

How diverse is the flora in old woods in Heartwood Forest?

Alla Mashanova, Agneta Burton and Ian Denholm

Heartwood Forest is a 347 hectare site owned and managed by the Woodland Trust. Old woodlands in Heartwood Forest formed the foundation for the planting scheme so that the new forest would link and extend the existing woodlands. They are expected to be the source of woodland species for colonising the new forest. Therefore, it is important to keep them in good condition. Traditionally, woodlands of this kind were managed as coppices, but this management has been largely abandoned in the last few decades leading to the closed canopy restricting the light reaching the ground and limiting the diversity of the ground flora. This has been happening in many woods for many decades, but it has started to be reversed with the reintroduction of coppicing for conservation purposes.

Woodland diversity is also affected by the size of the wood, as the larger the wood, the more species it can support (Dony & Denholm, 1985). Also, it can be expected that large open woods would support more ground flora species than small dark woods. At Heartwood Forest, Langley and Pudler's are the two large woods. Pudler's is a bit more open due to a larger proportion of maiden (uncoppiced) trees in some parts and gaps due to Ash trees killed by Ash dieback disease. Pismire Spring and Round Wood are small and both had a closed canopy until winter 2021-22 when part of Round Wood was coppiced as a trial (Wright *et al.* 2022). Another part of Round Wood was coppiced in winter 2023-24. Therefore, one can expect that Pismire Spring might have the lowest diversity and that Langley might have fewer species compared to Pudler's.

To assess the diversity of the woods compared to other woods, we used the Dony & Denholm (1985) study where they developed a model to estimate the expected number of species based on wood size for woods in Bedfordshire. We estimated the area of the woods using Google Maps measuring tool and calculated the predicted number of species using the equation $\text{Log}(N \text{ of species}) = 1.704 + 0.31 \times \text{Log}(\text{area})$ suggested as the best fit by Dony & Denholm (1985) (Table 1). The numbers of observed species came from the Heartwood Monitoring Group (Flora) regular surveys; a short visit during the BSBI meeting at Heartwood Forest in June 2022 and additional surveys by AM during 2016-24. A more detailed survey

of Round Wood in early August 2023 focussed on potential changes following coppicing.

Table 1. Expected and observed number of flora species in old woods in Heartwood Forest.

Wood	Area (ha)	Expected N	Observed N	% of expected
Pudler's	8.15	97	68	70
Langley	7.03	93	61	66
Pismire	2.58	68	54	80
Round	2.13	64	87	136

As expected, the number of species in Pudler's (68) was larger than in Langley (61) although the percentage of the expected number was similar (70% and 66%). As expected, Pismire Spring had fewer species (54) but the percentage of the expected number (80%) was higher than in Langley and Pudler's. In all three woods, the diversity was lower than expected for the woods of this size in Bedfordshire. The diversity in Round Wood with 87 species, however, exceeded the expected number of species. To emphasise the effect of coppicing, we compared the recently coppiced areas ("new") (Photo 1) with the area not coppiced in recent times ("old") and found that 31 species occurred in both areas, 10 only in the old part and 46 only in the recently coppiced area (Table 2).

Overall, 127 species including 28 Ancient Woodland Indicators (AWI) were recorded in the woods. The AWI



Photo 1. Recent coppice management in Round Wood, April 2024 (photo A. Mashanova).

Table 2. Species composition of old woods in Heartwood Forest. Ancient Woodland Indicator species (AWI) are marked with an asterisk *. 1 Present as saplings. For Round Wood, it is stated whether the species was found in the "old" part, "new" (recently coppiced) part or in both.

