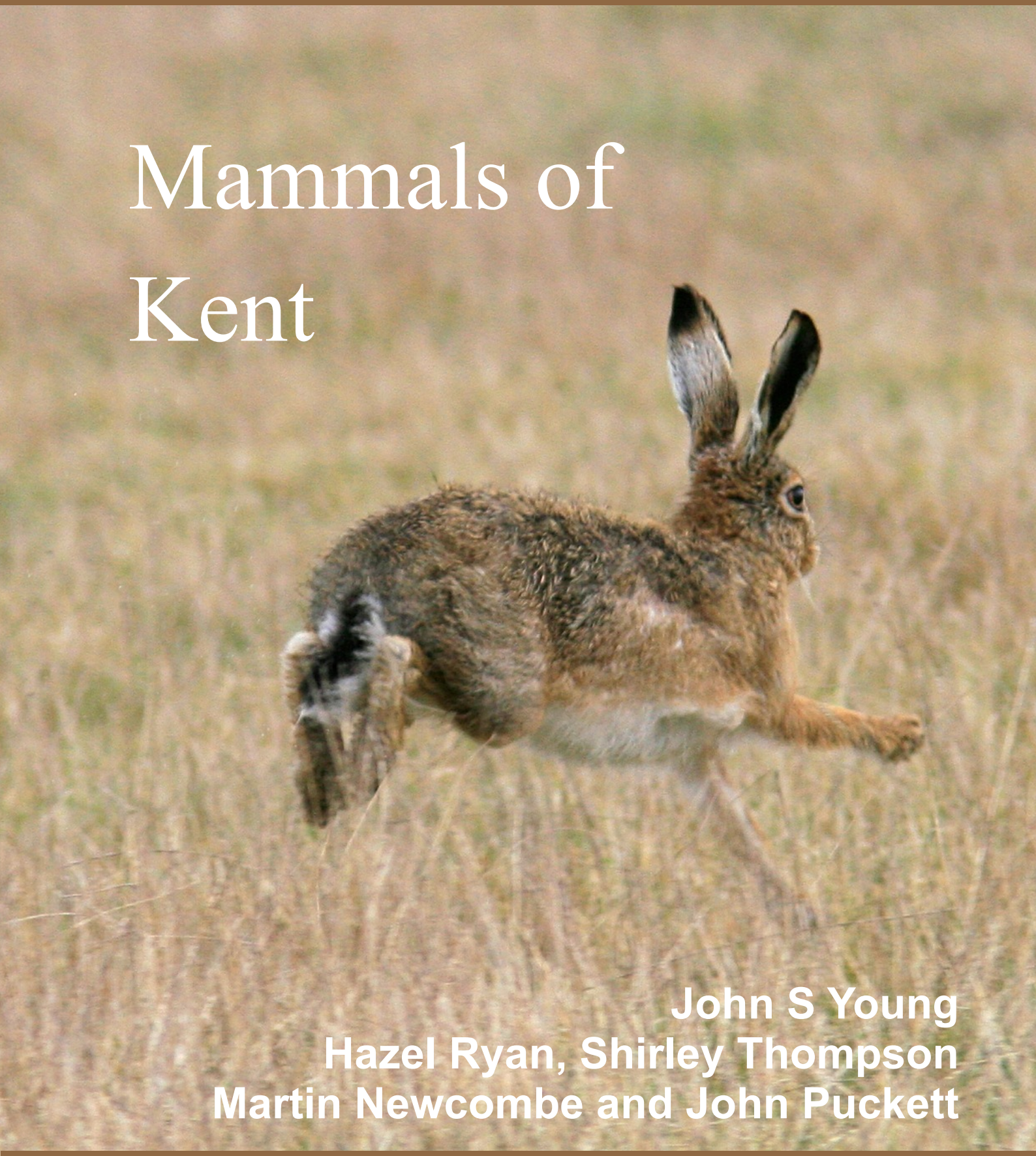
Mammals of Kent



John S Young
Hazel Ryan, Shirley Thompson
Martin Newcombe and John Puckett

Mammals of Kent

A mammal distribution atlas,

account of surveys, recording and monitoring

by John S Young, Hazel Ryan,

Shirley Thompson, Martin Newcombe and John Puckett

Published by Kent Mammal Group, Kent Bat Group, East Kent Badger Group and Kent Field Club

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Cover. Brown hare (photo © John S Young)

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Frank Spooner with grandson Daniel Blake
(photo © Julie Blake)

Tribute to Frank Spooner

In January 2011 Frank died of heart failure following a long battle to cope with a weak heart. Frank was a well-liked gentleman and follower of jazz. He and his wife Mary supported jazz in many local venues.

As a young boy Frank read 'Tarka the Otter' and it was this book that first inspired his love of nature which developed over time. He encouraged his family in his interests and was an enthusiastic member of the Gravesend RSPB group for over 25 years. A keen birder, volunteering at Northward Hill RSPB reserve, he helped to maintain and protect the habitat there as well as at various Kent Wildlife Trust reserves.

He always maintained a strong interest in natural history and was a member of the Mammal Society and Kent Mammal Group. Knowledgeable about the countryside, Frank was always willing to share this knowledge with others less well informed.

His wildlife interests led him to travel far and wide and even when he was clearly suffering from ill health he still managed to visit the Galapagos Islands. Frank was a caring, generous father who managed even with ill health to take his family on holiday to China.

Frank will be missed not only by his family but by a diverse range of people whose shared interests he actively supported throughout his life.

Frank kindly left a legacy specifically to help in the publication of the Mammals of Kent through his membership of the Kent Mammal Group.

Gavin Spooner & Julie Blake

Tribute to Eric Philp

Eric was one of the founder members of the Kent Mammal Group and was County Recorder for mammals for many years. He was Keeper of Natural History at Maidstone Museum from 1958 to 1993 and set up the Kent Biological Archives there in 1971. This created the first centralised database for storing the county's wildlife records.

The database was a hardcopy system, comprising sets of individual species cards arranged by taxonomic group and a folder for each tetrad, where details of all the known records of plant and animal species from sites within the tetrad were stored. This was a massive undertaking in the days before computerised databases. Eric was pleased to note that when the Nature Conservancy Council began transferring county data onto its national database in the 1980s, the usual one-to-two day visit to a county records centre extended to a month in the case of Kent. His pioneering work and the efforts of the county's recorders were well justified.

Eric's encyclopedic knowledge about the status and distribution of the county's flora and fauna was second to none. His publications include the Atlas of the Kent Flora (1982), The Butterflies of Kent (1993), the Provisional Atlas of the Amphibians and Reptiles of Kent (1998), the Provisional Kent Mammal Atlas (2002) and A New Atlas of the Kent Flora (2010).

Eric will also be remembered for his extraordinary field recording skills, often finding rare or overlooked species right under other members' noses when on a Kent Field Club field meeting, entertaining others with details of the species' history and enthusing others to look for the species themselves.

John Badmin

Eric Philp (photo © Dorothy Philp)

Foreword

Over the years we have struggled to map the mammals of Britain, trying to emulate the success of the ornithologists with their repeated and impressive surveys of birds. It's easier to study birds, of course, but it wasn't until the 1970s that the Mammal Society managed to create the first Atlas of British Mammals. In those days we collected records on bits of paper that were later centralised and laboriously transferred to maps.

Hazel dormouse (photo © Shirley Thompson)

As Chairman of the Mammal Society, I tried to get a computerised system for storing and mapping records, but the software wasn't really up to the job. After my time the project was abandoned, to be restarted 20 years later, hopefully with greater success now that everyone has access to user-friendly software systems.

Meanwhile, a similar history has dogged efforts to create more detailed maps at county level. We can't conserve wildlife species if we don't know where they are, or even what might be present. Distribution surveys are vital. At last we now have dedicated teams of fieldworkers, good software and funds to support publication, enabling several counties to produce excellent local mammal atlases. The Mammals of Kent is the latest of these and is a worthy testament to the dedication of the county's mammal fieldworkers. I know at first hand just how dedicated they are and the vital leadership that key individuals have provided.

Kent was one of the first counties to join my embryonic National Dormouse Monitoring Programme 30 years ago and then went on to develop more monitoring sites than any other county.

I hope the Mammals of Kent will be a source of pride and satisfaction to those who have contributed to this significant achievement. I hope too that it will help stimulate greater interest in the wildlife of Kent.

Well done everyone involved in putting Kentish mammals on the map.

Pat Morris

Introduction

The South East of England, particularly the county of Kent is continuously under great pressure from residential and industrial development. This increased pressure is often placed on its ever-dwindling remaining wild spaces. As a result it is essential to ensure that the distribution and relative abundance over time of the county's mammal species is understood.

In the years since publication of the first Kent Mammal Atlas, which covered records in the period 1991 to 2001, mammal recording, surveying and monitoring has enjoyed more focus.

In 2003 a partnership was established with the new Kent and Medway Biological Records Centre (KMBRC) with records from the county mammal organisations being held on the KMBRC database and managed by them. That year also saw the start of an ambitious project to record mammal observations within each county tetrad.

In 2009 work started on the production of a new publication on Kent's mammals that would cover the years 2002 to 2012 and include a revision of the distribution of mammals in Kent. An Editorial Committee was established which comprised members representing most of the county's mammal groups. A large number of authors (page 139) have assisted in writing the species accounts and contributing to other sections. This has inevitably led to different writing styles occurring throughout the publication which the Editorial Committee decided to retain.

Whilst not attempting to be a mammal identification guide, basic identification features are covered and for some species a more detailed identification focus is given. County distribution mapping by tetrad (2 x 2 km square) is provided, and uses the Watsonian Vice Counties VC16 for West Kent and VC15 for East Kent for species recording and status (Map 4). Comment on species status within the county is included where the quality of the collected observation data allows.

The aims of the publication include:

- catering for a wide range of potential readers, from those with little knowledge of the county's mammals to those with a keen interest and understanding
- stimulating interest in and raising awareness of our understanding of the status of mammals within the county
- helping to set a focus on future priorities for the conservation of the county's mammals
- providing information that can be useful to landowners, land managers, planning authorities and others
- the continuation and increase of mammal record submission

This has been an ambitious project, one which has only been possible as a result of successful collaboration between the East Kent Badger Group (EKBG), Kent Bat Group (KBG), Kent Mammal Group (KMG), Kent Field Club (KFC) and the KMBRC.

Abbreviations and symbols

The following abbreviations and symbols are used within the text.

Symbols and units

♀	female
♂	male
cm	centimetre(s)
g	gramme(s)
GPS	Global Positioning System
ha	hectare, an area measuring 10,000 square metres (100 x 100 m)
hectad	a grid square measuring 10 x 10 km
kg	kilogramme(s)
kHz	kilohertz
km	kilometre(s)
m	metre(s)
mm	millimetre(s)
mph	miles per hour
sp.	a single unknown species
spp.	more than one unknown species
sq m	square metre(s)
tetrad	a grid square measuring 2 x 2 km

Weasel, showing ragged flank line (photo © Mark Chidwick)

Organisations, groups and designations

BCT	Bat Conservation Trust
EKBG	East Kent Badger Group
KBG	Kent Bat Group
IUCN	International Union for the Conservation of Nature
KFC	Kent Field Club
KMG	Kent Mammal Group
KMBRC	Kent and Medway Biological Records Centre
KWT	Kent Wildlife Trust
LWS	Local Wildlife Site (formerly known as SNCI)
PTES	People's Trust for Endangered Species
SSSI	Site of Special Scientific Interest
VC	Vice County

Schemes and surveys

ARCH	Assessing Regional Change in Habitats
BAP	Biodiversity Action Plan
NBMP	National Bat Monitoring Programme
NDMP	National Dormouse Monitoring Programme

Checklist of Kent mammals

The mammal classification sequence used in this publication follows Harris and Yalden (2008). The checklist builds on documenting the mammals of Kent previously performed by Derek Frazer (1965) and Eric Philp (2002) and provides an updated county mammal list.

When deciding on the list of species to be included within the checklist, it was also necessary to decide which species should be omitted. Species meeting one or both of the following conditions have been omitted:

- Species that existed in Kent but are now extinct in Britain, whether known to have existed in historic times or whether extinct since the Pleistocene period. Recent examples are muskrat (*Ondatra zibethicus*) and coypu (*Myocastor coypus*).
- Mammals where a definite species identification could not be made. These include chipmunk sp., exotic deer sp., hamster sp. and mongoose sp.

The origins of the species regarded as escapes or introductions are many and varied. Escapes from the pet trade are probably rare nowadays, due to the commercial value of the animals concerned, but escapes from private collections and zoos still occur. Occasionally attempts to deliberately release mammals probably occur, either in order to introduce species illegally, or because the mammal concerned was once attractive when young but has become difficult to deal with as it matured.

The Kent checklist uses the following species status key:

- **Native or established introduction** - a species that occurs naturally in Kent, the species may also be breeding. Or an introduced species that has established a free-living population of more than 100 animals that has persisted for more than 10 years.
- **Extinct** - the species remains extant within the UK and historically has occurred within the county but is now extinct in Kent.
- **Escape or introduced** - a species recorded within the county but out of captivity, or an introduced species that has **not** established a free-living population of more than 100 animals that has persisted for more than 10 years. The mammals in this category are included to make this updated county list as complete as possible. Some have managed to remain in the wild for an extended period of time and may have bred. Eurasian beaver is included here as part of the KWT controlled release.
- **Feral** - species that are former domestic mammals that have escaped and established breeding populations in the wild.
- **Vagrant** - those species that occur occasionally and irregularly. In some cases an arbitrary distinction between ‘native’ and ‘vagrant’ has been applied as in the case of Pinnipedia and Cetacea.

Species		Kent Status				
		Native or established introduction	Extinct	Escape or introduced	Feral	Vagrant
Marsupials: Order Diprotodontia						
Red-necked wallaby	*Macropus rufogriseus*			√		
Rodents: Order Rodentia						
Red squirrel[1]	*Sciurus vulgaris*		√			
Grey squirrel	*Sciurus carolinensis*	√				
Eurasian beaver[1]	*Castor fiber*			√		
Hazel dormouse[1]	*Muscardinus avellanarius*	√				
Edible dormouse	*Glis glis*			√		
Garden dormouse	*Eliomys quercinus*			√		
Bank vole[1]	*Myodes glareolus*	√				
Field vole[1]	*Microtus agrestis*	√				
Golden hamster	*Mesocricetus auratus*			√		
Water vole[1]	*Arvicola terrestris*	√				
Harvest mouse[1]	*Micromys minutus*	√				
Wood mouse[1]	*Apodemus sylvaticus*	√				
Yellow-necked mouse[1]	*Apodemus flavicollis*	√				
House mouse	*Mus domesticus*	√				
Common rat	*Rattus norvegicus*	√				
Ship rat	*Rattus rattus*		√			
Rabbits and hares: Order Lagomorpha						
Rabbit	*Oryctolagus cuniculus*	√				
Brown hare	*Lepus europaeus*	√				
Insectivores: Order Erinaceomorpha						
Hedgehog[1]	*Erinaceus europaeus*	√				
Mole[1]	*Talpa europaea*	√				

[1]British native species.

Species		Kent status				
		Native or established introduction	Extinct	Escape or introduced	Feral	Vagrant
Insectivores: Order Soricomorpha						
Common shrew[1]	*Sorex araneus*	√				
Pygmy shrew[1]	*Sorex minutus*	√				
Water shrew[1]	*Neomys fodiens*	√				
Bats: Order Chiroptera						
Greater horseshoe bat[1]	*Rhinolophus ferrumequinum*		√			
Lesser horseshoe bat[1]	*Rhinolophus hipposideros*		√			
Whiskered bat[1]	*Myotis mystacinus*	√				
Brandt's bat[1]	*Myotis brandtii*	√				
Alcathoe bat[1]	*Myotis alcathoe*	√				
Daubenton's bat[1]	*Myotis daubentonii*	√				
Natterer's bat[1]	*Myotis nattereri*	√				
Bechstein's bat[1]	*Myotis bechsteinii*	√				
Greater mouse-eared bat[1]	*Myotis myotis*		√			
Leisler's bat[1]	*Nyctalus leisleri*	√				
Noctule[1]	*Nyctalus noctula*	√				
Common pipistrelle[1]	*Pipistrellus pipistrellus*	√				
Soprano pipistrelle[1]	*Pipistrellus pygmaeus*	√				
Nathusius' pipistrelle[1]	*Pipistrellus nathusii*	√				
Serotine[1]	*Eptesicus serotinus*	√				
Barbastelle bat[1]	*Barbastella barbastellus*	√				
Brown long-eared bat[1]	*Plecotus auritus*	√				
Grey long-eared bat[1]	*Plecotus austriacus*	√				

Species		Kent Status				
		Native or established introduction	Extinct	Escape or introduced	Feral	Vagrant
Carnivores: Order Carnivora						
Tiger	*Panthera tigris*			√		
Clouded leopard	*Neofelis nebulosa*			√		
Feral cat	*Felis catus*				√	
Wildcat[1]	*Felis silvestris*		√			
Fox[1]	*Vulpes vulpes*	√				
Timber wolf	*Canis lupus*			√		
Badger[1]	*Meles meles*	√				
Honey badger	*Mellivora capensis*			√		
Otter[1]	*Lutra lutra*	√				
Asian short-clawed otter	*Aonyx cinerea*			√		
Pine marten[1]	*Martes martes*		√			
Stoat[1]	*Mustela erminea*	√				
Weasel[1]	*Mustela nivalis*	√				
Polecat[1]	*Mustela putorius*		√			
Polecat-ferret/feral ferret	*Mustela furo*				√	
American mink	*Neovison vison*	√				
Raccoon	*Procyon lotor*			√		
Seals: Order Pinnipedia						
Walrus	*Odobenus rosmarus*					√
Bearded seal	*Erignathus barbatus*					√
Common seal[1]	*Phoca vitulina*	√				
Grey seal[1]	*Halichoerus grypus*	√				
Harp seal	*Pagophilus groenlandicus*					√
Elephants : Order Proboscidea						
Indian Elephant	*Elephas maximus*			√		

[1]British native species.

Species		Kent status				
		Native or established introduction	Extinct	Escape or introduced	Feral	Vagrant
Even-toed ungulates: Order Artiodactyla						
Wild boar[1]	*Sus scrofa*	√				
Reeves' muntjac	*Muntiacus reevesi*	√				
Red deer[1]	*Cervus elaphus*			√		
Sika	*Cervus nippon*			√		
Fallow deer	*Dama dama*	√				
Roe deer[1]	*Capreolus capreolus*	√				
Siberian roe deer	*Capreolus pygargus*			√		
Eland	*Taurotragus oryx*			√		
Feral sheep	*Ovis aries*				√	
Whales, dolphins, porpoises: Order Cetacea						
Humpback whale[1]	*Megaptera novaeangliae*					√
Minke whale[1]	*Balaenoptera acutorostrata*					√
Fin whale	*Balaenoptera physalus*					√
Sei whale	*Balaenoptera borealis*					√
Sperm whale	*Physeter macrocephalus*					√
Northern bottlenose whale	*Hyperoodon ampullatus*					√
Sowerby's beaked whale	*Mesoplodon bidens*					√
Narwhal	*Monodon monoceros*					√
Harbour porpoise[1]	*Phocoena phocoena*	√				
Bottlenose dolphin[1]	*Tursiops truncatus*					√
Striped dolphin	*Stenella coeruleoalba*					√
Common dolphin[1]	*Delphinus delphis*					√
White-beaked dolphin[1]	*Lagenorhynchus albirostris*					√
Atlantic white-sided dolphin	*Leucopleurus acutus*					√
Long-finned pilot whale[1]	*Globicephala melas*					√
False killer whale	*Pseudorca crassidens*					√
Risso's dolphin[1]	*Grampus griseus*					√
Killer whale[1]	*Orcinus orca*					√

Factors affecting mammal distribution

Populations of mammals flourish when they are able to move freely in the landscape. Commercial and residential development pressure in Kent is probably greater than many counties in the UK. Habitat destruction reduces the quantity of suitable places for mammals to live, roost and rear young and leaves these places increasingly isolated. This can lead to a fragmented matrix of highly modified and potentially hostile habitats.

The ever-changing use of Kent's marine and land habitats has a corresponding effect on the county's mammal fauna. Long-term studies are needed to help understand and manage those effects. These studies require continuous collection of records received through ad-hoc sightings, focused surveying and monitoring, as well as on-going habitat conservation and records analysis. These core activities should help to ensure that the populations and diversity of mammal species in Kent are protected into the future. Data from these studies helps to determine changes in abundance and distribution.

These are important factors when assessing the effects on Kent's mammals of environmental change, which can come in many forms:

- habitat loss and degradation
- habitat fragmentation
- agricultural intensification
- conflict with non-native species
- environmental pollution
- direct conflict with humans
- extreme weather events (storm, flooding, drought, etc.)

Examples of large scale commercial development in Kent during 2002 to 2012 are:

- Channel Tunnel rail link sections opened in September 2003 and November 2007
- three wind farms in the Thames Estuary, which at the time of publishing are among the largest in the world
- construction of several solar parks and solar farms
- largest greenhouse complex in the UK
- new Sheppey Crossing

Terrestrial habitats

Terrestrial and arboreal mammals are badly affected by habitat fragmentation as road and rail networks segment, and in some cases isolate, areas of suitable habitat. Without a network of suitable habitat patches and corridors, the ability of individuals to move between local populations can be disrupted. Terrestrial mammals by their very nature have to risk crossing roads and railway lines. This lack of inter-population movement increases the probability of local extinction through single disastrous events like flooding, disease or predation. An isolated population, once lost, is unlikely to be re-established naturally.

Opposite top. Wind farm in the Thames Estuary
Opposite centre. HS1, habitat fragmentation
Opposite bottom. North Kent Marshes, industrial development
(all photos © John S Young)


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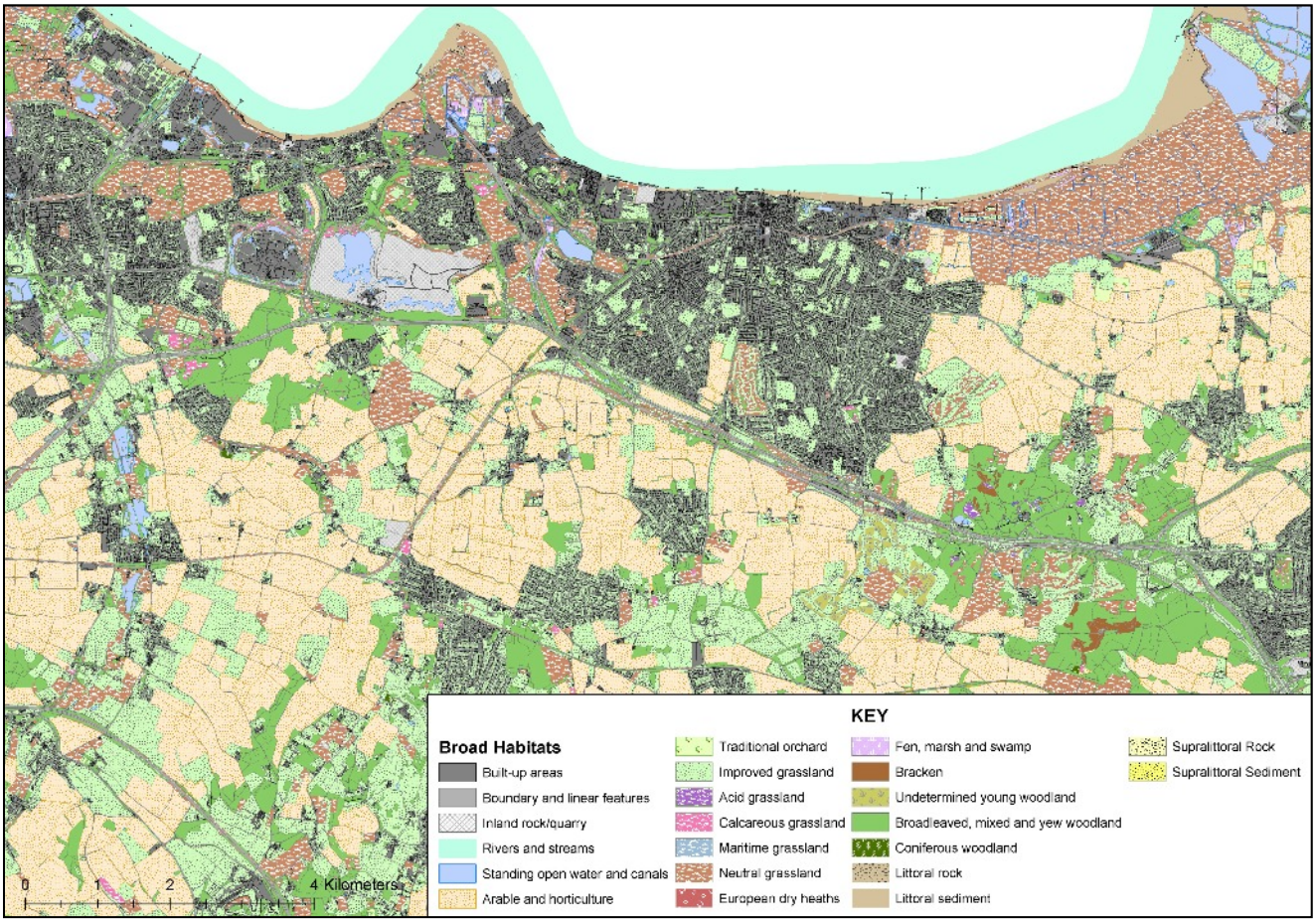


Map 1 Habitat fragmentation around the Gravesend area (Image courtesy of KMBRC)

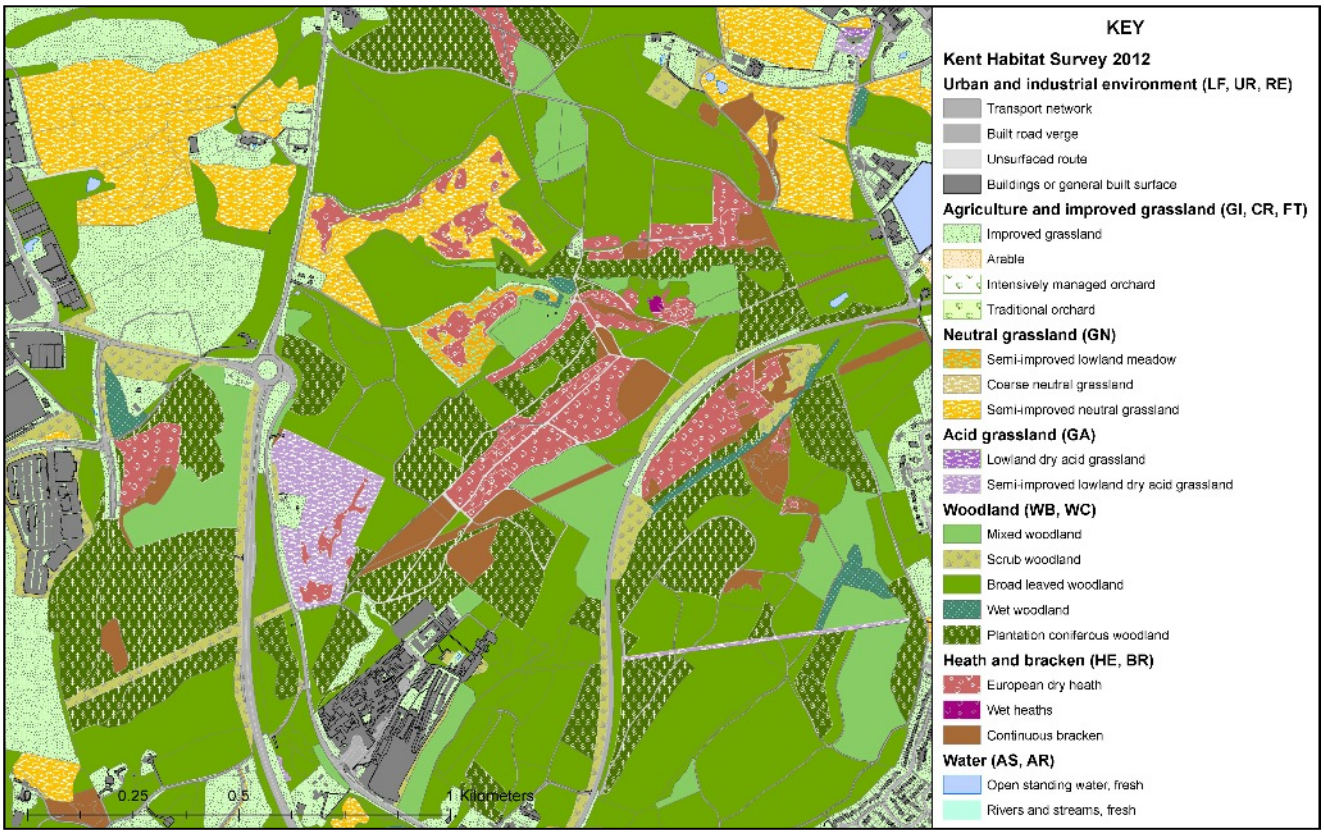
Marine habitats

Kent has a long coastline, which extends from the Thames Estuary to the south-east North Sea, the eastern English Channel and the Strait of Dover which is the world's busiest shipping channel. Regularly occurring marine mammals are restricted to those animals adapted to live in shallow waters, or who use this area as a migration or transit route. Complex sandbank systems create shallow channels that may cause cetaceans to become disorientated and cause them to strand. When exposed at low tide, some sandbanks are used as haul-out sites by seals which become easily disturbed by recreational boating activities. It is also likely that a number of stranded animals have died just outside the region and drifted ashore, helped by the prevailing currents. Marine wind farms pose a threat to migrating bats but once constructed, may provide foraging areas for marine mammals, resulting from their restricted access to shipping.

Habitat surveys

Kent is fortunate in having been the subject of three complete coverage habitat surveys in the last 20 years. However, these surveys only covered the administrative county of Kent and the Medway Unitary Authority area (to the Mean Low Water mark), not the Watsonian Vice Counties (see page 37). The previous surveys were completed in 1994 and 2003. The results of the third and most recent survey were published in 2012 (on behalf of the Kent Biodiversity Partnership) by the Kent County Council-led Assessing Regional Change in Habitats (ARCH) project. The earliest comparable dataset is the 1961 Land Utilisation Survey by Alice Coleman.

These surveys give us a great deal of information on changes in land use and habitats in the county. Analysis carried out by the ARCH project shows that approximately 60% of Kent is covered by agriculture and that this has remained fairly stable over the past



Map 2 Reversing habitat fragmentation by removing coniferous plantations and restoring heathland and acid grassland in the Pembury area (Image courtesy of KMBRC)

50 years, with the proportions given over to either arable or pasture tending to vary according to the economics of agriculture. The extent of woodland over the same period has also remained quite stable with a loss of 1% since 1961. However, the reality is that from 1961 to 2008 13,766 ha of woods were lost, whilst in the same period 9,505 ha were gained. 60% of the losses were to agriculture and 35% to development. It is unknown how much of this loss was ancient woodland. The gains in woodland cover come mainly from plantations, scrubbing-up of grassland where grazing has been abandoned, and woodland creation.

The biggest winners and losers are developed land, orchards and hop gardens. The surveys showed that the amount of built-up land has risen from 10% in 1961 to 17% in 2008; whilst the extent of orchards and hop gardens has fallen from just under 10% to 3%. According to the Kent Habitat Survey 2012, natural and semi-natural habitats cover 27% of the county's land surface. These are the most important resources for our flora and fauna, and as such many areas of these habitats are designated as Sites of Special Scientific Interest (SSSI) or Local Wildlife Sites (LWS), totalling 16% of the county area. However, it is outside these precious sites, in the wider countryside, that the greatest changes in our fauna and flora are being recorded.

The value of the farmed and forested environment to wildlife has not always been high on the public agenda. Since 1991 the UK government's farming, forestry and wildlife agencies have supported farmers and landowners to manage their land using methods more sympathetic to wildlife. Currently over 40% of Kent's land surface is being managed under agri-environment schemes. There has also been a recent paradigm shift in the conservation movement away from the concept of protecting standalone sites for wildlife and towards thinking and acting on a larger 'landscape' scale. This is a positive step towards reversing some of the habitat declines that have occurred.

Mammal records

Mammal records are received from a variety of sources, with each mammal organisation maintaining its own records database and using its own assessment criteria to validate and verify records. Assessment helps to ensure that the record is deemed correct and maintains a high degree of confidence in the quality of the records held. On a regular basis a synchronisation of the assessed, validated and verified records occurs between each mammal group and the KMBRC, ensuring that a single database of all the verified records is held by them.

Mammal prints can show up well in wet mud, American mink being no exception (photo © Lesley Mason)

Composing a mammal record

Sometimes the submitted record does not contain enough information to allow an appropriate assessment and the record cannot be validated. Therefore, when recording mammals it is essential that key information from your observation is noted and submitted to the appropriate county mammal organisation. The submitted record needs to include the four Ws.

- **WHO - name, address, e-mail, phone number**
- **WHAT - species name, how many and how did you identify it?**
- **WHERE - location name and six-figure grid reference or GPS reference**
- **WHEN - the day, month, year and time**

The four W's

Most of the county's mammal groups have an on-line recording system that allows mammal sightings to be entered easily. Many mammal sightings are of dead animals, sometimes by the side of busy roads, so ensure that it is safe and legal for you to collect the information described below.

The first W is Who; all records should contain the observer's contact details as above, allowing the mammal recorder to get in touch if needed. Further information could be required if the record concerns a species that is regarded as scarce, rare or difficult to identify, or if you have observed unusual behaviour.

Identification and presence of some mammals can be accomplished by field signs alone, whilst others require a sighting and a view of certain identification features or hearing of certain sounds.

Bank vole trapped and about to be released, during a tetrad survey (photo © Suzanne Kynaston)

Whilst the species name is essential, other useful information can include:

- features used to identify the mammal
- behaviour and field signs such as tracks, droppings, food, burrows, tunnels, vegetation marks, calls, nest etc.
- number and where possible the age. Was an adult accompanying a cub, calf or a juvenile?
- photographs of your observation that could be sent to the mammal recorder

The location where you saw the mammal or mammal signs needs to include a site name or location along with a six figure, or better, grid reference. Websites now exist that can provide an accurate grid reference such as:

www.gridreferencefinder.com

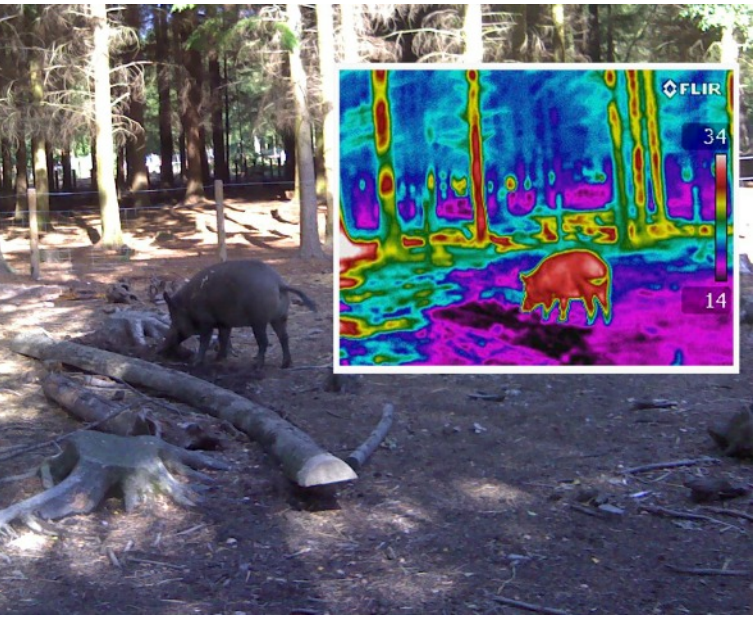
Finally, recording a specific date and time of your sighting is better than giving a month or year only.

Getting the most out of mammal recording

The best way to help you learn and look for mammals is to join one or more of the county mammal organisations (see page 142). These organisations work collaboratively with the KMBRC ensuring that all records are held and managed centrally. Joining will give you access to a wealth of knowledge and information that can enhance your understanding and enjoyment of Kent's mammals.

Collecting records and contributing to specialised surveys and species monitoring can be rewarding and pioneering. Mammal surveys can provide an important 'snapshot' view of presence or likely absence of species; alternatively, monitoring an area of habitat over a longer period of time can allow an assessment of the habitat and associated changes in mammal fauna that may occur there. The county mammal organisations provide training for species-specific surveys and long-term monitoring programmes allowing you to provide further vital contributions at both a county and national level.

A camera trap left overnight photographed a fox digging its earth underneath a garden shed (photo © Hazel Ryan)



Inset. A wild boar as viewed through a thermal imaging camera (photo © Martin Newcombe)

Specialist methods of recording

Year on year, the number of mammal records collected is increasing. Online forms are now used for almost all record submissions and allow for a more consistent set of collected data based on the four W's. The use of GPS for accurate positioning, and digital photography for recording the event, is improving the overall quality of records.

Other technologies in the form of motion sensor camera traps, thermal imaging and infra-red cameras can add an exciting and previously unseen insight into the county's mammals, especially those that have a more nocturnal habit.

The following detailed account of hedgehog behaviour was sent to the KMG County Mammal Recorder. It is a great example of what can be achieved using specialist recording methods and provides an insight into hedgehog behaviour that would otherwise have been missed. The account has been compiled from information captured by multiple motion sensor cameras, located within a Kent garden:

Camera trap image of a badger (photo © John S Young)

‘During 2012 up to six different hedgehogs were recorded on most nights including young. In October a female hedgehog was still visiting the garden on three occasions, initially with one and then two hoglets. The female was presumed to go into hibernation as she disappeared in late November but the youngsters continued to visit the feeding station every night. One of them injured a back leg but was still able to get about. In late November both young were weighed with the injured individual weighing 410 g and the other 500 g. A camera monitoring a hedgehog house in the garden showed that the hoglets were visiting the house during the night but not necessarily sleeping there during the day. The uninjured animal has been recorded taking naps of around an hour, up to five times during one night, leaving the nest for approximately 30 minutes at a time, presumably to feed but going elsewhere to sleep during the day. The injured animal spends the day in the hedgehog house, appearing around 8:30 pm to visit the feeding station, then leaving the garden and returning just before dawn to have a final feed before returning to the house at 7:00 am.’

Water voles (photo © Terry Whittaker)

Recording terrestrial mammals

Whilst many records are received through ad-hoc sightings, there have been a number of projects that have focused on recording terrestrial mammal species. These projects have gathered records from specific locations or focused on one species, sometimes in collaboration with a national group. All this activity, along with records collected from the public at county events such as the Kent County Show, resulted in a total of 31,092 records between 2002 to 2012 from 1,021 tetrads.

Below are some examples of species surveys and monitoring projects for terrestrial mammals that have been performed within the county.

Kent Mammal Group tetrad survey

Since 2003 the focus for terrestrial mammals has been on surveying every tetrad across the whole county with an aim of determining species distribution. Tetrad surveys have been managed alongside an important relationship with the Wildwood Trust, where classroom facilities and access to captive mammals combine to offer frequent high quality training courses on trapping techniques and field signs.

The following two survey methods are used:

- **Small mammals trapping survey**

Over a three day period, 50 Longworth or Wellfield humane small mammal traps are used to survey each tetrad. They are set in as wide a range of habitats as possible and checked twice daily. Any trapped animals are identified, sexed, weighed, assessed for breeding condition and then released.

- **Walkover survey**

In each tetrad the surveyor records mammals from a range of habitats, searching for field signs, live sightings and road kill of all terrestrial mammal species. For example this can involve actively searching through grass tussocks for nests and feeding remains, checking barbed-wire fences for snagged fur, and looking underneath reptile refugia for nibbled nuts. Signs include nests, footprints, droppings and feeding remains and even calls and scent of some distinctive species.

National Dormouse Monitoring Programme (NDMP)

In May 1990, 100 hazel dormouse nest boxes were erected in woodland, making Kent one of the earliest counties to be included in the NDMP, which is now administered by PTES. The KMG now monitors dormice in over 100 sites, with sets of 50 dormouse nest boxes erected in each area. Other organisations and individuals which are not part of the monitoring programme have also erected nest boxes, probably making Kent the mostly heavily monitored county in England. The monitoring has also determined that these nest boxes are used by other small mammals and invertebrates.

Results from this monitoring provides data on which trend and behavioural impact analysis can be performed. Changes in weather such as milder winters can cause dormice to wake early from hibernation, and wet summers impact their ability to forage and gain weight. In such conditions they have been found torpid in nest boxes in June and July which is much later than usual. This delays breeding, with very few litters then being found early in the summer.

In addition to long term monitoring with nest boxes, nest tubes are used for surveys to determine presence and likely absence of dormice. In partnership with the Kent Wildlife Trust (KWT), roadside nature reserves have been surveyed in this way.

Monitoring and handling the endangered hazel dormice requires a licence and specialised training. The Wildwood Trust in partnership with KMG runs a training scheme for those who wish to train for a licence to check dormouse nest boxes.

Top. Captive adult hazel dormouse (photo © Hazel Ryan)
Centre. Hazel dormouse nest box (photo © Hazel Ryan)
Bottom. Checking a hazel dormouse nest tube with a mirror (photo © Hazel Ryan)

Riparian mammals survey

Mammals in this group include otter, water vole, water shrew and the non-native American mink. In 2011, KMG in partnership with the Wildwood Trust commenced a twelve month survey in selected sites in east Kent. Of the 54 sites surveyed most were ditches, and water voles were found in 60% of sites. This was considered a low figure compared with other surveys carried out across ditch systems in Kent, and was thought to reflect unsympathetic habitat management in some areas.

There has also been a significant effort to monitor the status of otter within the county, the UK recovery of which has been largely attributed to the ban on organochlorine pesticides and legal protection of otter holts. The last 15 years have also seen some successes in otter recovery due to cleaner rivers.

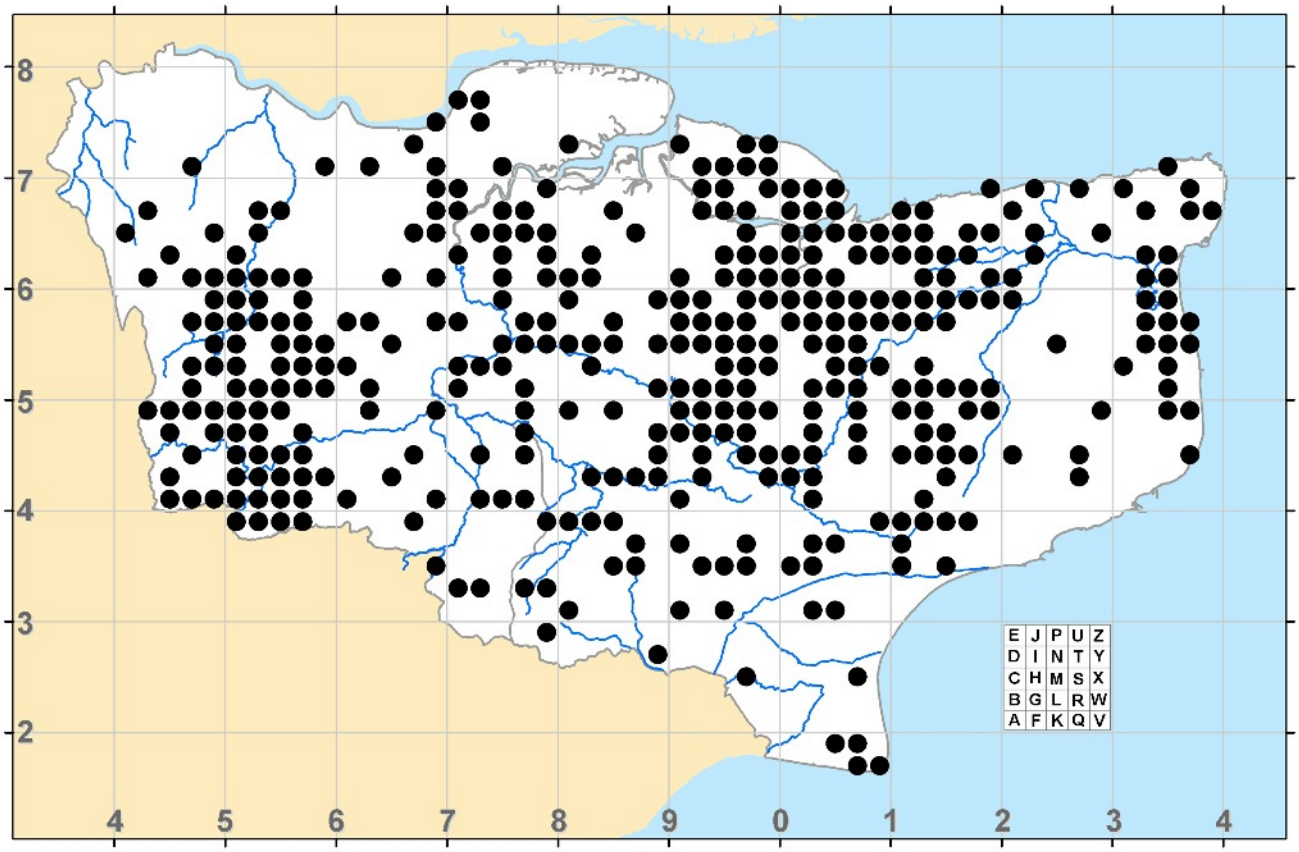
Water vole, a riparian mammal (photo © John S Young)

Harvest mouse survey

The harvest mouse exemplifies the difficulties associated with standard small mammal survey techniques, resulting in a confusing picture of this mammal's status that has prevailed for some time. A survey organised by the Mammal Society in 1979 showed a widespread distribution, as far north as parts of Scotland, but with most records towards the south and east of England. A follow-up survey in 1996 appeared to show a general decline and a loss from many former sites. However, given the short-lived nature of their preferred habitats, the mouse's habit of staying in one place only for a short time period and cyclical boom and bust population dynamics, it becomes clear that there is a great margin for error when surveying.

The main survey technique specific to the harvest mouse is the discovery of their globular aerial nests woven between grasses and a variety of other plants. This is best carried out between October and April; however, winter 'tidying' of verges removes the evidence, making surveying for nests more difficult. Prior to this time the nests are very hard to locate,

Harvest mouse survey, measuring the nest (photo © John S Young)



Map 3 *Tetrads where a focused survey of some terrestrial mammals occurred within the period 2002-2012*

being woven from living plant material, green in colour and often in dense vegetation.

Surveys indicate that where the habitat is suitable harvest mice are liable to occur. Repeat visits suggest that there are parts of the countryside that may be inherently unsuitable for harvest mice, for example, extensive areas of pasture and mature woodland. Access to land is also an issue and a small possibility that harvest mouse habitat could be occupied given adequate linkage to populations further afield must remain. It is also likely that harvest mice are absent from densely urban areas where their habitat requirements are not met, but are likely to occur close to the outskirts of towns. With this rodent displaying a particular liking for wetland habitats, Kent's extensive marshlands might be expected to yield more records. With large areas of suitable non-linear habitat, finding nests becomes more difficult if recording is attempted during years of low population density.

Brown hare survey

Nationally it is suggested that brown hare numbers have stabilised in recent times after 100 years of decline. This doesn't appear to be the case for the few regularly watched areas across Kent where hares occur. For example, indications suggest that the numbers of hares on Romney Marsh have reduced over the past nine years. The casual sighting of one or two animals whilst driving through the area is now a scarce occurrence.

