

Introducing the Hertfordshire Mammal, Amphibian and Reptile Atlas Project (MARA) and progress to date

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In January 2015, The Hertfordshire Natural History Society (HNHS) started co-ordinating a countywide biological recording project, focussed on mammals, amphibians and reptiles (Herts MARA). This project will culminate in the publication of an Atlas in 2020 which will update the last Atlas published in 2001 (Clark 2001). Herts MARA is being organised by the HNHS, together with the University of Hertfordshire (UH), Herts and Middlesex Wildlife Trust (HMWT), Hertfordshire Environmental Records Centre (HERC) and Herts Amphibian and Reptile Group (Herts ARG).



A new website (funded by donations from HNHS members) at <http://mammal-atlas.hnhs.org/> has been developed to present the records submitted since 1st January 2015 in map form. The Hertfordshire map has been divided into tetrads (2×2 km) based on the Ordnance Survey national grid and records are represented for each species using dots in the relevant tetrad where that species was recorded. Species and overall coverage maps can be viewed on the website so that recorders can identify gaps in the data and focus efforts in those locations where little or no data exists.

Herts MARA employs several methods to obtain records, including: roving records for all species by volunteer recorders; targeted walk-through survey visits to priority tetrads; specialist targeted surveys for small mammals, amphibians and reptiles as well as passive refugia surveys. A training day was held at the Bayfordbury Campus of the University of Hertfordshire in February 2015, to sign up volunteers and allocate tetrads for passive refugia placement. These refugia are simply made of bitumen roofing felt and once located in a tetrad can be checked regularly for reptiles, amphibians and small mammals (Plate 1). A good number of HNHS members have volunteered to help and have submitted records.

Over 30 ponds have been surveyed by members of the MARA team with the appropriate licences and experience, accompanied by regular volunteers and trainees. These include ponds at Bayfordbury, Patmore Heath, Balls Wood and around the Albury area, as well as ponds managed by Stevenage and Welwyn Hatfield Borough Councils (Plate 1). Similarly, a number of small mammal surveys have been undertaken by team members with experience in small mammal trapping (Plate 1). Sites surveyed to date include Bayfordbury, Balls Wood, Patmore Heath, Albury area, Heartwood Forest and Panshanger Park. These targeted specialist surveys will continue throughout the project period in order to determine the presence of those species less likely to be encountered through the other methods.

The aim is to achieve full coverage of all tetrads in the county by 2019, but at the very least we will ensure one intensively surveyed tetrad for every 10×10 km square.



Herts MARA organisers, Dave Willis, Ian Flack and Chantal Helm.

Records submitted for the Herts MARA project will be used to update distribution maps of the focus groups last surveyed in the 1980s and to analyse trends over time. Although mammals, reptiles and amphibians are relatively well-known groups of organisms in the UK, they are notoriously under-recorded. All the records will be passed on to the HERC who will make the information available for use in nature conservation, development planning, site designations and research.

Plate 1: Targeted surveys undertaken across the county by the MARA team (photos Chantal Helm).



Biological recording, 'the documentation of the presence of a species at a specific place at a specific time by a specific person', produces data that is an essential resource to help understand our natural environment and conserve the wild species we share it with.

Any biological recording project of this spatial scale requires a large number of skilled naturalists across the county able to identify the species being recorded. There is concern that professionally-trained naturalists are becoming rarer, partly due to the increasing trend towards lab-based indoor inquiries in the professional biology community (Noss 1996). The loss of field skills being taught at various universities has also raised alarm bells about the future of disciplines such as ecology and conservation biology. 'How can a biologist who lacks a long-term emotional investment in wild places be trusted to exercise sound judgement in making recommendations for conservation?' (Noss 1996). A recent letter to *Times Higher Education* entitled 'Save field biology skills from extinction risk' further highlights the crisis in universities tasked with training the future generations of naturalists (<https://www.timeshighereducation.co.uk/comment/opinion/save-field-biology-skills-from-extinction-risk/2018721.article>).

Although this skills shortage has been developing in the professional community, a recent special issue on biological recording published by the Linnean Society, in their *Biological Journal*, has emphasised the important role that amateur naturalists play in filling this expanding void. Zoology and Botany are the main professional sciences where amateur enthusiasts can still make significant contributions to the discipline (Roy *et al.* 2015), and an estimated 70 000 volunteers contribute biological records annually (Pocock *et al.* 2015). Herts MARA aims to encourage local amateur naturalists to submit their valuable mammal, amphibian and reptile records and hence contribute to local conservation projects and decisions.

Biological records help to identify ecological change over time, and are one of the most important sources of data for informing conservation science and policy (Roy *et al.* 2015). Examples where biological records have an applied value include: understanding the community and ecosystem-level effects of invasions; providing evidence to underpin models of disease; development of IUCN red lists; demonstration of the value of protected areas; and prediction of changes in species distribution with climate change (Roy *et al.* 2015; Powney & Isaac 2015).

What is being done with the records received to date?

