



**Barn Owl Trust
Second**

Reintroduction Report

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The long-term results from releases of captive-bred Barn Owls carried out by the Barn Owl Trust in the period 1986-92

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1.0 EXECUTIVE SUMMARY

1.1 Contents

This report briefly reviews the history of the release of captive-bred Barn Owls in Britain and summarises the contents of other reports containing release data. The main body of the report reviews Barn Owl Trust (BOT) releases (which took place between 1986 and 1992) and examines the subsequent nesting success and long-term survival of released birds.

The data presented includes the distribution and timing of releases, the numbers released by each method, the distance, duration and direction of recoveries, finding circumstances, supplementary food taken by released birds, site fidelity, and subsequent nesting success.

The conservation value of releases is discussed.

1.2 Samples

The BOT released captive-bred Barn Owls on 56 occasions from 41 sites involving a total of 223 birds, mostly in the county of Devon. The Long Term Release method was deployed 28 times during which 57 captive-bred adults were released with 56 pulli. The Young Clutch (or Brood) method was also used 28 times and 110 captive-bred pulli were released in this way.

At 8 sites breeding occurred after release (during the following year). A total of 30 subsequent broods contained 109 young. All released birds were marked with BTO rings and during the following nine years some extremely long duration ring recoveries were recorded. The recoveries of released birds (and those within subsequent broods at release sites) were compared with the recoveries arising from 173 wild Barn Owls ringed during the same period in the same area.

1.3 Recoveries

The proportion of BTO ring-recoveries from captive-bred birds released as pulli (both methods) was very similar that of wild pulli. Likewise, the median recovery distance, median duration, and finding circumstances. However, first year wild recoveries occurred mostly in September but release recoveries mainly in October through to December. Road casualties accounted for the highest proportion of pulli recoveries amongst both wild and released birds.

The recovery pattern of birds released as adults was very different from the other groups. A higher proportion were found dead close to the release site soon after release. Thus, compared to pulli, released adults had a higher initial recovery rate, a much lower median duration, and a much lower median recovery distance. Starvation accounted for a higher proportion of released adult recoveries but fewer adults were recovered as a result of road accidents (probably because most of them didn't travel far enough to discover fast roads).

Some of the birds from release sites survived for many years. Controls made during routine fieldwork included one at eight years old and one at ten years - the current British (published) record for the longest lived Barn Owl (found alive and well).

1.4 Site fidelity

At most release sites the amount of food taken was almost nil by 100 days after release but a quarter of all releases resulted in release site occupation by Barn Owls in the following year. Young clutch releases did not normally result in the establishment of a nesting pair at the release site. However, one-in-four long term releases produced subsequent broods and average brood size increased after release.

At nine out of eleven sites where subsequent breeding occurred supplementary food was provided and double-brooding was commonplace.

1.5 Conservation value

The use of release as an incentive for habitat improvement is discussed. Some potential release sites were not used because wild birds moved in after pre-release habitat improvements were made.

Due to the relatively low number of release sites that became established wild sites, it is suggested that a greater benefit is in the number of birds that disperse away from release sites to establish themselves elsewhere and integrate with the remaining wild population. Examples are given of released birds that dispersed away from release sites, survived for many years, and bred with birds of wild origin. The provision of supplementary feeding can greatly increase post-release productivity and the extent to which this might effect the wider population is discussed.

1.6 Importance of this report

Although the release period (1986-1992) preceded the release licensing system, the releases followed the two methods that were later outlined in the governments release guidelines. Thus, this report is unique in its ability to gauge the long-term results of the licensed releases that commenced in 1993.

1.7 Recommendations

- 1) The controlled releases of BTO ringed captive-bred Barn Owls in Britain should continue in order to a) increase the sample size (of recoveries and controls of released birds) for research purposes, and b) to encourage habitat improvements.
- 2) The BTO should be provided with the detailed ringing and release data (number of rings fitted and number of birds released) and contracted to investigate the survival of released birds (compared to wild birds). The relative merits of the two release methods should also be researched.
- 3) To avoid discouraging releases in habitats typical of those which sustain wild breeding Barn Owls, the recommended area of rough grassland around release sites (Guideline 1.1) should be reduced to “ideally 12 or more hectares (30 acres) and not less than 3 hectares (7.5 acres) of prey-rich rough grassland within 1km.”

In line with;
Andrews Ward Associates (1995) suggestion on p3, 1.18
Taylor (1994) = 3.6 Ha (linear)
Mason (1997) = 3.14 Ha
BOT (1995 & 1998) = 12 Ha (non-linear)



This wild Barn Owl site has produced broods of 3-4 young annually for many years. It has virtually no rough grassland within 1km. (0.3Ha)

2.0 INTRODUCTION

2.1 Barn Owl decline

Barn Owls are extremely difficult birds to census, they are largely nocturnal, not particularly territorial or vocal, and nests in hollow trees are likely to be under recorded (Bibby *et al.* 1992). Furthermore, a difficulty with interpreting census data is that populations show marked (but not necessarily regular) fluctuations from year to year in response to cyclical changes in the populations of small mammals on which they feed (Taylor 1994).

However, despite the difficulties in obtaining reliable survey data there is general consensus that there has been a substantial decline. The first national Barn Owl survey in 1932 estimated the total population of England and Wales at 12,142 pairs (Blaker 1934). The second survey, fifty one years later (1983-1985), estimated the total population for the same area at 3,778 pairs (Shawyer 1987), a decline of 69%.

The latest population estimate from a national survey of breeding Barn Owls between 1995 and 1997 produced national population estimates of 3,480 breeding pairs for 1995, 3,967 for 1996 and 3,951 for 1997 with confidence intervals of *c.* \pm 30% (Toms *et al.* 2001).

Cayford (1992) and Taylor (1994), amongst others, suggest the decline is a result of agricultural intensification, reducing the amount and quality of habitats containing populations of small mammal prey. The loss of nest sites in traditional farm buildings and tree cavities has also been a significant factor (Ramsden 1998, Toms *et al.* 2001). Pesticides, especially aldrin-dieldrin, have almost certainly contributed to declines in some areas (Newton *et al.* 1991).

Other contributory factors to Barn Owl decline which have been considered are severe winters (Shawyer 1987 & 1998, Percival 1990), rodenticides (Newton *et al.* 1999), drowning (Shawyer 1987) and increased mortality due to road traffic (Shawyer 1987, Ramsden, in prep.)

2.2 Barn Owl conservation

Barn Owls have a phenomenal reproductive capacity that enables populations to increase rapidly when prey is abundant and nest sites plentiful. The potential for population recovery is therefore high if the right conservation measures are implemented (Cayford 1992). Conservation measures include the maintenance and provision of foraging habitat, the provision and protection of secure nesting sites, advising land managers on the safe use of rodenticides, artificial supplementary feeding and captive breeding and release programmes (Taylor 1993).

2.3 Captive breeding and release programmes

Captive breeding and release involves the deliberate release of captive-bred birds into an area from which the wild population has been lost entirely (reintroduction) to

establish a self-sustaining and viable population in the long term, or to supplement an existing threatened population (restocking) to increase the overall viability of the wild population. The International Union for the Conservation of Nature guidelines for a successful re-introduction scheme includes the requirement that: “re-introductions should only take place where the habitat and landscape requirements of the species are satisfied, and likely to be sustained for the foreseeable future.”

The Barn Owl Trust captive breeding and release programme has been referred to as a ‘reintroduction’ programme but it is in fact a ‘restocking’ programme, as there is still a Barn Owl population in the general area. However, as Dockerty (1993) points out reintroduction is the word generally associated with Barn Owl releases in Britain.

Captive breeding and release in Britain was largely pioneered by Tony Warburton. Concerned by the decline in the Barn Owl population in Britain he became convinced that captive breeding and release (CBR) was a way in which local populations of isolated Barn Owls could be kept viable. He considered that the species was an ideal subject for CBR programmes as:

1. It has not (yet) reached the critical stage where its extinction in Britain is a formality.
2. It breeds readily in captivity and is kept in large enough numbers to ensure a ready supply of releasable birds with a vast genetic diversity.
3. It is innately wild and does not imprint as readily as some other birds of prey.
4. Its protracted fledging period and post-natal behaviour are eminently suited to particular release techniques.
5. Its beauty makes it attractive to large numbers of people, including lay people, making it easy to recruit support and funding for release and conservation projects.

(Warburton 1992)

2.4 A brief history of captive breeding and release in Britain

The 1970's

Following initial releases in the 1960's, Warburton set up his British Owl Breeding and Release Scheme (BOBARS) in the Lake District in 1972 and in the first ten years released 81 captive-bred Barn Owls. He also encouraged others to do likewise, and with his “breeding members,” Warburton had released 837 birds by 1992 using a similar method to the current Young Clutch (or Brood) Release. Unfortunately almost none of the released birds were fitted with a British Trust for Ornithology (BTO) ring and the distinct lack of result data from BOBARS indicates that the Scheme's record keeping was inadequate.

During the 1970's there were a small number of other release operators, most notably Jane Ratcliffe who pioneered the Long Term Release Method and used BTO rings (Ratcliffe 1979). However the numbers of birds involved seems to have been low and (as far as is known) no report data is available.

The 1980's

The species popularity amongst an increasing number of bird keepers and the fact that Barn Owls breed freely in captivity resulted in a huge growth in the captive population – far in excess of numbers in the wild. Simultaneously a Hawk Trust survey (coordinated

by Colin Shawyer) highlighted a decline in the wild population and the species' plight received massive publicity for the first time. The result was a proliferation of individual release operators and the establishment of a number of organised release schemes.

In 1987, Shawyer estimated that up to 2,000 birds were being released annually by 400 operators. He considered (pers. comm.) that most operators (although well intentioned) were using methods which were unlikely to succeed, the released birds were often unlikely to survive, the vast majority were not BTO-ringed, and most operators failed to keep detailed records. Shawyer also considered that a few schemes were operated to a higher standard, most notably the South Midlands BO Conservation Group (P Burman & M Nowakowski), the Devon BO Breeding and Release Scheme (D & F Ramsden), and the Staffordshire and Cheshire BO Conservation Project (C & P Hackney).

In 1989, the newly-formed Barn Owl Trust (previously Devon BO Breeding and Release Scheme) produced the first report of release results detailing the site fidelity and recoveries from the release of 140 BTO-ringed birds from 24 sites during a three year period and a comparison with recoveries of wild ringed birds in the same county and time period (1986-88) (Ramsden & Ramsden 1989). Shortly after, the BOT produced the first detailed guidance for release operators as part of a range of 24 free information leaflets. The aim was not to encourage additional releases, rather to increase standards amongst some of the existing operators known to Colin Shawyer who had agreed to facilitate leaflet distribution. Sadly, in December 1989 Shawyer refused to assist for "political" reasons and most release operators remained unaware of the only detailed guidance available.

The 1990's

By 1992 Shawyer's estimate had increased to; up to 3,000 birds released annually by 600 operators (cited in Cayford & Percival 1992 and DoE 1993). The proliferation of inappropriate releases prompted the Nature Conservancy Council, RSPB and BTO to voice concerns about the probable waste of effort and possible negative effects on the remaining wild population. This culminated in the New Scientist article "Born Captive, Die Free" written by J Cayford (RSPB) and S Percival (BTO) in 1992.

Following a recommendation from JNCC, the Department of the Environment had set up a working group (in 1991) to address the issues. The possibility of voluntary controls was soon dismissed as unlikely to work and the addition of the species to Schedule 9 of the Wildlife and Countryside Act 1981 was planned, making release illegal except under licence. At DoE's request, the Barn Owl Trust drafted the "Code of Practice for Barn Owl Release" which, in simple terms, required releasers to use the release methods tried and tested by the BOT.

During the first year of licensing (1993) only 62 (site) licence applications were received by the DoE of which 44 were approved and only 211 birds were actually released under licence. Since then the number of applications has shown a steady downward trend, the probable reasons for this being:-

- many release operators were unwilling to conform to higher standards and/or complete the necessary paperwork.
- the message that many releases were unsuccessful was communicated more effectively.

- the amount of rough grassland recommended in the selection of a 1km radius release area (following a recommendation by RSPB) was set at such a high level (50 Ha) as to be far in excess of the amount present within 1km of most wild nests and unattainable in almost every case.

2000/2001

The number of applications received, licences issued, and birds released under the scheme is now so low that DEFRA (new DoE) are inclined to end the scheme (in order to save on their administration costs), which has prompted the BOT to produce this report.

2.5 A brief summary of the contents of published reports containing release data

(in chronological order)

Barn Owl Trust

Ramsden, D and Ramsden, F (1989) Results of Barn Owl reintroduction carried out by the Barn Owl Trust in Devon 1986-88. Devon Birds, 42(2/3), 27-33.

Based on 140 BTO-ringed Barn Owls from 24 release sites operated by the Trust. The ring recoveries are compared with those obtained from 71 wild pulli ringed in the same county and time period. Recovery data presented includes distance, duration and finding circumstances. Site fidelity details are presented along with a comparison of two release methods Long Term (LT) & Young Clutch (YC). The importance of gradual release (establishing a pattern of return for food) is discussed.

British Trust for Ornithology

Percival, S. M. (1990) Population Trends in British Barn Owls (*Tyto alba*) and Tawny Owls (*Strix aluco*) in relation to environmental change. BTO Research Report, 57.

Based on 292 first-year and 279 adult captive-reared birds BTO-ringed and released between 1982 and 1987 (which produced 82 recoveries) compared with wild bird sample of 1,922 first-years and 319 birds ringed as adults (which produced 311 recoveries). Data is presented on survival rates that take no account of the release method (because BTO didn't have this data). In addition, the survival of wild birds ringed as adults (experienced survivors) is compared directly to captive birds released as adults which is entirely inappropriate as the latter have nil experience of life in the wild.

British Owl Breeding and Release Scheme (now World Owl Trust)

Warburton, T. (1992) Release of captive-bred Barn Owls as an aid to the conservation of declining wild populations.

Contains twenty pages of anecdotes, arguments, quotes, and opinions. In spite of the fact that BOBARS released 837 birds over a twenty year period, the only release data presented is in one small paragraph. Of the 81 birds released in the first ten years, 72 were ringed (mostly with plastic coloured rings bearing a telephone number) and 14 were recovered. Three of these were emaciated. No other data is given.

Pearce, G. (1992) A Study of wild and released Barn Owls in East Devon, 1980-1992. Devon Birds, 45(2), 37-45.

Based on the release of a mixture of (BTO-ringed) captive-bred and rehabilitated wild nestlings (n=115) this study made extensive use of colour rings and repeated annual searches mostly within one 10km square. Data on the movements and pairings of released individuals and their offspring is presented providing evidence of integration with wild birds of which 57 were ringed. Finding circumstances are presented. This study made extensive use of long term supplementary feeding.

Hawk and Owl Trust

Dewar, S. M. (1992) The conservation value of Barn Owl (*Tyto alba*) reintroduction. Durrell Institute of Conservation and Ecology

During 1984 –1990, Colin Shawyer (Hawk and Owl Trust) collected a large amount of data via 67 questionnaire forms completed by release schemes detailing the release of 467 birds and 63 recoveries. The data presented includes the nesting success of adult pairs both before and after release, site fidelity, finding circumstances, distance, duration, and a comparison of release methods.

Additional note:

Approximately 40% of the data used was supplied by the Barn Owl Trust (previously used in Ramsden & Ramsden 1989). A similar proportion was supplied by the South Midlands BO Conservation Group. In collaboration with Shawyer, Dewar failed to acknowledge the data providers and also stated that hers was the first report on the subject in the UK.

Joint Nature Conservation Committee (JNCC)

Hanna, L. (1992) The possible impacts of releasing captive-bred Barn Owls in Britain. JNCC Report No. 124, Peterborough.

Prior to licensing, Hanna took blood samples from birds of both captive-bred and wild origins held by the BOT and the South Midlands BOCG with the aim of testing for / showing a genetic difference. Unfortunately the blood samples appear not to have been used; the report contains no results and states that “as yet there is no information on the genetic structure of wild and captive barn owl populations in Britain”. A general recommendation on the selection of captive breeding stock was made. The report provides some data on the number of (BTO-ringed) birds released and recovered by the South Midlands BOCG in the period 1986-1991.

