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South Witham Marshes

Green Recovery Project Ecological Appraisal Report 2023

Contents

Revision History and Distribution List

Issue	Date	Status
Draft	23/03/2023	Final issue

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1. Introduction

Project Background

Jane Southey was instructed by Hill Holt Wood to undertake a habitat survey to inform the production of a Post-Project Ecological Appraisal Report for works undertaken at the South Witham Marshes in Lincoln (the site). The 4.2 ha site is located at Ordnance Survey Grid reference SK964678 and borders the right bank of the River Witham, south of the Newark Road, A1434.

A location map is given as Figure 1 in Appendix A. Historical recording of the site has been undertaken based on division of the site into three areas northern, central and southern which are given in Figure 2 in Appendix A and these areas are referred to in this report.

The site was acquired by Hill Holt Wood in 2015 from Lindum Homes who have constructed a housing estate on the adjacent land to the west. The site includes a flood attenuation pond for the housing estate. The site is a Lincolnshire Local Wildlife Site (LWS).

For the last 21 months conservation work on the site has been funded by the Government's Green Recovery Challenge Fund Round 2 and was one of ninety projects awarded a grant to accelerate the implementation of nature-based projects. The Green Recovery Challenge Fund was developed by Defra and its Arm's-Length Bodies and delivered by The National Lottery Heritage Fund in partnership with Natural England, the Environment Agency and the Forestry Commission. The project outcomes and objectives are given in Appendix B.

The conservation works on the site have been undertaken by a variety of groups with the aim to both maintain and improve the habitats and species present on the site and provide a positive experience and learning opportunity for conservation volunteers and this report provides a summary of those efforts.

2. Survey Methodology

Aim

The aim of the habitat survey was to provide a habitat map detailing the type and extent of habitats present on the Site. A detailed assessment of the quality of the habitats on the Site could not be robustly undertaken during a winter survey.

Survey Limitations

The habitat survey was undertaken on February the 10th and he 10th of March 2023 which is outside the optimal time of year for a habitat survey which was further exacerbated by the very dry summer in 2022. This was not considered to be a major limitation on mapping the type and extent of habitats present. A detailed assessment of the quality of the habitats on the site was not needed for this assessment. Additionally, there are other recent data gathered available on the plant and animal species which have been used to inform this report.

Survey Methodology

A habitat survey was undertaken based on the standard Phase 1 Habitat Survey methodology which includes mapping the habitat type according to the definitions in the Handbook for Phase 1 Habitat Survey (Joint Nature Conservation Committee, 2010); noting dominant species; and providing target notes (indicated as Tn) where appropriate to identify and refer to particular features/species both in the field and then in the report.

The site was walked, and plant species present were recorded along with an indication of abundance using the DAFOR abundance system as follows:

D = dominant

A = abundant

F = frequent

O = occasional

R = rare

In some instances where species were concentrated in a few areas in larger amounts the word “locally” (L) was used to describe the spatial dominance of that species in discrete local areas. These terms are used in the habitat descriptions after each species.

3. Habitat Survey Results

The site is dominated by broad-leaved woodland followed by neutral grassland and smaller areas of scrub, various wetlands, hedgerow, and “other” habitat.

The main habitats identified are given below in decreasing order of spatial area along with brief habitat descriptions. The three areas (northern, central and southern) referred to are given in Appendix A as Figure 2 and the habitat map is given in Appendix A as Figure 3. All plant names are given according to Stace (2019). Photographs are given in Appendix C.

Broad-leaved woodland (BLW)

There are three main stands of BLW with the oldest and most extensive stand in the south T5, dominated by scrubby woodland with much tall leggy hawthorn *Cratageus monogyna* and silver birch *Betula pendula* F; ash *Fraxinus excelsior* O-LF and occasional semi-mature pedunculate oak *Quercus robur*, especially in the north-east corner where oak dominates with a fairly open scrub layer.

Crack and grey willow species *Salix x fragilis* sens. lat. and *S.cinerea* both LF; Elderberry *Sambucus nigra* LF, Dog rose *Rosa canina* agg O, red currant *Ribes rubrum* O, and bramble *Rubus fruticosus* agg LF were also variously recorded across the BLW stand. Silver birch was more evident in the western half of the woodland where it was drier and willows were more common on the eastern side closer to the river where it was slightly wetter

The winter ground flora included stinging nettles *Urtica dioica* F, ground ivy *Glechoma hederacea O,* broad buckler fern *Dryopteris dilatata* O and Male-fern *Dryopteris filix-mas* O.

Small areas of standing water were evident on the second survey visit in March, typically bare of vegetation and in association with willow scrub and trees.

The central BLW stand T9 and T10 comprises mature/semi-mature crack willow over stinging nettle merging northwards into dense young silver birch woodland over sparse tufted hair grass *Deschampsia caespitosa* O and Yorkshire fog *Holcus lanatus* O. The latter northern community is also the composition of the small northern BLW stand adjacent to the board walk.

Neutral grassland

The largest managed area of neutral grassland T1 lies in the central area between two woodland areas. A group of semi-mature, pedunculate oak occur on the western edge.

The grassland was cut late summer 2022 and the arisings removed and stockpiled in two areas (see T8). Plant records for this fairly coarse dry sward include species such as black knapweed *Centaurium nigra* O-LF*,* common sorrel *Rumex acetosa* O, lady’s bedstraw *Galium verum O,* Yarrow *Achillea millefolium* O-LF, common bent *Agrostis capillaris* 0-LF, *creeping bent A.stolonifera* F*,* Yorkshire fog LF, cocksfoot *Dactylis glomeratus* F, False Oat-grass *Arrhenatherum elatius* F, red fescue *Festuca rubra* agg O, tufted Hair-grass LF, and Tormentil *Potentilla erecta* R.

There were also damper areas with species such as meadow sweet greater bird’s foot trefoil *Lotus pedunculatus*, meadow sweet *Filipendula ulmaria*, tufted hair grass and rush species. The plant assemblage was good for a winter survey and indicates a species-rich grassland and this area appeared to be the most diverse of the neutral grassland stands on the site.

Areas of neutral grassland also occur at the northern end. The western grassland area T 19 appeared to be uncut and is used for group woodcraft activities and has some small areas of a scrub and tall herbs. False oat grass F, cocksfoot F, rush species *Juncus* spp LF, creeping bent O, creeping thistle *Cirsium arvensis* LF, Teasel *Dipsacus fullonum* O, red fescue O,

tufted hair grass O, rough stalked meadow grass *Poa trivialis* O and rosebay willow herb *Chaemerion angustifolium* LD were amongst the species recorded.

Grassland T11 contained within brash walling was recently cleared of scrub and young trees and is damper with species recorded in the open, short sward including tufted hair grass A, soft rush F, great willow herb O, Yorkshire fog O-LF, meadow sweet O, creeping bent O, Teasel *Dipsacus fullonum*, ground ivy, marsh bedstraw *Galium palustre,* greater birds foot trefoil *Lotus pedunculatus* O, bramble O and willow spp. This damp grassland habitat also occurs in the managed strips parallel to drain T12, but with the addition of reed canary grass *Phalaris arundinaceae* F.

Neutral grassland T15 also extends northwards from the drain edge up to small triangle of BLW dissected by brash walled footpath and brash piles created for wildlife. This area was also cut at the end of summer. Species recorded included Yorkshire fog, false oat grass, creeping bent, red fescue and greater birds foot trefoil along with moss species such as Pointed Spear-moss *Calliergonella cuspidata.*

The foopaths through the northern neutral grassland are not mown and are kept short through the effects of foot fall. Much of the footpaths at the northern end are bordered by low brash fencing.

Dense and scattered scrub

Dense scrub stands occur is several locations across the site and largely comprise very tall bramble D with and hawthorn O along the edges of the BLW. The discontinuous and tall (two metres plus) scrub band along the western edge north of the Site entrance similarly comprises dominant bramble with smaller amounts of black thorn *Prunus spinosa* 0 and hawthorn. The bramble dominated scrub stand at the site entrance has been managed recently and is largely less than one metre high.