Latin name	English name	Langley Wood	Pismire Spring	Pudler's/Well Wood	Round Wood	Frequency
<i>Acer campestre</i> *	Field Maple	y	y	y	both	1
<i>Aesculus hippocastanum</i>	Horse-chestnut	y				0.25
<i>Agrostis stolonifera</i>	Creeping Bent				new	0.25
<i>Ajuga reptans</i> *	Bugle	y		y	new	0.75
<i>Alliaria petiolata</i>	Garlic Mustard	y	y	y	new	1
<i>Anemone nemorosa</i> *	Wood Anemone	y		y	both	0.75
<i>Anthriscus sylvestris</i>	Cow Parsley	y	y	y	both	1
<i>Arctium minus</i> agg.	Lesser Burdock		y	y		0.5
<i>Arrhenatherum elatius</i>	False Oat-grass				new	0.25
<i>Arum maculatum</i>	Lords-and-Ladies	y	y	y	both	1
<i>Betula pendula/pubescens</i> /x <i>aurata</i>	Birch			y	both	0.5
<i>Brachypodium sylvaticum</i>	False Brome	y				0.25
<i>Buddleja davidii</i>	Butterfly Bush				new	0.25
<i>Carex sylvatica</i> *	Wood Sedge	y				0.25
<i>Carpinus betulus</i> *	Hornbeam	y	y	y	both	1
<i>Cerastium fontanum</i>	Common Mouse-ear				new	0.25
<i>Chaerophyllum temulum</i>	Rough Chervil				new	0.25
<i>Chamerion angustifolium</i>	Rosebay Willowherb			y	new	0.5
<i>Circaea lutetiana</i> *	Enchanter's Nightshade			y		0.25
<i>Cirsium arvense</i>	Creeping Thistle	y			new	0.5
<i>Cirsium vulgare</i>	Spear Thistle				new	0.25
<i>Clematis vitalba</i>	Traveller's Joy		y	y		0.5
<i>Conopodium majus</i> *	Pignut	y	y			0.5
<i>Cornus sanguinea</i> subsp. <i>sanguinea</i>	Dogwood		y			0.25
<i>Corylus avellana</i> *	Hazel	y	y	y	both	1
<i>Crataegus monogyna</i>	Hawthorn	y	y	y	both	1
<i>Crepis capillaris</i>	Smooth Hawksbeard				new	0.25
<i>Dactylis glomerata</i>	Cocksfoot			y	new	0.5
<i>Daucus carota</i>	Wild Carrot				new	0.25
<i>Digitalis purpurea</i> *	Foxglove			y	new	0.5
<i>Dryopteris dilatata</i> *	Broad Buckler Fern	y	y	y	both	1
<i>Dryopteris filix-mas</i>	Male Fern	y		y	both	0.75
<i>Epilobium ciliatum</i>	American Willowherb				new	0.25
<i>Epilobium montanum</i>	Broad-leaved Willowherb				new	0.25
<i>Epilobium tetragonum</i>	Square-stemmed Willowherb				new	0.25
<i>Euonymus europaeus</i>	Spindle		y		old	0.5
<i>Fallopia convolvulus</i>	Black Bindweed				new	0.25
<i>Festuca rubra</i> agg.	Red Fescue				new	0.25
<i>Ficaria verna</i>	Lesser Celandine	y	y	y	both	1
<i>Fraxinus excelsior</i>	Ash	y	y	y	both	1
<i>Galeopsis tetrahit</i>	Common Hemp-nettle				new	0.25
<i>Galium album</i>	Hedge Bedstraw				new	0.25
<i>Galium aparine</i>	Cleavers	y	y	y	both	1

