



ABI Wildlife Consultancy

# Edinburgh Napier University Biodiversity

Phase 1 and 3 Survey of Craighouse,  
Craiglockhart and Merchiston Campuses

2010 - 2011



Craighouse Campus – South-eastern edge of North Woodland

Report commissioned by Jamie Pearson, Sustainability / Environmental Advisor  
Property & Facilities, on behalf of Edinburgh Napier University

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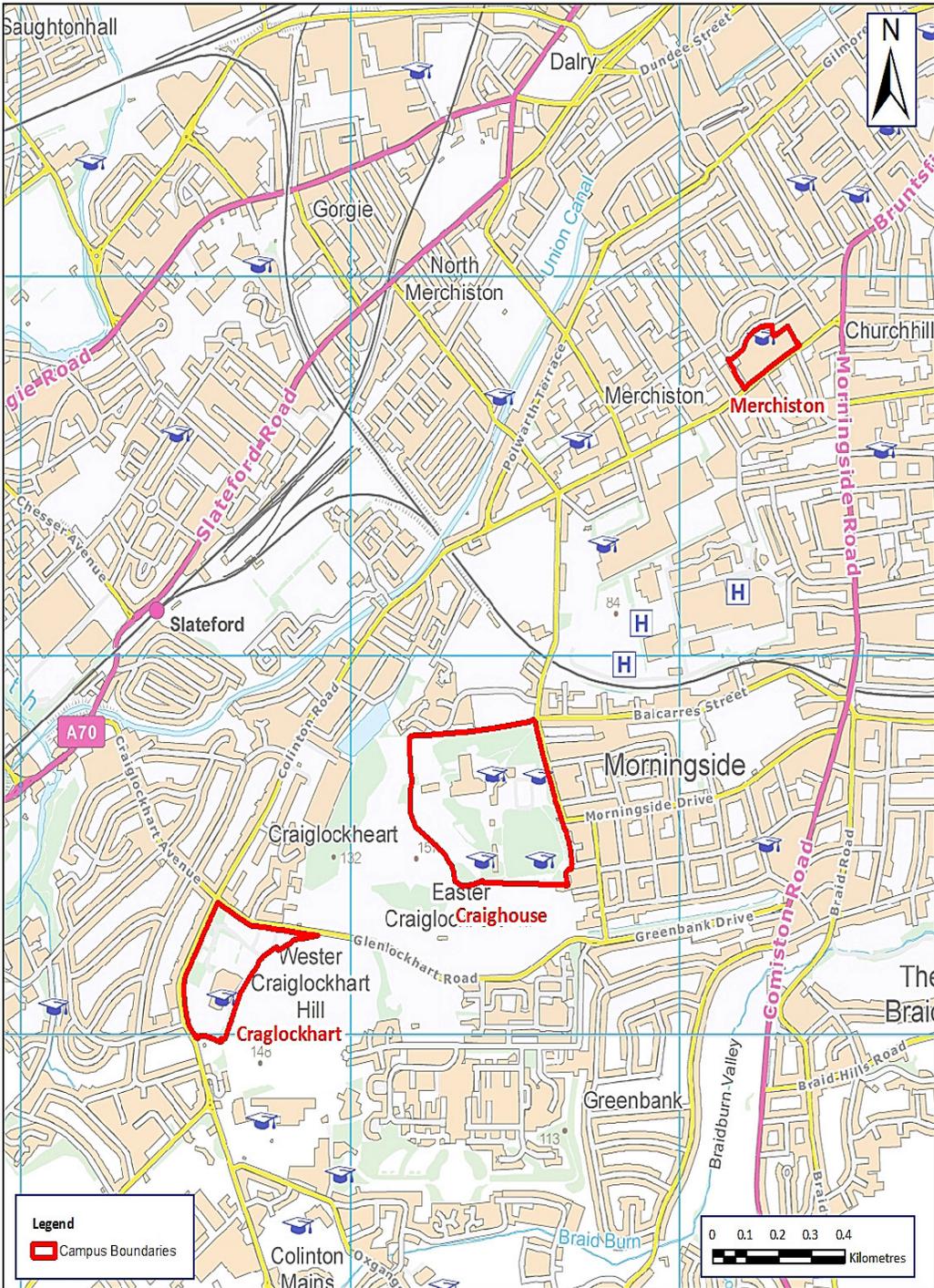
Map of Edinburgh Napier University Campus Locations.....	5
1 Introduction.....	6
2 Methodology of Phase 1 and 3.....	6
<b>3 Craighouse Campus</b>	
3.1 Summary.....	8
3.2 North Woodland A1.1.2 PBW	
Plants.....	9
Birds.....	10
Mammals.....	13
Fungi.....	14
Invertebrates.....	16
Lichens.....	17
3.3 South Woodland A1.1.2 PBW	
Plants.....	18
Birds.....	19
Mammals.....	21
Fungi.....	23
Invertebrates.....	24
Lichens.....	25
3.4 Parkland A3.1 SBW	
Plants.....	26
Birds.....	27
Mammals.....	30
Fungi.....	31
Invertebrates.....	31
Lichens.....	31
3.5 Buildings J3.6	
Plants.....	32
Birds.....	33
Mammals.....	34
Lichens.....	34
3.6 Craighouse Discussion.....	35

---

<b>4.</b>	<b>Craiglockhart Campus</b>	
4.1	Summary.....	39
4.2	Parkland A3.1 SBW	
	Plants.....	40
	Birds.....	40
	Mammals.....	43
	Fungi.....	44
	Invertebrates.....	45
	Lichens.....	46
4.3	Semi-improved Grassland B6.SI	
	Plants.....	47
	Birds.....	48
	Mammals.....	50
	Fungi.....	51
	Invertebrates.....	51
4.4	Buildings J3.6	
	Plants.....	53
	Birds.....	54
	Mammals.....	55
	Invertebrates.....	55
	Lichens.....	55
4.5	Craiglockhart Discussion.....	56
<b>5</b>	<b>Merchiston Campus</b>	
5.1	Summary.....	59
5.2	Buildings J3.6	
	Plants.....	60
	Birds.....	61
	Mammals.....	63
	Lichens.....	63

---

5.3	Introduced Shrub J2.3.2 PHT	
	Plants.....	64
	Birds.....	65
	Mammals.....	65
	Invertebrates.....	66
	Lichens & Fungi.....	67
5.4	Merchiston Discussion.....	67
	Acknowledgements.....	69
	References.....	69
	Appendix 1: Craighouse Campus	
	Species Lists .....	71
	Target Notes and Map.....	83
	Appendix 2: Craiglockhart Campus	
	Species Lists .....	88
	Target Notes and Map.....	97
	Appendix 3: Merchiston Campus	
	Species Lists .....	101
	Target Notes and Map.....	104



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### Edinburgh Napier University Location of Campuses

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## 1. Introduction

Phase 1 survey is a standardised system for classifying and mapping habitats allowing for a rapid assessment of habitat types and potential for biodiversity. Phase 3 survey provides more extensive detail to the extent and distribution of species within phase 1 habitat types. These survey methods were applied to all flora and fauna within Edinburgh Napier University campuses of Craiglockhart, Craighouse and Merchiston.

This will provide Edinburgh Napier University with a detailed monthly cross-section of species taken over a one year period, species lists for each habitat type, along with all protected and designated species for each habitat type as identified in Phase 1 Habitat Mapping. The detailed information will be invaluable for management regarding any development, land management and species management within the campuses. These campuses, with the exception of Merchiston, are situated within a landscape that has mixed habitat types containing both trees of differing age structure, open maintained grassland and rough grassland along with buildings and other man made structures such as walls. Merchiston campus is within the heart of a built-up area and surrounded by roads and buildings and has limited habitat quality. However, this campus has exotic shrubs, a few trees and minimal grass areas that do contain some degree of flora and fauna.

The information within this report will also be of benefit to students who may wish to use areas of the campus for studies for dissertations, research or other academic field study. Universities and students add a great deal to our knowledge, understanding and thinking on many complex issues which brings many benefits to society. This report will provide a strong baseline to enhance a more focused and in-depth study of ecological aspects within a city environment and its potential, a subject that has not been fully exploited and in many respects is still under-recorded. An understanding of the complexities of ecology within our cities has wide reaching benefits. For example planning areas for development, road infrastructure, housing, and industry can take into account biodiversity at an early phase of planning and help retain geomorphological links and corridors for both flora and fauna. This will go a long way in helping design a healthier environment for human populations to work and live in our cities and urban areas.

## 2. Methodology

Habitat types within each campus are coded (Table 1) according to parameters given by the Nature Conservancy Council, (NCC 1990), reprinted with some minor revisions by Joint Nature Conservancy Council Handbook for Phase 1 habitat survey (JNCC, 2010). This publication gives a standardised system for habitat survey and mapping habitats. The Phase 3 species survey adds a considerable amount of data to Phase 1 where each habitat is provided with a detailed species list. This list contains the status of species in relation to any designation for protection from current legislation that exists. Phase 1 habitat coding principally refers to vegetation type which categorises and helps interpret different areas throughout each campus with a consistent level of detail and accuracy. This was then followed with a phase 3 survey which adds greater detail to the phase 1 by identifying flora and faunal communities and their distribution. By using a standardised

method for mapping habitat allows data from one area to be compared with that of another similar area. This information is of value to development planners highlighting nature conservation values within the landscape and allowing a more sensitive and focused mitigation procedure to take place at the planning phase of any project.