Dockerty, T. (1993) An evaluation of Barn Owl (*Tyto alba*) reintroductions in Hertfordshire, University of Hertfordshire, Hatfield.

This detailed 78 page report reviews the past and present status of wild BO in the county and the value of local reintroductions, mainly concentrating on those carried out by an independent operator who did not use a licensable release method and “did not keep formal records”. Only twenty out of 48 released birds were BTO-ringed producing five short duration recoveries. Data includes habitat mapping, population estimates, diet (pellet analysis), site fidelity, plus recovery distance, duration, and cause.

Andrews Ward Associates (for the DoE)

(1995) An evaluation of Barn Owl re-introduction in Great Britain and the effectiveness of Schedule 9 Licensing, DoE, Bristol.

This 58 page report reviews the background to licensing at length and presents some information on people’s opinions of the licensing system. Only three pages contain any

release data. For 1993 and 1994, the numbers of applications and licences issued, numbers of birds released and the finding circumstances of 18 recoveries are presented. There were too few releases and insufficient time had elapsed which limited the sample size. Recommendations for minor changes to the licensing scheme were made.

Staffordshire and Cheshire BO Conservation Project (C. & P. Hackney)
Mason, I. (1997) Captive Breeding and Release of Barn Owls: factors affecting their success, Keele University.

This 81 page thesis investigates the species habitat requirements comparing wild and release areas. The study includes habitat mapping, small mammal trapping and an investigation of BO foraging behaviour and diet. The movement and survival of released Barn Owls, BTO-ringed over a ten year period are compared (using statistical tests) with wild BO ringed in a wider area. Distance, duration, finding circumstances, and survival data are included.

British Trust for Ornithology (for DETR)

Balmer, D. E., Adams, S. Y. and Crick, H. Q. P. (2000) Report on Barn Owl release scheme monitoring project phase II. BTO Research Report no. 250.

The number of rings supplied (1993-2000) for use on release birds is given but unfortunately DETR did not provide BTO with data on the numbers of rings fitted, numbers of birds actually released, and release method. Therefore the ringing data presented is based only on the 135 birds that were recovered. Data includes the timing of ringing, age class, finding circumstances, longevity, distance and direction. Although a comparison of (released/wild) survival rates was possible, regrettably DEFRA did not contract BTO to do this analysis.

3.0 AIM OF THIS REPORT

After producing the first release data in 1989, the Trust continued to operate a significant number of releases before licensing was introduced using the two licensable methods. During the intervening years, long duration ring recoveries from birds released (before 1993) have occurred. So as to include these, and to increase sample size, the report in hand re-examines the 1986-88 data alongside data from 1989-1992.

The report aims to show:

1. The distribution and timing of releases and wild Barn Owl ringing.
2. The numbers released by each method (and subsequent broods).
3. Supplementary food taken by released birds.
4. Finding circumstances, distance, duration and longevity.
5. Site fidelity and subsequent nesting success.
6. Integration of released birds in the wild population
7. Conservation value

Recommendations are made as a contribution to the licensing system review.



4.0 METHODS

This report covers the results from the release of captive-bred Barn Owls into the wild undertaken during the period 1986 to 1992 inclusive. All of the birds were marked with a British Trust for Ornithology (BTO) ring prior to release. These releases were conducted by the Barn Owl Trust (formerly The Devon Barn Owl Breeding and Release Scheme) and comparisons are drawn with wild Barn Owls ringed during the same period.

The release sites were selected on the basis that the owner had contacted the Barn Owl Trust (asking if birds could be released at their site). In every case, the Trust's response was to advise the applicant to erect nestboxes, improve foraging habitat as much as possible, and wait two years. If no wild Barn Owls occupied the area naturally then a release was planned. Every release area was surveyed to ensure that no wild birds were already established nearby and that the habitat was typical of those found around occupied wild nest sites. A random selection of these were habitat mapped and the amount of rough grassland within 1km varied from 0.3Ha to 35.3Ha (Ramsden 1995 & 1998), an average of 12Ha. For a full description of the two release methods see Appendices I and II. At some release sites the provision of supplementary food continued beyond the initial post-release period of circa. 3 months.

The results are based on 223 birds from 41 individual release sites using the Long Term (LT) and Young Clutch (YC) methods. The 173 wild Barn Owls used for comparison were ringed as pulli at 41 sites, mostly within Devon, by the Barn Owl Trust or Jerry Tallowin (an independent BTO ringer who provided the Trust with his ringing and recovery data) between 1986 and 1992.

All release sites were operated by volunteers who were asked to complete a Post Release Record Form noting details of fledging dates, daily observations and feeding habits. The Barn Owl Trust has kept records of all correspondence with release volunteers, observations arising from monitoring visits to release sites, completed Post Release Record Forms and all ringing and ring recovery records of individual owls.

Released owls have been subdivided into 3 categories:

LT adults – adult Barn Owls released using the LT method. A number of owls that were ringed but escaped prematurely from the site prior to the planned release have been excluded.

LT pulli – pulli released at sites using the LT method. Five pulli that failed to fledge from LT release sites have been excluded.

YC pulli – pulli released at sites using the YC method.

All wild owls ringed in the period were ringed as pulli. Seven of these which failed to fledge have been excluded.

At a number of LT release sites the adults produced a second brood of pulli during the release year. Also, at a number of both LT and YC release sites, Barn Owls bred in subsequent years. It is assumed that all subsequent breeding at release sites in consecutive years following a release was a direct result of release and the young are classed separately as subsequent brood pulli . This includes one case where released adults moved from the actual release site to a site less than 0.5km away and bred the following year.

Breeding at release sites following a period of at least one breeding season when Barn Owls were absent was not considered to be subsequent to release. All pulli ringed in non-subsequent broods at release sites were considered in the results to be wild.

A number of other exclusions of individual birds were made when compiling the results. One LT pulli was recovered dead from the spoiler of a lorry in Somerset. No distance or direction was recorded, so this recovery is included in the general recovery results but not the analyses of direction or distance. Also, 5 LT adults, 1 LT pulli and 4 YC pulli recoveries which had a distance of less than 1km were excluded from the direction analyses as the BTO-returned data coded them all at 360°. Where owls were controlled (found alive) and then subsequently controlled or recovered again at a later date the initial control was excluded from the results.

The Post Release Record Forms included records of food taken daily at release sites starting at the day of release at LT sites or the first day of fledging (first pulli seen out of the nestbox) at YC sites. These records were used to plot food taken over time divided into three categories; young clutch releases, long term releases where one or more adults stayed, and long term releases where both adults appeared to have left immediately. A small number of release volunteers failed to return record forms and not all record forms returned were complete.

Release site fidelity is assessed in terms of whether release sites were occupied in consecutive years following release. A site was considered to be occupied by Barn Owls in any one year if there was evidence of roosting or nesting at or near (within 0.5 km) the site at some period during that year. Since no comparison was made between occupancy at release and wild sites, and observations of occupancy are independent of ringing activity at sites, the period considered for release site fidelity extends from 1986 to July 2001.

5.0 RESULTS

5.1 Distribution of ringing sites

40 out of 41 release sites were in Devon with 1 in Cornwall. 29 release sites were South or East Devon (South Hams, Teignbridge and East Devon districts). The distribution of release sites is illustrated in figure 1.

The distribution of wild Barn Owl ringing sites was more widespread. 35 out of 41 wild ringing sites were in Devon, 5 in Cornwall and 1 in Somerset. Only 15 wild ringing sites were in South or East Devon (South Hams, Teignbridge and East Devon districts). The distribution of wild Barn Owl ringing sites is illustrated in figure 2. This does not necessarily reflect the distribution of all Barn Owl breeding sites in the study area.

Figure 1.
Distribution of
release sites
operated by the
Barn Owl Trust in
Devon and
Cornwall in the
period 1986-1992

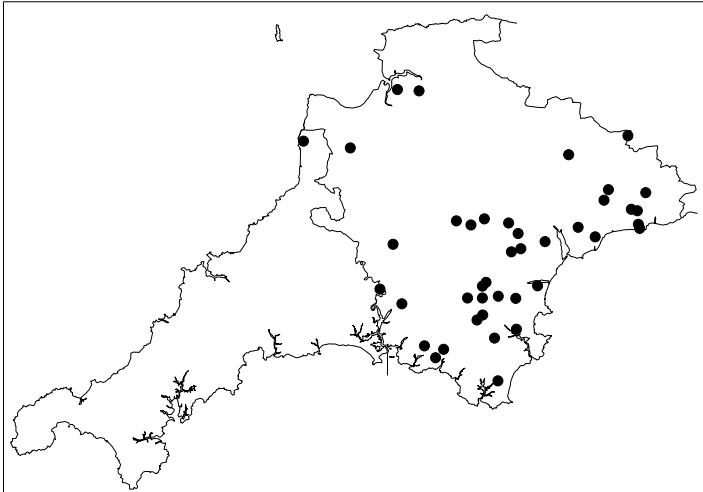
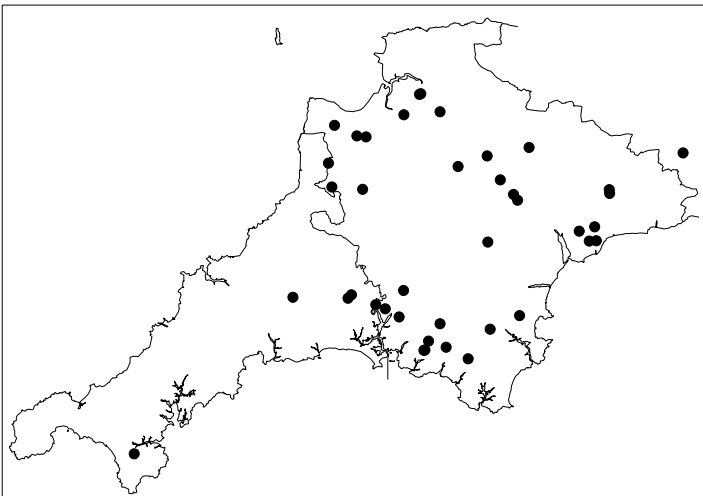


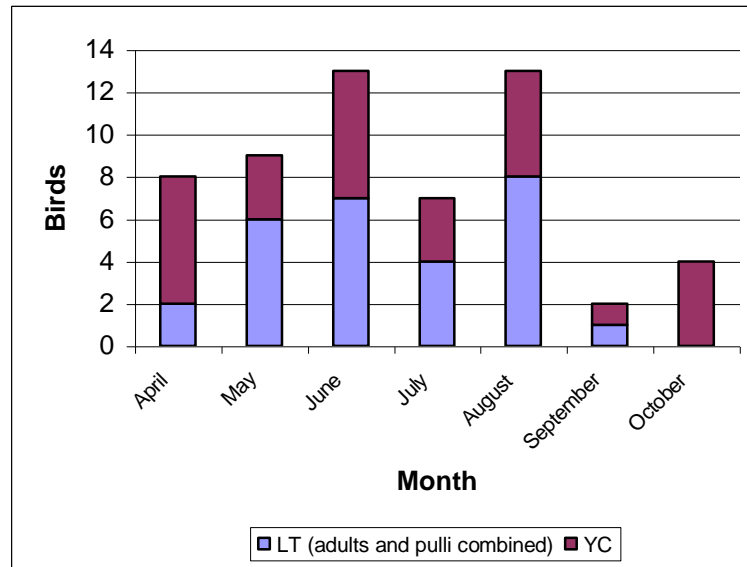
Figure 2.
Distribution
of wild Barn
Owl ringing
sites in
Devon and
Cornwall
1986-1992



5.2 Timing of releases

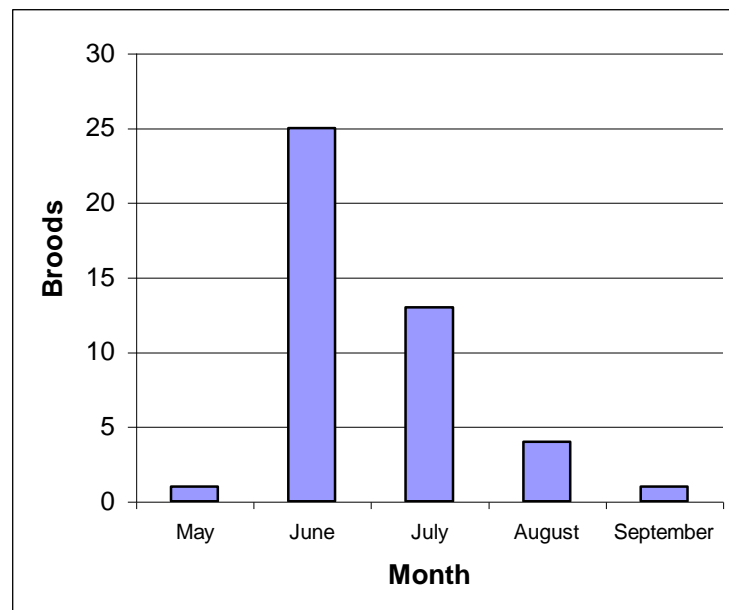
Considering all releases, most occurred in the spring and summer (67% were carried out before the end of August) and only 6 releases were carried out relatively late in the year (September and October).

Figure 3. Timing of Barn Owl releases by month divided according to the release method used (subsequent broods not included)



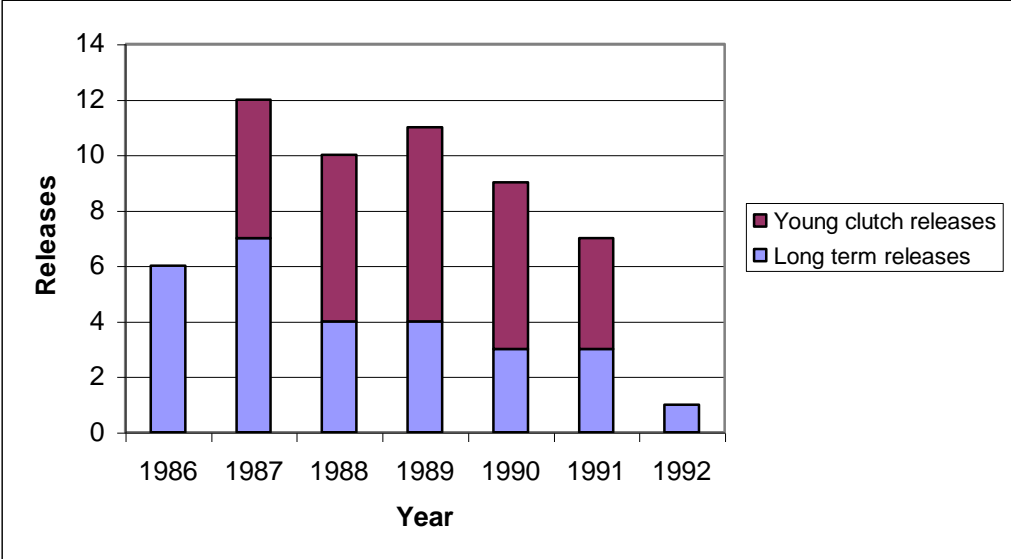
Note: For LT release adults the date used as the ringing date is in fact the birds' release date. For pulli (LT + YC) the ringing date is the date ringed.

Figure 4. Timing of wild broods ringed by month



A vast majority (89%) of wild pulli were ringed in June/July (Fig. 4) whereas the ringing of release birds (and releases of adults) occurred through a longer season (Fig. 3)

Figure 5. Number of Barn Owl releases per year divided according to the release method used (subsequent broods not included)



An average of 9 releases a year were carried out between 1986 and 1991. Only one release (LT) was carried out in 1992, the year prior to the Barn Owl's inclusion in Schedule 9 of the Wildlife and Countryside Act 1981.

