

River Corridors – County BCA

Introduction

Rivers are key biodiversity assets, which play a crucial role supporting a wide variety of wildlife and act as an ecological corridor connecting otherwise fragmented landscapes. In cities, rivers connect isolated wildlife populations with their rural counterparts, making them a crucial player in urban biodiversity conservation ([Hack J, 2021](#)).

Freshwater features of notes in Norwich include the Yare and the Wensum River Valley and their associated ditches, ponds and remnant periglacial features.

A number of Priority Species are strongly associated with aquatic habitats along river and stream corridors. They include various fish species, White-clawed Crayfish (*Austropotamobius pallipes*), Water Vole (*Arvicola amphibius*), Otter (*Lutra lutra*) and Daubenton's bat (*Myotis daubentonii*).

The River Wensum is a chalk river which provides a green and blue link through the city of Norwich and meets the River Yare at Whitlingham. For the purposes of connectivity and context, the River Wensum component of the BCA starts at Hellesdon Bridge.

The River Yare rises south of Dereham to the west to the village of Shipdham. Its journey through the southern fringes of Norwich starts in Bowthorpe, and it is joined by the River Wensum at Whitlingham. In its lower reaches it is one of the principal navigable waterways of The Broads and connects with the rest of the network.

Around Norwich the wards of Bowthorpe, University, Eaton, Town Close, Lakenham and Thorpe Hamlet border the Yare.

River Corridors Biodiversity Character Area Boundary

The boundary of the River Corridors Biodiversity Character Area (BCA) in Norwich can be seen in Figure 1.

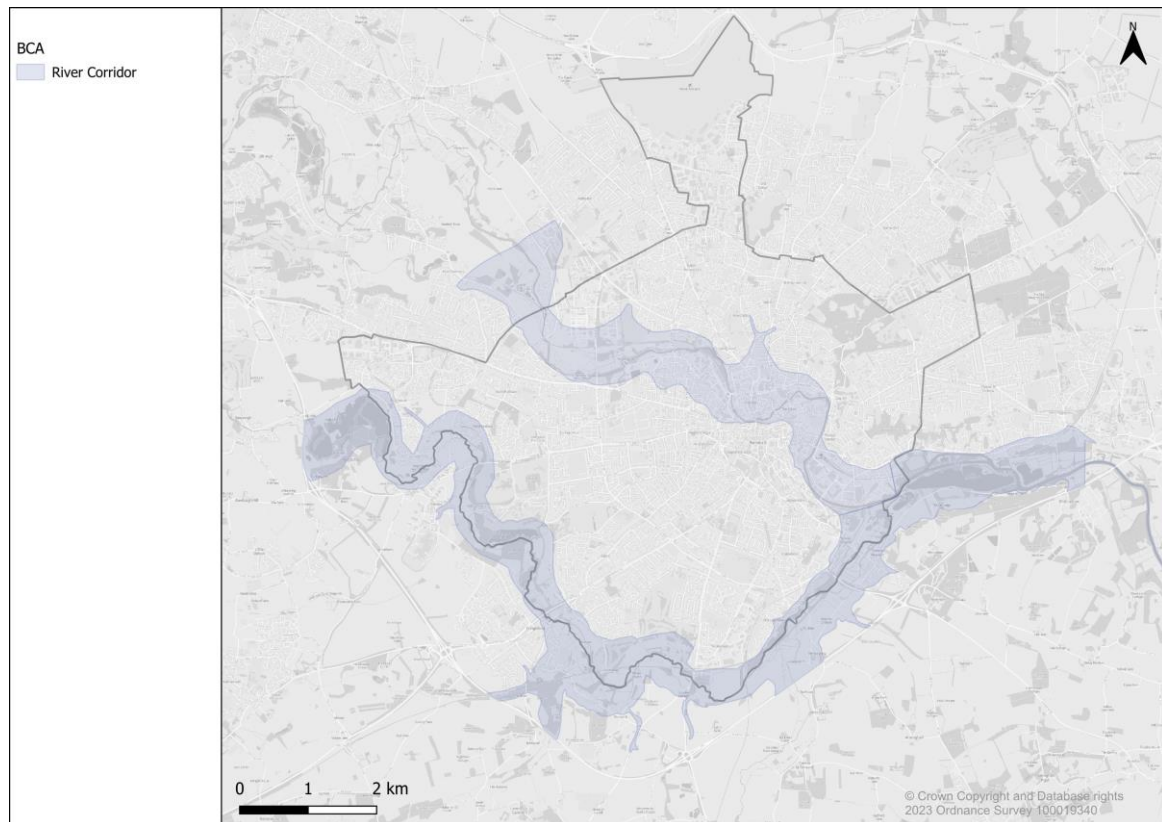


Figure 1. River Corridors BCA Boundaries.

Reasons for the BCA boundary

This BCA includes the floodplain/river valley, refined by the associated geology (alluvium and river terrace deposits) to determine the original river corridors.

Character Area name:	River Corridors
Main features	Chalk river; semi-natural floodplain grazing marsh; wet grassland; neutral grassland with flushes of acid grassland species/communities; elements of fen communities; amenity grassland; secondary woodland/wet woodland; urban with riverside trees; hedgerows.
Species diversity	4487* species have been recorded in this BCA. 569* of these species are designated as internationally, nationally, or locally important. *Species totals included records recorded to genus, species and sub species level
Indicative, characteristic and Priority species	<p>Indicative: White Clawed Crayfish (<i>Austropotamobius pallipes</i>), Desmoulins's Whorl Snail (<i>Vertigo moulinsiana</i>), Water Crowfoots (<i>Ranunculus sp</i>), Water Voles (<i>Arvicola amphibius</i>), Otter (<i>Lutra lutra</i>), Daubenton's Bat (<i>Myotis Daubentonii</i>), Norfolk Hawker (<i>Anaciaeschna isoceles</i>).</p> <p>Characteristic: Kingfisher (<i>Alcedo atthis</i>), Barn Owl (<i>Tyto alba</i>), Grey Heron (<i>Ardea cinerea</i>), Otter (<i>Lutra lutra</i>), Water Vole (<i>Arvicola amphibius</i>), European Eel (<i>Anguilla anguilla</i>) Pike (<i>Esox lucius</i>), Brown/Sea Trout (<i>Salmo trutta</i>), Bullhead (<i>Cottus gobio</i>), Common toad (<i>Bufo bufo</i>), Common Frog (<i>Rana temporaria</i>), Smooth Newt (<i>Lissotriton vulgaris</i>) Great Crested Newt (<i>Triturus cristatus</i>), Yellow Flag Iris (<i>Iris pseudacorus</i>), Flowering-rush (<i>Butomus umbellatus</i>), Marsh-arrow Grass (<i>Triglochin palustre</i>), Ragged Robin (<i>Silene flos-cuculi</i>), Bogbean (<i>Menyanthes trifoliata</i>), Marsh Cinquefoil (<i>Potentilla palustris</i>), Meadowsweet (<i>Filipendula ulmaria</i>), Marsh Orchids (<i>Dactylorhiza sp</i>), Cuckooflower (<i>Cardamine pratensis</i>), Common Reed (<i>Phragmites australis</i>), Bulrush (<i>Typha latifolia</i>), Hemp Agrimony (<i>Eupatorium cannabinum</i>), Gypsywort (<i>Lycopus europaeus</i>), Purple-loosestrife (<i>Lythrum salicaria</i>), Angelica (<i>Angelica sylvestris</i>), Bat species (<i>Chiroptera sp.</i>)</p> <p>Priority: White-clawed Crayfish (<i>Austropotamobius pallipes</i>), Water Vole (<i>Arvicola amphibius</i>), Otter (<i>Lutra lutra</i>), Daubenton's bat (<i>Myotis daubentonii</i>), Eel (<i>Anguilla anguilla</i>), Great Crested Newt (<i>Triturus</i></p>

Character Area name:**River Corridors**

cristatus), Norfolk hawk (*Anaciaeschna isosceles*), Bittern (*Botaurus stellaris*), Lapwing (*Vanellus vanellus*), Ramshorn Snail (*Anisus vorticulus*), Desmoulin's Whorl Snail (*Vertigo moulinsiana*)

The Yare is an important route for migratory species around Norwich, and one of the largest heronries in Norfolk is in Colney wood. Recent studies have identified at least ten bat species are present in this part of the Yare Valley, including four species of principal importance: Soprano pipistrelle (*Pipistrellus pygmaeus*); Brown long-eared (*Plecotus auritus*); Noctule (*Nyctalus noctula*) and Barbastelle (*Barbastella barbastellus*).

The Desmoulin's Whorl Snail has been noted as being present at Carrow Abbey Marsh (CWS 1455) however records for this species are over 10 years old and cannot be said to indicate general current presence. However, this species requires specialist survey, and so fewer or older records should not be entirely discounted.

The Rare and Scarce species lists include several molluscs (Ramshorn Snail (*Anisus vorticulus*), Slender Amber Snail (*Oxyloma sarsii*), Large-mouthed Valve Snail (*Valvata macrostoma*), The Shining Ram's-horn (*Segmentina nitida*), and Desmoulin's Whorl Snail (*Vertigo moulinsiana*)) which are particularly sensitive to changes in habitat condition including water pH, water temperature, and flow speed.

Axiophytes

Axiophyte species richness in the Wensum part of the BCA shows three distinct concentrations: the Sweetbriar Meadows area; the Train Wood area; and the area around Utilities Site, Cremorne Lane, The Deal Ground and Carrow Abbey Marsh, close to where the Wensum meets the Yare. The areas of high axiophyte species richness do not always align with where there are designated sites, suggesting there are areas of importance to biodiversity conservation outside of existing site designations. Maps of axiophyte species richness in the Yare part of the BCA show two distinct concentrations: in the

Character Area name:**River Corridors**

Bowthorpe Marsh to Earlham and Colney Marshes area, and around Marston Marshes. This highlights the conservation importance of marshland habitat, as it supports a high number of important plant species. These axiophyte-rich sites are well-managed and recorded in comparison to other similar grazing marsh/wet meadow sites.

Species richness

The highest species richness is found in the west of the Wensum part of the BCA, near Sweet Briar Meadows SSSI, Hellesdon Pastures, Mile Cross Meadows CWS and Marlpit Paddocks, plus the Train Wood (CWS) area. The southeast is also somewhat important, where the River Wensum joins the River Yare (Carrow Abbey Marsh and Trowse Meadows CWS).

The highest species richness of the Yare part of the BCA is broadly associated with designated sites such as the CWS around UEA, and Marston Marshes. Undesignated stretches in the Old Lakenham area were also shown to be species rich.

