

Symposium from your sofa- bats and trees online.

Written by Katie Goldsbrough

As with most things this challenging year, the 2020 Woodland Symposium had to adapt and become an online event instead of the usual in person experience. I would like to applaud the Bat Conservation Trust for taking on the challenge and creating a wonderful, virtual, online symposium instead that was incredibly connective and filled with amazing information, wonderfully communicated!

This event showed an amazing example of collective conversation and accessibility, allowing for people who would not normally be available to attend, be able join in from the comfort of their own home. I for one thoroughly enjoyed sitting with a cosy blanket, my dog (Hugo), cup of coffee (and a whole pack of biscuits oopps), watching all the presentations and excitingly joining in with discussions and questions.

All the talks and presentations provided were filled with incredibly interesting research and information about our native woodlands and bats. Personally, the talk that stood out the most for me was Vikki Bengtsson's research on 'veteranisation- using tools instead of time'.

The idea of veteranisation fascinated me on the day, as I had never heard of that expression and process before. Examples of veteranisation have been around for centuries, for instance pollarding, but the end goal of veteranisation is a relatively new notion. The idea is to physically create veteran features on trees by purposely 'damaging' the tree to accelerate decay and the creation of characteristics found on older trees, for example cavities, cracks, and woodpecker holes for bat roosting. This technique sounds brutal, but as we know trees are much stronger and resilient than we give them credit for and tend to survive the mild treatments to create the features. This project focused on oak trees, famously known for their bat roost potential. The presentation by Vikki showed the 2020 results of veteranisation of 878 oaks across England, Norway and Sweden at 18 different sites. The results were very interesting and amazingly only 12 oaks died after the damaging processes. The other 866 oaks provided the desired features. Is this the way forward to mitigate for loss of ancient trees across the UK and the biodiversity they support? Food for thought...

I also found the panel discussion about 'Back from the Brink' very interesting. This discussion looked at working in collaboration with experts in other taxa from bats to find ways to connect and balance the needs of mixed species in woodland management. 'Back from the brink' is an ambitious, multi-organisational, conservation project in England that aims to save 20 species from extinction and help an additional threatened 200 species of plant, fungi, birds, mammals, reptiles, and amphibians. They have an exciting project to help saved the stunning Grey

Long-Eared Bat, a species of bat that only has 1,000 individuals left in the UK. The efforts of this project will also provide protection for many other species of bat that share the same conservation needs.

I found this event to be incredibly interesting, informative, and extremely useful to my career in the conservation sector and my passion for protecting our wildlife. I work as a ranger for a nature reserve in Essex, helping to manage and protect the land and wildlife in the area. The knowledge I have taken from this experience will help shape management and action plans for the reserve and be shared between colleagues, fellow conservationists and the public through social media, public talks, and presentations. In my spare time I do bat surveys and volunteer with my local bat group as an ambulance driver and trainee bat carer. In this area, the knowledge of woodlands and their relationships with bats will be beneficial for passing on advice and bat data. In my spare time I also run a wildlife blog called 'Ranger Katie', where I often post about bats and other wildlife through the website and social media pages, to help share exciting information and help people understand and love the natural world.

Forests and bats have always captivated me and to learn more about their relationship and the ever impending need to protect them, motivates me, and most importantly inspires me to help make a positive change to help. I am sure the symposium did the same for all other delegates and speakers who attended and the ripples of information taken away from it will help inspire and benefit bat and woodland conservation going forward.

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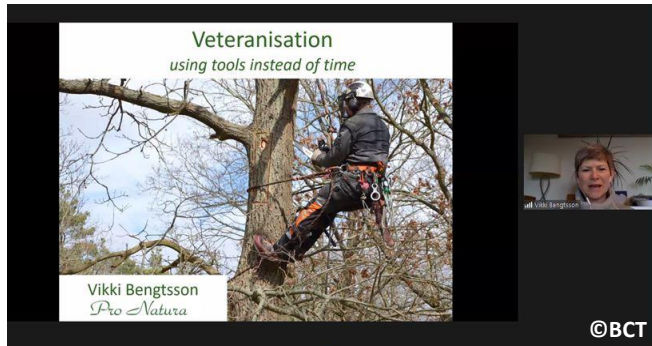


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Veteranisation – accelerating decay in oak trees

Ella Browning – PhD student (University College London & Institute of Zoology, ZSL)

A summary of Vikki Bengtsson's talk - *Veteranisation – using tools instead of time*



Vikki Bengtsson's talk on Veteranisation

Throughout Europe loss of ancient woodland is considered a key cause of species diversity loss. Ancient woodlands contain old, decaying and dying trees, dead wood, and varied canopies. These features make old-growth forests biodiversity hotspots, providing a wide range of microclimates and microhabitats for fungi, insects, birds, mammals and many

other taxa. Bat diversity is typically higher in old-growth forests than young or managed woodland due to higher availability of roosts and greater insect diversity.

