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Review of the Status of Introduced Non-Native Waterbird Species in the Area of the African-Eurasian Waterbird Agreement: 2007 Update

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EXECUTIVE SUMMARY

1. A review has been carried out in order to update knowledge of the status and potential impacts of non-native introduced waterbirds in countries falling within the African-Eurasian Waterbird Agreement (AEWA) area.

2. Questionnaires were sent to AEWA focal points, civil servants, conservationists and ornithologists in order to obtain information on these waterbirds. Extensive literature searches were also conducted.

3. Of 116 states contacted, a total of 101 responses for 89 different states was received. See Section 6 for the reasons why there were no contacts in three countries.

4. All information received, as well as that gathered for a previous review, was entered into a user-friendly database.

5. Thirty-two introduced species had been recorded as breeding more than five times in the AEWA region during the past 20 years. Of these, 15 species had increasing populations, ten species had relatively stable populations, and one species, the Ruddy Duck *Oxyura jamaicensis*, had a declining population. The remaining six species had localized populations where breeding occurred only occasionally (fewer than five breeding attempts per year).

6. Twenty-seven introduced species had been recorded to breed between one and five times in the AEWA region during the past 20 years, or breeding had been suspected but not confirmed. A further 45 waterbird species had been introduced but were not thought to have bred in the AEWA area.

7. Most introductions have occurred in northern and western Europe, with fewer in other parts of the AEWA range. The vast majority of introduced waterbird species are *Anatidae* (Ducks, Geese and Swans); relatively few species from other waterbird families have established introduced populations.

8. Hybridization with native species has been recorded or suspected for 18 introduced species, but for most of these species hybridization is rare. Two species that have hybridized regularly with native species, and therefore give the greatest cause for concern with respect to hybridization, are Mallard *Anas platyrhynchos* (which produces hybrids with several native species including Yellow-billed Duck *Anas undulata* and the globally endangered Meller's Duck *Anas melleri*) and Ruddy Duck *Oxyura jamaicensis* (which has hybridized with the globally threatened White-headed Duck *Oxyura leucocephala* in Spain).

9. A range of potential problems for native species, caused by introduced waterbirds, were either known to occur or suspected by correspondents. Competitive exclusion of and/or aggression towards native species was reported for thirteen introduced waterbird species, with some reports of extreme aggression leading to native species being killed by territorial introduced waterbirds. Seven introduced species were thought to cause eutrophication of waterbodies, although usually on a local scale. Six introduced species caused damage to natural or semi-natural habitats, either by grazing or trampling, and three species caused damage to man-made habitats or crops. One species (Sacred Ibis *Threskiornis aethiopicus*) was reported to predate the eggs or young of native species. For six introduced waterbird species, there is an indirect effect that introduced birds can prevent accurate monitoring of naturally occurring birds of the same species.

10. In most cases, the magnitude and importance of the effects of introduced waterbirds on native species and habitats has not been well studied, and therefore little is known about how introduced species may affect the population trends and distribution of native species. Further research in this field would improve understanding and aid future decision-making.

11. As a background for future research, a peer-reviewed publication summarising the findings of this review would be useful. Further recommendations immediately follow the executive summary.

12. For many countries there were large changes in the number of introduced waterbird species reported in the current review in 2007 and the 1999 review (Blair *et al*. 2000, Appendix 1). Many of these differences are of a magnitude that is unlikely to represent a true change in the status of the species in question, but is more likely to represent a difference in the knowledge or perceptions of the individuals completing the questionnaire; different people may have interpreted the phrase "non-native introduced species" in different ways, or some people may only have reported "established" populations whereas others may have reported all populations of introduced waterbird species. This also causes problems when comparing the number of introduced waterbird species between countries.

13. Correspondents from 57 countries gave information on whether their country had measures to prevent introductions, and of these, correspondents from 31 countries (54%) reported having legislation to prevent introductions, often introduced during the last 5-20 years. Thus unlimited introductions could have occurred legally in the past in most countries. Numerous populations of introduced species in the AEWA region are thought to derive from introductions that occurred before there was legislation to prevent them.

14. Correspondents from many countries suggested that legislation to prevent the introduction of non-native waterbirds was not stringent enough, or that loopholes allow introductions to occur. Additionally, existing legislation may not be enforced rigorously.

15. Control schemes have been implemented for a small proportion of introduced waterbird species in the AEWA region, with variable success. The most effective control schemes were those that were implemented when populations were relatively small, for example a population of around 60 Black Swans *Cygnus atratus* was eradicated in Austria, and a population of 10-15 Ruddy Ducks *Oxyura jamaicensis* was eradicated from Iceland. Control schemes that were implemented only on a local scale normally had little effect on the population as a whole; many localized attempts to reduce feral goose populations in Europe had little effect, with populations continuing to increase.

16. Correspondents from several countries suggested that improving public awareness of the potential problems caused by introduced species would be an important step to reduce introductions. Correspondents also identified a need for education projects targeting people rearing captive waterbirds.

17. Correspondents reported that introduced waterbirds are often ignored by birdwatchers during bird censuses so that even in countries with well-established waterbird monitoring schemes, introduced waterbirds may be under-recorded and therefore little is known about their true status. Therefore a simple and inexpensive way to improve knowledge of introduced waterbirds would be to encourage people participating in waterbird censuses to include counts of introduced species.

18. In many countries throughout the AEWA region, limited funding constrains the ability of governments and conservation organisations to prevent introductions and deal with the problems caused by introduced species. In some countries there are limited resources for monitoring introduced waterbirds, and therefore little is known about their numbers or any problems that they may cause.

19. Prevention of introductions is likely to be the most cost effective and the most ecologically sound strategy. Although this is suggested in paragraph 2 of the AEWA Action Plan, many countries currently lack effective measures to prevent introductions of non-native waterbirds.

RECOMMENDATIONS

The following recommendations are given in order of priority:

1. Prevention of introductions and escapes is likely to be the most cost effective and the most ecologically sound strategy, and strengthening and enforcing legislation to this effect should be a priority for the governments of AEWA Range States. The AEWA Secretariat should encourage governments to consider such measures. Although this is already suggested in paragraph 2 of the AEWA Action Plan, many countries currently lack effective measures to prevent non-native species from being introduced.

2. The AEWA Secretariat should consider how it could encourage better monitoring and recording of introduced waterbirds throughout the AEWA range. An inexpensive and simple solution would be for ornithological organisations in AEWA Range States that coordinate waterbird surveys to encourage counters to include introduced, feral and hybrid waterbirds in their existing waterbird censuses (many correspondents reported that introduced species are often ignored). In countries that do not already have established waterbird surveys, more investment would be required to establish effective monitoring systems for introduced waterbirds.

3. There is a need for more research into the effects of introduced waterbirds on native species and habitats, as currently there have been few scientific studies within the AEWA range concerning any introduced waterbird species other than Ruddy Duck. Such research could also aim to identify the feasibility of control schemes and the priorities for action. Most of the information in the current review is based on the observations and opinions of experts, rather than on scientific study. The AEWA Secretariat could usefully consider how funding for such research might be obtained and could encourage ornithological researchers in AEWA Range States to study these issues, and perhaps encourage governments of some states to consider funding these studies.

4. The AEWA Secretariat should encourage the governments of Range States to consider improving legislation to prevent the introduction of non-native species (Shaw 2006); AEWA could encourage governments to introduce such legislation in countries where there is currently no legislation. To be effective in preventing introductions, legislation would need to prohibit the deliberate release of any non-native species into the wild, and regulate the keeping of non-native birds in captivity to reduce the possibility of escapes occurring, ideally following the guidelines set out by Owen *et al*. (2006) after Blair *et al*. (2000).

5. The governments of AEWA Range States should consider implementing better regulation of the introduction of native bird species (for example for hunting purposes). Thousands of individuals of some native species (e.g. Mallard *Anas platyrhychos*) are released annually in several countries, and many European countries have feral populations of goose species that also occur naturally at certain times. These may exhibit different behaviour than naturally occurring birds, for example they may be resident rather than migratory. Furthermore there are problems with the genetic stock of such introductions where non-native subspecies or hybrids are introduced, which could potentially damage the purity of native races (Owen *et al*. (2006) after Blair *et al*. 2000; Rhymer 2006).

6. If control is deemed necessary, eradication or control projects should be co-ordinated at least nationally, if not internationally; locally implemented measures are likely to be ineffective. The international species action plan for White-headed Duck, which includes control measures for introduced Ruddy Duck, is a useful model, and AEWA could consider creating international species action plans for the management of introduced species. It should be taken into account that winter-only hunting has proven to be ineffective in many situations, although care should be taken to avoid undue disturbance to native birds occupying the same habitats as target species.

7. In all countries, governments should consider a requirement for better recording and monitoring of avicultural collections, and regular maintenance of aviaries or pens to prevent escapes. A particularly effective measure would be a requirement for birds not in covered aviaries to be pinioned. Some correspondents suggested that unique marking by ringing (or at least site-specific marking) could be introduced for all captive birds in order that they can be identified, and that penalties could be enforced if keepers do not comply with regulations and birds are allowed to escape.

8. Zoos and public collections can be a useful education and conservation tool, for example in captive breeding projects for endangered species. However, such establishments should be under obligation to ensure that accidental escapes are minimised. It may be worthwhile for governments to prohibit or have more stringent regulations for keeping certain species that pose a particular risk to native biodiversity such as hybridisation or competition (for example Ruddy Duck).

9. Non-native introduced species could be removed from existing legislation designed to protect wild birds, and excluded from any new bird protection legislation in those countries where they do not occur naturally. Control projects deemed to be necessary could then be implemented more easily in the future.

10. There is a need for education projects for members of the public, and particularly keepers of non-native species, as there is often a lack of knowledge and understanding of the problems caused by introductions. Public education may also be important for control schemes to be politically acceptable (Bremner & Park 2007).

1. INTRODUCTION

The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (hereafter abbreviated to AEWA) was developed under the auspices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS). AEWA was concluded in 1995 and entered into force in 1999. In 2000 a permanent Secretariat was established, administered by the United Nations Environment Programme.

The aims of AEWA are maintain and/or restore species to a favourable conservation status through co-ordinated conservation action for the waterbirds using the migratory system within its geographical remit. This includes 119 countries[1] ranging from the Middle East to Greenland and from Africa to Europe. There are currently 59 states[2] signed up to the agreement, and these Contracting Parties are encouraged to participate in the AEWA Action Plan, addressing important topics such as species and habitat conservation, management of human activities, research and monitoring, education and information, and implementation.

Paragraph 2 of the AEWA Action Plan describes the introduction of non-native species as an issue of particular concern for the AEWA Contracting Parties and they are invited to "*…prohibit the introduction of non-native species of animals and plants, which may be detrimental to the populations listed in Table 1…require the taking of appropriate precautions to avoid the accidental escape of captive birds belonging to non-native species…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.*". Indeed, some authors place non-native species second only to habitat loss in terms of threats to global biodiversity (Vitousek *et al.* 1997; Smith *et al.* 2005), and the Millennium Assessment concluded that invasive alien species were one of the most important direct drivers of biodiversity loss and ecosystem service changes (Millennium Ecosystem Assessment 2005).

Under clause 7.4 (g) of the AEWA Action Plan, the "*status of introduced non-native waterbird species and hybrids thereof*" is a topic for which international reviews are required to implement the plan. The first of these reviews was conducted in 1999 (Blair *et al.* 2000), and relied heavily on the responses of AEWA focal points, civil servants, conservationists and ornithologists to provide the requisite information. A lack of published literature on non-native and introduced waterbirds was identified, hence the need to approach experts in relevant AEWA states directly. This study aims to update Blair *et al.* (2000) using similar methods of enquiry.

The Global Invasive Species Programme (GISP) aims to *"…conserve biodiversity and sustain human livelihoods by minimizing the spread and impact of invasive alien species"*. GISP is particularly interested in gathering information on non-native species to feed in to a review of work to date on invasive alien species, which is being conducted as part of the upcoming 9th Conference of Parties (COP-9) of the Convention on Biological Diversity (CBD) in May 2008. This report compiles relevant information on non-native waterbirds in the AEWA region that will be of value both for the COP-9 review, and to the wider aims of the Global Invasive Species Programme, in addition to fulfilling the aims of the AEWA Action Plan described above.

There is international legislation to prevent the introduction of alien species that threaten native species, and control those species whose introduced population are already threatening native biodiversity. Article 8(h) of the Convention on Biological Diversity states that the countries that are Parties to the Convention must *"… prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species"*. In the European Union (EU) the EU Birds Directive also applies. Article 11 of the Directive states that *"Member States shall see that any introduction of species of bird which do not occur naturally in the wild state in the European territory*

[1] There are 118 countries plus the European Community, which makes 119
[2] In total 58 countries and the EC have ratified the Agreement, which makes 59

of the Member States does not prejudice the local flora and fauna…".

Despite such international legislation, it is known that several non-native waterbird species have been introduced deliberately or accidentally in some countries within the Agreement area. Although many introductions occurred in the past before legislation came into force, some introductions still occur today. There is a need for comprehensive and up-to-date information on the status of non-native introduced waterbirds, as such species can have devastating negative effects on the indigenous environment either in the country of original release, or following spread into other countries. Examples of effects of habitat degradation, competitive exclusion and hybridization from many different taxa are rife in a wide array of habitats (Lever 1994; Lever 2005). Amongst waterbirds (taken to mean divers, grebes, pelicans, cormorants, herons, storks, ibises, spoonbills, flamingos, swans, geese, ducks, cranes, rails, gallinules, coots, waders, gulls and terns), the most prominent example of the negative effects of introduced species is perhaps the Ruddy Duck *Oxyura jamaicensis*; following the escape of a limited number of individuals into the UK, the introduced population swelled to become an international concern, threatening already declining indigenous White-headed Duck *Oxyura leucocephala* with hybridization and eventually leading to lethal control measures to curb the problem (Smith *et al.* 2005; Hughes *et al.* 2006).

2. AIMS & OBJECTIVES

The review aims to cover all issues relevant to non-native introduced species in the AEWA area, but especially the following:

(i) Where, when and which non-native waterbird species have been introduced into the Agreement area (priority to be given to the Contracting Party states of AEWA);
(ii) Why these species were introduced;
(iii) What, if any, consultations were carried out prior to the introduction of these species;
(iv) What have been the effects on native species and habitats, in particular the effects on native waterbird species;
(v) Have hybrids with other species resulted from such introductions and if so, what has been their effect on native species and habitats, in particular on native waterbird species;
(vi) Whether and how easily the hybrids themselves are reproducing;
(vii) What remedial actions have been taken to mitigate the effects of introduced species and any hybrids on native waterbird species;
(viii) What further remedial actions, if any, need to be taken;
(ix) Lessons learned from past experience.

For the purposes of this report, the terms "non-native" and "introduced" are used indiscriminately, and are taken to include naturalised introductions, naturalised re-establishment, naturalised feral and vagrant naturalised species.

3. PROJECT APPROACH

3.1 Correspondents

Correspondents were identified and targeted in three ways. Firstly, the AEWA database of Focal Points for Range States was used. All Focal Point contacts were e-mailed or posted details of the review, along with the relevant documents. Secondly, established international contacts were approached, resulting either from links with BTO from other projects, or having participated in the previous non-native waterbird review (Blair *et al.* 2000). Thirdly, an extensive trawl of internet and library resources was undertaken to generate contacts for specific countries. These contacts tended to be conservationists, ornithologists and / or academics.

Correspondents were first contacted in March 2007. Reminders were sent at periodic intervals, and any new contacts unearthed were approached immediately. Towards the end of the review period, the countries where major gaps in knowledge remained (from a lack of responses) were targeted by searching for new contacts, often made through others not directly linked with waterbird research or policy. In the order of 700 emails were sent and received.

3.2 Questionnaires

Following the approach of Blair *et al.* (2000), a questionnaire was designed to obtain the information necessary. This was based largely on the document produced for the previous review (Blair *et al.* 2000), but was modified slightly to make the questionnaire simpler and more user-friendly. A 'General Questionnaire' was sent to all participants, with those in a position to also offer more in-depth information completing an additional 'Supplementary Questionnaire' (see Appendix 2 for both documents). The questionnaires were produced in English and French.

In order to facilitate responses, the questionnaires were available as both a Word document, which was e-mailed or posted to correspondents, or as a downloadable Excel document, which was obtained from the BTO website.

3.3 Literature Review

Blair *et al.* (2000) discovered that literature on non-native species of waterbirds was patchy, non-existent or largely irrelevant. Since that time, interest in the topic has apparently increased, as there is a growing trend for published papers on the scale and impact of non-native waterbirds (*e.g.* Ogilvie & RBBP 2002; Kestenholz *et al.* 2005), and there are good web resources established in many countries. However, there are still large gaps in knowledge, borne either from a lack of interest amongst amateur ornithologists (who often are responsible for collecting bird data) or from the relatively slow pace at which civil servants and ornithologists alike accept the need to understand the population dynamics and biology of introduced and non-native species.

3.4 Database

All data were loaded to a Microsoft Access database, which also contained data received for the previous review. Thus it was possible to compare and contrast data from different countries and on different species across time by using queries built within the program. Fields within the database were altered where necessary to reflect alterations in the questionnaires, but there was a large overlap between data collected from the two reviews.

4. THE STATUS OF NON-NATIVE INTRODUCED WATERBIRDS IN THE AEWA AREA

The information contained in this section is largely based on the opinions and observations of correspondents participating in this review, rather than on published peer-reviewed literature. Although the correspondents are experts in their fields, and we believe that the information provided is largely accurate, such information cannot be taken to be as rigorous as peer-reviewed published data, and therefore caution is advisable in interpreting the details given in these accounts. Where published information was available this has been included in the species accounts. Where there is conflicting information, priority has been given to information from published peer-reviewed literature, followed by information provided in the questionnaire responses from expert correspondents participating in this review, followed by information from the grey literature.

This section is divided into two sub-sections. In section 4.1, detailed species accounts, including a table of national population estimates and a map of the species' introduced range, are given for those introduced species that are known to have bred more than five times in total across all AEWA range states during the past 20 years. Section 4.2 provides brief accounts for those introduced species for which there have been five or fewer recorded breeding attempts across all AEWA range states during the past 20 years. Species falling into section 4.1 will equate broadly to those in the British Ornithologists' Union's Record Committee's (BOURC) Category E* (Dudley 2005); "species that have been recorded as introductions, human-assisted transportees or escapees from captivity, and whose breeding populations are thought not to be self-sustaining". Naturalised species (such as Greylag Goose *Anser anser* in the UK) are categorised under multiple category codes (*e.g.* A C2 C4 E*) but inclusive of E*. However, recognising that simply using BOURC Category E* was Anglo-centric, and was likely to result in many species that have insignificant populations being given detailed species accounts, this was modified so that species that had five or fewer recorded breeding records across all AEWA range states during the past 20 years were excluded from this section and instead given a brief species account in section 4.2. Where there were no data on the exact number of breeding attempts, species that were described as having bred "annually", "regularly" or whose populations were described as "widespread", "established" or "self-sustaining" were given detailed accounts in section 4.1, while those that were only described as having bred "occasionally", "rarely" or "not in recent years" were included in section 4.2.

4.1 Non-Native Introduced Species Known To Have Bred More Than Five Times In The Wild

This section contains information on all non-native introduced waterbird species that have shown evidence of breeding more than five times in total across all AEWA range states during the past 20 years.

For each species, there is a summary box at the top of the species account, which describes its *Status in countries with introduced populations* in the AEWA area, *Introduced breeding range in the AEWA area* and *Risk status*. The description of the species' *Status in countries with introduced populations* summarises both the distribution of the species within the countries in which it occurs and its population trend. Distribution is described as either widespread (occurring in many parts of the countries it occurs in) or localized (occurring only at a few places). Population trend is categorised as described in Table 4.1.1. The risk status of each species has been described using the numeric codes detailed in Table 4.1.2.

The summary box also provides information on the species' *Status in its natural range*, including the geographical range of the species, approximate numbers of individuals in the population, and the population trend, if known (described as increasing, stable or declining). This information is taken from the fourth edition of Waterbird Population Estimates (Wetlands International 2006).

Table 4.1.1 Categories used to describe the estimated population trends of introduced species.

Population Trend	Description (where required)
Increasing Rapidly	More than 10% increase per year on average
Increasing	1 – 10% increase per year on average
Increasing Slowly	Less than 1% increase per year on average
Increasing Locally	Increasing only in certain parts of the introduced range
Stable	No significant population trend
Declining	
Occasional Breeding	Breeds only occasionally or in very small numbers

Table 4.1.2 Numeric codes for 'risk status' used to categorise the potential risk(s) posed by each introduced species.

Code	Risk or potential risk posed by the introduced species
1	Predation of native birds, eggs or young
2	Competitive exclusion of native species, or aggressive to native species
3	Hybridisation with native species
4	Eutrophication or pollution of waterbodies
5	Damage to natural or semi-natural habitats
6	Damage to man-made habitats or crops
7	Introduced birds prevent accurate monitoring of numbers of naturally occurring birds of the same species

Species accounts in this section include five sub-sections.

The *Status in the AEWA area* describes the status and distribution of all introduced populations of the species.

The sub-section on *Origin of introduction* describes when, where and why the species was introduced (where known).

The sub-section detailing *Changes since the previous report* describes any known population trends since the time period covered by Blair *et al*. (2000), and includes a table of population sizes and a map of the distribution of the species. The table lists the number of breeding pairs in each AEWA range state where the species is known to currently breed, in each of two time periods, and an estimate for the total number of pairs in the AEWA region. The first time period represents the time of the previous review carried out in 1999 and reported in Blair *et al*. (2000). However, as surveys may not have been conducted every year, if data were not available from 1999, any information published or reported from surveys in the period 1996 - 2002 was used instead. For the current review, carried out in 2007, any information from surveys carried out between 2004 and 2007 were used if there were no available data for the year 2007. The estimated total number of pairs in the AEWA region in each time period was calculated by adding up the totals for each country. Where the number of breeding pairs was not known in one or more countries during a particular time period, a qualitative judgement was made of the approximate number of pairs likely to be present. This was based on the number of pairs present in the other time period (where known), or on any description of the population size. For example, if a correspondent reported "a few breeding pairs" or "occasional breeding" we assumed that 0-5 pairs bred per year. Where the total number of individuals was known but the number of breeding pairs was not, the number of breeding pairs was estimated based on a minimum of one fifth of the population attempting to breed (i.e. the number of pairs would be one tenth of the total population size). For species with large populations, the total population sizes were rounded to the nearest 10, 25, 50 or 100 as appropriate. Minimum population sizes were rounded down and maximum population sizes rounded up. For species where there was a great deal of missing information (such as Mallard *Anas platyrhynchos* and Muscovy Duck *Cairina moschata*) calculation of total numbers was not attempted.

Colour codes are used in the maps for each species to describe its current (2004 - 2007) population status and trend in each country. An example is given in Figure 4.1.1. These maps are based on the best information available from published sources, correspondents and grey literature, but in many cases the status of introduced waterbirds is poorly known and therefore these maps should be interpreted with caution.

Maps have not been included for species that occur in less than three countries, and tables of population size have not been included for species that breed only in one country.

The final two sub-sections of each species account describe any known or suspected *Effects on native species and habitats*, and details of any *Hybrids* that are known to have occurred in the wild.

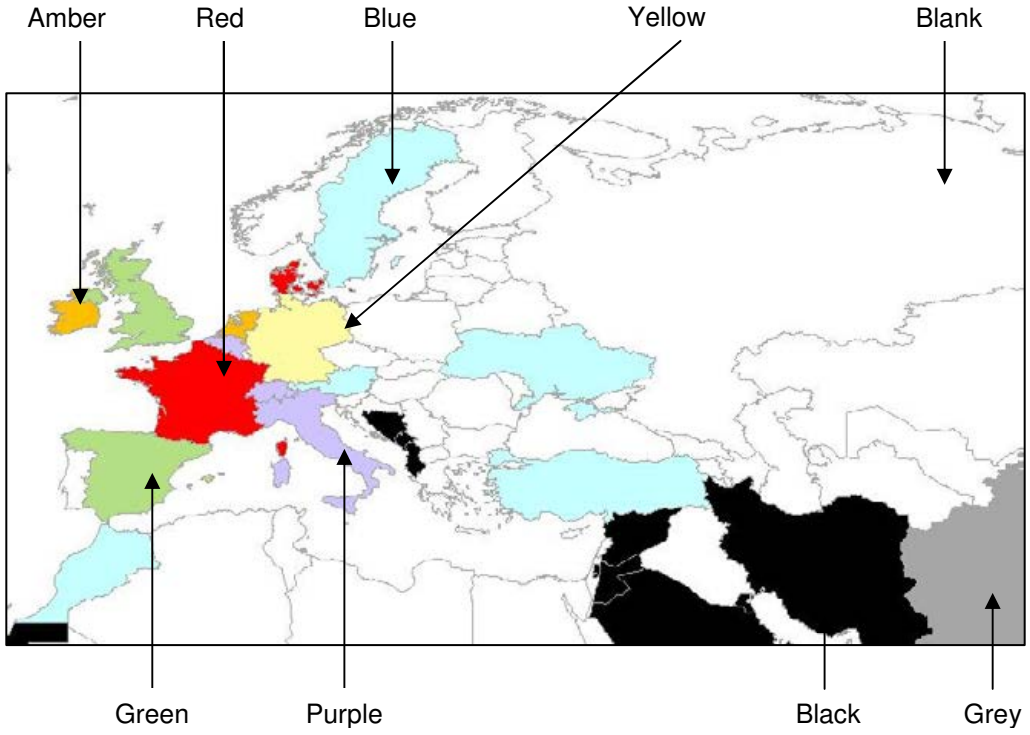

Figure 4.1.1 Key to colours used on species distribution maps.
Red = Increasing breeding population or newly breeding since Blair *et al*. (2000).
Amber = Stable breeding population, or breeding population with unknown trend.
Green = Declining or extirpated breeding population.
Yellow = Occasional breeding (not every year) or very localized breeding.
Purple = Occurs regularly (at least one record per year) but no breeding records.
Blue = Occurs occasionally (not every year) with no breeding records.
Blank = No evidence of occurrence.
Black = No data.
Grey = Non-AEWA countries.

4.1.1 Sacred Ibis *Threskiornis aethiopicus*

Sacred Ibis *Threskiornis aethiopicus*	
Status in countries with introduced populations	**LOCALIZED, INCREASING RAPIDLY**
Introduced breeding range in the AEWA area	Canary Islands, France, Italy, Netherlands, Spain, UAE
Risk status	1,2
Status in natural range	Sub-Saharan Africa: 200,000 - 400,000 (Stable) Iraq, Iran: 200 (Declining)

Status in the AEWA area

A comprehensive and informative review of Sacred Ibises in Europe was undertaken recently (Yésou & Clergeau 2005), and much of the information reported here is from that work. Breeding populations of the species have become established in France and Italy and, more recently, the Canary Islands. Breeding in Spain is unproven; although an established colony in Barcelona last showed breeding evidence in 2001, subsequent sightings of juveniles in the south of the country suggest potential breeding elsewhere (Yésou & Clergeau 2005). Questionnaire correspondents reported breeding Sacred Ibises in The Netherlands, perhaps having spread from the established population in France. The species is also known to breed in the United Arab Emirates.

Sacred Ibis is on the BOURC category E for the UK; occasional sightings are probably a mixture of escapes within the UK and wanderers from the naturalised population in western France.

Origin of introduction

Sacred Ibises are held in captivity in most European countries (Yésou & Clergeau 2005), and introduced birds in Europe are thought to be escapes from such collections. The most likely sources are from birds brought to zoos in France between 1975 and 1982 (Yésou & Clergeau 2005), to Branféré Zoological Gardens in Morbihan, western France, and a zoo at Sigean, southern France (Yésou & Clergeau 2005). Sacred Ibises spread outside the zoological gardens at Branféré into the local area and beyond from 1994 onwards (Dubois 2007). In southern France, the population has increased and spread from Sigean since 2000 and birds originating from this population bred in Camargue in 2006 (Dubois 2007).

Changes since previous report

Information on breeding estimates and distribution is derived from Blair *et al.* (2000), Yésou & Clergeau (2005) and correspondents participating in this review.

Table 4.1.1.1 Sacred Ibis: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007.

State	1996 - 2002	2004 - 2007
Canary Islands	?	5
France	200	1,205
Italy	10	25 - 28
Netherlands	0	7
Spain	4 - 6	Occasional
United Arab Emirates	c. 10	Confirmed but no data
TOTAL	220 - 230	1,240 - 1,270

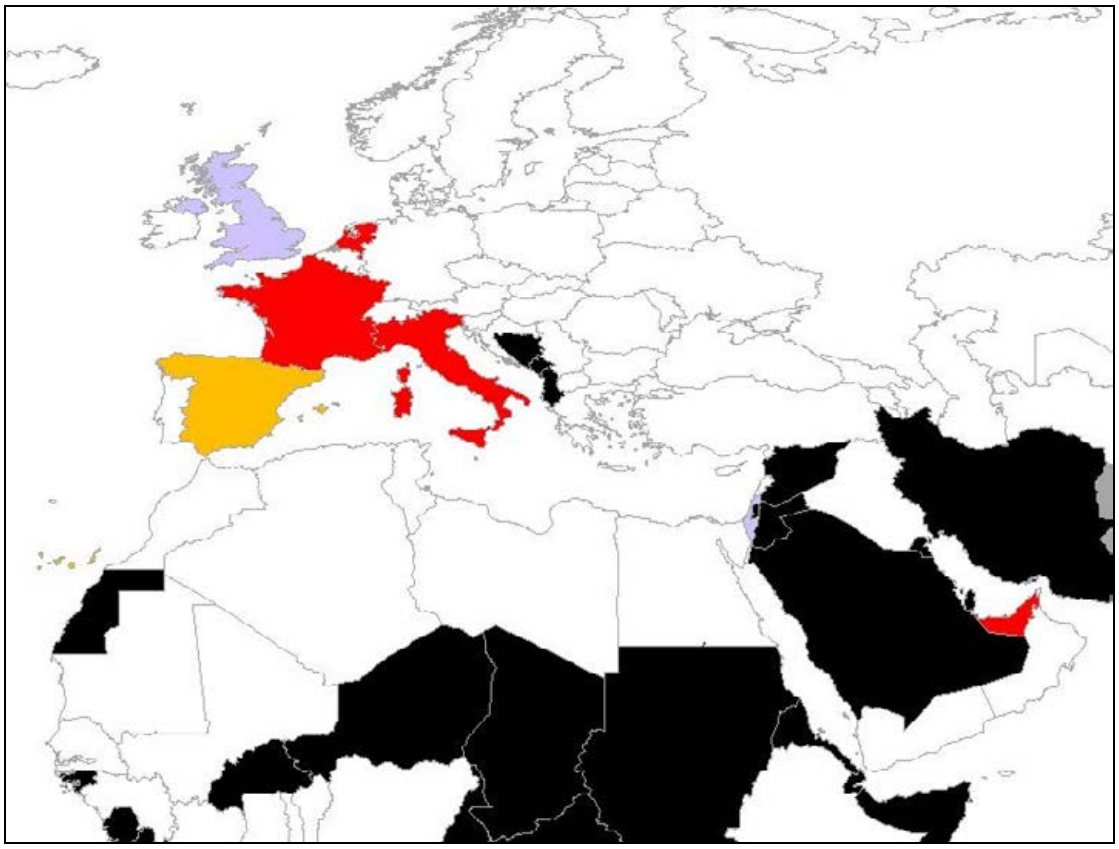

Figure 4.1.1.1 Distribution of introduced Sacred Ibis in the AEWA area. Sacred Ibises are native to Sub-Saharan Africa, Iraq and Iran.

Effects on native species and habitats

The Sacred Ibis is an opportunistic feeder and there is evidence that in some situations it will prey upon eggs and young of other species, including some tern species, which may lose entire colonies to such predation (Yésou & Clergeau 2005). Additionally, where the Sacred Ibis population has increased in southern France, competitive exclusion of Cattle Egrets *Bubulcus ibis* and Little Egrets *Egretta garzetta* has forced these indigenous species to leave breeding colonies (Kayser *et al.* 2005).

According to Yésou & Clergeau (2005), a case study is under way to examine the effects of the species on native flora and fauna, and to introduce control measures where necessary.

Hybrids

The species is not known to hybridise in the wild.

4.1.2 Greater Flamingo *Phoenicopterus roseus* and Caribbean Flamingo *Phoenicopterus ruber*

Greater Flamingo *Phoenicopterus roseus* & **Caribbean Flamingo** *Phoenicopterus ruber*	
Status in countries with introduced populations	**LOCALIZED, STABLE**
Introduced breeding range in the AEWA area	Germany, United Arab Emirates
Risk status	3
Status in natural range (Greater)	Africa, Mediterranean, Southern Asia: 545,000 - 682,000 (Stable/Increasing)
Status in natural range (Caribbean)	Galapagos, Caribbean: 257,000 - 332,500 (Stable/Increasing)

Status in the AEWA area

The status of introduced flamingos in northwest Europe, and particularly the mixed colony breeding at Zwillbrocker Venn in Germany, has been reviewed in two recent publications (Treep 2000, Treep 2006) and much of the information in the flamingo species accounts is taken from this work. The species account for Greater and Caribbean Flamingo has been combined for ease of comparison with earlier reports and publications, as they used to be thought of as conspecific subspecies, and were only split into separate species in recent years. Greater and Caribbean Flamingos occur widely in zoos and collections, and escapes have occurred from a range of locations. Both species can be found as part of a mixed breeding flock with Chilean Flamingos *P. chilensis* at Zwillbrocker Venn in northern Germany, close to the border with The Netherlands. The Caribbean Flamingos that occur at this site are clearly escapes from zoos or collections, but it is unclear whether the Greater Flamingos include vagrant individuals of wild origin from natural populations occurring further south in Europe (for example, in southern France and Spain). Greater Flamingos from the Zwillbrocker Venn colony may cross the border into The Netherlands to feed during the breeding season, and it is almost certain that they winter, along with the Chilean Flamingos from this mixed breeding colony, in the Delta of the Rhine, Meuse and Scheldt in south-west Netherlands (Treep 2000, 2006). Greater and Caribbean Flamingos both occur occasionally in the UK and these birds are thought to be either wanderers from the population in Germany/Netherlands or local escapes. Individual escaped Caribbean Flamingos have been recorded in Spain very occasionally.

Origin of introduction

Greater & Caribbean Flamingos occur widely in zoos and collections and introduced birds in Europe are thought to be escapes from such collections. However, in the United Arab Emirates a flock has been introduced on a man-made lake at Abu Dhabi Airport.

Changes since previous report

Numbers of Greater and Caribbean Flamingos at the Zwillbrocker Venn colony on the border between Germany and The Netherlands have been relatively stable since the mid-1990s (Treep 2006). Information published since the previous report indicates that the figures for flamingo numbers in Western Europe published in the previous report (Blair *et al.* 2000) are likely to have been over-estimates (Treep 2000, 2006). In 1999, there were five Greater Flamingos and one Caribbean Flamingo in the colony, and 1-2 pairs attempted to breed, but no young fledged due to nest predation by Brown Rats (*Rattus norvegicus*) and Red Foxes (*Vulpes vulpes*), while in 2007 there were 12 Greater Flamingos but no Caribbean Flamingos present in the colony, and 1-2 pairs attempted to breed with one chick fledging successfully (Treep 2006, Treep *pers. comm.*).

Table 4.1.2.1 Greater and Caribbean Flamingo: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Germany (Greater)	1 - 2 (5)	1 - 2 (12)
Germany (Caribbean)	0 - 1 (1)[1]	0 - 1 (1)[1]
United Arab Emirates (Greater)	-	Less than 150[2]
TOTAL	1 - 3	1 - 150

[1]At least one individual present at Zwillbrocker Venn from 1994 to 2006, sometimes forming hybrid pairs with Greater or Chilean Flamingos.
[2]There is a small breeding colony of artificially fed birds on a man-made lake at Abu Dhabi Airport. Over 150 young were produced in 2007, but an unknown proportion of these were wild birds, as the flock is thought to contain both wild and introduced birds.

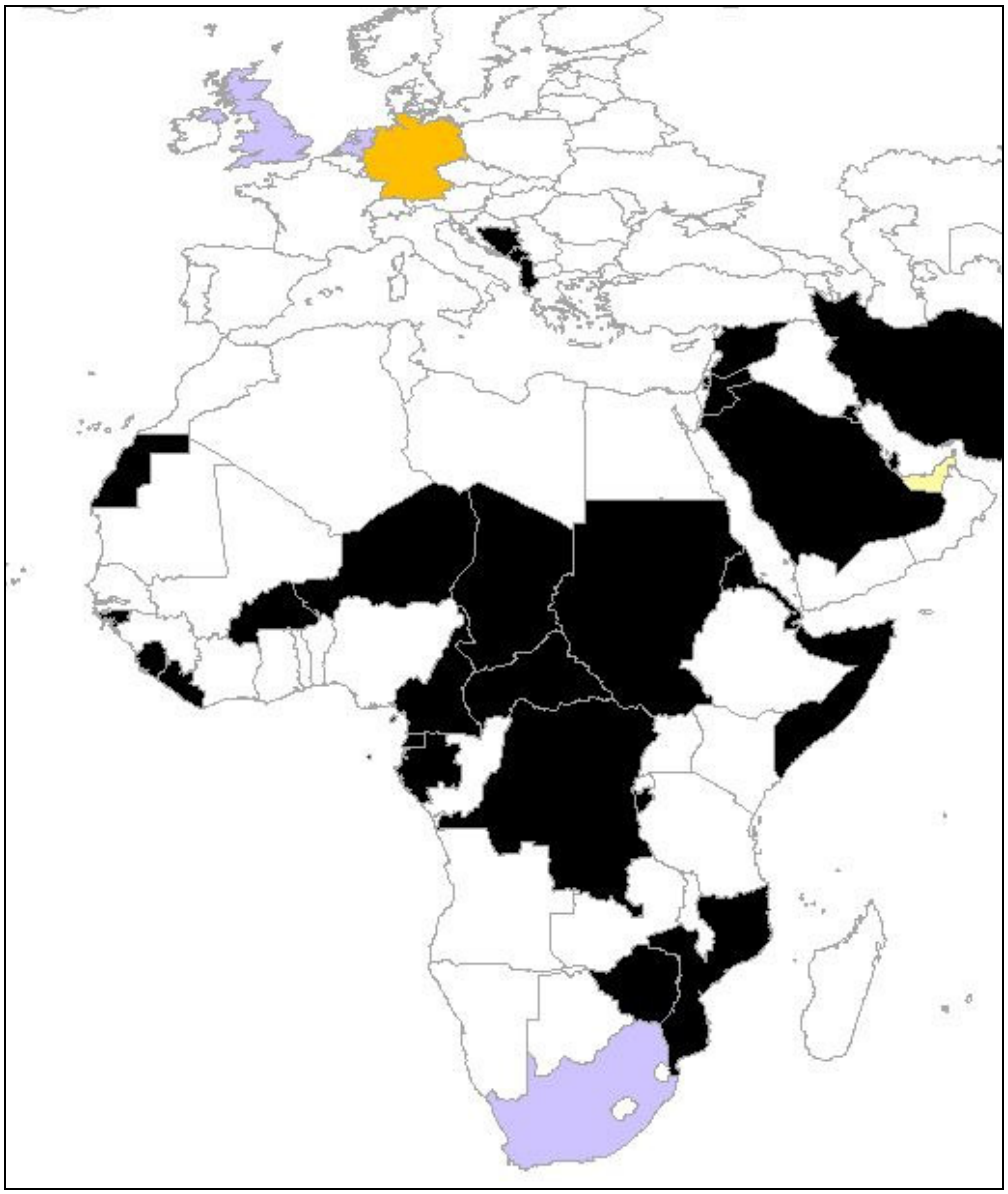

Figure 4.1.2.1 Distribution of introduced Greater and Caribbean Flamingo in the AEWA area. Greater Flamingos are native to Africa, the Mediterranean and Southern Asia. Caribbean Flamingos are native to the Galapagos and the Caribbean.

Effects on native species and habitats

Greater and Caribbean Flamingos are not known to affect native species or habitats.

Hybrids

Greater and Caribbean Flamingos can form hybrids with each other, or with Chilean Flamingos. Mixed pairs have been recorded at the colony in Zwillbrocker Venn, and these have reared offspring, although it is not certain whether the mixed pairs were always the biological parents of these offspring as mate infidelity was observed frequently at the colony (Treep 2000). However in the last two years hybrid birds have been observed at the site so it seems probable that at least some of these mixed pairs have bred successfully. It is possible that Caribbean Flamingos from this colony could spread and hybridise with wild Greater Flamingos in southern Europe, although there is no evidence that this has happened yet.

4.1.3 Chilean Flamingo *Phoenicopterus chilensis*

Chilean Flamingo *Phoenicopterus chilensis*	
Status in countries with introduced populations	**LOCALIZED, STABLE**
Introduced breeding range in the AEWA area	Germany, France
Risk status	3
Status in natural range	NEAR THREATENED
	Southern South America: 200,000

Status in the AEWA area

Introduced Chilean Flamingos have established a small but stable population in northwest Europe. The birds breed at Zwillbrocker Venn in Germany, close to the border with The Netherlands, and individuals may go into The Netherlands to feed and most migrate to parts of The Netherlands during the winter (Treep 2000, 2006), The birds have formed a mixed breeding colony with Greater and Caribbean Flamingos, with which they occasionally hybridise, although the flamingos in this colony usually form pairs with their own species (Treep 2000).