Invasive Non-native Species

Invasive non-native species present in the River Corridor BCA include Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*), Water fern (*Azolla filiculoides*), and Giant hogweed (*Heracleum mantegazzianum*) which can out-complete specialised axiophytes. Chinese Water Deer (*Hydropotes inermis*) and Muntjac Deer (*Muntiacus reevesi*) graze tree species, discouraging complex wooded habitats along the river. The lack of recent records of White-clawed crayfish (*Austropotamobius pallipes*) in the Wensum could be a results of crayfish plague which is transmitted by the invasive American signal crayfish (*Pacifastacus leniusculus*).

Key sites

River Wensum SSSI/SAC (only a very small fragment of the total designated area falls within the city boundary).

Wensum floodplains of Hellesdon to the

Broads: Hellesdon Mill Meadow CWS; Disused Railway Hellesdon CWS; Marlpit Paddocks CWS; Hellesdon Pastures CWS; Sweetbriar Road Meadows

Character Area name:

River Corridors

SSSI; Mile Cross Meadows CWS/Mile Cross Marsh LNR; Sloughbottom Park, Anderson's Meadow, Wensum Park; Train Wood CWS.

Woodlands buffer: Train Wood CWS; Sycamore Crescent Wood CWS/LNR, Woodlands Park CWS; Marlpit Woods.

River Yare (part CWS: River Yare (west and east), Bowthorpe).

Bawburgh/Colney Gravel Pits CWS; Bowthorpe Riverside (extension) CWS; Bowthorpe Southern Park; Bowthorpe Marsh CWS/LNR; Earlham and Colney Marshes CWS; The Heronry & Violet Grove CWS; UEA Marsh CWS; UEA Butterfly Meadow CWS; UEA Broad CWS; Bluebell Marsh CWS; Strawberry Field; Softley Drive Meadow CWS; Cringleford Meadow; Eaton Street Meadow CWS; Riding School Meadow CWS; Eaton Island CWS; Eaton Common CWS/LNR; Marston Marshes CWS/LNR; Harford Bridge Marshes CWS; Depot Meadow CWS; Coopers Wood; Sandy Lane; Old Lakenham Riverbank and Old Lakenham Meadow; Trowse Meadows CWS; Whitlingham LNR; Carrow Abbey Marsh CWS.

Woodlands buffer: Earlham Park Woods LNR/The Heronry & Violet Grove CWS; UEA woods; Softley Drive Meadow; other Bowthorpe and Yare marshes areas of woods; Danby Wood CWS/LNR; Coppers Wood; Sandy Lane.

Site Designations

1 Special Area of Conservation (SAC) (River Wensum).

2 Sites of Special Scientific Interest (SSSI) (River Wensum; Sweetbriar Road Meadows, Norwich).

8 Local Nature Reserves (LNR) (Wensum Valley (Mile Cross Marsh and Sycamore Crescent); Bowthorpe Marsh; Danby Wood; Earlham Park Woods; Eaton Common; Marston Marshes; Whitlingham Marsh, Whitlingham; Whitlingham).

37 County Wildlife Sites (CWS) (1445 – Bluebell Marsh; 1446 – The Heronry & Violet Grove; 1447 – UEA Marsh; 1448 – UEA Butterfly Meadow; 1449 – UEA Broad; 1450 – Bowthorpe Riverside (extension); 1451 – Earlham and Colney Marshes; 1452 – Marlpit Paddocks; 1453 – Disused Railway Hellesdon; 1454 – Hellesdon Mill Meadow; 1455 – Carrow Abbey Marsh; 1456 – Eaton Common; 1457 – Eaton Street

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Meadow; 1458 – Eaton Island; 1459 – Marston Marshes; 1465 – Hellesdon Pastures; 1466 – Mile Cross Meadows; 1467 – Train Wood; 199 – Meadow Farm Meadow; 200 – Intwood Carr; 2011 – Sycamore Crescent Wood; 2012 – Bowthorpe Marsh; 2014 – Danby Wood; 2138 – Carey’s Meadow; 2176 – Marriott’s Way; 2210 – Trowse Meadows; 2212 – Whitlingham Marsh; 2217 – Softley Drive Meadow; 2307 – Harford Bridge Marshes; 235 – Bawburgh/Colney Gravel Pits; 240 – River Yare (west and east), Bowthorpe; 243 – Land South of River Tud; 244 – Land South of River Tud; 246 – Red Bridge; 251 – Wensum Meadow; 273 – Depot Meadow; 276 – Riding School Meadow).

11 candidate County Geodiversity Sites (cCGS)

(Carrow Works; Slough Bottom; Wensum Meadows; Groundsman’s Pit; Easton Golf Course Pit; Bawburgh Gravel Pits; Colney Gravel Pits; Colney Meadows; Newfound Farm Pit; Keswick Mill Gravel Pit; Lafarge Gravel Pit).

1 Country Park (Whitlingham Country Park).

12 Conservation Areas (Bracondale; Bowthorpe; City Centre; Eaton; Earlham; Hellesdon; Old Lakenham; Sewell; St Matthews; Thorpe Ridge; Trowse Millgate; Thorpe; Thorpe Ridge).

Although designated portions of the River Wensum largely fall outside of the city boundaries, the Norwich portion of the river still supports a wide variety of species and habitats, as well as areas for nesting and spawning as an important chalk river. The river runs adjacent to several designated sites of importance for biodiversity and nature conservation, including Marlpit, Hellesdon Meadows and Train Wood CWS, and Andersons Meadow LNR. The River Yare is rich with CWS designations. It does not have international or national level designations (SACs or SSSIs) as the Wensum does, but, unlike the Wensum, sections of the river channel are designated as CWS.

Habitat diversity

Wensum Hellesdon to Sloughbottom Park: semi-natural floodplain grazing marsh; wet grassland; neutral grassland with flushes of acid grassland species/communities; elements of fen communities;

Character Area name:**River Corridors**

bounded by scattered broadleaved secondary woodland.

Wensum Sloughbottom Park to New Mills: amenity grassland/park on floodplain; secondary woodland/wet woodland.

New Mills to Whitlingham: urban with riverside trees; amenity grassland around Cow Tower to Pulls Ferry. Completely urban riverside apartments, leisure and industrial uses, with some riverside trees to Whitlingham Marshes, where semi-natural habitats reappear.

River Yare: Mostly semi-natural floodplain grazing marsh, wet grassland, neutral grassland with flushes of acid grassland species/communities, elements of fen communities and bounded by scattered broadleaved secondary woodland.

Key Priority Habitats

(including Broad Habitats that could contain Priority Habitat)

Coastal and Floodplain Grazing Marsh**Fen, Marsh and Swamp****Hedgerow or Field Margin****Lowland Mixed Deciduous Woodland****Semi-improved Grassland****Waterbodies****Biodiversity hotspots**

In the **River Wensum part** of the BCA, these are mostly located to the west of Norwich and include Marlpit Paddocks CWS, Hellesdon Pastures CWS and Meadows, Sweetbriar Road Meadows CWS, Mile Cross Meadows CWS, Sycamore Crescent CWS and Train Wood CWS.

To the east, there is a small pocket in Gas Hill; and Carrow Abbey Marsh/Whitlingham Country Park/LNR area.

In the **River Yare part** of the BCA, most of the river corridor can be classified for its high biodiversity value.

Consultation has highlighted that the Bawburgh-Colney lakes, woodlands and the associated grasslands and riverside meadows make that area perhaps the most important part of the middle Yare, in terms of landscape and habitat/species variety.

The marshes all score highly from Bowthorpe to Harford Bridge and at Whitlingham. However, the

Character Area name:	River Corridors
	scores between Harford Bridge and Trowse are markedly lower and reflect the fragmented and reduced extent of the marsh and wetland habitats along this section.
Geodiversity features of note	<p>Wensum meadows: natural depressions on valley floor, producing clusters of ponds and wet hollows, associated with periglacial activity in chalk.</p> <p>Sloughbottom: fluvial landforms/river terrace and archaeology.</p> <p>Carrow Works: river terrace and archaeology.</p> <p>Colney Meadows: Periglacial landform, producing cluster of ponds and wet hollows associated with periglacial activity.</p> <p>Bawburgh and Colney Gravel Pits: disused quarries, former river terrace sand and gravel exposures.</p>
Geology and soils	<p>Geology: Bedrock - Chalk. Superficial - Alluvium (clay, silt, sand and gravel); river terrace deposits (sand and gravel).</p> <p>Soils: Fen peat, loamy and sandy soils; with acid loamy, sandy and clayey soils on sides of floodplain.</p>
Cultural features of note	River corridors valuable for bird watching; fishing; walking and water activities.
Planning impacts or constraints	Impacts from development. Avoid any floodplain developments; BNG to buffer existing wetland sites between housing.
Ecosystem goods and services - Provisioning Services	Aquatic organisms; fresh water.
Ecosystem goods and services - Regulation and Preservation Services	Climate regulation, nutrient cycling; regulating waterflow; water cycling; water purification.
Ecosystem goods and services - Cultural Services	Aesthetic values; health and wellbeing; inspiration for art; recreation and ecotourism; sense of history; sense of wonder; tranquility.

Community and Active Spaces – Local BCA

Introduction

Community and Active Spaces is one of two Local Biodiversity Character Areas (BCAs) in Norwich. The Community and Active Spaces BCA represents a collation of the key open space areas across Norwich that are important to the health and wellbeing of residents, but which are not otherwise characterised by particular historic or ecological importance. This is a local, rather than county level, BCA due to the lack of priority habitats and species recorded within it, and the fragmented nature of the urban sites it includes. However, it has importance to Norwich due to cultural and amenity value, and many of the sites included can still offer value to enhancing biodiversity.

The Community and Active Spaces BCA covers parks that are not noted for their historical value, as well as the access routes of the Lakenham Way and Marriott's Way entering Norwich from the south and the north respectively. Other elements include golf courses, school playing fields not covered by the Historic BCA, and any other open greenspaces. Allotments also make up a significant percentage of this BCA. Community gardens are small pockets of biodiversity, highly valued for their community, health, wellbeing and education benefits. In urban areas, community gardens, orchards and allotments provide some of the best opportunities for biodiversity benefit (particularly for pollinators) in terms of cost effectiveness and outcomes.

Community and Active Spaces Biodiversity Character Area Boundary

The Community and Active Spaces BCA in Norwich spreads throughout the city from the city centre to the residential suburbs. Due to the urban nature of the city, the sites it represents are fragmented, as shown in Figure 1. Community And Active Spaces BCA: Map of boundaries.