Table 1. Campus Habitats/JNCC Phase 1 Codes

Craighouse	Craiglockhart	Merchiston
Woodland A1.1.2 PBW	Buildings J3.6	Buildings J3.6
Buildings J3.6	Parkland A3.1 SBW	Introduced Shrub J2.3.2 PHT
Parkland A3.1 SBW	Grassland B6 SI	

Three Edinburgh Napier University campuses were examined for their biodiversity by recording biota each month over a twelve month period. The recording began in August 2010 and ended in July 2011. Main biota types recorded were: flowering plants, grasses, ferns, lichens, fungi, invertebrates, mammals and birds. This inventory of biota misses out several other species groups which are important for biodiversity and these species groups were not included in the phase 3 survey due to a higher level of survey input and time required to conduct these surveys. This would have been impractical to carry out in conjunction with the current phase 1 & 3 surveys. For example a small mammal survey where traps have to be recorded each day and species released, traps moved and set up in another area to record a sample every three days. A full invertebrate survey would require four sets of sample type and collection each week for each habitat type within each campus. The size of sample would be extensive and take several months to analyse. However, the cross-section of biota recorded for this report gives a strong indication of the levels of biodiversity within campuses and where priority species are located.

Table 2. Recording effort for individual species groups.

Species Group	Recording Time	Months
Birds	Every month	12
Mammals	Every month	12
Bats	May to August	4
Grey Squirrel (drey survey)	January	1
Invertebrates (sweep net)	August	1
Butterflies	May to September	5
Ferns	July to September	3
Plants/grasses	February to August	7
Lichens	June to July	2
Fungi	September to November	3

The timing of each recording was mainly in the last week of each month for consistency keeping approximately four week gaps between collecting data. Weather was taken into account where all surveys took place in reasonable conditions avoiding very windy and continuous rain. In general only one specific group of species were surveyed at one time so that maximum focus could be maintained on that one group though some incidental sightings of other biota were recorded where these were known to be new records. Birds and mammals were recorded on a transect line through habitats e.g., woodland whereas fungi, lichens, ferns, plants were recorded by random transects quartering the ground.

Birds and mammals were recorded each month over the duration of the year while other species were mainly recorded in months when these species were more at their peak e.g., fungi in autumn (Table 2). Advantage was taken during snowy conditions to examine tracks to help identify the more elusive mammals.

### 3. Craighouse Campus

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#### 3.1 Summary

Craighouse campus is used by the visiting public mainly for dog walking, cycling, walking, running and families with children. In winter when the snow is abundant the parkland is used for sledging, skiing and general activities associated with snow. Few students were encountered around the periphery of the campus and tended to stay located within the nucleus around the building areas (*personal obs*).

Craighouse has three defined habitat types: two woodlands, parkland and buildings. The two woodlands have very little management carried out apart from keeping paths open and clear from fallen trees and branches and looking after the safety of the public. The parkland has regular grass cutting and the edges of the buildings and official paths spraying takes place with herbicide to control weeds. This minimal management input has a more positive affect on biodiversity where little chemicals are used to control mosses or to feed the grass within the parkland and within the woodlands fallen trees and limbs are left to rot naturally where they are safely away from public paths.

There are no comparative data to enable an assessment of the variety of species found within Craighouse. However, considering that the campus is within an urban area surrounded by housing, roads, amenity areas and a large population of people the list is impressive. Ninety five species of invertebrate caught using only one method of capture within one niche is a reasonable figure. If other method types had been used in conjunction with sweep netting invertebrates across other niches then this figure would be considerably higher. Also seventy plant species and thirty bird species is a respectable amount to find within an urban area (Table 1).

Table 1. Total number of species across all habitat types within Craighouse.

Species Group	No. of Species
Plant	70
Grass	9
Fern	8
Bird	30
Mammal	10
Invertebrate	95
Fungi	70
Lichen	11

North Wood habitat had the highest number of species followed closely by South Wood and Buildings had the least number of species which is to be expected. There were several species of note found which fell into several designations: Red Listed Species, Edinburgh Local Biodiversity Plan (ELBAP), Wildlife and Countryside Act 1981 (WCA) and Nature Conservation (Scotland) Act 2004. Other species found were listed as rare or uncommon within text books but was absent from any of the above designations. These rare and uncommon species could be new to the Lothian's and as such have not been added to local designation such as ELBAP as this will be an ongoing process. However, most of these species were invertebrates where this species group is under-recorded and species easily omitted from designations through lack of data input? Species were checked with the National Biodiversity Network (NBN) <http://www.nbn.org.uk/> and with local County Recorders to reference rarity within the Lothian area. Species lists and target species lists along with maps regarding habitats in Craighouse can be found in Appendix 1.

### 3.2 North Woodland - Phase 1 Habitat Code: A1.1.2 PBW

#### Plants

##### Methodology

Flowering plants, grasses and ferns were recorded from February through until August to cover the growing season. North Woodland was monitored towards the end of each month and any new plant found was recorded and added to the list. A transect was walked within the woodland following the path north running parallel to Craighouse Road on the south-east corner, then turning left onto the lower path heading west. At the west end of the wood, before the main wall which runs in a southerly direction separating the campus from Craiglockhart Local Nature Reserve (LNR), turning south east and heading up through the woodland at a gentle angle back up towards the start point in the south-east corner. There were some deviations from the path to inspect other possible interesting areas to maximise recording.

Plants were identified in the field and on occasions some samples were taken for further examination to confirm identification along with images taken of some species. Grasses and ferns were also identified during the survey. Any plant listed in Edinburgh Local

Biodiversity Action Plant (ELBAP) ‘priority species’, or interesting plants, a GPS of their location was taken for mapping purposes.

## Results

There was a total of 64 plant species including grasses and ferns recorded and one species listed in (ELBAP) was Bluebell *Endymion non-scriptus* found within north woodland. Other plants of note were introductions/garden escapees such as Canadian Golden Rod *Solidago canadensis* and Small Balsam *Impatiens parviflora*. Only 37% of plants found were shade tolerant and growing under the canopy where the remaining light loving plants were mainly recorded around the edge of the woodland where more sun penetrates. A comparison between north and south woodland highlights the influence that open edges to the sun can have on the diversity of a woodland (Figure 1a & 1b). However, there will be some overlap between shade and light tolerant plants. The north woodland edge habitat on the south-east side is in an earlier phase of succession than the rest of the woodland and it is this area that has largely contributed to the plant species recorded. The trees here are younger (approximately 10 to 15 years old) with an open canopy where the sun can penetrate and raise the temperature compared to the older and larger trees with a closed canopy, sloping north aspect with little to no sun penetrating and perhaps cooler temperature. The woodland is mainly broadleaf with some conifer tree species and is dominated by Sycamore, *Acer pseudoplatanus*.

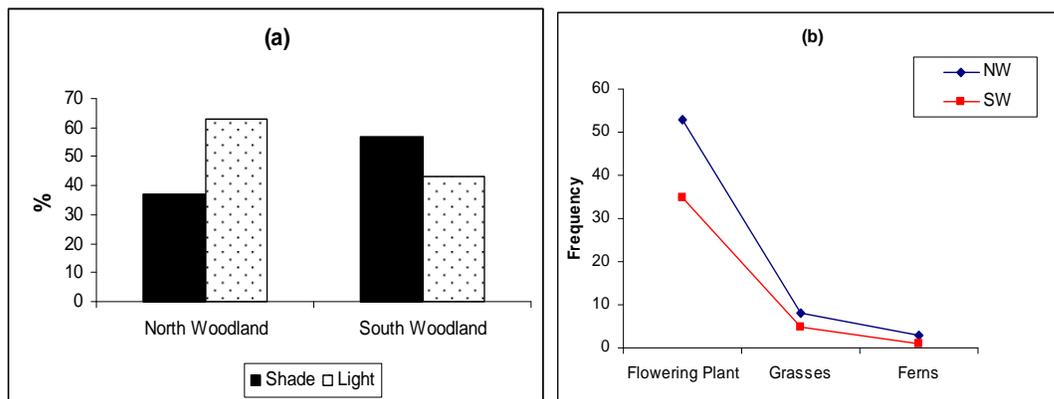


Figure 1. (a) Comparison between shade and light tolerant plants within north and south woodland and (b) frequency of plants highlighting contribution a woodland edge can make to biodiversity. NW=North Woodland and SW=South Woodland.

## Birds

### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month when weather was calm and avoiding windy and wet conditions. A transect was walked within the woodland following the path running parallel to Craighouse Road then turning left onto the lower path heading west. At the west end of the wood before the wall turning south and heading up through the woodland at a gentle angle back towards the start point in the south-east corner. Start times were

varied with most of the transects taking place in the morning. Transects were walked slowly and birds were identified either by sight or call. A pair of 8x40 binoculars was used to visually aid identification. Within each transect only one record of a species was noted e.g., one Dunnock even though I may have seen three. The number of same species was accumulated over the twelve monthly visits to identify the more common species using the woodland.

The movement of birds were defined as local, migrant and resident. The definition of *local* is that some birds though sedentary may move a short distance (few kilometres) from where they bred to their wintering grounds such as thrushes and tits depending on food supply. *Migrant* birds move larger distances from country to country and *resident* stay within the same area all year.

## Results

The most common species of bird that use the north woodland are: Wood Pigeon, Blue Tit, Wren, Robin, Blackbird, Chaffinch and Magpie followed closely by Jackdaw and Great Tit (Figure 1). The rarest birds seen were Tree Creeper, Tawny Owl and Great Spotted Woodpecker.