In France, the species is seen regularly, usually as single birds, although up to four have been seen in St. Michael's Bay (Dubois 2007). Breeding has occurred occasionally since 1976 as single pairs, sometimes with Greater Flamingo *P. roseus*. One pair bred in the Camargue in 2006 (Dubois 2007).

Individuals of this species have also been observed occasionally in Italy and Spain, but they are not thought to have bred.

Origin of introduction

Chilean Flamingos, as with the other flamingo species, occur widely in zoos and collections throughout Europe, and all the introduced birds are thought to be escapes from such collections. In The Netherlands, occasional single escaped birds have been reported in the wild since 1958, but in 1971 a group of 13 Chilean Flamingos was reported in the Delta area in southwest Netherlands, and groups of flamingos were reported both in the Delta area and in coastal areas in northern parts of The Netherlands throughout the 1970s.

The first record of a Chilean Flamingo at Zwillbrocker Venn in Germany during the breeding season was of a single individual in 1980, but numbers increased during the early 1980s and the birds first bred successfully at this site in 1983. These birds are thought to be the same individuals that were found wintering in The Netherlands around that time.

Chilean Flamingos were first observed in Italy in 1986 in Orbetello. These birds are thought to be either escapes or birds originating from the population in northwest Europe.

In the UK, sightings of escaped birds have been reported since the 1960s. Chilean Flamingo is currently on BOURC category E in the UK, with birds occurring in the UK thought to be a mixture of wanderers from the feral population in northwest Europe, and escapes from within the UK.

Changes since previous report

Numbers of Chilean Flamingos at Zwillbrocker Venn have been relatively stable since around 1990 at between 20 and 31 individuals. Numbers increased slightly in 2007 to 35 individuals (Treep 2006; Treep *pers. comm.*)

Table 4.1.3.1 Chilean Flamingo: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
France	0 - 1[1]	0 - 1[1]
Germany	6 (21)	5 - 8 (35)
TOTAL	6 - 7	5 - 9

[1]Single pairs have bred regularly (but not every year) since 1976 in the Camargue, sometimes forming mixed pairs with Greater Flamingos (Dubois 2007).

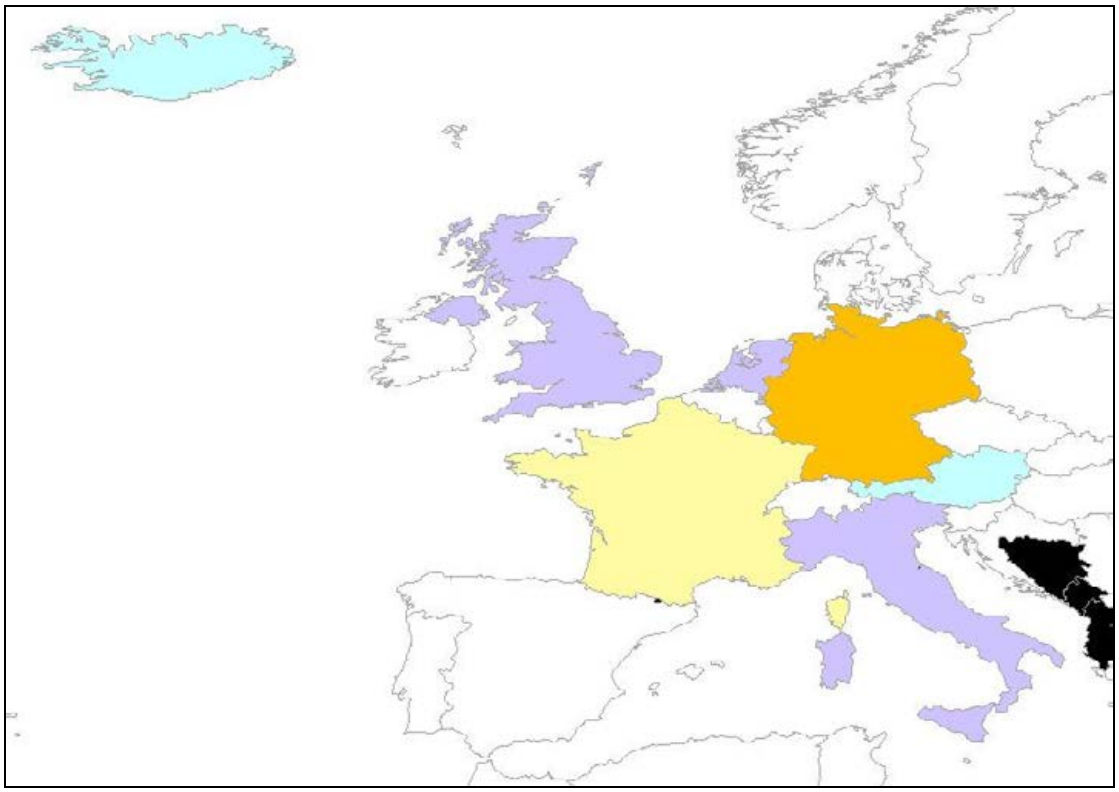

Figure 4.1.3.1 Distribution of introduced Chilean Flamingo in the AEWA area. Chilean Flamingos are native to southern South America.

Effects on native species and habitats (excluding hybridization)

There are no apparent adverse effects on native species and habitats.

Hybrids

Chilean Flamingos have formed hybrids with Greater Flamingos at the colony at Zwillbrocker Venn in Germany (Treep 2000; 2006), and occasionally in France (Dubois 2007). Although this has not as yet had any impact on the native population of Greater Flamingo in southern Europe, clearly these flamingo species can hybridise readily and further introductions of Chilean Flamingos could potentially lead to problems with hybridisation.

4.1.4 White-faced Whistling Duck *Dendrocygna viduata*

White-faced Whistling Duck *Dendrocygna viduata*	
Status in countries with introduced populations	**LOCALIZED, INCREASING**
Introduced breeding range in the AEWA area	Mauritius
Risk status	None known
Status in natural range	Sub-Saharan Africa, Madagascar, Central & South America: More than 1,700,000 (Increasing)

Status in the AEWA area

White-faced Whistling Ducks have been introduced in Mauritius, where the number of breeding pairs is unknown but the population is self-sustaining and increasing. There are a few records of escapes being found in the wild in the UK, France and Spain but there are no breeding records in these countries.

Origin of introduction

In Mauritius, White-faced Whistling Ducks are thought to have been introduced in the early 1800s as a gamebird, while birds that occur in the UK and France are all thought to be escapes from zoos or collections.

Changes since previous report

White-faced Whistling Duck was not reported in Mauritius in the previous report, but in 2007, the questionnaire respondent stated that it had been introduced there since the 1800s, so must have been present in 1999. The population, and its range within Mauritius, is increasing. Within the UK and France there is no perceptible trend, with only occasional records of escapes in both countries.

Table 4.1.4.1 White-faced Whistling Duck: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007.

State	**1996 - 2002**	**2004 - 2007**
Mauritius	?[1]	?[2]
TOTAL	Not known	Not known

[1]Not reported in Mauritius in 1999, but 2007 questionnaire states this species has occurred there since the 1800s.
[2]Number of breeding pairs unknown.

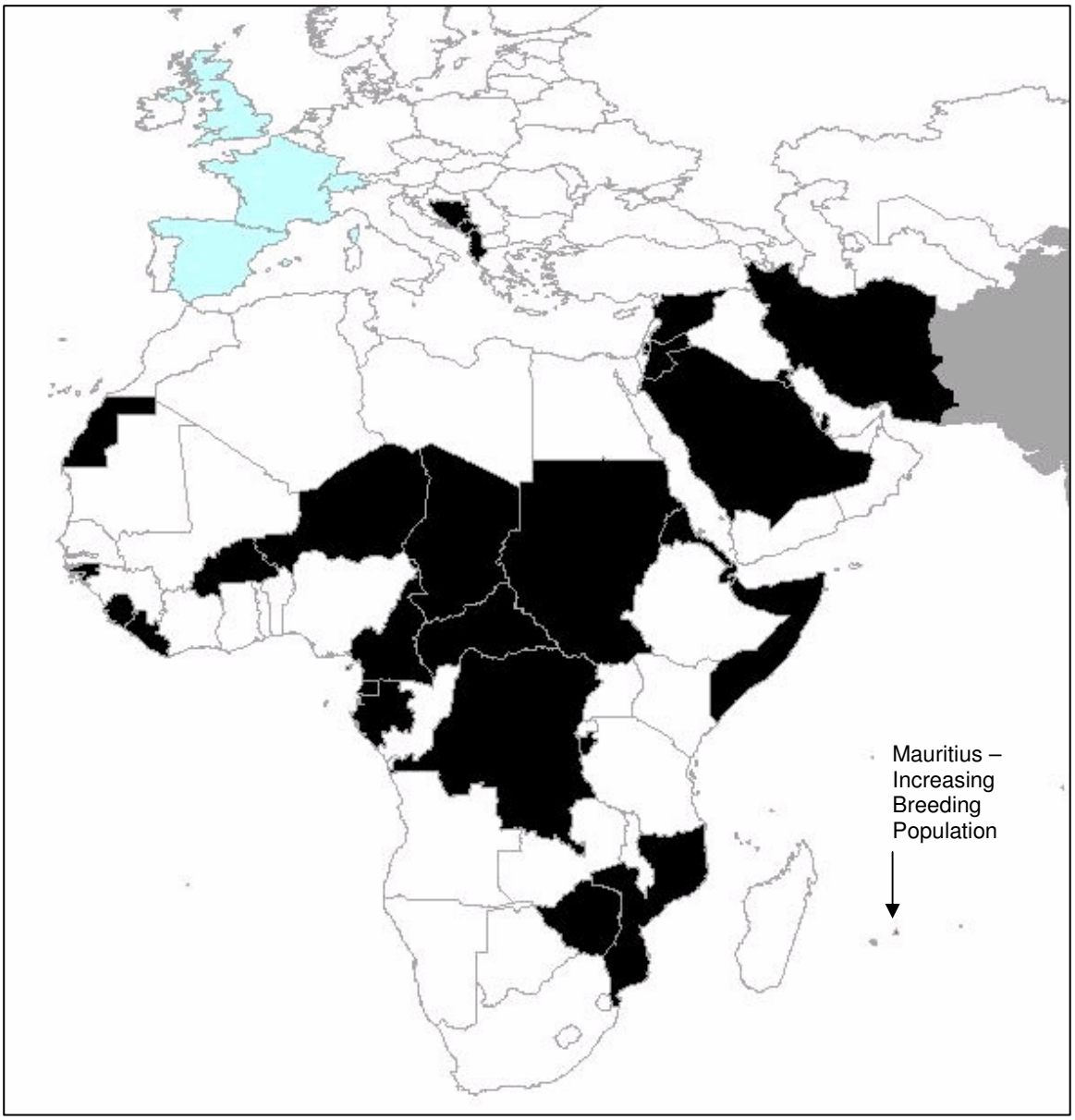

Figure 4.1.4.1 Distribution of introduced White-faced Whistling Duck in the AEWA area. White-faced Whistling Ducks are native to Sub-Saharan Africa, Madagascar, Central and South America.

Effects on native species and habitats (excluding hybridization)

This species is not known to affect native species or habitats.

Hybrids

White-faced Whistling Duck is not known to hybridise with any native species within the AEWA range, although the questionnaire respondent from Mauritius states that it may hybridise with other species of whistling duck (although none are native to Mauritius).

4.1.5 Mute Swan *Cygnus olor*

Mute Swan *Cygnus olor*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING LOCALLY**
Introduced breeding range in the AEWA area	Austria, Canada, Croatia, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Luxembourg, Mauritius, Switzerland, United Arab Emirates, UK
Risk status	2, 3, 4, 5, 6, 7
Status in natural range	Europe & Asia: 587,700 - 590,700 (Increasing)

Status in the AEWA area

Mute Swans have been introduced widely within and close to their native range, complicating assessment of the numbers of introduced individuals. Many countries where the species also occurs naturally reported the species only in one or other year (1999 or 2007), but often in large numbers, suggesting that it is likely to have also been present in the year when it was not reported. This could be because the questionnaire included the words "non-native" in the title, so many countries did not report introduced native species. It has been suggested that all Mute Swan populations in Europe contain birds of domestic origin (Lever 2005). However, Mute Swans have also been introduced in several countries that do not fall within the natural range of the species.

Mute Swans are widespread in Austria, Estonia, France, Italy and the UK (Table 4.1.5.1), but in all of these locations their populations may be augmented by the spread of the naturally occurring population, from which introduced birds are difficult, if not impossible, to discern. In Greece, around five pairs of introduced Mute Swans persist around Agras, where they were introduced during the 1960s.

Five European countries (Finland, Germany, Latvia, Luxembourg and Switzerland) reported introduced Mute Swans in 1999 only. All of these had relatively large, established and self-sustaining populations (Blair *et al*. 2000), and these populations are likely to represent a mixture of introduced and naturally occurring individuals. Croatia reported a small number of introduced Mute Swans in 1999, but subsequent information received recently suggests that these occur only in Zagreb Zoo and have not escaped into the wild. All wild Mute Swans in Croatia are thought to be naturally occurring.

Outside their native range, introduced Mute Swans are present in Canada, Mauritius, South Africa and the United Arab Emirates. In Canada, Mute Swans were introduced during the late 1800s and have since increased to around 8,000 pairs in the Great Lakes of Ontario. The population continues to increase at around 9-11% per year. They are causing many problems to native waterbirds and their habitats, but implementation of a control scheme has been hindered by the fact that Mute Swans are protected under the Migratory Birds Treaty Act. In Mauritius Mute Swans breed in the western part of the country around hotels and a bird park where they were introduced.

Mute Swans have been introduced to South Africa and the United Arab Emirates in the past, and formerly bred in both countries (Blair *et al*. 2000), but it is thought that they no longer breed in either country, although occasional escaped birds are still thought to be present in both locations.

A pair of Mute Swans was introduced to a park in Reykjavik in Iceland in 1958, and the population grew over the following years to a peak of 15-20 individuals. However, the species has not been present in Iceland since the last of the birds in this small population died in 1977 (Blair *et al*. 2000).

Throughout their native and non-native range, both introduced and naturally occurring Mute Swans are thought to have benefited from man-made habitats such as flooded gravel pits, urban wetlands and parks and artificially managed wetlands which provide the shallow, slow moving waterbodies that Mute Swans require. In Canada, Mute Swans have benefited from changes to waterfront areas such as parks, golf courses and man-made beaches, which provide suitable habitat for them.

Origin of introduction

Mute Swan populations in a number of European countries have been augmented by semi-domestication of the species over many centuries. This has occurred since the middle ages in Europe (Triplet *et al*. 2003). Although correspondents from The Netherlands did not report any introduced Mute Swans in either 1999 or 2007, The Netherlands breeding bird atlas suggests that Mute Swans in that country are concentrated in areas close to former swan farms, suggesting that the population has been supplemented by escaped or semi-domesticated birds (SOVON 2002). Furthermore, individuals of this species have been introduced for ornamental reasons in Austria from around 1880, and in Italy from the early 1960s to the mid 1970s. In Finland it was introduced at Aland in 1937 and then spread, but the population is thought to have been augmented by the spread of naturally occurring birds from Sweden, and in Greece it was introduced at Agras during the 1960s. A pair of birds was introduced to Reykjavik in Iceland in 1958, as a gift from the city of Hamburg in Germany! However, the species has not been present in Iceland since 1977 when the last bird deriving from this introduction died. Mute Swans have been introduced into Canada since the late 1800s, but the reasons behind introductions here are unknown. Mute Swans in Mauritius were introduced at some point during the last 20-30 years at a bird park and at hotels as tourist attractions.

Changes since previous report

Trends in Mute Swan populations are difficult to discern in many areas, partly because of mixing with naturally occurring (rather than introduced) birds, and because many countries only reported their presence in one or other of the two years when reviews were carried out (Table 4.1.5.1). Populations are thought to be increasing in Canada, Estonia, Italy, and Mauritius (Table 4.1.5.1, Figure 4.1.5.1). Numbers have declined in the United Arab Emirates and South Africa. In France numbers increased during the 1980s and 1990s (Dubois *et al*. 2000), and this increase is likely to have continued since that time. Elsewhere trends are uncertain.

Table 4.1.5.1 Mute Swan: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria	140 - 320	More than 400
Canada	?[1]	8,000
Estonia	?[1]	2,500 - 3,000
Finland	More than 2,000	?[1]
France	2,000 (7,000)	?[2]
Germany	4,000[3]	?[1]
Greece	"Small numbers"	c. 5
Italy	(800)[4]	More than 300
Latvia	500 (4,000 wintering)	?[1]
Luxembourg	12 - 20 (150 wintering)	?[1]
Mauritius	?[1]	Confirmed but no data
South Africa	2	Present but not breeding
Switzerland	400 - 600 (4,000)	?[1]
United Arab Emirates	1 (4)	Occasional escapes occur
UK	c. 6,150[2] (c. 19,400)	More than 6,150[3] (More than 19,400[3])
TOTAL	14,250 - 28,500	17,057 - 25,500

[1]Not reported from this country in this year, but likely to have been present and breeding.
[2]Numbers in France in 2004-2007 not known but were present.
[3]This population estimate includes birds deriving from introductions and birds from naturally occurring populations.
[4]Number of breeding pairs not known.

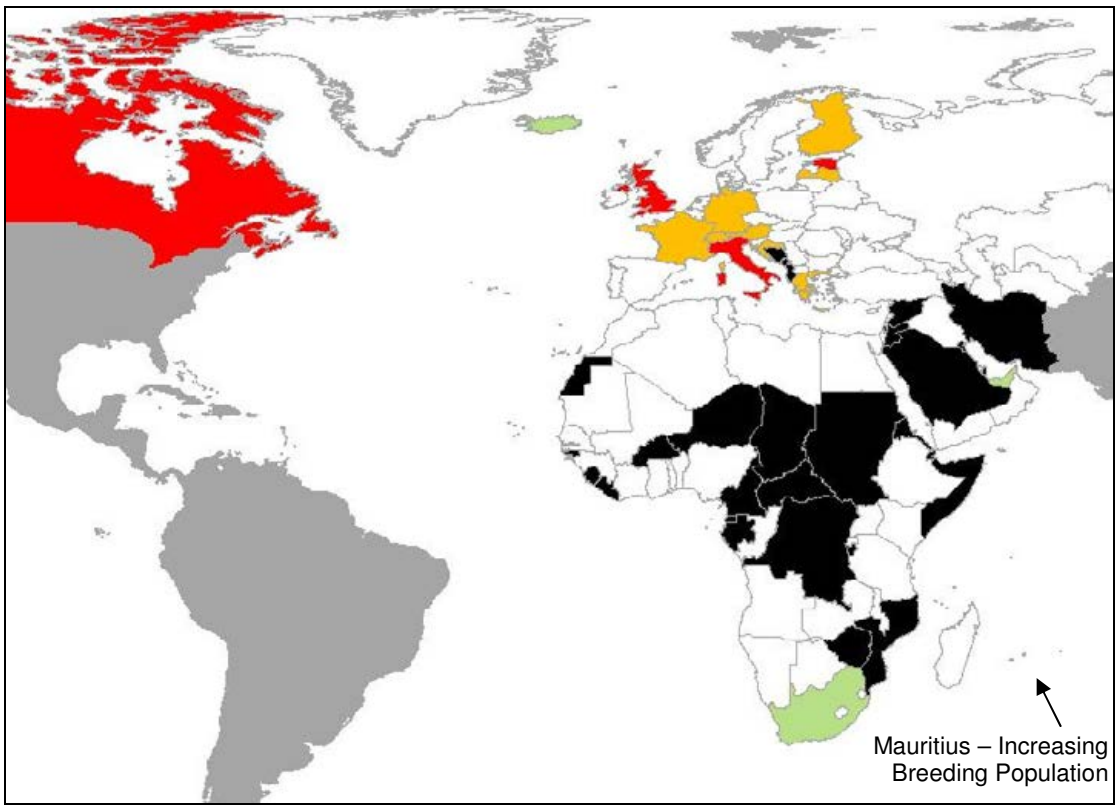

Figure 4.1.5.1 Distribution of introduced Mute Swan in the AEWA area. Mute Swans are native to Europe and Asia and in many European countries Mute Swan populations consist of a mixture of naturally occurring and introduced birds.

Effects on native species and habitats (excluding hybridization)

In Canada and in Europe, Mute Swans have been observed to kill adult and young native waterbirds during the breeding season (Lever 2005). They also exclude native waterbirds from local foraging areas because of their strong territorial behaviour. In addition, they have damaged the nesting, feeding and staging habitats of native waterbird species in Canada and in Europe, both by eutrophication of waterbodies and by overgrazing and trampling, and they may also cause crop damage in this way (Lever 2005). Correspondents from Austria also suggested that there may be conflicts between Mute Swans and native Greylag Geese *Anser anser*, and possibly some other waterfowl species, but that there was no good scientific evidence for this, and correspondents from the UK also suggested that Mute Swans could displace native species through their highly territorial behaviour.

In addition to the problems caused to native species and habitats, Mute Swans may also cause local damage to crops by trampling, although this is usually on a small scale.

Hybrids

In Canada, introduced non-native Mute Swans have bred with threatened Trumpeter Swans *Cygnus buccinator*, producing hybrid offspring, and they have hybridized with Whooper Swans *Cygnus Cygnus* in Sweden (Lever 2005). They also sometimes interbreed with introduced geese in the UK, and hybrids have been recorded occasionally. It is not known whether the hybrids are fertile.

4.1.6 Black Swan *Cygnus atratus*

Black Swan *Cygnus atratus*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING**
Introduced breeding range in the AEWA area	Belgium, France, Germany, Italy, Mauritius, Netherlands, Spain, Switzerland, Ukraine, UK
Risk status	2, 3, 4
Status in natural range	Australia: 100,000 - 1,000,000

Status in the AEWA area

Black Swans have been introduced throughout Europe and in several other states within the AEWA range, largely as an ornamental species. This species has small but increasing breeding populations in a number of European countries including Belgium, The Netherlands, France, Italy and the UK; a few pairs also breed in Germany. It has also recently been introduced in Mauritius where the breeding population is currently small but increasing. These populations are all thought to be self-sustaining. In Switzerland up to two pairs have attempted to breed annually since 2002, while in Spain Black Swan is on category E2, indicating that breeding has been recorded but that there is not an established population. The number of breeding records in Spain is not known. Control measures have been implemented in Austria and in some parts of France. In Austria a population of around 60 individuals had become established in Vienna in the early 1990s, but control measures implemented since the 1990s, including egg management, have removed this population. In Gironde (France) control measures successfully reduced the population from 12 to 4 individuals. These two examples suggest that control measures can be successful with small to medium sized populations of this species. Occasional individuals are seen in Iceland, the Czech Republic, Slovakia, South Africa and the United Arab Emirates but there are no records of breeding attempts in these countries.

Black Swans are thought to have gained from human habitats, such as flooded gravel pits, artificially managed wetlands, reservoirs and urban ponds and lakes, while in Mauritius they have benefited from habitats around hunting lodges.

Origin of introduction

In Austria Black Swans were introduced in Vienna from the 1950s to the 1970s as a tourist attraction, while in Belgium wild populations of Black Swans are thought to originate from ornamental birds in parks or deliberate releases from captivity. This species was first observed in the wild in Belgium in 1889 in the province of Limburg, but more recently was introduced in 1997 at Laken in the Brussels area. The first breeding record for Black Swan in The Netherlands was in 1978 at Kromme Rijn in Utrecht, with birds thought to be escapes from captivity. Individuals first appeared in Germany and the Czech Republic during the 1990s, and again are thought to be escapes from captivity or ornamental introductions. Black Swans were first introduced to Italy around 1980, in the Ravenna Province and elsewhere, where it was released for ornamental purposes. Black Swans have been introduced in the UK since 1791, and were first recorded breeding in the wild in 1902. More regular introductions took place from the 1930s onwards, and in recent years a small but increasing breeding population has become established. The first known introduction of Black Swans in South Africa was in 1926 in Humansdorp in the Eastern Cape Province. The timing of the introduction of Black Swans into Mauritius is not known precisely but thought to be during the last 20-30 years, and birds are thought to originate from private collections where they were introduced as an attraction.

Changes since previous report

Black Swan numbers have increased in many countries since the previous report. The most dramatic increase occurred in Belgium, where numbers have increased from around 8 individuals in 1999 to at least 40-45 breeding pairs in 2007. In most other countries the species has increased more slowly. In

Italy, the population is increasing slowly, from a maximum of 5 breeding pairs per year in 1999 to 5-20 breeding pairs per year by 2007. Similarly, in The Netherlands there has been an increase from around 25 breeding pairs to 60-70 breeding pairs, and in the UK the population increased from 2 breeding pairs in 1999 up to 11-16 pairs in 2004, and data from the Wetland Bird Survey (WeBS) suggest that more than 150 individuals are currently at large in the UK. In Germany there is a small but relatively stable population of around 15 breeding pairs, while in Switzerland the first breeding records have occurred since the last report. In 1999 there were only occasional records of individuals in Switzerland, but from 2002 onwards up to 2 breeding attempts per year have been recorded. In Mauritius there is a small but increasing population of a few breeding pairs. There was a small population on a private reserve called Pechenezhskoe Pole in eastern Ukraine in 1999, but these were not reported in 2007, so we presume that this population no longer exists. In Austria, a population of around 60 individuals in Vienna was controlled during the 1990s and, after egg management, the species no longer breeds in Austria.

Table 4.1.6.1 Black Swan: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	**1996 - 2002**	**2004 - 2007**
Austria	0[1]	0
Belgium	(At least 8)	minimum 40 - 45
France	0 - 2[2]	c. 25
Germany	Occasional	c. 15
Italy	Up to 5	5 - 20
Mauritius	-	Few but increasing
Netherlands	60 - 70	More than 60 - 70
Spain	-	Occasional
Switzerland	Not breeding	maximum 2
Ukraine	?	-
UK	2	11 - 16 (More than 150)
TOTAL	30 - 50	155 - 225

[1]Around 60 individuals in early 1990s, but culling and egg management had been undertaken by 1999.
[2]Breeding recorded most years in 1990s.

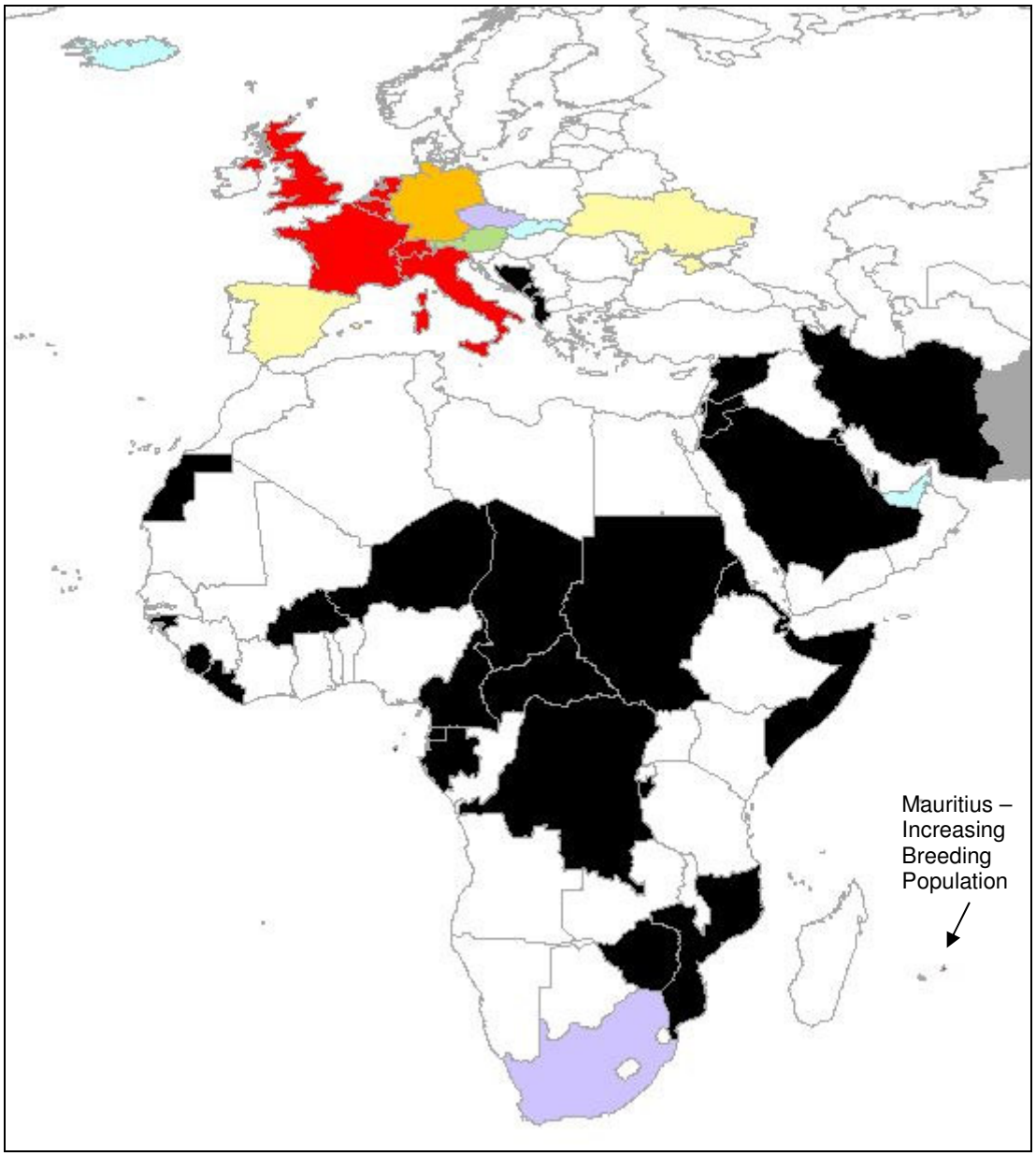

Figure 4.1.6.1 Distribution of introduced Black Swan in the AEWA area. Black Swans are native to Australia.

Effects on native species and habitats (excluding hybridization)

Black Swans may be aggressive towards Mute Swans or other swan species (Dubois 2007), and this has been recorded in France, Italy and the UK. In France they are also a threat to Greater Flamingos, and have been recorded to disturb their breeding in the Camargue (Dubois 2007). At one site in France where Black Swans had been introduced as an ornamental species they caused problems by being aggressive towards elderly people (Dubois 2007)! In Austria Black Swans were controlled because they were causing problems with water quality.

Hybrids

Black Swans have hybridised with Mute Swans in Germany and The Netherlands.

4.1.7 Whooper Swan *Cygnus cygnus*

Whooper Swan *Cygnus cygnus*	
Status in countries with introduced populations	**LOCALIZED, STABLE**
Introduced breeding range in the AEWA area	Germany, UK
Risk status	3, 7
Status in natural range	Northern Europe, Siberia, NE China: 177,000

Status in the AEWA area

A few pairs of introduced Whooper Swans, which are thought to be of captive origin, breed in Germany and the UK. Both countries are within the natural wintering range of this species. In the UK, breeding Whooper Swans in Highland, Orkney, Shetland and the Western Isles are thought to represent birds deriving from the naturally occurring population, either through expansion of the breeding range or as a result of injured birds that are unable to migrate to their breeding grounds staying in the UK to breed, however, the possibility of some escaped birds being involved cannot be ruled out (Ogilvie & the Rare Breeding Birds Panel 2004a, Baker *et al*. 2006). The few pairs occurring elsewhere in the UK relate to known escapes (Holling and the Rare Breeding Birds Panel 2007).

Origin of introduction

Breeding Whooper Swans in the UK and Germany are thought to be derived from naturally occurring populations, possibly supplemented by some escapes from captivity. They first bred in the wild in these countries during the 1990s.

Changes since previous report

Introduced Whooper Swan numbers have remained relatively stable in both Germany and the UK since the previous report, with only a few pairs of introduced birds breeding in each country. Figures in Table 4.1.7.1 represent introduced escaped birds only, and do not include those birds presumed to derive from naturally occurring populations. Numbers are from Ogilvie and the Rare Breeding Birds Panel (1999a; 1999b; 2000; 2001; 2002; 2003; 2004b), Holling and the Rare Breeding Birds Panel (2007) and correspondents participating in this review.

Table 4.1.7.1 Whooper Swan: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007.

State	**1996 - 2002**	**2004 - 2007**
Germany	Not known	11
UK	0 - 3	3 - 5
TOTAL	3 - 14	14 - 18

Effects on native species and habitats

Introduced Whooper Swans are not known to affect native species or habitats.

Hybrids

Whooper Swan has occasionally been recorded to hybridise with Mute Swan in the UK.

4.1.8 Swan Goose *Anser cygnoides* (including the domesticated form known as Chinese Goose)

Swan Goose *Anser cygnoides*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING LOCALLY**
Introduced breeding range in the AEWA area	Germany, Italy, Netherlands, UK
Risk status	2, 3
Status in natural range	ENDANGERED
	Central & East Asia: 60,000 – 100,000 (Declining)

Status in the AEWA area

Introduced Swan Geese breed regularly in Germany and The Netherlands and occasionally in Italy and the UK. In Germany, the population is thought to be relatively stable, with 100-150 pairs reported in 2007. In The Netherlands, the population has increased, with 10-20 pairs being reported at the time of the previous report, but around 150 by 2005. Swan Geese are recorded occasionally at many sites in northern Italy. It is in BOURC category E* in the UK, with breeding having been recorded occasionally in the past but no recent records. WeBS results suggest that at least 20 individuals are currently present in the UK. In Monaco, a small number of birds have been introduced in a park in the Quartier de Fontvieille but are not known to breed, while in Madagascar Swan Geese can occasionally be found around farms and villages, but they are not known to breed in the wild. There are also occasional records of Swan Goose from the Czech Republic, Spain and Switzerland, but this species has not been known to breed in these countries. Note that many of these records, particularly those close to human settlements, are likely to relate to Chinese Goose (the domesticated form of Swan Goose).

Origin of introduction

In most European countries where Swan Geese occur, the birds are thought to originate either from escapes from collections or purposeful introductions of ornamental birds. Swan Geese were introduced to Germany from the 1970s to the 1990s, and the species has occurred in The Netherlands since 1987, and in the UK since 1991, or possibly earlier. It was introduced into the Parc Paysager de Fontvieille in Monaco in 1995. In Italy, the species is kept in farming and has been released for ornamental purposes in gardens from 2000 to 2007.

Changes since previous report

Swan Goose populations in The Netherlands have increased since the previous report (Table 4.1.8.1), but elsewhere their numbers remain relatively stable.

Table 4.1.8.1 Swan Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007.

State	**1996 - 2002**	**2004 - 2007**
Germany	Not known	100 - 150
Italy	-	Occasional
Netherlands	10 - 20	150
UK	Occasional	Occasional
TOTAL	100 - 175	250 - 305

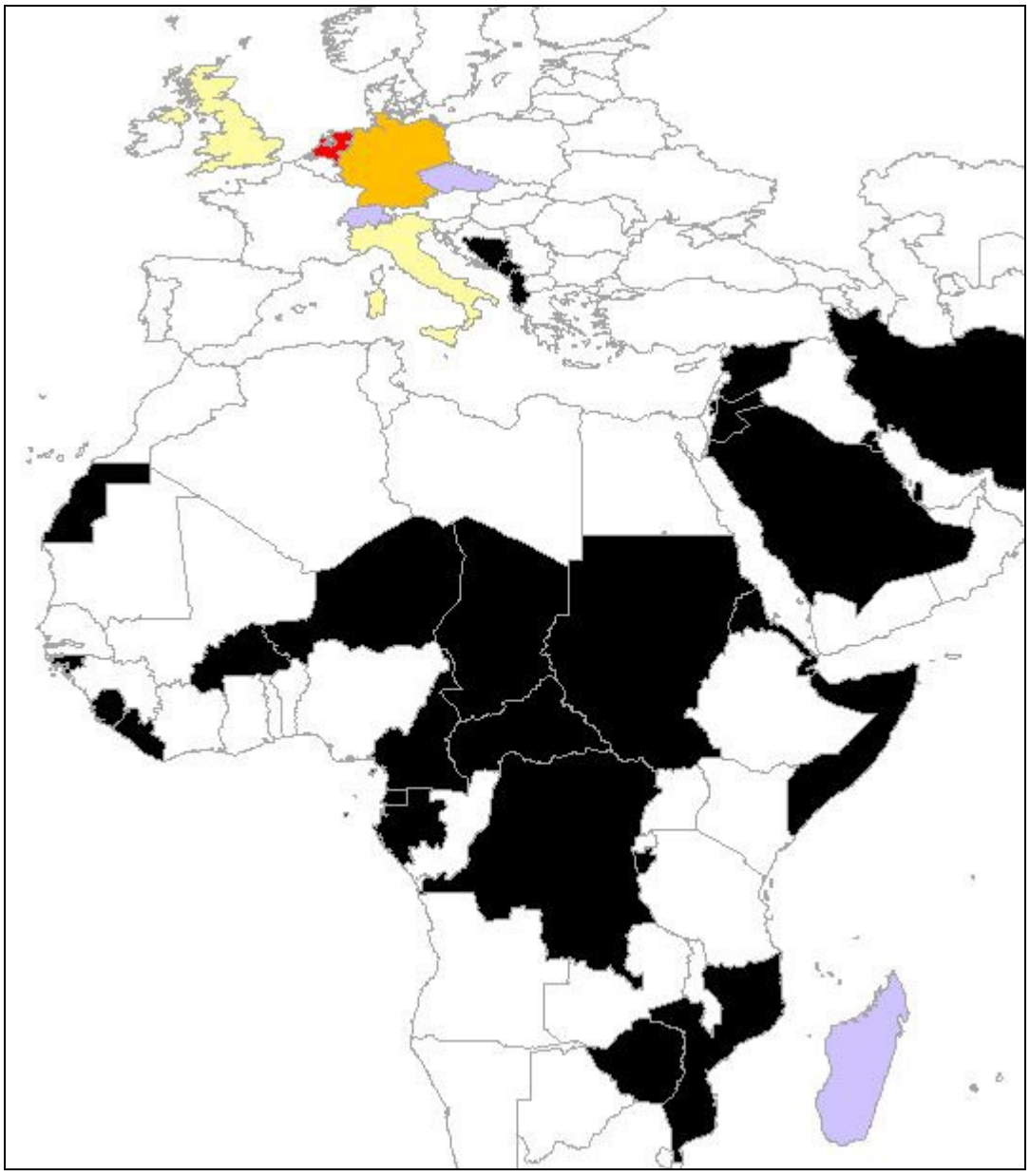

Figure 4.1.8.1 Distribution of introduced Swan Goose in the AEWA area. Swan Geese are native to Central and East Asia.

Effects on native species and habitats

Swan Geese may displace some native waterfowl in Italy, according to questionnaire respondents, but the species likely to be affected are not known.

Hybrids

Swan Geese have hybridised with Greylag Geese in Germany, Italy, The Netherlands and the UK (Randler 2004). The species may also hybridise with other introduced geese in the UK and Germany.

4.1.9 Bean Goose *Anser fabalis*

Bean Goose *Anser fabalis*	
Status in countries with introduced populations	**LOCALIZED, OCCASIONAL BREEDING**
Introduced breeding range in the AEWA area	Belgium, Netherlands, UK
Risk status	None known
Status in natural range	Northern Eurasia: 825,000 - 845,000 (Declining)

Status in the AEWA area

Feral populations of Bean Goose have been found in Belgium, The Netherlands and the UK. Although these countries are within the natural wintering range of this species, individuals present during the breeding season are thought to be introduced birds that have escaped from collections. Bean Goose was not reported as an introduced species by questionnaire respondents from Belgium and The Netherlands during the current review, despite having been reported in these countries previously (Blair *et al*. 2000). The Netherlands breeding bird atlas suggests that there is accidental breeding of a few feral birds, and breeding was confirmed in three atlas squares during 1998-2000 (SOVON 2002).

Origin of introduction

Feral Bean Goose populations in the UK are thought to originate from escaped ornamental birds since the 1980s. In The Netherlands and Belgium feral populations first appeared during the early 1990s (SOVON 2002).

