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Standing Committee

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ERADICATION OF THE RUDDY DUCK *OXYURA JAMAICENSIS* IN THE WESTERN PALAEARCTIC: A REVIEW OF PROGRESS AND A REVISED ACTION PLAN, 2011–2015

- Final Version-

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1. SUMMARY

- The Ruddy Duck has become established in the wild in the Western Palaearctic following escapes from wildfowl collections. It is considered the greatest long-term threat to the White-headed Duck. The obligation to eradicate alien Ruddy Ducks is recognised by many international conservation conventions and agreements. An Action Plan for eradication in the Western Palaearctic was prepared in 1999. The Bern Convention contracted the Wildfowl & Wetlands Trust to assess the status and distribution of Ruddy Ducks in the Western Palaearctic, review implementation of the Action Plan, and update the plan.

- A questionnaire was sent to countries to assess progress against actions in the eradication plan. Data on Ruddy Duck numbers, breeding and control measures in each country were also requested. A total of 31 countries completed at least part of the questionnaire, and a further seven provided brief details on the status of Ruddy Ducks.

- Numbers of Ruddy Ducks continued to grow rapidly in the UK until the early 2000s. This was reflected by increases in several neighbouring countries, notably France, Belgium and the Netherlands. There were also increased numbers of records in northern and eastern Europe. The absence of data for many countries in eastern Europe for this review precludes a clear picture of the true extent of the range, but it must be concluded that the range of wandering Ruddy Ducks expanded to cover a large part of Europe by the mid 2000s.

- Control measures in the UK since the late 1990s resulted in a 95% reduction in the Ruddy Duck population by 2010. Control effort in France and Belgium has been insufficient to prevent increases there. The decline in the UK is reflected in other European countries, and there was a notable decrease in records in most countries after 2005.

- Small breeding populations became well established in France and the Netherlands after the mid 1990s, and breeding has occurred annually in Belgium from 2005.

- There is generally a very poor understanding of the extent to which Ruddy Ducks birds are held in captivity, and few countries were able to provide accurate data on numbers.

- Positive progress has been made against some of the main actions of the 1999 eradication plan in core countries (France, the Netherlands, Spain and the UK). It is clear that progress is still needed in many areas in order for eradication be completed successfully.

- Policy and legislative actions to permit the control of wild birds have been completed for the majority of countries, but there has been little progress regarding birds in captivity. Eradication strategies and control programmes have been established, or are due to be initiated, in the core countries, such that the large majority of wild Ruddy Ducks in the Western Palaearctic occur in countries with active control.

- Although public awareness has been addressed in core countries, there has been very little progress elsewhere. Little negative public reaction has, however, been reported, and it is likely that Ruddy Duck control is not viewed as a controversial issue in countries that hold few birds.

- Monitoring of wild birds is generally considered adequate in many countries during winter months. Most countries have long-established national waterbird schemes and a large body of *ad hoc* data. These sources of data generally provide reasonable trend information for countries with established populations and reasonably early detection of wandering individuals in other countries. Coverage during the breeding season is, however, considered adequate in far fewer countries, but even this assessment may overestimate the suitability of monitoring at that time of year.

- Progress with implementing actions concerning Ruddy Ducks in captivity has been much poorer than for wild birds. Although legislation to prohibit the release or escape of captive birds exists in the majority of countries, none has taken active measures to reduce numbers in captivity.

- Whilst there has been close cooperation among core countries for the EU Life-Nature Project to eradicate Ruddy Ducks in the UK, there has been very little international collaboration or coordination to fulfil the international Action Plan.
- It must be concluded that the UK is no longer the sole source population of Ruddy Ducks in Europe and that the threat of the Ruddy Duck to the White-headed Duck is no longer 'contained' with the UK. Recent records further east in Europe presumably originate from the well-established breeding populations in mainland Europe. Rapid increase and further expansion appear inevitable unless concerted control is undertaken in all core countries.
- There is also a clear need for targeted surveys in neighbouring countries, to provide early warning of further spread and the establishment of breeding over a larger area.
- Given particular problems surrounding the keeping of Ruddy Ducks in captivity, it must be concluded that while a captive population remains, escapes into the wild are almost inevitable. The phasing out of Ruddy Ducks in captivity in the Western Palaearctic is therefore considered an essential aspect of the eradication programme.
- A revised Action Plan for the eradication of the Ruddy Duck in the Western Palaearctic is presented. The target is eradication of Ruddy Ducks in the wild by 2015, in keeping with the recommendation of the International Single Species Action Plan for the White-headed Duck. The Action Plan includes long-term and interim targets and 11 actions concerning Ruddy Ducks in the wild and in captivity, and concerning public awareness, co-ordination and reporting.
- Implementation of the Action Plan must be coordinated and synchronised at a pan-European level, to ensure that the problem is not allowed to persist in one area while being eliminated in others.
- It is essential that progress is monitored and reviewed annually. To simplify the reporting of progress with implementation and delivery, and to ensure that all data can be readily combined and assessed effectively and efficiently, a format for the provision of data for the annual report is suggested.
- Recommendations and considerations are given for implementation regarding international co-ordination and reporting, potential barriers to implementation, sharing expertise and experience, and the completion of eradications.
- The demonstrable success of control activities, particularly in the UK and in Spain, provides considerable reassurance that eradication is feasible. Their experiences show that substantial reductions in large populations can be achieved quickly very, and that small numbers can be controlled effectively using a reactive approach. Whilst such programmes clearly require a carefully targeted approach and resourcing, there appear to be no major barriers to implementing control. All countries are encouraged to establish control programmes as the removal of even small numbers may play a vital role in preventing expansion of the population.
- The costs of a large-scale national project needed to eradicate a widespread and numerous Ruddy Duck population are very substantial. Thus, whilst there is a clear need to implement control activities immediately on conservation grounds, there is also an over-riding imperative to act quickly while populations are relatively small to minimise the costs of eradication. Delayed implementation will increase the complexity, scale and lifespan of any control programme, and significantly increase the financial burden upon governments.
- As of 2010, the Ruddy Duck population is sufficiently small and concentrated in relatively few countries that control could be achieved relatively quickly and cheaply. A coordinated European-wide eradication programme should therefore be implemented with immediate effect.

2. INTRODUCTION

2.1 THE THREAT TO THE WHITE-HEADED DUCK

Ruddy Ducks *Oxyura jamaicensis* are common and widespread in their native habitat in North America where there is a stable population of around half a million birds (Wetlands International 2006). In the late 1940s, Ruddy Ducks were introduced into private wildfowl collections in the UK and a naturalised population soon became established as a result of a small number of escapes of offspring from these collection birds. Since the mid 1960s, Ruddy Duck numbers have increased rapidly in the UK, from an estimated 20 wintering birds to 5946 in January 2000 (Kershaw & Hughes 2002). This population is thought to be the main source of birds immigrating to Spain where they threaten the globally endangered White-headed Duck *Oxyura leucocephala* with extinction through hybridisation and competition (Green & Hughes 1996, Hughes *et al* 1999).

The 'International Singles Species Action Plan for the Conservation of the White-headed Duck *Oxyura leucocephala*' (WhD ISSAP; Hughes *et al* 2006), produced for the Convention of the Conservation of Migratory Species of Wild Animals (CMS), the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive) of the European Union (EU), notes that 'the greatest long-term threat to the White-headed Duck's survival is thought to be introgressive hybridisation (*ie* genetic swamping) with the non-native North American Ruddy Duck'. Further, that 'the threat from the Ruddy Duck is extremely serious, given the nature of the problem and the fact that, if allowed to proceed beyond a certain point, the Ruddy Duck's spread across the Palearctic will become unstoppable'.

2.2 THE INTERNATIONAL OBLIGATION TO ERADICATE RUDDY DUCKS

The obligation to prevent the introduction of, and to control established, non-native species is expressed in European legislation and a number of international conventions and agreements.

EU Directive (79/409/EEC) on the Conservation of Wild Birds (Birds Directive)

Article 11 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 of the Member States does not prejudice the local flora and fauna.'

EU Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive)

Article 22 (b) states that 'Member States shall ensure that the deliberate introduction into the wild of any species which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native flora and fauna and, if they consider it necessary, prohibit such introduction. The results of the assessment undertaken shall be forwarded to the committee for information.'

Convention on Biological Diversity (Biodiversity Convention)

Article 8 (h) states that 'each Contracting Party shall, as far as possible and appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.'

Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)

Article 11 (2) (b) states that 'each Contracting Party undertakes to strictly control the introduction of non-native species.'

Convention on Migratory Species of Wild Animals (CMS)

Article III (4c) states that 'parties that are Range States of a migratory species listed in Appendix I shall endeavour to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species.'

African-Eurasian Migratory Waterbird Agreement (AEWA)

Article III 2 (g) states that 'Parties shall prohibit the deliberate introduction of non-native waterbird species into the environment and take all appropriate measures to prevent the unintentional release of such species if this introduction or release would prejudice the conservation status of wild fauna and flora; when non-native waterbird species have already been introduced, the Parties shall take all appropriate measures to prevent these species from becoming a potential threat to indigenous species.' Article IV provides further guidance over the management of non-native waterbirds: 'Parties shall take measures to the extent feasible and appropriate, including taking, to ensure that when non-native species or hybrids thereof have already been introduced into their territory, those species or their hybrids do not pose a potential hazard to the populations listed in Table 1.'

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

On 18 August 2003, Commission Regulation (EC) No 1497/2003 added the Ruddy Duck to Annex B of the No. 338/97 on the protection of species of wild fauna and flora by regulating trade therein. The Ruddy Duck was added to Annex B in accordance with Article 3 (2d) of the Regulation as a species that would constitute an ecological threat to wild species of fauna and flora indigenous to the Community. This now allows for the prohibition of importation of Ruddy Ducks into the EU, and for restrictions to be placed on the holding and/or movement of birds, including the prohibition of keeping Ruddy Ducks in captivity.

In addition, the CMS/AEWA/EU WhD ISSAP includes as one of its objectives 'no hybridisation and competition for food and nesting sites with Ruddy Duck'. The indicator that this objective has been fulfilled is given as 'Ruddy Duck eradicated from Europe by 2015'.

2.3 THE 1999–2002 RUDDY DUCK ERADICATION PLAN

In recognition of the need to eradicate Ruddy Ducks, the Council of Europe commissioned 'The status of the Ruddy Duck (*Oxyura jamaicensis*) in the Western Palaearctic and an Action Plan for eradication, 1999-2002' (Hughes *et al* 1999) under the Bern Convention.

The eradication strategy included a series of recommendations:

International recommendations

1. Policy and legislation

   1.0. Produce a strategy to eradicate Ruddy Ducks from the Western Palaearctic, both in the wild and in captivity.
   1.1. Ensure international legislation is in place to:
      a. Permit the control of Ruddy Ducks
      b. Prohibit the escape or release of Ruddy Ducks from captivity or, preferably, prohibit the keeping of Ruddy Ducks in captivity.

2. Control measures

   1.1. Control all Ruddy Ducks & White-headed Duck hybrids
   1.2. Control wild Ruddy Ducks in the priority order:
      a. Total prevention of breeding
      b. Birds occurring March-September, inclusive (those birds with the potential to breed)
      c. Birds occurring October-February, inclusive.
   1.3. Phase out the keeping of Ruddy Ducks in captivity.

2. Monitoring and research

   2.1. Ensure adequate monitoring of the status and distribution of Ruddy Duck, both in the wild and in captivity
   2.2. Monitor control measures for Ruddy Ducks
   2.3. Conduct DNA studies to attempt to identify the provenance of Ruddy Ducks occurring in mainland Europe
   2.4. Model the timescale for eradication of the Ruddy Duck from the Western Palaearctic
   2.5. Model the timescale for extinction of the White-headed Duck with differing levels of Ruddy Duck immigration to Spain

3. Public awareness and training

   3.1. Produce an international public awareness strategy to increase awareness of the need to control non-native species using the Ruddy Duck as a case in point
   3.2. Organise a meeting for the exchange of technical information on Ruddy Duck control

4. Implementation and review

   4.1. Organise an international meeting in the year 2000 to agree a strategy to eradicate Ruddy Ducks from the Western Palaearctic
   4.2. Form a working group to co-ordinate control between countries and to monitor implementation of this strategy
   4.3. Draft a recommendation to the Standing Committee of the Bern Convention to request governments to implement the recommendations of this strategy and to produce annual reports on progress to the Standing Committee
   4.4. Review and update this strategy and every three years thereafter

National recommendations

1. Policy and legislation

   1.1. Form a working group of all relevant interest group
   1.2. Produce a strategy to eradicate Ruddy Ducks, both in the wild and in captivity
   1.3. Ensure national legislation is in place (and is enforced) to:
      a. permit the control of Ruddy Ducks
      b. prohibit the escape or release of Ruddy Ducks from captivity or, preferably, prohibit the keeping of Ruddy Ducks in captivity.

2. Control measures

   2.1. Control all Ruddy Ducks & White-headed Duck hybrids
   2.2. Control wild Ruddy Ducks in the priority order:
      a. Total prevention of breeding
      b. Birds occurring March-September, inclusive (those birds with the potential to breed)
      c. Birds occurring October-February, inclusive.
   2.3. Phase out the keeping of Ruddy Ducks in captivity.

3. Monitoring and research

   3.1. Ensure adequate monitoring of the status and distribution of Ruddy Duck, both in the wild and in captivity
   3.2. Monitor control measures for Ruddy Ducks
   3.3. Provide blood or tissue samples from Ruddy Ducks for DNA analysis to attempt to identify their place of origin

4. Public awareness and training

   4.1. Produce a public relations strategy to increase awareness of the need to control non-native species using the Ruddy Duck as a case in point
   4.2. Attend a meeting for the exchange of technical information on Ruddy Duck control

5. Implementation and review

   5.1. Attend an international meeting in the year 2000 to agree a strategy to eradicate Ruddy Ducks from the Western Palaearctic
   5.2. Attends meeting of a working group to co-ordinate control between countries and to monitor implementation of this strategy
   5.3. Produce an annual report of progress against the actions outlines above

The strategy recommended that all countries with Ruddy Duck records should produce a national eradication strategy, listing their planned activities, including a timescale for action, against the above recommendations. The WhD ISSAP also recommended that all Ruddy Duck 'range states' 'endorse and implement the International Ruddy Duck Eradication Strategy of the Bern Convention'. Ruddy Duck range states were listed as Algeria, Austria, Belgium, Denmark, Finland, France, Germany,

Hungary, Iceland, Ireland, Israel, Italy, Morocco, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, and UK.

2.4 PURPOSE OF THIS REPORT

The objectives of this report are:

- to produce an updated assessment of the status and distribution in the Western Palaearctic, specifically determining the number of Ruddy Ducks currently present in European countries other than the UK.
- to review the implementation of the 1999 Ruddy Duck eradication plan for the Western Palaearctic.
- to estimate the numbers and distribution of captive Ruddy Ducks in Europe.
- to update the Ruddy Duck eradication plan for the Western Palaearctic.

The results of this work will be communicated to the Bern Convention Standing Committee and AEWA Technical Committee, Standing Committee and Meeting of Parties.

3. METHODS

3.1 QUESTIONNAIRE AND ANALYSIS

This review was based largely on information collated through a questionnaire. The questionnaire was sent to Wetland International focal points. It was also sent to Bern Convention and AEWA representatives, so they were aware of the process and could help if appropriate.

The questionnaire (see Appendix 1) was designed to determine progress against the recommendations in the 1999 eradication strategy (Hughes *et al* 1999). The questionnaire was divided into six sections: status and distribution of Ruddy Ducks (which included requesting records of Ruddy Ducks observed in the wild); policy and legislation; public awareness; monitoring wild birds; monitoring birds in captivity (which included requesting information on the number of birds currently held in captivity); and control measures.

For the majority of questions, the questionnaire prompted respondents to provide one of a set of predetermined answers. It should be noted, therefore, that a response of, for example, '100-400' birds in captivity reflects simply the categories of answer in the questionnaire, rather than an uncertainty over the precise number (refer to Appendix 2 for the permitted answers to particular questions). An additional 'comments' field was provided for respondents to provide clarification or further information as appropriate.

During analysis of the responses, it was noted that in some cases, information provided in the comments field inferred a different answer to the one selected by the respondent, or strongly suggested a particular response where the answer had been left blank. In such cases, and where appropriate, the answers provided by the respondent were changed for use in the analysis. Any such changes are highlighted in the tables in the appendices. In some cases, there was some inconsistency between responses to questions from different countries (for example, regarding the legality of certain practices, and whether or not permits or licences were required). Such inconsistencies were assumed to be a misunderstanding of the question and/or ambiguity in questionnaire, and, where appropriate, responses have been standardised in the results.

Some respondents did not to answer certain questions. In many cases, this reflected that no answer was possible or applicable, for example, a country that has never held any Ruddy Ducks will not have controlled any birds (although in others, whole sections were unanswered, where a response was required, *eg*, although no Ruddy Ducks had been observed in that country, it is still valid to ascertain whether the country has a policy or legislation concerning Ruddy Ducks). In most cases, answers are presented as proportions (*eg* the proportion of countries which have legislation preventing the release of Ruddy Ducks). Since the number of countries that answered each question varied between questions, care must be taken in interpreting these figures. The number of responding countries is given after each percentage value in each case, and where useful for clarity, *eg* 'Although only 76% (n = 29) of countries indicated that the status and distribution of Ruddy Ducks in the wild are monitored, all the countries (n = 29) have some mechanism for reporting observations of Ruddy Ducks.'

To assess the status and distribution of Ruddy Ducks, countries were asked to provide data on Ruddy Ducks (and Ruddy Duck x White-headed Duck hybrids) for the period October 1996 to March 2009. For each observation of birds, countries were asked to provide the site name, geographical coordinates, date, and the number of birds (and, where available, also on the accuracy of the count, the source of data, and the age and/or sex of birds). Data were also requested for breeding observations, namely annual totals for the number of sites at which breeding occurred, total numbers of breeding pairs, successful pairs and the numbers of fledged young.