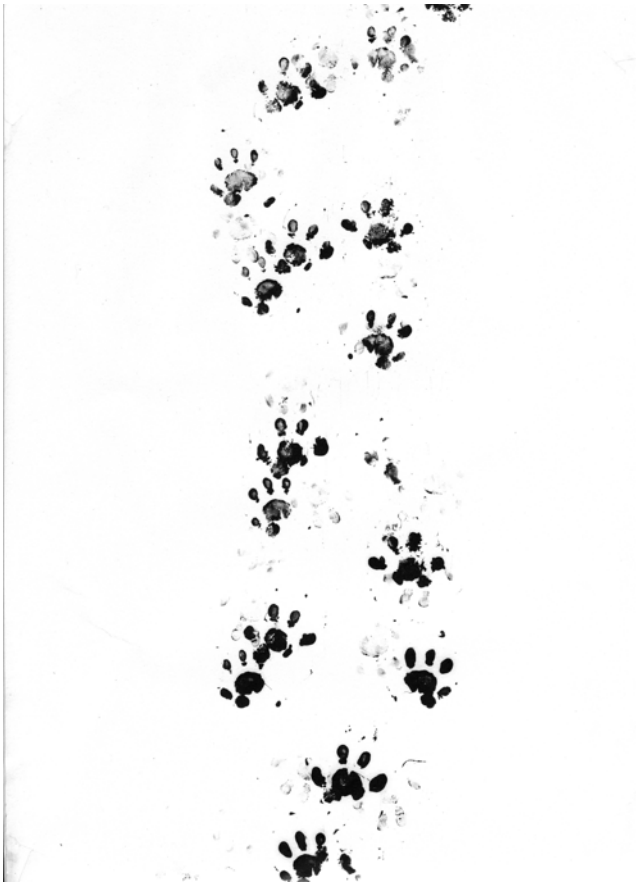
No year-on-year population comparison data for the county exists. However, two focused surveys attempted to establish presence and indicate population status. The first, on Romney Marsh, involved walking almost all the public footpaths on the Marsh over the January-April periods in 2004 to 2006 with hares being observed. Circular walks were used to establish presence within a tetrad. In 2010 another survey was performed but this time focusing on estimating the population within a defined area.

Hedgehog survey

Kent was one of the first counties to be involved in a countrywide assessment in the value of triangular hedgehog tunnels. The survey method used dye pads and paper inside the tunnels with bait at the centre. The tunnels tested the benefits of a non-invasive means of measuring hedgehog activity by detection of their prints within the tunnel. Any tracks detected on the paper were removed daily.

The survey effort entailed monitoring either a 10 or 20 tunnel density per kilometre square. Tunnels were checked over a six day and night period and set over the spring, summer and autumn. The survey periods were also used to compare whether spotlighting (one million candle powered lamp) is more or less favourable for detection of activity one hour after dark and beyond. Results suggested that 10 tunnels and a period of five days and nights were sufficient for detection in any area.

Kent results showed that tunnels are better than the spotlighting technique and that Kentish hedgehogs appear not to use tunnels before midnight, which might be a natural adaptation to the hazards associated with human and vehicle activity being much reduced. Other small mammals obviously use the tunnels and foxes and badgers attempt to gain access, but identification of hog prints versus others is relatively easy.



Hedgehog footprints captured from a tunnel (photo © Ian Gray)

Badger monitoring

The two county badger groups continuously monitor setts and maintain databases, whilst at the same time checking sett activity and recording new setts. The original database compiled after 1970 has been continuously updated. There is also ongoing long term research being carried out in the county to look at ways in which use of setts changes over time.

Stoat (photo © Mike Gould)

Mole remains from an owl pellet (photo © Johanna Elwell)

Stoat and weasel detection

These two species are much under-recorded, due to the difficulty in tracking and trapping them. Researchers at Southampton Solent University are currently working on ways to improve detection of stoats and weasels. The four methods on trial are: camera trapping, audio playback, track tunnels and hair tubes. The camera traps may be non-baited, baited or drag-baited (a dead rabbit is dragged along a hedge line towards a baited camera trap). Once identified and refined, the best technique will be expanded for use as a rapid occupancy-based assessment protocol culminating in a UK-wide study.

Owl pellets

Evidence of small mammals can also be found within the contents of owl pellets, which are ejected through the mouth. Pellets can be found under owl roosts such as barns, outbuildings and trees. Once carefully broken apart, the pellet reveals the indigestible parts of their mammal prey. Small mammal skulls and lower jaw bones are distinctly different for each mammal species when examined under a low power microscope and can be used for identification. Whilst pellets can contain the remains of four or five small mammals, it is difficult to assign mammal records to a particular tetrad due to the foraging range of owls.

Kent God's Acre Project

Many churchyards provide an undisturbed haven for wildlife. County wildlife organisations have been working in collaboration to provide skills and expertise to local communities through the Kent God's Acre Project. This project encourages local communities to manage their churchyards for history and wildlife, and the mammal groups obtain site records and access for species surveying.

Recording bats

Identification of bats can be difficult even for the most experienced. In the field the majority of records have been obtained by using bat detectors which convert the ultrasonic calls of bats to an audible level. Variation in the frequency of the calls between species is an important identification tool but closely related species may still be confused. The recording of calls and subsequent computer analysis of the sounds gives a much greater degree of accuracy, but some results can still be questionable.

Observation of flight characteristics, wing profile and hunting behaviour gives an added dimension to information gained by the use of a detector, but the habit of some species of emerging well after dark does not always provide this opportunity.

The most accurate identification is based on anatomical features, observed only when bats are examined in the hand which in some circumstances requires a licence. Even then, some closely related species may be confused, most notably in the Myotis genus.

As a result of these uncertainties it is clear that the quality and accuracy of the records is very varied, having been collected by those with a wide range of experience. Nevertheless, we consider the maps give a fair picture of the distribution as understood at present. The KBG database holds details of the recorders' experience and method of identification should this need to be taken into account for a specific enquiry.

Bat detector records

Individual members of KBG and small groups frequently explore and revisit sites to improve coverage of our records, using bat detectors. Increasingly members of the public now own detectors and are becoming more proficient in their use. This information helps to highlight important foraging areas.

The National Bat Monitoring Programme (NBMP)

KBG takes part in the NBMP, a scheme run by the Bat Conservation Trust (BCT). Colony counts of known maternity roosts, surveys of waterways, field surveys and winter visits to hibernation sites are carried out annually in accordance with a strict protocol. The data gathered is vital both locally and nationally to track changes in bat populations.

NBMP waterways survey (photo © Shirley Thompson)

Records from the public

Householders requesting a visit from the Helpline (Natural England's voluntary bat roost visitor scheme administered by BCT) can lead to the discovery of many roosts in buildings. Workmen also come across bats or evidence of bats in their work. Interested members of the public are encouraged to submit records online. Bat walks and talks delivered by members of KBG frequently lead to records of bats seen, especially foraging in gardens.

Bat Conservation Trust (BCT) Bechstein's Bat Survey

KBG was one of the groups to take part in the BCT Bechstein's Bat survey, a three-and-a-half-year funded project which started in September 2007 as part of the NBMP. A total of 36 woodlands were surveyed across the county. Two harp traps, each with an acoustic lure which replicates social calls to encourage bats to come and investigate, were set up for two hours under special licence. This was a very rich source of new records in woodland, normally a difficult habitat to survey. In all, 146 bats of 11 species were trapped and identified in the hand.

Harp trapping

Harp trapping has also been undertaken in autumn at some swarming sites, without a lure. Flying bats are intercepted by two parallel arrays of vertical nylon thread - supported by a large metal frame. The bats fall into a soft catching bag giving the opportunity to identify the bats in the hand. The bats are then released on-site.

Top. Collecting records from the public at the Kent County Show (photo © Shirley Thompson)
Bottom. Harp trap with an acoustic lure (photo © Shirley Thompson)

Bats and Roadside Mammals Survey

In the summers of 2005 to 2007 KBG took part in a survey organised by PTES. Surveys took place from a car driven slowly for two hours covering about 30 miles per night. Bat recordings were collected by attaching a time expansion bat detector to the rear window of the car. The use of a palmtop computer linked to a GPS mapping system enabled accurate geo-referencing of records.

Bats in winter

Although most bat sightings are noted in summer, knowledge of places where bats hibernate (hibernacula) is important. Bats in hibernation are particularly prone to disturbance and such sites need to be protected.

In order to search potential sites with the intention of finding bats a licence is essential. Some licensed KBG members explore new sites, in addition to monitoring known ones.

Grounded, dead and injured bats

Sadly many dead and grounded bats are brought to bat carers of which there is a network throughout the county. These can be a valuable source of records, even if rehabilitation proves impossible. Orphan bats are of particular importance as they frequently lead to the discovery of a maternity roost.

Top. Searching a derelict building for hibernating bats (photo © Shirley Thompson)
Bottom. Brown long-eared bat injured by a cat (photo © Shirley Thompson)

Recording marine mammals

Common seals (photo © John S Young)

The marine mammal fauna of the eastern Channel and Kent coast is sparse. Out of the 11 cetacean species observed in the recording period none is considered abundant and 60% of the species total is of animals found stranded.

There have been few focused surveys of marine mammals that occur in the county's coastal waters. Records rely primarily on opportunistic data collection and discovery of stranded animals that are sometimes heavily decomposed. If you do find a stranded marine mammal then please contact British Divers Marine Life Rescue noting the place, the state of the tide and any injuries. Further information can be found at www.bdmlr.org.uk.

Grey seal (photo © John S Young)

Seal surveys

Of the two seal species resident in the British Isles, both the common seal and Atlantic grey seal occur only casually in the region, their breeding grounds being some distance away. Numbers of common seals vary across Kent and further afield according to information obtained through scientific studies, as well as anecdotal observations reported by coastal wardens, tourist operators and members of the public. The Sea Mammal Research Unit conducts surveys of known haul-out sites around the British Isles.

Since 2003 survey activity has been recording seals in the English Channel and Thames Estuary waters around Kent's coastline. Initially this consisted of a partial survey of seal haul-out sites about 10 miles offshore from Herne Bay. Surveys of other haul-out sites and seal satellite tagging

undertaken on common seals off Margate and Southend resulted in large home ranges being found.

In 2010 further surveys of haul-out sites were performed from the air allowing sites occurring about 25 miles out from the Kentish coast to be checked. Using an aircraft allowed an extensive area to be covered and resulted in 27 sites being found that were used by seals for haul-outs, with five sites holding over 20 seals. Again in 2012 two plane surveys of offshore sandbanks, a number of boat surveys and a one-year study of a haul-out site near Pegwell Bay were performed. Results show that common seals are widely distributed and are found hauled-out on many sandbars off the Kent coast and in the Thames Estuary, with grey seals favouring hauling out on the Goodwin Sands complex. Numbers of seals hauling-out at any one time were found to significantly vary over the year (one haul-out site varied from having no seals hauling out to over 50 animals depending upon the season). Some animals also appear to show high fidelity to haul-out areas, while others range further; this may be an age-dependent relationship that is still to be explored.

Nationally, numbers of common seals are declining. The most recent minimum estimate of the UK common seal population is 24,250 seals of which 3,200 are found in England. The results of surveys carried out by the Sea Mammal Research Unit suggest that populations of seals have not recovered since the 2002 phocine distemper virus outbreak and continue to show widespread declines. National estimates of grey seals are based on pup production numbers since there remains uncertainty in overall population numbers. In the UK pup production was estimated at 45,100 in 2006 with a rate of increase at approximately 2.5% per annum.

Surveying for whales, dolphins and porpoises

Cetaceans are frequently recorded at Kent coastal localities that are popular with seawatching birdwatchers such as Dungeness, Cliffe, Foreness and St. Margaret's Bay/Bockhill. However, the only organised county survey currently performed is an annual watch from Dungeness as part of the Sea Watch Foundation's National Whale and Dolphin Watch.

Dead harbour porpoise, washed up on the shoreline (photo © Marie O'Connell)

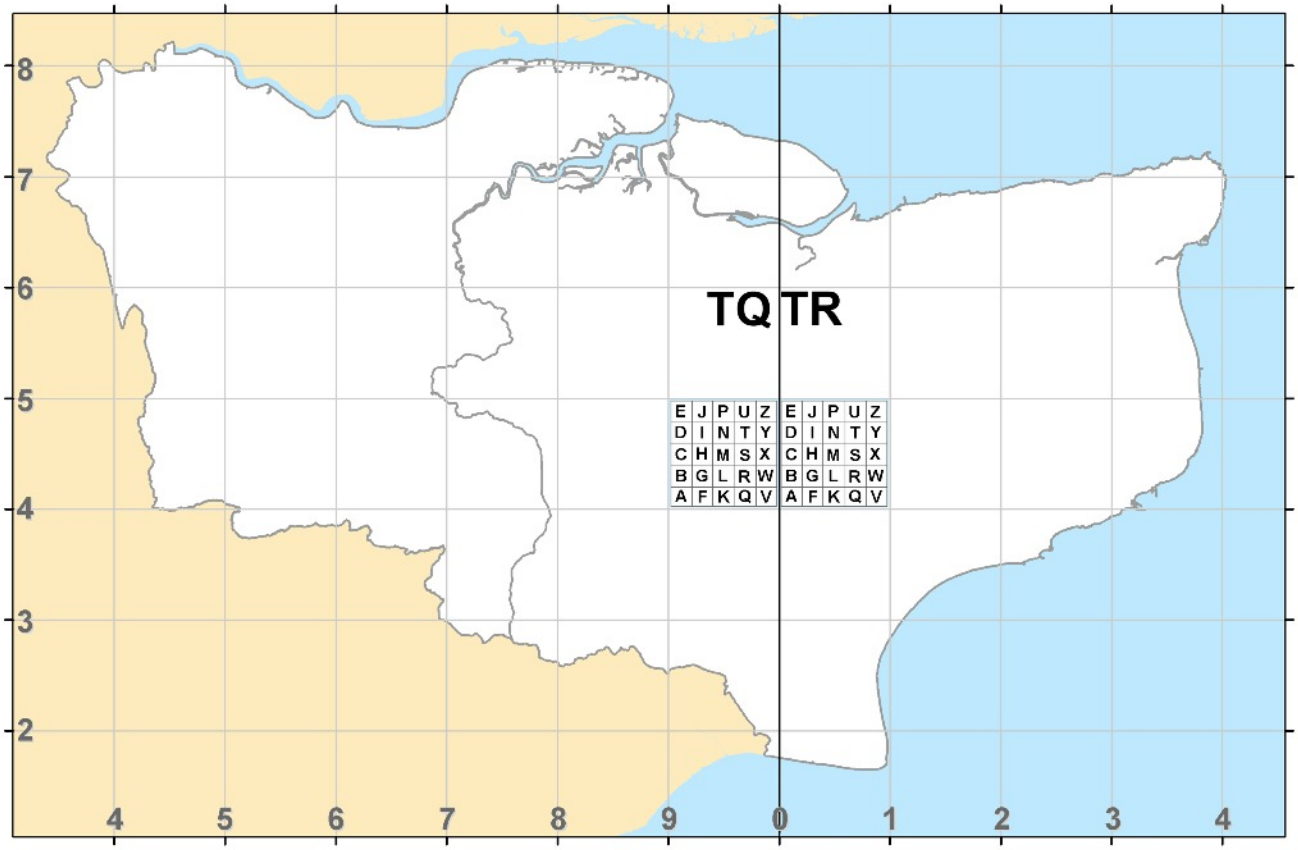
Species accounts and maps

The main species accounts include identification and field sign information with echolocation frequency data for bats also included. This information should be used in conjunction with a good UK mammal guide such as one of those listed within the reference and further reading sections.

Unless stated, measurements and weights refer to adults. Main species accounts also include sections on habits including information on preferred habitats and behavioural aspects. Reproduction and life cycle are described along with a section on status, distribution and conservation which for some species also includes comment on protection status. Confidential observations have not been included.

Species accounts cover 59 native and other mammals that are considered to be long term introductions in Kent along with an overview of a further 10 species considered alien, re-introduced or non-native.

The maps provide a view at a tetrad level of the species occurrence within Kent. They are based on the records received during the period of 2002-2012 and do not indicate either abundance or status. If an area of a species map is blank, it does not necessarily indicate that a specific mammal species does not occur there. It may mean that no recording has taken



Map 4 *The grey border represents the county of Kent as defined by the Watsonian Vice Counties VC15 East Kent and VC16 West Kent*

place there or that no mammal species were seen during a recorder's visit.

Watsonian Vice Counties (VC)

For species representation, recording and monitoring, having a permanent county boundary to work within is important. It ensures that species distribution and habitats can be measured over time within a consistent area. This is why the Watsonian Vice Counties system (Map 4) is most often used by naturalists. These vice county boundaries are based on old administrative boundaries and are permanent. The land boundary of the distribution maps consists of two vice counties, VC15 East Kent and VC16 West Kent. Within the vice counties lie the 13 districts that comprise Kent from a county administrative perspective and additional London Boroughs including Bexley, Bromley and parts of Greenwich.

Map keys

A number of the species distribution maps contain different coloured dots and keys that describe additional aspects of the distribution being shown. These include:

- comparison against the period 1991-2001
- monitored sites
- species groups

Specific to bats:

- hibernating bat
- examined in the hand
- detector record
- maternity roost

Specific to marine mammals:

- stranded animal

Marine mammals

For a marine mammal the distribution mapping has to take into account records beyond the boundaries of the vice counties and far out to sea. For consistency, a minimal number of records received have not been mapped i.e. those that are much nearer to Essex than Kent.

With the exception of seal haul-outs and stranded animals, it is unlikely that a marine mammal record will contain a location that includes a position reference. This is to be expected as within Kent there are very few opportunities for boat-based observations and with a few exceptions, nearly all records are taken from land-based observation points. Therefore the live sighting dot is a representation of the species occurrence along the Kent coast in relation to the nearest appropriate land based tetrad.

Sensitive species

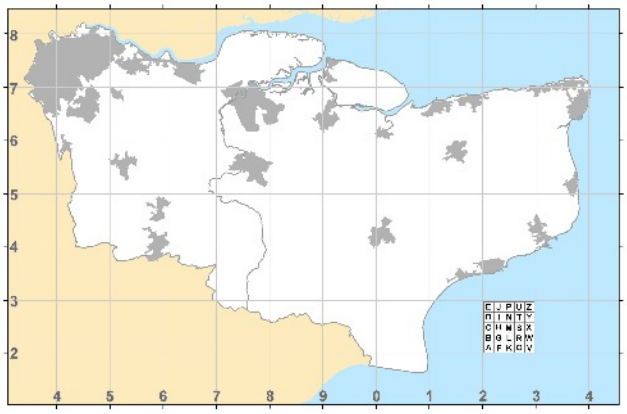
Each species has been carefully considered regarding its account and distribution representation. A decision was made not to include a map showing the distribution of badgers in Kent as they have a current and historic record of persecution both nationally and locally.

The representation of otter, given the species decline, persecution and tenuous foothold within Kent, shows the distribution at a hectad level (10 x 10 km square) and the enlarged dot is centralised. The same distribution presentation has also been used for brown hare, a species that suffers from illegal coursing.

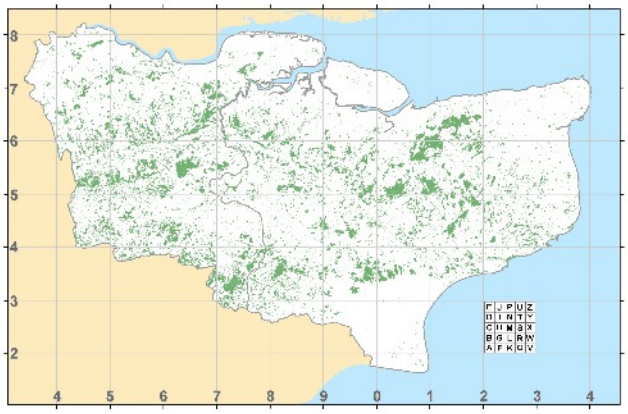
Map layers

Some mammal species are associated with certain specific habitat types. Map layers are included where appropriate to help illustrate relevant habitat types against a species distribution.

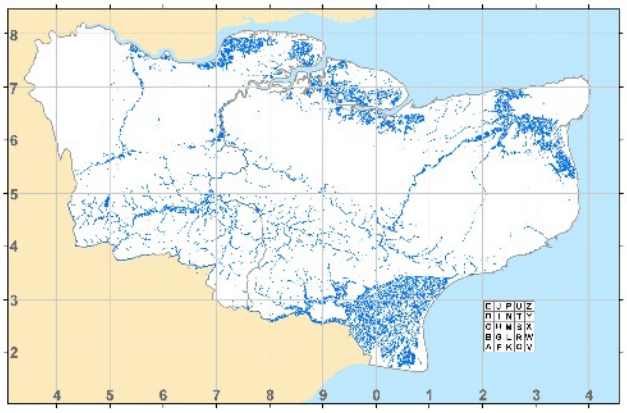
All maps show the vice county boundaries and the main rivers. Where it is considered that other information will complement the understanding of species distribution, one or more of the following additional map layers are included.



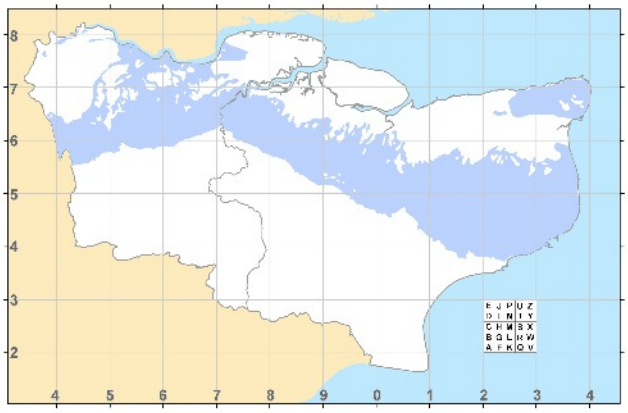
Main urban areas



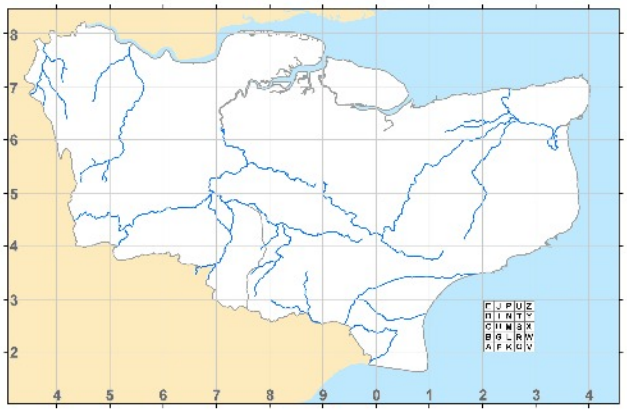
Woodland



Water bodies



Underlying chalk



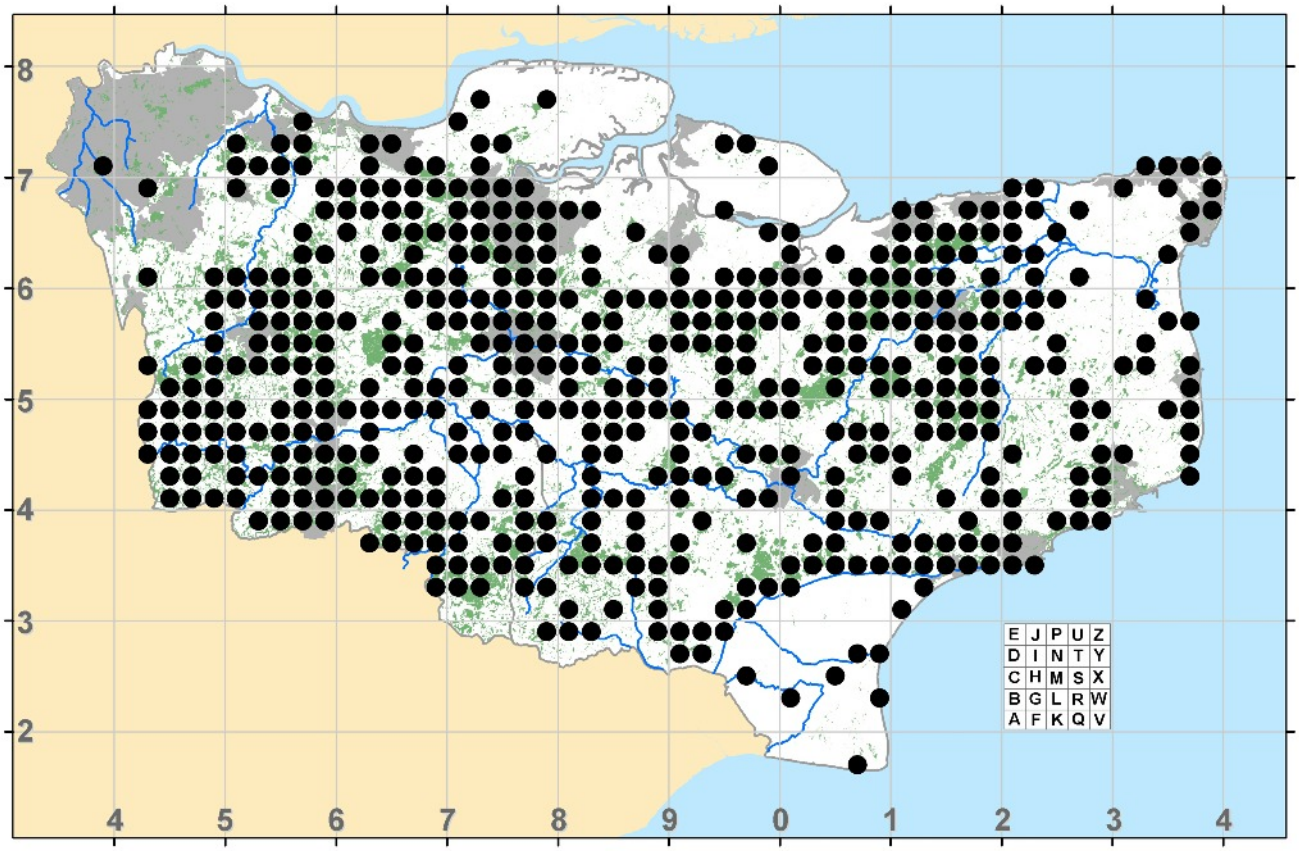
Main rivers

Harvest mouse (photo © Selwyn Dennis)

Grey squirrel

Order: Rodentia

Sciurus carolinensis



Identification

Head and body length (mm): 240-285
Tail length (mm): 195-240
Weight (g): ♂ 440-650 ♀ 400-720

Larger than the UK's native red squirrel, the grey squirrel has mainly grey fur on its upper body with flecks of brown hairs and a white underside. The percentage of grey/brown hairs can vary in the population and both dark melanistic and white albino colour forms occur in small numbers in Kent. The sexes are similar in size and appearance. Unlike the red squirrel the grey squirrel has no ear tufts.

Habits

The grey squirrel prefers mature broad-leaved woodlands with a rich understorey of vegetation and can also be found in smaller numbers in conifer woodlands. However, this species has adapted well to the urban environment and is seen in parks and gardens containing mature trees. It is also encountered in the towns and villages throughout Kent.

Regular visitors to bird tables, grey squirrels feed on a variety of seasonal food including tree seeds, nuts, buds and sap as well as insects, fungi and on occasion bird eggs and nestlings. Cannibalism has also been noted at times.

During the autumn they can regularly be seen burying seeds and nuts in small scrapes in the ground, scatter caching the food for times when it is hard to come by. Retrieval of this buried food is by a combination of memory and smell. Grey squirrels do not hibernate, but may remain in their dreys or dens (see below) during very harsh weather.

Field signs

Grey squirrels are active during the day and sleep at night in two main types of nest:

- dreys, domed nests found in the forks of trees
- dens, hidden away in tree hollows

During winter the dreys are a much more substantial structure designed to keep out the cold.

Reproduction and life cycle

Breeding can take place up to twice a year, generally December to February and May to June with gestation lasting for 44 days after mating. On average three young but sometimes as many as seven are born and take up to 10 weeks to wean.

Males take no part in rearing the young and the females nest alone with the developing young during this period. Sexual maturity is generally reached at 12 to 14 months for females and slightly less for males.

The average lifespan is three to four years, but some have been known to live for up to nine years in the wild and 20 in captivity.

Distribution, status and conservation

A non-native species, the grey squirrel was introduced at Benenden between 1892 and 1902 and at Sandling in 1910 (Shorten, 1954); most of Kent was occupied by 1930, apart from the east of the county and the islands of Grain and Sheppey. By 1935 these island pockets were colonised (Parsons and Middleton, 1937). By 1945 only Thanet remained uncolonised and this remained the case up to 1952 (Shorten, 1954).

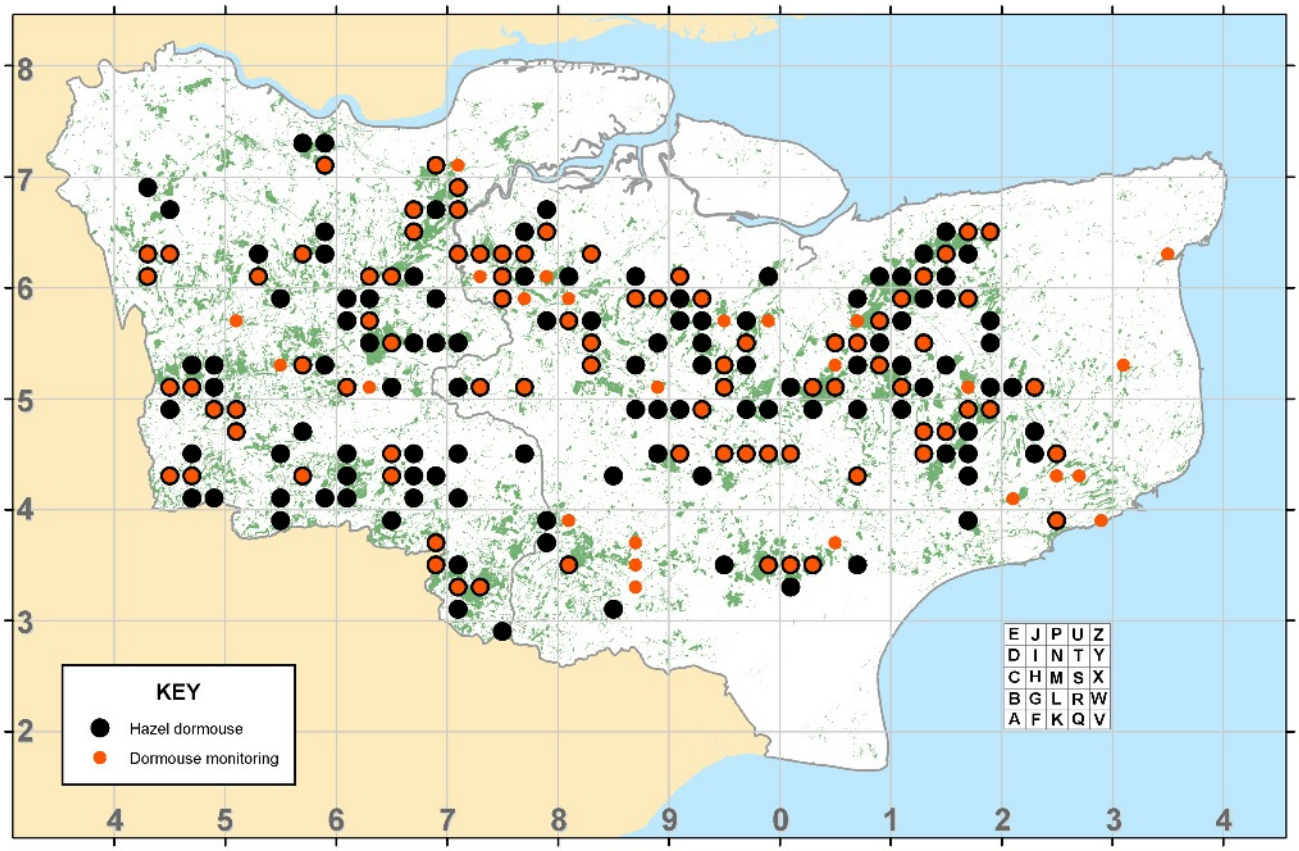
In contrast the native red squirrel was considered very common in 1908, but was confined to the eastern half of Kent and along the county's western border by 1945. By 1959 it was only recorded in four parishes, subsequently becoming extinct within the county.

Top. Grey squirrel (photo © Selwyn Dennis)
Centre. Albino grey squirrel (photo © Warren Baker)
Bottom. Field signs, pine cones eaten by grey squirrel (photo © Hazel Ryan)

Hazel dormouse

Order: Rodentia

Muscardinus avellanarius



Identification

Head and body length (mm): 60-90
Tail length (mm): 57-68
Weight (g): 15-26, increasing up to 43 before hibernation.

A mature hazel dormouse has soft fine orange/yellow fur with a thick furry tail and large black eyes. The skin of the tail is thin and if gripped comes off, leaving the bones exposed. These quickly dry and drop off leaving the dormouse with a truncated tail. The hind feet can be rotated at the ankle, permitting the animal to hang head downwards.

Field signs

Searching for hazel dormouse field signs is extremely difficult. The process mainly relies on locating hazel nuts which have been opened in a characteristic manner. A hazel nut with a round hole chewed into it and having a smooth inner edge and some tooth marks on the outer shell around the hole is a good sign. Chewed hazel nuts can be found from mid-August into the next year but gradually rot away, although they can be found in dry places for some time and occasionally for over a year. Sometimes nests can be found in brambles and similar vegetation; they are woven into a ball with variations in the nest material used.

Habits

They are strictly nocturnal and largely arboreal. A mixed habitat seems to be preferred, with different plants and trees producing flowers, pollen, nuts and fruits for food on a rotational basis, which the dormouse supplements with insects. There are many exceptions to this, with dormice having been found in reed beds in Kent and also in solely coniferous woodland or chestnut coppice, gorse, heather and large stands of rosebay willowherb. They have also been recorded on peanut bird feeders, either singly or in multiples.

Hazel dormouse (photo © John S Young)
Inset. Feeding signs showing round hole with smooth inner edge and some tooth marks on the outer shell (photo © Hazel Ryan)

Monitoring nest boxes in Kent has shown that wild dormice can live up to six years. They hibernate from October until April, depending on the weather conditions, in or on the ground in a tightly woven nest. At other times they can drop their temperature and become torpid if food is in short supply, or there is cold and inclement weather.

Reproduction and life cycle

Generally four to six young are born in July to August taking about 40 days to wean, but often staying with the adults until up to two months of age. However, there are frequent possibly weather-related exceptions, with young being found in Kent in May, June and September and on more than one occasion November. Second litters can occur.

Distribution, status and conservation

Primarily a species occurring within the southern counties of England, the hazel dormouse is found throughout Kent but assessing population status is difficult as they always exist at low densities. However, they are considered to be in slight decline across the county.

Conservation of dormice in Kent is reliant upon the preservation and protection of their habitat. In recent years, dormouse numbers have been impacted by habitat destruction from the construction of road and rail links, along with general development and the removal of woodland and hedges.

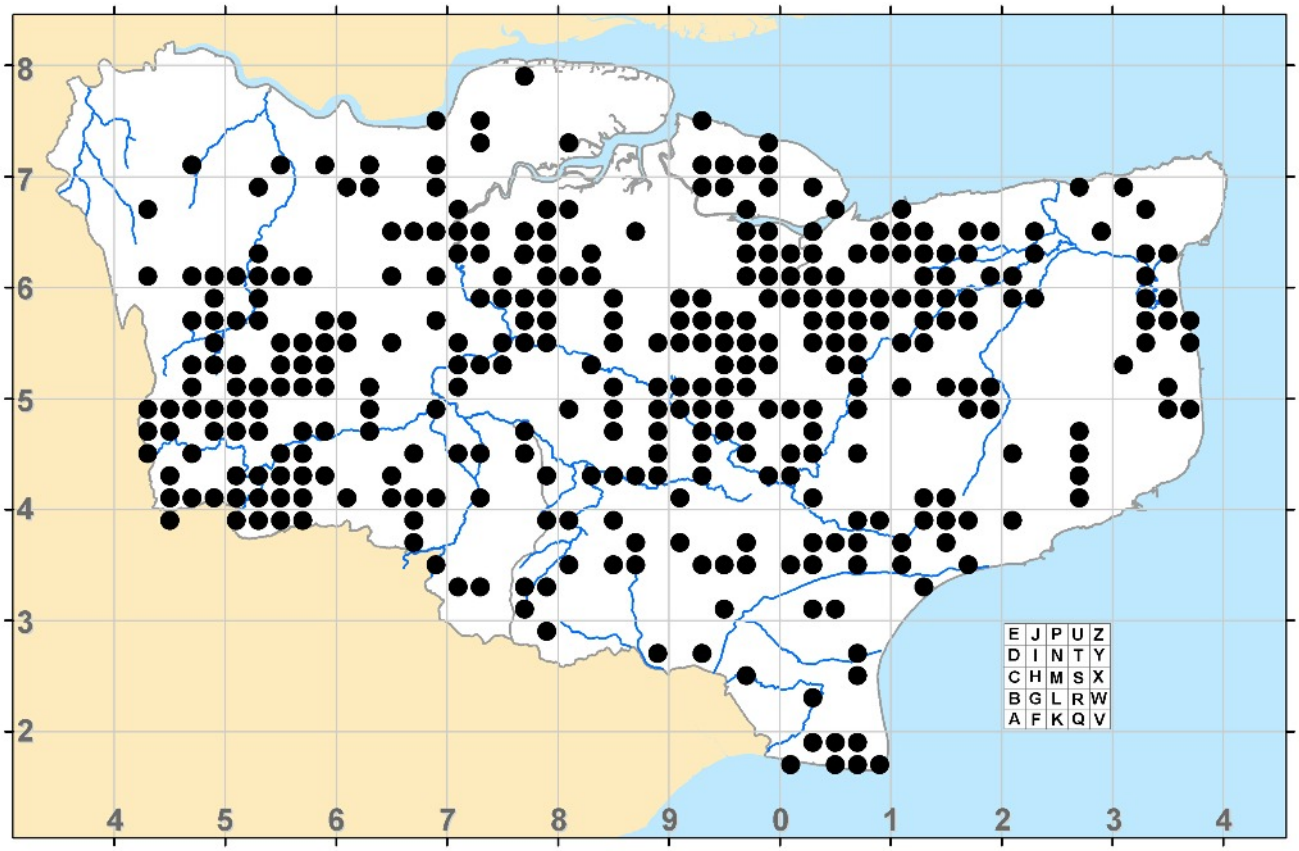
In 2005 construction of the A21 Lamberhurst bypass included the building of a unique ‘green bridge’ over the roadway, having banks of vegetation right across its span. Evidence has now been recorded of dormice breeding on the bridge.

Hazel dormice are protected by law and may not be intentionally killed, injured or disturbed in their nests, collected, trapped or sold except under licence.

Bank vole

Order: Rodentia

Myodes glareolus



Bank vole (photo © Hazel Ryan)

Identification

Head and body length (mm): 79-117
Tail length (mm): 33-48
Weight (g): 15-25

The bank vole has a chestnut brown coat, with breeding adults showing a redder tinge. The flanks are paler and the underside is whitish-cream. The muzzle is blunt and the ears are half hidden by fur. The tail is half the length of the body.

Often confused with the field vole, the bank vole has more prominent ears and a longer tail. The coat of the field vole is lighter and greyer without the reddish tinge.

Two melanistic bank voles were trapped during a small mammal survey that took place in West Blean woods in 2006. This is a rare colour variation within the species and is not often recorded.

Field signs

Like hazel dormice and wood mice, bank voles chew holes in hazelnut shells. Unlike the other species the bank vole creates larger and irregularly shaped holes. Tooth marks across the cut edge give it a corrugated effect. Unlike the wood mouse, no scratch marks are seen on the outer surface. Caches of nuts can be found within sheltered areas, most notably at the base of a tree, in small crevices, or under refugia.

Habits

The bank vole's diet is largely herbivorous, consisting of grass, leaves, fruits and seeds. It is primarily diurnal, but if disturbed may be active at night. It makes use of underground burrows for protection from predation and occupies nests to rest and to rear its young. Nest material generally consists of leaves, grass and moss.

Small mammal surveys in Kent have shown the bank vole occupying a range of habitats. However, it is most commonly found within woodland, scrub and hedgerows. This species is associated with a higher level of ground cover then the field vole.

Reproduction and life cycle

Breeding takes place between April and October. As with other small mammal species, the season may vary depending on weather conditions. Gestation is approximately 18 to 20 days with litters containing four to seven young which are weaned after approximately 21 days. A female born within the first few months of the breeding season may go on to breed in the same year.

Distribution, status and conservation

The bank vole is commonly found throughout Britain and is regularly caught during small mammal trapping surveys in Kent. Since 2002 the known distribution of the bank vole in Kent has substantially increased, which is probably related to an increase in survey effort.

The species has a number of predators, most notably mustelids and birds of prey. Their remains are often found in owl pellets; the shape of the molars differentiates them from other small mammals.

Bank voles have an IUCN conservation status of Least Concern.

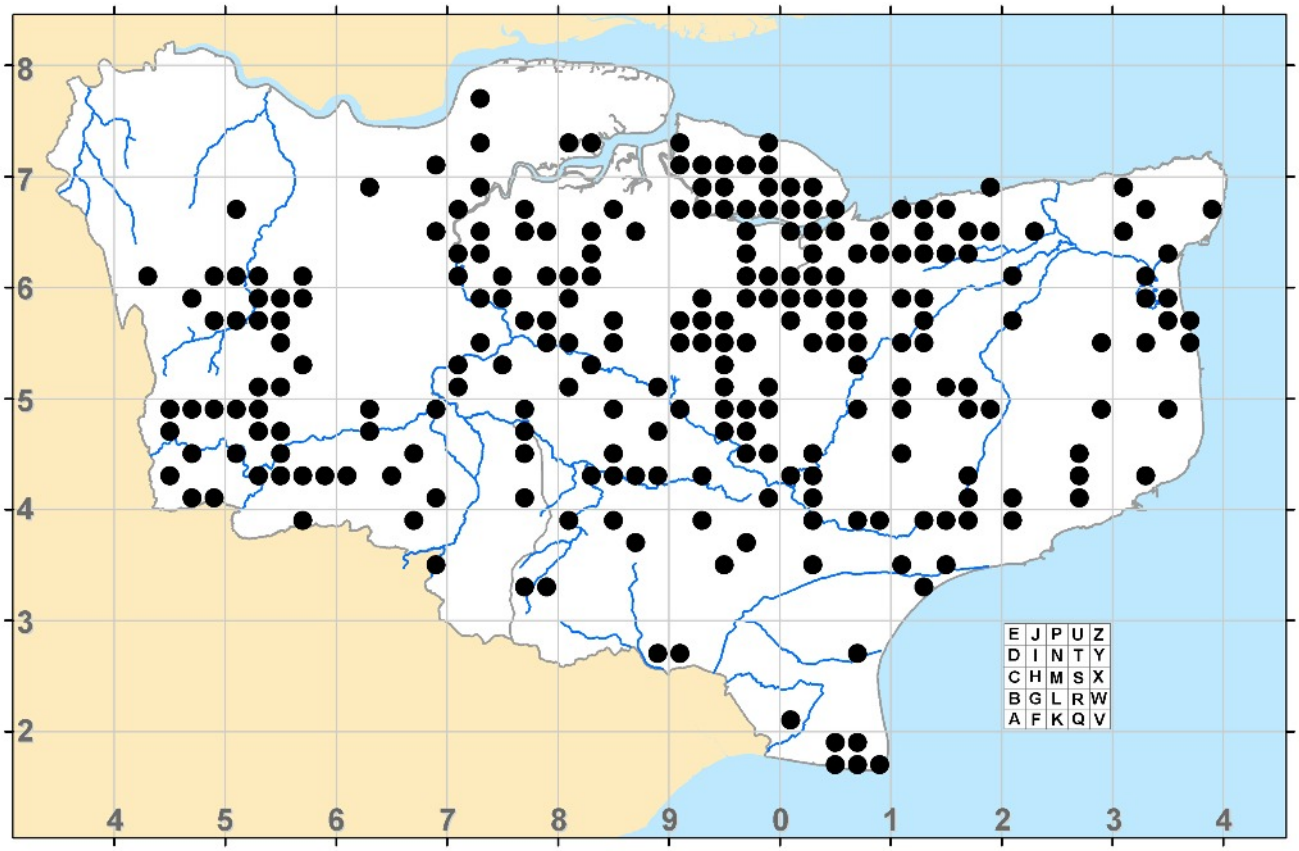
Bank vole feeding sign showing tooth marks across the cut edge (photo © Hazel Ryan)

Melanistic bank vole (photo © Hazel Ryan)

Field vole

Order: Rodentia

Microtus agrestis



Identification

Head and body length (mm): 95-120
Tail length (mm): 28-36 (30% to 40% of head and body length)
Weight (g): 20-45

The field vole has a greyish-brown coat and a creamy-grey underside with a greyer pelage in juveniles. Albinos and melanistic forms are rare but piebald animals with pale ear tufts are occasionally seen.

The field vole has small eyes and small ears that are almost totally hidden under its fur. It is similar in size to a bank vole, although males can be larger and are usually heavier than females. As a vole its nose is blunter than that of a mouse. The tail is only a third of its body length or less and it squeaks more readily when handled than the bank vole.

The field vole can be distinguished from the bank vole by the lack of chestnut or reddish colour in the coat, the shorter ears hidden under the fur and the shorter tail. Field voles can be distinguished from juvenile water voles by their smaller feet, shorter tail and paler coat colour.

Droppings and feeding signs may be confused with those of water voles as both species inhabit grassy river banks. However, signs of field voles are smaller.

Field signs

Field voles tend to be more reluctant to enter Longworth traps than other small mammal species. They dig burrows that are roughly the diameter of a table tennis ball, often with ‘lawns’ that are created by grazing around the burrow entrance. Latrines of bright green, cigar-shaped droppings and feeding stations of grass, rush or sedge chopped into small piles are often found along runs made through grass.

Nests can sometimes be found at the base of grass tussocks and under reptile refugia on survey or monitoring sites.

Habits

The field vole is found mainly in grassland, arable fields, roadside verges and gardens with plenty of grassy cover. It can also be found in young forestry plantations and at low densities in marginal habitats such as hedgerow, dunes and moorland.

Field voles are most active at dawn and dusk although they become more nocturnal in summer and more diurnal in winter, spending most of their time in burrows amongst the grass or along runs under grass tussocks. They are herbivorous feeding mostly on grasses, seeds and occasionally mosses, with teeth that are open-rooted, growing continuously throughout the animal's life.

Reproduction and life cycle

The field vole breeds mainly from April to September, producing two to seven litters of one to eight young per year. Females born before June may reproduce in the same year and can mate as soon as they are weaned at 14 to 21 days. Very few individuals survive two winters.

In the UK, many populations exhibit fluctuations which cycle with either a three to four year pattern or seasonally with irregular year on year changes. Usually the population either declines in spring then increases in late summer to autumn, or peaks in early summer and declines in late summer. Predator numbers can follow these cycles.

Distribution, status and conservation

The field vole is thought to be Britain's most numerous mammal. Widespread throughout the UK and in Kent, but absent in Ireland, it has an IUCN conservation status of Least Concern. It can cause damage to young plantations, grassland and cereal crops, reaching densities of more than 400 per hectare in grassy clear-felled areas.

The field vole is an important prey item for birds of prey making up 40% of the barn owl's diet and being found in 67% of hen harrier pellets. Other predators include heron, kestrel, buzzard, fox, stoat, weasel, American mink and badger. It is sometimes brought in by domestic cats.