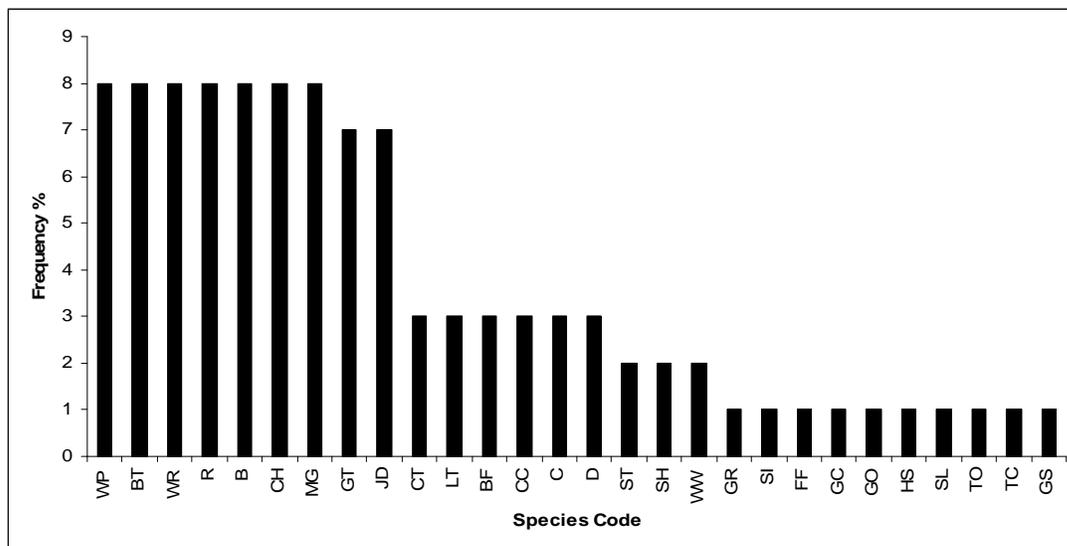


Figure 1. Frequency of birds recorded over one year within North Woodland. WP=wood pigeon BT=blue tit WR=wren R=robin B=blackbird CH=chaffinch MG=magpie GT=great tit JD=jackdaw CT=coal tit LT=long-tailed tit BF=bullfinch CC=chiffchaff C=carrion crow D=Dunnock ST=song thrush SH=sparrowhawk WW=willow warbler GR=greenfinch SI=swift FF=fieldfare GC=goldcrest GO=goldfinch HS=house sparrow SL=swallow TO=tawny owl TC=tree creeper GS=great spotted woodpecker

Overall nine birds were listed in the Edinburgh Local Biodiversity Action Plan (ELBAP) and two birds were red listed under JNCC/RSPB. Most species bred within the woodland with the exception of Redwing which is a winter visitor and possibly swift though the latter may have nested within the buildings. Birds were separated into their preferred feeding categories where 50% of species were insectivore, 18% granivore, 21% omnivore

and 11% carnivore: the latter feeding on birds and small mammals e.g., sparrowhawk and tawny owl (Figure 2).

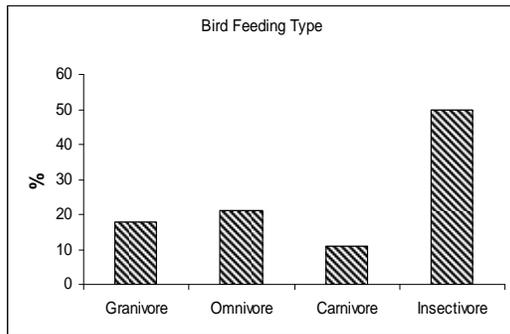


Figure 2. Bird feeding categories within north woodland. Accumulated data over one year.

Most birds were local to the woodland (43%) where in winter there is a slight geographic shift and (39%) were resident. There were (18%) that were migrant and more global in their movements that would have bred in the summer (Figure 3).

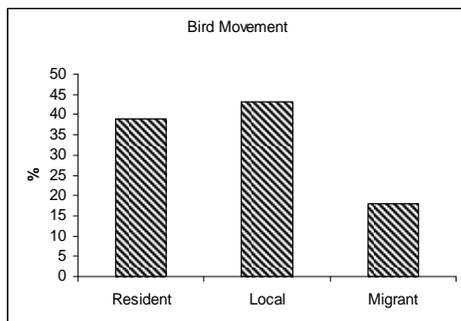


Figure 3. Bird movement within north woodland over one year.

Birds migrating from southern Europe and Africa where they have overwintered e.g., Swallow and Swift (insectivores) return to breed in the UK, and birds moving down from Scandinavia to overwinter in the UK e.g., Redwing and Fieldfare (omnivores) (Figure 4). Local migration and resident birds are more cosmopolitan in feeding though will differ in feeding habits between the winter when food is scarce, and in summer when food is more abundant.

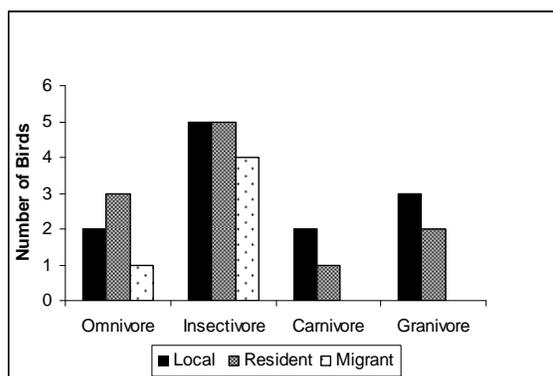


Figure 4. Food category in relation to bird movement over one year.

## Mammals

### Methodology

Most mammals were recorded on an add-hoc basis mainly using signs such as badger scrapings on the woodland floor while foraging for food, foot prints, droppings, scent marking trees e.g., Roe Deer. Some mammals were seen regularly such as rabbits and grey squirrel and snow conditions were used to record mammal tracks. Small mammals were not recorded as they would require a set methodology of capture and release using traps and time commitment. However, a small mammal survey was undertaken by a student from Craighouse as part of a biodiversity study (Melville, 2001).

A survey was carried out to count grey squirrel dreys to assess population density. This was carried out in January when the trees were bare of leaf to make viewing dreys easier. A 'dry run' was initiated to enable familiarisation with the differences between squirrel dreys and magpie nests, in particular old well built magpie nests. Some magpie nests can be large and overlap habitat with that of squirrel dreys e.g., grey squirrel dreys can be slightly out on large limbs where one would expect to find magpie nests, and some magpie nests were within main stem-fork of trees where one would expect to find squirrel dreys. The determining factor was width, height and overall size of the structure or, if a grey squirrel was seen using the drey. Binoculars (8x40) were used to examine the structures from different angles to assess scale. Large holes in trees were not examined where there is the possibility that squirrel dreys could be located.

It is estimated that there are two dreys per hectare of woodland given that grey squirrels will use two dreys within their territory: both as winter dreys but one will be built up in early spring to be used as the maternity drey. It is estimated that individual grey squirrels can be as high as 5 or 6 per hectare (Gurnell *et al.*, 2009). However; squirrel densities depend on various variables such as tree species type, age, structure and connectivity of woodland with other woodland corridors (Fitzgibbon, 1993) and this can have an influence on density.

Bats were monitored from sunset using a Magenta Bat5 Digital Precision bat detector where bat calls are recorded in kilohertz which is used to determine species given that all species echolocate at different kilohertz frequencies.

### Results

Grey squirrels inhabit most types of woodland and within Edinburgh there are small woodlands, woodland corridors and gardens where squirrels can feed and breed. Broadleaves are their preferred habitat where the seeds are larger but they will feed in conifers de-scaling cones to eat seeds. However, there is little energy return from eating cone seeds and most food is taken from large-seeded trees such as beech masts, oak, sycamore which provide higher energy return from these seeds. Not all tree species were identified mainly due to them being exotic species and not in leaf. Some trees have tag numbers where tree species can be cross-referenced in arboricultural consultant tree

report (2009) but no tags were found. It can be roughly estimated that the density of grey squirrels breeding within north woodland are between 2 -4 pairs (Table 1).

Table 1. Number of Squirrel dreys within North Woodland

Habitat	No. of Drey	Tree Species	Tree Tag No.
N. Wood	1	Beech	none
	1	Norway Spruce	none
	1	U/known	none
	1	U/known	none

Two protected species of note use the north woodland are Badger and Bats (Table 2). Two species of bat were recorded, *Pipistrelle pipistrellus* 45kHz and *Pipistrellus pygmaeus* 55kHz mainly within the north east corner of the woodland following the linear aspect of the path that runs from the entrance at Craighouse Road to Craiglockhart Local Nature Reserve (LNR).

Table 2. % of mammals recorded using mostly signs with some sightings

Species	Badger	Fox	Rabbit	R/Deer	H/hog	G Squirrel	Bats
%	8	8	28	19	4	28	8

Badger signs were recorded mainly within the north west of the woodland. No badger setts were found anywhere on the campus and one could hypothesise that badgers have their sett within the LNR where there is good habitat and there are several entrance gaps in the wall allowing easy access into the survey area.

There were signs of roe deer in the way of foot prints and confirmation from a member of the university ground maintenance staff who saw a roe deer on several occasions in the south side of the woodland. Rabbits were mainly contained in the south west woodland edge near Queen's Craig. Hedgehogs were identified through droppings and fox through their tracks.

## Fungi

### Methodology

Fungi survey took place from September to November 2010 where two visits were made per month giving a total of six visits overall and were spaced approximately every two weeks. Fungi were either identified in situ or a sample was taken away to be identified or verified by the county recorder. The woodland was randomly transected where most areas were covered along paths but also away from paths to maximise recording. Dead standing and fallen wood were also examined to cover as much habitat niches used by fungi.

Fungi samples taken away for identification were picked from as close to the base of the stem as possible along with a variety of growth stages of the same species for comparisons in identification. A microscope was used to look at finer structural detail to assist identification though spores though some species were not studied due to lack of

space to take spore prints. Fungi species were identified using the field guide 'Mushrooms' by Roger Phillips (2006).

## Results

In total fifteen specific species were found where two were left at family level due to difficulty in taking them to specific species level. Species categories are for the UK as represented in Roger Phillips *Mushrooms* (2006) and may not be totally reliable (Table 1).

Table 1. Specific species found and categorised into frequency according to (Philips, 2006).

Habitat /Category	Com	Freq	Occ	U/com	ELBAP	Rare	RD
North Wood	10	2	1	0	0	0	0

Com=*common*, Freq=*frequent*, Occ=*occasional*, U/com=*uncommon*, ELBAP=*Edinburgh Local Biodiversity Plan species*, RD=*red data species*.