Changes since previous report

In the previous report (Blair *et al*. 2000) introduced Bean Geese were reported to breed in Belgium and The Netherlands, but these were not reported in 2007. There has been little change in the UK with only a small number of introduced birds present. Breeding is only recorded occasionally. Data in Table 4.1.9.1 are derived from questionnaire correspondents and from SOVON (2002)

Table 4.1.9.1 Bean Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	**1996 - 2002**	**2004 - 2007**
Belgium	(Up to 400)	-
Netherlands	1 - 3	-
UK	Occasional	Occasional
TOTAL	1 - 50	0 - 5

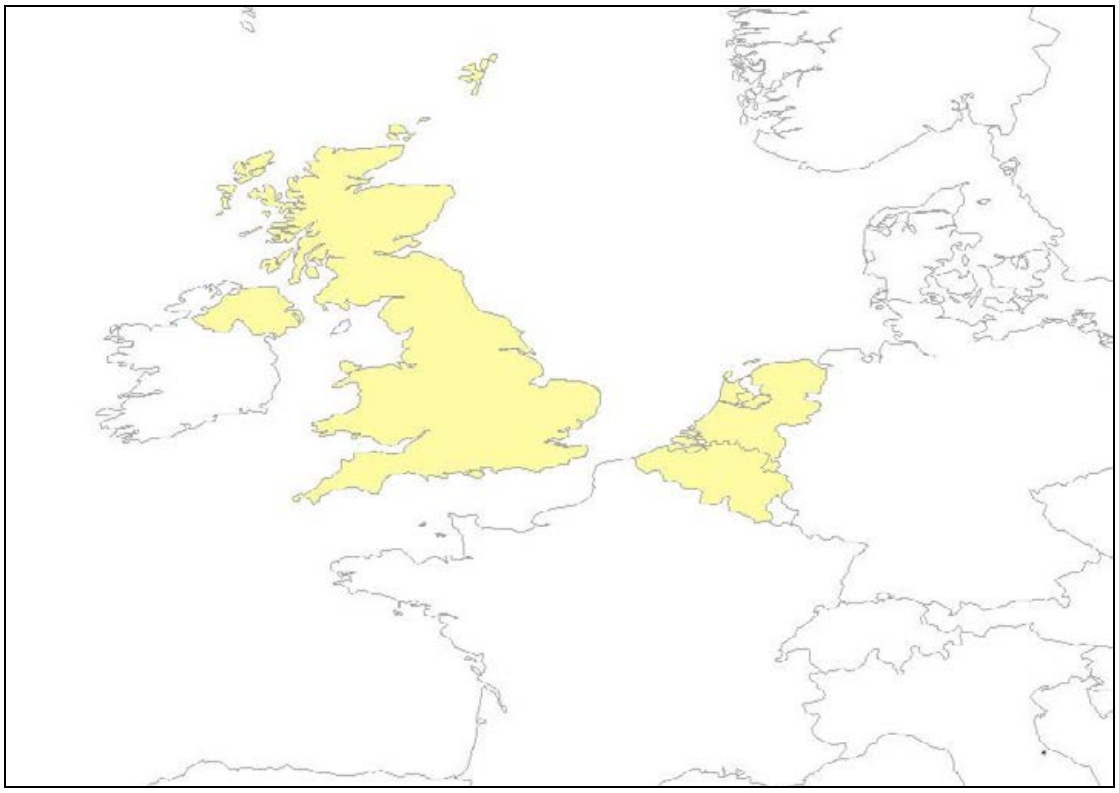

Figure 4.1.9.1 Distribution of introduced Bean Goose in the AEWA area. Bean Geese are native to Northern Eurasia and naturally winter in the countries where they have been introduced.

Effects on native species and habitats

There are no known effects of introduced Bean Geese on native species and habitats.

Hybrids

This species is not known to hybridise in the wild.

4.1.10 Pink-footed Goose *Anser brachyrhynchus*

Pink-footed Goose *Anser brachyrhynchus*	
Status in countries with introduced populations	**LOCALIZED, OCCASIONAL BREEDING**
Introduced breeding range in the AEWA area	France, Germany, UK
Risk status	None known
Status in natural range	Greenland, Iceland, Svalbard: 312,000 (Increasing)

Status in the AEWA area

In the UK a small number of feral birds is present and breeding is reported only occasionally, with a maximum of 1-2 breeding records per year. Up to five pairs of feral birds breed in Germany while in France a small and very localised population of introduced Pink-footed Geese has been present on a lake called Kir à Dijon in the Côte d'Or since 2003 (Dubois 2007). Occasional non-breeding escapes have been recorded in The Netherlands in the past (SOVON 2002), although none were reported by correspondents participating in this review.

Origin of introduction

Feral Pink-footed Geese in the UK are believed to originate from escapes of captive birds that have

occurred since 1990. In France, 14 individuals were introduced onto a lake called Kir à Dijon in 2003 by the Muséum de Dijon (Dubois 2007).

Changes since previous report

Since the previous report small numbers of feral Pink-footed Geese have been recorded in France and Germany. Numbers in the UK remain relatively stable.

Table 4.1.10.1 Pink-footed Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007.

State	1996 - 2002	2004 - 2007
France	-	?[1]
Germany	-	Less than 5
UK	Occasional	1 - 2
TOTAL	0 - 5	3 - 15

[1]Small feral population since 2003; little known about reproduction.

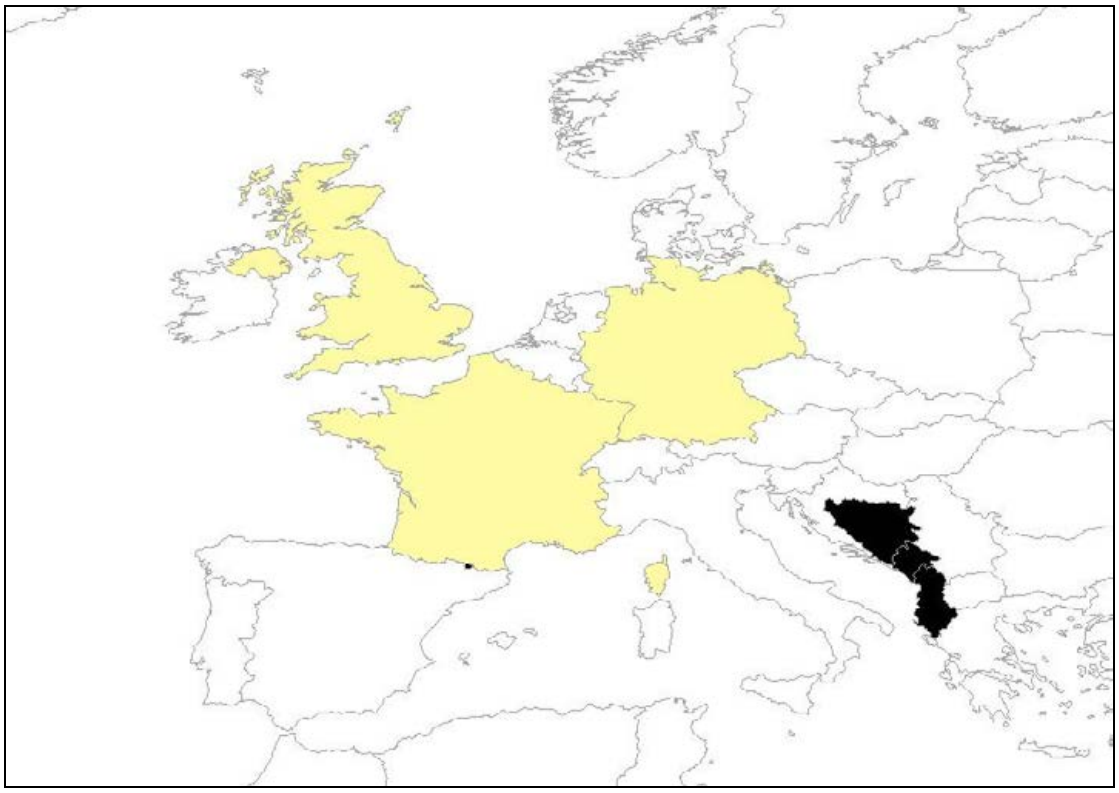

Figure 4.1.10.1 Distribution of introduced Pink-footed Goose in the AEWA area. Pink-footed Geese are native to Greenland, Iceland and Svalbard.

Effects on native species and habitats

This species is not known to affect native species or habitats.

Hybrids

Pink-footed Geese have occasionally hybridised with feral geese of other species in the UK.

4.1.11 Greater White-fronted Goose *Anser albifrons*

Greater White-fronted Goose *Anser albifrons*	
Status in countries with introduced populations	**LOCALIZED, OCCASIONAL BREEDING**
Introduced breeding range in the AEWA area	Germany, Netherlands, UK
Risk status	7
Status in natural range	Arctic Russia, Greenland, Canada & Alaska: 2,640,000 - 3,070,000

Status in the AEWA area

Feral populations of Greater White-fronted Geese occur in Germany, The Netherlands and the UK, but in both countries only a small number of birds are present and very few pairs breed (Table 4.1.11.1), therefore their feral populations in these countries are not thought to be self-sustaining. In the UK, Greater White-fronted Geese breed in small numbers (2-3 breeding pairs) on Islay and in Greater Manchester, and also occur in various other locations.

Origin of introduction

Feral Greater White-fronted Geese in Germany, The Netherlands and the UK are escapes from zoos or private collections in these countries.

Changes since previous report

Numbers of Greater White-fronted Geese in Germany and the UK have remained relatively stable, with up to 5 breeding pairs reported in each country annually. Greater White-fronted Goose was not reported as an introduced species in The Netherlands in 2007, despite being recorded in the previous report (Blair *et al*. 2000).

Table 4.1.11.1 Greater White-fronted Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	**1996 - 2002**	**2004 - 2007**
Germany	Occasional	Less than 5
Netherlands	More than 45	-
UK	c. 5	c. 5
TOTAL	50 - 60	5 - 10

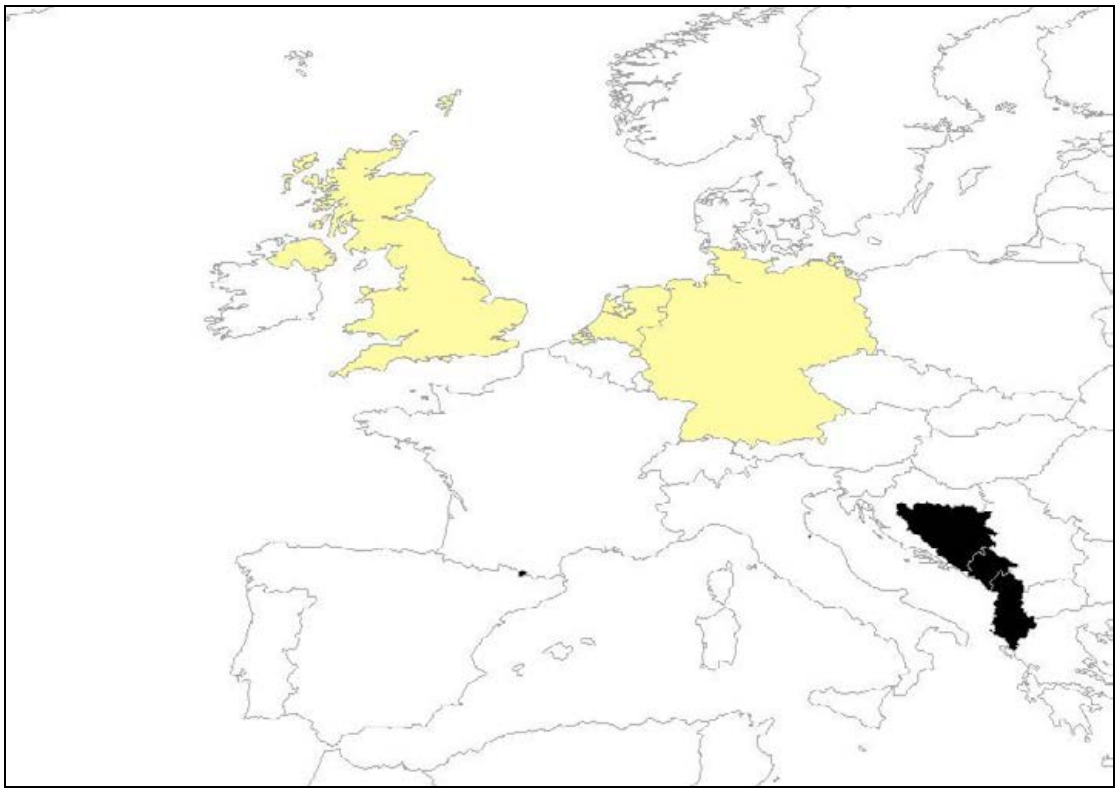

Figure 4.1.11.1 Distribution of introduced Greater White-fronted Goose in the AEWA area. Greater White-fronted Geese are native to Arctic Russia, Greenland, Canada and Alaska.

Effects on native species and habitats

There are no known effects on native species or habitats, although the correspondent from The Netherlands in 1999 stated that feral birds intermixed with wintering Greater White-fronted Geese and it was not known whether either population recruited from the other. This correspondent also stated that the presence of the feral population could affect studies of wintering wild birds that aimed to estimate breeding success from the number of juveniles present, as the breeding success of feral birds was unrelated to that of wild birds.

Hybrids

Hybridisation has occasionally been recorded with other feral goose species in The Netherlands and the UK. This is not thought to present a threat to native species.

4.1.12 Lesser White-fronted Goose *Anser erythropus*

Lesser White-fronted Goose *Anser erythropus*	
Status in countries with introduced populations	**LOCALIZED, OCCASIONAL BREEDING**
Introduced breeding range in the AEWA area	UK (formerly)
Risk status	3
Status in natural range	VULNERABLE
	Northern Scandinavia, Siberia: 28,000 - 33,000 (Declining)

Status in the AEWA area

Lesser White-fronted Geese are native to northern Finland, and the native population in this region is declining and listed as vulnerable. Because of this a reintroduction project was carried out for

conservation reasons, and 143 individuals were released between 1989 and 1997 in northernmost Finnish Lapland. However, more recent work discovered that the captive stock in Finland and Sweden that had been released had bred with Greater White-fronted Geese and with Greylag Geese during their captive history; hence alien genes are present in the introduced population (Ruokonen *et al*. 2000; Ruokonen *et al*. 2007). Furthermore it has been shown that there are genetic differences between the three main populations of Lesser White-fronted Goose creating further genetic differences between the captive stock and the wild Fennoscandian population (Ruokonen *et al*. 2004). The reintroduction project was stopped in 1997 after the genetic problems were discovered. Since then, in 2005 a couple of individuals were released by a private organisation, and later in 2005 tens of individuals escaped from a farm. It is not known whether or not the reintroduced birds have bred in the wild, but there are now concerns that if these birds did interbreed with the wild population they could introduce alien genes into the already vulnerable population. It is thought that there could be similar problems with a reintroduction project in Sweden.

A small number of feral Lesser White-fronted Geese are present in the UK. It is in BOURC category AE*, with records thought to largely represent feral birds but with an occasional wild vagrant. Breeding has been reported occasionally in the past but there are no records in recent years. This species also occurs occasionally in Spain, but is not known to breed.

Origin of introduction

Feral birds in the UK are thought to be escapes from ornamental collections. In Finland, birds were introduced in Lapland in the northern part of the country from 1989 to 1997 as part of a project aiming to support the critically endangered Fennoscandian wild population, before alien genes were discovered in the introduced birds.

Changes since previous report

There has been little change in the numbers of introduced Lesser White-fronted Geese since the previous report, but the problem with the reintroduced birds in Finland and Sweden has been revealed. There have been no breeding records in the UK in recent years.

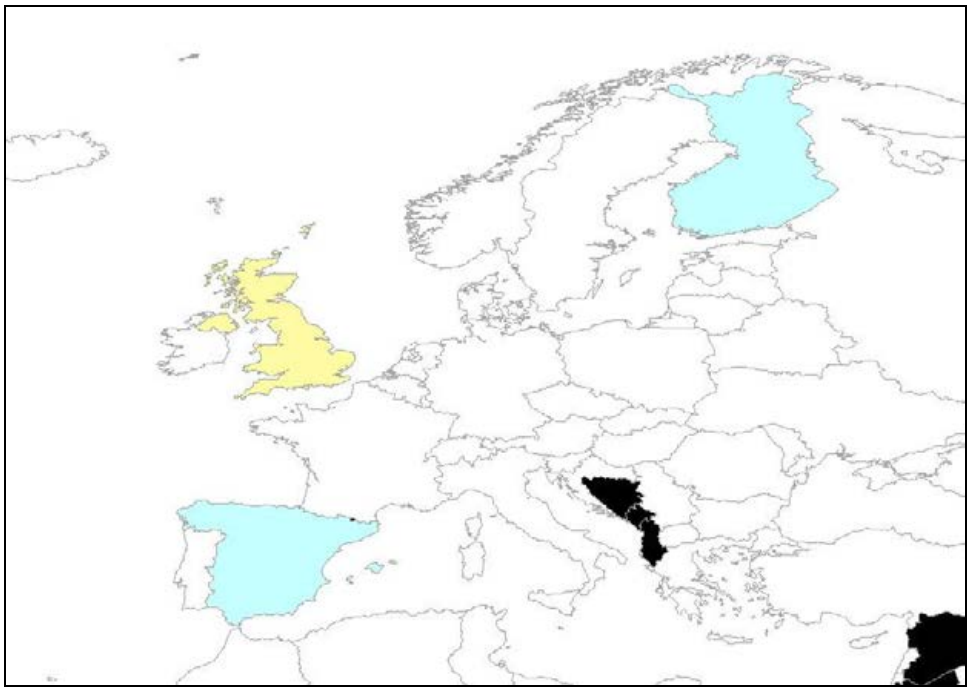

Figure 4.1.12.1 Distribution of introduced Lesser White-fronted Goose in the AEWA area. Lesser White-fronted Geese are native to northern Scandinavia and Siberia.

Effects on native species and habitats

This species is not known to affect native species or habitats, but there are concerns that birds released in Finland (which have inter-bred with Greater White-fronted and Greylag Geese during their captive history) could inter-breed with the critically endangered wild population of Lesser White-fronted Geese in that country, thus introducing alien genes to the wild population.

Hybrids

This species is not known to hybridise in the wild, but birds released in Finland as part of a re-introduction project were later found to have hybridised with Greylag Goose and Greater White-fronted Goose during their captive history.

4.1.13 Greylag Goose *Anser anser* (including domesticated Greylag Goose *Anser anser forma domestica*)

Greylag Goose *Anser anser*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING RAPIDLY**
Introduced breeding range in the AEWA area	France, Germany, Ireland, Israel, Italy, Netherlands, UK. Probably also South Africa. Possibly also Lithuania, Switzerland, Ukraine.
Risk status	2, 3, 4, 5, 6, 7
Status in natural range	Europe, central Asia: 1,032,000 - 1,082,000 (Increasing)

Status in the AEWA area

The status of introduced Greylag Goose populations is sometimes difficult to determine because this species has been widely introduced within its native range, so determining which birds are feral can be difficult. Furthermore, feral, hybrid or domesticated forms of this species are often ignored in bird censuses. In the questionnaire surveys carried out as part of this project, there was some inconsistency in the reporting of introduced Greylag Geese and *forma domestica*, with some countries only reporting the species in one of the two years (1999 or 2007), with no mention of the species in the questionnaire from the other year. This is particularly a problem in countries where both natural and introduced populations of this species occur and there may be difficulties in determining which birds are introduced. Only three countries (Germany, Ireland and the UK) reported introduced Greylag Geese or domesticated forms in both 1999 and 2007, but nine additional countries (Austria, Finland, France, Lithuania, Netherlands, South Africa, Switzerland, Ukraine and the United Arab Emirates) reported introduced Greylag Geese or feral hybrids (often in large numbers) in 1999 only. Of these, the species was reported to be widespread in France, The Netherlands and South Africa and therefore is unlikely to have completely disappeared from these countries since 1999. Two additional countries (Israel and Italy) reported introduced Greylag Geese in 2007 only, but both reported that these populations had been introduced before the time of the previous report in 1999.

In Europe, introduced Greylag Geese have been reported from a number of countries where this species also occurs naturally either in the breeding season or in the winter, or both. In Germany and The Netherlands, large populations of feral domestic geese were reported in 1999 (3,500-9,500 breeding pairs in Germany and 3,500-9,500 individuals in The Netherlands) but these were not mentioned by questionnaire respondents in 2007, although we assume that these populations must still exist, particularly as the recent Netherlands breeding bird atlas (SOVON 2002) reported populations of 3,000-4,000 breeding pairs and an additional 4,000-6,000 non-breeding individuals during 1998-2000. It is possible that feral *forma domestica* have been included in the introduced Greylag Goose totals reported by German questionnaire respondents in 2007, but Dutch questionnaire respondents in 2007 did not report introduced Greylag Geese.

In Germany 10,000 breeding pairs of Greylag Geese were reported in 1999 as well as the 3,500-9,500 breeding pairs of feral domestic geese *Anser anser forma domestica*. In 2007 questionnaire respondents reported that 17,000-20,000 breeding pairs were present during 2005, but it is not clear whether this total includes the domestic form or not. In France 58 - 59 pairs bred in 1999, while in 2006 this number had risen to 141-162+ (Table 4.1.13.1; Reigel & les coordinateurs espèce 2007).

In Switzerland and Austria, small numbers of introduced Greylag Geese were reported by questionnaire respondents in 1999 but the species was not mentioned in 2007. Ukraine reported the presence of Greylag Geese (and their hybrids) at the Ascania Nova reserve (a former hybridisation research centre) in 1999, but these were not known to be present in 2007. South Africa reported that the domestic form of Greylag Goose was a widespread breeding species in urban areas within the Western Cape Province in 1999, but questionnaire respondents in 2007 did not mention this species.

Questionnaire respondents from Italy in 2007 reported that Greylag Goose had been introduced since 1978, but this species was not mentioned by the previous questionnaire respondents in 1999. This could possibly be because the species was released as a re-introduction because Greylag Geese were thought to have bred historically in northeast Italy. There were 280-350 breeding pairs of this species in 2004, and with the population thought to be increasing there is likely to be a larger number than this at the present time.

In Ireland, questionnaire respondents reported that around 8,000 individuals are currently recorded in winter, but presumably some of these are migrant Greylag Geese that occur naturally, with the numbers augmented by resident introduced birds. Just under 1,000 introduced individuals were present in Ireland in 1999, with more than 4,000 migrant birds. It is unclear whether the population increase to the current level was caused by equal rates of increase in introduced and migrant populations, or whether one population has increased faster than the other.

Populations of re-established Greylag Geese are increasing in the UK (Austin *et al*. 2007). In 2000, there were an estimated 24,522 full-grown individuals in the UK, an increase of 170% since the previous survey in 1988-91. This represents an average increase of 9.4% per year, so if populations have continued to increase at a similar rate population sizes in 2007 could be much higher.

In Israel, around 10 pairs breed in Tel Aviv. The population size and range are thought to be increasing, but it is unclear at present whether these birds form a self-sustaining population. Two individuals were reported from the United Arab Emirates in 1999 on Sir Bani Yas Island, but there is no evidence of breeding here. In 2007 this species was no longer known to be present in the United Arab Emirates.

Introduced Greylag Geese and domestic varieties of this species have been recorded in Spain but are not known to breed there.

Origin of introduction

Introductions of Greylag Geese or escapes of domesticated hybrids have taken place in Germany since the 1950s, or perhaps earlier, and in The Netherlands since 1972 or earlier. In the 1999 report, French questionnaire respondents reported that birds had been introduced by hunters frequently since the 1990s, and these introductions included some birds of the non-native subspecies *rubirostris*. Greylag Geese have been introduced to Ireland since 1730, but most introductions have taken place since the 1950s. In the UK, introduced Greylag Geese are thought to represent a mixture of semi-domesticated escapes over many centuries and birds released for shooting during the past 100 years. Birds in Israel were deliberately released on the central coast plains during the 1990s.

In Italy a number of introductions have taken place as part of a reintroduction programme, and these are very well documented. In northeast Italy, birds were released in 1978 at Marano Lagoon, in the early eighties at Cornio Alto marsh, in 1984 at Cavanata marsh, in 1986 at Averto marsh, in the early

nineties at Portomaggiore, Torrile and Mirandola marshes, and in several sites of the Bologna plain. In northern Italy, birds were released in 1986 at Piedmont, Lombardia and Emilia-Romagna.

Changes since previous report

Although the numbers of breeding pairs of introduced or re-established Greylag Geese or their feral/domestic relatives are not known precisely in many countries it is clear that their populations are increasing rapidly in many parts of their range. Ireland, Italy, Germany and the UK reported increasing populations of Greylag Goose in their questionnaires and The Netherlands suggests that the numbers of domesticated Greylag Geese *Anser anser forma domestica* are increasing in The Netherlands in their latest Atlas (SOVON 2002). Numbers are also increasing in France (Riegel *et al*. 2003). South Africa, Switzerland, Lithuania and the Ukraine reported having feral populations of the domesticated form of Greylag Goose in 1999, but correspondents from these countries did not mention this species in 2007.

Table 4.1.13.1 Greylag Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
France	58 - 59[1]	141 - 162+
Germany	10,000	17,000 - 20,000
Ireland	1,000	(8,000[2])
Israel	-	c. 10
Italy	-	280 - 350
Lithuania	Confirmed but no data	-
Netherlands	(3,500 - 9,000)	-
South Africa	Confirmed but no data	-
Switzerland	"Breeding at 2 sites"	-
Ukraine	Confirmed but no data	-
UK	(24,522)	(More than 24,522[3])
TOTAL	More than 20,000	At least 20,000 - 40,000

[1]Some birds of subspecies *rubirostris* (not found naturally in western Europe) were introduced by hunters, and bred, but due to overhunting these populations may not be self-sustaining. Natural population also expanding e.g. in the Camargue. No data on reproduction or numbers.
[2]8,000 individuals present in winter including an unknown proportion of naturally occurring migrants (in 1999 there were 4,000 migrants and 1,000 introduced birds).
[3]Population estimate for re-established Greylag Goose in 2000 was 24,522 full-grown individuals in summer, with an average per-annum increase of 9.4% during the 1990s (Austin *et al*. 2007). Population size in 2007 unknown, but likely to have continued to increase since 2000.

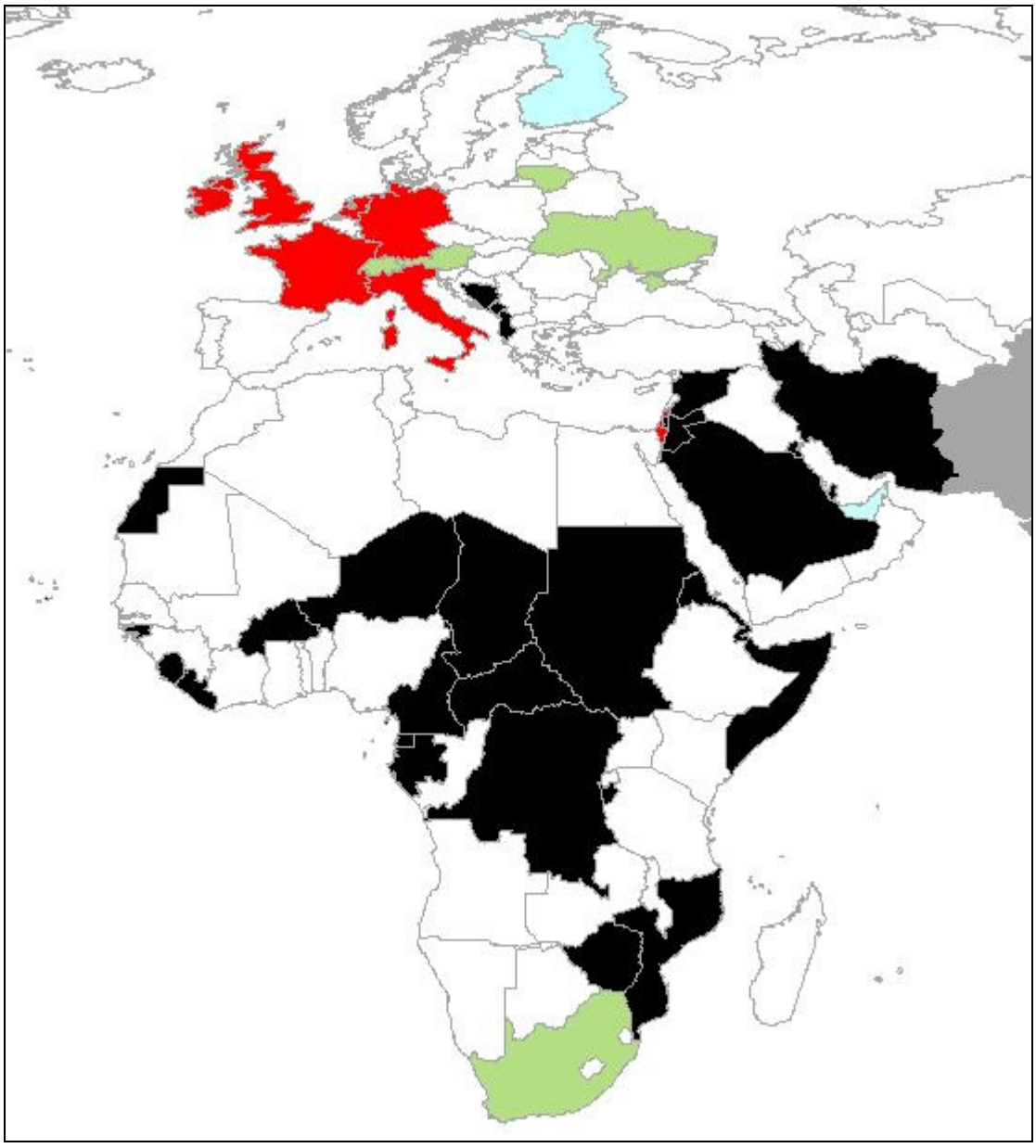

Figure 4.1.13.1 Distribution of introduced Greylag Goose in the AEWA area. Greylag Geese are native to Europe and central Asia. Note that countries are coloured green because Greylag Goose was not reported from those countries in 2007; however it is likely that this lack of reporting does not represent a true population decline in most cases.

Effects on native species and habitats

Questionnaire respondents from many countries suggested that introduced Greylag Geese might displace native species but none provided data to confirm whether this was actually happening or which native species would be affected.

Hybrids

This species hybridises fairly regularly with Greater Canada Goose, domestic goose varieties and other introduced goose species. Hybrids are particularly common in Germany and The Netherlands, where there are established populations of hybrid domestic-type geese, but have also been recorded frequently in Ireland and the UK.

4.1.14 Bar-headed Goose *Anser indicus*

Bar-headed Goose *Anser indicus*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING SLOWLY**
Introduced breeding range in the AEWA area	Belgium, France, Germany, Netherlands, Switzerland, UK
Risk status	3
Status in natural range	Central & southern Asia: 52,000 - 60,000

Status in the AEWA area

The largest population of introduced Bar-headed Geese in western Europe is in The Netherlands and Belgium, with around 100-125 breeding pairs in The Netherlands and 25-30 in Belgium. Numbers are increasing in these countries and it is likely that these birds are beginning to form an established and self-sustaining population. Around 100 individuals are present in the UK but these are widely dispersed and there are few breeding records (although breeding is probably under-recorded), with perhaps 10 pairs breeding annually. Similar numbers (around 10 pairs) breed in Germany, and in France breeding has occurred annually since 1999 at 4 sites; every year since 1999 at Lac Kir (5 young 2005; 4 young 2006), annually in Auvergne with up to three pairs breeding here, and at two other sites there are pairs of non-flying (presumably escaped) birds that breed in the wild (Dubois 2007).

A small number of Bar-headed Geese has been recorded annually in Switzerland since the mid 1990s, and the first two confirmed breeding records have been reported in recent years.

This species is present in northern Italy, but has not been recorded breeding in recent years despite being reported as breeding in 3 different provinces during the 1999 (Blair *et al*. 2000). There are small numbers of birds in the Czech Republic but there are no regularly breeding pairs here. This species has been reported very occasionally in Spain.

Origin of introduction

Bar-headed Geese have been introduced for ornamental reasons in parks in several locations in Europe, and birds have also escaped from captivity in countries such as the UK, The Netherlands and Germany. Feral or escaped birds were first reported in the wild in the 1960s in the UK and in 1966 in Antwerp in Belgium. The first record in Italy in 1969 was a ringed bird from Germany, where it had been known as an escape since 1968 (Blair *et al*. 2000).

Changes since previous report

Numbers of Bar-headed Geese have increased in The Netherlands and Belgium since 1999 (Table 4.1.14.1), where there is an established population of introduced birds. Numbers of breeding pairs are relatively stable in France, Germany and the UK, although the total number of individuals in the UK may have increased with 80 individuals estimated in 1999 and around 100 in 2007. This species has also been recorded breeding in Switzerland in recent years, but there have only been 2 confirmed breeding records so far. The number of individuals recorded in winter bird censuses in Switzerland has been relatively stable since the late 1990s, with less than 10 individuals recorded at any one time.

Small numbers of Bar-headed Geese were recorded breeding in Italy and the Ukraine in 1999 but there were no known breeding pairs in 2007, although birds were still present in Italy. Non-breeding individuals were reported in Austria, Finland, Iceland, Romania and Sweden in 1999 (Blair *et al*. 2000) but correspondents from these countries did not report their presence in 2007. Estimates for The Netherlands in the earlier period are based on the 1998-2000 breeding bird atlas (SOVON 2002).

Table 4.1.14.1 Bar-headed Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Belgium	Not breeding (c. 5)	At least 25 - 30
France	2 - 6	4 - 6
Germany	5-10	c. 10
Italy	Confirmed in 3 provinces	Present, no breeding record
Netherlands	70 - 100	100 - 125
Switzerland	Present, not breeding	0 - 2
Ukraine	Confirmed but no data	-
UK	5	At least 3 - 10[1]
TOTAL	85 - 150	140 - 190

[1]Only 3 pairs recorded 2003-2005 but breeding attempts are often not documented. Correspondents suggest that more than 10 pairs probably breed annually.

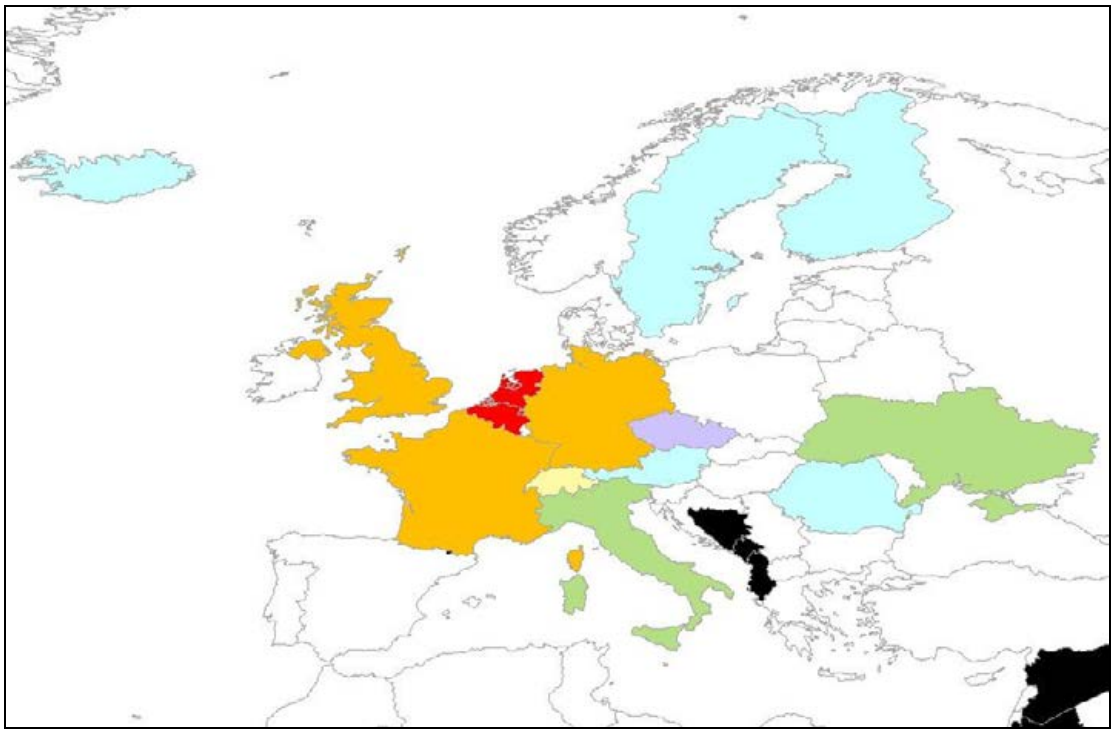

Figure 4.1.14.1 Distribution of introduced Bar-headed Goose in the AEWA area. Bar-headed Geese are native to central and southern Asia.

Effects on native species and habitats

This species is not known to affect native species or habitats.

Hybrids

Introduced Bar-headed Geese have hybridised with Greylag Geese in Germany, The Netherlands and the UK, and in Italy they have hybridised with Barnacle Goose and Snow Goose in "semi-captive" conditions.

4.1.15 Snow Goose *Chen caerulescens*
Other Names: ***Anser caerulescens***

Snow Goose *Chen caerulescens*	
Status in countries with introduced populations	**LOCALIZED, STABLE**
Introduced breeding range in the AEWA area	Germany, Netherlands, UK
Risk status	3
Status in natural range	North American Arctic, Greenland: 7,564,000 (Increasing) Northern Far East Asia: 20 - 30

Status in the AEWA area

Small numbers of Snow Geese breed in Germany, The Netherlands and the UK, with birds wintering regularly in northern Italy. In Germany, at least five pairs bred in 2005 and the population is thought to be increasing and self-sustaining. This species is only recorded breeding occasionally in The Netherlands, with 0-1 pairs breeding annually during 1998-2000 (SOVON 2002) and two breeding pairs recorded in 2005. Snow Goose is in BOURC category ACE* as wild vagrancy does occur occasionally, but escaped birds are found widely throughout the country. An established naturalised population of around 40 birds breeds regularly on the island of Coll, with six pairs recorded breeding there in 2005. Only small numbers of pairs are proven to breed elsewhere in the country (e.g. only two pairs in 2005), but there are thought to be at least 100 individuals, which are widespread throughout the UK. Like other introduced goose species, Snow Goose is thought to have benefited from the creation of flooded gravel pits and other man-made waterbodies.

A few birds were present in 1999 in Ukraine at a former hybridisation research centre, but these are no longer known to be present. Two birds were recorded in Switzerland in the winter of 2005/06 but there are no other records of Snow Geese in this country. Escapes have been recorded in France and Spain occasionally, but the species is not known to have bred in these countries.

Origin of introduction

Introduced Snow Geese in Europe are thought to be escapes from ornamental collections. They have been recorded in the UK since the 1970s, in Italy since 1978 and in Germany since 1980. Birds in Italy are thought to originate from outside that country. The timing of introduction in The Netherlands is not known.

Changes since previous report

There has been no major change in introduced Snow Goose populations since 1999, except that birds now breed regularly in Germany rather than occasionally. However, the population is still very small, with only around five pairs recorded breeding annually in Germany.

Table 4.1.15.1 Snow Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	**1996 - 2002**	**2004 - 2007**
Germany	Occasional	5
Netherlands	-	2
Ukraine	Confirmed but no data	-
UK	10 (170)	8 (More than 100)
TOTAL	10 - 20	c. 15

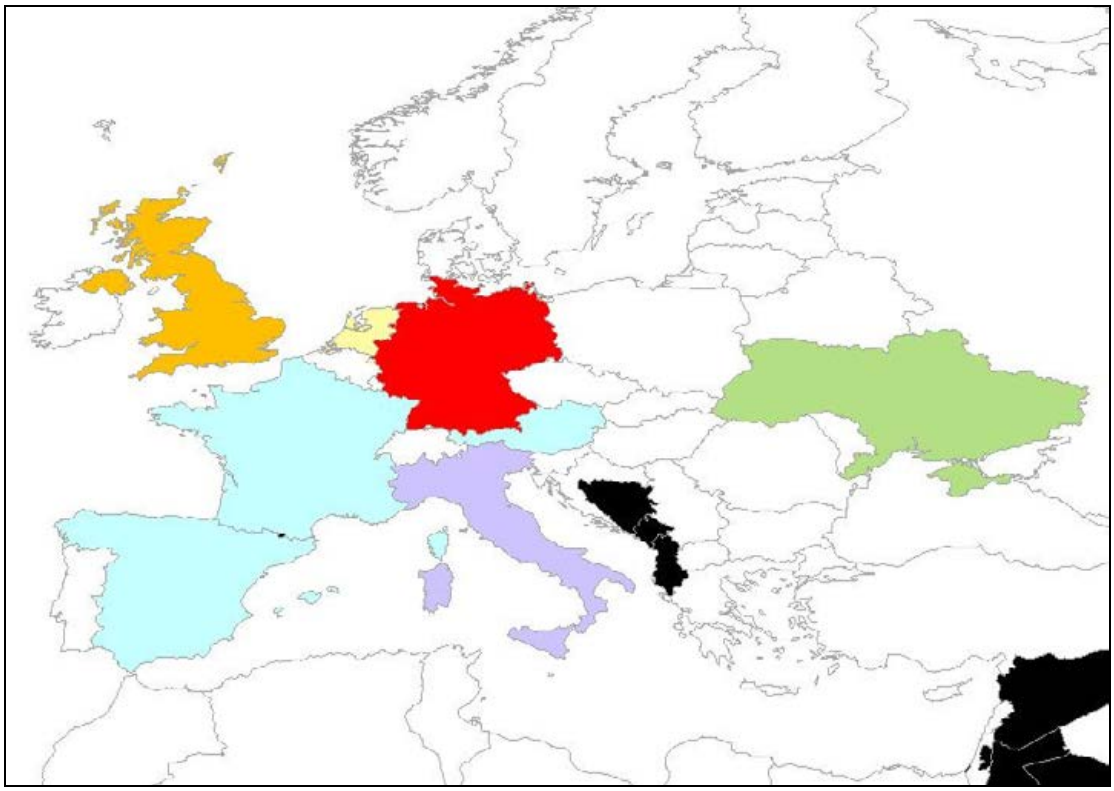

Figure 4.1.15.1 Distribution of introduced Snow Goose in the AEWA area. Snow Geese are native to the North American Arctic, Greenland and northern far-east Asia.

Effects on native species and habitats

There are no known effects on native species and habitats, but Snow Geese are highly aggressive near their nests and this could potentially affect other species at their breeding sites.

Hybrids

Snow Geese may hybridise with other introduced goose species. Hybridisation has been recorded in the wild in The Netherlands and the UK with both Greylag Geese and Barnacle Geese.