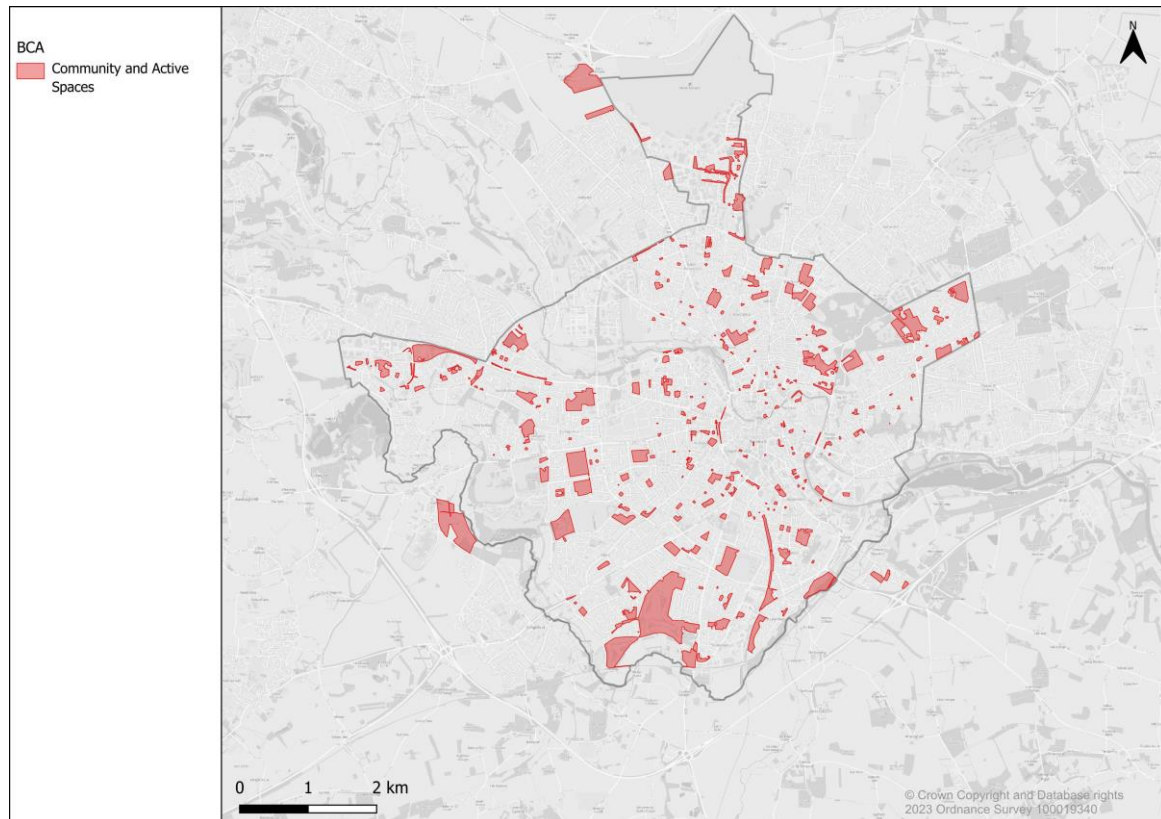


Figure 1. Community And Active Spaces BCA: Map of boundaries.

Reasons for the BCA Boundary

Several ways of defining the boundaries for this BCA using generalised areas, rather than individual sites, were reviewed. Using Output Areas to better show connections between sites was considered, alongside connecting sites via road verges. None of these were considered appropriate, and so ultimately it was decided to keep this BCA as simply the set of sites that are shown in Figure 1. Community And Active Spaces BCA: Map of boundaries.

Character Area name:	Community and Active Spaces
Main features	Amenity grasslands; parks and open spaces of no significant historic value; community gardens; allotments; school grounds; prison grounds; recreation spaces, pocket parks and footpath/cycleways of biodiversity value; golf courses, natural spaces.
Species diversity	4149* species have been recorded in this BCA. 518* of these species are designated as internationally, nationally, or locally important. <i>*Species totals include records recorded to genus, species and sub species level.</i>
Indicative, characteristic and Priority species	Indicative: Perennial rye-grass (<i>Lolium perenne</i>), Timothy (<i>Phleum pratense</i>), White clover (<i>Trifolium repens</i>). Characteristic: Low diversity of wildflowers with a short sward as a result of cutting and management. Common Vetch (<i>Vicia sativa</i>), Bush Vetch (<i>Vicia sepium</i>) and Red Clover (<i>Trifolium pratense</i>) may be found. Priority: Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>), Hedgehog (<i>Erinaceus europaeus</i>), House Sparrow (<i>Passer domesticus</i>)
Axiophytes	Axiophyte species richness is generally low within this BCA.
Species richness	Species richness is generally low within this BCA, and the highest areas were on the edges of sites, generally due to an adjacent species-rich

designated site.

Invasive non-native species	Invasive species present in this BCA include Three-cornered Garlic (<i>Allium triquetrum</i>), Butterfly-bush (<i>Buddleja davidii</i>), Russian-vine (<i>Fallopia baldschuanica</i>), Japanese Knotweed (<i>Fallopia japonica</i>), Giant Hogweed (<i>Heracleum mantegazzianum</i>) and Himalayan Balsam (<i>Impatiens glandulifera</i>).
Key sites	Marriott's and Lakenham Way; Eaton Park and Eaton Golf courses; several allotments; Yare and Wensum floodplain recreation spaces and parks; Grapes Hill Community Garden.
Site Designations	1 Site of Special Scientific Interest (SSSI) (Catton Grove Chalk Pit) 3 candidate County Geodiversity Sites (cCGS) (Catton Grove Chalk Pit SSSI; Upper Hellesdon Brick Pits; University of East Anglia Playing Fields Pit) 12 Conservation Areas (Sewell; Bracondale; Eaton; Mile Cross; City Centre; St Matthews; Old Lakenham; Unthank & Christchurch; Thorpe Hamlet; Heigham Grove; Newmarket Road; Thorpe Ridge.) Due to its local value and mostly non-priority habitats, there are limited designated sites in this BCA. One of note is the SSSI at Catton Grove Chalk Pit (also a cCGS).
Habitat diversity	Amenity grasslands with some Tree Preservation Orders that include mature and veteran trees. Some biodiversity features, such as ponds (often not managed for wildlife).
Key Priority Habitats (including Broad Habitats that could contain Priority Habitat)	Hedgerow and Field Margin Lowland Mixed Deciduous Woodland Semi-improved Grassland Waterbodies
Biodiversity Hotspots	The resolution of the hotspots was not particularly useful for the scale of this BCA, as many sites are very small and so grid cells may overlap adjacent sites, however scores were generally medium to low.
Geodiversity features of note	Disused quarries, mostly exposures of Chalk, as Chalk Pits (one designated as SSSI: Catton Grove Chalk Pit); plus Upper Hellesdon Brick Pits, a former exposure of

	Pleistocene 'Norwich Brickearth' exploited for brick making.
Geology and soils	Geology: All Norwich geology: Bedrock - Chalk and sand and gravel (crag). Superficial - Superficial - Alluvium (clay, silt, sand and gravel); river terrace deposits (sand and gravel); sand and gravel; Diamicton; none (crag and chalk exposed). Soils: All Norwich soils: Fen peat, loamy and sandy soils; with acid loamy, sandy and clayey soils, with impeded drainage on sides of floodplain and Tuckswold centre and The Wherry School.
Cultural features of note or significance	Community garden movement; value of Green Infrastructure to health and wellbeing.
Planning impacts or constraints	Not assessed
Ecosystem goods and services - Provisioning Services	Nutrient cycling; provision of habitat; soil formation.
Ecosystem goods and services - Regulation and Preservation Services	Air quality; erosion control; pollination; pollution reduction; water purification.
Ecosystem goods and services - Cultural Services	Aesthetic values; cultural heritage values; education and community; health and wellbeing; inspiration for art; recreation and ecotourism; social relations; spiritual and religious value.

Green Streets – Local BCA

Introduction

In an urban setting there are opportunities for all areas and all residents to make a positive impact on nature. This BCA defines the locally specific and important habitats associated with residential and built-up areas, outside of the semi-natural habitats and parks categorised within the other BCAs. Three zones for housing and businesses have been defined, characterised by their garden space and tree cover.

Green Streets Biodiversity Character Area Boundary

The Green Streets Biodiversity Character Area (BCA) in Norwich covers all the built up, urban areas of the city, and is therefore quite extensive (Figure 1.) The BCA is split into three zones which are explained in the next section.

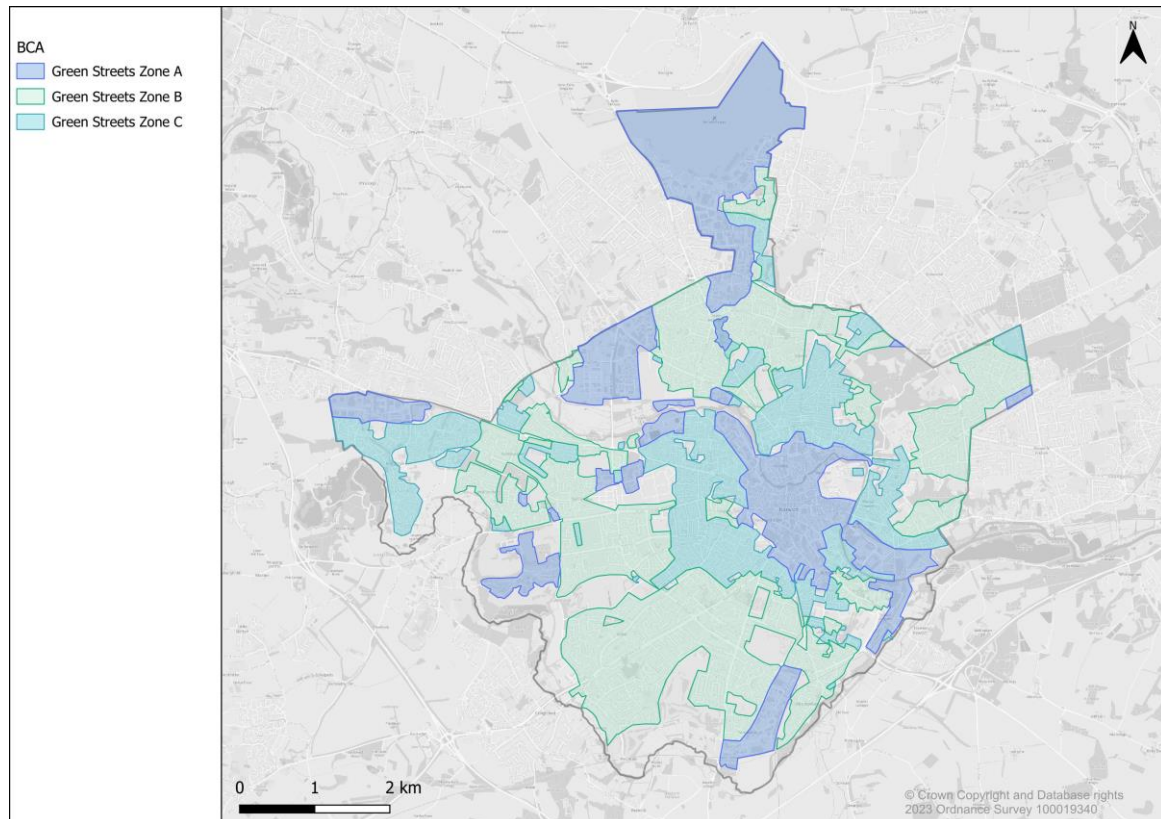


Figure 1. Green Streets BCA Boundaries: Includes three distinct zones, defined by differences in the associated street trees and gardens. Zone A = city centre and commercial; Zone B = Semi-detached and Detached; Zone C = Terraces and Apartments