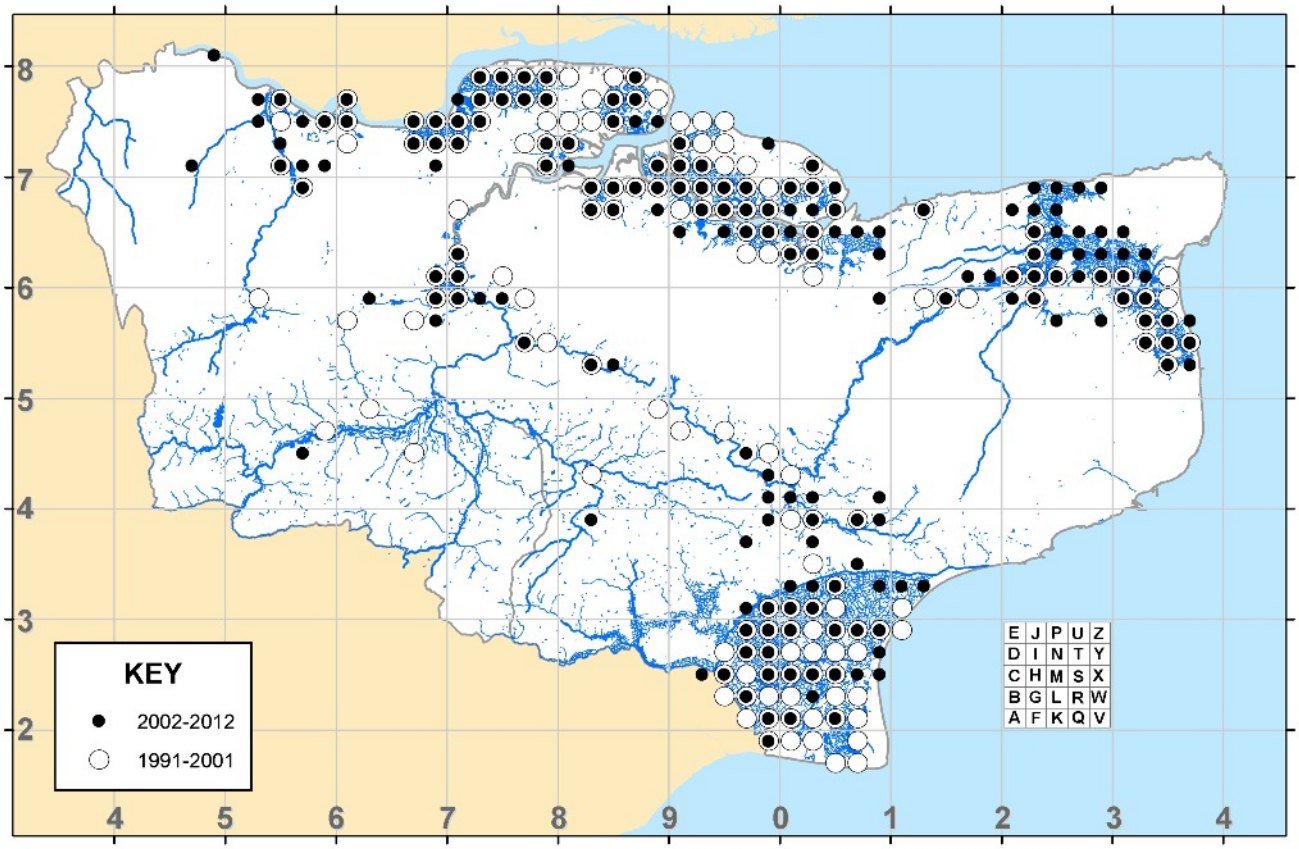
Threats include overgrazing, habitat loss, scrub growth and poisoning with rodenticides. It can do well in conservation field margins and meadows.

Field vole (photo © Hazel Ryan)

Water vole

Order: Rodentia

Arvicola terrestris



Water vole (photo © John S Young)

Identification

Head and body length (mm): 140-220
Tail length (mm): 95-140
Weight (g): ♂ 180-220, ♀ 160-210

The water vole is the largest of the British vole species. Its coat is dark brown with a slightly lighter underside. The muzzle is blunt, the ears are hidden by a layer of fur and the tail has a covering of brown hair. The juvenile water vole has much larger feet in relation to its body size than the smaller field vole.

Field signs

Due to its shy nature, seeing a water vole in the wild is very difficult. Occasionally whilst walking along a riverbank you may hear a characteristic 'plop' as it dives into the water, its way of alerting neighbouring voles to a potential threat. However, the most notable field sign is its latrine. Deposited faeces are flattened by drumming its hind feet thus adding scent from its lateral scent glands. This communicates its territorial status and breeding condition to neighbouring voles. Generally latrines

are located in prominent places throughout its territory. At sites within Kent latrines have been found upon floating timber, polystyrene tiles and a disused tyre. Other indicators to determine presence are burrow entrances and feeding stations, which are small piles of cut vegetation, approximately 100 mm long and chewed at a 45° angle.

Habits

Water voles inhabit locations near to water with lush riparian vegetation used as cover and food. They prefer slow-moving, shallow fresh water with penetrable river banks. A network of underground burrows is created by chewing into the banks and removing the spoil with their feet. Nests above ground occur in reed bed habitat such as Stodmarsh in Kent.

The voles' teeth are open-rooted, so grow continually and are worn down whilst excavating burrows and feeding. Primarily herbivores, they are known to eat 227 different species of plant.

Reproduction and life cycle

The main breeding season is from March to October, dependent on weather conditions. During mild winters breeding can be as early as February.

Gestation lasts 20 to 30 days and once the female has given birth she is sexually receptive within 24 hours. The first litter is weaned by the time she gives birth to her second. The female creates an intricate nest woven from shredded vegetation in which she rears her young. One pair may typically produce three to five litters of three to six juveniles. They are born blind and furless and after approximately 10 days their eyes open. At two to three weeks the young begin to venture away from the nest, becoming fully weaned shortly after.

Distribution, status and conservation

The UK distribution of the water vole has been severely reduced, mainly due to habitat loss and predation by the non-native American mink. Its distribution in Kent is linked with the more complex water systems and the extensive reed beds in the North Kent Marshes, Stodmarsh and Romney Marsh. It may also occur in reed-fringed saline lagoons and is found in brackish tidal ditches at Swalecliffe. Intricate ditch and dyke networks and reed beds provide an abundance of vegetation which may reduce the risk of American mink predation. These habitat types offer a stronghold for the species in Kent and provide opportunities for further targeted conservation efforts and re-introductions to expand its range. However, any future conservation efforts need to include long term monitoring and control of American mink to allow water vole populations to successfully establish.

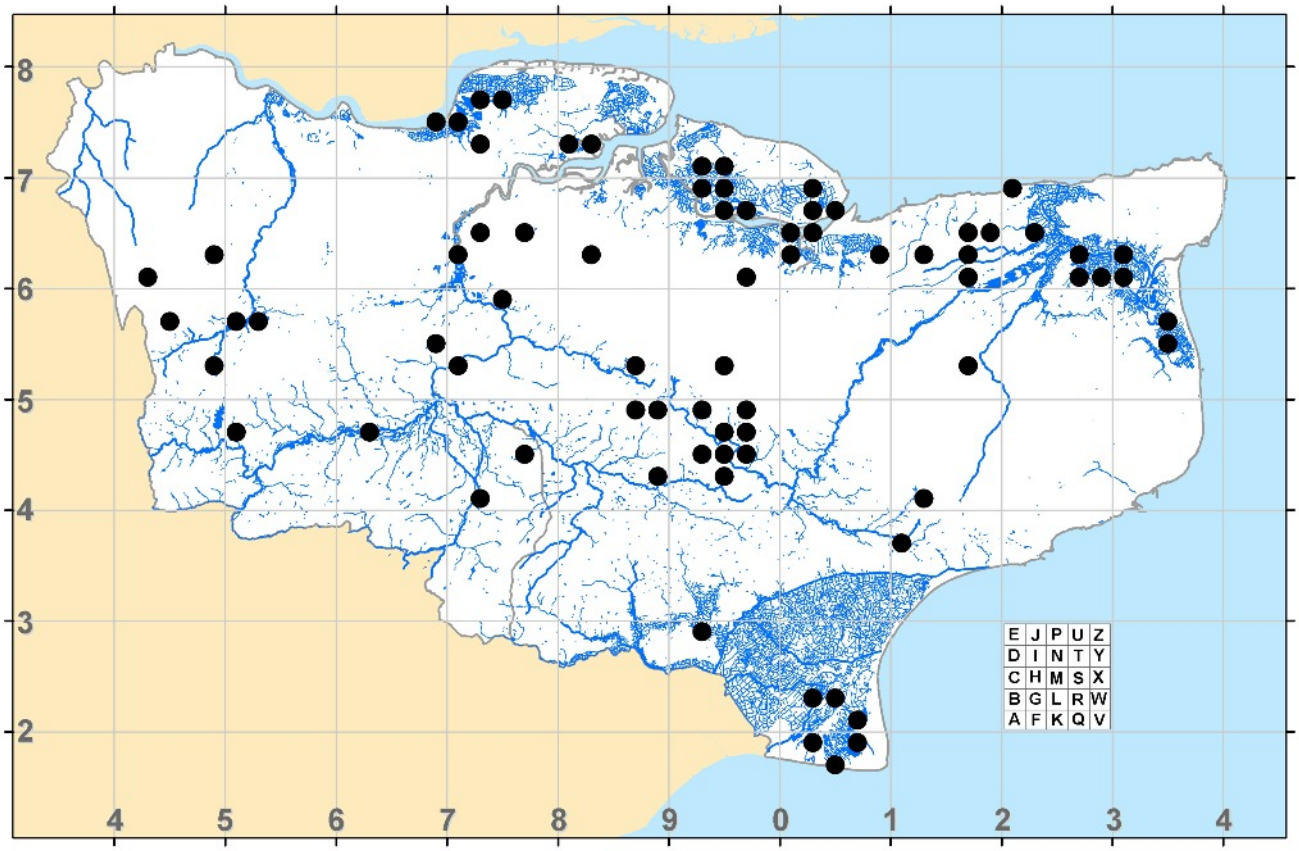
The water vole receives full protection under the Wildlife and Countryside Act 1981 and has been identified as a priority species under the UK BAP.

Water vole burrow entrance and latrine (photo © Jon Bramley)

Harvest mouse

Order: Rodentia

Micromys minutus



Identification

Head and body length (mm): 50-70
Tail length (mm): 40-75
Weight (g): 4-6

The harvest mouse (photo page 39) is Europe's smallest rodent. It has a blunter more vole-like face than most mice, with relatively large eyes that do not bulge and small rounded, well-furred ears. The body fur is orange-brown and the chin, throat and underparts are white. The grey-brown tail is proportionately long and is prehensile, enabling the mouse to use it to grasp plant stems whilst climbing.

Field signs

Small nests of woven grass leaves are sited above ground level usually at a height of 30 to 60 cm. Newly constructed nests are difficult to find because they are green, being built from living grass leaves. By early winter the grass leaves are brown and withered making the nests easier to locate.

Habits

The small size and light-weight, prehensile tail, and large opposable toe of the harvest mouse are all adaptations for life in the 'stalk zone'of long grasses and reeds. This is a habitat niche shared only with the pygmy shrew and juveniles of some mice and voles, for a brief period before they become too heavy. Here the mouse can find a wide variety of small seeds, green shoots and invertebrates to feed on through most of the year. In the winter it becomes more terrestrial and utilises the tunnels and runs of other small mammals such as the bank vole.

Nests occur in a wide variety of grassy habitats; road verges bordering arable fields, arable field headlands, margins of lakes, reservoirs, rivers, ditches and streams. Hedgerows are also used, particularly young grassy ones that have a diverse floral base.

Harvest mice are extremely difficult to observe in the wild. They are very sensitive to disturbance, fast moving and being so small, easily concealed. They are predominantly crepuscular, although during summer months they exhibit more diurnal behaviour to compensate for shorter nights.

Reproduction and life cycle

Nests may vary in height above the ground from a few centimetres in grass and sedge tussocks in winter to over a metre in reed beds at other times of the year. Breeding nests are between eight and 11 cm in diameter; winter nests and nests of individuals will be smaller. New grass growth rarely reaches sufficient height or hardens off so that it may safely support a nest before late May or early June. Breeding activity peaks in August and September and is not uncommon in October. In favourable years it may even continue until December.

After a gestation of 18 to 21 days, an average litter of four to five young is born and there is some suggestion that litter sizes of between six and 12 were historically the norm. After giving birth the female then only visits the nest at intervals to feed and clean the young, closing up the exit hole behind her when she leaves.

Prior to full weaning the young are introduced to solids via regurgitation feeding. Harvest mice are the only UK mammal outside the canid family known to do this. At 10 days the young mice may venture outside the nest and at 15 to 16 days become completely independent. Maturity is reached at 45 days when they are ready to breed.

Distribution, status and conservation

The historically strong association of harvest mice with agricultural fields is reducing, though their nests can still be found at the field margins. Wheat varieties are no longer so tall or leafy as they were and no longer easily support nests. In addition weeds are ruthlessly eradicated from the crop, reducing diversity and structure.

The practice of flailing hedges and mowing verges has taken place earlier and earlier in recent years and field headlands, field-facing hedgerows and ditches are scoured in August. Mechanical harvesting of crops may have contributed to the harvest mouse's decline in cereal fields. At worst it destroys late breeding nests and their contents.

The clustered distribution pattern for parts of Kent results from surveys targeted specifically at harvest mice and represents a bias in recorder effort. Incidental records make up less than one third of the county total; however, they do show that the harvest mouse is widespread.

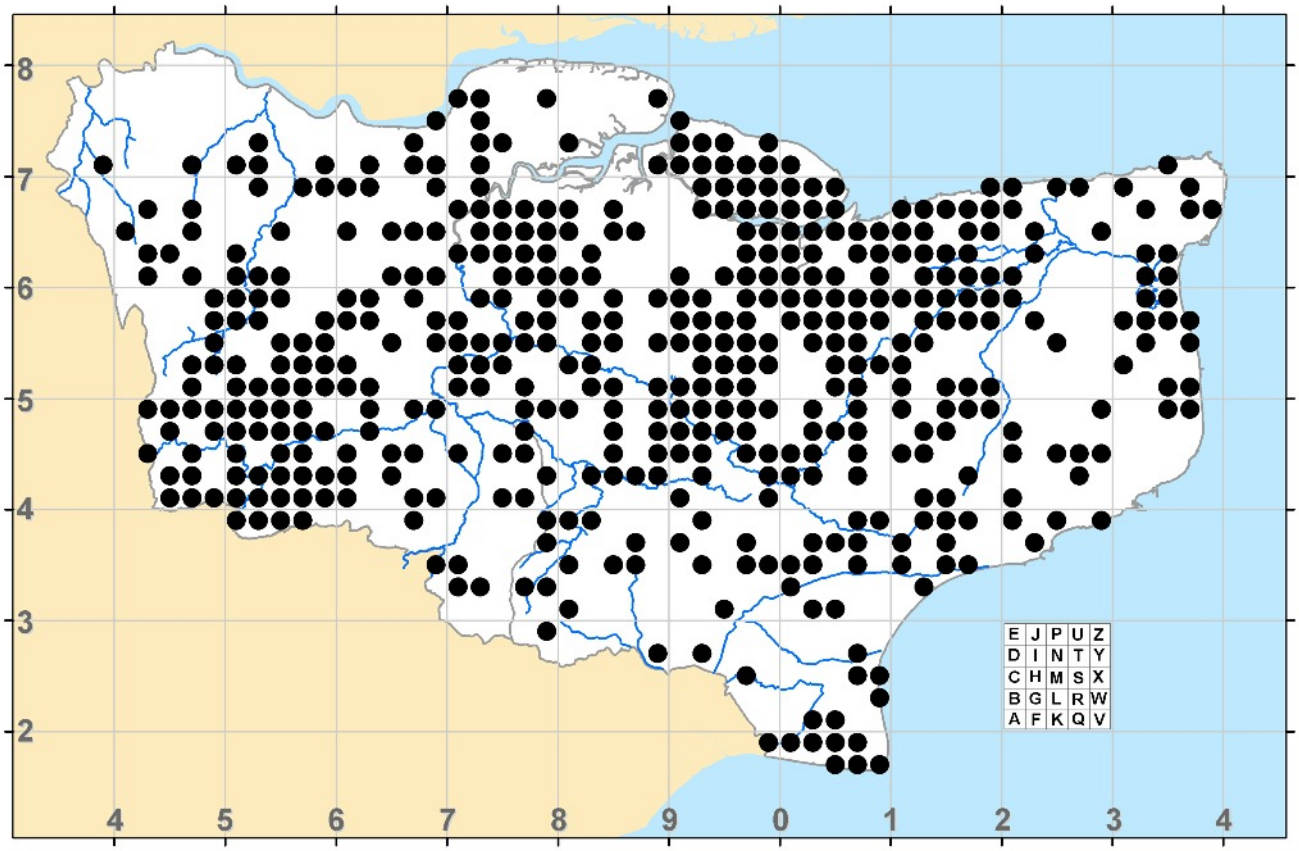
The harvest mouse is now a UK BAP priority species. It has a very wide national distribution and an IUCN conservation status of Least Concern. This may be a little over-optimistic given that this animal's ecology is so poorly understood.

Harvest mouse nest below a small bird nest (photo © John S Young)

Wood mouse

Order: Rodentia

Apodemus sylvaticus



Identification

Head and body length (mm): 81-103
Hindfoot (without claws) (mm): 19-23
Tail length (mm): 71-95
Weight (g): 13-27

The wood mouse has dark brown fur on the back with a greyish-white underside. There is a clear straight line where the two colours meet. It has a yellow chest spot which varies in shape and size but never meets with the brown fur of the back. Juveniles have a greyer pelage and paler chest spot than adults.

A mainly nocturnal species, it has protruding eyes and large ears. A tail as long as its body enables it to balance when climbing and jumping; the large hind feet assist with this.

Juveniles can be confused with the greyer house mouse but the wood mouse lacks the musty smell and has larger ears and feet. The house mouse does not have a clear line of demarcation between the dark dorsal and paler ventral fur colours.

Its fur colour and sparsely haired tail enable the wood mouse to be distinguished easily from the hazel dormouse, which has a bushy tail and a sandy-coloured coat.

Field signs

Wood mice nibble a round hole in hazelnut shells, leaving a corrugated effect of tooth marks across the cut surface around the edge of the opening and scratch marks on the outer surface of the shell.

Nests consist of a loose pile or cup of brown leaves and are often found in hazel dormouse nest boxes.

The skulls can be found in tawny and barn owl pellets but they are difficult to distinguish from those of the yellow-necked mouse.

Habits

The primary habitat of the wood mouse is woodland but it is found in a range of others including gardens, hedgerows, arable fields, road verges, heathland and saltmarsh. Diet varies with habitat and season and includes seeds and fruits, buds, invertebrates and fungi.

Wood mice have powerful jaws and given time can chew their way out of aluminium traps and plastic tanks.

In Kent, a female wood mouse made a nest in a desk drawer from a winter scarf. The wood mouse later raised a litter of young in a cardboard box under the desk, nesting in a pair of waterproof overtrousers.

Wood mouse inside a bird feeder (photo © Shirley Thompson)

Reproduction and life cycle

The main breeding season is from March to October but pregnant females have been trapped in Kent in December. Females can have up to six successive pregnancies in a season, with average litters of four to seven young. Born naked and blind, the pups are weaned at 18 to 22 days. Young females can become pregnant at only 12 g. Few adults survive from one breeding season to the next.

Distribution, status and conservation

The wood mouse is the most common species encountered during small mammal trapping surveys in Kent and can be trapped in almost any habitat including saltmarsh. It frequently enters houses, particularly in winter, and is commonly caught by domestic cats. It is an important food source for other predators including mustelids, foxes and kestrels.

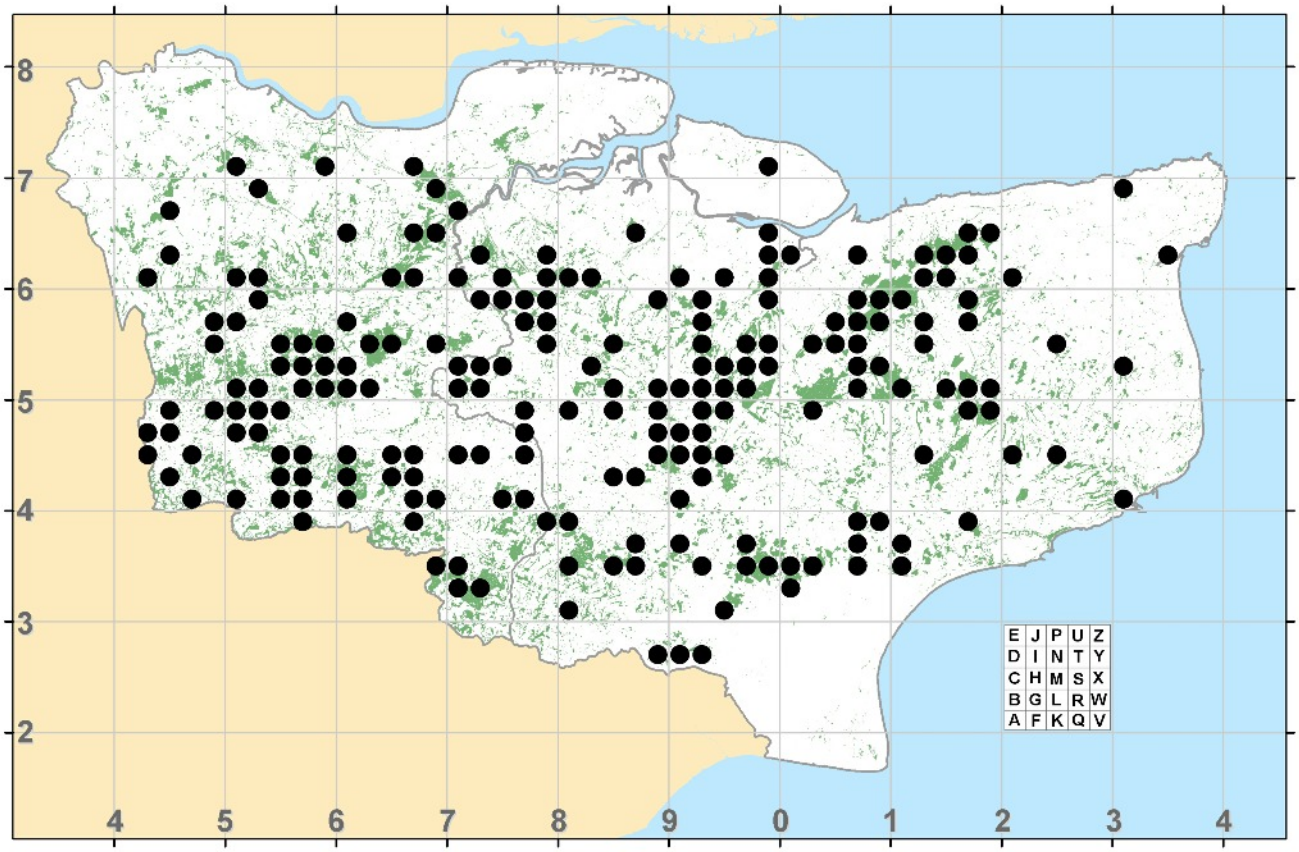
The wood mouse is beneficial to man as it preys on insect pests but can be a nuisance in gardens, farms and food stores by eating seed or seedlings.

Unusual grey colour form of wood mouse found at Hothfield (photo © Suzanne Kynaston)

Yellow-necked mouse

Order: Rodentia

Apodemus flavicollis



Yellow-necked mouse (photo © Hazel Ryan)

Identification

Head and body length (mm): 95-120
Hindfoot (without claws) (mm): 22-26
Tail length (mm): 77-118
Weight (g): 20-45

The yellow-necked mouse is about one and a half times larger than the wood mouse and has a more orangey-brown coat on the back with a whiter underside. A complete yellow throat collar joins with the brown fur on the shoulders and is a distinguishing feature separating it from the wood mouse. In juveniles the collar is greyer in colour but still visible.

It is mainly nocturnal having noticeably larger ears and protruding eyes than those of the wood mouse. Its tail, which is longer than its body, and larger hind feet make it a more adept climber than the wood mouse.

Habits

The yellow-necked mouse is a much more arboreal species than the wood mouse. The primary habitat is mature deciduous woodland, particularly ancient woodland, but it may also be found in coniferous woodland, hedgerows, orchards or wooded gardens. Nests can be in underground burrows or fallen logs or higher up in tree cavities. In Kent it commonly uses dormouse nest boxes in coppiced woodland or nest tubes in hedgerows.

This species is more aggressive when handled than the wood mouse and can easily bite through a thick plastic bag. It will bite when handled unless firmly 'scruffed' (held by the scruff of the neck). However, despite this aggressiveness, a weasel was observed killing a yellow-necked mouse in a car park at the Wildwood Trust in Kent.

The diet of the yellow-necked mouse, whilst being similar to that of the wood mouse, contains a higher proportion of seed. It is also an opportunist; an individual was observed entering an office above an old stable block and over time transferring a large bag full of walnuts into a pair of walking boots. One nut was rolled the length of the office, at least 15 m, and then eaten. Yellow-necked mice have entered the enclosures of captive dormice and killed them, squeezing through 12 mm square mesh.

Reproduction and life cycle

The yellow-necked mouse breeds from February to October but in years when exceptional amounts of forest tree fruits are produced, such as acorns and nuts (mast years); it may also breed in winter. They make a round or cup-shaped nest of leaves, often using fresh green leaves unlike wood mice.

Litters of five to six, exceptionally up to 11 young, are born naked and blind and weaned at 18 days. Those born early in the year can produce two litters themselves, but those born later will overwinter before breeding the following spring.

Distribution, status and conservation

In the UK the yellow-necked mouse is restricted to South and Eastern England and Wales. In Kent it is commonly found at almost every dormouse monitoring site and often comes into houses in winter.

It is sometimes caught by domestic cats. The skulls can be found in tawny and barn owl pellets but they are difficult to distinguish from those of the wood mouse. Other predators include mustelids, foxes and kestrels.

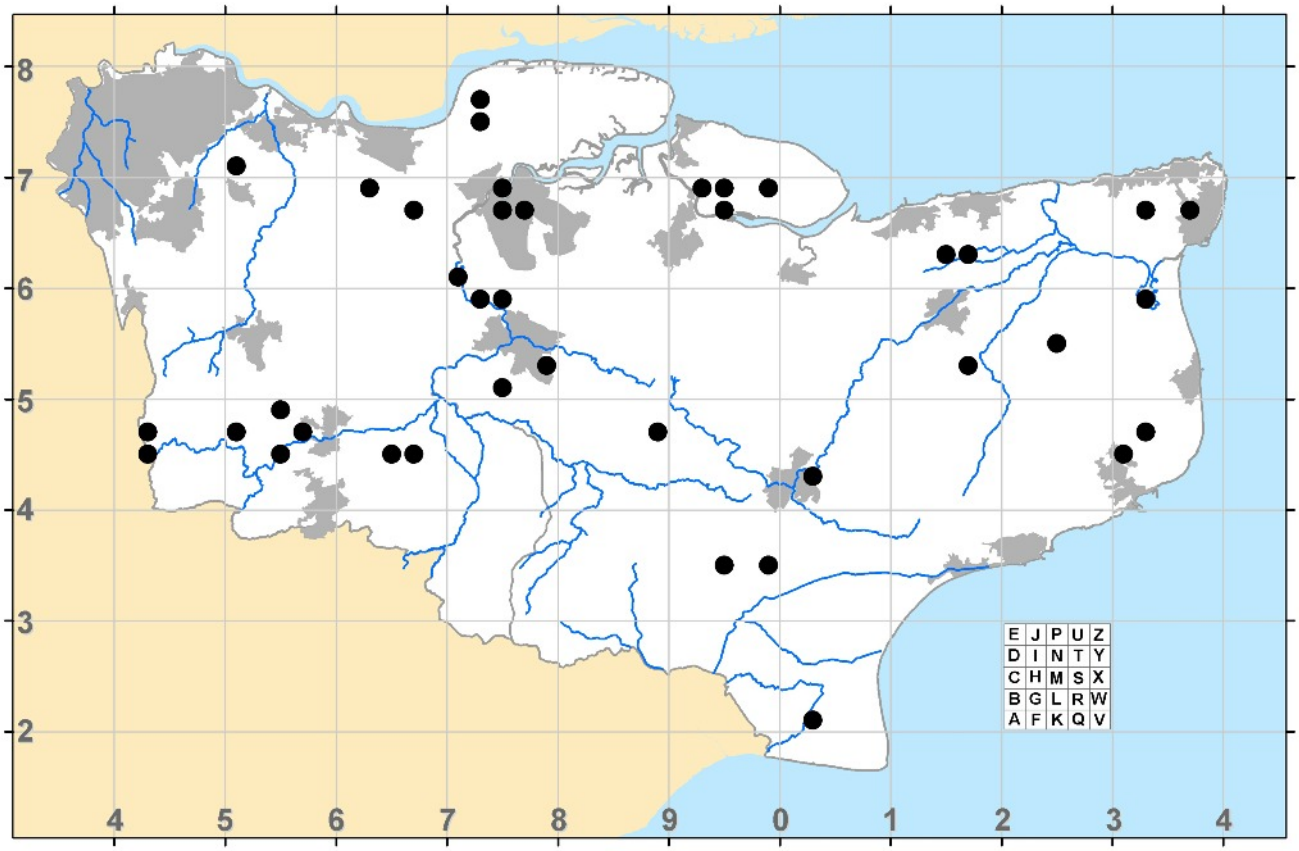
It has an IUCN status of Least Concern. It may be affected by woodland fragmentation but appears able to disperse easily to colonise new areas.

Yellow-necked mouse showing complete yellow throat collar (photo © Shirley Thompson)

House mouse

Order: Rodentia

Mus domesticus



Identification

Head and body length (mm): 70-90
Tail length (mm): 70-95
Weight (g): 15-20

The house mouse has a greyish-brown pelage with a slightly lighter underside. It is active during the day and at night, but is primarily nocturnal. It has a pointed nose, prominent ears and large eyes. The tail is bald and approximately the length of the body.

It may be confused with a juvenile wood mouse or yellow-necked mouse but has slightly smaller eyes and ears. It also lacks a clear divide between the dorsal and ventral colours and has a characteristic musty smell.

Field signs

When found within buildings a strong musty mouse smell is easily identified. The house mouse communicates by depositing urine along regularly used runs, which leaves a sticky consistency.

Habits

This mouse generally populates areas close to human settlements, and can exist in extremely high numbers when an abundance of food is available.

Nests are made from dried vegetation, but it has been known to use a range of man-made materials such as cloth, plastic and twine. The diet is mainly seeds and cereal grains and it will eat livestock foods by chewing through storage bags.

In urban areas house mice can be found within houses (where they have been known to nest in the cavity walls), sheds and outbuildings. On farmland they are often found within grain stores or amongst livestock. This species has also been known to inhabit hedgerows located close to human settlements.

At the Wildwood Trust, house mice regularly inhabit compost heaps and animal enclosures as these provide warmth throughout the winter and an abundance of food.

House mouse, showing large eyes, prominent ears and pointed pink nose (photo © John S Young)

Reproduction and life cycle

When living within buildings, the house mouse can produce a litter per month throughout the year if an abundance of food is available. When living outdoors litters are only produced throughout the summer months. Gestation is approximately 20 days, with litters of up to eight young which are weaned after 21 days. It has been known for adult females to share a nest with another female whilst rearing young.

At the Wildwood Trust, when checking through the pockets of a coat left hanging in a shed, a litter of young house mice was found in a nest made from the soft lining.

Distribution, status and conservation

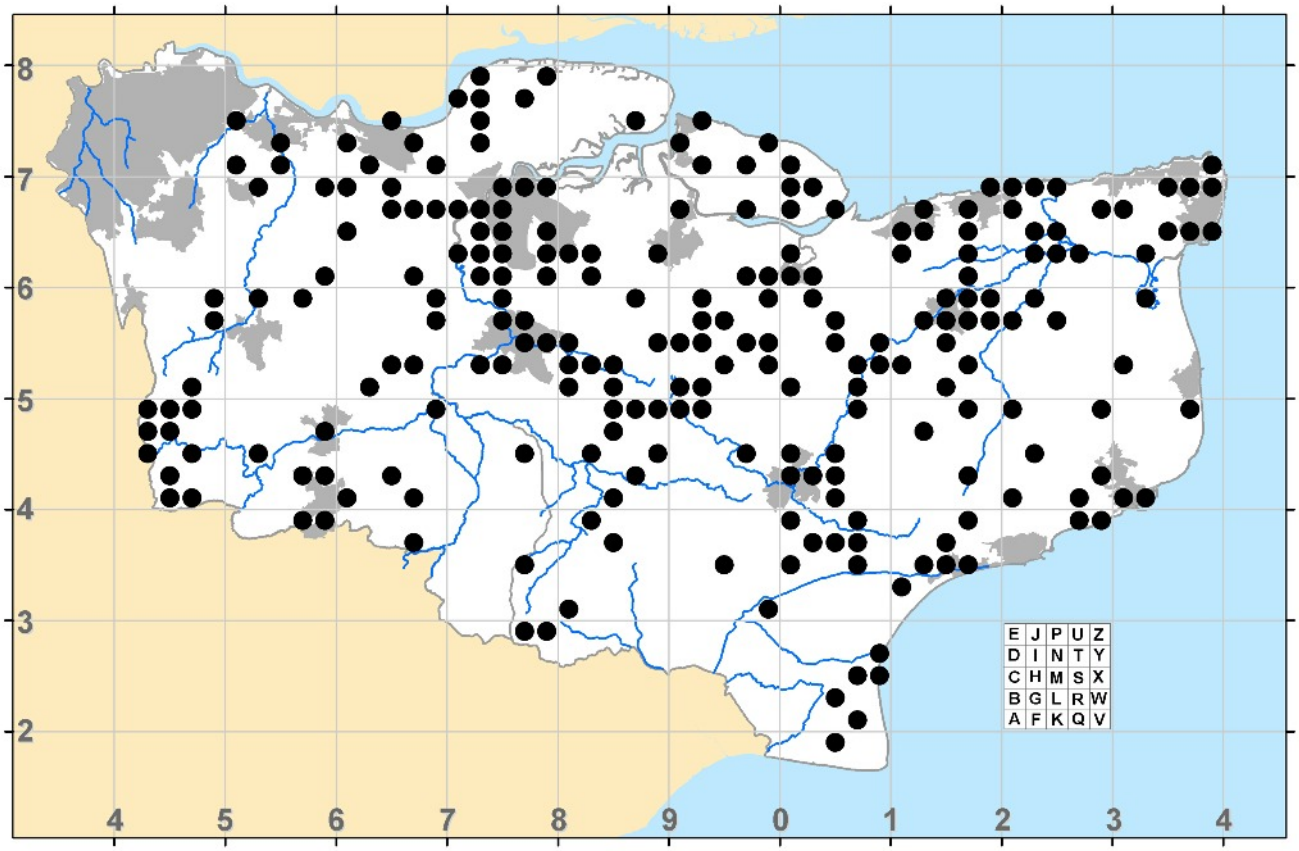
In Kent, house mouse distribution is widespread and generally linked with areas of higher human density; however, it is likely to be under-recorded. It may be caught by domestic cats as a result of its proximity to humans, but is more frequently predated by small mustelids, rats and owls.

Populations of the house mouse may be affected by the use of rodenticides, but can quickly recover due to the number of young produced. The mean lifetime production of young by a fertile female is about 40.

Common rat

Order: Rodentia

Rattus norvegicus



Common rat (photo © John S Young)

Identification

Head and body length (mm): 150-270
Tail length (mm): 105-240
Weight (g): 200-600

The common rat has greyish-brown fur and prominent eyes, a pointed muzzle and round ears. The bald tail is about as long as the head and body combined. It is larger than any mouse but can be confused with a water vole. However, there are physical differences between the two; the water vole has a blunt muzzle, hidden ears, a shorter hairier tail and a darker brown coat.

When swimming the water vole's head, shoulders and rump remain above water, whereas the brown rat almost fully submerges itself with just its head and shoulders visible.

Field signs

Droppings can be confused with those of water vole but are usually larger and more irregular in shape and have a strong ammonia smell.

When identifying tracks care needs to be taken when considering water vole as they are difficult to separate from common rat. The imprints show four toes in a star arrangement from the fore foot and five toes of the hind foot with the outer ones splayed. The hind foot typically measures 40 to 45 mm (heel to claw measurement) and is larger than that of the water vole. As the common rat is also heavier than the water vole it leaves a deeper impression.

Habits

The common rat is a very adaptable rodent species that occurs in many different habitats across the county. It lives in colonies with a hierarchy determined by size and age. Within the colony small family groups will exist. Rats dig their own burrows and obvious well-used runs join up the various entrances. Burrow entrances are circular or taller than wide, differentiating them from those of water voles which are protractor shaped. They are omnivorous, with cereals forming a substantial part of their diet. As such they can become a problem around bird feeders and are an unwelcome guest for many.

Reproduction and life cycle

Reproduction occurs all year round. However, few rats survive more than a year in the wild. Females can begin breeding at three to four months and if food is readily available they may breed continuously, but typically have five litters a year. Young rats are an important food source for many birds of prey, especially owls, and many of the county's carnivores such as stoats and foxes.

Common rat or water vole tracks with a five pence for size comparison (photo © Suzanne Kynaston)

Distribution, status and conservation

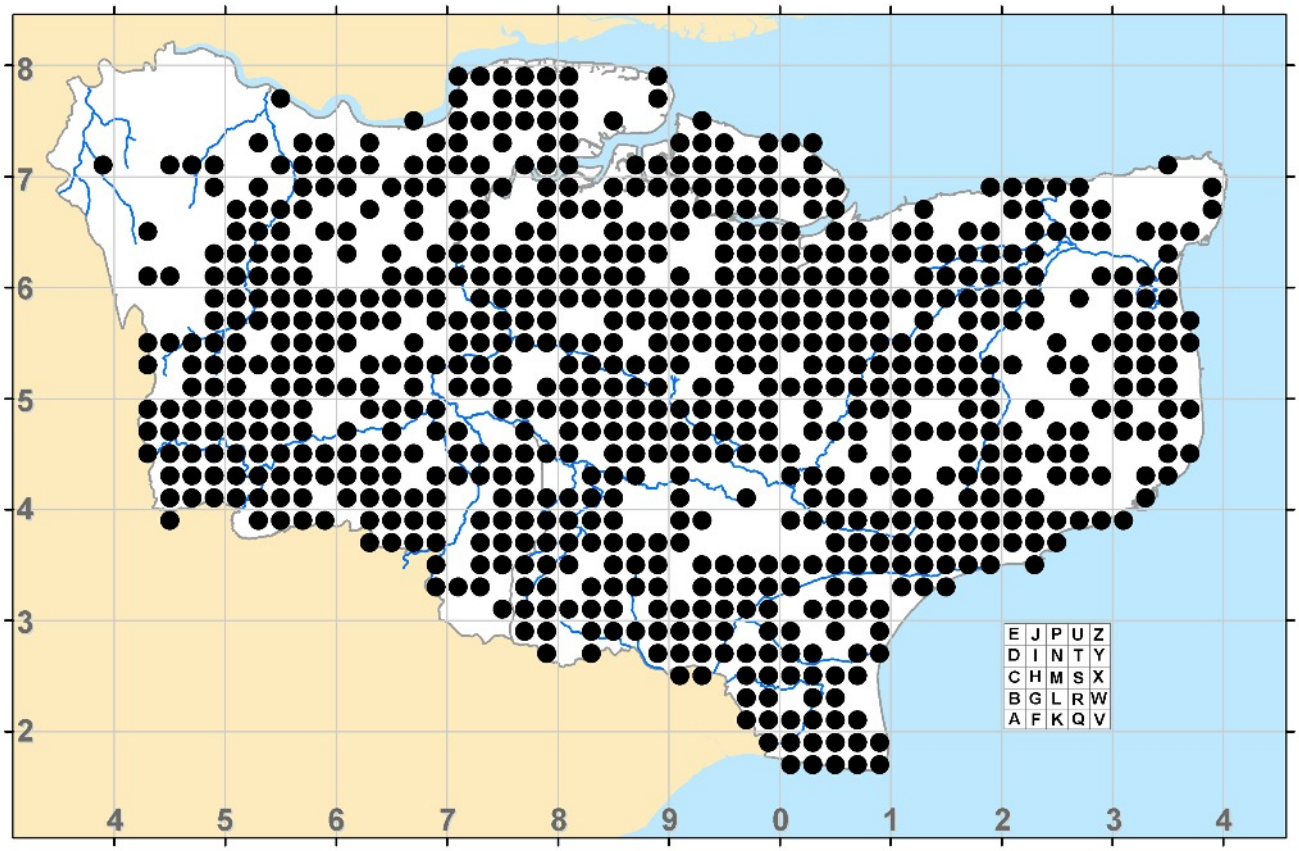
The common rat is a significant pest of stored food and a vector of human diseases. Assumed to be very common throughout the county, it is certainly under-recorded. Attempts at rat population control through the use of poison and traps can impact other wildlife. However, there are common rats with a naturally occurring genetic mutation that protects them from some rodenticide poisons (warfarin, bromadioline and difenacoum), meaning that far stronger poisons have to be used under strictly controlled conditions and under licence.

The endangered water vole is often mistaken for a common rat, resulting in the water vole being accidentally poisoned, trapped and/or disturbed.

Rabbit

Order: Lagomorpha

Oryctolagus cuniculus



Identification

Head and body length (mm): 400
Weight (g): 1200-2000

Rabbits have long ears, short forelegs and longer back legs. Most are grey-brown but there are variations towards beige/brown. Melanistic examples are seen frequently but albinos are rare. An important recognition feature is the white 'powder puff' underside of the tail, clearly seen as the rabbit runs away.

The rabbit is smaller than the brown hare with features that are less accentuated. The face is more rounded and less angular, with shorter ears without black tips.

Field signs

Presence of rabbits is shown by burrows, very close cropped grass, and latrine areas on bare ground with large numbers of small spherical droppings. Burrows are usually taller than wide, but this is not always the case and some may be very large and might be confused with those made by badgers or foxes. There may also be signs of recent excavation showing large mounds of earth or sand, where the rabbit has kicked the soil back with its hind legs. A narrow channel can often be seen leading to the burrow entrance.

Young rabbit (photo © John S Young)

Habits

Whilst rabbits tend to be more active at night they can easily be seen feeding at dusk or dawn. The preferred habitat is short grassland, most typically farmland along the margins of pastures, with burrows formed beneath hedgerows and in set-aside land. Even where the soil might be regarded as unsuitable, as on soft sand dunes, rabbits will dig burrows as soon as vegetation growth provides more stable ground conditions. Similarly, overgrown concrete floors and roads on brownfield sites provide for safe and dry burrowing at the margins. Runways beneath brambles and scrub provide well-used escape routes to burrows. Where ground conditions are especially favourable, e.g. the chalk and flint soils of the North Downs, extensive and ancient systems of burrows can be found such as those at Queendown Warren.

Distribution, status and conservation

Rabbits are widespread throughout Kent with the exception of town centres and suburban housing estates. There are some small rural areas without rabbits in the county but the reasons are not always clear. Rabbit-proof fencing and walls surrounding parkland may provide a visible clue. Rabbits can cause extensive damage to farm crops and are often controlled with a range of culling methods used.

Reproduction and life cycle

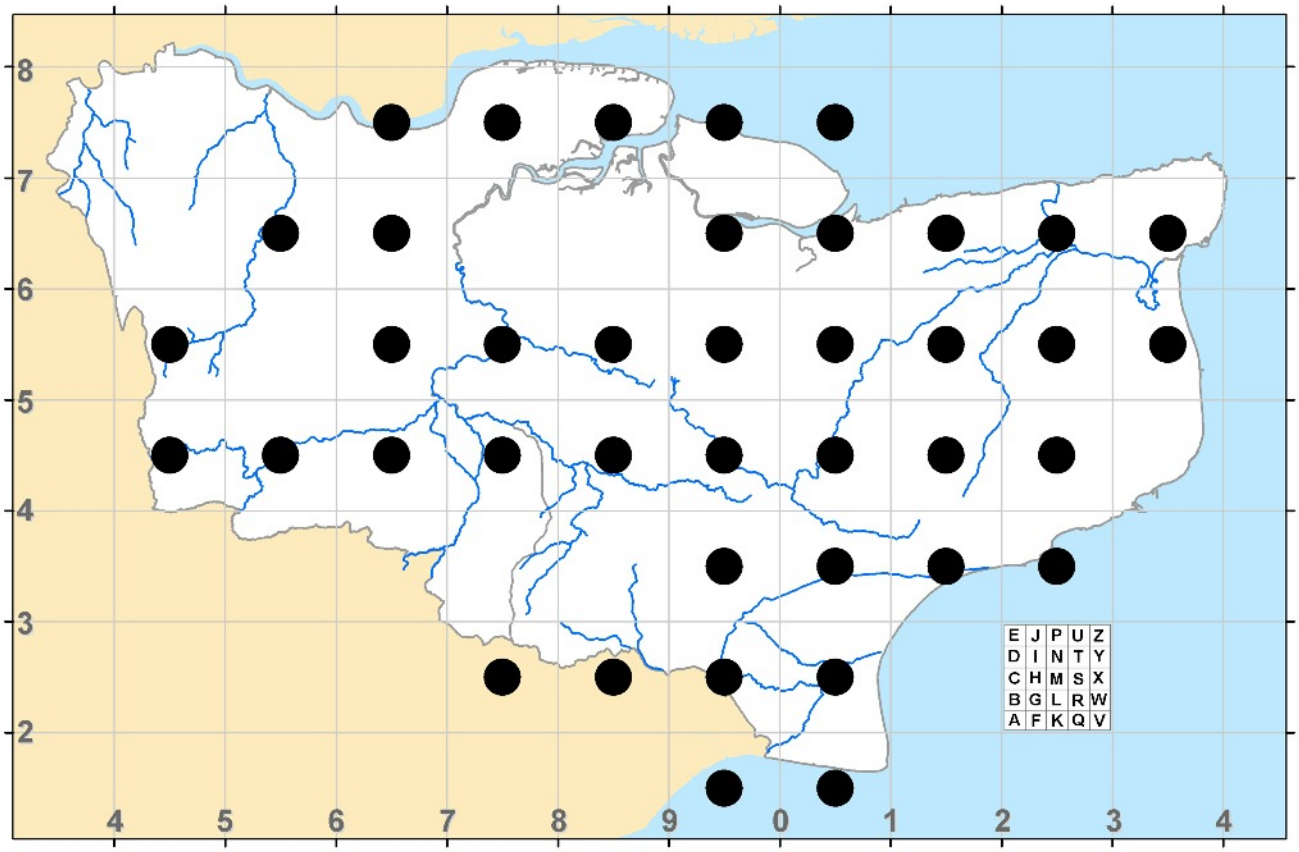
Prolific breeding occurs mainly between January and August, with a succession of litters of three to seven young produced at a minimum interval of 30 days. Breeding nests are lined with grass or moss and belly fur. Rabbits are highly gregarious and dominant females have the longest breeding seasons. The female suckles her babies (kits) for a few minutes just once during the night. The young develop rapidly and are seen at the entrance of the burrow after about 18 days.

Adult rabbit (photo © John S Young)

Brown hare

Order: Lagomorpha

Lepus europaeus



Identification

Head and body length (mm): 490-610
Tail length (mm): 40-100
Weight (kg): ♂ 2.23-4.10 ♀ 3.69-4.56

The brown hare is larger than the rabbit, with longer ears that have black tips. It has an overall colouration of russet-brown, a pale belly and a black stripe on the upper part of the tail. The sexes are alike although adult females tend to be larger than males.

Unlike a rabbit, a startled brown hare holds its tail down as it gallops away, showing a visible dorsal stripe. A startled rabbit holds its tail up as it runs, showing the white underside. The brown hare has longer legs that enable it to lope high off the ground with a leaping stride. The rabbit may jump from the ground in similar fashion to a hare but immediately drops into a ground-hugging run. Confusion between the grey coat of a rabbit and the russet-brown coat of a hare is unlikely and the iris of a rabbit is brown compared with yellow in the hare.