There were no rare or listed fungi found within north woodland and only one that was occasional *Tyromyces chioneus* (Philips, 2006). There is one other record for this species in Edinburgh listed in the Fungal Records Database of Britain and Ireland (FRDBI) though this record does not have a date. This bracket species is found on dead broadleaved trees.

Species were found in a variety of niches within the woodland where they perform the function of either recycling or parasitizing trees. Most species were found on the ground (60%) while (33%) were found on dead wood (Figure 1). Comparing south woodland to north woodland there are only two species that overlap highlighting how specific this species group are to their habitat preferences.

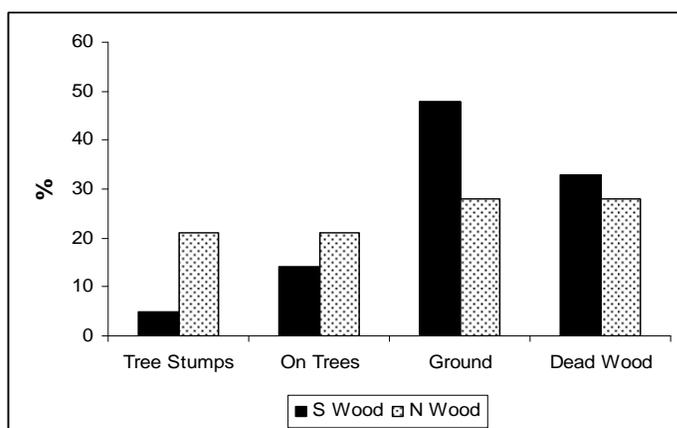


Figure 1. Comparison of niches within South and North Woodland.

## Invertebrates

### Methodology

Invertebrates were caught within vegetation using a sweep net set on a triangular aluminium frame with a stout short wooden handle. Sweeps were taken through the top portion of the vegetation taller than 15cm and below waist level using alternate backhand and forehand strokes. A set number of 6 sweeps were taken through a variety of vegetation types and habitat to maximise and diversify the catch. Invertebrates were removed from the net using a pooter and transferred into a jar containing 75% ethanol. These were later identified to family/species level and categorised into functional groups: *Herbivore* = insects living from plant material, *Carnivore* = insects living from eating other insects, *Detritivore* = insects living from old plant material and *Parasitic* = insects living from other insects. These functional groups are shown as a percentage for each habitat type. Invertebrates were caught in the month of August during dry conditions.

### Results

Herbivores are the most abundant of the functional groups (Figure 1). However, it is to be expected that herbivores as a group would be the most abundant given that their niche was vegetation and it was only this niche that was sampled. There were also a reasonable amount of carnivores (26%) preying and feeding on species within other categories. There was a correlation with the results throughout all the other habitats on all campuses and this is discussed at the end of the Craighouse campus section.

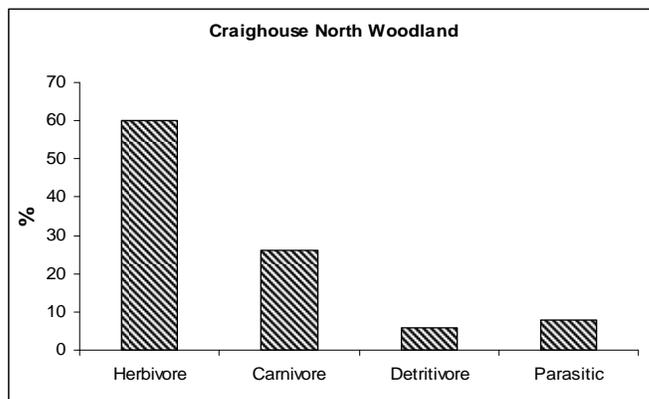


Figure 1. Functional groups expressed as a percentage that met with the survey criteria of 15cm vegetation height. Samples taken from top portion of vegetation by sweep-netting.

Predators were made up of species groups such as spiders (Arachnida), beetles (Coleoptera) and part predatory species such as hoverfly (Diptera) and parasitic wasp (Hymenoptera) (Table 1). Flies (Diptera) were the most abundant (25%) and bugs (Hemiptera) (23%).

Table 1. Class and order of Taxa and abundance given as a percentage of individuals caught.

Class	Order	Abundance %
Arachnida	Acarina	2
	Araneae	9
	Opiliones	9
Insecta	Diptera	25
	Hymenoptera	14
	Hemiptera	23
	Coleoptera	13
	Psocoptera	2
	Lepidoptera	2

## Lichen Survey

### Methodology

Samples were taken from various niches within the woodland from tree trunks, dead wood and branches. These samples taken from the field and later identified using a microscope to examine taxonomic features to determine species. Some samples were picked up from the ground where small branches from the upper canopy of the tree were broken off by the wind. Species were checked against the east of East Scotland Index of Ecological Continuity (ESIEC) (Coppins, 2002). This index is used to help determine habitat diversity where lichens are used as an ecological indicator. This indicator was designed for larger areas of woodland and results here may not be applicable. References used to identify species were: (The Lichens of Great Britain and Ireland, British Lichen Society, 2009), (a multi-access key database version 3.2, Dobson, 2010), (Ferns, Mosses and Lichens of Britain, Jahns, 1983) and a website that has affinity to the British Lichen Society <http://www.britishlichens.co.uk/>

### Results

Ten species of lichen were found within the woodland where most were found on trees than on any other habitat type e.g., stones and ground within the woodland (Figure 1). Most species were specific to their habitat type though some were cosmopolitan such as *Lecanora expallens* and *Chrysothrix candelaris* which can be found on other habitat types such as trees, stone walls and buildings. Using the (ESIEC) the woodland scored Grade 7 and indicates that the woodland is of low category regarding lichen fauna.

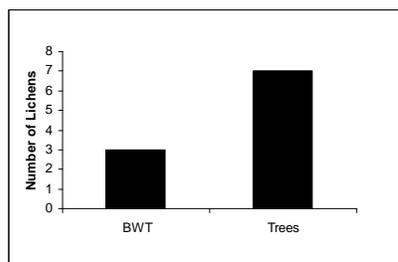


Figure 1. Habitats where lichens are found - BWT = *Buildings, Walls and Trees* where these species are cosmopolitan across these habitats and species specific to trees only.

### 3.3 South Woodland - Phase 1 Habitat Code: A1.1.2 PBW

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#### Plants

##### Methodology

Flowering plants, grasses and ferns were recorded from February through until August which covers the growing season. South Woodland was examined each month and any new plant found was recorded. The woodland was transected mainly following the paths but with some deviation. Timing of monthly visits was towards the end of each month to maintain continuity.

Plants were identified in the field and on occasions samples were taken for further examination to confirm identification or images were taken of the plant in situ. Grasses and ferns were also identified during the survey. Any plant listed in Edinburgh Local Biodiversity Action Plant (ELBAP) 'priority species', or interesting plants and their location were taken either as a map reference or GPS for mapping purposes.

##### Results

Combining flowering plants, grasses and ferns totalling 35 species only one notable species Bluebell *Endymion non-scriptus* is listed in the (ELBAP). Differing from the north woodland 57% of species were shade tolerant (Figure 1). There will be some degree of overlap where some species are light tolerant and can still thrive with some shade, and shade tolerant species that can still thrive within light conditions.

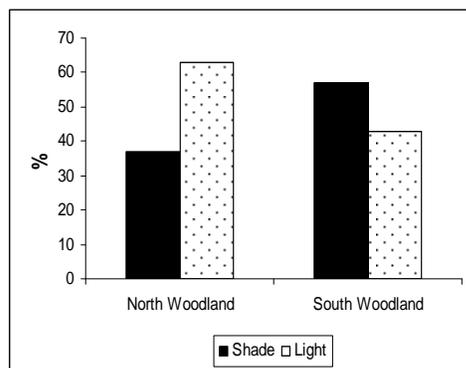


Figure 1. Comparison of shade and light tolerant species within north and south woodland.

The south woodland by comparison to the north woodland does not have an open south east facing edge influencing earlier successional plants. The south woodland is surrounded by barriers preventing early successional plants to grow with buildings and managed grass banks to the east and a dividing wall between the campus and the golf course from the south round to the west. In the north edge there is a rough area but is shaded by trees and dominated by Rosebay Willowherb *Epilobium augustifolium*. However, it has more ground flora growing under the canopy than the north woodland but has less overall species (Figure 2).

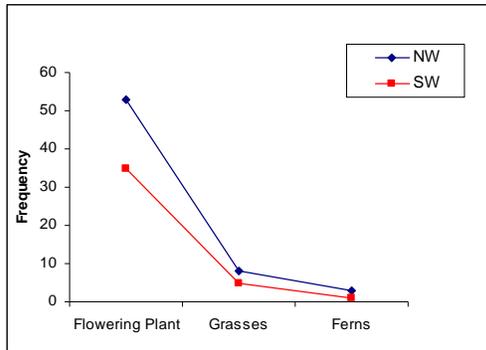


Figure 2. Comparison between species frequency for north and south woodland.

Age structure between both woodlands is much the same given that these woodlands would have all been planted up around the same time. Compared to that of the north woodland more light penetrates the forest floor in the south woodland and this may be due to slope-angle and aspect of these woodlands. Compared to the north woodland where it slopes more steeply to the north, therefore less light penetration, and trees will grow taller to compete for light creating more shade. In the south woodland floor it is mostly shrub species that are growing along with Broad Buckler fern *Dryopteris dilatata*. The woodland is mainly broadleaf with some conifer tree species and is dominated by Sycamore, *Acer pseudoplatanus* (Motion, 2009).

