

8th SESSION OF THE MEETING OF THE PARTIES

26 – 30 September 2022, Budapest, Hungary

DRAFT OVERVIEW OF KNOWLEDGE GAPS AND NEEDS RELEVANT FOR AEWA IMPLEMENTATION: PRIORITY NEEDS IN 2021

Introduction

Target 5.1 of the AEWA Strategic Plan 2019-2027 aims at identifying and assessing key gaps in scientific and technical information, including population monitoring data, required for implementation of the Agreement and completing or progressing initiatives to fill all priority gaps.

Action 5.1.(a) tasked the Technical Committee with identifying by the 8th Session of the Meeting of the Parties (MOP8) key gaps in information availability on relevant aspects of the implementation of the Agreement, establishing the potential role of AEWA in filling these, and recommending priorities accordingly.

Following this, by MOP9 it is expected to establish partnerships and initiate joint research programmes, with clear timeframes for delivery, to fill priority knowledge gaps by MOP10, where feasible.

The following assessment has been derived by work undertaken by the Technical Committee to:

- review systematically the AEWA Action Plan, the Strategic Plan 2019-2027 and the Plan of Action for Africa 2019-2027 to identify knowledge needs and gaps; and
- define priority gaps, and role AEWA could play in filling them and recommend processes to that end.

This draft overview approved for submission to MOP8 by the Technical and Standing Committees at their 16th meeting on the 25-29 January 2021 and 18th meeting on 28 July 2021, respectively.

Action Requested from the Meeting of the Parties

The Standing Committee is requested to review and adopt this draft document as an assessment of priority needs for information to underpin the implementation of the Agreement, including especially its Strategic Plan and Plan of Action for Africa.

**DRAFT OVERVIEW OF KNOWLEDGE GAPS AND NEEDS RELEVANT FOR AEWA
IMPLEMENTATION: PRIORITY NEEDS IN 2021**

Contents

Introduction.....	1
Summary.....	4
Introduction.....	5
1. Field of application.....	5
2. Species Conservation.....	6
2.1 Legal measures.....	6
2.1.1 Strict protection.....	6
2.1.2 Regulated taking and adaptive harvest management.....	6
2.1.3 Exemptions.....	7
2.2 Single Species Action Plans.....	8
2.2.1 International Single Species Action Plans.....	8
2.2.2 National action plans and look-alike species.....	8
2.3 Emergency Measures.....	9
2.4 Re-establishments.....	9
2.5 Introductions.....	10
3. Habitat Conservation.....	11
3.1 Habitat inventories.....	11
3.1.1 Habitat inventories.....	11
3.1.2 Site inventories.....	12
3.2 Conservation of areas.....	12
3.3 Rehabilitation and restoration.....	13
4. Management of Human Activities.....	14
4.1 Hunting.....	14
4.1.1 Sustainable use within hunting legislation and its reporting.....	14
4.1.3 Harmonised reporting of harvest data.....	14
4.2 Eco-tourism.....	15
4.3 Other Human Activities.....	15
4.3.1 Conflict situations.....	15
4.3.2 & 4.3.3 Crop damage and its mitigation.....	15
4.3.5 Impact of infrastructure.....	16
4.3.6 Disturbance to waterbirds.....	17
4.3.7 Impact of fisheries.....	17

4.3.10	Impact of threats from non-native terrestrial predators	18
4.3.11	Threats to waterbirds	19
4.3.12	Lead-fishing weights	20
5.	Research and Monitoring.....	20
5.1	Surveys.....	20
5.2	Monitoring	20
5.3	Population trends.....	21
5.4	Migration routes	22
5.5	Ecology and population dynamics	22
5.6	Effects of wetland loss and degradation	23
5.7	Impact of hunting and its socio-economic importance.....	23
6.	Other information needs	24
6.1	Waterbirds and their wetland habitats.....	24
7.	Priority gaps.....	24
8.	How AEWA could assist in filling priority gaps in knowledge	25
	Acknowledgements.....	25
	References.....	26

Summary

The implementation of the Agreement fundamentally depends on knowledge and implementation to ensure the effective delivery of conservation actions for species and populations under greatest threat.

Knowledge overall is best in Europe, given the long history of monitoring there, but nonetheless significant information also exists across much of Africa on which to base conservation actions.

This brief survey has identified a number of needs for better knowledge and information so implement the Agreement. In no priority order, these relate to:

Monitoring, trends and status assessment: Accurate assessment of the conservation status of populations depends on reliable monitoring data and improving this has long been an AEWA mission.

Marine conservation issues: A scoping survey of seabird conservation requirements, including knowledge needs was presented to MOP 6. These include survey needs at sea as the basis for the identification and establishment of marine protected areas; understanding and addressing bycatch of seabirds by marine fisheries; and prioritising the eradication of non-native mammalian predators on seabird breeding islands.

Protected areas: Whilst much data is held nationally on protected areas and the reasons for their establishment, their significance of these sites for AEWA-listed populations is poorly synthesised. Current work is seeking to address this and should be prioritised and supported by Parties.

Land-use and the potential for restoration: Away from protected areas, how land is used has major implications for many waterbird species. Recent international assessments have demonstrated the profoundly unsustainable approaches to land management. There is scope to address this through restoration, of direct benefit to waterbirds as well as typically resulting in carbon sequestration benefits also. Strategic guidance on wetland restoration in the context of AEWA and other stakeholders would be valuable.

Making more of existing data: Much ringing recovery and tracking data have been collated in past years. There is scope to undertake innovation multispecies analysis of such datasets to better understand what declining or increasing populations might have in common either in terms of ecological traits or range/route overlap that might help point to key geographic areas of importance for multiple waterbird species, or perhaps specific areas where threats might be having an impact on multiple populations.

More complete national reporting: The current national report format seeks to collate much data and information relevant to Agreement implementation, but reports are not submitted by all Parties¹ and many are incomplete. More complete reporting of existing information held nationally would materially assist the Agreement's international implementation.

AEWA has a particular role in establishing strategic priorities. This is undertaken through its Strategic Plan 2019-2027, reflected also in the current Plan of Action for Africa for the same period. Thus, the issues addressed in this review are already a subset of all potential waterbird conservation issues.

For many issues, work might most effectively, and cost-effectively, be aligned with that undertaken by other interested stakeholders including other international bodies and non-governmental organisations. Such collaborations have the scope to improve not only the technical depth of work but bring final products to the attention of wider audiences and should be encouraged.

¹ 53 national reports to MOP8 were submitted by the cut off date, a 67% response rate.

Introduction

Target 5.1 of the AEWA Strategic Plan 2019-2027 aims at identifying and assessing key gaps in scientific and technical information, including population monitoring data, required for implementation of the Agreement and completing or progressing initiatives to fill all priority gaps.

Action 5.1.(a) tasked the Technical Committee (TC) with identifying by MOP 8 key gaps in information availability on relevant aspects of the implementation of the Agreement, establishing the potential role of AEWA in filling these, and recommending priorities accordingly.

Following this, by MOP 9 it is expected to establish partnerships and initiate joint research programmes, with clear timeframes for delivery, to fill priority knowledge gaps by MOP 10, where feasible.

The following assessment has derived by work undertaken by the Technical Committee to:

- review systematically the AEWA Action Plan, Strategic Plan, Plan of Action for Africa 2019-2027, and National Reports to MOP8 (Doc. AEWA/MOP 8.13) to identify knowledge needs and gaps; and
- define priority gaps, and role AEWA could play in filling them and recommend processes to that end.

1. Field of application

Action Plan	1.1. The Action Plan is applicable to the populations of migratory waterbirds listed in Table 1 to this Annex.
--------------------	--

Definition of populations based on the best available knowledge on taxonomy, information on breeding, staging and wintering areas: population boundaries are documented on the [Critical Sites Network \(CSN\) Tool 2.0](#). Detailed description defining flyway populations are available for Anatidae (Rose & Scott 1996) and waders (Delany *et al.* 2009), and for some North Atlantic seabird species by Mitchell *et al.* 2001. Breeding distributions of all European waterbirds have been recently mapped by Keller *et al.* 2020.

Some populations boundaries have been revised by the Technical Committee (TC) based on new information, but this process has been *ad hoc* and a comprehensive review is pending until the publication of the CMS Eurasian-African Bird Migration Atlas synthesising ring recovery data from EURING.

BirdLife International review the global IUCN Red List status of waterbirds based on known significant changes. These status changes, together with population size and trend estimates, and information on other factors of vulnerability are used to review and update AEWA's *Conservation Status Review* every three years.

Future needs

- Given climate change driven distributional changes that have not only been predicted (Huntley *et al.* 2007; Johnston *et al.* 2103), but are now occurring for some waterbird species (Lehikoinen *et al.* 2013; Fox *et al.* 2016; Pavón-Jordán *et al.* 2015) there is thus a need to review contemporary data and information on the movements and population limits of Anatidae and waders as well as to better document flyway population of other waterbird species. This could be informed by the planned CMS Eurasian-African Bird Migration Atlas.

2. Species Conservation

2.1 Legal measures

2.1.1 Strict protection

Action Plan	2.1.1. Strict protection of populations listed in Column A of Table 1.
Strategic Plan	1.1. The legal measures required by the AEWA Action Plan are transposed into all Parties' domestic legislation and enforced effectively. 1.6. AEWA priorities relating to four causes of unnecessary additional mortality and other key threats to migratory waterbirds and their habitats are integrated in key multilateral processes. These causes of unnecessary additional mortality include illegal taking and killing.
Plan of Action for Africa	1.1.b). Align domestic law with AEWA requirements.

