



**Barn Owl Trust  
Second**

# **Reintroduction Report**

**August 2001**

*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. ± 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.

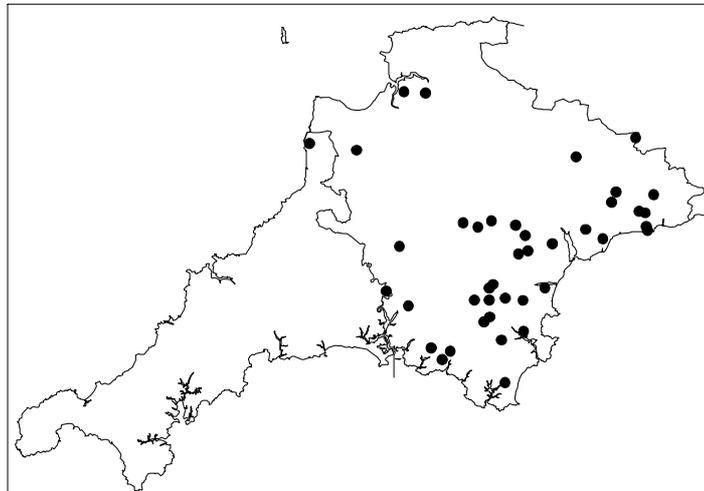
## 5.0 RESULTS

### 5.1 Distribution of ringing sites

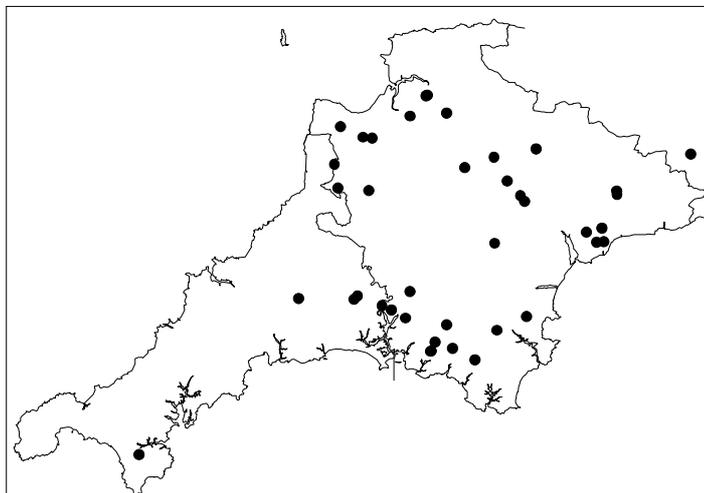
40 out of 41 release sites were in Devon with 1 in Cornwall. 29 release sites were South or East Devon (South Hams, Teignbridge and East Devon districts). The distribution of release sites is illustrated in figure 1.

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



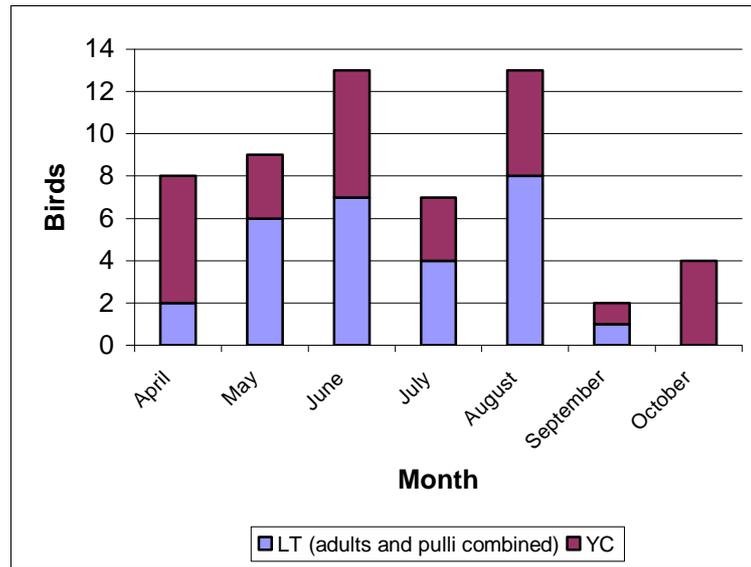
**Figure 2.**  
Distribution of wild Barn  
Owl ringing sites in  
Devon and  
Cornwall  
1986-1992