## Birds

### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month and when weather was calm and avoiding windy and wet conditions. A transect was walked within the woodland following the path on the western side running in a north aspect then following the east path zigzagging between the internal woodland tracks finishing at the start point in the south end near the Learning Resource Centre. Time of surveys varied with most transects taking place in the morning. Transects were walked slowly and birds were identified either by sight or call. Pair of 8x40 binoculars was used to aid identification. Within each transect only one record of a species was noted e.g., one Dunnock even though I may have seen three. The number of same species was accumulated over the twelve monthly visits to identify the more common species using the woodland.

The movement of birds were defined as local, migrant and resident. The definition of *local* is that some birds though sedentary may move a short distance (few kilometres) from where they bred to their wintering grounds such as thrushes and tits depending on food supply. *Migrant* birds move larger distances from country to country and *resident* stay within the same area all year.

## Results

There were fewer birds recorded within the south woodland compared to the north woodland. The most common species was wood pigeon and magpie which correlate with the north woodland and there were several birds that were only recorded once over the year such as great spotted woodpecker (Figure 1). Overall there were nine ELBAP species where two of these were Red listed species: Redwing and Song Thrush.

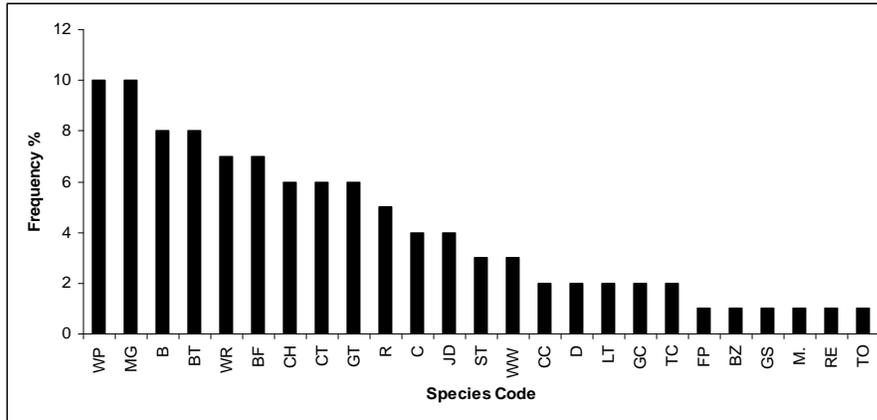


Figure 1. Frequency of birds recorded over one year within South Woodland. WP=wood pigeon MG=Magpie B=Blackbird BT=Blue Tit WR=Wren BF=Bullfinch CH=Chaffinch CT=Coal Tit GT=Great Tit R=Robin C=Carrion Crow JD=Jackdaw ST=Song Thrush WW=Willow Warbler CC=Chiffchaff D=Dunnock LT=Long-tailed Tit GC=Goldcrest TC=Treecreeper FP=Feral Pigeon BZ=Buzzard GS=Great Spotted Woodpecker M=Mistle Thrush RE=Redwing TO=Tawny Owl.

Birds were separated into their preferred feeding category where (48%) of species were insectivore, (12%) granivore, (28%) omnivore and (12%) carnivore: the latter feeding on birds and small mammals e.g., tawny owl. This correlates with the north woodland where there is only a slight difference in numbers (Figure 2).

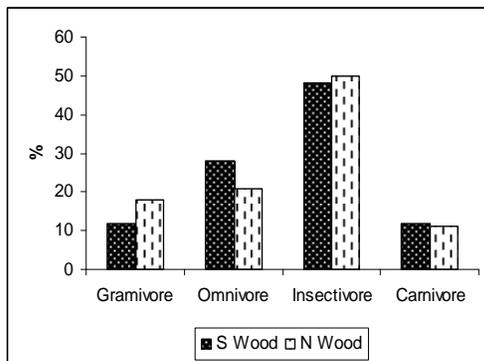


Figure 2. Bird feeding categories within south and north woodland as a comparison over one year.

Most birds were local to the woodland where in winter there is a slight geographic shift south and these birds are replaced by birds from the north and this movement is reversed in spring where birds move north again to breed. Some species that bred in the summer remained resident in the woodland over the winter period and would be joined by migrants in the spring that are more global in their movements (Figure 3). There is a

slight difference between north and south woodland regarding movement where south woodland has more local birds but less migrants.

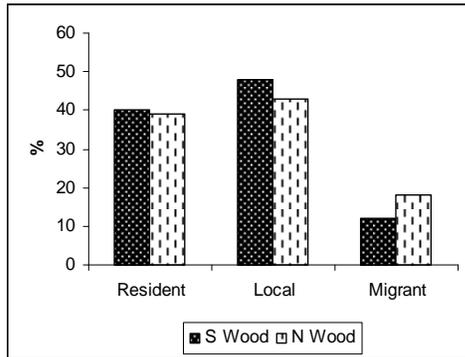


Figure 3. Comparison of south and north woodland bird movement over one year.

Birds migrating from southern Europe and Africa where they have overwintered e.g., Swallow and Swift (insectivores) return to breed in the UK, and birds moving down from Scandinavia to overwinter in the UK e.g., Redwing and Fieldfare (omnivores) (Figure 4). Local migration and resident birds are more cosmopolitan in feeding though will differ in feeding habits between winter when food is scarce, and more specific in the summer when more food and choice is available.

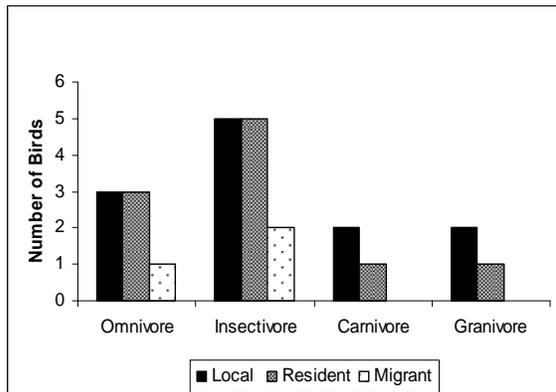


Figure 4. Food category in relation to bird movement over one year.

## Mammals

### Methodology

Most mammals were recorded on an add-hoc basis mainly using signs such as badger scrapings on the woodland floor, foot prints, droppings, scent marking trees e.g., Roe Deer. Some mammals were seen regularly such as rabbits and grey squirrel and snow conditions were used to record mammal tracks. Small mammals were not formally recorded as they would require a set methodology of capture and release using traps and greater time commitment. A small mammal survey was undertaken by a student from Craighouse as part of a biodiversity study (Melville, 2001). However, small mammals that were seen were recorded.

A survey was carried out to count grey squirrel dreys to assess population density. This was carried out in January when the trees were bare of leaf to make viewing dreys easier. A ‘dry run’ was initiated to enable familiarisation with the differences between squirrel dreys and magpie nests, in particular old well built magpie nests. Some magpie nests can be large and overlap habitat with that of squirrel dreys e.g., grey squirrel dreys can be slightly out on large limbs where one would expect to find magpie nests, and some magpie nests were within main stem-fork of trees where one would expect to find squirrel dreys. The determining factor was width, height and overall size of the structure or, if a grey squirrel was seen using the drey. Binoculars (8x40) were used to examine the structures from different angles to assess scale. Large holes in trees were not examined where there is the possibility that squirrel dreys could be located.

It is estimated that there are roughly two dreys per hectare of woodland given that grey squirrels will use two dreys within their territory: both as winter dreys but one will be built up in early spring to be used as the maternity drey. It is estimated that individual grey squirrels can be as high as 5 or 6 per hectare (Gurnell *et al.*, 2009). However; squirrel densities depend on various variables such as tree species type, age, structure and connectivity of woodland with other woodland corridors (Fitzgibbon, 1993) and this will influence overall density.

Bats were monitored from sunset using a Magenta Bat5 Digital Precision bat detector where bat calls are recorded in kilohertz which is used to determine species given that all species echolocate at different kilohertz frequencies.

## Results

Grey squirrels inhabit most types of woodland and within Edinburgh there are small woodlands, woodland corridors and gardens where squirrel can feed and breed. Broadleaves are their preferred habitat where the seeds are larger but will feed in conifers de-scaling cones to eat seeds. However, there is little energy return from eating cone seeds and most food is taken from large-seeded trees such as beech masts, oak, sycamore which provide higher energy return from these seeds. Not all tree species were identified mainly due to them being exotic species and not in leaf. Some trees have tag numbers where species can be cross-referenced in arboricultural consultant tree report (Motion, 2009). It can be roughly estimated that the density of grey squirrels breeding within south woodland are between 2 - 4 pairs (Table 1).

Table 1. Number of Squirrel dreys within South Woodland

Habitat	No. of Drey	Tree Species	Tree Tag No.
S. Wood	1	Beech	1202
	1	Beech	none
	1	Beech	none
	1	Cherry	1271
	1	Corsican Pine	1289

Two species of note that use the south woodland are Badger and Bats (Table 2). Two species of bat were recorded, *Pipistrelle pipistrellus* 45kHz and *Pipistrellus pygmaeus* 55kHz mainly within the south and north edges of the woodland. Badger signs were

recorded mainly within the eastern side of the woodland. No badger setts were found anywhere on the campus and one could hypothesise that badgers have their sett within the LNR nearby where there is good habitat and several gaps in the wall allowing easy access to the survey area to forage.

Table 2. Percentage of mammals recorded using mostly signs and some sightings

Species	Badger	Fox	Rabbit	R/Deer	H/hog	G Squirrel	Bats	S Mammal
%	13	10	23	7	3	24	13	7

There were signs of roe deer in the way of foot prints and also damaged to a tree where a male has been scent marking. Rabbits were mainly contained in the north woodland edge near Queen’s Craig. Hedgehogs were identified through droppings and fox by their tracks.