Field signs

Brown hares shelter and rest in a ‘form’, a scraped shallow depression in the ground. Brown hare droppings are larger than those of the rabbit and tend to be lighter in colour. They are scattered randomly in feeding areas well away from the margins of fields.

Habits

Brown hares live predominantly on farmland but can be found in other habitats. They prefer open spaces where they can safely establish their forms in which to crouch and keep watch in all directions.

Their diet is varied, including autumn-sown wheat and young rape crops during winter. In the spring the diet comprises wild herbs supplementing cultivated crops such as pea and bean foliage. In summer there is likely to be a greater reliance on herbs in pasture and set-aside land. As late summer arrives, hares move on to newly harvested fields to feed on any corn that has not been collected. In autumn, they will live on new growth in the stubble fields. Along

estuaries and coasts hares may be seen at low tide feeding on seaweed. They live on the wide-open spaces of the shingle peninsula at Dungeness, where lichens and mosses form an important part of their diet, and may occasionally be seen hopping boldly between the fishing boats drawn up on the beach.

Reproduction and life cycle

When hares are seen boxing, it is usually a female fending off the unwanted attentions of a male. There are also more violent encounters when the hares kick powerfully with their hind legs. These are likely to be males fighting for dominance.

The favoured time of year for breeding is spring, although there are records of baby hares (leverets) being born in all months of the year. The hare is one of the few species where the female can be pregnant with two litters at the same time. Females normally produce three litters each year with up to four leverets in each.

As the brown hare does not use a burrow, the leverets are born above ground. Shortly after birth the leverets disperse into the immediate area. They come together shortly after sunset when the female returns to suckle them, which occurs just once in each 24 hour period. At this time they rely on camouflage to avoid predation. Within two weeks of birth they start to graze.

Distribution, status and conservation

Due to the persecution of this species within the county, the distribution map shows a centred dot within a hectad where brown hares have been recorded.

In the past, brown hares might have been seen in almost any part of rural Kent. However, with human population growth, industrial and housing development and the associated expansion of roads and railways, they have tended to withdraw into specific areas, with their numbers now greatly reduced. As the brown hare lives on agricultural land, the species is highly dependent for its well-being on supportive farming methods. This applies to both crop choices and the use of machinery and herbicides. Where farmers provide set-aside areas for wildlife, brown hares are more likely to be able to resist the population decline that is associated with industrial farming practices. Extensive crop monocultures adversely affect abundance. However, they prosper when a range of crops is grown.

Brown hares can still be found in the north of the county where there are pasture and marshland areas. The large areas of arable land south of Sittingbourne provide good habitat. Exceptionally, this is an area where hares frequent the woodland blocks that in many cases are surrounded by tracts of arable land.

On the arable land in east Kent hares are found at lower densities and may be encountered in the flat parts of the river valleys, from the Stour in the east to the upper parts of the Medway and its tributaries. There are now few records from the North Downs in the west of Kent or from the High Weald, both having smaller and steeper fields which are unsuited to them.

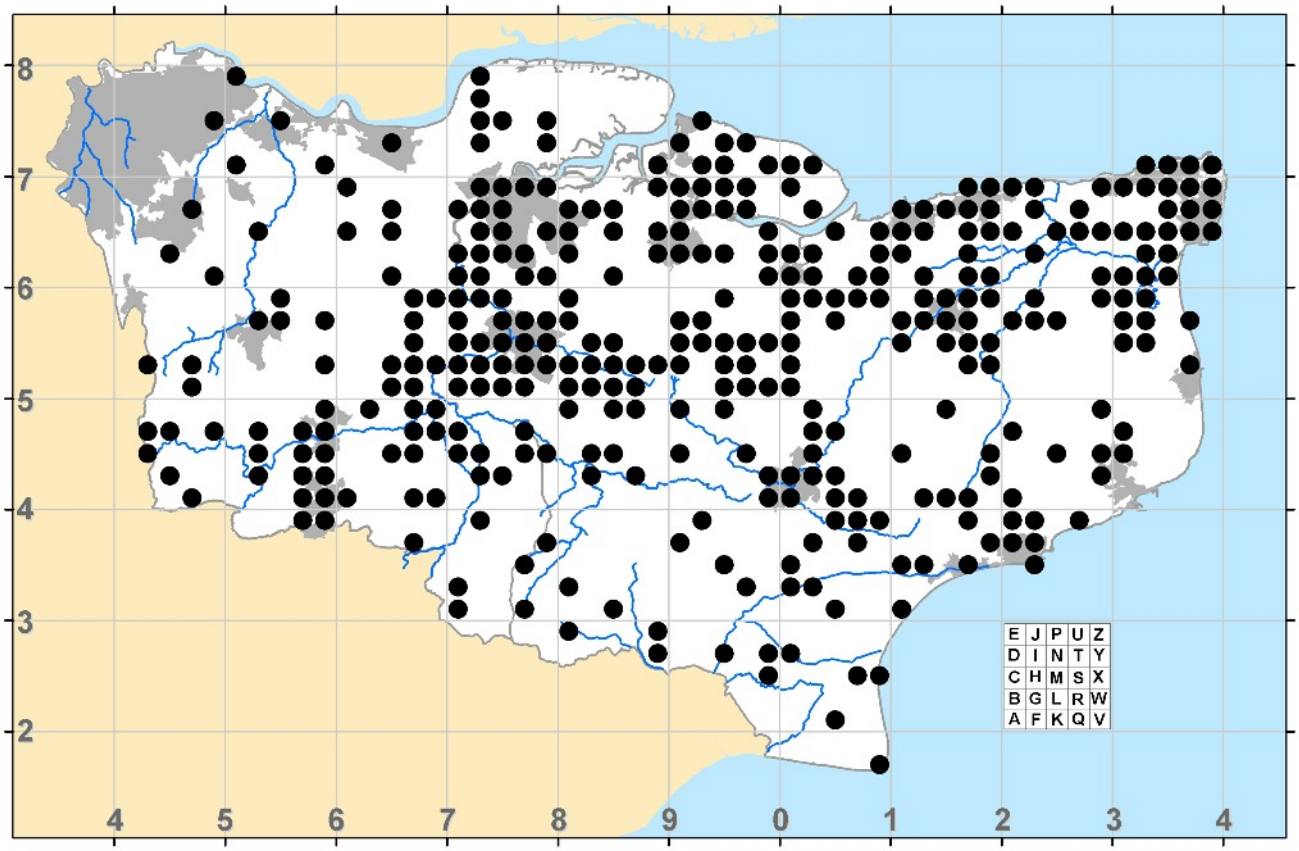
The brown hare has limited protection and a BAP is in place to support a national recovery and attempt to reverse their decline. Brown hares continue to be at risk from illegal hunting.

Brown hare standing on its hind legs to look around (photo John S Young)

Hedgehog

Order: Erinaceomorpha

Erinaceus europaeus



Identification

Head and body length (mm): 179-263
Tail length (mm): 17-35
Weight (g): 800-1200

The hedgehog is unmistakable, being the UK's only spined mammal. In general it is various shades of brown with slightly protruding black eyes and a fairly long snout. Variations in colour are seen but leucistic (blonde or white with black eyes), albinos and melanistic forms are very rarely observed.

The spines can be moved under muscular control, which enables the hedgehog to curl up when alarmed. Underneath, hedgehogs have a soft whitish belly/skirt which they can raise as they run off at around two to six miles per hour. They can swim, climb two metre structures when foraging, grunt and snuffle when mating and squeal when attacked. They have sensitive, set-back ears for detecting prey and an acute sense of smell but their eyesight is not good.

Habits

Hedgehogs prefer shorter grassed or scrubby areas to wetlands and they will use hedgerows and field edges to move between different foraging areas. They construct nests from grass and leaves under hedgerows, wood piles, tree roots, garden sheds and even cat-houses! An opportunist Kentish hedgehog was found trying to forage for eggs under sitting hens on a poultry farm.

Male hedgehogs will cover a foraging area of about 32 ha, and can travel up to three kilometres in a night; females cover half that area. Their foraging suggests a non-territorial behaviour.

Habitats rich in fallen leaves with log piles, garden sheds, or ground cover such as brambles and compost heaps are crucial for providing suitable nesting sites for winter survival. Hedgehogs build summer nests for daytime refuge, more substantial breeding nests and usually more than one winter nest used for hibernation. Most hedgehogs will move nests at least once during the winter.

Hedgehog (photo © Selwyn Dennis)

Studies have shown that hedgehogs recognise the smell of badgers and avoid areas with badger odour. They are not often active during daylight hours so if an adult is seen then it is, sadly, likely to be suffering from lung worm.

Reproduction and life cycle

Hedgehogs breed between April and September with the female being pregnant for four weeks before producing a litter of four to five white babies. If the female is disturbed she will abandon the nest and hoglets. After four to five weeks the hoglets move out of the nest and are independent. The hoglets need to weigh at least 500 g if they are to survive partial hibernation.

Distribution, status and conservation

Results of recent surveys in Kent suggest that people feed hedgehogs throughout the winter. Rural studies indicate movement out of the wilder countryside to more urban habitats, and Kentish hedgehogs do seem to be foraging more often after midnight when both human and vehicle activity is far less.

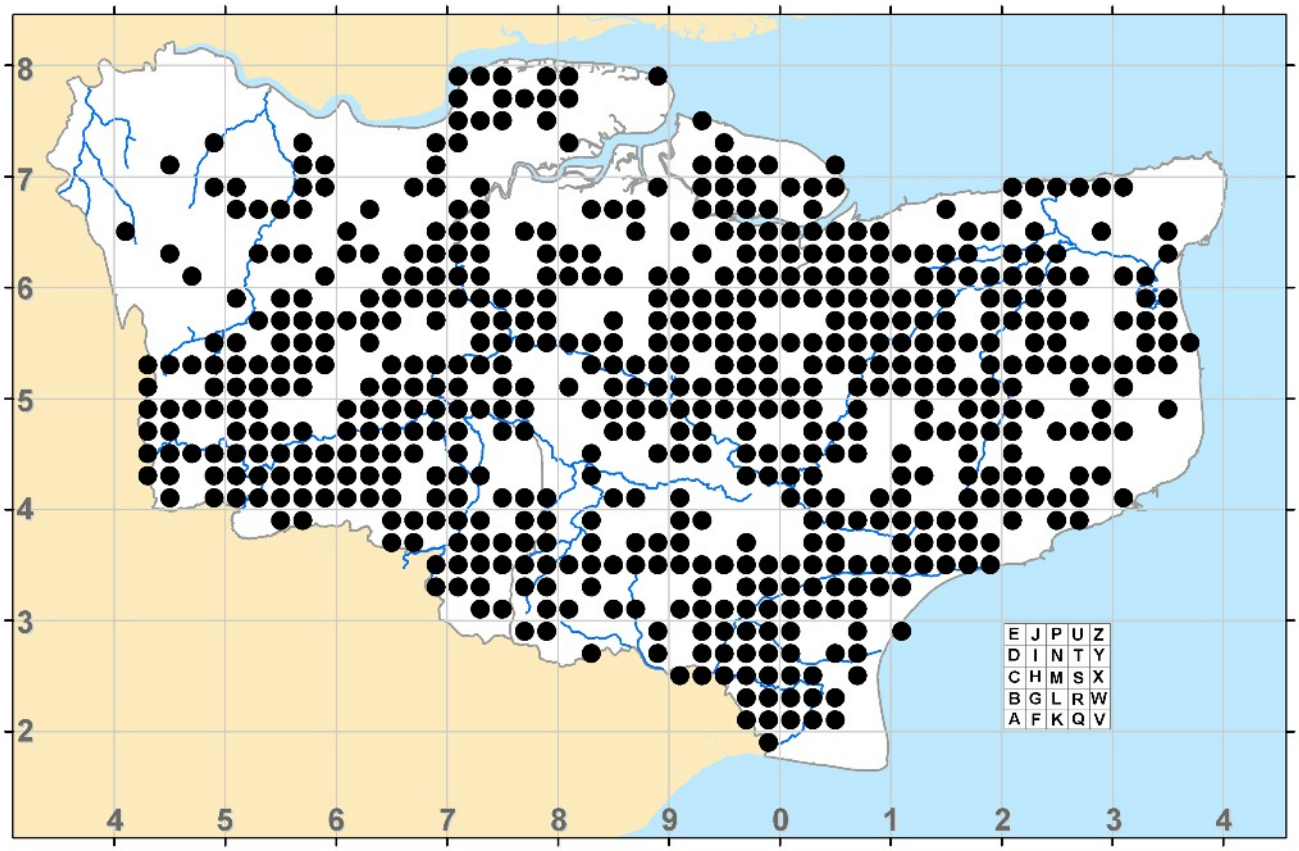
Once common, hedgehogs now appear to be in decline. This is probably due to a number of factors; rural habitat fragmentation, the use of pesticides and their impact on prey species and also the loss of hedgerows. Urban gardens now tend to be smaller, and previously available habitats are dissected with building developments causing populations to become isolated.

The hedgehog is protected under the Wildlife and Countryside Act 1981 (as amended) and is a BAP priority species.

Mole

Order: Erinaceomorpha

Talpa europaea



Identification

Head and body length (mm): 113-159
Tail length (mm): 25-40
Weight (g): 72-128

Moles have short black velvety fur, with spade-like forelimbs that have large claws facing towards the animal's rear. They have very small eyes and a pink fleshy snout.

Field signs

The most obvious are molehills which are spoil heaps formed during the excavation of permanent tunnels.

Habits

Their main habitat in Kent is deciduous woodland and adjoining pasture, followed by hedgerows, grassy road verges and the margins of waterways and fields, often persisting in a strip just two metres wide.

The mole is predated upon by foxes and rarely by badgers, but in general co-exists with them on account of its subterranean habit. Other predators are tawny owls, buzzards, stoats, cats and dogs.

Reproduction and life cycle

Moles can live for up to six years but few live beyond three. They are territorial and solitary until the breeding season when males enlarge their territory in search of females. Within their tunnel systems, one or more spherical nest chambers are built and lined with plant material. The nests are used for sleeping and raising young. A litter of usually three to four young are born in spring, followed by a second later in the summer. The young start to disperse from the nest after 33 days and leave their mother's territory at five to six weeks. Dispersal of

Mole, found dead at the surface (photo © Bryan Bullen)

the young takes place above ground and is a dangerous time for them. Young moles become sexually mature in the following spring.

Distribution, status and conservation

Moles are locally common and may be declining as a result of urban and industrial development as well as intensive agriculture. However, their distribution is seriously under-recorded, and moles can be difficult to detect in woodland and hedgerows where tunnels may show little disturbance at the surface. Sometimes they disappear from a locality during a period of drought and fail to re-colonise when more favourable conditions return. The mole is best searched for during the winter months when molehills are generally more numerous and obvious. Often they are regarded as a garden or agricultural pest and eradicated; this sometimes occurs when they attempt to re-colonise a former habitat e.g. a housing estate.

Their use of woodland habitats led to part of Rochester Forest bearing the name of Molehill Wood centuries ago. The woodland in this area was replaced with conifers in the 1960s which resulted in a serious drop in mole numbers, as worm numbers are generally lower in coniferous woodland and moles tend to inhabit only the fringes of this habitat.

Surprisingly moles are absent from some seemingly suitable habitats. This is sometimes due to isolation by busy roads, but often there is no obvious reason for their absence. Perhaps the number of earthworms, the single most important prey species, is just too low or the soils too dry, unduly shallow or unstable.

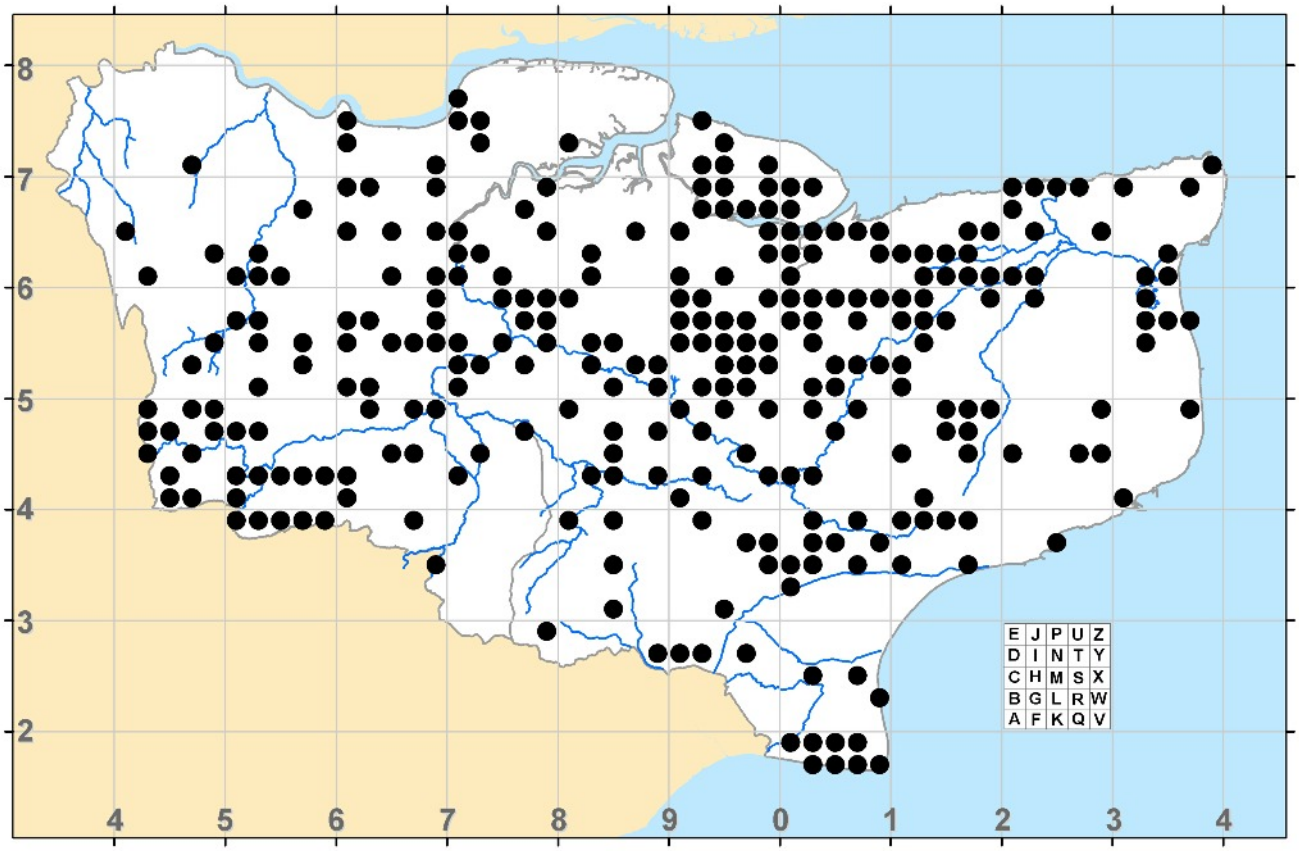
Winter surveying for moles appears to be more effective, as worms are thought to be generally closer to the surface and the tunnels need higher maintenance as they are prone to collapse. This gives rise to more ejected earth above the surface. Often along a hedgerow the tunnels are so stable that the mole rarely needs to create a molehill, so careful and frequent monitoring is essential.

As Kent remains a well-wooded county there is no immediate threat to the mole's status.

Common shrew

Order: Soricomorpha

Sorex araneus



Identification

Head and body length (mm): 48-80
Tail length (mm): 24-44
Weight (g): 5-14

The common shrew has a three-tone coat; a dark brown velvety back, paler brown flanks and a yellowish-grey underside. Its tail length is about 55% of its head and body length. Some individuals can show white patches on the ear tufts or tail tip. Tiny eyes offer poor eyesight so it relies on smell, sound and touch to detect prey using its narrow, pointed mobile snout and whiskers. Red iron deposits in the enamel of the tips of its needle-like teeth slow down wear that results from feeding on abrasive insect exoskeletons and soil-covered earthworms. Signs of wear of the red coating are seen in older animals.

The smaller pygmy shrew has a longer, thicker tail in proportion to its body size and length, paler body fur and no colour band along the flanks. The larger water shrew has black dorsal fur and hair fringes on the feet and tail.

Field Signs

It can produce soft, high-pitched and audible twitters when foraging and interacting with other common shrews.

Habits

Common shrews are found in most terrestrial habitats where ground cover is present, particularly thick grass, scrub, hedgerows and deciduous woodland. It can quickly colonise roadside verges and urban habitats. Its high metabolic rate means that it is almost continuously active day and night with short rest periods. It must consume at least 80 to 90% of its body weight daily, which can equate to 570 prey items. It eats a wide range of invertebrates including earthworms, slugs, snails, beetles, spiders, woodlice and insect larvae. To reduce energy requirement in winter it decreases its body size and weight by 12 to 20% by shrinking its skeleton and some internal organs.

Common shrew (photo © John S Young)

Predators include owls, kestrel, buzzard, stoat, weasel, rarely badger, mink, fox and the domestic/feral cat. Its flank scent glands make it distasteful and so it is often discarded after being killed. It is mostly solitary apart from when mating or rearing young.

Reproduction and life cycle

Small spherical nests are built in shallow underground burrows, under logs or dense undergrowth. Females rear between two to four litters of up to 11 young a year, with a 20 day gestation period. Young are born naked and blind, developing fur at nine days and opening their eyes at 14 days. They are weaned within 22 to 25 days but do not mature until the following spring.

The litter may be sired by up to six different males, perhaps to prevent inbreeding. The young are known to link snout to tail behind their mother as a 'caravan' when they need to leave a threatened nest. The average lifespan is 15 to 18 months but 50% of young die within two months of birth.

Distribution, status and conservation

The most common of our three shrew species, the common shrew is abundant throughout England, Wales and mainland Scotland and so requires no conservation measures. It is estimated that the UK population is around 41 million.

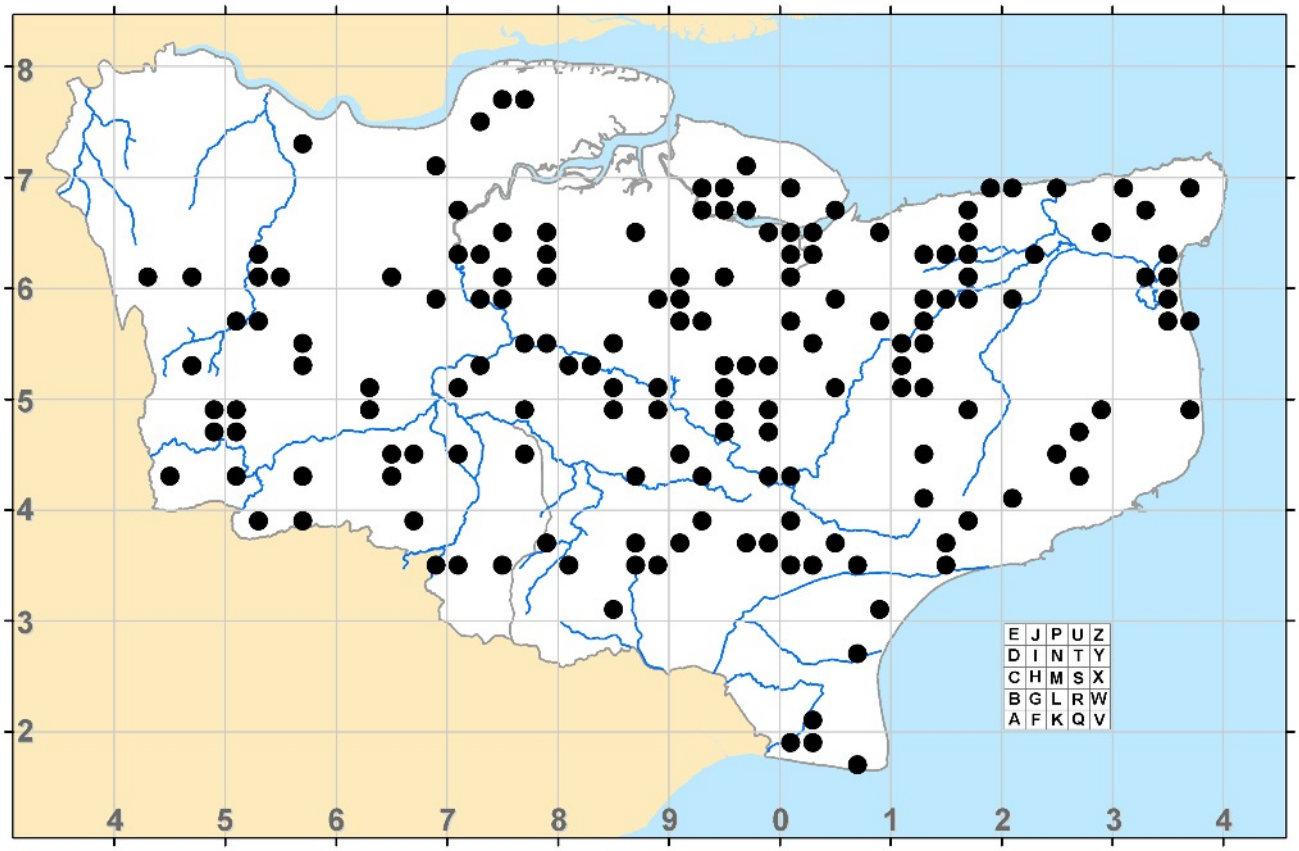
Its home range is between 360-630 sq m but males roam further during the breeding season. This species is likely to benefit from agri-environment schemes which encourage grassy field margins.

This species is partially protected under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) regarding trapping, killing and using invasive procedures. It is trapped in the majority of small mammal surveys in Kent but does not enter traps as frequently as rodents. It can die easily from starvation, cold or stress in traps if they are not checked frequently or provisioned well.

Pygmy shrew

Order: Soricomorpha

Sorex minutus



Identification

Head and body length (mm): 40-60
Tail length (mm): 32-46
Weight (g): 2.4-6.1

The pygmy shrew has a two-tone coat of greyish-brown on the back (paler than in the common shrew) and greyish-white on the underside. It is the smallest terrestrial mammal species in Britain. Its tail is long (70% of its body length) and thicker and hairier than that of the common shrew. With tiny eyes it relies on smell, sound and long whiskers to detect prey. As in the common shrew the needle-like teeth are red-tipped and it is able to decrease its body size in winter to reduce energy requirement.

In comparison the common shrew is larger with a darker three-tone coat and a shorter tail, although there can be some overlap in the weight of juvenile common shrews and large adult pygmy shrews.

Field signs

Being so small the pygmy shrew leaves very few signs. They are rarely heard in the wild as they are less vocal than the common shrew. The small spherical nest is sited underground or under dense cover. Droppings are sometimes found in water shrew bait tubes and can be recognised by their high content of spider remains, giving a brown appearance under magnification.

Habits

The pygmy shrew is widespread in all types of habitat but prefers dense ground cover and is more commonly found in grassland than woodland. It usually lives at a lower density than the common shrew with a larger home range. It spends most of its time on the ground, but will climb up into vegetation and trees and is even able to swim well. Unless searching for a mate, it is usually solitary and aggressive towards its own species. It is active day and night with frequent short rest periods. The main prey items are woodlice, spiders, beetles and harvestmen. Unlike the common shrew it does not

Captive pygmy shrew (photo © Hazel Ryan)

dig for prey under the soil, but uses its mobile snout to forage in leaf litter and vegetation for more than 250 prey items per day. It is a poor burrower so uses the burrows of other small mammals and makes surface tunnels through vegetation. It spends less time below ground than the common shrew. Predators include owls, kestrel, stoat, weasel, fox and the domestic/feral cat but its two scent glands exude a deterrent musty odour which often causes it to be abandoned after being killed.

Pygmy shrews have been regularly found in Kent dormouse nest boxes at sites such as Spong Wood. A nest of four young was found in a rot hole in a tree that was felled outside Westwell Village Hall in 2012.

They are often brought in by domestic cats and are commonly found in barn owl pellets as owls have a poor sense of smell and so are not put off by the scent glands.

Reproduction and life cycle

Pygmy shrews breed from April to October. Females rear four to six litters of up to nine young per year, with a 20 to 25 day gestation period. Juveniles overwinter then become sexually mature the following spring. They have a very hairy tail when young but most of this hair is lost as they reach maturity. Mortality of young is high but adults can live for 13 to 16 months.

Distribution, status and conservation

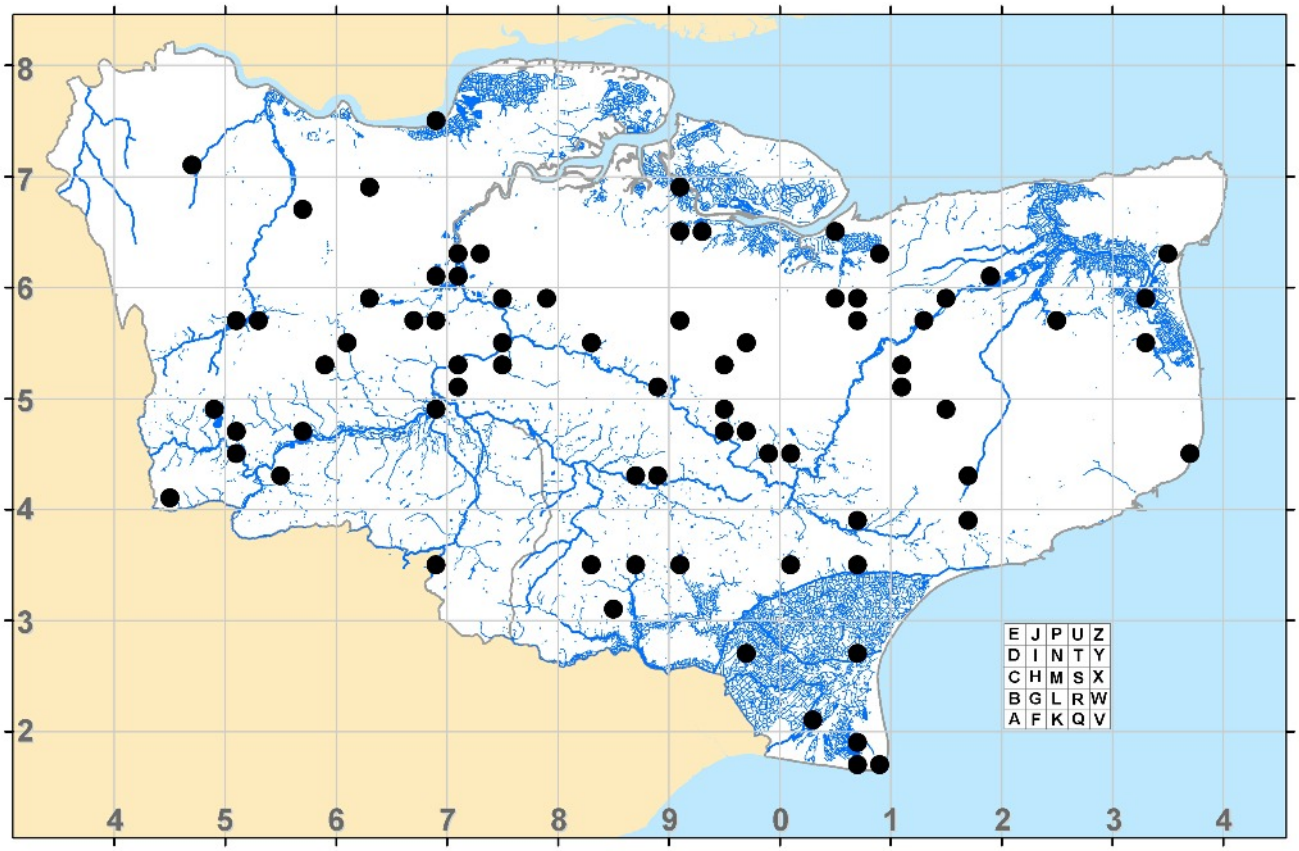
The pygmy shrew is widely distributed throughout Britain including many islands and is the only native species of shrew found in Ireland. It has partial protection under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) regarding trapping, killing and using invasive procedures. It is often trapped in small mammal surveys in Kent but is not encountered as frequently as the common shrew.

With its small size and high metabolic rate it can easily die from starvation, cold or stress in traps if they are not checked frequently or provisioned well. The main threat to this species is habitat change. Modern farming practices have resulted in fewer hedgerow corridors, with herbicide and insecticide spraying having reduced diversity of wildflower meadows and invertebrate populations.

Water shrew

Order: Soricomorpha

Neomys fodiens



Identification

Head and body length (mm): 67-96
Tail length (mm): 45-77
Weight (g): 12-18

The water shrew is the largest of our three native shrew species. It has a two-tone coat of black on the back and white on the underside, sometimes with a yellow or brown ‘stain’. Melanistic forms with a dark underside regularly occur and white ear tufts and/or eyebrows are common. The fur, which is longer and denser than in terrestrial shrews, traps air, giving a silvery sheen to the body when swimming under water. The long tail has a keel of long, stiff, silvery hairs on the underside which increases the surface area and acts like a rudder during swimming. The toes are also fringed with hairs enabling all four feet to be used as paddles.

With tiny eyes, it relies on its long whiskers and mobile snout to detect prey under water, often searching through gravel and silt on the river bed. As in the common shrew the needle-like teeth are red-tipped and it is able to decrease its body size in winter to reduce energy requirement.

Common and pygmy shrews are smaller than water shrews with paler dorsal fur. They lack the fringes of hairs on the tail and feet.

Field signs

Being so small the water shrew leaves behind very few signs. Small plastic tubes, baited with casters (blowfly pupae), can be placed close to the water’s edge to obtain water shrew droppings. These droppings look greyish in colour as they contain fragments of aquatic invertebrate exoskeletons. Droppings of pygmy shrews appear brown as they contain mainly spiders, whereas those of common shrews are black from beetle remains. The contents can be checked under magnification.

Burrow entrances are two centimetres in diameter and have a round cross-section.

Habits

The water shrew is primarily found in wetland habitats: unpolluted rivers and streams, ponds, lakes, ditches, reedbeds and marshes. In Kent it often inhabits watercress beds. It can travel up to three kilometres from water, particularly when dispersing, and has been found in gardens, woodland, hedgerows and grassland. It lives in extensive burrow systems in the river bank, building nests from moss, dried leaves, grass and sometimes stones. It is found at a lower density than common and pygmy shrews but also has a smaller home range. Unless searching for a mate, it is usually solitary.

The water shrew can dive to depths of 30 to 200 cm, staying submerged on average for three to 10 seconds but can be as long as 24 seconds. After a swim it dries off by shaking, scratching or squeezing through narrow burrows. The main prey items are aquatic invertebrates such as water slaters, freshwater shrimps, insect larvae, snails, water beetles and bugs. It also takes terrestrial invertebrates such as earthworms, beetles and millipedes. Our only venomous mammal in Britain, the water shrew uses neurotoxins in its saliva to paralyse larger prey such as small fish. Its high metabolic rate means that it needs to feed every few hours to consume 50% of its body weight in prey per day. It is therefore active both day and night, but mostly after dark.

Predators include owls, kestrel, buzzard, pike, stoat, weasel, fox, cat, and occasionally mink and otter. The shrew's scent glands exude a deterrent musty odour which often causes it to be abandoned after being killed.

Reproduction and life cycle

Water shrews breed from April to September. Females rear one to two litters of up to 15 young per year, with a 19 to 21 day gestation period. The young are born blind and naked, developing fur by 10 days of age. Whilst independent at 28 days they often stay with the mother for 40 days. Juveniles usually overwinter, becoming sexually mature the following spring. Their lifespan is 14 to 19 months, with most adults dying at the end of the breeding season.

Captive water shrew. (photo © H. Ryan)

Distribution, status and conservation

The water shrew is widely distributed across Kent, mostly associated with water courses. It is probably under-recorded in the county as it lives at a lower density than the common and pygmy shrew and so is less frequently caught during trapping surveys. Also traps are much more effective when set very close to or within (on objects protruding from the water) rivers or streams, which is not often the case on general small mammal surveys. In addition, it is a small species which leaves few obvious field signs.

The main threat is habitat change, particularly from water pollution and modification of river banks, over-grazing or over-management of bankside vegetation and loss of wetland habitat. The water shrew can quickly accumulate pesticides from the prey it ingests.

The water shrew is partially protected under the Wildlife and Countryside Act 1981 (as amended) regarding trapping, killing and using invasive procedures.

Bats

Bats are unique amongst mammals in having the power of true flight. The name given to the whole order of bats, the Chiroptera, is based on the Greek for hand-wing, for bats fly with their hands and their arms. The bat's wing is a double layer of skin supported by the extended bones of the hand, by the hind limb, and in all British bats, the tail.

Different species have different shaped wings, related to their preferred habitat and method of hunting; long narrow wings for speed, short broad ones for manoeuvrability, with a whole range of variations in between.

Of the 18 species known to be resident in the UK, 13 have been recorded in Kent during the period 2002 to 2012. All of these are members of the Vesper family, *Vespertilionidae.*

Brown long-eared bat (photo © BCT/Hugh Clark)

Food and feeding

All UK bats, like the majority of bats worldwide, feed on insects, though some will also take other invertebrates. Feeding will be in any insect-rich environment, with different species having different prey preference. Foraging methods are related to these preferences, and interrelated to flight patterns and echolocation.

All bats are nocturnal, flying only rarely in daylight. Emergence time varies with species, from just before sunset until up to an hour after sunset.

However, despite having many advantages flight is very energy expensive. Bats expend three times more energy than other mammals of the same size, so need a huge intake of food to remain active. As the amount of food needed is not always available, animals may need to survive for several days between meals.

In temperate regions like the UK bats have developed a strategy for survival based on energy conservation. Like all mammals they are warm-blooded, but show a variation on the theme.

Much of the time, like humans, they maintain a constant temperature above that experienced in the British climate. When insect food is in short supply in the winter months, and even in summer when the availability of insect food may be erratic, a controlled lowering of their body temperature reduces the rate of the body's chemical reactions. By selecting different roosts they can ensure the surrounding temperature is close to the temperature of their body.

Bats make no nests but use cracks, crevices and tree holes in which to shelter. Generally speaking they choose somewhere warm in summer and cool in winter.

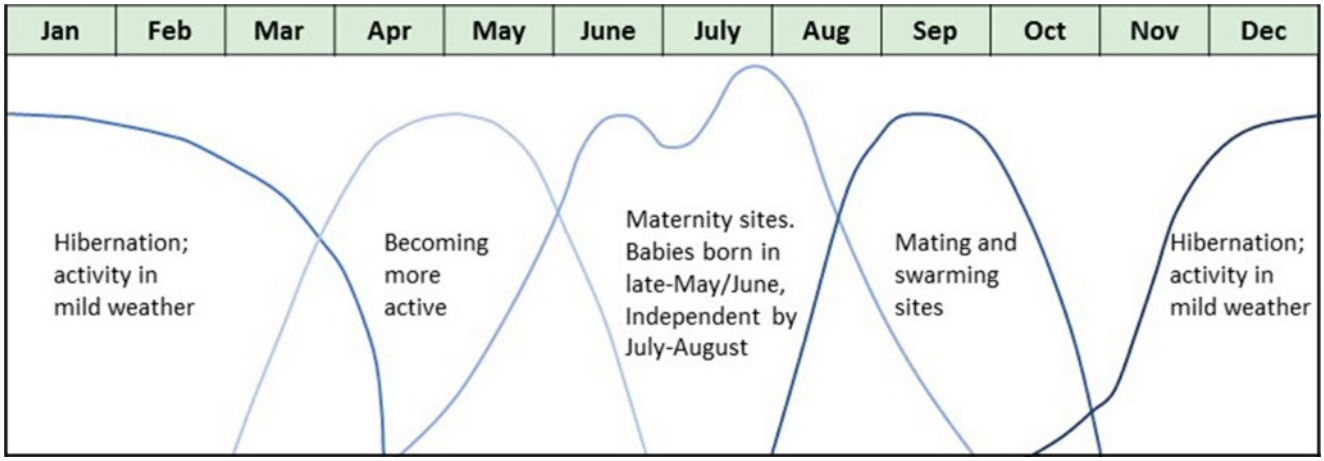


Fig 1 A bat's year

Echolocation

Most insects are caught in flight, but hunting methods and prey preferences vary with species. They can catch even tiny insects such as gnats and midges using echolocation, a highly sophisticated sonar system.

Bats produce ultrasonic calls and build up a sound picture based on the returning echoes, enabling them to fly and feed in total darkness. The frequency of the echolocation calls are measured in kilohertz (kHz). Bat detectors are valuable identification and survey tools, making these echolocation calls audible to humans. Many of the bat records have been obtained using detectors.

Legal protection

Both domestic and international legislation now applies to protect all bats and their roosts in the UK. Advice should be sought if any work is going to be undertaken that could disturb bats in their roost, damage or destroy a roosting place even if no bats are present at the time, or obstruct access to a bat roost.

For advice contact www.bats.org.uk or the bat Helpline 0345 1300 228

Threats

Bat populations nationally have undergone major long-term declines. The following are likely to have, or have had, the most impact on bat populations:

- changes in land use practices, reducing abundance and diversity of prey
- use of insecticides, reducing the availability of food and leading to accumulation of residues in their fatty tissues
- loss of roost sites as a result of building development from road schemes and barn conversions
- inappropriate management and loss of woodland
- fragmentation of remaining habitats, preventing economical travel between foraging and roosting sites
- deterioration in water quality and loss of marginal vegetation, affecting abundance and diversity of insects

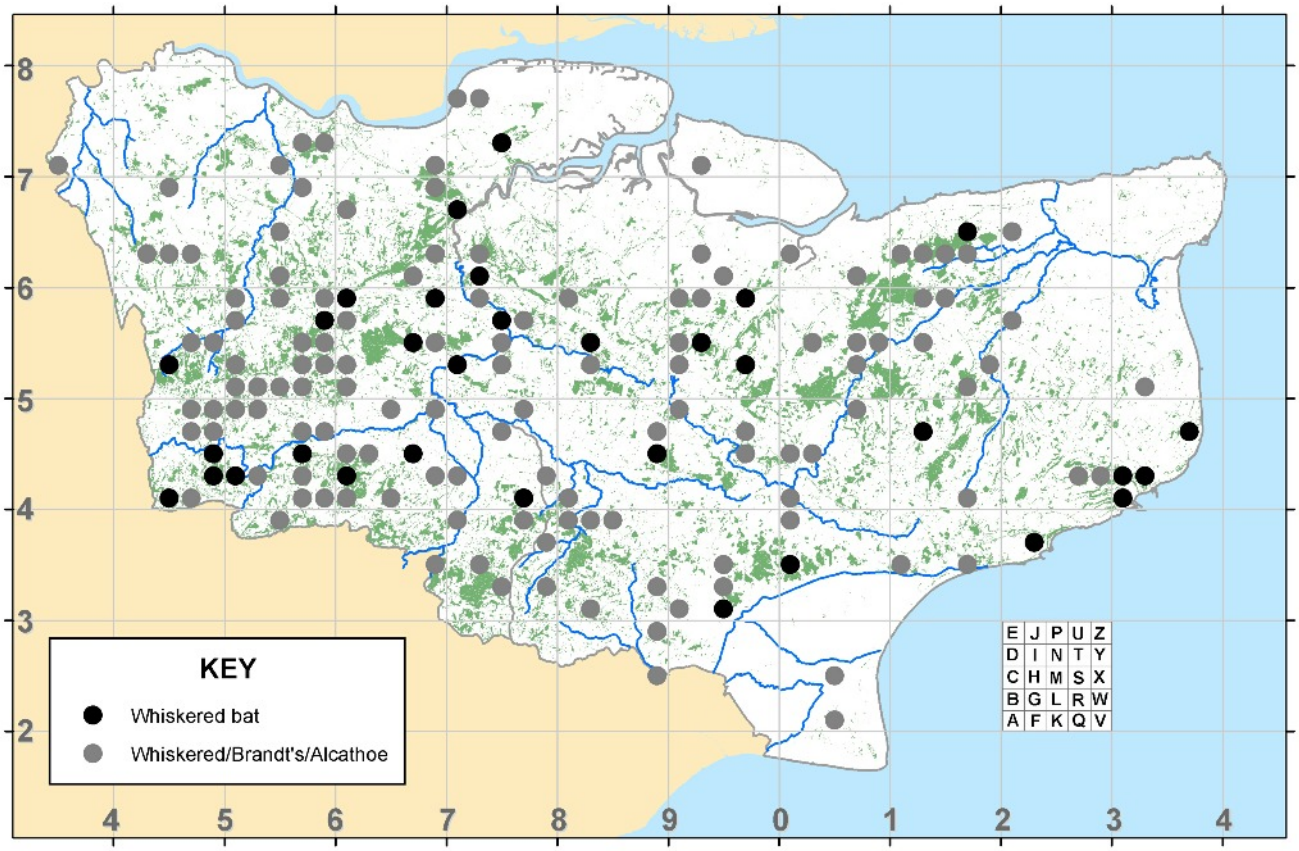
The maps

The map legend should be noted carefully as alternative species are given where identification is uncertain and the type of record is noted where particularly relevant.

Whiskered bat

Order: Chiroptera

Myotis mystacinus



Whiskered bat (photo © BCT/John Altringham)

Identification

Head and body length (mm): 35-48
Forearm length (mm): 30-37
Wingspan (mm): 210-240
Weight (g): 4-8

This species has dark grey or nut-brown shaggy fur on its back, buff/ greyish underneath, with a dark face and medium sized ears and a pointed tragus.

Whiskered bat has a fast fluttering flight with brief glides and occasional swoops.

Whiskered bat and Brandt's bat are very similar and were only separated in 1970. Prior to 2010 they were recorded in hibernation as whiskered/Brandt's. The recent addition of Alcathoe bat to the UK list makes the accuracy of many earlier records even less certain.

Echolocation

Whiskered bat calls are a series of clicks between about 35 and 90 kHz, sounding loudest at 45 kHz. The clicks are slightly less regular and slower than Daubenton's bat but heterodyne detectors cannot be relied on to identify to species. Flying in clutter they can be mistaken for pipistrelles, but their frequency range is much wider.

Habits

Whiskered bats favour woodland and riparian habitats, and often fly along woodland paths where they tend to hug the edges and hunt in the denser parts. They also forage in parks, gardens and meadows. Flies are their major prey, but they also take moths, beetles, lacewings, other small insects and spiders, both capturing them in flight and gleaning from vegetation.

In summer they roost in trees and a wide range of building types, including modern ones, but particularly in older stone buildings. They are crevice dwellers, often roosting under hanging tiles or under ridge tiles.

They are regularly found hibernating singly in caves and tunnels, in crevices or sometimes hanging free in the open.

Reproduction and life cycle

Mating takes places in the autumn but has also been observed in all winter months. Females can give birth in their first year but the majority do not do so until their second year. Nursery roosts are sometimes shared with pipistrelles and other species.

Young can fly by three weeks and by six weeks can forage by themselves. Like other Myotis species whiskered bats swarm in and around caves in autumn. This occurs from the beginning of August, earlier than Natterer's bat. The maximum age recorded is over 23 years.

Whiskered bat (photo © BCT/Derek Smith)

Distribution, status and conservation

Whiskered bats are widespread in England and Wales, but distribution and population size are uncertain, due to possible confusion with Brandt's and Alcathoe bats.

