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Spring 2019 | Issue 183

ADVOCATING SCIENCE-LED MAMMAL CONSERVATION

Mammal NEWS

The Mammal Society Review 2018

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THE Mammal SOCIETY

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The Mammal Society

Review of 2018

It may be the coldest time of year, but we are busy planning for spring here at the Mammal Society office. Our *Review of the Population and Conservation Status of British Mammals* – now available in hard copy from www.nhbs.com as well as on the internet – highlighted the massive information gaps that exist for many species and habitats.

We are planning, with your help, to put this right, **starting with grasslands and woodlands**. These habitats occupy very large areas and yet are woefully under-studied: the latest density estimates available for many species in woodlands or grasslands date back at least 15 or 20 years. Clearly a lot has changed in that time, including the intensity of cattle grazing on grassland, browsing pressure from deer in woodland, the introduction of new pesticides which might have affected invertebrate prey abundance.

We are particularly interested in the status of small mammals. Despite being at the heart of functional ecosystems, we were not able to estimate population trends for widespread species such as bank voles, field voles or common shrews in the *Population Review*. Instead they are classified as 'data deficient' – something quite remarkable when we compare the situation with that of birds or butterflies.

The worry is that, like sparrows, these small animals could be disappearing under our noses without anyone noticing. With your help we can fix this!

We need volunteers out on the ground doing small mammal live-trapping.

If you would like to get involved this spring in your local area then please get in touch (info@themammalsociety.org).

Please note that we need surveys to be conducted in all types of woodland and grassland, so the samples are representative of the wider countryside. Were surveys mainly conducted 'in the good bits', where densities are likely to be high, we would over-estimate how well small mammals are doing. If you can't get out trapping but want to help in other ways, perhaps you could put local volunteers in touch with sympathetic land owners who will allow access for the surveys. Or could you sponsor the creation of our online density database, where all the information from the project will be stored? It may not sound glamorous but data entry and curation is fundamental to the project and we want to make the dataset open access so that in future anyone can use it to inform mammal conservation.

We are also planning a second project to test camera trapping as a mammal survey method for woodland. For example, hedgehogs, weasels and stoats are traditionally thought of as woodland species, but when did you last see one there? I'm guessing 'never' or

MAMMAL NEWS is published by:
The Mammal Society
www.mammal.org.uk Tel. 02380 010981
Registered Charity No 278918
Editor: Hilary Conlan. Contributions to the next issue of *Mammal News* should be emailed to **editor@themammalsociety.org**
Print & Design: Lonsdale Direct Solutions 01933 228855
Cover image: Wild boar. Photography by Aaron Roberts

'years ago' is the most common answer. This is partly because most of us don't spend a lot of time in woodlands at night and partly because the animals are just genuinely difficult to spot in this environment. Camera trapping offers a way forward for monitoring several different species at the same time and we are hoping that members will want to get involved not just in collecting data, but also in looking at the footage. In the first instance, we will use the data to ask whether the size of the woodland and its connectivity to hedgerows is critical to whether or not a species is found there. For example, is there a minimum size below which it becomes unlikely that hedgehogs, grey squirrels or roe deer will use a woodland?

The cameras will be deployed in a grid formation (rather like a small mammal trapping grid) and we would love to hear from you if you want to get involved.

Finally, don't forget to get out and about with the Mammal Mapper App. I had lots of fun with it the other day in Dorset, where the sudden snow made mammal prints unusually easy to spot. We are currently working on an update that should be ready for release by Easter. This will make the app capable of recording one-off sightings (such as road-casualties), as well as transect surveys. If you are already a user of the app, you will receive a notification when the update is ready to download. We have had some excellent results from the app already and would particularly appreciate more surveys in urban areas and also in the National Parks.

I look forward to seeing many of you at the Spring Conference in Glasgow.

Fiona

Dr Fiona Mathews
Chair of the Mammal Society
chair@themammalsociety.org

Dear Members,

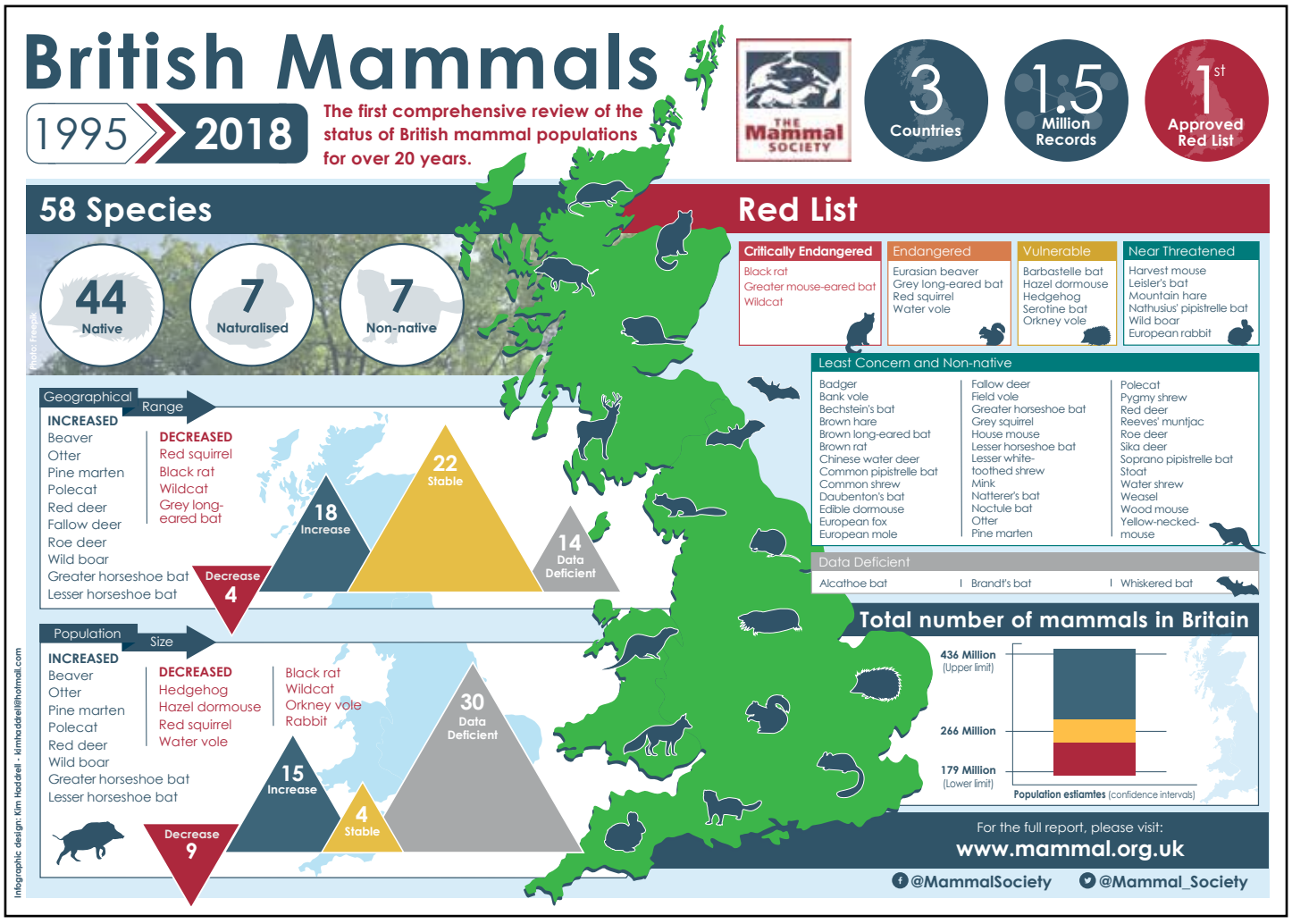
We had hoped, here, to give some draft numbers, on the 2018 financial results for the society.

However, the Mammal News publication deadline is a little early for a reasonably accurate prediction.

There are a number of items where there is still not enough certainty in what the final numbers may be.

Whilst I cannot be certain of the final position, I am prepared to predict, subject to independent review, of course, that we should be around the break-even position, leaving the balance sheet in a healthy position, in line with our reserves policy.

Rodger Pressland,
Honorary Treasurer 06/02/19



Welcome to our new staff members

Beth Smith, Data & Information Officer

Hi I'm Beth Smith, the Mammal Society's new Data & Information Officer, and I'm helping to answer enquiries and analyse data from key citizen science projects, predominantly the Mammal Mapper App and Ecobat.

I have a Natural Sciences degree from the University of Cambridge and recently gained my master's from Imperial College London, where I developed and tested environmental DNA surveys to detect water voles and American mink. For my second master's thesis I analysed data from a large camera-trapping project to investigate the impacts of tourists on brown bears in Croatia, during which I got to help with setting bear and lynx traps and radio-tracking individuals by plane and car. Although fond of all mammals, I do have a soft spot for large carnivores and so have also spent time researching the acoustic properties of wolf howls, and snow-tracking wolves, lynx and wolverine around the Finnish-Russian border.

As well as mammal ecology and conservation, I'm interested in freshwater ecology, particularly the linkages between aquatic and terrestrial ecosystems. I have spent two summers working as a field assistant in Ontario, Canada investigating how forest regeneration, and therefore increased leaf litter, impacts lake ecosystems – 'how forests feed fish'. Whilst out there I experienced my first encounters with several mammal species including wolf, beaver, moose and many black bears! I also spent three months as a research intern at Lake Mývatn, Iceland, investigating the causes and effects of fluctuations in the numbers of midges emerging from the lake each year. Although there weren't many mammals to see in my spare time, it certainly gave me a chance to work on my bird ID skills.

I grew up riding trials motorbikes and walking in the Pennines so when I'm not working I'll often be exploring the great outdoors, be it in the UK or further afield. When the weather is a little too dreary, I can usually be found engrossed in a good book/film, conducting some casual camera trapping or most likely, enjoying a pizza and a beer somewhere.

Lynx tracks in the snow

You can contact me at:
info@themammalsociety.org.

Rose Toney, Training and Events Officer

October 2018 heralded big changes for me, with a move to Cambridgeshire and joining the Mammal Society as the new Training and Events Officer. Having spent almost a dozen years in North East Scotland, where I moved to study an MRes in Ecology, these changes were both daunting and exciting. However, this new role brings together many aspects of all that I love; a lifelong passion for wildlife, the opportunity to bring people together and a gateway to learning new things.

Before joining the Mammal Society, I spent eight years as Biodiversity Co-ordinator for North East Scotland, a very diverse role that involved bringing together stakeholders from local government, agencies, charities and community groups. Spanning a range of habitats, the remit covered everything from outreach to education to research to delivery of conservation action.

