

Falkirk Stepping Stones



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Summary

The Falkirk Stepping Stones project managed and restored a mosaic of habitat features within the site Roughcastle, adjacent the Falkirk Wheel. The Historic Roman Antonine Wall passes through the site giving the area its heritage value and making it a very old brownfield site. During the last 200 years the site has been used for mineral extraction works, fish oil and guano works and a domestic tip. There is no current industrial work at the site and apart from the Antonine Wall there is very little evidence of previous industrial activity as the site has been reclaimed by nature.

There has been very little conservation management of the wildflower meadows and heathland present to the south of Roughcastle. This project aimed to enhance these areas for the invertebrate biodiversity present, which was previously recognised during a survey by a Natural Talent apprentice with The Conservation Volunteers (TCV) (Appendix 1- species list).

Habitat creation and enhancement carried out during this project:

- Wildflower plug planting,
- Yellow rattle seed planting,
- Creation of habitat piles,
- Creation of bare ground,
- Scrub removal and thinning,
- Removal of Sycamore and Beech saplings from woodland,
- Health check of recently planted Oak trees,
- And, spraying of invasive non-native Japanese knotweed.

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1. Introduction

1.1 Site information

The site Roughcastle (NS845795) is 32.64 hectares (ha) in size and is located between the Falkirk Wheel (to the east) and Historic Scotland's Roman Antonine Wall (to the west) (Figure 1). The site is approximately 2 miles to the west of central Falkirk and skirts the residential area of Tamfourhill.

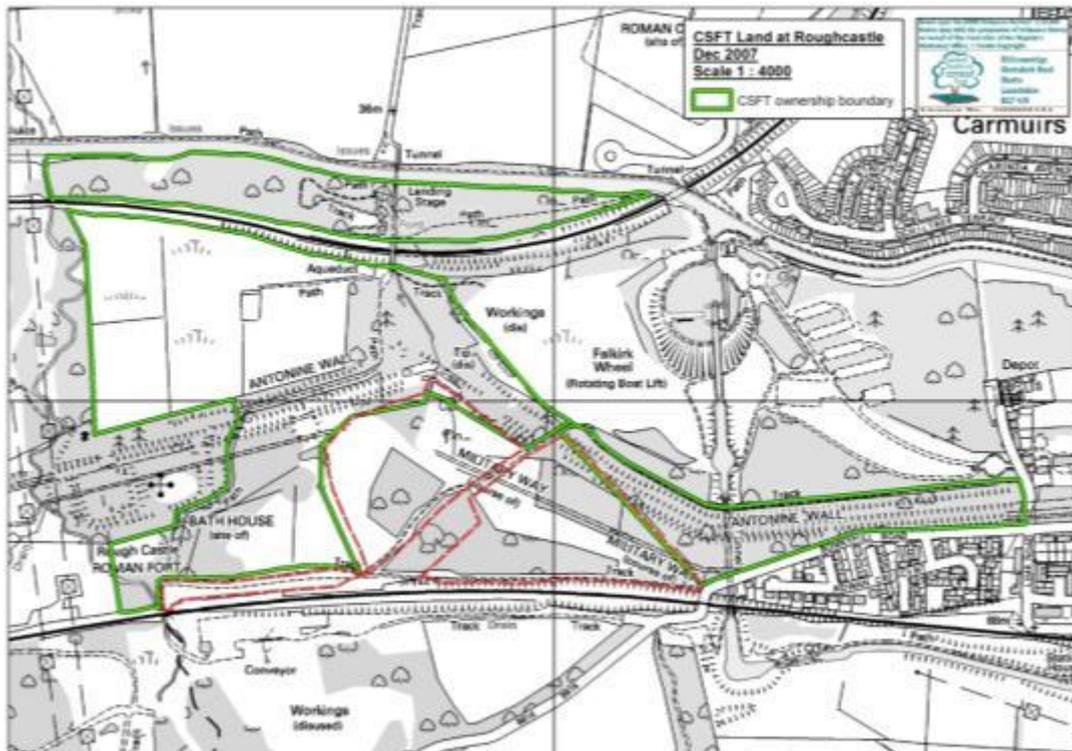


Figure 1. Map of Roughcastle showing the ownership boundaries and its location between the Falkirk Wheel and the Roman Antonine Wall; **CSFT- green, Callendar Estates- red.**

1.2 Site history

The Roman Antonine Wall was built from 142AD to 144AD and is a scheduled monument recognised as a World Heritage site and is protected under the Ancient Monuments & Archaeological Areas Act. The wall is about 37 miles in length from Bo'ness to Old Kilpatrick and passes through woodland within Roughcastle. The presence of the Antonine Wall in Roughcastle gives the area its heritage value.