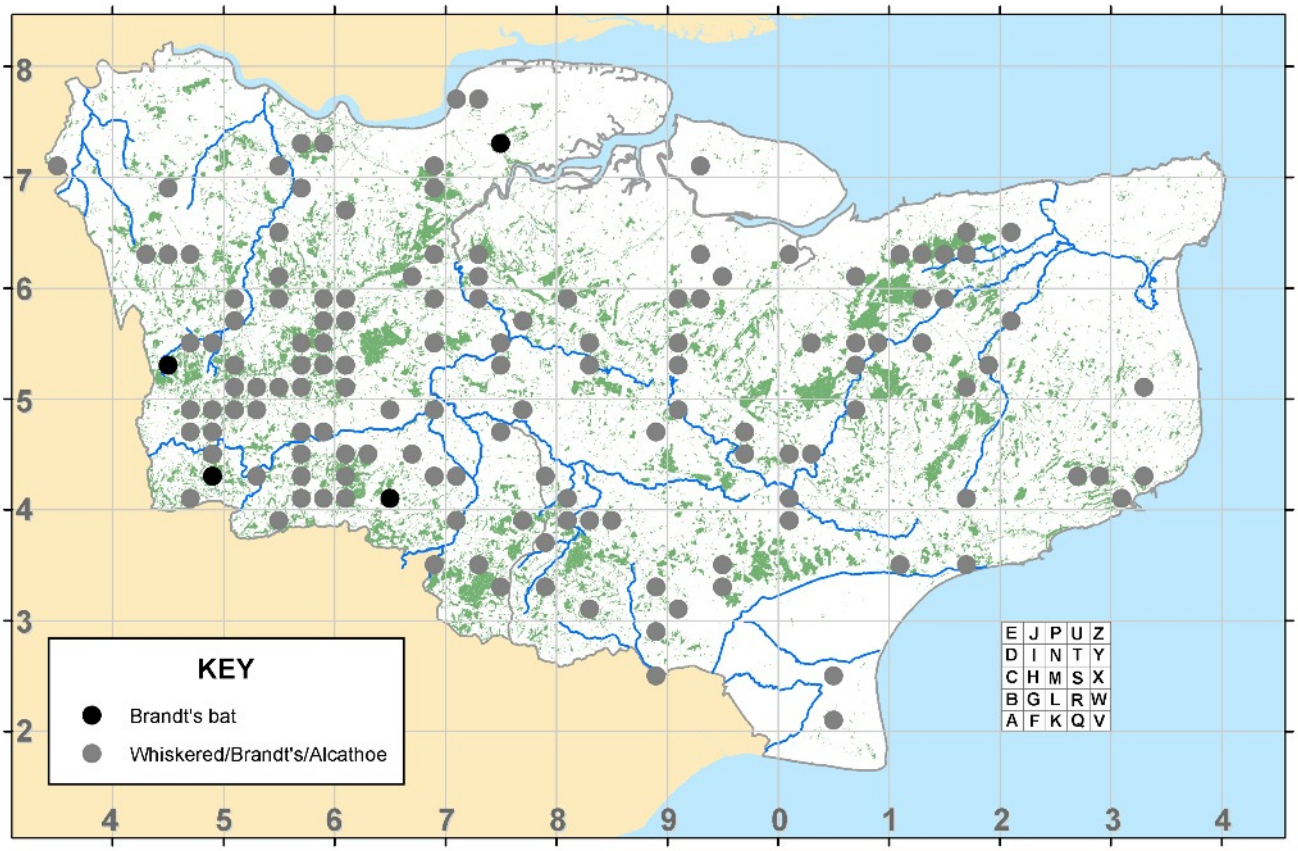
In Kent this species was considered rare. Only one small maternity roost, shared with common pipistrelles, is known within the time period of 2002 to 2012, and only occasionally are whiskered/Brandt's bats found in hibernation.

However, in the summers of 2009 and 2010, during the BCT Bechstein's Bat Survey, they were found at 12 sites, and the number of individuals trapped was second only to brown long-eared bats. In all woods the traps were set in cluttered habitat if it could be found. This highlights the importance of retaining dense woodland, rather than the tidy woods which result from the over-management and coppicing that is now so often undertaken in the name of conservation.

Brandt’s bat

Order: Chiroptera

Myotis brandtii



Brandt’s bat (photo © John Black)

Identification

Head and body length (mm): 38-50
Forearm length (mm): 31-39
Wingspan (mm): 210-240
Weight (g): 4.5-9.5

Brandt’s bat has dark grey or brown shaggy fur on its back, greyish underneath, with face and base of ears often pinkish. Young bats are darker but lighten after a few years.

It has rapid and skilful flight, often close to ground vegetation and up to the crown of trees.

Brandt's and whiskered bats are very similar and difficult to identify even in the hand. As with whiskered bats, the recent addition of Alcathoe to the UK list makes the accuracy of many earlier records even less certain.

Echolocation

Frequency sweeps similar to those produced by whiskered bats start at around 90 kHz ending at about 35 kHz.

Clicks are slightly less regular and slower than Daubenton's bat but heterodyne detectors cannot be relied on to identify to species. Flying in clutter they can be mistaken for pipistrelles, but their frequency range is much wider.

Habits

Brandt's bats appear to depend on similar habitats to whiskered bats, but are more related to woodland and bodies of water. They avoid foraging in open areas such as clear cuttings and fields. In Europe they are often found at high altitudes.

Their main food items are moths and other small insects and spiders. During some seasons non-flying prey makes up a major part of their diet.

In summer they roost in trees and churches, and are regularly found in houses, particularly older ones. They have been known to use bat boxes.

Small numbers are found hibernating singly in caves and tunnels, often in tight crevices. It is uncertain where the majority of them hibernate.

Reproduction and life cycle

Mating takes places in the autumn but has also been observed in all winter months. Females can give birth in their first year but the majority do not mate until their second autumn. Nursery roosts are sometimes shared with pipistrelles and other species.

Young can fly at three weeks and by six weeks can forage by themselves. Like other Myotis species Brandt's bats swarm in and around caves in autumn.

Brandt's bat (photo © BCT/Anita Glover)

Distribution, status and conservation

Brandt's bat is found throughout England and Wales and has recently been recorded in Ireland as well, but it is less common than the whiskered bat. DNA samples from a number of bats originally believed to be Brandt's bat have since been identified as Alcathoe bat. It is suggested that Brandt's bat is a much rarer bat than previously thought.

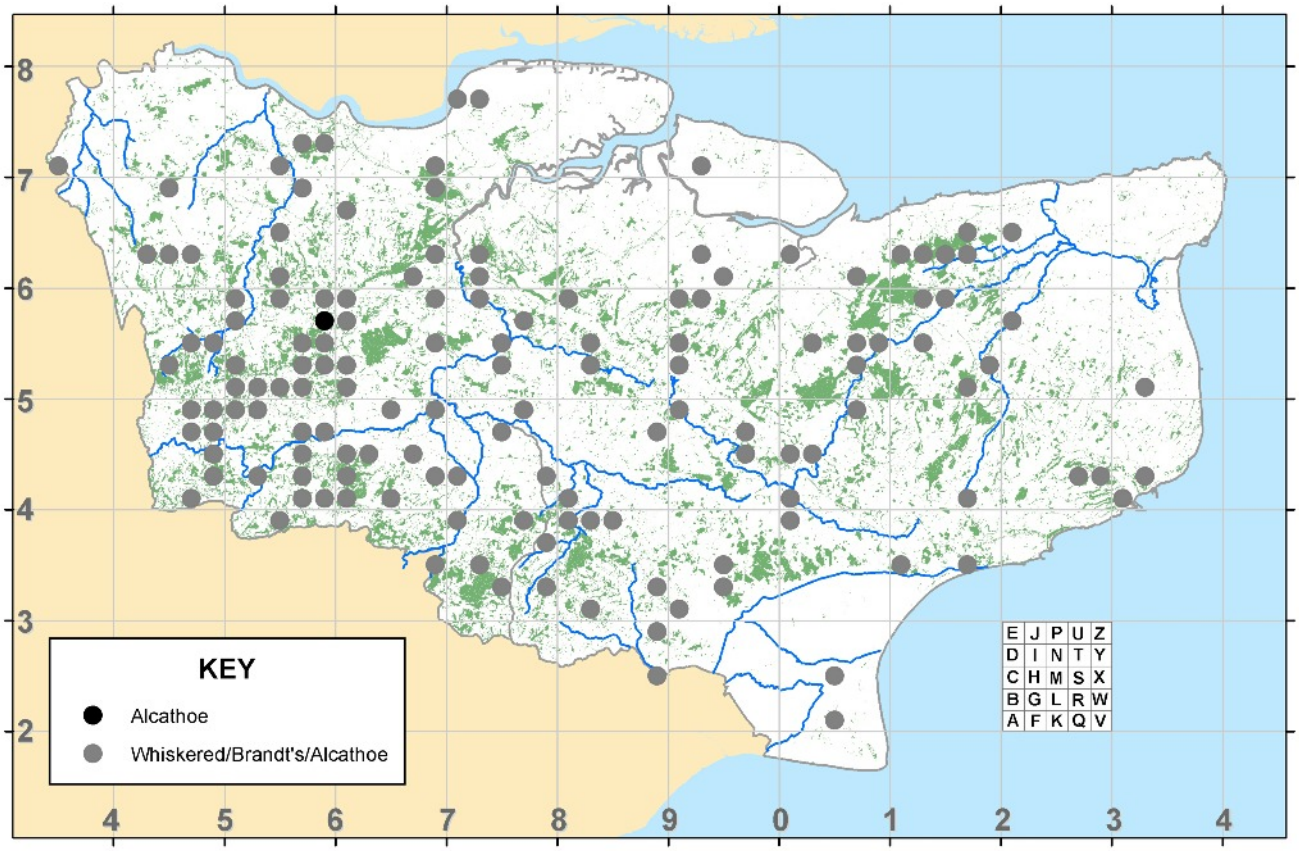
No maternity roosts have ever been found in Kent, and there are few positive records as this species can only be identified in the hand; even then it can be difficult. Two of the records shown on the map were of bats trapped in woodland during the BCT Bechstein's Bat Survey, one close to Westerham Mines during autumn swarming, and the fourth an injured bat in a garden. Some of the records shown as whiskered/Brandt's/Alcathoe may have been Brandt's bat.

Clearly more research is essential to find out more about this elusive species and its particular conservation needs.

Alcathoe bat

Order: Chiroptera

Myotis alcathoe



Alcathoe bat (photo © Shirley Thompson)

Identification

Head and body length (mm): 30.8-34.6
Forearm length (mm): 32.7-34.5
Wingspan (mm): 200
Weight (g): 3.5-5.5

Alcathoe bat is the smallest European Myotis species and has light brown fur which is slightly paler underneath. It is so similar in appearance to whiskered and Brandt's bats that it was confused with these in the past. Its presence as a separate species in Europe was not recognised until 2001.

It has a short pale snout, with skin areas less pigmented, (especially the tragus which is noticeably pale towards the base), small feet and other subtle physical differences.

Echolocation

Alcathoe bat produces calls which drop on average from 120 to 46 to 43 kHz, loudest at around 52 kHz, though this can vary a great deal and can be confused with common pipistrelle.

The high starting frequency and high end frequency seem to be characteristic.

Habits

In Europe dense deciduous woodland areas are characteristic of this species.

In the UK these bats were first identified in Yorkshire and Sussex at swarming sites with ancient woodland nearby. They were later found in biologically rich semi-natural ancient woodland and ancient parkland, already home to other rare woodland bat species. The animals hunt in dense vegetation.

Summer roosts are in long cracks, crevices and fissures in trees rather than holes, with bats regularly moving between roosts. Most of the bats in Yorkshire were captured as they entered underground swarming sites before going into hibernation.

Reproduction and life cycle

Currently little information is available. A maternity colony radio-tracked in Sussex (2011) was found to use six roosts over a short period of time, all in splits and cracks in trees. The roosts were relatively close to each other and no tagged bat stayed in the same roost for any length of time, but consistently foraged in the same small area. The peak count of 96 included juveniles. There is no information on roosts in spring or later in the year.

Alcathoe bat (photo © Daniel Whitby)

Distribution, status and conservation

First formally identified in Greece in 2001, Alcathoe bat has since been found in a number of European countries. Bats trapped in Sussex and Yorkshire and previously identified as whiskered or Brandt's bats were found to be Alcathoe bats when genetically analysed. The high number of individuals caught and their presence at sites 350 km apart demonstrates it is a well-established species and may be widespread, so it was confirmed as a resident in the UK in 2010.

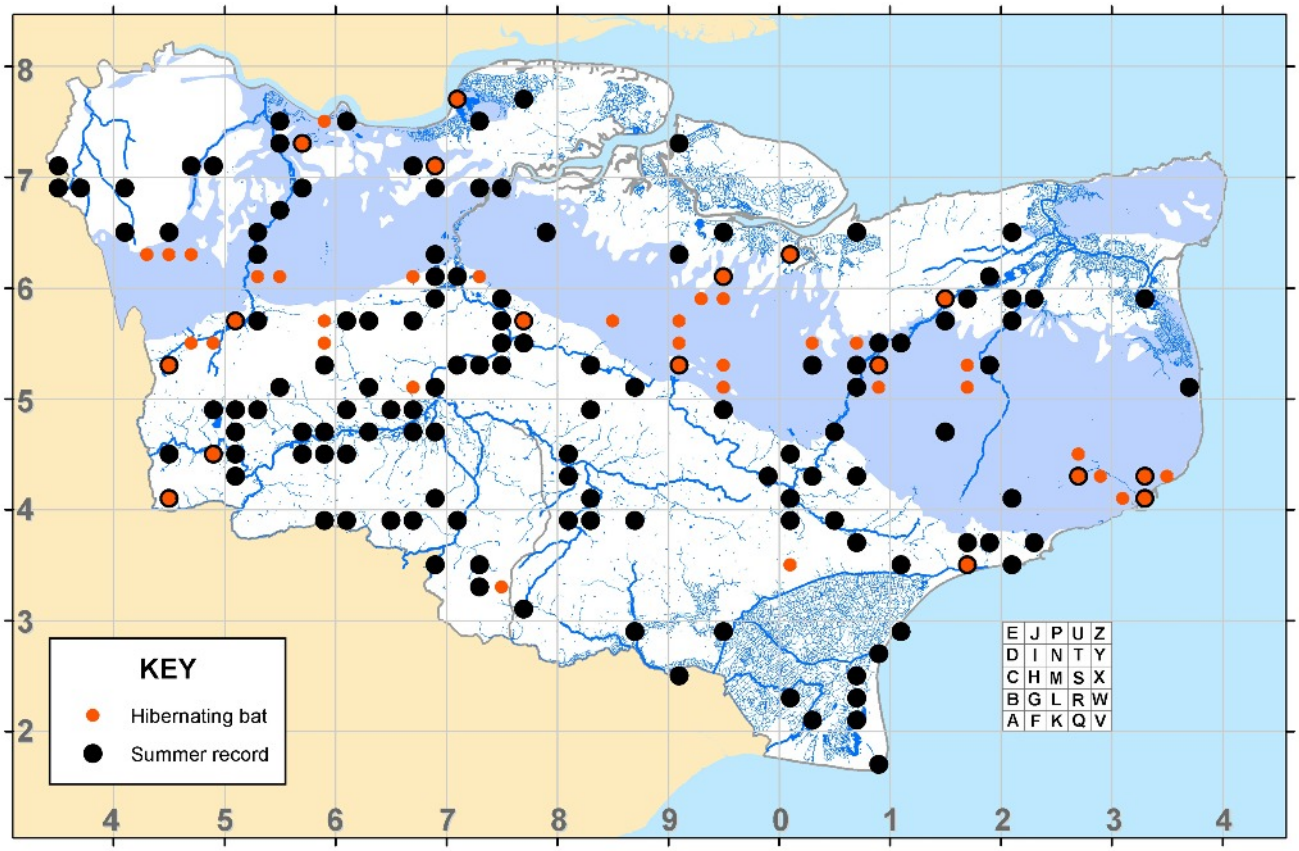
At woodland sites in Sussex and Surrey the majority of small Myotis caught were Alcathoe and not whiskered or Brandt's, as were a significant proportion of those caught in Yorkshire.

In June 2010, shortly after the announcement of the 'new' species, teams surveying woodland in west Kent as part of the BCT Bechstein's Bat Survey were excited to find in one harp trap what looked like a whiskered bat with a suspiciously short forearm. Measurements were made and a series of photographs taken to record the pale slightly rounded snout, pink face, and feet smaller than the whiskered bat. These were sent to Professor Altringham who was pleased to confirm identification as Alcathoe, so, a new species for Kent too!

Daubenton's bat

Order: Chiroptera

Myotis daubentonii



Daubenton's bat (photo © John Black)

Identification

Head and body length (mm): 38-50
Forearm length (mm): 31-39
Wingspan (mm): 210-240
Weight (g): 4.5-9.5

Daubenton's bat has brown, fairly dense, woolly dorsal fur and pale buff ventral fur. The pinkish face is usually bare around the eyes.

After dark on warm summer evenings you may see Daubenton's bats flying low over lakes and rivers. They take aquatic insects from close to the water, or even use their large hairy feet as a gaff or their tail membrane as a scoop to take insects from the surface.

Daubenton's bat (photo © BCT/Kevin Durose)

Echolocation

Calls range from 35 to 85 kHz, heard on a bat detector as a machine-gun-like series of rapid regular clicks. This can be heard more clearly if the detector is set at 35 kHz, so as to cut out most of the pipistrelle calls.

Habits

Radio-tracking has shown that they will typically forage within three kilometres of the roost, but may fly 15 km or more along the river in a night's activity, feeding over calm water. Although usually associated with water they will also forage in nearby woodland along paths and tree lines, but rarely very close to vegetation clutter.

Reproduction and life cycle

The few known summer roosts are close to the water, in tree holes or bridges, but very few are found compared with the number of bats seen flying. Bats roosting in trees move between roosts more often than those in bridges. Stone buildings such as churches or castles are occasionally used in England, though more often in Scotland.

Swarming occurs in late summer and early autumn around hibernation sites. Many hibernate in caves, mines and other underground places with cool humid conditions, both in crevices and in the open. Mating takes place in the autumn and throughout hibernation.

Distribution, status and conservation

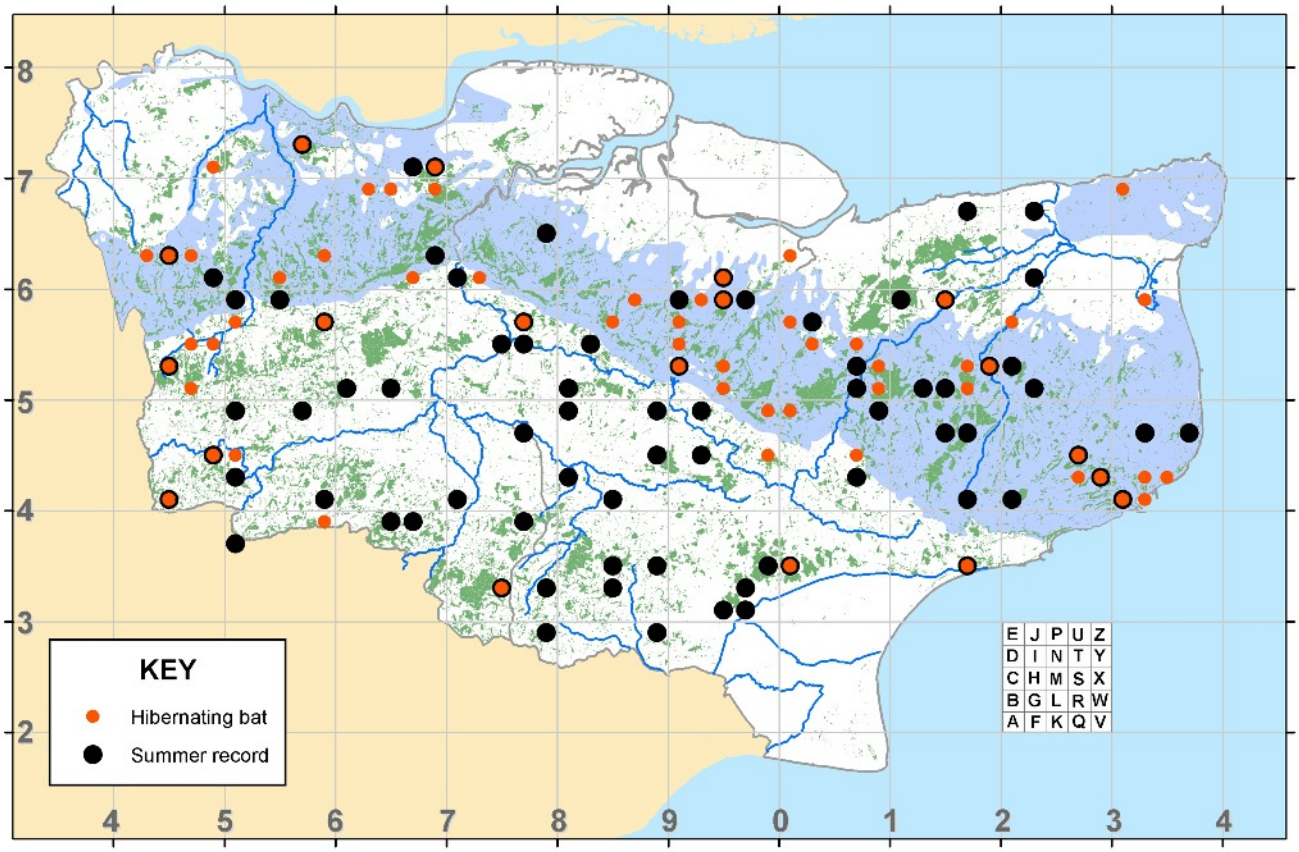
Daubenton's bat is widespread in the UK, and seems to be increasing in parts of its range. This may in part be due to the low level of pollution common along our waterways, as it supports their preferred aquatic insect prey.

Although very few summer roosts have been located in Kent, these bats may be seen flying over the majority of our rivers, lakes and ponds. It is one of the two species found most frequently in winter, hibernating in cool humid underground sites, including tunnels, chalk mines and deneholes.

Natterer's bat

Order: Chiroptera

Myotis nattereri



Natterer's bat (photo © BCT/Hugh Clark)

Identification

Head and body length (mm): 40-50
Forearm length (mm): 36-43
Wingspan (mm): 245-300
Weight (g): 7-12

Natterer's bat has buff, shaggy fur on the back and is white underneath. It has long ears that are turned back at the tip, and a narrow pointed tragus which is longer than half the ear length. Its muzzle is long and bare. The old name of 'red-armed bat' is based on its limbs appearing pinkish.

It is broad-winged and slow-flying, both taking insects in flight and gleaning from vegetation without landing.

Echolocation

In open habitats the call is similar to whiskered and Daubenton's bats, with a rapid series of clicks, although the repetition rate is faster and the call quieter. The calls are extremely broadband in frequency.

Caution is needed when using heterodyne detectors to identify Myotis bats to species level. The call of pipistrelle bats flying in clutter can sound similar to Natterer's bats.

Habits

Natterer's bat is found in a varied range of woodland habitats, from dense woodland to more open parkland, gardens and coniferous forest. Frequently it forages in open meadows and woodland clearings, away from linear features. Prey includes flies, moths and lacewings, with a substantial number of spiders.

Whilst naturally a tree-roosting bat, most known summer roosts in the UK are in old stone buildings with timber beams, such as castles, barns and churches. It will adopt bat boxes and even use them as nursery roosts. Winter roosts are almost always in underground sites, where the bats tuck themselves away in small crevices, sometimes on their back.

Reproduction and life cycle

Maternity colonies are formed from May to June and bats can stay in these roosts until September to October. Bats may move regularly between roosts and sometimes include some adult and immature males.

Swarming occurs with other species in late summer and early autumn around cave and mine entrances, with some bats travelling as far as 65 km to the swarming site.

In winter Natterer's bats are found in any small cave-like structure or even in exposed rock crevices.

Natterer's bats in hibernation (photo © Shirley Thompson)

Distribution, status and conservation

Natterer's bat is found throughout most of the British Isles; this is generally a scarce and poorly known species, but the British population is internationally important.

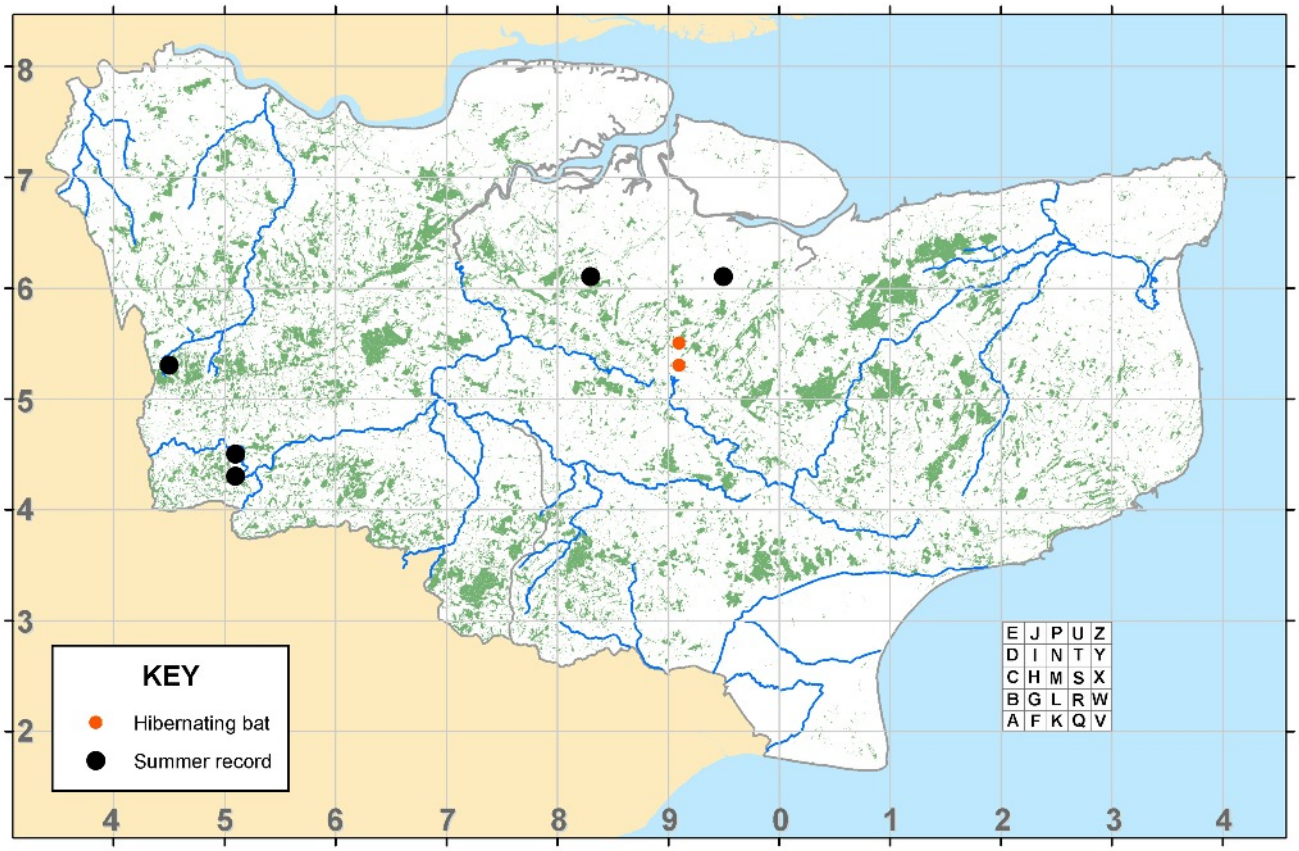
The majority of Kent records are of hibernating bats, as Natterer's bat is one of the two species most regularly found in underground sites in winter. Grounded bats feature in the records, and 15 new woodland sites were identified when Natterer's bats were trapped during the 2009 BCT Bechstein's Bat Survey.

Some maternity roosts are known to have been lost in the county as a result of the demolition or redevelopment of barns and other agricultural buildings. To conserve summer roosts the conversion of barns should be discouraged or allow for bats' continued use, and the maintenance and remedial timber treatment of other older buildings carefully monitored. Winter sites should be protected not only for hibernation, but also for the little-understood part they play in the bats' social calendar as autumn swarming sites.

Bechstein's bat

Order: Chiroptera

Myotis bechsteinii



Bechstein's bat (photo © Roger Jones and Sally-Ann Hurry)

Identification

Head and body length (mm): 43-53
Forearm length (mm): 38-47
Wingspan (mm): 250-300
Weight (g): 7-13

Bechstein's bat has dorsal fur which is light to reddish-brown and clearly demarcated from the buff ventral fur.

It is a medium-sized bat with very large ears, well separated from each other, with a long straight tragus reaching to almost half the length of the ear. It has a long pink muzzle. These bats have slow fluttering flight; they can hover and are extremely agile, even in confined spaces.

Echolocation

Echolocation is very quiet, with the regular and rapid clicks typical of Myotis bats. The frequency of most power is 50 kHz, but the call has a broad frequency range, and caution is needed when using heterodyne detectors to identify Myotis bat species.

Habits

Bechstein's bat is a rare bat in the U.K, found almost exclusively in deciduous woodland habitat, preferably with a well-developed understorey. It forages in enclosed vegetation from high in the canopy to low on the ground.

Prey may include not only flies and moths caught in flight, but also non-flying insect larvae and spiders gleaned from tree trunks or from the ground.

Summer roosts are usually in tree crevices, also in bat boxes but only very rarely in buildings. In winter it hibernates in tree holes and underground sites.

Reproduction and life cycle

Maternity colonies consist of related females, and are often spread across several roosts, subdividing and recombining again, and changing roost every few days.

From the end of August the nursery colonies disperse and swarming occurs at hibernation sites, as with other Myotis species. The maximum age recorded so far is 21 years.

Distribution, status and conservation

This is one of the UK's rarest bats, restricted mainly to the southern part of England. The destruction of ancient mature forests along with intensive woodland management practices such as coppicing has led to a decline in numbers. Recent survey work has discovered more maternity roosts and extended its known range.

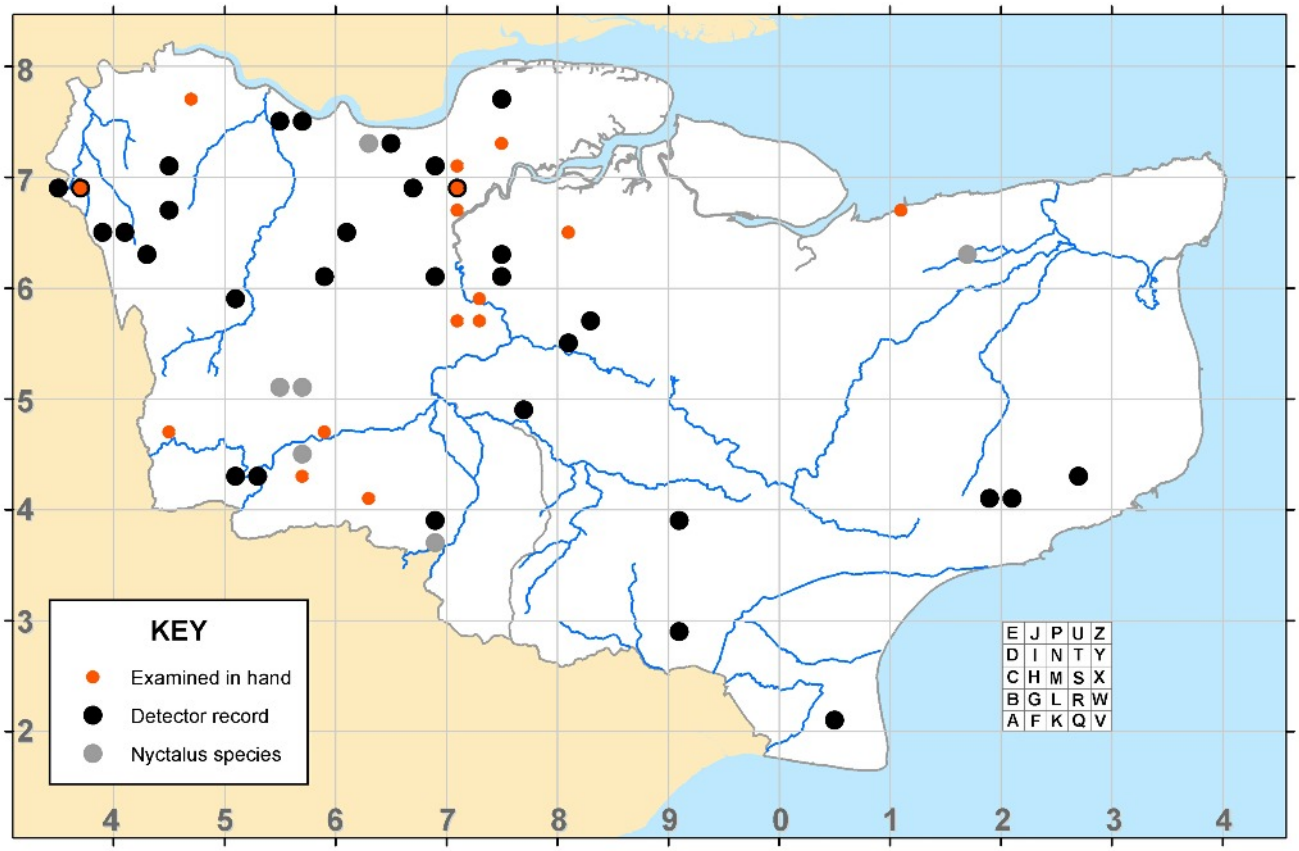
Bechstein's bat (photo © BCT/Derek Smith)

The first record in Kent was of an individual hibernating in a denehole in east Kent in January 2001. In August 2008 a single male was captured in a harp trap at a nearby swarming site. In July 2009, during the BCT Bechstein's Bat Survey, a lactating female was recorded in west Kent, thus confirming its status as a breeding species in the county. This find was followed up in August 2012 when another female was trapped at the same site and radio-tracked. On subsequent nights the bats were found to be using three trees, and a cumulative count confirmed the presence of a colony of at least 33 bats.

Leisler's bat

Order: Chiroptera

Nyctalus leisleri



Leisler's bat (photo © BCT/Hugh Clark)

Identification

Head and body length (mm): 50-70
Forearm length (mm): 38-47
Wingspan (mm): 260-320
Weight (g): 12-20

Leisler's bat has long fur that is reddish-brown or golden-tipped and is darker at the base.

It is very similar in appearance to the noctule, though it is smaller and the fur is usually longer, shaggier and less glossy. The male often has a ruff of thicker fur. They appear early in the evening and usually fly high and fast in the open. Early books refer to it as the hairy-armed bat, due to a band of fur extending onto the wing membrane along the body and arms.

Echolocation

Echolocation calls range from 15 to 45 kHz, peaking at 25 kHz. Two very loud calls are produced in a bubbly 'chip-chop' sound when the bat detector is tuned to about 25 kHz. The repetition rate of calls is much slower than smaller species.

Noctules' calls are similar, but the lower part of their call usually has a peak frequency of 21 kHz or less. Leisler's bat can be confused with serotines when flying in cluttered habitats with the peak frequency increasing up to about 30 kHz.

Habits

Leisler's bats forage over parkland, cattle pasture, woodland and meadow and also forage around white street lights. Above water bodies they may dive quite close to the water's surface, and sometimes forage close to the ground along lanes and well lit roads, feeding on flies, moths, caddis flies and beetles.

Radio-tracked bats in Kent foraged preferentially along woodland margins, even when these were along major roads.

Although naturally a forest species, these bats are much less dependent on trees for roosting than noctules, using a wide range of buildings, both old and new.

Leisler's bats hibernate in tree holes and cavities in buildings.

Leisler's bat, female and pup (photo © BCT/Hugh Clark)

Reproduction and life cycle

In summer, maternity colonies of females, usually around 20 to 50 bats, gather in tree holes and buildings. In houses they have been found in a variety of situations, including around gable ends in lofts, between tiles and underfelt and behind hanging tiles, often moving roosts every few days.

Mating occurs from late summer to mid-autumn, when males emerge from tree holes at dusk and fly around slowly calling loudly for females. Unlike their echolocation, these calls are audible to people.

Distribution, status and conservation

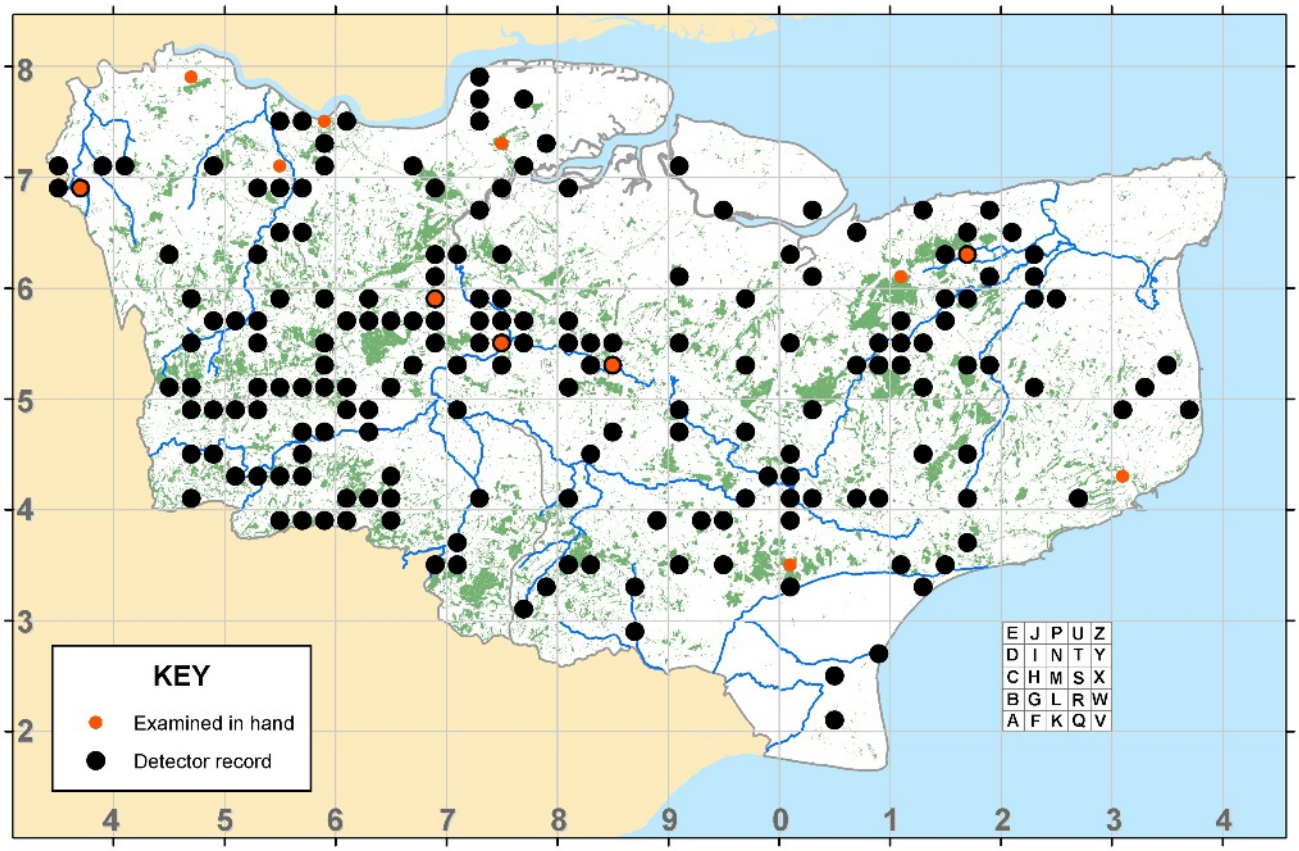
Although they are found throughout the British Isles, Leisler's bats are rare in most areas. Only in Ireland is this species common, where the population is of international importance.

In London and parts of the southeast of England it has been recorded more often in the last few years than previously, as noctules have declined. Noctules are very dependent on trees for roosting, and as more and more trees are felled, it is suggested Leisler's bats may now be at an advantage as they also roost in buildings.

Noctule

Order: Chiroptera

Nyctalus noctula



Identification

Head and body length (mm): 37-48
Forearm length (mm): 48-58
Wingspan (mm): 320-400
Weight (g): 18-40

An adult noctule bat has sleek golden brown fur; juveniles are dull chocolate brown.

The noctule is one of our largest bats and has long narrow wings. The ears are short and rounded, with a mushroom-shaped tragus.

It emerges early to forage and can be seen well before dark flying high and fast, often in straight lines, with frequent steep stoops and glides to catch prey items.

Echolocation

Noctules have the loudest call of any British bat, ranging from 20 to 45 kHz, peaking at 20 kHz. The lower part of the call is audible to children and some adults. In open habitats the call sequence has a loud 'chip-chop' sound on a bat detector with occasional clicks. In closed habitats and in clutter, calls vary from this pattern. In noctule the peak frequency can be higher and may be difficult to separate from Leisler's or serotine bats.

Habits

Noctules are very dependent on trees, but can be found foraging in a wide range of open habitats, especially over deciduous woodland, parkland and pasture. Both summer and winter roosts are mainly in trees in rot-holes and woodpecker holes, and occasionally in bat boxes, but noctules are found only very rarely in buildings in the UK.

Beetles, in particular chafer and dung beetles, are an important part of their diet, though they will take

Noctule leaving roost (photo © BCT/Hugh Clark)

other smaller insects, including mayflies and winged ants, at certain times of the year.

Reproduction and life cycle

Colonies start to gather in April and often break up into smaller groups prior to setup of nursery roosts. The mothers change roost frequently, carrying the young between roosts during lactation. Single males establish a mating roost during late summer, usually a tree hole, calling with loud shrill calls from the roost entrance, attracting a harem of usually four to five females which stay for one or two days.

Due to the difficulty of finding tree roosts, most of the records of this species are of bats in flight.

Distribution, status and conservation

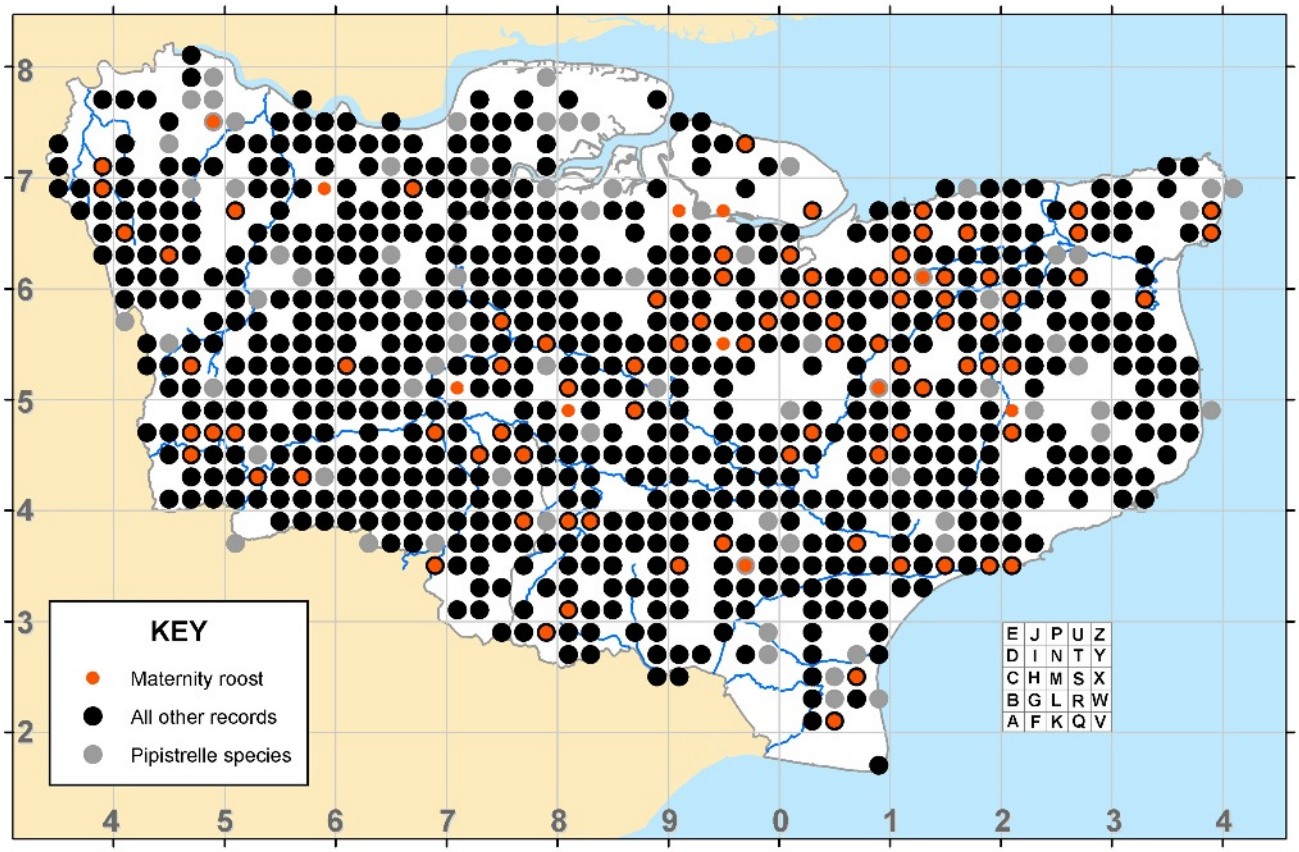
Although widespread in England and Wales, increasing concern for this species led to its recent addition to the list of priority species under the UK's BAP in 2007.

During the 1980s large numbers of noctules were observed at certain times of the year in Kent, but a decline in their numbers was noted and commented on in the early nineties, before it was recognised in other parts of the country. These bats are now considered scarce in the county with only single bats or small numbers seen occasionally. As this is the most easily observed of all our bats, due to its early emergence, size, and flight pattern, this is a matter of real concern. The loss of thousands of trees to make way for transport links and building developments, together with agricultural changes which have led to the loss of the chafers and dung beetles dependent on cattle grazing, have all played a part in the species' decline. During the last 10 years, only three tree roosts have been recorded by the KBG, and the status of these roosts has not been confirmed.

Common pipistrelle

Order: Chiroptera

Pipistrellus pipistrellus



Common pipistrelle (photo © John Black)

Identification

Head and body length (mm): 35-45
Forearm length (mm): 30-35
Wingspan (mm): 200-235
Weight (g): 3-8

The common pipistrelle is more or less a uniform medium to dark brown colour. The skin around the face and eyes is usually dark.

The common and soprano pipistrelles, our commonest bats, were only recognised as separate species in the late 1990s; prior to that all were recorded as *Pipistrellus pipistrellus*.

These two pipistrelle species can look very similar, the dark face of the common pipistrelle not always being obvious even in the hand, especially in juveniles. There is no ridge between the nostrils in common pipistrelle, and the pattern of the elastic fibres in the wing can also help to distinguish between the two. When using a bat detector it is usually, though not always, possible to separate them by the peak frequency of their echolocation calls.

Echolocation

To distinguish them from soprano pipistrelles they are often referred to as ‘45s’. Although social calls and chatter in the roost are audible, their echolocation calls are ultrasonic. On a bat detector they can be heard as a series of clicks and slaps, with the peak intensity of the call at about 45 kHz on average. Pipistrelles with peak frequency in the range 42 to 49 kHz are classified as common pipistrelle.

Habits

Naturally a tree-dwelling animal, the common pipistrelle has adapted well to living alongside people. This is the species you are most likely to see in your garden, twisting and dodging with an erratic flight path as it catches tiny insects in flight. It feeds mainly on a wide range of small flies as well as aquatic midges and gnats, typically within two kilometres of its roost. It forages in a range of habitats including woodlands and gardens and frequently forages along edge habitats such as hedges and tree lines.

Summer roosts of females are often in tight spaces on the outside of our houses, including modern ones. Only occasionally are single common pipistrelles found roosting in winter, little being known of their hibernation habits. They may be seen flying during the winter on mild days.

Reproduction and life cycle

Popular spots for maternity roosts are under hanging tiles and weather boarding, behind barge boards or between roof felt and tiles. The maternity colonies move around quite regularly between different roost sites. The young are fed solely on mothers’ milk for three or four weeks. After about four weeks they start to fly and at six weeks are able to forage for themselves. Once the young are foraging the maternity roosts start to break up.

Their audible chattering can often be heard just before they emerge, about 15 minutes after sunset, and it can be exciting to watch them return at dawn, though householders may previously have been unaware of their presence.

