




2003 Devon Barn Owl Survey Report

Results from a county-wide survey by the Barn Owl Trust with the Devon
Bird Watching and Preservation Society 



David J Ramsden and John A Howells

Acknowledgements

Amy Oliver BOT (fieldwork, volunteer training/coordination, data entry and cover design)
Mark Green exBOT (ledger production, volunteer training and fieldwork)
Isabel Vacas BOT Student Trainee (fieldwork and data entry)
Sue Searle exBOT (survey organisation and fieldwork)
Jamie Sutherland BOT volunteer (data entry)
Sandra Reardon BOT (proofreading and publishing)
Alan Lewis BOT (for IT support)
Frances Ramsden BOT (proofreading)
Jeanne Sylvestri BOT (proofreading)

BOT Volunteer Interviewers

Philip O'Doherty
John Randall
Pat Williams
Rhoda Causick
Susan Dorling
Mary Houldsworth

BOT Volunteer searchers

Chris Robinson
Mike Tyler
Graham Willson
Pete Kerten
Len Couch
Julie Laing
Alan Pomroy
Roger Hocking
Simon Bishop
Victor Watts
John and Jonathan Lightfoot
Stewart Dawber

Funding

Barn Owl Trust
North Devon District Council
West Devon Borough Council
The Lennox Hannay Charitable Trust
Claude and Margaret Pike Charity
Marjorie Coote Animal Charities Trust
The Heavitree Brewery Charitable Trust
Earth Resources Research Ltd

General

English Nature (licensing)
Jacquie Clark (BTO)
Devon Bird Watching and Preservation Society & DAP team
Holly Morgenroth BOT volunteer (fieldwork assistant)
Geoff Pearce (BTO ringer)
Heather Woodland (BTO ringer)
Cyril Cole
Keith Grant (BTO ringer)
John Turner (BTO ringer)
Brian Cresswell (providing remote camera system)
Dr James Cresswell, University of Exeter (scientific advisor)
All the farmers and landowners who facilitated the fieldwork.
Everyone who contributed records.

The Barn Owl Trust wishes to acknowledge all the local authorities and grant giving bodies who funded the South Hams, Teignbridge, North Devon and East Devon Barn Owl Schemes (1997 -2003) which we believe are largely responsible for the increase in numbers. THANK YOU!

The Trust also wishes to acknowledge the contribution to Barn Owl conservation made by DEFRA through the provision of agri-environment schemes (such as Countryside Stewardship), and the valuable advisory work carried out by Devon Farming and Wildlife Advisory Group and Devon Wildlife Trust, all of which have helped improve Barn Owl habitat.

2003 Devon Barn Owl Survey

1) Background to the survey

1.1 Introduction

The Barn Owl (*Tyto alba*) - one of Britain's most attractive and fascinating birds - has suffered a significant decline in numbers due largely to agricultural intensification (for a review of causes see Ramsden (1995) or Toms *et al.* (2000)). As a consequence the Barn Owl is afforded maximum legal protection under Schedule One of the Wildlife & Countryside Act (1981) and the Countryside and Rights of Way Act (2000). However, the evidence for Barn Owl decline is largely anecdotal (Taylor 1994). 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%. However, Percival (1992) suggests that "there is no satisfactory quantitative information available to identify how large the decline has been and whether it is still continuing". In more recent years, the first reliable UK population estimate of 4,000 pairs was produced by Project Barn Owl (Toms *et al.* 2000).

Since the 1980's considerable resources have been deployed in an effort to prevent further decline and to increase numbers, particularly in Devon where the *Barn Owl Trust (BOT)* is based. Between 1932 and 1985 the extent of Barn Owl decline in Devon (estimated at 66%) was similar to the decline across England and Wales (e. 69%) (Shawyer 1987). Causes of national Barn Owl decline (such as a reduction in food supply (Cayford 1992, Taylor 1993 and 1994), the loss of roost/nest sites (Ramsden 1998) and major roads (Ramsden 2003)) are evident in Devon (pers. obs.).

The first Devon Barn Owl Survey was carried out in 1993 (by the BOT and Devon Birdwatching and Preservation Society) and estimated the population at 250 to 350 pairs (Grant *et al.* 1994). However, the survey method was not primarily designed to produce a reliable population estimate. It consisted of the re-checking of all known roost and nest sites (a census) rather than the intensive searching of randomly selected map squares (as used by *Project Barn Owl*).

During the national survey, Project Barn Owl, volunteers intensively searched 891 tetrads (3,564 sq km) and recorded 133 nesting attempts out of an estimated population of c. 4,000 pairs (less than 3.3% of pairs located). Although the population estimate from the 1993 Devon Barn Owl Survey was much less reliable, the proportion of the population surveyed (using the census method) was much higher – 137 nest sites out of an estimated population of c. 250 – 350 pairs (approx. 46% of pairs located). In spite of its limitations, the census method has the advantage of producing a detailed database of the bird's activity (roosting only or nesting) at all known sites. It also enables detailed distribution maps to be produced and conservation effort to be targeted towards occupied sites.

The 2003 Devon Barn Owl Survey, carried out almost entirely by the BOT, repeated the census method used in 1993 (with a couple of minor modifications). Because the survey method depended on Barn Owl sites being recorded in advance by the BOT, it is important to evaluate any developments in the BOT's activities (in the years leading up to the survey) that may have altered the chances of sites being reported.

1.2 Barn Owl conservation in Devon since the 1993 survey

In 1995 the BOT published its *Barn Conversion Research Project Report* (Ramsden 1995) and the booklet *Barn Owls on Site – a guide for developers and planners* (Ramsden & Ramsden 2001) was sent to all planning authorities. This should have increased the awareness of Barn Owls amongst planners and developers. The number of development-related enquiries received by the BOT has increased over the years, and therefore the chance of occupied sites being reported has increased. However, the proportion of all occupied sites that are the subject of planning applications is relatively small.

In 1996 and 1997 intensive searches of three small study areas were carried out (as part of the BOT's research on the effects of major roads on Barn Owls) resulting in a small number of additional new sites being recorded. More significantly, in 1997 the BOT launched the first *district Barn Owl Scheme* which consisted of carrying out practical and advisory work at all known nest sites in a Local Authority district and then monitoring the outcome. Each scheme lasted for 2 ½ to 3 ½ years. The South Hams Barn Owl Scheme started in 1997, was followed by the Teignbridge scheme (in 1998), the North Devon scheme (1999), and the East Devon Scheme (2000). In each district an initial re-check of known nest sites was carried out and the schemes received additional publicity resulting in some new sites being recorded.

In addition, over the past ten years, the number of general enquiries received and the amount of fieldwork carried out by the BOT has steadily increased.

During the BOT's early years (leading up to the first county survey in 1993), awareness of the BOT's existence and its activities were inevitably biased towards south Devon where the BOT is based. Since the 1993 survey enquiries from the northern half of Devon have increased, as has the amount of BOT fieldwork carried out there (*pers. obs.*). Since 1998 much of the BOT's conservation work has involved the implementation of the Devon Biodiversity Action Plan (DCC, 1998) which encouraged Barn Owl records from across the county to be passed to BOT.

In summary, there has been an overall increase in the chances of sites being recorded (forthwith referred to as "recording effort") because Barn Owl-related activity and communication has increased, and the south Devon bias has reduced. Therefore, any increase in the number of sites recorded may (to some extent) be due to increased recording effort as well as to any actual increase in Barn Owl numbers. Alternatively, a real decrease in Barn Owl numbers could be masked by increased recording effort.

1.3 Aims

The main aims of the 2003 Devon Barn Owl Survey were as follows:

- a) To establish the number and distribution of known sites where breeding or roosting occurred during 2003.
- b) To recheck Barn Owl breeding and roosting sites found during the 1993 Devon Barn Owl Survey, and to analyse any trends.
- c) To quantify changes in the number of known sites in each local authority district as an aid to assessing the usefulness of the district Barn Owl Schemes.
- d) To create a more representative distribution map by surveying more sites.
- e) To check data coverage by interviewing landowners in areas where there were no records of Barn Owls (with follow-up searches where necessary).
- f) To estimate the county population level in 2003 and compare it with 1993.

