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Appendix 1: Target species biology

Table A1

Bat Species	Greater horseshoe bat (<i>Rhinolophus ferrumequinum</i>)	
Distribution	Relict population restricted to S Wales and SW England. Possibility of population expansion with recent records from outside its range (Surrey, Sussex, Leicestershire.)	
Conservation status	Endangered	
Number of known summer breeding roosts	Only 14 major breeding colonies known and little chance of other major colonies being identified. Additional smaller sites are known.	
Colony size	50–150, up to 600 recorded	
Roost fidelity	High	
Favoured summer roost type	Older buildings.	
Colony dynamics	Some of previous years' juveniles and breeding females start to arrive in May but most breeding females only arrive in mid June. Males up to 14yrs old return with the females and remain until mid July when peak nos of adults and birth occurs. Males depart when young are born. In early Sept breeding females begin to disperse.	
Birth dates	Mid July. Mean=15 July +/-2days (range=6–26) in Gloucs. Data R. Ransome.	
Emergence	Median 25 mins post sunset at 51°N	
Echolocation call frequency	83 kHz. High directionality and short detection distance of calls means that bat detector surveys are considered impractical	
Monitoring potential	Summer roost	Good
	Field study	Not applicable at present
	Hibernation	Good

Table A2

Bat Species	Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)	
Distribution	SW, W C England, throughout Wales.	
Conservation status	Endangered	
Number of known summer breeding roosts	Many but not all major summer roost sites are known. Circa 227 breeding/all year round roosts (Harris et al. 1995)	
Colony size	30–200	
Roost fidelity	High	
Favoured summer roost type	Buildings, often larger complex mansions with stable that offer a range of roost sites. Frequently the majority of the colony roosts in one building but some colonies include several smaller satellite roosts close by.	
Colony dynamics	Females start to collect at maternity sites in May, but may not reach their full complement until very shortly before birth dates. Non-breeding females may or may not remain with the colony after birth.	
Birth dates	Late June- July	
Emergence	Median 31 mins post sunset at 53°N Bats exhibit light sampling behaviour, emerge in darkness and often use multiple exit points leading to confusion, until colony behaviour is examined. Bats can frequently shift site within a large building and switch exit points.	
Echolocation call frequency	105–115 kHz High directionality and weak call strength makes bat detector surveys limited at present..	
Monitoring potential	Summer roost	Good
	Field study	Not applicable
	Hibernation	Good

Table A3

Bat Species	Daubenton's bat (<i>Myotis daubentonii</i>)	
Distribution	Common throughout the UK	
Conservation status	Low risk	
Number of known summer breeding roosts	Low number known. Circa 100 roosts, but many of these may not be breeding roosts, possibly 60.	
Colony size	40-80 but can exceed 100	
Roost fidelity	Low. This species shows high mobility of colonies in trees – but within a limited area and low mobility when roosting in old buildings.	
Favoured summer roost type	Trees and older buildings, sometimes bridges. More frequently found in buildings in Scotland.	
Colony dynamics	Males may aggregate to form their own separate communal roosts and sometimes join female colonies during the summer.	
Birth dates	Early June in S England.	
Emergence	Median 84 mins post sunset at 60/57°N Late emergence of this species causes inaccuracies in counts.	
Echolocation call frequency	Range 36- 84 kHz, Peak 47 kHz. Loud call. Very much associated with water, identification is difficult away from water and in this situation can be confused with Natterer's.	
Monitoring potential	Summer roost	Not applicable at present
	Field study	Good
	Hibernation	Good

Table A4

Bat Species	Natterer's bat (<i>Myotis nattereri</i>)	
Distribution	Fairly common throughout the UK, but unrecorded from most of north west Scotland.	
Conservation status	Vulnerable	
Number of known summer breeding roosts	Circa 150 summer roost sites, though these may not all be breeding sites.	
Colony size	Usually 40, can be up to 200.	
Roost fidelity	Generally high but some colonies are mobile	
Favoured summer roost type	Most in old stone buildings such as castles, churches or old barns. Traditionally tree-roosters, many may still do so but are not known.	
Colony dynamics	Colonies establishes from May/June but may change roost site.	
Birth dates	Mid June/early July	
Emergence	Median 75 mins post sunset at 51°N Counts may be inaccurate due to the late emergence of this species, high clustering of emerging bats, confusing light sampling behaviour and multiple exit points.	
Echolocation call frequency	Range 30 – 80 kHz, Peak 50 kHz. Soft call. Identification in the field is difficult and can be confused with Daubenton's near water. Very much associated with woodland.	
Monitoring potential	Summer roost	Low
	Field Study	Low
	Hibernatin	Medium

Table A5

Bat Species	Serotine bat (<i>Eptesicus serotinus</i>)	
Distribution	S England only	
Conservation status	Low risk	
Number of known summer breeding roosts	Circa 500 summer roosts in buildings, possibly 300 breeding roosts. Apart from Kent, Surrey, Sussex and Hants – recorded maternity roost sites are few.	
Colony size	15-30, may be as few as eight or up to 60, generally e. 20	
Roost fidelity	Generally high site fidelity, but some colonies frequently change roosts during the summer.	
Favoured summer roost type	Buildings, generally early 1900s or older.	
Colony dynamics	Consist almost exclusively of females, start to build up in May with numbers very stable in late May. Most of colony disperses by early September.	
Birth dates	Early July	
Emergence	Median 20 mins post sunset 14 mins post sunset. Good visibility of bats, easy to count due to large size.	
Echolocation call frequency	Range 20 – 60 kHz, Peak 27. Loud call. Can possibly be confused with Leisler's bat.	
Monitoring potential	Summer roost	Medium
	Field study	Good. Overlap noctule
	Hibernation	Inapplicable

Table A6

Bat Species	Noctule bat (<i>Nyctalus noctula</i>)	
Distribution	Throughout England and probably Wales, up to S Scotland but not present in Northern Ireland	
Conservation status	Low risk or Vulnerable	
Number of known summer breeding roosts	Low number known. Circa 100 summer roosts, many of which will not be breeding roosts	
Colony size	20-40, up to 200 recorded	
Roost fidelity	Low. This species is highly mobile.	
Favoured summer roost type	Primarily tree-dwelling, occasionally in buildings (especially pre-breeding).	
Colony dynamics	In Europe, females first appear in nursery roosts in March. Move between roosts carrying their young. In Aug/Sept individual males establish territorial mating roosts between which females move.	
Birth dates	Early July	
Emergence	First to appear at sunset Median five mins post sunset at 56°N. Easy to count.	
Echolocation call frequency	Range 19.5 – 45 kHz, Peak 22 kHz. Very loud call which can be detected over 50m.	
Monitoring potential	Summer roost	Low
	Field study	Good
	Hibernation	Inapplicable

Table A7

Bat Species	Common pipistrelle (<i>Pipistrellus pipistrellus</i>) Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)
Distribution	Widespread across whole of the UK.
Conservation status	Low risk
Number of known summer breeding roosts	In the 1000s, high density of known roost sites
Colony size	Average c60, 100-200 common, can be up to 1000. <i>P. pipistrellus</i> bats tend to have smaller colony sizes <i>P. pygmaeus</i> bats tend to have larger colony sizes
Roost fidelity	<i>P. pipistrellus</i> bats tend to be more mobile <i>P. pygmaeus</i> bats tend to be more stable A colony may use several roosts and movements of colony members between these roosts is common.
Favoured summer roost type	Buildings ranging from mediaeval churches to modern houses.
Colony dynamics	Females occupy nursery roosts while males roost singly or in small group apart from the females.
Birth dates	From 3rd week in June until 2nd week July
Emergence	Median 32 mins post sunset at 56°N
Echolocation call frequency	Range 35-105 kHz Peak 45 or 55
Monitoring potential	Summer roost Low Field study Good Hibernation Inapplicable

Appendix 2: Health and safety guidelines

The following are common sense health and safety guidelines. Please consult a more thorough text if necessary (the BCT's H&S Policy Statement: Health and Safety in the Field, BCT, and The Bat Worker's Manual, EN).

Think carefully about the risks involved before starting a survey. Consider the task, the environment, the weather, the time of day or other special circumstances; working alone and at night may significantly increase the level of risk.

Be aware of the following occupational diseases:

- *Tetanus*. Preventable by regular inoculation (every five years)
- *Lyme disease*. A bacterial infection transmitted to humans by the bite of an adult female tick. If walking in close proximity to long grass/bracken – regularly inspect skin for ticks. If a skin rash develops at the site of a tick bite or if flu-like symptoms persist, then consult a doctor immediately
- *Leptospirosis*. If you are working regularly near waterbodies, watercourses or farming operations, be aware of two varieties of leptospirosis. Cattle-associated leptospirosis (CAL) can be contracted by working in close contact with cattle. Human symptoms are a flu-like illness, severe headache and meningitis. Weil's disease is most commonly associated with rodents, particularly rats. The symptoms associated with this form of leptospirosis are jaundice, meningitis, conjunctivitis and renal failure

Make sure your clothing, especially footwear, is suitable for the environment and the time of year; carry extra clothing if working in areas of high ground, moorland or open water. When working in areas where the weather is likely to be poor or can change for the worse rapidly, e.g. high moorland areas, a plastic survival bag and food supplies (including high energy foods) should be carried. In remote areas carry a map and compass and know how to take bearings from the map, and back-bearings from the ground. Carry a whistle on a string around your neck. Carry a watch, preferably waterproof. When work extends into the hours of darkness, carry a torch and spare batteries. Always carry a first-aid kit.

Always leave a note of your whereabouts with a responsible person. This should include: date and time of departure, method of travel to and around the site, proposed itinerary, expected time of leaving the site and return to base, and vehicle identification details. The person to whom these details are given should be told who to contact if you do not return.

Identify potential hazards and familiarise yourself with your survey route during the day. Talk to landowners about the location of potentially hazardous animals. Avoid well-known danger spots in urban areas and keep a safe distance from banks, cliff and water edges. Do not cross railway lines or other potentially hazardous sites e.g. quarries, ravines. Be extra vigilant at night and wear something bright/reflective when walking on roads. Non-swimmers should always be accompanied by a swimmer when walking near water. Avoid / terminate outdoor activity in inclement weather.

And don't forget.....to enjoy yourself

Appendix 3: Example Survey Forms



JOINT BCT NATURE CONSERVATION COMMITTEE
National Bat Monitoring Programme
Colony Count Form
Pipistrelle 45/05 2001

SITE CODE

(Open Use)

1.0 YOUR DETAILS

Your Name	Address of colony site (if different)	
Your Address	Colony Address	
County	County	
Post Code	Post Code	
Day Tel:	Day Tel:	

Email address: _____

Note: Please give the postcode for the colony site and your own address where possible – this provides us with the OS grid reference

2.0 ROOST DETAILS (only complete for new sites)

2.1 Roost Name		(Please use LC)
2.1 Roost Grid Ref e.g. NK 204 875		

2.2 Circle the age and type of structure the roost is found in:
Age of Structure: Pre-1945 / Post-1945
Roost Type: House / Large Building / Church / Bridge / Barn / Tree / Other _____

2.4 Bat Species: based on listening to bats with a bat detector (please attach):
45 kHz / 55 kHz / Ultrasonic pipistrelle / Ultrasonic other species _____

2.5 Species Verification: Has the bat species been verified as 4S or 5S? Y / N
If Yes, circle verification method: time exp. (self analysis) / time exp. (BCT) / bat in hand

2.6 Number of EXITS used by bats: _____ Year bats 1st recorded at this site (if known): _____

2.7 I do not wish the data on this form to be held by a local bat group (see p.ym)

2.8 Roost Description
Please attach a photo marking the exit points or give a brief description below:

2.9 Roost Changes
Please give a brief description of any significant change to the roost building since last year:

P.T.O

3.0 SURVEY

Fill in the appropriate sections (Please return form regardless of the section completed):

3.1 No bats were present DURING survey dates, but were present at other times

3.2 No bats were present DURING survey dates, but do not know if present at other times

3.3 Bats were present DURING survey dates, but no count was made

3.4 No bats were present AT ALL this year

3.5 BATS WERE PRESENT and counts were carried out (please fill in your counts)

Count period	Date (dd/mm/yy)	Total Count	Cloud (see note)	Wind (see note)	Rain (see note)	Temp. °C	Reason for stopping (see note)	Detecter used?
1	6/8-15/6	/ /	Clear (0-1/8) Faintly (1/8-1/4) Full (1/4)	Calm Light breeze	Dry Drizzle Showers		No further activity Too dark Confusing behaviour Weather deteriorating	Y / N
2	16/6-20/6	/ /	Clear (0-1/8) Faintly (1/8-1/4) Full (1/4)	Calm Breezy	Dry Drizzle Showers		No further activity Too dark Confusing behaviour Weather deteriorating	Y / N

3.6 Were other species present? Y / N ? If yes, name of species _____ & approx. count _____

3.7 What time did the first bat emerge? (approx.) (in minutes e.g. 21:20)

3.8 How long did the count take approximately? (in minutes e.g. 65)

3.9 How many people were present to count the bats at the roost?

NOTE: Please avoid counting in strong winds, heavy rain or temperatures < 7°C at sunset

4.0 CHANGE OF DETAILS

Note: If the name and address of the surveyor given above is incorrect, or if you wish these forms to be sent to another person who has agreed to take over from you to survey the site, please correct the details in the box below:

Name: _____ Forms to be sent to this person next year (tick)
Address: _____ Incorrect details above (tick)