4.1.16 Emperor Goose *Chen canagicus*
Other Names: *Anser canagicus*

Emperor Goose *Chen canagicus*	
Status in countries with introduced populations	**LOCALIZED, OCCASIONAL BREEDING**
Introduced breeding range in the AEWA area	Netherlands, UK
Risk status	3
Status in natural range	NEAR THREATENED
	Alaska, North-eastern Siberia: 84,500 (Stable)

Status in the AEWA area

Small numbers of introduced Emperor Geese breed in the UK and The Netherlands. There may be more than 30 individuals in the UK, with 21 recorded at South Walney in 2004, but only a handful of individuals are recorded breeding each year. Non-breeding individuals have also been recorded occasionally in Switzerland.

Origin of introduction

Introduced Emperor Geese are thought to be escapes from collections. In the UK they have occurred since the 1980s, but the timing of their appearance in The Netherlands is not known.

Changes since previous report

The first confirmed breeding records in the UK occurred in 2001, after the time of the previous report. Although breeding was not reported in The Netherlands in 1999, and five pairs were recorded in 2005, the species is not thought to be increasing in The Netherlands. However, in the UK the population is thought to be increasing although it is not thought to be self-sustaining at the present time.

Table 4.1.16.1 Emperor Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Netherlands	-	5
UK	-	2 (More than 30)
TOTAL	0	5 - 10

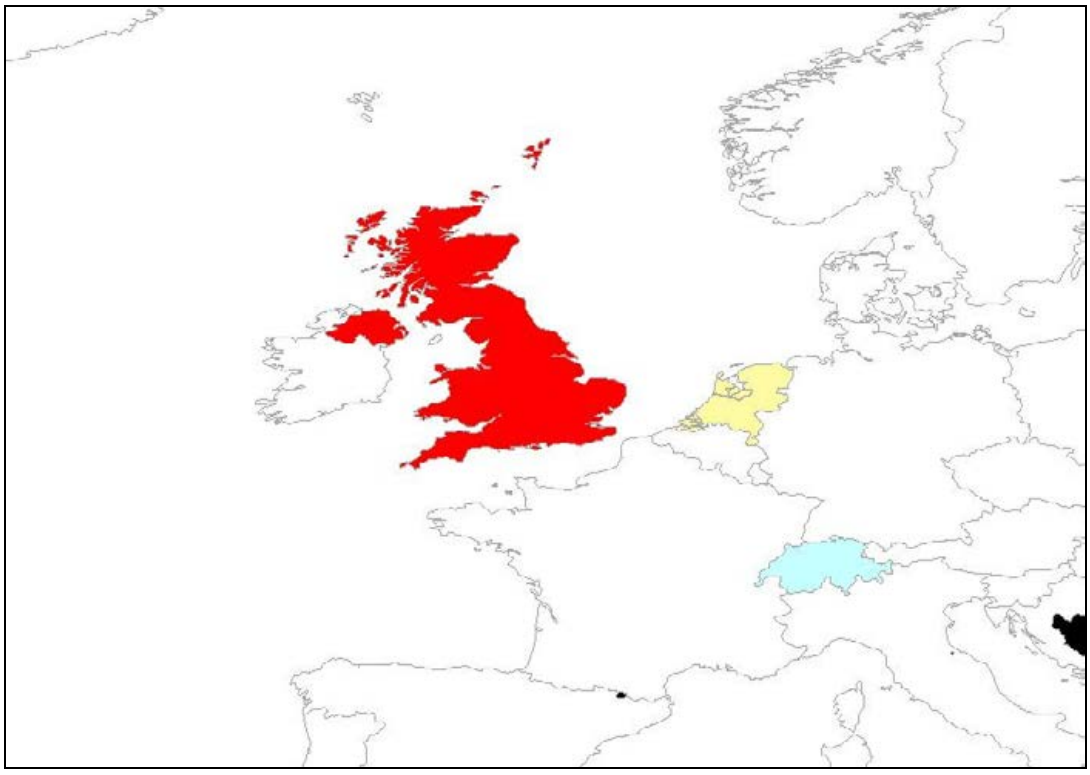

Figure 4.1.16.1 Distribution of introduced Emperor Goose in the AEWA area. Emperor Geese are native to Alaska and north-eastern Siberia.

Effects on native species and habitats

There are no known effects on native species and habitats.

Hybrids

Hybridisation in the wild has been recorded in The Netherlands with Barnacle Goose, but occurs rarely. There are no other records of hybridisation in the wild.

4.1.17 Greater Canada Goose *Branta canadensis* & Cackling Goose *Branta hutchinsii*
Other Names: Cackling Goose is also known as Lesser Canada Goose

Greater Canada Goose *Branta canadensis* & **Cackling Goose** *Branta hutchinsii*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING RAPIDLY**
Introduced breeding range in the AEWA area	Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Sweden, Switzerland, UK
Risk status	2, 3, 4, 5, 6
Status in natural range	North America: c. 6,400,000 (Stable / Increasing)

Status in the AEWA area

The accounts for Canada Goose and Cackling Goose have been combined due to the recent separation of these two species since the previous report. Many countries did not report separate estimates for Cackling Goose; perhaps because it is still considered as a subspecies of Canada Goose by some countries.

Greater Canada Goose populations are widespread and increasing rapidly throughout northwest Europe, and showing signs of spreading gradually into southern and eastern Europe (Table 4.1.17.1, Fig. 4.1.17.1). The largest population of introduced Greater Canada Geese is in the UK, where there were an estimated 89,000 adults present in the year 2000 within an increasing population (Austin *et al*. 2007). Approximately 1,050 individuals are estimated to be present in Ireland. There are also large numbers in Scandinavia, with 10,000 breeding pairs estimated in Sweden, more than 2,000 pairs in Norway and 7,000 pairs in Finland; the population is thought to be increasing in these three Scandinavian countries. One correspondent from Sweden reported that Greater Canada Geese had benefited from a switch from spring-sown to autumn-sown cereals had led to an increase in the food supply during the autumn and early winter. In contrast to the other Scandinavian countries, correspondents from Denmark reported only 20 breeding pairs. An estimated 3,200 pairs breed in The Netherlands, and around 1,500 pairs were reported from each of Germany and Belgium. In France, populations have increased exponentially since the early 1990s, with around 4,390-4,700 individuals estimated in France in 2006.

Elsewhere, around 5 pairs breed annually in Austria, with some non-breeders also present, and in northern Italy 1-2 pairs are recorded breeding each year from a small flock of around 12 individuals. Greater Canada Geese have been recently been recorded breeding in Poland around Gdansk, with around 3 pairs recorded each year so far. However, with the population increasing in neighbouring countries such as Germany the numbers in Poland are likely to increase. Breeding has recently been recorded in Switzerland for the first time, and numbers here also seem likely to increase.

Greater Canada Geese have been recorded breeding occasionally in the Ukraine in the past, and there was one breeding record reported in Russia in the previous review (Blair *et al*. 2000), but there have been no breeding records in recent years.

A small number of individuals are present in the Czech Republic, but as yet there are no regularly breeding pairs in this country. However with the population increasing in western Europe it seems likely that breeding Greater Canada Geese may spread into the Czech Republic soon.

In Estonia, Greater Canada Geese are occasionally seen in both summer and winter, or during migration (birds may migrate from breeding grounds in Scandinavia to France and Germany during the winter if weather is harsh (Blair *et al*. 2000)). These sightings occur mainly in coastal areas of northern and western Estonia, but there are no breeding records. Greater Canada Geese are also recorded occasionally in Latvia and Spain, but as yet there are no breeding records from these countries.

Cackling Goose was reported as an introduced species in 2007 only (it had not been split from Greater Canada Goose in 1999, with both species classed as subspecies of Canada Goose at that time). However, only two countries, The Netherlands and the UK, reported Cackling Geese as being present in 2007, with 200 individuals estimated in The Netherlands in 2005. In the UK the species is known to be widespread in relatively small numbers (compared to Greater Canada Goose) but there is no population estimate as yet. Although no other countries reported Cackling Goose it seems likely that a proportion of the birds recorded as "Canada Goose" elsewhere in northern and western Europe may in fact be Cackling Goose, as some countries may not yet have split the two species.

Origin of introduction

The earliest introductions of Greater Canada Geese into Europe were in the UK, where introductions for ornamental purposes, food and hunting, and escapes from ornamental collections have occurred since the 1700s (Lever 2005; Rehfisch *et al*. 2006). Elsewhere in western Europe, birds have largely been introduced since the 1950s, again for ornamental purposes, or due to escapes from ornamental collections. However, in Scandinavia birds have been released in Norway, Sweden and Finland primarily for hunting purposes since the 1930s, 1940s and 1960s respectively. There have been no introductions in Sweden since 1992 when it was made illegal to introduce this species.

Birds occurring in Denmark, Estonia, Latvia and Spain are thought to relate to introductions in neighbouring countries from which the population has spread.

In Poland, Greater Canada Geese escaped from Gdansk Zoo in 2004 and have since established a very small but self-sustaining breeding population in the surrounding area. In Luxembourg two individuals were released in 2000 in the Troivierges area by their owners, although the reason for this is not known. Numbers and the range occupied have since increased in Luxembourg, possibly being supplemented by immigration of introduced birds from elsewhere in Europe.

Changes since previous report

Greater Canada Goose numbers have increased since the time of the previous report (Blair *et al*. 2000) in all countries throughout northern and western Europe where established populations exist (Table 4.1.17.1, Fig. 4.1.17.1). Occasional breeding that was reported in Russia and Ukraine at the time of the previous report was not reported by correspondents participating in this review, suggesting that populations have, as yet, failed to establish in those countries. Since the previous report (Blair *et al*. 2000), breeding has been reported in Switzerland and Poland for the first time, and individuals have been recorded in Spain but with no known breeding attempts. Figures in Table 4.1.17.1 are derived from Blair *et al*. (2000), SOVON (2002), Austin *et al*. (2007) and questionnaire responses.

Table 4.1.17.1 Greater Canada Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria	2 - 5	c. 5
Belgium	More than 300	More than 1,500
Denmark	?[1]	20
Finland	3,500	7,000
France	200 (600 - 700)	Confirmed (4,390 - 4,700)
Germany	500 - 1,000	1,400 - 1,500
Ireland	(970)[3]	Confirmed (1,050)
Italy	1 (c. 10)	1 - 2 (c. 12)
Luxembourg	-	5 - 10
Netherlands	1,000 - 1,400	3,200
Norway	2,000	More than 2,000
Poland	-	3
Russia	1	-
Sweden	5,000	10,000
Switzerland	Present but not breeding	1
Ukraine	Confirmed but no data	-
UK	Confirmed (89,000)	Confirmed (More than 89,000)
TOTAL	32,700 – 33,900	48,500 – 73,750

[1]No questionnaire response was received from Denmark in 1999.

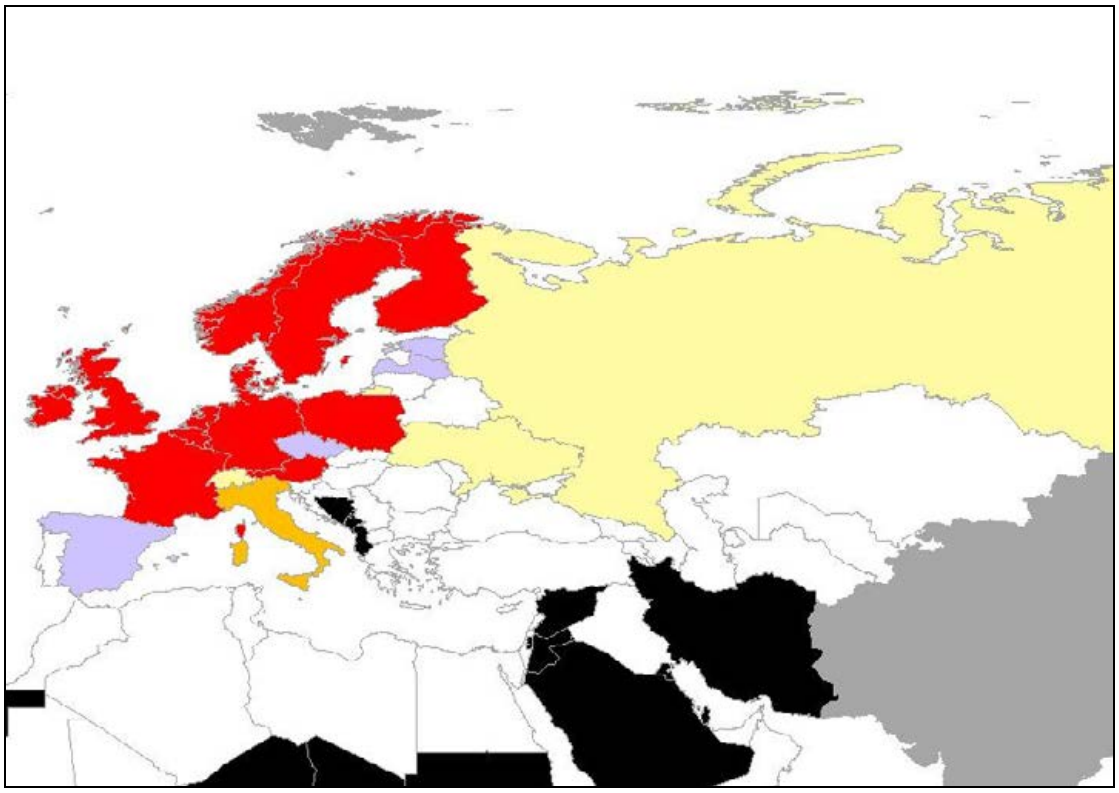

Figure 4.1.17.1 Distribution of introduced Greater Canada Goose in the AEWA area. Canada Geese are native to North America.

Effects on native species and habitats

Correspondents have suggested that introduced Greater Canada Geese have had a number of effects on native species and habitats. They often exhibit direct aggression, through strong territorial behaviour, to other bird species (Rehfisch *et al*. 2006; Dubois 2007), and where high breeding concentrations occur this may prevent smaller species from establishing territories. They have been observed to kill both adult and young Moorhen *Gallinula chloropus* and Coot *Fulica atra* (Fabricius *et al*. 1974). In Sweden, introduced Greater Canada Geese are known to have aggressive interactions with native Greylag Geese (Fabricius *et al*. 1974), and in Norway they are thought to displace native geese and divers. They also compete for food with native bird species, and may damage wetland habitats by overgrazing aquatic and terrestrial vegetation, and by trampling vegetation; they can also be an agricultural pest (Rehfisch *et al*. 2006). Where high numbers of Greater Canada Geese occur, faecal deposition can be a problem and may cause eutrophication of water bodies, or a high density of droppings may change soil conditions on a local scale. There have been some public health concerns relating to faeces in recreational parks, but there has been no research to determine whether this is a public health issue (Dubois 2007).

Hybrids

Introduced Greater Canada Geese have regularly been recorded to hybridise with a range of other introduced goose species throughout their European range, including Greylag Geese *Anser anser*, domestic/hybrid forms of Greylag Goose *A. anser forma domestica*, Bar-headed Geese *Anser indicus* and Barnacle Geese *Branta leucopsis*. Cackling Geese may also hybridise with Barnacle Geese, and there have been suggestions of hybridisation between Cackling Geese and Greater Canada Geese occurring occasionally, although these may be more difficult to detect due to the similar appearance of the two species, and the very recent split of these two species, formerly considered to be subspecies. Hybridisation with naturally occurring (rather than introduced) geese has been recorded rarely, but is known to have occurred with native Greylag Goose and Barnacle Goose. Hybridization may present a threat to native Greylag Geese in Scotland (Welch *et al*. 2001; Rehfisch *et al*. 2006). Breeding attempts between Greater Canada Goose and Mallard have also been recorded (Rehfisch *et al*. 2006).

4.1.18 Barnacle Goose *Branta leucopsis*

Barnacle Goose *Branta leucopsis*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING**
Introduced breeding range in the AEWA area	Austria, Belgium, France, Germany, Netherlands, UK
Risk status	4, 5, 7
Status in natural range	Greenland, Svalbard, Northern Russia, East Baltic: 503,400 (Increasing)

Status in the AEWA area

The largest population of introduced Barnacle Geese in the AEWA area is in the UK, where more than 1300 individuals are present and at least 100 pairs breed each year. In mainland Britain at least 1000 introduced birds are thought to be present, and are widely distributed throughout the country with breeding reported from 14 counties, but likely to be substantially under-recorded. Around 300 birds are present on Strangford Lough in Northern Ireland. Substantial introduced populations are also present in Belgium (180-250 pairs) and Germany (around 190 pairs bred in 2005).

A small and localised introduced population is present in Austria but only one or two pairs breed each year. Similarly in France three different pairs have been recorded breeding since 2000, two of which have bred only once while the other has bred annually since 2000.

Barnacle Goose was reported as an introduced species in The Netherlands in the previous report (Blair *et al*. 2000), with around 80 pairs breeding, but was not reported by correspondents participating in the

current review. However, The Netherlands breeding bird atlas suggested that 750-1,100 breeding pairs were present in 1998-2000 and these were thought to derive largely from releases and escapes (SOVON 2002). There is no indication that this population has declined or been controlled since this time.

Introduced birds have also been recorded in Finland, Norway and Switzerland, but they are not known to have bred in these countries.

Origin of introduction

In Austria, a small number of free-flying Barnacle Geese were introduced during the 1980s at Traunsee in Upper Austria as a study population for the Konrad Lorenz ecoethological station in Grünau.

Introduced populations of Barnacle Geese in Belgium, Germany and the UK are all thought to originate from escaped ornamental birds, and were first recorded in Germany in the 1970s, in the UK during the 1980s, and in Belgium in 1989. In The Netherlands, most Barnacle Geese present during the breeding season are thought to derive from releases and escapes from collections, although some may relate to wounded wild birds, particularly in the Delta area (SOVON 2002).

Changes since previous report

Numbers of introduced Barnacle Geese are thought to be increasing in Austria, Belgium, Germany and the UK. Information on numbers and distribution shown below is derived from Blair *et al*. (2000), SOVON (2002). Numbers in the UK are based on BTO unpublished data, following methods described in Austin *et al*. (2007).

Table 4.1.18.1 Barnacle Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria	1 - 3	1 - 2
Belgium	50	At least 180 - 250
France	-	1 - 2
Germany	12 - 25	c. 190
Netherlands	750 - 1,100	More than 750 - 1,100
UK	At least 30 (1,900 - 2,500)	(More than 2,000)
TOTAL	840 - 2,180	1,620 - 2,550

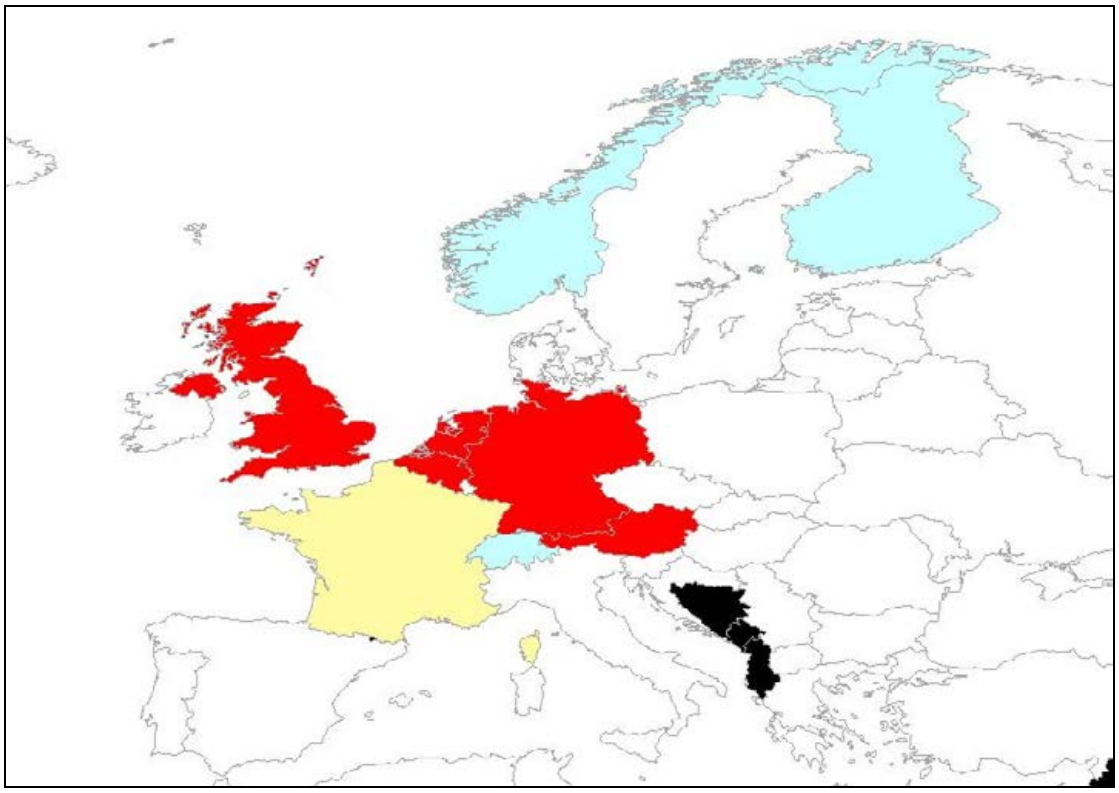

Figure 4.1.18.1 Distribution of introduced Barnacle Goose in the AEWA area. Barnacle Geese are native to Greenland, Svalbard, northern Russia and the eastern Baltic.

Effects on native species and habitats

Introduced Barnacle Geese may affect native habitats. In Belgium they have been shown to damage small ponds or shallow mesotrophic waterbodies by faecal deposition and by overgrazing of aquatic vegetation. No effects on native species or habitats have been recorded in other countries but this may be due to a lack of information rather than the absence of any effects. Further research would be useful.

Hybrids

Introduced Barnacle Geese have not been recorded to breed with native species; however they have been known to breed with other introduced goose species.

4.1.19 Upland Goose *Chloephaga picta*
Other Names: Magellan Goose

Upland Goose *Chloephaga picta*	
Status in countries with introduced populations	**LOCALIZED, INCREASING**
Introduced breeding range in the AEWA area	Belgium, Netherlands, UK
Risk status	2, 4, 5
Status in natural range	Southern South America, Falklands: 238,000 - 1,255,000 (Declining/Stable)

Status in the AEWA area

The largest numbers of introduced Upland Geese in the AEWA area occur in Belgium, where there are at least 30-45 individuals and an estimated 4-7 pairs breed annually. The population is thought to be self-sustaining in Belgium, with both the population size and range increasing. Small numbers of

escaped birds are also present in The Netherlands, but breeding is recorded only occasionally here. Occasional escapes occur in the UK, and this species is in BOURC category E* having been recorded breeding in the past, although there have not been any recent breeding records. Birds in The Netherlands and the UK do not form self-sustaining populations.

Origin of introduction

In Belgium, this species was first observed in the wild in 1980 in Meise near Brussels, and first recorded breeding in 1993 at Laken in Brussels. These birds are thought to originate from either escapes from captivity or deliberate releases in parks for ornamental reasons. Escapes have been recorded in The Netherlands since the 1980s. In the UK deliberate introductions took place in the 1930s, but these birds are all thought to have died and more recent records are presumed to relate to occasional escapes from captivity.

Changes since previous report

The number of birds in The Netherlands and the UK has changed little since 1999, but numbers in Belgium have increased.

Table 4.1.19.1 Upland Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	**1996 - 2002**	**2004 - 2007**
Belgium	Confirmed (17)	4 - 7 (At least 30 - 45)
Netherlands	0 - 2[1]	?[1]
UK	Occasional	Occasional
TOTAL	2 - 8	4 - 10

[1]Not recorded breeding during Atlas fieldwork 1998-2000, despite presence of several individuals. Occasional breeding suspected.

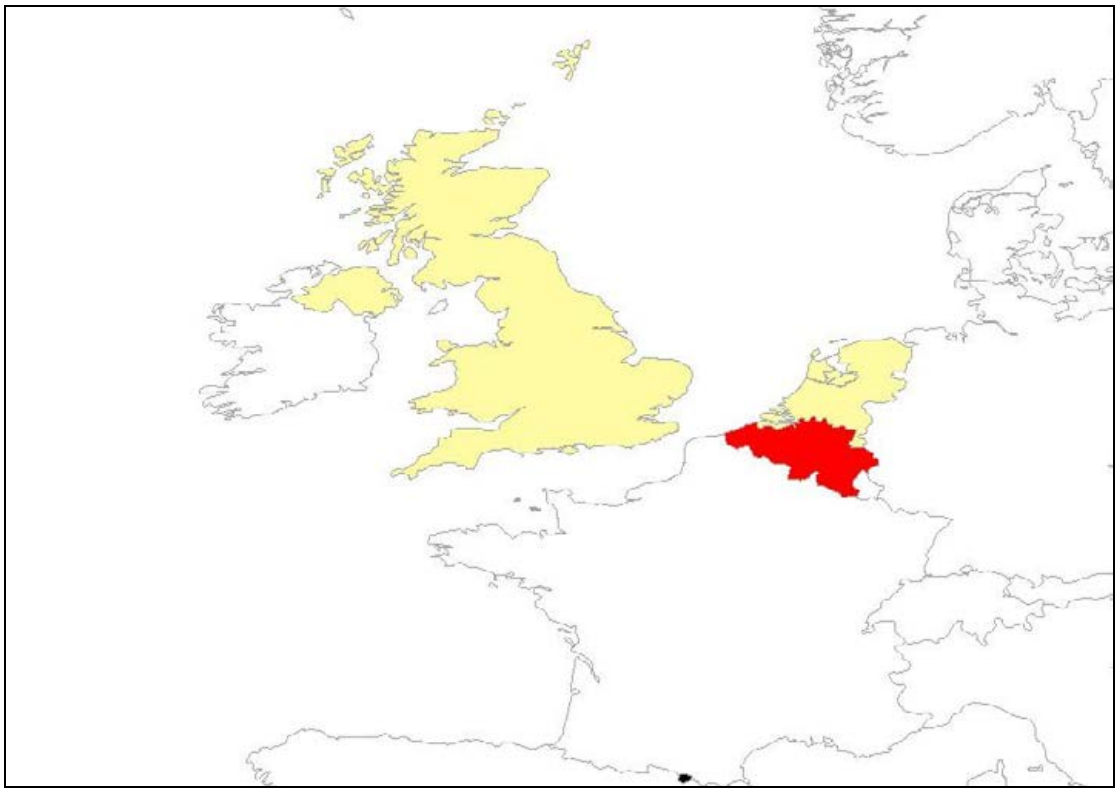

Figure 4.1.19.1 Distribution of introduced Upland Goose in the AEWA area. Upland Geese are native to southern South America and the Falklands.

Effects on native species and habitats

Upland Goose is aggressive towards other bird species and is thought to displace native waterbirds in Belgium. It may also contribute towards habitat damage and eutrophication caused by introduced geese in Belgium.

Hybrids

This species is not known to hybridise with natives.

4.1.20 Egyptian Goose *Alopochen aegyptiaca*

Egyptian Goose *Alopochen aegyptiaca*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING RAPIDLY**
Introduced breeding range in the AEWA area	Belgium, Denmark, France, Germany, Israel, Mauritius, Netherlands, Spain, Switzerland, UAE, UK
Risk status	2, 4, 5
Status in natural range	Western, Eastern and Southern Africa: 205,000 - 510,000 (Stable/Declining)

Status in the AEWA area

Egyptian Geese have been widely introduced in western Europe, and have successfully formed established self-sustaining populations in many countries. There are thought to be around 10,000 pairs in total in western Europe (Dubois 2007). The largest concentration of this species is in The Netherlands where there were an estimated 4,500-5,000 breeding pairs in 1998-2000 (SOVON 2002). The species had increased dramatically prior to this from the first breeding recorded in 1967, 48 pairs in 1977 and 345 pairs in 1989 (SOVON 2002). It is therefore likely that the population has continued

to increase in The Netherlands since the fieldwork was carried out for the latest atlas in 1998-2000. Like other waterbirds, the species has benefited from the huge network of man-made canals and drainage ditches in The Netherlands.

Egyptian Geese are also common in Belgium, with 800-1,100 breeding pairs largely around Brussels and in the Flanders region, but with some records in the Walloon region. In Belgium they have benefited from man-made waterbodies including reservoirs and artificial ponds created in urban parks and housing developments.

In Germany, there is a large and rapidly expanding population with an estimated 2000 pairs breeding in 2005, while in the UK there were thought to be in excess of 1000 individuals during the 1990s, but WeBS trends suggest numbers have at least doubled since that time. Most birds occur in the southeast but with the largest concentrations in East Anglia, particularly Norfolk. Only 78-130 breeding pairs were recorded by the Rare Breeding Birds Panel (RBBP) in 2003 but it is thought that the breeding Egyptian Geese are seriously under-recorded so actual breeding numbers are likely to be higher. The French population is concentrated in the northeast of the country although there are some isolated birds elsewhere in the country. The population size was estimated at 210-235 individuals in 2006, with 23 breeding pairs recorded (Dubois 2007).

This species has colonised Denmark in recent years, and the population is expanding very rapidly with many pairs breeding, particularly in Jutland. A small number of birds are present in Switzerland, and breeding has occurred annually since 2003 with up to two pairs confirmed breeding each year. This species is in category E2 in Spain; breeding has been recorded occasionally but the species has not formed an established population. Egyptian Geese occur regularly in Italy but are not known to breed. There have a small number of records from the Czech Republic in recent years but there are no regularly breeding pairs here yet. In most European countries there are many breeding failures recorded (SOVON 2002; Dubois 2007). Despite this their populations are expanding rapidly.
Outside Europe, this species has been introduced in the United Arab Emirates, Israel and Mauritius. In the United Arab Emirates there is an increasing population of 100-200 breeding pairs with most birds occurring at Al Ain, Abu Al Abyad Island and Sir Bani Yas Island. In Israel, 30-50 pairs breed in Gush Dan, Jerusalem, Pleshet and Westen Negev. Egyptian Geese breed in west Mauritius but the number of breeding pairs is not known, although the population is increasing.

Origin of introduction

Free-flying Egyptian Geese have been introduced as an ornamental species into parks and gardens in the UK since the 18th century, and similar introductions have taken place in Belgium and possibly other European countries in the second half of the 20th century. They have also escaped from captivity in many locations, for example in The Netherlands the first feral birds are thought to have been escapes from a park collection at Den Haag, Zuid-Holland, while in Mauritius pinioned adults were released in a private park in west Mauritius during the mid 1950s, but their offspring were not pinioned. Birds in Denmark are thought to originate from outside of that country, which seems likely given that large and expanding feral populations were present in Germany and The Netherlands before the species was first recorded in Denmark.

Changes since previous report

Introduced populations of Egyptian Geese are increasing wherever they occur and their range is expanding in Europe. Population increase and range expansion has occurred in Germany, The Netherlands, Belgium, France and the UK since 1999 (Table 4.1.20.1, Fig. 4.1.20.1). The established northern-European population has also spread into Denmark during this time where in now breeds and the population is increasing rapidly. Egyptian Geese were first recorded breeding in Switzerland in 2003, and there have been up to 2 confirmed breeding records annually since then. This species has been recorded in Czech Republic since 1999 but not yet recorded breeding here. Numbers are also increasing in Israel, the United Arab Emirates and Mauritius.

Figures given in table 4.1.20.1 are derived from Blair *et al*. 2000, Dubois 2007, SOVON 2002 and correspondents participating in this review. Numbers of individuals in the UK in the earlier period are based on summer counts carried out during the naturalised goose survey in 2000 (BTO unpublished data, following methods described in Austin *et al*. 2007). WeBS trends suggest that numbers have at least doubled since that time, hence the estimate for 2004-2007 is twice that for 1996-2002.

Table 4.1.20.1 Egyptian Goose: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	**1996 - 2002**	**2004 - 2007**
Belgium	At least 150	800 - 1100
Denmark	-	20
France	c. 5	23
Germany	c. 250	c. 2000
Israel	Breeding suspected	30 - 50
Mauritius	-	Confirmed but no data
Netherlands	4,500 - 5,000	More than 4,500 - 5,000
Spain	-	Occasional
Switzerland	Present, not breeding	2
United Arab Emirates	50	100 - 200
UK	c. 300 (1260 - 1580)	78 - 130[1] (At least 2,520 - 3,160)
TOTAL	5,250 - 5,850	7,550 - 10,000

[1]Note that this estimate is based on breeding records submitted to RBBP. There is only patchy reporting of breeding Egyptian Goose in the UK therefore this is an underestimate.

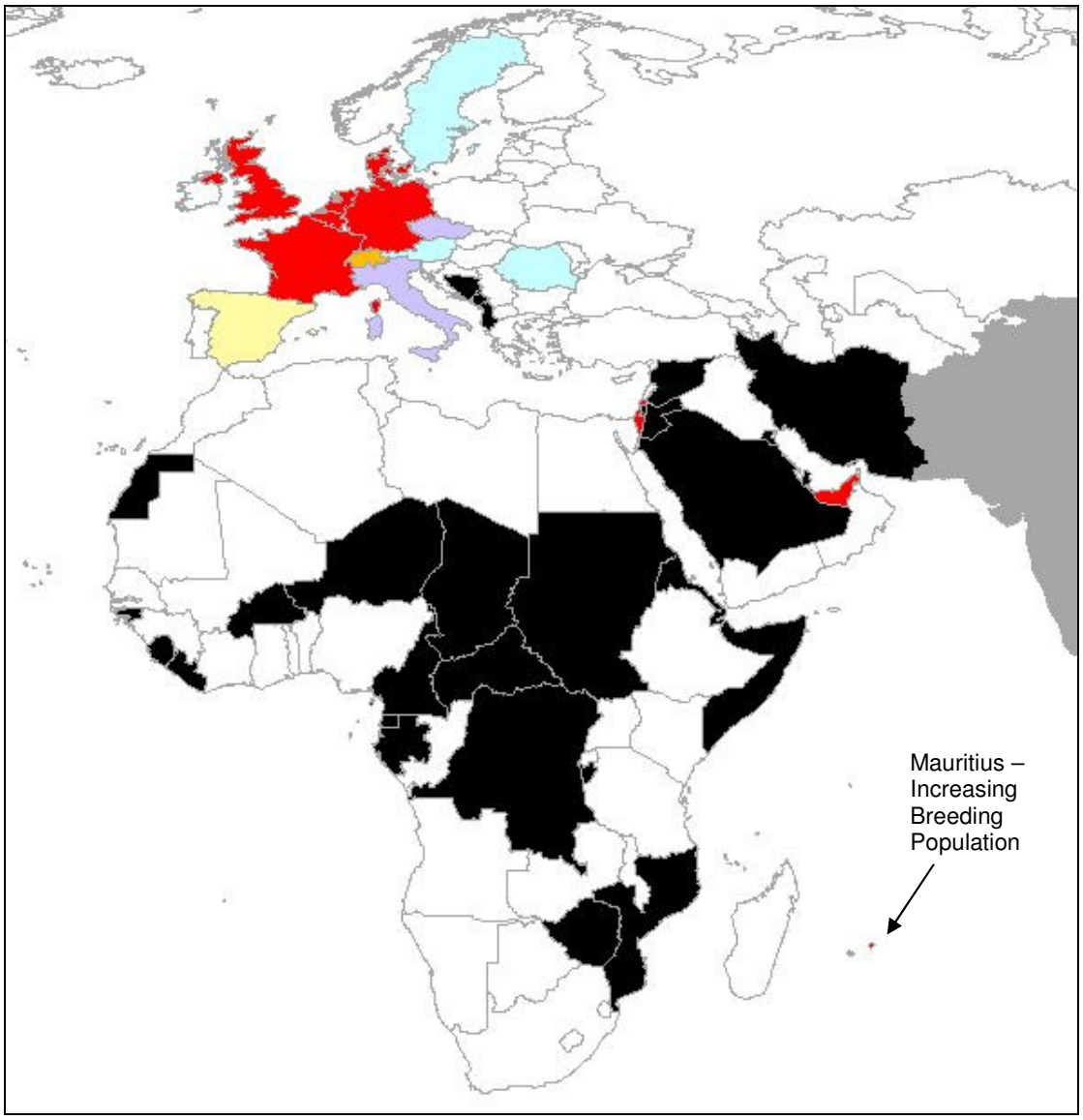

Figure 4.1.20.1 Distribution of introduced Egyptian Goose in the AEWA area. Egyptian Geese are native to western, eastern and southern Africa.

Effects on native species and habitats

Introduced Egyptian Geese exhibit dominant and aggressive behaviour towards other birds species and this may prevent native species, particularly smaller species such as ducks and coot, from establishing territories where Egyptian Geese are present (Anselin & Devos 2007). They can also cause habitat damage. In areas where large roosting groups are present eutrophication may be caused by faecal deposition (Anselin & Devos 2007).

Hybrids

This species may hybridise with other introduced goose species such as Canada Goose (Lever 2005) and Greylag Goose, or with ducks, such as Mallard.

4.1.21 Ruddy Shelduck *Tadorna ferruginea*

Ruddy Shelduck *Tadorna ferruginea*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING**
Introduced breeding range in the AEWA area	Austria, Belgium, France, Germany, Netherlands, Switzerland, Ukraine, UK
Risk status	2, 3
Status in natural range	Northern Africa, Eastern Mediterranean, Asia: 173,000 - 223,000

Status in the AEWA area

The largest introduced population of Ruddy Shelducks in the AEWA area is in Switzerland where the late-summer population in 2004 was around 450 individuals. The species was showing signs of establishing a self-sustaining naturalised population, and the birds breeding in Switzerland were thought to be the source of a feral population in Europe. There were also signs of nest-site competition with other hole-nesting species such as Barn Owl and Kestrel. Because of this control measures were introduced for this species in 2004, and over 400 individuals have been shot since this time. There are signs that the rate of population increase has now slowed or perhaps stopped, but the long-term success of these measures is uncertain at the present time. The Swiss population is thought to have spread into Southern Germany where no control measures are implemented. There were around 60 pairs in Germany in 2005.

In France there have been a total of 11 breeding pairs recorded since 2000, with three pairs recorded breeding in 2006 (Dubois 2007). Up to 100 birds were seen in France in the winter of 2005; these birds are thought to be individuals from the Swiss breeding population.

A small number of introduced Ruddy Shelducks breed in The Netherlands. The 1998 - 2000 breeding bird atlas (SOVON 2002) estimated 5-20 breeding pairs were present. In 2005 9 breeding pairs were recorded. In Belgium 5-10 pairs breed annually, while in the UK around 30-40 birds are thought to be present, but the species only breeds occasionally, with an average of one pair per year reported breeding during 1996-2000 (Baker *et al*. 2006). In 2005 3-5 pairs bred and all of these were in Norfolk. In Austria, one or two pairs breed around the Lower Inn River in Upper Austria.

In 1999, Ruddy Shelduck was reported as an occasional breeder in the Czech Republic, but it was not mentioned by correspondents participating in the current review. Similarly, in Ukraine the species was recorded to breed in the Ascania Nova reserve in 1999 but was not mentioned by correspondents in 2007. However, conflicting information has been published by Dubois (2007) who suggested that up to 300 breeding pairs may be present in Ukraine.

Small numbers of Ruddy Shelducks are present in Israel around Tel-Aviv, but they are not known to breed. In the United Arab Emirates isolated birds have been recorded, for example at Sir Bani Yas Island, but they are not thought to breed here as only single individuals have ever been seen.

Ruddy Shelducks were recorded as being present but not breeding in Belarus and Poland in 1999 (Blair *et al*. 2000) but this species was not mentioned by correspondents from those countries participating in the current review.

Origin of introduction

Introduced Ruddy Shelducks in Europe are mainly thought to relate to escapes from collections, but some may originate from intentional releases for ornamental purposes, for example in parks. Escapes have occurred periodically from the 1950s to the 1990s at least; the species was first recorded breeding in the wild in The Netherlands in 1969 and in Belgium in 1981. In Switzerland there was an isolated breeding record in 1963 but breeding has been confirmed every year since 1987.

Birds in Israel are also thought to be escapees, and have been present since the 1980s. The origin of introduced Ruddy Shelducks in the United Arab Emirates is not known.

Changes since previous report

Ruddy Shelduck populations have increased in Germany and Switzerland since 1999. In Belgium, France, The Netherlands and the UK there is negligible change in the population although breeding has been reported more regularly in Belgium and the UK in recent years, so careful monitoring of these populations would be advisable.