## 5.2 Timing of releases

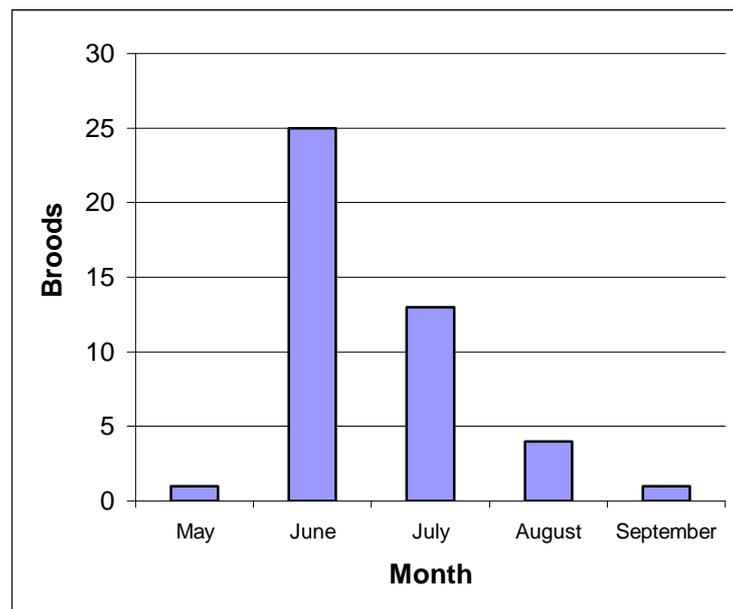
Considering all releases, most occurred in the spring and summer (67% were carried out before the end of August) and only 6 releases were carried out relatively late in the year (September and October).

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



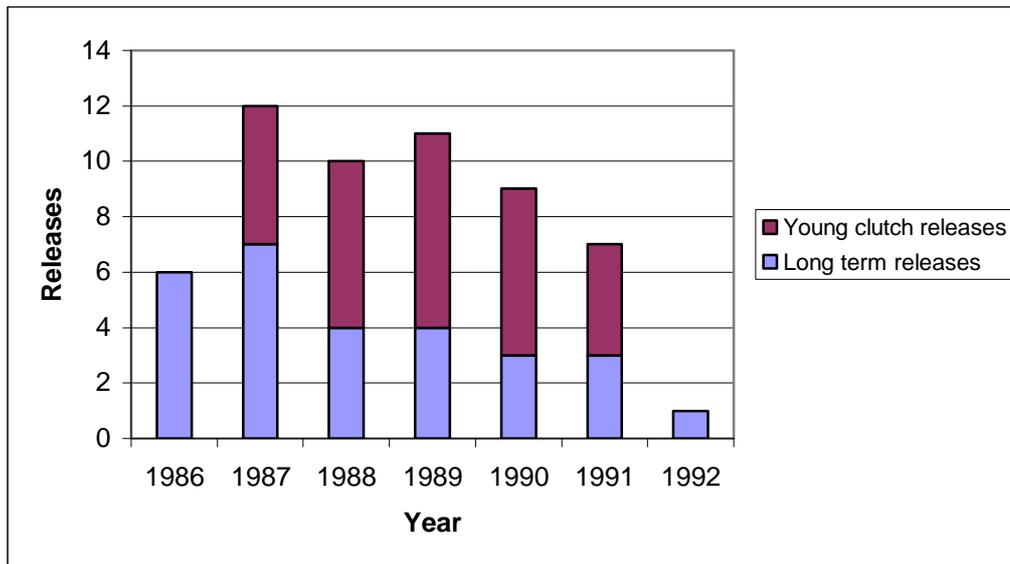
**Note:** For LT release adults the date used as the ringing date is in fact the birds' release date. For pulli (LT + YC) the ringing date is the date ringed.