County: _____ Day Tel: _____
Post Code: _____ Email: _____

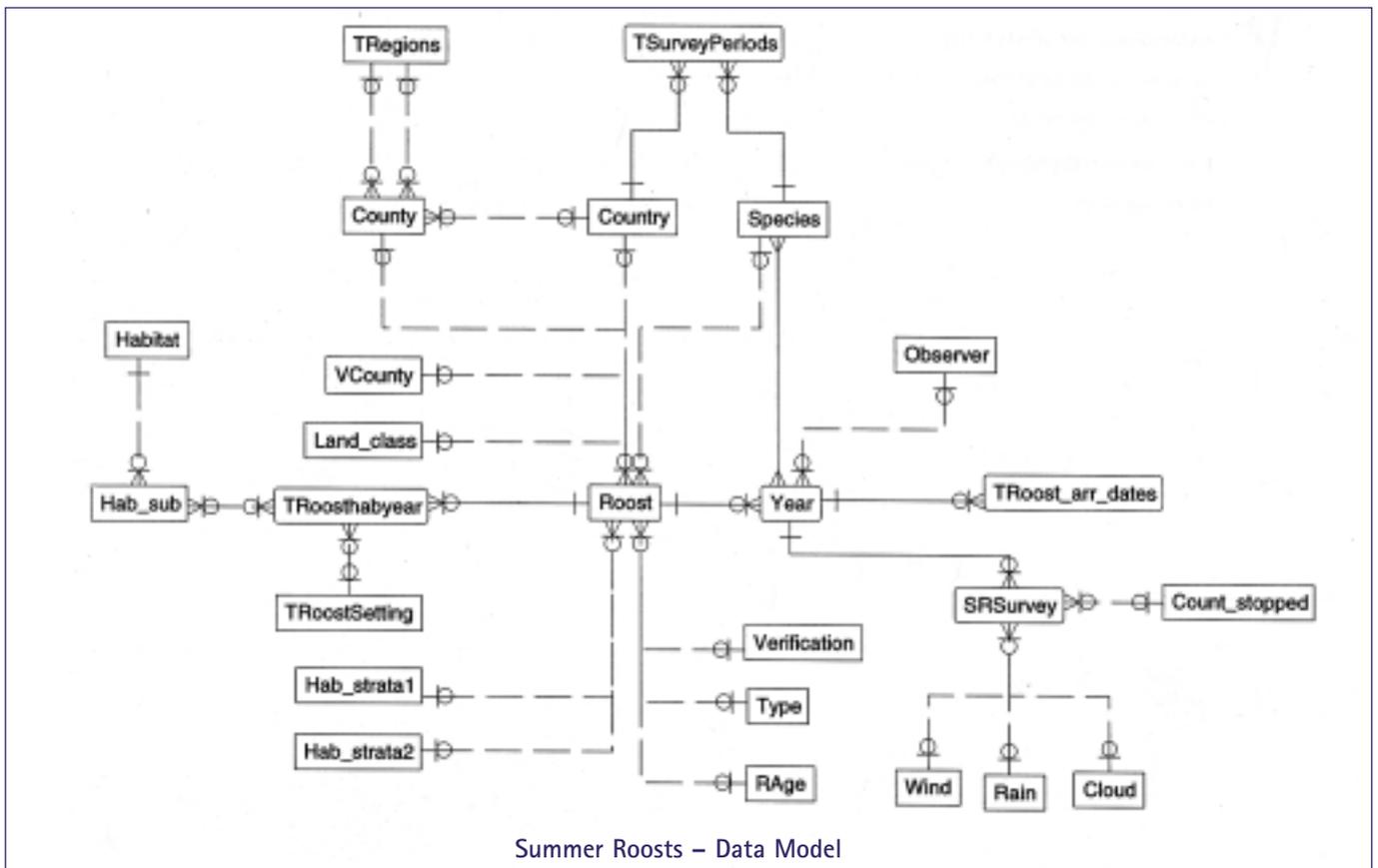
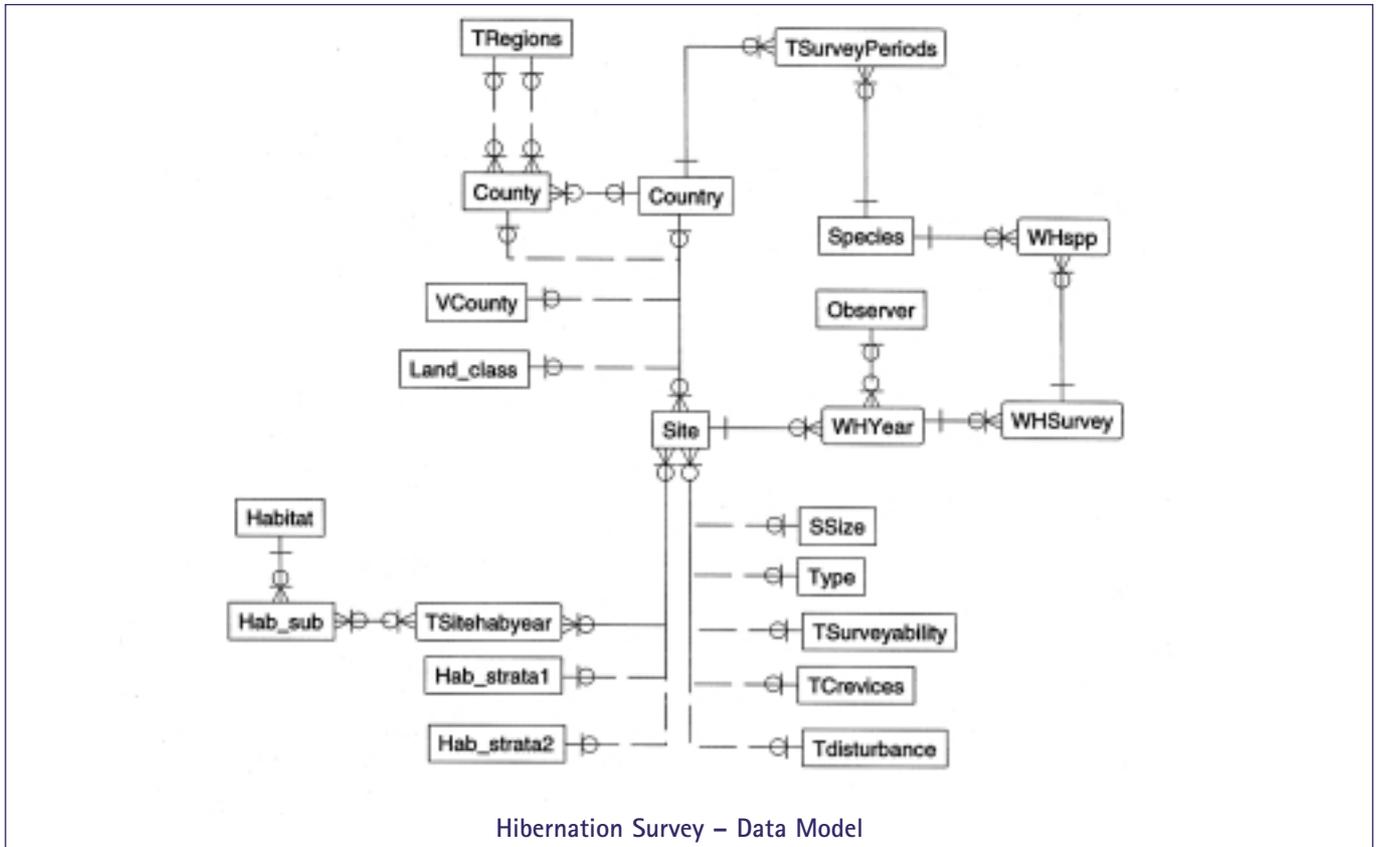
Please return completed forms in to:

NBMP
The Bat Conservation Trust
FREEPOST LON10138
London SW8 4BR

Consent to release of records
By returning this data sheet to the NBMP you consent to your data being accessible by the BCT, the JMC and others subject to the approval of the JMC and the BCT. Your intellectual copyright of the data will be recognised at all times. We will be entering your personal information onto a computerised database. Please let us know if you object to this.

Thank you for your valuable contribution to the Monitoring Programme!

Appendix 4: NBMP Database Model



Appendix 5: Distribution atlas of bats in Britain and Ireland

5.1 INTRODUCTION

The last distribution maps of bats in Britain were included in the "Atlas of mammals in Britain" published by HMSO in 1993 (Arnold). It did not include any records for Ireland. Since then there has been an upsurge in recording by local bat groups aided by new user-friendly computer programs, and a number of groups have published distribution maps for their areas. At the end of the millennium it was decided to amalgamate existing data for Britain (including the Channel Islands) and Ireland to show the present state of bat distribution so that comparisons can be made in the future. In addition, the National Bat Monitoring Programme of BCT is just completing its first 5-year cycle so this new atlas provides an opportunity to incorporate some of the results.

5.1.1 The records

It was decided to divide records into three categories:

- Bats at summer roosting sites
- Records of bats away from roost sites (this to include bat detector records, grounded bats, bats trapped indoors, dead bats, bats at, or heading to, feeding areas)
- Bats in hibernation

It is known that these are broad categories and that there are no clear-cut definitions that take into account all cases. Summer roosts may be nursery sites, all-male gatherings, spring gathering sites, single male sites, autumn dispersal roosts or a single bat in a bat-box in summer. Bats trapped indoors and grounded bats are often from a nearby roost yet are recorded here as being away from a roost site unless the roost was discovered. In autumn, bats may go to winter hibernation sites, but not begin to hibernate so such sites could be classed as summer roosts. Hibernation records were meant to give an impression of where bats are likely to be found in those cold months when activity is relatively low. Long-eared bats, however, are well-known for lingering in summer roost sites well into December, and becoming torpid. Nevertheless, overall, most records fitted well into the three categories. A few county recorders were unable to separate their records into the three categories (mainly Norfolk and Suffolk) and these have been recorded as hollow circles (records away from roosts) although some are known to be summer roosts and hibernation records.

Recording was based on 10km squares and did not take density into account.

Records from 1980 to 1999 were gathered. This was believed to be a long enough time to provide a significant number of records of the more scarce species, and also to have an up-to-date set of data.

5.1.2 Numbers of records

Over 16,860 records were collected and, once duplicate records had been removed, 13,051 records of 10km squares remained.

5.1.3 The recorders

The major contributors were the bat groups around Britain and Ireland. Most of these have recorders who provided the records, but in some cases the records came via local museum services, wildlife trusts or the statutory nature conservation organisations. In addition, major contributions were received from the National Bat Monitoring Project of BCT, the Vincent Wildlife Trust, the Forestry Commission, the National Trust and the National Parks and Wildlife Service of Ireland. Details of occasional migrants were extracted from *Bat News*, the BCT newsletter. A list of contributors is printed at the back of the appendices.

5.1.4 The maps

- Full circles represent roosts in summer, or hibernating bats
- Hollow circles represent bats away from roosts

To ensure confidentiality a cluster of smaller circles is used to indicate the general area of sensitive roosts.

Usually hibernation areas are in the same areas as summer roosts, but to assess overall distribution it is best to view both the summer and the hibernation maps side by side.

As with any distribution mapping the maps need to be interpreted with caution.

- One spot in a 10km of the National Grid can refer to a single bat seen once or 50 roosts each of 1000 bats

- There is a natural tendency to have clusters of records around recorders' home areas because that is where most fieldwork is carried out
- There is an unevenness of recording effort between areas:
 - some counties have a large number of active field workers whereas others have few;
 - changes in county boundaries have resulted in some areas lacking any recording by bat groups;
 - some counties have carried out special surveys on certain species resulting in a large number of records of those species
- There is a bias towards recording roosts that are relatively easy to find – residential buildings – whereas tree roosts are less often encountered and so tree-roosting bats are likely to be under-recorded. Bat box schemes are redressing the balance to some degree, but roost records tend to concentrate around human habitation
- Some bat species are relatively easy to detect (such as pipistrelles and noctules) whereas others need special techniques of detection (such as barbastelles and Bechstein's bats)
- Some roosts were known to have been abandoned during the two decade period covered by this Atlas and the bats were known to have moved to new locations so were represented by second spots on the map. Others were not re-discovered and it is not known if they died out or moved. This gives rise to the possibility of some over-recording

Nevertheless the maps give a guide to the ranges of different species of bats across Britain and Ireland. It is hoped that this will be used to monitor future changes in distribution. The full size maps are of the same size as overlays produced for publications such as the first Atlas of Breeding Birds in Britain and Ireland. These give useful information such as isotherms, altitude and some major habitat features.

Bat distribution in Britain and Ireland should also be viewed in terms of the ranges of the species across Europe and beyond. We are on the edge of the ranges of many species. Full accounts can be found in "The Atlas of European Mammals".

5.1.5 The future

In the immediate future it is hoped that these maps will stimulate more recording to fill in the gaps so that future maps will be more complete. In addition, a number of hollow

circles will become filled as roosts are discovered. It is envisaged that new sets of maps will be produced in the near future so that comparisons can be made. It is also hoped that by then we will have more information on numbers so that density can be plotted as well as distribution.

This project highlighted a number of problems with recording across the country – everything from recorders going missing with all the records (in one case 20 years of hard-won records were completely lost) to new databases that could not be questioned by the Group to extract the records. It is hoped that the necessity of an easy-to-use data retrieval system operated regularly in each area has been made apparent, and Groups will be able to improve the way they hold records. Help and suggestions on all aspects of recording can be obtained from BCT.

5.1.6 Errors

Please check for errors inadvertently made and notify the author. I would also like to hear of any suggested improvements in displaying distribution data. Records unknown to a Group recorder may have come from another source: please contact the author for details.

5.1.7 Thanks

Lists of the correspondents from the bat groups, individuals and organisations that submitted records are published at the back of the appendices. Their help has been invaluable in compiling this atlas. The whole project would not have been possible without the records of the hundreds of bat workers around the country. Please continue to record and submit your records through your county recorders.

This atlas builds on the NBMP funded by the DETR.

Thanks also to the proof readers – Conor Kelleher, Shirley Thompson and Frank Greenaway.

The DMap computer program made the collation and printing of the records easy. My thanks to Alan Morton for his help and advice.