Ancient trees in themselves are considered biodiversity hotspots and oak trees in particular are keystone species¹. Oak trees are long lived species, reaching ages of 400- 1000 years in ideal conditions. In Sweden, for instance, oak trees are associated with around 1800 species. Over time (150 – 200 years) microhabitats form in oak trees due to natural wear and tear. Hollows form with wood mould, the bark becomes coarse in structure and decaying wood is present at different stages. Hundreds of insects and fungi are dependent on ancient oak trees and in-turn these species develop habitats in oak trees that are used by larger taxa such as owls, mice and bats.

Ancient oak trees are now rare in the landscape. The important microhabitat hosted by these ancient trees take centuries to form and cannot be rapidly restored.

Millenia of human activity through agriculture, industrialisation and urbanisation has resulted in the felling of ancient woodland and trees in much of northern and western Europe. Plantation forests (for timber) have replaced much native woodland, but these are heavily managed to maximise yield using practises such as canopy thinning and removal of dead wood. These actions mean that plantation woodlands are usually poor habitats for woodland specialist species.

New woodlands are being created to combat climate change and biodiversity loss. However, it will take centuries for the microhabitats that are essential for woodland specialist taxa to form. In order to improve new-growth woodland for biodiversity, practices are being developed that aim to mimic natural processes and speed up the creation of important microhabitats.

Veteranisation is one such practise. It involves damaging younger trees (< 120 years) to speed up the decay process and produce microhabitats found in older trees (>200 years)^{2,3}. Naturally trees suffer damage to their bark from large mammal activity, such as horses or

bears, breaks and tears to branches are caused by storms or lightning strikes, and holes in the trunk created by woodpeckers.

The effectiveness of this practice for oak trees is currently being tested through a long-term, international collaborative project in England, Sweden and Norway³. Previously, short-term, trials have been conducted on oak trees in Italy and the USA, however, these didn't include the oak species *Quercus petraea* or *Quercus robur*, which are found in England, Sweden and Norway³.

At 20 sites throughout England, Sweden and Norway veteranisation of 700 50-100-year-old oak trees was carried out between 2011 and 2012^{2,3}. Trees were selected based on strict criteria:

- ✓ Trees under 120 years.
- ✓ A trunk diameter of 25- 60 cm.
- ✓ The tree is in a site that contains many young trees and might otherwise be removed to prevent over-crowding.
- ✗ Trees that already have developed habitat for species reliant on wood decay.
- ✗ Trees in parks or towns where safety could be threatened.

Five different treatments were applied to the selected trees:

Treatment 1: Creating a nest box by cutting a rectangular hole in the trunk and putting part of the extracted wood back, leaving a hollow behind.

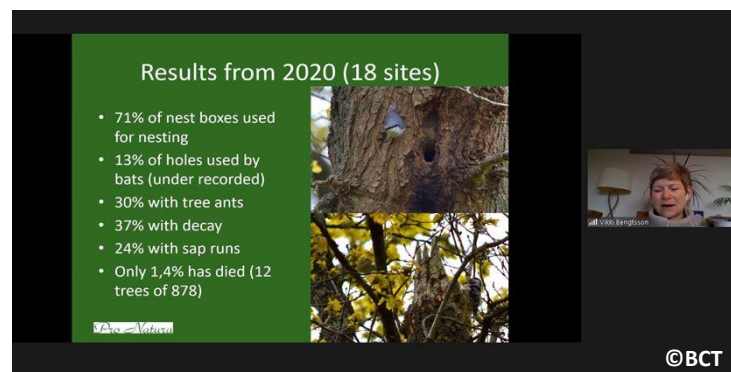
Treatment 2: Sawing woodpecker holes into the trunk, creating oval openings.

Treatment 3: Simulating horse damage to the bottom of the trunk and roots by removing bark.

Treatment 4: Breaking off a branch so that it rips and looks as if it's a natural fracture.

Treatment 5: Removing some of the bark and living tissue from a branch.

Although veteranisation is hoped to speed up the creation of ancient tree features, the effects of these treatments will still take many years to show². The progress of the project will be monitored for 25 years from the start date and veteranised trees will be compared to control trees³.



Results from 2020 (18 sites)

If successful, the practise of veteranisation will be a valuable conservation tool in sites where ancient trees are scarce and nature needs a helping hand to develop habitats. This is essential for the recovery of many threatened woodland specialist species, from fungi, to insects to bats.

