

PROTECTING OUR NATIVE ANIMALS AND THEIR HABITATS



Mammals Trust UK



The fourth of the annual updates following the publication of *Britain's Mammals: The Challenge for Conservation* for the launch of Mammals Trust UK in 2001

The State of Britain's Mammals 2005

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and Sandra Baker





Summary

1. The UK BAP (Biodiversity Action Plan) is undergoing revision in 2005; this involves updating the priority lists of species and habitats, and deciding, or revising, the targets for each. This is a mammoth undertaking: the original BAPs were published in 1995, and since then 427 UK action plans (31 for mammals) and 179 local BAPs have been produced. Knowledge has improved in this time and the review is essential to keep the BAP relevant.

2. We focus on one high profile BAP species, the water vole, and two less well-known priority species – Bechstein’s and barbastelle bats. We also highlight the pine marten, which, although not a priority for the BAP, raises tough conservation issues outside Scotland.

- Water voles. Their decline is attributed to agricultural intensification, and predation by American mink. Initiatives include National Key Sites, landscape-scale habitat restoration, raising public awareness, and potentially full legal protection of the species.

- Bechstein’s and barbastelle bats. A sudden increase in records for these rare woodland species is mainly the result of new technologies. Priorities are to: maintain and improve connectivity between woods; better adjust woodland management through research on microhabitat use; and improve roosting opportunities by retaining old trees and standing dead wood.

- Pine martens. The pine marten is Britain’s second rarest carnivore, and yet it is listed under the current UK BAP only as a Species of Conservation Concern. Martens have a few local BAPs, but should be upgraded to priority species status nationally.

3. The Tracking Mammals Partnership has launched its first report on species trends since 1995. Three native species, roe deer, common pipistrelle and otter, are estimated to have increased by more than 50%. One, the water vole, is reported to have declined by this amount.

4. Surveying mammals killed on roads may provide useful information. We report on three surveys with different remits:

- The MTUK/JNCC Mammals on Roads survey aims to detect relative changes in the abundance of different species.

- The Vincent Wildlife Trust/Mammal Society survey of polecats on roads is tracking their recovery across the UK.

- The National Deer Collisions Project records the scale and location of road accidents involving deer in order to develop mitigation to reduce such incidents.

5. We report three ingenious innovations in mammal monitoring.

- The Game Conservancy Trust has developed a mink raft for monitoring and trapping American mink.

- Researchers from the University of Sussex have developed the Autobat, an ultrasound synthesiser that has revolutionised the monitoring of the rare Bechstein’s bat.

- A retired forester from mid-Wales has devised a novel dormouse monitoring system, which may facilitate research on how dormice use the tree canopy.

6. Hunting wild mammals with dogs was banned in England and Wales under the Hunting Act from 18 February 2005. Elimination of long chases, and of ‘digging out’ (eg of foxes from their earths),



Pat Morris

are likely to be the main impacts of the Act on British mammals. The Act also repeals certain exemptions, for foxhunters, under the Protection of Badgers Act 1992.

7. This year has seen much discussion of bovine tuberculosis (bTB) in cattle, and the potential epidemiological role of badgers. In November 2003, Defra halted the reactive treatment in their ‘Krebs Trial’ following an apparent increase in cattle bTB under that treatment. The trial will continue testing a proactive culling strategy against a no culling control until mid-2006.

8. The Universities Federation for Animal Welfare (UFAW) have awarded their first Wild Animal Welfare Award to Dr Jonathan Reynolds of the Game Conservancy Trust, for designing the GCT mink raft. The raft allows mink to be trapped efficiently while reducing the risk of capturing non-target species.

9. In 2005, government payments to farmers are changing fundamentally in ways that could presage profound impacts on the conservation of mammals in the countryside.

- Subsidies are being decoupled from production, and linked instead to compliance with environmental, health, and animal welfare standards under the Single Payment Scheme. Farmers will have greater freedom to farm to the demands of the market, and environmentally-friendly farming will be better acknowledged and rewarded.

- In March, existing agri-environment schemes in England were replaced with Defra’s new Environmental Stewardship Scheme, including broad and shallow Entry Level Stewardship and Higher Level Stewardship, to deliver more focused environmental benefits.

10. Research in Somerset suggests that hares would benefit from increased habitat heterogeneity, eg diversity of vegetation types, within fields, to provide better year-round cover.

11. A radio-tracking study in Gloucestershire suggests that the presence of cattle may be an important factor in foraging by lesser horseshoe bats.

12. Four years after its launch, MTUK has funded research on bats, red squirrels, water voles, dormice and otters. In January 2005, MTUK awarded over £88,000 for eight new projects, and £4,000 internships to each of five graduates.

Preface

IT HAS BEEN FOUR YEARS since publication of the report *Britain's Mammals: The Challenge for Conservation*. Although much useful work has been done in the meantime, all the major issues highlighted in 2001 remain current. That said, the fact that the same issues remain topical - monitoring, farming and wildlife, predator control, diseases, planning and development, welfare, pesticides, etc - does not suggest that nothing has changed or been accomplished. Indeed, 2005 sees major punctuation marks in the unfolding of various significant episodes in the history of mammals and their management in the UK. The entire script for British conservation has changed within a decade or so, so much so that it is literally now written in a new language.

In the pages that follow we suggest that the current diversity of high-level political initiatives indicates that there may be increasing focus on mammal-based (indeed, biodiversity-based) definitions of sustainable development in Britain. Thus questions are being asked not only about how land management contributes towards the production of food, but also about how it can contribute to safeguarding wildlife and people's enjoyment of wildlife.

First, there is the decennial review of the UK's BAP and of the profusion of species, habitat and local BAPs that cascade from it. The BAPs are remarkable for several different reasons. Foremost is that these plans were only conceived in 1992 as the procedural fruits of the Rio Convention on Biological Diversity, and yet already they are a widely understood and completely embedded warp and weft to the fabric of conservation. In little over ten years the very word "biodiversity" has become general parlance, illustrating how central an issue conservation has become to society. A huge, inter-linked machinery of government and non-governmental organisations, and associated national and international processes, now underlie the BAP process and its review, as explained on p4-5.

A second punctuation mark this year has been the enactment of the Hunting Bill in England and Wales. While many may once have thought (and may still do so) that on the stage of international wildlife issues, hunting with dogs in Britain had little direct relevance to conservation, and was somewhat parochial

amongst animal welfare issues, the political tumult that has surrounded the debate about fox hunting can leave no doubt about just how philosophically central wildlife issues can be to society (see p12-13).

These two examples of very different facets of British conservation in 2005 meet, so to speak, on farmland. Radical upheavals in farming policy are now set to alter the countryside and its management for British mammals. Nobody could fail to see, in this topic, the link between wildlife, the lives of individual citizens, and grand politics. The desire to join up nature conservation and the rest of society's (especially rural) enterprises resonates in the Draft Natural Environment and Rural Communities Bill (February 2005). That bill seeks to integrate English Nature, The Countryside Agency and the Rural Development Service in a new agency called Natural England.

By next year conservation could be carried out in a countryside governed by a very different, and integrated, agency. It will remain important, nonetheless, that policy is appropriately informed by the research and observations of the conservation community.

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Cover pic credits: Badger - Terry Whittaker, Water vole - Dave Bevan, Barbastelle bat - Frank Greenaway, Pine marten - Terry Whittaker



The BAP Review

THIS IS AN IMPORTANT year for conservation in the UK, because it sees the tenth anniversary, and thus a major revision, of the UK BAP. The BAP helps to coordinate and drive conservation work at national and local levels by identifying priorities for action, and setting biological targets for the recovery of species and habitats. Since the original UK BAP lists were published in 1995, 427 UK action plans (31 of them relating to mammalian species, from bats to whales) and 179 local BAPs have been published. The plans, and targets set within them, were based on the best information available at the time. However, knowledge of species and habitats, the threats they face, and opportunities for their conservation, have changed. Regular reassessment of progress, priorities and targets (with regard both to species and habitats) is important. The first full review of the UK BAP is taking place between 2004 and 2006. This involves reviews of: (i) reports on progress integrating local and national information; (ii) targets set for UK priority species and habitats; and (iii) priorities. The Biodiversity Reporting and Information Group (BRIG) is coordinating this work on behalf of the UK Partnership Standing Committee.

Reporting on progress

The BAP review coincides with the latest three-yearly BAP reporting round. Reporting will involve the new web-based Biodiversity Action Reporting System (BARS), which is being developed by English Nature, the Scottish Executive, Scottish Natural Heritage and the Wales Biodiversity Partnership to support the planning, monitoring and reporting requirements of national and local BAPS. The goal is that BARS should: (i) provide a tool to



The BAP target of preventing expansion of grey squirrels into red squirrel areas has expired.

Terry Whittaker

help local BAP partnerships and organisations to structure their data and generate reports; (ii) offer new opportunities for integrating information between local and national levels, and across different organisations; (iii) provide a powerful tool for sharing experience and communicating with the general public; and (iv) allow information to be shared within partnerships. Staggered reporting (local BAP - July-September 2005, and Lead Partners - October-December 2005) should enable Lead Partners to take account of local BAP information when integrating their reports. BRIG is also looking into incorporating information from sources other than local BAPs and Lead Partners. The final report should be available at the June UK Biodiversity Partnership Conference in 2006¹.