The scrub band south of the site entrance is similar, but more open and also includes semi-mature pedunculate oak over a species-poor ground flora with stinging nettle, Yorkshire fog, cultivated daffodils *Narcissus* spp and snow drops *Galanthus nivalis*.

Dense bramble borders the southern side of BLW T9 and there is a wide very tall stand of bramble scrub with some specimen hawthorn bushes which straddles drain T6. Recent management efforts have reduced the northern extent of this scrub into the species-rich grassland T1.

There is also minor scattered bramble scrub within the neutral grassland T19.

Swamp

A small area of common reed *Phragmites australis* occurs at the western end of the drain T6.

A reed band lies between the Witham flood bank and the flood compensation area, marsh T13. Species recorded include reed canary grass *Phalaris arundinaceae*, reed sweet grass *Glyceria maxima* and bulrush *Typha latifolia* and lesser bulrush *Typha angustifolia*.

Marsh

The flood compensation area created for the housing estate T13 is a diverse marsh area which includes the non-native and very invasive, New Zealand Pygmy weed *Crassula helmsii* A along with occasional to locally frequent records for creeping bent, rush species *Juncus* spp.,water forget me not *Myosotis scorpioides*, Gypsywort *Lycopus europaeus,* Purple-loosestrife *Lythrum salicaria,* Creeping-Jenny *Lysimachia nummularia,* Water Mint *Mentha aquatica,* Tubular Water-dropwort *Oenanthe fistulosa* and Amphibious Bistort

Persicaria amphibia. The eastern edge merges into the swamp with increasing amounts of swamp species such as reed canary grass, bulrush and reed sweet grass.

Running water

Two ditches T6 and T12 run west to east through the site.

Drain T6 runs through BLW T5 and has a small stand of common reed *Phragmite australis* D with reed canary grass *Phalaris arundinacea* O at the western end. It is 1 to 1.5m wide and at the time of survey was very shallow with less than 5cm of water. The drain is shaded for the most part and species recorded in the shaded woodland included flote grass *Glyceria fluitans* O and brook lime *Veronica beccabunca* O. The drain opens out at the eastern end where there was great pond sedge *Carex riparia* LD, flag iris *Iris pseudocorus* O, reed sweet grass *Glyceria maxima* LF and water cress *Nasturtium officinale* agg.

T12 runs south of the attenuation pond T16 taking excess water from the north. It is fenced and along with drain T6 outfalls into the north south drain that borders the eastern side of the site. The drain is 1-1.5m wide and circa 0.5m deep with marginal species including branched bur reed *Sparganium erectum*, reed sweet grass, reed canary grass, marsh bedstraw, lesser bulrush *Typha angustifolia* and New Zealand swamp cress. Aquatic species recorded include New Zealand swamp cress, notably water violet *Hottonia palustris*, tubular water dropwort and ivy leaved and common duckweed *Lemna trisulca* and *L.minor.*

Other

Area T7 within the southern BLW stand T5 is a small newly established management area and was dominated by cut bramble stems with occasional rush spp., stinging nettles, Yorkshire fog, creeping bent and bryophytes. The scrub removal in 2022 was intended to encourage the development of grassland (pers comm Oliver Woodman. Hill Holt team).

Areas 8 are two separate piles of grassland arisings deposited after SIG T1 was cut. These areas have been created to serve a dual purpose: dispose of arisings and act as biodiversity refuges for species such as small mammals and potential egg laying areas for grass snake *Natrix helvetica.*

Hedgerow

A species-poor intact hedge borders the western site perimeter alongside the housing estate and records include hawthorn D, and occasional dogwood *Cornus sanguineus*, blackthorn, dog rose, bramble, and garden privet *Ligustrum.ovalis.*

Amenity grassland

There is a small amount of species-poor amenity grassland along the western footpath.

Hardstanding

A small area of hardstanding occurs around the bench within the neutral grassland T1 and along the crushed limestone footpath T22 that borders the western side of that area.

4. Management and Biodiversity Enhancement

The conservation improvement works on the site have been undertaken by a variety of groups providing opportunities for conservation volunteers of all ages, health and well-being focussed groups of all ages for people suffering from mental health issues, young people of all ages and needs including primary schools, home educators, special educational needs schools, other schools, further education, and universities. Undertaking such conservation works in the outdoors provides a powerful medium to assist with mental health issues, develop an awareness of the importance of wildlife while developing a range of skills including safe tool usage, green carpentry and forestry skills, team working and communication.

Informal discussions during the habitat surveys with local walkers using the site indicate approval of the works undertaken in terms of visitor access and amenity and enthusiasm for the conservation works being undertaken especially providing opportunities for the volunteers to learn new skills and improve their mental well being.

A summary of the management and biodiversity enhancement undertaken in the 21-month period of the Green Recovery Project are summarised in Table 1 below.

Tasks undertaken include the massive job of hand cutting and raking the neutral grassland which in the absence of grazing stock is an essential process to maintain, and potentially improve the diversity of the grassland and ensure that it doesn't scrub over.

A range of wildlife enhancement features such as bird and bat boxes were erected, and the locations and further details are also given below and in Appendix D. The bench T24 has been created by volunteers using sustainably sourced timber from land that Hill Holt team manages. The construction of these items for this project has provided volunteers with a chance to develop forestry, carpentry and organisational skills.

Table 1 Summary of Improvement and Maintenance Measures for Wildlife and Site Visitors

Activity	Receptor/Comments	Location (see Appendix A Figure 3)	Area/ Number
Summer cut and rake of neutral grassland	Neutral grassland	T1	8,714m^2
Scrub removal from neutral grassland margins	Neutral grassland	T1	150 m^2
Creation of wildlife refugia	Small mammals and grass snakes	T8	Two See *Photograph 3
Scrub removal	Creation of potential new grassland area	T7, T15, T11,	2,233 m^2 See Photograph 7
Scrub reduction	Scrub rejuvenated through cutting back and site made	T21	191m^2

	more welcoming to visitors at entrance		
Scrub and tree management	Humans Tree and scrub managed, and canopy lifted in places to create open areas for visitor activities and maintain safe footpath access, Woody arisings stacked to create biodiversity features/refugia	T5	See Photographs 8 and 14
Tree and scrub removal	Grassland created	T11, T15	2,152m^2
Creation of brash edging to footpaths and brash walls	General biodiversity features. Brash arisings are woven into boundary fencing or as brash wall features to help sustainably dispose of excess brash on site and in so doing create wildlife refugia. This edging also keeps visitors off sensitive grassland areas.	Feature locations include T5, T15, T11 and T19	376m See photographs 5 and 7
Board walk	Humans and marsh Enable safe all weather foot access across the marsh avoiding physical damage to the attenuation marsh with no interference with attenuation function. Also provides an educational pond dipping platform during high water periods	T13	one 50m See Photograph 9
Robin nest boxes	Nest boxes for robin and other open shelf nesters	See Appendix D	four
Tit nest boxes	Nest boxes for hole nesting species such as blue tit	See Appendix D	13
Kestrel nest box	Single nest box erected for kestrel	See Appendix D	one
Birch clad nest boxes	Birch clad boxes for small hole nesting bird species	See Appendix D	five
Hollowed out birch	Shallow hole drilled birch log for a range of fauna	See Appendix D	eight

Bug hotel	Construction of a range of woody features for invertebrates	Feature locations include T5, T15, T11 and T19	No exact data. See Photograph 14
All weather limestone access path	Humans Enable safe all weather foot access	T23	135m See Photograph 1
New footbridges	Humans Enable safe all weather foot access across a low-lying area and across drain T6	T20	Two See T20 and T27 See Photographs 11 and 12
Bench and hardstanding	Humans and fauna Seating area for site visitors and hardstanding provides a useful open area for invertebrates to warm up before flight.	T 24	One See Photograph 14
Information boards to help divert footfall	Information boards to discourage multi-access routes across sensitive meadow habitat and drain weir	T3, T25, T26	Three See Photographs 2 and 6
Hedgerow maintenance	Humans Hedgerow height maintained to ensure views across the reserve for adjacent houses and to ensure clear access along the parallel grassy footpath.	T17	147m

*Photographs given in Appendix C.

