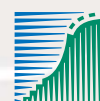


# Waterbirds around the world

A global overview of the conservation, management and research of the world's waterbird flyways

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voedselkwaliteit



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## Recent measures to control Ruddy Ducks *Oxyura jamaicensis* in the United Kingdom

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### ABSTRACT

The Ruddy Duck *Oxyura jamaicensis* is a native of the Americas, but was introduced to wildfowl collections in the UK in the 1940s. Following escapes, Ruddy Ducks became established in the UK, and by 2000, there was an estimated feral population of c. 6 000 birds. As the feral population in the UK increased, so did the number of records in mainland Europe. Hybridization in Spain between the globally-threatened White-headed Duck *Oxyura leucocephala* and Ruddy Ducks, presumably originating from the UK, was first recorded in 1991, and this is now regarded as the greatest threat to the long-term survival of the White-headed Duck. The UK Government began research into Ruddy Duck control in 1994, and further research was undertaken between 1999 and 2002 and in 2003/2004. A total of 4 332 Ruddy Ducks have been culled since 1999. Between February 2003 and February 2004, numbers nationally were reduced by almost 20%, and regional reductions of up to 70% have been achieved annually with limited manpower. Shooting, particularly of large winter flocks, has proved to be the most effective method of control. Modelling suggests that the UK population could be reduced to less than 50 birds within five years if eight full-time staff were available to carry out control in all seasons.

### INTRODUCTION

The Ruddy Duck *Oxyura jamaicensis* is a native of the Americas and is common in its native range, with a stable population of over 500 000 (Wetlands International 2002). However, since being introduced into wildfowl collections in the UK from North America in the 1950s, it has become established as an invasive, non-native species in Britain and is now beginning to colonize other north-west European countries. By January 2000, the UK population was estimated at c. 6 000 birds (WWT Wetlands Advisory Service 2002). In 1983, the first feral Ruddy Duck was recorded in Spain, raising concerns about the risk of hybridization with the globally-threatened White-headed Duck *Oxyura leucocephala*. Ruddy Ducks have been recorded annually in Spain since 1991, and the first Ruddy Duck x White-headed Duck hybrids were observed in the same year (Hughes *et al.* 1999). At least 139 Ruddy Ducks have been recorded in Spain since 1991, at a minimum of 43 different locations. Hybrids are fertile to the second and possibly third generation in the wild. Despite an active and well-organized control programme to cull any Ruddy Ducks present, 59 hybrids have been recorded (José Antonio Torres pers. comm.) on at least 23 sites (Hughes *et al.* 1999).

The numbers of White-headed Ducks in Spain have risen from 22 in 1977 to 2 600 in 2003, and Spain is the only region in which the White-headed Duck has expanded its breeding range and population size in recent years. There has been a major expansion of breeding sites eastwards and northwards

since 1980, from Andalucia to Valencia and Castilla-La Mancha (Ayala *et al.* 1994 and Torres & Moreno-Arroyo 2000, cited in Green & Hughes 2001), following protection of habitat and a ban on hunting. Breeding now occurs annually at over 20 sites (Torres 2003). The Council of Europe Species Action Plan for the White-headed Duck highlights hybridization with the Ruddy Duck as being of critical importance, and regards this as the most severe threat to the long-term survival of the White-headed Duck, particularly in Europe (Green & Hughes 1996).

Initial research into control of Ruddy Ducks in the UK in order to protect the White-headed Duck began in 1993, and further research took place in 1999-2002 and 2003/2004. The UK Government recognizes that eradication of Ruddy Ducks from the UK is the desired outcome (Morley 2003). As the UK holds an estimated 95% of the European feral population of Ruddy Ducks, control in other countries (including Spain) is likely to be futile unless eradication occurs in the UK.

### METHODS

#### Introduction

In general terms, it is recognized that no eradication programme should begin unless a specific assessment study has shown that this is technically and financially feasible (European Commission 2004). Control of Ruddy Ducks in the UK has been viewed from the beginning as a three-phase process, with the first two phases addressing the issues surrounding the feasibility and cost of eradication.