I have always believed that one of the biggest challenges in conservation is making people care, care enough to make a change, from implementing small (or big) changes in their daily lives, to petitioning policy makers to bring about changes in the law to protect our natural environment.

And, of course, people cannot care about what they don't know about, something that has shaped much of my interest over the last decade or so. I am an advocate for engaging people in all aspects of wildlife recording and conservation, and have had the opportunity to develop, and contribute to, several citizen science initiatives over the years. Much of this has focused on the use of camera traps as a tool for recording, monitoring and engaging.

My love affair with camera traps began quite a few years ago, when my husband and myself, in our voluntary role as reserve convenors for the Scottish Wildlife Trust, borrowed a camera trap from a colleague to try to increase our knowledge of the mammal species on one of our local sites. Almost the first mammal we recorded was a pine marten, a great find, as there were no previous records for the site. The excitement of discovering the image on the memory card was immense, and the anticipation and excitement each time we check memory cards never diminishes, even after many years. Our long-term monitoring of the site resulted in an increase from three to 19 mammal species for the reserve list.

Having realised the potential of camera traps to contribute to scientific study, an increase in knowledge and as an engagement tool, I have been fortunate enough to establish several projects, including an outdoor learning programme which has been implemented in over fifty schools in Scotland and targeting recording of elusive species, such as water shrew. At the forthcoming Spring Conference, I am looking forward to delivering a workshop with my husband, Nick, who has developed a technique aimed at recording small mammals using camera traps, to pass on some of these skills. I'm also looking forward to meeting everyone there.

As well as my role in organising the events for the Society, I will be helping to identify new opportunities for training courses, as well as running many of our well-loved courses form previous years. Watch this space, and if you have any ideas for training courses, please do get in touch!

Spring Conference

Friday 29th March – Sunday 31st March 2019

University of Glasgow

The Mammal Society's 65th Spring Conference will be held at Glasgow University on 29-31 March 2019.

The 2019 Spring Conference will include our usual wide array of speakers introducing their mammal research, stalls, conference dinner (book separately) and plenty of networking opportunities.

This year, we will be holding workshops on how to design camera trapping surveys for elusive mammals, introducing new techniques for monitoring dormice and giving updates on the state of mammals in Scotland plus much more.

Further information and the provisional programme can be found on the Mammal Society website.

Cranbrook Lecture on Friday 29th March

Our speaker is Peter Cairns: Project Director, Photographer and Cameraman.

Peter is a conservation photographer with 20 years professional experience under his belt. He has co-founded major communication initiatives such as Tooth & Claw, Highland Tiger, Wild Wonders of Europe and 2020VISION. Peter is a co-founder of The Wild Media Foundation, the company behind SCOTLAND: the Big Picture. A long-time advocate for rewilding, Peter is a serving Board Member of Scottish charity Trees for Life and is a Senior Fellow of the International League of Conservation.

AGM 30th March 4.30pm

Standing for election to the Mammal Society's committee:

Andrea Ayres

Andrea is an experienced general manager with over twenty-five years' experience within the environmental sector working for a range of public, private and charity organisations. These include the Environment Agency, Teignbridge District Council, Groundwork South West and her current role as Area Reserves Manager for the RSPB covering Devon, Cornwall, Somerset and Gloucestershire. Andrea has experience in operations management and leading teams, and plans to use this to support the staff team at the Mammal Society. When she isn't working she enjoys spending time with her family, camping and outdoor swimming.

Allan McDevitt

I am from the northwest of Ireland and have been a mammal enthusiast for as long as I can remember! After completing my BSc and PhD in University College Dublin, I was a well-travelled postdoc, with positions in Ireland, Canada, Poland and Belgium. I am currently a lecturer in Global Ecology and Conservation, having started my current post in the University of Salford in 2016. I am primarily a molecular ecologist, and specialise in the application of genetic and genomic techniques to give insights into colonization histories, hybridisation, detection, invasions and ultimately the conservation and management of multiple mammalian species in multiple continents. I am particularly fond of shrews, but also work on ungulates, carnivores, rodents, primates and bats. Since arriving back in the British Isles, my research has taken on a more applied focus with both government and non-government organisations, and I am very keen to become more actively involved with the Mammal Society's Council and its members to lead the way in conserving mammals in the UK.

Debbie Alston

I have been working in Wildlife and Conservation Management since 1992 (since 1998 in Derbyshire), after obtaining a degree in environmental science at the University of Wolverhampton and a postgraduate course in conservation management at Surrey University and very recently completed a MSc in Biological Recording at Manchester Metropolitan University. I have held a number of professional jobs working on conservation, including Wildlife Sites Officer for Derbyshire Wildlife Trust and Biodiversity Project Officer for the Lowland Derbyshire Biodiversity Partnership and a Biodiversity Mentor for the iSpot Project (Part of the Open University). Alongside my full time jobs, I have organised and taught many informal and formal training courses. I completed a series of teacher training qualifications finishing with a PGCE in further education at Sheffield Hallam University in 2007. I am a full member of both the Institute for Learning (IfL) and Chartered Institute of Ecology and Environmental Management. (CIEEM).

In 2011 I was taken on as an Associate Lecturer at the University of Derby. I am now a part-time Lecturer in Biodiversity there, teaching and supervision research projects in ecology based subjects including botany and mammals.

Outside of work I am interested in all aspects of wildlife, especially British wildlife, and am involved in a number of local wildlife related groups including the Derbyshire Mammal Group , where I am the Chair and the county mammal recorder. I was co-author of the county mammal atlas '*Mammals of Derbyshire*' published in 2012. I teach a number of the Mammal Society training courses, including the Mammal Identification weekend and have been the Chair of the Mammal Society's Training Committee since 2016.

The Eurasian beaver is back in *Cantwareburhrs* in Kent

Jon Bramley, Bramley Associates, Ecological Consultants and Surveyors
BramleyAssociates@btopenworld.com

It is debatable when in the UK the Eurasian beaver (Castor fiber) became extinct but it is a relatively easy mammal to find when surveyed for and no doubt was hunted out for meat, fur and of course castoreum by our ancestors, who had a very different and more physically demanding life; where popping into a supermarket overflowing with food and other choices was not an option.

In the late 1990's and early years of the millennium I had the privilege to meet and work with Graham Roberts, Chris Matcham and Rob Strachan in various mammal and wetland projects in the SE and we became part of the Otters and Rivers Officer network that spread around many areas of the UK.

I did then, and still do today in Kent, chase up reports of otters and other wetland mammals in the SE. During that millennium time I was approached by two people who reported signs of a 'large mammal' in a catchment found in the border lands of two counties in the SE. A site visit certainly did find the signs of a large free-living mammal. I was expecting spraint but this was even more of a surprise (**Fig.1**).

Fig.1 Beaver signs/felled tree.

This report may well have been the first record of a free-living beaver in the SE of England for over 500 years. Local landowners and the local public had mixed views on the presence of beavers in that catchment and access to a core habitat was not achievable. The matter was complicated by the actual identification of the beaver species and the number(s) of beavers in that catchment was not known (though probably very small) and this population appears to have subsequently died out.

Around this same time Kent Wildlife Trust introduced Eurasian beaver into a large enclosed area in East Kent to help manage one of the last fenland sites in Kent, where other management techniques were proving to be difficult and expensive.

In recent years there have been occasional reporting's of beaver elsewhere in Kent and one animal turned up in the sea in Ramsgate harbour in 2014. But I am not certain *Fucus vesiculosus* was to the animal's taste and that individual was collected by a wildlife charity.

In 2016 Bramley Associates moved to Canterbury and in the first summer here while we were on a pleasure trip beaver signs were evident in several places in the Greater Stour catchment. In 2018 Bramley Associates, friends and assorted ecologists were 'encouraged' into looking for beavers (though this was rather easy as everyone wanted to look) and with kind financial help from the Kent & Medway Biological Records Centre (KMBRC) we undertook a relaxed, though restricted, survey of the Greater Stour valley from Ashford in Kent to very near the sea at Sandwich Bay. The results showed that beavers are widespread east of Canterbury and indeed are found within the city centre itself (**Fig.2**). Overall, it would seem that currently beavers in Kent are perhaps the most widely distributed beaver population in England.

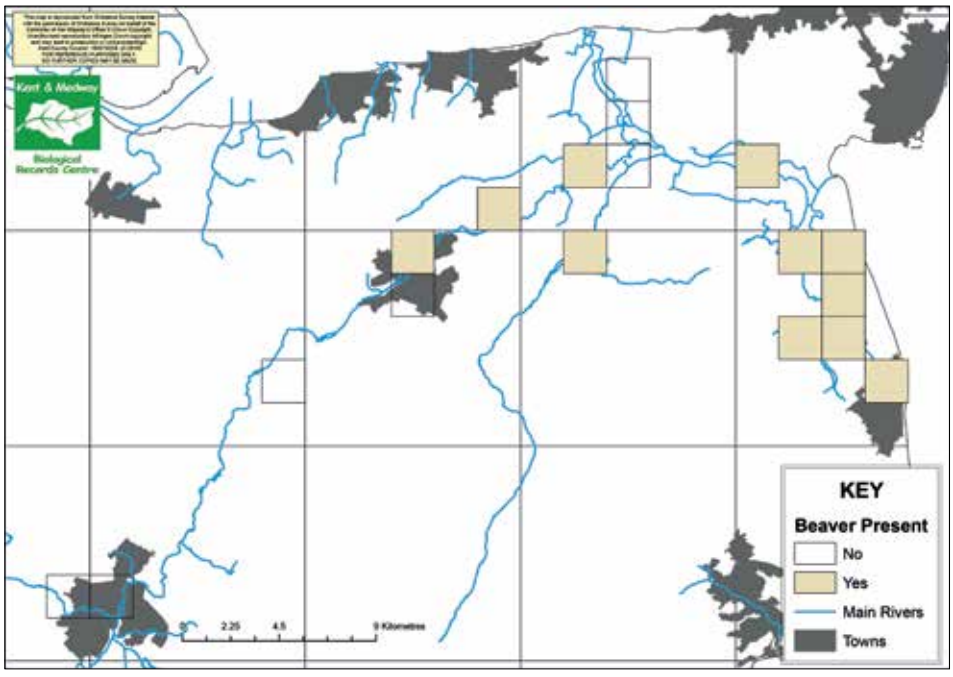


Fig.2 Map showing recorded beaver signs in the survey

In this survey we found evidence that beavers had lived freely for many years; felled trees and whips were rather widespread and dams, lodges and defined paths were found in a number of places (**Figs.3, 4 & 5**).