Common pipistrelle (photo © BCT/Hugh Clark)

Males usually roost singly or in small groups. In late summer and early autumn they defend mating roosts to which they attract females by making ‘song flights’ and social calls as they fly.

Distribution, status and conservation

Common pipistrelles are widespread throughout the UK and the rest of Europe, but nationally numbers have declined dramatically over the last few decades. Although populations have started to show signs of recovery in more recent years, they are nowhere near the level of 50 years ago.

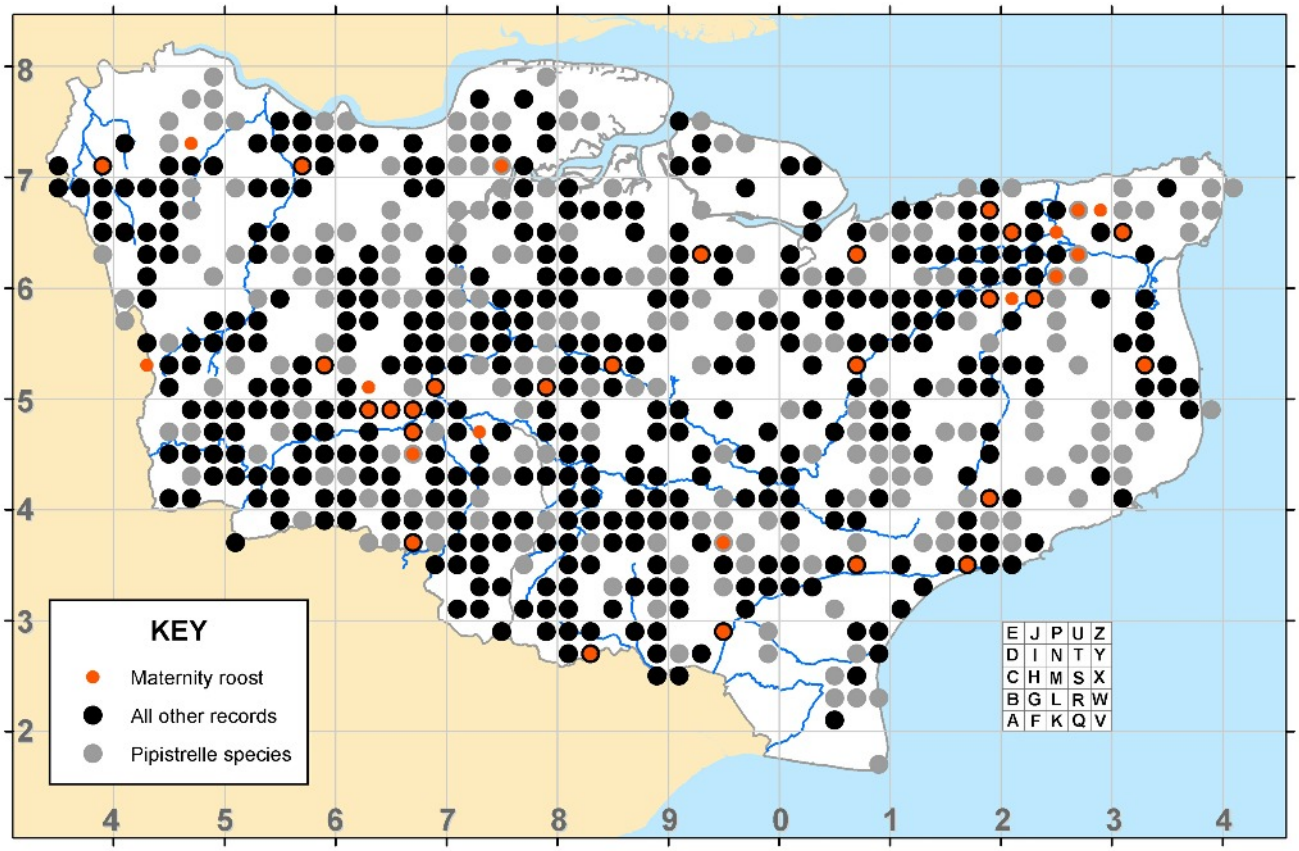
Car survey records have confirmed common pipistrelles as the most abundant bats in Kent, but they are still vulnerable to loss or severance of habitat, through development and transport links.

As the species most likely to be seen in or near our homes, we can help increase its food supply by careful garden planning. Extending the period when a wide range of nectar-rich flowers are in bloom, and leaving some grass to grow as food for insect larvae, can make a real contribution to helping bats.

Soprano pipistrelle

Order: Chiroptera

Pipistrellus pygmaeus



Soprano pipistrelle (photo © BCT/Dave Short)

Identification

Head and body length (mm): 35-45
Forearm length (mm): 29-34
Wingspan (mm): 190-230
Weight (g): 3-8

The soprano pipistrelle has medium to dark brown fur, more or less uniform in colour. The skin of the face and around the eyes is usually pink in colour.

The common and soprano pipistrelles, our commonest bats, were only recognised as separate species in the late 1990s. Prior to that all were recorded as *Pipistrellus pipistrellus*. The soprano lacks the dark face of the common pipistrelle and has a slightly more rounded head. There is an obvious ridge between the nostrils (internarial ridge) in soprano pipistrelle, and the pattern of elastic fibres in the wing can also help to distinguish the two species. Adult soprano pipistrelles often, but not always, have a musky smell. When using a bat detector it is usually, though not always, possible to separate them by the peak frequency of their echolocation calls.

Echolocation

To distinguish them from common pipistrelles they are often referred to as '55s'. Although social calls and chatter in the roost are audible, their echolocation calls are ultrasonic. On a bat detector they can be heard as a series of clicks and slaps, similar to those of the common pipistrelle, but are loudest at around 55 kHz on average. Pipistrelles with peak frequency above 52 kHz are classified as soprano pipistrelle.

Habits

Whilst the common pipistrelle is a generalist found in a wide range of habitats, soprano pipistrelles are more specialist. They usually forage in or near wetland habitats, over lakes and rivers, and also along woodland edges and tree lines. They feed mainly on flies, particularly the midges and mosquitoes associated with water.

Summer roosts of females are in tree holes, or in tight spaces on the outside of our houses, including modern ones. Single or small numbers of bats are found only occasionally in winter, in crevices in buildings and trees. Little is known of their hibernation habits and they are rarely found underground.

Reproduction and life cycle

Popular spots for maternity roosts are under hanging tiles and weather boarding, behind barge boards, between roof felt and tiles or in cavity walls. They are usually faithful to their roost, returning each year, and summer roosts are often larger than those of the common pipistrelles. Their audible chattering can often be heard just before they emerge, about 15 minutes after sunset, and it can be exciting to watch them return at dawn, though householders may be unaware of their presence. The young are fed solely on mothers' milk for three to four weeks. After about four weeks the young start to fly and at six weeks they are able to forage for themselves. Once the young are foraging the maternity roosts start to break up.

Soprano pipistrelle (photo © BCT/Daniel Hargreaves)

Males usually roost singly or in small groups. In late summer and early autumn they defend mating roosts to which they attract females by making 'song flights' and social calls.

Distribution, status and conservation

The soprano pipistrelle is widely distributed across the UK, but populations have declined in recent decades. Very large summer roosts were not unusual 50 years ago: several of around 1,000 were recorded by the KBG in the early 1980s, but all but one of these has been lost or reduced in size. Although national monitoring suggests that numbers have remained steady over the last 15 years, the average size of maternity roosts in Kent appears to be much smaller than in the past.

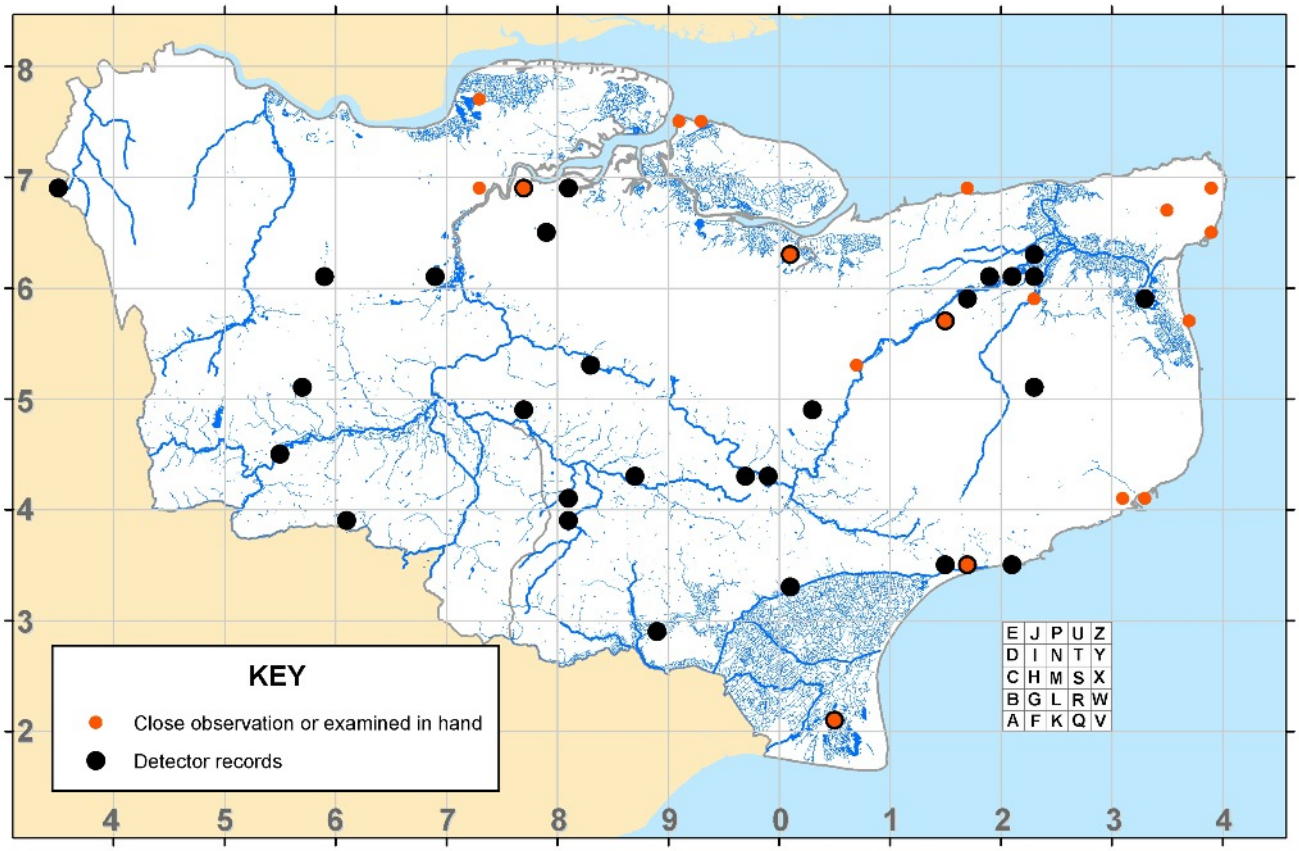
The map reveals that most of the known maternity sites are close to rivers.

In addition to making gardens more bat-friendly, as described for the common pipistrelle, their habitat can be improved by providing a network of new patches of woodland. These can be quite small, but should be no more than about 500 m apart and connected by hedges. Some taller trees should also be allowed to grow in hedges.

Nathusius' pipistrelle

Order: Chiroptera

Pipistrellus nathusii



Identification

Head and body length (mm): 46-55
Forearm length (mm): 32-37
Wingspan (mm): 228-250
Weight (g): 6-10

Nathusius' pipistrelle has reddish-brown fur which is longer than that of common and soprano pipistrelle, occasionally showing frosted tips, and the belly fur is pale. Ears, membranes and face are usually very dark. It is bigger than the common and soprano pipistrelles and has broader wings, with slightly more shaggy fur. Its rapid flight is faster and less manoeuvrable, but its foraging style is similar.

Echolocation

Calls are similar in sound to the common and soprano pipistrelle, but the peak frequency is slightly lower at around 40 kHz on average. Pipistrelles with peak frequencies between 36 and 41 kHz can usually be classified as Nathusius' pipistrelle. The repetition rate is noticeably slower than in common and soprano pipistrelles and more regular; this increases in cluttered environments where it can also tend to sound like dry clicks, more like Myotis calls.

Habits

There is still much to be learnt about Nathusius' pipistrelle. It was regarded as a vagrant in Great Britain until the mid-1980's, then upgraded to a winter visiting migrant as it was recorded more frequently. Since the 1990s occasional maternity colonies have been found, in addition to migratory individuals in autumn and winter. The species is now known to be widespread with some resident individuals, and an increasing number of migrating bats in autumn.

It forages along lowland woodland rides and edge meadows, and is most frequently observed over or near water, including lakes, rivers, dykes and marshy areas, feeding mainly on medium-sized flying insects such as aquatic flies, midges and mosquitoes.

Nathusius' pipistrelle (photo © Brett Lewis)

Reproduction and life cycle

Summer roosts in continental Europe are almost always in tree holes, but the known British nursery roosts are in buildings. It also roosts in bat boxes. Male bats usually roost alone in summer, and set up roosts close to the maternity roost site during the main mating period from July to early September. Each night they spend long periods singing social calls from their roost to attract females for mating.

Distribution, status and conservation

Nathusius' pipistrelle is a migratory species and mostly breeds in north east Europe, moving south and west in winter. It may fly long distances, often over 1,000 km from summer roosts to winter hibernacula. With Kent being so close to continental Europe, it is no surprise that this species appears to be found more frequently here than further north.

The first record in Kent was of an exhausted individual on the floor of the customs shed at Dover Docks in 1993, thought to have just flown across the Channel. In January 2002 several individuals were discovered hibernating in a disused building in Chatham, close to the river Medway, and since that time others have been heard increasingly on bat detectors, usually close to water. Records of grounded bats tend to be along the coast in autumn, including one on a curtain in Herne Bay, on the south coast and at Sheerness Docks, suggesting they are on migration.

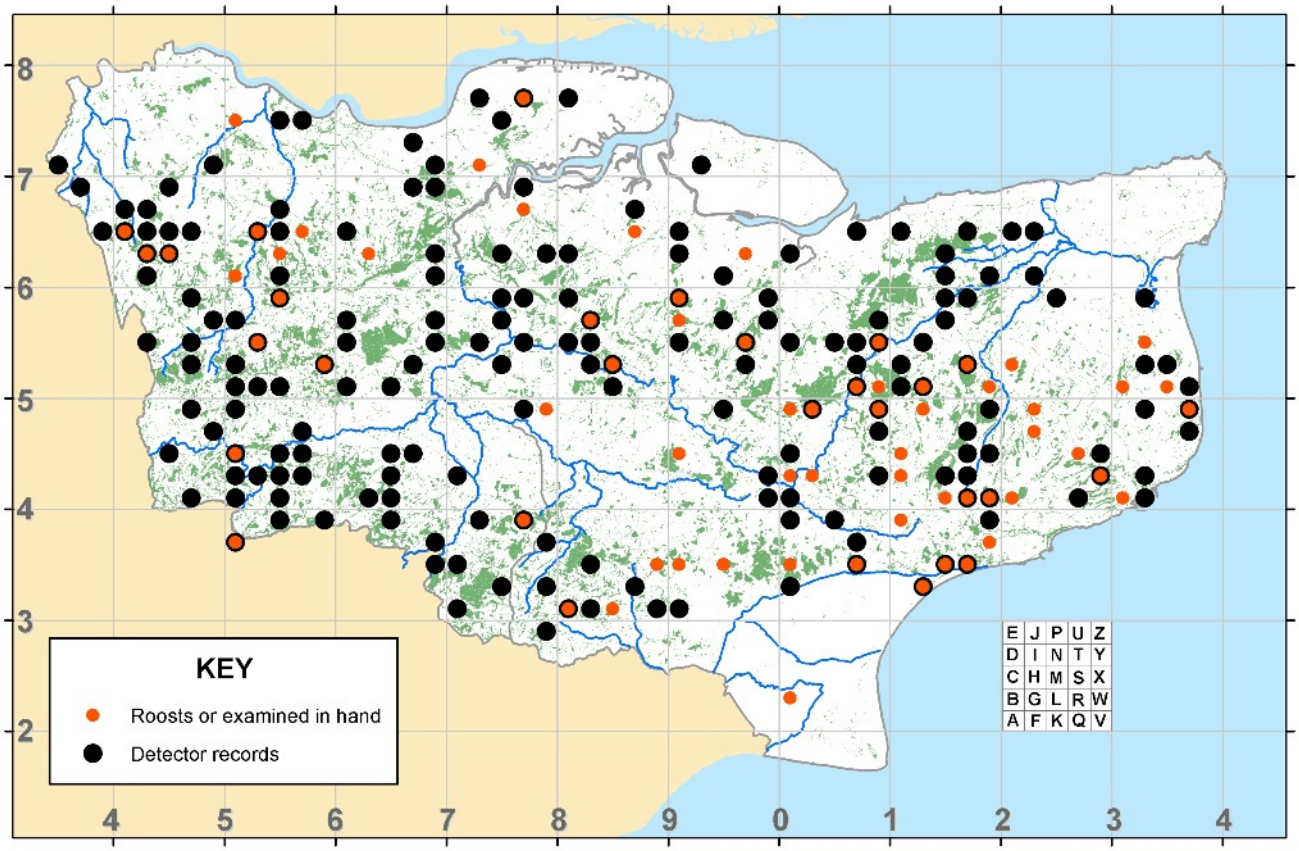
In June 2012 a baby bat was found on a back doorstep under a gable apex near Lydd; as the adults had moved on the pup had to be hand-reared. It was thought to be a common pipistrelle, but when it reached eight grams identification had to be re-thought! In August the householder where the pup had been found reported droppings under his neighbour's gable apex as well as his own bat boxes, and 53 bats were counted out. This was Kent's first known Nathusius' maternity roost. A team returned two weeks later and using a time expansion detector recorded social calls from the bat boxes, confirming that at least one box was a mating roost.

Nathusius' pipistrelle, mother with twins (photo © BCT/Hugh Clark)

Serotine

Eptesicus serotinus

Order: Chiroptera



Serotine (photo © BCT/Hugh Clark)

Identification

Head and body length (mm): 58-80
Forearm length (mm): 48-55
Wingspan (mm): 320-380
Weight (g): 15-35

The serotine has dark shaggy fur above and is paler underneath. Face, ears and membranes are black. This large bat looks more bird-like than other bats as it flies, with its broad wings and slow flight. It usually flies about four to 12 m above the ground, along woodland edges, over open pasture and around large trees close to the leaves. It is the only British bat that has a tail which extends beyond the edge of the tail membrane.

Echolocation

Calls range from about 25 to 50 kHz, with the peak frequency at around 25 to 27 kHz, or higher when close to the ground. Calls sound like ‘smacks’ on a bat detector. The repetition rate is very irregular, and can be confused with noctules or Leisler’s in certain environments.

Serotine (photo © BCT/Hugh Clark)

Habits

Parkland, pasture and woodland edge are important foraging sites for this species, especially where cattle graze. In spring it feeds on flies and moths but in summer chafers and dung beetles are an important part of its diet.

It relies heavily on buildings for roosting in summer, in disused chimneys, under ridge tiles, inside cavity walls and other small crevices. Access points to the roost are generally high up at about six to eight metres above the ground. Most roosts are in older buildings from around 1900. Very few serotines are found in winter; only occasionally have they been recorded in caves, and it is likely they hibernate in buildings.

Reproduction and life cycle

Reproductive females usually remain at a single roost during the summer, but other roosts nearby may also be used by non-breeding females. Almost nothing is known of the mating behaviour.

Distribution, status and conservation

One of our less common species, monitoring data collected as part of the National Bat Monitoring Programme (NBMP) shows no overall significant change in the population since 1997, although sample sizes are small as this species is not often encountered during surveys. There is also some suggestion of regional differences, with this species faring better in the south west than in the east. Loss of both feeding habitat where large insects can be found, and of buildings for roosting, have made it vulnerable.

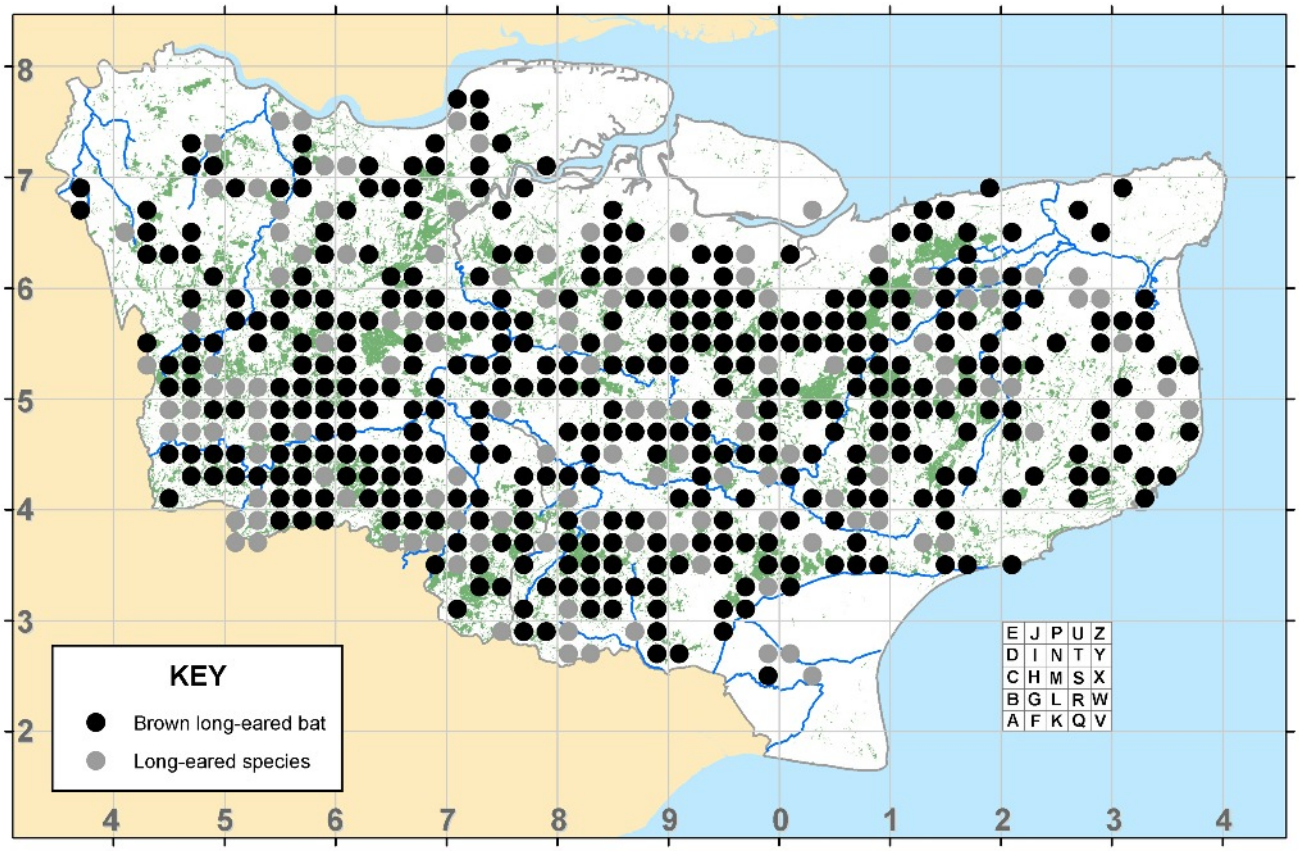
In Kent the decline has given cause for concern for over a decade. A number of summer roosts holding these bats over the last 20 years appear not to have been used recently. Numbers at roosts monitored each summer have declined, some to single figures. One roost in east Kent has been monitored since 1986, when 62 adults were counted out; in 2012 only 23 adults emerged.

The conservation of serotines depends on the effective management and protection of the farmed landscape around maternity roosts and other sites used by bats. Permanent grazing pasture is crucial.

Brown long-eared bat

Order: Chiroptera

Plecotus auritus



Brown long-eared bat (photo © John Black)

Identification

Head and body length (mm): 37-52
Forearm length (mm): 34-42
Wingspan (mm): 230-285
Weight (g): 6-12

Adult brown long-eared bats have light brown fur and are pale underneath; juveniles are greyish with dark faces. These medium-sized bats emerge after dark, preferring not to fly in the open. Their flight is slow and fluttering, but short broad wings enable them to manoeuvre amongst branches, gleaning insects from the leaves as well as catching them in free flight. They frequently hover in front of moths before taking them, and occasionally land on the ground to tackle prey. They have very large eyes and sometimes use sight rather than echolocation to detect their prey. Their enormous ears are nearly as long as their body, but are often curled back or tucked under their wings when at rest.

Echolocation

Unlike other species in this family, long-eared bats echolocate through their noses. Echolocation calls range from 25 to 50 kHz, peaking at 35 kHz. They are so quiet they can only be heard as 'ticks' through a detector from two to three metres away, so are often known as 'whispering bats'.

Habits

This is a woodland bat. It prefers to forage in open deciduous woodland, parkland, and large gardens and trees in towns and cities. Beetles, flies, earwigs and spiders are taken, but moths are a particularly important part of their diet. As many moths can hear the ultrasound of bats, the ability to approach prey silently is important.

Summer roosts are usually in trees or older buildings; churches, barns and old houses with large roof voids that are close to trees so the bats can avoid crossing open spaces when they leave the roost. They are very faithful to their roosts, and usually arrive in summer roosts earlier and stay later into the year than other species. As they leave to feed, they disperse along regular routes, flying close to vegetation. Usually they feed within 500 m of the roost, and never further than three kilometres. Large prey are taken to a night roost or regular feeding perch such as a porch or barn, sometimes identifiable by piles of discarded moth wings. In winter they hibernate in tree holes, caves, tunnels and deneholes preferring very cold sites.

Reproduction and life cycle

Nursery roosts are usually composed of 10 to 50 bats. Unlike some species, males are often present. One young is born around late June to mid-July and weaned at six weeks.

Small numbers are found at underground swarming sites in autumn. Bats of this species are known to have lived up to 30 years.

Brown long-eared bat (photo © Sean Hanna)

Distribution, status and conservation

After the pipistrelles, this is probably the most abundant bat in the UK. Prior to 2008, records in Kent were mainly of roosts in buildings where this species' droppings are very obvious, along with bats seen in hibernation and grounded bats. Their habit of flying close to the ground makes them very vulnerable to cat predation. The low intensity of their calls explains the absence of detector records. The BCT Bechstein's Bat Survey in Kent 2008/9, using an acoustic lure to trap bats in cluttered woodland, led to many new records. This was the species most frequently captured in woodland, both in Kent and other counties involved in this survey, highlighting their under-recording in most surveys.

The species appears to have undergone a major decline during the twentieth century. Although NBMP data suggests this decline has levelled and the population is currently stable, evidence in Kent of the species' past presence (in the form of old droppings) has been found in many buildings where bats no longer appear to be present, or are only present in small numbers. KBG believes there is still cause for concern in Kent, where the over-management of woodlands and the conversion of old farm buildings such as oast houses and barns has contributed to their loss by reducing suitable roosting and feeding sites.

Other bats

Order: Chiroptera

Lesser horseshoe bat (photo © John Black)

Lesser horseshoe bat

Rhinolophus hipposideros

Head and body length (mm): 35-45
Forearm length (mm): 35-42
Wingspan (mm): 200-250
Weight (g): 5-9

Adult lesser horseshoe bats are pinky buff-brown, juveniles are greyish. One of the smallest British species, the lesser horseshoe bat, wraps its wings around its body when at rest, and has a complex noseleaf related to its echolocation system (both features shared with the only other member of the horseshoe family in the UK, the greater horseshoe bat). It is rare in Britain and is now restricted to Wales, western England and western Ireland. Its marked decline in numbers is attributed to several factors including intensive agricultural practices. The last known individual of this species in Kent was recorded in November 1954 in Willington Street caves, Maidstone.

Greater mouse-eared bat (photo © BCT/Daniel Hargreaves)

Greater mouse-eared bat

Myotis myotis

Head and body length (mm): 65-80
Forearm length (mm): 57-68
Wingspan (mm): 365-450
Weight (g): 24-40

The greater mouse-eared bat has sandy-coloured dorsal fur which contrasts strongly with the white fur underneath. This is the largest and the rarest bat in Britain. In the past 25 years there have been few records of this species. A single male was found at Dover in February 1985, hibernating in Napoleonic fortifications under the Western Heights. One individual has been recorded annually for some years hibernating in Sussex, but there are no other known records in the UK.

Barbastelle bat

Barbastella barbastellus

Head and body length (mm): 40-55
Forearm length (mm): 35-45
Wingspan (mm): 260-290
Weight (g): 6-13

Barbastelle bat (photo © BCT/Hugh Clark)

Barbastelle bats have dark fur showing lighter tips on the back, and skin surfaces of black or dark brown. They forage over a large area in a range of habitats. In September 2009 a member of KBG was carrying out an NBMP Nathusius's bat survey near Tonbridge. There was a good deal of bat activity which was recorded on a Duet bat detector (which records in frequency division). When analysing the recording later he discovered one pass by what he believed was possibly a Barbastelle bat. As there had been no previous records in Kent, he sent the recording to others with more experience of this species, who thought it was 'almost certainly a Barbastelle bat'. As the identification was based on a single recording of a passing bat only, the KBG are currently counting this record as unconfirmed.

Grey long-eared bat

Plecotus austriacus

Head and body length (mm): 41-58
Forearm length (mm): 37-45
Wingspan (mm): 255-300
Weight (g): 7-12
Thumb (mm): 5-6.5
Tragus (mm): 5.2-6.6

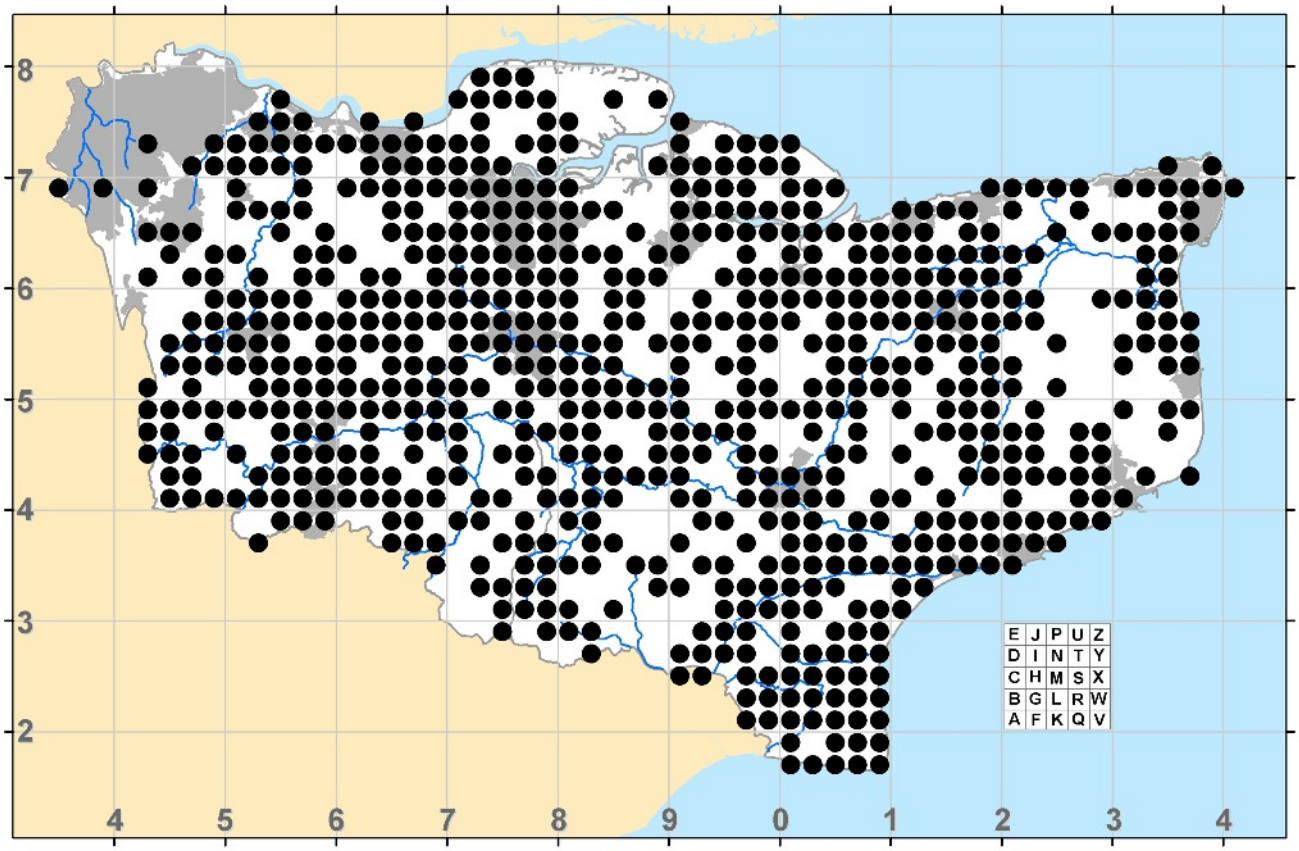
Grey long-eared bat (photo © BCT/Hugh Clark)

Grey long-eared bats are amongst the rarest mammals in the UK, found only in a few places in southern England. It can be very difficult to distinguish from the more common brown long-eared bat. Relatively little is known about its habitat use which is different to the brown long-eared bat. Despite the closeness of Kent to the continental mainland, where it is much more common, there have only been two validated records of this species in the county, both in the 1980s. One was recorded hibernating in an underground passage in the Napoleonic fortifications at Dover, and the other was discovered on a ship in Dover harbour.

Fox

Order: Carnivora

Vulpes vulpes



Identification

Head and body length (mm): 570-755
Tail length (mm): 335-470
Weight (kg): ♂ 5.5-8.2 ♀ 3.5-6.7

The coat of the fox is a mix of tawny-brown and grey with a long and often large bushy tail. It also has a long pointed snout and large pointed ears.

Field signs

Droppings are usually black when fresh and pointed if there is much indigestible material, e.g. fur or feathers. They are often deposited on prominent objects: stones, fallen branches, molehills. The characteristic smell of fox may be readily detected.

Habits

The fox is an omnivorous scavenger and hunter that lives below ground in cold or inclement weather or to breed. It may also prefer to lie up under ground cover in hot weather. Mainly crepuscular or nocturnal, with the level of diurnal activity reflecting the degree of persecution.

Good places to see foxes are generally where human activity is low, such as: railway embankments, schools, where 'temporary classrooms' (usually decades old) will allow for access beneath the building, old graveyards that have been left with some ground cover and mature household gardens. The best time of day to see a fox is a little after dusk or a little before dawn.

A resilient species, one observed in north Kent had three legs, one eye and no tail, yet managed to survive the harsh winter of 2012-2013.

Fox (photo © Selwyn Dennis)
Inset. Fox track against five pence piece (photo © Suzanne Kynaston)

Reproduction and life cycle

The breeding season begins around Christmas and a vixen has a three-day window of fertility once she comes into season. Vixens have a tendency for promiscuity and successful mating will result in an average litter size of five cubs, born black, blind and deaf. The vixen takes overall control but may use a previous year's subordinate daughter as a surrogate mother, and relies in part on the dog fox to provide food. Cubs are born after 53 days and are part-weaned at around three weeks.

The vixen will move her cubs to a back-up den if required. A vixen was once seen re-locating her cubs early in the morning to a box when the den hole had been blocked up.

Distribution, status and conservation

In Kent in recent years evidence of very early cubs born in January has become much more frequent. The breeding season also appears to be extending over a longer time period.

Studies performed by the Mammal Society and Bristol University estimated that during the period 1999-2004, fox numbers nationally had fallen by as much as 13% but were now almost fully recovered. The study showed the only area of the UK at that time which had an increase in population was East Anglia, where fox numbers had risen by three percent.

Changes in habitat as a consequence of land development constantly occur within the region; this probably has little effect on the opportunistic fox.

Badger

Order: Carnivora

Meles meles

Badger (photo © Selwyn Dennis)

Badger track against 10 pence piece (photo © Suzanne Kynaston)

Identification

Head and body length (mm): 673-803
Tail length (mm): 114-190
Weight (kg): ♂ 9.1-16.7 ♀ 6.6-13.9

A fully-grown badger has a grey-brown pelage overall, with darker fur to the limbs and occasionally the tail, a prominent black-and-white striped head, and usually white tips to the ears. The overall appearance is of a stocky animal, unmistakable to most people and not readily confused with any other native mammal. The hairs of the coat are usually banded, with a broad dark band between a short white tip and longer pale shank. The guard hairs are quite stiff and narrowly oval in cross-section. There is a degree of sexual dimorphism, with males (boars) being slightly larger and heavier than females (sows).

Field signs

Badger field signs include their characteristic latrines, where multiple dung-pits occur in one place. Paths are often very conspicuous as are setts, which have a large characteristically D-shaped entrance.

Hairs are often found attached to brambles and barbed wire.

Habits

Badgers often live communally in large underground setts in groups of four to six animals on average, although they can be solitary at certain times of the year. On average badgers live for four to eight years in the wild. Their setts are found throughout all types of habitat including some towns but are particularly common in wooded areas.

Reproduction and life cycle

Badgers have a reproductive technique known as embryonic diapause. Sows having their first oestrus cycle and those with cubs, mate and then keep the fertilized blastocysts in a state of suspended development until they implant in the uterine wall and start developing, usually in December. Despite the presence of the blastocysts, mating and additional oestrus cycles can still occur. One to five cubs are born in January to February after about seven weeks' gestation, although occasional litters can occur at other times. Cubs are born blind but are otherwise similar, occasionally paler versions of their parents. Boars are fairly territorial and occasionally polygamous but this is rare.

Distribution, status and conservation

Due to the on-going persecution of badgers, a distribution map has purposely been omitted from this account. Badgers are common in much of Kent and found throughout the whole of the county wherever there is suitable habitat for establishing their setts. The generally secretive and nocturnal nature of this species ensures that most reported sightings are of dead animals as a result of road kill. They used to occur on the Isle of Sheppey but were probably made extinct there in the mid-Victorian period. Badgers and their setts are fully protected by the 1992 Protection of Badgers Act.

Badger latrine (photo © Jon Bramley)

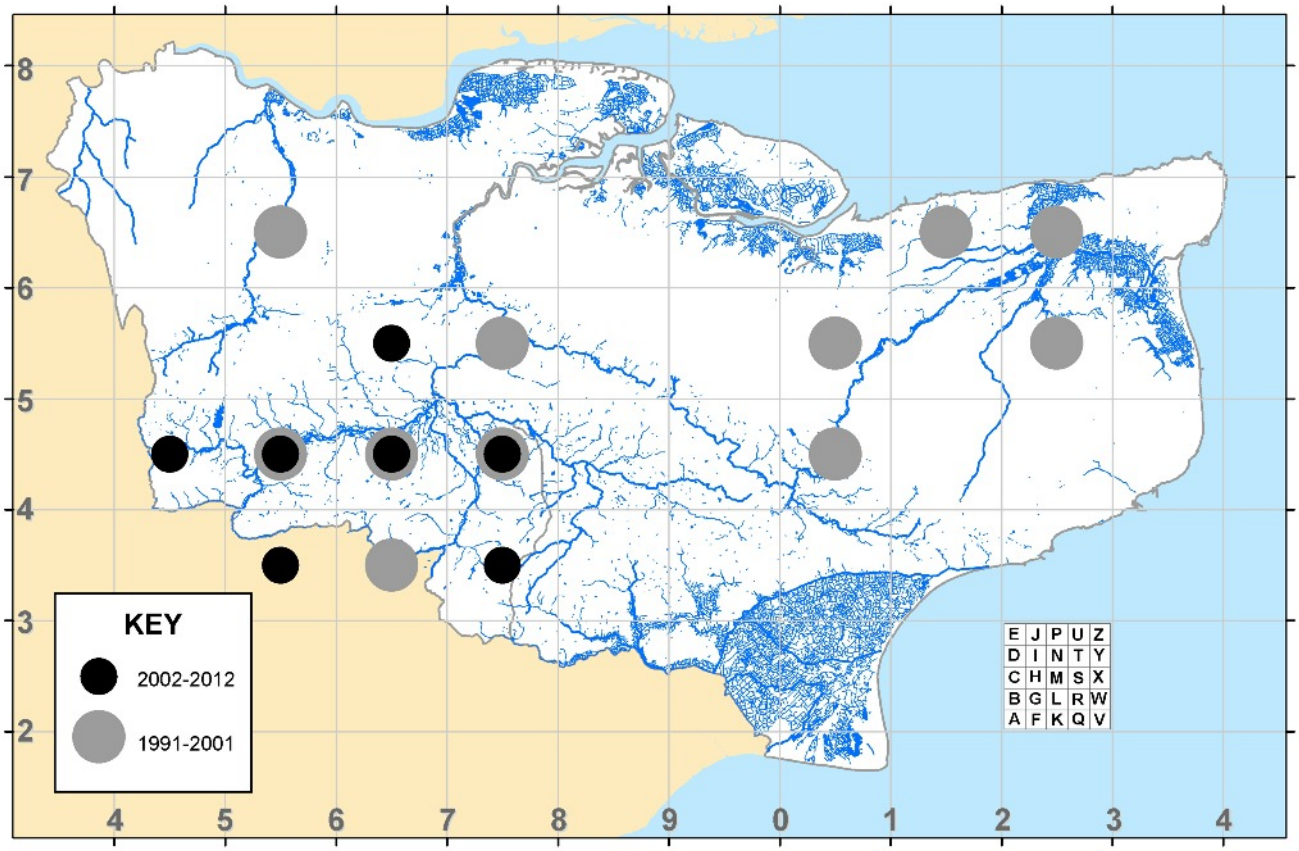
Badger sett entrance (photo © Suzanne Kynaston)

Badger sett on chalk bank (photo © Suzanne Kynaston)

Otter

Order: Carnivora

Lutra lutra



Identification

Head and body length average (mm): ♂ 722 ♀ 654
Tail length average (mm): ♂ 419 ♀ 381
Weight: average (kg): ♂ 8.75 ♀ 6.07

Otters have a broad muzzle and large flattened head, and a thick tapering tail. Their fur colour is medium to rich dark brown and may appear black when wet. Some lighter grey areas may occur around the throat and underparts and there are often white patches around the upper lip and chin.

Field signs

On soft sediments, tracks of otter are distinctive, showing five toes arching around the front of a central pad. Webbing between the toes shows rather rarely, but may be present along with claw marks on very soft, muddy areas. Regular paths, especially around holt sites, and otter slides have been found in Kent. Generally surveys seek to find otter faeces (spraints) which are deposited on prominent places such as fallen tree trunks, under bridges and on rocks. These droppings have a rather pleasant smell, often described as cut grass mixed with fish oil, and can vary in size from very small dabs to over 100 x 150 mm. Spraints generally contain numerous fish bones and are often dark green to black in colour when fresh, but dry to resemble cigar ash.

Habits

Adult otters without young live a solitary life in linear freshwater habitats, though group territories have been reported in large lakes and some marine environments in the UK. Home ranges can be large and individual otters have been recorded as utilising up to 50 km of riverine habitats in several areas. Males tend to have home ranges that cover one or more females. Otters tend to be more active foraging for fish, amphibians and other prey at night, especially in England. During the day they may rest above ground in couches, or in underground holts that are often sited around root systems of riparian trees.

Otter (photo © John S Young)

Reproduction and life cycle

Otters show aseasonal breeding in England, with perhaps some tendency for more summer births in Scotland. There is one breeding cycle per year, with no delayed implantation, and litters tend to be two to three cubs born after a gestation period of two months. Cubs are independent after a year though some may accompany their mother for longer periods. Otters typically live for three to four years but individuals as old as 16 years have been recorded in the wild.

Distribution, status and conservation

Due to the scarcity of this species within Kent and a resulting need for protection, the distribution map shows a central occurrence dot within a hectad for all records.

Prior to 1956, otters were distributed on all river catchments in Kent, though generally at rather low numbers. At that time, good populations were recorded in the Medway catchment, above Maidstone, and in the Stour Valley below Ashford.

After 1956 otter numbers in Kent significantly declined due to pesticide and other water pollution, loss of bankside habitat (especially riparian trees and holt areas) and the electrification of railway lines. For example the electrification of the line between Ramsgate and Deal is thought to have eliminated the otter population on the Worth Marshes.

A South East Otters and Rivers Project, based at Hampshire Wildlife Trust but covering Kent, was started in 1989 and ran for some 20 years. During that time a number of riparian habitat enhancement projects were carried out and surveys undertaken. This, in conjunction with the National Otter surveys carried out each decade since 1977, showed that otter numbers have increased nationally and also in some parts of the southeast, especially in Hampshire. However, otters in Kent have not shown a significant increase, which may reflect high levels of habitat fragmentation, unfavourable management of riparian habitat and the county's rather isolated geographical position.

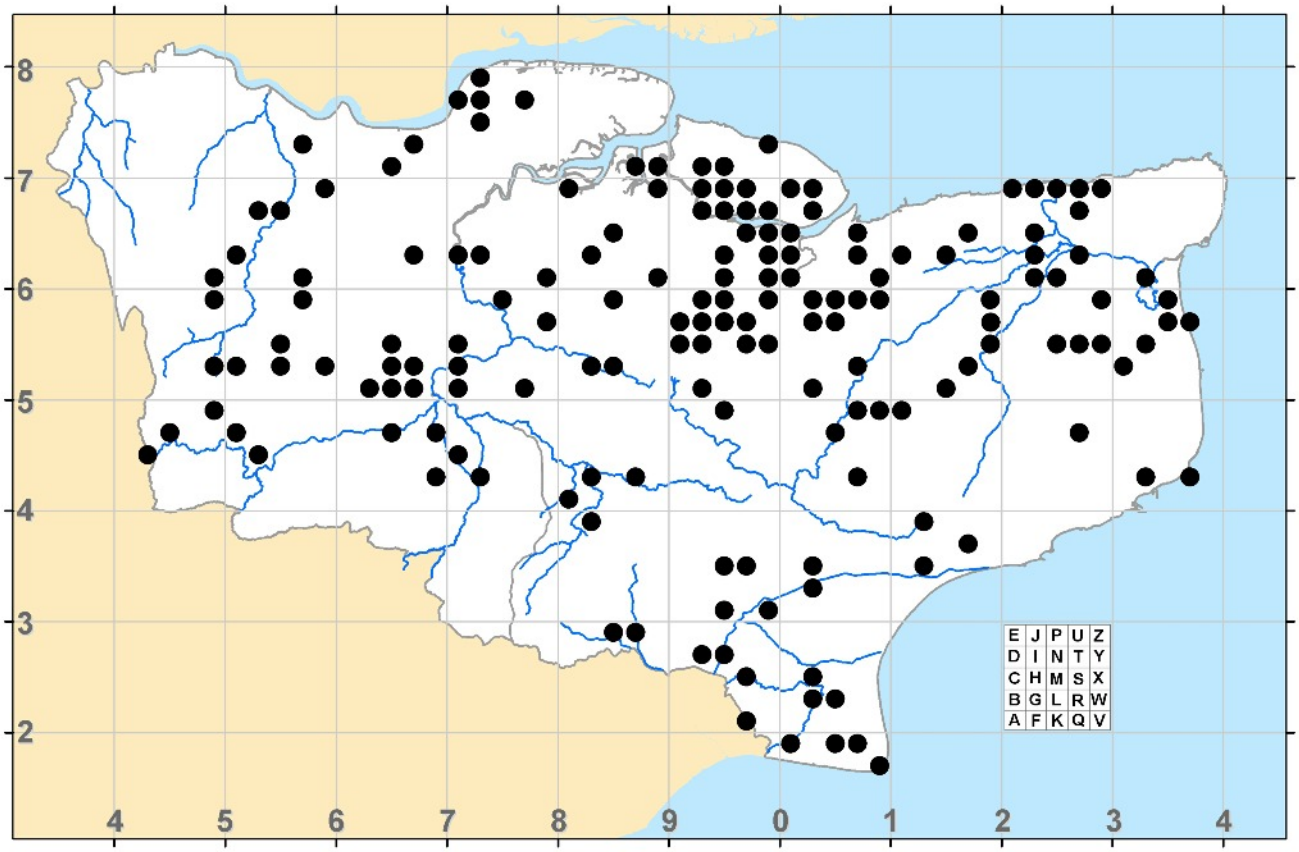
Current Kent records indicate that otters are limited to the Medway catchment. It is very likely, given the increase seen elsewhere, that otters will recolonise many of their historic habitats in Kent.