Another reason for carrying out the survey was to help protect occupied sites by facilitating the cross-referencing of Barn Owl data with planning application data held by local authorities. This helps ensure that provision for Barn Owls is incorporated into development sites (such as barn conversions).

2) Methods

2.1 Survey sites

The 2003 Devon Barn Owl Survey was undertaken in much the same way as the 1993 survey, with slight but significant improvements. The main activity involved rechecking sites already on the BOT's database at the start of the survey year. The main ways in which sites have been reported were as follows:

- a) intentionally given to the BOT by the public/landowners/farmers (sometimes in response to specific media appeals).
- b) incidentally recorded in the course of general enquiries received by BOT.
- c) via contact with other organisations/groups/individuals with an interest in Barn Owls/conservation/rural buildings.
- d) by BOT staff/volunteers in the course of general fieldwork, education events, or research projects.

In addition, a minority of previously unrecorded sites were reported to BOT during the survey year or discovered during survey fieldwork. However, there were no intentional physical searches for signs of Barn Owl occupation at completely unknown sites (no cold searching).

A request was made for Devon Birdwatching and Preservation Society volunteers engaged in the Devon Atlas Project (a county survey of all bird species) to ask landowners about Barn Owls and contribute these reports. However, this did not contribute a significant number of records.

Where reports were received from the public, BOT staff were always careful to ask pertinent questions about exactly what had been seen or heard so as to check the accuracy of each report. In some cases reports were verified by site visits. All doubtful records were excluded from the dataset.

Just before survey fieldwork commenced (in June 2003), a ledger was created which listed all sites in Devon where Barn Owls had been reported as nesting, or roosting, at any time since the start of the previous survey year (01/01/93) (n= 1,155). Duplicate site records were manually removed leaving 912 sites in the ledger. Great care was taken to ensure that no sites received duplicate visits so as to minimise any disturbance to the birds. However, duplicate visits could still occur where the original information given to BOT was inaccurate (either site name or grid reference) or if a known site was newly reported under a different name and/or grid reference. Independent Barn Owl workers (mainly BTO ringers) contributed a number of additional sites to the ledger and provided results from their visits.

The vast majority of sites were checked by BOT staff. However a significant proportion were checked by BOT-trained volunteer searchers working under the BOT's *English Nature Nest Observation Licence* as accredited agents.

2.2 Site search methods

Searches for evidence of occupation started by contacting the original informant (often the site owner) and where the informant provided reliable information on the bird's activity no verification visit was carried out. Most sites were visited and physically searched by trained and licensed workers.

A typical search started with looking for Barn Owls themselves, then searching for droppings, pellets, and feathers. After this any nest boxes or potential nest places were checked for signs of Barn Owl use. At each site all buildings to which the birds had access were checked unless too dangerous (either because they were too unsafe or the owners felt it was unsafe and refused permission to check them). The use of a small camera on a long pole proved extremely useful in determining the bird's status in inaccessible places.

Searches were conducted, signs were identified, and pellets were aged, following the methods described within the booklet *Barn Owls on Site - a guide for developers and planners* (Ramsden & Ramsden 2001).

2.3 Interview Tetrads

Prior to the commencement of site survey work (in June 2003), a distribution map of the 912 sites to be checked was produced. From this map, 2km map squares (tetrads) were identified where there were no records of occupation by Barn Owls (since 01/01/93). These tetrads were semi-randomly allocated to a distinct group of BOT volunteers known as *interviewers*. The allocation intentionally avoided tetrads dominated by unsuitable habitat (urban, open water/mud, continuous woodland etc.) and positively selected those within the volunteer-selected distance (from home). Within each tetrad every farmstead (and any other locations with potential roost/nest places) was visited and an interview held with the occupier following standard interview guidelines and recording form. Although interviewers did not search sites, BOT staff/volunteers were available for verification searches where necessary.

2.4 Data Recorded

Where all possible roost or nest places at a site were searched and no evidence of Barn Owls was found (or the evidence indicated occupation prior to 01/01/03 only) the status was recorded as *absent*. Where there was no material evidence of occupation but birds had been seen in the survey year the sightings were recorded as seen *less than once a month*, *seen more than once a month*, or *seen more than once a week*. Where material evidence was found (or reported with certainty) the status was recorded as follows;

Roosting Occasionally - less than 10 pellets dating from the survey year

Roosting Regularly - 10 or more pellets dating from the survey year

Nesting – one or more eggs or young seen, definite young heard calling for food night after night, definite adult(s) seen repeatedly carrying food into a suitable nest place, nestling (mesoptile) down and/or definite “ammonia” smell found with nest debris.

2.5 Data Processing.

The information collected during the survey was manually entered onto the BOT database (Microsoft Access™) from where the 2003 site status data and 1993 site status data was extracted. In addition, records of birds sighted more than once a week at any time in the main nesting season (March -August 2003) were extracted in order to check the distribution of these (*possible breeding* records) against nesting records.

The data was then transferred to Microsoft Excel™ for processing. This involved the manual amalgamation of multiple records for a small number of individual sites and searches for data entry errors, a small number of which were found and rectified. Distribution maps were created using D-map™.

3) Results

3.1 Site Occupation

The number of nest and/or roost sites checked from the ledger (see *Introduction*) was 912. During the survey year (2003) an additional 264 sites (thought to be occupied) were reported to the BOT and subsequently checked. This gave a total of 1,176 sites checked during the 2003 survey as compared to approximately 576 in 1993 (just over twice as many). The total number of occupied sites recorded in 2003 was 281 nesting, and 348 roosting only.

Table one shows the results for 1993 and 2003. Note that in 2003 roost sites were divided into two categories whereas in 1993 they were grouped. In 1993 a minority of sites where no evidence of occupation was found were not recorded, so the *absent* and *sites checked/reported* are not accurate figures. The reader should also note that sites without Barn Owls were not looked for (i.e. there was no cold searching). Those sites where the status was recorded as *absent* were all from the 912 ledger sites or amongst the majority of the 264 additional sites reported where Barn Owls were likely to be found.

Site Status	1993 survey results	2003 survey results		% change
Number of sites checked/reported	c.576	1176		+ 104%
Nest	137	281		+ 105%
Regular roost	151	223	348	+ 131%
Occasional roost		125		
Absent	c.288	547		+ 90%

Table 1: The number and status of previously occupied Barn Owl nest and/or roost sites re-checked in 1993 and 2003 in the county of Devon.

Total number of nest sites recorded in 1993		137	
Number of 1993 nest sites for which BOT hold detailed records		93	(100%)
Number of 1993 nest sites where in 2003 Barn Owls are:	Still breeding	22	23.7%
	Only roosting regularly	12	12.8%
	Only roosting occasionally	2	2.2%
	Seen more than once a week	0	0.0%
	Seen more than once a month	7	7.5%
	Seen less than once a month	1	1.1%
	Definitely absent	45	48.4%
	Unknown	4	4.3%

Table 2: Barn Owl status (in 2003) at sites in Devon where Barn Owls nested in 1993. Note: *definitely absent* refers to sites where no material evidence of occupation was found/reported.

The change in use over time of breeding and roosting sites appears to show a degree of stability as 23.7% of 1993 nest sites were used for nesting in 2003 and a further 15% were still used for roosting (only). Also, 15% of 1993 roosting (only) sites were used for nesting in 2003 and 23.1% were still roost sites. Tables 2 and 3 show these changes and where no material evidence of occupation was found the frequency of Barn Owl sightings near the sites is given. The BOT holds detailed records of most of the (known) 1993 sites and almost all of these were rechecked in 2003. However a minority of sites could not be checked because the independent workers who contributed the original data in 1993 provided insufficient detail.