3.2 RESPONDING COUNTRIES

The questionnaire was sent to representatives in 53 Western Palaearctic countries. The following 31 countries completed the questionnaire, although many countries did not provide answers to all questions (ISO 2-letter country codes are also given for responding countries):

AT	Austria
BE	Belgium (Flanders & Walloon)
HR	Croatia
CZ	Czech Republic
DK	Denmark
EG	Egypt
EE	Estonia
FR	France
DE	Germany
GR	Greece
HU	Hungary
IS	Iceland
IE	Ireland
IL	Israel
IT	Italy
JE	Jersey
KZ	Kazakhstan
LV	Latvia
LB	Lebanon
LY	Libyan Arab Jamahiriya
LU	Luxembourg
NL	Netherlands
NO	Norway
PT	Portugal
RO	Romania
SI	Slovenia
ES	Spain
SE	Sweden
CH	Switzerland
TN	Tunisia
GB	United Kingdom

Seven countries did not complete the questionnaire, but provided a brief response. A summary of those responses is as follows:

- Armenia: the Ruddy Duck issue is not considered a problem.
- Bosnia and Herzegovina: there are no data on Ruddy Ducks.
- Bulgaria: Ruddy Duck has not been recorded and is not on the official Bulgarian avifauna list.
- Cyprus: no Ruddy Ducks have been reported since 1958, when annual bird reports were produced. No Ruddy Ducks have been imported for the purpose of aviculture.
- Morocco: Records of Ruddy Ducks provided. An Action Plan (2003–05) to control Ruddy Ducks in Morocco was developed at a workshop in Rabat in October 2003.
- Russia: Ruddy Duck is not mentioned in the checklist of the Birds of the Russian Federation (Koblik *et al* 2006).
- Turkey: no Ruddy Ducks have been recorded according to the last bird checklist (Kirwan *et al* 2008).

The following countries have yet to provide a response to the questionnaire:

Algeria
Albania
Azerbaijan
Belarus
Finland
Iraq
Jordan
Lithuania
Macedonia (former Yugoslav Republic of)
Montenegro
Poland
Saudi Arabia
Slovakia
Syrian Arab Republic
Ukraine

Of the 31 countries that responded to the questionnaire, the majority provided data on Ruddy Duck observations:

- 18 provided data: Austria, Belgium (Walloon & Flanders), Denmark, France, Germany (for one state only) Hungary, Iceland, Ireland, Italy, Jersey, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland and the UK
- 13 reported that no Ruddy Ducks had been recorded during the period: Croatia, Czech Republic (though birds had been recorded after the period specified), Egypt, Estonia, Greece, Israel, Kazakhstan, Latvia, Lebanon, Libya, Luxembourg, Romania and Tunisia
- One (Iceland) reported that three Ruddy Ducks had been observed (in 2002), but provided no further details

In addition, two countries (Finland and Morocco) that did not complete the questionnaire provided records of Ruddy Duck observations. A further five countries that did not complete the questionnaire responded to say that no Ruddy Ducks had been recorded within their borders: Bosnia & Herzegovina, Bulgaria, Cyprus, Russia and Turkey.

3.3 PRESENTATION OF RESULTS

The majority of this report summarises responses from the questionnaire. For each section of the questionnaire, relevant recommendations from the 1999 strategy are listed. This is followed by the complete list of questions in the 2010 questionnaire. The number of responses to each question is then given in a table.

A brief summary of responses from all responding countries is then given for the key points. More detail is then provided, for which the countries were placed in four groups. These represent an approximate prioritisation for the implementation of the Ruddy Duck eradication strategy.

Priority 1 countries

These represent countries with regular records of Ruddy Ducks, where numbers have at some point between 1996 and 2009 been greater than 50 birds, and where Ruddy Duck are considered to be a major concern for breeding White-headed Ducks: France, the Netherlands, Spain and the United Kingdom.

Priority 2 countries

These countries have regular records of Ruddy Ducks, but where total numbers have generally been fewer than 50 birds: Belgium, Denmark, Germany, Ireland, Italy, Morocco (provided only records of Ruddy Ducks), Norway, Sweden, and Switzerland.

Priority 3 countries

These are countries where Ruddy Ducks have been recorded only irregularly: Austria, Czech Republic, Finland (provided only records of Ruddy Ducks), Hungary, Iceland, Jersey, Portugal and Slovenia.

Priority 4 countries

These countries have no records of Ruddy Ducks to date: Croatia, Egypt, Estonia, Greece, Israel, Kazakhstan, Lebanon, Luxembourg, Latvia, Libyan Arab Jamahiriya, Romania and Tunisia.

It should be noted that data presented in this report may not be wholly comprehensive for each country; for example, additional data or detail may be held by other organisations than those approached for this review. Whilst it is therefore possible that more complete information on numbers and distribution could be presented, it is believed that the information provided is sufficiently accurate to support the conclusions and recommendations presented within this review.

In figure legends, ‘NARD’ is used as an abbreviation of (North American) Ruddy Duck.

4. STATUS AND DISTRIBUTION OF RUDDY DUCKS

4.1 BACKGROUND

In the 1940s, Ruddy Ducks were introduced into private wildfowl collections in the UK and a naturalised population soon became established as a result of a small number of escapes. From the mid 1960s, Ruddy Duck numbers increased rapidly in the UK, from an estimated 20 wintering birds to around 6000 in January 2000 (Kershaw & Hughes 2002). By the mid 1990s, Ruddy Ducks had been recorded in 20 other countries in the Western Palaearctic, mainly in northwest Europe adjacent to the UK, but as far afield as Finland, Turkey and Morocco (Hughes *et al* 1999).

4.2 STATUS AND DISTRIBUTION OF RUDDY DUCKS IN THE WILD 1996–2009

At the end of the period used for this review (*ie* in 2009–10), non-native Ruddy Ducks were present in significant numbers in four countries (Table 1). Although it also occurs in a large number of other countries, numbers there are likely to be small (ten or fewer birds). Consequently, it is likely that the total population in the Western Palaearctic in 2010 is between 550 and 700 birds. The numbers of Ruddy Ducks on mainland Continental Europe now exceed those in the UK.

Table 1. Estimates[1] of Ruddy Duck numbers in key countries, 2009–10.

Country	Individuals
Belgium	15
France	220
The Netherlands	60
UK	250

1 Estimates are from presentations to the third workshop for the EU Life-Nature project 'Eradication of Ruddy ducks in the UK to protect the white-headed duck', Madrid, November 2010. Numbers are approximate.

Between 1996 and 2009, Ruddy Ducks occurred annually or near annually (that is, with records in ten to 14 years) in nine countries (France, Netherlands, Spain, Belgium, Ireland, Morocco, Sweden, Switzerland and UK). Three further countries (Denmark, Italy and Norway) reported Ruddy Ducks in over half the years during this period, and all 11 have observations for up to and including 2008 or 2009 (Table 2). Ruddy Ducks have occurred infrequently in seven further countries (Austria, Finland, Hungary, Iceland, Jersey, Portugal and Slovenia), where records have been of between one and three individuals.

Data were received from one state in Germany, indicating birds had been recorded in six years during 2000–2008. Other reports from the country indicate that birds are observed in all states and that the overall number of birds observed is certainly well below 50 individuals per year and probably fewer than 20 records per year.

No Ruddy Ducks were observed in Croatia, Egypt, Estonia, Greece, Israel, Kazakhstan, Latvia, Lebanon, Libyan Arab Jamahiriya, Luxembourg, Romania and Tunisia. No Ruddy Ducks were observed during the specified period in the Czech Republic, although there were subsequent records (in September and November 2009).

Hybrid Ruddy Ducks x White-headed Ducks were observed only in Spain and Morocco during the period 1996 to 2009 (Table 3).

Table 2. Occurrence of Ruddy Duck in Western Palaearctic countries, 1965 to 2009. Figures in parentheses are numbers of years with records assuming presence in years with missing data.

Count	First record	Latest record	Number of years with records			1965–1996		1996–2009		
			1965–1996	1992–1996	1996–2009	Total birds	Total records	Total birds	Total records	Largest observation
Priority 1 countries										
France[1]	1974	2009	20	5	13	281	153	1,670	63	259
Netherlands[2]	1973	2009	16	5	14	325	220	3,559	?	64
Spain[3]	1982	2009	12 (13)	4 (5)	14	175	102	165	?	12
UK[4]	1965	2009	32	5	14	238,321	12,910	300,642	19,418	1,345
Priority 2 countries										
Belgium	1979	2009	18	5	14	155	126	202	166	6
Denmark	1985	2009	7 (8)	2 (3)	8	10	10	50	42	4
Germany[5]	1982	2007	14	5	6	58	57	17	?	8
Ireland	1973	2008	17 (19)	2 (4)	13	234	80	110	58	14
Italy	1987	2008	6 (7)	4 (5)	8	9	9	26	24	2
Morocco	1986	2007	6	5	10	130	25	86	25	15
Norway	1984	2008	9	2	11	42	29	79	72	2
Sweden	1965	2008	13	5	13	32	26	97	70	8
Switzerland	1981	2009	13	4	13	25	21	42	41	2
Priority 3 countries										
Austria[6]	1991	2007	1	0	3	2	2	4+	4	1
Czech Rep.[7]	2009	2010	0	0	0	0	0	0	0	0
Finland[8]	1989	2006	4 (5)	1 (2)	10	4	4	?	31	3
Hungary	1994	2004	1	1	6	1	1	8	7	2
Iceland[9]	1976	2002	12	4	1	83	30	3	?	?
Jersey	1993	2003	3	0	3	3	3	4	4	1
Portugal	1989	2007	4	3	?	7	5	9	9	1
Slovenia	1999	2002	0	0	2	0	0	2	2	1
Priority 4 countries										
Israel	1983	1983	1	0	0	1	1	0	0	0
Turkey	1988	1988	1	0	?	1	1	0	0	0

Notes regarding data for 1996–2009:

1 Only January counts provided for France.

2 Only monthly total counts provided for Netherlands (individual records not provided).

3 Only yearly total counts provided for Spain (individual records not provided).

4 Ruddy Ducks have been observed in the UK since 1960. Coverage (through national waterbird surveys) has improved since then hence the number of records will also have increased due to more sites being surveyed.

5 Only yearly total counts provided for Germany (individual records not provided). Data received from one state only, although it was considered that the overall number of birds observed is certainly well below 50 individuals per year and probably fewer than 20 records per year.

6 There were six observations in Austria up to 2007, although dates were only provided for four.

7 No Ruddy Ducks were observed in the Czech Republic during the specified period. Birds were, however, observed after March 2009, and the years of the first and latest records are included here for completeness.

8 Only the yearly number of records provided for Finland (individual counts not provided). It was, however, noted that records were of between one and three individuals.

9 The three records from Iceland were all from 2002.

Table 3. Numbers of Ruddy Duck x White-headed Duck hybrids in Western Palaearctic countries, 1996 to 2009.

	96	97	98	99	00	01	02	03	04	05	06	07	08	09
Spain	4	3	3	2	6	1	0	2	5	0	2	1	0	0
Morocco	8	3	18	13	4	1	1	0	0	0	0	0	0	1

There has been a significant expansion in the distribution of Ruddy Ducks in Europe since 1996. Between 1965 and 1999, the key concentrations were along the northern parts of Belgium and the Netherlands, extending into northeast France and Denmark, Southern Spain, northern and western France, a thin line across the north side of the Alps centred on Switzerland, and small numbers in the southern half of Fennoscandia. Despite the limitations from the lack of geographical coordinates provided for many records, it is clear that there has been a significant eastwards and northwards expansion beyond the previous 'core area', with numerous and widespread records in Norway, Sweden and Hungary (Figure 1).

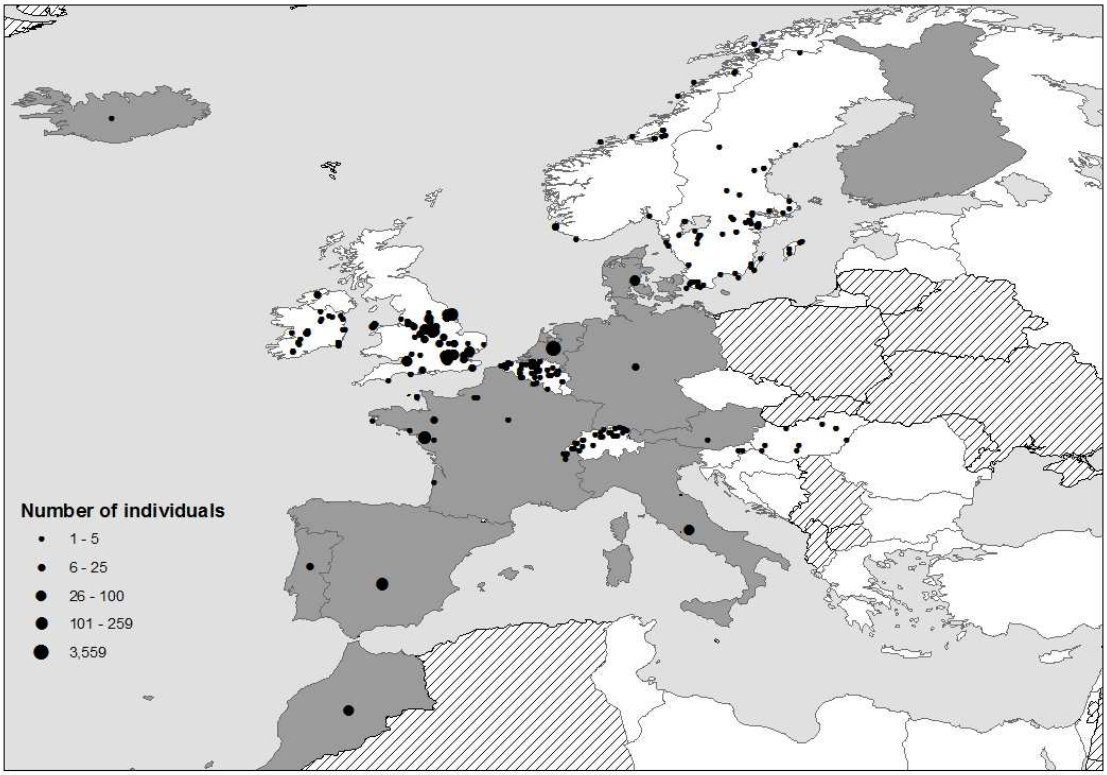


Figure 1. Distribution of Ruddy Duck records in Europe, 1996 to 2009.

Dots indicate the location of all observations during the period. Countries shaded grey are those where Ruddy Ducks were present, but coordinates were not provided for observations. Hatched countries indicate those for which no data were received. (Location information were provided for some observations in France, while single dots placed centrally in Austria, Denmark, Germany, Iceland, Italy, Morocco, the Netherlands and Spain signify the total numbers of birds; see Table 2. Locations in the UK are plotted only for observations in winter 2009/10. See footnotes to Table 2 for further information about data provided by individual countries.)

4.3 ANNUAL NUMBERS OF RUDDY DUCKS 1996–2009

Priority 1 countries (ES, FR, GB & NL)

The great majority of Ruddy Ducks in the UK are found in Great Britain. The population there showed a large increase during the 1990s, to a peak of around 6000 birds in the early 2000s (Figure 2). Control activities resulted in a sharp decrease in numbers after 2005 and by 2010 the population had declined by 95%. This pattern was reflected to a large extent in many European countries.

In the UK, small numbers of Ruddy Ducks are also recorded in Northern Ireland. Peak numbers ranged between 27 and 89 during 1999/00 to 2008/09 (Table 4), with a general pattern of decline during that period (*eg* D Allen *in litt*). It has been suggested that birds from Northern Ireland migrate in winter to Anglesey (north Wales). Notably, peak counts in Northern Ireland tend to be in autumn or early spring. Further, the start of Ruddy Duck control on Anglesey in 1999 coincided with the reduction in peak counts in Northern Ireland (*I-WeBS News* 2008).

A pattern of increase to the mid 2000s similar to that in the UK was observed in other Priority 1 countries, with notable increases in France and the Netherlands (Figures 3 & 4). In France, numbers rose to 63 records and 1,670 birds between 1997 and 2009 (based on only January data), compared with just 153 records and 281 birds during 1965–1996. Between 1998 and 2008, numbers recorded here in January have generally increased, peaking in 2006 at 272. Similarly, the overall number of birds recorded in the Netherlands greatly increased, with a rapid increase in numbers to a peak of 97 in 2005/06, since when numbers have stabilised. Although information on the numbers of records was not given for the latest period, there was a marked increase in the total number of birds observed: 3,559 in 1996–2009 compared with just 325 in the previous 30 years.

Although there have been declines in both countries since the mid 2000s, the extent of the decreases is relatively smaller than in other mainland countries, and in France, did not occur until 2008. These patterns presumably reflect the influence of breeding populations in France and the Netherlands and, in France, of a national control programme also.

Significant numbers continued to be observed in Spain during 1996–2009 (Figure 5). The trend is of fluctuating numbers, rather than an obvious decrease, to the mid 2000s (presumably reflecting national control activities), and there were notably fewer after 2003. Overall, there has been a corresponding fall in the numbers of Ruddy Duck x White-headed Duck hybrids.