Mineral extraction works have been carried out within Roughcastle from at least 1855, all ironstone shaft pits were out of use by 1897. A fish oil and guano works was operating from 1916 at the south-west boundary of Roughcastle. There is an old refuse tip within woodland at the site. There is currently no industrial activity within Roughcastle and very little evidence of the previous industrial work as the site has been reclaimed by nature.

1.3 Site ownership

Central Scotland Forest Trust (CSFT) owns woodland across the site as well as the wildflower meadow at the north of Roughcastle (Figure 1). Callendar Estates owns the wildflower meadow and heathland at the south of the site (Figure 1).

1.4 Access

Many people from Falkirk and tourists to the Falkirk Wheel utilise the area of Roughcastle. Graveled pathways link areas within the site to the Falkirk Wheel, Historic Scotland's Roman Antonine Wall and Tamfourhill Road where public access can be obtained. Desire lines within woodland connect to the gravelled pathways.

1.5 Habitats

Various habitats are present within the site including semi-natural woodland, created woodland, wildflower meadows, heathland and seasonal pools. It has previously been recognised during a survey by a TCV Natural Talent apprentice that the habitats present at the site are important for a wide range of invertebrate species as well as other wildlife (Appendix 1- species list).

2. Habitat Creation and Enhancement

Habitat creation and enhancement carried out during this project:

- Wildflower plug planting,
- Yellow rattle seed planting,
- Creation of habitat piles,
- Creation of bare ground,
- Scrub removal and thinning,
- Removal of Sycamore and Beech saplings from woodland,
- Health check of recently planted Oak trees,
- And, spraying of invasive non-native Japanese knotweed.

2.1 Wildflower planting

Altogether 3,500 plug plants of 31 wildflower species were planted into the wildflower meadow at the south of Roughcastle along with 2kg of Yellow rattle (*Rhinanthus minor*) seed (Table 1).

Table 1. Wildflower species planted as plug plants into the meadow at the south of Roughcastle.

Scientific name	Common Name
<i>Achillea millefolium</i>	Yarrow
<i>Ajuga reptans</i>	Bugle
<i>Campanula latifolia</i>	Giant bellflower
<i>Cardamine pratensis</i>	Cuckoo flower
<i>Centaurea nigra</i>	Common Knapweed
<i>Digitalis purpurea</i>	Foxglove
<i>Dipsacus fullonum</i>	Teasel
<i>Echium vulgare</i>	Vipers bugloss
<i>Eupatorium cannabinum</i>	Hemp agrimony
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Galium verum</i>	Lady's bedstraw
<i>Geranium pratense</i>	Meadow cranesbill
<i>Geranium robertianum</i>	Herb robert
<i>Hieracium pratense</i>	Yellow hawkweed
<i>Hypericum perforatum</i>	St. John wort

<i>Knautia arvensis</i>	Field scabious
<i>Leucanthemum vulgare</i>	Ox-eye daisy
<i>Lotus pedunculatus</i>	Greater birds foot trefoil
<i>Lysimachia nummularia</i>	Creeping jenny
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Myosotis arvensis</i>	Field Forget-me-not
<i>Origanum vulgare</i>	Wild marjoram
<i>Primula veris</i>	Cowslip
<i>Primula vulgaris</i>	Primrose
<i>Prunella vulgaris</i>	Self heal
<i>Scutellaria montana</i>	Lesser skullcap
<i>Silene dioica</i>	Red campion
<i>Stachys sylvatica</i>	Hedge woundwort
<i>Trifolium pratense</i>	Red clover
<i>Veronica officinalis</i>	Heath speedwell
<i>Viola riviniana</i>	Common dog violets

On Tuesday 27th September 2011, 500 plug plants of several species from Table 1 were planted into the meadow by volunteers from Green Routes, Enable Scotland, Countryside Rangers from Falkirk Council and from local Co-Operative stores.

A further 3,000 plug plants were planted during 3 days in May 2012 (8th, 15th, 22nd) and included wildflower species from Table 1 (Figure 2). Volunteers from Green Routes, The Conservation Volunteers (TCV), Enable Scotland and from the local area came along to help during the 3 separate days. The meadow at the south of Roughcastle has previously received no management and before the 3,000 wildflower plug plants were planted the meadow was cut by Falkirk Council ETU management team.