Latin name	English name	Langley Wood	Pismire Spring	Pudler's/ Well Wood	Round Wood	Frequency
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill				new	0.25
<i>Geum urbanum</i>	Herb Bennet	y	y	y	both	1
<i>Glechoma hederacea</i>	Ground Ivy	y	y	y	old	1
<i>Hedera helix</i>	Ivy	y	y	y	both	1
<i>Heracleum sphondylium</i>	Hogweed	y	y	y		0.75
<i>Holcus lanatus</i>	Yogshire Fog				new	0.25
<i>Hyacinthoides non-scripta</i> *	Bluebell	y	y	y	both	1
<i>Hypericum perforatum</i>	Perforate St. John's Wort				new	0.25
<i>Hypochaeris radicata</i>	Cat's-ear				new	0.25
<i>Ilex aquifolium</i> *	Holly	y	y	y	both	1
<i>Juncus effusus</i>	Soft Rush				new	0.25
<i>Lamiastrum galeobdolon</i> ssp. <i>argentatum</i>	Yellow Archangel (cultivar)			y		0.25
<i>Lamiastrum galeobdolon</i> subsp. <i>montanum</i> *	Yellow Archangel	y	y	y	both	1
<i>Lamium album</i>	White Dead-nettle		y	y		0.5
<i>Lamium purpureum</i>	Red Dead-nettle	y				0.25
<i>Lolium perenne</i>	Perennial Ryegrass				new	0.25
<i>Lonicera periclymenum</i>	Honeysuckle	y	y	y	new	1
<i>Malus pumila</i>	Cultivated Apple				both	0.25
<i>Malus sylvestris</i> *	Crab Apple		y			0.25
<i>Melica uniflora</i> *	Wood Melick			y		0.25
<i>Mercurialis perennis</i> *	Dog's Mercury	y	y	y	both	1
<i>Moehringia trinervia</i> *	Three-nerved Sandwort	y	y	y	both	1
<i>Mycelis muralis</i>	Wall Lettuce	y				0.25
<i>Myosotis arvensis</i>	Field Forget-me-not		y		new	0.5
<i>Narcissus</i> agg.	Daffodil			y		0.25
<i>Orchis mascula</i> *	Early Purple Orchid				old	0.25
<i>Phleum bertolonii</i>	Smaller Cat's-tail			y		0.25
<i>Picea abies</i>	Norway Spruce	y	y	y		0.75
<i>Pilosella aurantiaca</i>	Fox-and-cubs				new	0.25
<i>Plantago lanceolata</i>	Ribwort Plantain				new	0.25
<i>Plantago major</i>	Greater Plantain			y		0.25
<i>Poa annua</i>	Annual Meadow-grass	y	y	y	new	1
<i>Poa trivialis</i>	Rough Meadow-grass	y	y	y	both	1
<i>Polygonum aviculare</i>	Knotgrass				new	0.25
<i>Populus tremula</i> *	Aspen	y				0.25
<i>Potentilla sterilis</i>	Barren Strawberry	y				0.25
<i>Prunella vulgaris</i>	Selfheal		y		new	0.5
<i>Prunus avium</i> *	Wild Cherry	y	y	y	both	1
<i>Prunus laurocerasus</i>	Cherry Laurel			y		0.25
<i>Prunus spinosa</i>	Blackthorn	y	y	y	both	1
<i>Pteridium aquilinum</i>	Bracken		y	y	old	0.75
<i>Quercus robur</i>	Pedunculate Oak	y	y	y	both	1
<i>Ranunculus acris</i>	Meadow Buttercup	y	y			0.5
<i>Ranunculus auricomus</i> *	Goldilocks Buttercup	y	y	y	old	1
<i>Ranunculus bulbosus</i>	Bulbous Buttercup				new	0.25
<i>Ranunculus repens</i>	Creeping Buttercup		y	y		0.5
<i>Ribes rubrum</i> *	Red Currant	y				0.25
<i>Ribes uva-crispa</i>	Gooseberry				old	0.25
<i>Rosa</i> agg.	Rose	y			new	0.5

Latin name	English name	Langley Wood	Pismire Spring	Pudler's/ Well Wood	Round Wood	Frequency
<i>Rosa arvensis</i> *	Field Rose	y		y		0.5
<i>Rubus fruticosus</i> agg.	Bramble	y	y	y	both	1
<i>Rubus idaeus</i>	Raspberry				both	0.25
<i>Rumex obtusifolius</i>	Broad-leaved Dock		y	y	new	0.75
<i>Rumex sanguineus</i>	Wood Dock	y	y	y	old	1
<i>Salix caprea/cinerea/x reichardii</i>	Willow				old	0.25
<i>Sambucus nigra</i>	Elder	y	y	y	both	1
<i>Scrophularia nodosa</i> *	Common Figwort			y	both	0.5
<i>Jacobaea vulgaris</i>	Common Ragwort				new	0.25
<i>Senecio vulgaris</i>	Groundsel			y	new	0.5
<i>Silene dioica</i>	Red Campion				new	0.25
<i>Silene latifolia</i>	White Campion				new	0.25
<i>Solanum dulcamara</i>	Bittersweet				new	0.25
<i>Sonchus oleraceus</i>	Smooth Sow-thistle				new	0.25
<i>Sorbus aucuparia</i>	Rowan	y		y	new	0.75
<i>Stachys sylvatica</i>	Hedge Woundwort		y	y	new	0.75
<i>Stellaria holostea</i>	Greater Stitchwort	y	y	y		0.75
<i>Stellaria media</i>	Common Chickweed	y	y	y		0.75
<i>Tamus communis</i>	Black Bryony		y			0.25
<i>Taraxacum</i> agg.	Dandelion	y	y	y	new	1
<i>Taxus baccata</i>	Yew	y				0.25
<i>Tilia platyphyllos</i>	Large-leaved Lime	y		y		0.5
<i>Trifolium pratense</i>	Red Clover			y		0.25
<i>Trifolium repens</i>	White Clover			y		0.25
<i>Ulmus glabra</i> *	Wych Elm		y			0.25
<i>Ulmus minor</i> agg.	Elm	y		y		0.5
<i>Urtica dioica</i> subsp. <i>dioica</i>	Stinging Nettle	y	y	y	both	1
<i>Veronica chamaedrys</i>	Germander Speedwell	y	y	y	both	1
<i>Veronica hederifolia</i>	Ivy-leaved Speedwell	y		y		0.5
<i>Veronica montana</i> *	Wood Speedwell	y		y		0.5
<i>Vicia sepium</i>	Bush Vetch			y		0.25
<i>Viola hirta</i>	Hairy Violet				old	0.25
<i>Viola odorata</i>	Sweet Violet	y				0.25
<i>Viola reichenbachiana</i> *	Early Dog-violet	y	y			0.5
<i>Viola riviniana</i> *	Common Dog-violet	y	y		old	0.75
Number of species		61	54	68	87	127