5. Existing Ecological Data and Conservation Status

Local Wildlife Site (LWS)

The primary aim of a LWS is to protect local biodiversity. Although these areas receive no legal protection, but they are given some degree of protection through the planning system. LWS's support habitats or species that are of County significance, but are not the best examples in the County, performing as whole, an important biodiversity linkage function. The best areas are assigned SSSI status and statutory designation.

The site was accepted as a Lincolnshire Local Wildlife Site (LWS) in 2008 and in 2020 (based on data collected during August 2019) the designation was reconfirmed based on quality of the LWS categories NG1 neutral grassland, FW2 running or standing water habitat and We2 wetlands present on the site.

The conservation work undertaken as part of the Green Recovery Project will contribute towards the maintenance of the designation especially the grassland which has had considerable management effort aimed at it, to both expand the existing areas of grassland eg T 15, T11 and T7 and maintaining the main meadow T1.

The problem of the invasive New Zealand swamp cress in the northern marsh T 13 and ditch T12 is currently being explored to define suitable management. The continued presence and potential expansion of this species presents a significant management issue for the site team.

Drain T12 has been fenced for visitor safety.

Existing Ecological Data Sets

The most recent existing survey data for the site undertaken at an optimum time of year are those collected in August 2019 by the Greater Lincolnshire Wildlife Partnership (GNLP) to re-assess the LWS status.

The Hill Holt team working with volunteers also undertook an ecological survey at the outset of the Green Recovery Project in November 2021 which provided an educational opportunity for site volunteers to participate in an ecological survey and develop identification skills and understand more about the habitats and component species that they were working on and why. Potentially the development of those skills may help inspire them to undertake environmental studies or help secure further work for them.

The 2019 GNLP results and the Hill Holt team 2021 survey results are jointly given in Appendix D. The plant species recorded in 2019 and 2021 are very similar. The faunal and fungal records are greater for the 2021 survey, but the 2019 survey would only have recorded incidental faunal records picked up while doing the botanical survey for the LWS assessment.

Discussion and recommendations

There is good evidence that the conservation works undertaken satisfy the aims of the Green Recovery Project (see Appendix B).

The 2019 and 2021 data sets coupled with the results of the 2023 habitat survey help to demonstrate that valuable work has been undertaken as part of the Green Recovery Project

and a wide range of fauna, flora and habitats has been recorded, especially considering the small size of the site.

Scrub invasion is being held back in the existing neutral grasslands and new grassland areas are being actively created (eg: T7, T15, Appendix A Figure 2). The February 2023 habitat survey was undertaken outside the optimum time of year, but the main meadow T1 is a good example of a neutral grassland and has a range of typical damp and dry neutral grassland indicator species.

The broad-leaved woodland areas are being managed to ensure visitor access by cutting back vegetation from footpaths and carrying out canopy lifting within BLW T5 to provide areas where visitors can gather and undertake forest educational and recreational activities.

A range of wildlife enhancement features including bug hotels, bat and bird boxes, linear walls of woody arisings and grass heaps have been constructed. Visitor access has been improved through foot path improvements such as crushed limestone surfacing and a foot bridge and an attractive hand-made timber bench has been installed on the edge of the main meadow for visitor enjoyment.

Much of the conservation improvement work has been undertaken by volunteer groups providing educational opportunities to learn new skills in the great outdoors to the benefit of developing improved mental health, team working, interpersonal skills and personal fitness.

Solutions are being sought to help manage the invasive New Zealand Swamp cress.

The plant data set for the site would benefit from an in-season botanical survey (June to August) in 2023 to document the post project effects, especially in areas such as the neutral grassland where much management effort has been made.

References

Greater Lincolnshire Wildlife Partnership (2020) South Witham Marshes LWS update survey and assessment (unpublished letter report)

JNCC (2010) Handbook for Phase 1 Habitat Survey, Joint Nature Conservation Committee

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Wildlife Sites Review Group (2016). *Local Wildlife Sites, Guidelines for the Historic County of Lincolnshire (Lincolnshire, North Lincolnshire and North East Lincolnshire).* Lincolnshire Biodiversity Action Plan Partnership