Reasons for the BCA boundary

The Green Streets BCA zones were drawn using the following process:

- All private garden polygons were extracted from OS MasterMap.
- These were combined spatially with the vector Norfolk Vegetation Model of Trees and Hedges.
- A 10m grid of Norwich was created.
- Each grid square was given a score based on the percentage overlap of these combined data to create a heat map of Norwich private gardens and trees/hedges (these were mostly street trees in areas outside semi-natural habitats and parks).
- This grid was overlaid with OS base mapping, and areas of similar 'heat' scores were manually outlined and corrected to OS basemap lines (such as roads and other infrastructure boundaries).

The result was six numbered zones, characterising the built environment by garden/tree value associated with different house types or commercial use. In general, similar property types had similar heatmap scores and so fell into the same zone. However, this was not always the case, for example due to the much smaller garden size of modern properties, much of the Bowthorpe area is classified as terraced properties, despite being a mix of property types (from flats to detached houses).

The six zones initially identified were hard to visualise on a map and to manage actions for, and so it was decided to combine the following zones for the purpose of analysis, due to their shared characteristics and themes:

- Zone 1 (city centre) was combined with Zone 6 (commercial) to create Zone A
- Zone 2 (detached) was combined with Zone 3 (semi-detached) to create Zone B
- Zone 4 (Terraced) was combined with Zone 5 (flats) to create Zone C.

Character Area name:	Green Streets
Main features	Amenity grasslands; gardens; green roofs/walls; balconies; bird and bat boxes; street trees; garden trees; road verges.
Species diversity	4614* species have been recorded in this BCA. 595* of these species are designated as internationally, nationally, or locally important. <i>*Species totals included records recorded to genus, species and sub species level.</i>
Indicative, characteristic and Priority species	Indicative: No indicative species in this BCA identified using records from the NBIS database. Characteristic: Garden Birds, Noctule Bat (<i>Nyctalus noctula</i>), Pipistrelle bat (<i>Pipistrellus sp.</i>), Brown Long-eared bat (<i>Plecotus auritus</i>), Hedgehog (<i>Erinaceus europaeus</i>), Swift (<i>Apus apus</i>), House Sparrow (<i>Passer domesticus</i>), Peregrine Falcon (<i>Falco peregrinus</i>), Fox (<i>Vulpes vulpes</i>), Starling (<i>Sturnus vulgaris</i>), Bumblebees (<i>Bombus sp</i>), Hairy-saddled Colletes Bee (<i>Colletes fodiens</i>), Slow worms (<i>Anguis fragilis</i>), Mole (<i>Talpa europaea</i>), Great Crested Newt (<i>Triturus cristatus</i>), Smooth Newt (<i>Lissotriton vulgaris</i>). Priority: No priority species identified.
Axiophytes	Not assessed. The urban nature of private gardens making up most of this BCA, and the likely lack of recording in them, would mean the data were not comparative with other BCAs.
Species richness	Not assessed. The urban nature of private gardens making up most of this BCA, and the likely lack of recording in them, would mean the data were not comparative with other BCAs.
Invasive non-native species	Invasive non-native species include Butterfly-bush (<i>Buddleja davidii</i>), Russian-vine (<i>Fallopia baldschuanica</i>), Japanese Knotweed (<i>Fallopia japonica</i>), Giant Hogweed (<i>Heracleum mantegazzianum</i>) and Himalayan Balsam (<i>Impatiens glandulifera</i>).
Key sites	Unthank and Christchurch, Newmarket Road, Heigham Grove, Thorpe Ridge, Bracondale, Eaton, and Mile Cross Conservation Areas.
Site Designations	Elements of: 2 Sites of Special Scientific Interest (SSSI) (Catton Grove Chalk Pit; Eaton Chalk Pit) 1 Roadside Nature Reserve (RNR) (62 – Ipswich Road)

2 County Wildlife Sites (CWS) (2015 – Eaton Chalk Pit; 1468 – Fiddle Wood & Night Plantation)

7 candidate County Geodiversity Sites (cCGS) (Upper Hellesdon Brick Pits; Carrow Works; Bracondale Pit; Catton Grove Chalk Pit; Eaton Chalk Pit Complex; Gilman Road Chalk Pit; Lollards Pit)

17 Conservation Areas (City centre; Bracondale; Newmarket Road; Heigham Grove; Thorpe St Andrew; Sewell; Eaton; Trowse Millgate; Earlham; Old Lakenham; Bowthorpe; Mile Cross; Thorpe Hamlet; Thorpe Ridge; Unthank and Christchurch; Hellesdon; St Matthews).

There are limited overlaps of designated sites with this BCA. This is due to the lack of semi-natural habitats and features, and the nature of privately owned residential and business green spaces and gardens. The two chalk pit SSSIs within the BCA are Catton Grove and Eaton Chalk Pit. The former is a geological SSSI, whereas the latter is biological for its bat populations. There are 2 CWS within the area, and these include two areas of woodland. The first is Eaton Chalk Pit CWS, which contains woodland important for bat hibernation within the pit, and the second is Fiddle Wood and Night Plantation, a woodland buffer to Catton Park.

Habitat diversity

Very little diversity on a macro scale. Potentially high diversity on a micro garden-by-garden scale. The habitats are all gardens, with trees and flowering plants, often with significant hard surface coverage. These are not a Priority Habitat.

Key Priority Habitats
(including Broad Habitats that could contain Priority Habitat)

Hedgerow and Field Margin
Lowland Mixed Deciduous Woodland
Semi-improved Grassland
Waterbodies – this does not include garden ponds.

Biodiversity Hotspots

Very few high scoring areas within the BCA, mostly found on the edges of the zones where they adjoin semi-natural areas.

Geodiversity features of note

Carrow Works river terrace and archaeology; Various disused quarries, mostly exposures of chalk as Chalk Pits (some nationally important and 1 designated as SSSI) including Gilman Road Chalk Pit, Bracondale Pit, Eaton Chalk Pit complex; Upper Hellesdon brick pits.

Geology and soils	<p>Geology: All Norwich geology: Bedrock - Chalk and sand and gravel (crag). Superficial - Superficial - Alluvium (clay, silt, sand and gravel); river terrace deposits (sand and gravel); sand and gravel; Diamicton; none (crag and chalk exposed).</p> <p>Soils: All Norwich soils: Fen peat, loamy and sandy soils; with acid loamy, sandy and clayey soils, with impeded drainage on sides of floodplain, Tuckswood Centre and The Wherry School.</p>
Cultural features of note or significance	N/A
Planning impacts or constraints	Any new development should aim to connect biodiversity and to add buffering or connecting value to existing communities.
Ecosystem goods and services - Provisioning Services	Food production; nutrient cycling; provision of habitat; soil formation.
Ecosystem goods and services - Regulation and Preservation Services	Air-quality; erosion control; pollination; pollution reduction; sediment and surface water runoff reduction; water purification; water storage.
Ecosystem goods and services - Cultural Services	Aesthetic values; cultural heritage values; health and wellbeing; inspiration for art; recreation and ecotourism; social relations; spiritual and religious value.

Heathland – County BCA

Introduction

Heathlands are open spaces, made up of low-growing plants such as heather, gorse and broom. A diverse habitat, originally created by humans in the Bronze Age when native woodland was cleared for grazing animals, heathland creates homes for wildlife including mammals, insects, reptiles and birds.

In Norwich, Mousehold Heath is the epitome of a heathland habitat. It is a 74 ha public area of heathland, woodland and recreational open space north of Norwich city centre, and the largest nature reserve managed by Norwich City Council. It was once one of the largest extents of heathland in Norfolk, as shown by [Faden \(1797\)](#), which extended from the existing Mousehold Heath in the west, to Blofield in the east. The current Mousehold Heath is the largest element that remains, along with remnant heathland species in Sprowston Industrial Estate and Racecourse Plantation. Many areas were converted to woodland and farmland or lost to housing development. Mousehold Heath is a disused quarry complex and periglacial plateau landform, thought to be remnant of glacio-fluvial outwash plain. The notable dry valley landform 'Long Valley' is present, with tributary dry valleys.

[Faden \(1797\)](#) also shows another large extent of heathland present in the late 1700s; an area to the northwest of the city, from Drayton Drewray/Horsford Woods, to Hainford and Frettenham in the east. This also stretched north to the Cawston area, with another smaller area around Swannington Upgate Common. Areas of heathland remain today at Cawston Heath, Buxton Heath, Swannington Upgate and Drayton, with the largest extent between Horsford Woods and Broadland Country Park. This swathe of heathland is potentially connected via the soils and geology to the Hellesdon area of Norwich and Sweetbriar Industrial Estate and marshes. There is also remnant historic heathland (1st edition OS) at the old Royal Norwich Golf Course, and historic acid grassland (1st Edition OS) at the disused railway sidings either side of the A140 at Sweetbriar Road Industrial Estate, and the northern section of the new NWT Sweetbriar Marshes. This acid grass-neutral grass mosaic, at Sweetbriar Marshes and the disused railway, has been confirmed by ecological survey at CWS 1453 (Disused Railway Hellesdon) and 1466 (Mile Cross Meadows).