*Phil Richardson
Bat Conservation Trust
15 Cloisters House
8 Battersea Park Road
London SW8 4BG*

December 2000

5.2 GREATER HORSESHOE BAT (*Rhinolophus ferrumequinum*)

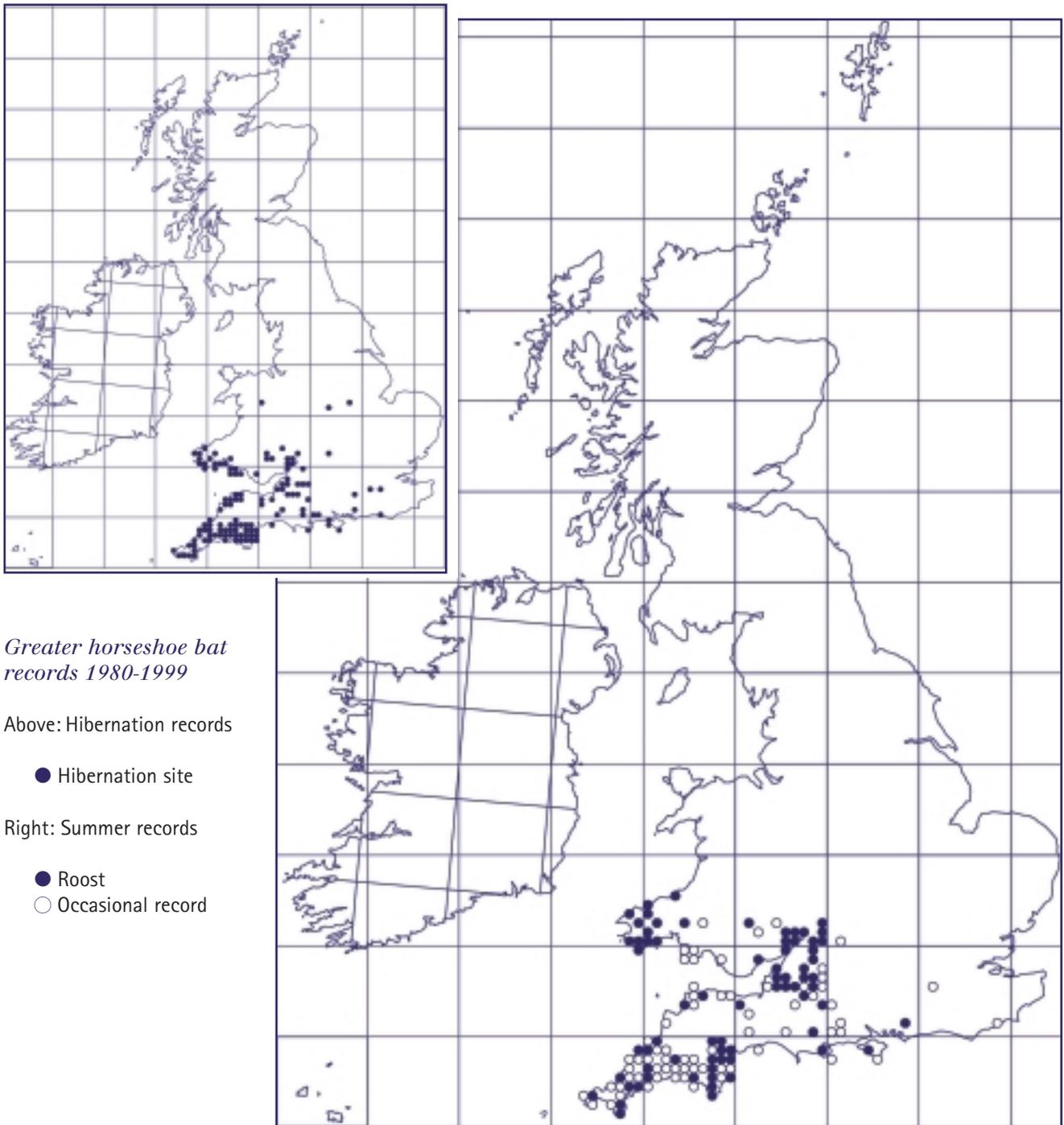
A species relatively easy to record as it does not hide in crevices. Also the subject of many studies over many years so traditional roost sites and hibernacula are relatively well-recorded.

Restricted to south Wales and south-west England.

Hibernates at relatively high temperatures in winter and is found in the same areas as the summer roosts, in the warmer south-west of Britain. A few wandering animals have been recorded in winter out of area. One of these (found in Leicestershire) had been ringed, and had come north-east from the main area of concentration.

The "roost" records may not be breeding sites and could include sites where a single bat was found once in summer.

○ 10km squares with records of roosts	71
○ 10km squares with records, but no roost recorded	62
○ 10km squares with hibernation records	125



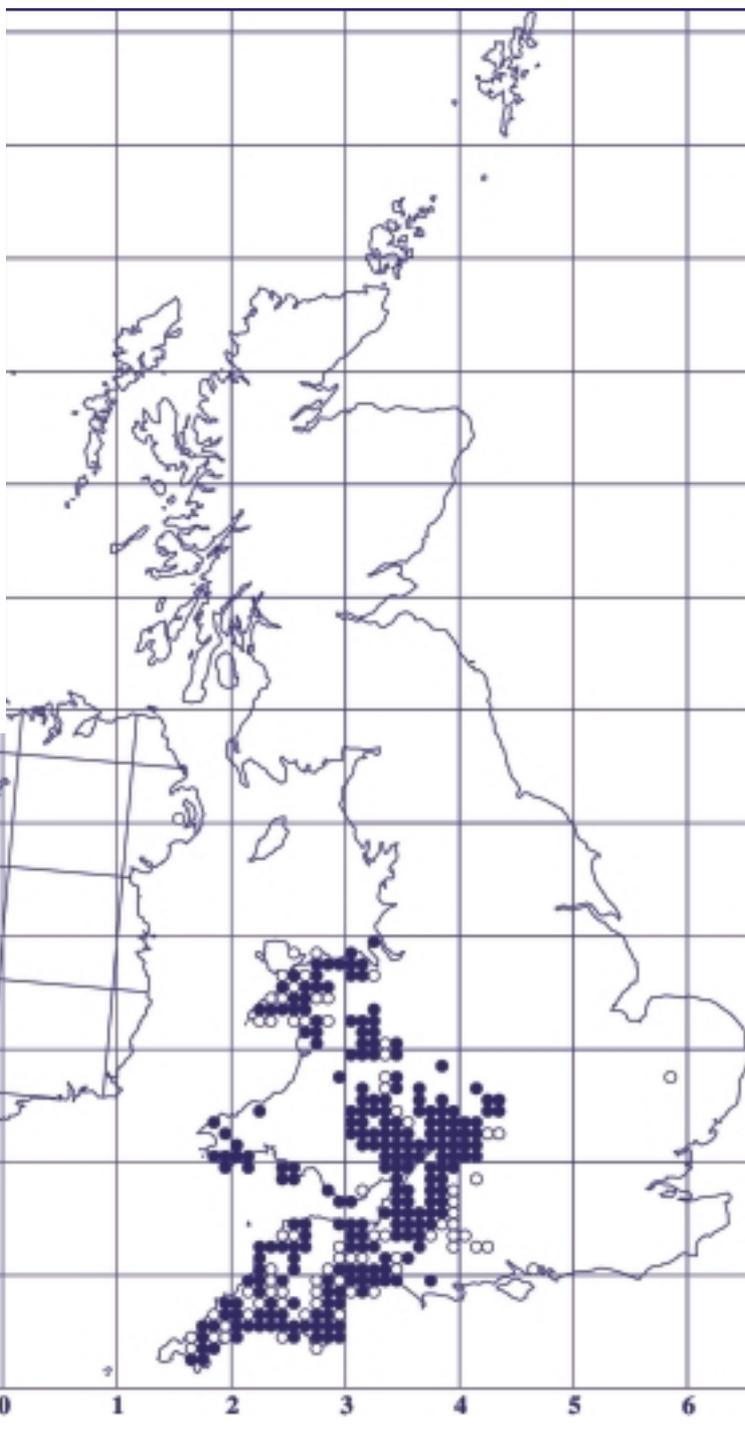
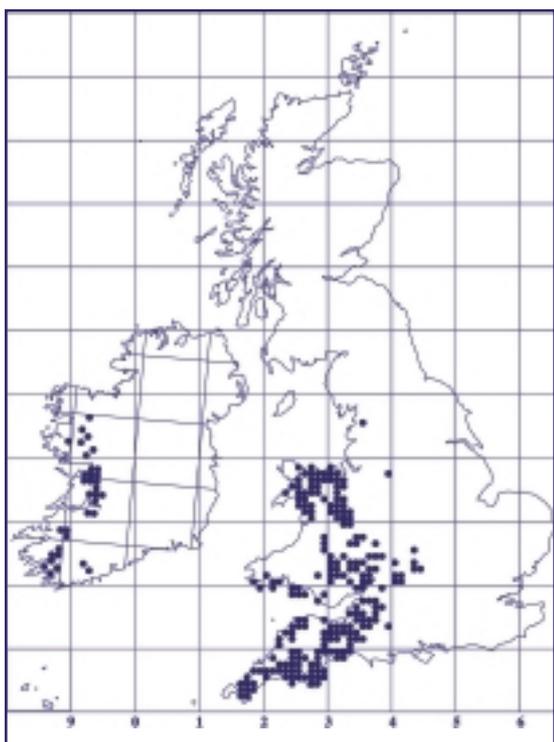
5.3 LESSER HORSESHOE BAT (*Rhinolophus hipposideros*)

Restricted to Wales, south-west England and west Ireland, with regular records as far east as Oxfordshire and Warwickshire.

Special efforts have been made to locate and monitor roosts and hibernacula.

The "roost" records may not be breeding sites and could include sites where a single bat was found once in summer.

○ 10km squares with records of roosts	300
○ 10km squares with records, but no roost recorded	78
○ 10km squares with hibernation records	254



Lesser horseshoe bat records 1980-1999

Above: Hibernation records

● Hibernation site

Right: Summer records

● Roost

○ Occasional record

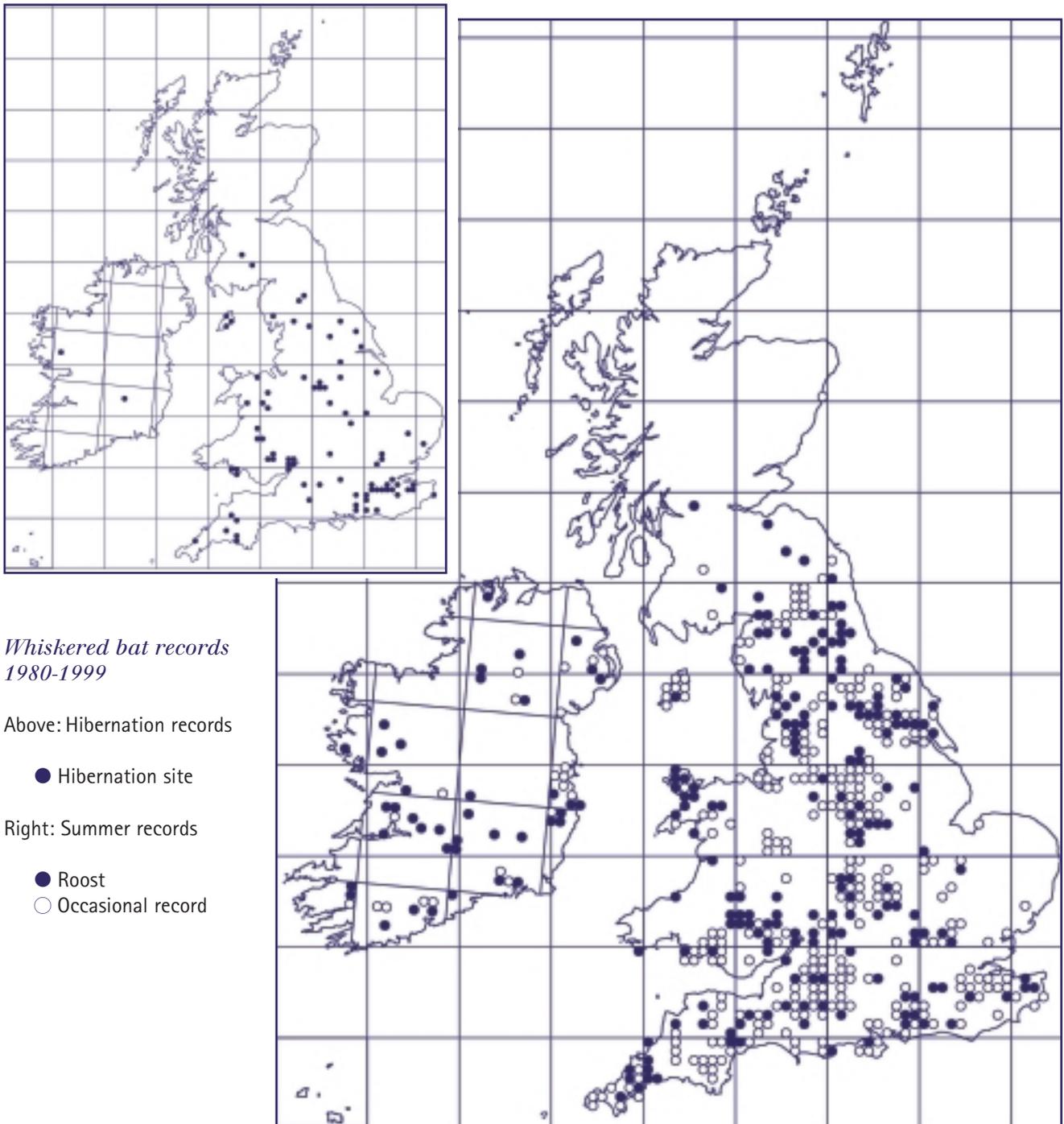
5.4 WHISKERED BAT (*Myotis mystacinus*)

Identification of this species is sometimes very difficult due to the presence of the very similar Brandt's bat, so also see whiskered/Brandt's bat distribution.

Although it is found across Britain as far north as southern Scotland, its distribution is patchy and it seems to be rarely encountered in some well-surveyed areas such as Norfolk, Suffolk and Essex. Even within areas where it has been recorded it is not present throughout. Being associated with woodlands could mean that it is under-recorded as roosts in trees are hard to find.

Distribution may be linked to areas of woodland such as sessile oakwoods.