Total number of roost sites recorded in 1993		151	
Number of 1993 roost sites for which BOT hold detailed records		113	(100%)
Number of 1993 roost sites where in 2003 Barn Owls are:	Now breeding	17	15.0%
	Still roosting regularly	16	14.2%
	Still roosting occasionally	10	8.9%
	Seen more than once a week	2	1.8%
	Seen more than once a month	9	7.9%
	Seen less than once a month	3	2.7%
	Definitely absent	51	45.1%
	Unknown	5	4.4%

Table 3: Barn Owl status (in 2003) at sites in Devon where Barn Owls roosted (only) in 1993. Note: *definitely absent* refers to sites where no material evidence of occupation was found/reported.

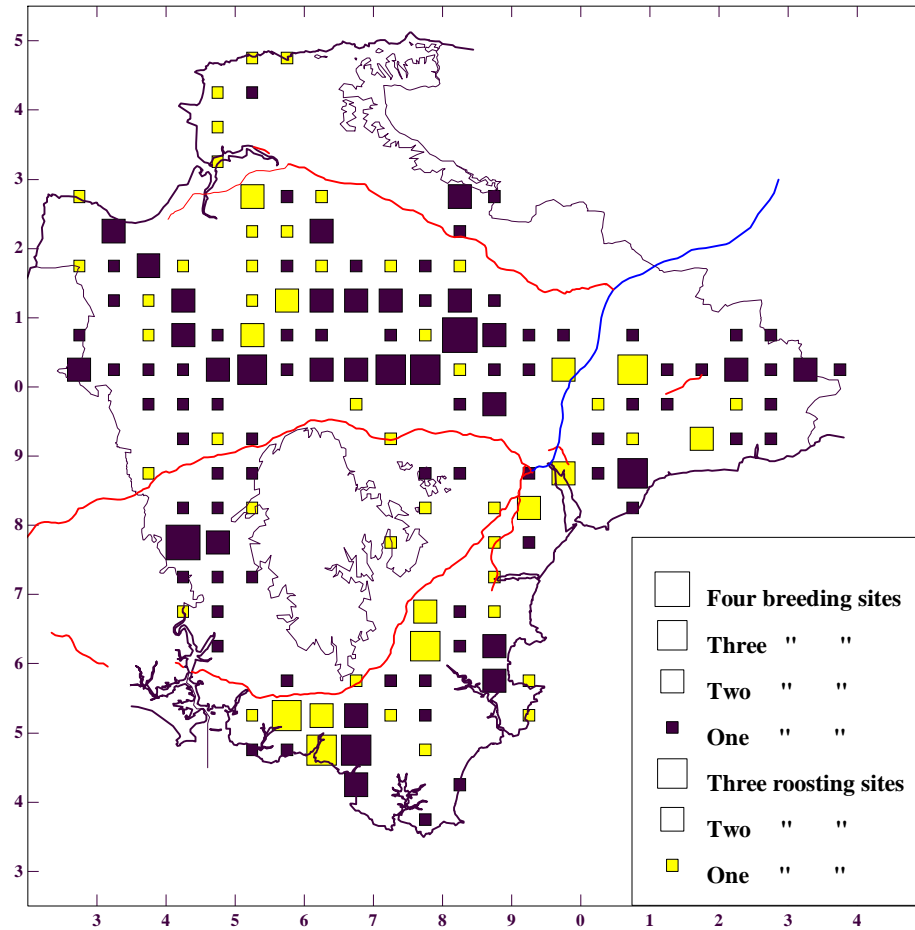
3.2 Distribution

The 1993 Barn Owl distribution map was presented at the 5km square level according to the BOT's confidentiality policy at the time. Since then the policy has been revised allowing publication at the 2km square (tetrad) level. When comparing the 1993 and 2003 distribution maps and Local Authority District totals, the reader should be aware of the reduction of the southerly bias in the 1993 data (i.e. the number of Barn Owls in the northern half of Devon has almost certainly not increased as much as the data appears to suggest).

Please note that in the distribution maps:

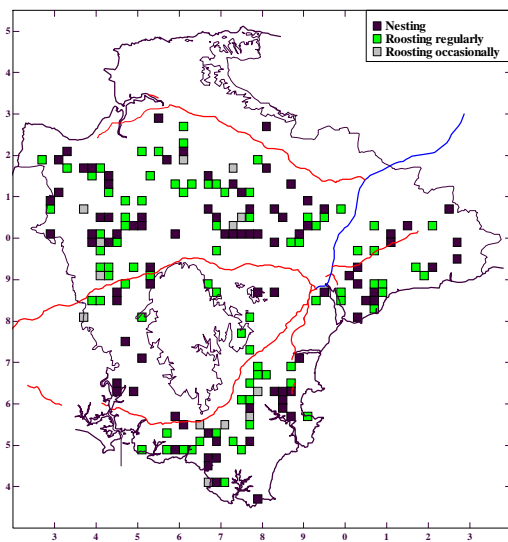
- 1) In any square with one or more breeding records, roosting records are not shown.
- 2) Blank squares do not necessarily indicate absence of Barn Owls
- 3) A black line following the 300-metre contour outlines uplands (generally less suitable habitat for Barn Owls).
- 4) Red and Blue lines show major roads (where most Barn Owl road casualties are reported (Ramsden 2003))

Map 1 shows the distribution of the 137 nest and 151 roost sites recorded in 1993 (at 5 km square level as depicted in the 1993 report). Overall 72% of the 1993 data is held by the BOT with sufficient detail to allow the production of a 1993 map at tetrad level. Map 2 shows this data. Provided that the reader is aware that map 2 shows only the majority of the 1993 data, a direct visual comparison can be made between 1993 and 2003 (maps 2 and 3).

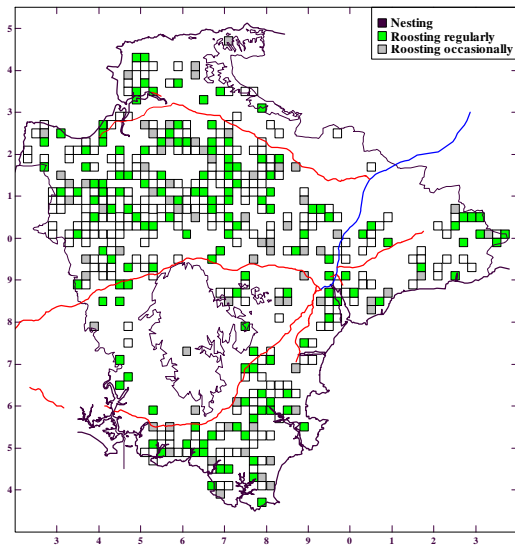


Map 1. The distribution of Barn Owl nesting and roosting (only) sites as recorded during the 1993 Devon Barn Owl Survey showing the number of sites in each 5km square.