Information on which populations occur in the territories of each Party can be derived from the [Critical Sites Network \(CSN\) Tool 2.0](#) which is updated periodically based on changes proposed by the TC and adopted by the Meeting of Parties (MOP).

Information concerning legal protection of species/populations is not known for every Contracting Party due to incomplete national reporting.

Recent regional reviews of the illegal killing of all birds (Brochet *et al.* 2016, 2019a, b) demonstrate the very significant scale of this activity in Europe, the Mediterranean and the Middle East.

Future needs

- National reporting of which species are strictly protected by each Party,

2.1.2 Regulated taking and adaptive harvest management

Action Plan	2.1.2. Regulating the taking of birds and eggs of all populations listed Column B of Table 1 with the objective of maintaining or restoring populations to favourable conservation status on the basis of best knowledge of population dynamics. (a) prohibit the taking [...] during their various stages of reproduction and rearing and during their return to their breeding grounds if the taking has an unfavourable impact on the conservation status of the population.
Strategic Plan	2.4. Adaptive harvest management regimes are in place and being effectively implemented at flyway level in the framework of Species Action or Management Plans for all prioritised declining quarry populations and 'conflict' species.
Plan of Action for Africa	In consultation with Range States and partners develop at least one pilot adaptive harvest management plan for an identified priority waterbird population in Africa requiring adaptive harvest management at flyway level (if applicable)

Favourable conservation status at national and population level is not defined for the vast majority of populations listed in Column B (or Column A). It is being defined by establishing favourable reference values as part of new

action and management plans (so far only for Barnacle Goose *Branta leucopsis*, one population of Greylag Goose *Anser anser* and in development for Common Eider *Somateria mollissima*).

Population dynamics (as the basis on which to regulate hunting) are poorly known for most Column B listed populations, especially outside of Europe.

(a) Timing of reproduction and rearing and return migration has been established only for the EU Member States (and an update for EU28 will be published in 2021 using contemporary data), although general guidance relevant to other countries was adopted by MOP 5 ([Resolution 5.10](#)). The impact of taking in these periods on the conservation status has only been assessed scientifically for a very few populations.

Future needs

- Sustainable harvesting has two fundamental needs: i) information that allows assessment of the favourable conservation status of a population; and ii) reporting of harvest levels and their assessment in the context of relevant population dynamics. Both remain needs for nearly all AEWA-listed populations on Column B.
- Information on timing of reproduction and rearing and its relation to periods in which species may be taken is largely unknown outside Europe. However, timing of reproduction and rearing is also highly variable in Africa and many species occurring in tropical Africa do not have seasonal reproduction as in temperate regions.

2.1.3 Exemptions

Action Plan	<p>2.1.2b. Granting exemptions from the prohibitions laid down in paragraph 2.1.2 to accommodate use for livelihood purposes, where sustainable.</p> <p>2.1.3. Parties may grant exemptions to the prohibitions laid down in paragraphs 2.1.1 and 2.1.2, ... where there is no other satisfactory solution, for [defined purposes]. ... Such exemptions shall be precise as to content and limited in space and time and shall not operate to the detriment of the populations listed in Table 1. Parties shall, as soon as possible, inform the Agreement secretariat of any exemptions granted pursuant to this provision.</p>
--------------------	--

No mechanism has yet been established to routinely reported exceptions to the AEWA Secretariat. However, note that this information is, and has previously been, routinely reported for relevant AEWA species to the EU Commission by EU Member States, and to the Bern Convention Secretariat for its Parties and, for relevant species, and that information could and should be readily shared with the AEWA Secretariat for integration with reporting from other Parties.

Proposed changes to national reporting should help ensure sufficient detail is provided by Parties to assess whether exemptions have been correctly and justifiably used, but the information needs to be assessed and follow up conducted with Parties where there are gaps or questions.

There is no AEWA definition of 'livelihood purposes' in the context of para 2.1.2b of the Action Plan and this would be beneficial to avoid ambiguity in that context.

Future needs

- Establishment of routine reporting mechanism for exemptions to the Secretariat, liaising with the European Commission and Bern Convention Secretariat with respect data exchange thus avoiding duplicative reporting for Parties.
- Develop a definition of 'livelihood purposes' in the context of para 2.1.2b of the Action Plan.

2.2 Single Species Action Plans

2.2.1. International Single Species Action Plans

Action Plan	2.2.1. Development, harmonisation and implementation of international single species action plans.
Strategic Plan	1.2. All priority species/populations are covered by effectively implemented Species Action Plans at flyway level. 1.3. For all other populations in unfavourable conservation status, science-based conservation and management guidance is made available.
Plan of Action for Africa	Principal Range States as defined in the respective ISSAPs ² /IMSAPs ³ develop and adopt national SAPs based on ISSAPs/IMSAPs and secure resources for their implementation. Identify waterbird populations in Africa in unfavourable conservation status requiring conservation and management guidance, and their ranges. Prepare guidance for these waterbird populations with input of experts from Africa and elsewhere and disseminate to concerned Range States.

Action Plan development and implementation is coordinated by the Secretariat based on prioritization drawn up by the Technical Committee, and following a format approved by the MOP. Implementation is monitored through the AEWA International Species Working Groups and the national reports of Parties.

AEWA [Conservation Guidelines No. 1 - Guidelines on the Preparation of National Single Species Action Plans for Migratory Waterbirds](#) provides guidance updated in 2018 with a [revised plan format and enhanced guidelines](#).

Knowledge gaps important for any given action plan species are routinely identified in the relevant action plans and form part of the implementation process. Similarly, key knowledge gaps will be also identified as part of the future planned management guidances and conservation briefs.

The EU has its own action planning processes alongside that of AEWAs.

Future needs

- Better future co-ordination with equivalent action planning processes in the EU which apply also to the same Contracting Parties.

2.2.2 National action plans and look-alike species

Action Plan	2.2.2. Preparation of national single species action plans for the populations listed in Column A of Table 1; avoidance of accidental shooting of look-alike species.
--------------------	---

Information on national action plans generally is provided through the national reports to the MOPs. Twelve Parties (23% of Reporting Parties; 15% of all Contracting Parties) reported to MOP 8 that they have in place or are developing National Single Species Action Plans for 28 species that are not yet covered by an AEWA ISSAP.

² International Single Species Action Plans

³ International Multi-Species Action Plans

Geographically and taxonomically complete guidance on avoidance of accidental shooting of look-alike species is submitted to MOP 8 (Doc. AEWA/MOP 8.34) following guidance adopted at MOP 6 ([Guidance on measures in national legislation for different populations of the same species, particularly with respect to hunting and trade](#)).

Future needs

- Better reporting on the existence of national species action plans.

2.3 Emergency Measures

Action Plan	Parties shall, in close cooperation with each other whenever possible and relevant, develop and implement emergency measures for populations listed in Table 1, when exceptionally unfavourable or endangering conditions occur anywhere in the Agreement Area.
--------------------	---

Information on emergency situations that arise, and responses are provided through national reports to the MOPs, and 14 Parties (26% of Reporting Parties: 18% of all Contracting Parties) reported to MOP 8 that at least one emergency situation had occurred within the last triennium which threatened waterbirds.

A scoping review of threats to AEWA seabirds (Tarzia *et al.* 2015) summarised key knowledge gaps for seabirds, including the need to identify key coastal and marine areas where regional oil spill response plans should be developed.

AEWA [Conservation Guidelines No. 2 - Guidelines on identifying and tackling emergency situations for migratory waterbirds](#) provides guidance.

Successful emergency response planning benefits significantly from systematic review of response actions after any emergency thus progressively allowing adaptive learning from experience. For example, Stroud *et al.* (2006) document the benefits that have arisen from integration of review into the UK's system for suspending shooting in periods of severe cold weather.

Future needs

- Responses to emergencies are most effective when they have planned in advance. Although exact timings may be unknown, many emergencies are predictable. There are benefits of Parties, individually and collectively, planning for future emergencies.
- Whenever an emergency has occurred, a critical review of responses should always be undertaken, with lessons learned used to adapt future response planning.
- Develop a series of regional oil spill response plans specifically designed for seabird conservation- identifying the key coastal and at sea areas where response would be most urgently required.
- Commission a study identifying the main potential oil pollution hotspots in the Agreement Area and work with the Parties and other Range States in those areas

2.4 Re-establishments

Action Plan	Parties shall exercise the greatest care when re-establishing populations listed in Table 1 into parts of their traditional range where they no longer exist. They shall endeavour to develop and follow a detailed re-establishment plan based on appropriate scientific studies. Re-establishment plans should constitute an integral part of national and, where appropriate, international single species action plans. A re-establishment plan should include assessment of the impact on the environment and shall be made widely available. Parties shall inform the Agreement secretariat, in
--------------------	---

advance, of all re-establishment programme for populations listed in Table 1.

Parties are required to inform the Secretariat in advance, but there have been no such instances of this so far. Thirty-seven Parties (47% of all Contracting Parties) stated they do not have an existing or planned national register for re-establishment projects, although 11 have such a register.

It is currently not known which species have been lost from which countries historically, or which of these could reasonably be re-established (versus those whose ranges have changed because of climate envelopes).