Records may reach the MARA team by one of several possible routes: HNHS website submissions page; Mammal Tracker app developed by the Mammal Society, spreadsheet by email, HERC and other relevant recording schemes. Each record is then verified by the team before it is loaded onto the MARA website (<http://mammal-atlas.hnhs.org/>).

A number of species are unmistakable (e.g. Badger, Fox, Hedgehog), but a large proportion of the county's species can cause confusion, especially if a brief or distant sighting. Verification involves a process of firstly checking to ensure that the submitted record is plausible in terms of location and time of year. For species easily misidentified, and unexpected or exciting records, such as Roe Deer, Polecats, Weasels, small mammals, the MARA team may potentially ask for additional information such as a photo or further details to ensure that the species has been correctly identified. These records are checked by the county recorder and followed up where necessary. It is assumed that all records are genuinely reported and that any possible erroneous submissions are likely to be due to such factors as:

- Misidentification of similar species e.g. Stoat/

Weasel, Frog/Toad, Smooth Newt/Palmate Newt, Wood Mouse/Yellow-necked Mouse, Water Vole/Brown Rat, Common/Pygmy Shrew, various deer etc.

- False assumptions, e.g. all small bats are pipistrelles; long snake = Adder.
- Problems with hybridisation, e.g. Polecat, Polecat-Ferret hybrid.
- Fleeting glimpses.
- Bat species, in particular, are very difficult to identify, the only certain way being to have the animal in the hand and identified by an experienced bat worker. Alternatively, some bats can be identified using a bat detector, although without recording and subsequent sound analysis only a small proportion of the species can be reliably assigned.

Once the record has been verified it is uploaded to the MARA website, whereupon the tetrad coverage map, species distribution maps and tetrad species lists are updated. Verification is time consuming and delays between record submission and upload to the Atlas are possible. All records are passed on to HERC.

Progress to date

Almost 1500 records had been submitted to the HNHS website by 23 July 2015 and 255 of the 491 tetrads (52%) have had at least one record submitted (Figure 1).

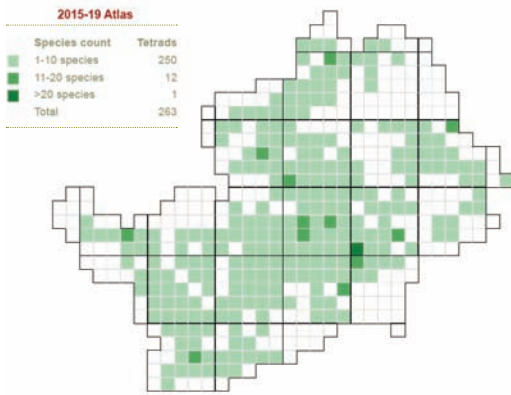


Figure 1: Hertfordshire Mammal, Amphibian and Reptile Atlas tetrad coverage map July 2015 (this analysis only reports on records submitted via the HNHS website records submission page. Other data sources will be included in due course).

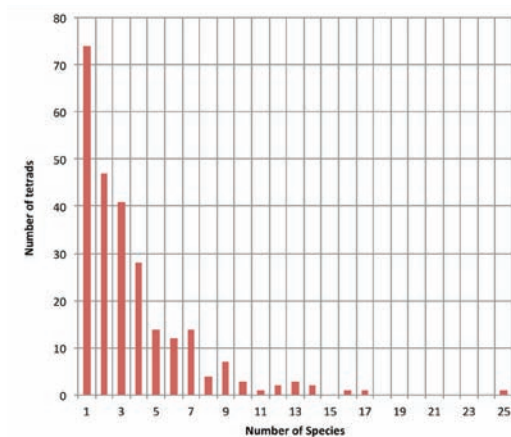


Figure 2: Analysis of the number of tetrads with one or more species recorded in Hertfordshire between 1 Jan and 23 July 2015.

Table 1: Summary of species with the greatest recorded spatial distribution in Hertfordshire and their corresponding percentage contribution to all the records submitted by July 2015 (n=1490).

Species	Number of tetrads with records	Percentage of records
Grey Squirrel	108	11.8
Rabbit	101	11.7
Mole	101	9.5
Badger	70	6.8
Fox	69	7.4
Muntjac Deer	62	5.8
Common Frog	57	7.2
Brown Hare	43	5.6
Hedgehog	39	5.0
Smooth Newt	37	3.4

It is evident that the majority of tetrads have only a few species recorded (Figure 2). Only 51 (10%) have over five species recorded and only one tetrad has more than 20 out of a possible total of 55 species recorded to date.

Some species such as Grey Squirrel (Figure 3) and Rabbit are more readily observed and identified than others, and it is hence not surprising that the species with highest tetrad coverage to date are the more familiar ones (Table 1). This of course does not yet represent the true distribution of these species but merely gives an indication of recording effort to date. Some species remain unrecorded in the county, including Dormice, Yellow-necked Mice, Harvest Mice and several bat species. Further survey effort over the course of the project will determine whether some of these species are under-recorded or truly absent from the county.