Table 4.1.21.1 Ruddy Shelduck: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria	0 - 1	1 - 2
Belgium	Present but not breeding	5 - 10
Czech Republic	Occasional	-
France	Confirmed but no data	3 - 11
Germany	8 - 10	c. 60
Netherlands	5 - 20	9
Switzerland	2 - 6 (50 - 80)	c. 25 (c. 450)
Ukraine	Confirmed but no data	0 - 300
UK	Occasional	3 - 5
TOTAL	17 - 350	105 - 425

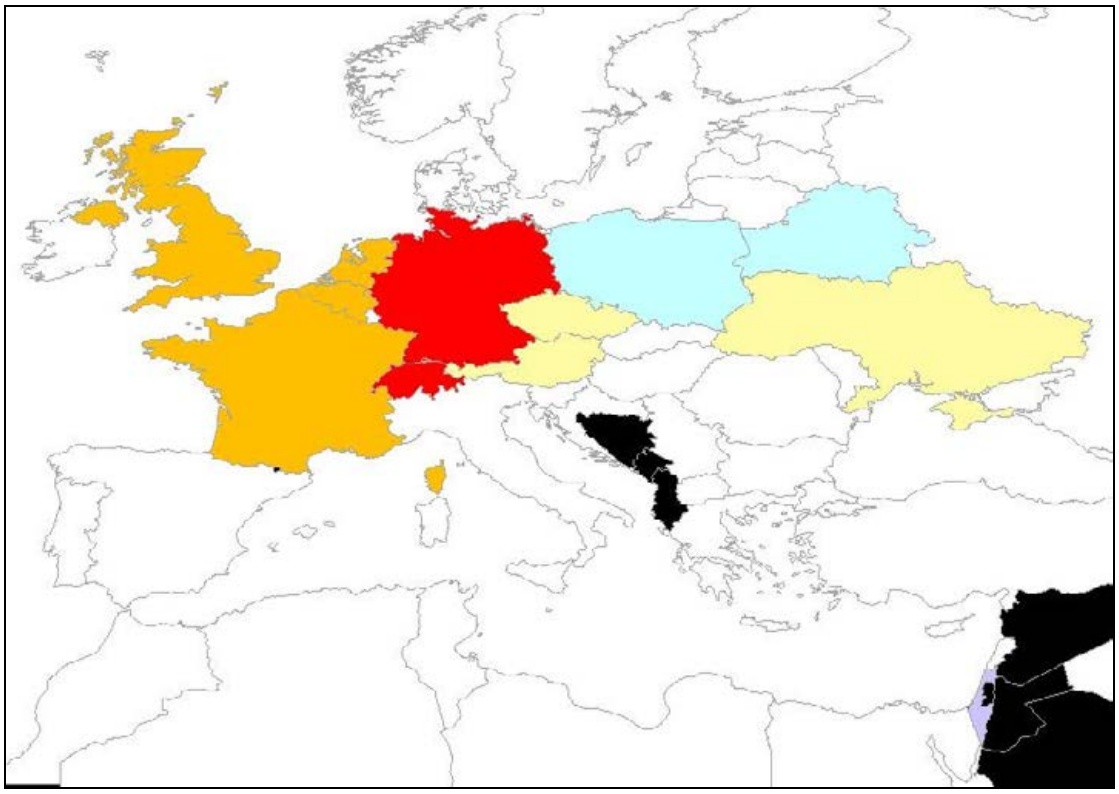

Figure 4.1.21.1 Distribution of introduced Ruddy Shelduck in the AEWA area. Ruddy Shelduck are native to northern Africa, the eastern Mediterranean and Asia.

Effects on native species and habitats

There are no known effects on native species and habitats, but Germany, The Netherlands and Switzerland all report that they are uncertain whether or not this species may displace natives. Correspondents from Switzerland suggest that this species may present a threat to native species and habitats as there is a risk of nest site competition with other hole nesting species such as Kestrel and Barn Owl (Anderegg 2005). Several Ruddy Shelduck broods have been found in nest boxes designed for Kestrel and Barn Owl in Switzerland. Because of this perceived threat control measures have been introduced (on the precautionary principle) in Switzerland since 2004 and over 400 birds have been shot.

Hybrids

This species is not known to hybridise with natives but may hybridise with other introduced species. Correspondents from Switzerland reported that it has hybridised with introduced South African Shelduck *Tadorna cana* (Blair *et al*. 2000; Lever 2005). It has been known to hybridise with Common Shelduck *Tadorna tadorna* in Austria (Blair *et al*. 2000).

4.1.22 Muscovy Duck *Cairina moschata* (including domesticated Muscovy Duck *Cairina moschata forma domestica*)

Muscovy Duck *Cairina moschata*	
Status in countries with introduced populations	**WIDESPREAD, STABLE**
Introduced breeding range in the AEWA area	Austria, Germany, Israel, Mauritius, Netherlands, Seychelles, South Africa, Spain, UK (formerly: Azores, Madagascar, Mauritania, Senegal)
Risk status	2, 3
Status in natural range	Central & South America: 100,000 - 1,000,000 (Declining)

Status in the AEWA area

Introduced Muscovy Ducks and their domesticated relatives (*forma domestica*) are inconsistently reported, and therefore assessing their status in the AEWA area is difficult. Many countries participating in this review reported the species in only 1999 or only 2007, but from the comments in their questionnaires it was clear that the species must have been present in the other year as well. It is quite possible that some countries where introduced Muscovy Ducks are present did not report the species in either year. This may be because a high proportion of introduced birds are *forma domestica* and often tend to stay close to human settlements, hence being viewed as semi-domesticated and therefore not recorded as an introduced species.

In the current review, introduced Muscovy Ducks were reported to breed in Austria, Germany, Israel, Mauritius, The Netherlands, the Seychelles, Spain and the UK. They were reported to be present but with no evidence of breeding in the wild in the Czech Republic and Switzerland.

In Austria, correspondents suggest that less than five pairs breed each year at a few irregular breeding places in Upper Austria. About 20 pairs are thought to breed in Germany, and in The Netherlands, between 15 and 30 breeding pairs were estimated to be present in 1998-2000 (SOVON 2002), but this is possibly an underestimate as the species tends to stay near human settlements in The Netherlands and is often ignored by birdwatchers. In the UK, breeding is probably under-reported for similar reasons with less than 10 pairs reported to the RBBP each year. WeBS suggests that more than 100 individuals are present in the wild, but there are small concentrations of the species at some sites, for example Ely in Cambridgeshire. The species has been recorded breeding occasionally in Spain. In Switzerland and the Czech Republic small numbers of individuals are seen each year, but breeding is not thought to have occurred.

Outside Europe, approximately 20 pairs breed each year in the Gush Dan area in Israel, forming a self-sustaining and increasing population. The species is widespread as a reared bird in Mauritius, with some escapes present in the wild where breeding is thought to occur, although the number of pairs breeding in the wild is not known. In the Seychelles this species has been introduced recently as an ornamental species on pools at the Plantation Club Hotel in Baie Lazare on the island of Mahé, where 10-15 pairs are thought to breed.

Madagascar, Mauritania, the Azores, Senegal and South Africa reported Muscovy Ducks as being introduced and breeding in the wild in the 1999 review (Blair *et al*. 2000), but did not report the species in 2007. South Africa and Madagascar reported that the species was widespread in 1999, so it seems unlikely that it has disappeared completely from these countries.

Origin of introduction

In most countries where introduced Muscovy Ducks are reported they have been farmed for their meat for many years, and domesticated birds have escaped frequently. Many of these escapes tend to stay close to human settlements and this may be why the species is under-recorded or why there is inconsistency as to whether birds are classed as introduced or semi-domesticated.

At some locations the species has been introduced for ornamental reasons. For example, in the Seychelles Muscovy Ducks were introduced in approximately 2002 on pools at hotels as a tourist attraction.

Changes since previous report

Questionnaire correspondents from several countries suggested that introduced Muscovy Duck numbers are probably underestimated because they are often found near to villages and towns where they may be ignored by bird watchers, perhaps being considered as semi-domesticated. Furthermore, reporting of introduced Muscovy Ducks by questionnaire correspondents also seems to be inconsistent, with a number of countries reporting the species as being widespread in one year, but not even mentioning the species as being present in the other year. Israel did not report the species in 1999 but correspondents in 2007 suggested it had been introduced since the 1980s, while Mauritius did not report the species in 1999, but correspondents in 2007 reported that the species had been introduced in Mauritius since the 1700s. A number of other countries reported the species in 1999 but not in 2007. It is therefore difficult to assess whether changes in the number of birds reported as part of this review represent real population changes or not.

Correspondents from Israel suggest that the population is increasing in that country, and in the Seychelles, birds were introduced in 2002 as a tourist attraction, having not been present previously. Germany, The Netherlands, Spain and Mauritius reported that population trends in those countries were uncertain (probably because of problems with under-reporting in some cases), while correspondents from most other countries where the species is introduced reported no significant population trend.

Table 4.1.22.1 Muscovy Duck: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria	14 - 20	Up to 5
Azores	Confirmed but no data	-
Germany	1 - 10	c. 20
Israel	-	c. 20

Table 4.1.22.1 Continued.

State	1996 - 2002	2004 - 2007
Madagascar	Unknown but widespread	-
Mauritania	Confirmed but no data	-
Mauritius	-	Unknown but widespread
Netherlands	15 - 30	15 - 30
Senegal	Confirmed but no data	-
Seychelles	-	10 - 15
South Africa	Confirmed but no data	Confirmed but no data
Spain	-	Confirmed but no data
UK	Confirmed but no data	Less than 10[1]
TOTAL	Inestimable	Inestimable

[1]Less than 10 pairs reported to RBBP each year, but breeding probably under-reported.

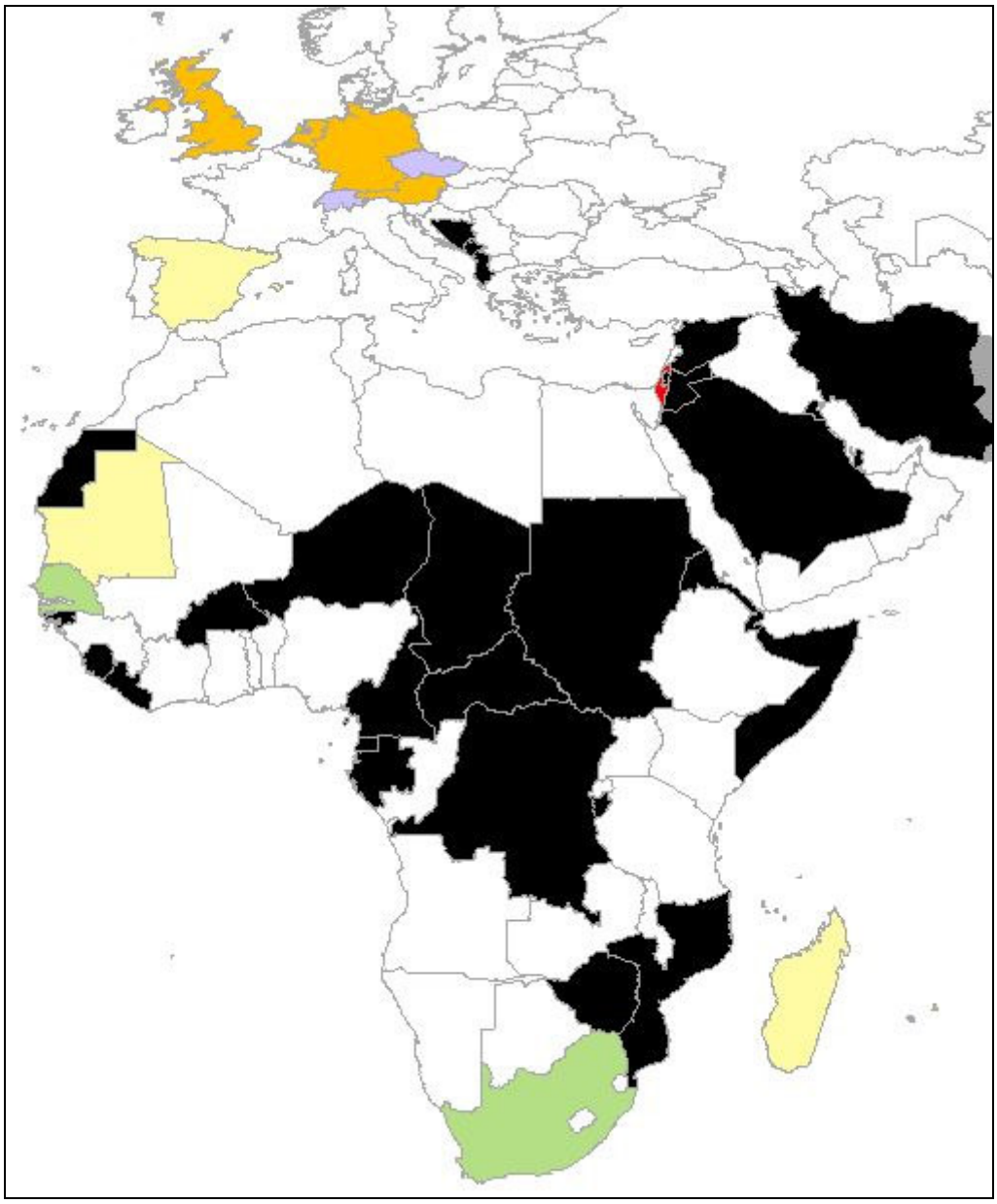

Figure 4.1.22.1 Distribution of introduced Muscovy Duck in the AEWA area. Muscovy Ducks are native to Central and South America

Effects on native species and habitats

In some countries, particularly in Mauritius, there are concerns that Muscovy Ducks displace native species. South Africa reported similar concerns in the previous review of introduced waterbirds in 1999 (Blair *et al*. 2000) but questionnaire correspondents from South Africa did not even mention Muscovy Ducks in the current review. Clearly more research in the distribution and prevalence of introductions of this species, and any potential effects on native wildlife, is required to enable an accurate assessment of its impact.

Hybrids

Muscovy Ducks have been recorded to hybridise with Mallards or with domesticated Mallard-type ducks in several countries. The hybrids produced may often be infertile, but it is not known whether this is always the case. In South Africa it has hybridised with a range of native species of goose and duck in the past, including Egyptian Goose *Alopochen aegyptiaca*, Spur-winged Goose *Plectropterus gambensis* and Comb Duck *Sarkidiornis melanota*. However, Muscovy Ducks is not considered to be a threat in South Africa because it is thought that its pairings with other species are rarely successful and hybrids are usually presumed to be infertile. In Mauritius, Muscovy Ducks may form pairs with native species but these pairings are not known to produce hybrid offspring. There are some concerns that Muscovy Duck could form hybrids with the endangered Meller's Duck *Anas melleri* (Lever 2005).

4.1.23 Wood Duck *Aix sponsa*
Other Names: American Wood Duck; Carolina Wood Duck; Carolina Duck

Wood Duck *Aix sponsa*	
Status in countries with introduced populations	**LOCALIZED, INCREASING**
Introduced breeding range in the AEWA area	Austria, Belgium, France, Germany, Netherlands, Spain, UK
Risk status	None known
Status in natural range	North America: 3,500,000 (Stable/Increasing)

Status in the AEWA area

This colourful species is very popular in waterfowl collections and therefore escaped birds are widespread, but their success at establishing populations is low. Introduced populations are not thought to be self-sustaining in any country within the AEWA range, with numbers thought to be maintained by repeated escapes. Breeding of introduced birds has been recorded in seven countries (Table 4.1.23.1) but there are only small numbers of breeding pairs, with the highest numbers recorded in Belgium (25-30) and Germany (c. 30). There is no sign of a significant population increase in any country, although breeding has been recorded more regularly in Belgium and Germany in recent years. Breeding success is said to be dependent on warm weather in late winter and early spring (Blair *et al*. 2000), therefore the success of introduced birds could improve with climate change.

In addition to the seven countries where breeding has been recorded (Table 4.1.23.1), a further seven countries have recorded introduced Wood Ducks but with no record of breeding. Between 19 and 50 birds have been recorded in winter waterbird counts in Switzerland annually since the mid-1990s, but there is no record of breeding in Switzerland. The species is seen regularly in the Czech Republic and in South Africa but again with no breeding pairs. It has been recorded once in the late 1990s in Botswana at the Phakalane sewage ponds near Gaborone. Escapes have also been recorded occasionally in Italy, Luxembourg and Romania. An internet search suggested that there have also been recent records of individual Wood Ducks in Finland, Norway, Estonia and Poland but questionnaire correspondents did not mention these birds, and their status (introduced or vagrant) is not known, although it seems likely that most of these records would relate to introduced individuals.

In their native range, Wood Ducks are strongly associated with beaver ponds (Merendino et al. 1995). Currently introduced Wood Duck have not become established in areas of Europe where there is suitable habitat, but there are significant populations of beavers in Norway, Sweden and Finland (Hartman 1999) creating suitable habitat for Wood Ducks. Therefore if introduced Wood Duck were to become established in these countries, or other parts of Europe where there are beaver ponds, there is the potential for them to become more of a problem as an invasive species (Nummi 2002). Recent records of Wood Duck in Finland and Norway are therefore a potential cause for concern.

Origin of introduction

Wood Duck introductions have occurred either from ornamental birds being introduced to parks and gardens or as a result of escapes from waterfowl collections. This species is very popular as an ornamental and collection species and therefore escapes have occurred frequently. In the UK escapes have been recorded since the late 1890s and in Austria since the early 1900s, although the species was not recorded breeding in Austria until 1986. It was first observed in Belgium in 1957. The timing of escapes in other countries is not known. The single record of a Wood Duck in Botswana is thought to relate to an escape from a nearby plant nursery where a small collection of captive waterbirds exists.

Changes since previous report

Wood Ducks have been recorded breeding more frequently in Belgium and Germany in recent years, and the only confirmed breeding in France was in 2005, and breeding has also been confirmed in Spain. In Ukraine, birds that had been recorded breeding in 1999 at the Ascania-Nova reserve were no longer known to be present. The species has been recorded for the first time in Botswana since the time of the previous report. Elsewhere the number of introduced birds is relatively stable.

Table 4.1.23.1 Wood Duck: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria	0 - 1	0 - 2
Belgium	Not known to breed	25 - 30
France	-	Occasional
Germany	Occasional	c. 30
Netherlands	1 - 5	1 - 5
Spain	-	Occasional
Ukraine	Confirmed but no data	-
UK	5 - 30	Less than 5[1]
TOTAL	7 - 50	50 - 100

[1]Less than 5 pairs reported to RBBP most years, but probably under-recorded.

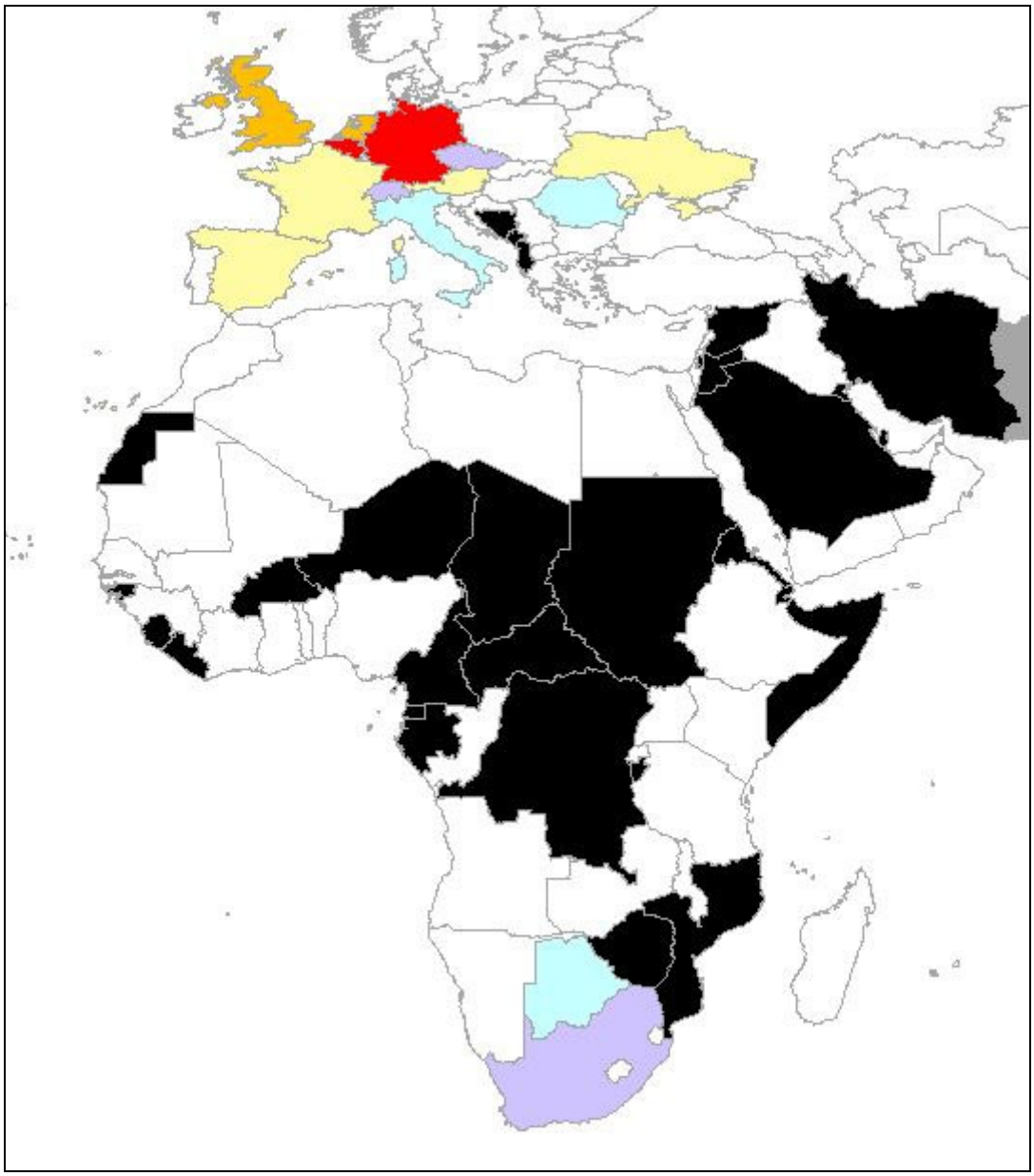

Figure 4.1.23.1 Distribution of introduced Wood Duck in the AEWA area. Wood Ducks are native to North America.

Effects on native species and habitats

Introduced Wood Ducks are not known to affect native species or habitats.

Hybrids

This species has not been recorded to hybridise with native species in the wild but was recorded to hybridise with introduced Mandarin in France in 2003, producing 2 offspring (Dubois 2007).

4.1.24 Mandarin *Aix galericulata*

Mandarin *Aix galericulata*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING**
Introduced breeding range in the AEWA area	Austria, Belgium, France, Germany, Monaco, Netherlands, Poland, Spain, Switzerland, UK (possibly South Africa)
Risk status	2, 3
Status in natural range	East Asia: 415,000 - 565,000 (Declining/Stable)

Status in the AEWA area

Introduced Mandarins are widespread throughout western Europe and also occur in South Africa.

In Austria 40-60 pairs breed, mainly around Vienna on the Danube and in Wienerwald, but also in other sites. The German population was estimated as around 350 breeding pairs in 2005, with additional non-breeding birds also present. The latest breeding bird atlas in The Netherlands (fieldwork 1998-2000) estimated that there were 200-260 breeding pairs in that country (SOVON 2002), while in Belgium more than 100 pairs breed in the Flanders region and Brussels. There were an estimated 7,000 individuals in the UK in the early 1990s, but this may not be accurate as the species is difficult to survey, so may be under-recorded (Lever 2005). The number of pairs breeding in the UK is not known but the population is well established and self-sustaining, although numbers are thought to be supplemented by continuing escapes. There are less than ten breeding records per year in Switzerland but 221 individuals were recorded in winter counts in November 2005. Eighteen pairs were recorded breeding in France in 2006 in three main areas: Loire Atlantique, around the Paris Île-de-France area and smaller numbers in southeast France. Up to 20 pairs have bred in Poland in recent years, mainly around Warsaw, and this species is on category E2 in Spain, having been recorded breeding there but without forming an established population. Two pairs bred in Monaco in recent years in the Quartier de Fontvieille. In South Africa, introduced Mandarins have been recorded breeding occasionally in the past and further occasional breeding is suspected.

Small numbers of Mandarins are present in the Czech Republic, in northern Italy and in Israel around Gush Dan but they are not known to breed in these countries. This species has been recorded once in Botswana at Phakalane sewage ponds near Gaborone.

Origin of introduction

Due to their attractive appearance, Mandarins have been widely introduced as an ornamental species in parks and gardens (Rehfisch *et al*. 2006). They are a popular collection species and escapes occur frequently. In Austria, escaped Mandarins have been recorded since the early 1900s, mainly along the Danube, and breeding was first recorded during the 1980s in Vienna. The first observation of Mandarin in the wild in Belgium was in 1953 where it had been introduced in parks in the provinces of Antwerp and Limburg. In France and Germany most birds are thought to be escapes from collections. The species was first recorded breeding in France in 1977, and there were individual attempts until 1985, after which a small population became established (Dubois 2007). Escapes have occurred in Germany since at least the 1990s. In Monaco Mandarin were introduced as an ornamental species in 1995 at the Parc Paysager de Fontvieille, and have recently been recorded breeding. Introduced Mandarins were first recorded breeding in The Netherlands at Wassenaar, Zuid-Holland, in 1964, while in Poland they were introduced much more recently in 2002-2003 in Warsaw. In South Africa escapes have occurred occasionally since at least 1983. Introduced Mandarins have a long history in the UK, where the first record of ornamental birds being introduced was in 1754, with regular breeding in the wild from around 1866. In Israel, where this species is not yet known to breed, escapes have occurred since the 1990s. The single record of Mandarin in Botswana is thought to relate to an escape from a nearby plant nursery where a small collection of captive waterbirds exists. The origin of birds in other countries is not known, but most are likely to relate to escapes.

Changes since previous report

Numbers of introduced Mandarins have increased in Belgium, Germany and The Netherlands, and the species has bred for the first time in Poland and Monaco, since the previous report in 1999. The number of breeding records has also increased marginally in Austria and France. At the time of the previous report Mandarins were recorded to be present, but not breeding, in Iceland, Luxembourg, the Azores, Romania, Russia (although these could have been natural vagrants) and Sweden. None of these countries reported introduced Mandarins in the current review. Additionally, in the Ukraine Mandarins were reported to be breeding at the Ascania-Nova reserve in 1999 but these were not reported by correspondents participating in the current review.

The information in Table 4.1.24.1 is derived from SOVON (2002), Rehfisch (2006), Dubois (2007) and correspondents participating in this review.

Table 4.1.24.1 Mandarin: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria	10 - 20	40 - 60
Belgium	More than 15	More than 100
France	10	18
Germany	100 - 200	c. 350
Monaco	-	2
Netherlands	200 - 260	More than 200 - 260
Poland	-	Less than 20
South Africa	Very Occasionally	?[1]
Spain	-	Occasional
Switzerland	10 - 15	Less than 10
Ukraine	Confirmed but no data	-
UK	1000+ (c. 7,000)[2]	? (c. 7,000)[2]
TOTAL	500 - 2,500	850 - 3,000

[1]Breeding may occur occasionally but not confirmed
[2]Approximately 7,000 individuals were present in the UK in the early 1990s, but difficult to survey.

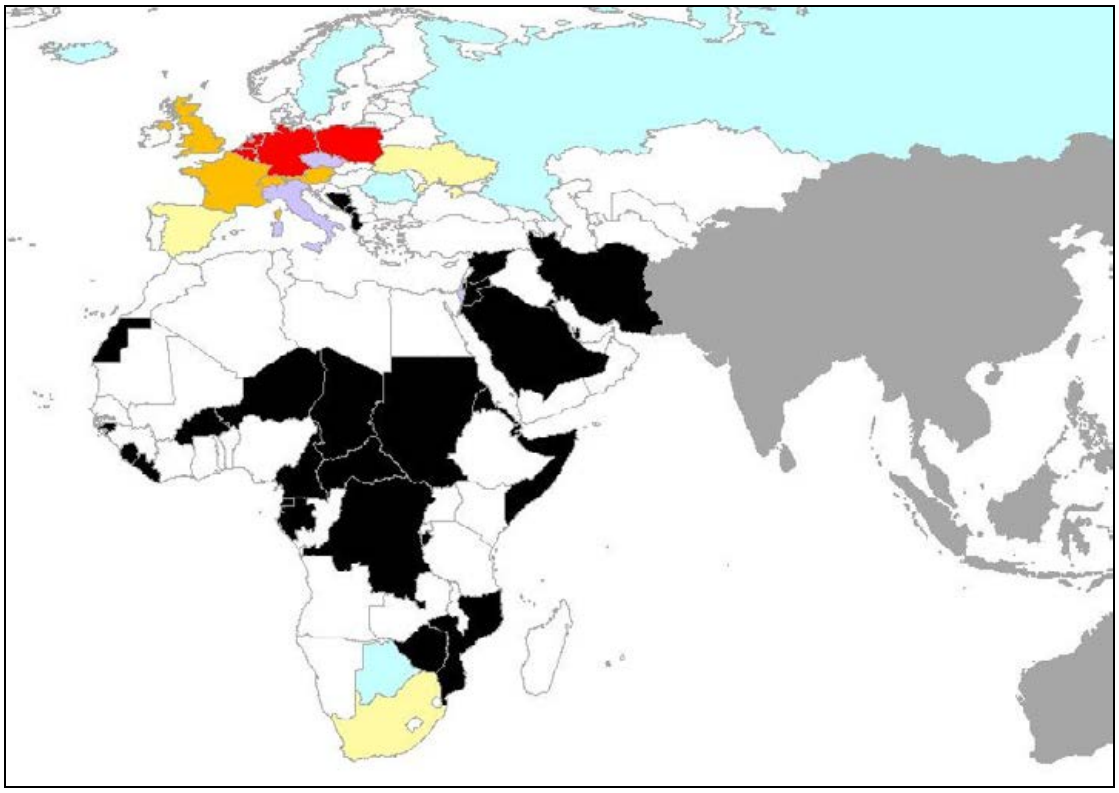

Figure 4.1.24.1 Distribution of introduced Mandarin in the AEWA area. Mandarins are native to East Asia.

Effects on native species and habitats

In Belgium, introduced Mandarins compete indirectly for nest sites with other species. However, little is known about the effect of introduced Mandarins on native species and habitats, with questionnaire respondents from many countries reporting that they were unsure whether or not this species displaced natives or posed a threat to other species. In captivity, Mandarins are known to destroy the nests and eggs of other species using nestboxes (Blair *et al*. 2000); and this is also thought to occur in the wild (Rehfisch *et al*. 2006). Further study would be useful to evaluate the potential effects of introduced Mandarin on native species and habitats.

Hybrids

Breeding attempts with Mallards have been recorded in Poland, but these are not known to have successfully produced hybrids. Introduced Mandarins are not known to hybridise in the wild in other countries.

4.1.25 Eurasian Wigeon *Anas penelope*

Eurasian Wigeon *Anas penelope*	
Status in countries with introduced populations	**LOCALIZED, OCCASIONAL BREEDING**
Introduced breeding range in the AEWA area	UK
Risk status	None known
Status in natural range	Northern Eurasia: 2,800,000 - 3,300,000

Status in the AEWA area

Introduced Eurasian Wigeons in the UK are far outnumbered by naturally occurring populations of this species, and therefore monitoring the number of introduced birds is difficult. A small number of

introduced birds are thought to be present, and may breed occasionally (Ogilvie and the Rare Breeding Birds Panel 2004), but possibly not annually. It is on BOURC category AE*, with a small number of naturally occurring birds breeding regularly in the UK in suitable locations particularly in the north, and much larger numbers of individuals present during the winter throughout the country.

Origin of introduction

Eurasian Wigeon is a popular collection species. Introduced birds are thought to be escapes from such collections, and have been recorded since the 19th century.

Changes since previous report

Numbers of introduced Eurasian Wigeons in the UK are thought to be relatively stable, but monitoring is difficult as native Eurasian Wigeons occur in far larger numbers than introduced birds.

Effects on native species and habitats

There are no known effects of introduced Eurasian Wigeons on native species and habitats.

Hybrids

This species is not known to hybridise in the wild.

4.1.26 Gadwall *Anas strepera*

Gadwall *Anas strepera*	
Status in countries with introduced populations	**WIDESPREAD, STABLE**
Introduced breeding range in the AEWA area	UK
Risk status	7
Status in natural range	Eurasia, North America: 3,245,000 – 3,820,000

Status in the AEWA area

Gadwalls have been introduced into the UK, which is also part of their native range. However a proportion of the breeding population is thought to originate from introductions, although most introductions occurred before 1970. Correspondents participating in this review suggest that Gadwalls breeding in Scotland are largely naturally occurring birds while those breeding in England comprise a mixture of naturally occurring birds and those deriving from the introduced population. Migrant birds appearing in the UK during the winter are naturally occurring.

Origin of introduction

Gadwalls were introduced in the UK during the 19th and 20th century for ornamental purposes. It is thought that the introduced population derives largely from naturally occurring migrants being captured, and then their descendents being released into the wild.

Changes since previous report

Gadwall populations in the UK have increased since the time of the previous report but it is unclear how much of this increase relates to introduced birds.

Effects on native species and habitats

Gadwalls are not known to affect native species or habitats

Hybrids

This species is not known to hybridise in the wild

4.1.27 Mallard *Anas platyrhynchos* (including domesticated Mallard-types *Anas platyrhynchos forma domestica*)

Mallard *Anas platyrhynchos*	
Status in countries with introduced populations	**WIDESPREAD, INCREASING LOCALLY**
Introduced breeding range in the AEWA area	Austria, Ireland, Israel, Lebanon, Lesotho, Madagascar, Mauritius, Slovenia, South Africa, United Arab Emirates, UK
Risk status	2, 3, 7
Status in natural range	Eurasia, North America: 19,000,000 - 19,400,000

Status in the AEWA area

Mallards have been introduced widely within their native range, and mix readily with naturally occurring populations; therefore assessment of the status of the introduced population is difficult. There is also a problem with many countries reporting introduced Mallards in large numbers, but only in either 1999 or 2007, and not mentioning the species in the other year (Table 4.1.27.1), similarly to the problems with Mute Swan and Greylag Goose. It is likely that in these cases introduced birds were present, but not reported by correspondents, in the other year (Table 4.1.27.1).

Assuming that introduced Mallards are still present in countries that reported large numbers in 1999, but did not report them in 2007, it is likely that they are breeding in Ireland, Israel, Lebanon, Madagascar, Mauritius, Slovenia, South Africa, the United Arab Emirates and the UK (Table 4.1.27.1). Additionally, several thousand individuals are released annually for hunting in Croatia but the number of these that survive to breed is not known. Feral domesticated birds *forma domestica* are thought to be breeding in Austria, Lesotho and South Africa. Correspondents from Lesotho reported that only *forma domestica* were thought to be present in that country; there are not thought to be any Mallards as in the surrounding South Africa.

Mallards that were introduced to Uzbekistan during the 1980s are no longer thought to be present. Around 750 individuals were released at one site for hunting, but were thought to have been hunted almost to extinction by the time of the 1999 review (Blair *et al*. 2000). All Mallards currently present in Uzbekistan are presumed to be naturally occurring, as introductions have been illegal since 1998 (Blair *et al*. 2000).

Origin of introduction

Mallards have been introduced by hunting organisations in many European countries for shooting. This has occurred for several decades and even centuries in some cases (for example in the UK). Such releases still occur in large numbers in many countries, as in most countries there is no legislation to prevent the introduction of native species (only non-natives), for example both the UK and Croatia reported that several thousand individuals are released annually for hunting, and we believe that similar releases occur in many other European countries.

Most domesticated ducks are thought to be derived from Mallards (Blair *et al*. 2000), and semi-domesticated escapes have occurred for many centuries in Europe, and for many decades (at least) elsewhere in the world. Recent introductions in Saudi Arabia (1995) and Lebanon (2004) are likely to have occurred for ornamental reasons.

Changes since previous report

Trends in introduced Mallard populations are difficult to discern in many areas, partly because of mixing with naturally occurring (rather than introduced) birds, and partly because many countries only reported their presence in one or other of the two years when reviews were carried out (Table 4.1.27.1). However, numbers are thought to be increasing in Israel, Mauritius, South Africa and the United Arab Emirates.

Table 4.1.27.1 Mallard and *forma domestica*: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Austria (*forma domestica)*	Widespread but no data	?[1]
Azores (*forma domestica*)	Confirmed but no data	-
Croatia (Mallard)	Several thousand individuals released annually for hunting	Several thousand individuals released annually for hunting
Germany (Mallard)	Not breeding (4)	-
Ireland (Mallard)	4,000 individuals released annually for hunting	?[1]
Israel (Mallard)	?[1]	More than 200
Lebanon (Mallard)	-	Confirmed but no data
Lesotho (*forma domestica*)	?[1]	1,000
Madagascar (Mallard)	Widespread but no data	?[1]
Mali (*forma domestica*)	Confirmed but no data	-
Mauritius (Mallard)	?[1]	Confirmed but no data
Namibia (*forma domestica*)	10	Only on farms
Saudi Arabia (Mallard)	?[2]	-
Seychelles (*forma domestica*)	A few feral birds present	-
Slovenia (Mallard)	Widespread but no data	?[1]
South Africa (Mallard)	c. 1,000	Widespread, but no data
South Africa (*forma domestica*)	More than 200	?[1]
Ukraine (Mallard)	Confirmed but no data	-
United Arab Emirates (Mallard)	20	At least 50 - 100
UK (Mallard)	c. 100,000[3]	50,000 - 127,000[3]
TOTAL	Inestimable	Inestimable

[1]Not reported from this country in this year, but likely to have been present and breeding.
[2]Present, but not known whether breeding occurs.
[3]Population includes both introduced and naturally occurring birds, in unknown proportions. Some sources suggest that over 1 million birds may be released annually for shooting purposes, but a large proportion of these are shot during the autumn and winter.

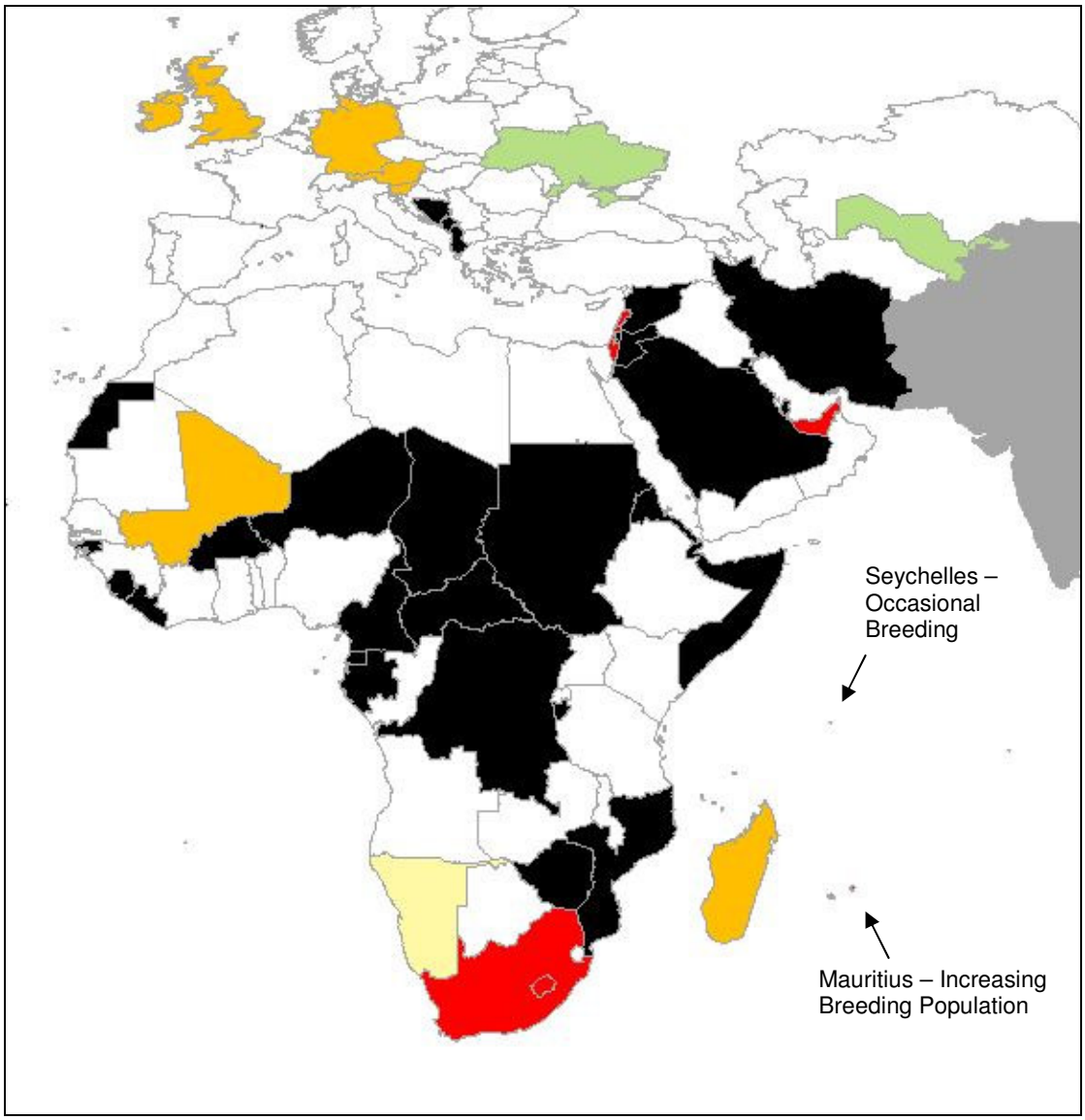

Figure 4.1.27.1 Distribution of introduced Mallard and *forma domestica* in the AEWA area. Mallards are native to Eurasia and North America.

Effects on native species and habitats

Introduced Mallards are thought to have displaced native waterbirds in South Africa and Madagascar. They may also displace native species in the UK, where a high density of excess males have been released. In South Africa they are thought to compete with native waterbirds for food and breeding sites.

Hybrids

Where Mallards are introduced within their native range, interbreeding occurs regularly between introduced Mallards or *forma domestica* and birds from naturally occurring Mallard populations. This is of little threat to native populations, although it is recognised that such interbreeding, particularly with domesticated forms of Mallard, could compromised the genetic integrity of the native population, although this is likely to have been occurring for several centuries (Blair *et al*. 2000). Hybridisation is of much greater concern where Mallards have been introduced outside their native range, and are hybridising with indigenous species. In South Africa, introduced Mallards hybridise readily with Yellow-billed Ducks *Anas undulata* (Rhymer 2006) and a control scheme has been implemented in

some provinces as a result (Cape Nature Conservation 1994, Rhymer 2006). There are concerns in Madagascar that hybridisation could occur between introduced Mallards and the endangered Meller's Duck *Anas melleri*, as Mallards are kept by indigenous people on Lac Alaotra, an important site for Meller's Duck (Young & Rhymer 1998; Rhymer 2006). Hybridisation between these two species has occurred in Mauritius, where both are introduced. Introduced Mallards have also been recorded to hybridise with feral or domesticated Muscovy Ducks *Cairina moschata forma domestica*, although their hybrid offspring are almost always infertile. They are thought to hybridise with a number of other duck species in the UK, but again with hybrid offspring being mostly infertile or of low fertility (Blair *et al*. 2000).