5.3 Timing and frequency of ringing at Barn Owl release sites

Table 1. Number of releases and subsequent broods, the number of birds released, and numbers ringed in the period 1986-92 inclusive

| | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | Total |
|--|------|------|------|------|------|------|------|------------|
| Long term release sites | | | | | | | | |
| <i>Number of releases</i> | 6 | 7 | 4 | 4 | 3 | 3 | 1 | 28 |
| Adults released | 13 | 13 | 7 | 8 | 7 | 6 | 3 | 57 |
| Pulli ringed at time of release | 16 | 9 | 11 | 9 | 8 | 2 | 1 | 56 |
| <i>Total owls ringed at time of release</i> | 29 | 22 | 18 | 17 | 15 | 8 | 4 | 113 |
| Subsequent breeding | | | | | | | | |
| <i>Number of sites with sub breeding #</i> | | 3 | 4 | 4 | 3 | 2 | 2 | ~ |
| <i>Number of subsequent broods</i> | | 3 | 6 | 6 | 5 | 3 | 3 | 26 |
| <i>Pulli ringed in subsequent broods</i> | | 11 | 18 | 17 | 23 | 11 | 10 | 90 |
| Young clutch release sites | | | | | | | | |
| <i>Number of releases</i> | | 5 | 6 | 7 | 6 | 4 | | 28 |
| <i>Pulli ringed at release</i> | | 19 | 22 | 30 | 23 | 16 | | 110 |
| Subsequent breeding | | | | | | | | |
| <i>Number of sites with sub breeding #</i> | | | | | 1 | 1 | 1 | ~ |
| <i>Number of subsequent broods</i> | | | | | 1 | 2 | 1 | 4 |
| <i>Pulli ringed in subsequent broods</i> | | | | | 5 | 9 | 5 | 19 |
| Totals | | | | | | | | |
| <i>Total number of releases</i> | 6 | 12 | 10 | 11 | 9 | 7 | 1 | 56 |
| <i>Total owls released/ringed at release sites</i> | 29 | 41 | 40 | 47 | 38 | 24 | 4 | 223 |
| <i>Total pulli ringed in subsequent broods</i> | 0 | 11 | 18 | 17 | 28 | 20 | 15 | 109 |

note:

There was subsequent breeding at a further three long term release sites and one young clutch release site where some single broods were not ringed and these are excluded from Table 1. Since 1992, breeding has occurred annually at some release sites but these broods are also excluded from Table 1.

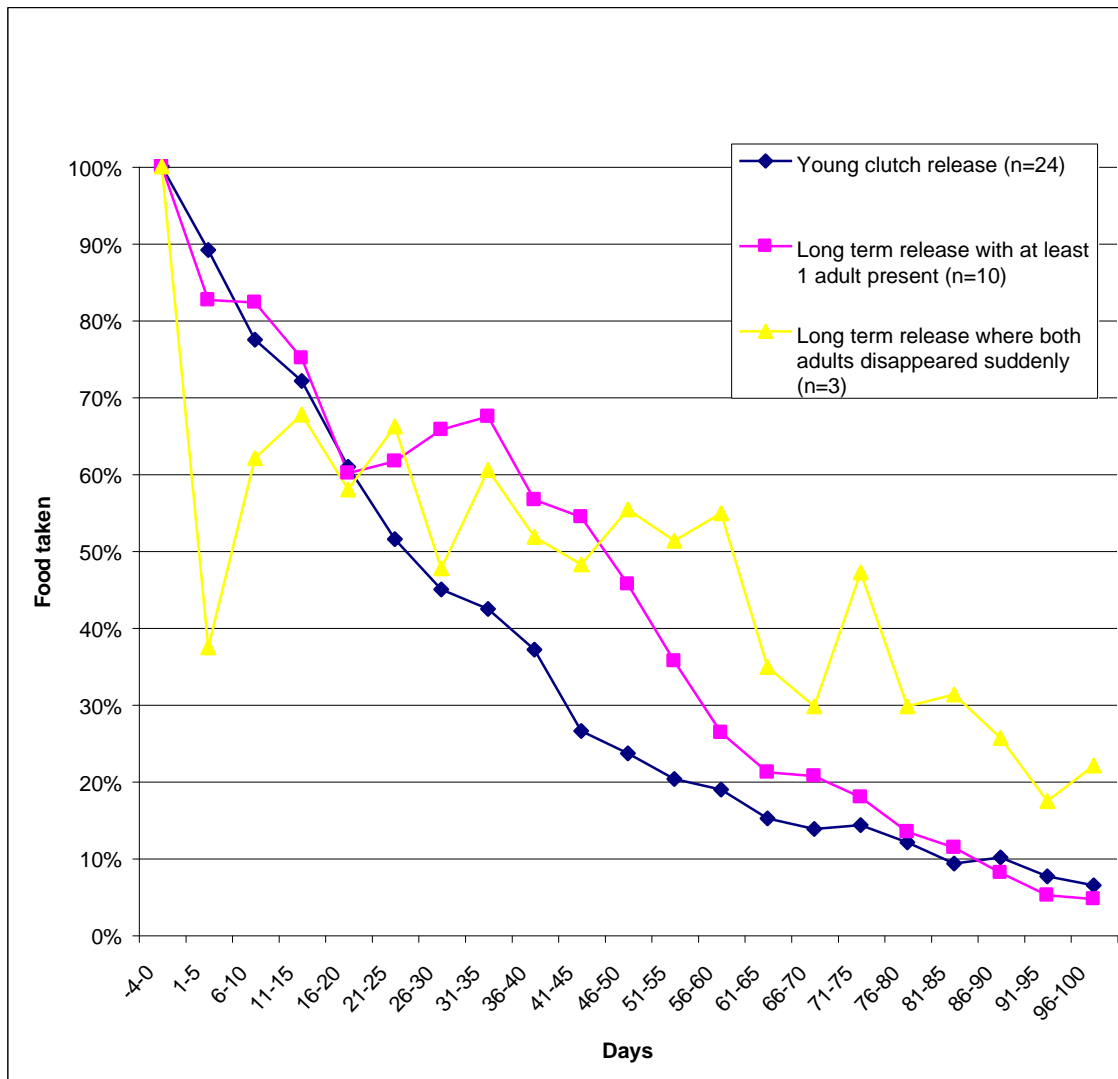
~ note:

Totals were not entered for these rows as subsequent breeding at some sites occurred in more than one year.

The average brood size at LT release sites at the time the adults were released was 2. In subsequent broods this figure increased to 3.5.

5.4 Food taken at release sites

Figure 6. Food taken over 5 day periods within the first 100 days at release sites expressed as a % of food taken during the 5 days prior to release or fledging (divided according to release method used and the apparent disappearance of released adults in some cases).



note: Records start at LT sites when the adults are released and the LT pulli are about 4 weeks old but at YC release sites records start when the pulli start fledging at about 8 weeks old therefore there is a time lag of approximately 20 days between the YC and LT release sites.

Overall, figure 6 shows a gradual reduction in the proportion of food (dead day-old poultry chicks) taken after release as released birds adapt to the wild (become independent) and/or disperse. After approximately 70 days the general descent of all three lines starts to level out. By 100 days most of the pulli have dispersed and a small number of birds, mostly adult, remain at or near the release site and some continue to take food.

Long-term releases where both adults disappeared suddenly (and a record form was received) (fig. 6) are few in number and this explains why this line is less smooth than the other two. In such cases the food taken dips immediately (providing evidence that

the adults have gone). After a few days the release site operator begins to place food in the nest box which the LT pulli take. The later dip between (61 and 70 days) reflects the situation at one release site when food wasn't taken for about a week. This is possibly explained by the silage cut of a nearby field that may have temporarily increased the wild food available to the owls.

5.5 Ring-recoveries by category

Table 2. Recoveries of released and wild Barn Owls (notified before 23/07/01)

| | LT adults | LT pulli | YC pulli | Sub. brood pulli | Wild pulli |
|--------------------------------|------------------|-----------------|-----------------|-------------------------|-------------------|
| Total no ringed (1986 to 1992) | 57 | 56 | 110 | 109 | 173 |
| Total number recovered | 18 | 10 | 18 | 25 | 30 |
| % of total ringed | 31.6% | 17.9% | 16.4% | 22.9% | 17.3% |

Table 2 shows that the proportions of released pulli and wild pulli recovered were similar. However a higher proportion of LT release adults were recovered than LT, YC, sub brood, or wild pulli.

5.6 Finding circumstances

Figure 7. The finding circumstances of captive-bred released Barn Owls (divided according to release method and age class at release) and wild Barn Owls ringed as pulli, expressed as a percentage of all birds recovered in each class

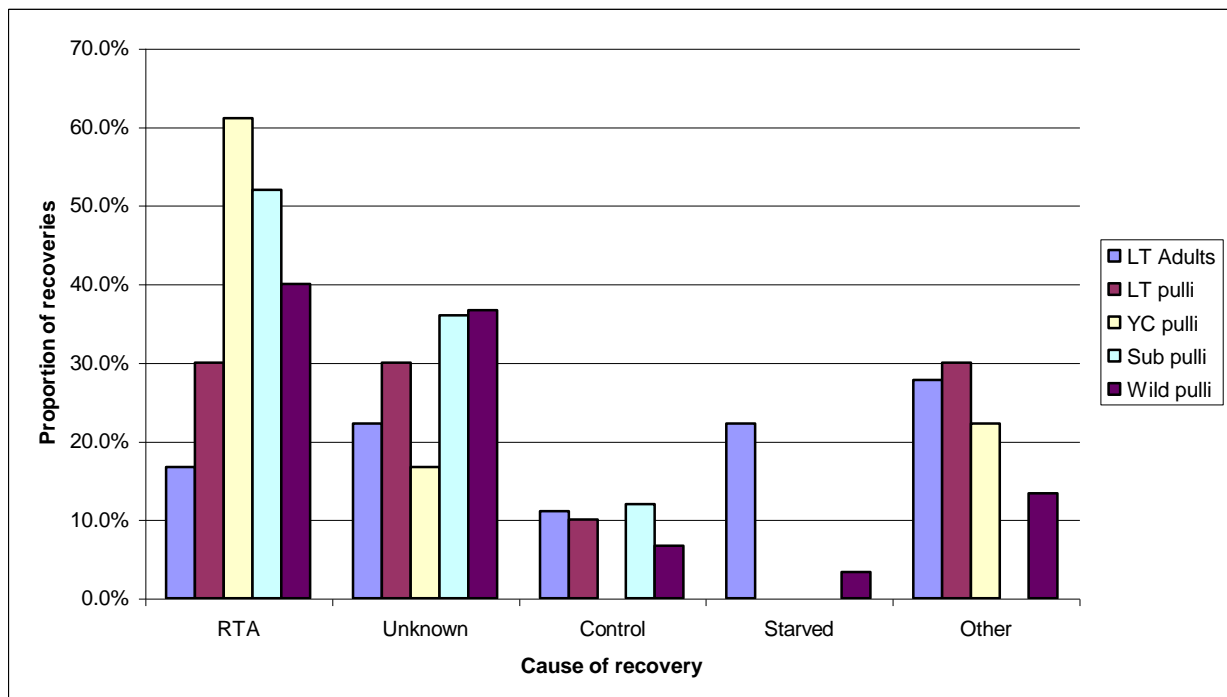


Figure 7 shows that the finding circumstances for released and wild pulli were similar. Starvation and other causes (combined) accounted for a higher proportion of released adult recoveries than pulli recoveries. A lower proportion of adults were recovered on roads than pulli.

Further analysis of Barn Owl Trust recovery notes revealed that 67% of road casualties were found along motorways, dual carriageways or modern 'A' roads as opposed to country lanes. 13% of recoveries within 30 days of ringing were road casualties compared to 47% of recoveries after 30 days of ringing.

Table 3. Other finding circumstances

| Cause | LT adults | LT pulli | YC pulli | SB pulli | Wild pulli |
|------------------|-----------|----------|----------|----------|------------|
| Flew into wire | | 1 | 2 | | |
| Trapped | 2 | 1 | | | |
| Railway casualty | | | 1 | | |
| Choked | | 1 | | | |
| Drowned | 1 | | | | 3 |
| Shot | 1 | | | | |
| Poisoned | 1 | | | | |
| Predated | | | 1 | | 1 |

5.7 Distance travelled

Table 4. Distance of recoveries of released and wild Barn Owls (up to 23/07/01)

| | Lt adults (n=18) | LT pulli (n=10) | YC pulli (n=18) | Sub. brood pulli (n=25) | Wild pulli (n=30) |
|----------------------|---------------------|--------------------|--------------------|----------------------------|----------------------|
| Median distance (km) | 1 | 5 | 12 | 17 | 11.5 |
| Min distance | 0 | 0 | 0 | 0 | 0 |
| Max distance | 33 | 60 | 112 | 390 | 73 |

Table 4 suggests that the median recovery distance between all classes of released pulli was similar to that of wild pulli. However the median distance travelled by released adults was considerably less.

Figure 8. Distance between ringing location and finding place of captive–bred released Barn Owls (divided according to release method and age class at release) and of wild Barn Owls ringed as pulli.

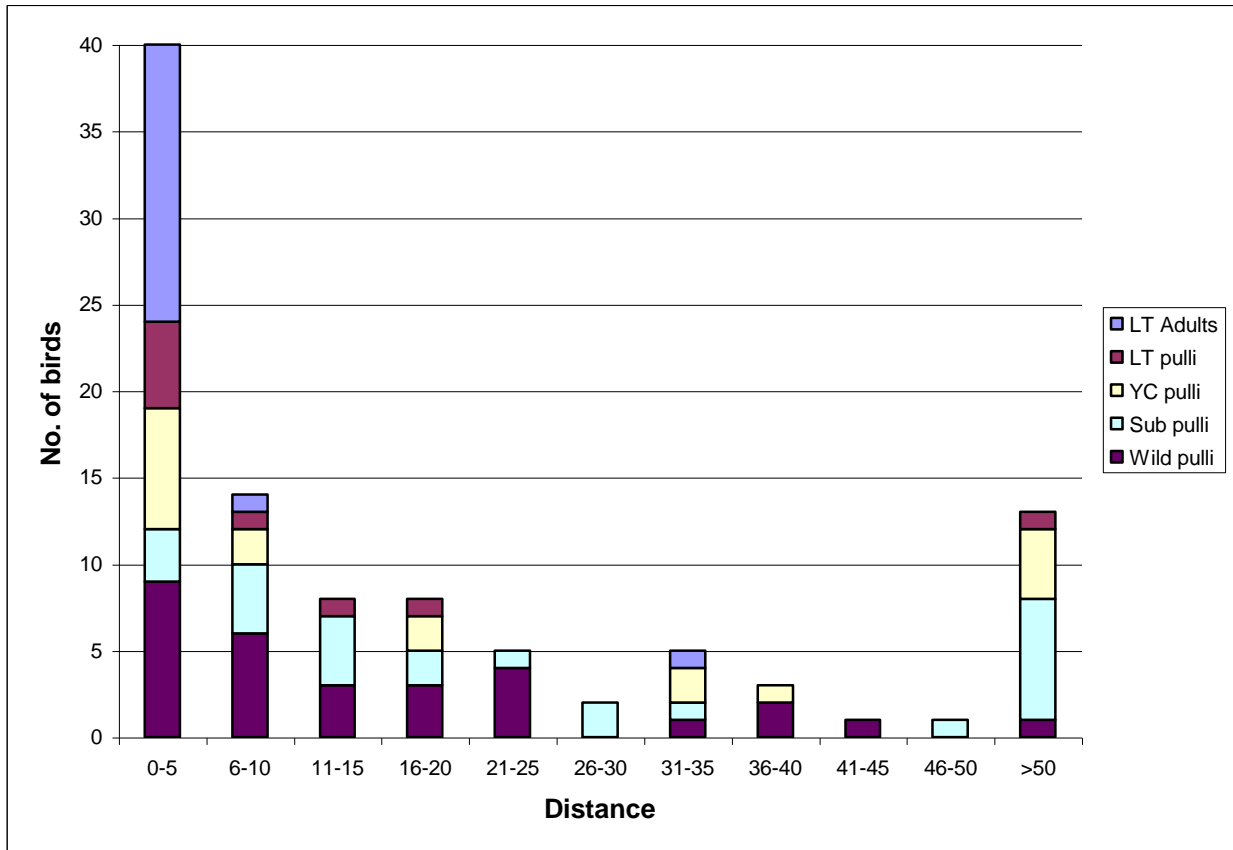


Figure 8 shows that the vast majority (89%) of LT adult recoveries occurred within 5km of the release site. Only one released adult was recovered further than 10km from its release site; a road casualty found 33 km and 1601 days after release.