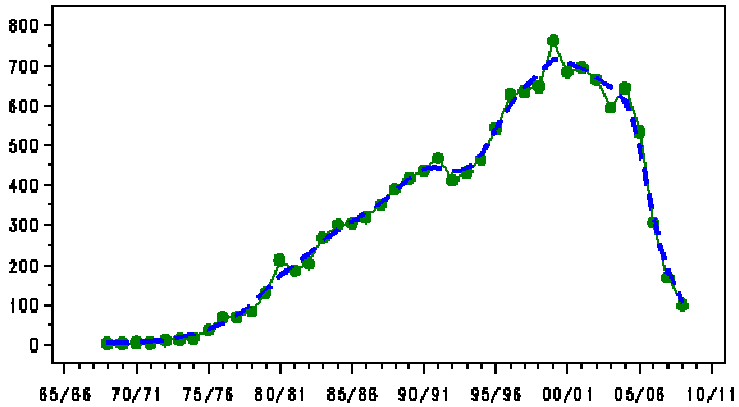


Figure 2. Annual index values (green circles) and trend (blue dashed line) for Ruddy Ducks in Great Britain, 1968/69 to 2008/09 (from the Wetland Bird Survey; Calbrade et al *2010).*

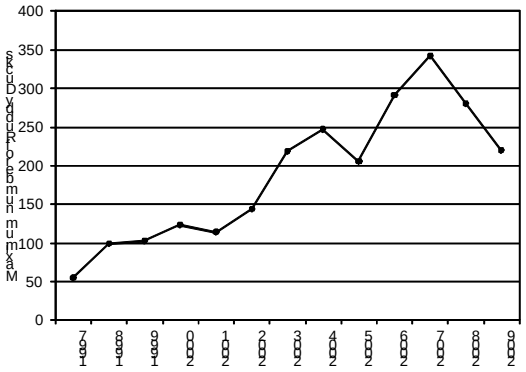


Figure 3. Total count of wintering Ruddy Duck recorded in France, 1997-2008 (per A Caizergues, Madrid 2010).

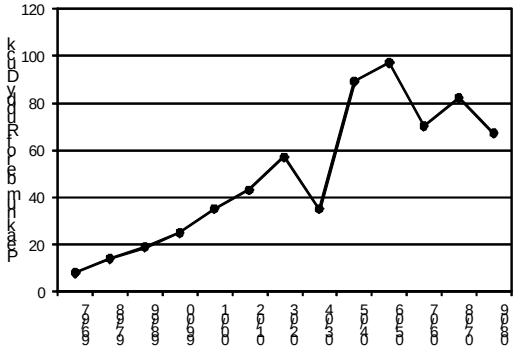


Figure 4. Peak counts of Ruddy Ducks recorded in the Netherlands, 1996/97–2008/09.

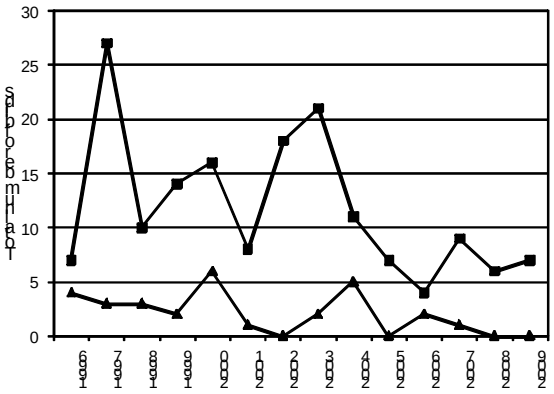


Figure 5. Total numbers of Ruddy Ducks (squares) and Ruddy Duck x White-headed Duck hybrids (triangles) recorded in Spain, 1996–2009.

Table 4. Peak numbers of Ruddy Ducks in Northern Ireland, 1999/2000 to 2008/09 (from Wetland Bird survey and D Allen in litt*)*

1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
89	54	59	67	72	33	39	41	39	27
Oct	Feb	Jan	Oct	Oct	Feb	?	Mar	Jan	Jan

Priority 2 countries (BE, CH, DE, DK, IE, IT, NO & SE)

There were increases in most Priority 2 countries during 1996–2009 (Figure 6). This was most notable in Belgium, but also in Nordic countries, and to a lesser extent in Italy and Switzerland. In all of these countries, numbers appear to have fallen (or at least held roughly stable) since 2005, with the notable exception of Belgium, where peak numbers were observed in the second half of the decade. In contrast, numbers in Ireland have generally decreased over the period. Small numbers of Ruddy Ducks are recorded in all states in Germany, though the overall trend is not clear due to the lack of data from all states.

Priority 3 countries (AT, CZ, HU, IS, JE, PT & SI)

Small numbers of birds were recorded in seven Priority 3 countries during 1996–2009. Annual data were only provided by all but one, and in all of these, there were no records after 2007 (Figure 7). It is not possible to deduce trends for the other countries, although it is notable that Ruddy Ducks were recorded in the Czech Republic for the first time in September 2009.

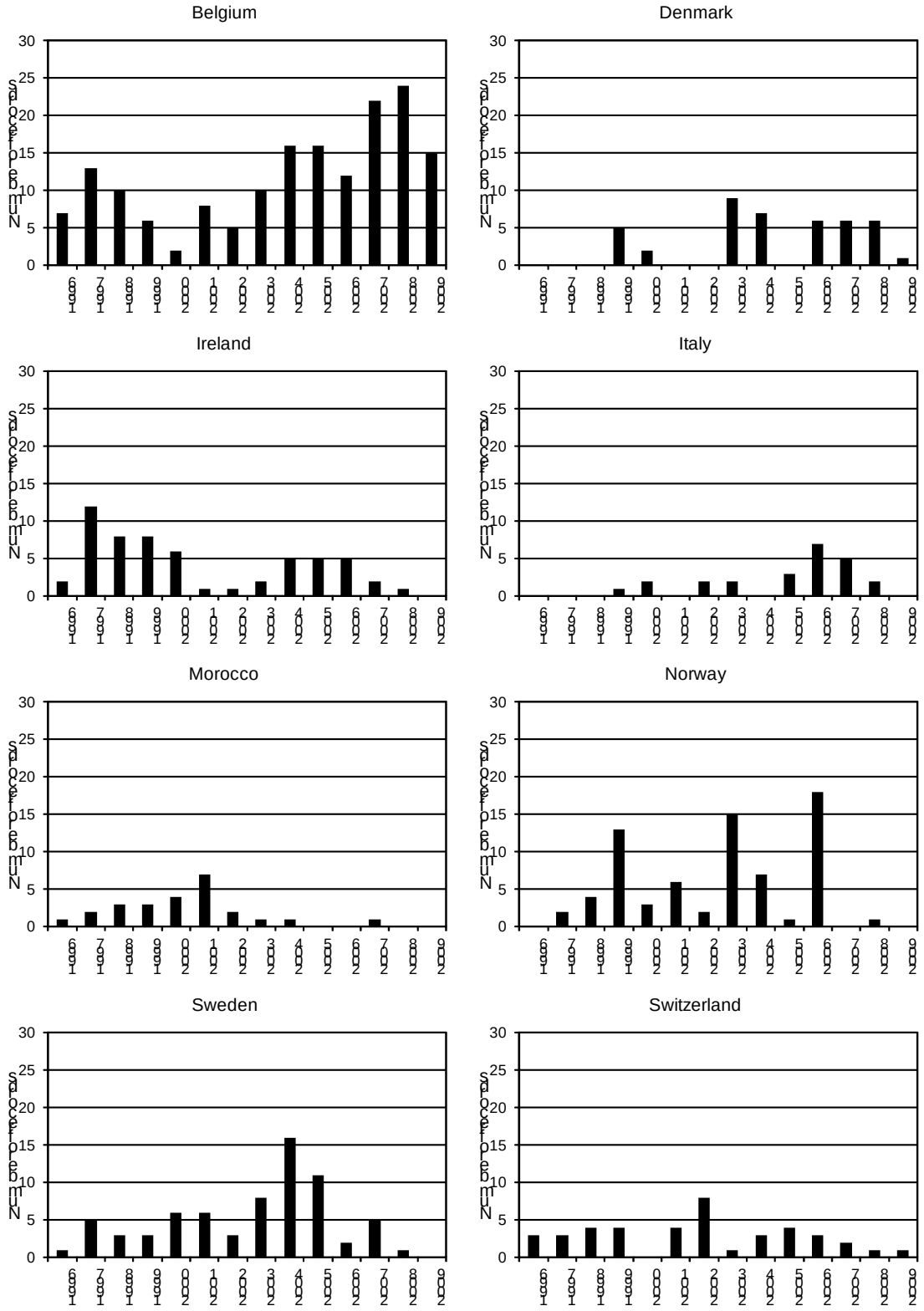


Figure 6. Annual totals of Ruddy Duck records in Priority 2 countries, October 1996 to March 2009. (Data were not received from all countries for all years, hence a blank might represent a zero count or missing data.)

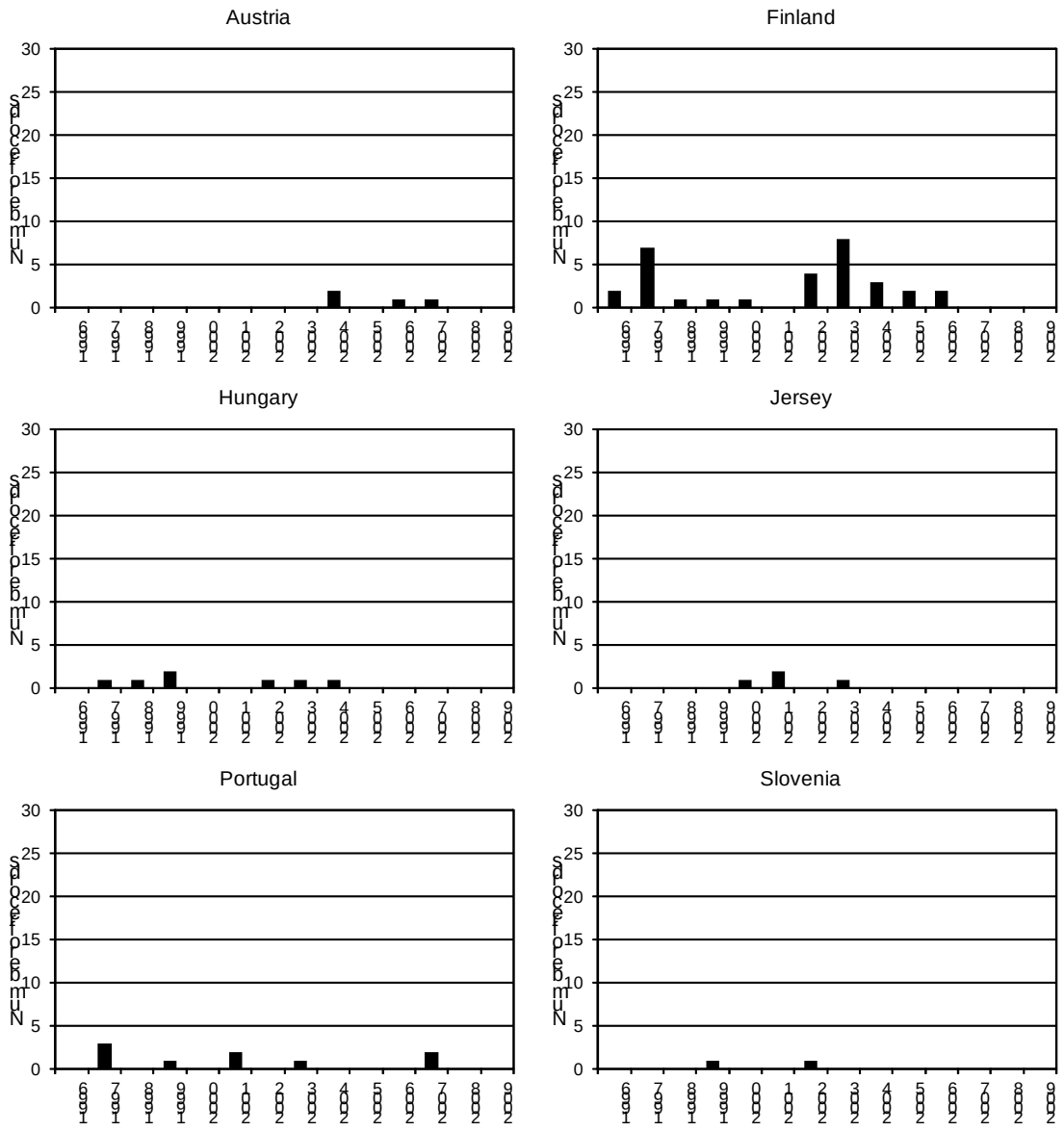


Figure 7. Annual totals of Ruddy Duck records in Priority 3 countries, October 1996 to March 2009. Note, three individuals were recorded in 2002 in Iceland. (Data were not received from all countries for all years, hence a blank might represent a zero count or missing data.)

4.4 MONTHLY VARIATION IN RUDDY DUCKS NUMBERS 1996–2009

The majority of Ruddy Duck observations in the Western Palaearctic countries were made during winter (Table 5), although there is a significant peak in late spring also. To some extent, this pattern will reflect monitoring effort (many waterbird monitoring schemes focus on the winter period) and the ease of detection (during winter, Ruddy Ducks usually congregate in flocks on open water, making them more obvious and easily counted; during summer, most birds are found singly or in pairs, often on smaller wetlands, and will usually be more secretive in their behaviour). An increase is naturally expected in early winter as a result of young from the preceding breeding season, and a small decline is expected during the winter as a result of natural mortality. The peak in May coincides with spring dispersal or 'migration', although it is unclear why this should result in an increased number of records.

Table 5. Seasonal occurrence of Ruddy Ducks in Western Palaearctic countries, October 1996 to March 2009. Winter – October to March; Summer – April to September. (Individual records not provided by Finland, Germany, the Netherlands or Spain.)

Country	Winter			Summer		
	Total records	No. of records	% of total records	No. of records	% of total records	No. of years with summer records
Priority 1 countries						
France[1]	63	63	100	?	?	?
UK	19,418	10,467	54	8,951	46	12
Priority 2 countries						
Belgium	166	161	97	5	3	4
Denmark	42	11	26	31	74	7
Ireland	58	56	97	2	3	2
Italy	24	20	83	4	17	3
Morocco	25	15	60	10	40	6
Norway	72	20	28	52	72	10
Sweden	70	11	16	59	84	12
Switzerland	41	34	83	7	17	7
Priority 3 countries						
Austria[2]	4	2	50	2	50	2
Hungary	7	7	100			
Portugal[3]	9	5	56	3	33	2
Jersey	4	4	100			
Slovenia	2	2	100			

1 France provided data for January only.
2 There were six records in Austria up to 2007, but dates were not provided for four.
3 One record from Portugal in 2003 was recorded as month unknown (11% of total records).

Ruddy Ducks are observed all year round in the UK. Peak numbers usually occur between October and January (Figure 8). Smaller numbers during summer months partly reflects a consequence of reduced survey effort and the practicalities of locating birds at that time. The general pattern of peak numbers in winter is reflected in records for most European countries, whether countries are in priority categories 1, 2 or 3 (Figures 9–12). Indeed, for many countries, only very small numbers of birds or records are reported during summer months (this is particularly marked for Belgium, despite significant numbers during winter). The notable exception is in Nordic countries, where the majority of Ruddy Ducks are observed during late spring and summer, particularly in Norway and Sweden.

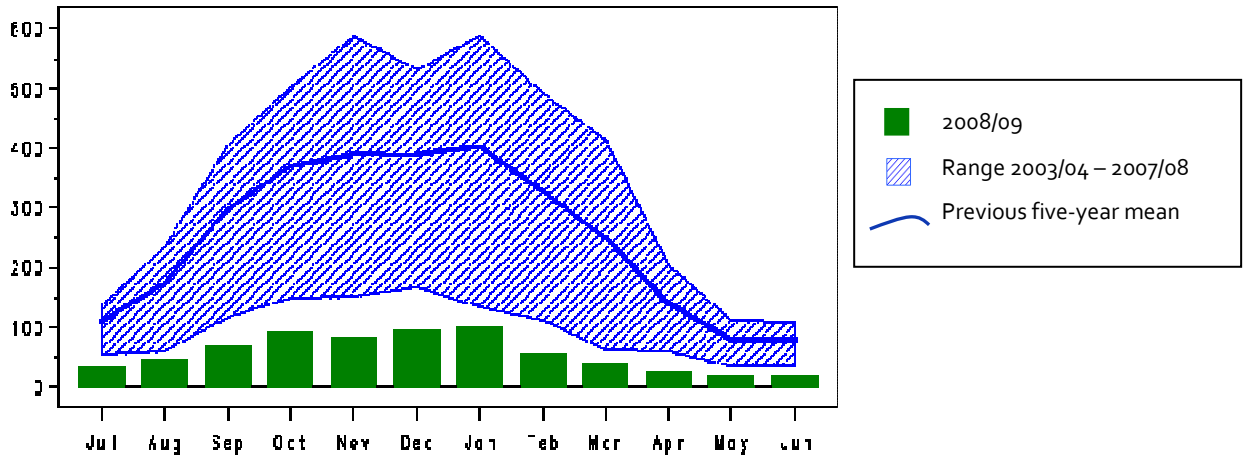


Figure 8. Monthly indices for Ruddy Duck in Great Britain, 2003/04 to 2008/09 (from Calbrade et al 2010).

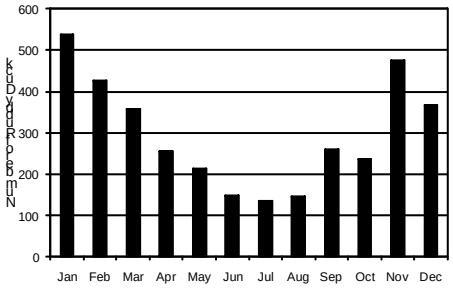


Figure 9. Monthly totals of Ruddy Duck recorded in the Netherlands, 1996–2009.

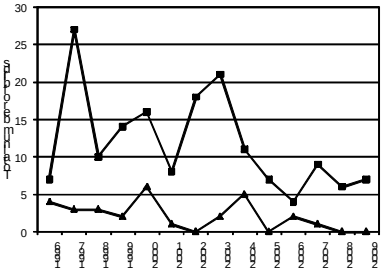


Figure 10. Monthly totals of Ruddy Duck and Ruddy Duck x White-headed Duck hybrids recorded in Spain, 1984–2009. (Note, these data cover 25 years).

