Natural England Commissioned Report NECR225b

The role of trees outside woodlands in providing habitat and ecological networks for saproxylic invertebrates

Supplement to
Part 1 Designing a field study to test initial hypotheses

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Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

Background

This work was commissioned as a preparatory phase to explore options to design and plan a practical research study which answers the question: what is the role of trees outside woodlands in providing habitat and ecological networks? In order to help increase our knowledge of the role of non-woodland trees to providing landscape connectivity.

It reviews and summarises what is known about the underlying biology of the veteran tree ecosystem, the biogeography of trees in the English landscape, and the various techniques which have been developed to study the saproxylic invertebrate fauna associated with those veteran trees. A rationale is developed for targeting the proposed study at the heartwood-decay fauna of oak using transparent cross-vane window flight-interception traps.

There are three parts to the study:

- Part 1: Designing a field study to test initial hypotheses (NECR225a)
- Supplement to Part 1 (NECR225b)
- Part 2: Supplementary literature review and other notes (NECR225c)

Part 2 was funded by the Woodland Trust.

The work makes recommendations for a suitable design for the proposed study, based on a standardised sampling protocol. Four locations are identified as possible sites for field-testing the protocol, but significant shortfalls in our current knowledge of the local treescapes have been identified, and it is clear that further baseline tree survey is needed before the fully developed study can begin.

In the meantime, a field trial will be considered at one or more of the four identified study sites, possibly using combinations of site staff, the biological recording community and/or students to provide logistical support.

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Further information
This report can be downloaded from the Natural England website: **www.gov.uk/government/organisations/natural-england**. For information on Natural England publications contact the Natural England Enquiry Service on 0300 060 3900 or e-mail **enquiries@naturalengland.org.uk**.

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Background

The tree survey data for Stowe and Wimpole have largely been completed in readiness for the second and agreed final study design to be implemented, using under-spend funds from the 2014-15 budget year. Further tree survey at Knepp was also planned but was delayed. This supplement reports on surveys carried out over selected farmland areas of the Knepp Castle Estate over 28th and 29th April 2015.

The original visit to Knepp was focused on gaining tree data for the first study design plan and so searched specifically – and only - for the required twenty hollowing oak trees. The adopted design plan however requires knowledge of the density of such trees across the landscape and the distances between them.

Methods

Two days were spent exploring the estate on foot, following as many of the hedge lines as possible and inspecting those trees as well as any field trees that were encountered. The land was explored systematically but rapidly, to ensure that as much ground was covered as possible in the time available and that few trees were missed. The survey covered most of the farmland to the south of the River Adur.

Results

Tree survey was achieved across all of this southern part of the estate excepting only sections at the outer margins, west of Shipley village and between Bentons Place Farm and Tory Copse. A large number of trees were identified and mapped where cavities are visible and where heartwood hollowing is occurring at least at a small scale; many of these trees appear more suitable for trapping than those identified in November 2014 and it is recommended that some adjustments are made to the selection.