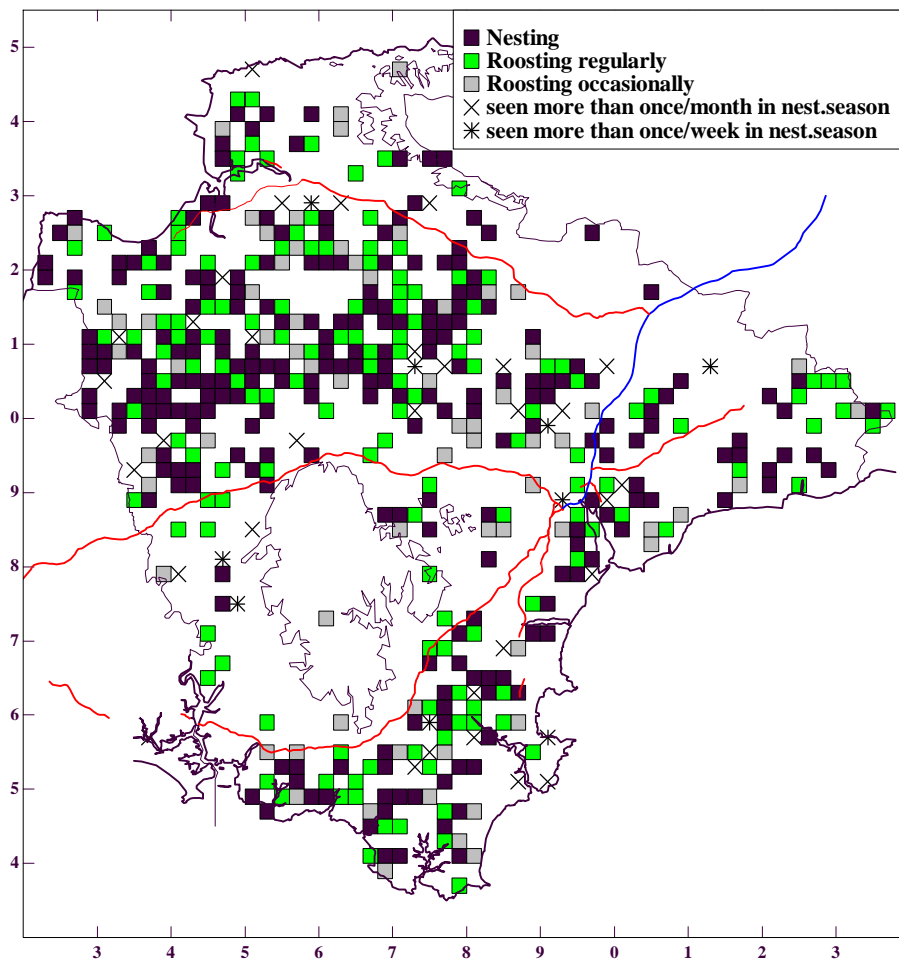
In the new distribution map (map 4), regular Barn Owl sightings in the main nesting period are included so as to check for the under-recording of nest sites. There are 17 sites where Barn Owls were reported as "seen more than once a week". 8 of these are not visible in Map 4 as they occurred in squares where roosting or nesting was also recorded. Of the 9 tetrads where frequent sightings were recorded and no material evidence of occupation was found, all but one is adjacent to one or more roost or nest squares. Possible nest under-recording was further investigated by ignoring roost squares and plotting nest squares with regular nesting season sightings. Map 5 reveals that of the seventeen reports of bird(s) seen more than once a week, only six were in squares without a nesting record nearby. Although sightings of birds seen less frequently (more than once a month) are more likely to be of non-breeding birds, note the generally close association between these sightings and known nest squares.



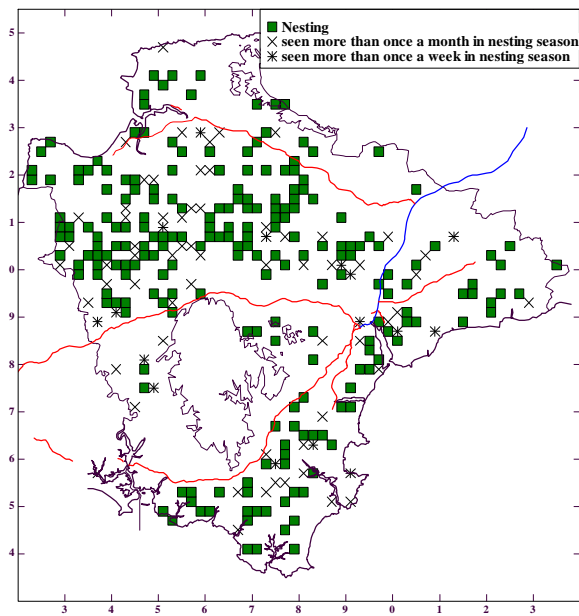
Map 2. The distribution of 72% (see tables 2 and 3) of the Barn Owl nesting and roosting (only) sites recorded during the 1993 Devon Barn Owl Survey.



Map 3. The distribution of all Barn Owl nesting and roosting (only) sites recorded during the 2003 Devon Barn Owl Survey.



Map 4. **MAIN 2003 RESULTS MAP** The distribution of Barn Owls as recorded during the 2003 Devon Barn Owl Survey (2km squares) including regular sightings in the main nesting season (March – August inc.).

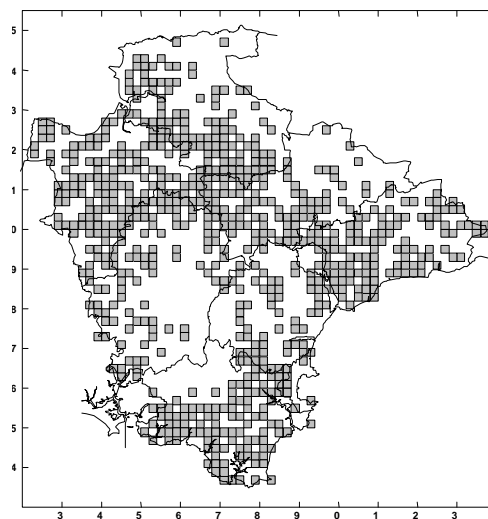


Map 5. The distribution of nesting Barn Owls as recorded during the 2003 Devon Barn Owl Survey (2km squares) and regular breeding-season sightings in tetrads where no nesting was recorded.

3.3 2003 Survey Coverage

The reader should bear in mind that no map squares were intensively searched (no cold searching) and that site recording was intentionally focused on previously reported occupied roost and/or nest sites (the 912 sites in the BOT ledger). 264 additional occupied sites were recorded during the survey, the initial information coming mainly from the media appeal (random) and from incidental reports to survey workers whilst visiting (mainly ledger) sites (semi random). Thus, although survey effort was biased towards the 912 sites reported in a variety of semi-random ways between 01/01/93 and 01/06/03, there was a more random element as well.

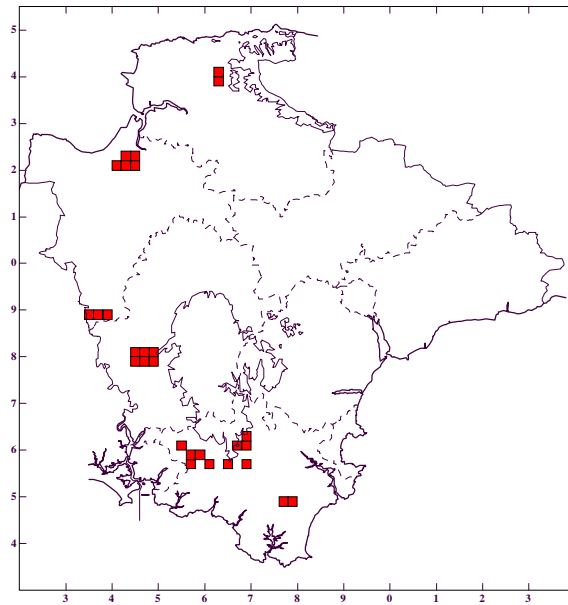
Map 6 shows all the tetrads where one or more site records were successfully updated during 2003 (inc. those sites where the status was recorded as absent) and tetrads containing positive occupation data at sites which were previously unrecorded.



Map 6. Distribution of tetrads containing one or more sites checked during the 2003 survey (includes squares where no material evidence of occupation was found).

Although map 6 shows the distribution of “survey activity” it does not include the “interview tetrad” element of the project, the intention of which was to provide evidence of data coverage.

The tetrads covered by volunteer interviewers (see *Introduction*) were intentionally biased towards local areas where there was a lack of Barn Owl roost/nest records but the landscape seemed generally suitable (i.e. not predominantly wooded, urban, water/mud, or upland). To a lesser extent, selection was also influenced by the distribution of volunteers and the distances they were prepared to travel. The individual squares (map 7) were selected on the basis that they contained no records of Barn Owl roosting or nesting since 01/01/93.



Map 7. The distribution of tetrads (n=28) where survey interviews were conducted (in all farmsteads and other potential Barn Owl sites) during the 2003 Devon Barn Owl Survey.

Within the 28 tetrads (112 sq km) surveyed by volunteer interviewers, the vast majority of interviewees reported that Barn Owls were indeed absent. Few 2003 sightings were reported (6 seen < once a month, 1 seen > once a month, 2 seen > once a week), no nests and only 5 (2003) roost sites (2 occasional roosts and 3 regular roosts). However, it is possible that there were occupied sites that the interviewees were unaware of.

3.4 Number of records in each District

When considering changes in the number of recorded Barn Owl sites the reader should be mindful of the increase in recording effort (see *Introduction*), especially in the northern half of the county (particularly Torrington and North Devon Districts).