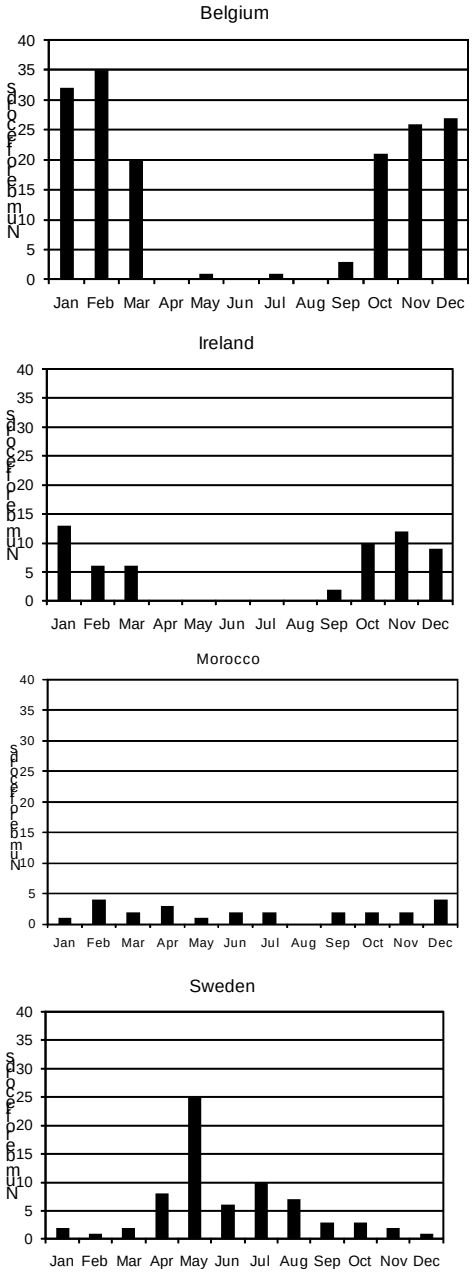
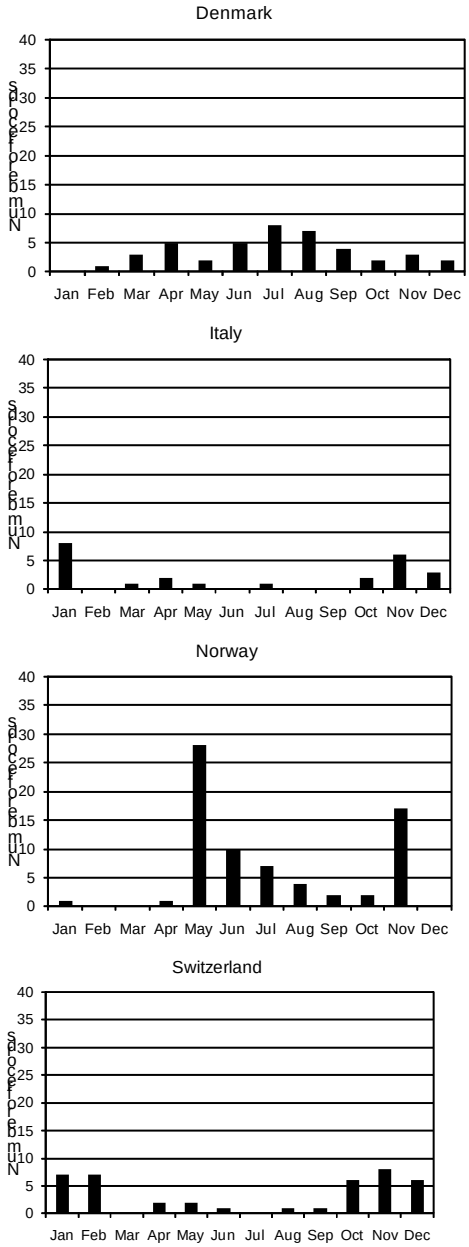


Figure 11. Monthly totals of Ruddy Duck records in Priority 2 countries, October 1996 to March 2009. (Data were not received from all countries for all years, hence a blank might represent a zero count or missing data.)



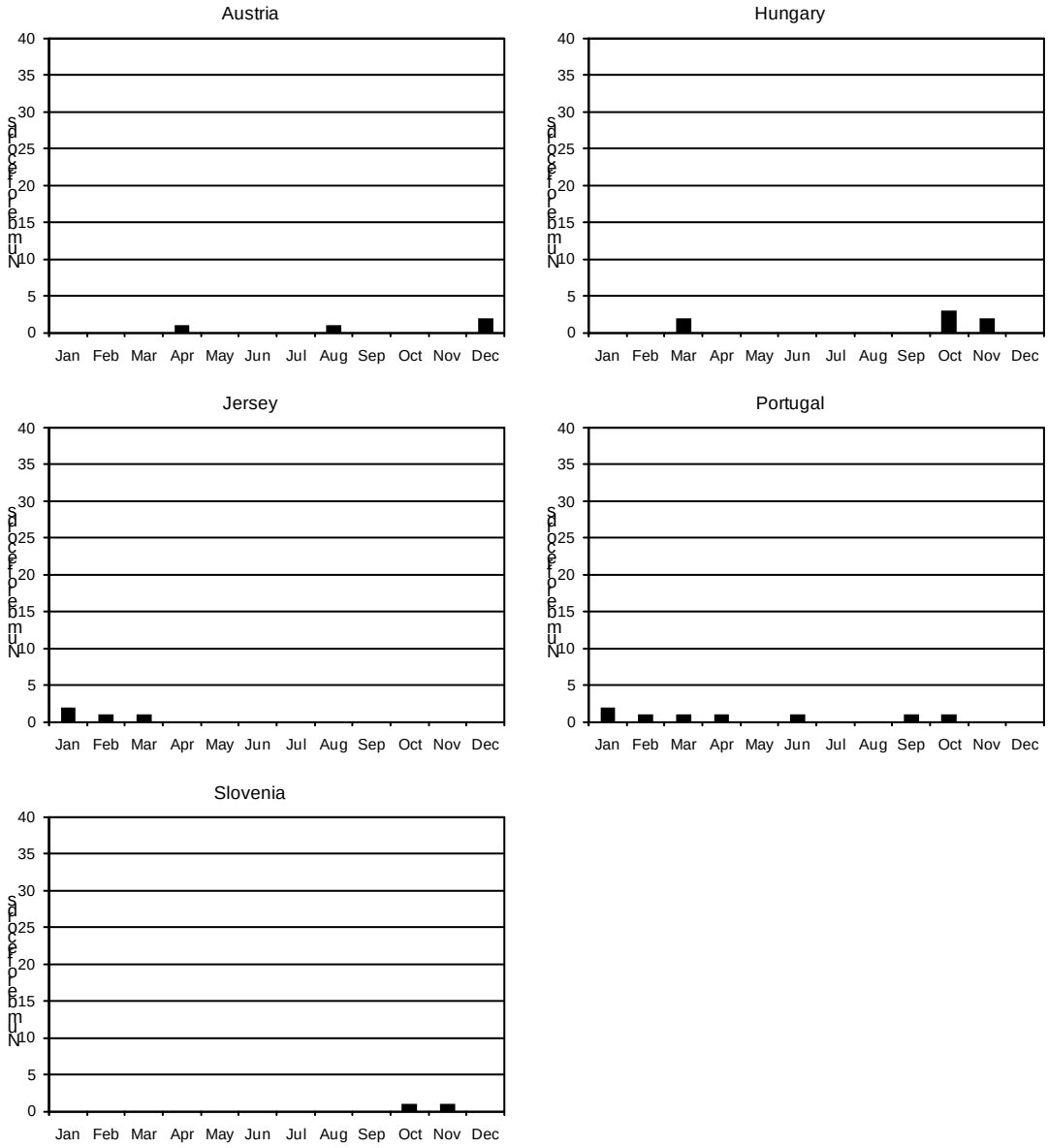


Figure 12. Monthly totals of Ruddy Duck records in Priority 3 countries, October 1996 to March 2009. (Data were not received from all countries for all years, hence a blank might represent a zero count or missing data.)

4.5 BREEDING NUMBERS OF RUDDY DUCKS 1996–2009

Breeding pairs of Ruddy Ducks were reported from seven countries between 1996 and 2009 (Table 6). It is clear that France and the Netherlands form the core breeding countries outside the UK. There have been notable increases over the last decade, and numbers in both countries are now significant. Breeding has also occurred regularly in Belgium since 2005. Breeding success was not reported by any country.

Table 6. Breeding pairs of Ruddy Ducks in Western Palaearctic countries, 1996–2009.

	96	97	98	99	00	01	02	03	04	05	06	07	08	09
Priority 1 countries														
France		<5	<10	<10	10	2	15	27	32	28	35	40-60[1]	40-60	30-50
Netherlands	5	5	4	5	6	8	11	10	12	9	18	22	16-22[1]	?
Spain			1	1	1				2					
UK	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Priority 2 countries														
Belgium										1	3	1	3	3-5[1]
Denmark													1	
Germany	0	0	0	0	0	1	1	1	0	0	0	0	0	0
Ireland			1		1		2?	1?						
Sweden		1							1					

1 Data from Henderson (2010)

4.6 AGGREGATION ON KEY SITES

The majority of Ruddy Ducks wintering in the UK is located on relatively few sites. Despite the marked decline in numbers, the population has continued to be concentrated, and, in most cases, the same individual sites are favoured (Hall & Cranswick 2010). The top ten sites have held between 57% and 78% of all birds counted (Table 7), while the top 20 sites held between 84% and 95% of the total.

Table 7. Numbers of Ruddy Ducks observed at British wintering sites, and the proportion recorded at the top ten sites, during dedicated Ruddy Duck surveys, 2006 to 2010 (from Hall & Cranswick 2010).

	Jan 06	Dec 06	Jan 07	Dec 07	Jan 08	Dec 08	Jan 09	Dec 09	Jan 10
Total numbers	3,077	1,535	1,223	997	909	757	648	253	269
Proportion on top ten sites (%)	72	64	60	57	65	60	74	78	78
Proportion on top 20 sites (%)	91	86	87	85	87	84	95	92	96
Number of sites covered	50	59	58	62	66	104	103	104	103

4.7 OCCURRENCE OF RUDDY DUCKS IN THE RANGE ON THE WHITE-HEADED DUCK

To determine the overlap between the distributions of Ruddy Ducks and White-headed Ducks, countries were asked whether Ruddy Ducks had been observed within the wintering or breeding areas of the White-headed Duck.

Of the 31 responding countries, White-headed Ducks had occurred in 16 (52%). Ruddy Ducks had been observed in six of these: in three cases, within both the wintering and breeding range of the White-headed Duck, in two cases within just the breeding range, and in one country within just the wintering range (Figure 13).

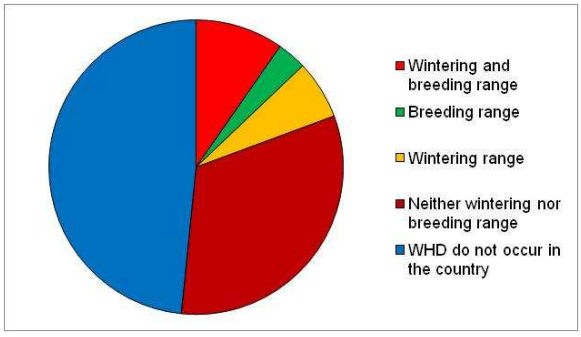


Figure 13. Proportion of countries (n = 31) where Ruddy Ducks have been observed within the wintering and/or breeding range of the White-headed Duck.

4.8 NUMBERS OF RUDDY DUCKS IN CAPTIVITY

Only seven countries provided information on numbers of Ruddy Ducks held and bred in captivity, and the number of collections holding birds prior to 2009 (in four of which it is currently legal to keep Ruddy Ducks in captivity). Six noted that numbers were unknown, that none has been held, or that the question was irrelevant; just one (Israel) reported a record of one bird (held in a collection in 1997). Several countries indicated that numbers in captivity were unknown. Consequently, very little information is available on Ruddy Ducks in captivity in the Western Palaearctic (Table 8), and any estimates of numbers must be considered provisional.

Table 8. Numbers of Ruddy Duck held in captivity in 2009 (in countries where it is legal to keep Ruddy Ducks in captivity).

Country	Number in captivity in 2009	Number of collections	Records prior to 2009
Austria	Unknown	Unknown	
Belgium	Unknown	Unknown	
Czech Republic	Unknown	Unknown	
Denmark	Unknown	Unknown	not known
Italy	no precise idea	no precise idea	
Jersey	Zero	Zero	none known
Luxembourg	estimate 10-100 birds	1-10	
Switzerland	probably small numbers	Unknown	
UK	200 to 400 best estimate; numbers appear to be declining	Unknown	
Slovenia	no reports of any being held	no reports of any being held	unknown
France	no accurate data available but probably more than 100	no data available	
Israel	Zero	Zero	1 held in 1997
Norway	not known, but probably very few if any	not known	
Tunisia	Zero	Zero	

5. IMPLEMENTATION OF THE 1999 ACTION PLAN

5.1 POLICY AND LEGISLATION

The 1999 Action Plan for eradication made the following recommendations regarding policy and legislation (where a recommendation applied only to the International or National plans, this is indicated in parentheses):

- Form a working group of all relevant interest group (National)
- Produce a strategy to eradicate Ruddy Ducks, both in the wild and in captivity
- Ensure international/national legislation is in place (and is enforced) to:
  - permit the control of Ruddy Ducks
  - prohibit the escape or release of Ruddy Ducks from captivity or, preferably, prohibit the keeping of Ruddy Ducks in captivity
- Form a working group to co-ordinate control between countries and to monitor implementation of this strategy (International)
- Attend meeting of a working group to co-ordinate control between countries and to monitor implementation of this strategy (National)

Countries were asked a series of questions (Box 1) to determine the current policy and legislation on Ruddy Ducks, and whether a control strategy and a working group is in place. Full responses to these questions can be found in Appendix 2.

Table 9. The number and percentage of responses to questions 2.1 to 2.12.

Question	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	2.12
Response count	29	29	30	30	28	26	23	24	20	23	24	29
Response %	94	94	97	97	90	84	74	77	64	74	77	94

Summary

A policy on invasive species currently exists in 52% (n = 29) of countries and 28% (n = 29) have a specific policy on Ruddy Ducks. Legislation permitting Ruddy Duck control is in place in 60% (n = 30) of countries and 23% (n = 30) have an eradication strategy in place (Figure 14). In 28% (n = 28) of countries, some or all of the policy and legislation also applies to Ruddy Duck x White-headed Duck hybrids.

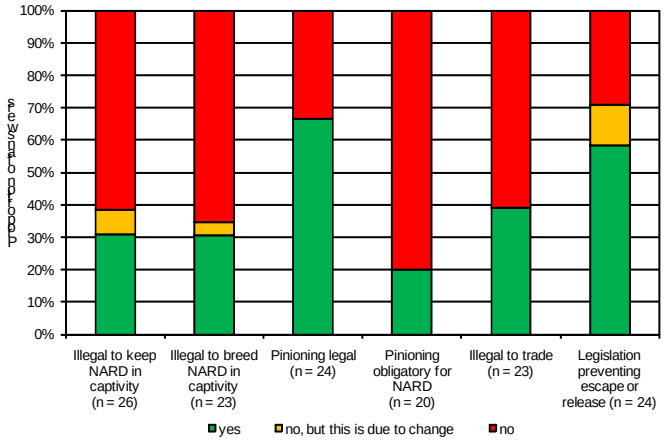


Figure 14. Proportion of answers to questions 2.1 to 2.4 (see Box 1).

It is currently legal to keep Ruddy Duck in captivity in 69% (n = 26) of countries (of which it is due to become illegal in two) and breeding is permitted in 70% (n = 23) (of which it is due to become illegal in one) (Figure 15). Pinioning is legal in 67% (n = 24) of countries but it is only obligatory in 20% (n = 20). Trade in Ruddy Ducks is legal in 61% (n = 23) of countries. Legislation to prevent the escape or release of birds is currently in place in 58% (n = 24) of countries and is due to be established in a further 12% (n = 24).

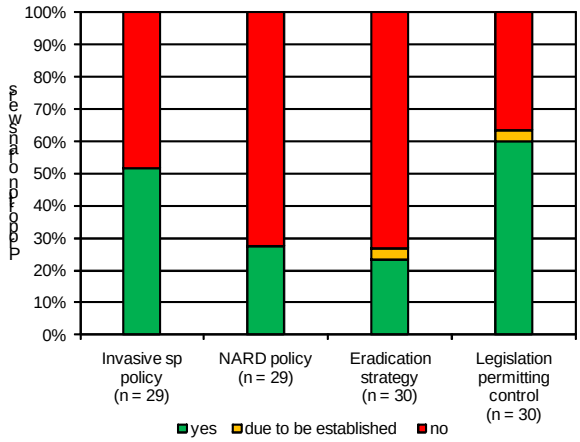


Figure 15. Proportion of answers to questions 2.6 to 2.11 (see Box 1).

A Ruddy Duck working group has been established in 10% (n = 29) of countries (also due to be established in one country), whilst a framework for discussing the issue on a regular basis exists in 14% (n = 29).

Priority 1 countries (ES, FR, GB & NL)

Question 2.5 was not answered by the Netherlands and reported as 'not applicable' by France

France, the Netherlands, Spain and the UK each have a policy on invasive species, and all but Spain also have a specific policy for Ruddy Ducks. All four countries have legislation permitting the control of Ruddy Ducks and all but the Netherlands have an eradication strategy in place (although a strategy is under development there and is due to be implemented in 2010/11). France, Spain and the UK indicated that they do not have specific policy and legislation that applies to hybrids. It should be noted that Spain controls both Ruddy Ducks and hybrids under general legislation for invasive species.