Figs.3, 4 & 5 showing beaver signs

Breeding of beavers was also reported and a number of photographs of beavers was shown to us.

Interestingly otters, which probably went extinct on this catchment in the last millennium, have also re-appeared in the last few years at a number of sites in east Kent from Ashford to near the sea at Sandwich and we were also shown photographs of that species (sometimes very close to known beaver sites). The future interaction between these species will be interesting to investigate and I am sure that an under-graduate or post-graduate research project would be an excellent way forward and we have spoken to two local universities about perusing this.

Since 2001 there have been several official and several guerrilla releases of beaver in the UK and while unofficial otter releases did occur into the 1990's in England it could well be that some 'supportive' releases of beaver and again also otter is now occurring. There are obvious positive and negative aspects to this activity and this was clearly set out by Roisin Campbell-Palmer in the Mammal Society's 2016 Spring News.

It will be interesting in having beavers back in the UK after 100's of years without them and there is no doubt they have now come back to colonise a city area that this species would have known previously and very likely in the 5th and 6th Century when the name Canterbury can be traced back to the Old English name *Cantwareburhrs*.

> Since 2001 there have been several official and several guerrilla releases of beaver in the UK and while unofficial otter releases did occur into the 1990's in England it could well be that some 'supportive' releases of beaver and again also otter is now occurring.

'Letting it all hang out.'
Paul Dibben

Nancy Jennings, Managing Editor

Mammal Review

History and organisation of *Mammal Review*

Mammal Review, the Mammal Society's international scientific journal, is getting old. In fact, it is as old as me, its Managing Editor; in 2020, we will publish Volume 50 and I will be celebrating half a century of life too. But *Mammal Review* has improved with age and gone from strength to strength in fact, under the guidance of an impressive series of Editors, including, from 1980, Derek Yalden who passed the baton to Robbie McDonald in 2003. From 2008, Klaus Hackländer, assisted by me as Managing Editor, took over as Editor-in-Chief and in 2016, Danilo Russo took the helm.

The first paper, published in February 1970 in Volume 1, Issue 1, was 'Parasitic protozoa of British wild mammals' by F. E. G. Cox of the Department of Zoology, King's College London. Since that time, *Mammal Review* has become more cosmopolitan in terms of readership, authors and subject matter, and the focus has evolved; though we still publish mainly review papers about mammals, the exact definition of a Review and the other types of paper we publish have changed over the years.

Mammal Review helps the Mammal Society to fulfil two of its key aims: encouraging research and helping to disseminate the results of research and new information; and providing up-to-date, reliable information and science-led advice to advocate effective conservation policy for mammals. The journal also provides a significant and increasing annual income for the Society.

Papers published in 2017 and their impact

In 2017, Volume 47 of *Mammal Review* consisted of 29 papers, including 19 Reviews and the first 3 Perspectives. Cover photos for Volume 47 reflected the international nature of the papers and were of a wild boar, a feral cat, the island endemic Commerson's leaf-nosed bat and a lion. Papers entitled 'Mammalian biogeography and the Ebola virus in Africa', 'Magnetic alignment in warthogs and wild boars', 'Impacts and management of feral cats in Australia' and 'Voluntary recording scheme reveals ongoing decline in the United Kingdom hazel dormouse population' caught the attention of journalists and received a lot of media coverage worldwide.

The impact of journals in the scientific community is quantified in several ways, including the 'impact factor': a measure of how many of the published papers are cited in other scientific papers. *Mammal Review*'s impact factor for 2017 was 4.25, a good increase since 2016, and early indications suggest that the impact factor for 2018 will be similar or higher. Impact factors for previous years are shown in **Fig.1** in comparison to the median impact factor for zoology journals. *Mammal Review* is certainly being used by, and having an impact on, the scientific community.

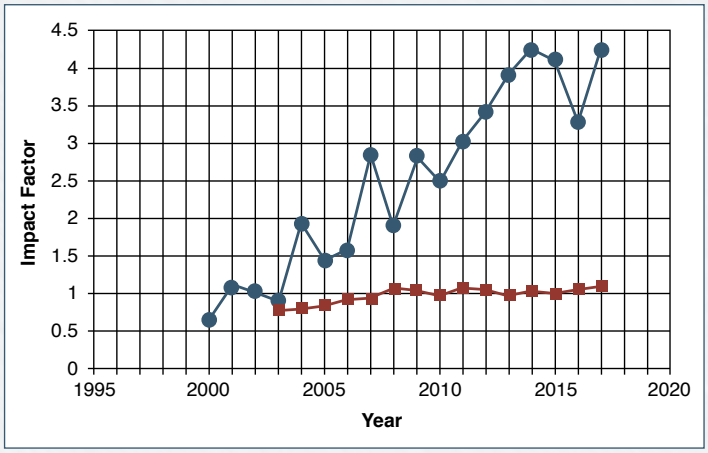


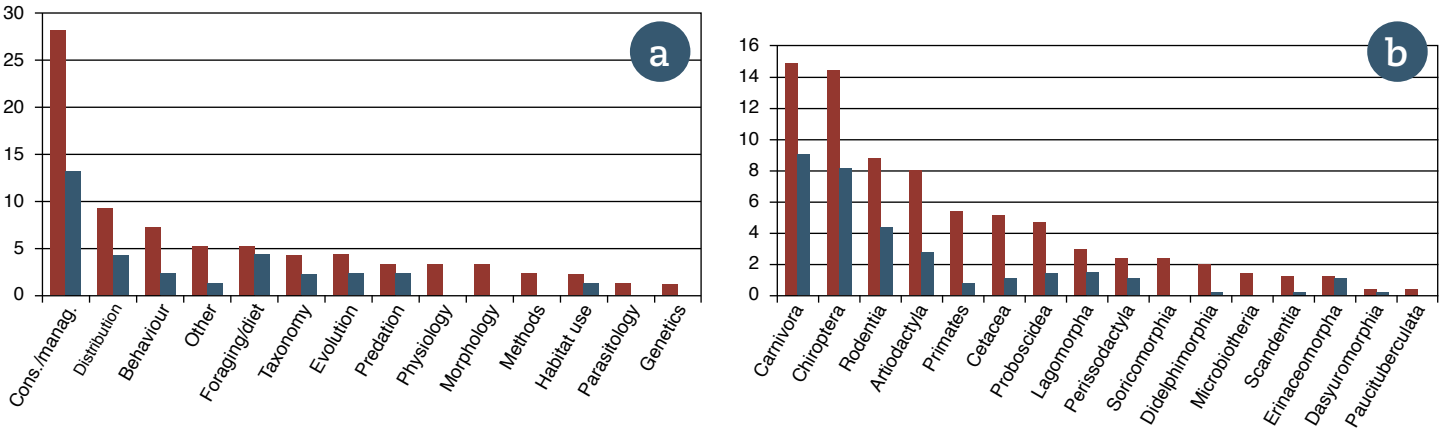
Fig.1. The impact factor of *Mammal Review*, 2000 – 2017 (blue line) and the median impact factor of the 167 zoology journals, 2003 – 2017 (red line).

Submissions, acceptance rates and decision times in 2017

One volume of *Mammal Review* is published each year. In 2017, 78 papers were submitted, of which 31 were accepted, so our acceptance rate was 40%. On average over the last 10 years, we've had 63 papers submitted each year and an acceptance rate of 29%.

Each paper is checked by me and returned to the authors if anything is missing or presented incorrectly; in 2017, 77 papers were passed to Danilo. At this stage, 33 papers were rejected without review, on

Fig.2. Numbers of manuscript submissions (red bars) and accepted papers (blue bars), in subject area categories (a) and taxonomic group categories (b), for *Mammal Review* in 2017.



average in ~3 days. This allows authors of unsuitable papers to move quickly on to a different, more appropriate journal. The remaining papers are then passed to experts in the field for double-blind peer review. Most papers go through two rounds of review and emerge from this process greatly improved, though some papers are rejected after review. Accepted papers are then edited by me and a small number are selected for publicity, before being sent to the production team at Wiley (the publisher) for typesetting and proofreading.

In 2017, the average time between submission and first decision was 29 days; the average time between submission and acceptance was 4.6 months. Publication takes a little longer of course; the average time between submission and online publication was 6.8 months, and between submission and paper publication was 9.5 months.

Geographical and topical coverage of submissions

In 2017, submitting authors were from 23 countries (Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Finland, France, Germany, Hungary, India, Italy, Japan, Mexico, Poland, Portugal, Slovenia, South Africa, Spain, UK, Ukraine, USA). Over the last 10 years, authors from ~69 of the 195 countries in the world have submitted a paper to *Mammal Review*. Most papers have more than one author and research is often conducted by international teams, so the real number is even higher.

The 77 submissions and the 31 accepted papers in 2017 were placed into categories based on taxonomic groups and subject areas (**Fig.2, above**). The pattern is fairly typical: most years, we have lots of papers on conservation and management, and carnivores, rodents and deer are always popular.

Article Types in *Mammal Review*

From 2019, authors will submit a Visual Abstract, a non-specialist summary of the paper consisting of an eye-catching image, photo, graph or flow-chart and some explanatory text. We also have a new article type, the Predictive Review.

The main article types we publish are as follows:

- Reviews draw together information from various sources in the public domain for a new synthesis or analysis in mammalian biology, contain few or no data derived from the author's own new empirical research and are <10,000 words.
- Predictive Reviews must provide major new insights into mammalian biology. Authors use sources in the public domain to conduct population viability analysis or to create species distribution models, individual models, or other models. Predictive Reviews are <7,500 words.
- Perspectives, in which authors present an original point of view on any aspect of mammalian biology, contain <5000 words.
- Comments, in which authors respond to papers published in Mammal Review, and Short Communications, in which new findings or methods in mammalian biology derived from empirical research are described, contain <2500 words.

Future publications

Issue 1, Volume 49, 2019, will include six reviews and an obituary of Alan Robert Rabinowitz, a champion of carnivore conservation who died in 2018. Issue 1, Volume 50, 2020 will be a special issue on Invasive Species, with Guest Editor Sandro Bertolino, University of Turin, Italy.