Significant work is still required to reduce threats and barriers. Increasing connectivity and allowing suitable holt sites to develop, and encouraging future sympathetic riparian habitat management are likely to be key.

Stoat

Order: Carnivora

Mustela erminea



Identification

Head and body length (mm): ♂ 260-318 ♀ 244-278
Tail length (mm): ♂ 67-199 ♀ 69-100
Weight (g): ♂ 252-471 ♀ 180-303

Footprint:
Forefoot c. 20 x 22 mm, hindfoot c. 42 x 25 mm
Bounding stride c. 300-500 mm between each group of four prints.

Stoats are characterised by their long, cylindrical shape and short legs, allowing them to pursue their small mammal prey into its burrow. They are chestnut-brown to sandy-brown in colour with a pale, creamy belly, separated by a distinct straight line on the flanks. The tail has a distinctive black tip. Partially white (ermine) stoats, giving a mottled appearance, have been seen as far south as Wiltshire and Essex, but so far none have been confirmed in Kent. Males are about half as heavy again as females.

A stoat is generally larger than a weasel, with paler brown dorsal fur compared to the darker brown weasel. Stoats have creamy belly fur separated by a straight flank line; weasels have whiter belly fur and an irregular flank line. Weasels' tails are shorter than stoats and have no black tip.

Field signs

Field signs are very rarely found. Stoat droppings are 40-80 mm long, thin and twisted, containing fur and feathers. They may occasionally be found in prominent spots or near their dens, which are usually made in the burrows of their prey, in hollow trunks or in stone walls. They have five toes on their forefeet and hind feet and their tracks may make a weaving line along a hedgerow or fence line in soft mud or snow.

Habits

Stoats are active day and night, with bouts of activity lasting 40 minutes and occasionally up to three to four hours, and rest periods lasting one to four hours. In winter they become more nocturnal. Their main prey is small and medium-sized mammals, with rabbits being a staple part of the diet,

Stoat, showing the straight flank line, characteristic black tail tip and creamy, not white, underparts (photo © Andy Cade)

particularly for males, which take a higher proportion of rabbits than females. They may also take game birds, other birds and their eggs. Prey is killed by a bite to the back of the neck. When prey is abundant they may kill more than they need and cache in a safe place. This is a strategy for an animal with high metabolic needs and unpredictable resources.

Male territories are larger than females and will encompass several female territories. However, territory size will vary between seasons depending on the relative importance of food and mates, expanding in the spring to include more female territories.

Stoats are very adaptable and can be found in a wide range of habitats as long as they have sufficient cover, including moors, marshes, woodland and farmland. Stoats are seen at higher altitudes than weasels, but are rarely seen in urban areas. They are able swimmers and have colonized many offshore islands.

Two stoats were observed on Cliffe Marshes hunting a moorhen and seemingly working together to corner and kill the bird. One stoat remained in the water and appeared to drive the bird to the other waiting stoat which performed the kill.

Reproduction and life cycle

Mating occurs between April and July, with implantation delayed until the following spring (embryonic diapause). A single large litter of up to 12 babies (kits) is produced once a year, enabling stoats to take advantage of temporary abundant resources. However, it can also be a limitation, so they have evolved an extraordinary strategy. Shortly after an adult female has given birth, she comes into oestrus again. A male attracted to the den, if granted access, will mate with her. He will then also mate with each of her daughters, who despite being blind and hairless are sexually mature. Each young female stoat is then pregnant before she leaves the nest, enabling them to readily colonize new habitats.

Distribution, status and conservation

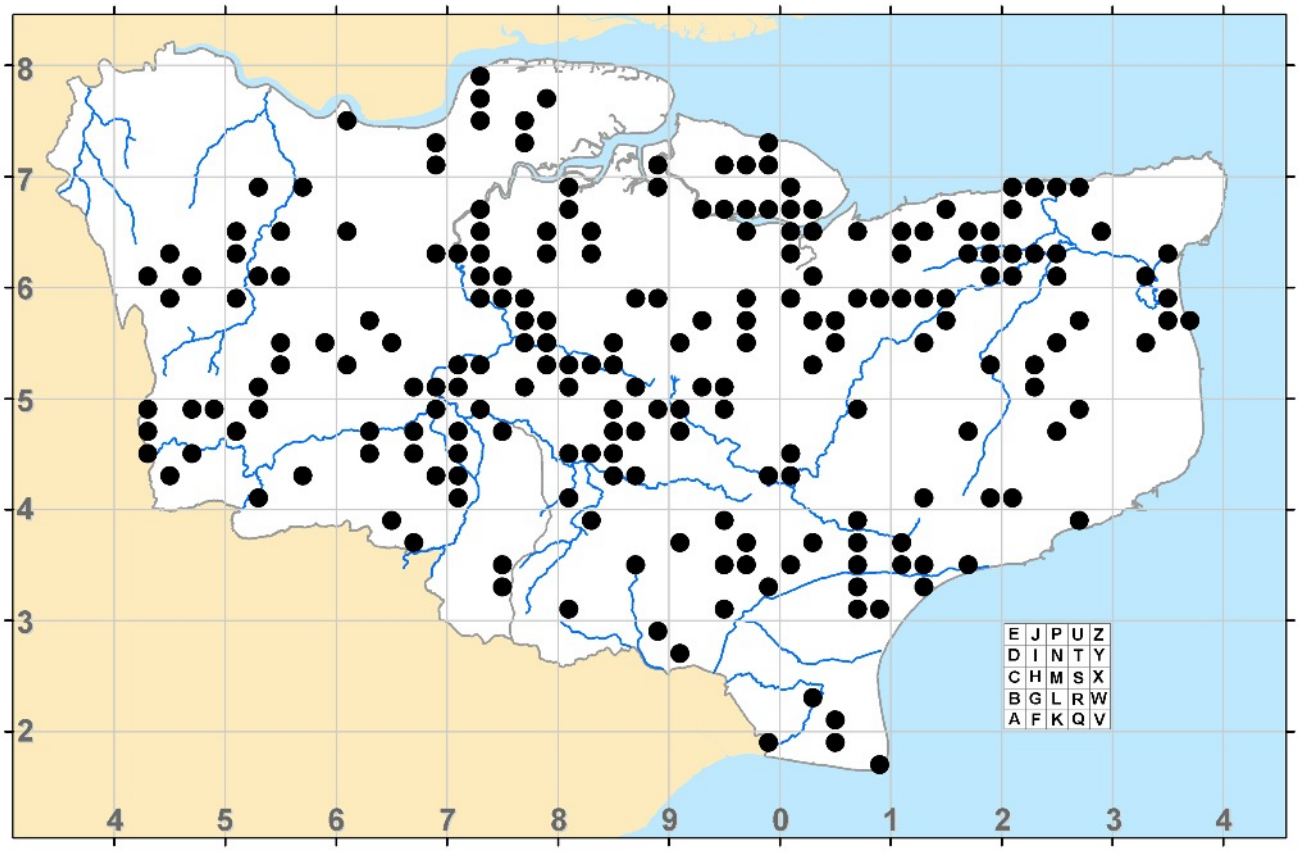
Stoats are present throughout Britain, occurring in every mainland county, and are well-established on many islands including the Isle of Sheppey.

Stoats are not protected under UK conservation legislation, but are included in Appendix III of the Bern Convention. They are heavily persecuted by game keepers because of predation on game birds and they can still be killed legally by shooting or the use of certain traps.

Weasel

Order: Carnivora

Mustela nivalis



Identification

Head and body length (mm): ♂ 195-248 ♀ 175-194
Tail length (mm): ♂ 32-62 ♀ 35-46
Weight (g): ♂ 81-195 ♀ 48-107

Footprint:
Forefoot (mm): c. 13 x 10 hindfoot: c. 15 x 13
Bounding stride (mm): c. 200-300 between each set of four prints.

The weasel is the smallest carnivore in Britain and is characterised by its long, cylindrical shape and short legs, allowing it to pursue small mammal prey into burrows. They have a chestnut-brown back and white belly demarcated by a wavy flank line (refer to the stoat account for other distinguishing features). Weasels in Britain do not turn white in winter.

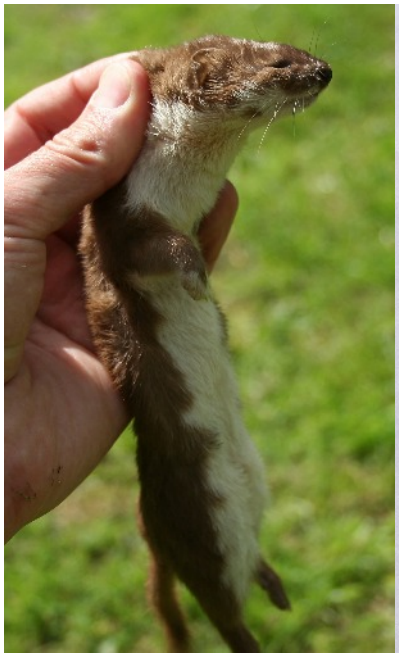
Field signs

Weasel droppings are long, thin and twisted, containing fur and feathers, and between 30-60 mm long. Occasionally nests can be found under corrugated iron sheets and are characterised by their droppings and half-eaten prey remains. They have five toes on each foot.

Habits

Weasels have several bouts of activity within a 24 hour period, each lasting up to 130 minutes interspersed with rest periods lasting a similar amount of time. They become more nocturnal in winter. It is a specialist hunter of small mammals with males occasionally taking young rabbits. Birds and birds' eggs are also commonly taken; very occasionally they may also take reptiles, amphibians and invertebrates. Territory size varies greatly according to food availability, becoming larger as prey density falls.

The habitats they occupy are determined by the presence of small mammal populations. They will



Left. Weasel showing irregular flank line (photo © Jon Bramley)
Right. Weasel, attacking and killing a common rat (photo © Selwyn Dennis)

use a wide range of habitats offering food and cover, but are less common where small mammals are scarce, such as in woodland with sparse ground cover.

Observations of wild weasels at the Wildwood Trust in Kent indicate that the population appears to have a two or three year cycle. Some years none are sighted, then during other years there will be numerous sightings, particularly around the captive water vole cages where they hunt for house mice. In November 2012, one was caught in a Longworth trap during a small mammal trapping course. It was a large male, caught in the trap with a dead yellow-necked mouse which had been killed by a bite to the neck. Presumably the weasel had followed the mouse in there!

Reproduction and life cycle

Adult females come into oestrus in February and may be mated immediately. After a gestation of 36 days up to eight blind, naked kits are born. The kits are generally weaned by May, at which point the female will come into oestrus again. Males and females become sexually mature at three to four months which means they could breed in their first year. As a result, weasels have a prodigious reproductive capacity and are able to increase their population rapidly when food is in plentiful supply.

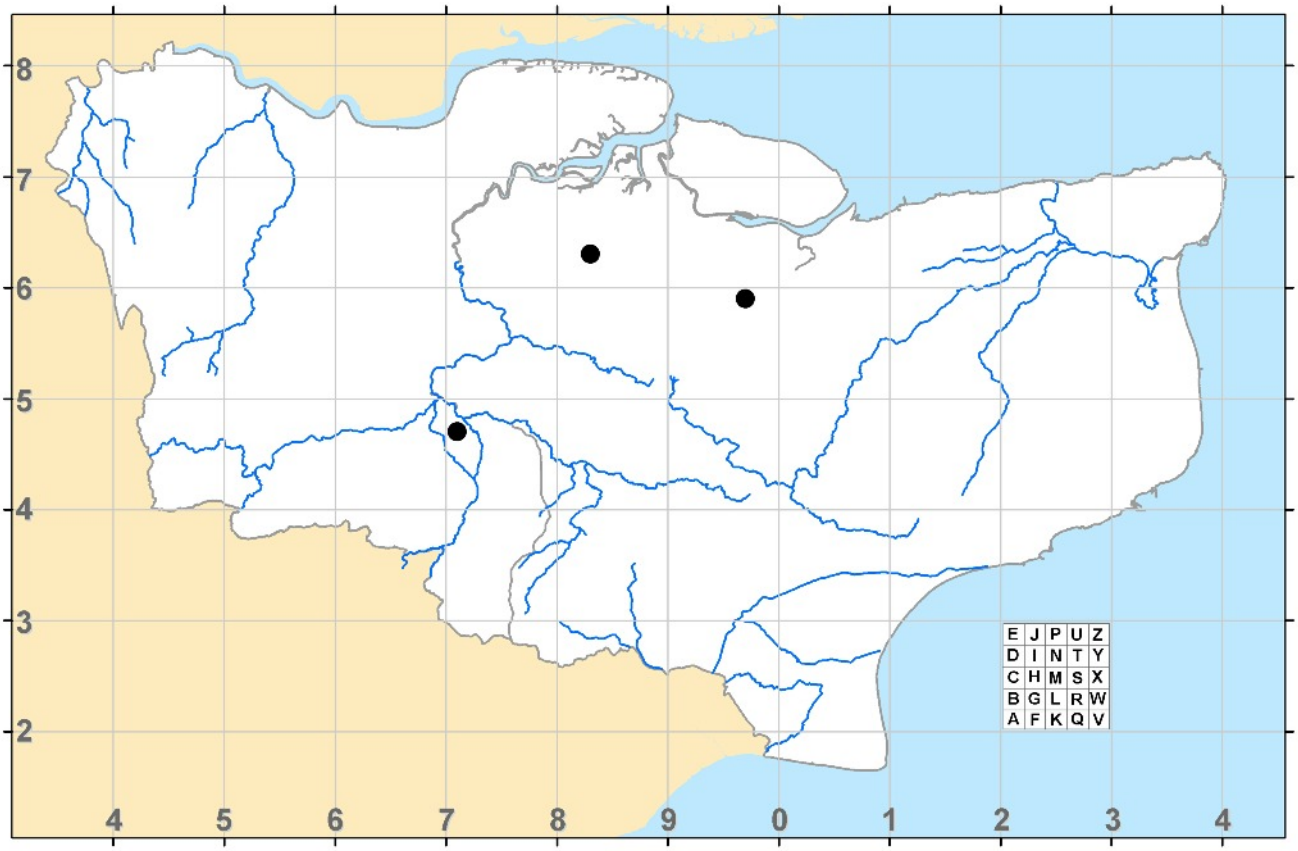
Distribution, status and conservation

Weasels occur throughout mainland Britain, but are absent in Ireland. They are established on some islands, including the Isle of Sheppey, but not on smaller islands or those without native stoat populations. Population sizes fluctuate widely on an annual basis, linked to prey density and breeding success, especially of voles. Weasels are not protected under UK conservation legislation, but are included in Appendix III of the Bern Convention. Many gamekeepers regard weasels as much less of a threat than stoats and most weasels are killed legally as a by-product of efforts to control stoat numbers.

Polecat-ferret and feral ferret

Order: Carnivora

Mustela furo



Polecat-ferret (photo © Jon Bramley)

Identification

Head and body length (mm): ♂ 390-430 ♀ 305-366
Tail length (mm): ♂ 123-156 ♀ 101-135
Weight (g): ♂ 1288-1789 ♀ 496-972

Footprint size is very variable:
Forefoot (mm): 25-40 x 30-35
Stride when bounding (mm): c. 400-600 between each set of four prints.

The polecat-ferret and feral ferret are both ferrets and can be distinguished from a true polecat if one or more of the following features are present:

- body fur is paler than the wild polecat type (taking account of seasonal pelage variations)
- dark fur on the face does not reach the naked skin surface around the nostrils
- pale cheek patches and frontal band are often very extensive and contrast poorly with the darker facial mask, which may be absent, taking into account seasonal variations
- pale throat patch is 50 mm or more in length

- polecat-ferret has one or more pale furred paws
- scattered white guard hairs occur over the body of polecat-ferret, especially on hindquarters and tail

The feral ferret and polecat-ferret are similar in size and proportions to the polecat. The feral ferret skull also has a distinctive 'waist' between the eye sockets that is not present in a pure polecat.

The polecat has a long sinuous body and short legs. It has dark brown guard hairs which overlie pale underfur, giving it a two-tone appearance particularly in winter, when the whole animal becomes lighter in colour. Its most distinctive feature is the 'bandit-mask' pattern of dark and light facial markings. This is thought to be aposematic colouration, warning other animals of the pungent smell it will release from its paired anal glands as a defence.

Field signs

Their twisted scats (droppings) can be up to 70 mm long and tapering at one end. Colour and consistency varies with diet. Their scats and footprints are difficult to distinguish from those of mink.

Habits

They use a wide range of habitats and usually den in existing cavities such as rabbit burrows, holes under trees, rock piles and wood stacks. In winter they have a tendency to move into farm buildings and outhouses. The size of the home range changes with prey availability, season, sex and social status. They are thought to be less strictly territorial than other small carnivores with males having larger, more fluid home ranges than those of females.

Compared to polecats, ferrets generally show lower levels of movement, alertness and fear. This docile nature and their white-yellow fur must limit their ability to survive in the wild. They are more likely to occur in urban areas than polecats.

Reproduction and life cycle

Male activity increases in the mating season between February and April, and females become more active both day and night when feeding their young in midsummer.

Distribution, status and conservation

The Vincent Wildlife Trust Surveys of 2004-2006 indicate that the nearest pure polecats have been recorded in West Sussex and Hampshire. The nearest polecat-ferret was recorded in East Sussex. Since that time polecat-ferrets have been recorded on a number of occasions in Kent. Little is known about the occurrence and status of feral ferret populations in Kent. Recently escaped or abandoned animals could be found almost anywhere which makes it difficult to detect well-established populations.

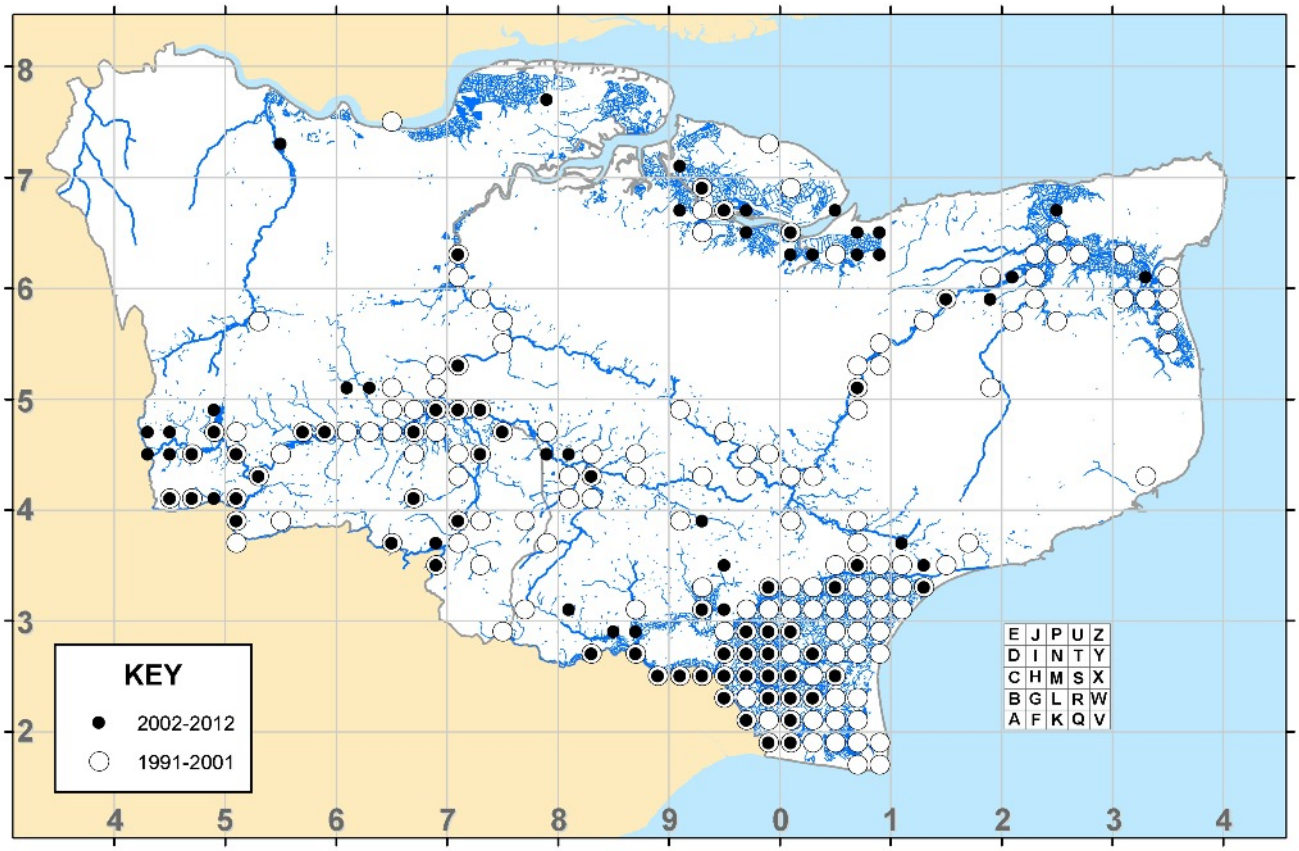
There have been no confirmed records of polecat in Kent since they became extinct in the county over 100 years ago. Once widespread in Britain, the polecat's range was severely reduced to a main stronghold in mid-Wales by 1915. Throughout the twentieth century there was a slow recovery and expansion from the Welsh stronghold, driven by reduced persecution and an increase in rabbit numbers.

In 2007 polecat was listed as a priority species for conservation in the UK BAP and is on the Biodiversity Lists for England and Wales (listed as a Species of Principal Importance under the NERC Act, 2006).

American mink

Order: Carnivora

Neovison vison



American mink (photo © Dave Butcher)

Identification

Head and body length (mm): ♂ 330-450 ♀ 320-360
Average weight (g): ♂ 850-1805 ♀ 450-810

The American mink is a non-native medium-sized semi-aquatic mustelid, with dark brown to almost black fur and a white chin patch. On some individuals the white markings extend further down the throat and underside. Mink are sometimes confused with otter but are very much smaller with a short bushier tail, roughly half the body length, as opposed to an otter's large tail with a flat broad base. Mink have a more pointed muzzle reminiscent of a ferret, whereas otter muzzles are broader with a large flattened head reminiscent of a common seal. Mink swim with their head and body high out of the water, whereas an otter will swim with only its head and part of the tail visible. Mink may also be confused with polecat-ferret in locations where they co-exist, as they are of a similar size and can occupy the same habitat. Mink are marginally smaller and have a dark face with a white chin spot, unlike polecat-ferrets which have a white snout with a white band above the eyes.

American mink (photo © Andy Cade)

Field signs

Mink footprints are approximately 40 mm in length. Typically four to five toes are seen on the print and the claw marks look like apple pips. It is very difficult to differentiate between polecat-ferret and mink prints. Mink droppings may be confused with those of otter, polecat-ferret and other mustelids. Difference may be determined by smell; otter spraint is almost sweet whereas mink scat has a foul scent. Depending on diet, mink droppings may contain bones, hair or feathers and are around five to eight centimetres long with a tapered end.

Habits

Mink are associated with wetland habitats but may occupy other habitat types subject to food availability. They prefer rivers, streams and ditches as these provide plenty of cover.

Reproduction and life cycle

Mating occurs in March or April and four to six babies (kits) are produced annually. As with other mustelids, embryonic implantation can be delayed and breeding may begin earlier depending on the weather conditions. Gestation can last approximately 40 days and the young are born in May, being blind with a fine covering of hair. Whilst rearing young, females may travel up to three kilometres each night to provide food for their offspring. The weaning process begins at five to six weeks and by August the juveniles disperse up to 40 km into new territories.

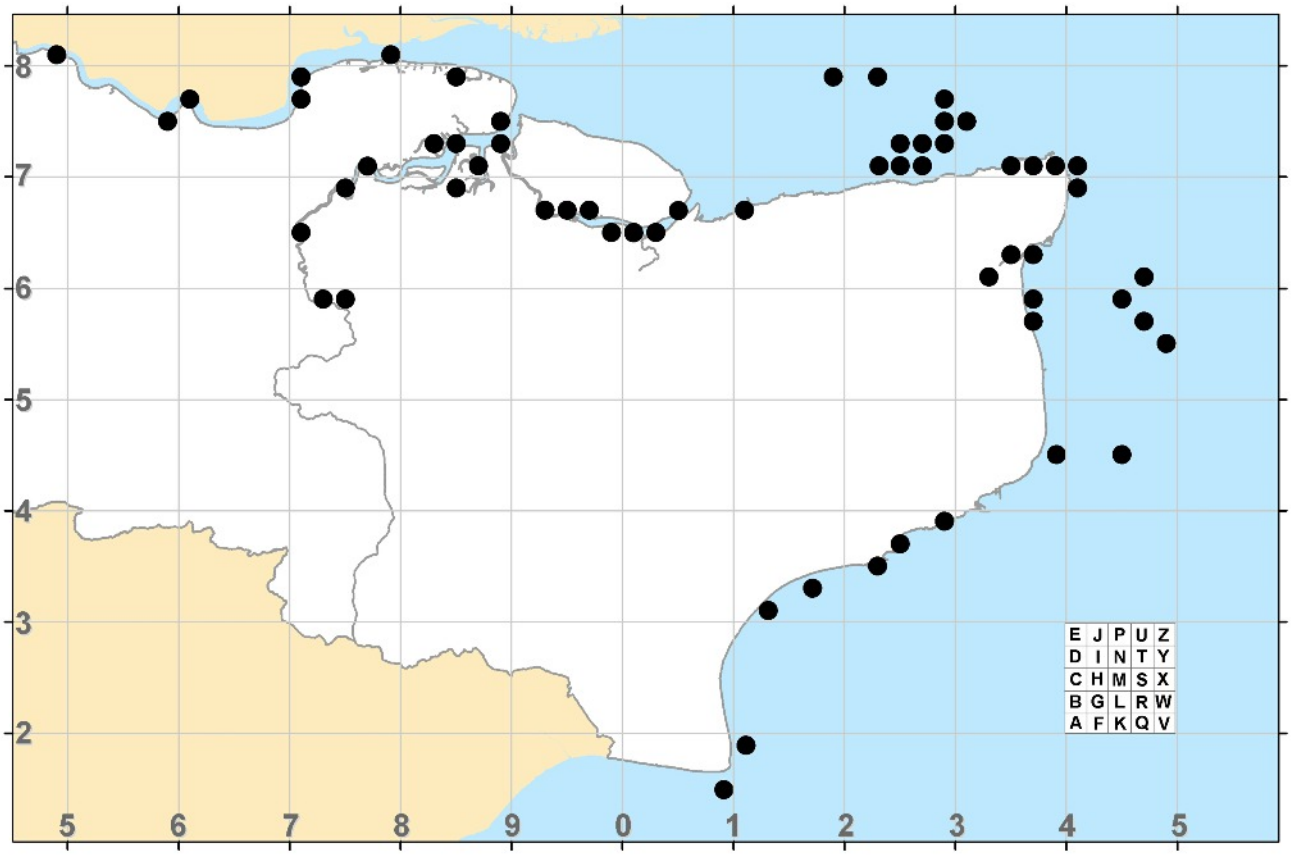
Distribution, status and conservation

American mink are found throughout Britain, with a higher population density in southern England. The Kent map shows the connection between mink and the more complex marshland habitats like Romney Marsh, but more notably it shows a similar distribution with that of the native water vole. The north Kent marshes have been identified as an important area for water voles, and a monitoring and trapping project is underway to remove the mink from this area to help ensure the safety of the voles. The map highlights a potentially significant drop in sightings of mink over the two recording periods shown, which may be the result of this increase in monitoring and trapping.

Common seal

Order: Pinnipedia

Phoca vitulina



Identification

Head and body length (cm): ♂ 138-158 ♀ 125-150
Weight (kg): ♂ 68-125 ♀ 50-98

The common seal can be identified by its snub nose and rounded, dog-like head shape, which contrasts to the elongated Roman nose of the grey seal. When observed at close range the common seal has a 'V' shaped nostrils. Their pelage has a fine, freckly spot pattern; however, this can be absent during their annual moult when their pelage becomes dull beige or brown in appearance.

Habits

Predominantly a coastal and estuarine species, common seals spend much of their time close to preferred haul-out sites, which can vary according to seasonal activity as well as breeding and foraging opportunities. Inquisitive seals can often be seen from the shoreline as they explore their territories and look for food. Common seals are regularly spotted at haul-out sites such as sand bars and estuarine mud flats and often forage upstream into intertidal river systems.

The diet of common seals varies according to seasonal availability of prey species. Although squid and crustacean remains are sometimes found, most prey species appear to be fish including cod, herring, plaice, salmon and sand eels.

Common seals (photo © John S Young)

Reproduction and life cycle

Male common seals reach sexual maturity at five to six years of age, whereas females show signs of sexual maturity at only three to four years old. It is thought that males live for approximately 25 years, whereas females may live for up to 35 years.

Common seals have a protracted breeding season, with pupping occurring from late May to July. As pups are weaned, females come into oestrus and can be mated. Embryonic implantation is delayed for two to three months until after the female's annual moult is completed in October.

A yearly moult occurs in both sexes soon after the breeding season, usually in August to September. At this time seals can be found in larger aggregations and spend more time hauled-out in order to aid the moulting process.

Distribution, status and conservation

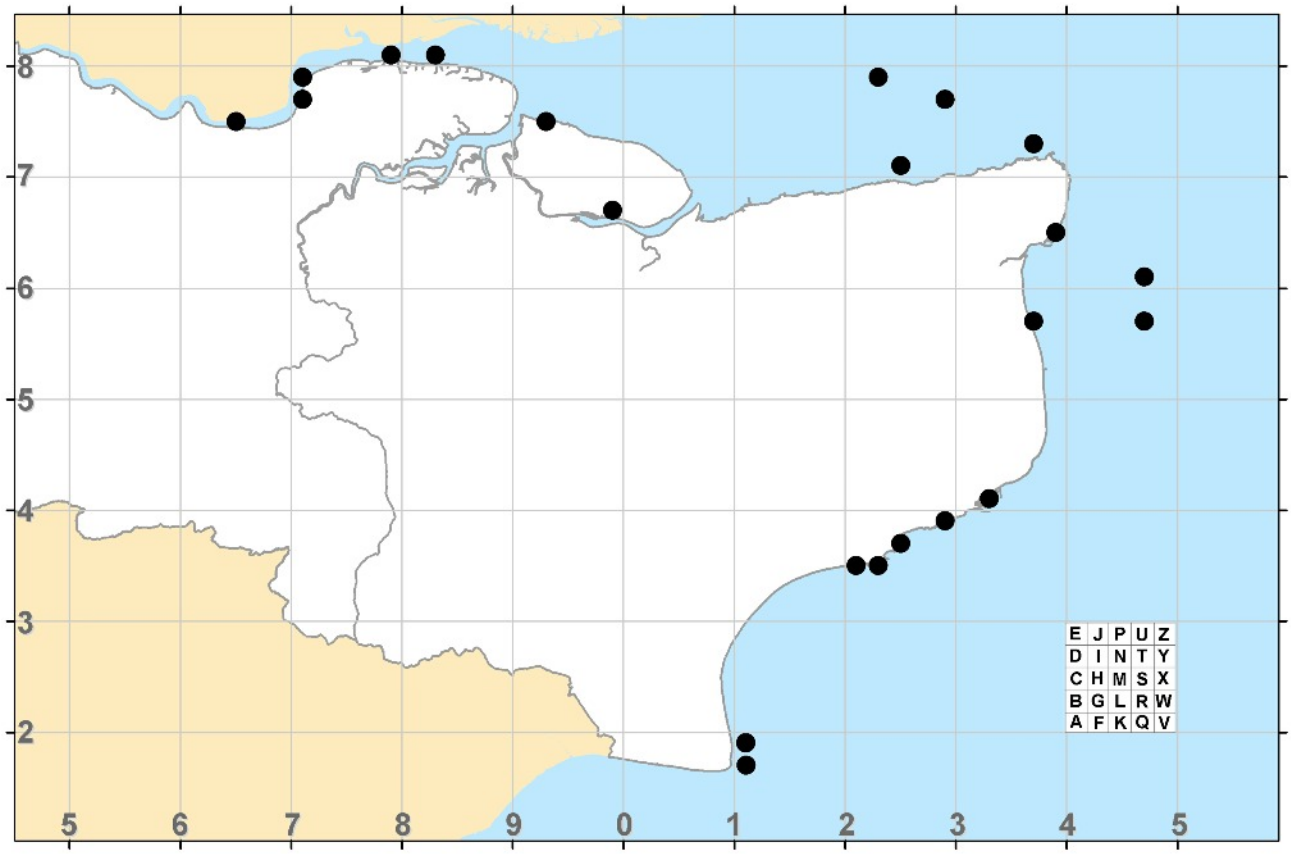
Common seals are distributed around the entire Kent coastline and major riverine estuaries including the Great Stour, Medway, Swale and Thames. At low tide common seals can be observed hauled-out on almost all of the intertidal sand bars including those of the Margate sands complex, Goodwin Sands, West Barrow, North Knob and Knock John, Shingles and Shingles Patch, Pan Sand and Ridge, the Last and north east Last. Estuarine haul-out sites include Horse Sands, Peg Fleet, Stangate Creek and Sharfleet.

Kentish coastal and riverine waters hold about 300 common seals. This is less than one percent of the UK total, but is still significant as it is the highest population of common seals inhabiting the extreme southern and southeastern coastlines of England. They may also be an important genetic link with common seal populations found along the coast of mainland Europe. As a result it may also be a potential transmitter of disease during outbreaks of Phocine distemper virus, as witnessed in 2002, from which common seal populations have still not fully recovered.

Grey seal

Order: Pinnipedia

Halichoerus grypus



Identification

Head and body length (cm): ♂ 195-230 ♀ 143-197
Weight (kg): ♂ 170-440 ♀ 131-251

Grey seals are large, sexually dimorphic phocid seals (true or 'earless' seals) with males weighing far more than females. Grey seals have an elongated muzzle with a 'Roman' nose and parallel nostrils. Their coat colouration can vary greatly, but in general grey seals have a 'blotchy' pattern to their pelage and sometimes show a series of dark spots around the head and shoulders against a lighter-coloured background. Males are often a dark grey or uniformly brown.

Habits

In Kent grey seals are transitory, spending long periods of time at sea, often travelling hundreds of kilometres during foraging trips that can average two to three days. Grey seals are regularly seen on intertidal sand bars in the English Channel, southern North Sea and Thames Estuary where they haul-out during the ebbing tide but remain close to their fishing grounds. Few grey seals are recorded in Kentish riverine habitats, but anecdotal reports have recorded them travelling several miles upstream into the Great Stour, river Medway and river Thames. Their diet consists of sand eels, gadoid fish such as cod, pollock, haddock and whiting, as well as flatfish.

Grey seal (photo © John S Young)

Reproduction and life cycle

Grey seals have a protracted breeding season. Pupping occurs on 'rookeries', sites where females aggregate and give birth between late September and December. Pups are born with lanugo (woolly down fur), which helps protect them against the elements as they develop on land at the rookeries. Pups are weaned after 18 to 21 days and lose their natal lanugo; their mothers will then abandon them. Female grey seals come into oestrus as the pups are weaning and are often shepherded by large bull seals awaiting the opportunity to mate. Copulation lasts for about 20 minutes and females may be mated up to three times, not necessarily by the same male. Upon successful mating the fertilised egg is subject to delayed implantation like that of common seals. The egg finally implants three to four months later at the same time as the female completes her annual moult.

No breeding sites have been recorded around the Kent coast, although pups with their natal lanugo have been found on less disturbed beaches in east Kent.

Male grey seals reach sexual maturity at six years of age but may not hold a breeding position within the group until they reach 10 years, whereas females show signs of sexual maturity at only three to five years old. Males will live on average for 25 years, whereas females may live for up to 35 years.

Distribution, status and conservation

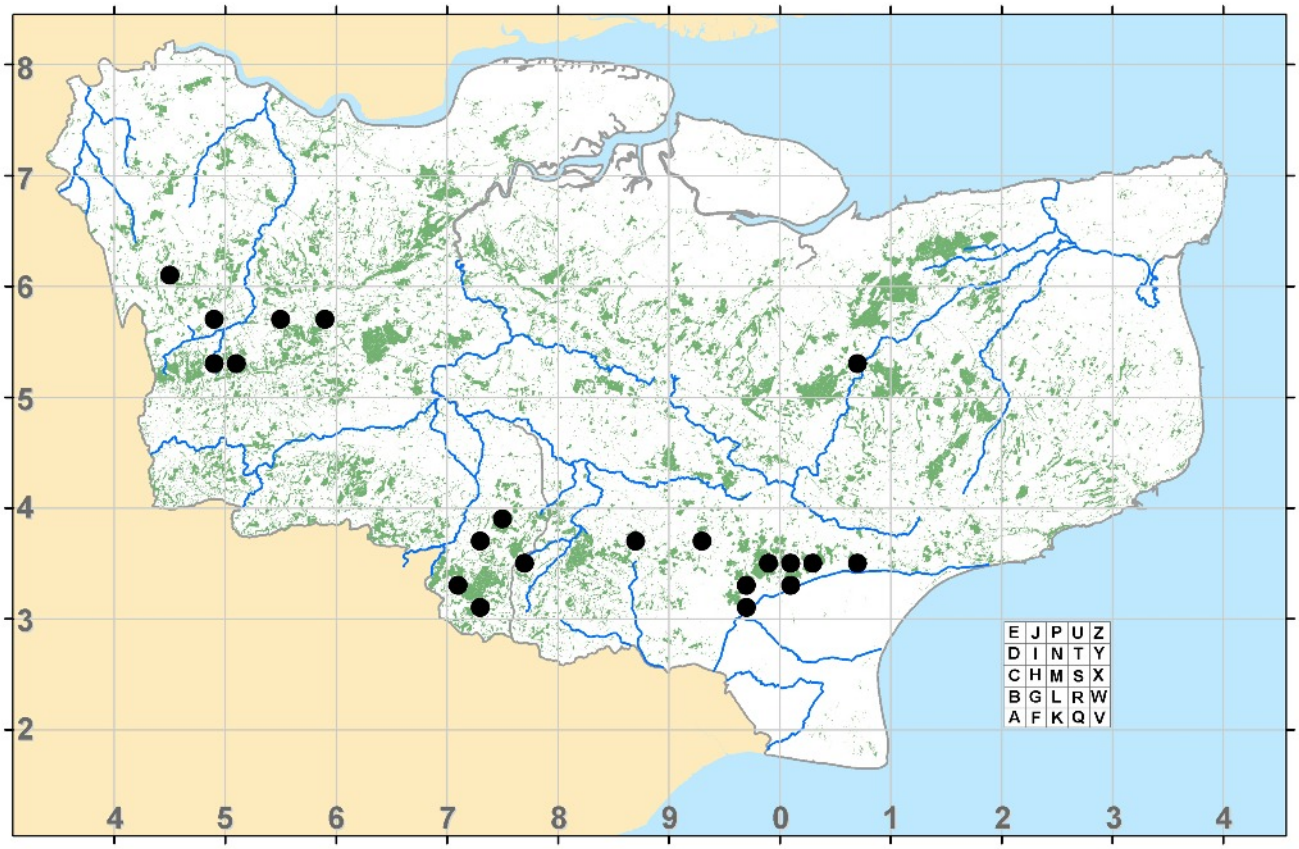
Grey seals are recorded on the majority of the county's intertidal sand bars including those of the Margate sands complex, West Barrow, North Knob and Knock John, Shingles and Shingles Patch, Pan Sand and Ridge. The largest aggregation of grey seals can be found on the Goodwin Sands complex, which is approximately six miles off the Deal coast in Kent.

The number of grey seals recorded in Kent continues to increase each year. Recent studies carried out by the Zoological Society of London suggest that there are about 200 grey seals in the Thames estuary alone. When coupled with larger colonies on the Goodwin Sands in the English Channel, the population may reach a total close to 600 seals. Whilst these figures are conservative estimates at best, they do reflect earlier reports by local tour operators, light aircraft users and fishermen whose accounts confirm similar numbers seen during their working lives in these areas.

Wild boar

Order: Artiodactyla

Sus scrofa



Identification

Head and body length (cm): ♂ 150 ♀ 140
Shoulder height (cm): ♂ 70-90
Weight (kg): ♂ up to 150 ♀ up to 95

The wild boar is one of Britain's largest mammals and has a formidable appearance. From a large head and muscular neck and shoulders, the body slopes down the back to the rump and a long-haired tail. The snout is long and narrow, ending in a cartilaginous disc; the ears are small and always erect. From the age of two, adult males have well-developed tusks that grow continuously. The lower tusks have a sharp cutting edge and are repeatedly sharpened by rubbing against the upper tusks, which are hollow and act as a permanent whetstone. Females (sows) are similar but have less heavy front quarters and no tusks. The coat in both sexes is shaggy and brindled, the guard hairs having lighter coloured tips. There is an underlying thick woolly pelage of light brown hair, and a mane of longer bristles running the length of the spine. Coat colour ranges from light fawn to black and adults moult annually in June to August.

Field signs

Their presence is often betrayed by the rooting damage they cause before the animals themselves are seen. Foraging signs of wild boar include severely rooted fields, pastures and woodland leaf litter, usually in small patches but can extend to whole fields. They often damage fences in order to get under rabbit netting; they root beneath with their snouts, then lift it, leaving arches of lifted wire. This behaviour can lead to high economic loss when deer and rabbits subsequently invade areas formerly protected by the fencing. Wallowing in mud leaves a smooth-sided oval depression with hoof prints showing the characteristic large dew claws. Rubbing against trees to remove ectoparasites often results in characteristic marking of trees, with hairs being left behind as evidence. Faeces are irregular in shape, up to seven centimetres thick by 10 cm long and black, occasionally with a purplish hue.

Habits

Wild boar are elusive and nocturnal. They use a mosaic of habitats but appear to prefer heavily-wooded countryside. They are predominantly, but not exclusively, vegetarian and have a wide diet including tree fruits such as acorns and chestnuts, bulbs, roots, carrion, worms, larvae, eggs, nestlings, small mammals, insects, potatoes and wheat.

Wild boar foraging signs (photo © Hazel Ryan)

Reproduction and life cycle

Wild boar are seasonal breeders. Before rutting, which occurs in the autumn and winter, males develop a protective layer of fat on their chest and shoulders. During the rut the dominant male mates with most females, driving off rivals using slashing tusks and sometimes causing lethal injuries. Males lose weight during the rut.

Pregnancy lasts 115-120 days, and sows usually give birth (farrowing) in spring and usually produce one litter per year. Four to six young are born in a well-concealed farrowing nest. Piglets will cross-suckle between other lactating sows. Piglets are born with a coat of alternating brown and creamy-yellow longitudinal stripes, which disappear as they are weaned at 12-16 weeks, to be replaced by a reddish-brown colour. The adult coat colour appears at about 12 months of age. Females are sexually mature from 18 months of age, and males from under a year old.

Distribution, status and conservation

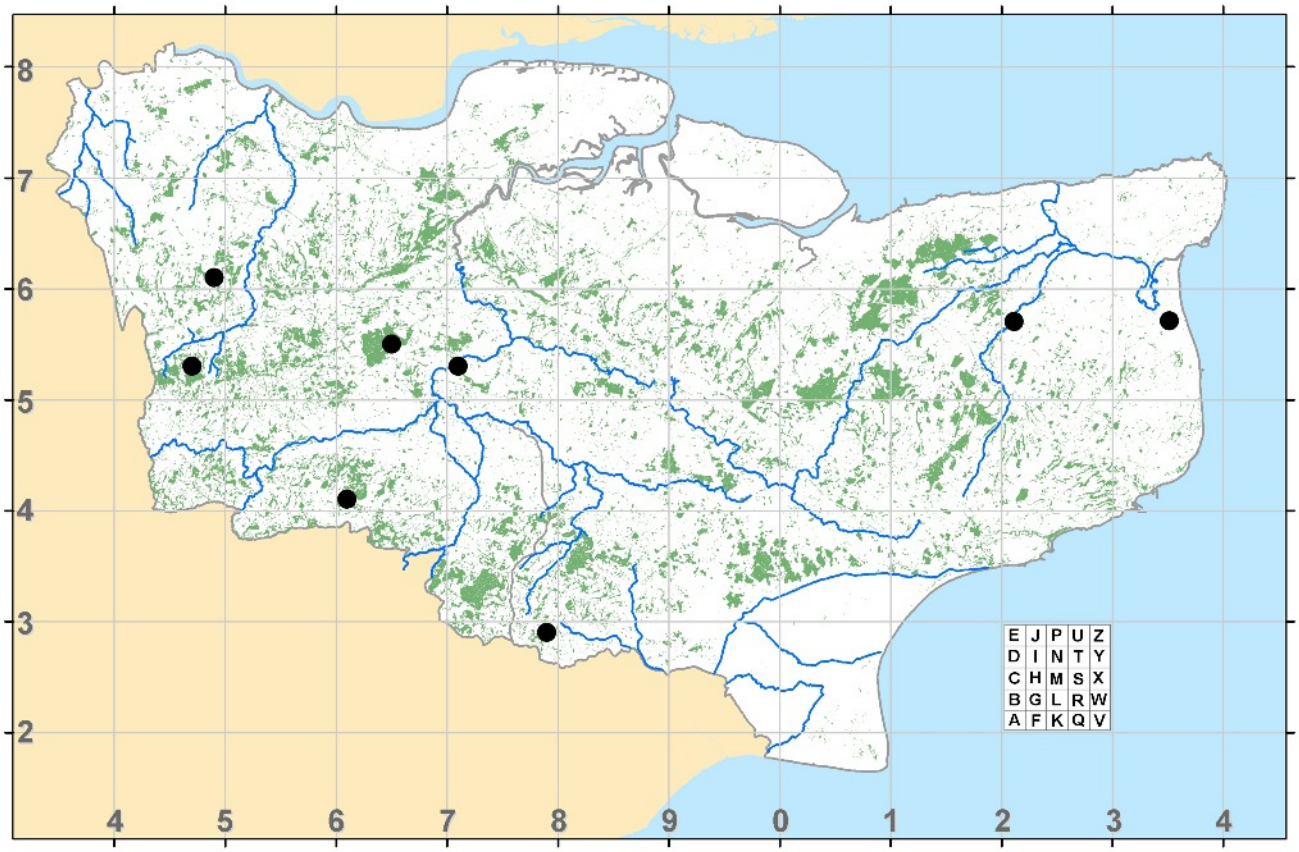
Wild boar went extinct in Britain by 1300 and those now present in Kent are mainly the result of escapes from boar farms. Their genetic heritage is complex and few substantial breeding colonies occur in the county. The only sustainable colony is possibly on the Kent/East Sussex border. It is mainly their destructive activities on agricultural land which bring them into conflict with farmers. The future of wild boar in Kent is largely under Government control. Outbreaks of bovine tuberculosis or foot and mouth disease could result in a legislated total cull.

Wild boar (photo © John S Young)

Reeves' muntjac

Order: Artiodactyla

Muntiacus reevesi



Identification

Head and body length (cm): 77-91
Shoulder height (cm): 45-52
Tail length (cm): 13-18
Weight (kg): ♂ 12.3-17 ♀ 10-16

A fully-grown muntjac has a red-brown summer pelage with a buff-coloured underside and variable amounts of white on the chin and inside of the thighs. The tail is a rich red or chestnut colour with white on the underside. The winter coat is much greyer and almost black on the underside, and males at maturity have a near V-shaped black stripe up the pedicles (antler attachment points) and frontal region of the head.