A third area of heathland with remnant heath and acid grassland species is within the northern section of Eaton Golf Course (OS drawings of 1816/7 marked this as heath, though only the southern area of this section remained around the time of the 1st edition OS maps). Other historical heathland in this area, now built upon, is the southern half of Bluebell Crescent. Potential acid grassland features adjacent to this area in the eastern part of Strawberry Field, and acid grasses in many gardens across Eaton, especially near to the Golf Course, have also been identified.

Heathland Biodiversity Character Area Boundary

The Heathland Biodiversity Character Area (BCA) in Norwich is comprised of three distinct areas; Mousehold Heath to the northeast of the city, Hellesdon/Sweetbriar to the northwest and Eaton to the southwest (Figure 1).

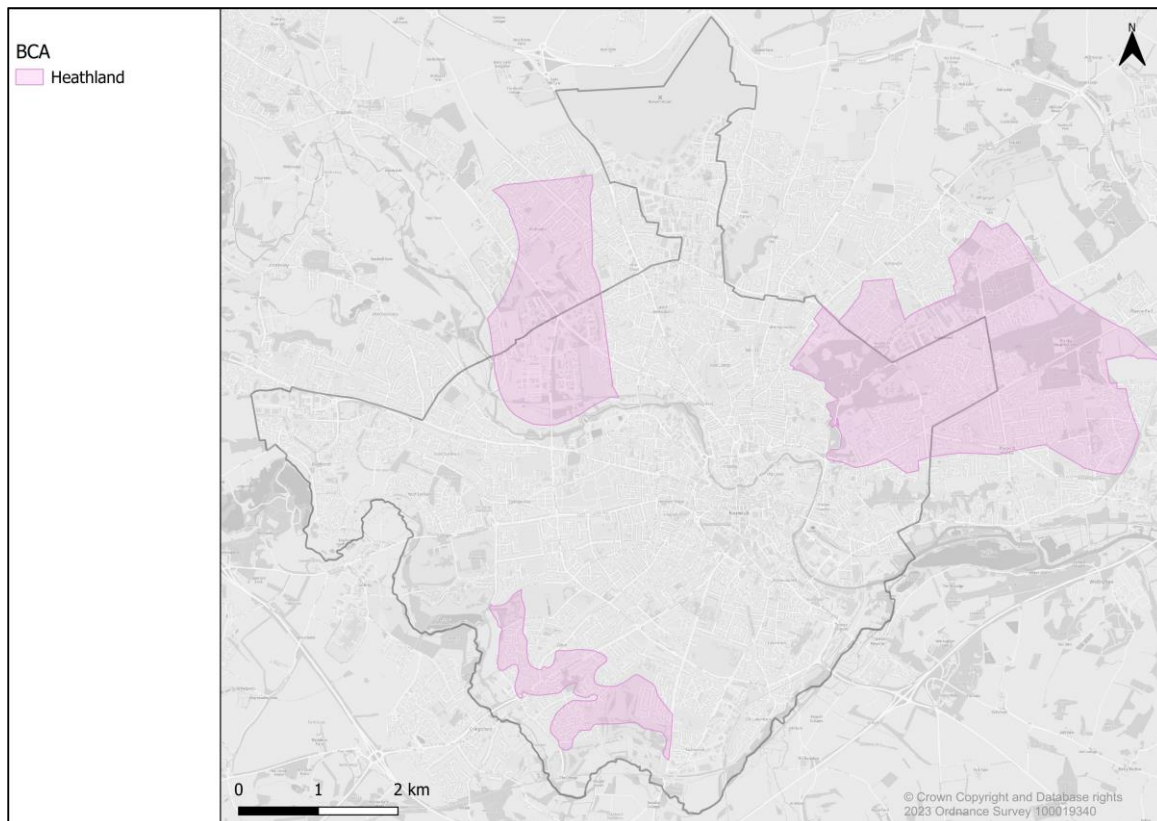


Figure 1. Heathland BCA Boundaries.

Reasons for the BCA boundary

The Heathland BCA extends past the city boundaries in some areas, illustrating the connections to wider habitats in Broadland and South Norfolk. The BCA boundary was defined by the admin units that most align to the natural features representing the character of the BCA. The boundaries for the 3 separate areas were drawn as follows:

- **Mousehold Heath:** Based on the Faden Map extent, cut to include Racecourse Plantation and Sprowston Industrial Estate (both known to contain some remnant heathland). Also cut by the railway at Thorpe St Andrew, Green Lane North at Thorpe End and Atlantic Avenue in Sprowston.
- **Hellesdon/Sweetbriar:** Incorporates historic extent of heathland/acid grassland and current acid grassland, determined from stakeholder comments and CWS citations, as well as the presence of free draining acid loamy soils and gravel superficial geology. Contains Hellesdon Disused Railway, Sweetbriar Industrial Estate, Sweetbriar Marshes and the old Royal Norwich Golf Course.
- **Eaton:** Based on historic extent of heathland from OS drawings and 1st Edition OS maps at Eaton Golf Course and Bluebell Crescent. Stakeholder comments suggest acid grassland and heathland species are present in Eaton gardens, and that the eastern area of Strawberry Field consists of acid grassland. Initial southern and northern boundaries were defined by the presence of free-draining acid sandy soils, and the underlying geology. The southern boundary was cut to match the extent of the exposed sand and gravel bedrock, and exclude areas of chalk bedrock along the boundary with the river corridor. The northern edge was defined as the boundary of the superficial sand and gravel, although this geology (and the soils above) is still appropriate for heathland. This was done to avoid continuing the BCA to the edge of the Eaton ward, which would have been unsuitable for defining the BCA as wards are a demographic unit, with no relevance to the habitats present.

Stakeholder engagement and CWS Phase 1 maps showed the acid grassland potential of a number of sites along the Yare valley:

- A southwest section of CWS 2012 at Bowthorpe Marsh.
- The area of CWS 1451 (Earlham and Colney Marshes) wrapped around the electricity substation.
- Marshes directly west/adjacent to the Yare and CWS 1446 (The Heronry), and the southern centre section of the UEA Colney Playing Fields (north of Colney lane before the main hospital roundabout).

All these sites were considered but rejected from the Heathland BCA, due to their soils being of impeded drainage. This means that acid grassland elements may establish or exist, but are unlikely to be Priority Habitat quality, where free-draining soils and geology is specified.

Character Area name:	Heathland
Main features	Heathland; remnant heathland; acid grassland; mixed deciduous woodland; scrub; ponds; mature trees; semi-improved grassland; coniferous plantation.
Species diversity	<p>3886* species have been recorded in this BCA. 497* of these species are designated as internationally, nationally, or locally important.</p> <p>Heathland adds to the species diversity of the city as it offers suitable habitat for a range of acid-loving species that are not found elsewhere in Norwich. It is also a vital core area for pollinating insects and their food plants.</p> <p><i>*Species totals included records recorded to genus, species and sub species level.</i></p>
Indicative, characteristic and Priority species	<p>Indicative: Nightjar* (<i>Caprimulgus europaeus</i>), Bell Heather (<i>Erica cinerea</i>), Ling Heather (<i>Calluna vulgaris</i>), Cross leaved Heath (<i>Erica tetralix</i>), Heath Bedstraw (<i>Galium saxatile</i>), Tormentil (<i>Potentilla erecta</i>).</p> <p>Characteristic: Gorse (<i>Ulex europaeus</i>), Western Gorse (<i>Ulex gallii</i>), Heath Rush (<i>Juncus squarrosus</i>), Heath Speedwell (<i>Veronica officinalis</i>), Heath Dog-violet (<i>Viola canina</i>), Heath Groundsel (<i>Senecio sylvaticus</i>), Green Tiger Beetle (<i>Cicindela campestris</i>), Common Lizard (<i>Zootoca vivipara</i>), Green Hairstreak (<i>Callophrys rubi</i>), Small Copper (<i>Lycaena phlaeas</i>), Heath Rustic (<i>Xestia agathina</i>), Stonechat (<i>Saxicola rubicola</i>), Solitary bees and wasps.</p> <p>Priority: Small Heath (<i>Coenonympha pamphilus</i>), Slow Worm (<i>Anguis fragilis</i>), Common Lizard (<i>Zootoca vivipara</i>), Heath Rustic (<i>Xestia agathina</i>).</p> <p><i>*not recorded in the Norwich BCA but records in adjoining heathland habitat.</i></p>
Axiophytes	Axiophyte species richness shows a single concentration at Mousehold Heath, highlighting both the importance of heathland habitat to conservation and the importance of this habitat type within the city.

Character Area name:	Heathland
Species richness	The highest species richness values are found on Mousehold Heath, which is also the largest area of this habitat type. Heathland species of importance do also occur in other small pockets across the city, in undesignated sites where they exist as remnants of the much more extensive heathland landscape that historically covered the city.
Invasive Non-native Species	Non-native plant species present within this BCA include Butterfly-bush (<i>Buddleja davidii</i>), Canadian Goldenrod (<i>Solidago canadensis</i>) and Three-cornered Garlic (<i>Allium triquetrum</i>). Muntjac deer (<i>Muntiacus reevesi</i>) are also present.
Key sites	Mousehold Heath LNR/cCGS and Mousehold Heath & Valley Drive CWS; Fragments of heathland/acid grassland flora of historical value at Sprowston Industrial Estate, south of Sweet Briar Industrial Estate, either side of Marriott's Way, Eaton Golf Course.

Character Area name:**Heathland****Site Designations****2 Sites of Special Scientific Interest (SSSI)**

(Sweetbriar Meadows, Norwich; Eaton Chalk Pit).

2 Local Nature Reserves (LNR) (Mousehold Heath; Wensum Valley (Mile Cross Marsh and Sycamore Crescent)).

7 County Wildlife Sites (CWS) (1453 – Disused Railway Hellesdon; 1465 – Hellesdon Pastures; 1466 – Mile Cross Meadows; 1469 – Mousehold Heath & Valley Drive; 2015 – Eaton Chalk Pit; 2041 – Racecourse Plantation; 2042 – Belmore & Brown’s Plantations).

7 candidate County Geodiversity Sites (cCGS) (Eaton Chalk Pit Complex; Gilman Road Chalk Pit; Mousehold Heath; Slough Bottom; Thunder Lane Corner Pit; Whiffler Road; Wensum Meadows).

4 Conservation Areas (Hellesdon; Mile Cross; Unthank & Christchurch; Newmarket Road).

Mousehold Heath: Designated as both a CWS and LNR for its habitat value and for the vital accessible green space it provides, with proximity to the city centre and the residential areas of Sprowston and Thorpe St Andrew. As part of the greater Mousehold extent, Racecourse Plantation is a CWS, designated as a vital heath remnant.