Revising UK BAP targets

The targets of the BAP are to: define aims, guide actions, and provide milestones against which to assess progress towards securing a long-term future for mammals, other animals and plants. The targets set for the UK Species Action Plans (SAPs) and Habitat Action Plans (HAPs) between 1995 and 1999 are now in need of revision for several reasons²:

- *The current targets are UK-wide. Biodiversity conservation is now the responsibility of the devolved administrations, and so country-level evaluations are required.*
- *Many targets were set against specific deadlines, of which some have been met (eg giving legal protection to the water vole) and others have expired (eg preventing the expansion of grey squirrels into key red squirrel areas). Indeed, 200 (nearly 20% of all targets) will have expired by the end of 2005, by which time all the targets listed in some plans will have expired.*
- *Many of the original targets had to be set with only incomplete knowledge of the species' or habitat's circumstances, which is one reason why fewer than 25% were quantitative. Discoveries made during the last decade (eg The Sussex Autobat (see*

p8) having superseded the installation of bat boxes as a method of locating Bechstein's colonies (see BAP species: rare woodland bats), or improved methods of mink management (see p8)), provide the opportunity to refine these targets, with a view to making the new ones more specific and measurable, and thus easier to monitor.

- *Planning has been complicated by the realisation, largely since original UK targets were set, that climate change has to be taken into account. Planning for, and managing, that change is a difficult task.*
- *As conservation has become a more sophisticated profession, inconsistencies in vocabulary have been identified, and these need to be sifted out in order to integrate UK and local BAP targets. The goal, of course, is that the revised targets will be SMART: Specific, Measurable, Achievable, Relevant, and Time bound². These new targets will be scheduled for 2010 and 2015. For widespread species, such as the water vole, new targets will be specific increases in the number of 10 km squares that are occupied (see BAP species: water voles).*

Updating the UK species and habitats priorities

Considering that 382 species (31 of them mammals) and 45 habitats are already listed as priorities, and that there are a huge number of interested parties and complicating factors, conducting this review is a tremendously difficult task. This is made all the worse because, while knowledge has improved, it is still very far from sufficient. The Priority Species and Habitats Review Working Group will provide a clearly audited process for listing species and habitats. This will be based on the application of scientific and practical criteria, and consideration of appropriate implementation mechanisms. The resulting plans will include: single species plans (examples might include red squirrels, hazel dormice, brown hares), grouped plans (eg for cetaceans, bats, or riparian species), or variations linked to agri-environment schemes or other policy instruments. By consulting widely with experts, and the JNCC's Species Status Assessment Project, the result will be new lists of priority species for each country within the UK. The principles that will be important include that such lists should be dynamic, with the capacity to adapt to changing circumstances and emerging knowledge, be transparent, consistent, evidence-based and precautionary.

Against this background, JNCC has set up a Mammals Expert Group, comprising Country Agency staff, the JNCC, voluntary organisations, and mammal experts Dr Paul Bright (Royal Holloway, University of London), Professor David Macdonald (WildCRU, University of Oxford), and Dr Derek Yalden (University of Manchester). This group is striving, under the chairmanship of Melanie Hardie, to develop criteria for selecting the species of terrestrial British mammal that merit most conservation concern. Their approach has been first to select the Species of Conservation Concern (SoCC) – the so-called 'sub-list', then to review in depth the evidence that might qualify each as a Priority Species, and then to identify necessary actions. This process will be complete by the end of 2006. Mammal specialists from English Nature, Environment and Heritage Services, NI, Countryside Council for Wales, JNCC and Scottish Natural Heritage contributed to the Inter-Agency Mammals Working Group, which customised the IUCN criteria to include in the sub-list of Species of Conservation Concern:

- Only those that occur (breed/reside) in the UK authority of the mainland and islands (eg the lesser white-toothed shrew on the Isles of Scilly) not including the Channel Islands (where the greater white-toothed shrew is found) and Isle of Man.
- Those that have been an established member of the UK fauna since at least the 1500s (eg the brown hare, black rat, and Orkney vole), but exclude feral species that have escaped from domestication.
- Only species should be included, not sub-species or races (eg the Skomer vole – a sub-species of the bank vole).
- Only those species NOT listed on Schedule 9 of the Wildlife and Countryside Act (1981) and Wildlife and Countryside (NI) Order 1985. For example, the edible dormouse is a European protected species that cannot be released back into the wild in the UK once caught. The black rat has been an established member of the UK fauna since at least the 1500s (see above), and yet it appears on Schedule 9 and so also

cannot be released.

Species that qualify for one or more of the following will be considered as candidates as SoCC:

- 1) Threatened endemic and other globally-threatened species (such as the Scottish wildcat).
- 2) Species of which the UK has more than 25% of the world or appropriate bio-geographical, population (such as Natterer's bat).
- 3) Species where number or range has declined at a level equivalent to 25% over 25 years, but restricted to the last 10 years. There are limited data from the last ten-year period that would allow us to qualify many species under this - possibly harvest mouse, hedgehog, hazel dormouse and water vole.
- 4) Species where the population numbers or range have declined by over 50% from historic populations (circa 1800s). This is to allow species that were persecuted in the 1800s, due to the activities of Victorian shooting estates and the fur trade, to recover. This may include polecat, pine marten and wildcat.



Susan Sharrafi

The globally threatened wildcat is a prime candidate for prioritisation under the revised BAP.

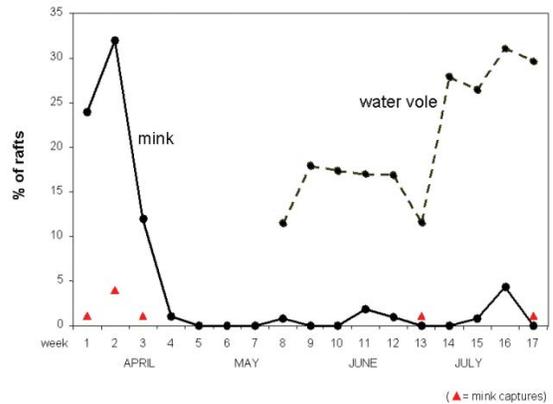
- 5) In some instances where the species is found in fewer than twenty 10 km squares in the UK (eg the grey long-eared bat, or greater mouse-eared bat).
- 6) Vulnerability index/threat assessment. Species that are, or are likely to be, threatened by or in clear and present danger from: a) climate change (eg the mountain hare, or hazel dormouse); and/or b) hybridisation (eg the red deer, polecat or wildcat).
- 7) Species listed under the Wildlife and Countryside Act 1981 Schedule 5 (all bats, all cetaceans, the red squirrel, water vole, hazel dormouse, pine marten, otter and wildcat) and the Wildlife Order (Northern Ireland) 1985 Schedule 5 and in the Habitats Directives Annex IV. Badgers are included in the Wildlife (NI) Order Schedule 5, so may be a species to debate. Pipistrelle bats are common and may be increasing, and yet they are on Schedule 5, as are all bats.

The Mammals Expert Group is currently applying these selection criteria to a list of qualifying mammals to identify species that they judge should be selected, and making suggestions for alternative criteria where appropriate.



BAP species: water voles

THE WATER VOLE may be the UK's most rapidly declining mammal. Once widespread and common in this country (as it still is on the continent), the species is now extinct in many English and Welsh rivers, with only a few strongholds scattered in England, Wales and Scotland. The decline of the water vole has its roots in the intensification of agriculture, with the associated widespread drainage and habitat loss, followed by the canalisation of rivers. Against this discouraging history, the coup de grace has been delivered by the American mink – a beautiful, fascinating and flexible species, but one that has been unnaturally introduced and against which the water vole has not had sufficient time to evolve an effective defence. The most recent of a succession of increasingly depressing surveys of water vole signs was conducted in 2004 by the Wildlife Trusts. Their survey of some 436 km of watercourses across the UK indicated that in three quarters of the areas surveyed evidence of water voles was even scarcer than just one year earlier. Indeed, in all three counties surveyed by The Berks, Bucks and Oxon Wildlife Trust the 2004 survey revealed signs had plummeted for the second year running. Poignantly, one of the dwindling populations was that at Moor Copse Nature Reserve, near Pangbourne, where the view of the River Pang was reputedly the inspiration for Kenneth Grahame's *The Wind in the Willows*³. The Species Action Plan (SAP) aims to maintain the distribution and abundance of water voles that was current in the UK at the time the original plan was drafted in 1997 – an aspiration that successive surveys reveal so far to be failing. The SAP also sets the target of ensuring that by 2010 water voles are present throughout the range they occupied in 1989/1990. Of course, this target is arbitrary, and while in the full sweep of the history of the species' decline it may not seem ambitious, the evidence so far is that it will be hard to achieve. Those seeking to decide what is achievable when drafting the revised, SMART, targets for the UK water vole BAP (see p7) face a dilemma in balancing inspirational optimism with realism bred of an unpromising past. Efforts to restore the UK's water vole population comprise a suite of six initiatives.



Removal of mink from the River Itchen was associated with a dramatic spread in water vole evidence. (GCT data)

Initiative 1: National Key Sites. Over the last three years, National Key Sites for water voles (NKS) have been established at fifteen extensive wetland sites (reedbeds and grazing marshes) in England and Wales; as yet, there are no key sites in Scotland. Each NKS is selected as a large, robust water vole population that can be protected through good management. Ideally, they should be refuges from mink and sources from which water voles recolonise their environs. To facilitate this hoped-for recolonisation, an area of radius 5 km around each NKS has been surveyed for suitable and potentially suitable water vole habitat. Although 75% of the areas surveyed were currently unsuitable, much of this area had the potential for restoration. These surveys provide a foundation on which to plan the reversal of habitat fragmentation in the buffer around each NKS, and thus the gradual expansion of each site. Habitat enhancement and restoration are the focus of the next three-year phase, together with establishing more sites – especially in Wales. NKS work is funded by the Environment Agency, PTES, MTUK, English Nature and the Countryside Council for Wales.



Landscape-scale experiments are testing the effect on water voles of habitat management options, including fencing off water courses.