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

# 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.

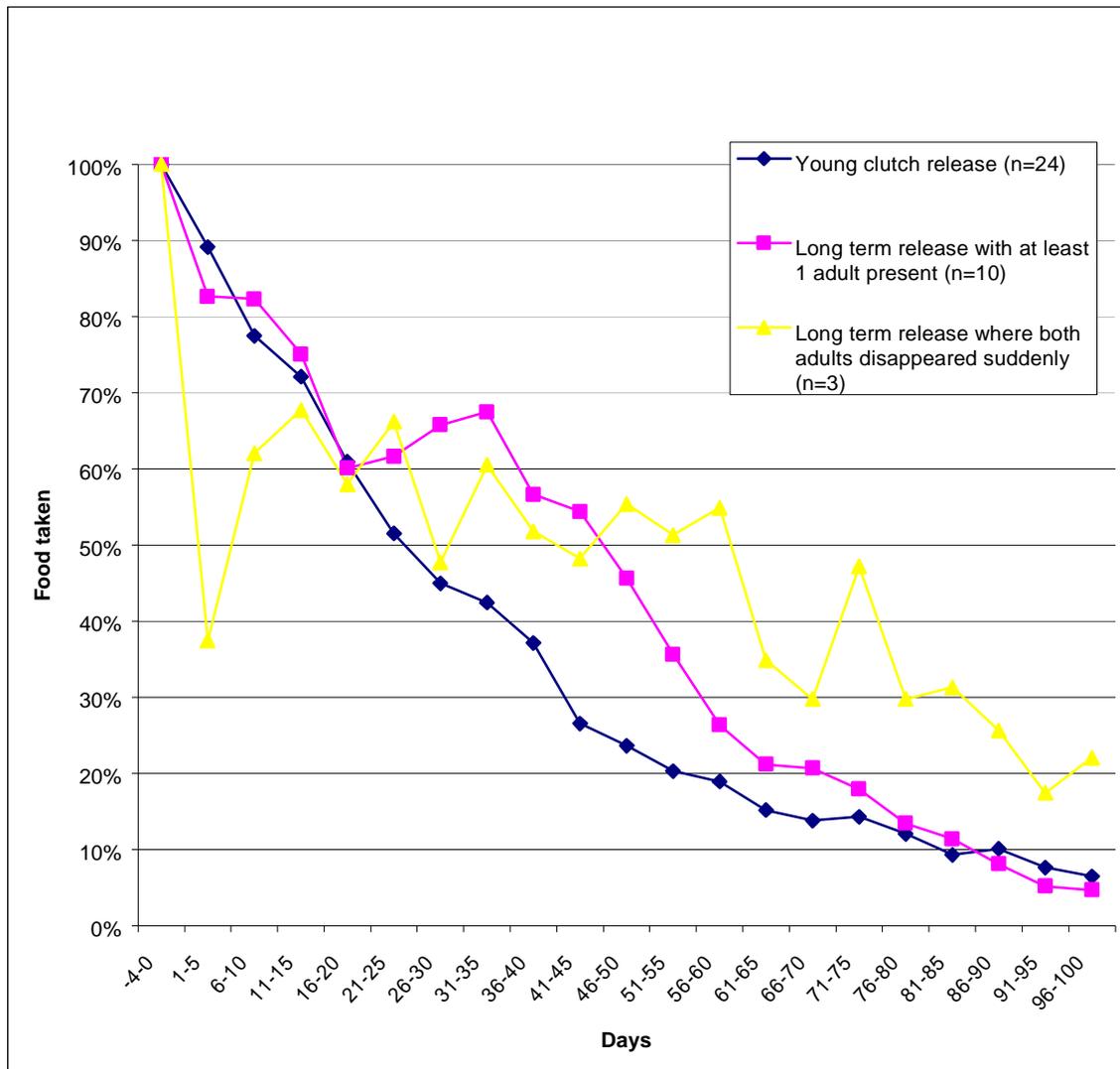
~ note:

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**

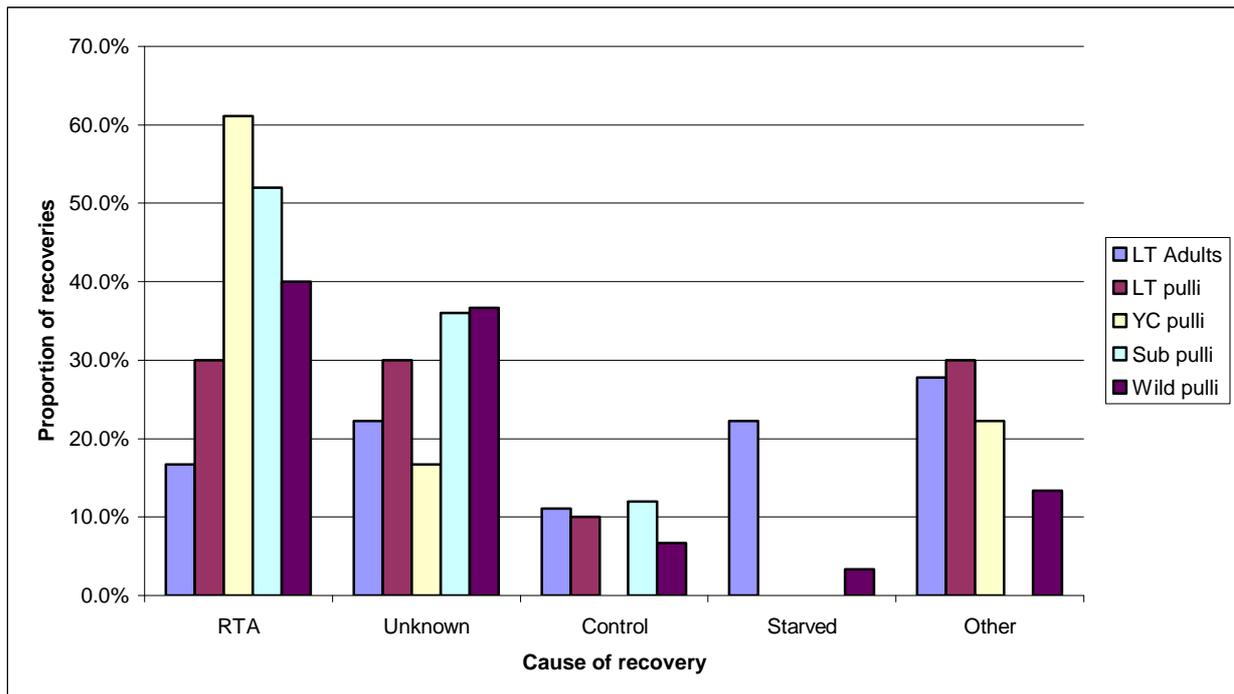


Figure 7 shows that the finding circumstances for released and wild pulli were similar. Starvation and other causes (combined) accounted for a higher proportion of released adult recoveries than pulli recoveries. A lower proportion of adults were recovered on roads than pulli.

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.**

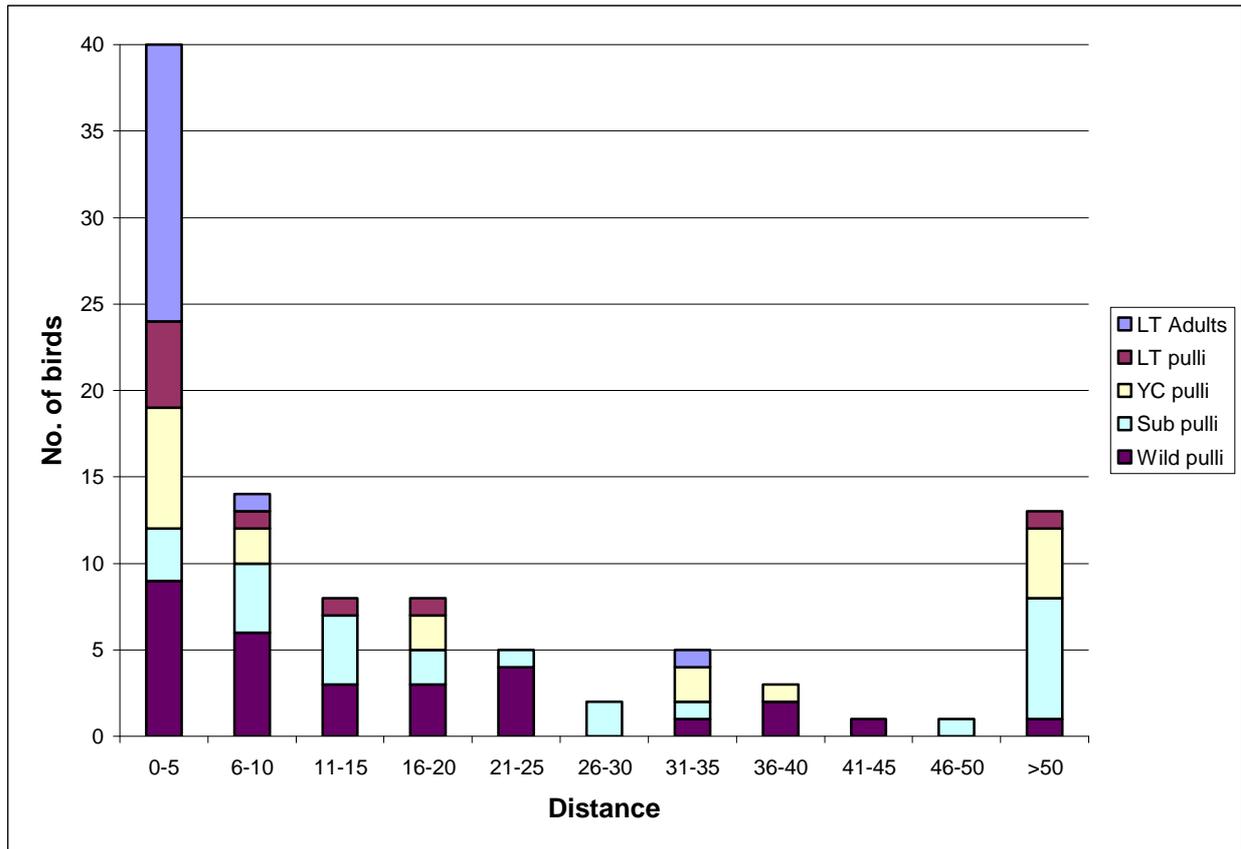


Figure 8 shows that the vast majority (89%) of LT adult recoveries occurred within 5km of the release site. Only one released adult was recovered further than 10km from its release site; a road casualty found 33 km and 1601 days after release.