## Fungi

### Methodology

Fungi survey took place from September to November 2010 where two visits were made per month giving a total of six visits overall and were spaced approximately every two weeks. Fungi were either identified in situ or a sample was taken away to be identified. The woodland was randomly transected where most areas were covered along paths but also away from paths to maximise species recording. Dead standing and fallen wood were also examined to cover maximum niches. Fungi samples taken away for identification were picked from as close to the base of the stem as possible along with a variety of growth stages of the same species for comparisons in identification. A microscope was used to look at finer structural detail such as small hairs to aid identification though spores from some species were not studied due to lack of space to take spore prints. Fungi species were identified using the field guide ‘Mushrooms’ by Roger Philips (2006).

### Results

In total twenty one specific species were found and one left at family level due to difficulty in identifying to specific species. Species categories are for the UK as represented in Roger Phillips *Mushrooms* (2006) and may not be totally reliable (Table 1).

Table 1. Specific species found and categorised into frequency according to (Philips, 2006).

Habitat /Category	Com	Freq	Occ	U/com	ELBAP	Rare	RD
South Wood /Numbers	14	4	2	0	1	0	0

Com=common, Freq=frequent, Occ=occasional, U/com=uncommon, ELBAP=Edinburgh Local Biodiversity Plan species, RD=red data species.

One listed species within the Edinburgh Local Biodiversity Species (ELBAP), Olive Oysterling *Panellus serotinus* was found within south woodland. This species is much less common in Scotland than England and there have been to-date 54 records in

Scotland whereas there have been 767 records in England. The difference between these figures could in part be due to under-recording?

Species were found in a variety of niches within the woodland where they perform the function of recycling and parasitism. A comparison between the south and north woodland shows that there were more species recorded on the ground and on dead wood within both woodlands compared to the other niches of tree stumps and on trees. South woodland had most species growing in the ground and on dead wood whereas north woodland had more species growing on tree stumps and trees. There was more ground species in the south woodland compared to the north woodland and this niche may be the result of more ground vegetation decomposing compared to the north woodland which had little ground vegetation.

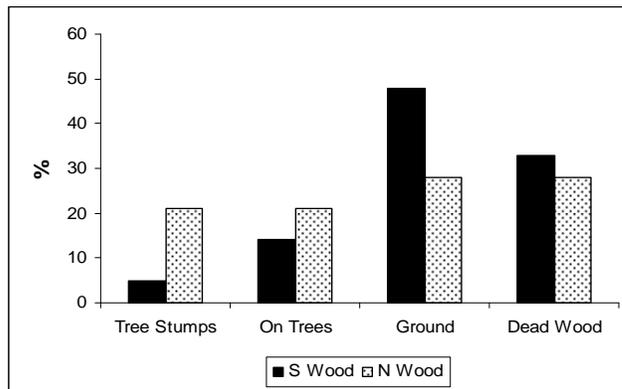


Figure 1. Species broad niche categories.

## Invertebrates

### Methodology

Invertebrates were caught within vegetation using a sweep net set on a triangular aluminium frame with a stout short wooden handle. Sweeps were taken through vegetation taller than 15cm and below waist level using alternate backhand and forehand strokes. A set number of 6 sweeps were taken through a variety of vegetation types and habitat to maximise and diversify the catch. Invertebrates were removed from the net using a pooter and transferred into a jar containing 75% ethanol. These were later identified to family/species level and categorised into functional groups: *Herbivore* = insects living from plant material, *Carnivore* = insects living from eating other insects, *Detritivour* = insects living from old plant material and *Parasitic* = insects living from other insects. These functional groups are shown as a percentage for each habitat type. Invertebrates were caught in the month of August during dry conditions.

## Results

There is a similar correlation between functional groups within both south and north woodlands where herbivores are the most abundant of the categories (Figure 1). However, it is to be expected that herbivores as a group would be the most abundant given that it was only vegetation that was sampled. In South Wood there is (21%) parasitic and (10%) detritivour whereas north woodland (8%) parasitic and only (5%) detritivour. There is more ground vegetation within the south woodland than in the north woodland and this may account for the higher number of detritivours and parasitic invertebrates.

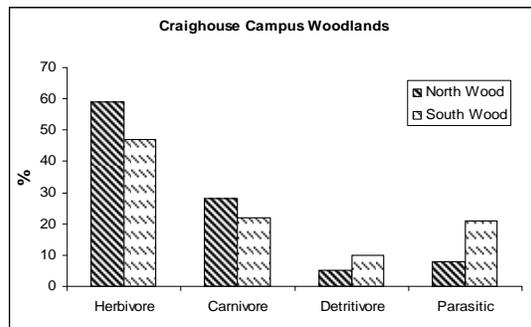


Figure 1. Comparison of functional groups expressed as a percentage across south and north woodland sites.

Predators were mainly made up of species groups such as spiders (Arachnida), beetles (Coleoptera) and part predatory species such as hoverfly (Diptera) and parasitic wasp (Hymenoptera) (Table 1). Flies (Diptera) were the most abundant (29%) and parasitic wasp (Hymenoptera) (20%).

Table 1. Class and order of Taxa and abundance given as a percentage of individuals caught.

Class	Order	Abundance %
Arachnida	Araneae	3
	Opiliones	7
Entognatha Insecta	Collembola	2
	Diptera	29
	Hymenoptera	20
	Hemiptera	19
	Coleoptera	10
	Dermaptera	3
	Psocoptera	3
	Thysanoptera	2

## Lichen Survey

### Methodology

Samples were taken from various niches within the woodland from tree trunks, dead wood and branches. Samples were taken from the field and identified using a microscope to examine taxonomic features to determine species. Some samples from trees were picked up from the ground where small branches from the upper canopy of the tree were

broken off by the wind. Species found were checked against the east of East Scotland Index of Ecological Continuity (ESIEC) (Coppins, 2002). This index is used to help determine habitat diversity where lichens are used as an ecological indicator. References used to identify species were: (The Lichens of Great Britain and Ireland, British Lichen Society, 2009), (a multi-access key database version 3.2, Dobson, 2010), (Ferns, Mosses and Lichens of Britain, 1983, Jahns) and a website that has affinity to the British Lichen Society <http://www.britishlichens.co.uk/>

## Results

Ten species of lichen were found within the woodland where more species were found on trees than on any other habitat type e.g., stones and ground within the woodland. Most species were specific to their habitat type though some were cosmopolitan such as *Lecanora expallens* and *Chrysothrix candelaris* which can be found on other habitat types such as stone walls and buildings. Using the (ESIEC) the woodland scored Grade 7 and indicates that the woodland is of low interest regarding lichen fauna.

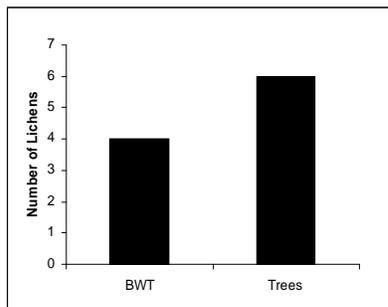


Figure 1. Habitats where lichens are found - BWT = *Buildings, Walls and Trees* where these species are cosmopolitan across these habitats and species specific to trees only.

## 3.4 Parkland – A3.1 SBW

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### Plants

#### Methodology

Flowering plants and grasses were recorded from February through until August which covers the growing season. Survey took place towards the end of each month to maintain continuity. Random transects covering most of the mown grass area were carried out while also transecting the edges of mature tree line and shrub areas at the edge of the parkland. Plants were identified in the field and on occasions some samples were taken for further examination to confirm identification. Any plant listed in Edinburgh Local Biodiversity Action Plant (ELBAP) ‘priority species’, or interesting plants, their location was taken either as a map reference or GPS for mapping purposes.

## Results

Parkland is a highly disturbed area where plant species have adapted to niches depending on the type of land management that takes place. Management of short cut grassland creates a niche where only a few plants are found (17%) whereas less disturbed ground at the edges near trees and shrubs (48%) of plant species are found within this niche. At the edges of paths and roads that are sprayed with herbicide there are early successional plants that are maintained within an equilibrium and succession held from advancing (35%) (Figure 1).

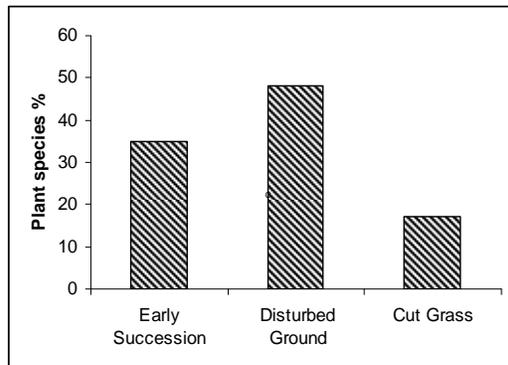


Figure 1. Percentage of plant species within a niche context.

Combining flowering plants and grasses 47 species were recorded and no notable species were found. The only species of interest which was found next to a path at the edge of the parkland was *Spergularia marina* Lesser Sea Spurry. It is not uncommon to find maritime species growing inland and this record may be due to gulls visiting the campus carrying seed from the coast. Also salt has been put on paths in winter to prevent people from slipping on snow and ice and this has increased the salinity of the path edge creating a niche for *S. marina* to grow.

## Birds

### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month when weather was calm and avoiding windy and wet conditions. Due to the possibility of dog walkers scaring birds away, parkland was walked mainly in the early morning when disturbance was at a minimum. A transect was walked around the perimeter of the parkland using the existing paths to identifying birds along with a vantage point from the balcony at South Craig which gave a clear view of the open grass area. Shrub areas were walked around to disturb birds hiding so that they could also be recorded. Transects were walked slowly using 8x40 binoculars to help identify bird species. Within each individual transect only one record of a species was noted e.g., one blackbird even though I may have seen six on one visit. The number of same species was accumulated over the twelve monthly visits to identify the more common species seen using the parkland.