AEWA [Conservation Guidelines No.13 - Guidelines for the Translocation of Waterbirds for Conservation Purposes: Complementing the IUCN Guidelines](#) provides guidance.

2.5 Introductions

Action Plan	2.5.3. Parties shall take measures to the extent feasible and appropriate, including taking, to ensure that when non-native species or hybrids thereof have already been introduced into their territory, those species or their hybrids do not pose a potential hazard to the populations listed in Table 1.
--------------------	---

A review of non-native waterbirds in the AEWA region was published in 2008 ([Banks et al. 2008](#)) and updated in 2015 ([UNEP-WCMC 2015](#)), with a succinct update prepared for release in 2021. The issue was addressed by [Resolution 6.4](#).

Apart from the genetic risk posed by Ruddy Duck *Oxyura jamacensis* to the White-headed Duck *O. leucocephala*, and predation and competition risks posed by the Sacred Ibis *Threskiornis aethiopicus*, the risks posed by other introduced taxa (e.g. Black Swan *Cygnus atratus*) are poorly understood.

EU's [Regulation 1143/2014 on invasive alien species](#) entered into force on 1 January 2015, and includes Egyptian Goose *Alopochen aegyptiacus*, Sacred Ibis and Ruddy Duck within its scope. The Regulation provides for prevention, early detection and eradication, and management. Considerable information is at https://ec.europa.eu/environment/nature/invasivealien/index_en.htm.

AEWA [Conservation Guidelines No. 10 - Guidelines on avoidance of introductions of non-native waterbird species](#) provides guidance.

Future needs

[Resolution 6.4](#):

- encouraged Parties to align species lists established under their regional or national frameworks for the prevention of the introduction and spread of invasive alien species so as to provide effective means of coordinated action within the AEWA area;
- encouraged Parties to align action plans to address priority pathways for the prevention of the introduction and spread of invasive alien species with the AEWA Action Plan, the AEWA International and National Single Species Action Plans and other relevant national, regional and international plans, as necessary;
- urged Parties to support research on risks posed by non-native waterbirds and further detailed analysis of the population status of the non-native waterbird species identified within the AEWA area, including the adverse impacts they have on AEWA native species and their habitats; and
- requested the Technical Committee to contribute to the development of internationally-agreed standards and guidance for risk assessment with respect to non-native waterbirds in order to facilitate the implementation of the Agreement and related legal instruments.

3. Habitat Conservation

3.1 Habitat inventories

3.1.1 Habitat inventories

Action Plan	3.1.1. Undertake and publish national inventories of the habitats which are important to the AEWA populations.
Strategic Plan	4.1. Priorities for habitat conservation and management in the wider environment are identified at Agreement level. 4.3. National habitat conservation and management priorities have been identified.
Plan of Action for Africa	<ul style="list-style-type: none"> i. Habitats in Africa study: Confirm habitat requirements of waterbirds and assess the status of waterbird habitats in Africa, including in mangroves and agricultural areas (particularly rice fields), in collaboration with others, such as UNEP-WCMC. ii. Develop a Habitats Conservation Action Plan, including priority actions for key habitats or groups of habitats in Africa and for collaboration with key partners (such as Ramsar and UNCCD) at the national and international levels. iii. Parties identify priority national actions within the AEWA Habitat Conservation Action Plan (see Activity 4.1.b) and establish national Habitat Implementation Plans to ensure and coordinate in-country implementation.

National wetland inventories are also encouraged by the Ramsar Convention, but only a few Parties have comprehensively mapped the extent of (wetland) habitats. National reports to Ramsar COP 13 from 72 relevant AEWA Parties⁴ indicate that at most only just over one-third (36%) of AEWA Parties reporting to Ramsar COP 13 have a complete national wetland inventory (*i.e.* at least 64% of Parties do not have a complete wetland inventory). A slightly higher percentage of European Parties (41%) than African (33%) and Asian (25%) have such an inventory⁵ (Davidson *et al.* in press; Davidson in litt.).

For the EU28, Maes *et al.* (2020) have recently mapped the extent of wetland and other ecosystems, whilst Tucker and & Evans (1997) gave a broad overview of habitats and conservation requirements, much of which remains highly relevant.

There is no equivalent detailed breakdown of habitat extent for Africa and Asia, although the mapping undertaken for recent IPBES assessments give considerable information based on remote sensing (with respect to biodiversity and ecosystem services - for Africa: IPBES 2018a; and for Europe and Asia: 2018b; and with respect to land degradation and restoration: IPBES 2018c), and other earth observation sources give considerable information on land-use.

⁴ Ethiopia and EU are not Ramsar Parties

⁵ Of these Parties, 32 (44%) reported a complete national wetland inventory - the same percentage as reported by Ramsar Parties globally. A higher percentage of European AEWA Parties (56%) reported having such an inventory than did African (36%) or Asian Parties (25%). However, from assessment of the additional information provided by some Parties to this indicator question, some of the “Yes” answers appear to be incorrect. Correcting for this, the number of Parties with a complete national wetland inventory is considerably lower: at most 26 Parties (36%), which includes 41% of European, 33% of African and 25% of Asian Parties. But even this could be an overestimation, since six Parties who reported “Yes” did not provide any additional information so their answers cannot be verified – so the percentage of AEWA Parties with complete national wetland inventory could be as low as 28%.

It is not known how many Parties have habitat action plans, but these are likely to be features of [National Biodiversity Strategies and Action Plans](#) developed under the auspices of the Convention of Biological Diversity.

Further to the Strategic Plan, a specification for a project has been produced by the TC to identify priority waterbird habitats and priority actions. It is anticipated that this will be undertaken jointly with other CMS instruments. Project development started in 2021.

Future needs:

- Completion and publication of national wetland inventories as a key element of developing inventories of habitats important to the AEWA populations;
- Fund and implement project to assess priority waterbird habitats and priority actions across the Agreement area, drawing on existing surveys and knowledge.

3.1.2 Site inventories

Action Plan	3.1.2. Identify all sites of international or national importance for the AEWA populations.
Strategic Plan	3.1. Known sites of national or international importance for populations listed in Table 1 of the AEWA Action Plan have been reviewed and confirmed.
Plan of Action for Africa	All Parties conduct a national site review building on existing inventories, and ensure they have active Technical Focal Points in place who are in a position to coordinate the review process.

Thirty Parties (57% of Reporting Parties; 38% of all Contracting Parties) confirmed that a network of sites had been fully identified within their country (Action 3.1(a) of the Strategic Plan 2019-2027), with a further 16 Parties reporting having partially done so (30% of RP; 20% of CP). This is significantly short of attaining Strategic Plan Target 3.1 which indicates that such networks should be identified for 75% of Parties.

IBA inventories were published by BirdLife International in the early 2000s for Europe, Africa, Middle East and the Central Asian Republics and also for West Siberia (although with no regular review process, these inventories are out of date for most countries). IBA information is available at <http://datazone.birdlife.org/site/search>. In the EU, Special Protection Areas under the Birds Directive have been classified for all EU Member States with information available at <https://natura2000.eea.europa.eu>. The [Critical Sites Network \(CSN\) Tool 2.0](#) has identified some 700 additional sites mainly in Africa.

A preliminary “Report on the Site Network for Waterbirds in the Agreement Area - 1st edition”, submitted to MOP 5 ([document AEWA/MOP 5.15](#)), was not revised and finalised due to lack of funding. However, under the AEWA Strategic Plan, a process of identification and reporting of nationally and internationally important sites by Parties started in 2020. This is planned to be completed by 2027.

Future needs:

- Completion of the current process to identify and report nationally and internationally important sites for migratory waterbirds, thus compiling a publicly available Agreement-wide inventory of nationally and internationally important sites recognised by Parties for populations listed in Table 1 of the AEWA’s Action Plan.

3.2 Conservation of areas

Strategic Plan	3.2. The status of, the threats to, and the effectiveness of conservation measures implemented at flyway network sites are being assessed at flyway scale.
-----------------------	--

Plan of Action for Africa	Collaborate with other initiatives, especially the Ramsar State of the World's Wetlands and their Services to People ⁶ and the BirdLife International IBA monitoring scheme, to coordinate data collection on the status of sites.
----------------------------------	---

This is being addressed by the AEWA Site Monitoring Framework work based on the TOR produced at TC15 and subsequently. The draft report was presented to TC 16 and the final version submitted to MOP 8 (Doc. AEWA/MOP 8.29).

Future needs:

- Assessment of the status of internationally important sites for migratory waterbirds in the Agreement area (per para 7.4c of the Action Plan which requires a site report to be produced for every second MOP although this has yet to occur).

3.3 Rehabilitation and restoration

Action Plan	3.3. Rehabilitation and restoration of areas which were important for AEWA populations.
--------------------	---

No such overview has yet been produced but this could be derived from comparison of the nominations submitted by Parties (see above) with other inventories of internationally important sites.

Recent global assessments related to land, its degradation and the potential for restoration are highly relevant to AEWA and have been undertaken by the UN Convention to Combat Desertification (UNCCD 2017) and IPBES (2018c). Additionally, activities under CBD also relevant, as is the UN initiative for a Decade of Restoration. It is likely that CBD COP15 will develop revised restoration targets possibly as part of the Post-2020 Global Biodiversity Framework. The EU will develop legally binding habitat and biodiversity restoration targets that are likely to include waterbird habitat as part of the [European Green Deal](#).