Ruddy Ducks can legally be kept in captivity in all four countries (authorisation, incorporating an assessment of the risk of invasion, is required in France), although this is due to change in Spain, and they can be bred in captivity in all but Spain. The Netherlands, the UK and (from July 2010) France have legislation prohibiting the escape or release of birds from captivity and such legislation is due to be established in Spain. Pinioning is legal in all but the Netherlands. It is, however, not obligatory for Ruddy Ducks in any country, although it is strongly recommended in France. Trade is legal in all four countries, although a licence/authorisation is required in France and the UK.

A Ruddy Duck working group has been established in France and the UK and one is due to be established in the Netherlands. Whilst there is no working group in Spain, a framework does exist to discuss the issue on a regular basis.

Priority 2 countries (BE, CH, DE, DK, IE, IT, NO & SE)

Section 2 of the questionnaire was not completed by Germany, except for question 2.8 and 2.12 A number of questions were not answered by all countries. Please see Appendix 2 for full set of results Question 2.5 was reported as 'not applicable' by a number of countries

Denmark, Sweden and Switzerland have a policy on invasive species, and this is also being discussed in various regions of Belgium. A specific policy for Ruddy Ducks also exists in Denmark and Switzerland. All seven countries have legislation allowing the control of Ruddy Ducks but only Denmark, Sweden and Switzerland have an eradication strategy (although culling does take place in Belgium). Italy and Norway indicated that their policy and legislation also applies to Ruddy Duck x White-headed Duck hybrids.

It is legal to keep captive Ruddy Ducks in Belgium, Denmark, Italy, Norway (a permit is required there) and Switzerland; it is not permitted in Ireland. Breeding of captive birds is legal in Belgium, Denmark, Italy, and, under permit, in Norway. Belgium, Denmark and Switzerland have legislation in place to prevent the escape or release of birds from captivity.

Pinioning is legal in Belgium and Denmark but it is not obligatory for Ruddy Ducks; Germany reported that it is not legal to pinion birds there but exceptions could be granted in some cases. Trade is legal in Belgium, Italy, Switzerland and Norway (here a permit is required); it is illegal in Denmark and Ireland.

Denmark is the only country to have established a Ruddy Duck working group, although there is a framework in Switzerland for discussing the issue.

Priority 3 countries (AT, CZ, HU, IS, JE, PT & SI)

Question 2.5 answered as 'not applicable' by Jersey Question 2.9 was not answered by Iceland or Portugal Question 2.10 was not answered by Iceland

Of the seven countries, Austria, Czech Republic and Jersey currently do not have a policy on invasive species (although one us due in 2011 in Jersey). Only Hungary and Portugal have a specific policy on Ruddy Ducks. There is also no legislation permitting Ruddy Duck control in Austria, Czech Republic or Jersey (where birds can be controlled under Government licence). Only Portugal has an eradication strategy in place, although birds are culled wherever possible in Iceland. In Iceland, Portugal and Slovenia, some or all of the policy and legislation also applies to Ruddy Duck x White-headed Duck hybrids.

It is legal to keep and rear Ruddy Ducks in captivity in Austria, Czech Republic, Jersey and Slovenia (there captive birds must be reported and a permit is required for breeding). All countries

except Iceland (where the legislation is not specific for Ruddy Ducks) have legislation in place preventing the escape and release of captive Ruddy Ducks.

Pinioning is legal in all countries but it is only obligatory for Ruddy Ducks in Czech Republic and Slovenia. Trade is legal in all countries except Hungary and Portugal.

None of the countries has established a working group, although a framework for discussing the issue exists in Portugal.

Priority 4 countries (EE, EG, GR, HR, IL, KZ, LB, LU, LV, LY, RO & TN)

A number of questions were not answered by all countries (see Appendix 2)

Of the twelve countries, four have a policy on invasive species, but only in Estonia is there a specific Ruddy Duck policy. Three have legislation permitting the control of Ruddy Ducks and this is also due to be established in Greece, where currently control would be permitted if deemed necessary. None of the countries has an eradication strategy.

Ruddy Ducks can legally be kept in five countries and bred in four of those (in some cases, under permit or licence). Legislation preventing the escape or release of birds from captivity exists in four.

Pinioning is permitted in three countries but is only obligatory for Ruddy Ducks in two of those. Trade in Ruddy Ducks is permitted in two countries.

None of the countries has a Ruddy Duck working group, but a framework for discussion exists in one.

5.2 PUBLIC AWARENESS

The 1999 Action Plan for eradication made the following recommendations:

- Produce a public awareness strategy to increase awareness of the need to control non-native species using the Ruddy Duck as a case in point
- Organise/attend a meeting for the exchange of technical information on Ruddy Duck control

Public relations issues are recognised as, for example, opposition to Ruddy Duck control from animal welfare groups and reluctance by the conservation community to act on the Precautionary Principle. Such issues could potentially lead to difficulties, for example, in the submission of Ruddy Duck records or access to sites.

Countries were asked a number of questions (Box 2) to determine whether a public awareness strategy had been developed and to provide a general indication of the extent of public reactions. Full responses to these questions can be found in Appendix 2.

Table 10. The number and percentage of responses to questions 3.1 to 3.3.

Question	**3.1**	**3.2**	**3.3**
Response count	29	28	28
Response %	94	90	90

Summary

A public awareness strategy is in place in only 14% (n = 29) of countries. Just three (10%, n = 29) reported the presence of negative feeling among relevant sections of the public (Figure 16). This is believed to have caused minor problems in two (7 %, n = 29) countries and no obvious problems in one (3%). Negative reaction was said to have remained the same in the last five years in two countries (n = 28) and decreased slightly in one (Figure 17).

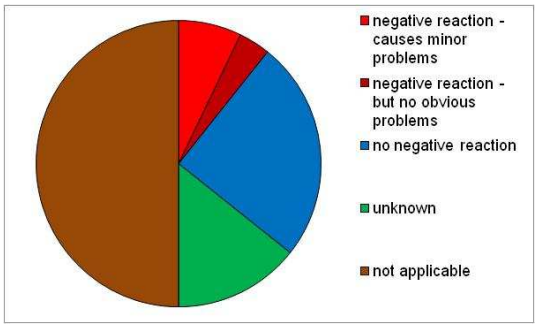


Figure 16. Proportion of answers (n = 29) to question 3.2 (see above for questions).

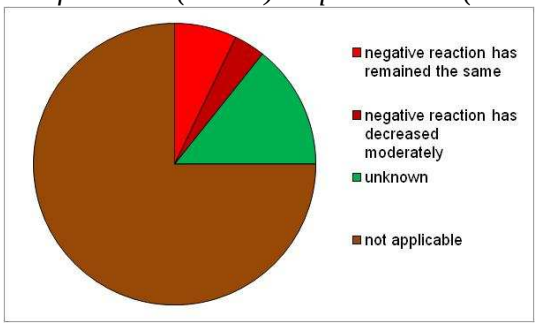


Figure 17. Proportion of answers (n = 28) to question 3.3 (see above for questions).

Priority 1 countries (ES, FR, GB & NL)

The Netherlands is the only country not to have a public awareness strategy, though it is suggested that in Spain the current strategy is not sufficient. Negative reaction has been seen amongst relevant sections of the public in France (where it has decreased moderately in the last five years) and UK (where it has stayed the same) but in both countries this has only caused minor problems such as non-submission of records and withholding bird locations.

Priority 2 countries (BE, CH, DE, DK, IE, IT, NO & SE)

Section 3 not answered by Germany

Only Denmark has a public awareness strategy in place, although this is a general strategy for invasive species. Information on Ruddy Ducks has, however, been made available to the public in Sweden (website information) and Switzerland (awareness leaflet). Negative reaction has only been noted amongst relevant sections of the public in Italy, although this was towards control of animals in general, and no obvious problems arose.

Priority 3 countries (AT, CZ, HU, IS, JE, PT & SI)

None of the countries has a public awareness strategy in place and no negative reaction has been reported.

Priority 4 countries (EE, EG, GR, HR, IL, KZ, LB, LU, LV, LY, RO & TN)

Section 3 was not answered by Libyan Arab Jamahiriya Questions 3.2 and 3.3 were not answered by Egypt

None of the countries has a public awareness strategy in place and no negative reaction has been reported.

5.3 MONITORING OF WILD BIRDS

The 1999 Action Plan for eradication made the following recommendations:

- Ensure adequate monitoring of the status and distribution of Ruddy Duck, both in the wild and in captivity

Countries were asked series of questions (Box 3) to determine whether the status and distribution of Ruddy Duck in the wild is thought to be adequately monitored during the non-breeding and

breeding season, and the type of monitoring undertaken. Full responses to these questions can be found in Appendix 2.

Table 11. The number and percentage of responses to questions 4.1 to 4.6.

Question	4.1	4.2.a	4.2.b	4.2.c	4.2.d	4.3	4.3.a	4.3.b	4.3.c	4.4	4.4.a	4.4.b	4.4.c	4.5	4.6
Response count	29	27	25	26	4	28	21	21	21	27	19	17	17	27	25
Response %	94	87	81	84	13	90	68	68	68	87	61	55	55	87	81

Summary

Although only 76% (n = 29) of countries indicated that the status and distribution of Ruddy Ducks in the wild are monitored, all the countries (n = 29) have some mechanism for reporting observations of Ruddy Ducks: 78% (n = 27) have a national waterbird census; 8% (n = 25) have specific Ruddy Duck surveys; and 73% (n = 26) collate *ad hoc* records (Figure 18).

Monitoring of non-breeding Ruddy ducks (October to March) was reported as adequate in 68% (n = 28) of countries; although in some cases it was noted that this was difficult to assess, particularly for countries with no national or specific monitoring scheme and small numbers of records. Monitoring of breeding Ruddy Ducks (April to September) was suggested as being adequate in 41% (n = 27) of countries. Monitoring in 56% (n = 25) of countries also applies, or partly applies, to Ruddy Duck x White-headed Duck hybrids. Changes to current monitoring is planned in 11% of countries (n = 27).

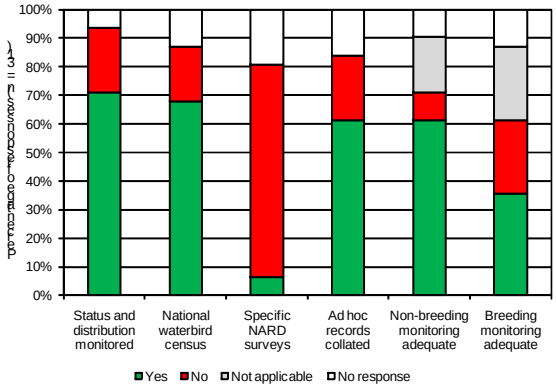


Figure 18. Proportion of answers to questions 4.1 to 4.4 (see Box 3).

Priority 1 countries (ES, FR, GB & NL)

Questions 4.4a, b & c, 4.5 and 4.6 were answered by Spain as 'not applicable'

The status and distribution of Ruddy Ducks is monitored in all countries except Spain, although there it was expected that birds would be recorded by general waterbird monitoring. Each country, except for Spain, has a national waterbird census that would note the presence of Ruddy Ducks, but only France and UK have specific Ruddy Duck surveys. *Ad hoc* records are collated in the Netherlands and Spain. Only in the Netherlands does the monitoring apply to hybrids. Changes to current monitoring are planned in France (improved monitoring of favoured breeding sites) and the Netherlands (specific Ruddy Duck surveys in 2010-11).

Monitoring of non-breeding birds (October to March)

In all but France it is believed monitoring provides adequate data for non-breeding Ruddy Ducks. There, coverage of sites is partially complete, although over half the sites are monitored, and coverage is adequate during one month. Over 20 years of data are available to calculate a trend. In the Netherlands and UK, complete coverage of sites is achieved and coverage is adequate during 4-6 months. Over 20 years of data are available to calculate a trend. In Spain, coverage of sites is partially complete, although over half the sites are monitored, and coverage is considered adequate during 4-6 months. Ten to twenty years of data are available to calculate a trend.

In the UK, in addition to the national waterbird monitoring scheme (the Wetland Bird Survey or WeBS; Calbrade *et al* 2010), dedicated surveys of Ruddy Ducks were conducted during the period of the eradication programme. Coordinated surveys were undertaken in December and January of each winter, focusing on the most important sites for Ruddy Ducks (*eg* Hall & Cranswick 2010). These surveys are designed to provide an accurate picture of the numbers of Ruddy Ducks, given concerns over the accuracy of WeBS owing to the lack of synchronous counts at key sites, and the non-submission of data by some counters who oppose the control programme.

Monitoring of breeding birds (April to September)

Only in the Netherlands is monitoring believed to provide adequate data for breeding Ruddy Ducks (not applicable for Spain). In France, coverage of sites is partially complete with less than half the sites monitored, and coverage is adequate during 2-3 months. Over 20 years of data are available to calculate a trend. In the Netherlands, coverage of sites is partial, although over half are monitored, and coverage is adequate during 4-6 months. Ten to twenty years of data are available to calculate a trend. In the UK, coverage of sites is partially complete with less than half the sites monitored. During no month is coverage deemed adequate and insufficient data are available to calculate a trend.

Priority 2 countries (BE, CH, DE, DK, IE, IT, NO & SE)

Questions 4.2a & b not answered by Norway
Questions 4.3, 4.3 a, b & c not answered by Norway
Question 4.4a not answered by Norway or Sweden
Question 4.4b not answered by Belgium, Norway, Sweden or Switzerland
Question 4.4c not answered by Norway, Sweden or Switzerland
Question 4.6 not answered by Ireland or Sweden

The status and distribution of Ruddy Ducks is monitored in all countries but Sweden, although *ad hoc* records there are believed to provide reasonable knowledge of Ruddy Duck numbers. All countries except Denmark and Sweden have a national waterbird census but no country has a specific Ruddy Duck survey. *Ad hoc* records are collated in all countries except Italy. Monitoring in Denmark, Germany, Italy and Switzerland also applies to hybrid birds. Changes to current monitoring are planned in Germany, where the development of a website in 2011 will enable closer monitoring of Ruddy Ducks.

Monitoring of non-breeding birds (October to March)

Monitoring is believed to provide sufficient data for non-breeding Ruddy Ducks in all counties but Germany.

In Belgium, Denmark and Switzerland, coverage of sites is complete with the majority of sites monitored and monitoring is considered adequate during 4-6 months. Over 20 years of data are available to calculate a trend for Belgium and Denmark, whilst Switzerland has 10-20 years of data.

In Germany, the status of site coverage is unknown and during no month is monitoring adequate. Records from rarity committees in Germany are thought to provide quite good knowledge on the status and numbers of Ruddy Ducks, but there is no regular monitoring scheme, coverage (for both breeding and non-breeding birds) was, by default, determined as inadequate, and due to the small number of records it is not believed possible to calculate a trend.

In Ireland and Italy coverage of sites is partially complete with over half the sites monitored and monitoring is adequate during 2-3 months in Ireland but only during one in Italy. Ten to twenty years of data are available to calculate a trend for both countries, although it was noted that it may be difficult to calculate a trend for these countries due to the small numbers of records.

No indication of coverage was provided by Norway, although it was noted that as a vagrant no site is known to hold Ruddy Ducks and the irregular observations would make it difficult to calculate a trend. Coverage of sites is unknown for Sweden, and no indication of the number of months in which data are collected was given. Ten to twenty years of data are available to calculate a trend.

Monitoring of breeding birds (April to September)

Monitoring in Denmark, Ireland, Sweden and Switzerland is thought to provide adequate data for breeding Ruddy Ducks.

In Belgium, coverage of sites is partially complete with over half the sites monitored, but no indication of the number of months during which coverage was adequate was given. Fewer than five years of data are available to calculate a trend. In Denmark, coverage of sites is complete and coverage is adequate during 4-6 months. Over 20 years of data are available to calculate a trend. In Germany, the status of site coverage is unknown and during no month is monitoring adequate. Not enough data are available to calculate a trend.

In Ireland and Italy, coverage of sites is partially complete with less than half the sites monitored. Only during one month is coverage thought to be adequate in Ireland and during none in Italy. Not enough data are available to calculate a trend for either country.

In Switzerland, coverage of sites is complete with the majority of sites covered. No indication of the number of months in which data are collected was given, nor how many years of data are available to calculate a trend.

Priority 3 countries (AT, CZ, HU, IS, JE, PT & SI)

Question 4.2b not answered by Jersey

The status and distribution of Ruddy Ducks is monitored in all seven countries. All but Austria have a national waterbird census, none has a specific survey, and all the countries collate *ad hoc* records. Monitoring in Portugal, Slovenia and Jersey does not cover hybrids. None of the countries is planning any changes to current monitoring.

Monitoring of non-breeding birds (October to March)

Monitoring in all the countries is believed to provide adequate data for non-breeding Ruddy Ducks.

In, Portugal, Slovenia and Jersey, complete coverage of sites is achieved with the majority of sites covered and monitoring is adequate during 4-6 months. Over 20 years of data are available to calculate a trend for Portugal and Jersey, whilst Slovenia has 10-20 years of data.

In Austria and Czech Republic, coverage of sites is complete with the majority of sites covered and monitoring is adequate during 2-3 months, and over 20 years of data are available to calculate a trend.

In Hungary and Iceland, coverage of sites is partially complete, although over half the sites are covered in both. Monitoring is adequate during 4-6 months in Hungary, where 10-20 years of data are available, but it was noted that no real trend could be calculated from the few records. In Iceland, monitoring is only adequate during one month and there are over 20 years of data.

Monitoring of breeding birds (April to September)

Monitoring in Iceland, Czech Republic and Jersey and Slovenia is thought to provide adequate data for breeding Ruddy Ducks.