Writing a paper for Mammal Review? Here are some things to consider:

- Read the 'aims and scope' and the 'author guidelines': **https://onlinelibrary.wiley.com/journal/13652907** – This will help you decide whether your paper is suitable for the journal and tell you how to present it.
- Look at the papers that we have published recently. This will give you an even better idea of what we are looking for. For example, we don't specifically exclude papers on domestic mammals, but we very rarely publish them.
- Give careful thought to authorship (who to include as an author and who to thank in the Acknowledgements). Make sure the authors listed on the title page are the same ones that you add to our system and provide a working email address for each.
- If your paper exceeds our word limit, shorten it. Do not be tempted to indicate that your paper is shorter than it is, as I will check the word count. I also check every paper for plagiarism, so be warned!
- Write a covering letter to the editors to introduce your paper, but don't claim to have presented the paper according to the journal guidelines if you haven't. I am very familiar with the journal guidelines and I will notice.
- Feel free to email me, the managing editor, to ask about the suitability of your paper. If we encourage submission, acceptance is not guaranteed.

> The first paper, published in February 1970 in Volume 1, Issue 1, was *'Parasitic protozoa of British wild mammals'* by F. E. G. Cox of the Department of Zoology, King's College, London.

Turning the Tide

Jackie Foott, British Red Squirrel Project Coordinator (volunteer)
www.britishredsquirrel.org All photos © The Red Squirrel South West project

Twenty-five years ago, a few forward-thinking people in the north of England realised that grey squirrels were displacing native red squirrels across much of the British Isles. They persuaded others to control greys in order to save our beloved and iconic reds – for the Lake District would not be the same without 'Squirrel Nutkin' and his cousins.

Red squirrel conservation

Local volunteer groups developed, doing much of the work covertly because the threat to the reds from the greys was not fully understood and discussed at that time. Over the years the groups kept careful records and these, along with more recent scientific monitoring and analyses, have shown that reds can survive and thrive if there is consistent grey squirrel control.

Red squirrels do not need special habitats and can live in colder northern European climates or the warmer climates of Cornwall and the Scilly Isles and in rural, suburban and sometimes even urban locations. The notion that red squirrels prefer conifers is somewhat confusing. They have been increasingly restricted to large conifer woodlands and plantations due to encroaching grey squirrels that out-compete them for food and habitat. While they can utilise coniferous trees better than grey squirrels, red squirrels reach their highest population densities in mixed or broadleaf woodlands that offer a diversity of tree species and availability of food.

Red squirrels are surviving in the north of England not by chance, but because of the work of volunteers in the first instance and then, more recently, through funded projects and organised conservation groups. However, there is still a reliance on volunteers to carry out much of the work on the ground.

A report by the Cumbria Wildlife Trust in November 2018 stated:
'One of the biggest citizen science efforts in mammal conservation in the UK has shown red squirrel populations across northern England are stable. This is thanks to over 30 community red squirrel groups which work tirelessly to protect the red squirrels on their doorstep.'

Red squirrels are also doing well in other parts of the British Isles: Scotland, North Wales, Mid Wales, Northern Ireland, Merseyside, Isle of Wight, Brownsea, Mersea, Tresco and Jersey, with releases anticipated in Cornwall within the next few years. Anglesey has been so successful in their conservation project that reds are coming off the island onto the mainland, where effective grey management is now in place. Most of the wild red squirrels in the British Isles are now protected by conservation groups and organisations, so their future is looking secure as long as they can be kept free of grey squirrels.

Despite the growing body of evidence that shows the devastating impacts non-native grey squirrels have had on native red squirrel populations, there is still opposition to culling grey squirrels. Increasingly, though, people are realising that grey control is essential for effective red squirrel conservation. Various funding streams have been available over the years, but this funding is now in short supply for the larger projects

Managing greys in non-red areas

Grey squirrel management also takes place in areas where red squirrels are absent, but for different reasons. Land managers, foresters, farmers, government agencies, NGOs and conservation organisations are concerned about the economic and environmental damage greys are causing, but they are often reluctant to openly endorse grey control because of a lack of public support.

Grey squirrels damage forests and woodlands by stripping bark from the trunks and branches of trees. If they strip a complete ring of bark from around the trunk it can cause the tree to die. The damage caused to our broad-leaved woodland landscape, commercial forestry, crops and property costs in the tens of millions of pounds each year.


Tree damage

Anecdotal evidence suggests grey squirrels may also impact songbird populations in some environments and may be a contributing factor in the decline of some species, although there are a variety of other human-induced issues that are having major negative impacts and a range of factors may be combining to cause serious population declines.


Grey with a bird's egg in its mouth

For many people in Britain, invasive non-native grey squirrels have become the 'norm' with little awareness of the issues they cause. The story of greys versus our native flora and fauna is not as popular or attractive to the media as the greys versus reds narrative. So how can public opinion be changed in order to make grey squirrel management publicly acceptable to protect our native trees, plants, animals, birds, crops and property?

The Future?

The good news is that there is strong movement to get the message out there to the general public and to all land managers. For example, the Mammal Society is leading the way by holding their recent Symposium on Non-Native Mammals in the UK, discussing the question 'What is the future for coordinated approaches to invasive mammal management in GB?'

The UK Squirrel Accord (UKSA) is a partnership of various organisations, agencies, volunteer groups, academics and others. Amongst other work, they are fundraising for and coordinating delivery of a five-year research project (currently in year two) on an oral immuno-contraceptive vaccine, a fertility control treatment, for grey squirrels. This would allow the squirrels to live out their lives, but prevent them from reproducing, gradually reducing their populations over time. This non-lethal method of managing levels of reproduction will, hopefully, be publicly acceptable and could be used for other mammal species in the future.

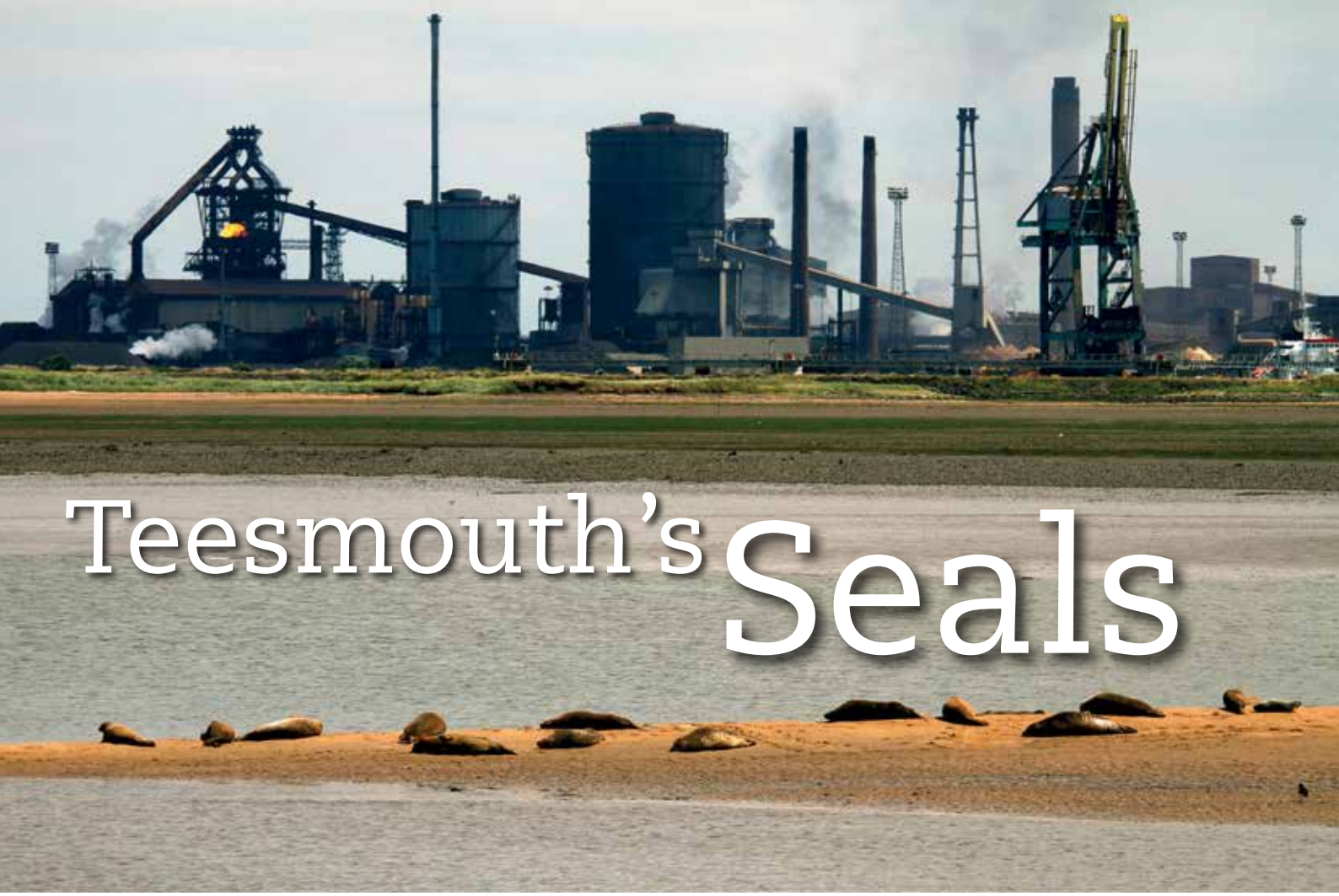
Current methods for humane grey squirrel management are trapping and shooting (Warfarin is no longer available as a poison) and the UKSA is also supporting the development of improved traps. The UKSA website is being redesigned and will be a hub for promoting the excellent work and resources of the many dedicated partners and supporters involved in red squirrel conservation and tree health.

British Red Squirrel is one of UKSA's partners and provides a web-based information service for people interested in red conservation and grey control, focussing on raising awareness and encouraging involvement from the general public.

Many national conservation charities only support grey control if it is part of a red squirrel conservation project, rather than in non-red areas where grey squirrels are impacting on tree health and thus associated flora and fauna. Understandably, they are concerned about public criticism and resignations from their valued members. However, it is hoped that recent studies showing the environmental and economic damage being caused along with non-lethal and improved methods of grey squirrel management, will enable organisations to justify national policies for supporting grey control. Similarly, land managers in the private and public sectors will be able to carry out grey control themselves or allow volunteers to work on their land with a positive conservation reason for doing so.

Reports from Anglesey seem to indicate that where there is a healthy population of red squirrels but no greys, damage has been limited to a few hornbeam trees. Elsewhere, with effective conservation efforts investment can be made in the production of high-quality timber plantations. In contrast, the proposed Northern Forest could have much of their investment in tree planting damaged by grey squirrel bark-stripping if management methods are not utilised.