Figure 2. Volunteers from TCV planting wildflower plug plants into the meadow at Roughcastle.

Wildflower species were chosen to reflect the different wet and dry areas present across the meadow at the south of the site as well as to provide a variety of plant species that flower across the season. This range of species will benefit a range of pollinating insects including bees, wasps, butterflies, moths and hoverflies as well as a wide range of other invertebrate species. Several wildflower species were chosen to provide food plants for species that are rarely recorded at the site. Common dog violet (*Viola riviniana*) was planted as they are the food plant of Small pearl-bordered fritillary (*Boloria selene*) caterpillars and butterflies of this species have previously been recorded at the site during CSFT butterfly transects. Cuckooflower was planted within the wet meadow as this is the food plant of the Orange-tip butterfly (*Anthocaris cardamines*) caterpillars.

Yellow rattle is a hemi-parasite of grasses feeding on their roots weakening the grass and reducing its growth. This opens up the grass sward allowing other plant species light and nutrients to grow and promoting the diversity of wildflower species within a meadow. Yellow rattle seeds require a winter frost to germinate.

Yellow rattle seed was sown by volunteers from Green Routes and TCV on Monday 19th December 2011 (Figure 3). As the meadow had not previously been cut, TCV volunteers cut the grass using a strimmer. This cut grass was then raked up and placed in piles at the side of the meadow. The seed was then raked into the cut areas of the meadow. Yellow rattle is now growing within the meadow helping to promote wildflower biodiversity which will then provide a greater variety of food for pollinators.



Figure 3. Yellow rattle seed was sown throughout the meadow at Roughcastle to reduce vigorous grass growth that will aid in improving the diversity of wildflower species within the meadow.

There has been a change in management of the wildflower meadow achieved within this project. Meadows are best managed by being cut and lifted once a year in autumn, usually September. By removing the cuttings this reduces the fertility of the soil creating a balance between the growth of wildflowers and grasses. The meadow at Roughcastle has previously not been managed this way. Falkirk Council have now agreed that their ETU management team will cut and lift the meadow once in the autumn and this change in management has been achieved this year (Figure 4). Areas have been left deliberately uncut across the meadow to provide homes for over-wintering invertebrates and other wildlife.



Figure 4. The wildflower meadow after being cut and lifted in September 2012. There is an area that has been left deliberately un-cut to provide homes for over-wintering species.

2.2 Scrub removal

Silver birch (*Betula pendula*) and Willow (*Salix* species) scrub was encroaching onto the wildflower meadow and also onto an area of heathland with bare ground used by Green tiger beetles (*Cicindela campestris*). The scrub was removed over several days throughout the year long project with help by Countryside Rangers from Falkirk Council, TCV, Green Routes and local volunteers from The Co-operative and surrounding local area (Table 2; Figure 5). By clearing scrub from the heathland we have reduced shading and created new areas of bare ground for Green tiger beetles and other warmth loving invertebrate species (Figure 6); Green tiger beetles were observed on bare ground within heathland in May 2012.

Table 2. Date of scrub removal.

Date of scrub removal
Monday 14 th November 2011
Monday 19 th December 2011
Tuesday 17 th April 2012
Tuesday 24 th April 2012
Wednesday 23 rd May 2012
Thursday 24 th May 2012



Figure 5. Volunteers removed Silver birch and Willow scrub from the wildflower meadow and heathland.



Figure 6. The area of heathland after being cleared of Silver birch scrub showing new areas of bare ground.

2.3 Habitat piles

The scrub that was removed from heathland and the wildflower meadow was placed in piles at the woodland edge and within woodland to create several habitat piles of varying size for invertebrates, amphibians, reptiles and small mammals (Figure 7). A habitat pile was created on an area of Bracken (*Pteridium aquilinum*) to reduce its growth.



Figure 7. Scrub that was removed was made into habitat piles along the woodland edge to provide homes for invertebrates, amphibians, reptiles and small mammals.

2.4 Non-native tree sapling removal

Several Beech (*Fagus sylvatica*) and Sycamore (*Acer pseudoplatanus*) saplings were removed from within woodland surrounding the wildflower meadow using loppers as these trees are non-native to Scotland and can be invasive. These trees are non-native and can reduce diversity of tree species within woodland by out-competing native tree species.