40% of all recoveries were within 5 km. Over half of all recoveries were within 10km (54.9% of released birds and 50% of wild birds). 84% of all recoveries were within 40 km of the ringing/release site. These results suggest that released birds are more likely (than wild birds) to be recovered at over fifty kilometres distance.

The data for each category of owl was divided into four categories according to the direction travelled by recovered birds: 0-90°, 91-180°, 181-270°, 271-360°. A preliminary examination of the data suggested no obvious trend other than a tendency for long distance movers to go northeast (up the southwest peninsula).

5.8 Longevity

Table 5. Time elapsed between ringing and recovery of released Barn Owls, Barn Owls in subsequent broods at release sites, and wild Barn Owls (notified before 23/07/01)

| | Lt adults (n=18) | LT pulli (n=10) | YC pulli (n=18) | Sub. brood pulli (n=25) | Wild pulli (n=30) |
|------------------------|---------------------|--------------------|--------------------|----------------------------|----------------------|
| Median duration (days) | 28 | 201 | 170 | 214 | 232 |
| Min duration (days) | 5 | 10 | 25 | 55 | 8 |
| Max duration (days) | 2153 | 1957 | 1119 | 3635 | 2768 |

Table 5 shows that the median durations of all four categories of pulli were similar. The median duration of adults was considerably less – only four weeks.

Figures 9 & 10 show the frequency of ring-recoveries by period. 65% of all recoveries (all classes) occurred within a year of release/ringing. 15% of all Barn Owls ringed were recovered in the second year after ringing. The proportions of LT, YC, sub brood and wild pulli recovered up to 720 days after ringing are similar, whereas, half of the released adult recoveries occurred within 30 days of release.

Further analysis revealed that 13% of recoveries within 30 days were road casualties compared with 47% of recoveries after 30 days.



Figure 9. Time elapsed between ringing and recovery of captive-bred released Barn Owls (divided into separate graphs according to release method and age class at release) and of wild Barn Owls ringed as pulli.

Please note that the time scales (in days on the x axes) are non-linear. The y axes show numbers of birds.

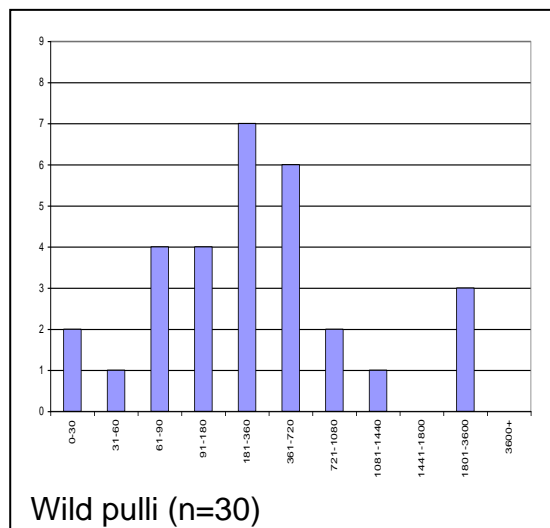
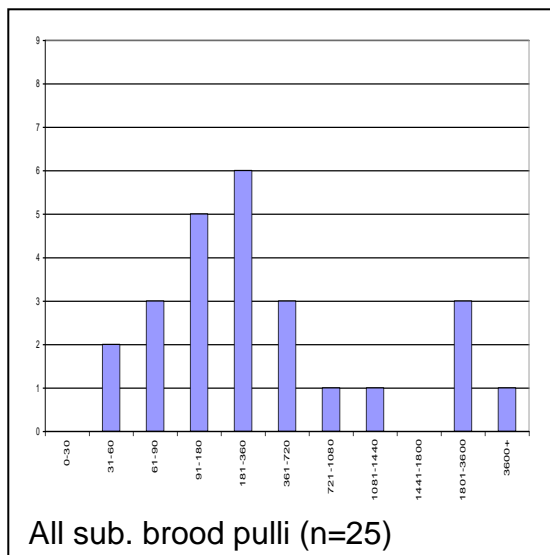
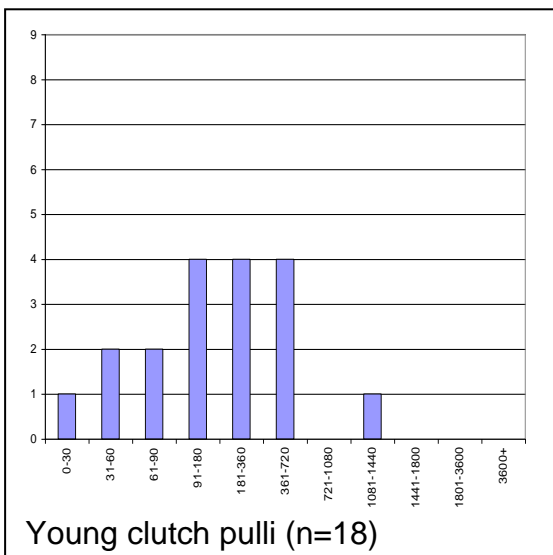
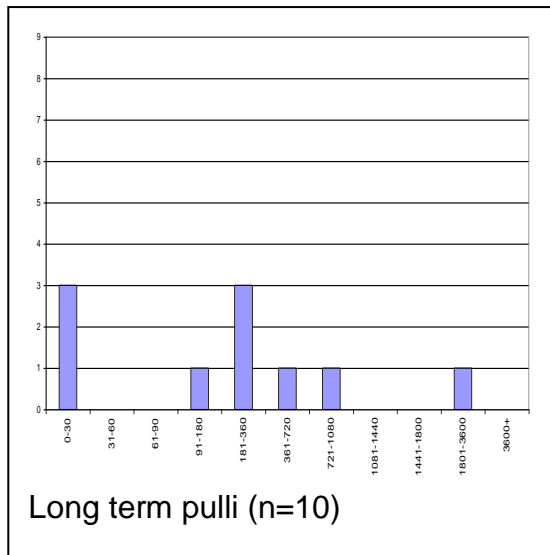
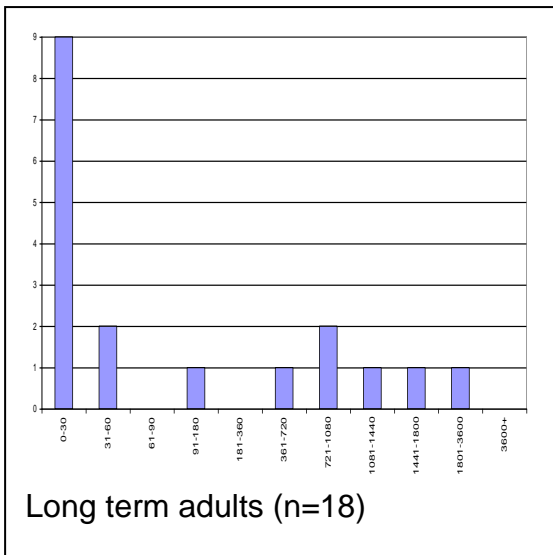


Figure 10. Time elapsed between ringing and recovery of captive-bred released Barn Owls (divided according to release method and age class at release) and of wild Barn Owls ringed as pulli.
Please note that the time scale (in days on the x axis) is non-linear.

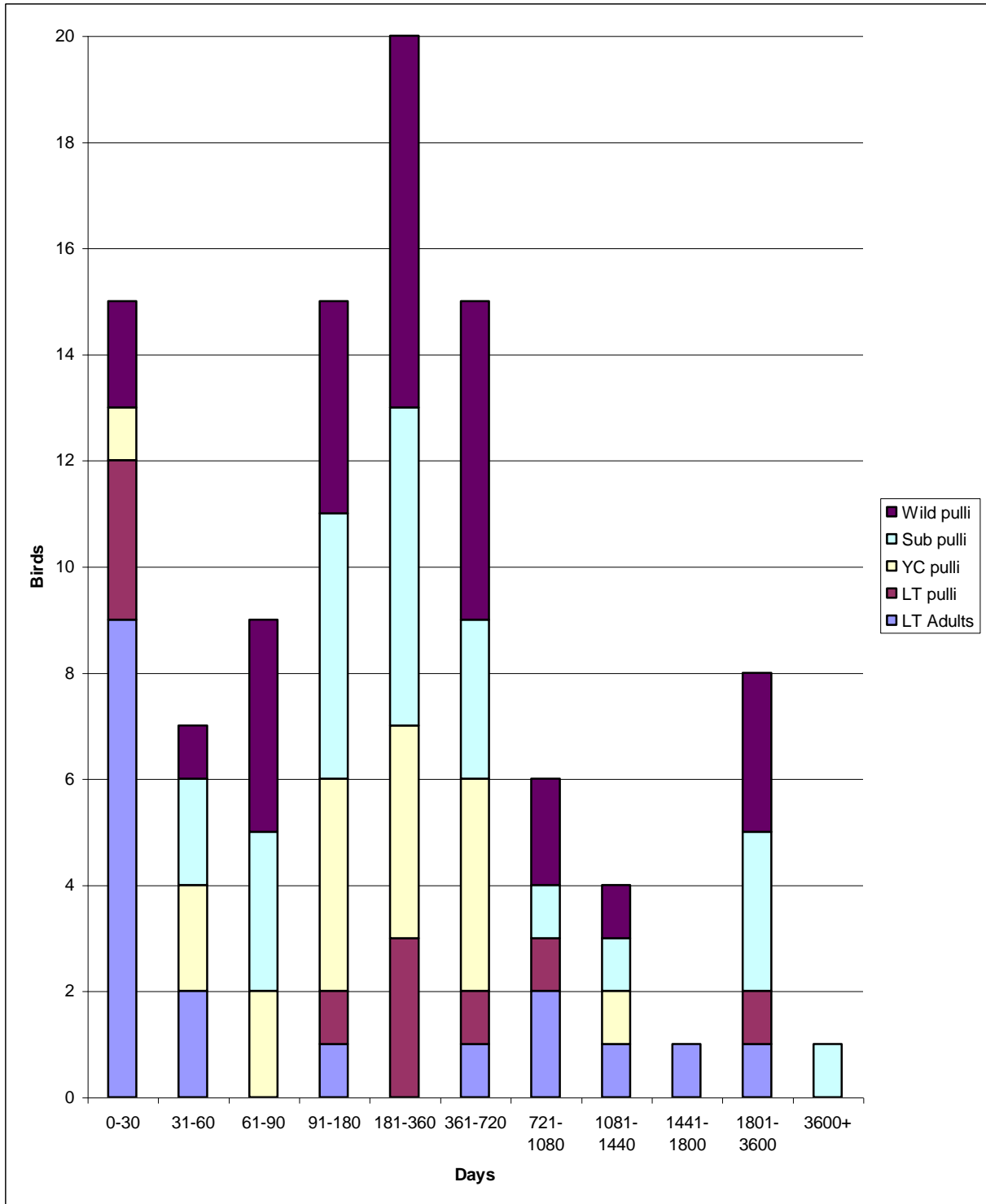


Figure 11. Month of finding of Barn Owls recovered within a year of release/ringing divided into three categories; released (Young Clutch Method), released (Long Term Method), and wild.

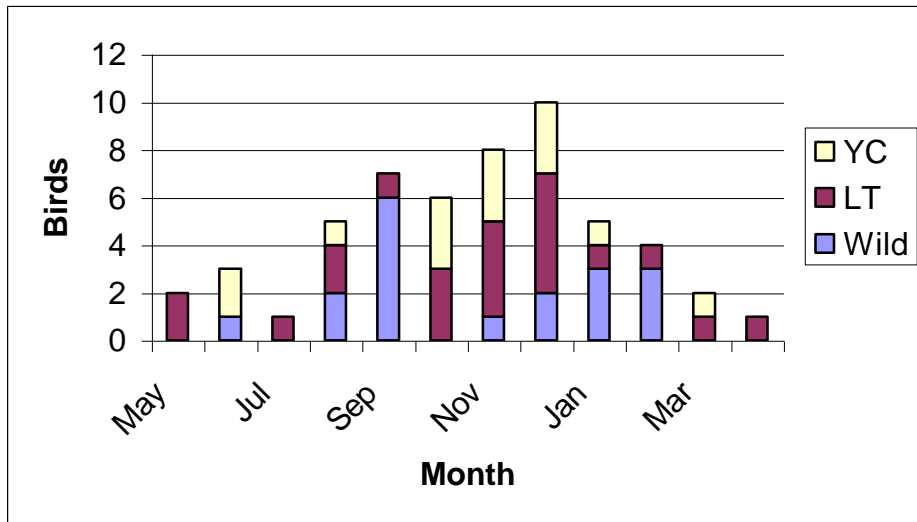
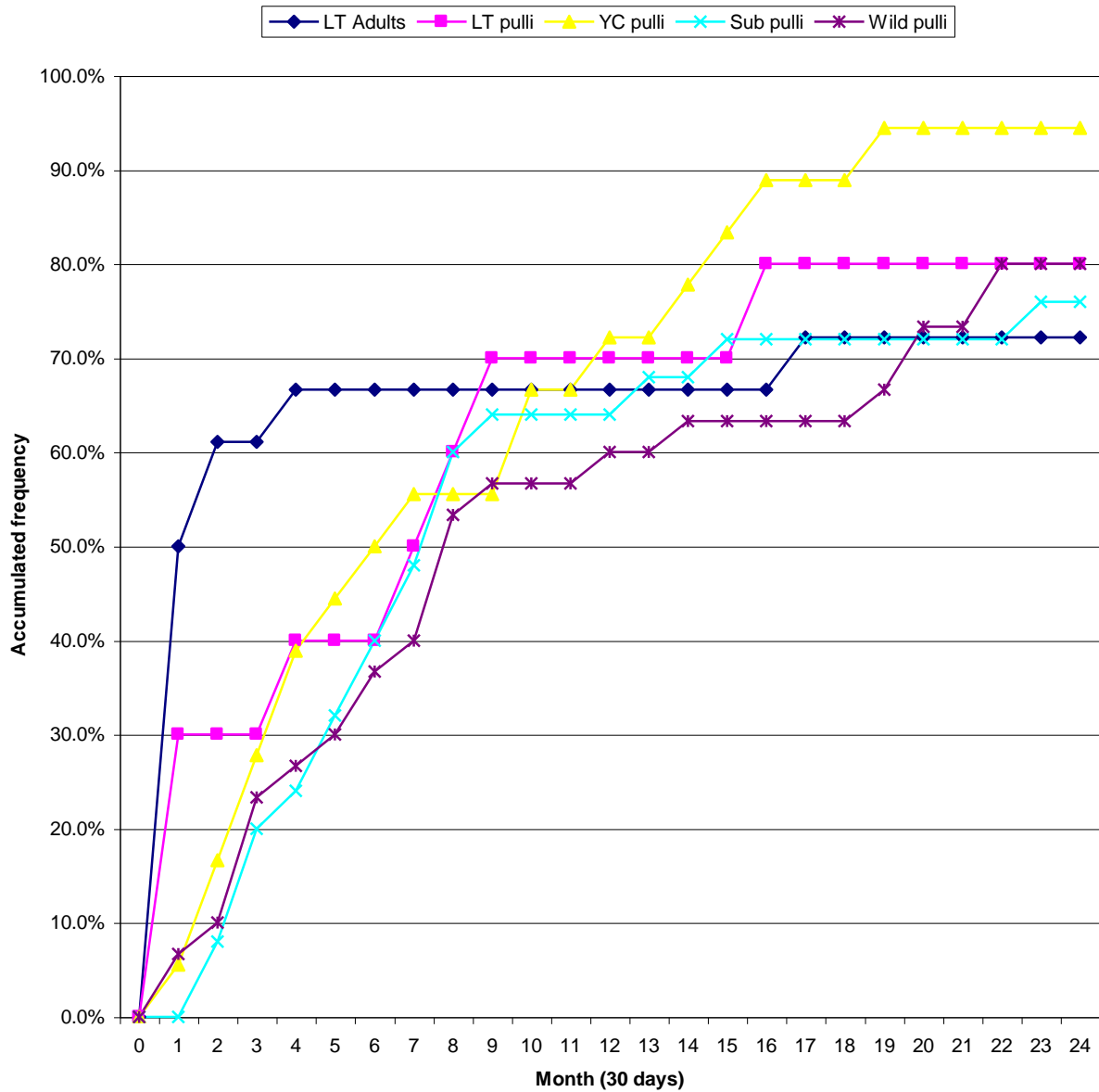


Figure 11 suggests that recoveries of pulli in the year following ringing were high in the autumn and winter months and low in the spring and summer. Wild pulli recoveries occurred mainly in late summer (post fledging/early independence) and in late winter whereas most YC and LT release recoveries occurred in the autumn/early winter (Oct. Nov. Dec.).