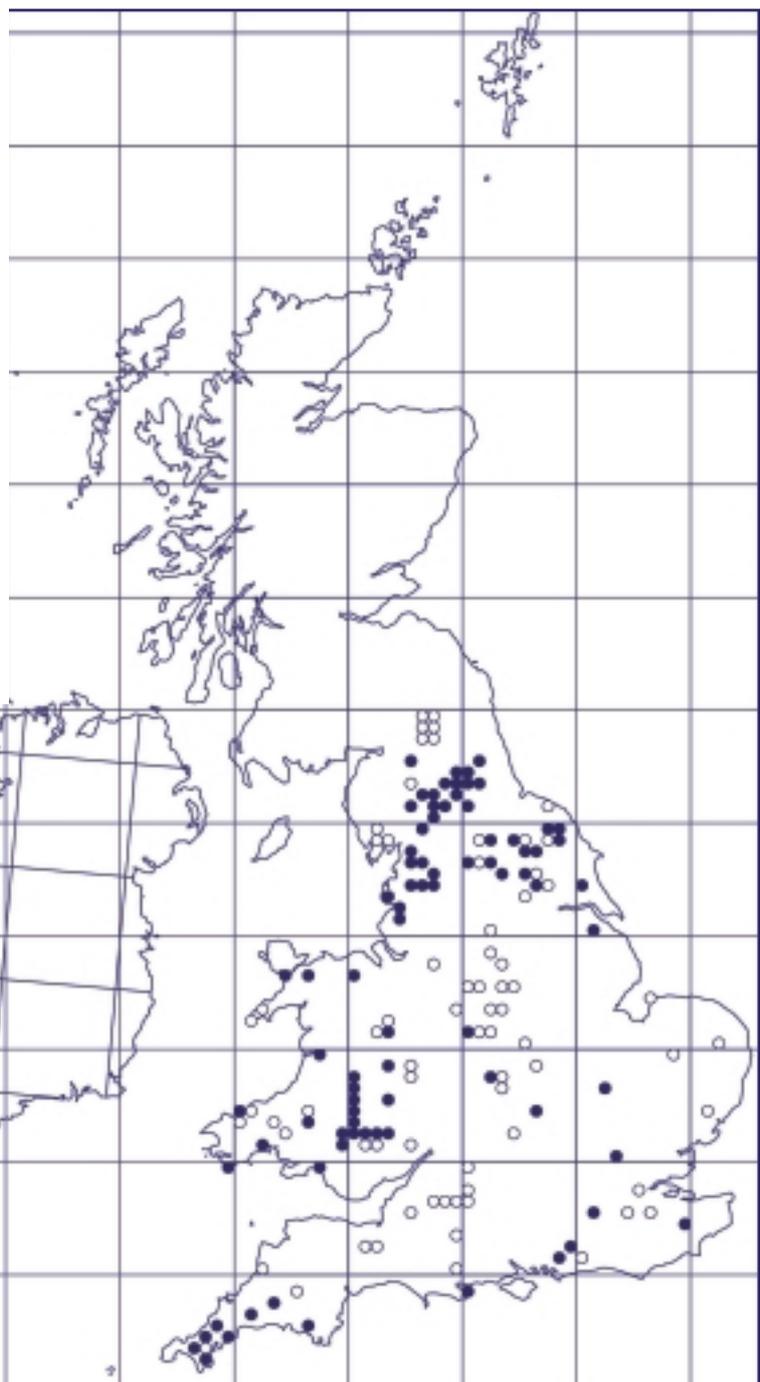
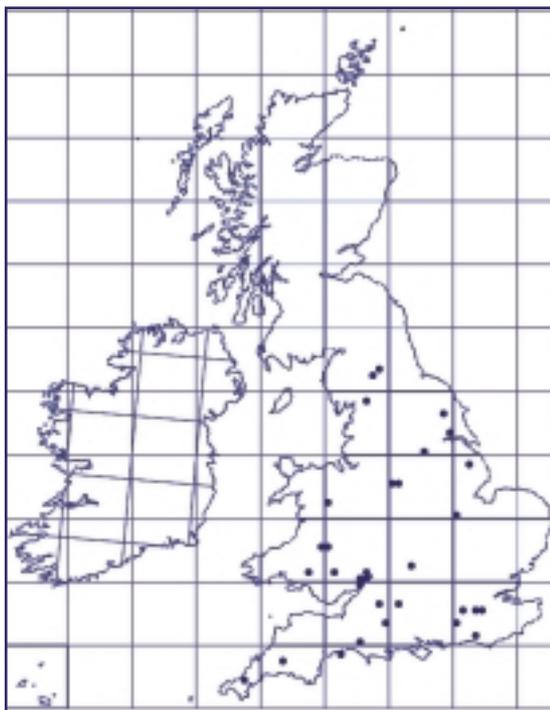
○ 10km squares with records of roosts	225
○ 10km squares with records, but no roost recorded	311
○ 10km squares with hibernation records	86



5.5 BRANDT'S BAT (*Myotis brandtii*)

A similar distribution to whiskered bat, but rarer. Not recorded in Ireland (yet).

○ 10km squares with records of roosts	81
○ 10km squares with records, but no roost recorded	75
○ 10km squares with hibernation records	32



*Brandt's bat records
1980-1999*

Above: Hibernation records

● Hibernation site

Right: Summer records

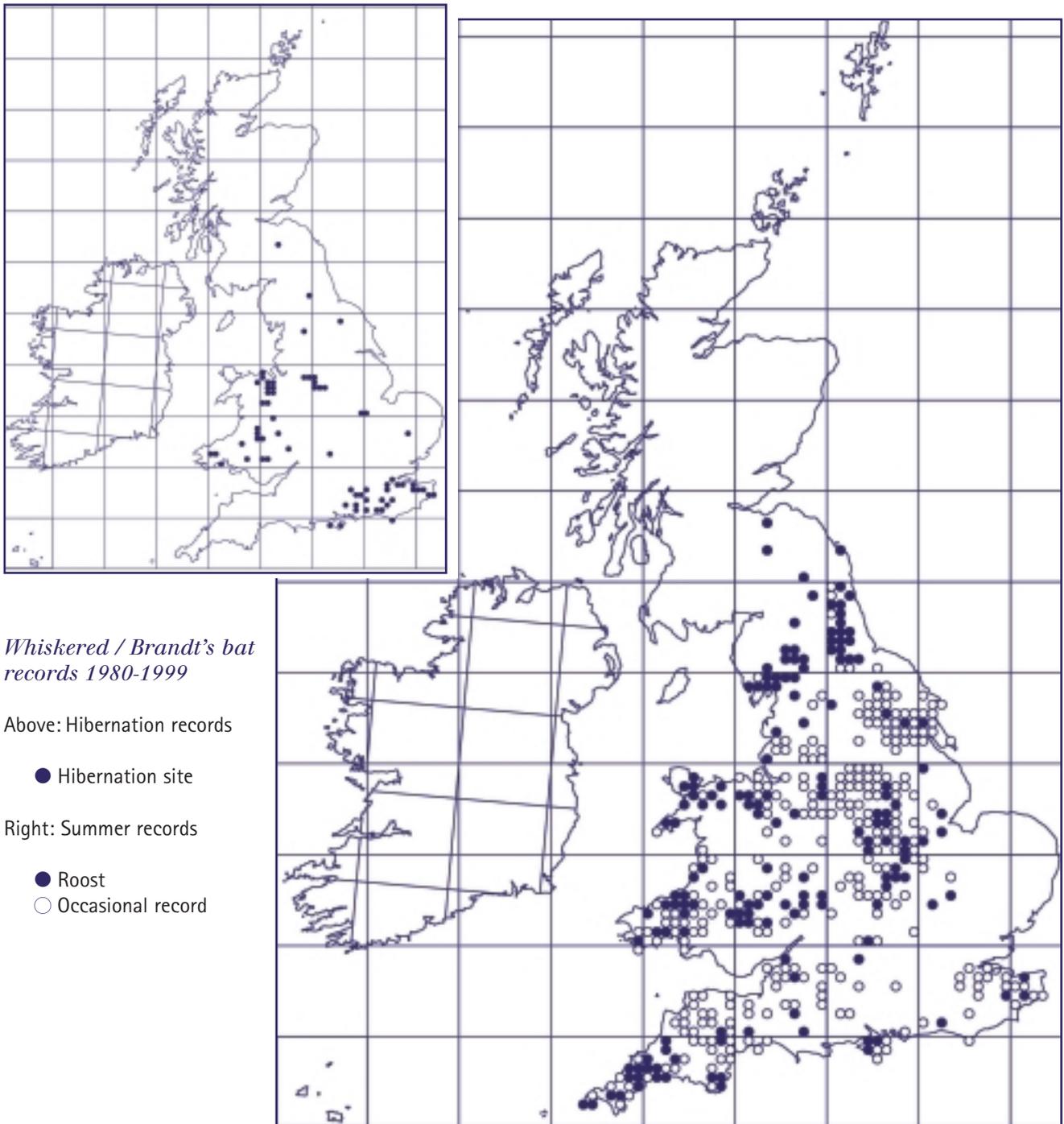
● Roost

○ Occasional record

5.6 WHISKERED / BRANDT'S BATS

Problems with identification result in these maps. It is hoped as new characteristics for separating whiskered bats from Brandt's bat are discovered, the true distribution of these species can be found.

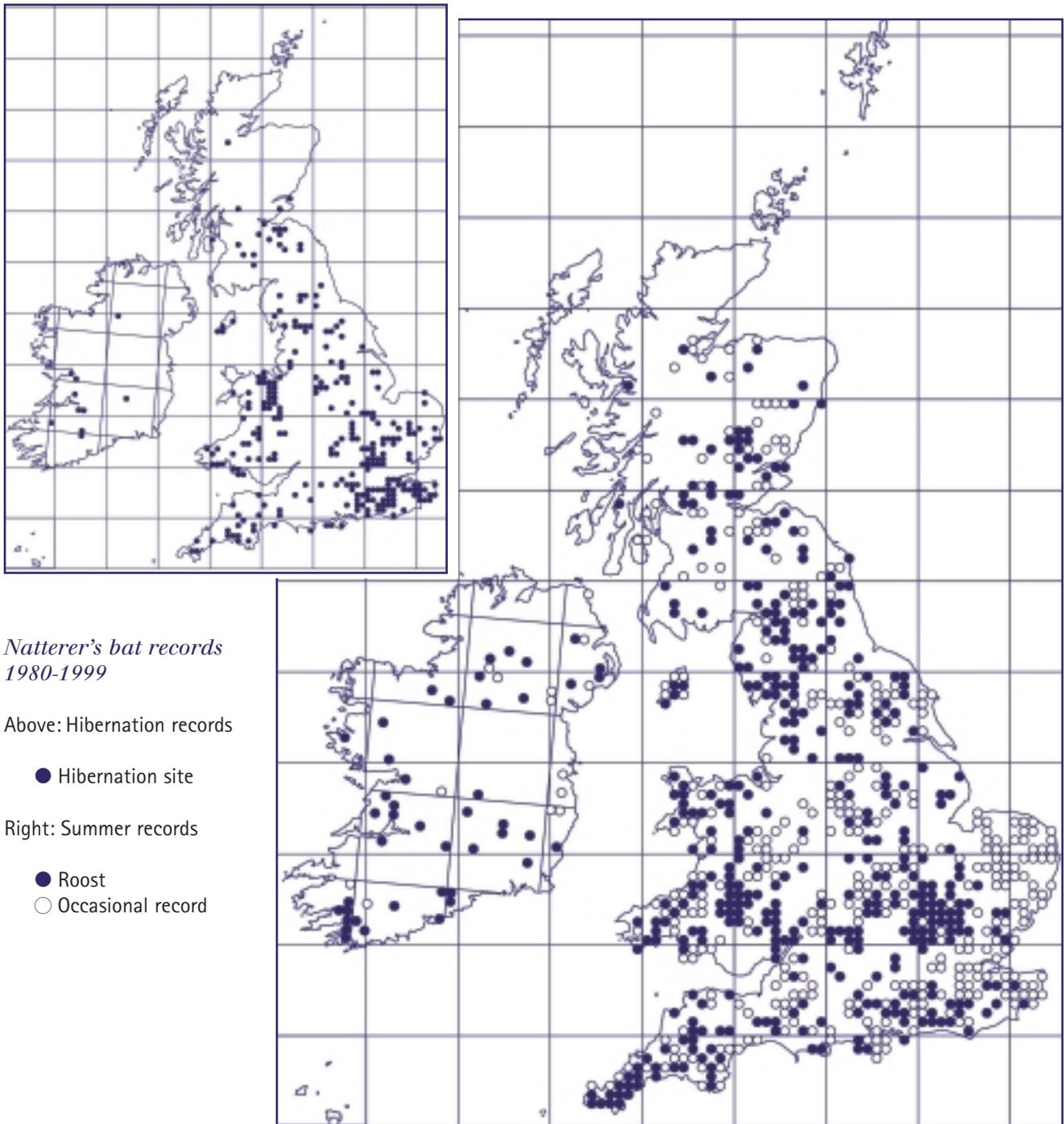
○ 10km squares with records of roosts	163
○ 10km squares with records, but no roost recorded	279
○ 10km squares with hibernation records	71



5.7 NATTERER'S BAT (*Myotis nattereri*)

Although not an easy species to locate, the two decades of the mapping period have produced a wealth of records. It is widely distributed across the UK. Some clusters of records are the result of special surveys (e.g. Hertfordshire barns survey, Natterer's bat roost survey for BCT in part of Wales) and these show that extra effort can produce records in each 10km square studied.