In Czech Republic, Slovenia and Jersey, coverage of sites is complete. Adequate data are collected during 4-6 months in Slovenia and Jersey, and 2-3 months in Czech Republic. Over 20 years of data are available to calculate a trend for Czech Republic and Jersey, whilst Slovenia has 10-20 years of data.

In Iceland and Portugal, coverage of sites is partially complete with over half the sites are monitored. Monitoring is adequate during 4–6 months in Portugal and in one in Iceland, and both countries have over 20 years of data with which to calculate a trend.

In Austria, coverage of sites is partially complete, with less than half the sites monitored, and coverage is adequate during 2–3 months. It is unknown how many years of data are available.

Hungary noted that coverage of sites is partially complete, with over half the sites visited, although Ruddy Ducks do not breed in there.

Priority 4 countries (EE, EG, GR, HR, IL, KZ, LB, LU, LV, LY, RO & TN)

A number of questions were not answered by many of the countries. See Appendix 2 for details.

Four countries indicated that the status and distribution of Ruddy Ducks is monitored, although seven reported having a national waterbird census. No country undertakes specific Ruddy Duck surveys, and *ad hoc* records are collated in three. Monitoring in five countries covers hybrids and in none of the countries are there any plans to change their current monitoring.

Monitoring of non-breeding birds (October to March)

Monitoring in three countries is believed to provide adequate data for non-breeding Ruddy Duck. In two, coverage of sites is complete. Coverage is adequate during 2-3 months in one of the three, but only in one month in the other two countries. Over 20 years of data are available to calculate a trend for two countries. One additional country also reported monitoring being adequate during one month.

Monitoring of breeding birds (April to September)

Monitoring in two countries is thought to be adequate for breeding birds. In one of these, coverage of sites is partially complete, with over half the sites monitored, and coverage is adequate during 2-3 months. Over 20 years of data are available to calculate a trend. In the other, coverage is adequate during one month and 10-20 years of data are available to calculate a trend. One additional county indicated that only partial coverage of sites was achieved, with less than half the sites monitored and during no month is coverage believed to be adequate.

5.4 MONITORING OF BIRDS IN CAPTIVITY

The 1999 Action Plan for eradication made the following recommendations:

- Ensure adequate monitoring of the status and distribution of wild and captive Ruddy Ducks

Countries were asked series of questions (Box 4) to determine the number of birds held in collections; the estimated number of escapes; whether any mechanisms are in place to prevent birds escaping; whether there are any initiatives to reduce numbers of birds in captivity; and whether trade currently takes place. Full responses to these questions can be found in Appendix 2.

Box 4

5.1 Is the status and distribution of Ruddy Ducks in captivity monitored in your country?
5.2 Please provide the minimum and maximum estimates of Ruddy Ducks held in captivity in 2009 (or the most recent year available). Please indicate if no Ruddy Ducks are held in captivity in your country. Please indicate in the comments box if you think the figures accurately represent the current situation in your country.
5.3 Please provide the minimum and maximum estimates of collections holding Ruddy Ducks in 2009 (or the most recent year available). Please indicate in the comments box if you think the figures accurately represent the current situation in your country.
5.4 Please provide previous records on a) numbers of Ruddy Ducks in captivity, b) the number of collections holding Ruddy Ducks, and c) the number of Ruddy Ducks bred in captivity. Please click on the link to the right to access the record sheet.
5.5 Please estimate the number of Ruddy Ducks that have escaped from captivity since 2000.
5.6 Has the number of annual escapes increased or decreased?
5.7 Which of the following actions are or will be taken to prevent captive birds escaping in your country?
a) Pinioning
b) Prohibit trading of Ruddy Ducks
c) Prohibit keeping of Ruddy Ducks in captivity
d) Informing the keepers of Ruddy Ducks of the need to prevent escapes
e) Other (please specify)
5.8 Are there any initiatives to reduce the number of captive Ruddy Ducks in your country?
• If yes, please indicate which of the following apply - please enter the year in which the initiative was or will be implemented in the comments box.
a) ban on keeping non-native waterfowl in captivity
b) ban on keeping Ruddy Ducks in captivity
c) ban on trade in Ruddy Ducks
d) voluntary initiative to reduce numbers of captive Ruddy Ducks
e) voluntary initiative to reduce Ruddy Duck trade
f) other (please give details)
5.9 Does trade in Ruddy Ducks take place in your country?
• If yes, please estimate the number of birds traded each year
• In the most recent five years, has the number of birds traded increased, decreased or remained stable?

Table 10. The number and percentage of responses to questions 5.1 to 5.9.

Question	5.1	5.2	5.3	5.5	5.6	5.7.a	5.7.b	5.7.c	5.7.d	5.7.e	5.8	5.8.a	5.8.b
Response count	27	16	16	21	22	17	17	19	16	3	25	6	15
Response %	87	52	52	68	71	55	55	61	52	10	81	19	48

Question	5.8.c	5.8.d	5.8.e	5.8.f	5.9	5.9.1	5.9.2
Response count	14	6	5	0	25	6	8
Response %	45	19	16	0	81	19	26

Summary

The status and distribution of Ruddy Ducks in captivity are monitored in 15% (n = 27) of all countries. Of the countries where it is legal to keep Ruddy Ducks (n = 18) the status is monitored in 17%.

Of countries where it is permitted to keep birds in captivity (n = 18; of which four gave no answer), the number of Ruddy Ducks held in 2009 is unknown in 27%, and 22% indicated that no birds are held. Of the remaining countries, it was suggested that numbers ranged from 'small numbers' to fewer than 400 birds (see Table 8).

The number of Ruddy Ducks that have escaped from captivity since 2000 is unknown in 53% (n = 21) of countries; 19% indicated that none has escaped. As actions taken, or that will be taken, to prevent captive birds escaping, 47% (n = 17) of countries suggested pinioning; 35% (n = 17) indicated prohibiting trade; 37% (n = 19) suggested prohibiting birds being kept in captivity; 37% (n = 16) suggested informing keepers of Ruddy Ducks of the need to prevent escapes.

Of those countries where it is legal to keep birds in captivity, 33% have initiatives in place to reduce the number of captive birds. Trade is legal and known to take place in 12% (n = 25) of countries.

Priority 1 countries (ES, FR, GB & NL)

Spain did not answer a number of the questions in this section.
Question 5.9.1 was not answered by the UK
Noted in section 2: pinioning is illegal in the Netherlands and trade in Ruddy Ducks is only permitted with a licence in France and the UK

The status and distribution of Ruddy Ducks in captivity is not monitored in any of the four countries. France suggested that more than 100 birds are held in captivity there, although there is no accurate data, and the UK estimated between 200 and 400, where numbers appear to be declining. The number of escapes from captivity is unknown for all countries.

France and UK highlighted pinioning and providing information to keepers as actions that are being or will be taken to prevent captive birds escaping; the latter action is due to be implemented in the Netherlands. Only the UK indicated prohibiting trade as an action and no country suggested banning birds in captivity.

Spain and the UK indicated that initiatives are in place to reduce numbers of birds in captivity; the UK highlighted a ban on trade and voluntary initiatives to reduce numbers of captive birds and trade; and Spain indicated that a ban on keeping Ruddy Ducks is due to be implemented.

Trade in Ruddy Ducks is only known to take place in France, which requires a licence, but the number of birds traded is unknown.

Priority 2 countries (BE, CH, DE, DK, IE, IT, NO & SE)

A number of questions were not answered by many of the countries. See Appendix 2 for details.
Noted in section 2: it is illegal to hold Ruddy Ducks in captivity in Ireland, pinioning is not permitted in Germany, Italy, Norway and Switzerland, and trade in Ruddy Ducks is illegal in Ireland and Denmark

The status and distribution of Ruddy Ducks in captivity is not monitored in any country and the number of birds held in captivity is unknown for the majority, although Ireland and Sweden indicated that none is known to be held there and Switzerland suggested only small numbers may be present in collections there. The number of escapes from captivity is unknown for all countries.

No country indicated that any actions are being or will be taken to prevent captive birds escaping. Denmark and Ireland have initiatives in place to reduce the number of birds in captivity; Ireland highlighted having a ban on keeping Ruddy Ducks and both countries have a ban on trading of birds.

Trade in Ruddy Ducks is only known to occur in Belgium, but it is unknown how many birds are traded.

Priority 3 countries (AT, CZ, HU, IS, JE, PT & SI)

A number of questions were not answered by many of the countries. See Appendix 2 for details.
Noted in section 2: it is illegal to hold Ruddy Ducks in captivity in Hungary, Iceland and Portugal, and trade is illegal in the last two countries

The status and distribution of Ruddy Ducks in captivity is monitored in Hungary, Jersey and Slovenia, although none is held in collections in any of the three. It is not known how many birds are held in any of the other countries. Austria indicated that fewer than 10 birds may have escaped since 2000.

Austria, Czech Republic and Slovenia highlighted pinioning as an action to prevent captive birds escaping; Hungary indicated prohibiting trade; Hungary, Iceland and Portugal highlighted prohibiting birds in captivity; and no country suggested informing keepers of the need to prevent escapes, although this will be implemented in Austria.

Hungary and Portugal indicated that ban on keeping Ruddy Ducks and on trade are in place as initiatives to reduce the number of captive Ruddy Ducks. Iceland also reported a ban on captive birds.

Trade in Ruddy Ducks is only known to take place in the Czech Republic, although the number of birds traded is unknown.

Priority 4 countries (EE, EG, GR, HR, IL, KZ, LB, LU, LV, LY, RO & TN)

A number of questions were not answered by many of the countries. See Appendix 2 for details.
Noted in section 2: it is illegal to keep Ruddy Ducks in captivity in Croatia, Egypt, Estonia and Kazakhstan; pinioning is illegal in the latter two countries and Latvia; and trade is illegal in Croatia, Estonia, Israel, Kazakhstan and Tunisia

The status and distribution of Ruddy Ducks in captivity is only monitored in Israel. No Ruddy Ducks are kept in four countries, while in Luxembourg 10-100 birds are held in 1-10 collections. The number of escapes is not known for any country.

Three countries highlighted pinioning as an action to prevent captive birds escaping; four indicated prohibiting trade and the keeping of captive birds; and two highlighted informing keepers of the need to prevent escapes.

Six countries have initiatives in place to reduce the number of Ruddy Ducks in captivity. Four have a ban on the keeping of birds and this is due to be implemented in one other. Five all have a ban on the trade in Ruddy Ducks.

Trade in Ruddy Ducks is not known to occur in any of the countries.

5.5 CONTROL MEASURES

The 1999 Action Plan for eradication made the following recommendations (where a recommendation applied only to the International or National plans, this is indicated in parentheses):

- Control all Ruddy Ducks & White-headed Duck hybrids
- Control wild Ruddy Ducks in the priority order:
  - Total prevention of breeding
  - Birds occurring March-September, inclusive (those birds with the potential to breed)
  - Birds occurring October-February, inclusive

- Phase out the keeping of Ruddy Ducks in captivity
- Monitor control measures for Ruddy Ducks
- Conduct DNA studies to identify the provenance of Ruddy Ducks in Europe (International)
- Provide blood or tissue samples from Ruddy Ducks for DNA analysis to identify their place of origin (National)
- Produce an annual report of progress against the actions (National)

Countries were asked a series of questions (Box 5) to determine whether Ruddy Duck control strategies are in place; the targets of the control strategy; what control methods can be used; and any barriers to implementation. Full responses to these questions can be found in Appendix 2.

Box 5

6.1 Does a control programme for Ruddy Ducks exist in your country? If yes or under development, please enter the year the programme was or will be introduced in the comments box. If no, please explain briefly.
6.2 If a Ruddy Duck control programme exists or is under development in your country please answer the following:
6.2.1 Do you aim to eradicate Ruddy Ducks entirely in the wild?
6.2.2 Do you aim to eradicate Ruddy Ducks entirely in captivity?
6.2.3 Do you have any specific targets? Please select from the following - please give target numbers and completion dates.
a) Reduce the number of Ruddy Ducks in the wild.
b) Reduce the number of sites that hold Ruddy Ducks.
c) Reduce the number of breeding pairs of Ruddy Ducks.
d) Reduce the number of Ruddy Ducks held in captivity.
e) other targets (please describe)
6.3 Please provide records for your country on a) numbers of Ruddy Ducks and Ruddy Duck x White-headed Duck hybrids culled, and b) numbers of nests controlled (*eg* egg pricking, destroying nests) in the separate worksheets.
6.4 Can the following control methods be legally used in your country? If yes, please specify any restrictions in the comments box, *eg* months in which control is permitted, or if only certain people are permitted to undertake control.
a) live trapping; b) nest control (*eg* egg pricking or destroying nests); c) shooting with rifles; d) shootg with shotguns
6.5 Does the control programme also apply to Ruddy Duck x White-headed Duck hybrids?
6.6 Are any tests undertaken on culled Ruddy Ducks? Please select from the following:
a) blood sampling; b) genetic testing; c) other (please specify)
6.7 If a control programme exists in your country, please answer the following:
6.7.1 Do you believe the current targets set in your control programme will be met?
6.7.2 If there is a significant shortfall in meeting the targets, what are the major barriers to implementation, *eg* training, resources, permissions, public relations? Please explain.
6.7.3 What measures are needed to ensure the short- and long- term targets of the control programme are met? Please explain briefly.
6.7.4 Are the targets set in the control programme due to be revised? If yes, please state when.
6.7.5 Is there an annual review of the control programme?
6.7.6 Does your country produce an annual report on progress?

Table 12. The number and percentage of responses to questions 6.1 to 6.7.

Question	**6.1**	**6.2.1**	**6.2.2**	**6.2.3.a**	**6.2.3.b**	**6.2.3.c**	**6.2.3.d**	**6.2.3.e**	**6.4.a**	**6.4.b**	**6.4.c**
Response count	27	12	9	8	7	6	7	0	19	19	21
Response %	87	39	29	26	23	19	23	0	61	61	68

Question	**6.4.d**	**6.5**	**6.6.a**	**6.6.b**	**6.6.c**	**6.7.1**	**6.7.2**	**6.7.3**	**6.7.4**	**6.7.5**	**6.7.6**
Response count	20	10	11	11	2	7	6	4	9	9	9
Response %	64	32	36	36	6	23	19	13	29	29	29

Summary

A control programme exists in 27% (n = 27) of countries and one is under development in one country. Culling has also taken place in two countries that do not have a formal programme in place. Of the eight countries with a control programme, four suggested their targets are likely to be met, while three indicated that it is unlikely that their targets will be reached; one country did not answer.

As methods of controlling Ruddy Ducks, live trapping can legally be used in 79% (n = 19) of countries; nest control in 89% (n = 19); shooting with rifles in 86% (n = 21); and shooting with shotguns in 85% (n = 20). No country reported any tests being undertaken on culled Ruddy Ducks, although samples from one country have been sent to Spain for testing.

Table 13. Numbers of Ruddy Ducks and Ruddy Duck x White-headed Duck hybrids culled, 1996–2009. (The use of blanks and zeros reflects the data as provided by the countries, although blanks are presumed to indicate zeros, rather than the absence of data.)

	96	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**
Ruddy Ducks														
Belgium	0	0	0	0	0	0	0	0	0	0	0	2	0	10
Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0
France		7	6	25	37	32	6	13	101	36	118	139	106	212
Iceland							3							
Spain	7	27	10	14	16	8	18	21	11	7	4	9	6	7
Switzerland										1	1			
UK	0	0	0	758	849	714	330	774	1092	881	2,261	1,670	1,365	1,017
Total	7	34	16	797	902	754	357	808	1,204	925	2,384	1,809	1,448	1,161
Ruddy Duck x White-headed Duck hybrids														
Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain	4	3	3	2	6	1	0	2	5	0	2	1	0	0
UK	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	3	3	2	6	1	0	2	5	0	2	1	0	0

Additional information, and the numbers of nests controlled, was provided as follows:

Belgium: in 2009 no nests were controlled; catching adults with cages using sound and a male decoy duck was tested but proved inefficient.

Denmark: no nests have been controlled.

France: the number of hybrid birds controlled is unknown. No data are available on the number of nests controlled.

Hungary: no culling or nest controlling measures are necessary.

Italy: no birds have been culled.

Jersey: no birds controlled.

Switzerland: during 2005-2009, seven Ruddy Ducks were reported to the Cantonal authorities as agreed in the management plan. In two cases the birds were shot, two attempts were unsuccessful, and for three no reports were received from Cantons.

UK: on average, less than one nest per year destroyed, 1999-2009.

Priority 1 countries (ES, FR, GB & NL)

Questions 6.4a & b, 6.5, 6.6a & b, 6.7.1, 6.7.4 and 6.7.5 were not answered by Spain *Noted in section 2: of the four countries the Netherlands is the only one not to have an eradication strategy in place, although this is under development*

A control programme exists in all but the Netherlands, although one is under development there and due for implementation in 2010/11. All the strategies include the aim of eradicating Ruddy Ducks entirely in the wild, but only in Spain is one of the aims to eradicate all Ruddy Ducks from captivity.

The programme does not apply to Ruddy Duck x White-headed Duck hybrids in France, the Netherlands or the UK (hybrids are culled in Spain).

As methods of control, shooting with rifles is permitted in all countries; shooting with shotguns is allowed in all but the Netherlands; and live trapping and nest control is permitted in all countries but Spain. In none of the countries are tests undertaken on culled birds, although in the UK samples have been sent to Spain as part of a study into Ruddy Duck genetics.

In France, it is thought that the targets of the control programme are unlikely to be met. Currently, consideration is being given to tackling different aspects of the problem, such as number of birds and sites, and issues that may arise with birdwatchers. A suggested measure to ensure the targets are met is better monitoring of efficiency. A review of the programme is due in 2010 and the targets will be revised. No annual report is produced.

In the Netherlands, it is believed the targets of their control programme, which is under development, will be met. A possible barrier to implementation may be public reactions and the reluctance of birdwatchers to submit Ruddy Duck records. A suggested measure to overcome this is the support of BirdLife Netherlands with public relations. The control programme will be reviewed and targets revised, and an annual report is produced.