It is widely recognised that wetland restoration as a ‘nature-based solution’ to climate change has significant potential to sequester carbon, thus providing benefits not only to waterbirds, but also to people and in the context of climate change mitigation. However, restoration or other mitigation measures to sequester carbon should not be undertaken where these will negatively impact important habitats for waterbird and other biodiversity – for example planting trees on important waterbird breeding areas. Accordingly, there is urgent need for strategic guidance on restoration – not only how to do it (much technical guidance exists but its scattered⁷), but also how to set priorities and best targeting to appropriate areas.

Scoping of restoration for threatened species should be an element of individual species action plans.

Future needs:

- Development of a guide to technical guidance for wetland restoration techniques relevant to restoring the good ecological condition waterbird habitats.
- Development of guidance on undertaking strategic approaches to planning wetland restoration so as to maximise benefits and minimise risks of unintended negative consequences.
- Undertake a scoping study of the extent to which wetland restoration of areas which were important for AEWA populations could provide conservation benefits to threatened AEWA-listed species, as well as identify strategic priorities.

⁶ This was published as the [Global Wetland Outlook](#). There is no on-going process of data gathering by Ramsar, other than the update by Parties of Information Sheets for designated Ramsar Sites.

⁷ Some is given in AEWA's [Guidance on taking a systematic approach to responding to waterbird declines: a checklist of potential actions](#)

4. Management of Human Activities

4.1 Hunting

4.1.1 Sustainable use within hunting legislation and its reporting

Action Plan	4.1.1. Parties shall cooperate to ensure that their hunting legislation implements the principle of sustainable use as envisaged in this Action Plan, taking into account the full geographical range of the waterbird populations concerned and their life history characteristics. 4.1.2. The Agreement secretariat shall be kept informed by the Parties of their legislation relating to the hunting of populations listed in Table 1.
Strategic Plan	2.2. The provisions of the AEWA Action Plan that relate to the use and management of migratory waterbirds, including harvesting, are transposed into all Parties' domestic legislation and enforced effectively.
Plan of Action for Africa	Align domestic law with AEWA requirements, especially in relation to waterbird harvest.

Forty-four Parties (87% of Reporting Parties; 58% of all Contracting Parties) reported to MOP 8 that their legislation implements the principle of sustainable use of waterbirds, using elements such as closed seasons, quotas, and restrictions on hunting equipment, and also adaptive harvest management plans based on population monitoring.

Both the EU's [Guide to sustainable hunting under the Birds Directive](#) (European Commission 2008), as relevant, and AEWA's [Conservation Guidelines No. 5 - Guidelines on Sustainable Harvest of Migratory Waterbirds](#) provide comprehensive guidance.

Future needs:

- Complete reporting to Meetings of Parties of the elements of national hunting legislation is needed, allowing assessment of Parties legislation to assess whether the principle of sustainable use is implemented.

4.1.3 Harmonised reporting of harvest data

Action Plan	4.1.3. Reliable and harmonised system for the collection of harvest data in order to assess the annual harvest of populations listed in Table 1. Parties shall provide the Agreement secretariat with estimates of the annual take for each population, when available.
--------------------	---

This information has not been provided to the Secretariat so far even by those Parties who collate it. This amounts to a major knowledge gap. In the absence of this information the sustainability of current harvest cannot be assessed, and a precautionary approach should be taken.

Most recent reporting under Article 12 of the Birds Directive has collated this information for EU Member States although the quality and reliability of harvest statistics thus reported needs significant improvement with the development of common standards. The TC had developed prioritisation of AEWA populations for harvest data collection with proposals on reporting on harvest data by Contracting Parties, which was approved by the Standing Committee at its 16th meeting in May 2021 (Doc. AEWA/StC 16.23) and consequently circulated to the Parties for implementation.

Future needs:

- A process to collate and analyse harvest data at international scale should be established by AEWA as an essential step to enable sustainable hunting.

4.2 Eco-tourism

Action Plan	4.2.1. Parties shall encourage, where appropriate but not in the case of core zones of protected areas, the elaboration of cooperative programmes between all concerned to develop sensitive and appropriate eco-tourism at wetlands holding concentrations of populations listed in Table 1. 4.2.2. Parties, in cooperation with competent international organisations, shall endeavour to evaluate the costs, benefits and other consequences that can result from eco-tourism at selected wetlands with concentrations of populations listed in Table 1. They shall communicate the results of any such evaluations to the Agreement secretariat.
Strategic Plan	2.5. Waterbird related ecotourism is promoted in at least half of the Contracting Parties following the model/example of at least three ecotourism pilots focusing on migratory waterbirds that exemplify benefits to local communities as well as for the conservation status of AEWA.
Plan of Action for Africa	Share Africa ecotourism experiences.

The TC is undertaking a collation of case studies of ecotourism initiatives with proven benefits for both community livelihoods and conservation plus review of the organisation of the ecotourism industry and identification of possible strategic partners for involvement to be brought to MOP 9.

4.3 Other Human Activities

4.3.1 Conflict situations

Action Plan	4.3.1. Parties shall assess the impact of proposed projects which are likely to lead to conflicts between populations listed in Table 1 that are in the areas referred to in paragraph 3.2 and human interests, and shall make the results of the assessment publicly available.
--------------------	--

Best available information suggests that Strategic Environmental Assessment and/or Environmental Impact Assessments are not always undertaken when would be appropriate or, when undertaken, such assessments are not necessarily sufficient in their scope and depth.

AEWA [Conservation Guidelines No. 11 - Guidelines on how to avoid, minimise or mitigate impact of infrastructural developments and related disturbance affecting waterbirds](#) provides guidance.

4.3.2 & 4.3.3 Crop damage and its mitigation

Action Plan	4.3.2. Gather information on the damage, in particular to crops and to fisheries, caused by AEWA populations, and submit to the AEWA Secretariat. 4.3.3. Identify appropriate techniques to minimize damage, or to mitigate the effects of damage, in particular to crops and to fisheries, caused by AEWA populations.
--------------------	--

Most research investigation damage to agricultural crops has been historically focused on geese, although some waders such as Ruff *Philomachus pugnax* can significantly damage rice crops in West Africa. AEWA's [European Goose Management Platform](#) has established an [Agricultural Task Force](#) that aims to collate and make available information and national experiences on agricultural crop damage by geese and potential solutions. This will update the previous international reviews by van Roomen & Madsen (1992), Fox & Madsen (2017), and Fox & Abraham (2017).

The European Commission has supported activities on understanding damage caused by Cormorant *Phalacrocorax carbo*. The [EU Cormorant Platform](#) disseminates information about Cormorants, Cormorant numbers, management and solutions to conflicts related to cormorants, fish, fisheries and aquaculture, and is relevant beyond the EU.

AEWA [Conservation Guidelines No. 8 - Guidelines on reducing crop damage, damage to fisheries, bird strikes and other forms of conflict between waterbirds and human activities](#) provide guidance.

Future needs:

- Parties should continue to exchange national successful practice in conflict avoidance or reduction, and this should periodically be synthesised by AEWA, inter alia through update of the Conservation Guidelines.
- Both successful and unsuccessful responses to conflict situations involving waterbirds should be documented and published as a matter of routine.

4.3.5 Impact of infrastructure

Action Plan	4.3.5. Parties shall, as far as possible, promote high environmental standards in the planning and construction of structures to minimize their impact on populations listed in Table 1. They should consider steps to minimize the impact of structures already in existence where it becomes evident that they constitute a negative impact for the populations concerned.
Strategic Plan	<p>3.5. Legal or administrative measures are in place at national level—and being implemented effectively—to avoid, mitigate and compensate for adverse impacts of development activities and other pressures, including the impacts of climate change, on sites of national and international importance for migratory waterbirds in all Contracting Parties.</p> <p>1.6. AEWA priorities relating to four causes of unnecessary additional mortality and other key threats to migratory waterbirds and their habitats are integrated in key multilateral processes.</p> <p>These causes of unnecessary additional mortality include energy infrastructure (especially powerlines, wind turbines).</p>

CMS and AEWA have recognised the need to integrate the conservation of migratory species across the energy sector and have adopted a number of resolutions and guidelines to this end. The [CMS Energy Task Force](#) was established in 2015 in accordance with CMS [Resolution 11.27 Renewable Energy and Migratory Species](#) to support the implementation of these Resolutions and the use of relevant guidelines. It brings together governments, multilateral environmental agreements, investors, the private sector and non-governmental organizations with an aim of avoiding and minimising negative impacts of energy developments on migratory species.

AEWA [Conservation Guidelines No. 11 - Guidelines on how to avoid, minimize or mitigate impact of infrastructural developments and related disturbance affecting waterbirds](#) and [Conservation Guidelines No. 14 - Guidelines on how to avoid or mitigate impact of electricity power grids on migratory birds in the African-](#)

[Eurasian region](#) provide guidance, together with the [draft CMS/AEWA Guidelines for sustainable deployment of renewable energy technologies with respect to migratory species](#).

There is a major knowledge gap in relation to the proliferation of dams and planned dam developments (for reservoirs, hydropower, irrigation *etc.*) and the hydrological and other impacts these might have individually and cumulatively on waterbirds, their habitats, and specific waterbird sites. The EU has published [Guidance on the requirements for hydropower in relation to EU nature legislation](#), as well as on [Wind energy developments and Natura 2000](#).