## Results

Overall there were 34 species recorded and most were feeding on the grassland while others were feeding within the apple trees within the grassland and also the more mature perimeter trees and shrubs (Figure 1). Birds of prey such as buzzard, sparrowhawk and kestrel were attracted to the grassland area to prey on small birds. The most common species recorded using the parkland to feed were blackbird and black-headed gulls followed closely with bullfinch and blue tit. There were four gull species recorded feeding within the grassland on a variety of invertebrates and apples that had fallen onto the ground. These apples were also a source of food for migrants such as redwing and fieldfare along with other members of the thrush family, song and mistle thrush.

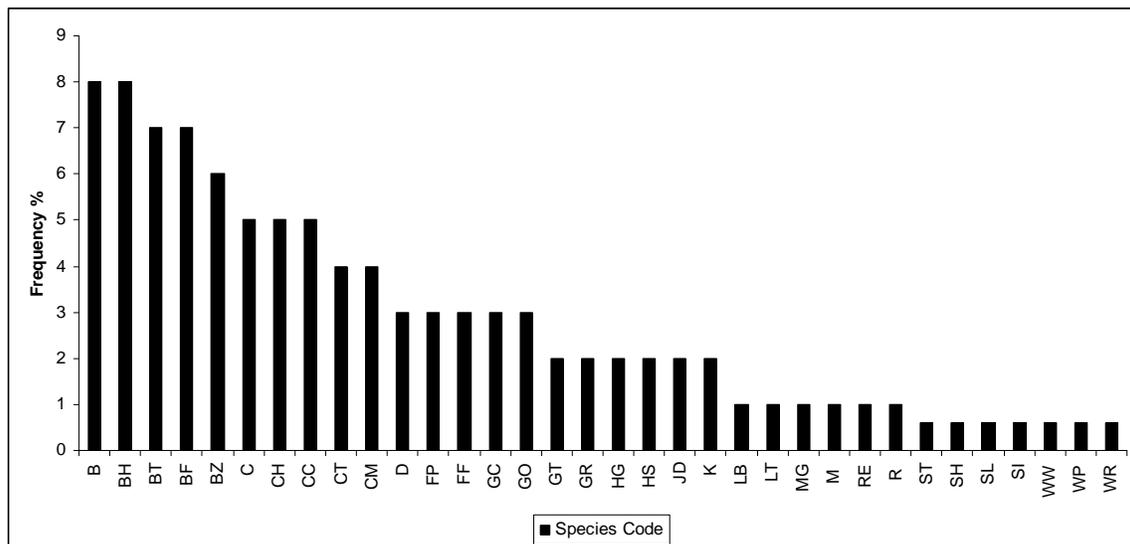


Figure 1. Frequency of birds recorded over one year within the parkland. B=Blackbird, BH=Black-headed Gull, BT=Blue Tit, BF=Bullfinch, BZ=Buzzard, C=Carrion Crow, CH=Chaffinch, CC=Chiffchaff, CT=Coal Tit, CM=Common Gull, D=Dunnock, FP=Feral Pigeon, FF=Fieldfare, GC=Goldcrest, GO=Goldfinch, GT=Great Tit, GR=Greenfinch, HG=Herring Gull, HS=House Sparrow, JD=Jackdaw, K=Kestrel, LB=Lesser Black-backed Gull, LT=Long-tailed Tit, MG=Magpie, M=Mistle Thrush, RE=Redwing, R=Robin, ST=Song Thrush, SH=Sparrowhawk, SL=Swallow, SI=Swift, WW=Willow Warbler, WP=Wood Pigeon, WR=Wren.

There were fourteen birds that are listed within the Edinburgh Local Biodiversity Action Plan (ELBAP) and three birds that are on the Red List.

The feeding categories where most of the birds were recorded were equally distributed between omnivore and insectivore (35%) and where (9%) were carnivores. Parkland provided an ideal hunting ground for the latter where there was a good food supply and good cover for ground predators e.g., fox to approach unseen.

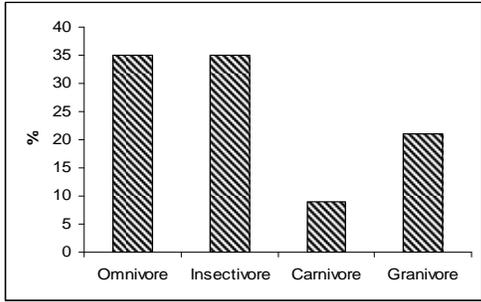


Figure 2. Bird feeding categories within parkland over one year.

Most birds were local to the area (44%) and a good number were resident (38%) (Figure 3). This highlights that parkland as a habitat has a resemblance of ‘country’ habitat with fields and corridors of woodlands and mosaics providing nesting, feeding and cover habitat while predators at the top of the food chain can also function having a food supply.

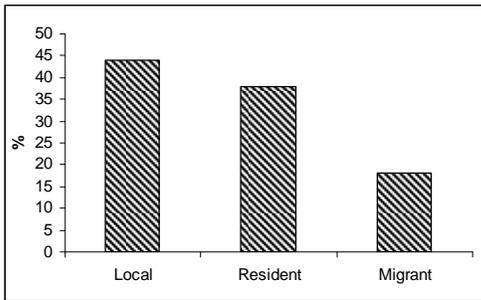


Figure 3. Bird movement within parkland over one year.

Amongst migrant birds a higher percentage were insectivores (67%) and omnivores (33%) where the insectivores were summer migrants and omnivores winter migrants (Figure 4). Local and resident birds were cosmopolitan in their feeding and most were omnivore (46%). The definition of *local* is that some birds though sedentary may move a short distance (few kilometres) from where they bred to their wintering grounds such as thrushes and tits depending on food supply. *Migrant* birds move larger distances from country to country and *resident* stay within the same area all year.

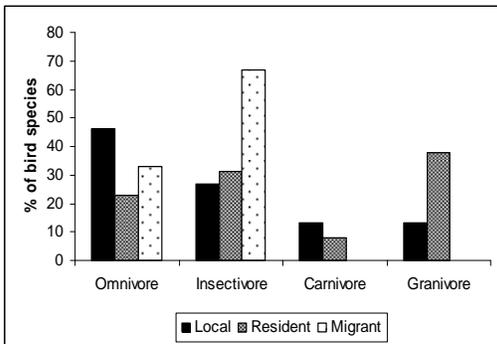


Figure 4. Feeding type and seasonal distribution categories.

## Mammals

### Methodology

Most mammals were recorded on an add-hoc basis mainly using signs such as foot prints, droppings, scent marking trees e.g., Roe Deer. Some mammals were seen regularly such as rabbits and grey squirrel and snow conditions were used to record mammal tracks. Small mammals were not formally recorded as they would require a set methodology of capture and release using traps and greater time commitment. A small mammal survey was undertaken by a student from Craighouse as part of a biodiversity study (Melville, 2001).

A survey was carried out to count grey squirrel dreys to assess population density. The survey was carried out in January when the trees were bare of leaf to make viewing dreys easier. A 'dry run' was initiated to enable familiarisation with the differences between squirrel dreys and magpie nests, in particular old well built magpie nests. Some magpie nests can be large and overlap habitat with that of squirrel dreys e.g., grey squirrel dreys can be slightly out on large limbs where one would expect to find magpie nests and some magpie nests were within main stem-fork of trees where one would expect to find squirrel dreys. The determining factor was width, height and overall size of the structure or, if a grey squirrel was seen using the drey. Binoculars were used to examine the structures from different angles to assess scale. Large holes in trees were not examined where there is the possibility that squirrel dreys could be located.

It is estimated that there are roughly two dreys per hectare of woodland given that grey squirrels will use two dreys within their territory: both as winter dreys but one will be built up in early spring to be used as the maternity drey. It is estimated that individual grey squirrels can be as high as 5 or 6 per hectare (Gurnell *et al.*, 2009). However; squirrel densities depend on various variables such as tree species type, age, structure and connectivity of woodland with other woodland corridors (Fitzgibbon, 1993) and this will influence overall density.

### Results

Drey counts took place within the more mature trees around the perimeter edge of the parkland and revealed two dreys suggesting that there will only be one pair of grey squirrel breeding in this area. Overall only seven grey squirrels were seen and counted within this area over the one year survey. The most common species recorded were rabbits (33%) followed by grey squirrel (26%) (Table 1).

Table 1. Percentage of mammal species recorded within Parkland habitat

Species/	Badger	Bat	Fox	G. Squirrel	Rabbit	Roe Deer
%	7	7	19	26	33	7

Two protected species under the Wildlife and Countryside Act 1981 as amended (Scotland) Act 2004 were recorded: badger and bat species. Two species of bat were

recorded: Pipistrel 45khz and 55khz feeding within the edge of the mature trees around the perimeter of the parkland.

## Fungi

### Methodology

Fungi survey took place from September to November 2010 where two visits were made per month giving a total of six visits overall. These visits were spaced approximately every two weeks. Fungi were either identified in situ or a sample was taken away to be identified. The parkland was randomly transected covering most of the mown grass area and the mature tree and shrub areas at the edge of the parkland were also covered by transect. Any dead standing or dead wood were also examined to cover as much habitat niches used by fungi. Fungi samples taken away for identification were picked from as close to the base of the stem as possible along with a variety of growth stages of the same species for comparisons in identification. A microscope was used to look at finer structural detail such as small hairs to aid identification though spores from some species were not studied due to lack of space to take spore prints. Fungi species were identified using the field guide 'Mushrooms' by Roger Philips (2006).

### Results

There were thirty three species recorded and were identified to specific species (88%) while (12%) remained at family level. Most species were listed as common (59%) while (7%) were uncommon and (3%) were Red Data species (Table 1).

Table 1. Specific species found and categorised into frequency according to (Philips, 2006).

Category/	Common	Occasional	Frequent	Uncommon	Red Data
%	59	21	10	7	3

Most species were found growing on the ground (90%) and (10%) found growing on tree stumps and on trees. The current management of cutting the grass around the parkland is important in maintaining the fungi species that grow there.