○ 10km squares with records of roosts	420
○ 10km squares with records, but no roost recorded	380
○ 10km squares with hibernation records	281

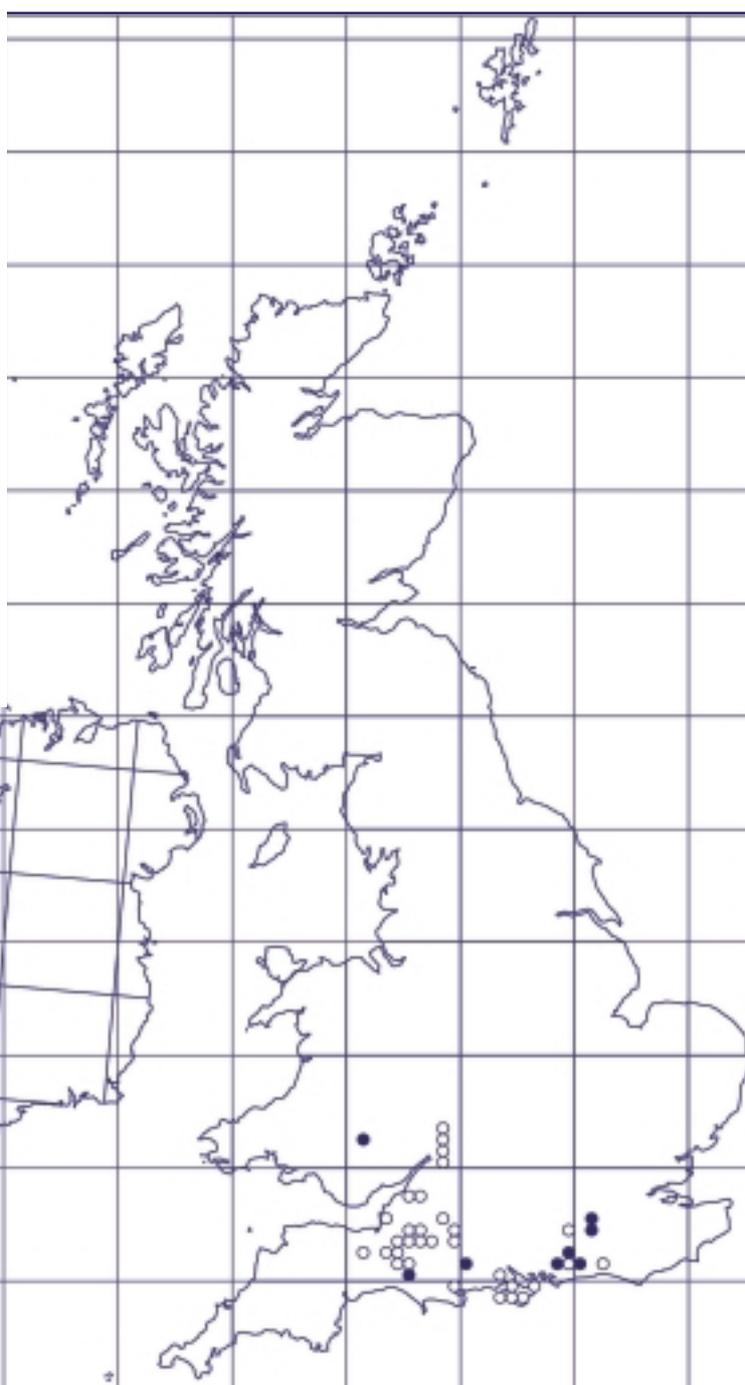
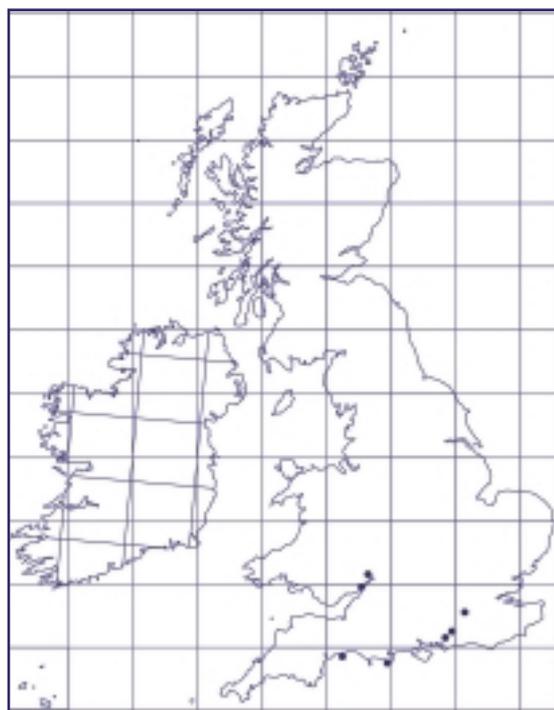


5.8 BECHSTEIN'S BAT (*Myotis bechsteinii*)

Restricted to southern England. A difficult species to detect, but special studies on this species are producing new techniques, and new information is being obtained which will help future recording.

The "roost" records may not be breeding sites and could include sites where a single bat was found once in summer.

○ 10km squares with records of roosts	8
○ 10km squares with records, but no roost recorded	31
○ 10km squares with hibernation records	7



*Bechstein's bat records
1980-1999*

Above: Hibernation records

● Hibernation site

Right: Summer records

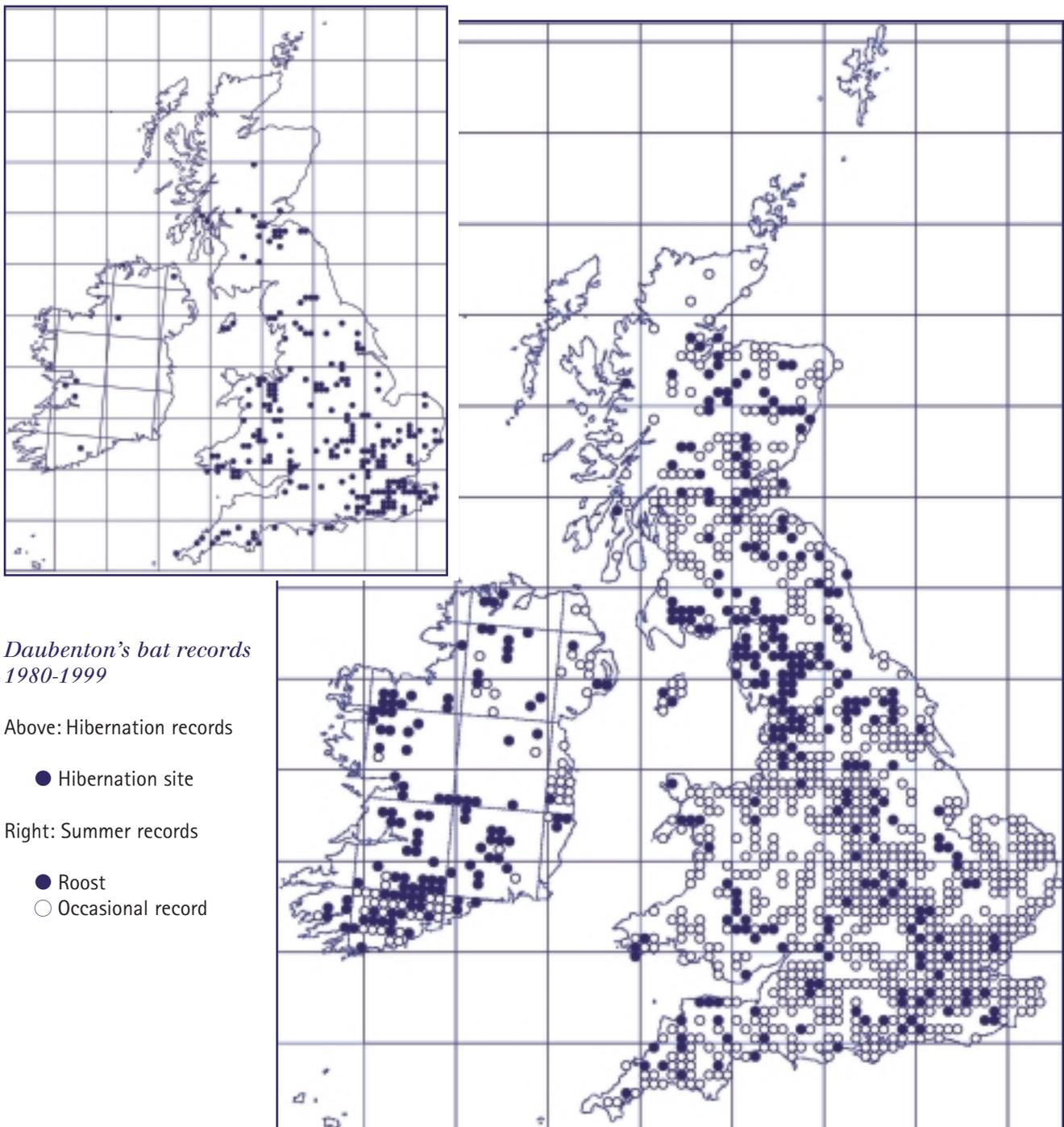
● Roost

○ Occasional record

5.9 DAUBENTON'S BAT (*Myotis daubentonii*)

Widely distributed across Britain and Ireland. Most records are of bats at feeding areas by electronic detector. This must be the easiest bat to identify in flight. Relatively few roosts are known, probably an indication that many are in tree holes – always difficult sites to locate.

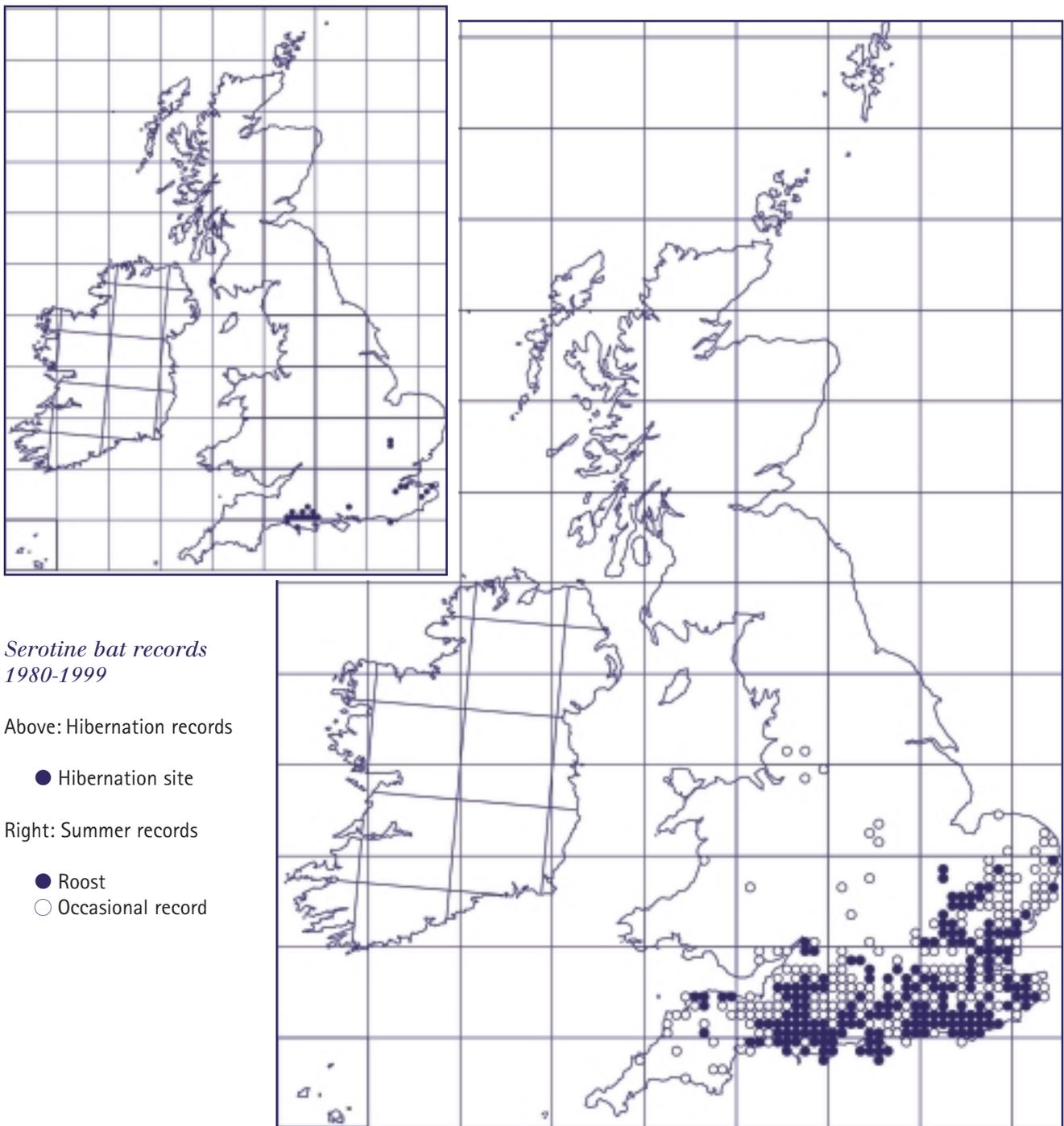
○ 10km squares with records of roosts	361
○ 10km squares with records, but no roost recorded	875
○ 10km squares with hibernation records	240



5.15 SEROTINE (*Eptesicus serotinus*)

The range is restricted to the south and south-east of England. There has been a worrying trend of summer roosts declining and being abandoned in the east. Future mapping should prove interesting to see if this produces a change in distribution. There is a scattering of occasional records in parts of the Channel Islands, Wales, S Lancashire and the Midlands. Hibernation records are few as this species is rarely found underground. A record from the Shetlands would be of a migratory animal.