included 8 tree species: Field Maple *Acer campestre*, Hornbeam *Carpinus betulus*, Hazel *Corylus avellana*, Holly *Ilex aquifolium*, Wild Cherry *Prunus avium*, although only a dead tree in Pismire Spring in all woods; Wych Elm *Ulmus glabra* and Crab Apple *Malus sylvestris* in Pismire Spring, only and Aspen *Populus tremula* in Langley only; 2 shrub species: Red Currant *Ribes rubrum* in Langley and Field Rose *Rosa arvensis* in Pudler's; 1 fern: Broad Buckler Fern *Dryopteris dilatata* in all woods (Photo 3); and 15 ground flora species: Bluebell *Hyacinthoides non-scripta*, Yellow Archangel *Lamiastrum galeobdolon* subsp. *montanum*, Dog's Mercury *Mercurialis*

perennis, Three-nerved Sandwort *Moehringia trinervia*, Goldilocks Buttercup *Ranunculus auricomus* in all woods; Bugle *Ajuga reptans*, Wood Anemone *Anemone nemorosa*, Pignut *Conopodium majus*, Foxglove *Digitalis purpurea*, Common Figwort *Scrophularia nodosa*, Wood Speedwell *Veronica montana*, Early Dog Violet *Viola reichenbachiana*, Common Dog Violet *Viola riviniana* in 2 or 3 woods; Enchanter's-nightshade *Circaea lutetiana* in Pudler's and Early Purple Orchid *Orchis mascula* in Round Wood (Photo 2). Early Purple Orchid was first found in Round Wood in 2024 although it had been on the "wish list" (Wright *et al.* 2022).



Photo 2. Early Purple Orchid in Round Wood, April 2024 (photo A. Mashanova).

There was a noticeable number of hedge species like Rosebay Willowherb *Chamerion angustifolium*, White Dead-nettle *Lamium album*, Small Cat's-tail *Phleum bertolonii* and Hedge Woundwort *Stachys sylvatica* in wood margins, especially in the wide margin in Pudler's Wood which opened up due to Ash dieback. Coppicing in Round Wood gave an opportunity to a few "ruderal" species like Broad-leaved Willowherb *Epilobium montanum*, Square-stemmed Willowherb *Epilobium tetragonum*, Common Ragwort *Jacobaea vulgaris* and Smooth Sow-thistle *Sonchus oleraceus* to name a few but also encouraged "desirable" species like Bugle and Foxglove as well as Hedge Bedstraw *Galium album*, Ribwort Plantain *Plantago lanceolata* and Bulbous Buttercup *Ranunculus bulbosus* which are usually associated with woodland rides and gaps in the canopy and were not seen in other areas.

Langley Wood was marginally the least diverse wood for its size. The reason for this is probably because it is a very old Hornbeam and Lime coppice (Photo 4). Lime casts heavier shade than Hornbeam (Rodwell, 1991) making the wood floor even darker than in a Hornbeam coppice of similar age. This makes coppicing even more important for improving diversity in Langley. On the other hand, Pudler's Wood suffered from trampling more than Langley until recently when fences were put in place to steer visitors to the official paths. There is a hope that the floral diversity



Photo 3. Broad Buckler Fern and Bluebells in Pismire Spring Wood, May 2024 (photo A. Mashanova).

in Pudler's Wood might increase if this management measure works.