Spain noted that an annual review of their control programme is not undertaken and the targets are not due to be revised as it is currently believed to be effective.

In the UK, research was initiated in the 1990s to identify suitable control measures (Hughes 1996), and between 1999 and 2002 the UK Government conducted a regional trial of control methods to assess the feasibility of eradicating the Ruddy Duck from the UK. These were extended to national trials from 2003 to 2005. As a result, the Food and Environment Research Agency, under contract to the Department for the Environment, Food and Rural Affairs (Defra), began a control programme, with the aim of complete eradication in the UK. A total of £3.3m was provided, jointly funded by EU LIFE-Nature and Defra. The five-year project began in 2005.

Since the start of the eradication programme in 2005, between 750 and 2200 Ruddy Ducks have been controlled annually, and numbers fell by over 95% between 2005/06 and 2009/10 (Figure 19; Hall & Cranswick 2010, Henderson 2010).

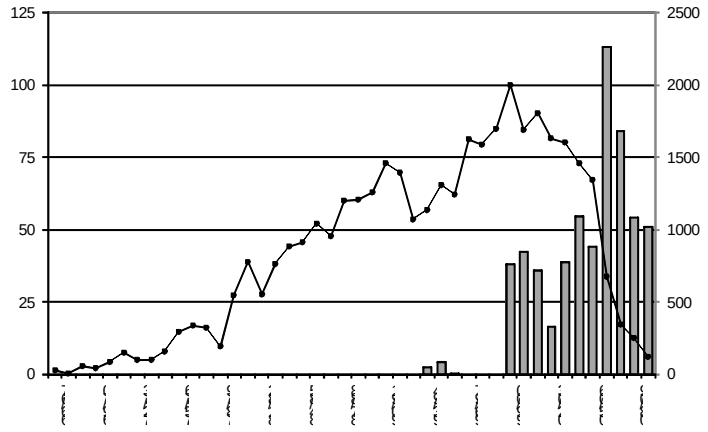


Figure 19. Numbers of Ruddy Ducks controlled (grey columns, right axis) and the national index of numbers in Great Britain, 1966/67 to 2009/10. (Shot numbers are totals for the calendar year preceding the winter on the x axis, eg *the value for 2005/06 is the number shot in 2005.)*

It is thought that the targets set in the UK's strategy are likely to be met, with the only barrier to implementation being funding for culling the remaining small numbers of birds. The programme is annually reviewed, but at this time none of the targets is due to be revised. An annual report on progress is produced.

Priority 2 countries (BE, CH, DE, DK, IE, IT, NO & SE)

A number of questions were not answered by many of the countries. See Appendix 2 for details.
Noted in section 2: Denmark, Sweden and Switzerland have eradication strategies, and all the countries have legislation permitting the control of Ruddy Ducks

Denmark, Sweden and Switzerland have a control programme in place, which aims to completely eradicate Ruddy Ducks from the wild but not entirely from captivity. In Denmark and Switzerland the programme also applies to hybrids. In Belgium, whilst there is no control programme, culling has taken place through the co-operation of several organisations. Discussions have taken place in Ireland over the eradication of the few birds there are as yet no clear outcomes.

As methods of control, live trapping is permitted in Belgium, Denmark, Ireland, Italy and Switzerland, as is shooting with shotguns. Shooting with rifles and nest control is allowed in all the afore-mentioned countries plus Sweden.

Tests on culled birds are not carried out in any of the countries.

In Denmark, it is believed the strategy targets will be met, the only barrier to implementation being a lack of personnel. There is no annual review of the strategy and none of the targets is due to be revised. There is no annual report on progress.

It is thought the targets in Sweden are unlikely to be met, with barriers to implementation being that few birds are seen, that Ruddy Ducks are not currently seen as a real threat, and there may be problems if there is a need to shoot birds in protected areas. There is currently no review of the targets and no annual report of progress is produced.

In Switzerland, the targets are unlikely to be met. Possible problems in implementing the strategy are a lack of resources and the authorities not seeing the issue as urgent. A suggested measure to help ensure targets are met is to increase awareness of the situation. There is no annual review of the strategy and the targets are not due to be revised. Whilst no annual report on progress is produced, records are kept at the Swiss Ornithological Institute.

Priority 3 countries (AT, CZ, HU, IS, JE, PT & SI)

A number of questions were not answered by many of the countries. See Appendix 2 for details.
Noted in section 2: Hungary, Iceland, Portugal and Slovenia all have legislation in place permitting control of Ruddy Ducks, and only Portugal has an eradication strategy in place

Of the seven countries, only Portugal has a control programme, where the aim is to eradicate all Ruddy Ducks from the wild. It is believed the targets of the programme will be met. There is no annual review of the programme, none of the targets is currently due to be revised, and there is no annual report on progress. Whilst no tests are undertaken on Ruddy Ducks culled in Portugal, birds have been sent to Spain for analysis.

Although there is no control programme in Iceland, birds there are culled wherever possible.

As methods of control, live trapping, nest control, and shooting with rifles and shotguns is permitted in Austria, Iceland, Jersey, Portugal and Slovenia.

Priority 4 countries (EE, EG, GR, HR, IL, KZ, LB, LU, LV, LY, RO & TN)

A number of questions were not answered by many of the countries. See Appendix 2 for details.
Noted in section 2: none of the countries have an eradication strategy in place and legislation permitting the control of Ruddy Ducks exists in Croatia, Estonia, Greece and Israel

None of the countries has a control programme.

Two countries permit live trapping; they also allow nest control, and shooting with rifles and shotguns, as does one other country. Another country permits shooting with shotguns.

5.6 RESEARCH

The 1999 Action Plan for eradication made the following recommendations for international activity:

- Conduct DNA studies to attempt to identify the provenance of Ruddy Ducks occurring in mainland Europe
- Model the timescale for eradication of the Ruddy Duck from the Western Palearctic
- Model the timescale for extinction of the White-headed Duck with differing levels of Ruddy Duck immigration to Spain

A genetic analysis assessed 67 birds from USA, 29 from Great Britain, 19 from France, 39 from Spain, three from Iceland and 14 from two different wildfowl collections in the UK (Muñoz-Fuentes *et al* 2006). Limited genetic diversity in the European population was consistent with a founder population as small as the seven birds originally imported to Europe, and from which all European birds are thought to have originated. The study confirmed that the European Ruddy Duck population is likely to derive solely from the captive population in the UK and there was no evidence of recent arrivals from North America or of an admixture between Ruddy Ducks from Europe and North America.

Although a timescale for the eradication of Ruddy Ducks from the Western Palaearctic as a whole has not been undertaken since the 1999 Action Plan, such an assessment has been made for the UK (Smith *et al* 2005). A simple generic model was produced to assess whether sufficient Ruddy Ducks could be culled to allow the UK population to be reduced to fewer than 175 individuals (> 97% population reduction) within 10 years. A simulation model was constructed to project the UK population under a variety of strategies. The model allowed for variations in cull rate per person (*ie* by how much each control officer could reduce the national population per year), number of control officers, and changes in the Ruddy Duck population growth rate as the population was reduced. Given historical data showed a reduction in the mean population growth rate when the population was in excess of 2000 birds, both density-dependent and density-independent models were produced. The mean time to reduce the UK Ruddy Duck population by 97% was predicted to be between three and five years, with 14 or 15 control officers reducing the population by between 65% and 70% per year. There was an 80% certainty that the population could be reduced to this level by 16 control officers within 4–6 years if annual reductions of more than 60% were achieved.

No model has been produced to predict the timescale for extinction of the White-headed Duck in Spain.

5.7 INTERNATIONAL COORDINATION

The 1999 Action Plan made the following recommendations for international activity concerning cooperation and coordination of eradication activities at an international level:

- Organise an international meeting in the year 2000 to agree a strategy to eradicate Ruddy Ducks from the Western Palearctic
- Form a working group to co-ordinate control between countries and to monitor implementation of this strategy
- Draft a recommendation to the Standing Committee of the Bern Convention to request governments to implement the recommendations of this strategy and to produce annual reports on progress to the Standing Committee
- Review and update this strategy and every three years thereafter

Recommendation No 77 (1999) on the eradication of non-native terrestrial vertebrates was adopted by the Standing Committee of the Bern Convention on 3 December 1999. This recommends, among other things, that member states regulate or even prohibit the deliberate introduction and trade in their territory of certain species of non-native terrestrial vertebrates; and eradicate populations for which eradication is deemed feasible. Ruddy Duck is specifically listed as an example of such a species.

The key countries for the Ruddy Duck issue (Belgium, France, the Netherlands, Spain and the UK) have met at a series of workshops undertaken as part of the EU Life-Nature project ‘Eradication

of Ruddy ducks in the UK to protect the white-headed duck' between 2005 and 2010. There has been no formal coordination between countries regarding the 1999 plan: no group has been established nor international meetings held to review progress or revise the plan.

5.8 OVERVIEW OF NATIONAL IMPLEMENTATION OF THE 1999 ACTION PLAN

An overview of progress against the main recommendations of the 1999–2002 Action Plan for eradication is provided for each country in Table 14. Positive progress has been made against some areas of the strategy, particularly in Priority 1 countries. Whilst eradication of Ruddy Ducks from the Western Palaearctic will not require all countries to complete all activities, it is clear that progress is still needed in many areas to be confident that the strategy will be completed successfully.

Policy and legislative actions to permit the control of wild birds have been completed for the majority of countries, but there has generally been little progress regarding birds in captivity. Eradication strategies and control programmes have been established, or are due to be initiated, in the critical countries, such that the large majority of wild Ruddy Ducks in Europe occur in countries with active control.

Although public awareness has been addressed in Priority 1 countries, there has been very little progress elsewhere. Little negative public reaction has, however, been reported, and it is likely that Ruddy Duck control is not viewed as a controversial issue in countries that hold very few birds.

Monitoring of wild birds is generally considered adequate in many countries during winter months. Most countries have long-established national waterbird schemes, at least as part of the International Waterbird Census, and the popularity of birdwatching creates a large body of *ad hoc* data. These sources of data will, in many cases, provide reasonable trend information for countries with established populations, and will provide reasonably early detection of wandering individuals in other countries. Coverage of birds during the breeding season is, however, considered adequate in far fewer countries. Given the much small amount of data provided for the breeding period, it is possible that even this assessment overestimates the suitability of monitoring at this time of year.

Progress with implementation of the strategy for issues concerning Ruddy Ducks in captivity has been much poorer than for wild birds. Although legislation to prohibit the release or escape of captive birds exists in the majority of countries, few have taken active measures to control or limit the keeping of birds. Indeed, there is generally a very poor understanding of the extent to which birds are held in captivity, and no countries were able to provide accurate data on numbers (except for those with very few birds).

Table 14. Progress with implementation of Ruddy Duck (NARD) eradication measures in the Western Palaearctic.
Y – measures in place, N – measures not in place, X – measures due to change, P – measures due to be established, L – Licence/authorisation required.

Country	Legislation permitting control	Eradication strategy	Control programme	Public relations strategy	Status and distribution of NARD in wild monitored	Adequate monitoring of non-breeding NARD	Adequate monitoring of breeding NARD	Status and distribution of captive NARD monitored	Illegal to keep in captivity	Ban on keeping planned	Illegal to trade	Ban on trade planned	Legislation prohibiting escape or release
Priority 1 countries													
France	Y	Y	Y	NP	Y	N	Y	N	NL	N	NL	N	Y
Netherlands	Y	NP	NP	N	Y	Y	Y	N	N	N	N	N	Y
Spain	Y	Y	Y	Y	Y	Y	n/a	N	NX	NX	N	?	NX
UK	Y	Y	Y	Y	Y	Y	N	N	N	N	NL	Y	Y
Priority 2 countries													
Belgium	Y	N	N	N	Y	Y	N	N	N	?	N	?	Y
Denmark	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y
Germany	?	?	?	?	Y	N	N	?	?	?	?	?	?
Ireland	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	Y	N
Italy	Y	N	N	N	Y	Y	N	N	N	N	N	N	N
Norway	Y	N	?	N	Y	?	n/a	N	NL	?	NL	?	?
Sweden	Y	Y	Y	N	N	Y	Y	N	?	?	?	?	?
Switzerland	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	Y
Priority 3 countries													
Austria	N	N	N	N	Y	Y	N	N	N	N	N	N	Y
Czech Rep.	N	N	N	N	Y	Y	Y	N	N	N	N	N	Y
Hungary	Y	N	N	N	Y	Y	n/a	Y	Y	Y	Y	Y	Y
Iceland	Y	N	N	N	Y	Y	Y	N	Y	Y	?	?	?
Jersey	N	N	N	N	Y	Y	Y	Y	N	N	N	N	Y
Portugal	Y	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y
Slovenia	Y	N	N	N	Y	Y	Y	Y	N	N	N	N	Y
Priority 4 countries													
Croatia	Y	N	N	N	N	n/a	n/a	N	Y	Y	Y	Y	N
Egypt	N	N	?	N	?	?	?	?	Y	Y	?	?	?
Estonia	Y	N	N	N	N	n/a	n/a	N	Y	Y	Y	Y	NX
Greece	NP	N	N	N	Y	Y	N	N	NL	N	N	N	Y
Israel	Y	N	N	N	Y	Y	Y	Y	NLX	NX	Y	Y	Y
Kazakhstan	N	N	N	N	N	N	?	N	Y	Y	Y	Y	N
Latvia	N	N	N	N	Y	Y	Y	N	N	?	N	?	N
Lebanon	N	N	N	N	N	n/a	?	N	?	?	?	?	N
Libya	N	N	?	?	?	?	?	?	?	?	?	?	?
Luxembourg	N	N	N	N	Y	n/a	n/a	N	N	?	?	?	Y
Romania	N	N	N	N	N	n/a	n/a	N	?	?	?	?	N
Tunisia	N	N	N	N	N	n/a	n/a	?	N	NP	Y	Y	?

6. CONCLUSIONS

Although the majority of countries provided data for this review, there were significant gaps. In some countries, relevant information is held across several organisations and the representatives approached were unable to provide data for all sections of the questionnaire. Data on numbers of Ruddy Ducks were provided in several different formats and were often patchy or incomplete. Comprehensive data needs to be provided in a standard format both to inform and guide national control programmes, and in order to be able to monitor implementation of the plan and assess progress against targets by relevant reporting deadlines.

Following the publication of the European eradication Action Plan (Hughes *et al* 1999), numbers of Ruddy Ducks continued to grow rapidly in the UK. This was reflected by increases in several neighbouring countries, notably France, Belgium and the Netherlands, all of which now hold significant numbers of birds. There were also increased numbers of records in northern and eastern Europe, including the Nordic countries and Hungary. The absence of data from many countries in eastern Europe for this review precludes a clear picture of the true extent of its distribution, but it must be concluded that the range of wandering Ruddy Ducks expanded to cover a large part of Europe by the mid 2000s. It should be noted, therefore, that an expanding population could threaten White-headed Duck populations in eastern and southern Europe and not just that in Spain.

Control measures employed in the UK from the late 1990s have been successful and have resulted in a 95% reduction in the population there. Control effort in France and Belgium has been insufficient to prevent increases in those countries. The decline in the UK is reflected in other European countries, and there was a notable decrease in records in most countries after 2005. It is, however, of concern that, although the UK population after 2006/07 fell to a very low level (equivalent to the population size before the 1980s), small numbers of Ruddy Ducks continue to be recorded in many European countries.

A significant development since the mid 1990s has been the establishment of core breeding areas in countries outside the UK. Breeding had already occurred in France and the Netherlands prior to 1996, but small populations became firmly established after that time, and both countries now support sizeable numbers of breeding pairs (at least 20 in the Netherlands and around 50 in France). Breeding has also become established in Belgium, and has occurred there annually from 2005. As a result of recent control activity in the UK, numbers of Ruddy Ducks in mainland Europe now exceed those in the UK. It must therefore be concluded that the UK is no longer the sole source population of Ruddy Ducks in Europe and that the threat posed by the Ruddy Duck to the White-headed Duck is no longer 'contained' with the UK.

Given the decline in the UK, some recent records of Ruddy Ducks further east in Europe presumably originate from the breeding populations in mainland Europe. Whilst records in eastern Europe probably represent wandering birds, marked spring peaks in Nordic countries may represent pioneering or prospecting individuals. The Ruddy Duck is poised to establish a sizeable breeding population on mainland Europe, and rapid increase and further expansion appear inevitable unless concerted control is undertaken in all core countries.

Given the eastward expansion, it is likely that additional occurrences in eastern Europe have gone undetected or unreported. This may also be the case in North Africa, particularly in Morocco, Algeria and Tunisia. Increased monitoring is needed in such countries, to provide early warning of further spread and the establishment of breeding over a larger area. Careful assessment will be needed to ensure that the small numbers observed in non-core countries are not dismissed simply as wandering birds from the core range; low level survey effort in these countries may overlook a genuine expansion in the species' range.

An Action Plan for eradication in Europe has been in place for over ten years. Despite activities by several countries, there are significant gaps in implementation of the Action Plan. In particular, there has been little coordination of activity internationally. Given steady increases in breeding populations outside the UK, and the occurrence of Ruddy Ducks across much of Europe, there is a clear need for activities to be coordinated and synchronised at a pan-European level, to ensure that the problem is not allowed to persist in one area while being eliminated in others.

The demonstrable success of control activities, particularly in the UK and in Spain, provides considerable reassurance that eradication is feasible. Their experiences show that substantial reductions in large populations can be achieved quickly very, and that small numbers can be controlled effectively using a reactive approach. Whilst such programmes clearly require a carefully targeted approach and resourcing, there appear to be no major barriers to implementing control across all countries.