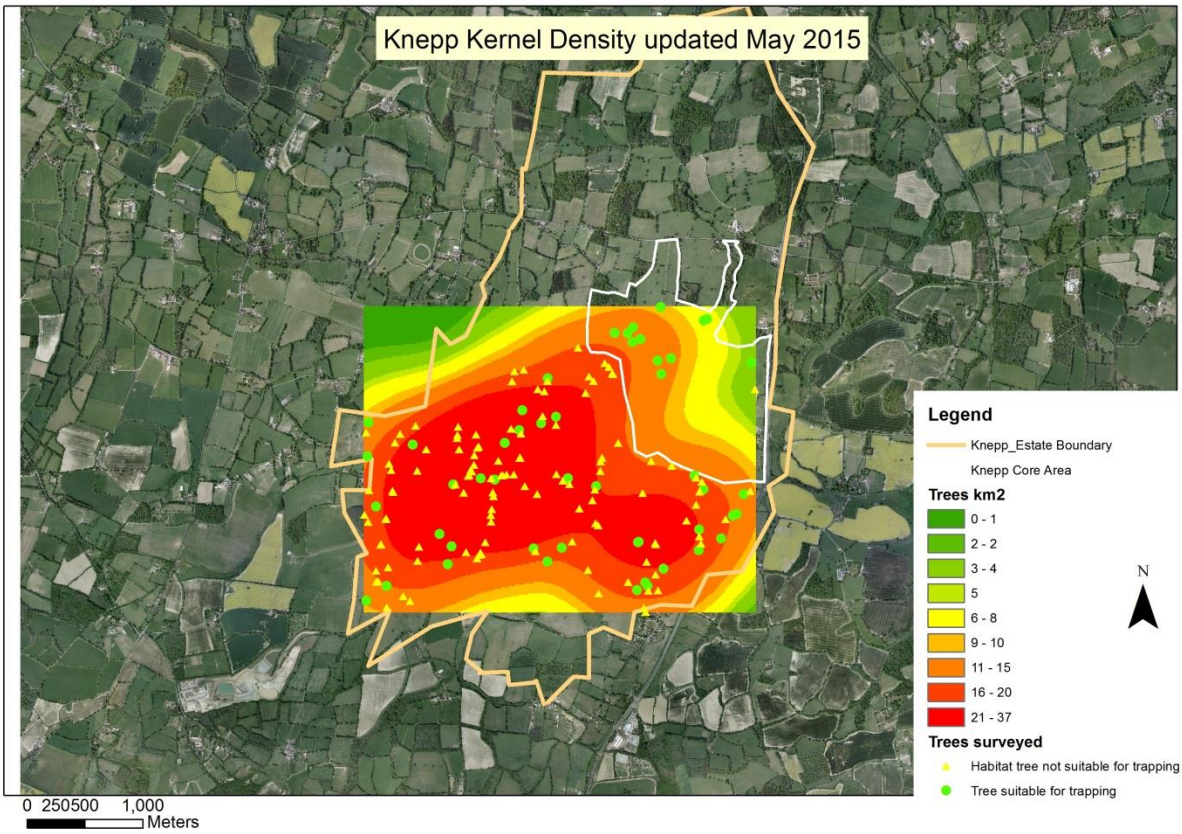
One very significant discovery made has been the presence of a thin scatter of ancient oak pollards across the landscape – none had been found during the first exploration, largely as none featured on the Ancient Tree Inventory record at that time. The largest ancient oak pollard on the estate lies by Church Farm South, with a girth of 7.3m. All other pollard oaks found have girths in the range of 3.65 to 4.6m. These pollards are especially significant as they demonstrate the presence of an older cohort of oak trees and hence greater ecological continuity of saproxylic habitat. Some of the pollards are obviously hollow and provide some of the highest quality wood decay habitats on the estate. Advanced red-rot decay of heartwood is apparent in a number of these trees, making them ideal subjects for the vane trapping study.