North Devon, Torrington and Teignbridge Districts have shown the biggest increases in the number of Barn Owl nest sites recorded (see table 4). South Hams, East Devon and Mid Devon increased by a smaller amount and West Devon showed no increase. When the overall increase in recording effort is taken into account, it is highly probable that West Devon has suffered a significant decline in Barn Owl numbers between 1993 and 2003.

Table 4 also contains comments that may help to explain the observed changes in numbers. Both under-recording in 1993 and conservation work in the inter-survey years are likely to have caused an increase in the number of nest sites recorded.

Local Authority District	1993 Nest sites	2003 Nest sites	% change	Comments
North Devon	11	44	+300%	Under-recorded in 1993 North Devon Barn Owl Scheme 1999-2002
Torrige	25	90	+260%	Under-recorded in 1993 No dedicated conservation measures
Teignbridge	5	17	+240%	Teignbridge Barn Owl Scheme 1998-2004
South Hams	19	37	+95%	South Hams Barn Owl Scheme 1997-2000
East Devon	21	31	+48%	East Devon Barn Owl Scheme 2000-2004
Mid Devon	28	35	+25%	No dedicated conservation measures
West Devon	26	26	no change	No dedicated conservation measures
Exeter	0	0	no change	Small area, largely urban
Plymouth	0	0	no change	Small area, largely urban
Torbay	2	1	-50% (small sample size)	Insignificant sample size. Small area, largely urban.
Total	137	281	+105%	

Table 4: Changes in the number of recorded Barn Owl nest sites (in 1993 and 2003) in each Local Authority District in the county of Devon including possible causes.

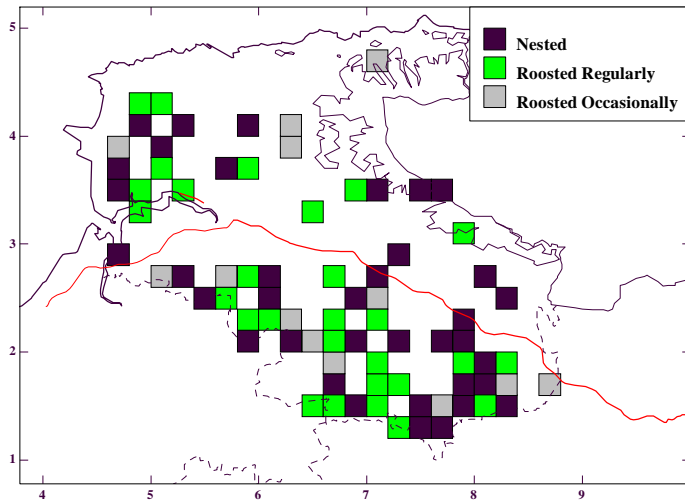
Local Authority District	1993 Roost Sites	2003 Roost Sites	% change	Comments
North Devon	18	58	+ 222%	Under-recorded in 1993 North Devon Barn Owl Scheme 1999-2002
Torrige	26	91	+ 250%	Under-recorded in 1993 No dedicated conservation measures
Teignbridge	11	26	+ 136%	Teignbridge Barn Owl Scheme 1998-2004
South Hams	25	58	+ 132%	South Hams Barn Owl Scheme 1997-2000
East Devon	19	36	+ 89%	East Devon Barn Owl Scheme 2000-2004
Mid Devon	28	39	+ 39%	No dedicated conservation measures
West Devon	22	37	+ 68%	No dedicated conservation measures
Exeter	0	1	-	Small area, largely urban
Plymouth	1	1	no change	Small area, largely urban
Torbay	1	1	no change	Small area, largely urban.
Total	151	348	131%	

Table 5: Changes in the number of recorded Barn Owl roosting (only) sites (in 1993 and 2003) in each Local Authority District in the county of Devon including possible causes.

Local Authority District	Barn Owl status in 2003			
	Nesting	Roosting Regularly	Roosting Occasionally	Previously occupied now Absent
North Devon	44	38	20	55
Torrige	90	55	36	67
West Devon	26	28	9	79
South Hams	37	40	18	89
Mid Devon	35	22	17	78
East Devon	31	23	13	122
Teignbridge	17	16	10	49
Exeter	0	1	0	6
Torbay	1	0	1	1
Plymouth	0	0	1	1
Totals	281	223	125	547

Table 6: The number of Barn Owl sites in each Local Authority District in the county of Devon as recorded in the 2003 Devon Barn Owl Survey. Note: all sites referred to as “absent” are where bird(s) had been reported as either roosting and/or nesting at some time since 01/01/93.

3.5 Description of distribution and numbers in each local authority district

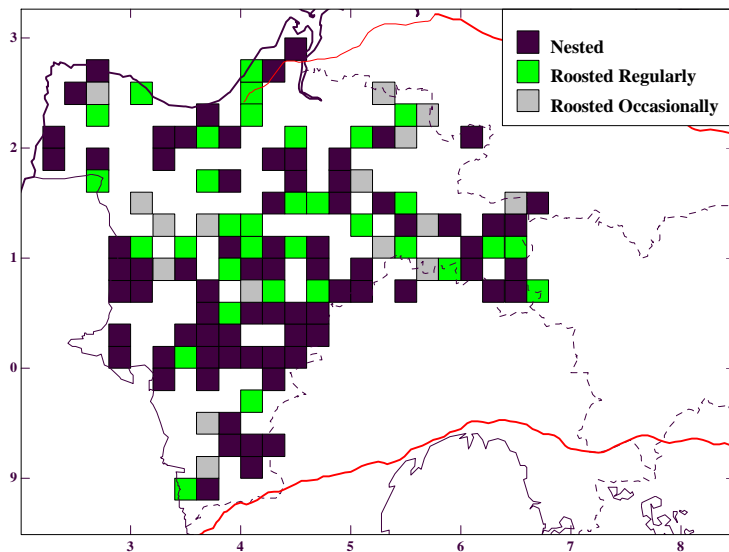


North Devon

Distribution – Generally, less records of birds in the foothills of Exmoor and high ground extending along the northern coastal strip to Ilfracombe. However, repeated successful nesting recorded at 310 metres above sea level (asl) where foraging habitat was improved. Generally less records adjacent to A361/A39 possibly as a consequence of major road mortality.

Numbers – Almost certainly very under-recorded in 1993 compared to south Devon area. 11 nests and 18 roosts recorded in 1993. North Devon Barn Owl Scheme launched in 1999

enhanced 22 sites where nesting had been recorded at some time between 1993-1999. 44 nest sites recorded in 2003 which may be accounted for by a genuine increase in numbers combined with a reduction in under-recording. Two interview tetrads on the edge of Exmoor produced two previously unrecorded occasional roost sites but no nests. Barn Owls still somewhat under-recorded but to a much lesser extent than in 1993.

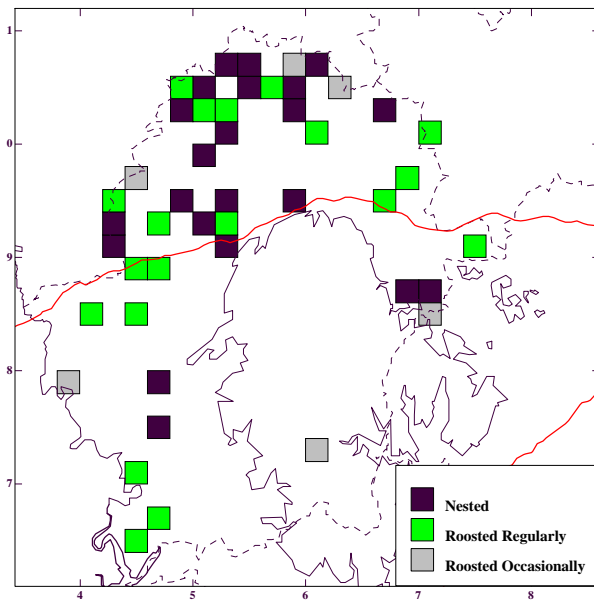


Torridge

Distribution – Widely and fairly evenly distributed records probably due to the lack of upland and general lack of major roads.