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.

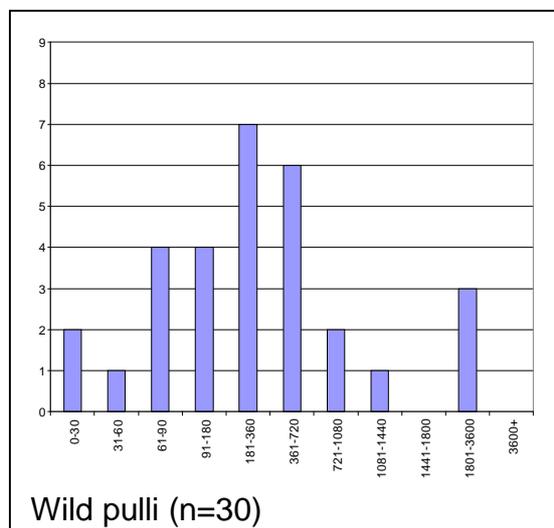
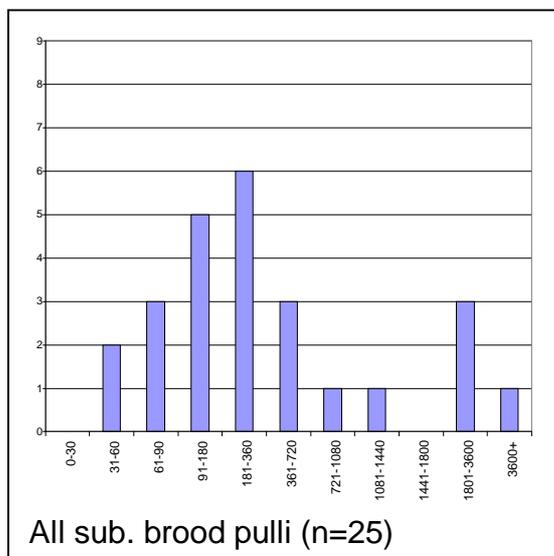
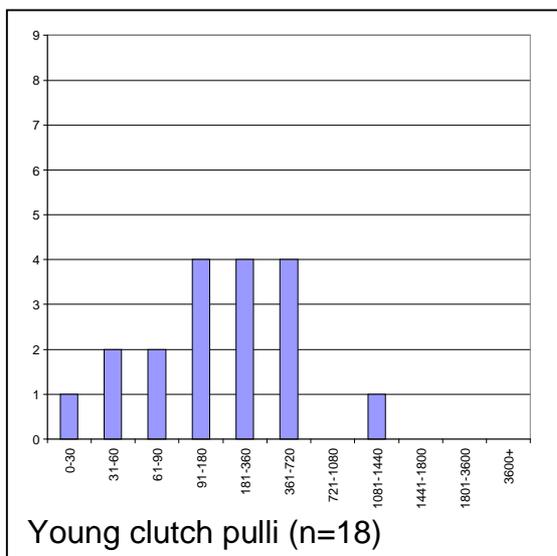
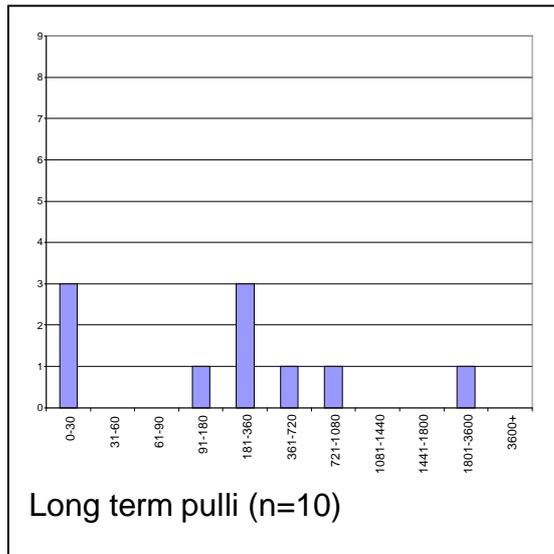
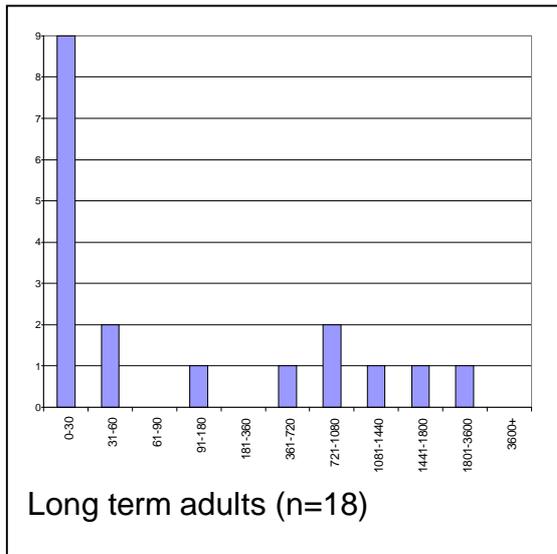
Figures 9 & 10 show the frequency of ring-recoveries by period. 65% of all recoveries (all classes) occurred within a year of release/ringing. 15% of all Barn Owls ringed were recovered in the second year after ringing. The proportions of LT, YC, sub brood and wild pulli recovered up to 720 days after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