Analyses of tree data from Knepp following further field work in April 2015

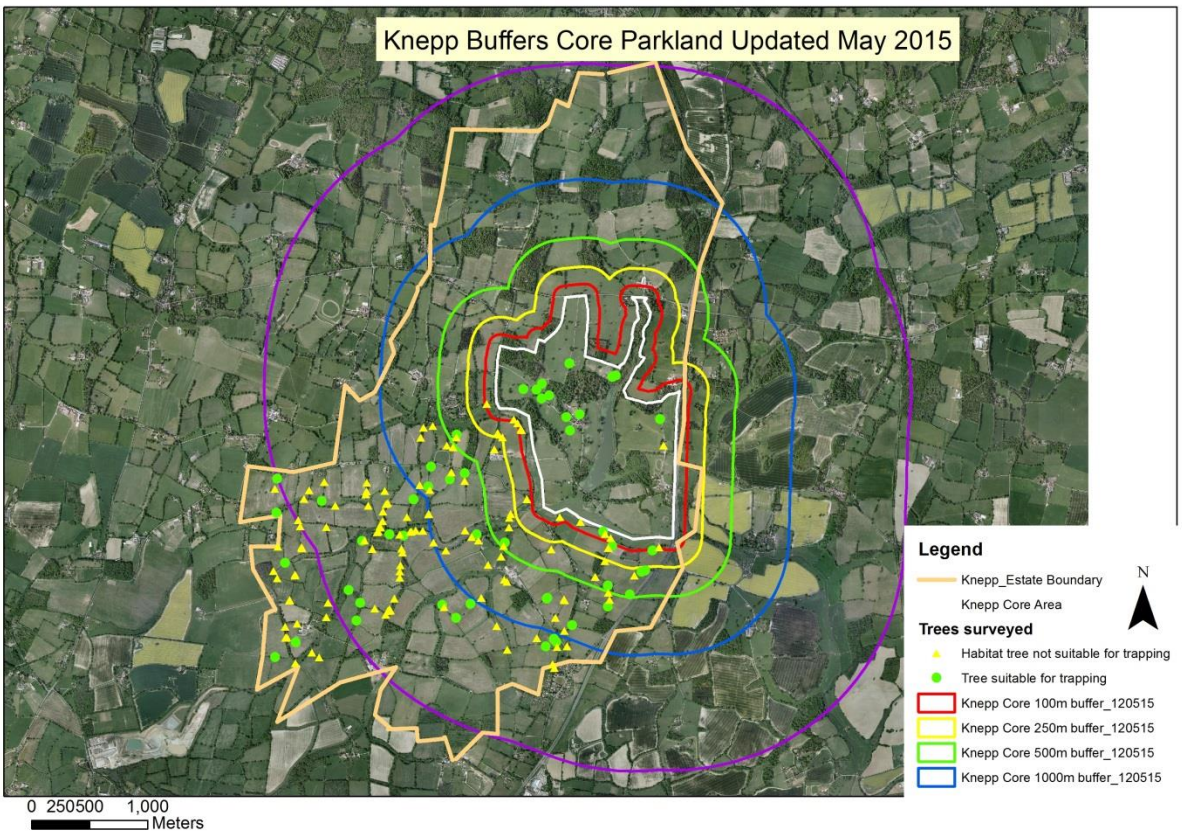
MAPS – KNEPP

1) Kernel Density map. This map shows that there is virtually complete connectivity in the landscape where the surveys have taken place at a scale of 1000m between the trees. The green dots are trees with habitat suitable for trapping and the yellow triangles are trees with habitat but not suitable for trapping. The redder the colour the greater the density of trees. The white boundary indicates the historic park which has been extended for the purposes of