2.5 Oak tree guard check

About 1,000 Common oak (*Quercus robur*) trees were planted over 3 years ago in the wildflower meadow owned by CSFT at the north west of Roughcastle. During this project it was noted that plastic tree guards were affecting the growth of many of the trees. TCV volunteers helped to check the tree guards around many of the Oak trees and either snipped the top of the guards to loosen them or removed them completely (Figure 8). This was carried out in 2012 on Thursday 24th May, Friday 24th August, Thursday 6th September and 1st October.



Figure 8. Tree guards that were choking young Oak trees were snipped around the top to give the tree space.

2.6 Japanese knotweed

Within woodland at the north of the site is an area of the invasive non-native plant Japanese knotweed (*Fallopia japonica*). As part of this project, volunteers from TCV sprayed the plant on the 1st October 2012. The plant was sprayed with Glyphosate by a certified pesticide sprayer from TCV (Figure 9). This will help kill the plants within the area but will not prevent regrowth after the project is finished as Japanese knotweed needs to be sprayed over several years to be successfully removed from a site.



Figure 9. Japanese knotweed after being sprayed with Glyphosate.

3. Project summary

Roughcastle is a very old brownfield site that has been reclaimed by nature through natural succession and some previous management. This project has enhanced and managed a mosaic of habitat features across the site.

A diverse range of wildflower species have been planted within the meadow and this will benefit a range of pollinating insects including bees, wasps, hoverflies and butterflies as well as other wildlife. By sowing Yellow rattle seed to reduce vigorous grass growth this will help the wildflowers that were planted during this project as well as those that were already present within the meadow. It must be noted that it can take some time for Yellow rattle to have an effect on grass growth. Since meadow enhancement began for this project, 6-spot burnet moths (*Zygaena filipendulae*) have been recorded at the site and they had not been recorded from the site by the TCV Natural Talent apprentice or through CSFT butterfly transects.

Birch and Willow scrub has been removed from across the meadow and in the area of heathland. This has reduced shading within the meadow and has created new areas of bare ground within the heathland area for Green tiger beetles and other warmth loving invertebrate species.

As the meadow has previously not been managed the main aim for this project was to get the meadow cut and lifted once a year in autumn. This has been achieved through an agreement with Falkirk Council and their ETU management team. The once a year cut and lift will help to improve wildflower species diversity as the removal of the meadow cuttings reduces the fertility of the soil creating a balance between the growth of grasses and wildflowers.

There is an area within woodland at the north of the site with the non-native and invasive plant Japanese Knotweed. As part of this project the 2 separate patches of the plant were sprayed with the herbicide Glyphosate by a certified sprayer from TCV. The plant was sprayed to the upper and underside of the plants leaves. To successfully remove this invasive plant there will need to be repeated applications of the herbicide to leaves over several years. The best time to spray Japanese knotweed is during the autumn.

Appendix 1

Invertebrate species list from surveys by Suzanne Bairner through a TCV Natural Talent apprenticeship at Roughcastle from May 2010-July 2011.

Species	Common Name
Aranaea	Spiders
<i>Alopecosa pulverulenta</i>	Wolf spider
<i>Anelosimus vittatus</i>	Comb-footed spider
<i>Araneus diadematus</i>	Orb weaver spider
<i>Dictyna arundinacea</i>	Mesh webbed spider
<i>Haplodrassus signifer</i>	Ground spider
<i>Pachygnatha degeeri</i>	Long-jawed spiders
<i>Pardosa palustris</i>	Wolf spider
<i>Pardosa pullata</i>	Wolf spider
<i>Philodromus cespitum</i>	Running crab spider
<i>Tetragnatha extensa</i>	Long jawed orb weaver
<i>Tibellus maritimus</i>	Marram spider
<i>Trochosa terricola</i>	Wolf spider
<i>Xysticus cristatus</i>	Crab spider
<i>Zygiella x-notata</i>	Orb weaver spider
Opiliones	Harvestmen
<i>Mitopus morio</i>	Harvestmen
<i>Oligolophus tridens</i>	Harvestmen
<i>Phalangium opilio</i>	Harvestmen
<i>Platybunus triangularis</i>	Harvestmen
Isopoda	Woodlice
<i>Philoscia muscorum</i>	Common striped woodlice
Coleoptera	Beetle
<i>Agriotes obscurus</i>	Click beetle
<i>Agriotes pallidulus</i>	Click beetle
<i>Athous haemorrhoidalis</i>	Click beetle
<i>Bembidion lampros</i>	Ground beetle
<i>Byrrhus pilula</i>	Pill beetle
<i>Calathus fuscipes</i>	Ground beetle
<i>Cantharis figurata</i>	Soldier beetle
<i>Carabus problematicus</i>	Ridged violet ground beetle
<i>Carabus violaceus</i>	Violet ground beetle
<i>Chaetocnema concinna</i>	Leaf beetle
<i>Cicindela campestris</i>	Green tiger beetle
<i>Coccinella septempunctata</i>	7-spot ladybird
<i>Ctenicera cuprea</i>	Click beetle
<i>Lochmaea suturalis</i>	Willow leaf beetle
<i>Luperus longicornis</i>	Leaf beetle
<i>Nebria brevicollis</i>	Ground beetle