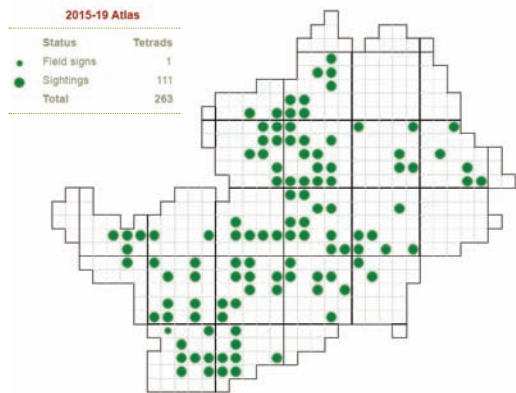


Figure 3: Grey Squirrel records submitted to the HNHS website between 1 Jan and 23 July 2015

Currently a total of 121 people have submitted records via the HNHS website, with the number of recorders and the total number of records steadily increasing over time (Figure 4).

The number of records submitted per week peaked at 87 in early June (Figure 5). There are some commendably prolific recorders, with ten people having submitted over 50 records and a further five with over 30 records.

Future plans and what you can do to help

The success of this project requires the participation of people countywide – everybody can contribute, whatever their level of expertise. All records are valuable, even for the more common species: you can always check the distribution map to see if that Rabbit record is missing. Records of the more elusive common species are always welcomed, even if already recorded in a given tetrad as numbers could significantly change over the 5-year project period.

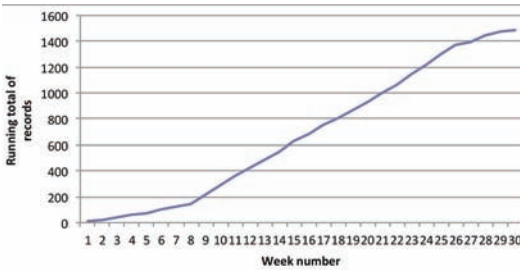
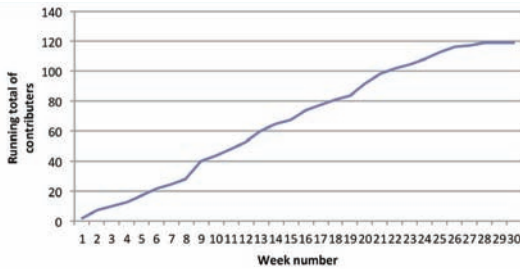


Figure 4: Summary of the cumulative number of records and recorders over time submitting sightings to the HNHS website between 1 Jan and 23 July 2015.

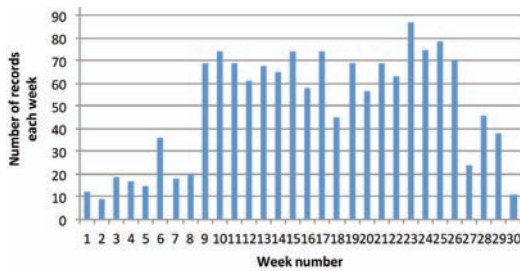


Figure 5: Number of records submitted to the HNHS website per week between 1 Jan and 23 July 2015.

Anyone interested in wildlife is encouraged to pay particular attention to the area where they live, walk the dog or go bird-watching and submit records wherever seen to the HNHS record submission page (www.hnhs.org/recordssubmission.php). Other methods of submission are also possible via the organisers who can be contacted using the email: mammal-atlas@hnhs.org. For those who would like to contribute further, the next step would be to position a few refugia in quiet, undisturbed locations to survey for the presence of reptiles, amphibians and small mammals in a non-invasive way. If you

are keen to adopt a tetrad in this way, please let us know, thus enabling us to concentrate our efforts on under-recorded areas elsewhere and help to ensure even coverage across the county. As well as submitting sightings, please submit your photos as these will be needed for the book that will be published at the end of the Atlas period. And finally, don't overlook road-kill or what the cat brought in – dead animals are also an indication of presence in the immediate area.

Further training courses are planned to help in the identification of species and their field signs. Some targeted survey techniques (e.g. amphibian bottle-trapping and Longworth small mammal trapping) have associated welfare and licensing issues, so we would demonstrate alternative survey techniques to those that do not have the appropriate training. We will also continue to conduct specialist surveys across the county and anyone interested in joining in on these is welcome to get in touch and we will add you to the email distribution list.

The members of the Herts MARA team are Chantal Helm, Ian Flack, Jenny Jones, Dave Willis, Tim Hill, Ian Carle and Linda Smith. We gratefully acknowledge the contributions that have been made by the over 100 observers who have submitted records to date and would like to encourage those who have not submitted anything as yet to please do so. Your records will help secure the future of wildlife in our beautiful county.

Contact us by email at:
mammal-atlas@hnhs.org

References

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- Pocock, M.J.O., Roy, H.E., Preston, C.D., Roy, D.B. (2015). Biological Records Centre: a pioneer of citizen science. *Biological Journal of the Linnean Society* 115: 475-493.
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