Appendix A Figures

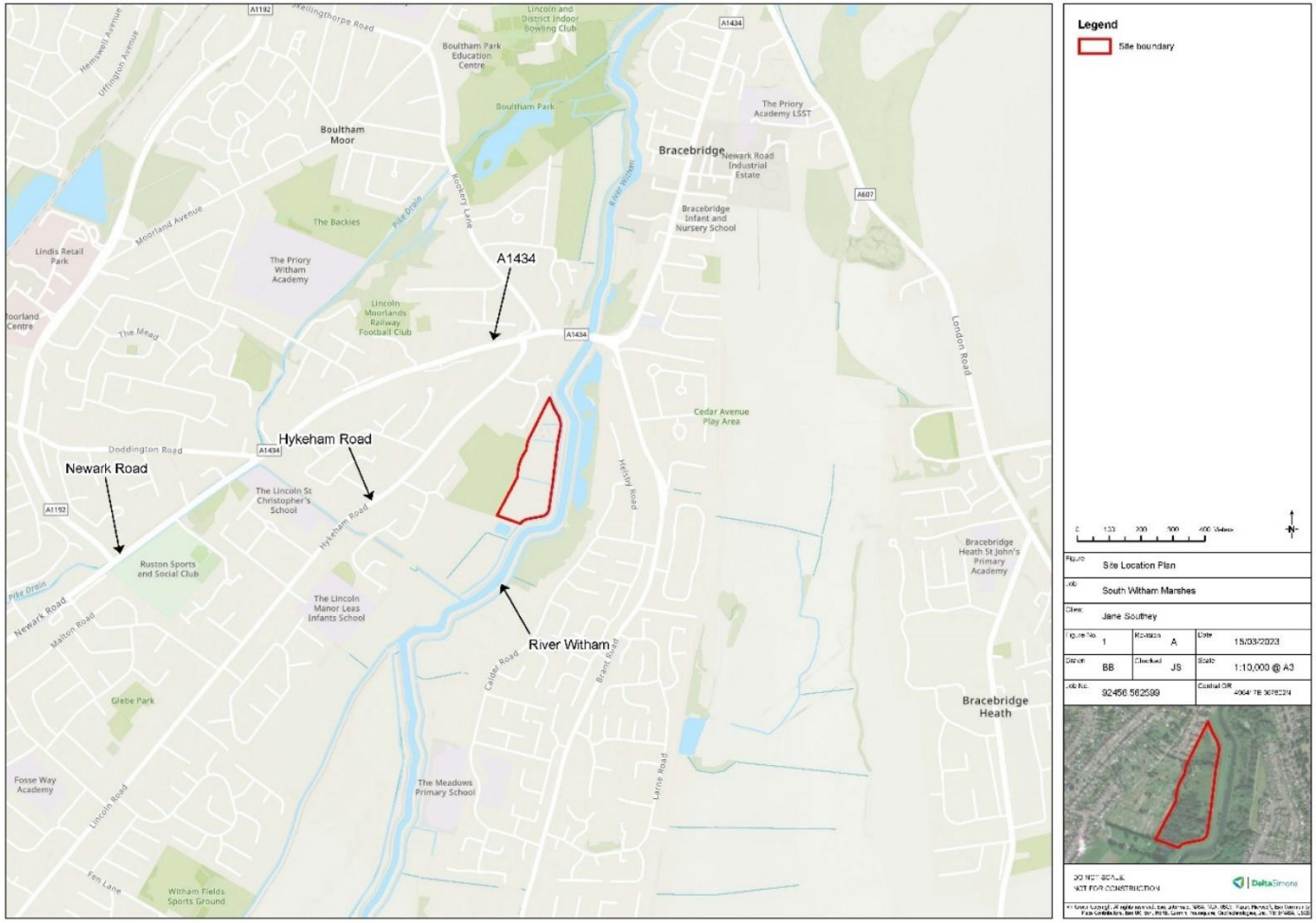


Figure 1 Location Plan

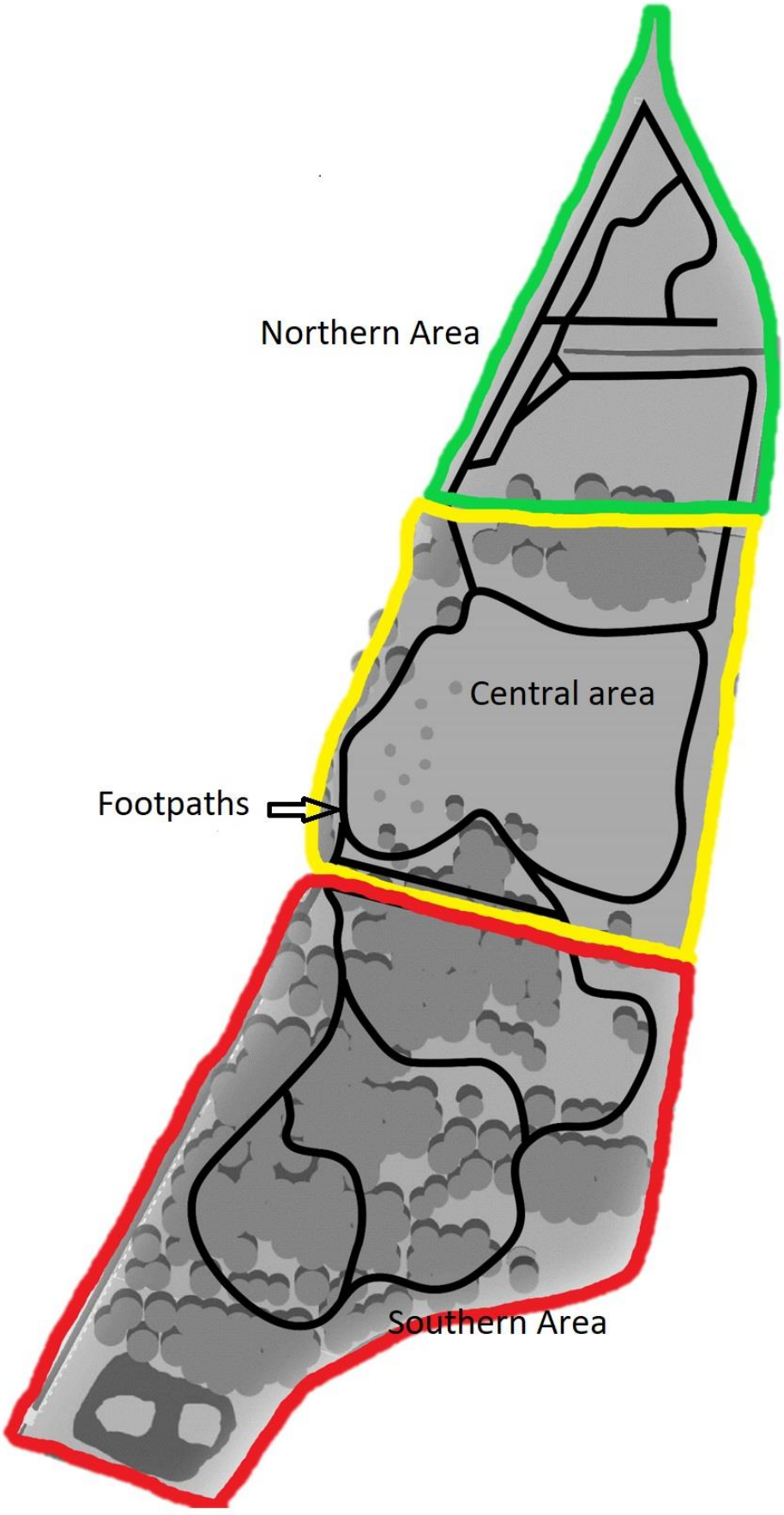


Figure 2 South Witham Marshes Management and Recording Areas

Figure 3 Habitat map

Appendix B Green Recovery Project Outcomes and Output Measures

1. Nature conservation and restoration

Example Project Outcomes

Heritage will be in a better condition, as a result of (for example):

- new or restored wildlife-rich/priority habitats
- existing wildlife habitats protected and enhanced
- wildlife habitats expanded or more connected
- actions to support species (particularly pollinators and other native species)

Example Outputs – what are your expected results by March 2023?

- area of land/water prepared or planted to support new habitat or species
- area of woodland brought into active management to improve condition
- area of natural habitats now joined up to create wildlife corridors
- area and number of wildlife ponds
- measures implemented as part of river or waterways restoration plans and fish passageways

2. Nature-based solutions for climate change mitigation and/or adaptation

Example Project Outcomes

Heritage will be in a better condition, as a result of (for example):

- habitat restored or created for enhanced carbon sequestration and storage and/or improved resilience to climate risks
- nature and land use change supporting better resource management, reduce carbon emissions or improve quality e.g. water, air
- nature-based solutions to support climate change adaptation, including flood mitigation or coastal erosion management
- increased investment in Natural Capital to deliver solutions
- use of green infrastructure to support enhanced river or urban cooling alongside other adaptive benefits to urban areas
- improvement in soil health and associated benefits for biodiversity, water retention, agriculture etc

Example Outputs – what are your expected results by March 2023?

- number, area and/or density of trees planted, or woodland brought under active management
- land management assessed for carbon budget and actions implemented to reduce emissions

- measures implemented to improve soil health
- volume of natural water storage secured, or area of land managed for water quality
- area of catchment roughened for water slowing
- area of land and habitats identified, prepared or undergoing changes to increase resilience to climate change risks, following assessment of local vulnerabilitie

3. Connecting people with nature

Example Project Outcomes

- engaging or empowering community to support nature-based objectives
- access to nature improved
- people connecting with nature to increase understanding and/or improve wellbeing
- improving or increasing nature where people live

Example Outputs – what are your expected results by March 2023?

- relative position along the community engagement standards scale (outreach/consult/involve/collaborate/shared leadership)
- opportunities for volunteering for nature or citizen science, such as species monitoring
- increase in numbers and diversity of people engaging with nature or visiting natural features
- length of footpath or area of open access land now accessible
- area of new nature identified/ prepared or introduced within 200m of residential area
- number of features supporting wildlife in schools, parks and residential areas

4. Jobs/local economic impact and financial sustainability

Example Project Outcomes

- people gain or retain employment in the environment sector
- skills developed or retained within the organisation
- additional income for local businesses
- greater local involvement in your organisation
- improved governance or partnership arrangements
- increased financial resilience

Example outputs – what are you expecting to achieve by March 2023?

- number of jobs created or retained
- skills, expertise or qualifications gained

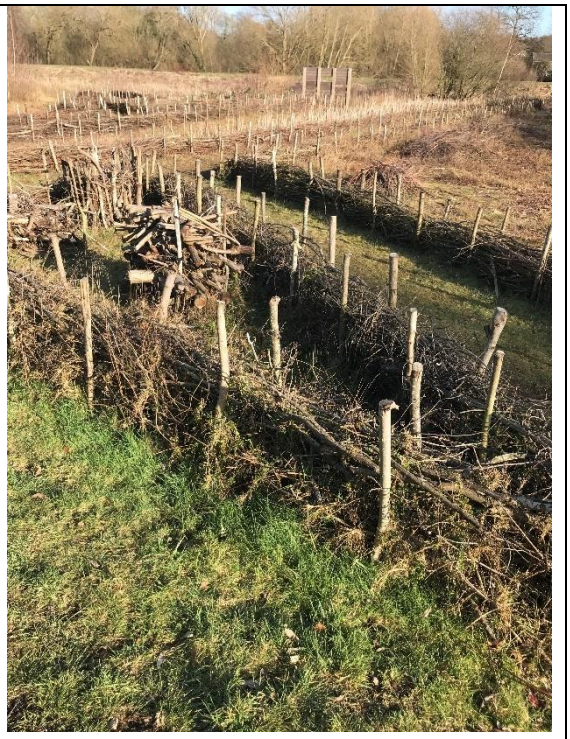
- number of businesses supported
- increase in visitor or volunteer numbers
- development of relationships to secure income streams