[Resolution 6.12](#) summarises AEWA and CMS Resolutions and adopted guidance (to 2015) that address issues which cause unnecessary additional mortality for migratory waterbirds.

Future needs:

- Sensitivity mapping with respect to new energy infrastructure development and mapping of hazardous powerlines for retrofitting.

4.3.6 Disturbance to waterbirds

Action Plan	4.3.6. In cases where human disturbance threatens the conservation status of waterbird populations listed in Table1, Parties should endeavour to take measures to limit the level of threat. Special attention should be given to the problem of human disturbance at breeding colonies of colonially-nesting waterbirds, especially when they are situated in the areas which are popular for outdoor recreation. Appropriate measures might include, inter alia, the establishment of disturbance-free zones in protected areas where public access is not permitted.
--------------------	---

Much research has been published on the causes and consequences of disturbance to waterbirds. Fox & Madsen (1997) outlined principles of good practice refuge design.

AEWA formally defined disturbance in [Resolution 6.7](#) and adopted guidance on its application. Simple, largely visual guidance for wetland managers on avoiding and minimising disturbance is submitted to MOP 8 for adoption (Doc. AEWA/MOP 8.32).

4.3.7 Impact of fisheries

Action Plan	<p>4.3.7. Parties are urged to take appropriate actions nationally or through the framework of Regional Fisheries Management Organisations (RFMOs) and relevant international organisations to minimise the impact of fisheries on migratory waterbirds, and where possible cooperate within these forums, in order to decrease the mortality in areas within and beyond national jurisdiction; appropriate measures shall especially address incidental killing and bycatch in fishing gear including the use of gill nets, longlines and trawling.</p> <p>4.3.8. Parties are also urged to take appropriate actions nationally or through the framework of Regional Fisheries Management Organisations (RFMOs) and relevant international organisations to minimise the impact of fisheries on migratory waterbirds resulting in particular from unsustainable fishing that causes depletion of food resources for migratory waterbirds.</p>
--------------------	--

Strategic Plan	<p>1.6. AEWA priorities relating to four causes of unnecessary additional mortality and other key threats to migratory waterbirds and their habitats are integrated in key multilateral processes.</p> <p>These causes of unnecessary additional mortality include fisheries bycatch.</p>
-----------------------	---

[Resolution 6.9](#) outlined priorities for seabird conservation in particular needs to eliminate mortality from fished and drew on a review of marine fisheries impacts on AEWA seabirds (Hagen & Wanless 2014), whilst a scoping review of threats to AEWA seabirds (Tarzia *et al.* 2015) summarised key knowledge gaps for seabirds. Those relevant to fisheries are given below.

Future needs:

- Understand the extent and scale of seabird bycatch in gillnets, including the collection of data on gillnet fishing effort.
- Collect seabird bycatch records from national governments, through AEWA’s national report and through promotion of existing regional MEAs (*e.g.* Regional Fisheries Management Organisations).
- Develop regional guidance for sustainable use of species which are particularly affected by bycatch and are also exploited by humans (*e.g.* harvesting).

4.3.10 Impact of threats from non-native terrestrial predators

Action Plan	<p>4.3.10. Parties shall establish appropriate measures, ideally to eliminate or otherwise to mitigate the threat from non-native terrestrial predators to breeding migratory waterbirds on islands and islets. Measures should refer to contingency planning to prevent invasion, emergency responses to remove introduced predators, and restoration programmes for islands where predator populations are already established.</p>
Strategic Plan	<p>1.6. AEWA priorities relating to four causes of unnecessary additional mortality and other key threats to migratory waterbirds and their habitats are integrated in key multilateral processes.</p> <p>These causes of unnecessary additional mortality include invasive alien species.</p>

Threat from non-native terrestrial predators to breeding birds is relatively well studied and understood in islands and archipelago areas. Comprehensive studies about the threat at inland and coastal wetlands and at landscape scale are more difficult to organize and so scientific evidence is limited. Based on field observations and existing studies the threat is likely severe in areas of established non-native terrestrial predator populations.

A large-scale impact study is needed to further understand the level of threat in continental areas and to develop effective management strategies. In continental Europe, species of concern include Raccoon Dog *Nyctereutes procyonoides*, Raccoon *Procyon lotor* and American Mink *Neovison vison*.

Working models for elimination and mitigation of terrestrial predators are currently being developed in various countries, and the Agreement on the Conservation of Albatrosses and Petrels has published [Guidelines for eradication of introduced mammals from breeding sites of ACAP-listed seabirds](#) which are equally relevant in an AEWA context. Guidelines summarising working models of effective management of non-native terrestrial predators would be useful. Good examples are found, for example, in New Zealand, UK, Finland and Sweden⁸.

⁸ Examples from these countries and elsewhere are given in AEWA’s [Guidance on taking a systematic approach to responding to waterbird declines: a checklist of potential actions](#)

Strategic approaches for the elimination of introduced mammalian predators on offshore islands is encouraged (Brooke *et al.* 2007; Capizza *et al.* 2010; Dawson *et al.* 2014) and these are necessary given the scale of issues to be addressed.

A scoping review of threats to AEWAs seabirds (Tarzia *et al.* 2015) summarised key knowledge gaps for seabirds. Those relevant to invasive predators are to:

- develop an understanding of the extent of impact (and most vulnerable sites) for invasive predators on AEWAs seabirds and the cumulative impact on a species across its breeding range; and
- regionally prioritise seabird breeding islands where eradication of rats and other introduced predators can be effective and share knowledge on techniques and best practice.

Future needs:

- Better information on the presence of non-native predators on offshore seabird islands is a precondition to establishing strategic approaches for their elimination. AEWAs could assist in developing such an approach with Parties and other stakeholder organisations.

4.3.11 Threats to waterbirds

Action Plan	4.3.11. Parties are urged to establish appropriate measures to tackle threats to migratory waterbirds from aquaculture, including environmental assessment for developments that threaten wetlands of importance for waterbirds, especially when dealing with new or enlargement of existing installations, and involving issues such as pollution (<i>e.g.</i> from residues of pharmaceutical treatments used in aquaculture or eutrophication), habitat loss, entanglement risks, and introduction of non-native and potentially invasive species.
Strategic Plan	1.6. AEWAs priorities relating to four causes of unnecessary additional mortality and other key threats to migratory waterbirds and their habitats are integrated in key multilateral processes. These causes of unnecessary additional mortality include energy infrastructure (especially powerlines, wind turbines); illegal taking and killing; fisheries bycatch; and invasive alien species.

[Resolution 6.12](#) summarises AEWAs and CMS Resolutions and adopted guidance (to 2015) that address issues which cause unnecessary additional mortality for migratory waterbirds. It demonstrated that considerable guidance already exists to address these threats.

For the European Union, most recent reporting under Article 12 of the Birds Directive included the needs to assess current Pressures as well as future Threats on relevant birds – which include many AEWAs-listed species. Monitoring of threats and pressures is not yet established outside the EU but a proposed way forward is explored in the monitoring priorities report submitted to MOP 8 (Doc. AEWAs/MOP 8.27).

For threatened species, BirdLife International has produced threat assessments (available via the species information pages on BirdLife International’s world bird database <http://datazone.birdlife.org/species/search>) and for some additional ones under the Wings Over Wetlands project.

The systematic review of threats is part of the AEWAs action planning and management guidance processes.

Future needs:

- The establishment of a simple threat assessment process, compatible with existing international processes, would improve information on priority pressures and threats.

4.3.12 Lead-fishing weights

Action Plan	4.3.12. Parties, the Agreement secretariat and the Technical Committee will as appropriate work together to provide further documentation on the nature and scale of the effects of lead fishing weights on waterbirds and to consider that documentation, noting that lead in general poses a threat to the environment with harmful effects on waterbirds. Parties will, as appropriate, seek alternatives to lead fishing weights, taking into consideration the impact on waterbirds and water quality.
--------------------	---

A review of the effects of lead fishing weights on waterbirds and wetlands was presented to MOP 5 ([Doc: AEWA/MOP Inf. 5.2](#)). It concluded that ingestion of a single fishing weight can lead to acute lead poisoning and documented that 14 species of waterbirds listed by AEWA have been shown to be affected by lead poisoning through lead fishing weights.

The EU's chemicals Regulation REACH, which aims to improve the protection of human health and the environment from the risks that can be posed by chemicals, is currently (2021) assessing the threats from the use of lead fishing weights, including to waterbirds.

[Resolution 6.12](#) summarises AEWA and CMS Resolutions and adopted guidance (to 2015) that address issues which cause unnecessary additional mortality for migratory waterbirds including lead fishing weights.

Future needs:

- Parties should continue to report instances of lead poisoning in their national reports.

5. Research and Monitoring

5.1 Surveys

Action Plan	5.1. Parties shall endeavour to carry out survey work in poorly known areas, which may hold important concentrations of the populations listed in Table 1. The results of such surveys shall be disseminated widely.
--------------------	--

Gaps in survey information have been identified by the Wings Over Wetlands project. Some gap filling surveys (e.g. Egypt, Sudan, South Sudan, Chad, Saudi Arabia, Oman, Tanzania) have taken place, but a lot remains (Somalia, Mozambique, Zambia, Angola, Eritrea).

Analysis of tracking data can tell us about potentially important locations / routes for migratory waterbirds for later targeting by gap filling surveys.