Numbers – The number of recorded nest sites in Torridge (90) is more than twice as many as in any other district. This almost certainly relates to the size of the district, lack of upland and major roads, and food availability due to above average habitat quality (amount of unimproved/wet/culm grassland). No specific conservation scheme has been implemented. Smaller increase in recorded nests than in North

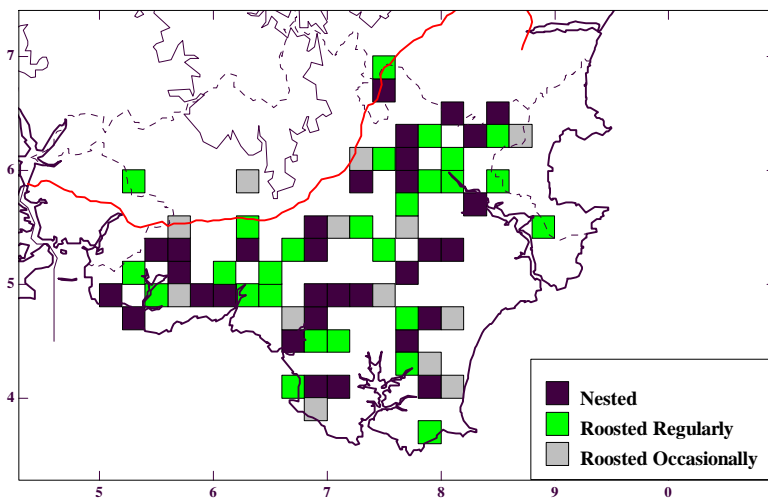
Devon. Almost certainly very under-recorded in 1993 compared to south Devon area. Eight interview tetrads produced two previously unrecorded regular roost sites and two occasional roost sites but no nests. Barn Owls still somewhat under-recorded but to a much lesser extent than in 1993.



West Devon

Distribution – Strong northern bias (where the landscape characteristics are similar to Torridge). Lack of records across upland Dartmoor is to be expected. Scarcity to the north & east of Dartmoor and in the extreme west may be in part related to A30 mortality. However, the general lack of records between west Dartmoor and the Tamar is surprising.

Numbers – Between west Dartmoor and the Tamar the number of nest records has fallen from 16 in 1993 to only 2 in 2003. The overall number of recorded nests in West Devon Borough (26 in 1993) has stayed the same despite additional recording effort (see *Introduction*). This strongly suggests that Barn Owls have declined significantly in West Devon where no specific conservation scheme has been implemented. Six interview tetrads produced one previously unrecorded regular roost site and two sightings less than once a month. No nests were reported and in three tetrads Barn Owls were reported to be absent.

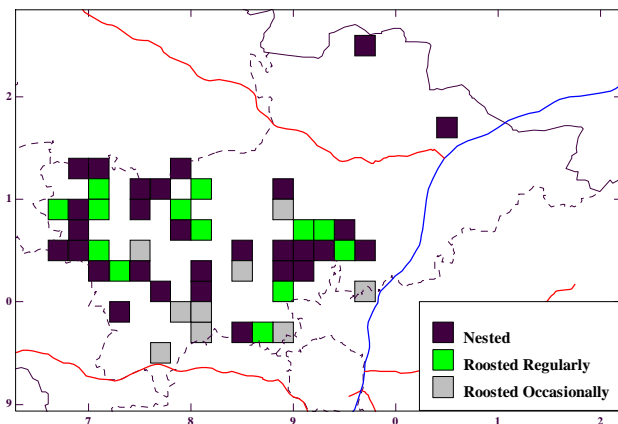


South Hams

Distribution – Widely distributed across most lowland with a lack of records on upland (as expected) and foothills of Dartmoor. Generally less records adjacent to A38 possibly as a consequence of major road mortality.

Numbers – May have been under recorded in 1993 but not compared to north Devon area. 19 nests and 25 roosts recorded in 1993. South Hams Barn Owl Scheme launched in 1997 enhanced 32 sites where

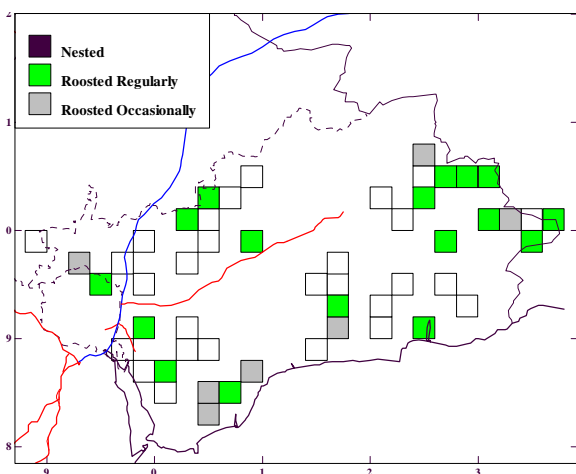
nesting had been recorded at some time between 1993-1997. 37 nest and 58 roost sites recorded in 2003, which may be accounted for by a genuine increase in numbers, combined with a relatively small reduction in under-recording. Twelve interview tetrads produced no reports of occupation or sightings at all. This suggests that Barn Owls were not significantly under-recorded in the South Hams.



Mid Devon

Distribution – Strong westerly bias. Lack of records in the north and east of the district (which was also found in 1993) may reflect genuine low numbers due possibly to relatively poor habitat (higher altitude) and presence of M5/A361 (major road mortality).

Numbers - May have been under-recorded in 1993 but probably not as much as north Devon area. 28 nests and 28 roosts recorded in 1993. Moderate increase to 35 nests and 39 roosts in 2003 may be simply a reflection of the overall increase in recording effort. No specific conservation scheme has been implemented.

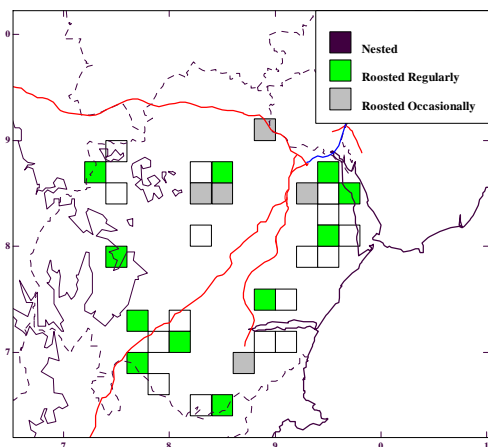


East Devon

Distribution – Widely distributed across most lowland with a lack of records on upland (in the north; Blackdown Hills) that surprisingly extends SW to the north of Honiton and even to the Ottery area. Generally less records adjacent to A30 possibly as a consequence of major road mortality.

Numbers - May have been under-recorded in 1993 but not compared to north Devon area. 21 nests and 19 roosts recorded in 1993. East Devon Barn Owl Scheme launched in 2000 enhanced 42 sites (mainly sites where nest or roost activity was recorded at some time since 1993). 31 nest and 36 roost sites recorded in

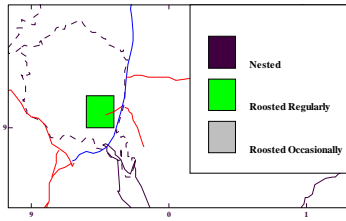
2003, which may be accounted for by a genuine increase in numbers, combined with a relatively small reduction in under-recording. Mortality associated with the A30 dual carriageway (opened 1999/2000) is likely to have caused local decline and suppressed any overall increase in numbers (Ramsden 2003).



Teignbridge

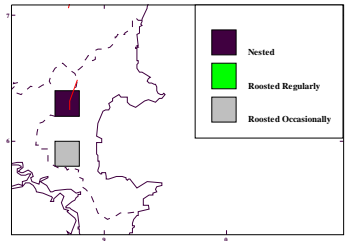
Distribution – very patchy with a lack of records from several distinct local areas, possibly a result of the relatively high density of major roads. No records at all between the A38 & A380 and distinct lack of records around the A30 (in the north). Very few records in the foothills of Dartmoor (in the west).