<i>Notiophilus biguttatus</i>	Ground beetle
<i>Oulema melanopus</i>	Cereal leaf beetle
<i>Pterostichus madidus</i>	Ground beetle
<i>Pterostichus niger</i>	Ground beetle
<i>Rhagium bifasciatum</i>	2 banded longhorn beetle
<i>Rhagonycha fulva</i>	Red soldier beetle
<i>Sericus brunneus</i>	Click beetle
<i>Silpha atrata</i>	Black snail beetle
Dermaptera	Earwig
<i>Forficula auricularia</i>	Common earwig
Diptera	Flies
<i>Eristalis tenax</i>	Hoverfly
<i>Helophilus pendulus</i>	Hoverfly
<i>Melanostoma mellinum</i>	Hoverfly
<i>Platycheirus albimanus</i>	Hoverfly
<i>Platycheirus angustatus</i>	Hoverfly
<i>Platycheirus clypeatus</i>	Hoverfly
<i>Platycheirus scambus</i>	Hoverfly
<i>Sphaerophoria interrupta</i>	Hoverfly
<i>Syrphus ribesii</i>	Hoverfly
<i>Trichocera annulata</i>	Winter gnat
Hemiptera	True bug
<i>Agallia venosa</i>	Leaf hopper
<i>Anthocoris nemoralis</i>	Leaf hopper
<i>Aphrodes marakovi</i>	Leaf hopper
<i>Aphrophora alni</i>	Frog hopper
<i>Calocoris roseomaculatus</i>	Seed bugs
<i>Capsus ater</i>	Plant bug
<i>Cicadella viridis</i>	Leaf hopper
<i>Cicadula aurantipes</i>	Frog hopper
<i>Cicadula persimilis</i>	Leaf hopper
<i>Conomelus anceps</i>	Frog hopper
<i>Deltocephalus maculiceps</i>	Leaf hopper
<i>Deltocephalus pulicaris</i>	Leaf hopper
<i>Dicranotropis hamata</i>	Leaf hopper
<i>Elasmotethus interstinctus</i>	Birch Shield bug
<i>Eupelix cuspidata</i>	Leaf hopper
<i>Eupteryx aurata</i>	Leaf hopper
<i>Euscelis incisus</i>	Frog hopper
<i>Grypocoris stysi</i>	Leaf hopper
<i>Lopus decolor</i>	Plant bug
<i>Lygus punctatus</i>	Frog hopper
<i>Megalocoleus tanacetii</i>	Plant bug
<i>Megophthalmus scanicus</i>	Leaf hopper