Increasingly, land managers are seeing the need for grey squirrel control. There are thousands of volunteers across the British Isles forming local networks, joining conservation projects, or working as individuals trapping and shooting to rid their neighbourhoods and landscapes of the non-native invasive grey squirrel. If you would like to get involved and for more information, please see the British Red Squirrel website **www.britishredsquirrel.org**.



Teesmouth's Seals

Ian Bond, Ian.bond@inca.uk.com

Seals and industry co-existing around Seal Sands.
Photograph by Dave Miles

Teesmouth hosts one of the major industrial centres in the UK and is currently the UK's third largest port. Seals have lived at the mouth of the River Tees for hundreds of years with an estimate of around 1,000 seals in the early 19th Century. Whether this estimate is accurate cannot be substantiated but their numbers were such that their extermination was proposed because of the extent to which they interfered with the local salmon industry.

What is certain is that their numbers declined rapidly during the mid-19th Century such that by the late 1800s any occurrences of seals around the Tees were notable and by the 1930s seals appeared to have totally disappeared from the Estuary.

This decline would have been due to a range of factors, with pollution likely to have been a very significant cause. The mid-20th century saw old-style steel and coke plants being replaced by newer, less polluting works. Reclamation of the lower estuary restricted river access and probably reduced disturbance to the seals. From the early 1970s there was a concerted effort by regulators and industry to reduce the pollution load discharged to the estuary.

Seals began to re-appear and by the 1970s there was again a very small, resident population.

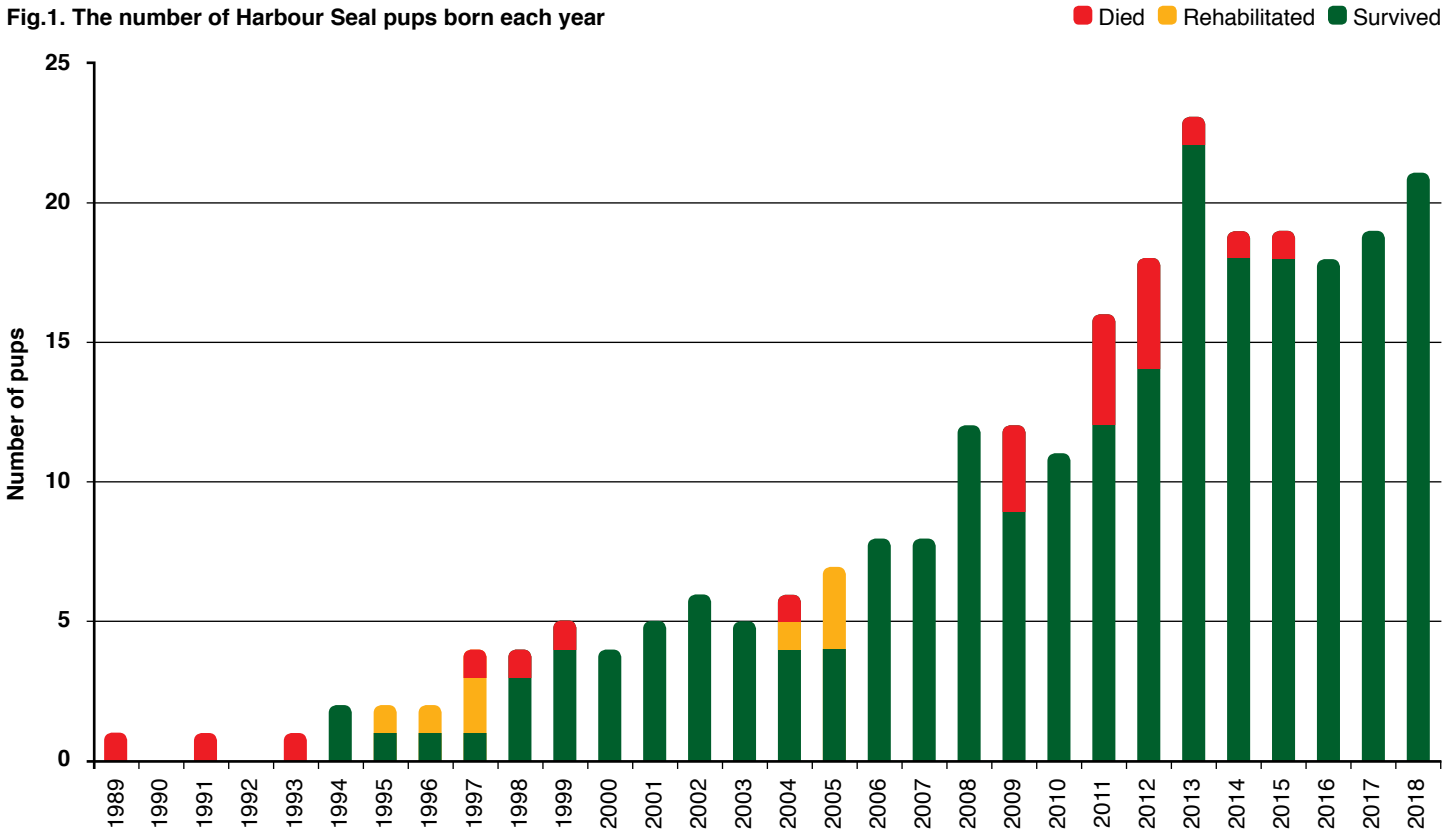
In 1988 the Teesside Development Corporation initiated the Tees Seals Research Programme (TSRP) to monitor the effects of a Phocine Distemper Virus (PDV) outbreak that had caused significant mortality of Harbour Seals elsewhere in the North Sea. Fortunately, the PDV outbreak missed Teesmouth and since 1992 the programme has been continued by INCA as an annual census of the seals in the Tees Estuary, thus providing a continuous 30-year dataset of the changing populations.

Initially the TSRP concentrated on Harbour Seals, hence the counts take place from mid-June to mid-September to coincide with the breeding and moulting periods for that species. However, it is known that both Harbour and Grey Seals are present in the Tees Estuary throughout the year and detailed information about Grey Seal numbers has been systematically collected since 2005.

The traditional area where seals haul out is the eponymous Seal Sands. Much of Seal Sands was reclaimed during the 1970s and, while it is still an extensive area of intertidal mud, (ca 160 ha), it sits very low in the tidal frame, being entirely covered with water other than for approximately two hours either side of low tide. Nevertheless, it is the only area of intertidal soft sediment on Teesside which is inaccessible to people and this is where almost every Harbour Seal pup is born and from where it inevitably has to swim off with its mother within, at most, an hour or so of birth. In addition to Seal Sands, seals have been noted as hauling out at Greatham Creek in significant numbers since 2009, so the TSRP has undertaken simultaneous counts at both sites since that time. Greatham Creek is around one kilometre upstream from Seal Sands and the water course itself is quite narrow at that point, around 5 m at low tide, but has intertidal mudflats and saltmarsh extending to around 100 m where the seals can haul out. Seals haul out at Greatham Creek, sometimes within a few metres of the A178 coast road, throughout most of the tidal cycle but vacate it on low spring tides when the receding tide only leaves a shallow freshwater stream.

The size and inaccessibility of Seal Sands, the short time frame over which it is exposed and the mobility of the seals between the haul out sites and the sea provides challenges for accurately counting seals. The TSRP has addressed this to some extent by adopting the method of having surveyors in place over the

Fig.1. The number of Harbour Seal pups born each year



entire daylight low tide period. Two surveyors, one based at the seal hide overlooking Seal Sands and the other based near the Greatham Creek road bridge, conduct simultaneous counts every 30 minutes, giving a total of 7-9 counts each day. These counts record: the numbers of each seal species, the locations where the seals are hauled out and the number of pups. In addition, across the whole of the three to four-hour count, the surveyors also record: instances of disturbance to seals, deaths or injuries to seals, abandonment of pups and notable features of behaviour, e.g. species interactions and weather conditions.

Recording several times across the low tide period enables a more accurate maximum count to be obtained as the numbers of seals that are hauled out at any one time will typically vary by around 20% on any given day and regularly by as much as 50%.

The Harbour Seal pupping season lasts approximately three weeks, with the first pups of the year almost invariably being born in the third week of June. The highest number of Harbour Seal pups recorded at any one time has usually occurred by the second week of July. It is impossible to say if this is the maximum number of seal pups for the year as some pups may be born on the nocturnal low tide and we don't know if all the pups haul out at every low tide, nevertheless this has always been taken as a proxy for the maximum number and, given the high survey effort, is probably reasonably accurate.

The first seal pup at Teesmouth for well over 100 years was born in 1989 but, unfortunately, it did not survive. It was not until 1994 that there was successful breeding, when two pups survived to weaning. The numbers of seal pups born has grown steadily since then, more or less in line with the growth in the maximum numbers of adults recorded, but has perhaps plateaued at around 20 births per annum in recent years. The numbers of Harbour Seal pups born each year is shown in **Fig.1**.

The highest numbers of Harbour Seals are usually recorded in August or early September, when they are moulting and spending more time hauled out. The initial recolonisation of the Tees by seals wasn't documented but they were recorded as hauling out in low double figures on several occasions prior to the commencement of the TSRP. Since then, Harbour Seal numbers increased gradually to around 70 in 2000 then remained at that level until 2010, after which they almost doubled to 128 in 2017. This remains the only location where Harbour Seals breed between Lincolnshire and the Firth of Forth and, in 2018, breeding Harbour Seal was included as an interest feature of the Teesmouth and Cleveland Coast SSSI.