Numbers – May have been under-recorded in 1993 but not compared to north Devon area. Only 5 nests and 11 roosts known in 1993. Teignbridge Barn Owl Scheme launched in 1998 enhanced 13 sites where nesting had been recorded at some time between 1993-1998. 17 nest and 26 roost sites recorded in 2003, which may be accounted for by a genuine increase in numbers, combined with a relatively small reduction in under-recording.



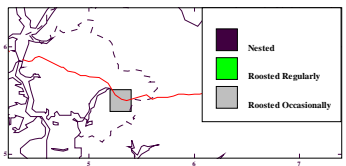
Exeter

Exeter City Council's area is relatively small, predominantly urban, and therefore unlikely to support many Barn Owls. In addition the proximity of major roads is likely to suppress numbers (Ramsden 2003). However, in recent years ECC has provided areas of excellent habitat within the north and western extremes of its area providing scope for future population growth.



Torbay

Torbay Borough contains significant areas of farmland that held 2 nests and a roost site in 1993. The remaining nest site sandwiched between the A830 dual carriageway and gradually expanding urban area is vulnerable. In spite of this, nesting has been recorded at this site most years (since 1993) providing an unusual example of the species ability to occupy urban fringe sites.



Plymouth

Plymouth City Council area is almost entirely urban and the only significant areas of potential Barn Owl habitat are next to, or between, major roads.

4) Discussion

4.1 BOT data recording / methodology

The BOT and its predecessor (the Devon Barn Owl Scheme) have been systematically recording every sighting (dead or alive), every roost and every nest discovered or reliably reported since 1985. In so doing the BOT has built up a unique data set without which the 1993 and 2003 surveys could not have been carried out. As far as is known, the scale of Barn Owl recording in Devon is unique and the 2003 survey is the largest county census of known Barn Owl sites ever carried out in Britain.

Although the census methodology is ideal for the purpose of this Survey, it is not ideal for producing a reliable population estimate, largely because it makes no attempt to quantify the absence of Barn Owls from a random selection of potential sites. However, the huge increase in the number of occupied sites recorded (Table 1) suggests that the population has increased. Although the extent to which this may be a result of an increase in recording effort cannot be satisfactorily quantified, an estimate of coverage can help validate a population estimate.

4.2 Indications of coverage achieved

Elements of the 2003 survey and other BOT activities carried out over many years provide indications of the coverage achieved and the extent to which Barn Owls may still be under-recorded in Devon. The factors that suggest good coverage are as follows:

- The majority of Barn Owl sites reported to the BOT in recent years are sites already recorded (pers. obs.).
- Successful interviews at all farmsteads in 28 tetrads did not produce any reports of previously unrecorded nest sites (see 2003 Survey Coverage).
- The intensive cold searching (in 1996) of two 5km squares in south Devon showed that most of the occupied sites had been previously recorded.
- Regular sightings of Barn Owls during the nesting season occurred mainly in, or adjacent to, tetrads where nesting was recorded (see maps 4 & 5).

4.3 Numbers found and county population estimate

In 1932 Devon's Barn Owl population was estimated at 712 pairs (Blaker 1934) using a survey method based primarily on a public appeal for information. Using a similar method, the 1982-85 Hawk Trust survey recorded 135 breeding sites (Toms *et al.* 2000) and estimated the population at 235 pairs and an average density of 3.5 pairs per 10km square (Shawyer 1987). In 1993 (the first census-type survey) the BOT & DBWPS recorded 137 nests and 151 roosts and estimated the total population at 250 to 350 pairs (Grant *et al.* 1994). These figures suggest that in 1982-85 Shawyer (1987) felt he had recorded 57% of pairs and in 1993 Grant *et al.* (1994) felt they had recorded between 39% and 55% of pairs. Current indications are that coverage has improved markedly since 1993, especially in more remote parts such as north Devon.

If coverage during 2003 was exceptionally low (50%) the population estimate would be 562 pairs, and if it were exceptionally high (90%), 312 pairs. It seems much more likely that coverage was in the range of 60% to 80% and therefore **the 2003 Devon Barn Owl population estimate is 350 to 470 pairs.**

Excluding urban areas, land over 300metres asl, and squares less than 50% in the county, there are 260 5km squares in Devon. From this figure, the 2003 population density can be estimated at 1.32 to 1.77 pairs per 5km square (or 5.3 to 7 pairs per 10km square). These figures are higher than those estimated by previous authors including Shawyer (1987) 3.5/10km sq, Grant *et al.* (1994) 4/10km sq. Toms *et al.* (2000) gave figures of 3.06 to 4.5 per 10 km square for South-west England.

The Devon Biodiversity Action Plan, launched in 1998, was the first BAP to contain a Barn Owl Species Action Plan (DCC 1998). The plan stated the following target for population recovery: "a 50%

increase in the population as estimated from the 1993 survey (i.e. no fewer than 375 pairs) to be achieved by 2012". It is pleasing to realise that this target has already been achieved! However, by 2012 there is a possibility that numbers may fall. Maintaining and/or further increasing the Barn Owl population will require sustained effort and awareness.

4.4 Estimated overall change in coverage

By comparing the number of sites recorded with the population estimates produced, (in 1993 and in 2003) mean coverage estimates are as follows: 1993 47% coverage and 2003 70% coverage. This suggests an estimated increase in coverage of 23% across the county as a whole. However, the actual change in coverage is highly likely to be much lower in south Devon (where the BOT is based) and much higher in more remote parts (see *Introduction*). Across the middle distance range (west, mid, and east Devon) the 23% change in coverage is likely to be a more representative estimate.

4.5 Distribution

Although Barn Owls are widely distributed within Devon the distribution maps show a distinct lack of records in upland areas (Dartmoor, Exmoor, and Blackdown Hills) and fewer records on the hilly fringes of these. In this respect distribution has not changed markedly since 1993. However, it is considered unlikely that this is due to altitude or rainfall since several cases of high-altitude successful nesting were recorded where prey-rich habitat was available. There is tremendous scope for habitat improvement in hilly/upland areas. If changes in hill farming subsidy payments result in a significant reduction in grazing (especially by sheep) and an increase in tussocky rough grassland Barn Owl distribution could increase significantly.

The fact that Barn Owls appear to be very scarce in some lowland areas is a cause of great concern, in particular the lack of records between Dartmoor and the Tamar. Recent research has highlighted the effect of major roads on local Barn Owl distribution (Ramsden 2003) and the general absence of nest and roost records along most major roads confirms this. Although discussions between the BOT and the Highways Agency are currently addressing this issue, any changes to reduce road mortality are unlikely to be implemented quickly.

4.6 Changes in Local Authority District population levels

Torrige (TDC) and North Devon District (NDDC) together cover the whole of the north Devon area where Barn Owls were most under-recorded in 1993. In both districts the number of recorded nests and roosts increased dramatically due largely to a reduction in the 1993 southerly bias. However the increases were greater in NDDC (nests +300% roosts +222%) where the North Devon Barn Owl Scheme was carried out (which involved BOT staff fieldwork implementing measures to reduce mortality and increase nesting success at all known nest sites). Although it could be argued that the extra conservation activity in NDDC was responsible for the extra recording this is most unlikely. This is because changes in the distribution in the fieldwork in the county was only one of the reasons for the reduction in southerly bias. In addition, the extra NDDC recording effort associated with the North Devon Barn Owl Scheme occurred in 1999 and produced a total of only 19 nest sites at which monitoring stopped in 2002. Thus the 44 nest sites recorded in 2003 suggest a genuine increase in numbers.

Across the middle distance range, the reduction in 1993 southerly bias is likely to have been less extreme and relatively even. Thus, in West Devon (WDBC), Mid Devon (MDDC) and East Devon (EDDC) the changes in recorded numbers should have been similar. In fact, they varied significantly. The increase in nests (+48%) and roosts (+89%) was much bigger in East Devon (where the East Devon Barn Owl Scheme had been implemented). The moderate increases in Mid Devon (+25% & +39%) may be simply a reflection of the overall estimated (23%) increase in recording effort (see above). Whereas in West Devon the fact that there was no change in the number of recorded nests suggests that Barn Owls declined significantly. The reasonable number of WDBC roosts (+68%) suggests that some birds may have been present but not breeding. However, the general absence of records between Dartmoor and the Tamar is indicative of a worrying decline at which conservation effort needs to be targeted.