Initiative 2: Landscape scale habitat restoration. Following on from the success of their water vole restoration work on the Chichester plain⁴, researchers from the WildCRU, University of Oxford (and funded by the Tubney Charitable Trust, Oxford University Research Development Fund and the Environment Agency), are conducting a new landscape scale project in the Upper Thames. In contrast to the site-focused NKS initiative, the Upper

Thames project is catchment-based, and designed with a view to making practical use of an ecological concept – the metapopulation. A metapopulation is one whose behaviour is the emergent property of the interacting dynamics of a constellation of linked, but discrete, sub-populations – in conservation terms, the virtue of a metapopulation is that the flux between sub-populations provides the safeguard of, metaphorically, not putting all your eggs in one basket. The WildCRU's work in the Upper Thames involves large-scale controlled experiments to test the effect on water voles (and other species) of various habitat management options including extensive field margins and fencing off watercourses.

Initiative 3: Raising public awareness. In 2004, the Wildlife Trusts distributed over 10,000 'Know-your-vole' cards to members of the public, pest control officers and landowners. The British Pest Control Association now includes the cards and a leaflet, 'Rat control and water vole conservation', in all their training packs for pest control officers. These efforts are in direct response to incidents where water voles had been accidentally poisoned during attempted rat control. If, as seems both likely and desirable, water voles become fully protected later this year (see below), poisoning them would become a criminal offence.

Initiative 4: Full legal protection for water voles. It is an offence under the Wildlife and Countryside Act (1981) to destroy or damage a known water vole burrow, but water voles themselves are not protected. This quaint anomaly should be rectified, and indeed the UK Water Vole Steering Group has recognised that the species needs full protection in the UK to fortify plans for its recovery. On 4 January 2005, the Government announced a proposal to give water voles full legal protection in the wild, under Schedule 5 of the Wildlife & Countryside Act for England and Wales, during its quinquennial review. While this legislation should eradicate persecution of water voles, its main impact seems likely to be within the planning process through strengthening the duty of care on local authorities, developers and landowners. Offences under the Act could incur fines of up to £5,000 and 6-months imprisonment.

Initiative 5: New water vole conservation handbook. A new handbook, up-dating best conservation practice for water voles, will be published in 2005. The first edition, published in 1998, described best practice for managing the species and its habitat based on information available at that time. Subsequently, research has provided insights to revise, and radically to improve guidance on such topics as habitat enhancement, mitigation methods, the reintroduction, translocation and temporary exclusion of voles, and other aspects of water vole and mink ecology. The WildCRU has

Devising mink control strategies

A collaboration between the University of Newcastle and the WildCRU (funded by the Esmee Fairbairn Foundation and MTUK) has recently completed a computer model to identify the optimum strategy for controlling for mink. The great strength of such models is that, by incorporating the best available data on the biology of both mink and water voles, set in a virtual landscape based on real river systems (within a Geographic Information System), they allow researchers to explore plausible scenarios for attempted control without risk of making wasteful mistakes. In this way, the most promising approaches can be identified, and expensive fieldwork appropriately focused. Tentative results of the simulations are that it is indeed feasible radically to reduce mink numbers by trapping IF the campaign is sustained, conducted systematically, focusing effort on specified phases of the mink annual cycle, and provided that it targets immigrating juveniles as well as reproductive adults⁷. The predictions of the model are currently being tested in the field by WildCRU researchers – this is a major undertaking, and likely to take four years, but it is important, for reasons of both efficiency and ethics, to make sure that procedures are thoroughly tested. The Game Conservancy Trust (GCT), British Association for Shooting and Conservation (BASC), Central Science Laboratory (CSL), the Environment Agency, and a number of County Wildlife Trusts are all involved in strategic mink control. All of these projects have been greatly aided by the invention of the GCT's splendid mink raft (see p8&12).

Dave Bevan



been commissioned to draw together this information in the new handbook, and also therein to explore the consequences of the anticipated full legal protection of the water vole, together with the implications of changing agri-environment schemes. It will also explore the practical, and ethically difficult, topic of mink management.

Initiative 6: Research on mink. In 2003, scientists from Royal Holloway College demonstrated that reed beds could provide water voles with refuge from predation by mink and other mustelids⁵. To investigate the mechanism involved, the researchers radio-tracked mink to monitor their habitat use. Mink generally hunted close to main watercourses and avoided the depths of the reed bed⁶. This finding confirmed the importance of reed beds on the criteria for selecting National Key Sites (NKS) for water voles.

SMART targets for the Water Vole BAP

Specific, Measurable, Achievable, Relevant and Time bounded (SMART) targets will be instituted for all BAP species in 2005. So far, the process of identifying SMART targets for water voles has prioritised securing their distribution and populations at the level of 10 km squares. For this purpose, the best data currently available were collated between 1996 and 1998 for the second Vincent Wildlife Trust (VWT) national survey⁸; these figures will act as a baseline for water vole distribution in 2005. From these insights into the current state of the nation's water voles, the tricky task is to identify plausible targets (in terms of occupied 10 km squares) for the expansion of their distribution by 2010 and 2015. This involves making judgments on the likelihood of colonising adjacent squares, and how proactive management might prepare

	Number of 10 km squares occupied		
	Baseline 2005	Target 2010	Target 2015
England	582	605	635
Scotland	79	95	110
Wales	69	80	90

their way. Similarly, account must be taken of the likelihood of water voles being lost from some current isolated sites. So far, the actions proposed within the BAP to achieve these new targets are little changed from those set out in 1997.



Monitoring Britain's mammals

Species status & population trends



FOR A LONG TIME it has been clear that Britain was sadly - and arguably in dereliction of international obligations - lacking an adequate mammal-monitoring network. As an approach to rectifying this, the Tracking Mammals Partnership (TMP) is a collaboration of 24 organisations involved with mammal conservation, management and research in the UK. The Partnership was launched in July 2003, with the aim of producing population data for all resident terrestrial UK mammal species, and improving the quality, quantity and dissemination of such information.

In spring 2005, the TMP released the first major report on species trends since 1995⁹. It attempts to assess population change for 33 of the UK's listed 63 resident terrestrial



Pat Morris

can give different results for the same species - eg water vole, brown rat, and red and fallow deer - and records for some species have fluctuated greatly between years - eg red deer, red fox and mountain hare). Trends for some species, eg brown and mountain hare, hazel dormouse and American mink, have differed substantially in different parts of the UK.

The TMP relies heavily on contributions from volunteers, and recognises the importance of training them and verifying their data, but evaluation of volunteer input and alternative survey methods is not yet complete. Investment in the TMP's work to date runs at around £500k annually, mostly contributed by the participating NGOs, and the Partnership estimates that an additional £350k pa

would be necessary to expand the programme to provide coverage of the 30 species not yet fully included. The TMP have estimated the value of volunteer input to be £4.5 million per annum. However this does not allow a simple comparison with the likely cost of engaging professionals instead - a comparison further complicated by the possibilities that professionals might require less training, and might work at a different rate to volunteers.

	DECLINING	STABLE	INCREASING	NO CLEAR TREND
NATIVE SPECIES	Water vole Mountain hare Hazel dormouse	Mole Whiskered bat Brandt's bat Soprano pipistrelle	Greater horseshoe bat Lesser horseshoe bat Natterer's bat Daubenton's bat Badger Red deer Roe deer Common pipistrelle Otter* Polecat *	Red fox Stoat Weasel Hedgehog Serotine bat Noctule bat Brown long-eared bat Irish hare*
INTRODUCED SPECIES	Rabbit	Brown hare American mink	Grey squirrel Brown rat Reeves' muntjac Fallow deer Sika deer* Chinese water deer*	

Reported population trend at UK level for mammals since 1995. **Bold** = population change of more than 50%. Asterisk = insufficient data to conduct formal trend analysis

mammal species and one subspecies, the Irish hare (involving formal population trend analysis in the cases of 29); see above. However, as yet, the findings are inevitably largely based on short time series, and margins of error associated with such surveys can be large (practical difficulties include the reality that different types of survey

Monitoring innovations

AutoBat playback surveys

Researchers from the University of Sussex have developed an ingenious method of monitoring for Bechstein's bat, a BAP species and one of Britain's rarest mammals¹⁶. Bechstein's is an elusive woodland species that is particularly difficult to monitor, study or catch (see p14). Inspired by the use of acoustic lures in bird surveys, the researchers replicated one of Bechstein's social calls using the AutoBat, an ultra-sound synthesiser that they have developed, and found that bats (including other species) were strongly attracted to it¹⁷. By luring bats into mist nets, and fitting them with radio tags, they were able to identify previously unknown roosts, more than doubling the number of Bechstein's maternity colonies known in Britain in less than two years.

The Game Conservancy Trust (GCT) mink raft

The GCT has developed a mink raft that provides a sensitive means of monitoring American mink, and a favourable trap site. The raft incorporates a 'tracking cartridge' containing a moist sand/clay mixture that records the footprints of animals visiting the raft. Once mink are detected, and if they are to be removed from the site, managers can install traps on rafts that mink have visited. This system increases cost-efficiency (using less manpower and fewer traps) and reduces the capture of non-target animals (see UFAW Wild Animal Welfare Award 2004). Once mink have been caught, the trap can be removed and the raft returned to 'detection' mode to check whether other mink are present¹⁸. These rafts are already being used by the WildCRU team researching mink control in Oxfordshire and by Wildlife Trusts and other conservation bodies in 13 counties¹⁹ (see p12).

Monitoring mammals killed on roads

Many thousands of mammals are killed on Britain's roads annually. Logging their numbers and whereabouts offers two hopeful prospects – first that the tallies of the dead might function as a barometer of abundance of the living, and second that the circumstances of these corpses might provide insight into how to diminish road accidents, for the safety of both motorists and wild mammals.