Hellesdon/Sweetbriar area: The southern section overlaps with the River Wensum BCA. CWS 1453 (Disused Railway Hellesdon) and CWS 1466 (Mile Cross Meadows) both contain an important acid grass-neutral grass mosaic.

Eaton: No designated sites of relevance to the character/habitat of the BCA. The only designated site of note is the Eaton Chalk Pit complex, which is a cCGS (exposure of the chalk), SSSI (for the bat use of the tunnels) and CWS (broadleaved secondary woodland on steep slopes).

Habitat diversity

Heathland with significant regenerated secondary woodland and acid grassland at Mousehold Heath. Remnant heath and acid grassland at Eaton and Hellesdon/Sweetbriar.

Character Area name:	Heathland
Key Priority Habitats <i>(including Broad Habitats that could contain Priority Habitat)</i>	Lowland Heathland Lowland Mixed Deciduous Woodland Semi-improved Grassland – likely to partially contain Lowland Dry Acid Grassland, later confirmed from field survey work. Waterbodies
Biodiversity hotspots	Concentrated in Mousehold Heath, with some of the highest scoring hotspots in the city. The acid grassland complex of the Hellesdon/Sweetbriar area also scores highly, but these scores better represent the wetland habitats present, rather than potential for acid grassland.
Geodiversity features of note	Mousehold Heath is a disused quarry complex and periglacial plateau forming landform, with various exposures of sand and gravel; notable dry valley landform.
Geology and soils	Geology: Bedrock - Chalk. Superficial - Sand and Gravel. Soils: Acid Loam (sandy).
Cultural features of note	Mousehold Heath is an important recreational area.
Planning impacts or constraints	Surrounded by development. Links to the river corridors and woodland/heath outside Norwich is restricted by Roundtree Way/Sprowston Retail Park and housing. Crucial that BNG is within or adjacent to the development site in this BCA.
Ecosystem goods and services - Provisioning Services	Habitat provision; nutrient cycling; oxygen production; soil formation and retention.
Ecosystem goods and services - Regulation and Preservation Services	Air quality; climate regulation; erosion control; natural hazard protection; water regulation.
Ecosystem goods and services - Cultural Services	Aesthetic values; inspiration for art; recreation and ecotourism; social relations.

Historic Habitats – County BCA

Introduction

Cities often depend largely on parks and open spaces for greenery and biodiversity. Compared to other urban areas, Norwich is less reliant on these types of green spaces, due to the extensive semi-natural habitats present in the city, particularly at Mousehold Heath and the river corridors, plus the high percentage tree cover.

Norwich has many parks and open spaces that are important for biodiversity and green space, but also for their historic and cultural heritage. The Historic Habitats Biodiversity Character Area encompasses a variety of sites, connected by the locally designated [Conservation Areas](#). The most significant sites in terms of area are the Registered and Unregistered Parks and Gardens, such as Eaton Park, Heigham Park and Chapelfield Gardens.

At the edge of the city are the two County Parks of Catton and Whitlingham. Whilst not within the Norwich City boundary, these two sites are well-used by Norwich residents and are often considered to be part of Norwich. Both sites also contain historic Registered Parks and Gardens.

There are a further four parks and gardens that are included in this BCA, despite being separated from Norwich by the River Yare or the A47. These are important sites that buffer Norwich, including Colney Hall, Cringleford Hall, Keswick old hall historic extent, Keswick Hall, and Intwood Hall (registered).

Historic Church of England churchyards (many of which are medieval) make up a great number of sites within the BCA. These are vital pockets of historic green spaces, within a dense medieval city centre. The cathedral complex is a large area of the city centre, and includes the cathedral itself, the Bishop's House garden, the Great Hospital and St Helens Church (both with gardens), Cow Tower with Riverside Walk Park and Norwich School playing fields.

There are only two active cemeteries in Norwich, and both are also Registered Parks and Gardens. They are Earlham and Rosary Cemeteries, with the latter being the oldest non-denominational burial ground in the United Kingdom.

Further historic sites that complete the BCA are Eaton Common (a registered common); the Lion Wood Ancient Woodland and associated woods on Thorpe Ridge; and parks and gardens identified via historic mapping, where remnant parkland features still exist.

Historic Habitats Biodiversity Character Area Boundary

The Historic Habitats BCA in Norwich covers a fairly large area of the city, including the city centre itself, with a more contiguous area covered to the south and east of the city centre, and more scattered sites to the north and west (Figure 1.) The BCA extends outside of the city boundary where appropriate.

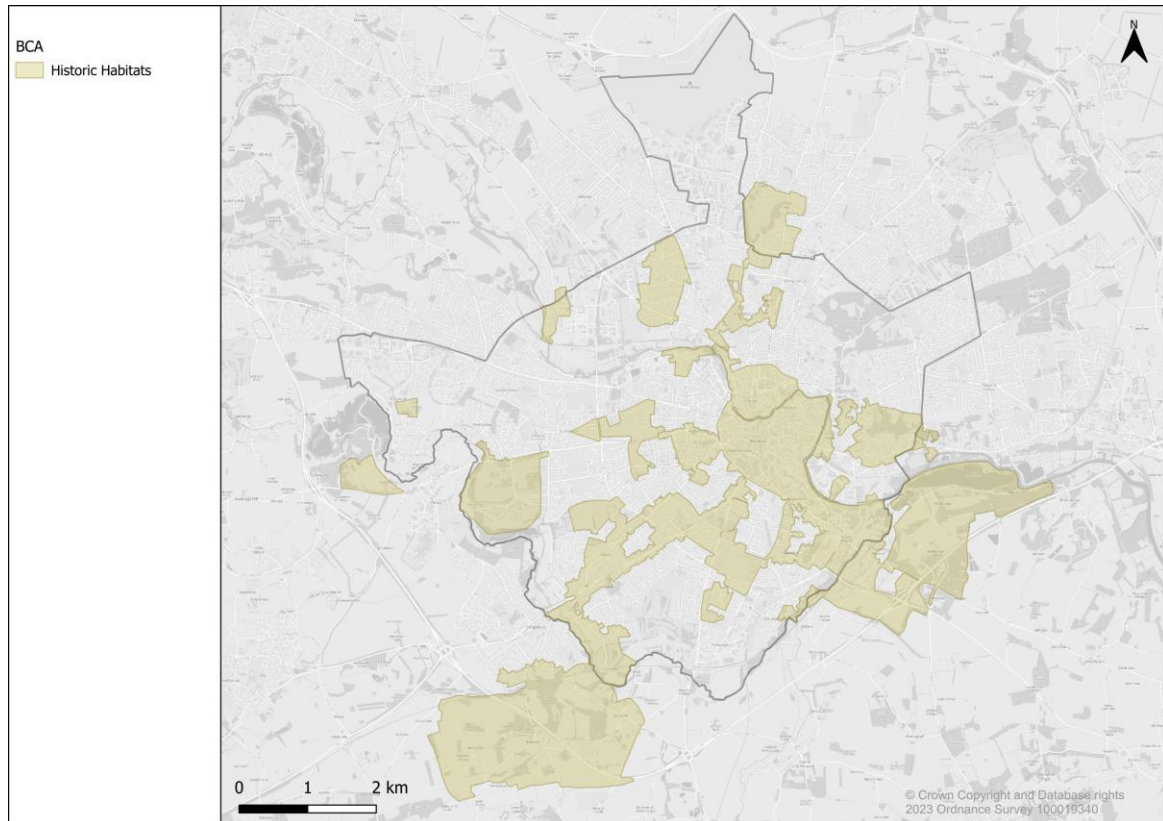


Figure 1. Historic Habitats BCA boundaries.

Reasons for the BCA boundary

Defining contiguous boundaries, rather than a set of sites, poses a challenge for this BCA. The process firstly involved identifying key sites with a historic relevance and character. These were placed into two groups: those with Priority Habitats likely present and those without.

- Group 1: Sites potentially containing Priority Parkland and Wood Pasture Habitats; Registered, Unregistered and Remnant (identified during this project) Parks and Gardens associated with large houses or estates from the 1700/1800s or before; Churchyards and Cemeteries, registered commons; and the Ancient Woodland at Lion Wood.
- Group 2: Historic city parks, registered or unregistered for their historic and cultural value, many of which were created during the mid-late 1800s or pre-second world war 1900s. These rarely contain Priority Habitats but have soils and gardens that have changed little in over 100 years.

In the first category, in addition to the Registered and Unregistered Parks and Gardens, there was inclusion of Historic Parkland sites digitised from Faden 1797 and the OS 1st edition maps, with some more recent parklands from OS 1st edition only. Both epoch 1 (County Survey 1879-86) and 2 (1st revision 1900-6) were used from OS 1st edition mapping.

These sites were brought together to draw the BCA boundaries by adding in the Norwich Conservation Areas containing these sites, as the character of these heritage areas is related to the sites within them. Where there were isolated sites, the Output Area demographic units that connected the sites over the least distance were used to make contiguous areas where practical. Isolated sites that could not be reasonably connected to a wider BCA area were left as is.