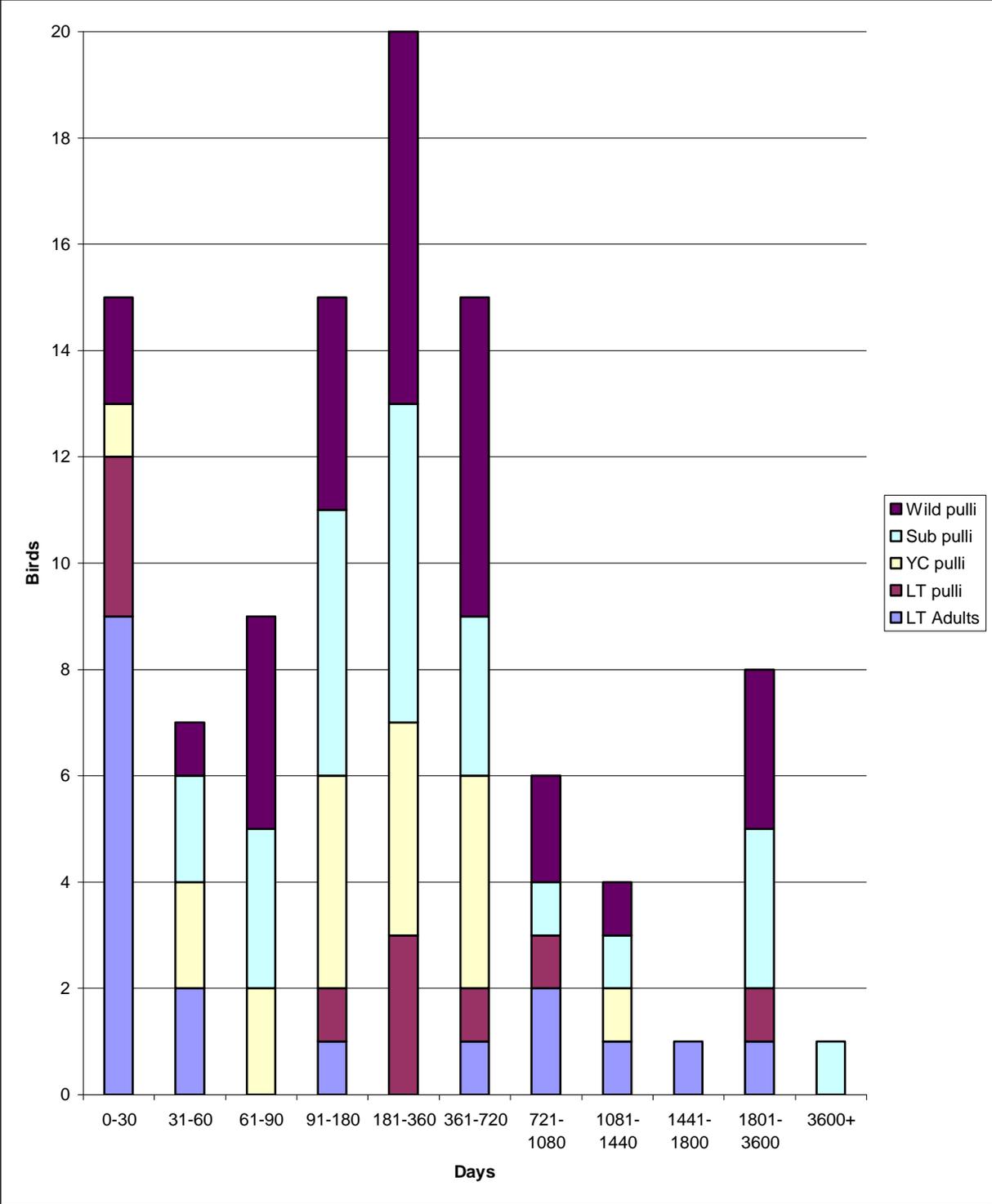


Figure 11. Month of finding of Barn Owls recovered within a year of release/ringing divided into three categories; released (Young Clutch Method), released (Long Term Method), and wild.

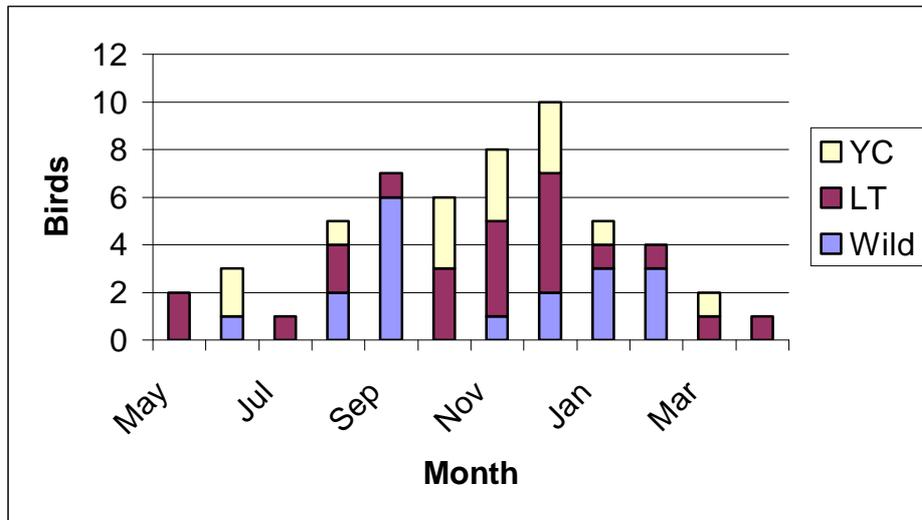
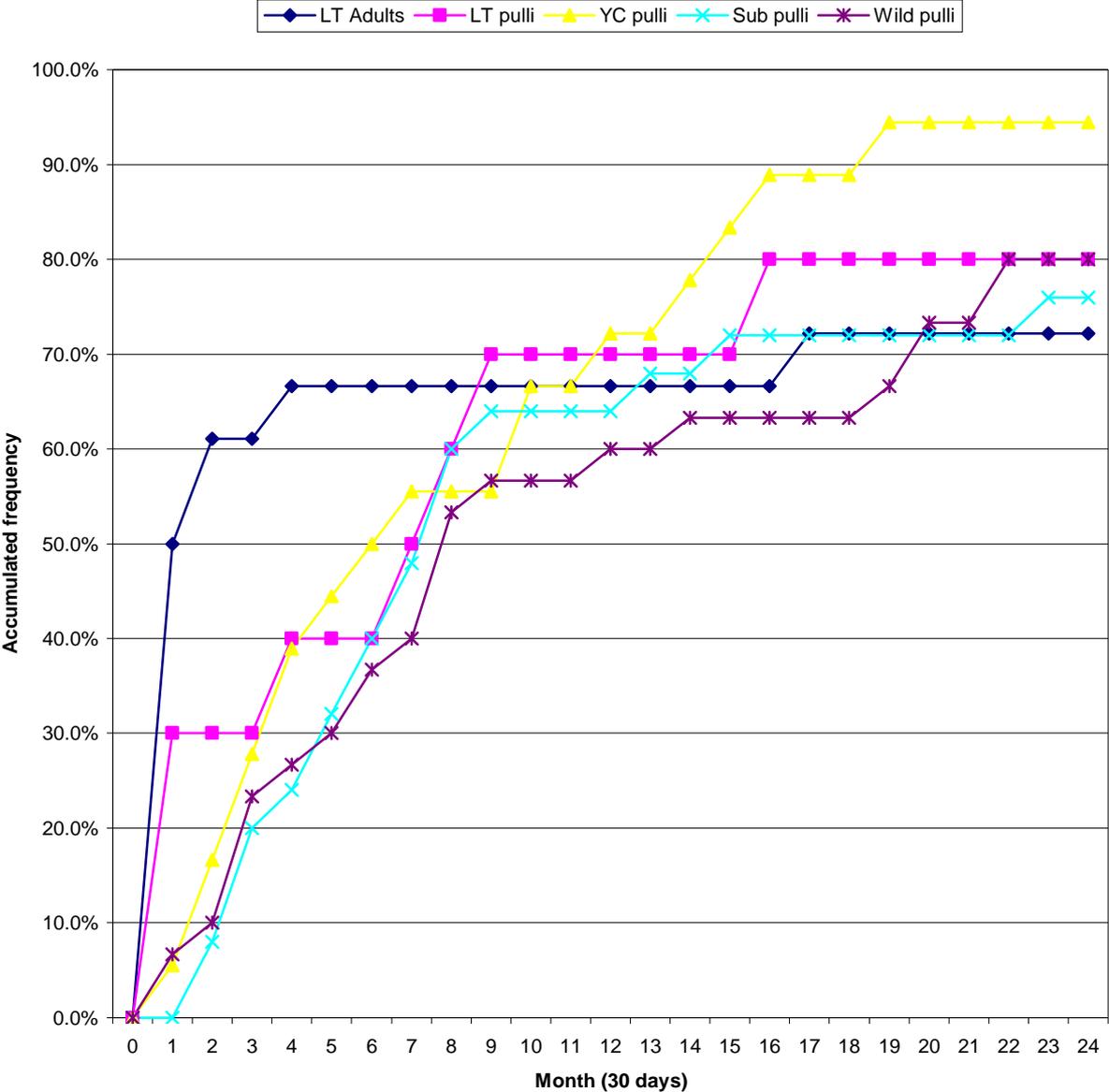