In 2002, a national survey of squashed mammals began under the title: **Mammals on Roads** – an initiative of the Mammals Trust UK and the JNCC under the Tracking Mammals Partnership. Participants report mammals seen dead on the road, the casualty location, and the length of the motorist's journey (as a measure of surveying effort). In its first three years, the survey has received over 26,000 mammal reports from journeys totalling 226,000 miles. This information could become a baseline against which to detect changes in population abundance. However, the interpretation of mammalian road deaths has already been the subject of quite a lot of analysis around the world^{10,11}, and these studies emphasise pitfalls in interpretation. The tempting assumption is that there is a simple relationship between the abundance of each species and the probability of its collision with road traffic, but obviously this needs to be checked. Interestingly, when this was checked, for foxes in Bristol¹², it emerged that the distribution of fox mortality varied with road type, more foxes being killed (per unit length of road) on motorways and A-roads. In this case, therefore, it was necessary to take account of the length of each road category in each region when calibrating the relationship between dead foxes seen on the road and estimates of the abundance of live foxes in the vicinity. Analyses of this sort remain to be done for most species, and face the obvious hurdle that the abundances of rather few mammalian populations are known, against which the tallies can be validated.

Polecats were once widely distributed in England, Scotland and Wales. By 1915 trapping had restricted them mainly to mid-Wales. However, with changes in the numbers and attitudes of gamekeepers, and thus reduced trapping pressure, by the 1990s polecats were once again widespread in much of Wales, and had begun to recolonise large parts of England¹³. Tracking the recovery of polecats is complicated (as is almost everything else about their



R Randall

conservation) by their hybridisation with feral ferrets. Actually, ferrets, *Mustela furo*, were domesticated originally from a different species, the Steppe polecat, *M. eversmanni*, although both interbreed readily with the British species, the western polecat, *M. putorius*. The hybrids are easily confused with western polecats. A continuing survey by the Vincent Wildlife Trust and the Mammal Society (2004-2006) is plotting the locations of polecats, ferrets and hybrids reported by the public¹⁴. In the first 12 months, 246 possible polecats were reported, 209 of which were judged, by experts examining either photos or the corpses, to be polecats.

Over 30,000 deer are estimated to be involved in road accidents each year in mainland UK. In 2003, the **National Deer Collisions Project (NDCP)**¹⁵ was established via the Deer Initiative to monitor the scale and geographical distribution of incidents, and the location of accident black spots. The NDCP has received 18,000 reports of collisions or deer found dead at the roadside since January 2000; over 12,000 of these relate to the last two years alone. These reported incidents have led, on average, to over 250 personal injury accidents and 10 human fatalities per year, and yet they probably represent only a small proportion of all deer collisions. The annual cost of car repairs due to collisions with deer is estimated to have exceeded £11 million. Accidents peak between October and December, when rush-hour traffic increasingly overlaps with the busiest times of deer activity - dawn and dusk - and this is also the rutting period for large species such as red and fallow deer, when stags and bucks may be preoccupied and less vigilant. A further peak occurs during May when roe deer in particular are killed in higher numbers.

Dormouse nest boxes on poles.

Dormice require a diverse, highly-structured habitat of arboreal pathways, and coppicing is often recommended as a means of providing this. However, tree holes can be limited in coppice and young scrub, so nest boxes may be important in such areas. Boxes are usually positioned at about chest height, but recently dormice were found nesting in bat boxes (3-5 metres up) in areas of Wiltshire, Hampshire, Sussex and Surrey, where they were previously unknown. Jack Grasse, a retired forester from mid-Wales, has devised a novel dormouse monitoring system that utilises this phenomenon. He made lightweight nest boxes, which are fixed to the end of 7-8m poles, thus facilitating easy positioning of boxes in the canopy. The entrance hole is placed facing the tree trunk, and the box secured by strapping the pole to tree. The hole can be closed, using a sliding door operated by a cord, to prevent escape of any occupants before the box is lowered. Once the box has been checked and repositioned, the entrance can be reopened from the ground, by removing a corded bung. The boxes were originally designed for use in

coniferous woodland, where open branches at chest height and a lack of ground cover would be unattractive to dormice. These boxes may help in studying the distribution of dormice in conifers, a topic that has been neglected. Accumulating evidence suggests that dormice can use this habitat effectively, but it is not clear how, given the absence of typical food resources. Initial trials along the edge of conifer plantations have already revealed signs of animals in the canopy. Nest boxes on poles may provide a way of learning more about how dormice use the tree canopy in a variety of habitats, a topic that is otherwise difficult to investigate except by radio tracking (which confirms that dormice can climb at least 20 metres into the canopy). Studies of pied flycatcher nest boxes in Devon, by Gordon Vaughan, of the Devon Bird Club, suggested that dormice were more likely to use boxes placed 2-3 metres off the ground, than those higher in the canopy. Therefore it may also be worth testing boxes at different heights.

The case for pine martens



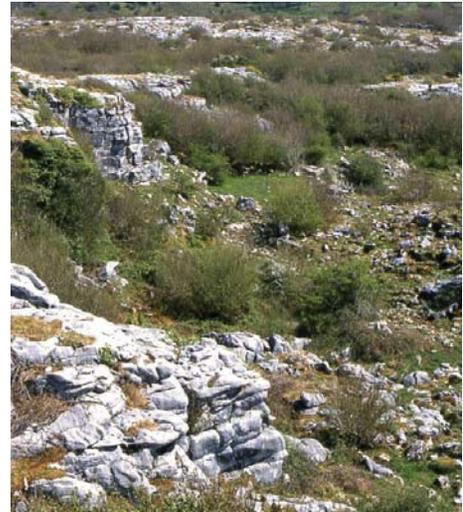
WOODLAND CLEARANCE, PERSECUTION, and trapping for fur, have had a lasting impact on the distribution and abundance of pine martens in Britain and Ireland. Although this fact may not console game managers in areas where they are abundant, the pine marten is Britain's second rarest carnivore (the unenviable rarest slot being held by wildcats). By 1800, the species was scarce in many parts of lowland Britain. In the late 1800s, increased predator control, for game keeping, hastened its rate of local extinction, until by 1915 the pine marten was apparently confined to the West Highlands of Scotland, North Wales, parts of northern England, and a few scattered areas in Ireland. The decline in Ireland occurred later and was due more to poisoning. World War I brought about a decline in game keeping, while an increase in tree planting, following establishment of the Forestry Commission in 1919, might have been expected to benefit pine martens further. However, the species has only expanded its Scottish distribution slowly since the 1930s. Irish populations have been recovering since the use of strychnine, for controlling foxes, was phased out in the 1980s^{20,21}.

Views diverge regarding the current status of pine martens outside Scotland. Indeed, although marten carcasses and scats have been recovered and numerous sightings reported, in parts of northern England and Wales, these are interpreted differently. One view is that any martens persisting in England or Wales have either escaped from private collections, or have been illicitly translocated from Scotland²². Others however are convinced that isolated, yet persistent, populations struggle on in remote parts of both countries²¹. Whatever the reality, it is clear that populations in England and Wales have not expanded, as they have in Scotland. Surveying these carnivores is difficult. Surveys conducted in England and Wales in the 1990s, on behalf of English Nature and CCW, reported little evidence of pine martens²³. However, since they exist only at low densities, this may not be surprising. Sign surveys conducted between 1987 and 1988 by the JNCC, and ongoing monitoring by the Vincent Wildlife Trust, have been interpreted by some to suggest that martens persist in six core upland areas: the Cheviots, Lakeland, the North York Moors, the Peak District, North Wales and central southern Wales^{20,21,24}. One paper details 525 reported sightings during the period 1996-2003²⁵ although

Terry Whittaker



In Britain & Ireland, pine martens inhabit landscapes where trees are scarce, such as the Burren in County Clare (below), but they prefer wooded habitat²¹.



Johnny Birks

interpreting these is far from easy. Other evidence includes one photograph of a live marten, 8 dead specimens, and numerous scats, one of which – from north Wales - has been confirmed as pine marten by DNA testing²⁶.

There seems little reason to doubt that pine martens survived throughout at least most of the 20th century in a handful of areas of England and Wales - North Wales, Lakeland and central southern Wales being the strongest candidates. These may have been relicts of the pre-decline populations. Other populations might have been more newly established, perhaps thanks to translocations and deliberate releases, as has been suggested for the North York Moors. Evidence of the meddling hand of man is highlighted by the recent confirmation, based on their DNA, that two marten corpses from northern England were American martens, perhaps most likely fur farm escapees²¹.

Perhaps more interesting is why pine martens have been slow to recover or recolonise – a question to which answers might underpin a restoration plan. Possible reasons for the slow recovery of martens include: (i) the refuges in which they may have survived have not provided ideal habitat or den sites²⁷; (ii) their rate of reproduction may be low – rarity itself can make reproduction problematic – a phenomenon recognised as long ago as 1949 when W.C. Allee coined the term 'under-crowding' when describing a potential blight on the recovery from very low population densities; and (iii) juveniles tend not to disperse far from their natal area²².

Are there pine martens in Snowdonia?

Conservationists from Mamaliaid Eryri ('Snowdonia Mammals', a voluntary conservation group) and Snowdonia National Park are seeking photographic evidence that pine martens inhabit Snowdonia. There have been 101 reported sightings of the species in north Wales over the last nine years and pine marten DNA was recovered from a dropping found in Gwydir Forest, near Betws-y-Coed, in 1996. The Snowdonia team began work in summer 2003 with a campaign to encourage the public to report suspected marten sightings; this attracted 63

responses. In 2004, the researchers began targeting areas where clusters of sightings had been reported, using three purpose-built automatic 'camera traps' (two donated by PTES). Camera traps are cameras that incorporate an infrared beam which, when broken by an animal, triggers the camera to take its photograph. The portable systems are installed and checked fortnightly for activity, and can be moved in response to reported sightings. Between March and November 2004, the cameras were set up outdoors on baited platforms. So far they have recorded no martens.