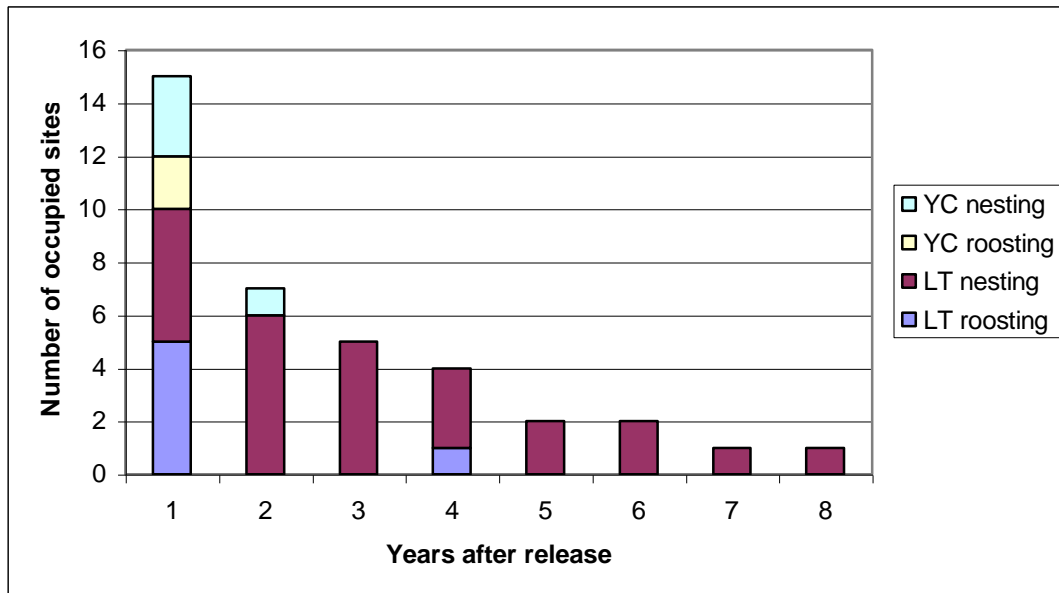
Figure 12. The monthly accumulation of Barn Owl recoveries in the two years following release/ringing expressed as a percentage of all recoveries received (<23/07/01) in each class. (Divided according to origin/release method, and age class).



Considering the recoveries of captive-bred Barn Owls released as adults in the period 1986-1992, half of all the birds found (by 2001) were picked up within one month of release (figure 12). This compares with six to eight months for the various classes of pulli. However, the proportions of recoveries occurring within twelve months are broadly similar for all classes of birds (circa 60-70%).

5.9 Release site fidelity

Figure 13. Number of release sites with continuous occupation in the years following release of broods from 28 LT releases and 28 YC releases



27% of all releases resulted in release site occupation (roosting only or roosting and breeding) in the year following release. 18% of LT releases resulted in occupation by breeding Barn Owls in the year following release compared to 11% of YC releases. By the second year after release these percentages had changed to 21% for LT releases and 4% for YC releases respectively.

No YC release sites were continuously occupied more than two years following release.

LT release sites produced 45 subsequent broods from 1986 to July 2001, 20 of which were second broods. YC release sites produced 5 subsequent broods from 1986 to July 2001, 1 of which was a second brood.

There was continuous supplementary feeding at all release sites that produced subsequent broods with the exception of two sites (one LT which produced 3 subsequent broods over 3 years and one YC which produced 1 subsequent brood).

5.10 Integration of released owls with the wild population

Due to practical limitations, no searches were carried out beyond the immediate area. Therefore the chances of finding a released bird alive were very slim. However, during the course of routine fieldwork a number of individual released Barn Owls were observed which provided evidence that released birds do integrate with the wild population:

At a 1986 LT release site the adult male (FV87526) died shortly after release. Within a month the surviving female (FV87524) had paired up with a wild adult male. The pair raised two young in 1987.

At another LT release site the resident adult female (FS96859) released in 1992 bred with an unringed wild male in 1997 and 1998 at the release site. At this site supplementary food has been provided continuously since release.

A male (FC54107) ringed in a subsequent brood at a LT release site in 1989 was controlled eight years later whilst roosting at a wild breeding site 8km away. Breeding was first reported at the wild site in 1990 and Barn Owls nested every year to 1996.

A female (FC49104) ringed in a subsequent brood at a YC release site in 1990 was controlled on eggs ten years later and 81km away at a site where supplementary feeding has been maintained and Barn Owls have nested annually for many years. This bird holds the current British (published) longevity record for a Barn Owl found alive (M. Toms pers. comm.)

A female (FS96877) ringed as a pullus at a LT release site was controlled whilst breeding in a nestbox 39km distant and 358 days after release.

A female (FC49108) ringed as a pullus in a subsequent brood at a YC release site near Exeter was recorded nesting on Salisbury Plain the following year (374 days after ringing), a distance of 131 km.

A captive-bred female (FC55800) from a YC release site was found after three years (1,119 days) at a distance of 2km in a site where Barn Owls nested annually throughout this period.

6.0 DISCUSSION

6.1 General comparison

The wild ringing sites were well distributed across Devon with a few in neighbouring counties whereas the release sites were biased more towards south Devon. However this slight difference was unlikely to bias the results to any extent as all sites were well within the southwest peninsula (see fig. 1 & 2).

Wild Barn Owl ringing occurred mainly in June and July whereas the release sample were ringed/released over a longer period (April to September) (see fig. 3 & 4). Taylor (1994) suggested that the earlier in the year birds fledge the more likely they are to survive. Thus, the pre-June released birds may have survived better than the June/July wild sample. Conversely the post-July released birds may have survived less well. Considering timing alone, there was unlikely to be a major difference between the released and wild samples.

6.2 Food taken at release sites

Birds released as pulli started to take less of the food provided (dead day-old poultry chicks) within a few days of fledging. Typically, ten days after being seen out of the nestbox for the first time, sightings would confirm that all young were still present in the release area but the amount of food they were taking had already reduced by about 20%. DR (co-author) witnessed recently fledged YC-release juveniles hunting whilst the food provided was available but not taken. Generally, by the 70th day after release the amount taken had reduced by 80% and by the 100th day hardly any food was being taken (see fig. 6).

Birds released as adults often disappeared suddenly (upon release) and the lack of food taken was the primary indicator of this. Where adults stayed and established a pattern of return for food they often continued to take food beyond 100 days although the amount was normally very small.

6.3 Recovery rates

Percival (1990) found no significant difference in the recovery rate of 292 released pulli and 1,922 wild ones. In this study the overall recovery rate of released pulli calculated from table 2 (19.3%) was similar to that of wild pulli (17.3%).

Birds released as adults produced a much higher recovery rate (31.6%) (table 2). Relatively high numbers of adults were recovered dead near the release site shortly after their release (when the release site operators would have been actively looking for their released birds). Mason (1997) found that most of the returns of released owls from the first 90-day period were from around the release site and suggested this was possibly due to the increased vigilance of the landowners and may not imply that there were more owls killed within this period (however, see 6.10).

6.4 Timing of recoveries

First year recoveries of released birds occurred mainly in October, November and December whereas first year wild pulli recoveries occurred mainly in September with very few in the following couple of months (see fig. 11). Most wild pulli were ringed at 4 to 6 weeks old in June or July and moved away from the parental area in August or September. Many died during post fledging dispersal. The later recoveries of released birds may be accounted for by three factors. Firstly, a third of the releases happened after July and so some released pulli fledged later than most wild pulli. Secondly, released pulli may have been in better condition and less susceptible to immediate post-fledging mortality, thirdly the provision of supplementary food at release sites might have encouraged released birds to stay at the site for longer before dispersing.

6.5 Finding circumstances

Balmer *et al.* (2000) found that the finding circumstances for captive-bred Barn Owls are similar to those of wild birds recovered in Britain and Ireland and elsewhere. Road casualties were the most common finding circumstance accounting for 40% of all recoveries. However the actual proportion of deaths attributable to each circumstance was undoubtedly heavily biased (Illner 1990). The reported recoveries of ringed birds show a strong bias towards birds that die in conspicuous places and road casualties make up a high percentage of these (Taylor 1993).

Out of a total of 46 recoveries of captive-bred released birds, all those reported as starved were birds released as adults (see fig 7). These were almost all short duration recoveries of birds that disappeared suddenly upon release and failed to establish a pattern of return for food.

It should be noted that this occurrence seems to be an unavoidable danger in Long Term releases. So as to minimise the risk, it is important that every effort is made to maximise the chances of establishing a pattern of return for food in released adults (as stressed in the DEFRA Release Guidelines).

A relatively small proportion of released adults were reported as road casualties as they generally stayed close to their release site (either dead or alive) and so were less likely to encounter roads than young birds dispersing over 10km. Figure 7 also shows that a higher proportion of YC pulli and Sub. Brood pulli became road casualties than wild pulli. Interestingly, table 4 shows that these birds also had a tendency to disperse further (than wild birds) and were therefore more likely to encounter the major roads upon which most road casualties were reported (see 5.6).

6.6 Distance and direction

The median distance travelled by released adults was only 1km either because they became established at the release site or because they died very quickly after release (see Table 4).

The median dispersal distance for British Barn Owls is 12km (Wernham *et al.* in press). Balmer *et al.* (2000) compared captive-bred birds released under licence in Britain (since 1993) with wild bird recovery distances and found them to be similar (of 135 released birds recovered over half were found within 0-10 km of the ringing site).

The above figures compare well with the results in hand. Just over half (54.4%) of released birds were found within 10km of the release site (compared with 50% of wild birds) (see 5.7). Considering all pulli from release sites, the median dispersal distance (calculated from table 4) was 11.3km compared to 11.5km for wild pulli. However, when divided according to release method there was a surprising level of variation within the released pulli sample. This may have been due to sampling error.

Balmer *et al.* (2000) found no trend in the direction travelled by released birds. Percival (1990) also found no significant variation in regional dispersal patterns of wild Barn Owls ringed as pulli. However, in this study some YC pulli and wild pulli appeared to be inclined to travel in a northeast direction (up the south west peninsula). This result may be accounted for either by chance or possibly by the influence of the local landscape. A large proportion of ringing/release sites were near the south coast and the sea may have acted as a barrier. Another influence on the direction of travel might have been the prevailing southwest wind. Alternatively it is possible that some birds did move out to sea and that the slim chance of maritime recovery has biased the data.

6.7 Longevity

The fact that the median durations of all classes of released and wild pulli were similar suggests that released pulli (the vast majority of which dispersed away from their release sites) were just as likely to survive as wild ones (see table 5).

Concerns expressed by various authors about the poor survival of captive-bred released Barn Owls (such as Cayford and Percival 1992) are not supported by this study*. Recoveries in this study suggest that wild pulli and all classes of Barn Owls from release sites (including adults) had first year mortality rates of 60% to 72% (see fig. 12). Although 6 or 7 out of every ten captive-bred released Barn Owls were likely to have died within a year the same was true for Barn Owls of wild origin. From his studies in SW Scotland, Taylor (1993) estimated that on average about 65% of wild Barn Owls die during their first year. Similarly, Percival (1990) stated that in SW England the first year survival rate for wild Barn Owls was only 29.4%. Birds released as adults were often short-lived but those that survived the release process had a reasonable chance of survival.

*However, concerns about the fate of birds that are simply taken from an aviary and "let go" are thoroughly justified.

6.8 Release site fidelity

From a total of 56 releases were carried out from 41 release sites. In the year following release, fifteen sites were still occupied (Fig. 13) and breeding occurred at eight of these. Young clutch releases did not normally result in the establishment of a nesting pair at the release site but at some LT sites breeding occurred annually for many years and at sites where supplementary food was provided the birds were often double-brooded. 21 out of 50 subsequent broods (< July 2001) were second broods. Burman and Nowakowski (2000) also reported a number of release sites where breeding occurred for 3 and in one case 4 consecutive years.

It should be noted that the Long Term release method's main advantage is that it stands a reasonable chance of establishing a breeding pair at or near the release site.

Interestingly, average brood size increased after release. Captive pairs in LT release sites produced an average of two young per brood but after release the average increased to 3.5 despite of the fact that ample food was provided prior to release (see 5.3 and Appendix 1). This may perhaps be explained by the birds behaviour becoming more natural after release or perhaps by an improvement in nest hygiene: The quality of Barn Owl nest debris is determined by diet; birds fed on a natural diet produce a thicker and more absorbent nest debris than birds fed on day-old chicks (pers. obs.).

Although the primary motivation of release volunteers was often the desire to establish birds at their site, this did not often occur. The numbers of birds that dispersed from release sites (to boost numbers in the wider population) was potentially of greater benefit than the number of release sites that became wild sites.

6.9 Comparing released and wild adults

In this study, no comparison was made between released adults and wild birds ringed as adults. Although Percival (1990) did carry out this analysis it was both inappropriate and unhelpful. Wild birds ringed as adults are birds which have already survived their first year and stand a reasonable chance of further survival. A study of Barn Owls in Scotland (Taylor 1993) found that the mortality rate of birds in their second year is about 50%, in their third year 40% and in their fourth year 30%. Adult survivors should not be directly compared to newly released captive-bred adults (which have no experience of life in the wild) many of whom were likely to perish.

6.10 Released adults and released pulli

In the early days after release, mortality amongst adults was higher than amongst pulli. The speed of release of pulli was governed by the natural pace of their development and a pattern of return for food was almost always established. Thus, the release was gradual and relatively safe. The young were able to develop their prey-catching skills near the release site where they were supported by the provision of supplementary food. However, when an adult was released it was immediately able to fly a long distance from the release site and away from the support of supplementary food before

it learned to hunt. Thus, a pattern of return for food was often not established. This would account for the higher proportion of adult recoveries attributed to starvation.

No matter how good the surrounding habitat, if the adults do not learn to hunt very quickly and/or are not able to find their way back to the release site they starve. Fajardo *et al.* (2000) found that the key factor that exerts strongest influence on post-release survival was live prey training prior to release. This helped considerably to increase survival chances and suggests that refinement of the LT release method to include live prey training may result in lower initial mortality of adult birds.

6.11 Influence of long term supplementary feeding

Sustained supplementary feeding appeared to influence the vitality and breeding success of released birds. In this study, at eight out of ten release sites where subsequent breeding occurred, supplementary food was provided for as long as the birds were taking it. Other release schemes have found similar results. Shawyer (1998) commented that “the fact that pairs released [by the South Midlands Barn Owl Conservation Group] established themselves at all is probably because of the level of adult mortality in winter has been reduced artificially, through supplementary feeding”. Dockerty (1993) observed that continued supplementary feeding was a feature at the two Hertfordshire sites at which pairs became established and suggested, therefore, that lengthening the period of feeding may encourage released birds to remain at the site. Pearce and Woodland (1988) reported a released female double-brooding in 1987 and 1988 with help from food supplements. She had mated with a released male who continued to roost at his release site some distance away where food was provided. Each night he repeatedly carried dead day old chicks 1.5 miles to his mate’s nestbox. The pair had fledged seventeen young. Hackney (1988) also suggested that many released birds might have survived because their diets were being supplemented by the continued provision of food at release sites.

It is possible that these artificially sustained birds competed unfairly with the fragile wild population, however, such competition would have been restricted to the assisted birds foraging range. It is probable that supplementary fed adults didn’t forage as extensively as their wild counterparts who may occasionally venture as far as 5km from their former nest sites during winter (Taylor 1994). Given the scarcity of long term supplementary feeding sites, the overall effect on the wider population was (and is) almost certainly negligible. It is also possible that supplementary feeding masks the higher mortality, which might result from releasing birds into areas of less suitable habitat. However, in this study the release sites were chosen partly because the release area habitat did not appear to be inferior.