4.1.28 Meller's Duck *Anas melleri*

Meller's Duck *Anas melleri*	
Status in countries with introduced populations	**LOCALIZED, STABLE**
Introduced breeding range in the AEWA area	Mauritius
Risk status	None known
Status in natural range	ENDANGERED
	Madagascar: 2,000 – 2,500 (Declining)

Status in the AEWA area

A small population of introduced Meller's Ducks occurs in Mauritius, where they are known breed but the number of breeding pairs is not known. The population is thought to be self-sustaining but does not appear to be expanding. This species is endangered in its native Madagascar, and some introduced birds from Mauritius have been taken into captivity for a captive breeding conservation project.

Origin of introduction

Meller's Ducks were introduced to Mauritius from Madagascar from around 1850 as a game bird. The native population in Madagascar is now endangered.

Changes since previous report

The number of breeding pairs of Meller's Duck was not known in either 1999 or 2007, but correspondents participating in this review suggest that the population is relatively stable although very small.

Effects on native species and habitats (excluding hybridization)

Introduced Meller's Ducks are not known to affect native species or habitats.

Hybrids

Meller's Ducks have been recorded to hybridise with introduced Mallards in Mauritius.

4.1.29 Red-crested Pochard *Netta rufina*

Red-crested Pochard *Netta rufina*	
Status in countries with introduced populations	**LOCALIZED, INCREASING**
Introduced breeding range in the AEWA area	UK
Risk status	3
Status in natural range	Europe, central & south Asia: 420,000 - 443,500

Status in the AEWA area

Introduced Red-crested Pochards have established a small, but increasing, breeding population in the UK, with up to 29 pairs estimated to breed annually, although they may be under-recorded. The majority of individuals form an established population in the upper Thames Valley, where they have benefited from man-made habitats such as flooded gravel quarries. Smaller numbers of individuals scattered across other parts of the country may relate to more recent escapes rather than deriving from the naturalised population. The population estimate in 2003 was 254 individuals occurring at 63 different sites (Dudley 2005). This species is in BOURC category ACE* with some individuals thought to occur naturally as vagrants, but it is almost impossible to separate these from the naturalised birds in the field.

Elsewhere, a few introduced individuals have been recorded in South Africa and the United Arab Emirates, but there are no breeding records from these countries. In Botswana this species has been seen once at Shashe Dam near Francistown in October 1999.

Red-crested Pochard were introduced to Greece in the past, and have bred there, but the introduced population is thought to have died out during the 1980s.

In the previous report in 1999 Red-crested Pochard were recorded as an introduced species in The Netherlands, with around 25 breeding pairs. This species was not reported by correspondents in the current review, perhaps because The Netherlands is also part of the natural range of this species so that introduced birds cannot easily be differentiated from naturally occurring individuals. The Netherlands breeding bird atlas reports that between 120 and 170 breeding pairs were present in 1998 – 2000 (SOVON 2002), but most of these were presumed to be naturally occurring.

Origin of introduction

In the UK, Red-crested Pochard have escaped from captivity since the early 1900s, and were first recorded breeding in the wild in 1937. An established population has since formed in the upper Thames valley, with the number of birds increasing.

Red-crested Pochard were introduced into the United Arab Emirates in 1989 and the 1990s on Sir Bani Yas Island. In South Africa this species occurs as an occasional escape, but it is now prohibited in this country.

Red-crested Pochard were introduced to Greece in 1967 in Agras as an ornamental species, but had died out by the 1980s.

Changes since previous report

In the UK, the population size and range of Red-crested Pochard is increasing (Dudley 2005), however the number of breeding pairs is uncertain and likely to be under-recorded. Red-crested Pochard was recorded as an introduced breeding species in The Netherlands in 1999, but not in 2007. This could be because the species is also present here naturally and introduced individuals may be difficult to identify. Data in Table 4.1.29.1 is derived from Dudley (2005) and correspondents participating in this review.

Table 4.1.29.1 Red-crested Pochard: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Netherlands	c. 25	-
UK	7 – 29 (170)	6 - 19[1] (More than 250)
TOTAL	32 - 54	6 - 19[1]

[1]Breeding is likely to be under-recorded. The population is increasing in the UK.

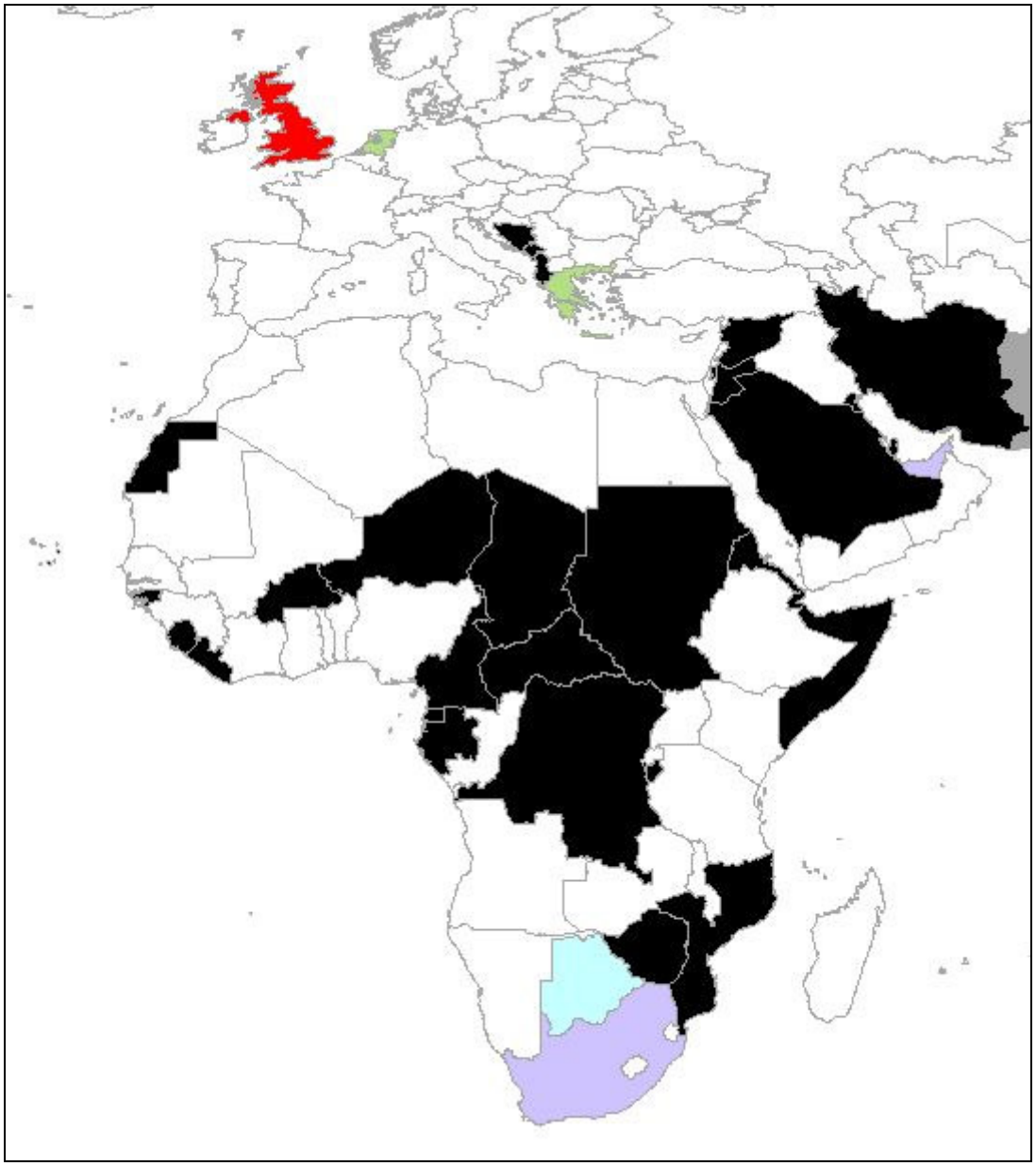

Figure 4.1.29.1 Distribution of introduced Red-crested Pochard in the AEWA area. Red-crested Pochards are native to mainland Europe and central and southern Asia.

Effects on native species and habitats (excluding hybridization)

There are no known effects of introduced Red-crested Pochard on native species or habitats.

Hybrids

This species has been recorded to hybridise with Common Pochard *Aythya ferina* in the UK (Ogilvie & RBBP 2002, in Dudley 2005). In South Africa, it has been recorded to hybridise in captivity with three native species: African Black Duck *Anas sparsa*, African Yellow-billed Duck *A. undulata* and Rosy-billed Duck *Netta peposaca*. It is therefore now prohibited to introduce this species in South Africa.

4.1.30 Ruddy Duck *Oxyura jamaicensis*

Ruddy Duck *Oxyura jamaicensis*	
Status in countries with introduced populations	**WIDESPREAD, DECLINING (DUE TO INTERNATIONAL CONTROL SCHEMES)**
Introduced breeding range in the AEWA area	Denmark, France, Germany, Ireland, Netherlands, UK
Risk status	2, 3
Status in natural range	North & Central America: 485,000 - 495,000

Status in the AEWA area

The largest population of introduced Ruddy Duck in the AEWA region is in the UK, which held around 6,000 individuals in 2000 (Hughes *et al*. 2006). However the UK population is now thought to be less than 2,000 individuals (1,538 and 1,239 counted in December 2006 and January 2007 respectively) following the implementation of a control project which aims to reduce the population by 97% over five years (Smith *et al*. 2005; Hughes *et al*. 2006; Worden *et al*. 2007). The control project is currently in progress and the long-term success will not be established for some years, but initial results are promising. The UK population of escaped Ruddy Duck is thought to have been the source for birds elsewhere in Europe (Green & Hughes 1996). In France, the breeding population was estimated at 32-39 pairs in 2006, largely in the west of the country, but numbers have declined since 2002, probably due to control measures in the UK and France. In France, control of Ruddy Ducks in the Mayenne and Vendée regions and at Lac de Grand-Lieu has led to stabilisation of the population at 25-40 breeding pairs during the past five years (Dubois 2007). Although the French Ministry of the Environment has established an action plan to eradicate Ruddy Duck, there is a lack of co-ordination and control actions are erratic except at Lac de Grand-Lieu (Dubois 2007). Smaller numbers of birds have been recorded breeding in Ireland, Germany and The Netherlands (Table 4.1.30.1), and there is particular concern in the Netherlands where both the number of breeding pairs, and the number and range of locations of wintering Ruddy Ducks have increased continuously since the early 1990s. One pair has been recorded breeding in Denmark in 2006 and 2007 at Lolland.

Ruddy Duck formerly bred in Spain, where they were widespread and were interbreeding with the globally threatened indigenous White-headed Duck *Oxyura leucocephala*. Hybridisation with Ruddy Duck is thought to be the most significant threat to the White-headed Duck, and could potentially lead to extinction in Europe (Smith *et al*. 2005). Because of this, there has been much investment into implementing a stringent control scheme in Spain since 1993, with all Ruddy Ducks and hybrids that are found being shot. Before the control scheme was introduced there were thought to be more than 120 individuals resident in Spain, with additional winter migrants arriving from other countries. Blair *et al*. (2000) reported that over 100 birds were shot in Spain in 1998. In 2006, the population had been reduced to such an extent that only 4 Ruddy Ducks and 2 hybrids were found in Spain and all of these were shot, therefore no individuals are known to have bred successfully. Ruddy Duck has also been exterminated from Iceland, where control was applied when the population was still relatively small (10-15 individuals).

A small number of Ruddy Ducks are present in Belgium, where a pair was recently shot in the Walloon region as they were preparing to nest. There are no other known breeding attempts in Belgium. A few Ruddy Ducks can be found in Italy, where they have been recorded in Latium, Sardinia, Campania and Veneto, and in Switzerland, where up to three individuals have been recorded

in winter counts. Control measures have been implemented in Switzerland with 2 individuals shot in the canton of Geneva since 2005, but other cantons have taken no action. They are not known to have bred in Switzerland or Italy. Occasional individuals have occurred in the past in Austria, Morocco, Sweden, Turkey and the Ukraine, but there have been no records in recent years. In Morocco, an eradication plan for Ruddy Duck was adopted but never applied, as Ruddy Ducks and their hybrids were no longer seen in Morocco after control measures were applied in Spain. It is thought that individuals that formerly occurred in Morocco were wintering birds from the Spanish population.

Origin of introduction

The first known introduction of Ruddy Duck was when birds were accidentally allowed to escape from Slimbridge in the UK in 1952 (Hughes *et al*. 1999). Since that time the population has increased and expanded, with the first birds recorded in continental Europe in the 1960s (Hughes *et al*. 2006). Although there may have been some local releases or escapes in other European countries, the majority of the European Ruddy Duck population is thought to stem from the spread of the UK population (Green & Hughes 1996).

Changes since previous report

Data in Table 4.1.30.1 derives from questionnaire correspondents, Dubois (2007), Hughes *et al*. (1999), Hughes *et al*. (2006) and Worden *et al*. (2007). Although France is marked as red on the map, because the current population is larger than in 1999, the population is now declining due to culling being implemented in some parts of the country. There was an initial increase in the French Ruddy Duck population size after 1999 followed by a population decline once culling was introduced, but numbers are still higher than in 1999 (Dubois 2007). The number of birds culled has increased, with an annual maximum of 118 individuals shot in France in 2006 (CSL 2007). Ruddy Ducks that were previously present in Iceland were culled while numbers were relatively low, and the species is now thought to be extinct in Iceland. In Spain, an eradication project has also been implemented since 1993 (Blair *et al*. 2000), and all individual Ruddy Ducks and hybrids (Ruddy Duck x White-headed Duck) found have been shot. In 2006 the population had been reduced to the extent that only four Ruddy Ducks (two males and two females) and two hybrids were found, and all of these were shot before they could breed. No Ruddy Ducks are known to have bred successfully in Spain in the last two years. Numbers in the UK have declined markedly due to the ongoing control programme described above.

Despite the successful reduction of Ruddy Duck numbers in some European countries, there is some concern over population increases elsewhere in Europe, notably in the Netherlands, where the numbers of breeding and wintering birds have increased, and the range of sites where they are found has also increased. Ruddy Ducks have also started breeding in Germany and Denmark in recent years.

Table 4.1.30.1 Ruddy Duck: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	1996 - 2002	2004 - 2007
Denmark	-	1
France	More than 10 (50 - 110)	32 - 39 (280 wintering)
Germany	-	0-1
Iceland	Occasional (10 - 15)	Extinct
Ireland	50 - 54	34 - 39
Netherlands	1 - 5	12 - 15 (96 wintering)
Spain	(More than 100)[1]	0[2]
UK	Confirmed (3,600 - 6,000)	Confirmed (Less than 2,000)
TOTAL	700 - 3,000	400 - 800

[1]Number of breeding pairs not known, but widespread.
[2]Four Ruddy Ducks and two hybrids were found in Spain in 2006; all were shot.

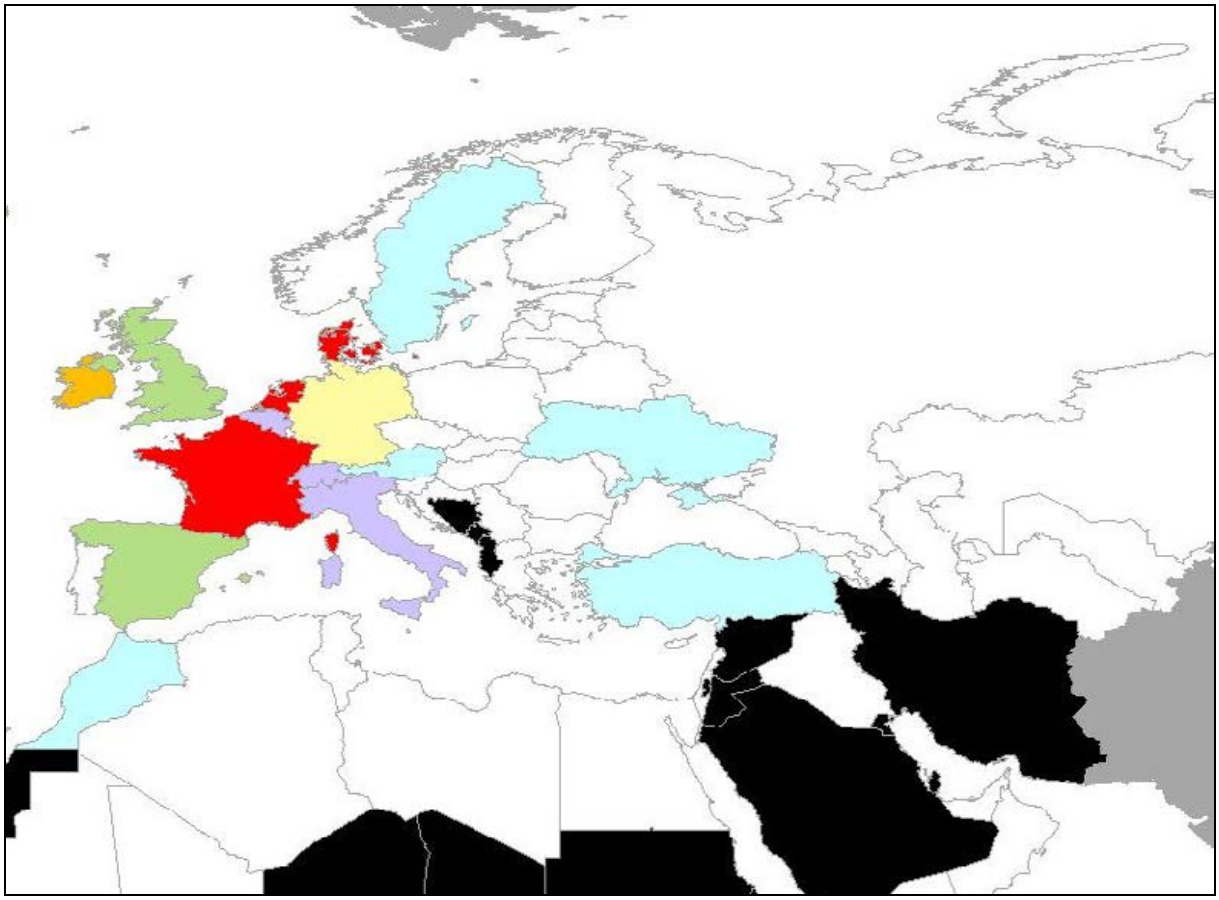

Figure 4.1.30.1 Distribution of introduced Ruddy Duck in the AEWA area. Ruddy Ducks are native to North and Central America.

Effects on native species and habitats (excluding hybridization)

The primary effect of Ruddy Duck on native species or habitats is the problem caused by hybridisation with the endangered White-headed Duck *Oxyura leucocephala* described below. However, in Iceland, there were records of aggressive interactions with Slavonian Grebe *Podiceps auritus* before Ruddy Ducks were exterminated from this country (Blair *et al*. 2000).

Hybrids

In Spain, Ruddy Duck has hybridised with the globally endangered White-headed Duck, producing fertile hybrids. Hybridisation with Ruddy Duck is considered to be the greatest threat to the European White-headed Duck population (Smith *et al*. 2005) and therefore an International Single Species Action Plan was developed, and control schemes have been implemented. These have been very successful in Spain, reducing the population from over 120 individuals in the early 1990s to only six (including two hybrids) in 2006, all of which were shot. However, the long-term success of this project will depend on the success of control measures in other European countries where Ruddy Ducks are still at large. In the UK, which holds around 95% of the introduced European Ruddy Duck population, a control project is currently underway, and has already reduced the population considerably (Worden *et al*. 2007). Control measures are also being implemented in other European countries including Belgium, Denmark, France, Portugal, Sweden and Switzerland (Hughes *et al*. 2006).

4.1.31 Purple Swamphen *Porphyrio porphyrio*

Purple Swamphen *Porphyrio porphyrio*	
Status in countries with introduced populations	**LOCALIZED, STABLE**
Introduced breeding range in the AEWA area	Italy, United Arab Emirates
Risk status	None known
Status in natural range	Southern Europe, Southern Asia, Africa, Australia: 1,700,000 - 3,000,000

Status in the AEWA area

A small but self-sustaining population of introduced Purple Swamphen is present in Italy around a bird park called "La Selva" in Frosinone. There are thought to be between 40-50 individuals in this population, and they are known to breed although the number of pairs breeding annually is uncertain. There are also a small number of introduced birds in the United Arab Emirates, with breeding proven at Al Warsan Lake in Dubai. There are other records of single birds elsewhere in the country. In the UK escaped individuals are recorded rarely and there are no breeding records; it is in BOURC category E.

Origin of introduction

The Italian population around La Selva originates from birds introduced to the park as a tourist attraction in 1976. Birds have been introduced to the United Arab Emirates since 1989, with the breeding birds on Al Warsan Lake in Dubai being introduced at that location in 2004. This species has been recorded in the UK since the second half of the nineteenth century, with most records probably the result of occasional escapes from captivity within the UK.

Changes since previous report

Although breeding has been confirmed in the United Arab Emirates since the time of the previous report, the number of individuals present is still low and is not thought to be increasing significantly. There has been little change in the numbers of Purple Swamphen in the UK or Italy since 1999. Although correspondents did not report the species from Italy in 1999, Italian correspondents participating in the current review suggest that numbers are stable.

Table 4.1.31.1 Purple Swamphen: Estimates of the annual number of breeding pairs in the AEWA area in 1996 - 2002 and 2004 - 2007. The total number of individuals is given in brackets where there is better information on numbers of individuals than on breeding pairs.

State	**1996 - 2002**	**2004 - 2007**
Italy	?[1]	Confirmed (40 - 50)
United Arab Emirates	Not known to breed	Confirmed but no data
TOTAL	0 - 25	5 - 30

[1]Not reported by correspondents in 1999, but 2007 correspondents suggest this species has been introduced since the 1970s.

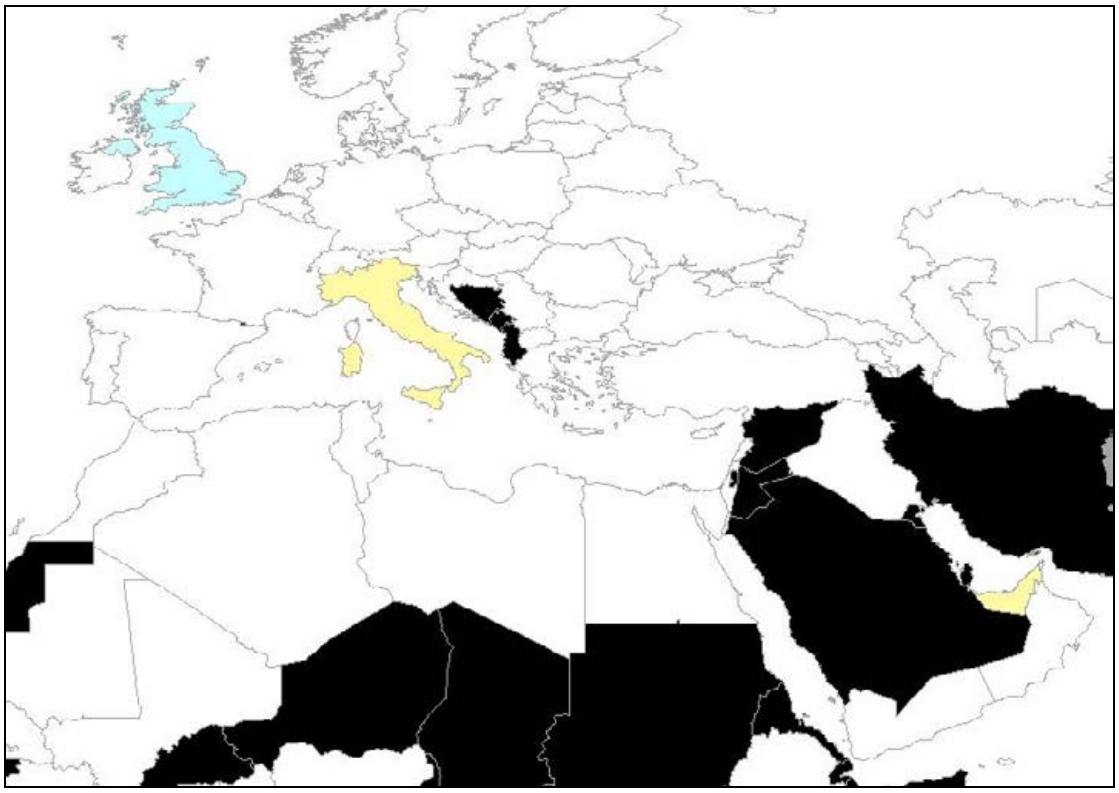

Figure 4.1.31.1 Distribution of introduced Purple Swamphen in the AEWA area. Purple Swamphens are native to southern Europe, southern Asia, Africa and Australia.

Effects on native species and habitats (excluding hybridization)

Introduced Purple Swamphens are not known to affect native species or habitats.

Hybrids

This species is not known to hybridise in the wild.

4.2 Non-Native Introduced Species That Have Bred Up To Five Times In The Wild, Or Are Not Known To Have Bred In The Wild

This section contains brief information on introduced species that are not known to have bred in the wild in any AEWA countries, or where only isolated breeding attempts have been recorded. Species that have a total of five or fewer breeding records across all countries during the last 20 years are included in this section. Where there is no information on the exact number of breeding attempts, species have been included in this section if they are described by correspondents as having bred "occasionally", "rarely" or "not in recent years".

It is important to note that some questionnaire correspondents will not have reported species that have only occurred as occasional escapes and therefore this species list may be incomplete for some countries. If it is considered important to include these data, collection could be organised by contacting National Rarities Committees in those countries that have them, but not all countries in the AEWA region will have such organisations.

4.2.1 Great White Pelican *Pelecanus onocrotalus*
Other Names: White Pelican

Records of White Pelican in the UK have occurred irregularly since 1906. These birds are likely to be escapes from collections within the UK or collections in nearby European countries. It is possible that some records may relate to vagrants from naturally occurring populations in south-west Europe, but this has not been proven. It is in BOURC category DE, with no record of breeding in the UK.

4.2.2 Pink-backed Pelican *Pelecanus rufescens*

In France, this species has bred since the early 1990s in a "wildlife reserve" (Safari Park) where it has been introduced in Sigean, which is in the Aude region of southern France. More than 50 individuals were observed in the wild in the Aude region in 2006. About 15 young are produced each year within the "wildlife reserve", and all are ringed, but it is not known to have bred elsewhere. Occasional individuals of this species have been recorded in Italy in the past, but not in recent years. An escaped individual has been observed in the wild at least once in Spain. Escaped birds have been recorded very occasionally in the UK since the 1990s, but there are very few records. It is on BOURC category E.

4.2.3 Dalmatian Pelican *Pelecanus crispus*

Around 10 free-flying individuals have been introduced into a bird park in France, and reproduce there occasionally, but they have not spread outside of the park. There have been three other records of escaped individuals in France since the start of the 20th century, the last being in 1990 (Dubois 2007). This species has been recorded a handful of times in the UK since the 1950s, with records thought to relate to escapes although vagrancy from south-east Europe is possible. Escapes have also been recorded in Spain.

4.2.4 Cattle Egret *Ardea ibis*
Other Names: *Bubulcus ibis*

Escaped individuals of this species have been recorded in various locations in the UK. However, most records are presumed to be wild vagrants from the increasing population in continental Europe. An escape was recorded in the past in Western Lander in Germany, but there have been no introduced Cattle Egrets in Germany in recent years.

4.2.5 Black-crowned Night Heron *Nycticorax nycticorax*
Other Names: Night Heron

In the UK, free-flying birds have escaped from a collection in Norfolk and from Edinburgh Zoo. Eight pairs bred at one site in Norfolk in 2003 but breeding has not been recorded since then. At Edinburgh Zoo a policy of reducing the number of free-flying birds is now being implemented. This species is on BOURC category AE*, as many records of this species in the UK relate to vagrants from naturally occurring populations in neighbouring countries in western Europe.

4.2.6 Yellow-billed Stork *Mycteria ibis*

Twelve individuals of this species were introduced in the United Arab Emirates in 1998-1999, and were released in the Khor Dubai area. The species is thought to have gained from "mudflat enhancement" that has occurred in that country. Breeding is not known to have occurred.

4.2.7 Black Stork *Ciconia nigra*

Individuals of this species have been recorded occasionally in the UK, but most records are thought to relate to naturally occurring vagrants. However a few escapes have also occurred, hence it is in BOURC category AE. Breeding has not been recorded.

4.2.8 European White Stork *Ciconia ciconia*
Other Names: White Stork

Captive collections with free-flying White Storks are present in the UK, for example at Harewood in Yorkshire and Thrigby in Norfolk. It is on BOURC category AE as records of this species in the wild are a mixture of escapes from such collections and naturally occurring vagrants from Europe. Historically White Stork was a native breeding species in the UK.

4.2.9 Straw-necked Ibis *Threskiornis spinicollis*

This species has been recorded as an introduction in the UK only. It is in BOURC category E with escaped individuals occurring very occasionally.

4.2.10 Scarlet Ibis *Eudocimus ruber*

This species occurs widely in collections due to its bright plumage. Scarlet Ibis is on category E in the UK; escaped birds have been recorded but have never attempted to breed. In the past it had been recorded as an introduced species in the United Arab Emirates, where birds had escaped from a free-flying collection, but it is no longer thought to be present in the wild in that country.

4.2.11 Glossy Ibis *Plegadis falcinellus*

Escaped Glossy Ibises have been recorded in the UK however they are on BOURC category AE as most individuals recorded in the UK are thought to be naturally occurring vagrants rather than escapes from collections. They are not known to have been introduced in any other AEWA range state.

4.2.12 African Spoonbill *Platalea alba*

In Italy, African Spoonbills occur in the Comacchio area and the Cervia saltpans. One bird formed a mixed pair with Eurasian Spoonbill *Platalea leucorodia* in 2006 and bred successfully. In France, there have been 15 records of African Spoonbills and one record of a pair breeding at Grand-Lieu in 2001, but their three young died of cold (Dubois 2007). Individual birds have occurred occasionally in the UK since the 1980s but there has been no evidence of breeding attempts; similarly, individuals have been recorded in Spain. Birds in Europe are presumed to be escapes from zoos or other collections. An African Spoonbill was first recorded in the UK in the 1980s, and first recorded in Italy in 1994 at Cervia, where it may have escaped from local collections. At the time of the previous report escapes had been recorded in Italy and the UK, but there were no breeding records. Since that time breeding attempts have been recorded in France and Italy; however there has been little change in the introduced population size or range. This species has been recorded to hybridise with a Eurasian Spoonbill *Platalea leucorodia* on one occasion in Italy. Although this is unlikely to have had any effect on the Eurasian Spoonbill population, care should be taken to avoid any further introductions of African Spoonbills to ensure that further hybridisation events do not occur. There are no other known effects on native species or habitats.

4.2.13 Lesser Flamingo *Phoenicopterus minor*
Other Names: *Phoeniconaias minor*

Lesser Flamingos are kept in many zoos and collections in Europe. Escaped birds have been recorded in France, Italy and the UK. In France, one pair has attempted to breed more or less regularly since 1994 in the Camargue with the Greater Flamingos, but they have only raised one young during this time (Dubois 2007). In Italy, Lesser Flamingos have been recorded occasionally since before 2000 at the Po Delta wetland, Margherita di Savoia and the Sardinia saltpans; these birds are alleged to be escapes from collections abroad rather than escapes from within Italy. This species is in BOURC category E in the UK; escaped individuals have been recorded on a number of occasions since the late 1980s, but it has not attempted to breed.

4.2.14 Magpie Goose *Anseranas semipalmata*

Magpie Goose has been recorded only once in the UK, during a Wetland Bird Survey count in 1996. This individual is thought to have escaped from a nearby collection. The species is not on the BOURC list and there are no records of introductions from any other AEWA range states. The natural range of this species is Australia and New Guinea.

4.2.15 Fulvous Whistling Duck *Dendrocygna bicolor*

Fulvous Whistling Ducks have been recorded in France, the United Arab Emirates and the UK. There are two breeding records in France from 2003 (when three flying young were produced) and in 2006 (when 3 young were produced). It is recorded regularly in France, sometimes in small groups of up to 4 individuals (Dubois 2007). In the United Arab Emirates individual birds have been recorded at Sir Bani Yas Island, while in the UK occasional escaped birds have been recorded since at least the 1990s, but it has not been known to breed. Escapes have been recorded occasionally in Mpumalanga Province in South Africa in the past but there are no records from recent years. One individual was recorded in Switzerland in November 2003 and another in November 2004.

4.2.16 Lesser Whistling Duck *Dendrocygna javanica*

Occasional escaped Lesser Whistling Ducks have been seen in the UK, where this species is on BOURC category E, and in the United Arab Emirates at a pond in Saffa Park. This species has been recorded in Switzerland in the past but not in recent years.

4.2.17 West Indian Whistling Duck *Dendrocygna arborea*
Other Names: Black-billed Whistling Duck

At least one escaped individual of this species has been recorded in Switzerland in the past, but it has not been recorded in recent years. It is not known to have been introduced in any other AEWA countries.

4.2.18 Black-bellied Whistling Duck *Dendrocygna autumnalis*
Other Names: Red-billed Whistling Duck

This species has been recorded as an occasional escape in France, Spain and South Africa. It has attempted to breed at least once in Spain. In France a few individuals have escaped from captivity. The maximum annual count was in 2003 when 8 adults and 1 juvenile were recorded. Individual escapes have been recorded in Switzerland in the past, but not in recent years.

4.2.19 Black-necked Swan *Cygnus melanocorypha*

A small number of Black-necked Swans have been introduced on Sir Bani Yas Island in the United Arab Emirates, but they have not been recorded breeding in this country. In the UK it is on BOURC category E; a few escaped birds have been recorded in the south of England but the species is not thought to have attempted to breed. In Switzerland, one individual was recorded in winter counts in November 1998 and January 1999, but the species has not been seen since in Switzerland.

4.2.20 Trumpeter Swan *Cygnus buccinator*

Escaped Trumpeter Swans have been recorded occasionally in the UK since 1993. One pair bred in Northamptonshire in 1997. All records of Trumpeter Swans in the UK are thought to relate to birds that have escaped from captivity. There are no known effects on native species or habitats and introduced Trumpeter Swans are not known to hybridise with any other species, although in Canada, naturally occurring Trumpeter Swans have hybridised with introduced Mute Swans *Cygnus olor*.

4.2.21 Coscoroba Swan *Coscoroba coscoroba*

Occasional escapes have been recorded in the UK in recent years. There are no records of introduced Coscoroba Swan from any other AEWA range state.

4.2.22 Ross's Goose *Chen rossii*
Other Names: ***Anser rossii***

Ross's Goose is known as an introduced species only in the UK, where it is in BOURC category DE*, having bred occasionally. There are no known breeding records in recent years, however this species may be under-recorded. The number of introduced individuals present in the UK is not known. Introduced Ross's Geese are thought to be escapes from ornamental collections and have been recorded in the UK since the 1960s, however the numbers of wild Ross's Geese in arctic Canada are increasing, and therefore it is possible that some records in the UK, particularly individuals found with wild Pink-footed Goose flocks, could relate to wild vagrants rather than escapes. There has been no apparent change in status, numbers or distribution of introduced Ross's Geese since the previous report, and there are no known effects on native species and habitats. This species may hybridise accidentally with Pink-footed Goose *Anser brachyrhynchus* and Snow Goose *Chen caerulescens*.

4.2.23 Hawaiian Goose *Branta sandvicensis*
Other Names: Nene

Hawaiian Geese were introduced to the United Arab Emirates between 1989 and 1991. One unsuccessful breeding attempt, where eggs were laid but failed to hatch, has been recorded in the past, but there have been no recorded breeding attempts in recent years. Occasional escapes have occurred in the UK, and the species in on BOURC category E, with no breeding attempts recorded.

4.2.24 Brent Goose *Branta bernicla*

Occasional escaped Brent Geese have been recorded in the UK, where this species is also a widespread winter visitor. It is in BOURC category AE. There are no records of introduced Brent Geese in any other AEWA range state.

4.2.25 Red-breasted Goose *Branta ruficollis*

Small numbers of introduced Red-breasted Geese occur in Germany and the UK, and occasional breeding attempts are recorded in both countries. In the UK, the only recorded breeding attempt was in Yorkshire in 2003 when a pair laid eggs but these subsequently disappeared. It is assumed that this breeding attempt was unsuccessful. The introduced population is not thought to be self-sustaining in either country, however many other introduced goose populations started from small numbers so it is possible that this species could establish self-sustaining populations in the future. Introduced Red-breasted Geese in Germany and the UK are presumed to be escaped ornamental birds, with the species being recorded as an escape in both countries since the 1960s. The fact that the numbers of records are relatively stable suggests that additional escapes must have occurred from time to time since the 1960s. Introduced Red-breasted Geese are not known to affect native species or habitats and they are not known to hybridise in the wild.

4.2.26 Blue-winged Goose *Cyanochen cyanoptera*

Occasional escapes have been recorded in the UK in recent years. This species has not been recorded as introduced in any other AEWA range state.

4.2.27 Orinoco Goose *Neochen jubata*

Occasional escapes have been recorded in the UK in recent years. This species is not known to have

been introduced in any other AEWA range state.

4.2.28 South African Shelduck *Tadorna cana*
Other Names: Cape Shelduck

The species has been recorded as an escape in South Africa away from its native breeding grounds and there have been sporadic records of escapes from Switzerland and Spain since the 1970s. It has been fairly regularly recorded as an escape in the United Kingdom, where it is in BOURC category E and has bred once. This species has not been recorded as introduced in any other AEWA range state. It has possibly attempted to hybridise with native species in the UK.

4.2.29 Paradise Shelduck *Tadorna variegata*

The species has been recorded sporadically in Switzerland and in the United Kingdom, where it is listed where it is in BOURC category E. There are no records from other AEWA range states and no recorded instances of hybridisation with native species.

4.2.30 Australian Shelduck *Tadorna tadornoides*

The species has been recorded sporadically in Switzerland and in the United Kingdom, where it is listed in BOURC category E. There are no records from other AEWA range states and no recorded instances of hybridisation with native species.

4.2.31 Common Shelduck *Tadorna tadorna*

Occasional escaped Common Shelduck have occurred in Austria, Ukraine, the Czech Republic and South Africa, since at least the 1970s. In the Czech Republic it may be slowly increasing and in South Africa, it may have hybridised with native species. This species is not known to have been introduced in any other AEWA range state.

4.2.32 Radjah Shelduck *Tadorna radjah*

This species has been recorded as an occasional escape in Spain and in the United Kingdom, where it is in BOURC category E. It is not thought to have bred outside captivity within the AEWA region and is not known to have been introduced in any other AEWA range state.

4.2.33 Comb Duck *Sarkidiornis melanotos*

This species has been recorded as an occasional escape in Spain and the Canary Isles and in the United Kingdom, where it is in BOURC category E. It is not thought to have bred outside captivity within the AEWA region and is not known to have been introduced in any other AEWA range state.

4.2.34 Ringed Teal *Callonetta leucophrys*

A single pair of introduced Ringed Teal has been recorded to breed in Israel, where they were introduced to the central coast plains during the 2000s. They are thought to have benefited from ponds and suitable habitat created in city parks. In France there have been three recorded breeding attempts in the wild at two different sites; at the first site a pair bred in 2005 and 2006 producing four and three young respectively, while at the second site a pair bred in 2006 and reared three young (Dubois 2007). Introduced individuals of this species occur more or less regularly in South Africa, Switzerland and the UK, but it has not been recorded to breed in these countries. A few individuals are recorded annually in Switzerland during winter waterbird counts. It has also been recorded in Germany in the past but not in recent years. Introduced Ringed Teal in Europe and South Africa are thought to be escapes from captivity. They have occurred in the UK since the 1980s but the timing of escapes in other countries is not known (although they have been present since at least the 1990s). The birds in

Israel were deliberately released during the 2000s. This species is not known to affect native species or habitats and has not been recorded to hybridise in the wild.

4.2.35 Maned Duck *Chenonetta jubata*
Other Names: Maned Goose

Occasional escapes have been recorded in Switzerland, Spain and in the United Kingdom. In the United Kingdom it is in BOURC category E. This species has not been recorded within any other AEWA range state and is not thought to breed within the AEWA region.

4.2.36 American Wigeon *Anas americana*

This species is thought to occur as an escape in Belgium, Switzerland and the United Kingdom, although in all three countries it is probably more frequently recorded as a genuine vagrant. The difficulty of distinguishing escapes from wild birds makes any temporal pattern difficult to discern, but escapes are thought to be declining in Belgium. There are no recorded instances of escaped bird hybridising with native species, but is known to hybridise regularly with Eurasian Wigeons *Anas Penelope* in the wild.