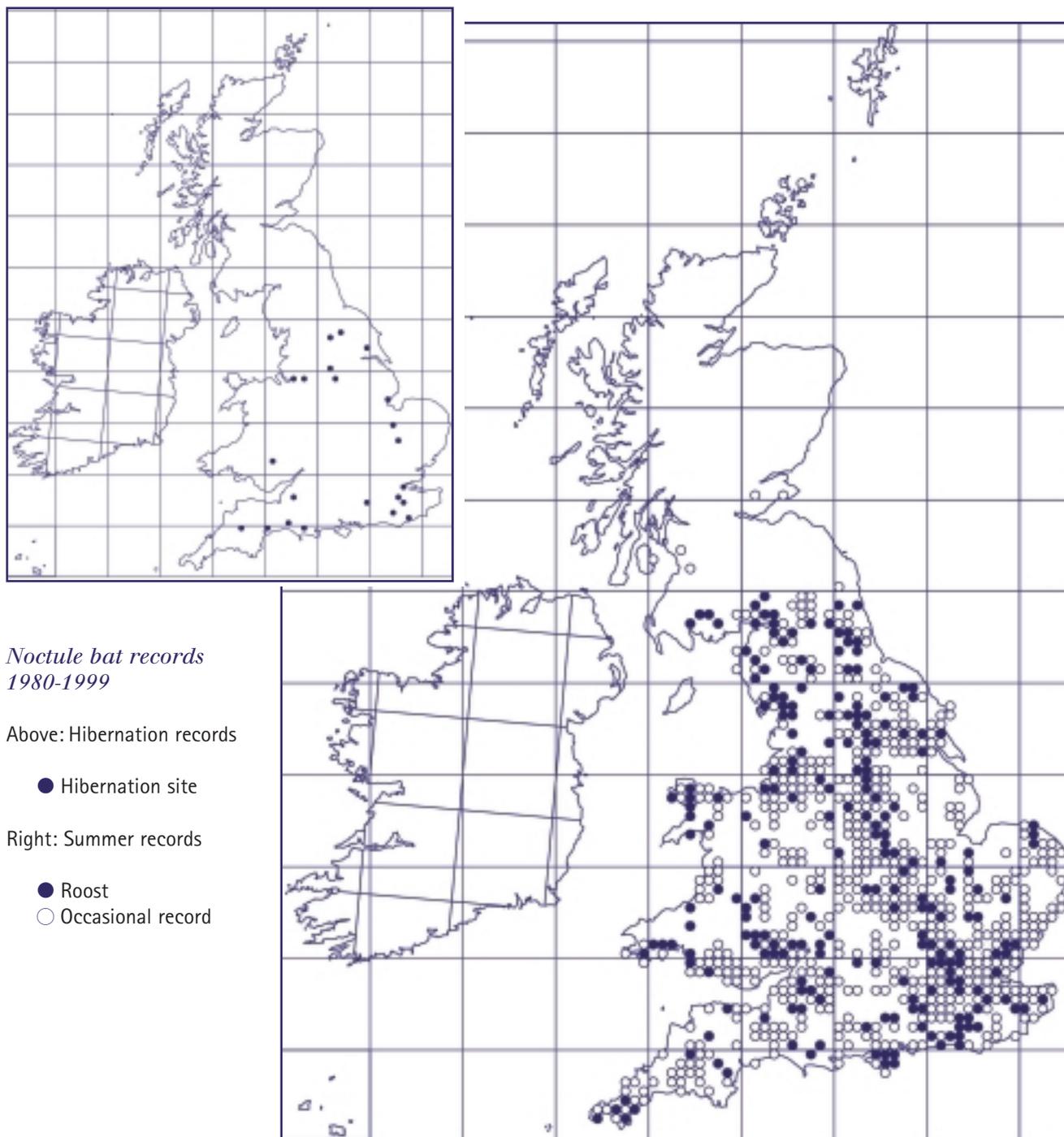
○ 10km squares with records of roosts	180
○ 10km squares with records, but no roost recorded	194
○ 10km squares with hibernation records	23



5.16 NOCTULE (*Nyctalus noctula*)

Restricted to England, Wales and south-west Scotland. Being principally a tree-roosting bat relatively few roosts have been discovered. It is a big and obvious bat in flight, easily detected on a bat detector so producing a wealth of occasional records away from roosts. This species does not use underground sites so is rarely encountered in winter months. Records of single bats from N Ronaldsey and Sanday (Orkneys), Voe (Shetlands) and from the North Sea oil rigs would be of migrating animals, as may be a few records from some other parts of Scotland.

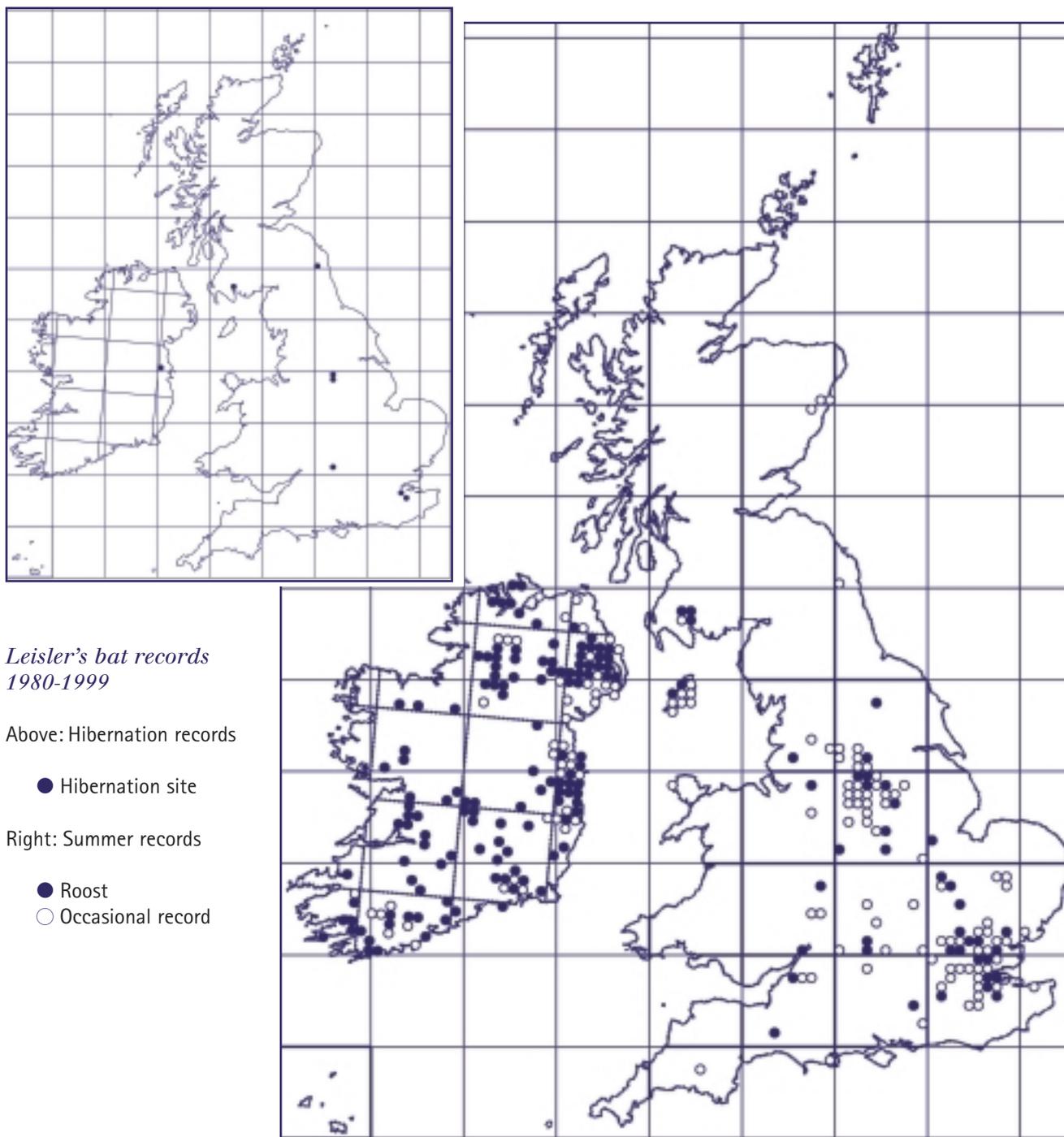
○ 10km squares with records of roosts	225
○ 10km squares with records, but no roost recorded	561
○ 10km squares with hibernation records	22



5.17 LEISLER'S BAT (*Nyctalus leisleri*)

The third most commonly found bat in Ireland, but much scarcer elsewhere. Other than Ireland, records are mainly restricted to the central and south-eastern parts of England with major concentrations east of London and in the Derbyshire/South Yorkshire area. Records from Dumfries & Galloway and the Isle of Man reflect their geographical closeness to Ireland. The similarity of this species to noctule has probably resulted in it being overlooked in some areas.

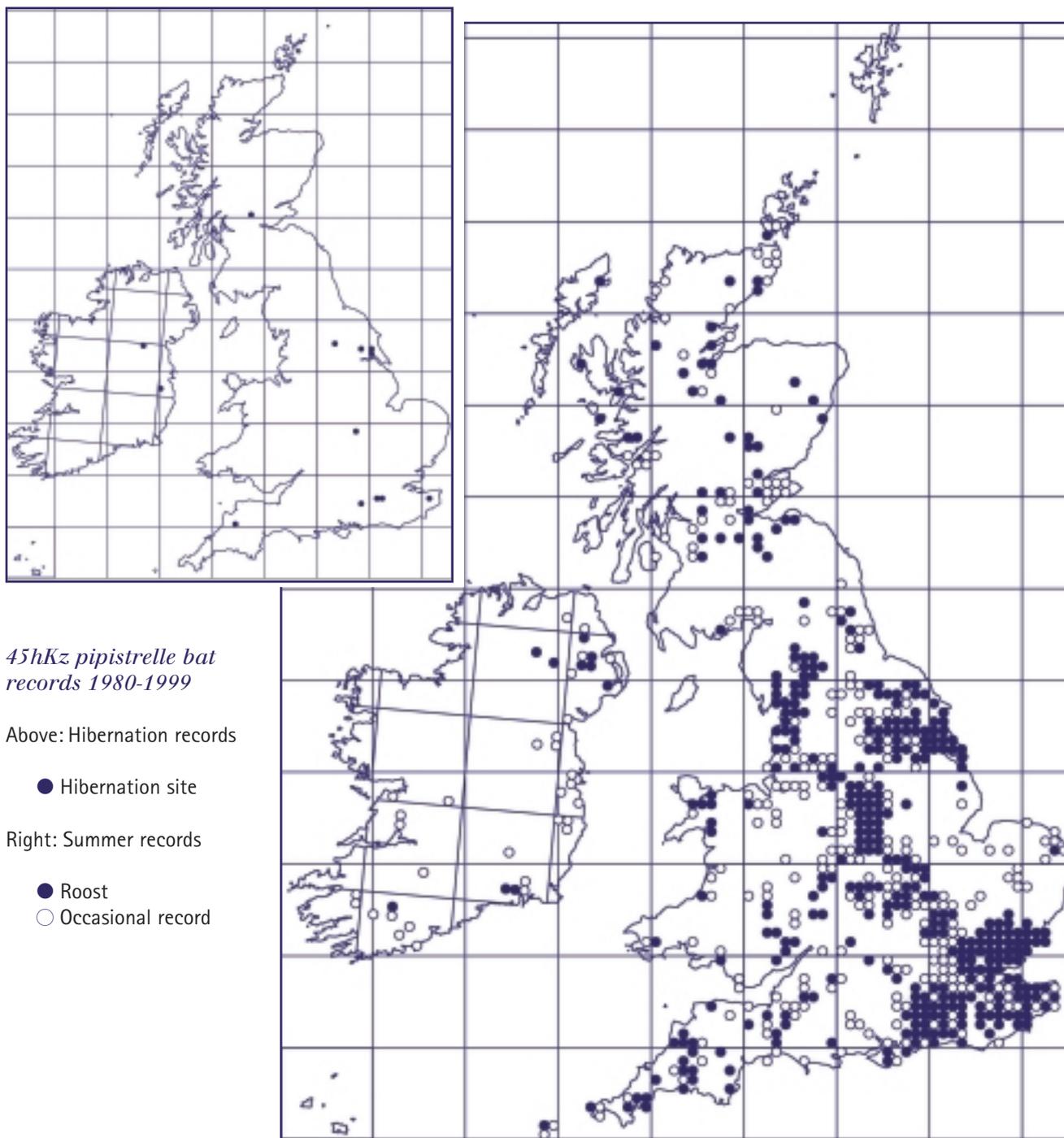
○ 10km squares with records of roosts	166
○ 10km squares with records, but no roost recorded	133
○ 10km squares with hibernation records	8



5.19 45kHz *PIPISTRELLE* (*Pipistrellus pipistrellus*)

Bat groups are just beginning to separately record the two recently-split species of pipistrelles, and the maps show little difference as yet between their ranges with both species widely distributed across Britain and Ireland as far north as the Orkneys.

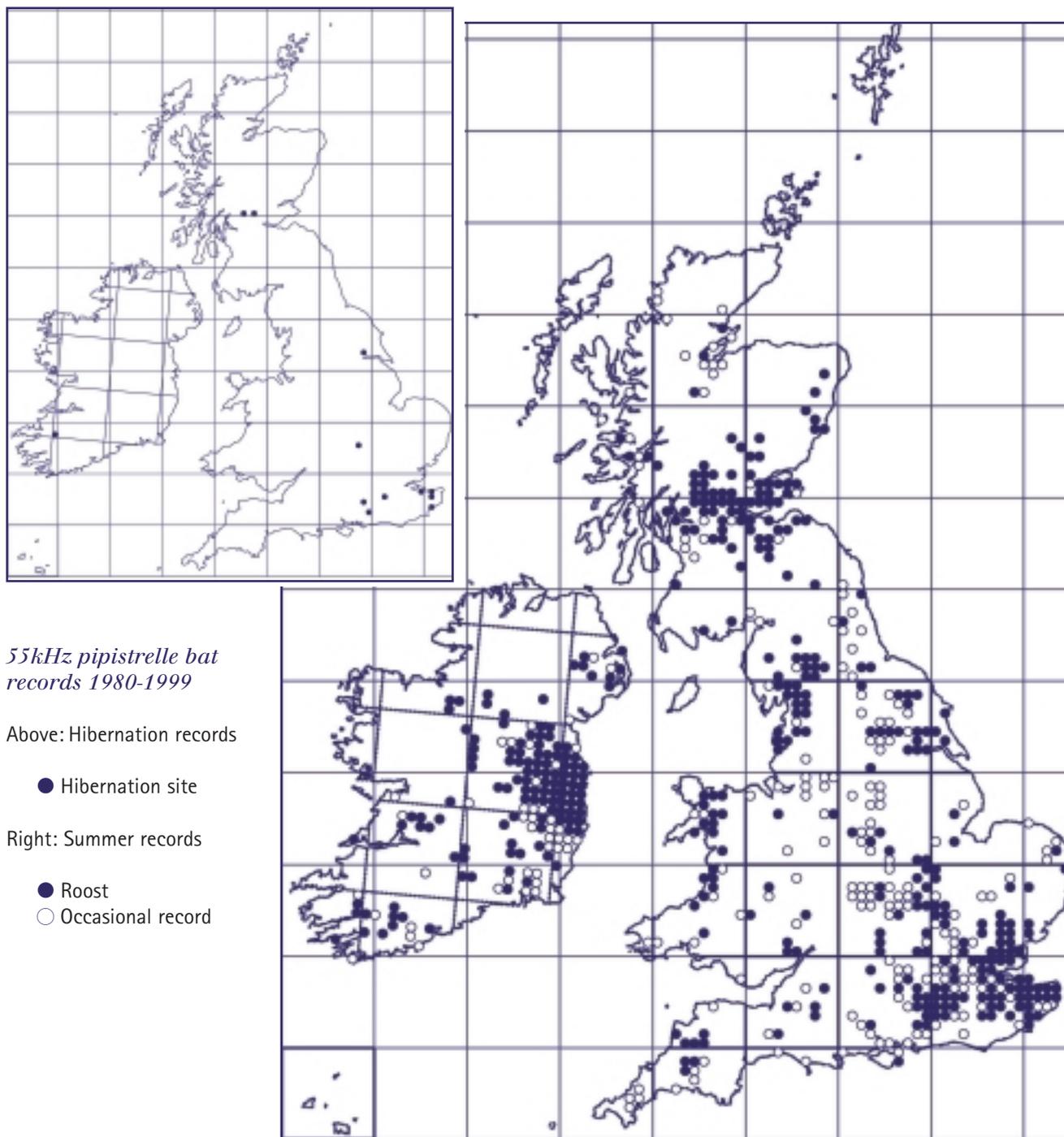
○ 10km squares with records of roosts	381
○ 10km squares with records, but no roost recorded	294
○ 10km squares with hibernation records	13



5.20 55kHz *PIPISTRELLE* (*Pipistrellus pygmaeus*)

See 45kHz pipistrelle. Widely distributed across Britain and Ireland although there has been the suggestion that 55kHz pipistrelle roosts are more common in Scotland and parts of Ireland.