Newly released adults that returned for food and survived their first month after release had a tendency to stay at or near the release site. Released pulli on the other hand normally dispersed away from the release site (away from the source of supplementary food) and were therefore much less influenced by its provision. Considering the wider population, for example SW England, whether or not a small number of released pairs were artificially supported may be of little importance. The net gain for the wild population was the number of young that dispersed away from such sites. Whereas most wild nest sites produced circa 2-3 young per year, sites with supplementary feeding typically produced 6-9 per year.

With the help of long-term supplementary feeding, one Barn Owl Trust release site still has a breeding pair in residence ten years after release. Whilst the release volunteers do not have the satisfaction of stating that their resident pair are self sufficient, they are content in the knowledge that their site alone has produced no less than 17 broods and a total of 59 young have dispersed into the wild. Given that their dispersal pattern and longevity is similar to that of birds from un-supplemented sites, the value of long term supplementary feeding should not be underestimated.

6.12 Integration with the wild population

DETR (1997) release guidelines state that the long term aim of any release is to establish a self-sustaining Barn Owl population with captive-bred stock which will integrate with the existing, wild population and breed successfully. However gaining evidence of this was extremely difficult due to practical issues such as the time-consuming nature of detailed searches.

It was extremely difficult to closely monitor released Barn Owls, particularly those that moved away from the immediate release area. However, the results presented thus far, indicate that released pulli dispersed in the same way as wild pulli and were therefore likely to come into contact with any remaining wild birds in the general area. Amongst released juveniles there was no reason to suppose that their intra-specific behaviour was unnatural; all were naturally imprinted.

Those released adults that survived the release process were likely to remain at the release site and breed in subsequent years and were therefore unlikely to encounter birds of wild origin unless one moved in. This is known to have occurred at a small number of LT release sites.

Seven chance sightings away from release sites provided evidence (in some cases conclusive) that released birds did integrate with the wild population and breed with wild birds. Pearce and Woodland (1988) also reported released and wild birds breeding together; a released male paired with a wild female fledging broods of five and three young.

However it was not possible to determine the extent to which the releases contributed to the maintenance of a self-sustaining wild population. Even if the precise size and make up of the free-living Barn Owl population were known, it would be extremely difficult to quantify the impact of releases because, in the absence of an identical "control area" for comparison, the impact of all other variables would need to be quantified.

Dockerty (1993) reported that it was difficult to precisely quantify the contribution made by released birds to Hertfordshire's Barn Owl population. In the USA, Ehresman *et al.* (1988) reported that although more than 1,000 captive-bred Barn Owls were released in Iowa, Missouri and Nebraska over six years there was not much evidence that these releases had a significant impact on the Midwest Barn Owl population.

6.13 Conservation value

The establishment of captive-bred birds as breeders in the wild is not, on its own, an adequate criterion by which to assess the success of reintroduction schemes as a contribution to the conservation of the species. Population simulations carried out by Taylor and Massheder (1992) suggested that some pairs may become established but, following the cessation of releases, fail to maintain a stable population because their survival and productivity are inadequate. Productivity and survival are closely linked to food supply and therefore habitat quality (Taylor 1994).

Taylor and Massheder (1992) showed (in simulation) that where habitat was improved, a depleted natural population could increase naturally and the validity of releasing captive-bred birds must be questioned. Mason's (1997) study strongly suggests that adopting policies of habitat improvement, such as creating areas of rough grassland/mature set-aside and erecting nestboxes may have a positive effect on the Barn Owl population without the need for captive-breed and release programmes.

There can be little doubt that if a significant proportion of every farm became ideal Barn Owl habitat the remaining Barn Owl population would expand naturally. In such circumstances releases would be a waste of effort. However, in spite of growing awareness and an increase in the scale of grant-aided improvements, the vast majority of land does not afford good habitat and Barn Owl numbers remain worryingly low with an estimated 300 pairs in Devon (Grant *et al.* (1993) and circa. 4,000 pairs nationally (Toms *et al.* 2001).

One advantage of involving landowners in a reliable release scheme is that this often leads to a new and enlightened attitude towards habitat restoration (pers obs., Hanna 1992, Warburton 1992). Throughout the release period covered by this report the Barn Owl Trust was contacted by circa 160 landowners / farmers who wanted birds released on their land. In every case, the Trust's response was to advise the applicant to erect nestboxes, improve foraging habitat as much as possible, and wait two years. If no wild Barn Owls occupied the area naturally (and the habitat was deemed suitable) then a release was planned. Thus, the possibility of a future release was used as an added incentive; encouraging habitat improvements.

This system resulted in real habitat improvements and in several cases wild birds did colonise sites as a result (pers. obs.). The sites (and areas) not occupied naturally (in spite of the apparent suitability of the habitat), (where the owners were still keen), became the release sites featured in this report.

Ehresman *et al.* (1988) reported that the positive impact resulting from releases in Iowa was an increased public awareness of Barn Owls and that educating the public about Barn Owls was an important part of the Iowa Barn Owl restoration program.

Release is capable of establishing additional pairs and of boosting the numbers of young birds with the potential to supplement the breeding population. Release is a useful tool for increasing awareness and obtaining habitat improvements. Dedicated release operators are often also involved in habitat and rodenticide-use advisory work, nest box erections, BTO ringing and annual monitoring. To remove release from the range of conservation tools at their disposal would be a mistake.

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9.0 APPENDICES

9.1 Details of the Long Term release method

Barn Owl Trust information leaflet no.11 provides the only (known) source of detailed information on the Long Term Release Method. Although updated, the information presented is essentially the same as that published by the Barn Owl Trust in 1989.

The Long Term Release

LEAFLET No 11



Reg. Charity No 299 835

This specialist leaflet describes a method of releasing adult Barn Owls and their young into the wild (for which a licence from DEFRA is required). It covers the selection and preparation of a site, the breeding of birds for release, release procedure and post-release monitoring.

Note

In order to understand the basic concepts and the need to adhere to the recommended methods, we strongly recommend you read *Why Release Barn Owls?* (leaflet no. 6).

The process in brief

A Long Term Release aims to establish a pair of Barn Owls at or near the release site with the intention that they will breed there in future years. A pair of captive-bred, healthy, unrelated, BTO-ringed adults are introduced into a suitable building where they are confined for up to six months, ideally with views of good habitat. They are fed every night and if all goes well they will breed whilst still captive in the release site. When the young are half grown the adults are given access to the outside world but the provision of food is maintained. The short term aim is to establish a pattern of return for food. Eventually the adults should start to hunt for themselves. The owlets fledge about four weeks after the release and disperse naturally.

Basic requirements

The release site must be in an area of suitable habitat (with at least some rough grassland), supporting a good population of small mammals, but with no wild Barn Owls present. The release site must be big enough for the birds to fly around in whilst they are confined. It doesn't have to be an agricultural building but should be the kind of site that wild Barn Owls would choose to roost and nest in. Buildings always require at least some temporary alterations for use as a release site.

You will need to do a detailed survey of all land and potential roosting places within 2 km of the proposed release site. You will need a freezer, a store of owl food, and someone to feed the birds every night for at least six months.

The release of captive-bred Barn Owls into the wild in Britain requires a licence. An application form and copy of *The Guidelines for the Release of Captive Bred Barn Owls in Britain* is available from the Department for Environment, Food & Rural Affairs, Wildlife Licensing and Registration Service, Floor 1, Zone 17, Temple Quay House, 2 The Square, Temple Quay, Bristol BS1 6EB.

Once captive owls have been released they are legally wild birds and so are protected against disturbance

during breeding. You will require an additional licence from English Nature if you intend to carry out nest inspections during any subsequent breeding attempts.

Please note: This leaflet should be used in conjunction with the DEFRA guidelines.

Survey

If you already know that one or more wild Barn Owls have roosted within 2 km of the proposed release site in the past twelve months there is no point applying for a licence. It is much better to concentrate on encouraging wild birds through habitat improvements. If there are no Barn Owls around, ask yourself why. Please see *Habitat Management* (leaflet no.1). If there is an obvious probable cause the area may not be suitable for a release. Try to avoid an area where second generation rodenticides are widely used, see *Rodent Control* (leaflet no.21).

Before your licence application is submitted a survey within 2 km of the proposed release site should be completed in accordance with the DEFRA guidelines. The survey is essential and has two aims, a) to show that the habitat quality is adequate and b) to determine if there is any evidence of wild Barn Owls roosting within 2 km at any time in the past 12 months.

Please see *Survey Techniques* (leaflet no.8).

The building

The release building must be selected and prepared in such a way that a free-flying Barn Owl would choose to frequent it. Generally speaking Barn Owls are not found in very small or very low buildings. The absolute minimum height for a release site is 3.5 metres (12') at the apex. If there is a range of buildings to choose from, go for one over 4.5 metres (15') high. A two storey fully enclosed traditional barn overlooking open countryside with areas of good habitat should be ideal. Whilst confined the owls should come to associate the building with food, shelter and security.

It is essential that the owls do not escape prematurely—during preparation the building must be thoroughly searched and all possible escape holes firmly blocked off. The smallest square hole a Barn Owl can get through is only 70mm (2 ¾") and premature escape from the release site is normally fatal. Some old barns are virtually impossible to make owl-proof and this factor may influence site selection.

In a large building the birds may not need to have access to the whole of the interior but they should always have access to the upper part. Obviously the site must have one or more suitable owl holes in the wall(s) at least 3 metres (10') above ground level. An aviary (see fig 2) will need to be provided on the outside of whichever hole affords the best view of the landscape. If the owls have a good view out of the

building in more than one direction this will enable them to become familiar with the lie of the land before release. Nearby trees or buildings will obstruct the view and increase the danger of newly released birds failing to find their way back (which is usually fatal). There will need to be a minimum length of 4m (13') of flying space indoors.

Safety precautions

Before you prepare the site take time to consider the hazards you might face and what steps you could take to minimise the risks. Hazards might include an injury at a remote location; falling from a ladder; injury from heavy lifting. The following are examples of precautions you should take to reduce the risks.

- 1 Ideally take a companion. If working alone at an isolated site, let someone know where you are going and when you expect to be back before you set off. Carry a mobile phone if you have one.
- 2 Time spent in reconnaissance and preparation is seldom wasted. Always plan ahead - especially for tasks up ladders!
- 3 Ensure that your ladder is secure before climbing it. If possible tie it off at the bottom and top.
- 4 Avoid over-reaching - never attempt to carry out any task up a ladder if you cannot reach comfortably.
- 5 When planning how to position, support and fix a nestbox or a wall aviary, try to create a situation where it can rest in position without being held. This will allow you to have both hands free to fix it safely.
- 6 When carrying anything large up a ladder, ensure that it is kept low relative to your body (ideally not above waist height). This will keep your centre of gravity down. Try to keep it in front of both you and the ladder so that it pulls you towards the ladder - never hold it behind or above you.
- 7 You are responsible for your own safety - assess all the risks and be careful.

Nestbox erection

The suitability of almost every building can be improved by providing a nestbox. It is a good idea to erect one or more boxes at the earliest opportunity. There is always the possibility that a wild Barn Owl will move in and prevent the need for a release. See *Indoor Nestboxes* (leaflet no. 3).

Be aware that the optimum position for a nestbox in a release site is often not the same as for a box for wild birds. The main difference is that the release box must be in a totally rat and cat proof position. Also, in most cases, a ladder will need to be semi-permanently positioned below the box enabling you to check the nest contents. At a later stage, it may become necessary to place food items in the box nightly.

Make sure there is a clear flight path from where the owls will be entering the building to the hole of the box.

If the owls are confined in a loft, it is likely that their box will be low in relation to you when you enter. In these situations it is important to position the box well away from your entry point with the hole facing you as you enter. This should encourage the owls to fly into the box each time you enter, rather than flying back and forth and getting upset.

Occasionally a potential release site may be discovered which is OK without a nestbox. For example, an empty disused water tank in the top of a suitable building may be suitable.

Whatever type of cavity is used it is essential that you can see and reach all of the interior and that food can be provided there without any danger of something other than the owls gaining access to it.

Partitions

If you are going to partition off part of a building, leave plenty of room for the birds to fly around inside. Bales, boards and wire netting (2.5 cm or 1") are all useful for constructing partitions. When using bales, stack them lengthways and pack them tightly to prevent escape. Don't forget a lockable doorway. You will need to enter the owls' space daily so make your access easy. Also, make an owl hole 12.5cm x 25cm (approx. 5" x 10") at the top of the partition. Fix wire netting over the outside which can easily be removed later, allowing the owls access to the rest of the building without flying outdoors (*Fig. 1*). The rest of the building can be used for other purposes whilst the owls are confined. Regular noise will not be disturbing but unexpected loud noises may frighten them.

A wall aviary

The owls' exit to the outside of the building should have a small aviary (see fig 2) fitted over it, allowing them to perch outside the building whilst still captive. One of the advantages of this is that the owls' field of vision will be increased, permitting greater familiarity both with the surrounding landscape and the outside appearance of their building. This is important and will help to reduce the risk of the owls simply getting lost upon release. An adult owl flying free for the first time may be highly stressed by this new experience and may fly for quite a distance. If it does not find its way back to the release site its chances of survival are extremely slim. The more familiar the bird is with the outside appearance of its building and its immediate surroundings the better. Allowing the owls to perch outside should also teach them to stay inside during bad weather. This will reduce the chances of the bird flying in rain and becoming water-logged after release.

The wall aviary is simply a five-sided cage covering the owls' exit hole high on the wall of the building. It is very awkward to manoeuvre a cage up a ladder and fix it on the wall - the operation requires a good deal of planning. Make a lightweight frame of 2.5cm (1") square timber (see fig 2) and cover four sides with 2.5 cm (1") wire netting. Fix a perch in the aviary - a broom handle or similar. Make a separate frame, covered in wire, to fit

over the front and attach it in such a way that it can be removed quickly and quietly. Alternatively, make the aviary out of stiff weldmesh so that a wooden frame is unnecessary.

Make sure that once the aviary is on the wall you can reach all four corners of the front to undo it. Attach the front frame with tying wire or rot-proof cord so that it can also be released quickly and quietly with wire cutters.

Feeding table

This is basically a standard (but roofless) bird table (see fig 3). The provision of food for the owls is likely to encourage rats, particularly when food items are left lying about. Under no circumstances should rat poison be used at a release site. The food-table must be a guaranteed rat-proof feeding place. It may not matter that rats can get at the food whilst the owls are captive, since the owls can carry off what they need before the rats take any. However, once owls are released the adults may not be in the building when the food is put out. If this happens, it is likely that rats will take everything.

It is important that the food-table is not moved at release time so you need to get it in the right position from the beginning. Remember that rats can run along beams and drop on food from above.

Food should only be provided on the feeding table where you can be sure that only the Barn Owls can take it both before and after release. Unless you have many hours to spend watching the owls after release, your main indicator of what is happening is the amount of food being taken. If the food is being removed by other animals, then this vital indicator is lost and the owls will starve while you presume all is well.

Water bowl

Although Barn Owls do not drink very often, they do like to bathe. A small dish with 2cm (1") of water in it is useless, but anything very large and deep is dangerous as the owls may become water-logged and drown. Ideally, use a large washing-up bowl with 7cm (3") of water in it. Wash the bowl with pure water (not detergents) and change the water every time it is soiled and at least once a week.

Encouraging mice into the release site

If the owls can practice hunting in the site prior to release this should greatly improve their chances of survival. Encourage mice to live in the release site - (either house mice or wood mice) - by providing cover in the form of hay or straw bales, food and water. However, the food must be provided in such a way that rats cannot get at it. This is a simple matter of completely surrounding the food container with 12mm (½") wire netting or weldmesh, which a mouse can easily pass through but a rat cannot. A simple alternative is to use an old budgie cage with a metal floor to put the food in. The easiest food to provide is any kind of whole grain. Mice will also need a water supply - use a poultry water drinker or similar. The food

and water can be incorporated into a small stack of bales on the floor of the release site. Pellet analysis can determine whether or not the owls are successful. See *Pellet Analysis* (leaflet no. 20).