4.2.37 Chiloe Wigeon *Anas sibilatrix*

This species has been recorded as an occasional escape in Belgium, Spain and Switzerland and is recorded fairly regularly in the UK, where it is in BOURC category E. This species has been recorded breeding in both Spain and Belgium. However there seems little immediate risk of it becoming established as a regular breeder, as in Belgium it appears to be declining. This species has not been recorded within any other AEWA range state

4.2.38 Falcated Duck *Anas falcata*
Other Names: Falcated Teal

This species has been recorded sporadically in Spain and the Canaries and in Italy. It has been recorded fairly regularly in the UK since the 1950s, where it is in BOURC category E. This species is not known from any other AEWA range state and has not been recorded breeding outside captivity within the AEWA region. It is possible that some individuals could be natural vagrants, but this has not been proven and such birds would be impossible to tell from introduced individuals in the field.

4.2.39 Baikal Teal *Anas formosa*

This species has been recorded occasionally from Spain, Italy, Switzerland and the United Kingdom, where it was first recorded in 1906. True patterns of distribution and trends are masked by the occurrence of genuine wild birds, which are thought to reach the AEWA region occasionally; one record in Denmark was proven as a vagrant through stable isotope analysis.

4.2.40 Speckled Teal *Anas flavirostris*

This species has been sporadically recorded in France, Switzerland and the United Kingdom. This species bred once in France in 1999 when 1 female and 4 ducklings were seen in June (Dubois 2007), but is not thought to have bred elsewhere within the AEWA region.

4.2.41 Cape Teal *Anas capensis*

This species has been recorded as an escape in Spain and the Canaries, in the Netherlands and in the United Kingdom. It may have bred in the UK, and is known to have bred occasionally in the Netherlands, but with little risk of the population becoming self-sustaining in the immediate future. It has also been recorded as an escape in South Africa, where the prevalence of escaped birds is masked

by the presence of wild birds.

4.2.42 Chestnut Teal *Anas castanea*

This species has occasionally been recorded as an escape in Switzerland, Spain and the United Kingdom. In the United Kingdom, it is listed in BOURC category E and may have bred, but the population is very unlikely to be self-sustaining. It has not been recorded within any other AEWA range state.

4.2.43 American Black Duck *Anas rubripes*

This species has been recorded as an occasional escape in South Africa. It is thought that a small number of pairs breed, but it is unlikely that the population is self-sustaining. Elsewhere within the AEWA region, particularly in the west, patterns of incidences of escape are masked by the fairly regular occurrence of this species as a genuine vagrant.

4.2.44 Yellow-billed Duck *Anas undulata*
Other Names: African Yellow-billed Duck

Escapes of this species have been recorded very occasionally in the United Kingdom and Switzerland. This species is native to sub-Saharan Africa, but has not been recorded breeding outside its native range.

4.2.45 Northern Pintail *Anas acuta*

This species has been recorded as an escape in South Africa, where it may have bred. In the United Kingdom, it occurs as a rare native breeder, predominantly in Northern Scotland, but is in BOURC category AE, so presumably escapes do occur. The true prevalence of this species as an escape is masked by the widespread occurrence of wild birds within the AEWA region.

4.2.46 Yellow-billed Pintail *Anas georgica*
Other Names: South Georgia Pintail

This species has occasionally been recorded as an escape in Spain and the United Kingdom and once in Switzerland. It has not been recorded as a breeding species within any AEWA range state.

4.2.47 White-cheeked Pintail *Anas bahamensis*
Other Names: Bahama Pintail

This species has been recorded as an escape in France, Spain, Israel, the Netherlands, Switzerland and the United Kingdom. This species may have bred and the Netherlands and the United Kingdom, where pairs are sometimes seen. In France, this species has bred on three occasions in the Paris area. In 1999, 5 young were produced, in 2005, 4 young were produced and in 2006 1 young was produced (Dubois 2007). There is little immediate danger of populations becoming self-sustaining and breeding remains sporadic.

4.2.48 Red-billed Duck *Anas erythrorhyncha*
Other Names: Red-billed Teal

This species has been recorded as an escape in South Africa and twice in the United Kingdom. In South Africa, the prevalence of escapes is masked by the occurrence of native breeders. This species is a native resident in sub-Saharan Africa, but is unlikely to have bred outside captivity elsewhere within the AEWA region.

4.2.49 Silver Teal *Anas versicolor*

This species has been recorded several times as an escape in Switzerland and the United Kingdom, in the latter country, since the 1980s. There are no recorded instances of breeding within AEWA range states.

4.2.50 Hottentot Teal *Anas hottentota*

This species is native to sub-Saharan Africa, but escapes have been recorded several times in the United Kingdom and Switzerland. In the United Kingdom it is in BOURC category E and may have bred, but is unlikely to become established as a self-sustaining breeder.

4.2.51 Blue-winged Teal *Anas discors*

Small numbers of introduced or escaped Blue-winged Teal are present in the wild in the UK, but they have only been recorded breeding once, in Essex in 1994. Blue-winged Teal in the UK are thought to be escapes from captivity or ornamental collections, which have occurred since the 1940s, along with some naturally occurring vagrants. The number of records is relatively stable, and this species has no known effects on native species and habitats and is not known to hybridise in the wild.

4.2.52 Cinnamon Teal *Anas cyanoptera*

A small number of individuals are present in the UK, where this species is in BOURC category E*, having bred occasionally. There are no breeding records in recent years. There has also been an isolated occurrence of Cinnamon Teal in Switzerland; a single individual was recorded during a waterbird census in January 1999. Cinnamon Teals in the UK are thought to be escapes from captivity, which have occurred occasionally since at least the 1980s. The single individual recorded in Switzerland in 1999 was also thought to be an escaped bird. There has been no significant change in the numbers of Cinnamon Teals in the UK since 1999; it was recorded as an occasional escape in both years. There have been no records in Switzerland since 1999. This species has no known effects on native species or habitats and is not known to hybridise in the wild.

4.2.53 Marbled Teal *Marmaronetta angustirostris*
Other Names: Marbled Duck

This species has been recorded as an escape in Oman, Belgium, France and the United Kingdom. In the latter country it is in BOURC category DE. It is strongly suspected that pairs have bred in Oman, but is not documented to have bred in the wild anywhere else outside its native range. True incidences of breeding and the true extent of escapes are masked by the presence of wild birds within the Mediterranean range and the likely occurrence of this species as a vagrant elsewhere.

4.2.54 Rosy-billed Pochard *Netta peposaca*

This species has been recorded sporadically as an escape in Botswana (Sashe Dam), Switzerland and France. In the United Kingdom, it is recorded on category E of the BOURC list and has been recorded on at least five, but probably far more occasions. Although there are no confirmed instances of this species breeding within the AEWA region outside captivity, it is becoming a regular escape in France and breeding seems likely. There are no well documented cases of this species hybridising. However, *Netta* and *Aythya* ducks are notorious for hybridisation and it seems likely that this species would inter-breed with native species if it became more widespread.

4.2.55 Common Pochard *Aythya ferina*

This species has been recorded as an escape in the United Arab Emirates and South Africa and in Germany and the United Kingdom, where the prevalence of this species as an escape is masked by the

widespread occurrence of this species as a wild bird. Within the AEWA region, but outside its normal range it may breed, although documented instances of this occurring are lacking. As with other *Aythya* species, hybridisation is extremely likely.

4.2.56 Redhead *Aythya americana*

This species has been recorded sporadically as an escape in the United Kingdom, where it is in BOURC category AE. The prevalence of escapes is somewhat masked by the likely occurrence of genuine vagrants. Breeding has not been documented within the AEWA region. As with other *Aythya* species, hybridisation with native species is likely, should it become more prevalent.

4.2.57 Ferruginous Duck *Aythya nyroca*

Escapes of this species have been recorded in the Netherlands, South Africa, the United Arab Emirates and the United Kingdom. It is listed in category AE on the BOURC list. In the United Arab Emirates and the Netherlands breeding has occurred and in South Africa and the United Kingdom, breeding is possible, but unconfirmed. The true extent of escapes of this species are masked by the likely occurrence of genuine wild birds. As with other *Aythya* ducks, this species is very prone to hybridisation.

4.2.58 Tufted Duck *Aythya fuligula*

This species has been sporadically recorded as an escape in South Africa, where it may have bred outside captivity, but documented instances of this are lacking. Throughout most of the AEWA region, this species occurs naturally in the wild and thus identification of escapes is difficult. As with other *Aythya* ducks, this species is very prone to hybridisation.

4.2.59 New Zealand Scaup *Aythya novaeseelandiae*

Since this 1980s, escapes of this species have occasionally been recorded in the UK, where it is in BOURC category E. There are no documented instances of breeding and it has not been recorded in any other range state within the AEWA region. Thus, the establishment of self-sustaining breeding populations seems very unlikely in the immediate future. The scarcity of this species outside its native range and the limited occurrence of closely related species within its range is such that documented instances of hybridisation are scarce. However, should this species become more prevalent as an escape, it seems likely that hybridisation would occur.

4.2.60 Bufflehead *Bucephala albeola*

This species has been recorded as an escape in both Switzerland and the United Kingdom. In both countries, the prevalence of escapes is masked by the occasional occurrence of true vagrants. It has not been recorded as an escape elsewhere within the AEWA region.

4.2.61 Barrow's Goldeneye *Bucephala islandica*

This species has been recorded as an occasional escape in the United Kingdom, since 1910, but most frequently since the 1980s. It is in category AE of the BOURC list, and the prevalence of escapes is masked by the likely occurrence of true vagrants.

4.2.62 Hooded Merganser *Lophodytes cucullatus*
Other Names: ***Mergus cucullatus***

This species has been recorded as an escape in Switzerland and the United Kingdom, with most records having occurred since the 1970s. It is in category DE of the BOURC list. The true prevalence of this species is somewhat masked by the potential occurrence of this species as a genuine vagrant. It

is not known whether this species has bred within the AEWA region, but there are no documented instances of it having done so.

4.2.63 White-headed Duck *Oxyura leucocephala*

This species has been recorded as an escape in the United Kingdom and is in category DE of the BOURC list. The true prevalence of escapes here and elsewhere within the AEWA region is masked by the potential occurrence of wild birds, which occur around the Mediterranean. This species is known to hybridise with other *Oxyura* species, notably Ruddy Duck. However, at present hybridisation is of more concern for this species than for others.

4.2.64 Maccoa Duck *Oxyura maccoa*

This species has been recorded as an escape in Switzerland and the United Kingdom and is in category E of the BOURC list. It has also been recorded as an escape in South Africa, where its status as such is masked by the occurrence of wild birds. There are no documented instances of breeding outside its native range and there seems little possibility that this species will establish a self-sustaining breeding population in the immediate future.

4.2.65 Lake Duck *Oxyura vittata*
Other Names: Argentine Blue-billed Duck

Since the 1990s, this species has been recorded as an occasional escape in the United Kingdom and is in category E of the BOURC list. It has not bred in the wild within the AEWA region and has not been documented in any other AEWA range state. *Oxyura* ducks are known to hybridise. At present, this species has not become sufficiently widespread as an escape within the AEWA region for this to have occurred, and there seems little immediate risk that self-sustaining populations will establish.

4.2.66 Grey Crowned Crane *Balearica regulorum*
Other Names: South African Crowned Crane

This species has been recorded as an escape in the United Arab Emirates, where it was first introduced in 1989 and two pairs have bred at the Zabeel Palace. It has also been recorded as an escape in Spain, but has not been documented as a breeder there. There seems little risk of it establishing in Spain, but some possibility of it becoming a more regular breeder in the United Arab Emirates. However, thus far, there is no overall temporal trend.

4.2.67 Black Crowned Crane *Balearica pavonina*
Other Names: Crowned Crane

This species has been recorded as an escape in the United Kingdom, Spain and Italy, but there are no documented instances of it having bred. In France, one pair bred in 1981 in a marsh in the Somme region and raised 2 young (Dubois 2007). There is no overall trend in the prevalence of escapes and it seems unlikely that self-sustaining breeding populations will establish themselves in the near-future.

4.2.68 Demoiselle Crane *Grus virgo*
Other Names: *Anthropoides virgo*

This species has occurred as an escape in the United Arab Emirates and in the United Kingdom, but it is not known if any have bred outside captivity. It is listed in BOURC category E. In Spain and elsewhere within the Mediterranean region, its status as an escape is somewhat masked by the potential occurrence of genuine wild birds from small breeding populations in Morocco, Turkey and the Black Sea area. It may establish itself as a breeder in the United Arab Emirates, but it is unlikely to do so within the United Kingdom.

4.2.69 Sarus Crane *Grus antigone*

There are a small number of escapes of this species recorded from the UK, where it is listed in BOURC category E, but has not recorded as a wild breeder. In France, a pair escaped from Parc à Cigognes de Kientzheim (Haut Rhin region of Alsace), and between 1974 and 1984 they lived in the Lower Rhine region. They bred between 1981 and 1983 (3 years) and raised at least 2 young to fledging (Dubois 2007). It seems highly unlikely that a self-sustaining breeding population of this species will become established in the immediate future.

4.2.70 Common Crane *Grus grus*
Other Names: Eurasian Crane

This species has been recorded as an escape in the United Arab Emirates, where it may have bred. Elsewhere within the AEWA region, particularly within Europe, the status of this species as an escape is masked by the regular occurrence of wild birds. For example, there is some suggestion that the recent re-establishment of Common Cranes in the United Kingdom was aided by the presence of escaped birds (Mathews and MacDonald 2001).

4.2.71 Spur-winged Lapwing *Vanellus spinosus*
Other Names: Spur-winged Plover; *Holopterus spinosus*

This species has been recorded as an escape in the United Kingdom and is listed in BOURC category E. It is not thought to have bred and self-sustaining populations are highly unlikely to establish.

4.2.72 Grey-headed Gull *Larus cirrocephalus*

This species has been documented as an escape on four occasions in the United Kingdom, but may be under-recorded. It is listed in BOURC category E and is not likely to have bred. There are no documented escapes from elsewhere within the AEWA region.

5. CONSULTATION, PROTECTION AND CONTROL

For each country, the questionnaires asked whether the correspondent knew of any measures to stop the introduction of non-native waterbirds. They also asked whether any steps were taken to control non-native waterbirds, and to describe the effectiveness of such steps. Correspondents were also asked to describe any further action that they thought was needed.

5.1 Prevention Of Introductions

Not all questionnaire correspondents answered the question about whether there were any measures to stop the introduction of non-native waterbirds in their country (for 32 out of 89 countries there was no response to this question), but of those that did answer (57 countries), more than half (34 countries, 54% of those that answered) stated that there was some kind of legislation, permit system or other restriction on the import of non-native species. However correspondents from 26 countries did not know of any restrictions, or stated that their country had restrictions that applied only to certain parts of the country (e.g. nature reserves, or particular provinces) rather than the whole country. Countries with no known restrictions were usually those that have few introduced waterbirds at the present time, although some countries with few or no known introduced waterbirds had quite stringent legislation.

Many countries reported that legislation designed to prevent the introduction of non-native species was not well enforced, and that better enforcement was required for the restrictions to be effective. Shaw (2006) states that despite legislation to prevent the introduction of non-native species being in place, introductions still occur. Furthermore, in some countries legislation on the introduction and control of non-native species is implemented by local or provincial authorities, rather than on a national scale, and this can lead to a lack of co-ordination both in terms of preventing introductions but also in implementing effective control programmes. For example in South Africa, where introduced Mallards *Anas platyrhynchos* are a problem, being very invasive and hybridising with some native species, conservation bodies in some provinces are actively culling Mallards and Mallard hybrids, while other provinces are less active in dealing with the problem. Correspondents from this country suggested that co-ordinated eradication plans should be implemented by the national government in all nine provinces, rather than being organised on a provincial scale.

It has been suggested that although sufficient international legislation exists to limit the introduction of non-native waterbirds, at the national or provincial scale legislation is often inadequate or ineffective (Shaw 2006).

Although more than half of the countries reported some kind of legislation to limit the introduction of non-native species, such legislation has often been introduced relatively recently (in the last 5-20 years), with a correspondent from one country reporting having only draft legislation at the present time. This means that unlimited introductions could have occurred legally in the past in most countries, and numerous populations of introduced species in the AEWA region are thought to derive from introductions that occurred before there was legislation to prevent them.

5.2 Consultations Carried Out Prior To Introductions

The questionnaires asked correspondents from each country to report, for each introduced species, whether any consultations were carried out before the introduction took place.

There is only one known case where consultation took place prior to introductions being made was in Finland with a re-introduction project for Lesser White-fronted Goose. In this case the Ministry of Environment in Finland and the WWF were consulted and initially approved the project, but the project was stopped in 1997 after genetic work revealed the hybrid history of some of these birds. However, despite these consultations, correspondents suggest that guidance by the Ministry of the Environment (after 1997) was ignored by a private organisation aiming to continue to introduce these birds, and a small number of birds were released after this time.

5.3 Protection And Control Of Introduced Waterbirds

In many countries legislation designed to protect wild birds protects all species, including those that have been introduced. For example, in the European Union, introduced species that occur naturally within Europe are protected by the EU Birds Directive in all member states, whether or not they are native in a particular member state. Furthermore, introduced Canada Geese (which do not occur naturally in Europe) are protected from hunting during the close season. Although a licence can be obtained to control these species under Article 9 of the Birds Directive, normally such a licence can only be obtained when there is evidence that a species is a threat to native flora or fauna. Similar legislation is in place in many other countries in the AEWA region. This type of legislation can cause problems with controlling introduced species. For example, in Canada there have been problems with implementing a control scheme for introduced Mute Swan, which is protected under the Migratory Birds Treaty Act. This means that no control measures for this species can be implemented at the present time, and the population is currently increasing rapidly (9-11% per year) in the Great Lakes area and having detrimental effects on native biodiversity.

Control schemes have been implemented for only a small proportion (six out of 32 regularly breeding species) of introduced waterbirds in the AEWA region, with variable success.

The most successful control schemes are those that are implemented when populations are relatively small, or have not yet even established. For example, in Austria, a population of around 60 Black Swans in Vienna was successfully controlled by egg pricking and egg collection; this species has now been virtually extirpated from Austria, with no breeding pairs remaining. In Slovakia, there are no established introduced species, but occasional escapes from zoos or avicultural collections have been successfully controlled by trapping or culling. A control scheme for Ruddy Ducks was implemented in Iceland, in line with those being carried out elsewhere in Europe, when the population was only about 10-15 individuals and breeding had only occurred a few times. This was very successful and eliminated the species from Iceland, presumably because it was carried out when the population was still very small and could easily be controlled.

In many countries in northern and western Europe, some control measures are applied for feral geese, such as Greater Canada Goose, Egyptian Goose and Greylag Goose. However, in most cases this simply means that particular species are added to the hunting list, and can be hunted during the open season in the autumn and winter (dates vary slightly between countries, but usually around September-January). In most cases this has been ineffective as birds are usually protected from hunting during the breeding season. Furthermore, in almost all countries there is no targeted or co-ordinated hunting of these species. In some countries egg control has also been implemented but again only locally, usually with no co-ordinated national or international scheme, and therefore it has been ineffective. Established populations of feral geese continue to increase throughout the region.

In Belgium, a more co-ordinated winter hunting project has been organised in the Flanders region, with several thousand Greater Canada Geese killed since 2002. Additionally permits can be obtained to catch and kill Greater Canada Geese during moult, and to destroy eggs. This system has only recently been applied, and so far only on a local scale, but initial results are promising with recent winter counts suggesting that there has been a slower population increase since these measures were taken. However, the correspondents from this region suggested that future bird counts would be required to confirm the efficacy of this project, and catching during moult would need to be extended in order to be successful on a wider scale.

The only known control measures that have been implemented in an internationally co-ordinated project are part of the ongoing Ruddy Duck *Oxyura jamaicensis* eradication plan, which is part of the International Species Action Plan for White-headed Duck *Oxyura leucocephala*. The results of the project are promising so far, with breeding Ruddy Ducks virtually eliminated from Spain, and numbers in the UK (which held the greatest proportion of the introduced population) reduced by more than 50% so far (Worden *et al*. 2007). Birds have also been controlled in several other countries,

including a large number in France (Hughes 2006; Dubois 2007). This is the most effective example of control measures reducing the population of an established non-native species, but the long-term success of the project remains to be seen.

5.4 Further Action

The questionnaire asked correspondents to state what further action they thought was needed to help to reduce introductions and population increase of non-native waterbirds.

Correspondents from several countries have suggested that improving public awareness of the potential problems caused by introduced species would be an important step to reduce introductions. For example, in the Seychelles non-native waterbirds were introduced by the management of hotels as an attraction, with no thought to the ecological consequences because of a lack of understanding and knowledge of the issues, and no requirement for consultation with conservation organisations or government prior to the introductions. Correspondents from Israel also suggested that education projects would be useful, and that these should be targeted particularly at people rearing waterbirds. Public education may also be important if any control measures for non-native species are to be politically acceptable. It has been shown that members of the public who had heard about control or eradication projects were more likely to support them than those who had no information about such projects (Bremner & Park 2007).

Correspondents from many countries suggested that existing legislation was not stringent enough, or that there were loopholes, and therefore it needed to be strengthened, or, in countries with no existing legislation correspondents often suggested that some should be introduced. Additionally, numerous correspondents suggested that existing legislations should be enforced more rigorously as currently there are problems with enforcement of existing legislation. One correspondent suggested that penalties should be introduced for non-compliance with legislation that requires keepers of non-native species to prevent escapes.

There are a large number of cases where limited funding, both for implementation of legislation and for control projects, has constrained the ability of governments and conservation organisations to deal with the problem of introduced species. In some countries there are also problems with obtaining funding for monitoring of introduced waterbirds, and therefore little is known about their numbers and any problems they may cause.

6. GAPS IN COVERAGE IN THE AEWA AREA

A questionnaire was sent to at least one, and in most cases two or more, contacts in all but three of the 119 states within the AEWA area. For four countries there were no known contacts and attempts to obtain the names of suitable contacts were unsuccessful. These countries were Montenegro (Europe), San Marino (Europe), Somalia (Africa) and Western Sahara (Africa). Montenegro was formerly part of Serbia and Montenegro and only became a fully independent state in 2006, hence no contacts were available. San Marino is one of the smallest countries in the AEWA range (61 km^2) and is completely surrounded by Italy. In the previous report introduced birds in San Marino were included in the Italy questionnaire response. Although this was not the case in the current report there are no waterbodies of any significant size in San Marino therefore the number of introduced waterbirds is likely to be limited. The two African countries where no contact was available (Somalia and Western Sahara) do not have stable governments and therefore obtaining contacts was difficult. In any case, neither country is likely to have a significant number of (if any) introduced waterbirds, both being largely arid and with little suitable habitat. There is a small amount of suitable habitat for waterbirds in Somalia near the only two permanent rivers in the southwest. However it is still unlikely that many waterbirds have been introduced into Somalia due to it being a developing country with other priorities.

Responses were received from at least one contact in 89 countries (76% of contacted countries). For the remaining 27 countries no contacts had responded by November 2007, although contacts from seven of these have promised to respond, leaving a further 20 countries where no response is expected from the currently known contacts (Figure 6.1).

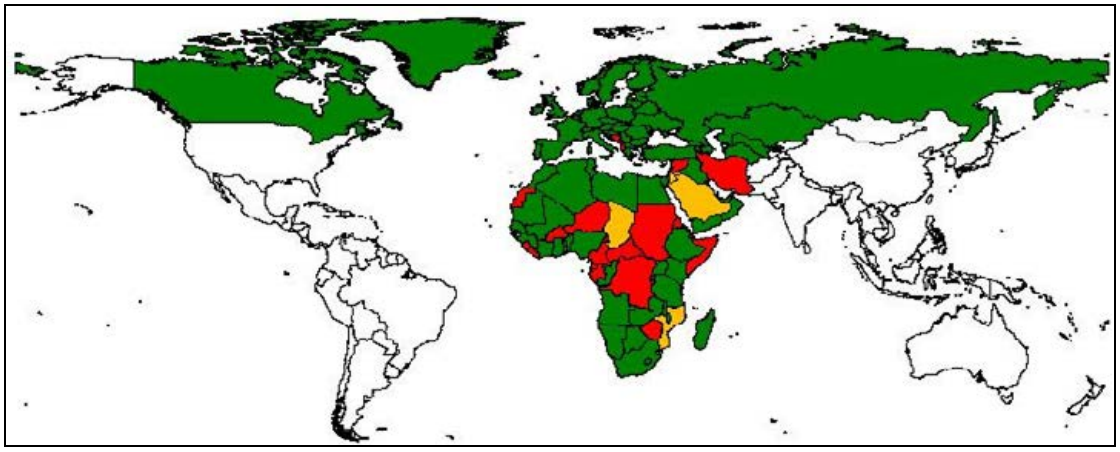

Figure 6.1 Map of the world showing AEWA range states that responded to the questionnaire (green); those where a response has been promised but had not been received by November 2007 (amber) and those where no response has been received (red). States outside the AEWA region are shown in white.

The largest area with missing information is central Africa, where contacts in many countries did not respond to the questionnaire (Fig. 6.1.1). However there are also several countries in other parts of Africa, the Middle East and Europe where no contacts responded to the questionnaire (Fig. 6.1.1, 6.3.1, 6.4.1).

In the tables listing countries with missing information, the number of introduced waterbird species likely to be present in each country has been estimated. These estimates are subjective best guesses, based on the numbers of introduced waterbird species in neighbouring countries, the size of the country, the amount of suitable habitat and, where data are available, the number of introduced waterbird species reported from the country in 1999 from Blair *et al.* (2000).

6.1 Africa

In Africa there are 22 countries with missing information in the 2007 review, although eight of these had participated in the previous review in 1999, so there is some historical information for those countries (Table 6.1.1, Fig. 6.1.1). There are three countries where a questionnaire response has been promised (Chad, Guinea-Bissau and Mozambique), but had not been received by November 2007. In mainland Africa, only one country (South Africa) that participated in the review had more than one established introduced species, with most other countries having no introduced species. Those that did have an introduced species had only feral/hybrid forms of Mallard or Muscovy Duck. Botswana has isolated records of a total of 4 species, but these all related to single sightings of single individuals (i.e. very isolated and certainly not established), and some were close to the border with South Africa and thought to relate to birds from that country. It is therefore unlikely that any of the countries in mainland Africa where there is missing information would have more than one or two introduced species. Estimates of the number of introduced waterbird species in countries with missing information in Table 6.1.1 are based on numbers in neighbouring countries (Appendix 1) and, where appropriate, the number of species reported in 1999.

Table 6.1.1 The AEWA status (CP = contracting party, NCP = non-contracting party) and estimated number of introduced waterbirds species in each country in Africa for which no questionnaire was returned in the current review. The response status in 1999 is shown in the right-hand column, and if a questionnaire was received in 1999 the total number of introduced waterbird species present at that time is shown in brackets.

Country	AEWA Status	Estimated Number of Introduced Waterbird Species	Responded 1999 (Number of IWS)
Burkina Faso	NCP	0-1	N
Burundi	NCP	0-1	N
Cameroon	NCP	0-1	Y(0)
Cape Verde	NCP	0-1	N
Central African Republic	NCP	0-1	N
Chad[1]	NCP	0-1	N
Democratic Republic of Congo (formerly Zaire)	NCP	0-1	N
Djibouti	CP	0-1	N
Equatorial Guinea	CP	0-1	N
Eritrea	NCP	0-1	Y(0)
Gabon	NCP	0-1	N
Gambia	CP	0-2	Y(0)
Guinea-Bissau[1]	CP	0-1	Y(0)
Liberia	NCP	0-1	Y(0)

[1]Countries where a response is expected but had not been received by November 2007.
[2]Countries where no contact was available to send a questionnaire to.

Table 6.1.1 Continued.

Country	AEWA Status	Estimated Number of Introduced Waterbird Species	Responded 1999 (Number of IWS)
Mozambique[1]	NCP	0-2	Y(0)
Niger	CP	0-2	N
Sao Tome and Principe	NCP	0-1	N
Sierra Leone	NCP	0-1	N
Somalia[2]	NCP	0-1	Y(0)
Sudan	CP	0-1	N
Western Sahara[2]	NCP	0	N
Zimbabwe	NCP	1-2	Y(1)

[1]Countries where a response is expected but had not been received by November 2007.
[2]Countries where no contact was available to send a questionnaire to.

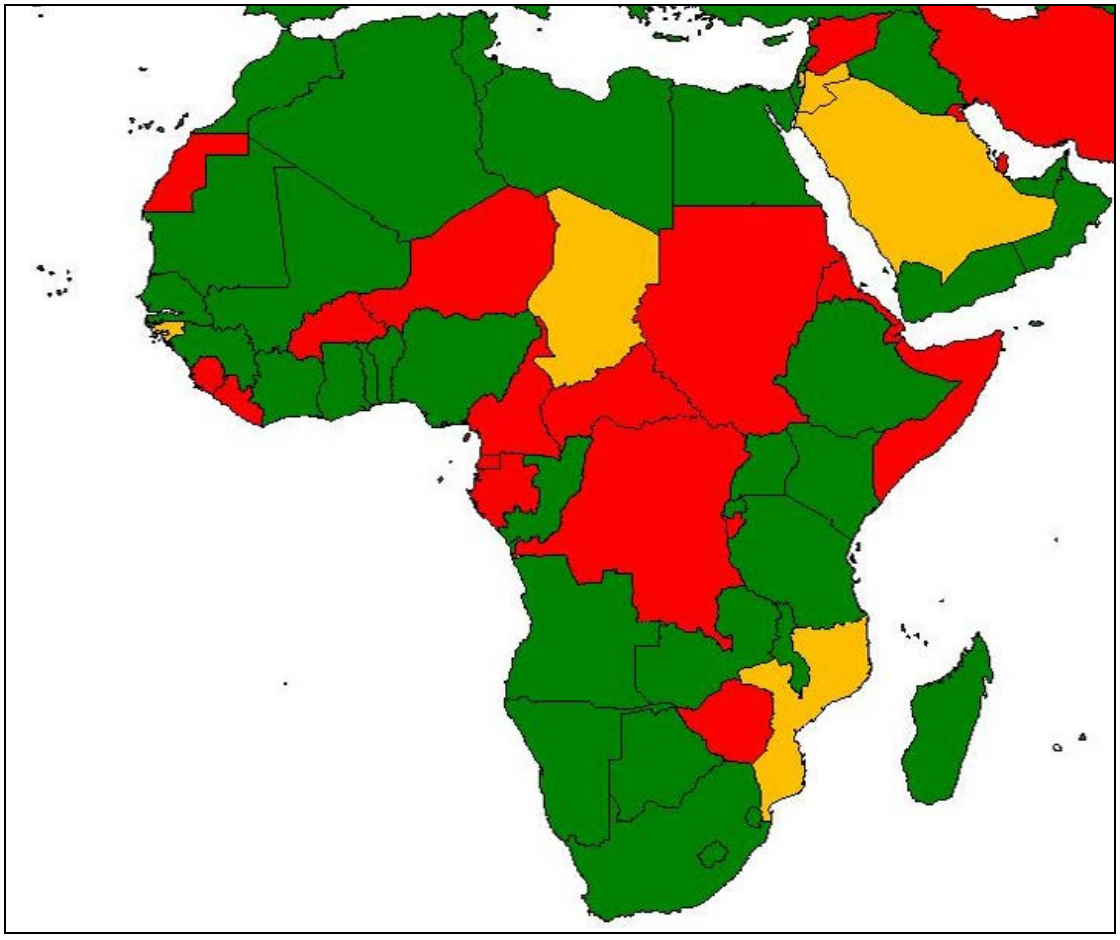

Figure 6.1.1 Map of Africa showing AEWA range states that responded to the questionnaire (green); those where a response has been promised but had not been received by November 2007 (amber) and those where no response has been received (red).

6.2 America

There are only two countries on the American continent that fall into the AEWA range; Greenland (part of Denmark) and Canada (north and east Arctic Islands). Both of these countries participated in the review so there are no missing data.

6.3 Asia And The Middle East

There are eight countries in the Middle Eastern part of the AEWA range for which no questionnaire was received as part of the current review (Table 6.3.1), however contacts from four of these countries (Bahrain, Jordan, Palestine and Saudi Arabia) have promised a response but this had not yet been received by November 2007. There are more collections of non-native birds in the Middle East than in Africa, probably because this area is more affluent (Blair *et al*. 2000), therefore estimates of the number of introduced species in countries that did not participate in the current review tend to be higher than those for African countries. Furthermore, countries in this region that did participate often had large numbers of introduced waterbirds, for example Israel (9 species) and the United Arab Emirates (17 species).

Table 6.3.1 The AEWA status (CP = contracting party, NCP = non-contracting party) and estimated number of introduced waterbirds species in each country in the Middle East for which no questionnaire was returned in the current review. The response status in 1999 is shown in the right-hand column, and if a questionnaire was received in 1999 the total number of introduced waterbird species present at that time is shown in brackets.

Country	AEWA Status	Estimated Number of Introduced Waterbird Species	Responded 1999 (Number of IWS)
Bahrain[1]	NCP	0-10	N
Iran	NCP	0-10	N
Jordan[1]	CP	0-10	N
Kuwait	NCP	0-10	N
Palestine[1]	NCP	0-10	N
Qatar	NCP	0-10	N
Saudi Arabia[1]	NCP	1-5	Y(2)
Syria	CP	0-10	N

[1]Countries where a response is expected but had not been received by November 2007.

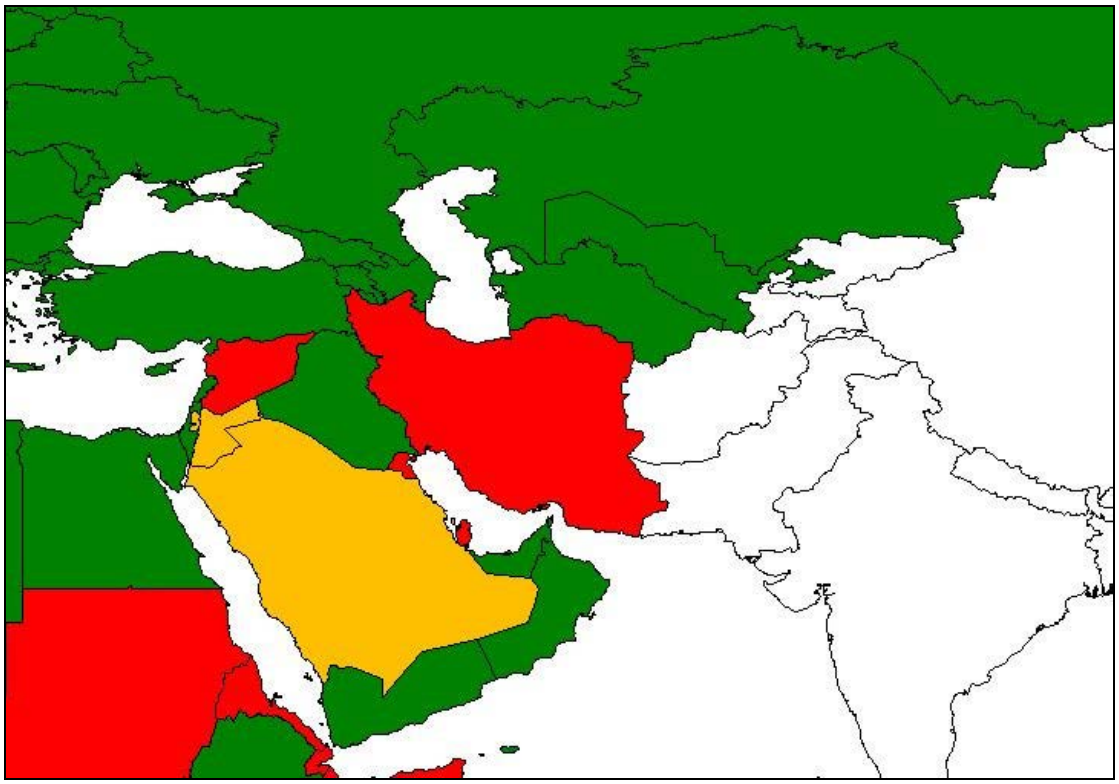

Figure 6.3.1 Map of the Asian and Middle Eastern parts of the AEWA range showing AEWA range states that responded to the questionnaire (green); those where a response has been promised but had not been received by November 2007 (amber) and those where no response has been received (red). States outside the AEWA region are shown in white.

6.4 Europe

Five states in Europe did not participate in the current review (Table 6.4.1). Estimates of the number of introduced waterbird species in each country are given based on the numbers of species in neighbouring countries, the size and geography of the country, and, where appropriate, the number of species reported in the 1999 review (Blair *et al*. 2000).

Table 6.4.1 The AEWA status (CP = contracting party, NCP = non-contracting party) and estimated number of introduced waterbirds species in each country in Europe for which no questionnaire was returned in the current review. The response status in 1999 is shown in the right-hand column, and if a questionnaire was received in 1999 the total number of introduced waterbird species present at that time is shown in brackets.

Country	Signatory Status	Estimated Number of Introduced Waterbird Species	Responded 1999 (Number of IWS)
Albania	CP	0-4	N
Andorra	NCP	0-2	Y(0)
Bosnia and Herzegovina	NCP	0-4	N
Montenegro[1]	NCP	0-4	N/A[2]
San Marino[1]	NCP	0-2	Y[3]

[1]Countries where no contact was available to send a questionnaire to.
[2]This country did not exist as an independent state in 1999. Was part of the Federal Republic of Yugoslavia in 1999 (this country did not participate in the previous review), then became part of Serbia and Montenegro (2003-2006), became independent 2006.
[3]San Marino was included with the response for Italy in the previous review.

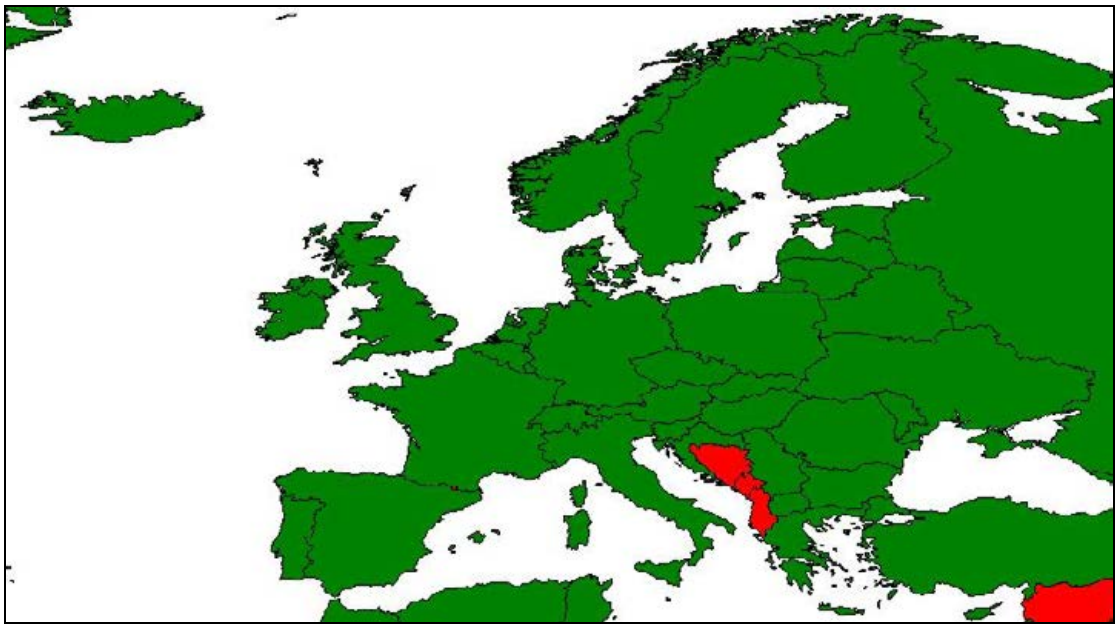

Figure 6.4.1 Map of Europe showing states that responded to the questionnaire (green); those where a response has been promised but had not been received by November 2007 (amber) and those where no response has been received (red).

6.5 Collecting Missing Data

Correspondents in seven countries (Bahrain, Chad, Guinea-Bissau, Jordan, Mozambique, Palestine and Saudi Arabia) have promised responses and so these may be obtained in time for inclusion in the final report. It is possible that other gaps in coverage could be filled in the future either if new contacts are obtained by AEWA or if new sources of information become available after the publication of the report.

In addition to the problems of countries for which no questionnaire response was obtained in the current review there are further problems created by discrepancies between the current review and the previous review (Blair *et al*. 2000). For many countries there is a large difference in the number of introduced waterbird species between 1999 and 2007, and these differences are of a magnitude that is unlikely to represent a true change in the status of these species in most cases (Appendix 1). This is an inherent problem in questionnaire data where the response received is very much dependent on the knowledge and perceptions of the individuals completing the questionnaire.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Limitations Of The Review

This review relies heavily on the opinions, observations and knowledge of the AEWA focal points, ornithological experts and civil servants who participated in the review by completing questionnaires. Although the information provided is believed to be largely correct, it is not as robust as information provided by quantitative scientific methodologies or peer-reviewed publications and therefore should be treated with an element of caution.

For some countries questionnaire respondents reported very different numbers of introduced waterbird species compared to the numbers reported from their country in 1999 (Blair *et al*. 2000) (Appendix 1). Presumably many of these differences are due simply to differences in the knowledge of the person responding to the questionnaire compared to the person who responded in 1999, or differences in their opinion of what constitutes an introduced species. Comparison between countries is also difficult, both because some of these differences will relate to differences in the knowledge and opinions of correspondents (as described above), but also because of the considerable differences in the quality and quantity of research and monitoring of waterbirds generally, and introduced species particularly, between countries.