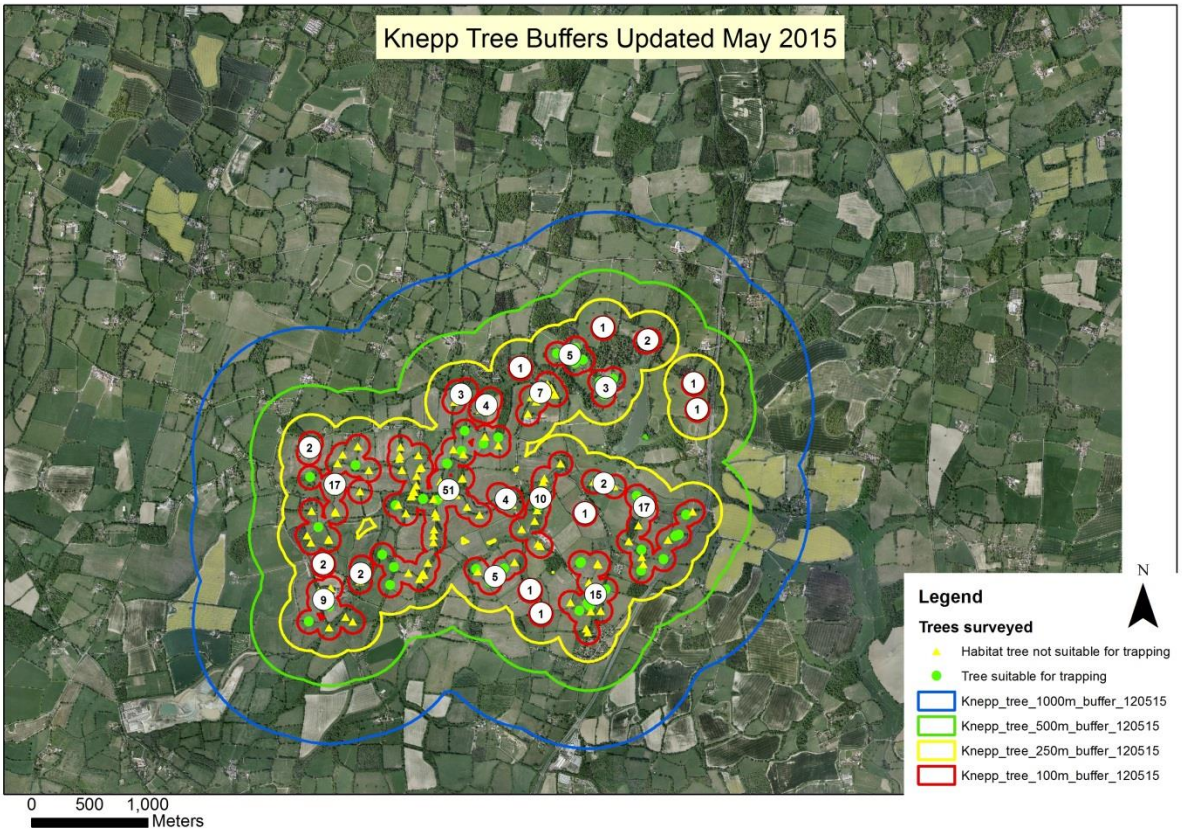
this project to highlight the core area of the park in an ecological sense. Knepp provides the potential for being a good site due to the consistency of trees across the landscape. It may however be difficult to tease out the cause and effect in terms of clustering.



2) Buffer from core parkland – This map shows the zones out from the core parkland and where the trees are located up to a distance of 2km from the edge of the parkland boundary. It would be important to be sure that all the suitable habitat trees have been identified within this 2km boundary. According to the updated survey work, carried out in April 2015, there are 13 habitat trees in the core parkland, 11 in the area 100m out, 6 in the 100 – 250m ring, an additional 16 in the 250-500m ring and 36 trees in the 500m to 1000m ring, there are a further 61 in the outermost ring and 24 outside of the 2000m ring. This suggests that the landscape around Knepp has as many trees as in the core area, although the core area needs further survey to be sure of this fact. The site probably provides the opportunity to study trees in the parkland compared with an agricultural landscape pretty rich in trees and which is in contrast to Stowe and Wimpole. Further field work is likely necessary to be fully clear regarding cause and effect in this area.



3) Tree buffers – this map shows buffers that are joined together based on the clustering of the trees. The numbers on the map indicate the number of suitable habitat trees within the "sites" created using the 100m radius buffer, which means these trees are not more than 200m from one another within these clusters. It is interesting to see that there is a large cluster with more than 50 trees which is southwest of the core parkland. This provides at least two key "core areas". The buffer which was created using a radius of 500m (i.e. two trees can be up to 1000m from on another) contains all of the trees surveyed including the additional trees in April 2015, apart from 2. Once again this map shows where the trees suitable for trapping are as well as the other trees with habitat. This map shows more clearly where there are individual trees and clusters with varying gradients.



4) This final map shows where the trees are distributed in relation to the land ownership. The map also highlights (in orange) those areas that have not been surveyed.