Selecting and installing the birds

There is generally no shortage of captive-bred Barn Owls in Britain, but not every captive owl is a suitable candidate for release. In order to ensure birds are most suitable, the first generation progeny of disabled wild birds found locally would be ideal. The most important factors are: both birds must be of the white-breasted British race *Tyto alba alba*, both should be no more than two years old, not tame, unrelated, and in perfect condition. Where the birds can be chosen from an aviary containing several individuals, try to choose a male and female who have already chosen each other (they roost side by side).

The adults should be installed during the winter so they have time to settle in and establish a pair-bond before the breeding season. It is important that their BTO rings are fitted before they are placed in the release site. See *Rings and Ringing* (leaflet no. 15). From the time the pair are installed, nightly feeding should be omitted not more than once a fortnight. See *Feeding Barn Owls* (leaflet no. 13).

Breeding

In order to monitor the owls during breeding it will be necessary to regularly inspect the nestbox with a torch to see if the female is sitting and later to check the owlets. It is a good idea to get the adults accustomed to these brief inspections from the time they are installed. Remember that the unexpected is most disturbing to a Barn Owl so a familiar routine should be established. If the female flies out of the box every time you enter the building then the nestbox is in the wrong place.

As egg-laying time approaches (late March-April), briefly shine your torch into the box about twice weekly. It is very useful to know the date that the first egg is laid. Eggs are laid at approximately two day intervals, so if there are three eggs you can calculate that the first one was laid about six days earlier. When visiting a sitting female, you may find that she will slowly rise to a crouching position and start to sway from side to side. This is useful as it allows you to see some of the eggs. However, retreat quickly before she moves off the eggs altogether. If she has plenty of time to get used to you, she may ignore you completely and sit tight - don't encourage her off the eggs. Maintain your regular inspections throughout the incubation period - just shine your torch briefly into the nestbox.

Eggs are laid (and hatch) at 2-3 day intervals. Although each egg takes about 31 days incubation; this is extended to approximately 6 weeks by the staggered laying and hatching times.

At hatching time the food supply will need to be increased. This is why it is useful to know when the first egg was laid - you can calculate when to increase the food and avoid extra inspections. As the first-egg-due

date approaches there are several things to watch out for. You may find half an egg shell on the floor or you may hear the young calling. The food-begging call starts off as a faint "Psh-psh-psh", you may also detect a feeble repeated chittering sound - quite often nothing is heard. From the date the first egg is due to hatch, increase the food supply on the feeding table at a rate of one day-old poultry chick per night. Use common sense - try to supply very slightly more than the owls eat.

With luck most of the eggs will hatch and the owlets develop well. One problem that may occur is "disappearance". During incubation, particularly the later stages, eggs can simply disappear. Similarly, from hatching up to around six weeks old owlets can vanish without trace.

If no attempt is made to breed, you probably have two males. When two females are together, anything short of successful breeding can occur - sometimes as many as 15 infertile eggs are laid with the two females sitting side by side (see *Sexing Barn Owls* leaflet no. 23).

Assuming that five eggs have hatched over ten days, you will be using between ten and fourteen poultry chicks per night. Maintain your regular inspections, watching out for food surpluses. When the oldest chick reaches three weeks of age the female will be spending less time brooding. Whilst she is off the nest the owlets may huddle together to keep warm. At only two weeks, an owlet can swallow a small mouse whole, and at four weeks it can deal with a whole dead day-old poultry chick and maintain its own body temperature.

Nest hygiene

In the wild Barn Owls normally lay their eggs on a layer of their own pellet debris which is composed mainly of compressed hair and small bones. The owlets droppings are very wet and quite smelly but in a wild nest the compressed hair absorbs all the mess and the owlets stay virtually clean. Sadly, in a captive situation things are not so wholesome.

The pellets from captive owls (fed on a diet of poultry chicks) contain no hair and never form an absorbent layer. When the young produce their droppings the nest can become extremely wet and smelly. Also the yolk from within the poultry chicks brought into the nestbox may be uneaten. The net result is nothing short of disgusting! The legs and feet of the young can become covered in a hard layer of sticky brown dirt which is very difficult to remove.

To combat this you should provide a 5cm (2") layer of an absorbent material in the nestbox from the time the adults are first installed. Genuine wild Barn Owl pellets are probably best. Wood flakes are not particularly good but may be used. For various reasons hay, straw, and sawdust should be avoided. Whatever happens you should try to avoid the need to clean out the box. If you must then do it once around mid March - at least a couple of weeks before you expect laying to commence. When inspecting the nestbox, watch out for left-over food and reduce the food supply (if necessary)

to prevent any infestation of maggots.

BTO ringing

When the owlets are about four weeks old they must be fitted with BTO rings (the adults should already be ringed). In addition, it may be possible to individually colour ring each owl. If you have been giving wild food (ie mice, voles, or shrews) to the owls, remove any black pellets they may have produced. This will help you to determine when the birds start catching their own food. After ringing it is important to give the birds a few nights to settle down before release - allow them to regain their confidence in the safety of their surroundings.

Release timing

Do not release the adults until the youngest owlet is four weeks old and capable of dealing with whole food items. You should then release the adults as soon as possible. The fact that the adults have young in the nest should encourage them to return. You should aim to maximise the interval between the adults' release and the young fledging.

Generally the adults are released when the owlets' age range is four to six weeks. Choose an evening with dry weather, little wind, no fog and a good forecast. It is better to delay the release night for up to two weeks rather than release in bad weather but always ensure that the release occurs before the first owlet fledges (at eight to nine weeks old).

If the adults fail to breed or the young die before release night there are two options. You can postpone the release until a second breeding attempt has succeeded or you can release the adults without any young in the nest. However, both of these options are less than ideal as birds released late in the year are less likely to survive the winter and adults released without young are less likely to return.

If, when ringing the young, it is found that only one or two young have survived it is sometimes possible to foster-in additional captive-bred owlets of a similar age if you happen to have some available. Please contact the Trust for further advice.

Release procedure

If the site has been prepared properly, the removal of wire to release the owls will be a simple job. It is essential that the owls emerge slowly and in a totally relaxed manner after you have gone. If there's more than one hole, open all exits simultaneously - if you don't there is a danger that the owls may fly out of the first exit whilst the wire on the second is being removed, become frightened by your unexpected activity and fly off never to be seen again. If only one exit is to be opened, this should be a fairly simple task.

The release must be done at dusk. Arrive at the release site well before dusk and start to plan ahead. First put up all the necessary ladders very quietly and make sure

that all the required tools are conveniently placed. Walk away from the building. Decide who is going to remove the wire, who is going to watch the owls emerge (who can sit still for two hours?) and from where. It is not necessary to hide if you can keep still and quiet, but watchers should be at least 20 metres (60') away. Some binoculars (e.g. 7x 50) are very good in poor light. If there is a good vantage point within 0.5 km, watch from there. If there is an outside light on the barn, leave it on. Alternatively, a static spotlight can be pointed at the exit hole. Torches can be used provided the beam is kept still.

Dusk is the best time for release: before dusk the owls may be chased by crows (disaster); after dark you won't see very much. As daylight fades the watchers should get into position and stay there. Just before half-light, go up the ladder and silently remove the frame of wire from the wall aviary. This should only take a minute or two. Quietly lower the ladder and leave it until morning, creep away to your watching place and keep still. Sometimes nothing happens. Probably an adult will appear at the hole several times before eventually coming out on to the perch. If one seems to fly off a long way, don't worry, just keep still and wait. It's good to see one emerge and then re-enter, but don't worry if they both go out of sight. As long as they emerge in a relaxed manner they stand a good chance of coming back and establishing the pattern of return which is so vital.

It is not a good idea to remove the whole aviary since the owls may be less stressed if their regular perch is still in position. Also, from a distance, the familiar sight of the aviary may help them to home in and return. If the whole aviary must be removed then delay this until the owls have either dispersed or are very well established.

Continuing routine

A Barn Owl is a creature of habit with a nightly routine. Unexpected release is almost certainly very disruptive. To keep stress to a minimum it is important that everything else remains constant. When and where you provide food, the way you enter and how often you inspect the nestbox should all remain the same

Unless you have many hours available to watch the owls, the amount of food being removed will be the main indicator of what is happening. From the night of release you should start keeping a record of the amount of food the owls take. During your nightly checks keep an eye open for unusually dark pellets. If wild small mammals have been eaten the pellets will look black. Also, note any sightings of the adults and relevant factors such as bad weather. On the final page of this leaflet is a Post-Release Record Form. Maintaining records in this way is not only interesting to look back on but will also prove useful when completing your DEFRA End of Year Report Form.

Hopefully the adults will establish a pattern of return and will continue to carry food from the food table up to the nestbox as well as feeding themselves. We

have not yet come across a case where the adults remained but failed to feed their young. However, no matter how well the release is organised and operated, there is about a one in three chance that both adults will leave the site as soon as they are released and completely abandon their young.

What to do if the adults disappear

If after release night you find that the food is not being taken and the owlets seem more hungry (vocal) than usual then the adults have probably gone for good. (We have only ever recorded one instance where the adults returned after several nights' absence).

If there is no sign of the adults DO NOT start to feed the young immediately. The sound of the young calling for food may help to attract the adults back. For two or three nights after the adults disappear keep putting all the food on the table. On the third or fourth night you should start feeding the owlets by simply placing whole food items in the nestbox (2-3 chicks each per night). Maintain a small food supply on the table in case an adult returns (in which case revert to placing all food on the table and monitor the owlets). No matter what happens DO NOT replace the wire and close up the release site.

When the young are eight to nine weeks old they will start to fly. If there are no adults present, do not start to put the owlets food on the food table - always put it in the nestbox.

Once the adults have disappeared you are then in exactly the same situation as if you had originally chosen the Young Brood (or young clutch) release method where young are simply placed in a nestbox and fed nightly (no adults are released), (see leaflet no.17). For this method to work well it is essential that the owlets are not shut-in at all. In this way the speed of their release is governed only by the natural pace of their own development. They gradually become more mobile but when hungry they instinctively return to the nest - this is where their food must be put.

After the release

Providing that the initial pattern of return for food is established, most Barn Owls will adapt to life in the wild (no parental training is needed). Every Barn Owl is instinctively interested in small moving objects on the ground and if released into a suitable habitat and given enough time, will start to hunt. This transition may take from three weeks to three months. By collecting and analysing the owls pellets you can easily find out what they have been eating. Record the details on your post release record form.

At eight to nine weeks old the eldest of the owlets will start to fly. At first they will only make short flights within the building.

The fledging period and the following few weeks are a great time to watch the owls outdoors. For observing their behaviour in the surrounding countryside dusk is the best time: the owls are unlikely to emerge before dusk and after dark you won't see so much.

Inexperienced juveniles sometimes roost in strange places. The first time one is absent from the nestbox during the day it is usually roosting nearby but may be in a surprisingly exposed position. It is highly unlikely that a fledgling will disappear for good as soon as it fledges but they are prone to accidental deaths. Individuals which spend too long on the ground are sometimes taken by foxes. Also, if there are any steep-sided water containers within about 200 metres of the site please consult our leaflet *How to Prevent Drowning* (leaflet no. 31).

Do not reduce the food supply to encourage hunting - it should be the owls that determine how much food is provided. Rarely, an individual owl will continue to rely on your feeding. In such cases you can reduce the supply after a minimum of three months and during good weather - but do it very gradually.

Stopping feeding can give you the satisfaction of knowing that your Barn Owls are now truly wild and self-sufficient. However you may wish to continue feeding them in the long term - perhaps for years! This will not only help to ensure their survival but can dramatically increase their nesting success. As an example, two long term releases were organised by the Trust, both pairs successfully bred for the next three years. At one site artificial feeding was stopped during the first autumn and the adult pair raised single broods of two owlets in each subsequent year. At the other site, artificial feeding was continued at the reduced rate of about ten day-old poultry chicks per week, resulting in the pair rearing double broods of between three and five owlets in each year. The net gain (young owls leaving the site) for the first site was six and for the second was 17 (over the 3 years). Continued small amounts of supplementary feeding help bring the adults into breeding condition earlier each spring, encourage more broods and larger brood sizes.

Supplementary feeding during the owls' first winter and during bad weather is particularly helpful. As a nation we have been maintaining garden bird populations at artificially high levels with supplementary feeding for years. Why not do the same for Barn Owls?

The maintenance of a viable wild population depends upon sympathetic land management for which artificial feeding is no substitute. However, the local benefits of long term artificial feeding should be considered. Please see *Feeding Barn Owls* (leaflet no. 13).

The ultimate aim of the long term release method is to establish a breeding pair at or near the release site but in about two thirds of cases the birds leave before the first winter. Providing they disperse gradually, the first year survival rate for released captive-bred Barn Owls is about the same as for wild-bred young (about one in four).

If you are not too concerned about the owls leaving you may prefer to try a different release method which involves less work, please see *Young Brood Release* (leaflet no. 17).

Finally, don't forget that for each release site DEFRA require an "End of Year Report" to reach them by December 1st.

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The Trust provides a wide range of free leaflets on Barn Owl related matters. For details of these and further information about the Trust and its work, please write including a large SAE to the Barn Owl Trust, Waterleat, Ashburton, Devon TQ13 7HU
Tel 01364 653026
e-mail info@barnowltrust.org.uk
web-site www.barnowltrust.org.uk