The Grey Seals at Teesmouth tend to haul out at the sea-ward entrance to Seal Sands, over a kilometre from the surveyor location and this, combined with their habit of hauling out in a

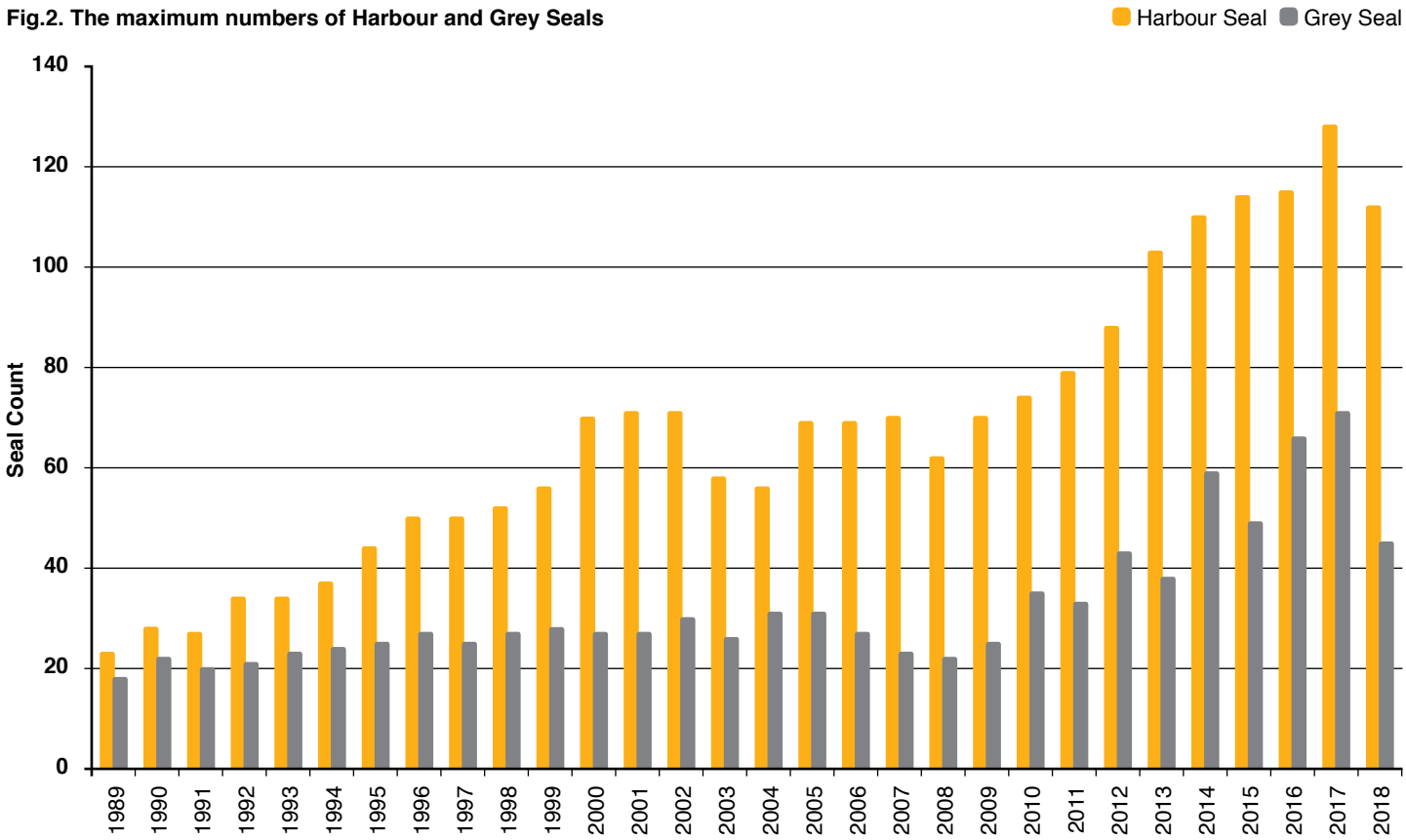
Seals among the Sea Lavender a Greatham Creek.
Photograph by Dave Britton

tight group, renders it impossible to count them accurately once their numbers reach double figures, so most counts represent the minimum figure. Their numbers appear to have stayed fairly constant until 2010 when, like Harbour Seals, they started to increase significantly. The maximum number that has been recorded as part of the TSRP is 66, but outside of that there have been two occasions when the Grey Seals have been counted from a better viewpoint and have numbered in excess of 80 animals. The changes in the numbers of both seal species can been seen in **Fig.2**.

For the past 30 years the seals at Teesmouth have been a symbol that nature and industry can co-exist successfully. More recently they have also become a local tourist attraction and the RSPB has installed a seal viewing hide at Greatham Creek with a live video link in their visitor centre at Saltholme. With the total number around the estuary now almost certainly numbering in excess of 200, the tide certainly has changed for Teesmouth's seals.

Photograph by Chris Cachia Zammit

Fig.2. The maximum numbers of Harbour and Grey Seals



Acknowledgements:

We are blessed with a loyal band of volunteers who have stood counting seals for four hours a day, for three months of the year, for many years now. We are also grateful to Venator (formerly Huntsman Tioxide plc) for their many years of providing practical support for the project.

For further information on Teesmouth's seals visit the INCA website:

http://www.inca.uk.com/wp-content/uploads/2018/11/Teesmouth-Seals-Report-2018-final.pdf

Photograph by Grant Auton

Field Vole. Photograph by Phil Winter

The University Mammal Challenge begins for another year!

O.Middleton@sussex.ac.uk

A new year means a new set of teams, consisting of budding student ecologists setting off to record mammals around their university campus. The University Mammal Challenge (UMAC) is a national project where, for the next six months, students will survey their local area to find out what, and how many, mammals are living alongside them. Armed with camera traps, Longworth traps, bat detectors, as well as the new Mammal Mapper App, teams will compete for the highest number of records, while contributing towards a national project to increase our knowledge of the urban ecology of British mammals.

Many of our most common mammal species lack strong quantitative data on population trends or densities across the UK, even in urban environments. This may be surprising as we all know where we can spot our local rabbits, squirrels and, perhaps, even foxes and badgers. However, the lack of quantitative data ensures it is currently difficult to track population trends through time and to understand how species are responding to various anthropogenic pressures. To solve this, gaps in the mammal record need to be filled, using a variety of survey methods and across a multitude of habitats.

The University Mammal Challenge began in 2017, in connection with A Focus on Nature, with two primary goals. The first is simple: to address the data shortage and to increase the number of mammal records across the UK. The second is to provide current students with the opportunity to gain crucial fieldwork skills in ecological monitoring and surveying. This makes for a perfect combination, by using the enthusiasm and skills of students who actually have the potential to fill in these mammal record gaps by surveying around their campuses and offering them the chance to contribute towards a national conservation project. In the long term, the hope is for each team to pass the torch onto another group in the following year, so that we can begin to build up long-term studies of mammal population trends across a large number of sites across the UK.

As the project enters its third year, there have already been some great results. In 2017 and 2018, a total of 71 teams contributed towards this project, providing an opportunity for 317 students to get involved and increase their experience with ecological monitoring. This has led to the collection of 15,860 independent mammal records for 46 species, in just two years.

With the 2019 challenge underway, there is one key difference to previous years, which is the inclusion of the Mammal Mapper App as the primary survey method. This was designed by the Mammal Society to improve the ability to monitor mammal densities across the UK through distance sampling, building upon our current knowledge of regional occupancy estimates.

Currently, a total of 40 teams, representing 25 universities from across England, Ireland, Scotland and Wales, are setting out to contribute towards this growing dataset on mammal population trends and density estimates on and around university campuses. With the challenge only just beginning, it's exciting to think about what the teams will find on their campus this year. Will there be anything surprising? Which team will gain the highest number of records? Which team will record the greatest number of species? It's all to survey for, so good luck to all of the students taking part in UMAC 2019.

Photograph by Dave Hudson

Photograph by Matthew Gould

Brighton University Challenge

Chloe Morel

The University of Brighton has three campuses across Brighton, with two of the three being situated in urban areas and one (the largest) being on the edge of South Downs National Park. The red fox and grey squirrel are commonly seen around all three campus', therefore when our team (Skulk of Vixens) saw there was an opportunity to participate in the University Mammal Challenge, we were excited to potentially discover other species utilising the areas around each campus. Each campus is very different in size and location, with Grande Parade campus being in the town centre, Moulsecoomb campus being next to a railway and near large housing estates and Falmer campus being close to Stamner Park and South Downs National Park. Our team have set a few goals throughout the challenge to achieve the most accurate and best results we can. Our first goal is to attempt as many ecological surveys as we can. Alongside our regular walking mammal transects using the Mammal Mapper app, we are also setting up camera traps, performing bat surveys and would like to attempt live traps later on in the year. We hope that using different survey techniques will widen our data set. Our second goal is to use the University Mammal Challenge to widen our ecological surveying skills further for future career opportunities and most importantly, our final goal is to have fun doing the challenge and enjoy investigating the mammal wildlife we have on our front door steps. ➤

Lady Margaret Hall Mammalologists

Emma Dale, Team Leader DPhil Reading Zoology

Living with the UK's charismatic carnivores

In Australia, living alongside carnivores is scarcely heard of. In my home state, Tasmania, it is a source of much pride to have a family of devils (the Tasmanian kind), living below your porch or quolls living in the rafters. Elsewhere, having carnivores in your backyard can be a terrifying and life-threatening prospect. We are lucky; our carnivores in the UK seldom pose a physical threat and, in fact, sightings of them are usually associated with increased life satisfaction. Lady Margaret Hall is nestled amongst an expansive connection of gardens and forests, and is one of the University of Oxford's 38 colleges. One of the newer additions to the University, formed in 1878, it was a women's only college until 1979. We are extraordinarily lucky to be a part of this college's rich and pioneering history.

Photogenic Grey Squirrel

The grounds of the college form what is probably an intricate network of corridors and pathways used by all manner of wildlife around Oxford. This is only speculation of course; we don't know for sure what these animals are doing. But a project to investigate this may be in the pipelines! This is the third year we have installed camera traps at Lady Margaret Hall, so we have an increasingly better understanding of what is living here or at least passing through.

A wood mouse! (Can you spot it? Hint: look top right!)

I have a specific interest in carnivores, as they are an integral node in ecosystem stability, but our team has a wide range of passions. Julia is extraordinarily keen on all British mammals and is a budding urban ecologist. Lindsey has a soft spot for edible dormice, which have other-worldly vocalizations. Vaishali is an enthusiastic guide and naturalist, who will draw you in with exciting anecdotes from working in India and her otter encounters here. The college dog, Archie, enjoys investigating the spraints left by the badgers. The entire gardening team give us intel on different spraint sites and signs of wildlife throughout the grounds, and maintain the college wildlife hut.

This competition has been an empowering method to engage students from across a wide breadth of disciplines. We run weekly wildlife walks for undergraduates, graduates and staff, where our team talk about the sites natural history, identify signs and presence of different species, and hopefully see something of note! The local vixen, who is increasingly noisy of late, is the first to show up most evenings (I suspect this is her in the image below). We are excited to be introduced to her kit in a few months.

Our local vixen, caught on the camera trap

The crowd favourite is consistently the otter midden on site. Otters were locally extinct 30 years ago, but now, if you get up around 8am, in winter, you may well see one, or a few, on the banks of the river Cherwell. We only have a single camera trap set up (one was unfortunately stolen; invest in bike locks for your cameras!) but we are getting some really nice images on the traps. No otters or badgers on the cameras yet but we have hope!

Badgers by Val Gall. **Hedgehogs** by Zoe Shreeve. **Rabbits** by Jonathan Ball. **'Kerb side'** by Alex White. **Bank vole** by Melissa Nolan. **Rat** by Tina Beck.