Small-scale research was carried out between 1993 and 1996, concentrating on the feasibility of control. This work was carried out by the Wildfowl and Wetlands Trust (Hughes 1996), and involved testing different methods of control, namely shooting during the breeding season, shooting in winter, trapping females at the nest, trapping in winter, and egg-oiling. The results showed that shooting during the breeding season was the most effective method of control, followed by shooting in winter. Although trapping at the nest had a high intrinsic efficiency, the rate of control in terms of staff effort was very low. The report concluded that eradication was feasible, but that larger-scale control was required to obtain a better indication of the time-scale and costs involved.

#### Regional control trials and control on major sites nationally

Research into large-scale control was undertaken between 1999 and 2004. This work concentrated on control by shooting in line with the results of the initial research, and was conducted by the Central Science Laboratory (CSL), an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra). Four full-time and two part-time control staff were employed on the project. The principal aims of the research were to assess the

feasibility and cost of reducing the UK population by over 95%, to reduce the breeding population on Anglesey, Wales, by a minimum of 70% within three years, and to conclude whether compulsory access to land would be necessary to ensure the success of any future national control strategy.

Access to all sites was by agreement in advance with site owners and tenants. The owners, tenants and principal users of all the known breeding, post-breeding and wintering sites for Ruddy Ducks within the trial areas were contacted and asked for permission to control Ruddy Ducks by shooting.

Control by shooting during the breeding season (1 March to 31 August) was carried out in two regions during this phase of research: the Western Midlands in England and the Island of Anglesey in Wales. Control of birds early in the breeding season, especially of adult females, is important in an eradication programme as it minimizes the numbers of young birds hatched and the total number of birds which must be killed. It is more efficient early in the season as by late May more cover is available for both sexes and the females begin to spend a large part of their time sitting on eggs and are thus more difficult to shoot. Most birds were shot from the bank with either a .223 rifle or a shotgun.

Control by shooting during the post-breeding and winter periods (defined as 1 September to 28 February) was carried out in all trial areas, including the Western Midlands and Anglesey. Ten visits were made to sites outside the trial areas in the winter of 2000/2001, and work was carried out at a range of sites nationally in the winter of 2003/2004. At this time of year, a high proportion of the UK population is found on a small number of sites (Fig. 1). For example, in January 2000, 83% of the UK population was recorded on only 25 sites, with 67% occurring on only ten sites. Thus access to these sites and the ability to carry out control effectively are critical to the feasibility of eradicating

Ruddy Ducks from the UK. Four to six Field Officers were usually involved, and the ducks were either herded towards guns on the bank by means of a boat or, on the larger waters, shot from the boats themselves. With very few exceptions, only shot-guns were used for post-breeding and winter control.

## RESULTS

### Access

Agreement to control Ruddy Ducks by shooting was forthcoming from 58% of the landowners and tenants approached (at both breeding and wintering sites), with little variation between the two main trial areas of Anglesey and the Western Midlands. However, this proportion rose to 78% for major wintering sites nationally, which contain large flocks of Ruddy Ducks in the post-breeding and winter periods. Thus access to a relatively small number of sites gives access to a large proportion of the UK population.

### Breeding season control

A total of 249 control visits were made during the period April 1999 to March 2002, and a total of 793 Ruddy Ducks were shot (255 adult females, 398 adult males and 140 immature birds). This figure represents 30.1% of the total number of Ruddy Ducks killed during the period. However, this figure would have been higher had control operations in the 2001 breeding season not been severely curtailed as a result of an outbreak of foot and mouth disease in the UK.

The mean amount of time per staff member spent on site for each bird killed in the breeding season was 1.98 hours. On average, 47.3% of the Ruddy Ducks present were shot at each visit (range 0-100%). In over 85% of cases where at least one bird was shot, the staff input was four hours or less on site (Defra 2002).