Character Area name:	Historic Habitats
Main features	Amenity grasslands; high quality grasslands; churchyards and cemeteries; remnant lowland meadow; hedgerows; ancient/veteran/mature trees; registered and unregistered historic parks and gardens; remnant historic parks and gardens (or elements/features of these); cathedral complex including bishops garden and school grounds; ancient woodland/mature woodland; country parks; registered common land.
Species diversity	<p>4591* species have been recorded in this BCA. 582* of these species are designated as internationally, nationally, or locally important.</p> <p><i>*Species totals included records recorded to genus, species and sub species level.</i></p>
Indicative, characteristic and Priority species	<p>Indicative: Historic grassland - Meadow Foxtail (<i>Alopecurus pratensis</i>), Cock's-foot (<i>Dactylis glomerata</i>), Oxeye Daisy (<i>Leucanthemum vulgare</i>), Field Wood-rush (<i>Luzula campestris</i>), Yellow-rattle (<i>Rhinanthus minor</i>), Common Sorrel (<i>Rumex acetosa</i>);</p> <p>Historic parkland – Woodland management techniques used on trees, ancient and veteran trees.</p> <p>Characteristic: Historic Grassland - Skylark (<i>Alauda arvensis</i>), Bee Orchid (<i>Ophrys apifera</i>), Bumblebees (<i>Bombus sp.</i>), Waxcap species (<i>Hygrocybe sp.</i>), Meadow Brown (<i>Maniola jurtina</i>)</p> <p>Historic parkland - Red Deer (<i>Cervus elaphus</i>), Roe Deer (<i>Capreolus capreolus</i>), Chicken of the woods (<i>Laetiporus sulphureus</i>), Greater spotted Woodpecker (<i>Dendrocopos major</i>), Fox (<i>Vulpes vulpes</i>) and Badger (<i>Meles meles</i>).</p> <p>Priority: Grass snake (<i>Natrix helvetica</i>), Yellow Wagtail (<i>Motacilla flava flavissima</i>), Cuckoo (<i>Cuculus canorus</i>), Grasshopper Warbler (<i>Locustella naevia</i>), Brown Long-eared Bat (<i>Plecotus auratus</i>).</p>
Axiophytes	Axiophyte species richness in the BCA shows the same pattern as overall species richness. However, axiophyte species richness appears to be low, which is not what would be expected in sites of historic species rich grassland, as these are of high importance to biodiversity conservation.
Species richness	The largest areas of highest species richness are found in the Colney/UEA area, Earlham and Rosary cemeteries, Lion Wood and undesignated areas in the

	<p>city centre. Smaller pockets of species-rich habitat are scattered across the city, corresponding with historic sites such as churchyards and former parkland.</p>
Invasive non-native species	<p>Invasive species present include Japanese Knotweed (<i>Fallopia japonica</i>), Canadian Goldenrod (<i>Solidago canadensis</i>), Butterfly-bush (<i>Buddleja davidii</i>), Russian-vine (<i>Fallopia baldschuanica</i>), Three-cornered Garlic (<i>Allium triquetrum</i>) and Muntjac deer (<i>Muntiacus reevesi</i>).</p>
Key sites	<p>Registered Parks and Gardens: Earlham and Rosary Cemeteries, Earlham Park, Waterloo Park, Wensum Park, Mile Cross Gardens, Heigham Park, Eaton Park, Chapelfield Gardens, and Catton Park (also a Country Park).</p> <p>Remnant parkland: Bowthorpe Hall, Hellesdon House, Heigham Hall, Harford Hall, Eaton Hall, Crown Point, County Hall grounds, Plantation Gardens, Cathedral complex including Bishops Garden, Lion Wood/Holmwood Ancient Woodland, Whitlingham Country Park.</p> <p>Historic parks not registered: Kett's Heights, Carrow House and Abbey grounds, The Gildencroft, The Wilderness (Carrow Hill).</p>
Site Designations	<p>1 Site of Special Scientific Interest (SSSI) (River Wensum).</p> <p>6 Local Nature Reserves (LNR) (Earlham Park Woods; Eaton Common; Lion Wood; Marston Marshes; Whitlingham Marsh, Whitlingham; Whitlingham)</p> <p>1 Ancient Woodland (Lion Wood, including Thorpe Ridge ancient woodlands).</p> <p>19 County Wildlife Sites (CWS) (1446 - The Heronry & Violet Grove; 1447 – UEA Marsh; 1448 - UEA Butterfly Meadow; 1449 – UEA Broad; 1453 - Disused Railway Hellesdon; 1456 - Eaton Common; 1457 - Eaton Street Meadow; 1458 - Eaton Island; 1459 - Marston Marshes; 1461 - Earlham Cemetery; 1463 - Lion Wood, Telegraph Plant'n & Rosary Cemetery; 1467 - Train Wood; 197 - Foxburrow Meadow; 200 - Intwood Carr; 2211 - Old Wood; 2213 - Trowse Wood; 2290 - Pack Lane Meadow; 2302 - Spruce's Plantation and Carleton Corner Wood; 240 – River Yare (west and east), Bowthorpe).</p> <p>10 candidate County Geodiversity Sites (cCGS) (Bracondale Pit; Carrow Works; Bluebell Road Pit;</p>

Groundsman's Pit; Lollard's Pit; Whitlingham Lime Kiln Pit; Chalk Pit West of White House; Colman's Pit; Crown Point Pit; Lafarge Gravel Pit).

2 Country Parks (Catton Park; Whitlingham).

17 Conservation Areas (City Centre; Bracondale; Newmarket Road; Heigham Grove; Thorpe St Andrew; Sewell; Eaton; Earlham; Old Lakenham; Bowthorpe; Mile Cross; Thorpe Hamlet; Thorpe Ridge; Unthank and Christchurch; Hellesdon; St Matthews; Trowse Millgate).

There are several CWS within the BCA. Those directly related to the biodiversity character are mostly wooded sites such as Earlham and Rosary cemeteries, Lion Wood (also designated as an LNR and Ancient Woodland), Trowse Wood, Old Wood, The Heronry and Violet Grove, UEA Butterfly Meadow and County Hall Woods. In addition to being designated a Country Park alongside Catton Park, Whitlingham is an LNR for its important access and recreational benefits, as are Trowse Wood and Earlham Park Woods.

There are several cCGS sites across and adjacent to the BCA, including Lollard's Pit at Kett's Heights and several other sites, mainly chalk pits, where the medieval mines or quarries have value for their heritage, cultural, geological and natural values.

Habitat diversity

Considerable area of Parkland, Wood Pasture and Lowland Mixed Woodland (much of which is Ancient Woodland). Fragments of Lowland Meadow habitats remain in isolation in churchyards and cemeteries. Remaining elements contain mostly amenity grassland, with some mature, TPO or veteran trees.

Key Priority Habitats
(including Broad Habitats that could contain Priority Habitat)

Coastal and Floodplain Grazing Marsh (22ha)
Hedgerow or Field Margin (25.74ha)
Lowland Mixed Deciduous Woodland (176.63ha)
Semi-improved Grassland (135.51ha)
Waterbodies (62.74ha)

Biodiversity Hotspots

The wooded areas of the western side of Earlham Park, Earlham and Rosary cemeteries, and Lion Wood/Thorpe Ridge are biodiversity hotspots, whereas the remaining sites scored less highly, with some of the more mixed use/urban sites scoring near to zero. This could be in part due to the resolution of the mapping not picking up mature

trees and other historic biodiversity features.

Geodiversity features of note	<p>Carrow Works river terrace and archaeology; Various disused quarries, most exposures of chalk, as Chalk Pits (some nationally important): Lollard's Pit, Bracondale Pit, Bluebell Road Pit, Groundsman's Pit (Earlham Park).</p> <p>Mousehold Heath: Disused quarry complex and periglacial plateau forming landform (various exposures of sand and gravel); notable dry valley landform.</p>
Geology and soils	<p>Geology: All Norwich geology: Bedrock - Chalk and sand and gravel (crag). Superficial - Superficial - Alluvium (clay, silt, sand and gravel); river terrace deposits (sand and gravel); sand and gravel; Diamicton; none (crag and chalk exposed).</p> <p>Soils: Almost all Norwich soils: Fen peat, loamy and sandy soils; with acid loamy, sandy and clayey soils, with impeded drainage at Tuckswood Centre and The Wherry School.</p>
Cultural features of note or significance	<p>Churchyards and cemeteries (Christian and non-denominational); historic houses, parks and gardens and their legacy as schools; public parks with tourism value and medieval legacy of the city.</p>
Planning impacts or constraints	<p>Inappropriate development adjacent to development impacting the BCA or site. Constraints on development may result from the need to gain BNG credits.</p>
Ecosystem goods and services - Provisioning Services	<p>Nutrient cycling; provision of habitat; soil formation.</p>
Ecosystem goods and services - Regulation and Preservation Services	<p>Air quality; erosion control; pollination; water purification.</p>
Ecosystem goods and services - Cultural Services	<p>Aesthetic values; cultural heritage values; inspiration for art; recreation and ecotourism; spiritual and religious value; social relations.</p>

Wooded Ridge – County BCA

Introduction

Woodlands offer a unique and diverse habitat for thousands of species. Mammals, birds, invertebrates, plants, lichens, and fungi all rely on a woodland's diverse structure. Each woodland type has its own characteristic range of flowers, invertebrates, and vertebrates. Broadleaved woodlands, being Norfolk's predominant and most structurally diverse habitat, are also its most biologically diverse terrestrial habitat ([NWT, 2023](#)).

This Biodiversity Character Area (BCA) covers Ancient Woodland, other broadleaved semi-natural woodland, and secondary woodland, as well as the proposed opportunities in between. It encompasses two culturally important wooded ridges in Norwich, described below.

Wooded Ridge Biodiversity Character Area Boundary

The Wooded Ridge BCA in Norwich encompasses two culturally important wooded ridges. The first, known as Thorpe Ridge, extends from Thorpe St Andrew to Mousehold Heath, and out of the city to the northeast. The second, known as Bracondale Ridge, starts near Rouen Road, extends through Bracondale via County Hall, to Lakenham, Eaton, and Earlham. Through Bowthorpe, it extends to Bunker's Hill in New Costessey and Charter Wood natural area. It roughly follows the chalk ridge line, particularly where the chalk bedrock is exposed at the top or edge of the river corridors (Figure 1.).