References

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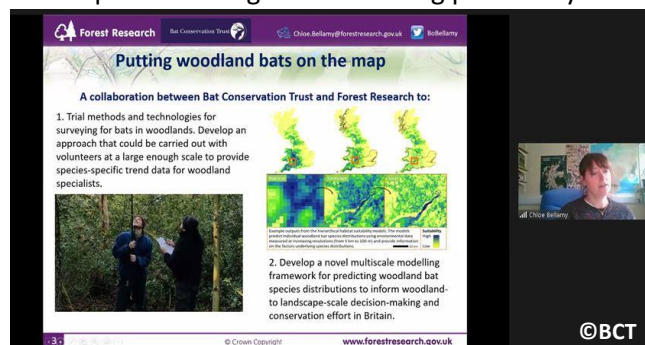
Woodland Symposium 2020

Where to start...Woodland Symposium 2020 was a two days of full emersion in the world of bat conservation in woodlands, surrounded by researchers, enthusiasts, bat specialist, ecologists, students and many more. While the Woodland Symposium 2020 was held virtually it did not miss anything that a face-to face event would have had. It had excellent diverse talks, panel discussions and networking sessions.

Day one was launched by Dr. Carol William, director of conservation at the BCT, with an overview of the priorities from the last Woodland Symposium held in 2014. What struck me is that the priorities discussed in 2014 are very much current after six years in 2020.

The day progressed with an array of interesting talks. We learned about survey methods for woodlands bats, improving acoustic lures; a new online resource '*the woodland wildlife toolkit*' which has great potential for conservation management. We also learned how habitat suitability models can be used to inform targeted actions; Dr. Chloe Bellamy and colleagues from Forest Research developed an easily- implemented framework for multi-level habitat suitability models.

Sonia Reveley, Woodland officer at BCT, gave us a snapshot of the ground-breaking pilot study of BCT and Forestry England; a great effort to help protect woodland bats using a novel cost-effective approach. Through the use of static acoustic detectors, audiomoths, and cutting-edge AI sound identification tools they monitored bats in woodlands in the South West which yielded over a million of bat calls recordings.



Chloe Bellamy's Habitat Suitability model talk

The day did not just include talks/presentations but also very exciting panel discussions. During the 'Working in collaboration' panel discussion, we learned about the 'Back from the Brink project', a great collaboration between different organisations across the UK with a common purpose to save 20 species from extinction.

What stood out the most for me of the first day was during the 'Drivers of change' panel discussion, an ecologist proposed that we should form the "Ecologist Anonymous" where we discuss the failures of our works. Although he clearly said it as a joke, there is a hint of truth in it... Failures are as important as successes! Especially in our line of work, we shouldn't try to hide them, but embrace them and be transparent about them without shame. How else are we ever going to learn what works and what doesn't in ecology if no one speaks up? We will continue making the same mistakes over and over again!



Drivers of change panellists

As John Dewey beautifully put it *“Failure is instructive. The person who really thinks learns quite as much as from his failures as from his successes”*

Day two started with a great presentation by Ash Murray, sharing details of the Swanton Novers project to explore how forestry management affects how bats use our woodlands. The day continued by exploring the latest research in bat conservation in woodlands. From veteranisation to woodland plants, to effects of forest management such as thinning, on woodland bats and their insect prey.

We then delved into a very hot topic about climate change and bats, where Dr. Orly Razgour from the University of Exeter, gave a very interesting and insightful talk on the impacts of climate change on woodland bats which was followed by a vivid and stimulating conversation at the ‘Climate Change and Conservation’ panel discussion with the rest of the panellists (Dr Orly Razgour, Prof Danilo Russo, Dr Olly Watts and Simon Duffield).



Climate Change panellists

A take home message from this session was that a multi-interdisciplinary approach is needed to tackle climate change, we need people looking at it from a different perspective. And as Simon Duffield, from Natural England, said we are in a

period of change management; we should move to an era of reshaping not so much recovering as it was done in the past.

By the end of the Woodland Symposium 2020, the atmosphere was filled with optimism and hope, so many people from different disciplines working together for a common goal! Protect, conserve and enhance woodlands and bats!

Penelope Fialas

Bat Symposium 2020: Past, Present and Future

Managed Woodlands

Forests are an integral part of life providing ecosystem services such as shelter, food and material use as well as navigational landmarking. In today's world of anthropogenic uses, remote sensing and GIS (global information system) modelling have been able to supply predictions through evaluating data over the past 5 decades of woodland changes. Modern technology additionally provides improved harvesting equipment which provides efficiency and ensures safety in working within the forestry industry. Furthermore, there is an increase in monitoring and planting efficiency via use of drone technology which are extremely useful for difficult to access areas.