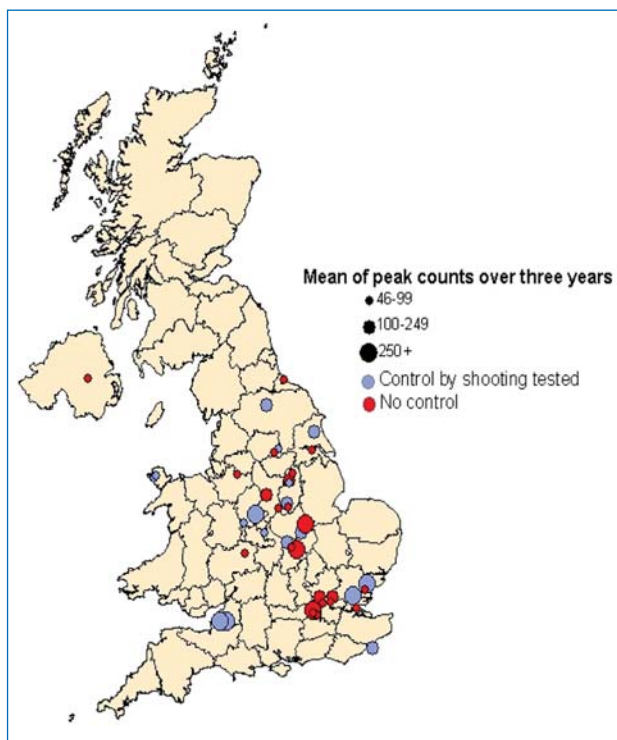
### Post-breeding and winter control, September 1999 – March 2002

A total of 1 841 birds (727 adult males, 491 adult females and 623 immature birds) were shot on seventeen sites. This figure represents 69.9% of the total number culled between April 1999 and March 2002 (Defra 2002). Because of the range of sizes of post-breeding and wintering sites and the effect that this had on efficiency, data for sites of less than 1 sq. km in size ("small wintering sites") were analysed separately from data for sites greater than 1 sq. km in size ("large wintering sites").

Data from the 54 visits to thirteen small post-breeding and wintering sites showed that the average staff time on site per bird killed was 1.11 hours in these situations (1 107 birds shot in total). On average, 53.9% of the Ruddy Ducks present were shot per visit (range 8% to 92%).

Many of the major wintering sites used by Ruddy Ducks are large reservoirs ranging from 1 sq. km to 12 sq. km in extent. A total of 21 control visits were made to four water bodies of this size, although in one case shooting was limited to two bays and not permitted in the main body of water. A total of 651 Ruddy Ducks were shot on these sites. Data from these visits show that although a smaller proportion of the Ruddy Ducks was killed per visit (mean 18.7%, range 1% to 56%), the staff input, at 0.81 hours per bird shot, was lower than on the smaller sites.

The main wintering site in the Western Midlands is approximately 3.5 sq. km in extent. A total of 522 Ruddy Ducks were



**Fig. 1.** The major post-breeding and wintering sites for Ruddy Ducks *Oxyura jamaicensis* in the UK.

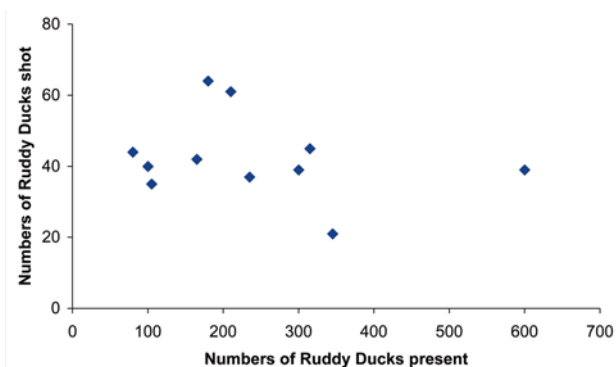


Fig. 2. Number of Ruddy Ducks *Oxyura jamaicensis* shot and number present per visit at a major wintering site in the Western Midlands: 1999-2002.