Appendix C Photographs

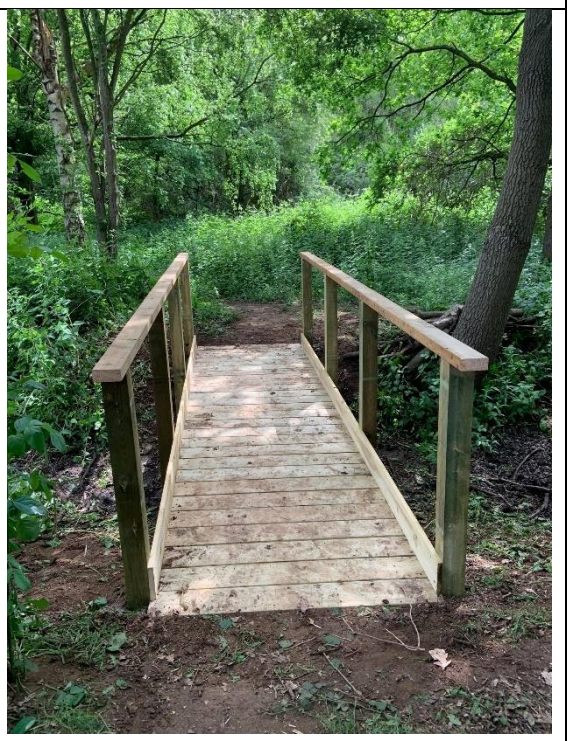
Photograph 1: View from site notice board across the main meadow and to the new seating area	
Photograph 2: New signage and brash fencing installed to deter footfall over the boundary drain T26	

Photograph 3: Grass arisings pile T8 by Drain T6. Such areas are ideal for grass snakes to breed in and for small mammals to burrow in	
Photograph 4: View over drain T12 to bird screen and attenuation pond	

Photograph 5: Brash edging and features in T15 grassland. Such features help to dispose of brash on site and serve as wildlife habitats	
Photograph 6: Signage to deter walkers from crossing the main meadow T1. The sign has been successful with reduced footfall across the meadow on undesignated footpaths obvious when compared to foot-wear on main footpath.	

Photograph 7: Wildlife refugia (timber stacks) and newly cleared grassland area with brash fencing on rear right of photograph	
Photograph 8: Open woodland area with brash wall in background of photograph serving as a meeting place for woodland activities	

Photograph 9: Boardwalk over marsh	
Photograph 10: Crushed limestone footpath along western edge of the main meadow T1	

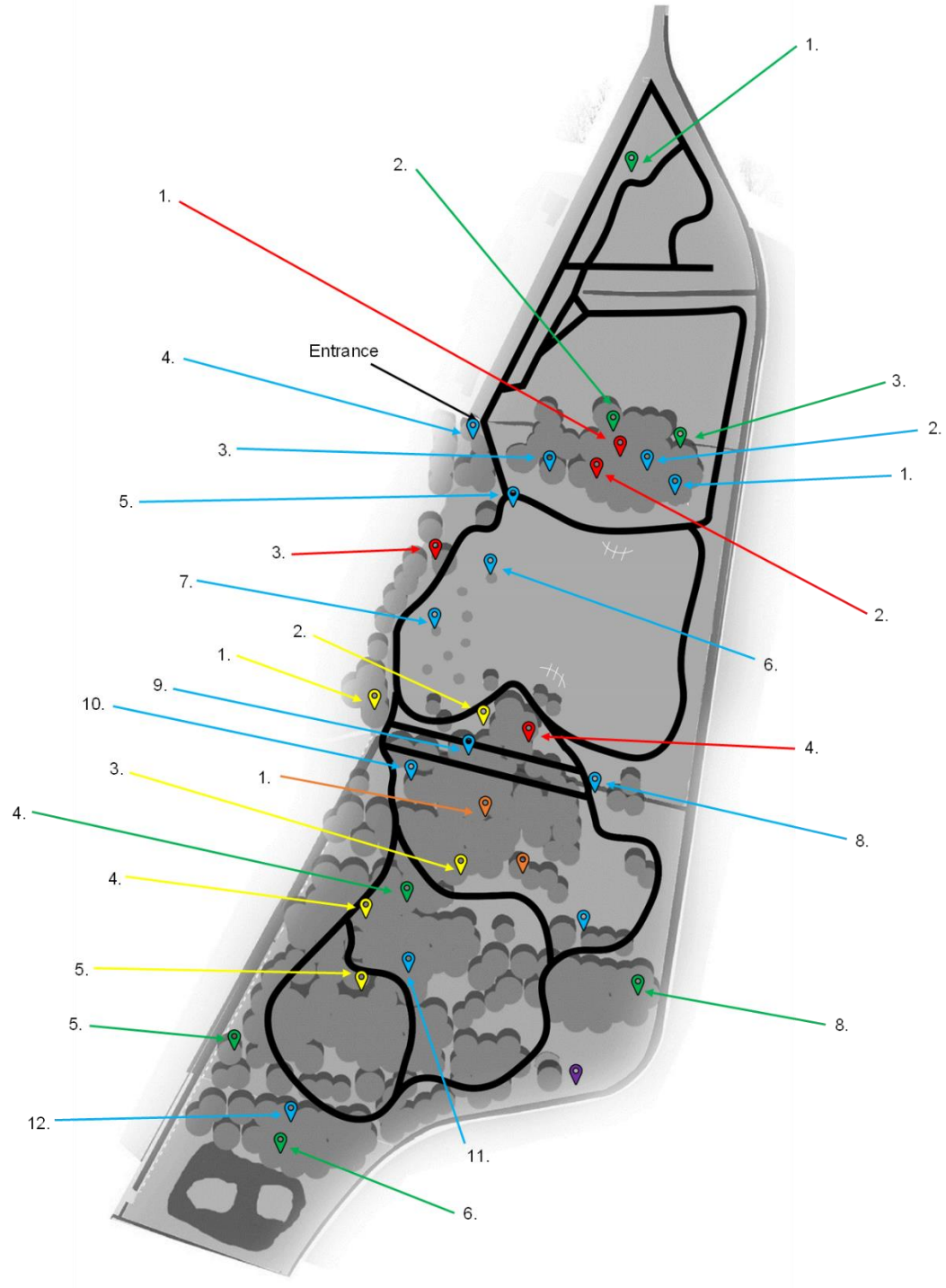
Photograph 11: Footbridge T20 in BLW T10	
Photograph 12: Footbridge T27 over drain T6 in BLW T5	

Photograph 13: Old stump with turkey tail mushroom growing on it. Many species of fungi and bryophytes thrive on old wood and woody brash arisings are left in the woodland to provide this habitat over time	
Photograph 14: Bug Hotel and brash walling	

Photograph 15: Blue tit box	
Photograph 16: New bench looking over managed main meadow to BLW and bramble scrub and Lincoln Cliff beyond	

Appendix D Biodiversity Enhancement Features:

South Witham Marsh Bird and Bat Box locations



Key

Blue tit box		Kestrel box	
Birch clad box		Hollowed out birch log	
Bat Box		Robin box	

Bird and Bat box photographs

Box type	Map locator	Photographs	Photographs
Blue tit box			
Birch clad box			
Bat Box			
Kestrel box			
Hollowed out birch log			

Robin box			

Appendix E Existing Ecological Data

See Appendix A Figure 2 for survey area locations. Data is given below for GLNP (2019) and Wilson et al (2021) which are the most recent ecological survey data sets for the site.