Studies have shown that there are varied effects on inhabitants of forests and woodlands under management schemes. Some areas have shown positive results with an increase in populations of flora and fauna flourishing where previously there were fewer numbers and less diverse. Coppicing of some areas have shown reduction in bats travelling to locations where perhaps they are foraging or looking to reproduce when compared to denser understories within woodlands. This could be due to better protection for the bats when flying through dense understory as well as potentially warmer areas as a compacted area of foliage can withhold or even maintain a steady temperature within that environment. On the other hand, there have been some incidences where changes to the woodland structure has resulted in the dispersal of some species: bats for instance which had been roosting in a particular area for a long time had suddenly left their roost. It was found that by removing the holly which was situated within the undergrowth of the canopy actually was responsible as the holly acted as a temperature buffer and kept the roost at a constant temperature. When the holly was removed it resulted in the roost temperature dropping and so the bats left to find a warmer location.

The Present

Bat populations in the UK are continuing to recover and stabilize due to the actions of conservationists and legislation which have been formed to protect bat species and ancient woodlands. Some species of bat are niche specific such as the Natterer's, Brandt's and Barbastelle bats which all prefer woodland habitats and therefore are some of the rarer species of UK bats. Urbanisation on the other hand has been effective in supporting the roosting behaviours of bat species as some are commonly found in church rafters, barns, lofts and even disused bomb shelters. Additionally, keen wildlife friendly people have also enabled population growths of bats by installing bat boxes within their facilities.

Habitat Suitability models have been created as a way to identify the most preferred areas that certain species of bats are located. These are calculated through climate and landscape comparisons and then analysed against recordings of bat population ranges, roosting and foraging levels to gain an approximate idea of bat distributions across varied habitats in the UK. This process will enable future plans on forest recovery that we know will support the bat populations in time.

Veteranisation is a relatively new system where young trees are damaged in a variety of ways to speed up the process of healing thus creating some naturalistic pockets within the tree. Some sections within the trees are deliberately cut to specific sizes and shapes to assimilate woodpecker holes, storm damage and crevices for bats to fit inside. A study from 2012 to 2020 showed that a variety of species including invertebrates, small rodents and nesting birds had been utilising these spaces and the trees themselves were successfully healing and growing after the damage had been done. This implies that this method is a successful way to encourage population growth across a multitude of species.

The future

Climate change is a factor that is a continuous occurrence throughout time on earth. Glacial changes have been witnessed throughout 7 stages in time within the last 650,000 years and the globe is currently warming up further due to human activities. The earth's temperature has risen by 8 degrees over the past 135 years. Flora, such as ferns, have been around for over 140 million years which suggests when it comes to changes in climate, some species are able to adapt to survive. Fauna too have found ways to cope with changes as it can be seen across the world one particular species of animal can be found in a hot country and has genetic and physical adaptations to cope with the hot climate and its relative has done the same in a very cold climate. Bats are no exception to this rule as they have adapted by becoming frugivores or insectivores to suit a particular environment. Their size also varies depending upon their diet and climate. There are even some bats that are migratory including the Nathusius' pipistrelle which travels to and from the UK across countries in Northern Europe. It is theorised that the migratory patterns of any species are based upon the changes in the climate which alert the biological compass within these types of species.

With this information, it has been predicted that over the next century there will be a dispersal of bat species emigrating from the southern continent and migrating north into the UK. What this means for our native bats is currently unknown due to most bats in the Southern Continent being familiar with migration patterns, whereas native UK species are not. Therefore, would our species choose to move to an area of cooler climate or will they be forced to adapt? In this instance they will face competition with the invasive bats for food, shelter and space, thus resulting in a decline of our native species. However, if planned ahead, the species of southern trees that contain the right ecosystem services could then support these migratory bats, allowing our natives to remain safely within their habitats. Unless of course our woodlands face the threat of climate change and begin to falter, thus resulting in our natives to locate more suitable accommodations to support their feeding, reproductive and living needs. Further investigation will need to clarify the severity of these risks to our native bats in a theoretical study comparing behaviours of bats that would be predicted to migrate to the UK to the behaviours of the UK species of bats.

Additionally, the introduction of new species of trees could disrupt the status of our native tree species. It has been seen in the past decade where ash dieback has impacted roughly 80% of our ash tree populations. This is a disease that came across from Asia in 2012 and has spread across most of the country, including Northern Ireland. The disease itself is simply spread by the wind or movement of infected plants transporting fungal spores across the country. To prevent a repetition of this with any other type of disease risk, there needs to be a system of transporting flora which is not contaminated to ensure the successfulness of their growth and the safety of our natives. These select species of flora can then be utilized to build up and support ecosystems as well as assist in the recovery of diminishing woodlands.

Urbanisation is an expanding process which is encroaching on the natural populace. Currently there are developments which are implementing as much flora input as they can to balance out the impact of destruction through industrial growth. These are especially seen in housing developments such as Red Row who ensure they create natural open spaces, green corridors, install hedgehog highways, bird boxes, bee hives and suitable pollinating plants.

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