References

- Dony, J.G. and Denholm, I. (1985). Some quantitative methods of assessing the conservation value of ecologically similar sites. *Journal of Applied Ecology* **22**: 229-238.
- Rodwell, J.S. (1991). *British Plant Communities. Vol. 1. Woodlands and scrub.* Cambridge: Cambridge University Press.
- Wright, T. *et al.* (2022). Long-term monitoring at Heartwood Forest – 2022 update. *Hertfordshire Naturalist* **54**: 15-35.



Photo 4. Old coppiced Lime stool in Langley Wood, May 2024 (photo A. Mashanova).

Water Voles in the Lee Valley

Martin Ketcher

Abstract

Thirty-two 500 metre transects to survey for Water Voles *Arvicola amphibius* were carried out in the spring of 2022 on the River Lee catchment, from Ware to the Queen Elizabeth Olympic Park, a distance of about 31km. Twenty-two were repeat transects from a 2012 survey. The survey methodology is described and the results tabulated and discussed, including a comparison between the two survey years. A map of the whole area shows the distribution of the 32 transects. The survey found that the proportion of occupied sites in 2022 was very similar to that in 2012 but that some sites had lost the species, while others had gained Water Voles.

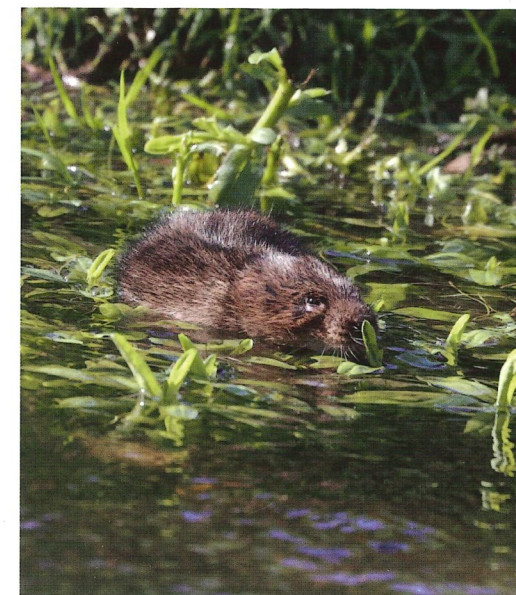
Introduction

The Lee Valley Regional Park Authority (LVRPA) commissioned the Hertfordshire and Middlesex Wildlife Trust (HMWT) to carry out a survey for Water Voles in the Park. Amanda Proud and Martin Ketcher were employed by HMWT as surveyors, although one site was surveyed by Cath Patrick and Dawn Richardson from the LVRPA. The surveys were undertaken in March and April 2022 with one site being surveyed at the end of February. The 2022 survey repeated 22 sites that were surveyed in 2012 by Graham White (White 2012) with an additional 10 new sites. As well as recording Water Vole signs, evidence of Otter *Lutra lutra*, Mink *Neovison vison* and Brown Rat *Rattus norvegicus* were noted. The habitat at each site was also recorded, a judgement made as to its suitability for Water Voles and management recommendations were made that could improve the site for Water Voles, all contained within a survey report (Ketcher 2022).

The methodology and results are considered below. This article is for the *Hertfordshire Naturalist* and the focus is on the northern sites, i.e. those outside the M25. A similar article for the *London Naturalist* focused on sites inside the M25. Inevitably, much of the content is identical in both articles.

Methodology

The survey was carried out according to the best practice guidance as set out in the 'Water Vole Conservation Handbook' (Strachan *et al* 2011) and



Water Vole at Tewinbury, October 2024 (photo Rose Newbold).

used the standard Water Vole Survey recording sheets modified for use in Hertfordshire.

The survey was carried out between February 28th and April 12th 2022. All but transect 1 (February 28th) were surveyed between March 21st and April 12th. This is the ideal time to survey for Water Voles as signs are at their easiest to see as they are less likely to be obscured by growth of vegetation.

The 32 transects were surveyed by walking the entire stretch surveying from one bank (sometimes two banks) and, where possible, by walking in the watercourse. Where access was not possible it was noted on the survey sheet. A 10-figure GPS reading was taken at the start and end of each survey section. The following signs were used to note the presence of Water Voles: a sighting, latrines, droppings (dropping piles not considered to be latrines), feeding signs, nests, holes in the bank, runs in the vegetation and footprints. Latrines, droppings and large extensive feeding signs were the only signs considered to be definitive for the presence of Water Voles. The number of latrines, droppings, feeding signs and holes were recorded.