Although ringing data on the movements of Ruddy Ducks are very limited, it is clear from records in Morocco, Turkey and Finland that individuals can travel large distances. Further, the regular occurrence of individuals during spring and summer in Norway, Sweden and Finland suggests a seasonal element to some movements, rather than simply lost or wandering individuals. It has been speculated that the records in Fennoscandia may relate to the same prospecting individuals returning in subsequent years, prompting concern that they may expand the species' range. Consequently, whilst targeting control operations at the large established populations is clearly essential to the eradication programme, all countries are encouraged to establish control programmes as the removal of even small numbers may play a vital role in preventing expansion of the population. Small-scale reactive programmes should be relatively cheap to operate.

It is clear, however, that the costs of a large-scale national project needed to eradicate a widespread and numerous Ruddy Duck population are very substantial. Thus, whilst there is a clear need to implement control activities immediately on conservation grounds, there is also an over-riding imperative to act quickly while populations are relatively small to minimise the costs of eradication. Delayed implementation will increase the complexity, scale and lifespan of any control programme, and significantly increase the financial burden upon governments.

Control activites to date have identified a number of challenges for implementation, *eg* access to sites, restictions on acceptable control methods in protected sites, and times of day or year when control operations might conflict with wildlife conservation or public interests. Experience from the UK, France and elsewhere has identified local solutions to these issues. Many of the new challenges that will be faced by control programmes in other countries can be readily anticipated, *eg* national restrictions on certain types of firearms. Preparatory action should be taken at the outset to address these issues and thereby avoid unncessary delay to the eradication programme.

Whilst control activities for wild birds have been undertaken in several countries, there have been very few active measures by countries to reduce the numbers of Ruddy Ducks in captivity. Given particular problems surrounding the keeping of this species in captivity, it must be concluded that while a captive population remains, escapes into the wild are almost inevitable. The phasing out of Ruddy Ducks in captivity in the Western Palaearctic is therefore considered an essential aspect of the eradication programme. There is, as yet, little experience to suggest which measures are likely to prove most successful to achieve this aim (and there are potential complications with some possible measures, such as legislation to ban the keeping of Ruddy Ducks in captivity). All countries are encouraged to address this issue, and identify proportionate measures, to achieve the phasing out of birds in captivity within a reasonable timescale.

Experience has shown that international conservation action plans which are supported by an international working group (comprising representatives from each country) are far more likely to be successfully implemented. Regular contact between range states not only ensures continued focus and incentive for activities, but provides a forum for the exchange of skills and experiences, and the opportunity to adapt to changing situations and new challenges. Collation of national results into a single report is essential to enable progress against international targets to be assessed. The compilation of data for this review was hampered by differences in data formats. Standardised reporting by countries, and the collation of data on birds and on progress against the targets at an international level, is an essential part of ensuring successful implementation of the eradication plan.

Considerable success has been achived in the conservation of the White-headed Duck over the last decade. During the same period, the failure to act quickly to address the Ruddy Duck issue has seen the population expand first in the UK and then into mainland Europe. Without concerted, urgent and coordinated action, further expansion is inevitable. As of 2010, the Ruddy Duck population is sufficiently small and concentrated in relatively few countries that control could be achieved relatively

quickly and cheaply. A coordinated European-wide eradication programme should therefore be implemented with immediate effect.

7. A REVISED ERADICATION ACTION PLAN

7.1 ACTION PLAN FOR THE ERADICATION OF THE RUDDY DUCK IN THE WESTERN PALAARCTIC, 2011-2015

Goal: *Ruddy Ducks[1] stop being a threat to the White-headed Duck*

Aim: *Eradication of the Ruddy Duck in the Western Palaearctic*

I. Actions concerning Ruddy Ducks in the wild

Long-term target: *Eradication of Ruddy Ducks in the wild by 2015*

Interim target: *Annual reduction by at least 50% of national wintering populations*

Action 1. Remove legal barriers that may hinder the control of Ruddy Ducks

Action 2. Monitor the status and distribution of Ruddy Ducks in the wild

Action 3. Control Ruddy Ducks in the wild

II. Actions concerning Ruddy Ducks in captivity

Long-term target: *Phase out all captive populations of Ruddy Ducks, if possible by 2025*

Interim target: *Avoid any new escape of Ruddy Ducks into the wild*

Action 4. Prohibit the release of Ruddy Ducks from captivity

Action 5. Prohibit trade in Ruddy Ducks by 2015

Action 6. Monitor the status of Ruddy Ducks in captivity

Action 7. Prevent breeding and encourage the elimination of Ruddy Ducks in captivity

III. Actions concerning public awareness, co-ordination and reporting

Long-term target: *Improve understanding of the problem by the public and other stakeholders*

Interim target: *Review progress against the Action Plan annually and update it as necessary*

Action 8. Implement awareness activities on the need to control Ruddy Ducks

Action 9. Establish, as necessary, national working groups to guide the implementation of this Action Plan

Action 10. Appoint a national focal point for international co-ordination and collaborate with other states, the Bern Convention, AEWA and other appropriate bodies in the implementation of this Action Plan

Action 11. Report annually to the Bern Convention on national activities

1 In the framework of this Action Plan, the term 'Ruddy Ducks' refers both to Ruddy Ducks and to the hybrids of Ruddy Ducks and White-headed Ducks

7.2 REPORTING PROGRESS WITH IMPLEMENTATION

To facilitate annual reporting of progress, and to ensure that all data can be readily combined and assessed effectively and efficiently, countries should provide data in a standardised format.

Progress against Actions

Progress against each action should be reported using one of the following categories:

- Established/completed
- Partially established/completed

- Planned (give date when it will be established)
- Not yet planned (report barrier and actions being taken)

Numbers of Ruddy Ducks in the wild

All observations should be provided. For each observation, the following information should be given:

- Site name
- Geographical coordinates
- Date of observation
- Number of birds (ideally, the sex and age of birds should also be given)

National estimates should be given for:

- Total numbers of wintering individuals
- Number of sites used during winter
- Number of breeding pairs or number of young
- Number of sites at which breeding occurred

For each of the national estimates, an assessment of the completeness should be given using one of the following categories:

- Data representative of national population
- Data partially representative of national population
- Data unrepresentative of national population

Where the data are felt to be only partially representative or unrepresentative, the main barriers should be identified, and the actions being taken to improve the data should be specified

Numbers of Ruddy Ducks in captivity

Each country should provide the following information:

- Number of collections holding Ruddy Ducks
- Total number of Ruddy Ducks in captivity in the country
- Total numbers traded into and out of the country

For each of the national estimates, an assessment of the completeness should be given using one of the following categories:

- Data representative of national population
- Data partially representative of national population
- Data unrepresentative of national population

Where the data are felt to be only partially representative or unrepresentative, the main barriers should be identified, and the actions being taken to improve the data should be specified

Countries are encouraged to collect standard husbandry data. For each collection, as annual totals of males, females and birds of unknown sex for each of the following categories:

- Name of organisation or individual responsible for the collection
- Total numbers of birds on 1 January
- Number of young hatched
- Number of arrivals
- Number of deaths at age less than 30 days
- Number of transfers
- Number of other deaths

Number of Ruddy Ducks controlled (Action 16)

The following information should be supplied as annual totals:

- Number of sites at which birds were controlled and total number of birds controlled

- Number of sites at which nests were controlled and total number of nests controlled

For each control event, the following data should be provided:

- Site name
- Geographical coordinates
- Date
- Number, age and sex of birds controlled or number of nests controlled

Likelihood of meeting target dates

The likelihood of eradicating birds in the wild and in captivity by the target dates should both be reported using one of the following categories:

- target date will be met
- reasonably confident target date will be met
- unlikely target date will be met
- target date will not be met

Where the target date(s) are unlikely to be met or will not be met, the following additional information should be supplied:

- Barriers to implementation
- Actions being taken to overcome barriers
- Revised date for eradication
- Any key assumptions
- Any other issues arsing

7.3 RECOMMENDATIONS AND CONSIDERATIONS FOR IMPLEMENTING THE ACTION PLAN

International and national co-ordination and reporting

National Focal Points should be appointed by the middle of 2011.

The first report of progress should be prepared in early 2012 for activity undertaken during 2011.

The Wildfowl & Wetlands Trust will, on behalf of the Bern Convention Group of Experts on Ruddy Duck Eradication and the AEWA White-headed Duck International Working Group, distribute a reporting proforma to National Focal Points and collate responses to report to the Bern Convention and AEWA Secretariats.

A Ruddy Duck eradication planning meeting should be held in 2015 to review progress and update the Action Plan.

Potential barriers to implementation

Access to and restrictions at individual sites are potential major barriers to implementation. The extent to which site-specific issues – for example, lack of access, restrictions on control methods, and locations or times at which control may be undertaken – may be a barrier to the control programme should be assessed at the outset. Potential activities and solutions should be identified at an early stage through liaison with site owners and land managers to avoid significant delays to control.

Awareness materials should be prepared in advance for a range of stakeholders (public, wildfowl collection managers, land owners) to ensure implementation can proceed smoothly.

Sharing expertise and experience

Regular contact should be maintained between control teams in different countries. This will allow those with long-standing expertise to share their experiences, which, in turn, should enable new control programmes to be established more effectively and rapidly in other countries, and problems encountered to be addressed more quickly.

Completion of eradication

Consideration should be given to the final stages of the eradication programme. Increased monitoring effort will probably be required as the population becomes smaller as a result of control activities. Whilst general waterbird surveys may be able to provide accurate data when the population is reasonably large, dedicated survey and appropriate resources targeted at specifically at Ruddy Ducks are likely to be needed to provide an accurate assessment as the population decreases. Such survey, and rapid feedback to the control teams, will be essential for the control programmes to be completed successfully. An increase in relative control effort will be needed when the population of Ruddy Ducks declines to small numbers to ensure complete eradication.

A clear procedure should be agreed to judge whether complete eradication has been achieved.

Structures for monitoring and control should remain in place for an appropriate period after eradication has presumed to have been achieved to deal with birds that escaped the control programme. Mechanisms should be established that allow control teams to be re-established and mobilised at short notice. It is recommended that these structures and mechanisms remain in place for a minimum of three years after the last Ruddy Duck is deemed to have been eradicated in the country in question; while Ruddy Ducks remain in the wild in nearby countries; or while Ruddy Ducks remain in captivity in the country in question.

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10. APPENDIX 1

SELECTED RECORDS OF RUDDY DUCKS AFTER MARCH 2009

Countries were requested to provide data on Ruddy Ducks up to March 2009. The following observations after that date were also provided, and are listed below as noteworthy, representing continuing occurrence in lower priority countries or significant numbers in core countries. (Ruddy Ducks have also continued to be recorded in other countries.)

- In Belgium, 264 records reported between March 2009 and March 2010, equating to 385 birds, each record being of between one and eight birds
- The Czech Republic reported two records between September and November 2009
- Five records in Denmark, April 2009 to September 2009, each of single individual
- Two records in Hungary, February and March 2010, each of a single individual
- Two records in Norway, September and October 2009, each of a single individual
- Three records in Austria, two in November 2009 and one in December 2009 (still present in May 2010)

  A peak of 85 Ruddy Ducks recorded in the Netherlands in winter 2009/10 (Henderson 2010)

11. APPENDIX 2

COUNCIL OF EUROPE CONSEIL DE L'EUROPE

Convention on the Conservation
of European Wildlife and Natural Habitats

Standing Committee

Recommendation No. 149 (2010) of the Standing Committee, adopted on 9 December 2010, on the eradication of the Ruddy Duck (*Oxyura jamaicensis*) in the Western Palaearctic

The Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats, acting under the terms of Article 14 of the Convention;
Having regard to the aims of the Convention to conserve wild flora and fauna and its natural habitats;

Recalling that Article 11, paragraph *b*, of the Convention requires parties to strictly control the introduction of non-native species;

Recalling that Article 1, paragraph 2, of the Convention requires Contracting Parties to give particular emphasis to the conservation of endangered and vulnerable species;

Noting that the species *Oxyura leucocephala*, listed in Appendix II of the Convention, is endangered;

Recognising the efforts of Contracting Parties in preserving the populations of this species;

Noting, however, that the main threat to the long-term survival of the species is its hybridisation with American Ruddy Ducks *Oxyura jamaicensis* introduced in Europe;

Conscious of the need to arrest the expansion in Europe and Northern Africa of the Ruddy Duck;

Recalling Recommendation No. 48 of the Standing Committee, adopted on 26 January 1996, on the conservation of European globally threatened birds;

Recalling the International Single Species Action Plan for the Conservation of the White-headed Duck, prepared by BirdLife International, Wetlands International and the Wildfowl & Wetlands Trust and adopted by CMS, AEWA and the European Union;

Recalling Recommendation No. 61 (1997) on the conservation of the White-headed Duck (*Oxyura leucocephala*) which asked Contracting Parties to develop and implement without further delay national control programmes which could include the eradication of the Ruddy Duck from all the countries in the Western Palaearctic;

Recalling the Bern Convention Action plan for eradication of the Ruddy Duck (1999-2002) drafted by the Wildfowl & Wetland Trust [document T-PVS/Birds (99) 9];

Noting that the Bern Convention Action Plan for the eradication of the Ruddy Duck is an integral part of the International Single Species Action Plan for the Conservation of the White-headed Duck;

Welcoming the very effective control carried out in the United Kingdom, in the framework of the LIFE project, to drastically reduce the number of Ruddy Ducks in its territory;

Welcoming also the commendable efforts to control the species in the wild in other contracting parties;

Regretting, however, that delayed or insufficient action in some states following the Bern Convention eradication plan, has allowed the establishment of populations in mainland Europe and thereby made eradication more costly and difficult;

Noting that very little action has been taken to address the issue of Ruddy Ducks in captive collections;

Referring to the document "*Eradication of the Ruddy Duck (*Oxyura jamaicensis*) in the Western Palaearctic: a review of Progress and revised Action Plan 2011-2015*" by the Wildfowl & Wetland Trust [document T-PVS/Inf (2010) 21];

Conscious that, following present culling efforts, it is realistic to achieve a full eradication of the Ruddy Duck in the wild in the Western Palaearctic in the next five years;

Noting, however, that this commendable goal will only be reached if all states concerned collaborate in a common action plan for eradication of the species,

Noting that failure to act effectively and immediately will increase the threat to the White-headed Duck and increase the complexity and financial cost of eradication;

Recalling also Resolution 4.5 of AEWA, which, amongst others, strongly urges all countries with Ruddy Duck populations to establish or step up complementary eradication measures in order to prevent the spread of the species in Europe and towards its complete eradication in the AEWA area,

Recommend that:

All Contracting Parties:

1. Implement without delay the actions specified in the "Action Plan for the Eradication of the Ruddy Duck in the Western palaearctic, 2011-2015 enclosed as appendix to this recommendation;

Priority States:

2. Belgium urgently implement an eradication programme aimed at achieving the common target of eliminating annually at least 50 % of Ruddy Duck national population to achieve total eradication in its territory no later than 2015;
3. France intensify present efforts to eradicate Ruddy Duck and carry out an extensive public awareness campaign;
4. The Netherlands urgently implement the existing eradication programme, providing the resources needed for its completion; and as a matter of urgency establish the national co-ordination foreseen in the plan so as to facilitate its implementation, taking into account that delays will increase costs;
5. Spain continue its current policy to eradicate every single Ruddy Duck or hybrid detected in its territory;
6. United Kingdom continue present efforts to eradicate the remaining populations of Ruddy Duck and pursue them after the end of the very effective and positive LIFE project;

Other States:

7. Denmark, Czech Republic, Finland, Hungary, Iceland, Italy, Norway, Portugal, Sweden and Switzerland eliminate systematically all Ruddy Ducks appearing in their territories;
8. Morocco control systematically Ruddy Ducks and hybrids in its territory;
9. Tunisia monitor White-headed Duck and eliminate systematically Ruddy Ducks and hybrids in its territory;

Invites Algeria to monitor White-headed Duck and eliminate systematically Ruddy Ducks and hybrids in its territory.

APPENDIX

Action Plan for the Eradication of the Ruddy Duck in the Western Palaearctic, 2011-2015

Goal	*Ruddy Ducks [1] stop being a threat to the White-headed duck*
Target	*Long-term eradication of the Ruddy Duck in the western Palaearctic and establishment of measures to avoid new introductions of the species.*

I. Actions concerning eradication of Ruddy Ducks in the wild

General target	*Eradication of the Ruddy Duck in the wild in the western Palaearctic by 2015*
National targets	*Annual reduction of at least 50 % of the national wintering population*
Action 1	Remove legal barriers that may hinder the control of Ruddy Ducks
Action 2	Monitor the status and distribution of Ruddy Duck in the wild
Action 3	Eliminate Ruddy Ducks in the wild following the national target
Action 4	Establish, as necessary, national working groups to guide the implementation of this eradication strategy and appoint a national focal point for international co-ordination.

II. Actions concerning Ruddy Duck in captivity

Goal	*Avoid any new escape of Ruddy Ducks to the wild in the Western Palaearctic*
General target	*Phase out all captive populations of Ruddy Ducks, if possible by 2020*
Action 5	Prohibit the release of Ruddy Ducks from captivity
Action 6	Prohibit trade in Ruddy Ducks by 2013
Action 7	Monitor the status of Ruddy Ducks in captivity
Action 8	Encourage the sterilisation and/or elimination of Ruddy Ducks in captivity

III. Actions concerning public awareness, reporting and international co-ordination

Goal	*Improve understanding by the public of the problem*
Goal	*Follow the progress of the eradication plan and update it as necessary*
Action 9	Implement public awareness activities on the need to control Ruddy Ducks.
Action 10	Report annually to the Bern Convention on national action and collaborate with other states, the Bern Convention, AEWA and other appropriate bodies in the implementation of this eradication plan and the Action plan for the conservation of the White-headed Duck.

[1] In the framework of this action plan the term « Ruddy Ducks » refers both to Ruddy Ducks and to the hybrids of Ruddy Ducks and White-headed Ducks.