University Mammal Challenge 2018

THE Mammal SOCIETY

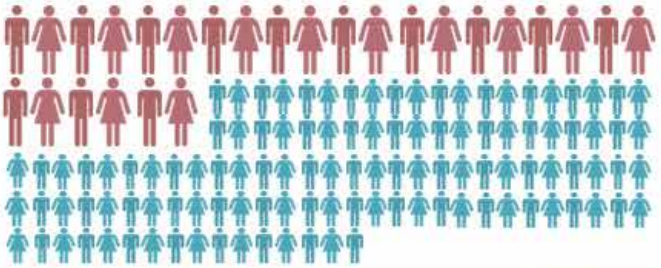
17

UNIVERSITIES & COLLEGES

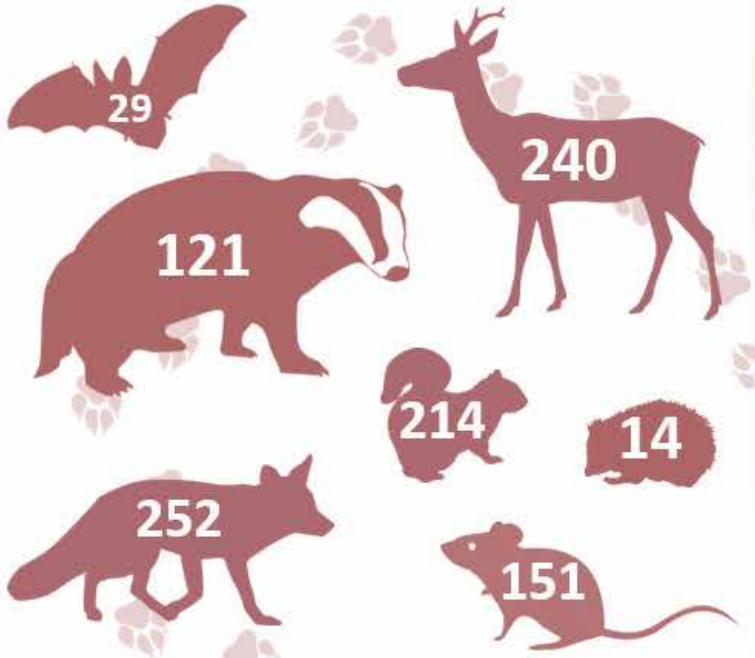
Hertfordshire University, Harper Adams University, Scottish School of, Exeter University, University of York, University of Cambria, University of Sheffield, University of Aberdeen, University of Sussex, University of Kent, Cambridge University, University of Worcester, Imperial College London, University of Manchester, Bishop Burton College, University of Manchester, University of Oxford

25 TEAMS

114 STUDENTS



31 SPECIES



SURVEYS

- Habitat
- Camera Traps
- Line transects
- Standard walks
- Bat surveys
- Live Traps
- Field signs
- Footprint tunnels

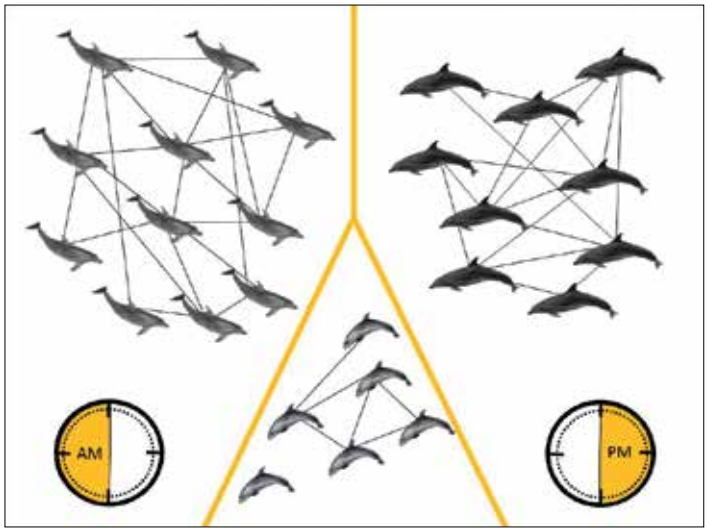
1,397 RECORDS

Contact: unichallenge@themammalsociety.org

The Mammal Society – Tel: 02380010982 – Web: www.mammal.org.uk – Email: info@themammalsociety.org

Area Time Sharing in a Dolphin Society

Tilen Genov, Morigenos



A new study documented a previously unseen temporal partitioning of dolphin social groups, which overlap in space but not in time, using the same area at different times of day. Just like humans, dolphins have their social networks and some animals seem to avoid each other.

It is widely known that most whales and dolphins usually occur in groups. In fact, these animals are famous for their complex social structure. However, this structure can vary. Many (non-specialist) people believe all whales and dolphins stay in stable family groups. While this is true for some species such as killer whales (*Orcinus orca*) and pilot whales (*Globicephala* sp.), it is not necessarily true for others. In the case of common bottlenose dolphins (*Tursiops truncatus*), group composition often changes, with animals joining or leaving the groups on a daily or even hourly basis. This type of social organisation is called a "fission-fusion" society. But these groups are not random. Individual dolphins prefer to spend time with particular other dolphins, which could sometimes be described as their "best friends". In some places, these "friendships" (or, more technically, associations) tend to be related to sex, with females and males often forming separate groups, and male bottlenose dolphins sometimes even forming alliances to gain control over females and fight off other alliances.

Common bottlenose dolphins (*Tursiops truncatus*). Photograph by Tilen Genov, Morigenos

However, structure may also vary *within* species, with considerable differences among populations. While some populations do feature male alliances, sex segregation and group fluidity, other populations may form mixed-sex groups that are more stable. Moreover, many populations of bottlenose dolphins remain poorly studied. This all shows that patterns cannot be generalised and that our understanding of bottlenose dolphin social structure remains incomplete.

In a long-term study published recently we investigated the social network of free-ranging dolphins living in the Gulf of Trieste, northern Adriatic Sea (part of the Mediterranean Sea). We have been studying these dolphins since 2002, looking at their population size and distribution, behaviour, social and genetic structure, and the effects of human activities on them. By photographing dolphins and identifying them by unique natural markings on their dorsal fins, we built a detailed history of re-sightings for each individual, as well as determine who was spending time with whom. This enabled us to get a detailed picture of the social network of the resident dolphin population. We discovered something quite remarkable and unexpected. It turned out that the resident dolphin society is composed of three **distinct social groups**: two large social groups with stable membership and long-lasting friendships, and a smaller third social group, nicknamed 'freelancers', with much weaker bonds and no particularly long-lasting friendships. In fact, group membership in the two larger social groups was more stable than is typically the case for this species. Bottlenose dolphin social structure may therefore be more variable than was previously assumed.

Photographing dolphins for individual identification. Photograph by Ana Hace, Morigenos

Individual dolphins can be identified by natural markings such as nick, notches and scars on their dorsal fins. Photograph by Tilen Genov and Ana Hace, Morigenos

Part of the "morning group" off the coastal town of Piran, Slovenia.
Photograph by Ana Hace, Morigenos

Part of the "evening group" off Piran, Slovenia.
Photograph by Ana Hace, Morigenos

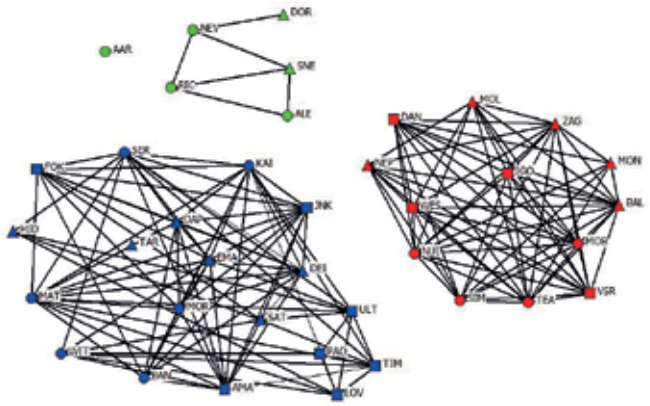
But this isn't the remarkable part yet. It turned out that the two large social groups seem to avoid each other most of the time. However, instead of them having different 'territories', they actually overlap in space – but not in time. In other words, we found that dolphins share at least some part of their home range, but they use it at **different times of day**. This pattern was so persistent through the years that we internally started referring to these two social groups as **'morning group'** and **'evening group'**. Such temporal partitioning based on time of day has not previously been documented in whales and dolphins, nor in other mammals it seems. The 'freelancers' displayed no such pattern.

We were quite surprised by this. It is not uncommon for dolphin social groups to segregate in *space*, but here they segregate in *time*. It appeared a bit unusual. We still do not know the entire extent of their ranging patterns, so it is possible that their ranging patterns differ overall. But we do know they overlap in at least part of their range and they seem to share it by sticking to particular times. We would sometimes even see one group in the morning and then another group in the same area in the late afternoon of the same day.

Interestingly, the two social groups also differed in ways they interact with fisheries, as one regularly interacted with trawlers, while the other did not (**'trawler'** vs. **'non-trawler'** dolphins). These dolphins therefore employ different strategies when it comes to obtaining food, as is the case in several other populations. Previous studies elsewhere have shown that such tactics are learned and passed on from mothers to young. So the next logical question was: are differences in fishery-related behaviour affecting the segregation patterns? Apparently not. Even when taking fishery-related behaviour into account, this failed to explain the time-of-day segregation.

Dolphins following trawlers. Photograph by Tilen Genov, Morigenos

It remains unknown what the reasons for these differences are. Both social groups contain males and females, so segregation is not dependent on the sex of the animals. There may be genetic factors (dolphins within social groups may be close relatives) or there may be diet differences, which would partly explain why some dolphins follow fishing boats and others do not. All this is the topic of further investigation, currently ongoing. Another study, published just days before this one, showed that these groups are all equally contaminated with **PCBs (polychlorinated biphenyls)**, toxic man-made chemicals, regardless of potential differences in what they eat. But this is a story for a later time.



The local dolphin network is composed of three distinct social groups.
Source: Genov *et al.* 2019.

Understanding the mechanisms of these patterns is interesting biologically, but may also help conservation efforts because, as this study shows, not all segments of a population necessarily respond to, or interact with, human activities in the same way or at the same time. This study demonstrates how **different segments of the same animal population** may behave very differently and have differing effects on human activities such as fishing. In turn, they may respond **differently** to human impacts, as temporal partitioning may make animals either more or less vulnerable to certain types of disturbance.