Northern field			2019	2021
Scientific Name	**English Name**	**Group**		
Agrostis capillaris	Common Bent	flowering plant	x	x
Agrostis stolonifera	Creeping Bent	flowering plant	x	x
Alisma plantago-aquatica	Water-plantain	flowering plant	x	x
Angelica sylvestris	Wild Angelica	flowering plant	x	x
Arrhenatherum elatius	False Oat-grass	flowering plant	x	x
Artemisia vulgaris	Mugwort	flowering plant	x	x
Betula pendula	Silver Birch	flowering plant	x	x
Calystegia sepium	Hedge Bindweed	flowering plant	x	x
Carex flacca	Glaucous Sedge	flowering plant	x	x
Carex hirta	Hairy Sedge	flowering plant	x	x
Carex otrubae	False Fox-sedge	flowering plant	x	
Centaurium erythraea	Common Centuary	flowering plant	x	x
Cerastium fontanum	Common Mouse-ear	flowering plant	x	x
Chamaenerion angustifolium	Rosebay Willowherb	flowering plant	x	x
Cirsium arvense	Creeping Thistle	flowering plant	x	x
Crassula helmsii	New Zealand Pigmyweed	flowering plant	x	x
Crepis capillaris	Smooth Hawk's-beard	flowering plant	x	x
Dactylis glomerata	Cock's-foot	flowering plant	x	x
Deschampsia cespitosa	Tufted Hair-grass	flowering plant	x	x

Dipsacus fullonum	Teasel	flowering plant	x	x
Elymus repens	Common Couch	flowering plant	x	x
Epilobium hirsutum	Great Willowherb	flowering plant	x	x
Equisetum fluviatile	Water Horsetail	flowering plant	x	x
Festuca rubra	Red Fescue	flowering plant	x	x
Filipendula ulmaria	Meadowsweet	flowering plant	x	x
Galium aparine	Cleavers	flowering plant	x	x
Galium palustre	Common Marsh-bedstraw	flowering plant	x	x
Glechoma hederacea	Ground-ivy	flowering plant	x	x
Helosciadium nodiflorum	Fool's-water-cress	flowering plant	x	x
Holcus lanatus	Yorkshire-fog	flowering plant	x	x
Hottonia palustris	Water-violet	flowering plant	x	x
Hypochaeris radicata	Cat's-ear	flowering plant	x	x
Jacobaea vulgaris	Common Ragwort	flowering plant	x	x
Juncus articulatus	Sharp-flowered Rush	flowering plant	x	x
Juncus conglomeratus	Compact Rush	flowering plant	x	x
Juncus effusus	Soft-rush	flowering plant	x	x
Lathyrus pratensis	Meadow Vetchling	flowering plant	x	x
Lemna minor	Common Duckweed	flowering plant	x	x
Lemna trisulca	Ivy-leaved Duckweed	flowering plant	x	x
Lipandra polysperma	Many-seeded Goosefoot	flowering plant	x	x
Lolium perenne	Perennial Rye-grass	flowering plant	x	x

Lotus pedunculatus	Greater Bird's-foot-trefoil	flowering plant	x	x
Lycopus europaeus	Gypsywort	flowering plant	x	x
Lysimachia nummularia	Creeping-Jenny	flowering plant	x	x
Lythrum salicaria	Purple-loosestrife	flowering plant	x	x
Mentha aquatica	Water Mint	flowering plant	x	x
Mentha arvensis	Corn Mint	flowering plant	x	x
Myosotis scorpioides	Water Forget-me-not	flowering plant	x	x
Oenanthe fistulosa	Tubular Water-dropwort	flowering plant	x	x
Persicaria amphibia	Amphibious Bistort	flowering plant	x	x
Phalaris arundinacea	Reed Canary-grass	flowering plant	x	x
Pinus sp.	Pine species	conifer	x	
Populus alba	White Poplar	flowering plant	x	x
Prunus spinosa	Blackthorn	flowering plant	x	x
Ranunculus acris	Meadow Buttercup	flowering plant	x	x
Ranunculus subgenus *Batrachium*	Water-crowfoot species	flowering plant	x	x
Ranunculus repens	Creeping Buttercup	flowering plant	x	x
Rubus fruticosus agg.	Bramble	flowering plant	x	x
Rumex acetosa	Common Sorrel	flowering plant	x	x
Rumex conglomeratus	Clustered Dock	flowering plant	x	x
Rumex obtusifolius	Broad-leaved Dock	flowering plant	x	x
Rumex sanguineus	Wood Dock	flowering plant	x	x
Salix caprea	Goat Willow	flowering plant	x	x
Salix cinerea	Grey Willow	flowering plant	x	x

Salix x fragilis sens. lat.	Crack-willow	flowering plant	x	x
Sanguisorba officinalis	Great Burnet	flowering plant	x	x
Solidago canadensis/gigantea	Canadian/Early Goldenrod	flowering plant	x	x
Sonchus arvensis	Perennial Sowthistle	flowering plant	x	x
Stachys palustris	Marsh Woundwort	flowering plant	x	x
Stachys sylvatica	Hedge Woundwort	flowering plant	x	x
Stellaria aquatica	Water Chickweed	flowering plant	x	x
Stellaria graminea	Lesser Stitchwort	flowering plant	x	x
Symphytum sp.	Comfrey species	flowering plant	x	x
Tanacetum vulgare	Tansy	flowering plant	x	x
Torilis japonica	Upright Hedge-parsley	flowering plant	x	x
Trifolium pratense	Red Clover	flowering plant	x	x
Trifolium repens	White Clover	flowering plant	x	x
Typha angustifolia	Lesser Bulrush	flowering plant	x	x
Typha latifolia	Bulrush	flowering plant	x	x
Urtica dioica	Common Nettle	flowering plant	x	x
Veronica catenata	Pink Water-speedwell	flowering plant	x	x
Vicia cracca	Tufted Vetch	flowering plant	x	x
Columba palumbus	Wood Pigeon	bird	x	x
Erithacus rubecula	Robin	bird		x
Galinago galinago	Common snipe			x
Prunella modularis	Dunnock	bird		x
Sylvia communis	Common Whitethroat	bird	x	x

Troglodytes troglodytes	Wren	bird	x	x
Turdus merula	Blackbird	bird	x	x
Oryctolagus cuniculus	Rabbit	mammal		x
Erinaceus europaeus	Hedgehog	mammal		x
Vulpes vulpes	Fox	mammal		x
Talpa europaea	European Mole	mammal		x
Muntiacus reevesi	Muntjac deer	mammal		x
Aphantopus hyperantus	Ringlet	butterfly	x	x
Pararge aegeria	Speckled Wood	butterfly	x	x
Pyronia tithonus	Gatekeeper	butterfly	x	x
Aeshna grandis	Brown Hawker	dragonfly	x	x
Notostrias elongate	Elongate grass bug			
Chiasmia clathrata	Latticed Heath	moth	x	x
Ero Aphana	Pirate Spider	spider		x
Coreus marginatus	Dock Bug	bug		x
Stenodema calcarata	Elongate Grass bugs	bug		x
Atyaephyra desmaresti	Freshwater shrimp (Drain)	Crustacean		x
Dytiscus marginalis	Great Diving beetle larvae (Drain)	Beetle		x
Asellus aquaticus	Water Hog louse (Drain)	Crustacean		x
Agabus bipustulatus	Common Black Diving beetle (Drain	beetle		x
Chlorophyllum rhacodes	Shaggy Parasol	Fungi		x

Hebeloma spp	Poison Pie	Fungi		x
Lepiota cristata	Stinking Parasol	Fungi		x
Lepiota subincarnata	Fatal Dapperling	Fungi		x

x

Central Area			2019	2021
Scientific Name	**English Name**	**Group**		
Achillea millefolium	Yarrow	flowering plant	x	X
Achillea ptarmica	Sneezewort	flowering plant	x	X
Aegopodium podagraria	Ground-elder	flowering plant	x	x
Agrostis canina sens. lat.	Velvet/Brown Bent	flowering plant	x	x
Agrostis capillaris	Common Bent	flowering plant	x	X
Agrostis stolonifera	Creeping Bent	flowering plant	x	x
Alopecurus pratensis	Meadow Foxtail	flowering plant	x	x
Angelica sylvestris	Wild Angelica	flowering plant	x	x
Anthoxanthum odoratum	Sweet Vernal-grass	flowering plant	x	X
Anthriscus sylvestris	Cow Parsley	flowering plant	x	X
Arctium minus sens. lat.	Lesser Burdock	flowering plant	x	x
Arrhenatherum elatius	False Oat-grass	flowering plant	x	x
Calystegia sepium	Hedge Bindweed	flowering plant	x	X
Carex acuta	Slender Tufted-sedge	flowering plant	x	x