○ 10km squares with records of roosts	406
○ 10km squares with records, but no roost recorded	228
○ 10km squares with hibernation records	12



5.21 NATHUSIUS' PIPISTRELLE (*Pipistrellus nathusii*)

An increasing number of records, many of single, grounded bats probably migrating from mainland Europe. Many of these are at coastal sites. Some records also received from the oil rigs in the North Sea. Breeding roosts have now been discovered. As bat groups become more proficient at identifying this species and separating it from the other, superficially similar, pipistrelles more records will result.

○ 10km squares with records of roosts	4
○ 10km squares with records, but no roost recorded	39
○ 10km squares with hibernation records	2

Hibernation (no map). NS99 (S Scotland) and WV37 (Channel Islands).

Nathusius' pipistrelle bat summer records 1980-1999

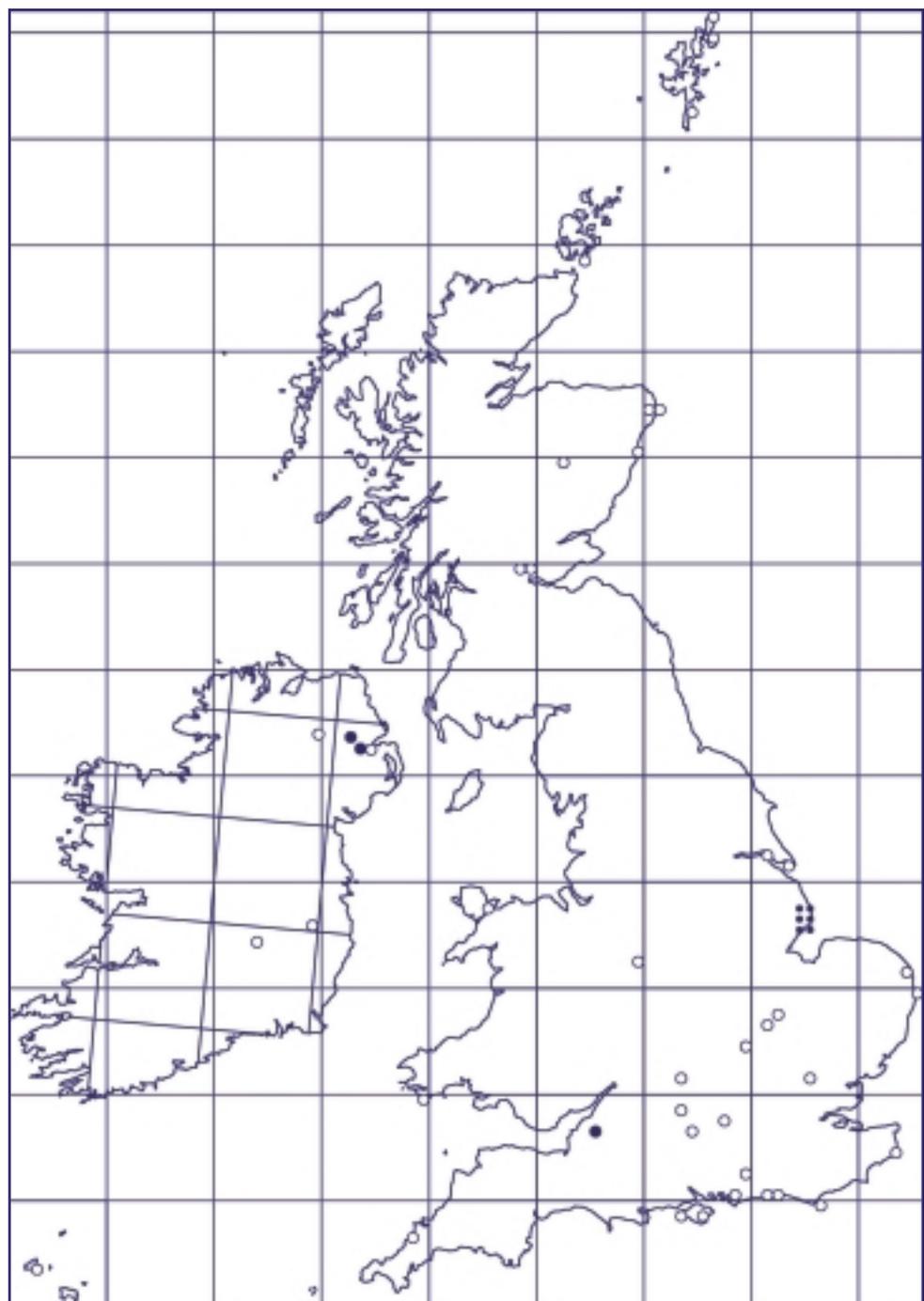
● Roost
○ Occasional record

5.22 KUHLS' PIPISTRELLE (*Pipistrellus kuhli*) – no map

Two records from the docks at Felixstowe and Southampton and another in a container were likely to be bats accidentally imported. In addition, holiday-makers returning from abroad to Waterlooville, Hants, brought in another by accident. Three coastal records of single, grounded bats at St Helier (Jersey), St Leonards (E Sussex) and St Blazey (Cornwall) may have been migrating animals. Range is southern Europe from Spain, through France to East Caucasus.

5.23 SAVTS' PIPISTRELLE (*Pipistrellus savii*) – no map

This southern European pipistrelle has been recorded from the Sussex coast at Pevensey Bay, Wallesea (near Liverpool Docks), East London in frozen beans and from Wick. It is believed that ship-assisted passages may have been involved in at least two of these records.

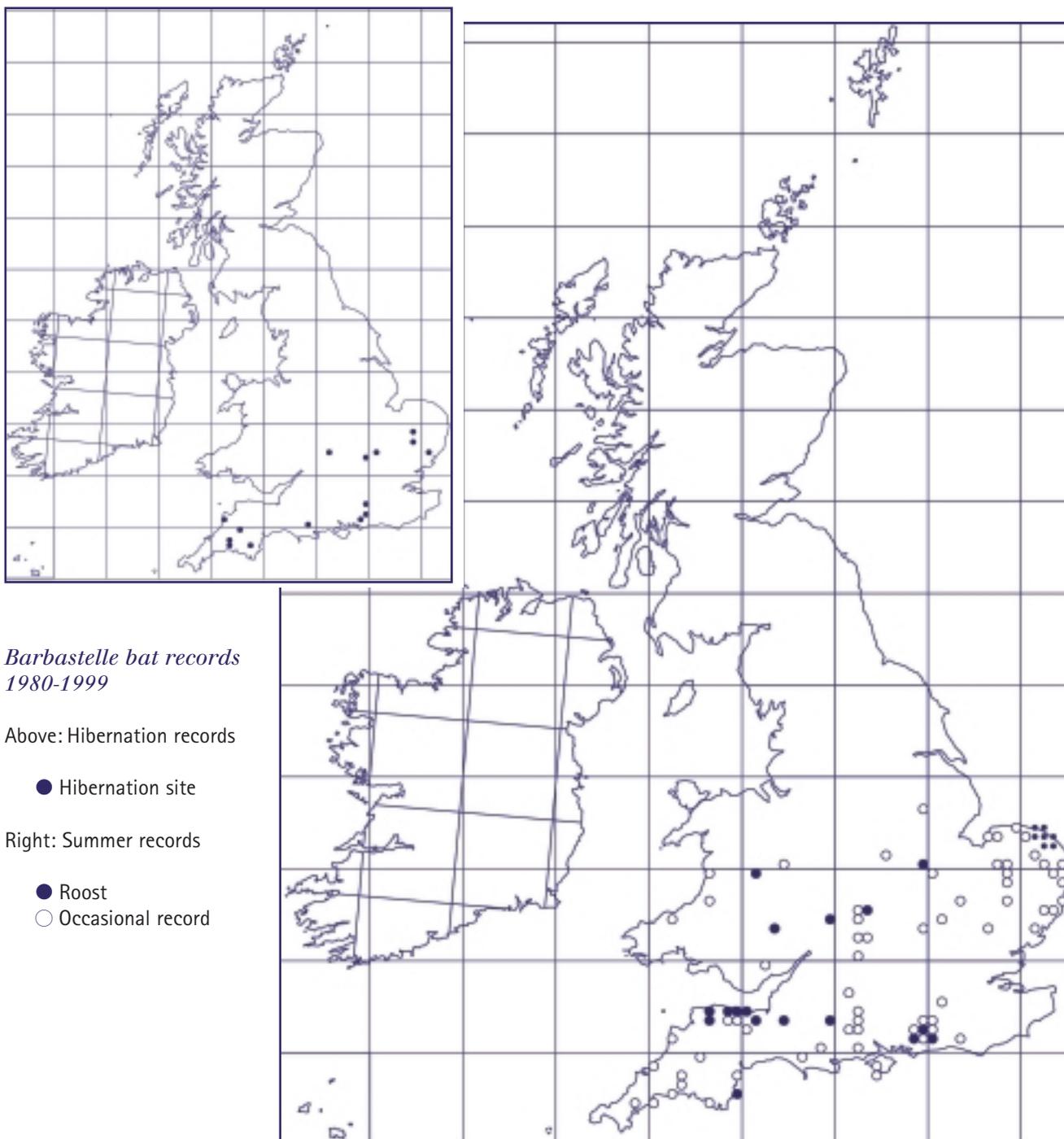


5.24 BARBASTELLE (*Barbastella barbastellus*)

This hard-to-find species is limited to southern England and Wales, south of a line between the Wash and Anglesea. Special studies, some with radio transmitters, have resulted in the finding of breeding and other summer roosts. These studies are giving us a better understanding of the habitats the species requires and the techniques needed to detect it.

The "roost" records may not be breeding sites and could include sites where a single bat was found once in summer.

○ 10km squares with records of roosts	18
○ 10km squares with records, but no roost recorded	68
○ 10km squares with hibernation records	15

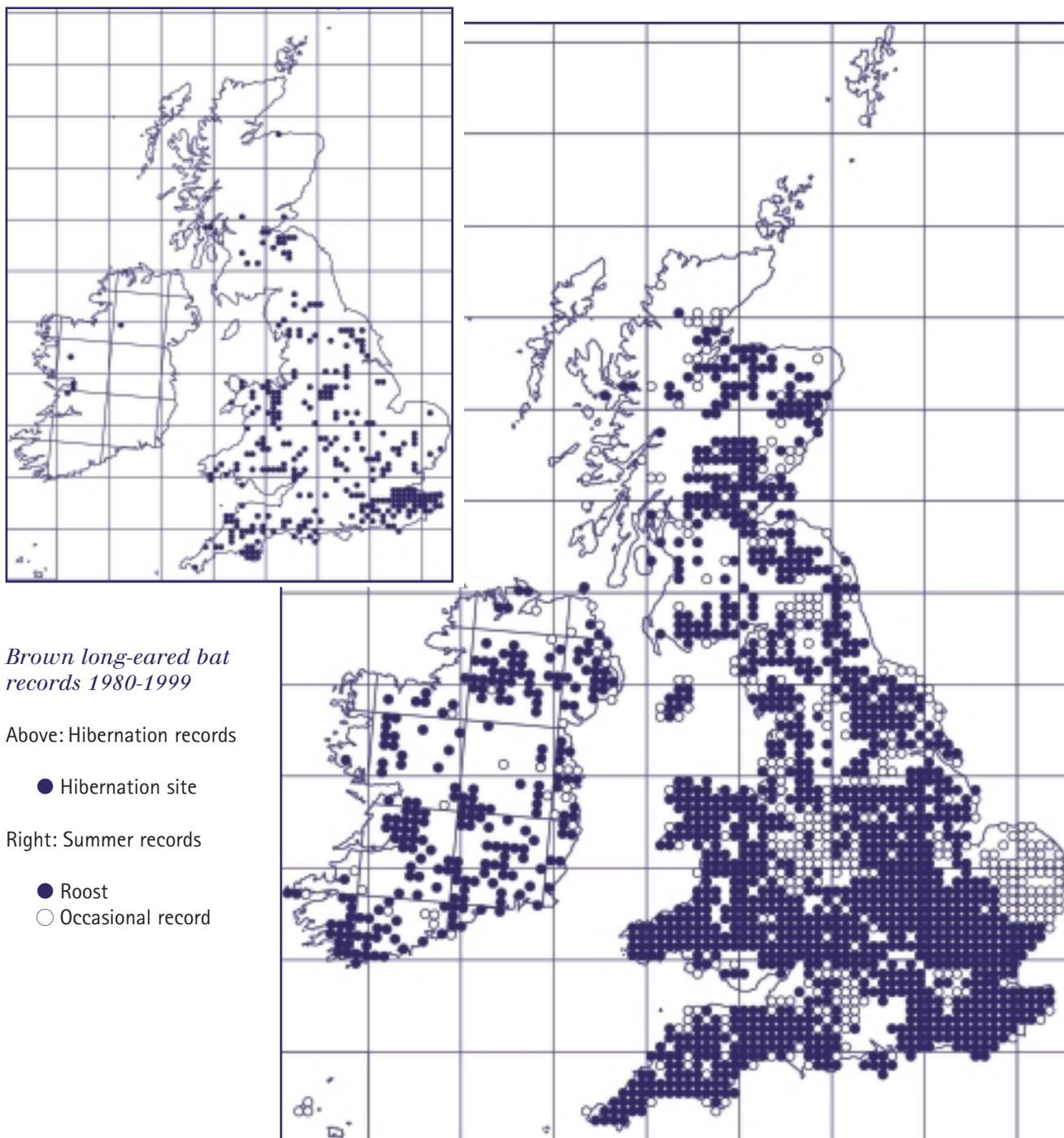


5.25 BROWN LONG-EARED BAT (*Plecotus auritus*)

Widespread throughout Britain and Ireland except for the Scottish islands. In winter it is regularly found in underground sites in mainland Britain but rarely discovered in Ireland. In Northants, an area where detailed recording has taken place since 1980, this species has been recorded on average in 14% of the 100 1km squares in each 10km square, with up to 22% in some squares. In Lincolnshire there was found to be good numbers in areas near to woodland and the Wolds, but few as expected in the Fens (although some bats have turned up in very open areas).