<i>Nabis ferus</i>	Damsel bug
<i>Nabis flavomarginatus</i>	Plant bug
<i>Nabis limbatatus</i>	Plant bug
<i>Neolygus contaminatus</i>	Damsel bug
<i>Neophilaenus lineatus</i>	Frog hopper
<i>Nysius ericae</i>	Plant bug
<i>Oncopsis flavicollis</i>	Frog hopper
<i>Philaenus spumarius</i>	Frog hopper
<i>Pithanus maerkeli</i>	Plant bug
<i>Plagiognathus arbustorum</i>	Plant bug
<i>Plagiognathus chrysanthemi</i>	Plant bug
<i>Psammotettix cephalotes</i>	Leaf hopper
<i>Psammotettix nodosus</i>	Leaf hopper
<i>Saldula saltatoria</i>	Shore bug
<i>Scleroracrus plutonius</i>	Leaf hopper
<i>Stenodema calcarata</i>	Leaf hopper
<i>Stenodema holsata</i>	Plant bug
<i>Stenodema laevigata</i>	Plant bug
<i>Streptanus marginatus</i>	Leaf hopper
<i>Tachycixius pilosus</i>	Leaf hopper
Hymenoptera	Bees, wasps and ants
<i>Apis mellifera</i>	Honey bee
<i>Bombus lapidarius</i>	Red tailed bumblebee
<i>Bombus lucorum</i>	White tailed bumblebee
<i>Bombus pascuorum</i>	Common carder bee
<i>Bombus pratorum</i>	Early bumblebee
<i>Bombus terrestris</i>	Buff tailed bumblebee
<i>Formica lemani</i>	Ant
<i>Lasius niger agg.</i>	Black garden ant
<i>Leptothorax acervorum</i>	Red fire ant
<i>Myrmica ruginodis</i>	Red ant
<i>Myrmica scabrinodis</i>	Red ant
<i>Tenthredo arcuata</i> complex	Sawfly
<i>Vespula vulgaris</i>	Common wasp
Lepidoptera	Butterflies and moths
<i>Anthocharis cardamines</i>	Orange tip butterfly
<i>Aphantopus hyperantus</i>	Ringlet butterfly
<i>Coenonympha pamphilus</i>	Small heath butterfly
<i>Inachis io</i>	Peacock butterfly
<i>Maniola jurtina</i>	Meadow brown
<i>Pieris brassicae</i>	Large white
<i>Pieris napi</i>	Green veined white butterfly
<i>Pieris rapae</i>	Small white butterfly
<i>Polyommatus icarus</i>	Common blue butterfly
Odonata	Dragonflies and damselflies

<i>Enallagma cyathigerum</i>	Common blue damselfly
<i>Ischnura elegans</i>	Blue tailed damselfly
Orthoptera	Grasshoppers
<i>Chorthippus parallelus</i>	Meadow grasshopper
<i>Myrmeleotettix maculatus</i>	Mottled grasshopper
<i>Omnocestus viridulus</i>	Common green grasshopper

All other wildlife recorded at Roughcastle by Suzanne Bairner through a TCV Natural Talent apprenticeship from May 2010-July 2011.

Scientific Name	Common name
Bird	
<i>Acrocephalus schoenobaenus</i>	Sedge Warbler
<i>Aegithalos caudatus</i>	Long tailed tit
<i>Apus apus</i>	Swift
<i>Buteo buteo</i>	Common buzzard
<i>Calumba palumbus</i>	Wood pigeon
<i>Carduelis carduelis</i>	Goldfinch
<i>Carduelis chloris</i>	Greenfinch
<i>Certhia familiaris</i>	Treecreeper
<i>Corvus corax</i>	Raven
<i>Corvus corone</i>	Carrion crow
<i>Corvus frugilegus</i>	Rook
<i>Cyanistes caeruleus</i>	Blue tit
<i>Dendrocopus major</i>	Great spotted woodpecker
<i>Emberiza schoeniclus</i>	Reed bunting
<i>Erithacus rubecula</i>	Robin
<i>Fringilla coelebs</i>	Chaffinch
<i>Garrulus glandarius</i>	Jay
<i>Hirundo rustica</i>	Swallow
<i>Larus argentatus</i>	Herring gull
<i>Locustella naevia</i>	Grasshopper Warbler
<i>Parus major</i>	Great tit
<i>Parus ater</i>	Coal tit
<i>Phylloscopus collybita</i>	Chiffchaff
<i>Phylloscopus trochilus</i>	Willow warbler
<i>Pyrrhula pyrrhula</i>	Bullfinch
<i>Regulus regulus</i>	Goldcrest
<i>Sylvia atricapilla</i>	Blackcap
<i>Troglodytes troglodytes</i>	Wren
<i>Turdus merula</i>	Blackbird
<i>Turdus viscivorus</i>	Mistle thrush
<i>Vanellus vanellus</i>	Lapwing
Mammal	
<i>Capreolus capreolus</i>	Roe deer

<i>Microtus arvalis</i>	Vole
<i>Sciurus carolinensis</i>	Grey squirrel
<i>Talpa europaea</i>	Mole
<i>Vulpes vulpes</i>	Red fox
Amphibian and Reptile	
<i>Lissotriton</i> species	Newt species
<i>Rana temporaria</i>	Common frog
<i>Zootoca vivipara</i>	Common lizard