Carex disticha	Brown Sedge	flowering plant	x	x
Centaurea nigra agg.	Common/Chalk Knapweed	flowering plant	x	x
Chamaenerion angustifolium	Rosebay Willowherb	flowering plant	x	x
Cirsium arvense	Creeping Thistle	flowering plant	x	x
Cirsium vulgare	Spear Thistle	flowering plant	x	x
Crataegus monogyna	Hawthorn	flowering plant	x	x
Crepis capillaris	Smooth Hawk's-beard	flowering plant	x	x
Dactylis glomerata	Cock's-foot	flowering plant	x	x
Deschampsia cespitosa	Tufted Hair-grass	flowering plant	x	x
Dipsacus fullonum	Teasel	flowering plant	x	x
Dryopteris filix-mas	Male-fern	fern	x	x
Epilobium ciliatum	American Willowherb	flowering plant	x	x
Epilobium hirsutum	Great Willowherb	flowering plant	x	x
Erigeron agg.	Fleabane species	flowering plant	x	x
Festuca rubra	Red Fescue	flowering plant	x	x
Filipendula ulmaria	Meadowsweet	flowering plant	x	x
Fraxinus excelsior	Ash	flowering plant	x	x
Galeopsis bifida	Bifid Hemp-nettle	flowering plant	x	x
Galium aparine	Cleavers	flowering plant	x	x
Galium verum	Lady's Bedstraw	flowering plant	x	x

Geum urbanum	Wood Avens	flowering plant	x	x
Glechoma hederacea	Ground-ivy	flowering plant	x	x
Glyceria maxima	Reed Sweet-grass	flowering plant	x	x
Holcus lanatus	Yorkshire-fog	flowering plant	x	x
Holcus mollis	Creeping Soft-grass	flowering plant	x	x
Iris pseudacorus	Yellow Iris	flowering plant	x	x
Jacobaea vulgaris	Common Ragwort	flowering plant	x	X
Juncus acutiflorus	Sharp-flowered Rush	flowering plant	x	x
Juncus articulatus	Sharp-flowered Rush	flowering plant	x	x
Juncus effusus	Soft-rush	flowering plant	x	x
Lathyrus pratensis	Meadow Vetchling	flowering plant	x	x
Lotus pedunculatus	Greater Bird's-foot-trefoil	flowering plant	x	x
Lycopus europaeus	Gypsywort	flowering plant	x	x
Malus domestica	Apple	flowering plant	x	x
Persicaria amphibia	Amphibious Bistort	flowering plant	x	x
Phalaris arundinacea	Reed Canary-grass	flowering plant	x	x
Phleum pratense sens. str.	Timothy	flowering plant	x	x
Potentilla anserina	Silverweed	flowering plant	x	x
Potentilla erecta	Tormentil	flowering plant	x	x
Potentilla x *mixta* sens. lat.	Hybrid Cinquefoil	flowering plant	x	x

Prunus spinosa	Blackthorn	flowering plant	x	x
Quercus robur	Pedunculate Oak	flowering plant	x	x
Ranunculus acris	Meadow Buttercup	flowering plant	x	x
Rosa canina agg.	Dog-rose	flowering plant	x	x
Rubus fruticosus agg.	Bramble	flowering plant	x	x
Rumex acetosa	Common Sorrel	flowering plant	x	x
Rumex conglomeratus	Clustered Dock	flowering plant	x	x
Rumex crispus	Curled Dock	flowering plant	x	x
Rumex obtusifolius	Broad-leaved Dock	flowering plant	x	x
Salix caprea	Goat Willow	flowering plant	x	x
Salix cinerea	Grey Willow	flowering plant	x	x
Salix x fragilis sens. lat.	Crack-willow	flowering plant	x	x
Sanguisorba officinalis	Great Burnet	flowering plant	x	x
Solanum dulcamara	Bittersweet	flowering plant	x	x
Solidago canadensis/gigantea	Canadian/Early Goldenrod	flowering plant	x	x
Sonchus asper	Prickly Sow thistle	flowering plant	x	x
Stachys sylvatica	Hedge Woundwort	flowering plant	x	x
Stellaria aquatica	Water Chickweed	flowering plant	x	x
Stellaria graminea	Lesser Stitchwort	flowering plant	x	x
Succisa pratensis	Devil's-bit Scabious	flowering plant	x	x

Tanacetum vulgare	Tansy	flowering plant	x	x
Trifolium repens	White Clover	flowering plant	x	x
Tussilago farfara	Colt's-foot	flowering plant	x	x
Urtica dioica	Common Nettle	flowering plant	x	x
Veronica chamaedrys	Germander Speedwell	flowering plant	x	x
Vicia cracca	Tufted Vetch	flowering plant	x	x
Rana temporaria	Common Frog	amphibian	x	x
Ardea cinerea	Grey Heron	bird		
Columba palumbus	Wood Pigeon	bird	x	x
Corvus corone	Carrion Crow	bird	x	x
Erithacus rubecula	Robin	bird		x
Larus canus	Common Gull	bird		x
Phalacro coracidae	Cormorant	bird		x
Microtus agrestis	Field Vole	mammal		x
Myodes glareolus	Bank Vole	mammal		x
Oryctolagus cuniculus	Rabbit signs	mammal		x
Talpa europaea	European Mole	mammal		x
Aphantopus hyperantus	Ringlet	butterfly	x	x
Aricia agestis	Brown Argus	butterfly	x	x
Pararge aegeria	Speckled Wood	butterfly	x	x
Pieris rapae	Small White	butterfly	x	x
Polyommatus icarus	Common Blue	butterfly	x	x

Pyronia tithonus	Gatekeeper	butterfly	x	x
Aeshna grandis	Brown Hawker	dragonfly	x	x
Autographa gamma	Silver Y	moth	x	x
Metrioptera roeselii	Roesel's Bush-cricket	orthopteran	x	x
Cepaea hortensis	White Lipped Snail	gastropoda		x
Cepaea nemoralis	Brown Lipped Snail	gastropoda		x
Discus rotundatus	Rounded Snail	gastropoda		x
Trochulus hispidus	Hairy Snail	gastropoda		x
Larinioides cornutus	Furrow Orb weaver	spider		x
Pseudochorthippus parallelus	Meadow Grasshopper	orthopoda		x
Odiellus spinosus	Harvestman	Harvestman		x
Rilaena triangularis	Harvestman	Harvestman		x
Notostira elongata	Elongated Grass Bug	bug		x
Ero aphana	Pirate Spider	spider		x
Porcellio spinicornis	Painted Woodlouse	Crustacean		x
Steatoda bipunctata	Rabbit Hutch Spider	spider		x
Palomena prasina	Green Shield Bug	bug		x
Sitona regensteinensis	Weevil spp	weevil		x
Dysdera Crocata	Woodlouse Spider	spider		x
Elasmostethus Interstinctus	Green Birch Sheildbug	bug		x
Tachypodioides niger	White legged snake millipede	millipede		x

Pholcus Phalangioides	Daddy Long Legs	spiders		x
Coccinella septempunctata	7 spot ladybird	beetle		x
Lithobius forticatus	Common Centipede	centipede		x
				x
Ischnodemus sabuleti	European Chinchbug	bug		x
Odiellus spinosus	Large Bodied Harvestman	opilinid		x
Lygus rugulipennis	Tarnished Plant Bug	bug		x
Clubiona robusta	Stout sac spider	spider		x
Linyphiidae spp	Money spider	spider		x
Nabis rugosus	Damsel Bug	bug		x
Araneus diadematus	Cross Orbweaver	spider		x
Rhyzobius chrysomeloides	Beetle spp	beetle		x
Bombus pascuorum	Common Carder Bee	bee		x
Bombus muscorum	Moss Carder Bumble Bee	bee		x
Porcellio scaber	Common rough woodlouse	crustacean		x
Neottiura bimaculata	Cobweb spider	spider		x
Phyllobius pyri	Common leaf weevil	weevil		x
Paradosa Amentata	Wolf Spider	spider		x
Otiorhynchus sulcatus	Black Vine Weevil	weevil		x
Graphopsocus cruciatus	F-winged Barklouse	crustacean		x
Vespula vulgaris	Common Wasp	Wasp and bees		x
Tipulidae spp	Crane fly	flies		x
Paraoligolophus agrestis	Harvestman	opilinid		x