Future needs:

- Analysis of tracking data to identify possible areas of importance that are not currently known.
- Targeted surveys for areas without previous waterbird survey coverage.

5.2 Monitoring

Action Plan	5.2. Monitor the AEWA populations to review their status and trends. The results of such monitoring shall be published or sent to
--------------------	---

	appropriate international organizations, to enable reviews of population status and trends.
Strategic Plan	1.4. The quality of waterbird population status assessments, including information on drivers of population trends, is improved so that at least two-thirds of all AEWA populations are being assessed on the basis of the most complete and up-to-date monitoring information available.
Plan of Action for Africa	<p>Parties define and update national waterbird monitoring schemes and align scope to site management and national and international priorities.</p> <p>Parties work together to improve coordinated sub-regional, transboundary and flyway level monitoring, and collaborate with relevant initiatives (e.g. Wadden Sea Flyway Initiative), programmes and projects (e.g. BirdLife International Marine Programme and the Second Southern African Bird Atlas Project).</p> <p>Parties establish mechanisms to collect relevant comparable data, in collaboration with existing schemes (e.g. International Waterbird Census and IBA monitoring).</p> <p>Parties incorporate monitoring drivers of waterbird population trends into their national biodiversity monitoring programmes.</p>

Waterbird monitoring at international scales in the AEWA Agreement area is undertaken through the [African-Eurasian Waterbird Monitoring Partnership](#), established in 2011. A Strategic Working Group includes Partner organisations with a long-term strategic interest in the development of waterbird monitoring at regional, subregional or flyway scale.

AEWA monitoring guidance was adopted by MOP7 ([Resolution 7.7 Strengthening the monitoring of migratory waterbirds](#)), with a [Report on the development of waterbird monitoring along the African-Eurasian flyways](#). Monitoring priorities have been assessed and are brought to MOP 8 (Doc. AEWA/MOP 8.27).

The 8th *Conservation Status Review* (CSR) (Nagy & Langendoen 2021) found that for all AEWA populations, 69% of population estimates and 71% of trend estimates were based on monitoring. Outside the EU, 12 African and two Asian countries report on population status. However, population trend estimates for one in five of AEWA populations are still based on qualitative information. Population trend estimates are less based on monitoring data in Africa and Asia than in Europe.

Future needs:

- Enhanced monitoring is needed especially in areas with poor existing information on waterbird species status or where trend assessments are based largely on qualitative information.

5.3 Population trends

Action Plan	5.3. Parties shall cooperate to improve the measurement of bird population trends as a criterion for describing the status of such populations.
Strategic Plan	1.5. Decision-making for national and flyway-level conservation and management of waterbird populations is based on the best available monitoring data.
Plan of Action for Africa	<p>Produce guidelines for African Parties about the different uses of monitoring data for implementing AEWA.</p> <p>National Focal Points/Technical Focal Points [NFPs/TFPs] retrieve national data analyses from national waterbird monitoring</p>

	<p>coordinators after each CSR and develop recommendations based on IWC and other monitoring data for improving national AEWA implementation for dissemination to decision-makers and other partners.</p> <p>TFPs coordinate analysis of national waterbird data and the preparation and dissemination of an annual report with conclusions and promote recommendations for action.</p>
--	---

National reports to MOP 8 require reporting on population status and this will next be needed for MOP 10.

Future needs:

- With ever changing environmental conditions, the need to enhance the quality of monitoring and trend assessment of AEWA-listed species will become more important to provide a basis for conservation actions.

5.4 Migration routes

Action Plan	5.4. Parties shall cooperate with a view to determining the migration routes of all populations listed in Table 1, using available knowledge of breeding and non-breeding season distributions and census results, and by participating in coordinated ringing programmes.
--------------------	--

National migration atlases have been published in 13 European countries and in South Africa. AEWA and the EU currently supported The African Bird Ringing Scheme – AFRING.

The [CMS Eurasian-African Bird Migration Atlas project](#) is reviewing existing ringing and tracking data for all AEWA-listed species and which will be published on-line in early 2022.

The outputs from these projects need to inform a review of biogeographic population boundaries (see above). It would be valuable to carry out multispecies analysis including to better understand what declining or increasing populations might have in common either in terms of ecological traits or range/route overlap that might help point to key geographic areas of importance for multiple waterbird species or perhaps specific areas where threats might be having an impact on multiple populations.

Intra-African waterbird migration systems remain poorly known (Dodman & Diagana 2006).

Future needs:

- Multispecies synthesis of information on migration routes to identify key areas used and/or where threats may be influencing populations.

5.5 Ecology and population dynamics

Action Plan	5.5. Parties shall endeavour to initiate and support joint research projects into the ecology and population dynamics of populations listed in Table 1 and their habitats, in order to determine their specific requirements as well as the techniques which are the most appropriate for their conservation and management.
--------------------	--

The review of ecology and population dynamic data and the status of the habitat of the species is part of the AEWA action and management planning processes. At a broad scale, much information was collected for AEWA species under the Wings Over Wetlands project and is available via the species information pages on BirdLife International's [world bird database](#) as well as published in ornithological guides such as *Birds of the Western*

Paelearctic and the *Handbook of the Birds of the World* (which is continually updated on the subscription-based *Birds of the World* portal).

5.6 Effects of wetland loss and degradation

Action Plan	5.6. Effects of wetland loss and degradation and disturbance on the carrying capacity of wetlands used by the AEWAs populations and on their migration patterns.
--------------------	--

The significance of habitat loss for waterbirds has been the object of research since the 1970s, especially in the context of habitat destruction of inter-tidal mudflats (*e.g.* Evans *et al.* 1979; Burton *et al.* 2002). Significant loss of inter-tidal habitats as a consequence of rising sea-levels has predicted serious negative consequences for waterbirds (Galbraith *et al.* 2002; Murray *et al.* 2019). IPBES (2018c) have reviewed the extent of land degradation which amounts to habitat loss for waterbirds in many situations. <https://global-surface-water.appspot.com/> provides assessments of surface waters.

Wetlands International's [Climate Resilience Flyway project](#) carried out a systematic analysis of the impact of predicted changes in wetlands.

Further work is needed on the specific impacts of existing and planned dams on waterbirds and their wetland habitats.

www.conservationevidence.com makes available information on the success or otherwise of mitigation measures often undertaken in response to wetland habitat loss.

Future needs:

- Collate systematically data and information on habitat losses across the Agreement area⁹, but this could only be realistically undertaken by remote sensing.

5.7 Impact of hunting and its socio-economic importance

Action Plan	5.7. Parties shall endeavour to undertake studies on the impact of hunting and trade on the populations listed in Table 1 and on the importance of these forms of utilization to the local and national economy. (Also linked to Strategic Plan actions 4.1.1 and 4.1.3).
Strategic Plan	2.1. Harvest levels are monitored and readily available at flyway level to support sustainable harvest of all prioritised quarry species.
Plan of Action for Africa	Develop simple guidelines to direct and harmonize estimating and collecting of harvest data at the national level and make available to Parties. Develop sampling protocols for waterbird harvest levels in selected major wetlands in Africa, in collaboration with existing or new networks, programmes or projects, <i>e.g.</i> the RESSOURCE project ¹⁰ . Parties conduct inventories of waterbird harvest at markets, production and supply chains and recreational hunting agencies.

A number of national studies have been undertaken in some European countries (*e.g.* Aebischer 2019) but there is no wider or comprehensive review at the scale of the Agreement areas. Most EU Member States reported harvest levels for species listed on Annex II of the Birds Directive for the first time for the period of 2012 – 2018. Some species level estimates exist also for Russia.

⁹ This has already been undertaken for inter-tidal flats by Murray *et al.* 2019

¹⁰ <http://www.fao.org/3/ca8998en/CA8998EN.pdf>

FAO's RESSOURCE project has started to address the issue in Africa. In five countries in the Sahel and the Nile Valley (Senegal, Mali, Chad, Sudan and Egypt), and in collaboration with the national authorities and local communities, it aims to:

- preserve the ecosystems of major Sahelian wetlands;
- improve knowledge on waterbird populations and on harvesting by hunting;
- develop innovative solutions for the sustainable management and exploitation of wetlands and waterbird populations.

Overall, much more complete and reliable data on harvest levels (see section 4.1.1 above) needed in order to understand scale of cumulative harvest throughout the flyway and demonstrate sustainability. Similarly, more complete and reliable data on derogations are needed along with adequate justification of scale of take and efforts to apply alternative solutions to problems.

Future needs:

- There is a need to better understand the socio-economic implications of different modes of hunting and the significance of this activity to the local and national economies. The Technical Committee commenced work on this issue in 2021.
- Research on assessing the contributions of recreational hunting areas to waterbird conservation objectives, and the quality of management and its impact on conservation in these areas

6. Other information needs

6.1 Waterbirds and their wetland habitats

Strategic Plan	2.6. Consideration of the ecosystem services derived from migratory waterbirds is integrated into policy and decision-making processes that affect waterbird habitats in at least two-thirds of AEWAs Parties.
-----------------------	--

The ecosystem services that derive from waterbirds alone are just elements of the ecosystem services and values (whether of economic significance or not) arising from the wise use of their wetland habitats more generally. Waterbird ecosystem services should never be considered (or assessed) in isolation, but rather as an integral component of this wider array of wetland benefits. Indeed, the ecosystem service benefits to society that come from waterbirds, including the continued existence of the birds themselves, are direct outcomes of the wise use of their wetland habitats.