Fig 1: Temporary wiring of a small owl hole in the top of a barn partition

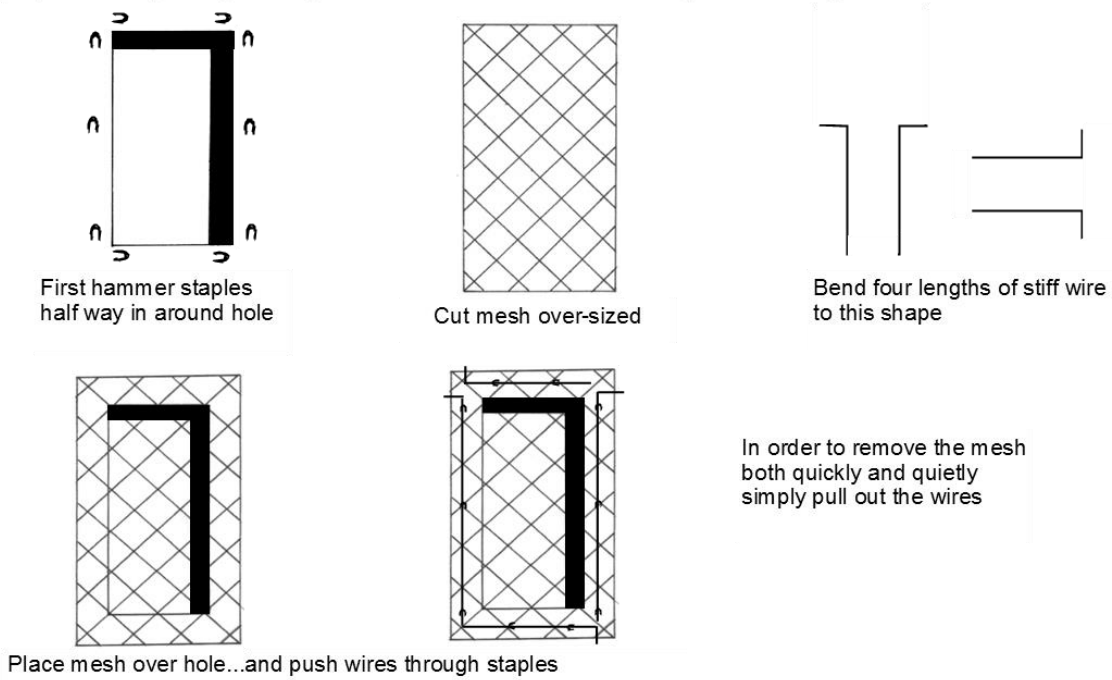


Fig 2: The Wall Aviary

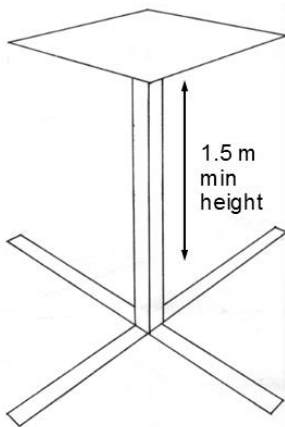
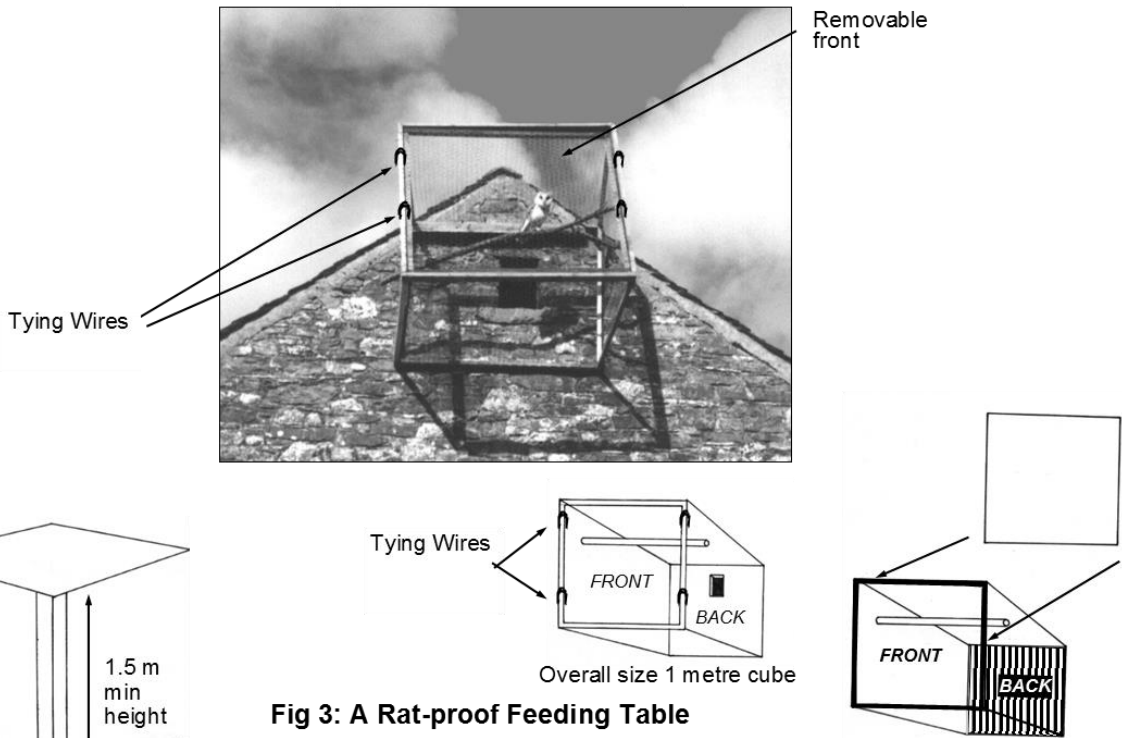


Fig 3: A Rat-proof Feeding Table

Table top 60cm x 60cm minimum

If possible use a slippery leg which a rat could not climb. If using a wooden leg make the top larger.

The base must be large and heavy enough to ensure that the table is never knocked over.

Be sure to position the table away from walls or roof beams which a rat can jump from.

9.2 Details of the Young Clutch (or Young Brood) release method

Barn Owl Trust information leaflet no.17 provides detailed information on the Young Clutch Release Method. Although updated, the information presented is essentially the same as that published by the Barn Owl Trust in 1989. Young "Clutch" is in fact a misnomer hence the leaflets new title.

The Young Brood Release



This specialist leaflet describes a method of releasing Barn Owls into the wild (for which a license from DEFRA is required). It covers the selection and preparation of a site, release procedure, and post-release monitoring.

Note

In order to understand the basic concepts and the need to adhere to the recommended methods, we strongly recommend you read *Why Release Barn Owls?* (leaflet no. 6).

The process in brief

A Young Brood Release can be used to introduce a number of young Barn Owls into an area where wild Barn Owls are absent. A brood of captive-bred nestling Barn Owls 4-6 weeks old is placed in a nestbox erected in a suitable building, ideally with good habitat near by. They are each fitted with a British Trust for Ornithology ring and are fed every night. They fledge 3-5 weeks later. A pattern of return for food is normally established without difficulty and the provision of food is maintained until all the owls have become self-sufficient. Barn Owls released in this way usually disperse away from the release site but in a minority of cases one or more may stay.

Basic requirements

The site must be in an area of suitable habitat (with at least some rough grassland) supporting a good population of small mammals. The release site doesn't have to be an agricultural building but should be the kind of place that wild Barn Owls would choose to roost and nest. Most of these releases involve placing the young in a nestbox in a building. However, a nestbox in a big tree is also a possibility.

You will need to do a detailed survey of all land and potential roosting places within 2 km of the proposed release site. You will need a freezer, a store of owl food, and someone to feed the birds every night for at least three months.

The release of captive-bred Barn Owls into the wild in Britain requires a licence. An application form and copy of *The Guidelines for the Release of Captive Bred Barn Owls in Britain* is available from the Department for Environment, Food & Rural Affairs (DEFRA), Wildlife Licensing and Registration Service, Floor 1, Zone 17, Temple Quay House, 2 The Square, Temple Quay, Bristol BS1 6EB.

Once captive owls have been released they are legally wild birds and so are protected against disturbance during breeding.

You will require an additional licence from English Nature if you intend to carry out nest inspections during any subsequent breeding attempts.

Please note

This leaflet should be used in conjunction with the DEFRA guidelines.

Survey

If you already know that one or more wild Barn Owls have roosted within 2 km of the proposed release site in the past twelve months there is no point applying for a licence. It is much better to concentrate on encouraging wild birds through habitat improvements. If there are no Barn Owls around, ask yourself why. If there is a probable cause the area may not be suitable for a release.

Before your licence application is submitted a survey within 2 km of the proposed release site should be completed in accordance with the DETR guidelines. This survey is essential and has two aims, a) to show that the habitat quality is adequate, and b) to determine if there is any evidence of wild Barn Owls roosting within 2 km within the past 12 months. Please see *Survey Techniques* (leaflet no.8).

The release site

The site should be selected and prepared in such a way that a free-flying Barn Owl would choose to frequent it. Generally speaking wild Barn Owls are not found in very small or very low buildings. The minimum recommended height for a release site is 3.5 metres (12') at the apex. If there is a range of buildings to choose from, go for one over 4.5 metres (15') high. A building close to open countryside with areas of good habitat may be ideal. Please see *Habitat Management* (leaflet no. 1). Try to avoid an area where second generation rodenticides are widely used, see *Rodent Control* (leaflet no.21).

Obviously the site must have good access for the owls. A fully enclosed site such as a traditional barn must have one or more suitable owl holes in the wall(s) at least 3 metres (10') above ground level. Open sided buildings are often suitable. Almost any well positioned nestbox can be used but buildings are generally preferred to trees as they afford additional shelter. Please see *Indoor Nestboxes* (leaflet no. 3) and *Outdoor Nestboxes* (leaflet no. 4).

Occasionally a potential release site may be discovered which is OK without a nestbox. For example, an empty

disused water tank in the top of a suitable building may be OK. A hollow tree is another possibility.

Whatever type of cavity is used it is essential that you can see and reach all of the interior and that food can be provided there without any danger of something other than the owls gaining access to it.

Safety precautions

Before you prepare the site take time to consider the hazards you might face and what steps you could take to minimise the risks. Hazards might include an injury at a remote location; falling from a ladder; injury from heavy lifting. The following are examples of precautions you should take to reduce the risks.

- 1 Ideally take a companion. If working alone at an isolated site, let someone know where you are going and when you expect to be back before you set off. Carry a mobile phone if you have one.
- 2 Time spent in reconnaissance and preparation is seldom wasted. Always plan ahead - especially tasks up ladders!
- 3 Ensure that your ladder is secure before climbing it. If possible tie it off at the top and bottom.
- 4 Avoid over-reaching - never attempt to carry out any task up a ladder if you cannot reach comfortably.
- 5 When planning how to position, support and fix a nestbox, try to create a situation where it can rest in position without being held. This will allow you to have both hands free to fix it safely.
- 6 When carrying a nestbox up a ladder, ensure that it is kept low relative to your body (ideally not above waist height). This will keep your centre of gravity down. Try to keep it in front of both you and the ladder so that it pulls you towards the ladder - never hold it behind or above you.
- 7 You are responsible for your own safety - assess all the risks and be careful.

Nestbox erection

The suitability of almost every building can be improved by providing a nestbox. It is a good idea to erect one or more boxes at the earliest opportunity. There is always the possibility that a wild Barn Owl will move in and save the trouble of a release. See *Indoor Nestboxes* (leaflet no. 3).

When erecting the box which the brood will probably be placed in, be aware that the optimum position for a nestbox in a release site is often not the same as for a box for wild birds. The main difference is that the release box must be in a totally rat and cat proof position. Also, in most cases, a ladder will need to be

semi-permanently positioned below the box enabling you to monitor and feed the owls.

Selecting, rearing, and installing the birds

There is generally no shortage of captive-bred Barn Owls in Britain. However not every brood is suitable for release. In order to ensure genetic suitability, the first generation progeny of a pair of disabled wild birds found locally would be ideal. The most important factor is: both parent birds must be of the white-breasted British race *Tyto alba alba*. Where both parent birds are captive-bred, always ensure that they are unrelated.

Broods for release can be hand-reared from hatching but it is better if they are always kept together (so they become only partially imprinted on humans). Semi-tame broods which call for food every time they see or hear you approach can be released. The behaviour normally stops soon after the birds are transferred into the release site.

Broods which are parent-reared should be removed from the aviary nestbox when the youngest owlet is about three and a half weeks old and kept indoors in a suitable box with minimum human contact.

Feeding Barn Owls (leaflet no. 13) gives information on selecting, obtaining and storing food as well as guidance on feeding. Initially a diet of dead day-old chicks cut in half should be provided.

When the youngest owlet can manage a whole chick (normally at about four weeks old) the young are ready to be fitted with BTO rings and transferred to the release site nestbox.

For the release method to work well it is essential that the owlets are not shut in at all. In this way the speed of their release is governed only by the natural pace of their own development. They gradually become more mobile but when hungry they instinctively return to the nestbox - this is where their food must always be put.

BTO ringing

When the owlets are installed (4-6 weeks old) they must be fitted with BTO rings. In addition it may be possible to individually colour ring each owl. Please see *Rings and Ringing* (leaflet no. 15).

Providing food at the release site

From the time the brood is installed, nightly feeding should be omitted not more than once a fortnight. The food-begging call is "Psh-psh-psh" which should not be confused with a defensive hiss (a continuous sound rather like a gas leak). Most broods are quiet during the day and will call for food from dusk until

they are fed. Their degree of hunger is usually apparent from the volume of their food-begging calls. When gauging how much to provide use common sense. As long as each one gets two dead day-old poultry chicks per night they will not starve. Although some may eat three in a night you should not give three each every night. Over-feeding normally results in an extremely unpleasant nest environment.

Nest hygiene

In the wild Barn Owls normally lay their eggs on a layer of their own pellet debris which is composed mainly of compressed hair and small bones. The owlets droppings are very wet and quite smelly but in a wild nest the compressed hair absorbs all the mess and the owlets stay virtually clean. Sadly, in a release situation things are not so wholesome.

The pellets from owls fed on a diet of poultry chicks contain no hair and never form an absorbent layer. When the young produce their droppings the nest can become extremely wet and smelly. Also, the yolk from within the poultry chicks may be uneaten. The net result is nothing short of disgusting! The legs and feet of the young can become covered in a hard layer of sticky brown dirt which is very difficult to remove.

To combat this you should provide a 5cm (2") layer of an absorbent material in the nestbox from the time the adults are first installed. Genuine wild Barn Owl pellets are probably best. Wood flakes are not particularly good but may be used. For various reasons hay, straw, and sawdust should be avoided. Whatever happens you should try to avoid the need to clean out the box. When inspecting the nestbox, watch out for left-over food and reduce the food supply (if necessary) to prevent any infestation of maggots.

Fledging and monitoring

When the young are installed they are already capable of walking and become increasingly mobile as they grow. Don't be concerned if you look in the box and see one lying down - they can roost in this position until almost fully grown. If the brood is in a deep nest box (as recommended in leaflet no.3) they will not be able to get out until around seven weeks old; watch out for droppings on the tray and on the box lid.

At eight to nine weeks old the eldest will start to fly. At first they will only make short flights within the building. If this period coincides with wet weather (and especially if you are using an outdoor nestbox) check each morning to ensure that all are safely in.

The fledging period and the following few weeks are a great time to watch the owls outdoors. Static lights don't bother the owls. A spotlight can be pointed at the exit hole and torches can be used provided the beam is kept still. Dusk is the best time for watching their behaviour in the surrounding countryside: the owls are unlikely to emerge before dusk and after dark you won't see so much.

Inexperienced juveniles sometimes roost in strange places. The first time one is absent from the nestbox during the day it is usually roosting nearby but may be in a surprisingly exposed position. It is highly unlikely that a fledgling will disappear for good as soon as it fledges but they are prone to accidental deaths. Individuals which spend too long on the ground are sometimes taken by foxes. Also, if there are any steep-sided water containers within about 200 metres of the site please consult our leaflet *How to Prevent Drowning* (leaflet no. 31).

Unless you have many hours available to watch the owls, the amount of food being removed will be the main indicator of what is happening. From the night the first owlet is first seen out of the box you should start keeping a record of the amount of food the owls take. During your nightly checks keep an eye open for unusually dark pellets. If wild small mammals have been eaten the pellets will look black. Also make a note of any relevant factors such as bad weather. On the final page of this leaflet is a Post Release Record Form. Maintaining records in this way is not only interesting to look back on but will also prove useful when completing your DEFRA End of Year Report Form.

After the release

Providing that the initial pattern of return for food is established, most Barn Owls will adapt to life in the wild (no parental training is needed). Every Barn Owl is instinctively interested in small moving objects on the ground and if released into a suitable habitat and given enough time, will start to hunt. By collecting and analysing the owls' pellets you can easily find out what they have been eating. Please see *Pellet Analysis* (leaflet no. 20). Record the details on your post release record form.

Do not reduce the food supply to encourage hunting - it should be the owls that determine how much food is provided. The owls normally disperse away from the release site by about fourteen weeks old (in the same way as wild-bred young). Even in cases where one or more stay around the release site they usually stop taking food. Rarely, an individual owl will continue to

rely on your feeding. In such cases you can reduce the supply after a minimum of three months and during good weather - but do it very gradually.

Stopping feeding can give you the satisfaction of knowing that all your Barn Owls are now truly wild and self-sufficient. However you may wish to continue feeding them in the long term - perhaps for years! This will not only help to ensure survival but if you are lucky and a pair become resident it can dramatically increase nesting success.

As an example, two pairs were established by the Trust and both successfully bred for the next three years. At one site artificial feeding was stopped during the first autumn and the adult pair raised single broods of two owlets in each subsequent year. At the other site, artificial feeding was continued at the reduced rate of about ten day-old poultry chicks per week, resulting in the pair rearing double broods of between three and five owlets in each year. Continued small amounts of supplementary feeding help bring the birds into breeding condition earlier each spring, encourage more broods and larger brood sizes.

Supplementary feeding during the owls' first winter and during bad weather is particularly helpful. As a nation we have been maintaining garden bird populations at artificially high levels with supplementary feeding for years. Why not do the same for Barn Owls? The maintenance of a viable wild population depends upon sympathetic land management for which artificial feeding is no substitute. However, the local benefits of long term artificial feeding should be considered. Please see *Feeding Barn Owls* (leaflet no. 13).

The aim of most releases is to establish a breeding pair at or very near the release site. However, in most cases the Young Brood method does not achieve this (the young disperse). Although a Long Term Release (leaflet no. 11) is more likely to result in the establishment of a pair, in about two thirds of cases the birds leave before the first winter. The Long Term Release method also involves a lot more work. Young Brood releases are normally the preferred method.

Observations of the owlets taking their first flights (and their hilarious antics!) are very rewarding indeed. Providing they disperse gradually, the first year

survival rate for released captive-bred Barn Owls is about the same as for wild-bred young (about one in four).

Finally, don't forget that for each release site DEFRA require an "End of Year Report" to reach them by December 1st.

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