Artificial natal den boxes for pine martens

Food resources often limit mammal populations, but there are cases where den sites are limiting (eg rabbits³⁰ and badgers³¹). Pine marten populations may potentially be limited by the scarcity of elevated, insulated dens required for predation avoidance and energy conservation²⁷. Consequently, they tend to breed in roof voids (see below), burrows, and large bird boxes, often with adverse consequences, such as persecution, a growing reputation as a nuisance species, and predation by foxes. Providing artificial den boxes in managed woodland might improve habitat for pine martens. Previous attempts to foster pine martens through providing nest boxes have met little success, but that may mean the box design was wrong, rather than that the idea flawed. The VWT has designed and tested a new den box, designed as a breeding nest that attempts to improve on the thermo-energetic deficiencies of previous designs. Key features of the new design are:

- den chamber size similar to natural den sites (20 x 25cm floor area), eg Black woodpecker holes in mainland Europe
- thick timber and boarding provides good thermal insulation
- entrances at bottom, and snug-fitting lid reduce convectional heat loss
- double 'chimney' entrances ensure den chamber has no external corners, preventing rain penetration and giving animals choice of entrances and escape routes
- shallow-pitched roof allows scat deposition on top to advertise occupancy



Pine marten kits in a den box in Galloway Forest, May 2004

Johnny Birks

Four of nine captive martens preferred the new box to their existing den boxes. In trials in Scotland, 60% of boxes in Galloway Forest, and 20% in Cowal and Trossachs Forest, were used regularly by wild martens after 14 months. Kits were recorded in 20% of Galloway boxes. Martens advertised their occupancy of boxes by piling scats on the lid. So, as well as providing a habitat enhancement aid, the boxes act as a useful non-invasive detection and monitoring tool. Ten boxes were erected in Silton Woods, North Yorkshire at the end of February this year.

Each of these factors could exacerbate the impacts of direct and indirect persecution by gamekeepers.

Disagreement about the status of pine martens in England and Wales inevitably has polarised opinions regarding the most appropriate approach to restoring the species. Insofar as viable populations still exist, one might advocate promoting the natural recovery of these populations through habitat improvements. England is one of the least wooded countries in the pine marten's geographic range, which extends from France, through Italy as far north as Russia and Scandinavia and into Asia. Consequently the pine marten is more numerous on the continent²², and many populations there are stable²⁸. The task of increasing suitable woodland in England is not inconsiderable. However, perhaps merely the provision of den boxes would improve habitat suitability until standing deadwood conditions improve. A different view, is that those areas where relict populations may (or may not) persist do not offer optimal habitat, and better sites may exist – in that case, a reintroduction programme could be devised. Since any surviving pine martens have evidently failed to reach such better sites under their own steam, and in the interests of accelerating the restoration of Britain's mammalian fauna, it would not seem too impulsive to explore the feasibility of such reintroductions within a carefully evaluated Species Recovery Programme²⁹.

Pine martens were afforded strict legal protection in 1988, when they were added to Schedule 5 of the Wildlife and Countryside Act 1981. However, the UK BAP currently lists the pine marten only as a Species of Conservation Concern. Although listed in a few local BAPs, eg the Snowdonia local BAP, the species should be given the additional protection offered by inclusion as a Priority Species, with its own UK Species Action Plan (which should consider the contrasting questions raised by its very different circumstances in each of the countries).

Habitat use work

The current trend in silviculture is moving from large-scale clear felling towards more selective continuous-cover felling systems. Continuous-cover systems use partial harvests and natural

Pine martens denning in buildings

In parts of Scotland where pine martens are considered common, they sometimes den in buildings, probably because of a scarcity of natural dens. Buildings provide a well-insulated, predation-free site with protection from the weather. Over the last 22 years, SNH have had increasing requests from the public for help in dealing with pine martens in houses, probably as a result of the species expanding its range, and the conferment of full legal protection under the Wildlife and Countryside Act 1981 (Variation of Schedules) Order 1988. In 2004, SNH had nine requests for help across Inverness-shire, Ross-shire, Badenoch and Strathspey³². Martens are excellent climbers, and can pass through a hole measuring just 50mm in diameter; they also enlarge smaller holes in timber. Martens are found in attics, chimneys and wall or floor cavities. An individual may be excluded from a building by blocking access holes while it is out hunting; otherwise it may be trapped and relocated under licence. If it is necessary to trap, handle or relocate a marten, the occupant of the house must apply to the Scottish Executive for a licence (which will not be granted where there is a risk of a breeding female abandoning kits). Where it is necessary urgently to move a female with kits, the kits can be moved during the evening to a nearby safe place outside, for her to collect and relocate; she can then be excluded from the building by blocking access routes. In all 12 or more cases where this intervention has been attempted the mother has collected her kits when they have been moved from a building.

regeneration to transform even-aged, simply structured forests into multi-aged, structurally more complex forests. Much of the forest is maintained as closed canopy as a result, and this is thought to benefit biodiversity, sustainability and aesthetics. However, within commercial stands, foraging martens favour tussock grass microhabitats, where the density of their preferred prey, field voles, is highest; these habitats tend to occur under canopy breaks and clearings. If continuous-cover systems do not provide suitable habitat for their prey, the ongoing change in silviculture could be inimical for pine marten. A new partnership project between Forest Research, the University of Stirling, and SNH is investigating the seasonal habitat use and diet of pine martens in forests under different management practices in the Scottish Highlands.

Wild mammal welfare



ACCOMMODATING THE human dimension of any conservation issue is central. In this context, it is a notable episode in the history of mammal conservation that the hunting of wild mammals with dogs was banned in England and Wales on 18 November last year, when the Hunting Act 2004 received Royal Assent³³. The Act outlaws the hunting with dogs of foxes, deer, hares and mink, as well as hare coursing. MPs twice rejected amendments suggested by the House of Lords that would have allowed hunting to continue under registration, so the Parliament Acts 1911 and 1949 were automatically invoked to fulfil the wishes of the House of Commons. The Countryside Alliance (CA) has challenged the ruling on the grounds that the Parliament Act 1949 was invalid, but on 16 February the Court of Appeal dismissed this claim and refused the CA the right to appeal to the House of Lords. The judges also refused to grant an injunction that would have delayed the Act from being implemented. Hunt supporters now plan to challenge the ruling in the European Courts on the grounds that it infringes the European Convention on Human Rights.

The hunting ban came into force on 18 February 2005. Penalties for breaking the law include a fine of up to £5,000, and failure to pay the fine could incur a six-month jail sentence. On conviction,



the court can order forfeiture of any dog or hunting article that was used in committing the offence or found in the hunter's possession at the time. Approximately 270 hunts turned out in England and Wales on Saturday 19 February, and anti-hunt groups sent out 100 monitors in an attempt to check the law was not being broken. The CA reported that 91 foxes were killed, most shot within the law. But there were four 'accidents', and one stag killed in the West Country. There were four arrests - over hunting hares in Wiltshire -



Above Non-target capture is further reduced on mink rafts by employing otter excluders, though sometimes other species are inadvertently trapped. **Right** Mink footprints left in the clay tracking cartridge indicate whether a raft is being visited by mink, before the trap is set.

UFAW Wild Animal Welfare Award 2004

The Universities Federation for Animal Welfare have awarded their first Wild Animal Welfare Award to Dr Jonathan Reynolds of the Game Conservancy Trust, for designing the GCT mink raft (see p8). The award recognises innovations that improve the welfare of captive wild animals or that alleviate or prevent harm of human origin to animals in the wild. Many trapping systems can be unselective, but the GCT mink raft allows mink to be trapped efficiently while reducing the risk of capturing non-target species. The mink raft system improves selectivity chiefly by allowing managers to identify trap sites that are in current use by mink, which in turn minimises the number of traps used and the time for which they must be deployed⁹.



Jonathan Reynolds The Game Conservancy Trust

although it was not clear whether they were made under the Hunting Act.

Hunting was banned in Scotland in 2002 when the Scottish Parliament passed the Protection of Wild Mammals (Scotland) Act. Last December, a huntsman from the Scottish Borders was cleared, in what was seen as a test case, of deliberately using a pack of hounds to hunt foxes in breach of this legislation. He denied the charge and claimed the hounds were used to 'flush' out foxes so they could be shot. However, the Protection of Wild Mammals (Scotland) Act 2002 differs from the Hunting Act, because it does not limit the number of dogs used. As a result, large-scale hunts have continued under the guise of flushing foxes to guns³³. The crucial criterion whereby it is legal in Scotland to 'hunt' wild mammals is that the activity is undertaken with the express purpose of killing the quarry, when disturbed or flushed from cover, by shooting or using birds of prey.

In England and Wales, the wording of the exemption for stalking and flushing out in the Hunting Bill is much more tightly drawn and does not allow the chasing of wild mammals after they have been found or flushed out. Also, foxes may no longer be dug out, although there is nothing in the Act to stop a dog being dug out to protect its own welfare. Eliminating chasing and digging out are likely to be the main impacts of the Act. The Hunting Act also repeals certain parts of the Protection of Badgers Act 1992. From 18 February it has therefore been illegal to block a badger sett for the purpose of hunting foxes with hounds, and to allow hounds to 'mark' at a badger sett (obstruct access to the sett, or disturb a badger occupying it). Previously these were exemptions under the 1992 Act. Nothing in the Hunting Act makes the entering or use of a dog or dogs in a badger sett legal³⁴.

The Hunting Act 2004 outlaws all hunting with dogs, with the following exemptions³⁵:

- Stalking a wild animal or flushing it out of cover (provided this is to protect livestock, game and wild birds, food for livestock, crops, growing timber, fisheries or the biological diversity of an area, or to obtain meat for human and/or animal consumption, or to take part in a field trial). Stalking cannot involve more than two dogs, and once the animal has been stalked or flushed it must be shot as soon as reasonably possible.
- Dogs can be used below ground to flush out foxes for stalking and shooting to protect wild or game birds or to help prevent or reduce serious damage to game or wild birds. There is no

exemption for terrier work to protect domestic livestock. Only one dog can be put to ground at any time. There are further rules about the dog's welfare, and the quarry must be shot as soon as reasonably possible. The dog must be used in the course of legal terrier work and must comply with the British Association of Shooting and Conservation's (BASC) Code of Practice³⁶.