Photograph by Tilen Genov, Morigenos

Reference:

Genov T., Centrih T., Kotnjek P., Hace A. (2019) 'Behavioural and temporal partitioning of dolphin social groups in the northern Adriatic Sea'. *Marine Biology* **166**:11. **https://doi.org/10.1007/s00227-018-3450-8** (available open access)

Arup hosted the Mammal Society's Autumn Symposium on Non-native Mammals in Britain

Dr Lizzie Gardner, Hanna Grimsdale, Freya Johnson, ARUP

Non-native species are those which have been introduced outside their natural past or present distribution. Non-native species, which have the ability to disperse causing damage to the environment, our health and the way we live, have long been known as 'invasive non-native species' (INNS). These species often significantly alter the ecosystems in which they reside to the detriment of native species. The symposium brought together experts from the private, public and charitable sectors to cover topics ranging from the status of non-native species and their impacts, to innovative monitoring and horizon scanning.

It was clear from the talks and discussions that eradicating existing widespread INNS was likely to be an impractical and unsuccessful venture. Olaf Booy from the GB Non-Native Species Secretariat gave insight into the disproportionately high impact that non-native mammals have on our ecosystems, compared to that of other non-mammalian, non-native species. His alarming data highlighted the enormity of the problem we face and presented the need to focus on selecting targeted INNS for management. It was clear from this and other talks that, in order to increase biodiversity, Arup and other consultancies should be leading the way by focusing more efforts on preventing further invasion of non-natives both locally and nationally.

A recurring theme was the importance of future horizon scanning in preventing further invasion of existing and potential INNS within the UK. Trevor Renals' talk on biosecurity mentioned Defra's 25 year Strategy, a document that emphasises the broad range of threats from potential INNS, as well as the uncertainty around which methods work best and how the success of these methods are measured. Trevor, along with other speakers during the two days, stressed the importance of best practice for consultancy work, which is something Arup views as of utmost importance. Similarly, speaker Allan McDevitt presented on DNA metabarcoding, a pioneering tool which captures the DNA of all animal species in a sample. This method can be used to determine the presence of INNS much more efficiently than traditional sight, track and sign survey methods, saving crucial time and money. Innovative methods such as these are vital in the ongoing battle against INNS. Rapidly identifying the initial spread of INNS into new areas is imperative in preventing their long-term establishment.

Despite all the challenges associated with combatting the spread of INNS, there have also been some success stories. Conservation organisations, such as Red Squirrels United and Scottish Invasive Species Initiative, all demonstrated their achievements in landscape-scale management of INNS. They did this using a combination of volunteers, citizen science and stressed the importance of public awareness in increasing collaboration; however, a severe lack of funding and resources, restricting the collaboration and communication between organisations, ecological consultancies, the public and local authorities, was a problem across the board. While there is a national INNS strategy to unite conservation efforts between organisations and across regions, a national policy and action plan preventing the dispersal of targeted INNS is required. Such a policy would raise awareness for the need to allocate funds, supply consistency in methods and assist organisations to work collaboratively across regional borders.

Presenting research to the government and to the public on the extent, impact and economic cost of targeting INNS should be the first step towards creating new policy. Consultancies have the platform to raise developer awareness and share data on INNS. In so doing, it is hoped that Arup, and similar organisations, are able to contribute more to research focussing on the control and removal of INNS for the benefit of biodiversity conservation in the UK.

Sika deer by Jamie Nicholson. **Muntjack** by Klara Ismail. **Eye Contact** by Guy Pilkington (guyjan@f2s.com). **Grey Squirrel** by Elliot Lambell.

Invasive Species Landscape-scale Collaborative Management

Red Squirrels United is one of the largest invasive species management collaborations in the UK. The partnership directly unites the action of nine organisations managing grey squirrels for red squirrels conservation across a broad range of landscapes. The project facilitates sharing of best practise with the broader community. To build on the success of the Red Squirrels United partnership Dr Mariella Marzano (Forest Research) and Dr Aileen Mill (Newcastle University) hosted a presentation and panel discussion session to debate **'What is the future for coordinated approaches to invasive mammal management in the GB?'**

Symposium attendees heard about current squirrel and mink management programmes, Nikki Robinson presented the successes of the Red Squirrels United project and Gwen Maggs of Saving Scotland's Red Squirrels showcased the project's new volunteer online hub and described how they engage with volunteers, and data collection and sharing. Tony Martin asked the audience to consider if eradication of mink from Great Britain was possible and what it would take to achieve this. Xavier Lambin outlined the history of the mink control project in Northern Scotland, demonstrating the benefits of learning from experience. He proposed that longer term projects should consider multiple species' management. All of the speakers recognised that individual, localised efforts may not be sustainable in the long term if uncoordinated across the wider landscape, but consensus on how best to achieve this wasn't clear. **The following panel discussion fell into three main challenges: coordination, funding and volunteers.**

In Great Britain, the Non-Native Species Secretariat coordinate the national response to the threat posed by invasive species on behalf of a programme board made up of policy makers from across Great Britain. With many invasive species and limited resources, the Great Britain strategy focuses on prevention and early eradication of species that pose the greatest risk. Often the management of established, widespread invasive mammal species is a lesser national priority and there is currently no central mechanism to support large scale ongoing management.

There were concerns that centrally managed projects could stifle the enthusiasm that comes from local identity and ownership of smaller regional projects. It was recognised that there needs to be a balance between small-scale local effort and joined-up approaches across landscapes or catchments. Many projects focus only on single species and improved efficiency could come from managing multiple species simultaneously. The Scottish Invasive Species Initiative is an example of this tackling mink, Himalayan balsam, giant hogweed and other invasive species in Highland river catchments. However, working together can be difficult, if not impossible, as different organisations will have a distinct focus and separate priorities that are not straightforward to reconcile. There are additional challenges to collaborative working, including recognition, project ownership and particularly with reputation where management involves killing animals.

It was recognised that the costs of large-scale projects are not insignificant and the availability of funding is limited, so much so that it is likely volunteers will be essential to any large-scale management. However, volunteer engagement is not free; there are significant costs to coordination and management, even if the labour is voluntary. Understanding volunteer motivation and ensuring that volunteers are valued and supported will be important to the success of any future landscape-scale projects.

The discussion will be used to inform future plans for the Red Squirrels United project and we thank all participants for their questions and comments. We thank additional panel members Conor McKinney (Ulster Wildlife Trust), Sarah Crowley (Exeter University), Rob Raynor (Scottish Natural Heritage) and Xavier Lambin (Aberdeen University) for their contributions.

Mammal Training 2019

This year, we are bringing you one of our most diverse training programmes yet. From ecological consultants to keen naturalists, we have something for everyone. Many of our training opportunities get booked up quickly, so do book early to avoid disappointment https://www.mammal.org.uk/training/courses/.

In addition to all the courses listed on our website, we are continually working to develop new training events for the coming year and beyond – so do check back periodically. If you have an idea for a training course you would like to see, or would like to enquire about bespoke training, please drop us a line at training@themammalsociety.org.

2019 Courses

Beaver Ecology and Conservation

5th July – Dunkeld, Perthshire

No food is supplied on this course.

Dormice and Development

11th October – Gloucestershire (TBC)

No food is supplied on this course.

Dormouse Ecology and Conservation

17th May / 21st June / 23rd August / 13th September – Callow Rock, Somerset

10th August – Basildon Park, Reading

17th August / 21st September – Wildwood, Kent

No food is supplied on these courses.

Hazel Dormouse. Charlie Fayers

Grassland Water Vole Ecology and Mitigation

12th June
The Bridge Centre, Glasgow

No food is supplied on the course.

Watervole. Steve Deeley

Harvest mouse. Mark Hills

Harvest Mouse Day

12th October
Doxey Marshes, Staffordshire

No food is supplied on this course.

Mammal Identification Weekend

30th August – 1st September – Juniper Hall, Surrey
6th–8th September – Malham Tarn, Settle

Food and refreshments are provided on this course when booked as a residential.

Water Vole Ecology, Mitigation and Live-Capture Techniques for Practitioners

18th & 19th September – Witney, Oxfordshire

COMING SOON! Bones Identification Workshop.

Please note, some dates and locations may be subject to change, so do check the website for latest information.

Supporters' Page

Thanks to our Supporters

The Clarkson and Woods team were treated to a highly interesting training session from Paul Chanin which started with him taking us on a whistle-stop tour of the history of British mammal research and national monitoring programmes.

After this we were brought bang up to date with the latest news and research into dormouse and otter mitigation and licensing as well a sneak peek at the forthcoming Dormouse conservation and mitigation guidance. With the flexibility of having a bespoke training package as Mammal Society platinum sponsors, we were able to mine Paul's considerable expertise for his take on some of the new and emerging survey techniques and their potential pitfalls, such as dormouse footprint tunnels, as well as his thoughts on best practice for habitat mitigation and compensation. The session has already borne fruit with the adoption of data collection apps in our daily field practice which Paul introduced us to.

Harry Fox, Clarkson and Woods

Symposium

We had super feedback on the Non-Native Mammals in Britain symposium. Thank you to our sponsors:

ARUP · South West Water · Thames Water · Red Squirrels UNITED · Life · heritage lottery fund LOTTERY FUNDED · NNSS

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Mike Mathews "A Call for Nature" T shirt collection

A big thank you to you – that's all our volunteers, Local Groups and members. Together we are making difference for mammals.

Member's Observations

Graham Parry, All photographs © Graham Parry

The Stoat, the Rabbit and the Crows

The details of the kill were taken with my Canon 7 D mk 2 at around 60 yards into the sun using a 150 to 600 mm Sigma global lens.
I noticed a group of six rabbits standing on alert as I walked round Dungeness RSPB, so I waited to see why and then the stoat bolted after his intended victim though the scrubby field and puddles and the Stoat simply outran the Rabbit after about 50 yards. I was amazed that he had the speed. I watched the kill at the same sort of distance (60 yards) and the crows pulling the stoat off the now-dead rabbit by the tail. The crows kept at the stoat for six minutes after the kill and the whole thing took fourteen minutes start to finish.

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Stoat Over Water

The Rye NNR was the scene for the stoat moving its young as the rising tide, combined with the rain, started to flood the hole they lived in. These images were taken at around 35 yards from the hide near Lime Kiln Cottage. It had rained heavily overnight and the mother had to move her young to higher ground. The sea floods a pool and this is the shallowest place to cross; each trip was around 100 meters each way and she made the trip eleven times running flat out in both directions. It took her a total time of half an hour to cover the 2,200 meters.