Lactarius rufus	Rufous milk cap	fungi		x
Daedaleopsis confragosa	Blushing Bracket	fungi		x
Hypholoma fasciculare	Sulphur Tuft	fungi		x
Plutens cervinus	Deer Mushroom	fungi		x
Russula emetica	The Sickener	fungi		x
Russula fragilis	Brittle Gill	fungi		x
Marasmius cohaerens	Gilled Mushroom	fungi		x
Trametes versicolor	Turkey tail mushroom	fungi		X
Lactarius camphoratus	Curry milkcap	fungi		X
Amanita muscaria	Fly agaric	fungi		x

Southern Area			2019	2021
Scientific Name	**English Name**	**Group**		
Alisma plantago-aquatica	Water-plantain	flowering plant	x	X
Angelica sylvestris	Wild Angelica	flowering plant	x	X
Arrhenatherum elatius	False Oat-grass	flowering plant	x	X
Betula pendula	Silver Birch	flowering plant	x	x
Callitriche agg.	Water-starwort species	flowering plant	x	X
Calystegia sepium	Hedge Bindweed	flowering plant	x	X
Carex riparia	Greater Pond-sedge	flowering plant	x	X
Cerastium fontanum	Common Mouse-ear	flowering plant	x	X
Chenopodium album	Fat Hen	flowering plant	x	X
Cirsium arvense	Creeping Thistle	flowering plant	x	X

Crassula helmsii	New Zealand Pigmyweed	flowering plant	x	x
Crataegus monogyna	Hawthorn	flowering plant	x	x
Crepis capillaris	Smooth Hawk's-beard	flowering plant	x	x
Dactylis glomerata	Cock's-foot	flowering plant	x	x
Dipsacus fullonum	Teasel	flowering plant	x	x
Dryopteris affinis	Golden-scaled Male-fern	fern	x	x
Dryopteris dilatata	Broad Buckler-fern	fern	x	x
Dryopteris filix-mas	Male-fern	fern	x	x
Epilobium ciliatum	American Willowherb	flowering plant	x	x
Epilobium hirsutum	Great Willowherb	flowering plant	x	x
Epilobium obscurum	Short-fruited Willowherb	flowering plant	x	x
Epilobium parviflorum	Hoary Willowherb	flowering plant	x	x
Erigeron agg.	Fleabane species	flowering plant	x	x
Euonymus europaeus	Spindle	flowering plant		x
Filipendula ulmaria	Meadowsweet	flowering plant	x	x
Fraxinus excelsior	Ash	flowering plant	x	x
Galeopsis bifida	Bifid Hemp-nettle	flowering plant	x	x
Galium aparine	Cleavers	flowering plant	x	x
Galium palustre	Common Marsh-bedstraw	flowering plant	x	x
Geranium robertianum	Herb-Robert	flowering plant	x	x
Glechoma hederacea	Ground-ivy	flowering plant	x	x
Glyceria maxima	Reed Sweet-grass	flowering plant	x	x

Gnaphalium uliginosum	Marsh Cudweed	flowering plant	x	x
Holcus lanatus	Yorkshire-fog	flowering plant	x	x
Hypochaeris radicata	Cat's-ear	flowering plant	x	x
Juncus bufonius sens. lat.	Toad Rush	flowering plant	x	x
Juncus effusus	Soft-rush	flowering plant	x	x
Lathyrus pratensis	Meadow Vetchling	flowering plant	x	x
Lemna minor	Common Duckweed	flowering plant	x	x
Lemna trisulca	Ivy-leaved Duckweed	flowering plant	x	x
Lycopus europaeus	Gypsywort	flowering plant	x	x
Malus domestica	Apple	flowering plant	x	x
Myosotis scorpioides	Water Forget-me-not	flowering plant	x	x
Nasturtium officinale agg.	Water-cress	flowering plant	x	x
Persicaria amphibia	Amphibious Bistort	flowering plant	x	x
Persicaria maculosa	Redshank	flowering plant	x	x
Phalaris arundinacea	Reed Canary-grass	flowering plant	x	x
Phragmites australis	Common Reed	flowering plant	x	x
Plantago major	Greater Plantain	flowering plant	x	x
Poa annua	Annual Meadow-grass	flowering plant	x	x
Poa trivialis	Rough Meadow-grass	flowering plant	x	x
Prunella vulgaris	Selfheal	flowering plant	x	x
Quercus robur	Pedunculate Oak	flowering plant	x	x
Ranunculus repens	Creeping Buttercup	flowering plant	x	x

Ranunculus sceleratus	Celery-leaved Buttercup	flowering plant	x	x
Ribes rubrum	Red Currant	flowering plant	x	x
Rosa canina agg.	Dog-rose	flowering plant	x	x
Rubus fruticosus agg.	Bramble	flowering plant	x	x
Rumex conglomeratus	Clustered Dock	flowering plant	x	x
Rumex obtusifolius	Broad-leaved Dock	flowering plant	x	x
Rumex sanguineus	Wood Dock	flowering plant	x	x
Sagina procumbens	Procumbent Pearlwort	flowering plant	x	x
Salix caprea	Goat Willow	flowering plant	x	x
Salix cinerea	Grey Willow	flowering plant	x	x
Sambucus nigra	Elder	flowering plant	x	x
Scrophularia auriculata	Water Figwort	flowering plant	x	x
Senecio vulgaris	Groundsel	flowering plant	x	X
Solanum dulcamara	Bittersweet	flowering plant	x	X
Solanum nigrum	Black Nightshade	flowering plant	x	X
Solidago canadensis/gigantea	Canadian/Early Goldenrod	flowering plant	x	x
Sonchus asper	Prickly Sowthistle	flowering plant	x	x
Sparganium erectum	Branched Bur-reed	flowering plant	x	x
Stachys palustris	Marsh Woundwort	flowering plant	x	x
Stellaria aquatica	Water Chickweed	flowering plant	x	x
Symphytum sp.	Comfrey species	flowering plant	x	x
Typha latifolia	Bulrush	flowering plant	x	x
Urtica dioica	Common Nettle	flowering plant	x	x
Urtica urens	Small Nettle	flowering plant	x	x

Veronica beccabunga	Brooklime	flowering plant	x	x
Veronica catenata	Pink Water-speedwell	flowering plant	x	x
Veronica serpyllifolia	Thyme-leaved Speedwell	flowering plant	x	x
Vicia cracca	Tufted Vetch	flowering plant	x	x
Buteo buteo	Common Buzzard	bird	x	x
Columba palumbus	Wood Pigeon	bird	x	x
Cyanistes caerulus	Blue tit			x
Dendrocopus major	Greater spotted-woodpecker			x
Erithacus rubecula	Robin	bird	x	x
Garrulus glandarius	Jay	bird	x	x
Pyrrhula pyrrhula	Bullfinch	bird	x	x
Sylvia curruca	Lesser Whitethroat	bird	x	x
Troglodytes troglodytes	Wren	bird	x	x
Turdus merula	Blackbird	bird	x	x
Muntiacus europaeus	Muntjac deer			x
Sciurus carolinensis	Grey Squirrel			x
Lehmannia marginata	Tree slug	gastropoda		x
Lehmannia valentiana	Three-banded Garden Slug	gastropoda		x
Aglais io	Peacock	butterfly	x	x
Aeshna grandis	Brown Hawker	dragonfly	x	x

Metrioptera roeselii	Roesel's Bush-cricket	orthopteran	x	x
Pterostichus niger	Ground Beetle			x
Neriene montana	Spider species			x
Dermaptera	Earwig species			x
Philodromus Spp	Spider			x
Tetragnathidae spp	Long jawed orbweaver			x
Diaea dorsata	Green crab spider			x
Zygiella atrica	Silver sided sector spider			x
Amaurobius fenestralis	Window spider			x
Paroligolophus agrestis	Harvestman			x
Xysticus cristatus	Common Crab spider			x
Amaurobius spp.	Tangled nest spider			x
Armadillidium vulgare	Pill Woodlouse			x
Bombus lucorum	White Tailed Bumblebee			x
Lithobius Forticatus	Common Centipede			x

Tachypodoiulus niger	Black Snake Millipede			x
Zygiella x-notata	Silver-sided sector spider			x