Figure 11 suggests that recoveries of pulli in the year following ringing were high in the autumn and winter months and low in the spring and summer. Wild pulli recoveries occurred mainly in late summer (post fledging/early independence) and in late winter whereas most YC and LT release recoveries occurred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



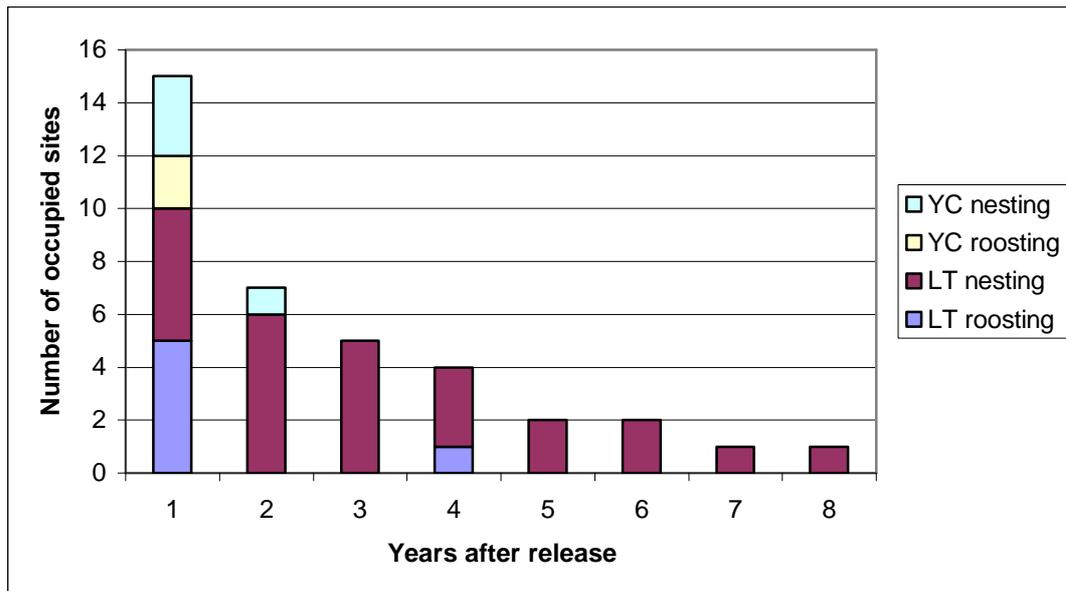
**Figure 12. The monthly accumulation of Barn Owl recoveries in the two years following release/ringing expressed as a percentage of all recoveries received (<23/07/01) in each class. (Divided according to origin/release method, and age class).**



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 70<sup>th</sup> day after release the amount taken had reduced by 80% and by the 100<sup>th</sup> 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.

## **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.