Initial guidance on waterbird and their wetland habitats as providers of ecosystem services has been prepared by the TC and is submitted to MOP 8 (Doc. AEWAs/MOP 8.33).

Future needs:

The Strategic Plan indicates that Parties will:

- by MOP 9, implement national pilot projects and/or collate and make available examples/case studies of decision-making which takes into consideration waterbird values and their habitats; and
- by MOP 10 produce AEWAs guidelines on valuation of ecosystem services derived from migratory waterbirds and their habitats and communicate to relevant stakeholders at all levels.

7. Priority gaps

The implementation of the Agreement fundamentally depends on knowledge and implementation to ensure the effective delivery of conservation actions for species and populations under greatest threat.

Knowledge overall is best in Europe, given the long history of monitoring there, but nonetheless significant information also exists across much of Africa on which to base conservation actions (*e.g.* Davidson & Stroud 2006; Zwarts *et al.* 2009).

This brief survey has identified a number of needs for better knowledge and information so implement the Agreement. In no priority sequence, these relate to:

Monitoring, trends and status assessment: Accurate assessment of the conservation status of populations depends on reliable monitoring data. This issue has been repeatedly addressed by Meetings of Parties with the adoption of multiple relevant decisions and guidance.

Marine conservation issues: A scoping survey of seabird conservation requirements, including knowledge needs was presented to MOP 6 (Tarzia *et al.* 2015). These include survey needs at sea as the basis for the identification and establishment of marine protected areas; understanding and addressing bycatch of seabirds by marine fisheries; and prioritising the eradication of non-native mammalian predators on seabird breeding islands.

Protected areas: Whilst much data is held nationally on protected areas and the reasons for their establishment, their significance for AEWA-listed populations is poorly synthesised. Current work is seeking to address this and should be prioritised.

Land-use and the potential for restoration: Away from protected areas, how land is used has major implications for many waterbird species. Recent international assessments (*e.g.* UNCCD 2017; IPBES 2018c) have demonstrated the profoundly unsustainable approaches to land management. There is scope to address this through restoration, of direct benefit to waterbirds as well as typically resulting in carbon sequestration benefits also. Strategic guidance on wetland restoration in the context of AEWA and other stakeholders would be valuable.

Making more of existing data: Much ringing recovery and tracking data have been collated in past years. There is scope to undertake innovation multispecies analysis of such datasets to better understand what declining or increasing populations might have in common either in terms of ecological traits or range/route overlap that might help point to key geographic areas of importance for multiple waterbird species, or perhaps specific areas where threats might be having an impact on multiple populations.

More complete national reporting: The current national report format seeks to collate much data and information relevant to Agreement implementation, but reports are not submitted by all Parties¹¹ and many are incomplete. More complete reporting of existing information held nationally would materially assist the Agreement's international implementation.

8. How AEWA could assist in filling priority gaps in knowledge

AEWA has a particular role in establishing strategic priorities. This is undertaken through its Strategic Plan 2019-2027, reflected also in the current Plan of Action for Africa for the same period. Thus, the issues addressed in this review are already a subset of all potential waterbird conservation issues.

For many issues work might most effectively, and cost-effectively, be aligned with that undertaken by other interested stakeholders including other international bodies and non-governmental organisations. Such collaborations have the scope to improve not only the technical depth of work but bring final products to the attention of wider audiences.

Acknowledgements

Thanks to Mikko Alhainen, Nicola Crockford, Nick Davidson, Cy Griffin, Vicky Jones, Nina Mikander, Jaime Garcia Moreno for their inputs and insights.

¹¹ 53 national reports to MOP 8 were submitted by the cut off date, a 67% response rate

References

- Aebischer, N.J. 2019.** Fifty-year trends in UK hunting bags of birds and mammals, and calibrated estimation of national bag size, using GWCT's National Gamebag Census. *European Journal of Wildlife Research* 65(4). 10.1007/s10344-019-1299-x
- Banks, A.N., Wright, L.J., Maclean, I.M.D., Hann, C. & Rehfisch, M.M. 2008.** *Review of the status of introduced non-native waterbird species in the area of the African-Eurasian Waterbird Agreement: 2007 update.* BTO Research Report No. 489. 149 pp.
- Brochet, A.-L., Bossche, W. van den, Jbour, S., Ndong'ang'a, P.K., Jones, V.R., Abdou, W.A.L.I., Al-Hmoud, A.R., Asswad, N.G., Atienza, J.C., Atrash, I., Barbara, N., Bensusan, K., Bino, T., Celada, C., Cherkaoui, S.I., Costa, J., Deceuninck, B., Etayeb, K.S., Feltrup-Azafzaf, C., Figelj, J., Gustin, M., Kmecl, P., Kocevski, V., Korbeti, M., Kotrošan, D., Mula Laguna, J., Lattuada, M., Leitão, D., Lopes, P., López-Jiménez, N., Lucić, V., Micol, T., Moali, A., Perlman, Y., Piludu, N., Portolou, D., Putilin, K., Quaintenne, G., Ramadan-Jaradi, G., Ružić, M., Sandor, A., Sarajlic, N., Saveljić, D., Sheldon, R.D., Shialis, T., Tsiopelas, N., Vargas, F., Thompson, C., Brunner, A., Grimmett, R. & Butchart, S.H.M. 2016.** Preliminary assessment of the scope and scale of illegal killing and taking of birds in the Mediterranean. *Bird Conservation International* 26: 1–28.
- Brochet, A.-L., Bossche, W van den, Jones, V.R., Arnardottir, H., Damoc, D., Demko, M., Driessens, G., Flensted, K., Gerber, M., Ghasabyan, M., Gradinarov, D., Hansen, J., Horvath, M., Karlonas, M., Krogulec, J., Kuzmenko, T., Lachman, L., Lehtiniemi, T., Lorgé, P., Lötberg, U., Lusby, J., Ottens, G., Paquet, J.Y., Rukhaia, A., Schmidt, M., Shimmings, P., Stipniek, A., Sultanov, E., Vermouzek, Z., Vintchevski, A., Volke, V., Willi, G. & Butchart, S.H.M. 2019a.** Illegal killing and taking of birds in Europe outside the Mediterranean: assessing the scope and scale of a complex issue. *Bird Conservation International* 29: 10–40.
- Brochet, A.-L., Jbour, S., Sheldon, R.D., Porter, R., Jones, V.R., Al-fazari, W., al saghier, O., al Khuzai, S., al-obeidi, L., Angwin, A., Ararat, K., Pope, M., Shobrak, M., Willson, M., Sadeghi zadegan, S. & Butchart, S. 2019b.** Preliminary assessment of the scope and scale of illegal killing and taking of wild birds in the Arabian Peninsula, Iran and Iraq. *Sandgrouse* 41: 154-195.
- Brooke, M.D., Hilton, G.M. & Martins, T.L.F. 2007.** Prioritizing the world's islands for vertebrate-eradication programmes. *Animal Conservation* 10: 380–390.
- Burton, N.H.K., Rehfisch, M.M. & Clark, N.A. 2002.** Impacts of disturbance from construction work on the densities and feeding behavior of waterbirds using the intertidal mudflats of Cardiff Bay, UK. *Environmental Management* 30: 865–871.
- Capizzi, D., Baccetti, N. & Sposimo, P. 2010.** Prioritizing rat eradication on islands by cost and effectiveness to protect nesting seabirds. *Biological Conservation* 143: 1716– 1727.
- Davidson, N.C. & Stroud, D.A. 2006.** African-Western Eurasian Flyways: current knowledge, population status and future challenges. Pp. 63-73. In: *Waterbirds around the world.* Eds. G.C. Boere, C.A. Galbraith & D.A. Stroud. The Stationery Office, Edinburgh, UK.
- Dawson, J., Opper, S., Cuthbert, R.J., Holmes, N.D., Bird, J.P., Butchart, S.H.M., Spatz, D.R. & Tershy, B.R. 2014.** Prioritizing islands for the eradication of invasive vertebrates in the United Kingdom overseas territories. *Conservation Biology* 29: 143–153.
- Delany, S., Scott, D.A., Dodman, T. & Stroud, D.A. (eds.) 2009.** *An atlas of wader populations in Africa and western Eurasia.* Wetlands International, Wageningen, The Netherlands. 524 pp.
- Dodman, T. & Diagona, C.H. 2006.** Conservation dilemmas for intra-African migratory waterbirds. Pp. 218-223. In: *Waterbirds around the world.* Eds. G.C. Boere, C.A. Galbraith & D.A. Stroud. The Stationery Office, Edinburgh, UK.
- European Commission 2008.** *Guidance document on hunting under Council Directive 79/409/EEC on the conservation of wild birds "The Birds Directive".* European Commission, Brussels. 106 pp.
- Evans, P. R., Herdson, N.M., Knights, P.J. & Pienkowski, M.W. 1979.** Short-term effects of reclamation of part of seal sands, Teesmouth, England, U.K. on wintering waders and shelduck. 1. Shorebird diets, invertebrate densities and the impact of predation on the invertebrates. *Oecologia* 41: 183–206.