- Hunting rats, rabbits and birds is exempt. Hare coursing is banned, but a dog may be used to retrieve hares that have already been shot. The Act has no implications for falconry or ferreting.
- It is legal to hunt with dogs an animal that has escaped, provided it was not released for hunting. It must be shot immediately. There are exemptions for hunting an injured animal, but with no more than two dogs. No terrier work is permitted. There are exemptions for research and observation using no more than two dogs.

These exemptions are subject to the hunter having permission to use the land for the purpose, from the occupier or landowner. The range of scenarios, where the Act may be deemed to have been breached, has been the subject of much debate, but will only be established by the courts. While it remains to be seen how this story unfolds, it provides an exceptionally revealing illustration of the complexity of scientific and sociological factors that (although it is not widely realised) beset almost every intervention in the relationships between people and wildlife.

Terry Whittaker



Krebs' trial update

The past year has witnessed much discussion of bovine tuberculosis (bTB) in cattle, and the potential epidemiological role of badgers. In November 2003, Defra halted the reactive treatment in their Randomised Badger Culling Trial (the so-called 'Krebs' Trial') following an apparent increase in cattle bTB under that treatment. Since then, a team of scientists, led by Professor Charles Godfray, has reviewed the trial³⁷. Last year, the Independent Scientific Group (ISG), overseeing the trial, produced its fourth report³⁸, and, earlier this year, Defra published a 10-year strategic framework for the control of bTB in Great Britain³⁹. The Krebs Trial is set to continue testing a proactive culling strategy against a no culling control until the experiment comes to an end in mid-2006³⁸. The Irish Four Counties Trial has already been completed, and while the researchers conducting that study reported that proactive badger culling reduced bTB in cattle, they reported that such an approach would not provide a viable long-term control strategy⁴⁰.

BAP species: rare woodland bats



BARBASTELLE AND BECHSTEIN'S bats are rare, little-known woodland species. Both are classified as vulnerable by the IUCN. Bechstein's bat is an elusive specialist of mature broad-leaved woodlands where it roosts in old woodpecker holes and other tree cavities, typically in oak or ash. The species is regarded as one of Britain's rarest resident mammals and – more importantly - is threatened with extinction throughout its range. Bechsteins rarely emerge from the woodland interior and are difficult to study. Their ultrasonic calls are quiet and not easy to distinguish from those of other *Myotis* species, so that they are impossible to identify with confidence using bat detectors.

The species is also hard to catch because it uses flyways less often than others⁴¹ and its echolocation capabilities make it extremely good at detecting mist nets. It is not clear whether the apparent poor status of Britain's Bechstein's bats is the result of a continuing decline or an historic one. Indeed it may naturally be a low-density species, although fossil evidence suggests it was more abundant and widespread in prehistoric times; archaeological finds have been made in Norfolk, Kent and Derbyshire - all outside its present range⁴². Bechstein's were only recorded 140 times in Britain between 1800 and 1998 - almost all of these records were of isolated individuals - since 1998, over a dozen breeding colonies have been discovered in Britain - in Dorset, Hampshire, Sussex, Surrey and Wiltshire - and the Isle of Wight is a stronghold.

In Britain, the barbastelle bat is most frequently associated with wooded valleys, although some colonies appear to use parklands as well. Although it is widespread throughout England and Wales, especially in the south, the species is precariously rare and threatened with extinction throughout its range - throughout Europe, except Iceland, Northern Ireland, Scotland, most of Scandinavia, Estonia and much of southern Europe. Up to 1995, annual records for Britain were few and scattered. However, in 1996/1997, two barbastelle maternity colonies were discovered in Norfolk and

Storms threaten insectivorous bats

Summer storms last year may have had a detrimental impact on Scotland's bat populations. The warm spring encouraged females to give birth earlier than usual, and this was immediately followed by a period of cold, wet and windy weather mid-summer. Since young bats are dependent on their mother's milk until they are six weeks old, it is essential that their mothers are well fed during this period. Although there was an abundance of midges in Scotland throughout summer 2004, their availability to bats as prey may have been seriously reduced if the insects were sheltering from the wind and rain. At some roosts starving females were forced to abandon their young, and householders reported finding more stray baby bats than usual. Some bat workers visited roosts to carry out bat emergence counts only to find normally occupied roosts empty. Later in the season adult male and female bats with no signs of injury, but which were obviously weak and underweight were reported. Bats were also observed hunting during daylight, which can expose them to attack from birds of prey, and which indicates that they were very hungry. If, as some scientists predict, storms become increasingly common as a result of climate change, insectivorous bat populations could suffer⁵¹.

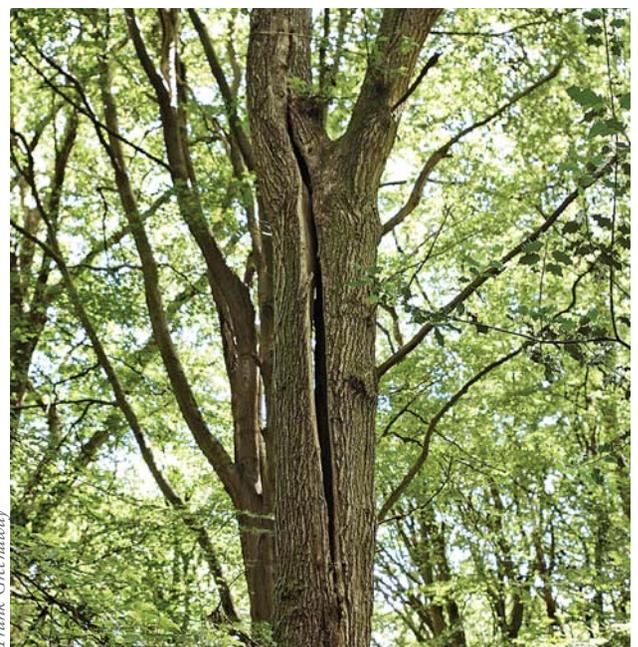
Sussex and since then more have been found in Wales, Somerset, Hampshire⁴³, Herefordshire, Worcestershire, Cambridgeshire, Sussex^{44,45}, and the Isle of Wight. The sudden increase in records for both barbastelles and Bechstein's is largely the result of newly available technologies such as radio-tracking, time-expanding bat-detectors, an acoustic lure known as the Sussex AutoBat (see p8), and other types of ultrasonic lure. Further discoveries may reveal that neither species is as rare as was thought.

Because Bechstein's bat is difficult to locate and catch, little has been known about it, and therefore science had not much useful to say



Frank Greenaway

Above Bechstein's bats roost in old woodpecker holes and other tree cavities.



Frank Greenaway

Above Barbastelle bats prefer to roost in cracks in tree trunks or under loose bark.



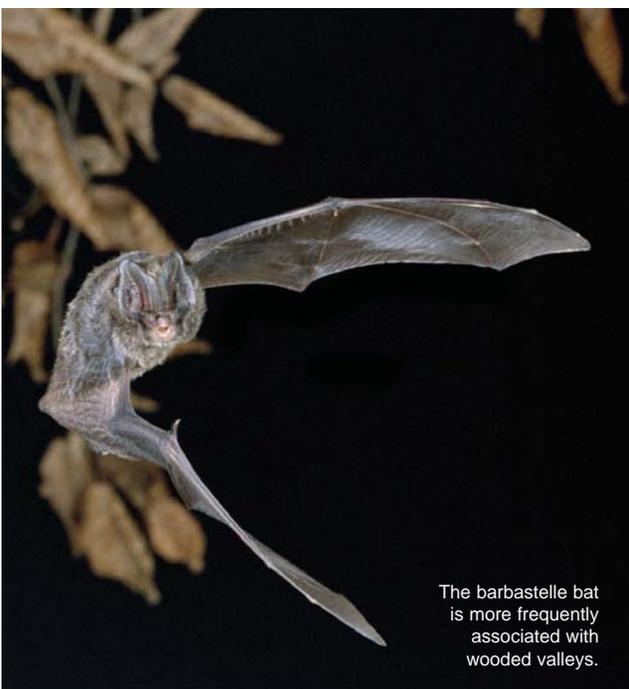
Bechstein's bat is an elusive specialist of mature broad-leaved woodland.

about its conservation. Very recent work has identified broadleaved woodland with water as the most important habitat for Bechstein's, and within broadleaved woodland they select closed canopy and well-developed under storey as foraging habitat. In Wiltshire males have been found using isolated trees along hedgerows and in paddocks. This discovery reveals that Bechsteins are vulnerable to changes in woodland management, particularly conversion to, and restoration of, woodland pasture⁴⁶. Habitat changes in the UK over the last 200 years were probably unfavourable for barbastelles, and historical records suggest that the UK population declined dramatically during the last century. This was attributed to the loss of woodland roosts, removal by collectors, and reduced availability of its preferred micro-moth prey. The barbastelle forages in riverine habitats in spring, and hedgerows, meadows and calcareous grassland during summer – often more than 15 km from the roost site. Nonetheless, they remain generally dependent on woodlands for roosting sites all year round. In summer, barbastelles roost in cracks in the trunks of storm damaged or decaying trees, in spring and autumn they roost under loose tree bark - at Mottisfont, in Hampshire, they use loose bark almost all year, depending on availability. By careful daily roost selection, barbastelles can minimise water loss and select the most favourable temperature regime

according to ambient conditions⁴³. In the depths of winter they hibernate deep within hollow trees⁴⁶, the coldest weather driving some individuals into caves and disused mine sites in January.