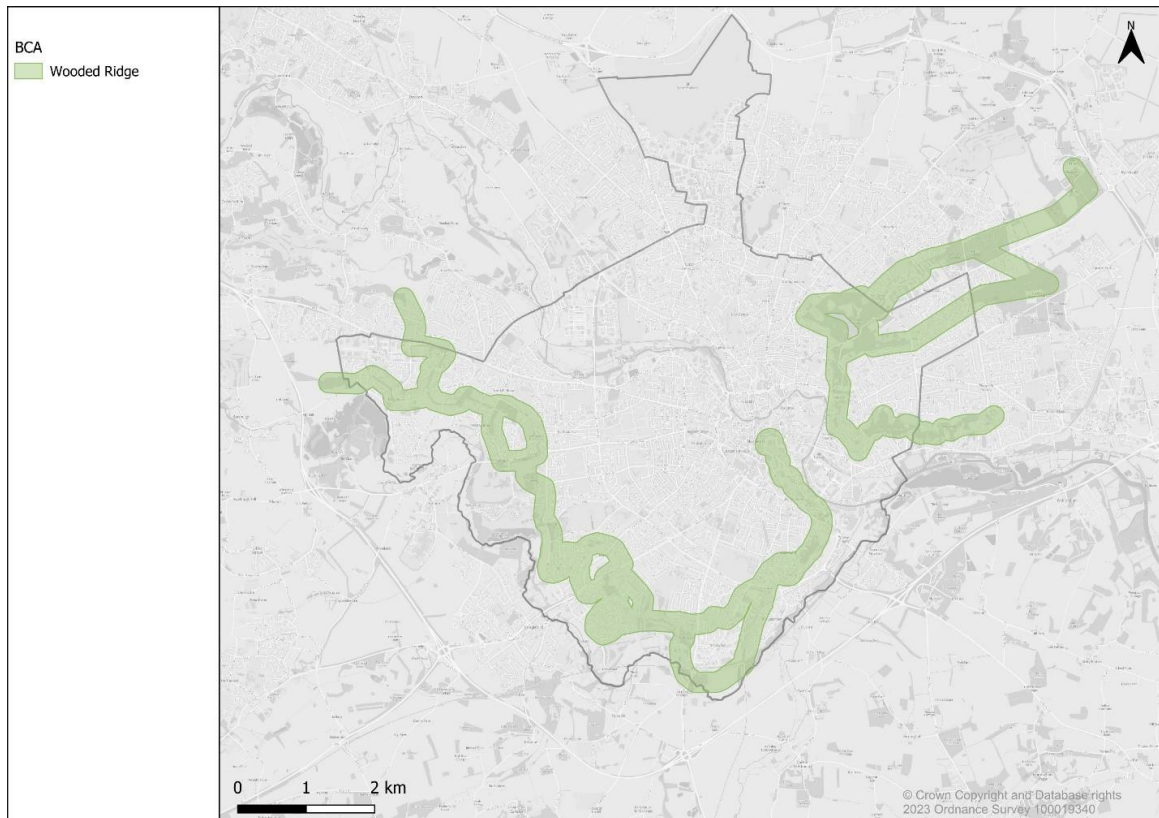


Figure 1. Wooded Ridge BCA boundaries.

Reasons for the BCA boundary

The Wooded Ridge BCA boundary was defined by a 150m buffer around a centre-line following the path of the Thorpe and Bracondale ridges approximately along the 25m contour.

The line of each ridge passes adjacent to many different natural assets. These mostly consist of woodland that is either designated as a CWS, LNR or Ancient Woodland, or is a Natural Area or key cCGS site. The ridges connect with woodland outside the city to the northwest, northeast and east. The ridge line itself represents a 'best fit' approach, following both the contours and the biodiversity/open space between the sites.

The line was buffered by 150m either side to produce a biodiversity character area. The buffer distance was selected to incorporate the typical dispersal/foraging range used in the planning process for most Priority Species.

Character Area name:	Wooded Ridge
Main features	Broadleaved, coniferous, and mixed woods (semi-natural, and plantation); ponds; ancient woodland, mature and veteran trees.
Species diversity	<p>4088* species have been recorded in this BCA. 559* of these species are designated as internationally, nationally, or locally important.</p> <p>Woodlands are an important habitat for bats. 588 records of bats have been made in the BCA, for 11 identifiable species. These include: Noctule, three species of Pipistrelle, Brown Long-eared Bat, Daubenton's Bat, Natterer's Bat, Leisler's Bat, Western Barbastelle, Serotine and Brandt's Bat. Records have also been submitted for Whiskered/Brandt's Bat.</p> <p><i>*Species totals included records recorded to genus, species and sub species level.</i></p>
Indicative, characteristic and Priority species	<p>Indicative: Sites are less botanically diverse than ancient woodland, reflecting their history of natural regeneration following human disturbance. This woodland will not have occupied the site continuously since the last Ice Age. Some relic species from older woodland may still be found and include Ancient Woodland Indicator (AWI) species, such as Bluebell (<i>Hyacinthoides non-scripta</i>).</p> <p>Characteristic: Ruderals such as Bramble (<i>Rubus fruticosus agg.</i>), Nettles (<i>Urtica dioica</i>), Cow Parsley (<i>Anthriscus sylvestris</i>) and Bracken (<i>Pteridium aquilinum</i>) can dominate the ground flora.</p> <p>Priority: Noctule Bat (<i>Nyctalus noctula</i>), Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>), Lesser Redpoll (<i>Acanthis cabaret</i>), Spotted Flycatcher (<i>Muscicapa striata</i>), Dark Crimson Underwing (<i>Catocala sponsa</i>).</p>
Axiophytes	Axiophyte species richness in the Wooded Ridge BCA is lower than that in other BCAs, due to their history of human disturbance. The concentration of axiophytes around Mousehold Heath is likely due to the presence of heathland species. Any Ancient Woodland Indicator species will have been identified

Character Area name:**Wooded Ridge**

as axiophytes, as they are important plants for woodland conservation.

Species richness

Pockets of higher species richness exist throughout the character area, broadly corresponding with designated sites. The highest species richness is seen in the northeastern part of the BCA, particularly around Mousehold heath. Although this site is important for woodland species, this may also be the result of overlap with heathland habitats.

Invasive non-native species

Invasive non-native plant species found in the BCA include Cherry laurel (*Prunus laurocerasus*), Variegated yellow archangel (*Lamium galeodoides* ssp. *argenteum*), Butterfly Bush (*Buddleia davidii*) Small balsam (*Impatiens parviflora*) and Cotoneaster (*Cotoneaster* sp.)

Key sites

(Sites are listed in order as you travel along the ridge):

Thorpe Ridge: Lion Wood and Thorpe ridge ancient woodland; Pinebanks; Rosary Cemetery; Old Library wood; Lollard's Pit; Kett's Heights; St James' Pit; Mousehold Heath; Gilman Road Chalk Pit. Harrison's Plantation; Bulmer Coppice Ancient Woodland; March Covert; Racecourse Plantation.

Bracondale Ridge: Castle gardens; wooded ridge walk between Rouen Road and Ber Street via Horns Lane and Argyle Street; Black Tower and The Wilderness natural area; Bracondale Pit; County Hall Woods; Springbank and Jubilee Park; Lakenham Way and railway line Bridge; Harford Victorian tip; wooded Harford Marshes; Danby Wood; Eaton Golf Course; Eaton Chalk Pit; Bluebell Wood; Blackdale Plantation; Twenty Acre and Bunker's Hill Wood; Chapel Break and Clover Hill natural areas; Charter Wood natural area; East Hills.

Character Area name:**Wooded Ridge****Site designations**

2 Ancient Woodland (Lion Wood (including Thorpe Ridge ancient woodlands); Bulmer Coppice)
2 Sites of Special Scientific Interest (SSSI) (Eaton Chalk Pit; St James' Pit).
3 Local Nature Reserves (LNR) (Danby Wood; Lion Wood; Mousehold Heath).
11 County Wildlife Sites (CWS) (1390 – Pinebanks; 1392 – Paine's Yard Wood, The Owlery & March Covert; 1463 – Lion Wood, Telegraph Plant'n & Rosary Cemetery; 1469 – Mousehold Heath & Valley Drive; 2013 – Twenty Acre & Bunkers Wood; 2014 – Danby Wood; 2015 – Eaton Chalk Pit; 2018 – County Hall Woods; 2041 – Racecourse Plantation; 2307 – Harford Bridge Marshes; 242 – East Hills).
1 County Geodiversity Sites (CGS) (Pinebanks).
10 candidate County Geodiversity Sites (cCGS) (The Dell Pit; School Lane Pit; Bracondale Pit; Bluebell Road Pit; Eaton Chalk Pit Complex; Gilman Road Chalk Pit; Eaton Golf Course Pit; Lollard's Pit; Mousehold Heath; St James' Pit SSSI).
10 Conservation Areas (Bracondale; Bowthorpe; Earlham; City Centre; St Matthews; Unthank and Christchurch; Thorpe Hamlet; Newmarket Road; Thorpe Ridge; Thorpe).

Thorpe Ridge has a concentration of designated sites that Bracondale Ridge does not. This includes the only currently designated Ancient Woodland within Norwich (Lion Wood). There are several woodland CWS, including the wooded Rosary Cemetery, throughout the ridge toward Mousehold Heath CWS/LNR. This connects to the wider countryside via Racecourse Plantation CWS in Thorpe St Andrew, North and March Culvert CWS at New Rackheath.

Bracondale Ridge contains a handful of CWS including County Hall Woods, Danby Wood (also an LNR), Harford Bridge, Eaton Chalk Pit (also a cCGS and SSSI for bat value) and out to the wider countryside at East Hills CWS.

Habitat diversity

Broadleaved, coniferous, and mixed woods (semi-natural and plantation); ancient woodland, mature and veteran trees; hedgerows; ponds.

Key Priority Habitats

(including Broad Habitats that could contain Priority Habitat)

Hedgerow or Field Margin
Lowland Mixed Deciduous Woodland
Waterbodies

Character Area name:	Wooded Ridge
Biodiversity Hotspots	<p>Whilst species richness is comparatively low, the habitat data for the Wooded Ridge BCA highlights its importance as a biodiversity corridor through the city. Biodiversity hotspots for the Wooded Ridge BCA are as follows:</p> <ul style="list-style-type: none"> • Northeast of the ridge around Mousehold Heath. • Danby Wood and Marston Marshes in Cringleford. • Twenty Acre and Bunkers Wood in West Earlham. <p>The rest of the ridge also has significant biodiversity value due to the habitats found there.</p>
Geodiversity features of note	<p>Various disused quarries, mostly Chalk Pits (some nationally important and two designated as SSSIs): Gilman Road Chalk Pit, St James' Pit (nationally important for fossils), Lollard's Pit, Bracondale Pit, Eaton Golf Course Pit, Eaton Chalk Pit complex, Bluebell Road Pit.</p> <p>Mousehold Heath is a disused quarry complex and periglacial plateau forming landform (various exposures of sand and gravel); notable dry valley landform.</p>
Geology and soils	<p>Geology: Bedrock - Chalk and edge of Crag (sand and gravel). Superficial - On the boundaries of sand and gravel, Diamicton, none (crag and chalk exposed).</p> <p>Soils: Acid sandy and loamy.</p>
Cultural features of note	<p>The wooded ridge is a known characteristic of Norwich and there are areas with promoted Wooded Ridge walking routes, especially in Bracondale and Thorpe Hamlet.</p>
Planning impacts or constraints	<p>Infill development. Crucial that BNG is within or adjacent to site here.</p>
Ecosystem goods and services - Provisioning Services	<p>Creating a Forest City; pollination; tree cover.</p>
Ecosystem goods and services - Regulation and Preservation Services	<p>Absorbing CO₂ and producing oxygen; climate regulation; pest regulation; reducing heat island effect; regulating waterflow.</p>
Ecosystem goods and services - Cultural Services	<p>Recreation e.g. for dog walking and commuting, sense of place/ wonder; sense of history; tranquility.</p>