- Fox, A.D. & Abraham, K.F. 2017.** Why geese benefit from the transition from natural vegetation to agriculture. *Ambio* 46(Suppl. 2): S188–S197.
- Fox, A.D. & Madsen, J. 1997.** Behavioural and distributional effects of hunting disturbance on waterbirds in Europe: implications for refuge design. *Journal of Applied Ecology* 34: 1-13.
- Fox, A.D. & Madsen, J. 2017.** Threatened species to superabundance: the unexpected international implications of successful goose conservation. *Ambio* 46(Suppl. 2): S179–S187.
- Fox, A.D., Dalby, L., Christensen, T.K., Nagy, S., Balsby, T.J.S., Crowe, O., Clausen, P., Deceuninck, B., Devos, K., Holt, C.A., Hornman, M., Keller, V., Langendoen, T., Lehtikoinen, A., Lorentsen, S.-H., Malina, B., Nilsson, L., Stipnice, A. Svenning, J.-C. & Wahl, J. 2016.** [Seeking explanations for recent changes in abundance of wintering Eurasian Wigeon *Anas penelope* in northwest Europe.](#) *Ornis Fennica* 93: 12–25.
- Galbraith, H., Jones, R., Park, R., Clough, J., Herod-Julius, S., Harrington, B. & Page, G. 2002.** Global climate change and sea level rise: potential losses of intertidal habitat for shorebirds. *Waterbirds* 25: 173–183.
- Hagen, C. & Wanless, R.M. 2014.** [Potential impacts of marine fisheries on migratory seabirds within the Afrotropical region.](#) 48 pp. Unpublished report to the African-Eurasian Waterbird Agreement. Doc: AEW/MOP 6.39.
- Huntley, B., Green, R.E., Collingham, Y.C. & Willis, S.G. 2007.** *A climatic atlas of European breeding birds.* Durham University, RSPB and Lynx Edicions, Barcelona. 521 pp.
- IPBES 2018a.** *Summary for policymakers of the regional assessment report on biodiversity and ecosystem services for Africa of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.* Archer, E., Dziba, L.E., Mulongoy, K.J., Maoela, M.A., Walters, M., Biggs, R., Cormier-Salem, M.-C., DeClerck, F., Diaw, M.C., Dunham, A.E., Failler, P., Gordon, C., Harhash, K.A., Kasisi, R., Kizito, F., Nyingi, W.D., Oguge, N., Osman-Elasha, B., Stringer, L.C., Tito de Morais, L., Assogbadjo, A., Egoh, B.N., Halmy, M.W., Heubach, K., Mensah, A., Pereira, L. & Sitas, N. (eds.). IPBES Secretariat, Bonn, Germany. 49 pp.
- IPBES 2018b.** *Summary for policymakers of the regional assessment report on biodiversity and ecosystem services for Europe and Central Asia of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.* Fischer, M., Rounsevell, M., Torre-Marín Rando, A., Mader, A., Church, A., Elbakidze, M., Elias, V., Hahn, T., Harrison, P.A., Hauck, J., Martín-López, B., Ring, I., Sandström, C., Sousa Pinto, I., Visconti, P., Zimmermann, N.E. & Christie, M. (eds.). IPBES Secretariat, Bonn, Germany. 48 pp.
- IPBES 2018c.** *The IPBES assessment report on land degradation and restoration.* Montanarella, L., Scholes, R. & Brainich, A. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 744 pp.
- Johnston, A., Ausden, M., Dodd, A.M., Bradbury, R.B., Chamberlain, D.E., Jiguet, F., Thomas, C.D., Cook, A.S.C.P., Newson, S.E., Ockendon, N., Rehfisch, M.M., Roos, S., Thaxter, C., Brown, A., Crick, H.Q.P., Douse, A., McCall, R.A., Pontier, H., Stroud, D.A., Cadiou, B., Crowe, O., Deceuninck, B., Hornman, M. & Pearce-Higgins, J.W. 2013.** Observed and predicted effects of climate change on species abundance in protected areas. *Nature Climate Change* 3: 1055-1061. doi:10.1038/nclimate2035
- Keller, V., Herrando, S., Voříšek, P., Franch, M., Kipson, M., Milanese, P., Martí, D., Anton, M., Klvaňová, A., Kalyakin, M.V., Bauer, H.-G. & Foppen, R.P.B. (eds). 2020.** *European Breeding Bird Atlas 2: Distribution, Abundance and Change.* European Bird Census Council & Lynx Edicions, Barcelona. 967 pp.
- Lehtikoinen, A., Jaatinen, K., Vachetalo, A.V., Clausen, P., Crowe, O., Deceuninck, B., Hearn, R., Holt, C.A., Hornman, M., Keller, V., Nilsson, L., Langendoen, T., Tománková, I., Wahl, J. & Fox, A.D. 2013.** Rapid climate driven shifts in wintering distributions of three common waterbird species. *Global Change Biology* 19: 2071–2081.
- Maes, J., Teller, A., Erhard, M., Condé, S., Vallecillo, S., Barredo, J.I., Paracchini, M.L., Abdul Malak, D., Trombetti, M., Vigiak, O., Zulian, G., Addamo, A.M., Grizzetti, B., Somma, F., Hagyo, A., Vogt, P., Polce, C., Jones, A., Marin, A.I., Ivits, E., Mauri, A., Rega, C., Czucz, B., Ceccherini, G., Pisoni,**

- E., Ceglar, A., De Palma, P., Cerrani, I., Meroni, M., Caudullo, G., Lugato, E., Vogt, J.V., Spinoni, J., Cammalleri, C., Bastrup-Birk, A., San Miguel, J., San Román, S., Kristensen, P., Christiansen, T., Zal, N., de Roo, A., Cardoso, A.C., Pistocchi, A., Del Barrio Alvarelos, I., Tsiamis, K., Gervasini, E., Deriu, I., La Notte, A., Abad Viñas, R., Vizzarri, M., Camia, A., Robert, N., Kakoulaki, G., Garcia Bedito, E., Panagos, P., Ballabio, C., Scarpa, S., Montanarella, L., Orgiazzi, A., Fernandez Ugalde, O. & Santos-Martín, F. 2020. *Mapping and assessment of ecosystems and their services: An EU ecosystem assessment*. EUR 30161 EN, Publications Office of the European Union, Ispra. ISBN 978-92-76-17833-0, doi:10.2760/757183, JRC120383.
- Mitchell, I., Newton, S.F., Ratcliffe, N. & Dunn, T.E. 2004. *Seabird populations of Britain and Ireland*. T. & A.D. Poyser, London.
- Murray, N.J., Phinn, S.R., DeWitt, M., Ferrari, R., Johnston, R., Lyons, M.B., Clinton, N., Thau, D. & Fuller, R.A. 2019. The global distribution and trajectory of tidal flats. *Nature* 565, 222. <https://doi.org/10.1038/s41586-018-0805-8>.
- Nagy, S. & Langendoen, T. 2021. *Report on the conservation status of migratory waterbirds in the Agreement area – 8th edition*. 36 pp + Annexes. [Doc. AEWA/MOP 8.19](#).
- Pavón-Jordán, D., Fox, A.D., Clausen, P., Dagys, M., Deceuninck, D., Devos, K., Hearn, R.D., Holt, C.A., Hornman, M., Keller, V., Langendoen, T., Ławicki, L., Lorentsen, S.H., Luigujõe, L., Meissner, W., Musil, P., Nilsson, L., Paquet, J.Y., Stipniece, A., Stroud, D.A., Wahl, J., Zenatello, M. & Lehtikoinen, A. 2015. Climate-driven changes in winter waterbird abundances in relation to EU protected areas. *Diversity and Distributions* 21: 571-582.
- Roomen, M. van & Madsen, J. 1992. *Waterfowl and agriculture: review and future perspective of crop damage in Europe*. Proceedings of the international workshop convened by the Ministry of Agriculture, Nature Management and Fisheries and IWRB. *IWRB Special Publication* 21. Slimbridge, UK.
- Scott, D.A. & Rose, D.A. 1996. *Atlas of Anatidae populations in Africa and western Eurasia*. Wetlands International Publication No. 41. Wageningen, The Netherlands.
- Stroud, D.A., Harradine, J., Shedden, C., Hughes, J. Williams, G., Clark, J.A. & Clark, N.A. 2006. [Reducing waterbird mortality in severe cold weather: 25 years of statutory shooting suspensions in Britain](#). *Waterbirds around the world*. Eds. G.C. Boere, C.A. Galbraith & D.A. Stroud. The Stationery Office, Edinburgh, UK. Pp. 784-790.
- Tarzia, M., Hagan, C. & Wanless, R.M. 2015. [Review of the Status, Threats and Conservation Action Priorities for the Seabird Populations Covered by the Agreement](#). Unpublished report to the African-Eurasian Waterbird Agreement. 150 pp. Doc: AEWA/MOP 6.40.
- Tucker, G.M. & Evans, M.I. 1997. *Habitats for birds in Europe: a conservation strategy for the wider environment*. Cambridge, BirdLife International. BirdLife Conservation Series No. 6. 464 pp.
- United Nations Convention to Combat Desertification 2017. *The Global Land Outlook*. First edition. Bonn, Germany. 340 pp.
- UNEP-WCMC. 2015. *Update on the status of non-native waterbird species within the AEWA Area*. UNEPWCMC, Cambridge. 31 pp.
- Zwarts, L., Bijlsma, R.G., van der Kamp, J. & Wymenga, E. 2009. *Living on the edge. Wetlands and birds in a changing Sahel*. KNNV Publishing, Zeist, The Netherlands. 564 pp.