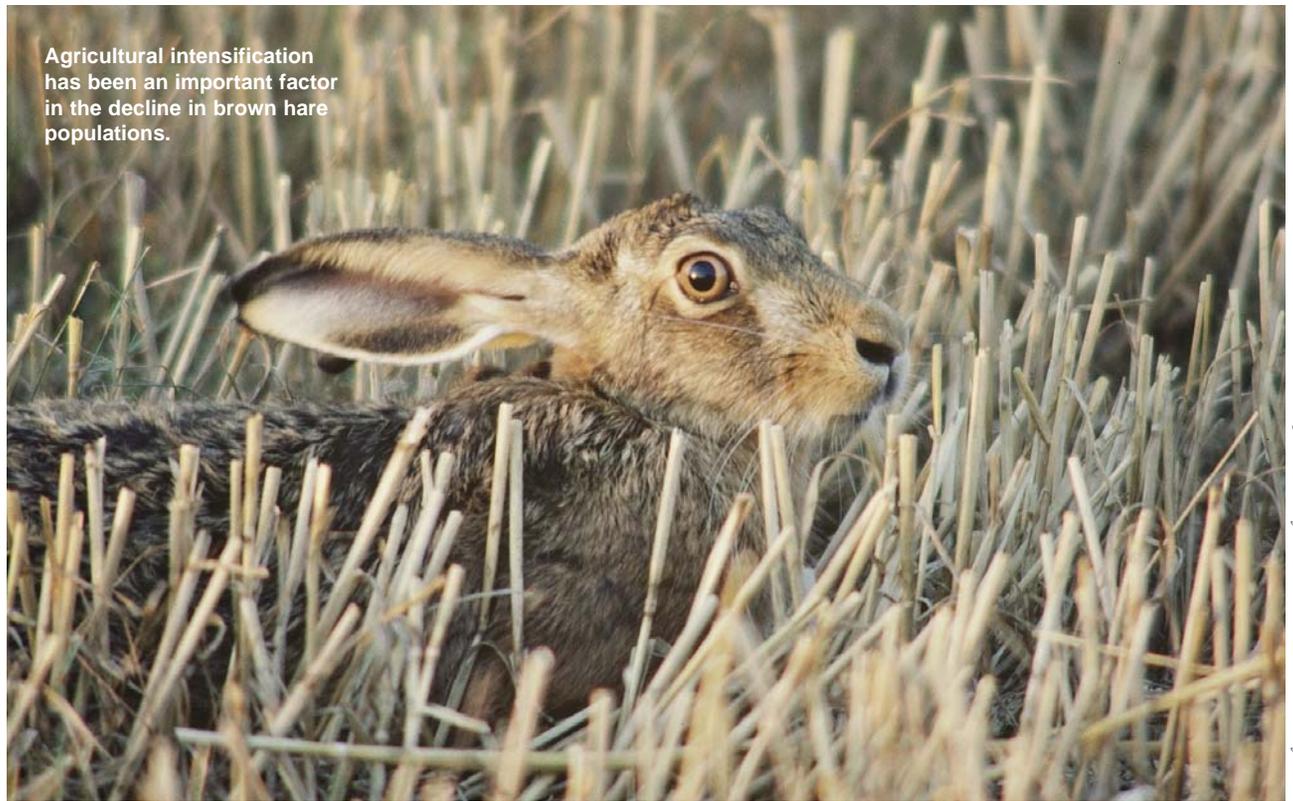
The Species Action Plans (SAPs) for barbastelles and Bechstein's aim to maintain the range and size of known populations, as well as to increase the total population size of both species in the UK. In order to meet these aims, broad conservation priorities are: maintenance and development of strategic connections between woods, including ancient woodlands; more work on microhabitat use in woodland to inform stand management; and the retention of large old trees and any standing dead wood to provide a range of roosting opportunities⁴⁶.

A strength of the BAP process, especially as it moves to new SMART targets, is that aims can be adaptive. Indeed, a proposal formerly listed in the BAP - installing bat boxes to benefit Bechstein's bat - may be flawed. A variety of boxes were installed at Ebernoe Common, where there are seemingly viable colonies of Bechstein's and barbastelles. Although Bechstein's have been found in bat boxes in Germany⁴⁷ and England, it seems the boxes must be in position for several years in the heart of established colony territory to be effective. Barbastelles will use boxes designed for them; however, the species most commonly recorded in all types of boxes are pipistrelles⁴⁸. Although pipistrelles were present at Ebernoe before the boxes were installed, one fear is that the provision of boxes in woodland might increase the resident pipistrelle population, and in turn lead to increased competition with the barbastelles for food. The literature suggests that there should be little dietary overlap between pipistrelles and barbastelles^{49,50}, but most data come from analysis of droppings from adults, collected in summer/autumn. Much less is known about the diet of newly emergent young barbastelles, but the woodland in the immediate vicinity of roosts is likely to be the most important foraging habitat for them. Furthermore, what little is known of the winter diet of barbastelles suggests that it is not dissimilar to that of pipistrelles at this time of year. The Sussex Autobat (see p8) and other ultrasonic lures have now superseded the installation of bat boxes for locating Bechstein's colonies. The idea that box installation is beneficial for Bechsteins was well intentioned, but may well prove unwise under scrutiny of the forthcoming BAP review. Since neither Bechstein's, nor barbastelles, typically roost in buildings in Britain, it is likely that two more of the original actions – which were specifically directed to bats in buildings - will also need to be changed.



The barbastelle bat is more frequently associated with wooded valleys.

Agricultural intensification has been an important factor in the decline in brown hare populations.



Jonathan Reynolds The Game Conservancy Trust

Farming and mammals

CHANGES TO GOVERNMENT PAYMENTS to farmers and land managers have been implemented. So much of the British countryside is farmland, that a central determinant of mammal conservation is the practice of agriculture. In 2005, two significant changes are being made to the way in which farmers and land managers receive government payments to support food production and management of the environment. First, as a result of the ongoing reforms of the CAP⁵², subsidies are being decoupled from production, and linked instead to compliance with EU standards for the environment, public and animal health, and animal welfare. One consequence of this is that ten subsidy schemes will be rolled into one new Single Payment Scheme (SPS). Farmers will have greater freedom to farm to the demands of the market, and environmentally-friendly farming practices will be better acknowledged and rewarded. To qualify for the Single Payment, farmers will need to meet two types of Cross Compliance standards and requirements: (i) Good Agricultural and Environmental Condition (GAEC) ensures that land is maintained in good

condition (including protection of hedges and water-courses with a 2m-wide buffer strip); and (ii) Statutory Management Requirements secure compliance with various specific articles of EU regulations and directives as implemented in domestic legislation. Starting in 2005, a process known as modulation will gradually redistribute money from direct payment schemes (eg the SPS) to fund wider rural development and environment schemes (eg Environmental Stewardship (ES), described below). The proposed level of modulation will transfer nine billion euros of CAP funding to agri-environment schemes and rural development across the EU between now and 2013; £75 million of this will come to the UK each year.

The second change has been the launch, in March 2005, of Defra's new Environmental Stewardship scheme (ES) in England. This replaces existing agri-environment schemes (Environmentally

Hares and habitat

Agricultural intensification has been associated with, and probably largely caused, a dramatic decline in farmland biodiversity among many taxa. The brown hare is one species that has probably been affected. Records of numbers of brown hares shot suggest that populations have declined throughout Europe, particularly since the 1960s⁵⁵. As a result, the brown hare is protected under the Bern Convention, and classed as a priority species under the UK BAP. The main cause of the decline in brown hares is thought to be habitat change. The current BAP lists the main factors as: (i) the conversion of grassland to arable; (ii) a loss of biodiversity in agricultural landscapes (reducing the diversity of food available); and (iii) changes in cropping practices, including planting cereal crops in the autumn and the move from hay to silage production. A recent study in Somerset by the University of Bristol and English Nature used radio-tracking to determine the importance to hares of heterogeneity at the between-habitat and within-habitat scales in pasture land⁵⁶. The Somerset study concluded that hares might benefit from increasing habitat heterogeneity at the farm scale, especially in highly homogeneous, intensively managed landscapes. However, managers of pastureland, in particular, should aim to



Dave Bevan

increase habitat heterogeneity (or diversity of vegetation types) within fields, to provide better year-round cover. The Bristol team concluded that agri-environment schemes should target the regeneration of heterogeneity in pasture landscapes by encouraging increases in fallow land, new buffer strips, and reduction in livestock density. The new Environmental Stewardship scheme should be more beneficial to the conservation of hares and farmland biodiversity in general because, although some of these options have been available under previous agri-environment initiatives, they are likely to become more widespread under the Entry Level Scheme.

The lesser horseshoe bat may benefit from the presence of cattle.

Sensitive Area, Countryside Stewardship and Organic Farming Schemes, and some Wildlife Enhancement Scheme agreements), which will be phased out as current agreements run their course. The ES scheme is separate from SPS payments and payments are made for voluntarily implementing environmentally beneficial land management. SPS and ES can be on the same land because they relate to different activities, with ES complementing obligations under cross compliance. ES is backed by £150 million of new money in 2005-6, half coming from modulation (as described above), and half from the government. ES is a central component of the British government's strategy for sustainable farming and food, announced in 2002⁵³.

ES comprises three elements: Entry Level Stewardship (ELS), Organic Entry Level Stewardship (OELS), and Higher Level Stewardship (HLS)⁵⁴.