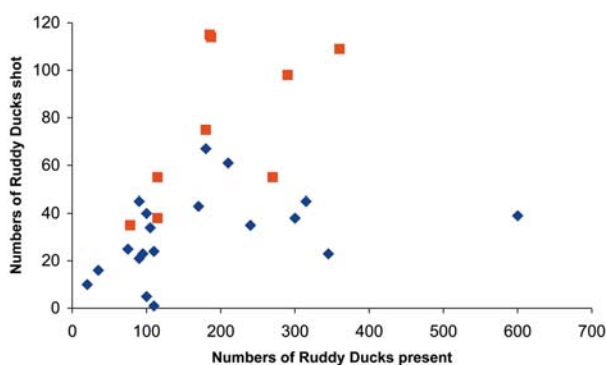


Fig. 3. Number of Ruddy Ducks *Oxyura jamaicensis* shot and number present per visit at larger wintering sites: 1999-2002 (blue diamonds) and 2003/04 (red squares).

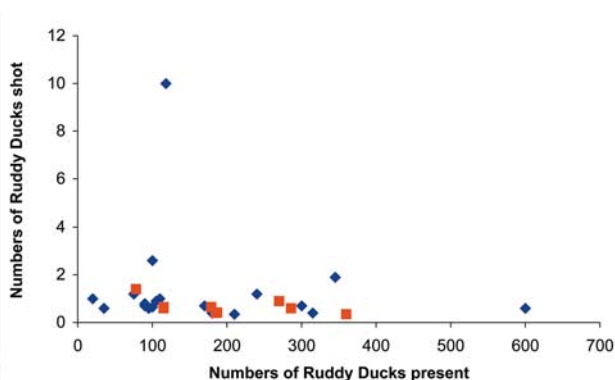


Fig. 4. Staff time per Ruddy Duck *Oxyura jamaicensis* shot at larger wintering sites: 1999-2002 (blue diamonds) and 2003/04 (red squares).

shot on 15 visits to this site during the September to February period. The results from this site showed that similar numbers of Ruddy Ducks were culled on each visit, regardless of numbers present (Fig. 2). Therefore as numbers were reduced, a larger proportion of those present was removed at each visit. Evidence from the 1999-2002 research suggested that at sites with high numbers of birds, the presence of more staff and the availability of more boats on the first few visits would allow a greater proportion of the birds present to be removed per visit (a maximum of four boats was available between 1999 and 2002). In order to test this, further research on large wintering sites was carried out in the winter of 2003/2004.

### Post-breeding and winter control, winter of 2003/2004

Three additional boats were bought in March 2003. Although of similar design to three of the boats used during the Regional Control Trials, these were slightly larger (14ft in length rather than 12ft) and had more powerful engines (20hp rather than 9.9hp). Thus, for the control operations on large wintering sites in 2003/2004, the CSL had a total of seven boats available: three 12ft aluminium boats with 10hp engines, three 14ft aluminium boats with 20hp engines, and one 12ft RHIB with a 25hp engine. In addition to the six staff used during the Regional Control Trials, a further three were trained in Ruddy Duck control and used on the large wintering sites in 2003/2004. One other member of staff was used to drive a boat on these sites. Thus, where operations during the period 1999-2002 typically involved three to four boats and five to seven staff, visits during the winter of 2003/2004 typically involved five to seven boats and up to ten staff.