There was inconsistency in the reporting of species that have been introduced within their native range such as Mute Swan *Cygnus olor*, Greylag Goose *Anser anser* and Mallard *Anas platyrhynchos*. Correspondents from many countries reported these species only in one year (either 1999 or 2007), with correspondents from the same country in the other year not reporting the species, perhaps because they can be native. This led to a lack of information on the introduced population size and trend of these species in many countries. For completeness, it may be useful to follow up with further research into the introduced populations of these species.

Hunters and hunting organisations were not sent questionnaires to allow them to participate in the review. Because hunters have been instrumental in the introduction and control of some introduced waterbird species it would be pertinent to include hunting organisations in further research or any future review of this kind in order that information on the numbers of birds released for hunting purposes, and bag statistics, can be obtained.

Although some information from the scientific literature has been included in this review there is generally little published information on introduced waterbirds in the AEWA region. Certainly there has been little study of the ecological effects of introduced waterbirds (with a few exceptions), and therefore in many cases there is little evidence available to assess the magnitude and importance of their potential effects on native species and habitats.

7.2 Conclusions

Introduced non-native waterbirds are increasing in numbers, range and diversity in many parts of the AEWA region. The only species showing a significant decline is Ruddy Duck *Oxyura jamaicensis*, for which rigorous international control measures have been implemented, although the long-term success of these has yet to be determined and numbers are still increasing in some European countries, most notably the Netherlands. In this section the questions posed in the aims and objectives (section 2) are reviewed, and answers summarised.

The range of species that have been introduced, the timing and origin of introductions, and the reasons for introductions have been reviewed in detail in section 4. Generally, the species of greatest concern are those whose populations are increasing rapidly: Greylag Goose *Anser anser*, Greater Canada Goose *Branta canadensis*, Egyptian Goose *Alopochen aegyptiaca* and Sacred Ibis *Threskiornis aethiopicus*; however at least thirteen other species have introduced self-sustaining populations that are increasing (Table 7.2.1) and therefore should be a priority for future research and, where resources

permit, control measures could be considered if they are deemed necessary.

The vast majority of introduced waterbird populations derive from escapes from ornamental collections or deliberate introductions for ornamental reasons, therefore such introductions have occurred largely in affluent countries. A few species have been introduced to provide food, and these species tend to occur more widely, including in less affluent parts of the AEWA region. There were no reported cases of consultations being carried out before birds were introduced, except for the Lesser White-fronted Goose re-introduction project in Finland that was later stopped (see Sections 4.1.12 and 5.2 for details).

The effects of introduced waterbirds on native species and habitats are poorly known for most species, and further research is required to provide a better understanding. As a background for future research, the findings of this review should be published in a peer-reviewed journal. The potential risks that each introduced species may pose are summarised in Table 7.2.1. Risks have largely been identified by correspondents, although some derive from published material.

Table 7.2.1 Status, population trends and risk status of introduced species that are known to breed within the AEWA region. The range of each species is classified as either "widespread" or "localized"; this refers to the range of the species within the countries in which it occurs. The population trend is also described. The risk status is expressed using the following numeric codes: 1 = Predation of native birds, eggs or young; 2 = Competitive exclusion of native birds or aggressive to native species; 3 = Hybridisation with native species; 4 = Eutrophication or pollution of waterbodies; 5 = Damage to natural or semi-natural habitats; 6 = Damage to man-made habitats or crops; 7 = Introduced birds prevent accurate monitoring of numbers of naturally occurring birds of the same species. Where a published source exists to support the Risk Status, the numeric code is in **BOLD** type, and the references for each risk are given in the relevant species accounts in section 4.1. Where the Risk Status is based solely on the observations or opinion of questionnaire correspondents, the numeric code is not bold.

English Name	Scientific Name	Risk Status
Widespread, Increasing Rapidly		
Greylag Goose	*Anser anser*	2, 3, 4, 5, 6, 7
Greater Canada Goose	*Branta canadensis*	**2**, **3**, **4**, **5**, **6**
Egyptian Goose	*Alopochen aegyptiaca*	**2**, **4**, **5**
Localized, Increasing Rapidly		
Sacred Ibis	*Threskiornis aethiopicus*	**1**, **2**
Widespread, Increasing		
Black Swan	*Cygnus atratus*	**2**, 3, 4
Barnacle Goose	*Branta leucopsis*	4, 5, 7
Ruddy Shelduck	*Tadorna ferruginea*	**2**, **3**
Mandarin	*Aix galericulata*	**2**, 3
Widespread, Increasing Locally		
Mute Swan	*Cygnus olor*	**2**, **3**, **4**, **5**, **6**, 7
Swan Goose	*Anser cygnoides*	2, **3**
Mallard	*Anas platyrhynchos*	2, **3**, 7

Table 7.2.1 Continued.

English Name	Scientific Name	Risk Status
Localized, Increasing		
White-faced Whistling Duck	*Dendrocygna viduata*	None known
Upland Goose	*Chloephaga picta*	2, 4, 5
Wood Duck	*Aix sponsa*	None known
Red-crested Pochard	*Netta rufina*	**3**
Widespread, Increasing Slowly		
Bar-headed Goose	*Anser indicus*	3
Widespread, Stable		
Muscovy Duck	*Cairina moschata*	2, 3
Gadwall	*Anas strepera*	7
Localized, Stable		
Greater Flamingo	*Phoenicopterus roseus*	None known
Caribbean Flamingo	*Phoenicopterus ruber*	**3**
Chilean Flamingo	*Phoenicopterus chilensis*	**3**
Whooper Swan	*Cygnus cygnus*	3, **7**
Snow Goose	*Chen caerulescens*	3
Meller's Duck	*Anas melleri*	None known
Purple Swamphen	*Porphyrio porphyrio*	None known
Widespread, Declining		
Ruddy Duck	*Oxyura jamaicensis*	2, **3**
Localized, Occasional Breeding		
Bean Goose	*Anser fabalis*	None known
Pink-footed Goose	*Anser brachyrhynchus*	None known
Greater White-fronted Goose	*Anser albifrons*	7
Lesser White-fronted Goose	*Anser erythropus*	3
Emperor Goose	*Chen canagicus*	3
Eurasian Wigeon	*Anas penelope*	None known

Hybridisation with native species, as with other risks posed by introduced waterbirds, is not well understood for most species due to a lack of detailed research. However, introduced Ruddy Duck *Oxyura jamaicensis* has been well studied and is known to have hybridised with White-headed Duck, producing fertile hybrids to at least the second generation in Spain (Hughes *et al*. 2006). Introduced Mallards are also known to hybridise with a range of other species in the genus *Anas* (Rhymer 2006), and in this review correspondents reported concerns over hybridisation between introduced Mallard and native Yellow-billed Duck *Anas undulata* in South Africa, which produce fertile hybrids (Owen *et al*. 2006, Rhymer 2006). In Madagascar, there is concern that introduced Mallard could hybridise with the endangered Meller's Duck *Anas melleri* (Rhymer 2006). This has not yet been recorded in Madagascar but introduced Mallard do hybridise with introduced Meller's Duck in Mauritius. Introduced geese of various species may hybridise with other introduced goose species, or occasionally with native geese, but there is no evidence to suggest that the hybrids are fertile (Geiter *et al*. 2002). At the present time, Ruddy Duck and Mallard are the two species of greatest concern with regards to hybridisation with native species. However, Rhymer (2006) stated that hybridization can lead to the decline of rare species whether or not it results in fertile offspring, because reproductive effort is put into hybrid pairings. This suggests that any incidence of hybridization by non-native introduced species should be treated as a threat to native species, particularly when the native species is rare.

Control schemes have been implemented for only a few species in a small proportion of countries in the AEWA area, with variable success. In general, the most successful control measures are those that are implemented when the population is still small, for example a population of 60 Black Swans in Austria, and a population of 10-15 Ruddy Ducks in Iceland, were both eradicated successfully. Actions taken to control introduced species on a local scale or with a low level of control are generally unsuccessful, for example there have been many localized or low intensity attempts to control introduced goose populations in various parts of Europe, but there has generally been little effect on the population as a whole because the measures taken are not stringent enough or are implemented only in a small part of the range where a species has been introduced.

The only control measures that have shown any sign of success in reducing the populations of widespread, established species are those that are currently being implemented for Ruddy Duck *Oxyura jamaicensis* across Europe, involving stringent, labour intensive and expensive control measures being implemented at an international scale. These have successfully reduced the population size in the UK (Worden *et al*. 2007) and virtually eliminated the breeding population in Spain, but the project in ongoing and therefore the long-term success remains to be evaluated. The Ruddy Duck population is still increasing in some countries, particularly in the Netherlands, where 12 - 15 breeding pairs and 96 wintering individuals were recorded in 2006.

7.2.1 Lessons learned from past experience

Introduced waterbirds can cause a range of ecological problems, as can other types of introduced species, and they may significantly threaten native biodiversity (Vitousek *et al.* 1997; Smith *et al.* 2005). Once an introduced non-native species has become established, control or eradication is difficult, labour intensive and costly, therefore every effort should be made to avoid further introductions of non-native waterbirds following the guidelines set out by Owen *et al*. (2006), based on Blair *et al*. (2000). Control measures are likely to be much more effective if they are implemented when the population is still small, and therefore control measures could be considered for species whose populations are currently in the process of establishment. Localized control efforts do not work except where the introduced species only has a local distribution.

Legislation or guidelines designed to avoid the introduction of non-native species are often ineffective unless backed up by appropriate resources to enforce them. There is a widespread shortage of such resources in many countries in the AEWA area, and also a shortage of resources for the implementation of control measures.

As a guideline for future work and prioritisation of resources, we have provided an assessment of the relative risk / threat posed by different introduced waterbirds in table 7.2.1.1.

The recommendations resulting from this review are given on pages 13-14 at the start of the report.

Table 7.2.1.1 List of introduced waterbird species in order of "risk status" (high risk – low risk) in the AEWA region. The geographic area in which each species is introduced is given, and for some species introduced populations are divided into different geographic areas with different risk statuses. The "risk status" is categorised from Very High – High – Medium – Low – Very Low. These assessments are subjective, but are based on the evidence gathered as part of this review. "Resource requirement" describes the amount of resources that would be required to conduct further research on each species or to implement control programmes, if control is deemed necessary, and the assessment of resource requirement is again subjective but is based on the size and distribution of the introduced population, as well as certain behavioural characteristics (for example, colonial nesting easily detected species such as Sacred Ibis might be easier to study or control than dispersed and secretive species such as Mandarin).

English Name	Scientific Name	Geographic Area	Risk Status	Resource Requirement	Notes
Ruddy Duck	*Oxyura jamaicensis*	Western Europe	Very High	High	Ongoing international control scheme.
Mallard	*Anas platyrhynchos*	Madagascar, Mauritius, South Africa	Very High	Very High	
		Other parts of AEWA region	Medium	Very High	
Canada Goose	*Branta canadensis*	Europe	High	Very High	Increasing population. Control (if deemed necessary) will be more difficult and costly in the future.
Sacred Ibis	*Threskiornis aethiopicus*	South and west Europe, UAE	High	Low - Medium	Increasing population. Control (if deemed necessary) will be more difficult and costly in the future.
Mute Swan	*Cygnus olor*	Canada Mauritius Europe	High Medium Very Low	High Medium Very High	
Egyptian Goose	*Alopochen aegyptiaca*	Western Europe, Mauritius, UAE	Medium - High	High	Increasing population. Control (if deemed necessary) will be more difficult and costly in the future.
Ruddy Shelduck	*Tadorna ferruginea*	Western Europe	Medium - High	Medium	Control in Switzerland ongoing.
Greylag Goose	*Anser anser*	Europe	Medium	Very High	Re-established in many areas.

Table 7.2.1.1 Continued.

English Name	Scientific Name	Geographic Area	Risk Status	Resource Requirement	Notes
Black Swan	*Cygnus atratus*	Europe, Mauritius	Medium	Medium	
Mandarin	*Aix galericulata*	Europe	Low - Medium	High	
Barnacle Goose	*Branta leucopsis*	Western Europe	Low - Medium	High	More research is needed on the ecological effects of this species.
Upland Goose	*Chloephaga picta*	Belgium, Netherlands, UK	Low - Medium	Very Low	Increasing population. Control (if deemed necessary) will be more difficult and costly in the future.
Chilean Flamingo	*Phoenicopterus chilensis*	Germany/Netherlands, France	Low - Medium	Low	
Swan Goose	*Anser cygnoides*	Europe	Low	Low - Medium	
Bar-headed Goose	*Anser indicus*	Western Europe	Low	Medium	Increasing population. Control (if deemed necessary) will be more difficult and costly in the future.
Wood Duck	*Aix sponsa*	Western Europe	Low	Medium	Increasing population. Control (if deemed necessary) will be more difficult and costly in the future.
Muscovy Duck	*Cairina moschata*	Europe & Africa	Low	Very High	
Snow Goose	*Chen caerulescens*	Germany, Netherlands, UK	Low	Low	
Emperor Goose	*Chen canagicus*	Netherlands, UK	Low	Very Low	
Purple Swamphen	*Porphyrio porphyrio*	Italy, UAE	Low	Very Low	
Caribbean Flamingo	*Phoenicopterus ruber*	Germany/Netherlands	Low	Very Low	

Table 7.2.1.1 Continued.

English Name	Scientific Name	Geographic Area	Risk Status	Resource Requirement	Notes
White-faced Whistling Duck	*Dendrocygna viduata*	Mauritius	Low	Low - Medium	
Greater Flamingo	*Phoenicopterus roseus*	Germany/Netherlands & UAE	Very Low	Low	
Red-crested Pochard	*Netta rufina*	UK	Very Low	Medium	Increasing population. Control (if deemed necessary) will be more difficult and costly in the future.
Whooper Swan	*Cygnus cygnus*	Germany, UK	Very Low	Low	
Gadwall	*Anas strepera*	UK	Very Low	High	
Bean Goose	*Anser fabalis*	Belgium, Netherlands, UK	Very Low	Very Low	
Pink-footed Goose	*Anser brachyrhynchus*	France, Germany, UK	Very Low	Very Low	
Greater White-fronted Goose	*Anser albifrons*	Germany, Netherlands, UK	Very Low	Low	
Eurasian Wigeon	*Anas penelope*	UK	Very Low	Low	
Lesser White-fronted Goose	*Anser erythropus*	Finland / Sweden, UK			
Meller's Duck	*Anas melleri*	Mauritius	Very Low	Low - Medium	At present this species is not known to affect native biodiversity in Mauritius. The wild population in Madagascar is critically endangered, therefore control should not be recommended for the introduced population as it could be vital to the conservation of the species.

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APPENDIX 1

Numbers of introduced species in AEWA States in 1999 and 2007: Africa
Note that where "NR" is entered if no questionnaire response was received from that country.

Country	Number of Introduced Species		Country	Number of Introduced Species	
	1999	2007		1999	2007
Algeria	NR	0	Libya	NR	0
Angola	NR	0	Madagascar	6	0
Benin	NR	0	Malawi	NR	0
Botswana	0	1	Mali	1	0
Burkina Faso	NR	NR	Mauritania	1	0
Burundi	NR	NR	Mauritius	1	7
Cameroon	0	NR	Morocco	NR	0
Cape Verde	NR	NR	Mozambique	0	NR
Central African Republic	NR	NR	Namibia	0	0
Chad	NR	NR	Niger	NR	NR
Comoros	NR	0	Nigeria	NR	0
Congo (Brazzaville)	NR	0	Rwanda	0	0
Côte d'Ivoire	0	0	Sao Tome and Principe	NR	NR
Democratic Republic of Congo (formerly Zaire)	NR	NR	Senegal	1	0
Djibouti	NR	NR	Seychelles	1	1
Egypt	NR	0	Sierra Leone	NR	NR
Equatorial Guinea	NR	NR	Somalia	0	NR
Eritrea	0	NR	South Africa	34	13
Ethiopia	0	0	Sudan	NR	NR
Gabon	NR	NR	Swaziland	0	0
Gambia	0	NR	Tanzania	NR	0
Ghana	0	0	Togo	0	0
Guinea	0	0	Tunisia	NR	0
Guinea-Bissau	0	NR	Uganda	0	0
Kenya	0	0	Western Sahara	NR	NR
Lesotho	0	1	Zambia	0	0
Liberia	0	NR	Zimbabwe	1	NR

Numbers of introduced species in AEWA States in 1999 and 2007: America
Note that where "NR" is entered if no questionnaire response was received from that country.

Country	Number of Introduced Species		Country	Number of Introduced Species	
	1999	2007		1999	2007
Canada (NE Arctic Is)	0	1	Greenland (Denmark)	NR	0

Numbers of introduced species in AEWA States in 1999 and 2007: Asia and Middle East
Note that where "NR" is entered if no questionnaire response was received from that country.

Country	Number of Introduced Species		Country	Number of Introduced Species	
	1999	2007		1999	2007
Bahrain	NR	NR	Palestine	NR	NR
Cyprus	0	0	Qatar	NR	NR
Iran	NR	NR	Saudi Arabia	2	NR
Iraq	NR	0	Syria	NR	NR
Israel	4	9	Turkey	1	0
Jordan	NR	NR	Turkmenistan	0	0
Kazakhstan	0	0	United Arab Emirates	27	17
Kuwait	NR	NR	Uzbekistan	1	0
Lebanon	0	1	Yemen	NR	0
Oman	2	0			

Numbers of introduced species in AEWA States in 1999 and 2007: Europe
Note that where "NR" is entered if no questionnaire response was received from that country.

Country	Number of Introduced Species		Country	Number of Introduced Species	
	1999	2007		1999	2007
Albania	NR	NR	Lithuania	1	0
Andorra	0	NR	Luxembourg	3	1
Armenia	0	0	Macedonia (FYR)	NR	0
Austria	17	9	Malta	0	0
Azerbaijan	0	0	Moldova	NR	0
Belarus	1	0	Monaco	0	2
Belgium	26	16	Montenegro	N/A[1]	NR
Bosnia and Herzegovina	NR	NR	Netherlands	21	20
Bulgaria	0	0	Norway	3	1
Croatia	1	0	Poland	1	2
Czech Republic	8	8	Portugal	0	0
Denmark	NR	3	Portugal, Azores	3	0
Estonia	0	2	Portugal, Madeira	0	0
Faeroes (Denmark)	NR	0	Romania	4	0
Finland	8	2	Russia	3	0
France	23	27	San Marino	with Italy	NR
Georgia	0	0	Serbia	N/A[1]	0
Germany	51	21	Slovakia	1	0
Gibraltar (UK)	0	0	Slovenia	1	0
Greece	1	2	Spain	1	11
Hungary	0	0	Sweden	6	1
Iceland	6	1	Switzerland	43	34
Ireland	7	3	Ukraine	11	0
Italy	18	15	United Kingdom	92	92
Latvia	2	1	Federal Republic of Yugoslavia	NR	N/A[1]
Liechtenstein	0	0			

[1]These countries did not exist during the year marked N/A. The country that was called the Federal Republic of Yugoslavia in 1999 is now two independent states – Serbia and Montenegro.

APPENDIX 2a – GENERAL QUESTIONNAIRE (ENGLISH)

REVIEW OF THE STATUS OF INTRODUCED NON-NATIVE WATERBIRDS & THEIR EFFECTS: GENERAL QUESTIONNAIRE

The questionnaire is in three parts: 1. General information about introduced waterbirds in your country; 2. Details of the size and status of populations of introduced species, including information about hybrids and threats to native species; 3. Further sources of information that we can use. Any **non-native introduced waterbird species** which you know of should at least be mentioned. If you have more detailed comments to make, please do so in Part 3 or in the space on the final page. There is also a **Supplementary Questionnaire** for more specialist knowledge of introduced species.

Please tell us which **country** you are reporting on. You may report on any country for which you have a detailed knowledge of non-native waterbirds.

Please tell us your details. Please enter your title, full name, email and postal address and telephone / fax number here:

UK DATA PROTECTION ACT: Your personal details may be kept on a computer database to allow the possibilities of exploring responses more deeply and of developing feedback. If you do not want to be contacted by any third party as a result of this, please put a mark in this box ☐

1. GENERAL INFORMATION

1.1 INTRODUCED NON-NATIVE WATERBIRDS		Yes	No
1.	Do you know of any collections of non-native waterbirds in your country?	☐	☐
2.	Do you know of any deliberately or accidentally introduced populations of waterbirds in your country? 'Population' means any group larger than isolated individuals.	☐	☐

If you have answered **Yes** to either of these questions, please complete section 3 for each introduced species. You should print or copy a new sheet for each different species. Please e-mail heidi.mellan@bto.org if you have problems.

1.2 PROTECTION & CONTROL		Yes	No	?
1.	Have you any responsibility for preparing or applying protection or conservation measures involving introduced non-native waterbirds?	☐	☐	☐
1a.	Please describe your responsibilities:			
2.	Do you know of any measures used to stop introduction of non-native waterbirds?	☐	☐	☐
2a.	Please describe these measures:			
3.	Are steps taken to control non-native waterbirds / hybrids (shooting, trapping, egg-control)?	☐	☐	☐
3a.	Please describe these and their effectiveness:			
4.	Please describe any further action you think is needed:			

2. SPECIES INFORMATION

Please use a **new sheet** for each species you report on.

Species name (include scientific name if known) ONE ONLY PLEASE	Location (place name, grid reference or co-ordinates)	Description of area (include habitat if possible)

2.1 CONSULTATIONS, PROTECTION & CONTROL (not AEWA, Bern, Bonn & UN Conventions)		Yes	No	?
1.	Were any consultations taken before introduction of the species?	☐	☐	☐
1a.	If **Yes**, what consultations occurred?			
2.	Are there protection measures or conservation legislation for the species?	☐	☐	☐
3.	Are these protection / conservation measures practical?	☐	☐	☐
4.	Are these protection / conservation measures applied?	☐	☐	☐
4a.	How successful are these measures? Give reasons if they are not successful.			

2. 2 SIZE & STATUS OF INTRODUCED WATERBIRD POPULATIONS				
		Yes	**No**	**?**
1.	Introduced waterbird species name:			
2.	When was the species first introduced?			
3.	Where was the species first introduced?			
4.	Why was the species first introduced?			
5.	Is it present all year-round?	☐	☐	☐
6.	Is it widespread?	☐	☐	☐
7.	Is it only in one area?	☐	☐	☐
8.	Does it breed in your country?	☐	☐	☐
9.	The national population of the introduced species is how many breeding pairs?			
10.	Is its range increasing?	☐	☐	☐
11.	Is its population increasing?	☐	☐	☐
12.	Is its population naturally self-sustaining?	☐	☐	☐

2. 3 EFFECT ON NATIVE WATERBIRDS & HABITATS				
1.	Does the species displace native waterbirds?	☐	☐	☐
2.	Does the species breed with native birds?	☐	☐	☐
2a.	If **Yes**, which native waterbirds?			

3.	Are hybrids produced?	☐	☐	☐
4.	If **Yes**, do the hybrids reproduce themselves?	☐	☐	☐
5.	Is the hybrid breeding population increasing?	☐	☐	☐
6.	Has the introduced species spread disease?	☐	☐	☐
6a.	If **Yes**, which native waterbirds have been affected?			
7.	Has the species changed native habitat?	☐	☐	☐
7a.	If **Yes**, which native waterbird habitat types have been affected?			
8.	Has the species gained from human changes?	☐	☐	☐
8a.	If **Yes**, changes to which habitat types have been of benefit to introduced species?			
9.	Do escapes/releases add to population?	☐	☐	☐
10.	Does the introduced species or its hybrids present any other threat to native waterbirds?	☐	☐	☐
10a	If **Yes**, what threat(s)?			

3. FURTHER INFORMATION

Please use this sheet to provide any further information or to continue your answers from previous questions.

1.	Please tell us where your information about introduced waterbird species comes from. Names and contact details (email, postal address) of other specialists, politicians or non-specialists that can add to your information are also most welcome.
2.	Please tell us anything you know about the extent of the breeding range or movements / migration of the introduced species (e.g. personal knowledge, books, references, articles, websites, etc.).
3.	Please offer any advice you have for AEWA based on the experiences your country has had with introduced waterbird species.

SPACE FOR CONTINUED COMMENTS (please state question numbers, e.g. 2.1: 2a)

APPENDIX 2b – SUPPLEMENTARY QUESTIONNAIRE (ENGLISH)

REVIEW OF THE STATUS OF INTRODUCED NON-NATIVE WATERBIRDS & THEIR EFFECTS: SUPPLEMENTARY QUESTIONNAIRE

This supplementary questionnaire is designed to accompany the General Questionnaire and should be used where participants are able and willing to provide more detailed information on introduced waterbirds or to report information that could not be reported in the General Questionnaire. Please use additional questionnaires if there is more than one introduced species that you would like to comment on.

Please tell us which **country** you are reporting on. You may report on any country for which you have a detailed knowledge of non-native waterbirds.

Please tell us your details. Please enter your full name, email address, postal address and telephone / fax number here:

UK DATA PROTECTION ACT: Your personal details may be kept on a computer database to allow the possibilities of exploring responses more deeply and of developing feedback. If you do not want to be contacted by any third party as a result of this, please put a mark in this box ☐

S1.1 CONSULTATIONS, PROTECTION & CONTROL (excluding AEWA, Bern, Bonn & UN Conventions)	
1.	Please give any details of consultations taken before introduction, protection measures and conservation legislation concerning these introduced waterbird species.
2.	Please provide any further details of the effectiveness of these actions, including whether they have failed or succeeded, and why.
3.	Please provide any further details of measures taken against introduced waterbirds and / or their hybrids, either to prevent further introductions or to control existing populations. State whether they have failed or succeeded, and why.
4.	Please describe any further remedial actions that are needed, how likely these are to occur and the likely effect on native waterbirds.

NOTES **S2.1**: **Q**=Quantitative (e.g. survey data or counts); **U**=Unquantified; **A**=Anecdotal. **Pos**=Possible; **Prob**=Probable; **Conf**=Confirmed. **S2.2**: ↑=increasing; ↓=decreasing; = stable. **S2.3**: Actual/potential threat: please state whether **actual** threats apply to many or few native individuals and whether **potential** threats are based on evidence or speculation. A threat means something negatively affecting native species. Write **NA** (Not Applicable) where appropriate.

S2. 1 SIZE OF INTRODUCED WATERBIRD POPULATIONS		**Q**	**U**	**A**
1.	Introduced waterbird species name:			
2.	Estimated isolated individuals (**totals**):			
3.	Estimated isolated groups (**totals**):			
4.	Non-breeding groups:			
5.	Breeding evidence (**Pos / Prob / Conf**):			
6.	National population estimate (**breeding pairs**)			
7.	If **Q**, what is your confidence in the estimate? (**low / high / do not know**)			
S2. 2 STATUS OF INTRODUCED WATERBIRD POPULATIONS		**↑**	**↓**	**=**
1.	Status of breeding range:	☐	☐	☐
2.	Status of breeding population:	☐	☐	☐
S2. 3 EFFECT ON NATIVE WATERBIRDS & HABITATS		**Yes**	**No**	**?**
1.	Hostile interaction with native waterbirds?	☐	☐	☐
2.	Dominance over native waterbirds?	☐	☐	☐
3.	Actual/potential threat to native waterbirds?	☐	☐	☐
3a.	If **Yes**, what is the nature of the threat, and which native species are threatened?			
S2. 4 HAS THE INTRODUCED WATERBIRD SPECIES…		**Yes**	**No**	**?**
1.	Reduced native survival / breeding success?	☐	☐	☐
2.	If **Yes**, which native waterbirds have been affected?			
3.	Hybridised with native/domesticated birds?	☐	☐	☐
4.	If **Yes**, which native waterbirds have hybridised?			
5.	Displayed promiscuous mating?	☐	☐	☐
S2.5 HYBRIDS				
S19	Hybrid fertility? (**low / high / do not know**)			
S20	How many hybrid generations exist? (**2 / 3 / 3+ / none / do not know**)			
S21	Do hybrids prefer: **hybrids / native species / introduced species / do not know**			

FURTHER INFORMATION

Please use this sheet to provide any further information or to continue your answers from previous questions. Please indicate which question your answer relates to (e.g. S2.4 S15).

SPACE FOR CONTINUED COMMENTS (please state question numbers, e.g. S2.4 S15)

APPENDIX 2c – GENERAL QUESTIONNAIRE (FRENCH)

EXAMEN DU STATUT ET DES EFFETS DES OISEAUX D'EAUX INTRODUITS ET NON-NATIFS
QUESTIONNAIRE GÉNÉRAL

Le questionnaire est en trois parties: 1. Informations générales sur des oiseaux d'eau introduits dans votre pays ; 2. Détails sur la taille et le statut des populations des espèces introduites, y compris des informations sur les hybrides et ce qui menace les espèces indigènes; 3. Les autres sources d'information que nous pouvons employer. Toutes espèce non-indigène d'oiseau d'eau mais introduite et connue doit être mentionné. Si vous avez d'autres commentaires détaillés à faire, veuillez le faire dans la section 3 ou bien dans l'espace réservé à la dernière page. Il y a aussi un questionnaire supplementaire en vue de connaissances plus précises sur les espèces introduites.

Veuillez nous dire de quel **pays** vous nous parlez. Vous pouvez nous parler de n'importe quel pays sur lequel vous avez des connaissances détaillée sur les oiseaux d'eau non-indigènes.

Donnez-nous vos coordonées s.v.p.: vos titres, nom entier, votre email, adresse postale, et numéros de telephone et de fax – ci dessous:

LOI BRITANNIQUE DE PROTECTION DE DONNÉES: Vos coordonnées personnelles peuvent être conservées sur ordinateur pour permettre une exploration plus approfondie des réponses et leur "feed-back. Si vous preferez ne pas être contacté par un tiers à ce sujet, veuillez faire une croix dans le carré ci-contre: ☐

1. INFORMATIONS GÉNÉRALES

1.1	OISEAUX D'EAU INTRODUITS, NON- INDIGÈNES	Oui	Non
1.	Connaissez-vous des groupes d'oiseau d'eau non-indigènes dans votre pays?	☐	☐
2.	Dans votre pays connaissez-vous des populations d'oiseau d'eau introduites délibérement ou par accident? Par "population" on parle d'un groupe comportant plus que des individus isolés.	☐	☐

Si vous avez répondu **Oui** à l'une ou l'autre de ces questions, veuillez remplir la section 3 pour chaque espèce introduites. Imprimez ou copiez une feuille séparée pour change espèce différente. En-cas de problème envoyez un email à heidi.mellan@bto.org.

1.2	PROTECTION ET CONTRÔLE	Oui	Non	?
1.	Avez-vous avez une responsabilité dans la préparation ou l'application de measures de protection ou de conservation s'adressant à des oiseaux d'eau non-indigènes mais introduits?	☐	☐	☐
1a.	Veuillez décrire vos responsabilités:			
2.	Connaissez-vous des measures pour stopper l'introduction des oiseaux d'eau non-indigènes?	☐	☐	☐
2a.	Veuillez décrire ces measures:			
3.	Des démarches sont elles prises pour contrôler les oiseaux d'eau non-indigènes / ou les hybrides (telles que tir, piège, contrôle sur les oeufs)?	☐	☐	☐
3a.	Décrivez celles-ci et leur efficaité:			
4.	Décrivez svp toute autre action qui vous parait nécessaire:			

2. INFORMATION SUR LES ESPÈCES

Veuillez utiliser une **feuille independante** pour chaque espèce dècrite.

Nom de l'espèce (avec son nom scientifique si vous le connaissez) **UNE SEULE ESPECE à la fois s.v.p.**	**Lieu (Nom du lieu, référence de quadrillage ou coordonnées)**	**Inscription du secteur (donner l'habitat si possible)**

2.1 CONSULTATIONS, PROTECTION & CONTROL (pas l'AEWA, Berne, Bonn, ni Conventions de l'ONU)		*Oui*	**Non**	**?**
1.	Des Consultations ont-elles été prises avant l'introduction de l'espèce?	☐	☐	☐
1a.	Si **Oui**, quelles consultations ont-elles eu lieu?			
2.	Y a-t-il des mesures de protection ou une législation de conservation pour l'espèce?	☐	☐	☐
3.	Ces mesures de protection ou de conservation sont-elles pratiquées?	☐	☐	☐
4.	Ces mesures de protection ou de conservation sont-elles appliquées?	☐	☐	☐
4a.	Dans quelle mesure ces actions ont-elles réussi? Sinon, donnez les raisons pour lesquelles il n'y a pas eu de réussite			

2. 2 QUANTITÉ ET STATUT DES POPULATIONS D'OISEAU D'EAU INTRODUITES				
		Oui	**Non**	**?**
1.	Nom d'espèce d'oiseau d'eau introduite:			
2.	Quand l'espèce a-t-elle été introduite tout d'abord?			
3.	Où l'espèce a-t-elle été introduite tout d'abord?			
4.	Pourquoi l'espèce a-t-elle été introduite au départ?			
5.	Est-elle présente toute l'année?	☐	☐	☐
6.	Est-elle répandue?	☐	☐	☐
7.	Est-elle seulement dans une region?	☐	☐	☐
8.	Cette espèces se reproduit-elle dans votre pays?	☐	☐	☐
9.	Au niveau national, l'espèce introduite comprend combine de couples?			
10.	Son aire de répartition augmente-t-elle?	☐	☐	☐
11.	Sa population augmente-t-elle?	☐	☐	☐
12.	Sa population est elle capable de se nourrir naturellement?	☐	☐	☐

2. 3 EFFET SUR LES D'OISEAUX D'EAU INDIGÈNES ET LEURS HABITATS				
		Oui	**Non**	**?**
1.	Les oiseaux d'eau indigènes sont-ils déplacés par les nouveaux venus?	☐	☐	☐
2.	La nouvelle espèce s'accouple-t-elle avec les indigènes?	☐	☐	☐
2a.	Si **Oui**, quels oiseaux d'eau indigènes?			
3.	Cela donne-t-il des hybrides?	☐	☐	☐
4.	Si **Oui**, les hybrides se reproduisent-ils?	☐	☐	☐
5.	La population hybride qui se reproduit augmente-t-elle?	☐	☐	☐
6.	L'espèce introduite diffuse-t-elle des maladies?	☐	☐	☐
6a.	Si **Oui**, quels oiseaux d'eau indigènes sont-ils affectés?			
7.	La nouvelle espèce a-t-elle changé l'habitat des indigènes?	☐	☐	☐
7a.	Si **Oui**, quels types d'habitat d'oiseau d'eau indigènes ont-ils été affectés?			
8.	La nouvelle espèce a-t-elle gagné à des changements d'ordre humain?	☐	☐	☐
8a.	Si **Oui**, à quels types d'habitat ces changements ont-ils été utiles à l' espèce venue?			
9.	Des oiseaux échappés relachés sont-ils ajoutés à la population?	☐	☐	☐
10.	L'espèce introduite ou ses hybrides présente-t-elle une autre menace quelconque aux oiseaux d'eau indigènes?	☐	☐	☐
10a	Si **Oui**, quelle(s) menace(s)?			

3. COMPLEMENT D'INFORMATIONS

Employez cette page-ci pour fournir des renseignements complementaires ou pour prolonger vos réponses à des questions précédentes.

1.	Veuillez nous dire d'où proviennent vos informations concernant les espèces d'oiseau d'eau introduites. Les details concernant les noms de vos contacts (email, addresse postale), d'autres specialistes, de politiciens et/ou non-spécialistes que vous pouvez ajouter seront vraiment les bienvenus.
2.	Veuillez nous dire tout ce que vous savez quant à l'étendue des zones de reproduction, de déplacements, de migration, de l'espèces introduite (par exemple à partir de vos connaissances personnelles, vos livres, vos références, des articles, sur le web, etc.).
3.	Veuillez-nous offrir votre avis pour AEWA, basé sur les expériences que votre pays a pu avoir concernant des espèces d'oiseaux d'eau introduites.

ESPACE SUPPLEMÉNTAIRE POUR PLUS DE COMMENTAIRES (indiquez bien le nombres de la question, telque 2.1 : 2a)

APPENDIX 2d – SUPPLEMENTARY QUESTIONNAIRE (FRENCH)

EXAMEN DU STATUT ET DES EFFETS DES OISEAUX D'EAU INTRODUITS ET NON-NATIFS: QUESTIONNAIRE SUPPLÉMENTAIRE

Ce questionnaire supplémentaire est conçu pour accompagner le questionnaire général et devrait être employé quand les participants voudront bien fournir des informations plus détaillées sur les oiseaux d'eau en question ou quand ils voudront donner des renseignements qui ne pourraient pas être presentées dans le questionnaire général. Veuillez employer un questionnaire supplémentaire additionnel par espèce introduite pour laquelle vous voulez presenter plus de données.

Veuillez nous dire de quel **pays** vous parlez. Vous pouvez nous parler de tout pays dont vous avez une connaissance approfondie quant à ses oiseaux d'eau non indigènes.

Veuillez nous donner vos coordonnées. Inscrivez votre nom entier, votre adresse email et postale, vos numéros de telephone et de fax ici-même:

LOI BRITANNIQUE DE PROTECTION DE DONNÉES: Vos coordonnées personnelles peuvent être conservées sur ordinateur pour permettre une exploration plus approfondie des réponses et permettre un compte-rendu. Si vous preférez ne pas être contacté par un tiers à ce sujet, veuillez faire une croix dans le carré ci-contre: ☐

S1.1	**CONSULTATIONS, PROTECTION et CONTROL (à l'exclusion d'AEWA, de Berne, Bonn et des conventions de l'ONU)**
1.	Veuillez donner des precisions sur les consultations effectuées avant toute introduction, mesures préventive de protection et toute législation sur la conservation des espèces d'oiseaux d'eau introduites.
2.	Veuillez fournir tout autre precision concernant l'efficacité de ces actions, y compris le fait qu'elles aient réussi ou non et pourquoi?
3.	Veuillez fournir des détail complémentaires sur les mesures prises à l'encontre des oiseaux d'eau introduits, ou / et contre leurs hybrides, - soit pour empêcher de nouvelles introductions, soit pour contrôler les populations existantes. Dites si ces measures ont réussi ou non. Et pourquoi?
4.	Veuillez décrire toute autre action nécessaire pour remèdier la situation, dans quelle mesure elle serait susceptible d'être envisagée et quelle serait son effet probable sur les oiseaux d'eau indigènes?

S2.1	QUANTITÉS DES POPULATIONS D'OISEAUX D'EAU INTRODUITES	*Q*	N	A
1.	Nom de l'espèce introduite d'oiseaux d'eau:			
2.	Estimation des individus isolés (**totaux**):			
3.	Estimation des groupes isolés (**totaux**):			
4.	Groupes non-reproducteurs:			
5.	Évidence de reproducteurs (**Pos/Prob/Conf**):			
6.	Évaluation de la population nationale (**couples**):			
7.	Si **Q**, quelle est votre confiance en cette estimation? (**basse/haute/ne sait pas**)			
S2.2	**CONDITIONS DES POPULATIONS INTRODUITES D'OISEAUX D'EAU**	**↑**	**↓**	**=**
1.	Étendue des couples reproducteurs:	☐	☐	☐
2.	Population des reproducteurs:	☐	☐	☐
S2.3	**EFFETS SUR LES OISEAUX D'EAU INDIGÈNES ET LEURS HABITATS**	**Oui**	**Non**	**?**
1.	Interaction hostile avec les oiseaux d'eau indigenes?	☐	☐	☐
2.	Caractère dominant par rapport aux oiseaux indigènes?	☐	☐	☐
3.	Menace réelle / potentielle sur les oiseaux indigènes?	☐	☐	☐
3a.	Si **Oui**, quelle est la nature de la menace et de quelle espèces indigènes sont-elles menaceés?			
S2.4	**EST-CE QUE L'ESPÈCE D'OISEAU D'EAU INTRODUITE**	*Oui*	**Non**	**?**
1.	A réduit la survie des indigènes / leur bonne reproduction?	☐	☐	☐
2.	Si **Oui**, quels oiseaux d'eaux indigènes ont été affectés?			
3.	S'est hybridisée avec les oiseaux d'eaux indigènes / domestiqués?	☐	☐	☐
4.	Si **oui,** dans quels type d'habitat se trouvent les hybrides?			
5.	S'est accouplée au hasard (promiscuous mating)?	☐	☐	☐
S2.5 LES HYBRIDES				
S19	La fertilité des hybrides? **(basse/élevée/ne sait pas)**			
S20	Combien de générations d'hybrides existent-elles? (**2/3/3+/aucun/ne sait pas**)			
S21	Les hybrides préfèrent: **les hybrides/les indigènes/les introduits/ne sait pas**			

NOTES **S2.1**: **Q**=Quantitatif (par exemple données ou comptes d'oiseaux aperçus)); **N** = Non-quantifié; **A** = Anecdotique; **Pos** = Possible ; **Prob** = Probable; **Conf** = Confirmé.
S2.2: ↑= en augmentation; ↓= en diminution; = stable.
S2.3: Menace réelle/potentielle: Veuillez préciser si **réelle** s'applique comme menace envers beaucoup ou peu d'oiseaux individuels; et si les menaces **potentielles** sont basées sur l'évidence ou la spéculation. Une menace signifie quelque chose de négatif qui affecte une espèce indigène. Écrivez **NA** (Non Applicable) le cas échéant.

INFORMATIONS COMPLEMENTAIRES

Veuillez utiliser cette page pour fournir des renseignments complémentaires ou pour préciser les réponses apportées à des questions précèdents. Veuillez indiquer à quelle question votre réponse s'applique (par exemple S2.4 S15).

UNE DERNIÉRE PAGE FOURNIT DE LA PLACE POUR CONTINUER LES COMMENTAIRES (Précisez bien le numéro de la question - par exemple S2.4 S15)