ELS is a 'broad and shallow' scheme aimed at encouraging widespread participation in simple environmental commitments. This aims to address, amongst other issues, loss of farmland biodiversity (eg brown hares, bats, harvest mice, wood mice, bank voles), and landscape-scale issues such as diffuse pollution caused by nitrates and nutrient leaching (this could adversely affect riparian species, eg water shrews, water voles, otters). Interested farmers prepare a simple Farm Environmental Record, mapping features such as hedges, ponds, woodland etc. A handbook will advise on how environmental benefits could be achieved through a combination of management options (selected from a list of over 50), each of which earns the farmer points towards a target of 30 points/ha on lowland farms (8 points/ha on parcels 15ha or more in Less Favoured Areas). Provided the farmer reaches this target, he will earn a flat rate of £30/ha over that area of his holding that has been registered on the Rural Land Register (£8/ha on parcels 15ha or more in Less Favoured Areas), including non-agricultural production areas, eg woodland, scrub, and other marginal areas, which often have high environmental value. The Organic ELS is open to all organic farmers not receiving aid under the Organic Aid System (OAS) or Organic Farming Scheme (OFS). The OELS is similar in design to the ELS, except that farmers receive £60/ha provided they achieve a target of 60 points/ha. Thirty points/ha are allocated automatically for organic land entered into the scheme and the remaining 30 points are made up from selected management options as in the ELS.

Higher Level Stewardship aims to deliver more focused environmental benefits in high priority situations and areas. Wildlife conservation is among the scheme's primary objectives. Payments are higher under HLS, than for ELS, but entry is competitive, and acceptance is discretionary and assessed against a scoring system. First, farmers complete a Farm Environment Plan, mapping and recording the condition of environmental features relevant to the objectives of the HLS. They then select from a long list of HLS management options, which are linked to environmental features that they are designed to benefit. Where UK BAP Priority species occur, eg water voles, hazel dormice, otters, hares and bats, they will be identified in the targeting statements, which are based on the local Joint Character Area. Options are outcome-focused and linked to compulsory management rules or 'prescriptions' - their effectiveness will be measured using specific 'indicators of success' which may include the monitoring of certain species. Farmers are expected to refer to the indicators, and use their knowledge of their

Bats and cattle

The presence of cattle might be an important factor in foraging by lesser horseshoe bats, according to a recent study conducted by Cresswell Associates on the Sherborne Park Estate, Gloucestershire⁵⁷. Habitats that were most important for bats contained a high proportion of woodland, parkland and grazed pasture woodland, combined with linear features, such as overgrown hedgerows. Sometimes, however, bat activity was concentrated in fields containing cattle. Several radio-tracked bats foraged directly over cattle, but the same bats foraged little, if at all, over the same pasture immediately after the cattle were removed, highlighting the potential importance of the cattle themselves, rather than their dung (which is likely to attract flies). Cattle-grazed pasture close to bat roosts may provide productive foraging habitat that offers a valuable and predictable food source at a time of year when bats are energetically stressed (pre- to post-weaning), because they are feeding their young. If this possible relationship between the presence of cattle and foraging bats is validated, summer cattle grazing regimes could be incorporated into management plans for sites close to bat maternity roosts. The report recommends a grazing density of 0.5-1 cow per hectare.



Pat Morris

land and farming system to fine-tune their management, while continuing to comply with the management prescriptions. For example, HLS options might involve: building otter holts; coppicing to benefit dormice; installing bat or dormouse boxes; or reed bed creation, or fencing (to prevent poaching of riverbanks), with the aim of restoring water voles to a stretch of river. The indicators for these examples might include the presence of water voles or dormice, or use of boxes by dormice or bats, by year 10. However, the farmer still receives payment if such biodiversity indicators are not met, provided he has adhered to the prescriptions.

Defra will fund a programme of monitoring to allow evaluation of ES against its stated objectives; both the ELS and HLS will be addressed, encompassing biodiversity elements as well as other environmental objectives. In particular, Defra will focus efforts on monitoring the effects of ELS on farmland birds, and HLS on SSSI condition, at a national scale (these being Public Service Agreement targets). Furthermore, site-specific 'indicators of success' will provide a means of reporting on HLS outcomes on a large scale.

Considering that the European tax payer will see £150 million pa of new money (of which £75 million is drawn from the British exchequer) ploughed into the ES scheme - from which the main deliverable is environmental benefit - and considering that the best barometer of environmental benefit is biodiversity, the tax-paying customer will expect to see significant biodiversity returns on this investment. A top priority is therefore to measure thoroughly, and on numerous organisms (not just birds), the consequences for biodiversity, and to use this emerging information to refine and customise the financial carrots and sticks encouraging best practice. The idea of managing farmland for environmental gain is surely welcome, and the notion of paying farmers to do it is rational, but with the high stakes involved there is a huge imperative to ensure that the management produces the sort of countryside the customer wants - the role for biodiversity research within the agri-environment has never been more important.



MTUK update, April 2005

IT HAS BEEN ANOTHER exciting year for MTUK. Many of the projects that we have funded in the past are producing interesting results. Our work covers lots of species including bats, red squirrels, water voles, dormice and otters.

Our two general mammal surveys were run in 2004 and are planned again for 2005. 73% of participants in the Living with Mammals survey in 2004 found their sites to be home to mammals that have been defined as Species of Conservation Concern (SoCC). These include the red squirrel, water vole, brown hare, otter, hazel dormouse and bat species. At least one wild mammal species was found in 97% of surveyed sites and between three and five wild species were found at over 50% of the sites. Riverbanks and streams were the most species-rich of the sites surveyed closely followed by allotments. Each year the variations in results tell us more about how mammals' use of the built environment is changing. With so much building work planned in the next few years, it is essential to understand the ways in which mammals use these environments so that they can be appropriately protected.

To add to this picture, from the Mammals on Roads survey and other data, casualty numbers in Britain are estimated at 50,000 badgers⁵⁸; 30,000 - 50,000 deer⁵⁹ and 50,000 - 100,000 foxes.

The MTUK Advisory Group meets annually to consider applications for funding and other issues. Following their meeting in January 2005, over £88,000 was awarded in 8 grants (see box, right). And 5 recent graduates were awarded internships to the value of £4000 each (see box below).

Plans are in hand at the time of writing for the 2005 MTUK conference in May on the theme of wild mammals and disease. MTUK is running the event in collaboration with WildCRU and the proceedings will be published in a special edition of the Journal of Biological Conservation.

MTUK Projects Funded during 2005

- Dr David Hill, from the University of Sussex, and Frank Greenaway, will continue their studies of Bechstein's bats. They are entering the second phase of establishing Bechstein's distribution throughout woodlands in the south of England, in particular identifying the key habitat type used and where maternity roosts are located.
- Professor Xavier Lambin, of University of Aberdeen, will carry out practical work to conserve water voles in north east Scotland where the species has quite different needs to those of animals further south, and Dr Paul Bright, of Royal Holloway, University of London, will continue habitat restoration around key sites for water voles in England and Wales.
- MTUK is very keen to support the development of new techniques for monitoring both aerial and terrestrial mammals, so in the coming year we will be working with BCT to see if useful data can be gathered by driving slowly along roads with bat detectors firmly mounted on the vehicle and counting mammals seen on roads.
- MTUK has also granted funds for red squirrel work in the north of England where a consortium of groups is being formed to put together a really comprehensive plan to defend them. We shall be offering our strong support and working with them to ensure our contribution is as effective as possible.
- Cuvier's beaked whale will be studied by Organisation Cetacea in the Bay of Biscay, where it is found more commonly than in UK waters. Although Cuvier's beaked whales are one of our BAP listed species there is still a great deal we need to learn about them.
- WildCRU will also be receiving further MTUK funding to look into the social behaviour of badgers. The study will concentrate on their mating system.

MTUK Student Projects

- *Emma Hare recently graduated from Queen Mary, University of London. She will be carrying out a project that will tell us more about how small mammals use hedgerows.*
- *Amanda Dickie, University of Aberdeen, will be looking at the ecology and behaviour of Daubenton's bat in relation to the epidemiology of European bat lyssavirus 2 (EBL2), with particular reference to the species' relative reliance on roosts in houses.*
- *Helen Wheeler, also at the University of Aberdeen, will be studying the extent to which seals prey upon salmon. Seals are often culled to protect salmon fisheries, but how great is the potential threat they pose?*
- *Ann Champneys will also be looking at how mammal diversity varies with the hedgerow and the quality of field margins, at Nottingham Trent University. The project should highlight those hedgerow management methods that best promote the conservation of small mammals*
- *Emma Stone will be looking into reducing the impact of foxes on ground-nesting birds, such as grey partridge, stone curlews and capercaillie. She will evaluate the effect of diversionary feeding on both predator and prey at the University of Bristol.*



MTUK

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Mammals Trust UK

Mammals Trust UK is dedicated to working in partnership with voluntary organisations, wildlife experts, government and industry to conserve wild mammals and their habitats throughout the British Isles.

Our Aims

- To raise funds for research and practical conservation based on sound scientific understanding.
- To increase public awareness, bring together all with an interest in mammal conservation and share knowledge.
- To create opportunities for people to participate actively in mammal monitoring and conservation projects across the UK.
- To manage key conservation sites to protect them for the future and to create opportunities for education, recreation and enjoyment of our natural heritage.

Fundraising and grant making

Mammals Trust UK raises funds from a variety of sources, including individual supporters, trusts and industry. An Advisory Group advises on conservation policy issues and the work to be funded and comprises representatives of the following voluntary organisations: the People's Trust for Endangered Species, The Bat Conservation Trust, The Mammal Society, The National Federation of Badger Groups, The British Hedgehog Preservation Society, The Wildlife Trusts, English Nature, Scottish Natural Heritage, The Countryside Council for Wales, The Environment and Heritage Service, Northern Ireland, and the Joint Nature Conservation Committee. They are joined by Professor Paul Racey, Regius Professor of Natural History at the University of Aberdeen, Professor David Macdonald, Director of the Wildlife Conservation Research Unit at the University of Oxford and Dr Pat Morris of Royal Holloway, University of London.

Mammals Trust UK is administered as a restricted fund of the People's Trust for Endangered Species (PTES), registered charity no. 274206. Chairman Professor John Beddington, Chief Executive Ms Jill Nelson

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The Wildlife Conservation Research Unit's (WildCRU) mission is to undertake original research on aspects of fundamental biology relevant to solving practical problems of wildlife conservation and environmental management.

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