In both south Devon districts (South Hams (SHDC) and Teignbridge (TDC)) Barn Owls were relatively well recorded in 1993 and therefore any significant increase is highly likely to represent genuine increases in Barn Owl numbers. The % gains in TDC (where the Teignbridge Barn Owl Scheme was carried out) are particularly outstanding (nests +240%, roosts +136%) although the birds still seem to have a very patchy distribution (probably caused by three dual carriageways and lack of habitat on Dartmoor/foothills). The South Hams Barn Owl Scheme was the first to be launched (in 1997) and in SHDC area the increases (nests +95%, roosts +132%) are impressive.

4.7 Long-term site occupation

The fact that individual Barn Owls are highly site faithful (Cayford 1992, Taylor 1993 & 1994) is well known. Even where suitable-looking alternatives exist within their home range the birds generally ignore these, frequenting only their "chosen" sites (Ramsden 1995). In addition, Barn Owl sites are sometimes termed "traditional" as they can be occupied by successive generations of Barn Owls for 100 years or more (Shawyer 1987). However, data on long-term site occupation is hard to find. *Project Barn Owl* attempted to re-check the 135 breeding sites reported to the Hawk Trust in 1982-85 but only received 28 responses and the number where Barn Owls still nested was not given. Across England, responses were received from 555 sites of which 14% were either still "occupied" by Barn Owls or they were present in the immediate locality (Toms *et al.* 2000).

The 2003 Devon Barn Owl Survey successfully re-checked 95% of the sites where Barn Owls nested or roosted in 1993 (and detailed records are held by BOT, see Tables 2 & 3). Ten years on, the species was absent from almost half of the old nest sites and still nesting at nearly a quarter of them. A small proportion of old roost sites had become nest sites. If one considers all signs of Barn Owl presence as "occupation" (including sightings only) then roughly half of the 1993 sites were still "occupied" in 2003 and roughly half were unoccupied. Most of the sites where Barn Owls were found to be absent were still available although a significant minority had been converted or demolished (pers obs).

Given a mean adult survival rate of 66% (Percival 1990), on average, each adult has to be replaced every third year in order for a pair to be maintained. At those sites that were continuously occupied by a pair between the surveys it can be estimated that each one of the pair has been replaced four times during the eleven years (1993-2003 inc.) and surmised that each one of the eight new recruits chose to occupy the traditional site rather than move to a new one. The long-term occupation of sites by successive individuals suggests that the sites themselves hold a certain "appeal" to Barn Owls as a species rather than simply "liked" by the individual. Research to identify which site characteristics influence site selection would be of interest.

4.8 Possible reasons behind population change

The fact that numbers have increased more in areas where the BOT has implemented dedicated conservation schemes suggests that the schemes were largely responsible for the observed increases. However, Barn Owl populations are influenced by numerous variables such as annual changes in prey numbers (Taylor 1994) and variations in weather (Percival 1990). Fortunately in the south-west survival and nesting success don't vary as much as in more northern latitudes and population level appears to be more stable year-on-year (pers obs). The only notable exception to this (in recent years) was the low numbers in 1995 and high numbers in 1996 that appeared to be due to genuine changes in Barn Owl abundance and productivity reported across England in those years (Toms *et al.* 2000). 1993 and 2003 (when the two surveys were carried out) appeared to be typically average years.

Thanks largely to government-funded agri-environment schemes and the advisory work carried out by NGO's the amount of potential Barn Owl habitat has increased. It is impossible to quantify the extent to which any increase in numbers has resulted from the work of DEFRA, the Devon Wildlife Trust, Devon FWAG, or individual landowners. However it is probable that numbers have increased as a result of the combined efforts of all concerned.

Although Barn Owls have almost certainly increased, their numbers are nowhere near historical levels as most farmland still lacks areas of prey-rich Barn Owl habitat. Many of the benefits from the conservation measures implemented (such as advice on habitat and rodenticide use) may be short-lived. Factors such as agricultural policy, support for agri-environment schemes, support for the BOT (and other conservation organisations), transport/road policy, and Local Authority planning policies will strongly influence the Barn Owl population in future.

5) Summary

The 2003 Devon Barn Owl survey consisted primarily of the re-checking of all nest and roost sites recorded by the Barn Owl Trust since 1st January 1993. 264 additional sites were recorded during 2003 bringing the total number of sites checked/recorded to 1,176; the largest survey of its type ever carried out. In addition, selected map squares without Barn Owl records were surveyed in an attempt to evaluate data coverage. Barn Owl status was classified as nesting, roosting regularly, roosting occasionally, or absent. At sites without evidence of nesting or roosting the frequency of Barn Owl sightings was recorded.

281 nest sites and 348 roost sites were recorded – more than twice as many as in the 1993 Devon Barn Owl Survey. The extent to which the higher number of sites may be due to greater recording effort is discussed. Overall, Barn Owl distribution had not changed markedly since 1993 the species being scarce or absent from much of Dartmoor, Exmoor, and the Blackdown Hills (due to the lack of prey-rich habitat) and along most of the major road network (M5, A30, A38, A361/A39, A380) as a result of road mortality. The only area where Barn Owls appear to have declined significantly is the southern part of west Devon.

Changes in distribution and numbers are reviewed for each local authority district in an attempt to gauge the value of the Barn Owl Schemes which were implemented in four out of the seven rural districts in the period 1997-2003. The evidence presented suggests that all four schemes have succeeded in increasing the number of pairs. In the three districts where no specific Barn Owl conservation schemes had been implemented numbers had increased less or not changed. In West Devon Borough Barn Owls appear to have declined significantly since 1993.

Devon's Barn Owl population is estimated at between 350 and 470 pairs, an increase of 37% on the 1993 estimate (250-350 pairs).

References

- Blaker, GB (1933). The barn owl in England and Wales: results of the census I and II. *Bird Notes and News* **15**, 169-172, 207-211.
- Cayford, J (1992). Barn owl ecology on East Anglian farmland. *RSPB Conservation Review* **6**, 45-50.
- Devon County Council (1998). The nature of Devon: a biodiversity action plan. Exeter: Devon County Council.
- Grant, K, Pearce, G and Ramsden, DJ (1994a). 1993 Barn Owl survey of Devon: a joint project by the Barn Owl Trust and the Devon Bird Watching and Preservation Society. Ashburton, Devon: Barn Owl Trust Report.
- Grant, K, Pearce, G and Ramsden, DJ (1994b). 1993 Barn Owl survey of Devon: a joint project by the Barn Owl Trust and the Devon Bird Watching and Preservation Society. *Devon Birds* **47**(2), 31-39.
- Percival, SM (1990). Population trends in British barn owls (*Tyto alba*) and tawny owls (*Strix aluco*) in relation to environmental change. BTO Research Report, 57.
- Ramsden, D (1995). Barn conversion research project report. Ashburton, Devon: Barn Owl Trust.
- Ramsden, D (1998). Effect of barn conversions on local populations of barn owl *Tyto alba*. *Bird Study* **45**, 68-76.
- Ramsden, D and Ramsden, F (2001). Barn owls on site: a guide for developers and planners (2nd edition). Peterborough, Cambs: English Nature.
- Ramsden, D (2003). Barn Owls and major roads: results and recommendations from a 15-year research project. Ashburton, Devon: Barn Owl Trust.
- Shawyer, CR (1987). The Barn Owl in the British Isles: its past, present and future. London: The Hawk Trust.
- Taylor, I (1993). Barn owls: an action plan and practical guide for their conservation in Scotland. University of Edinburgh.
- Taylor, I (1994). Barn owls: predator-prey relationships and conservation. Cambridge University Press.
- Toms, MP, Crick, HPQ and Shawyer, CR (2000). Project barn owl final report. Unpublished report to Bayer AG, Liphia SA, Sorex Ltd and Zeneca Agrochemicals.