Nine visits were made to five large wintering sites between December 2003 and February 2004. These five water bodies hold 70% of the Ruddy Ducks occurring on the ten most important wintering sites in the UK, and 30% of those on the forty most important wintering sites. A further sixteen visits were made to twelve small wintering sites between September 2003 and February 2004. The results of this further research show substantially increased efficiency on both larger and smaller wintering sites when compared with the results from the Regional Control Trials. There was a 58% increase in efficiency in terms of the proportion of Ruddy Ducks shot per visit on the large wintering sites (Fig. 3). This increase in efficiency was due principally to the availability of additional staff and, in particular, additional boats allowing better coverage of the waters bodies involved. There was also an 18% increase in the proportion of ducks shot per visit on the smaller sites. This was due principally to the refinement of site-specific methods for carrying out the control operations. Importantly, this increase in the proportion of birds shot was not at the cost of a large increase in staff time. On the large wintering sites there was a 55% reduction in the staff time on site per bird killed (Fig. 4), while on smaller wintering sites the comparable figure was 72%.

### CONCLUSIONS

The research on Ruddy Duck control in the UK since 1999 has shown that it is highly feasible to eradicate the species from the UK. A number of factors have led to this conclusion.

- 1 Ruddy Ducks are highly visible, particularly in the autumn and winter, when very large numbers of birds congregate on known traditional sites. For example, in January 2000, 83% of the UK population was recorded on only 25 sites, with 67% occurring on only ten sites. This makes control easier than if the birds were widely dispersed, and permits a more accurate estimation of the national population.
- 2 High quality data are available on the location, numbers and spread of Ruddy Ducks in the UK. There have been regular counts of Ruddy Ducks on many sites as part of the Wetland Bird Survey (WeBS) counts, and in recent years the number of sites for which these data are available has risen to over 1 500. These data, supplemented by data from County Bird Reports, allow better planning of an eradication programme.

- 3 In 2002, the Wildfowl and Wetlands Trust carried out a detailed analysis of all available WeBS data. This gave an estimated total UK population of almost 6 000 in January 2000 (WWT Wetlands Advisory Trust 2002), and an annual growth rate of between 6% and 7% in recent years (without control), compared to a mean annual rate of 24% in the years 1976-1996. Count data from 20 key wintering sites in February 2004 suggest that the national population now stands at around 5 000 following the recent control measures.
- 4 Several years of active control have allowed the development of a model which predicts the response of the Ruddy Duck population to further control (Smith *et al.* in press). This model suggests that eradication from the UK is feasible as part of a five-year control programme. The mean time predicted to reduce the population to less than 50 individuals (i.e. by over 99%) is five years.
- 5 Analysis of the WeBS data and experience of control since 1999 have shown that Ruddy Ducks move freely between sites in response to changes in weather conditions and during seasonal migrations. This makes access to all sites unnecessary, as it is highly likely that birds will occur at some time on sites where permission to carry out control has been granted. Ruddy Ducks move between sites in large numbers in response to changes in weather conditions in winter. During cold weather, birds move from smaller waters to larger ones, which are less likely to freeze over. Movement between sites also occurs as a result of the birds' mating strategy during the breeding season, when unattached males move between sites in search of females.
- 6 A range of control methods has been tested and the most effective identified. Shooting is the most effective method in all seasons, but trapping during the breeding season, trapping at the nest and egg-oiling are also effective on some sites. In the winter of 2003/2004, with additional staff and equipment available, it proved possible to cull between 20% and 60% of Ruddy Ducks per visit on the larger wintering sites. On smaller wintering sites, the mean proportion culled per visit rose to 59% (up to 220 birds) during the same period. On breeding sites, the mean proportion culled per visit was 47%.
- 7 Agreement has been obtained for access to a high proportion of sites. The owners of 37 of the 40 most important wintering sites in the UK have been approached, and 78% of these have given permission for Ruddy Ducks to be shot on their sites. As discussed above, the regular movement of this species between sites means that it is not necessary to secure access to all sites in order to meet the aims of the project.
- 8 The much reduced numbers of Ruddy Ducks on Anglesey during the 2000 breeding season allowed an assessment of the likely time requirements when dealing with very low numbers of birds. The count information from Anglesey suggests that reduced numbers of birds are not distributed across all the potential breeding sites. Rather, the birds appear to concentrate in the best breeding habitats in the area.

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