There are a few records from the oil rigs in the North Sea of Scotland and one from Sumburgh Airport (Shetlands) indicating some migratory tendencies.

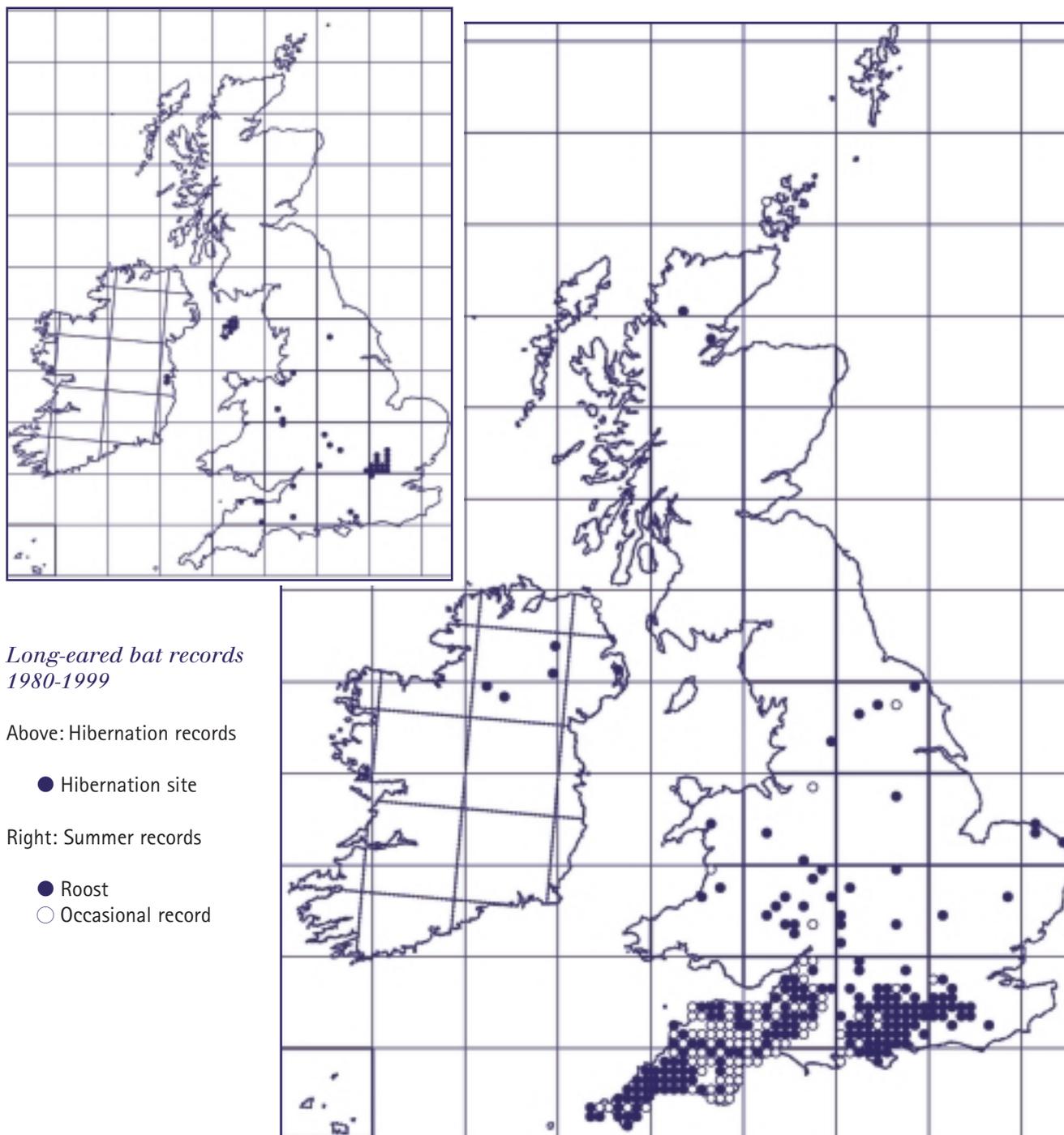
○ 10km squares with records of roosts	1423
○ 10km squares with records, but no roost recorded	473
○ 10km squares with hibernation records	301



5.26 LONG-EARED BAT SP. (*Plecotus sp.*)

Due to the presence in Britain of the grey long-eared bat, this category exists to encompass those *Plecotus* not closely examined by an expert. In most cases they would be *P. auritus*.

○ 10km squares with records of roosts	193
○ 10km squares with records, but no roost recorded	88
○ 10km squares with hibernation records	44

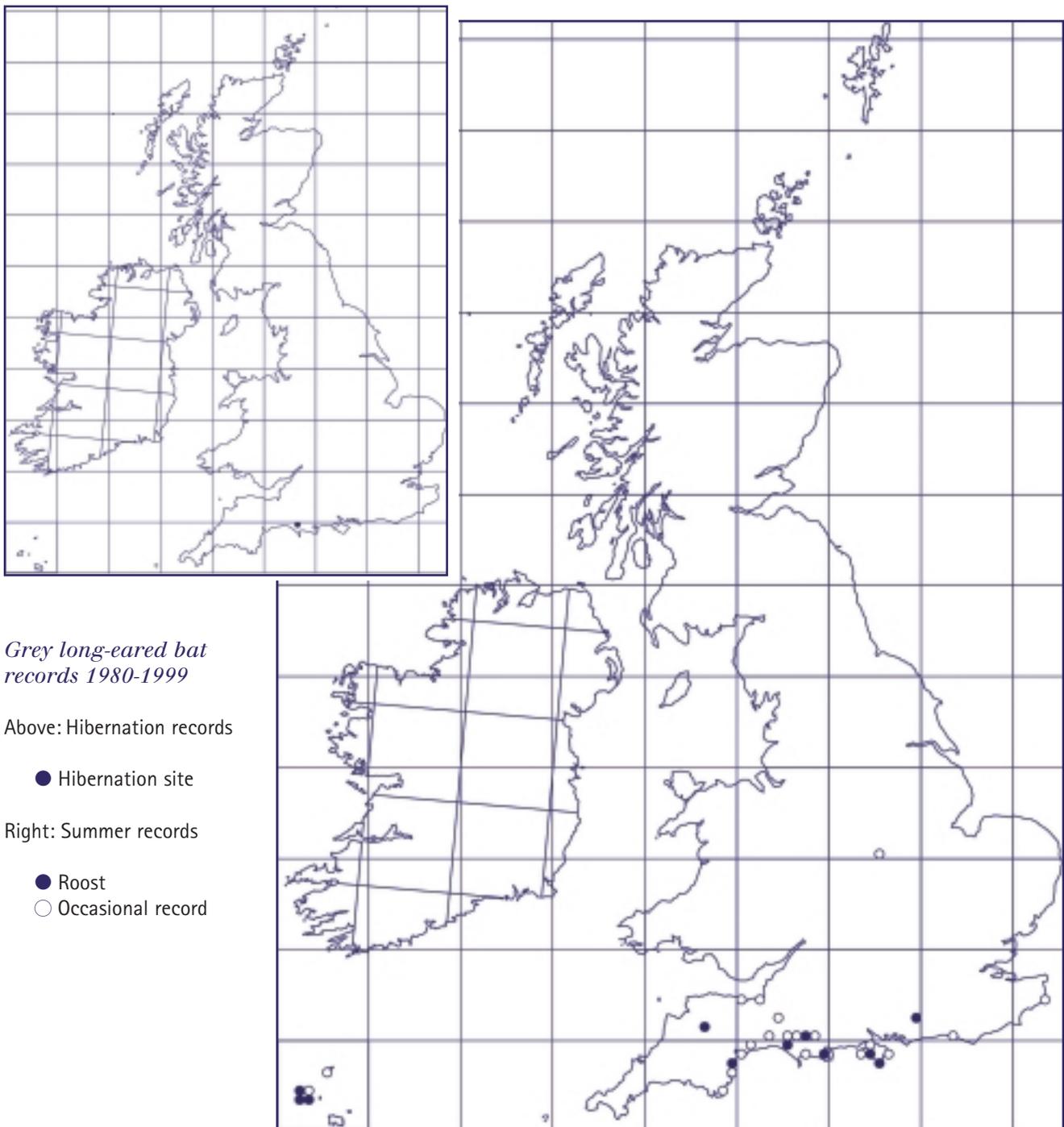


5.27 GREY LONG-EARED BAT (*Plecotus austriacus*)

Restricted to the south coast and south-west of England and the Channel Islands, although there was one vagrant grounded bat recorded in Leicestershire.

The "roost" records may not be breeding sites and could include sites where a single bat was found once in summer.

○ 10km squares with records of roosts	11
○ 10km squares with records, but no roost recorded	20
○ 10km squares with hibernation records	1



Bat Atlas Acknowledgements

The majority of the records were collected by members of the local bat groups across Britain and Ireland. These members usually submitted their records through their area recorders (see below) who collated them and sent them on to me. Many thanks to all of you.

Avon – Bob Howard; **Bedfordshire** – Tony Aldhous; **Berks & S Bucks** – Pat Martin; **Birmingham & Black Country** – Chris Sherlock; **Borders** – Anne Kiggins; **Brecknock** – Phil Morgan; **N Bucks** – Linda Piggott; **Cambridgeshire** – Chris Vine; **N Ceredigion** – Helen Porter; **Channel Islands** – Pat & Peter Costen; **Cheshire** – Mike Freeman; **Clwyd** – Karl Martin; **Clyde** – Catriona Morrison; **Cork/Eire** – Conor Kelleher; **Cornwall** – Daniel Eva; **Cumberland** – Steve Hewitt; **Cumbria** – Tony Marshall; **Derbyshire** – Alan Wragg; **Devon** – Helen Shaw; **Dorset** – Carolyn Steele; **Dublin/Eire** – Brian Keeley; **Dumfries & Galloway** – Gill Hinchcliffe; **Durham** – Ian Bond; **Dyfed/Powys** – David Woolley; **Eire** – Paddy O'Sullivan; **Essex** – John Dobson; **Fife** – Keith Cohen; **Glamorgan** – Rob Colley/John Galvin; **Gloucestershire** – Janet Illingworth-Cooper; **Greater London** – Peter Guest; **Greater Manchester** – Derek Yalden; **Gwent** – Ian Rabjohns; **Gwynedd** – Jean Matthews; **Hampshire** – Brian Edgeworth; **Herefordshire** – Rebecca Collins; **Hertfordshire** – Jenny Jones; **Highland** – Iain Andrew Macdonald; **Isle of Man** – Ed Pooley; **Isle of Wight** – Colin Pope; **Kent** – Peter & Pauline Heathcote; **E Lancashire** – Trevor Smith; **S Lancashire** – Kathryn Berry; **W Lancashire** – Steve Bradley; **Leicestershire & Rutland** – Jenny Harris; **Lincolnshire** – Annette Faulkner; **Lothian** – Nuala Lonie; **Merseyside & W Lancs** – Clem Fisher; **Montgomeryshire** – Andrew McLeish; **Norfolk** – John Goldsmith; **N Ireland** – Lynne Rendle; **Northamptonshire** – Phil Richardson; **Northumberland** – Ruth Hadden; **Nottinghamshire** – Sheila Wright; **Oxfordshire** – David Endacott; **Orkneys** – Chris Booth; **Perth** – Sue Swift; **Radnorshire** – John Mitchell; **Sheffield** – Derek Whiteley; **Shropshire** – John Mackintosh; **Skye** – Grace Yoxon; **Somerset** – Ed Wells; **Staffordshire** – Keith Bloor; **Suffolk** – Alan Miller; **Surrey** – Ross Baker; **Sussex** – Martin Love; **Warwickshire** – Paul Elliott/John Waller; **Westmoreland & Furness** – Tony Marshall; **Wiltshire** – Dick Last; **Worcestershire** – Mike Uren; **E Yorkshire** – Tony Lane; **N Yorkshire** – John Drewett; **S Yorkshire** – Eric Bennett; **W Yorkshire** – Bryan Brown.

Important sets of data were supplied by the following organisations:

Bat Conservation Trust National Bat Monitoring Project, Forest Enterprise, National Trust, National Parks & Wildlife Service of Eire, Scottish Natural Heritage, Vincent Wildlife Trust.

In addition, the following individuals supplied records:

Peter Andrews, Geoff Billington, Ian Forsyth, Frank Greenaway, John Haddow, Tom McOwat, Paddy O'Sullivan, Stuart Smith, Tony Taylor, Michael Thompson.

Bat Atlas References:

Arnold, H.R. 1993. Atlas of mammals in Britain. HMSO.

Mitchell-Jones, A.J. et al. (eds.) 1999. The Atlas of European Mammals. Pp 90-157.

O'Sullivan, P. 1994. Bats in Ireland: supplement to the Irish Naturalists' Journal.

Shetland Bird Report 1991. Pub. Shetland Bird Club. Pp 76-79.

ITE Environmental Zones Map

1. Easterly lowlands (England and Wales)
2. Westerly lowlands (England and Wales)
3. Uplands (England and Wales)
4. Lowlands (Scotland)
5. Intermediate uplands and islands (Scotland)
6. True uplands (Scotland)
7. Northern Ireland