Males (bucks) acquire simple unbranched antlers at between five and 20 weeks old and these continue to develop as the buck ages, eventually forming small brow tines. Bucks shed and regrow their antlers each year.

Muntjac have a distinctive dog-like barking call and lift their large tail when running away, revealing a white underside. They are usually solitary and may live for 14 years in the wild.

Muntjac is the smallest British deer species, and cannot easily be confused with other species except the Chinese water deer which has not occurred in Kent to date.

Field signs

Searching for field signs when the deer are at low density is very difficult. The small slots (footprints) of adults and fawns are recognised with experience, but otherwise could be easily missed. Damage to vegetation can be confused with rabbit damage.

Reeves' muntjac (photo © Dave Butcher)

Habits

Muntjac prefer dense habitats such as young coppice, scrub, unkempt gardens, rapeseed fields and similar habitats, especially where there is a diverse 'field' layer of vegetation.

Reproduction and life cycle

A buck will usually mate with more than one doe (female) if she wanders into his territory. A single fawn is born after about five to seven months' gestation and multiple births are rare. Since breeding can take place at any time of year, the population can increase quickly.

Distribution, status and conservation

An introduced species, muntjac are found only sparingly in Kent, but this is a fast-breeding species and it is anticipated that their population will increase. Records from other counties indicate that they can travel some distance, possibly resulting in a rapid rate of spread.

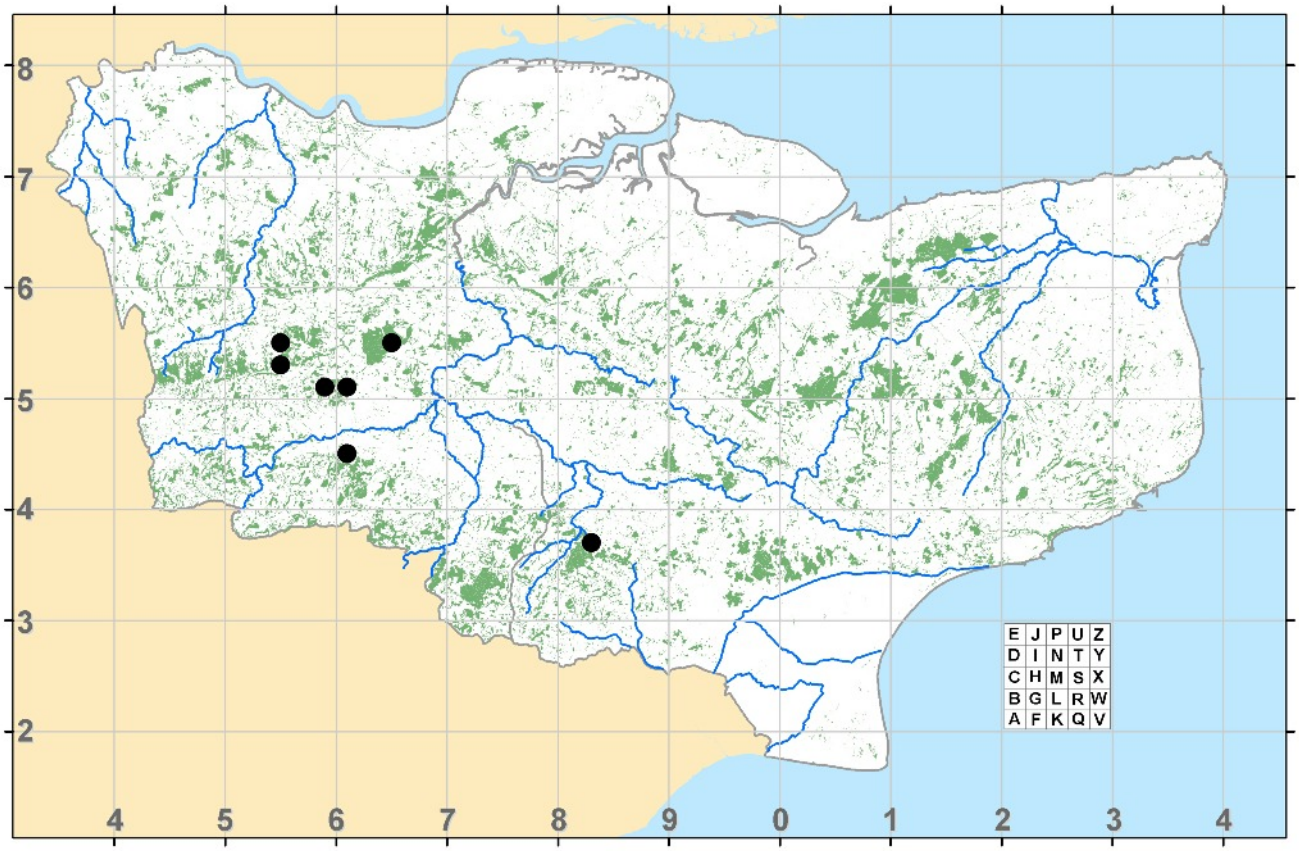
There are scattered records of muntjac throughout the county, but little evidence of breeding, so the animals which are recorded are probably wandering males. However, their recorded distribution may be misleading due to the amount of woodland and similar habitat within Kent where the species could be missed when at low density. In East Anglia where they are common, they are easily seen even in broad daylight.

There is no closed season for shooting muntjac because of their year-round breeding.

Sika

Order: Artiodactyla

Cervus nippon



Sika deer stag (photo © John Phillips)

Identification

Head and body length (m): 1.4-1.8
Shoulder height (cm): 50-120
Tail length (cm): 14-21
Weight (kg): ♂ 40-63 ♀ 31-44

Sika along with red deer are the largest deer in the UK and are often confused with each other, since they are very similar in size and colouration. Especially in summer, red deer have no spots on their backs, which is unlike all other British deer including sika. Both red and sika deer have branched antlers; sika deer usually have a maximum of eight points and red deer up to 16 points. In red deer the angle between the brow tine (first point) and the main beam (main shaft of the antler) is always more than 90º. The tail of a sika deer is white with a dark stripe, compared with plain yellow-brown in the red deer.

Field signs

Searching for sika field signs when the deer are at low density is very difficult, not least because the animals tend to lie up in daytime. The slots of adults are not easily recognised but damage to vegetation may help an observer to find this species. If seen during summer the large size and spots are valuable aids to identification.

Habits

In Kent, sika deer are largely associated with heathland habitat and also favour the deciduous woodland within their range.

Reproduction and life cycle

Sika have a prolonged rut in September to October and a single fawn born in May to June after about five to seven months gestation.

Distribution, status and conservation

Sika deer are currently very localised in Kent and have been for some decades. They are unlikely to increase much in the near future due to habitat limitation.

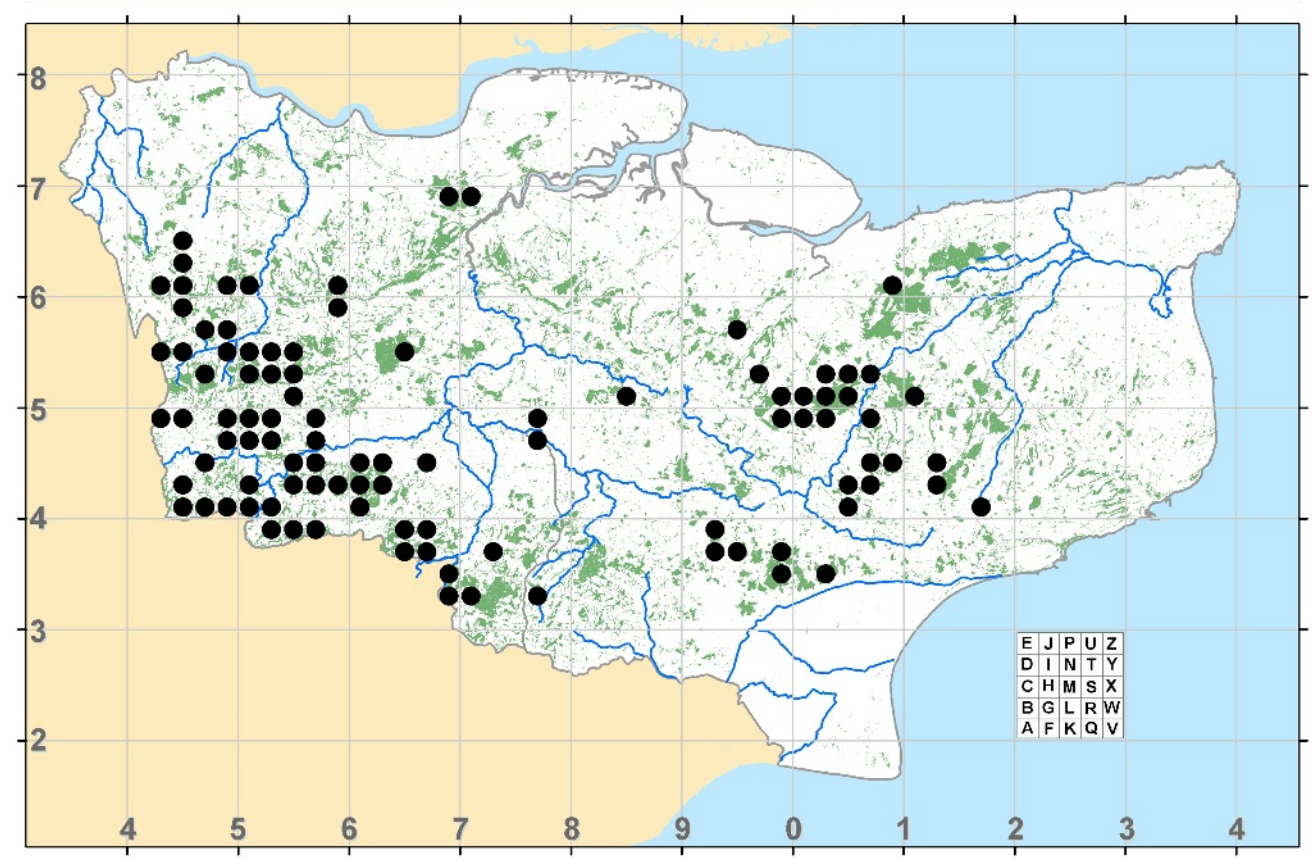
Sika deer are observed largely around Tonbridge and Tunbridge Wells, where they have occurred for over a century. The species was introduced from Japan and theories abound on the origins of the Kent populations. Supposedly some are escapees from Knole Park near Sevenoaks; however, many of the current animals show signs of hybridisation with red deer, and are thought to be the descendants of ‘carted’ deer which were released for hunting and then recaptured by the Mid-Kent Staghounds during the 19th and early 20th centuries.

Red deer are rarely observed in Kent with individuals occasionally escaping from deer farms.

Fallow deer

Order: Artiodactyla

Dama dama



Fallow deer stag (photo © John S Young)

Identification

Head and body length (cm): ♂ 155-179 ♀ 138-157
Shoulder height (mm): ♂ 840-940 ♀ 730-910
Tail length (mm): ♂ 180-240 ♀ 140-210

Adult fallow deer usually exhibit one of four main colour variations - common, menil, black and white. The common colour is a tan brown with spots on the flanks which fade in winter, and a white rump with a diagnostic black stripe down the tail and the sides of the rump. Menil is paler with spots all year round, but no black rump outline. Black forms are almost completely black, with no white. White forms are not albino but white or sandy-coloured.

Males (bucks) develop simple unbranched antlers at about six months of age, but size and complexity of antlers varies with age, genetics and overall health. This is the only British species of deer to have palmate antlers.

Fallow deer females and a white form male (photo © John S Young)

Field signs

Fallow deer slots are sheep-like. Fallow deer damage to vegetation can be confused with that caused by other deer species or even by sheep. Their herding behaviour and the distinctive palmate male antlers make visible confusion with other deer species unlikely. However, fallow deer are wary animals that will, except sometimes in parks, often initially freeze on human approach and then suddenly run away.

Habits

Fallow deer are crepuscular and not often seen away from parks. They often favour deciduous woodland wherever they occur. Groups of males and females live in loose herds all year, but males become more solitary as their antlers mature and they become aggressive in the rut in early autumn.

Reproduction and life cycle

A single fawn is born in June or July after a gestation period of about eight months. Multiple births are extremely rare. Fallow deer live for about eight to 10 years in the wild.

Distribution, status and conservation

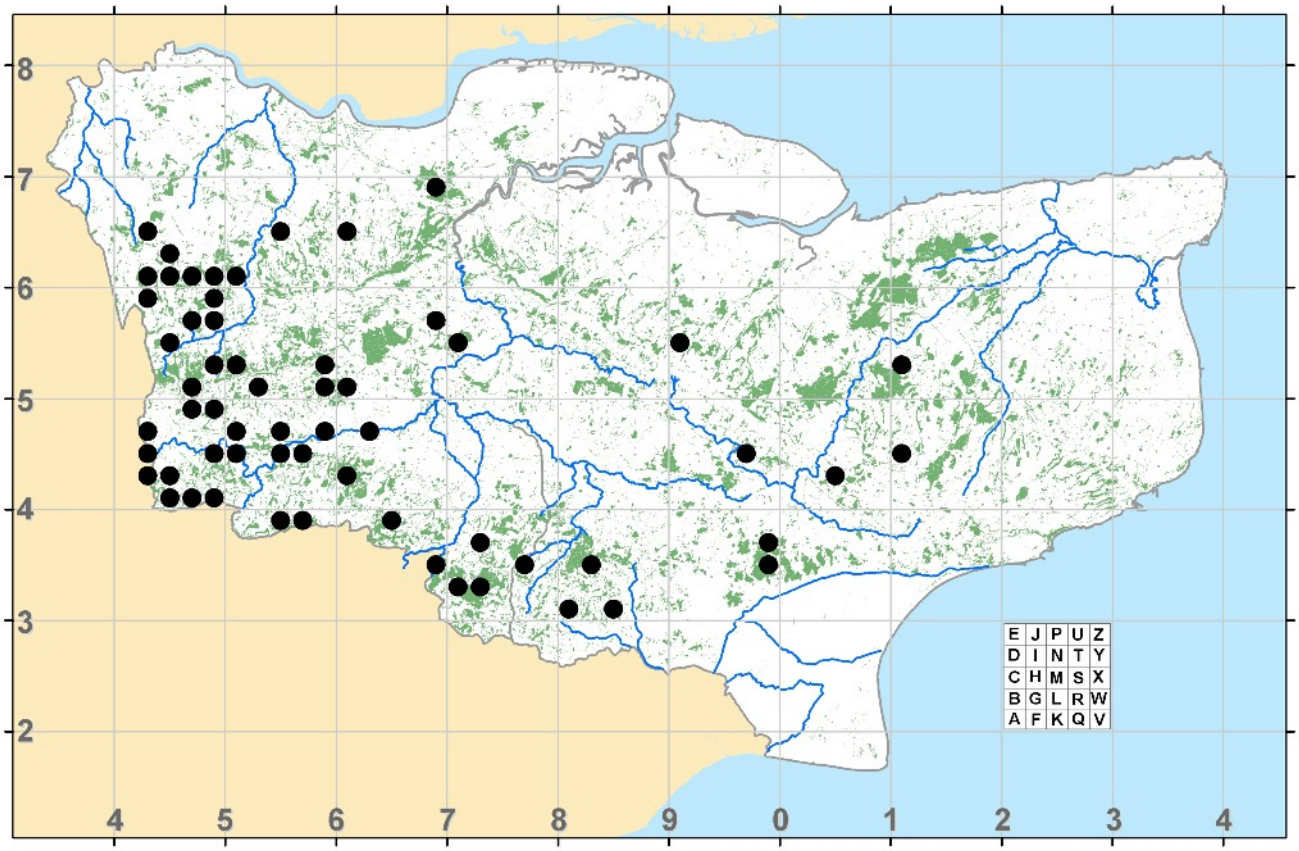
Fallow deer distribution is concentrated on the Kent/Sussex border and in parts of the Weald and east Kent, except in Thanet and Romney Marsh. They also occur in deer parks such as Boughton Monchelsea, Knole Park and Mersham-le-Hatch. The recorded distribution has probably altered little in the last 50 years as they are fairly slow to disperse and use new sites.

In England there is an annual closed season for shooting fallow deer, from 1st May to 31st July for males and 1st April to 31st October for females.

Roe deer

Order: Artiodactyla

Capreolus capreolus



Identification

Head and body length (cm): ♂ 90-138 ♀ 85-138.5

A fully-grown roe deer has a uniform red/brown summer pelage with a distinctive whitish, inverted heart-shaped patch on the rump, which is more obvious in females in winter. The rump patch in males is cream rather than white and more kidney-shaped. Roe deer (bucks) have relatively short antlers which are cast in October to December each year. Males (bucks) develop their first simple button antlers at about 12 to 16 weeks of age, with the first true antlers subsequently forming as simple spikes.

Field signs

The characteristic bark of a disturbed roe deer is unique and the apparent lack of a visible tail is a great aid to identification.

Habits

Roe deer prefer broadleaved woodland to conifers, but they can be found in a variety of places such as coppice, scrub, gardens, arable fields and similar habitats. They are usually solitary in summer with males establishing territories between March and September.

Reproduction and life cycle

Bucks usually mate with females within their territory in July/August. Gestation is around 10 months, including five months of embryonic diapause until December. One or two young (fawns) are born in late May or early June, and females (does) over a wide area may synchronise their births to within a few days of each other. Roe deer may live up to six years in the wild, although this varies with habitat quality and population density.

Roe deer (photo © Warren Baker)

Distribution, status and conservation

Roe deer mainly occur on the Kent, Sussex and Surrey borders. However, records from north-west Kent and the south-east London border areas exist. There is little evidence of breeding, and the other scattered records of roe deer throughout the county are probably wandering males. However, the distribution records may be misleading as the species could be missed when at low density in the amount of woodland and similar habitat found in Kent.

Within Kent, it is expected that roe deer are likely to increase in number considerably over the next few decades.

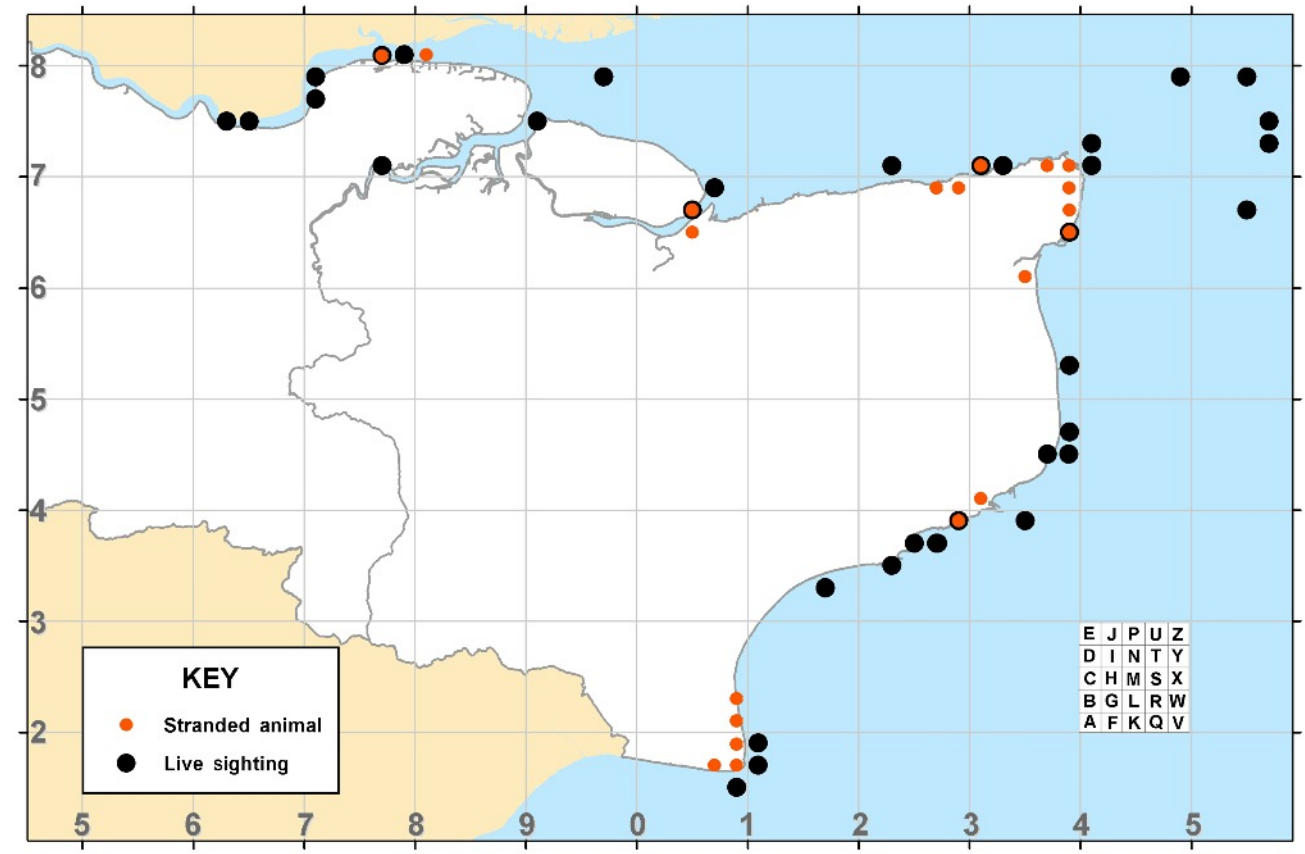
In England there is an annual closed season for shooting male roe deer from 1st November to 31st March, and females from 1st April to 31st October.

Roe deer (photo © Dave Butcher)

Harbour porpoise

Order: Cetacea

Phocoena phocoena



Above. Harbour porpoise
Below. Surging at the surface, showing the 'rooster tail' splash

Identification

Head and body length (cm): ♂ 145-163 ♀ 160-189
Weight (kg): ♂ 50-54 ♀ 50-81

The harbour porpoise is the smallest cetacean to occur around the coast of Kent. It has a robust body with a small rounded head and no beak. Its small triangular dorsal fin is centrally placed. The body colour is dark grey merging to a lighter grey on the sides, with the underside being white. Calves and juveniles often have brownish backs. They have a quick surface-rolling action and when alarmed or moving at speed they can produce a distinctive splash that is similar to a 'rooster tail' in shape.

It is generally unobtrusive but breaching behaviour, where the whole body is launched from the water has been observed at Dungeness. In Kent waters, the only species that might be confused with the harbour porpoise is the bottlenose dolphin. It also has a greyish colour and central dorsal fin, but this fin and the whole animal is much larger with a pronounced beak. It also behaves more extrovertly.

Harbour porpoise, typical view at the surface (all photos © John S Young)

Habits

Harbour porpoise favour inshore waters, either alone or in small groups. They are not showy animals, with a quiet and unobtrusive behaviour. Their small size makes them very difficult to observe in all but the calmest sea conditions. Unlike many dolphin species they are shy, rarely approaching boats. Larger vessels are generally actively avoided and they will swim rapidly away from them; smaller vessels tend to be ignored allowing closer approach. The species also favours some of the larger river estuary areas of the county.

Reproduction and life cycle

Few records of juveniles and calves are received so little is known regarding the breeding success of the Kentish harbour porpoise population. However, calves and juveniles are infrequently recorded from Dungeness along with signs of breeding behaviour.

Distribution, status and conservation

In Kent there are no boat operators that provide a trip to see these marine mammals, although chartered recreational marine fishing trips quite often record porpoise and sometimes other cetacean species. Due to their habit of being an inshore species it is possible to observe harbour porpoise from the shoreline and they can occur anywhere around the Kent coastline and estuaries. The population size around Kent is unknown. However, the species is regularly observed at St. Margarets Bay, the Upper Thames area, Foreness and Dungeness where a small population occurs all year. In June 2012 up to 39 were observed at Dungeness confirming that this area is important for the species. Harbour porpoise are also seen in the larger river estuaries of the outer Thames, the Medway and in the Swale.

Threats include pollution, by-catch, net entanglement, acoustic disturbance and over-fishing, with at least 10 dead harbour porpoises being washed up annually around the Dungeness peninsula area alone. The exact reasons for these deaths and the impact they have on the local porpoise population are unknown.

Other whales and dolphins

Order: Cetacea

Minke whale

Balaenoptera acutorostrata

This species can be seen during the summer and autumn in coastal waters around the British Isles, including the North Sea and English Channel. In December 2011 a minke whale live-stranded at Epple Bay, Westgate but died shortly afterwards. A subsequent post-mortem revealed that the whale had no food in its stomach and had a heavy parasite infection in its gut. This constitutes the fourth minke whale to strand in Kent in the last 22 years.

Humpback whale

Megaptera novaeangliae

Humpback whale is one of the rarer rorquals in the European Atlantic. Sightings are however becoming more frequent around the British Isles. In April 2006 a humpback whale was washed ashore dead at Kingsdown beach. In September 2009 a young whale thought to have died from starvation was found washed ashore at Dartford.

In December 2010, a single live whale was seen off the Nord-Pas de Calais in the Dover Straits. It was subsequently seen in January at Port of Boulogne and last seen on 11th January at Sangatte. Whilst very unusual, this constitutes the third sighting in 10 years off northern France. The first animal was recorded in 2006 off Dunkerque and later stranded on the Belgian coastline. A mother and calf pair were seen alive in 2008.

Sperm whale

Physeter macrocephalus

This is a deep water species, with males travelling to higher latitudes to feed, then joining females in tropical or sub-tropical waters to breed. It occurs off the coast of northern Norway and in the Bay of Biscay.

In March 2011, a male sperm whale was washed up at Pegwell Bay. Post-mortem results indicated that the whale had died from starvation.

Northern bottlenose whale

Hyperoodon ampullatus

Northern bottlenose whale is normally restricted to the deeper waters of the northern North Atlantic. An initial report of possibly two whales came from near the Thames Barrier on 20th January 2006. A single whale was subsequently observed in the Thames upriver in central London. The whale was a juvenile female. Whilst rescue attempts were made to get the whale to deeper water it later died of convulsions.

Sowerby's beaked whale

Mesoplodon bidens

Sowerby's beaked whale is restricted to the northern north Atlantic with most sightings from ocean areas between the Canaries and the Arctic. In July 2010 a single whale was found dead and stranded at Seasalter. The record is the only reported stranding in Kent in the last 20 years.

Killer whale

Orcinus orca

Reports of killer whales came from an area offshore of Folkestone in 2007 and 2008. In 2011 a pod of four males, showing their distinctive dorsal fins, was seen feeding a mile offshore from Dungeness.

Common dolphin

Delphinus delphis

Common dolphin is the most abundant and widespread cetacean in the north Atlantic but is very rare around the coast of Kent. In June 2004 dead common dolphins were found washed up on the shoreline at Gravesend and in 2008 on the ramp of Littlestone lifeboat station. In July 2004 a sighting of a live common dolphin was recorded off the north Kent coast, near Reculver.

Striped dolphin

Stenella coeruleoalba

Striped dolphin is a very rare dolphin within the region and usually associated with deep water areas. In August 2002 one was stranded at Otterham Key, Rainham.

Bottlenose dolphin

Tursiops truncatus

Bottlenose dolphin is a rare dolphin within the region but records suggest that it can occur at any time of year. In 2004 sightings from Dungeness occurred in June, September and October along with a record from Reculver in July. A female was regularly observed offshore in the Folkestone and Hythe areas from June 2006 to November 2007.

White-beaked dolphin

Lagenorhynchus albirostris

White-beaked dolphin is rare within the region with recent records suggesting some seasonal movement, probably originating from the North Sea through the English Channel. In the UK it is most commonly found along the coasts of northern Britain. Indications in recent years suggest that populations are increasing or moving down the northeast coast of England into that part of the North Sea.

Two sightings occurred in December 2004, the first at Dungeness on the 8th (having not been recorded there since 1989), and the second on the 10th from a fishing boat east-north-east of Thanet.

At Dungeness on April 29th 2011, a pod of three moved slowly east offshore. In 2012 one stranded on Margate beach on 22nd March and at Dungeness on April 7th and 12th, there were sightings of a group of at least eight or nine.

Common dolphin (photo © John S Young)

Bottlenose dolphin (photo © John S Young)

White-beaked dolphin, observed ENE of Thanet (photo © Dave Hancock)

Re-introduced, alien and non-native species

This group could have included such species as grey squirrel, fallow deer, muntjac, American mink and rabbit which are long-term introductions. Instead, the species here are those which have not become established and have either been recorded in the county under enclosed release, or may have occurred as escapes, or have an unknown or feral origin.

Red-necked wallaby

Macropus rufogriseus

Like a small kangaroo, often with a brown to reddish marking on the neck. The species has no distinguishing field signs, but is unmistakable when seen. Usually found grazing in open grassland or scrub, but has been found feeding in woodland in spring. The species has not been known to breed in Kent, but escapees from collections have lingered in the wild for several weeks and maybe longer.

Records appear to be concentrated in an area between Maidstone and Ashford. A wallaby was disturbed during a pheasant shoot near Lenham in 2003 and others killed by road traffic at Charing and Iwade in 2003. Other records are from Lenham in 2005, Stubbs Cross in 2008, Pluckley in 2009 and again in 2012. The species does not persist long in the wild. Unlikely to be seen regularly in the wild.

Asian short-clawed otter

Aonyx cinerea

During the early part of the 21st century a pair escaped into the River Stour near Upstreet and were at large for several weeks. Although one was recaptured the other was apparently killed on a road and the animals never became established. Since then, the species has been found in the same area on occasions, one in a garden near Preston in 2007. A possible candidate for confusion with native otters, this species is smaller and differs slightly in behavioural terms from the native species. There have been rumours of this species being at large on Romney Marsh.

Timber wolf

Canis lupus

A single wolf escaped from a collection near Ashford in 1999, when it was at liberty in the countryside for a few days. Subsequently, another is supposed to have escaped from the same area in 2006.

Mongoose sp.

Herpestes sp.

A mongoose was found crushed to death on the surface of the A21 near Kilndown in 2004. The remains were unidentifiable to species, but the animal is assumed to have escaped from a private collection.

Racoon

Procyon lotor

The species has been recorded during 2011 near Dartford, but there was no confirmation of the record. Two were also seen in woodlands near Pembury where several people confirmed the sighting in 2006.

Siberian roe deer

Capreolus pygargus

Approximately six animals were lost when they jumped a ditch surrounding their field near Bethersden in 2007. They were never recaptured but there have been occasional reports of roe deer in the general area since then, so they may persist and could perhaps be breeding.

Eurasian beaver

Castor fiber

There was an enclosed release of two beaver families to the Kent Wildlife Trust Ham Fen Nature Reserve in 2002. They were imported from Norway in 2001 and released at Ham Fen after having spent one year in quarantine. Since then there have been two top up releases involving animals originating from Poland and Germany.

Garden dormouse

Eliomys quercinus

An adult male was recorded being chased by a dog in a concrete backyard at High Street, Hawkhurst in July 2011. Its origins are unknown.

Garden Dormouse (photo © Dave Butcher)

Golden hamster

Mesocricetus auratus

An animal was reported as feral on a rubbish dump somewhere in East Kent' in 2004/5, and also in a block of flats in Gravesend in c. 2003. Neither record was substantiated.

Chipmunk sp.

Tamias sp.

A single animal was reported in Mote Park, Maidstone, during 2006, where it was visiting food put out for water birds during the late summer and autumn.

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I apologise humbly for any omissions and accept responsibility for any inaccuracies that remain in the text.

John S Young,
County Mammal Recorder
Kent Mammal Group

Coordinator and Chief Editor

John S Young

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John S Young, Hannah Cook, Martin Newcombe, John Puckett, Hazel Ryan, Steve Songhurst, Shirley Thompson.

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For further information please refer to http://www.multifor.eu/en/home

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Page 6, Julie Blake - tribute to Frank Spooner
Page 7, John Badmin - tribute to Eric Philp
Page 23, Lynda Marshall - hedgehog family in garden
Page 137, Tony Swandale (Kent Wildlife Trust) - Eurasian beaver
Page 111, Trevor Hatton - two stoats hunting a moorhen
Page 135, Dave Hancock, white-beaked dolphin
www.charterboats-uk.co.uk/excel2

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J Raley, J Ramsey, B Ravensdale, A Razul, H Redding, J Reed, M Reed, T Reed, D J Rees, S Reffell, P Reid, P M Reid, T Reid, S Rendell, S Reynaert, A Reynolds, D Reynolds, K Reynolds, S Reynolds, R Richards, M Richmond, I Rickards, A Riddell, S Ridley, K Rigby-Faux, A Riggs, A Rillie, J Rivers, B Rixon, D Roberts, I Roberts, J Roberts, R Roberts, J Robinson, M Robinson, D Rogers, L Rolfe, A Roman, S Roman, V Rook, G Rooke, A Roper, P Roper, D Rose-Lewis, M Roser, A Rosser, R Rowden, J Roy, P Ruddick, T Ruffles, L Rule, H Russell, H U Russell, J Russell, K Russell, A Ruyter, H Ryan, K Ryland.

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B Tansley, J Tardivel, N Tardivel, M Tate, D Taverndale, D Taylor, M Taylor, N Tew, E Thompson, G Thompson, N Thompson, P Thompson (2), S Thompson (4), W Thompson, W Thurrell, M Tilley, C Tivenan, M Tortelli, E Touze, M Towler, D Trangmer, D Treharne, D J Treharne, R Trout, T Tuck, S Tunstall, J Turner-Moss, D Tutt, J Tyler.

B Uffingdell, K Upton.

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A Waite (2), D Walker, S Walker, J Wallace, J Waller, D Walsh, J Walsh (2), S Walsh, B Walton, H Ward, P Ward, B J Wardy, C Ware, M Warnes, J Watchorn, D Watson, K Watson, A Watts, D Webb, J Webb, M Webb, J Webber, J Websper, M Webster, V Webster, A Weddle, S Weeks, J Weightman, J West, K West, L Weston, J Whale, D Whitby, P White, P Whitestone, S Whitestone, T Whittaker, C Whitworth, M Whybrow, D Wilde, T Wileman, A Wilkinson (2), P Willcocks, A Williams, G Williams, R Williams, A Wilson, S Wilson, G Wise, D Wiseman, J Witcher, A Withers, M Withers, N Withers, P Withey, T Witts, S Wood, B Woodhams, J Woodrow, M Woods, M Woollard, D Worrall, P Worrall, A Wright, D Wright, S Wright, A Wrigley, H Wrigley, D Wymark.

D Yarwood.

J S Young, L Young, M Young, P Young.

Records were also received from the following groups, companies and charities, where individuals were not named:

ACTA, Adonis Ecology, The Ash Partnership, Bat Conservation Trust, Bockhill Birders, Bramley Associates, British Divers Marine Life Rescue, Chris Blandford Associates, Complete Land Management, Corylus Ecology, CSA Environmental Planning, Dungeness Bird Observatory, Ecology Solutions, Environment Agency, Environmental Assess Ltd, Halcrow Group Ltd, Highways Agency, Jacobs Engineering UK, Kent Charter Fishing, Kent Ornithological Society, Kent Wildlife Trust, Natural England, Plantlife, Romney Marsh County Partnership, RPS Consultants, RSPB, Sheerness Harbour Office, The Mammal Society.

County organisations

The following county organisations have a focus on the education, conservation, recording and monitoring of mammals within Kent.

East Kent Badger Group (EKBG)

The Group cares about badgers and other wildlife of east Kent.

More information can be found at www.eastkentbadgergroup.org.uk

Kent Bat Group (KBG)

The Group works to raise public awareness of the need for the conservation of bats and their habitats. Send records of bats to records@kentbatgroup.org.uk

More information can be found at www.kentbatgroup.org.uk

Kent Field Club (KFC)

The Club aims to deepen the understanding and appreciation of the natural history of Kent.

More information can be found at www.kentfieldclub.org.uk

Kent Mammal Group (KMG)

The Group offers an enjoyable approach to conservation and recording which appeals to people from a wide variety of backgrounds.

More information, including an online recording form can be found at www.kentmammalgroup.org.uk

Kent and Medway Biological Records Centre (KMBRC)

KMBRC provides a full data management service by acting as custodians of high quality biological and environmental data.

More information can be found at www.kmbrc.org.uk

The Fox Project

The Fox Project is a registered charity dedicated to the red fox.

More information can be found at www.foxproject.org.uk

West Kent Badger Group

Information regarding the West Kent Badger Group can be found at www.wkbg.org.uk

Wildwood Trust

Wildwood in Kent is a British wildlife park that links each of its animals to a conservation programme.

More information can be found at www.wildwoodtrust.org

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Suggested further reading

In addition to the list below, The Mammal Society produces an excellent range of educational and practical publications on mammal biology, ecology and conservation and methods to survey for mammals using a range of techniques.

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Glossary

Agri-environment scheme

These schemes provide funding for farmers and land managers to farm in a way that supports biodiversity, enhances the landscape and improves the quality of water, air and soil.

Albinism

Albinism is characterised by the complete or partial absence of the pigment melanin in the skin, hair and eyes. A mammal with this condition is described as an albino and has white hair and pink eyes.

Aposematic

Antipredator adaptations serving as a warning. They can be in the form of colour, sound or odour and are associated with the unprofitability of a prey item to potential predators.

Aseasonal breeding

Breeding is not limited to a particular season.

Blastocyst

A structure formed in the early development of mammals. It possesses an inner cell mass which subsequently forms the embryo.

Crepuscular

Primarily occurring or active during dawn and dusk periods.

Denehole

A man-made underground structure consisting of a number of small chalk caves entered by a vertical shaft.

Delayed implantation

See ‘Embryonic diapause’.

Diurnal

Occurring or active during the daytime rather than at night.

Dorsal

Situated on the back of an animal.

Embryonic diapause

Also known as ‘delayed implantation’, this is a reproductive strategy of certain mammal species to allow their offspring to be born in favourable environmental conditions.

Normally, when an egg is fertilized it rapidly implants into the wall of the mother’s uterus (womb), develops into an embryo and then a foetus, and eventually is expelled from the uterus at birth. The period from fertilization to birth is known as the ‘gestation period’ (pregnancy).

In embryonic diapause, physiological conditions arise so that the embryo does not implant into the uterine wall immediately but enters a state of dormancy or ‘suspended animation’. During this dormant period the embryo does not develop, so the gestation period is extended.

After a given period, and often in response to environmental changes, the mother’s physiology alters to allow the embryo to finally become implanted into the uterine wall. Its development then proceeds ‘as normal’ through the ‘true’ gestation period to birth.

Embryonic diapause is an adaptation seen in several mammal orders and species including some rodents, mustelids, pinnipeds and roe deer. It can be brought about seasonally as a regular part of the species’ breeding cycle, or it can be triggered by the mother continuing to lactate (produce milk) for her existing litter, thus suppressing development of the new offspring until the older ones are weaned.

Gadoid

A bony, soft-finned fish of the Gadidae family i.e. cods, hake and their relatives.

Gestation

Gestation (pregnancy) in mammals is the process by which the female mammal carries a developing embryo/foetus in her body from fertilization and implantation through to birth. In general, female mammals can have one or more gestations at the same time, i.e. multiple offspring can develop simultaneously. The time from fertilization to birth is called the gestation period.

Gleaning

A term used to describe a feeding behaviour of some bats (and birds), in which invertebrate prey is plucked from surfaces such as foliage or the ground.

Lanugo

A very fine, soft and usually unpigmented downy hair which can be found on a newborn animal.

Leucism

Leucism is a condition in which pigmentation is partially reduced. Unlike albinism, it is caused by a reduction in all types of skin pigment, not just melanin. A leucistic mammal will have white, pale or patchy-coloured hair or skin but its eyes are unaffected.

Longworth trap

The Longworth trap is designed to capture small mammals. The trap consists of two parts: a tunnel which contains the door tripping mechanism, and a nest box. The nest box provides a space for food and bedding material to ensure that the trapped animal is comfortable until release.

Melanistic

Melanism is a the opposite of albinism. The dark-coloured pigment melanin develops widely in the skin, giving a melanistic mammal an unusually dark appearance (e.g. a black leopard).

Mustelid

A member of the carnivorous mammal family Mustelidae, which includes otters, badgers, stoats, weasels, ferrets, polecats, martens, minks and wolverines. Most have long slender bodies and short legs, and anal scent glands.

Oestrous cycle

The oestrous cycle is the reproductive cycle of a sexually mature female mammal, consisting of a recurring set of physiological changes triggered by reproductive hormones. A female in oestrus is said to be ‘on heat’, i.e. sexually receptive.

Pelage

Refers to the body hair or fur of an animal as a complete coat.

Phocid

Phocids are known as true or ‘earless’ seals. These seals lack external ear flaps and are incapable of turning their hind-flippers forwards which makes them more cumbersome on land.

Pinniped

An aquatic mammal with front and rear flippers – includes seals, sea lions and walrus.

Polygamous

An animal typically having more than one mate.

Polyoestrus

If not impregnated, the animal will come into heat repeatedly during the breeding season and breed more than once a year.

Postpartum oestrus

This is a condition seen in the females of some mammal species, in which the female comes 'into heat' immediately (or very soon) after giving birth.

Refugia

Refugia are hiding places used by reptiles to rest and warm up. Artificial refugia such as corrugated metal sheets or squares of bitumastic roofing felt can be placed in suitable habitats to attract reptiles and are quite often used by small mammals.

Riparian

The riparian zone is the area between land and a river or stream. Plants and animals occurring in such areas are also described as riparian (e.g. otter, water vole) and can form distinct communities such as riparian woodland.

Sexual dimorphism

This is the existence of physical differences between male and female of the same species, which are directly related to the gender of the animal. These may include colour, body size or shape, or the development of specialised structures, e.g. antlers in male deer.

Swarming

This circling bat behaviour is observed in some species and can take two forms. Autumn swarming around the entrance to a prospective hibernation site or dawn swarming in the summer, outside roost sites before entering.

Tetrad

Kent is split in two by the Ordnance Survey 100km square designations of TQ and TR (Map 4), which are further sub-divided into 10 x 10 km squares (hectads). Each hectad is then further sub-divided into 25 2 x 2 km tetrads designated with a letter A-Z (omitting O).

Tine

Any of the sharp terminal branches on a deer's antler.

Torpid

A torpid animal is in a state of decreased physiological activity in an animal. The state is usually brought about by reducing the body temperature and metabolic rate. A state of torpor enables animals to survive periods of reduced food availability.

Tragus

Many insectivorous bats have a tragus, which is part of their external ear. It is a fleshy projection which covers the entrance of the ear and is thought to help in echolocating prey. The tragus shape varies between species and can be an aid to identification.

Vector

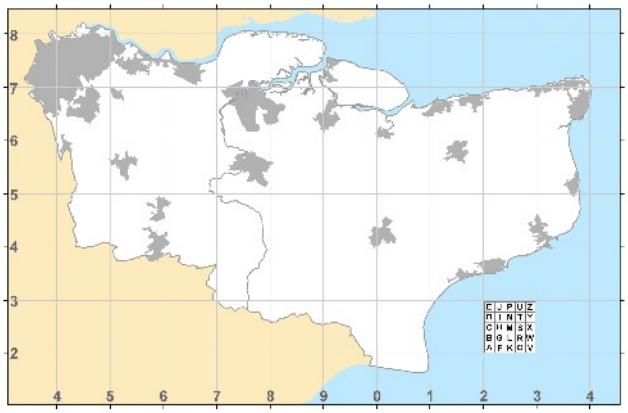
A vector is an organism which carries a disease-causing pathogen and transmits it from one living host to another. For example, mosquitoes are vectors of the malarial parasite and rats are vectors of disease.

Ventral

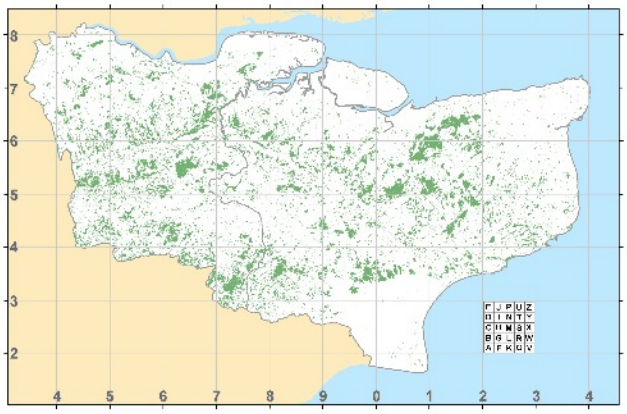
Situated on or toward the lower, abdominal (belly) plane of an animal's body, equivalent to the front in a human.

Map layers

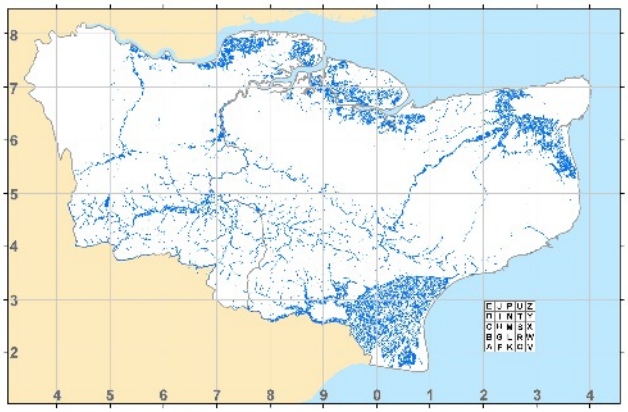
All maps show the vice county boundaries and the main rivers. Where it is considered that other information will complement the understanding of species distribution, one or more of the following additional map layers are included.



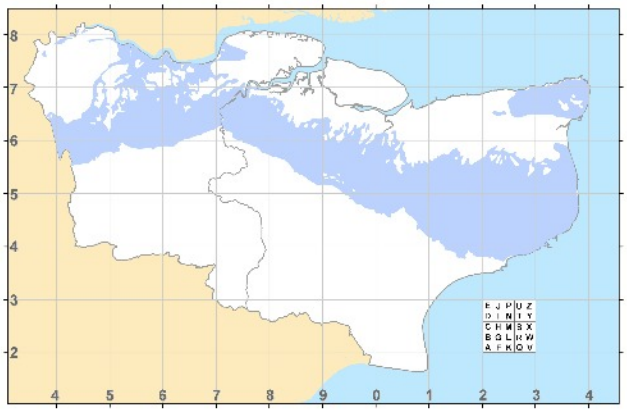
Main urban areas



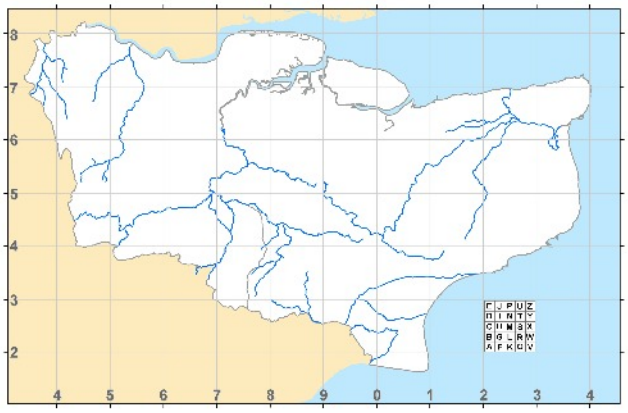
Woodland



Water bodies



Chalk



Main rivers.

Index of mammal species

Numbers in bold indicate the main account pages.

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Mammals of Kent

The most up-to-date account on the distribution and recording of Kent's mammals during the period 2002 to 2012. Information is provided on the complete mammal fauna of Kent. Covering 69 species with 58 distribution maps compiled from over 33,000 observations.

The publication results from a collaboration of county experts and dedicated volunteers and supporters from the following county mammal and wildlife recording groups; Kent Mammal Group, Kent Bat Group, East Kent Badger Group, Kent Field Club and the Kent and Medway Biological Records Centre.

It is hoped that the Mammals of Kent will raise awareness and encourage increased monitoring and observation of mammals in the county.

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