### Invertebrate and Lichens

An invertebrate survey was not carried out on Parkland as the vegetation was not of a length to allow sweep netting to take place. Three butterfly species were noted: Large White *Pieris brassicae*, Peacock *Inachis io*, and a Green-veined White, *Pieris napi*.

Three lichen species were found growing on trees: *Caloplaca flavenscens*, *Chrysothrix candelaris* and *Lecanora explallens*.

## 3.5 Buildings – J3.6

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### Plants

#### Methodology

Flowering plants, grasses and ferns were recorded from February through to August which covers the growing season. Each building was walked around and plants within one meter of the building were recorded and where there was a concrete path adjacent to the base of the building, plants were recorded to the outside edge of this structure. Survey was conducted towards the end of each month to maintain continuity.

Plants were identified in the field and on occasions some samples were taken for further examination to confirm identification. Grasses and ferns were also identified during the survey. Any plant listed in Edinburgh Local Biodiversity Action Plan (ELBAP) ‘priority species’, or interesting plants, their location was taken either as a map reference or GPS for mapping purposes.

#### Results

Most species around the buildings, path edges and walls are strongly influenced by the habitat, poor stony soil, lack of sunshine i.e. north side of the building, and the type of management carried out. All these areas are either sprayed with herbicide, which slows and prevents plant succession to progress, or the grass is cut to the edge of the stone structure limiting species that can live in this highly disturbed niche. Out of 53 species of plant recorded within this habitat 81% were plants that are found in disturbed ground or were pioneering species associated with an early phase of succession.

One ELBAP species found next to a building adjacent to the south woodland was *Endymion non-scriptus* Bluebell. There were two species of spleenworts and two species of ferns found growing on the buildings. Flowering plants were more dominant than other plants such as grasses and ferns (Figure 1).

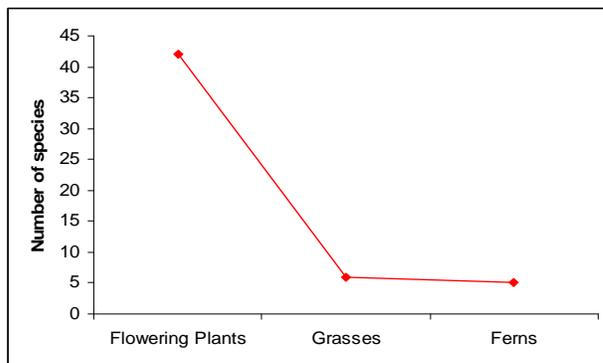


Figure 1. Flowering plants were more dominant than grasses and ferns.

## Birds

### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month and when weather was calm and avoiding windy and wet conditions. Buildings were surveyed by examining all sides from roads and paths at distance using binoculars (8x40) and birds counted. Time of surveys varied with most transects along roads and paths taking place in the morning. Transects were walked slowly and birds were identified mainly by sight. Within each individual transect only one record of a species was noted e.g., one magpie even though I may have seen three magpies. The number of same species was accumulated each month over the twelve monthly visits to identify the more common species using the woodland.

### Results

The most common species using buildings were Carrion Crow and Magpie (Figure 1) and these mainly used the building elevation as an advantage point to spot food. Jackdaw and Feral Pigeon used the buildings for nesting while other species used the buildings for resting and preening.

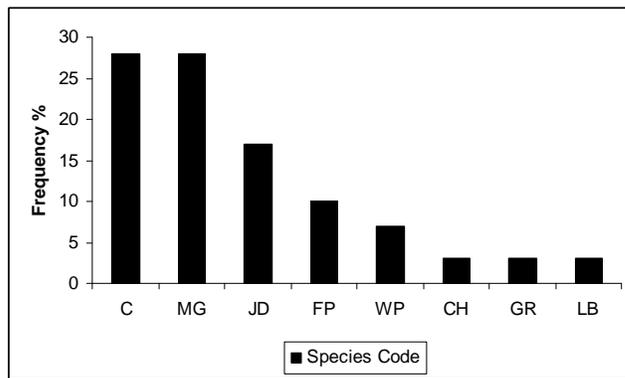


Figure 1. Bird species using buildings. C=Carrion Crow, MG=Magpie, JD=Jackdaw, FP=Feral Pigeon, WP=Wood Pigeon, CH=Chaffinch, GR=Greenfinch, LB=Lesser Black-backed Gull.

One bird was listed within the ELBAP (Lesser Black-backed Gull) which visits the campus to feed only and breeds elsewhere. Most birds recorded were resident (75%) and these were a mixture of granivore and omnivore. Species such as chaffinch and greenfinch were local (25%) where a local seasonal migration takes place and these were granivores (Figure 2). There were no migratory species and no feeding category types of carnivore and insectivores recorded using buildings.

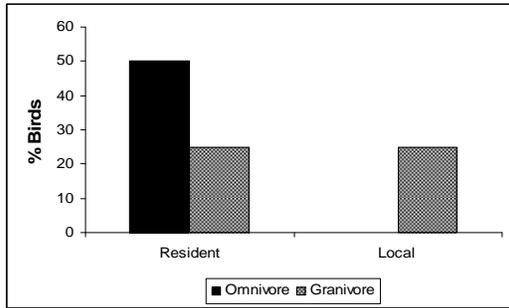


Figure 2. Bird movement feeding categories.

## Mammals

### Methodology

Most mammals were recorded on an add-hoc basis mainly using signs such as foot prints, droppings and runs though some species were visually recorded. Bats were monitored from sunset using a Magenta Bat5 Digital Precision bat detector where bat calls are recorded in kilohertz which is used to determine species given that all species echolocate at different kilohertz frequencies.

### Results

Two species of note recorded are Badger and Bats. Species of bat recorded were, *Pipistrelle pipistrellus* 45kHz and *Pipistrellus pygmaeus* 55kHz. *Pipistrelle pipistrellus* 45kHz was hunting between the south woodland edge and the Learning Resource Centre and *Pipistrellus pygmaeus* 55kHz found on the south side of New Craig. It is not clear if these bats use the buildings to roost or the nearby woodland?

Fox, grey squirrel, brown rat and bats were recorded more than other mammals around buildings but the numbers involved were low (Table 1). Badger signs were recorded in the snow on the south side of New Craig building along with roe deer and fox. Rabbits and grey squirrels were recorded on paths adjacent to buildings. Field signs of brown rats were recorded adjacent to building edges where there were typical runs leading to holes.

Table 1. % of mammals recorded using field signs with some sightings

Species	Badger	Fox	Rabbit	R/Deer	G Squirrel	Bats	Brown Rat
%	8	17	16	8	17	17	17

## Lichens

### Methodology

Samples were taken from various niches on buildings and walls. Samples taken from the field were identified using a microscope to examine features to determine species. Species found were checked against East Scotland Index of Ecological Continuity (ESIEC) (Coppins, 2002). This index is used to help determine habitat diversity where lichens are used as an ecological indicator. References used to identify species were:

(The Lichens of Great Britain and Ireland, British Lichen Society, 2009), (a multi-access key database version 3.2, Dobson, 2010), (Ferns, Mosses and Lichens of Britain, 1983, Jahns) and a website that has affinity to the British Lichen Society <http://www.britishlichens.co.uk/>

## Results

Seven species were recorded and were specific to their habitat type though four species were cosmopolitan and can be found on other habitat types such as trees. Using the (ESIEC) indicates that the species found were of low interest.

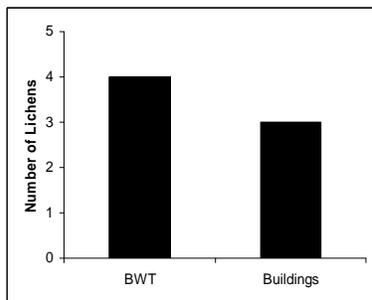


Figure 1. Habitat categories where lichens were found - BWT = *Buildings, Walls and Trees*, where species were more cosmopolitan in their habitat requirements and species specific to buildings and other stone structures.

## 3.6 Craighouse Discussion

### Species of note

Rare and protected species along with species of note have been recorded across several species groups: birds, mammals, plants, fungi and invertebrates. A leaf beetle may be a first record for the Lothian's *Lamprosoma concolor* found within the north woodland. There are a few species records for Scotland but they are very scarce. They can be found on umbellifer species and ground ivy *Hedra helix*. There are many invertebrate species that will not appear on local records possibly due to this Taxa group being under recorded. Therefore one could assume from this that there are perhaps several invertebrate species within Craighouse campus that are rare but not actually listed within the ELBAP.

It is interesting that in the designations to help protect and raise awareness of the more vulnerable species that there are high numbers of bird designations and a smaller number of other designated species (Table 1). There were no designations attributed to the smaller invertebrate and lichen species groups though there are generally many considered rare and vulnerable, and this may be due to either lack of data for the Lothian's, or minimal representation for these Taxa through organisations?

Any species listed in (table 1) under the WCA or Red Data Book will also automatically be listed within the ELBAP.

Table 1. Species with protective designations and listed species within each habitat type.

Habitat	Designation	Birds	Mammals	Plants	Fungi
<u>N. Wood</u>	WCA		3	1	
	Red Listed	2			
	ELBAP	9			
<u>S. Wood</u>	WCA		4	1	1
	Red Listed	2			
	ELBAP	6			
<u>Buildings</u>	WCA		3		
	Red Listed				
	ELBAP	1		1	
<u>Parkland</u>	WCA		3		
	Red Listed	3			
	ELBAP	15			
	Red Data Book				1

WCA=Wildlife and Countryside Act 1981 as amended (Scotland) 2004  
 ELBAP=Edinburgh Local Biodiversity Plan

Birds are possibly the most recorded and monitored species in the world with a large number of people who enjoy bird watching. This species group are represented by many organisations world wide and are a ‘loud voice’ within conservation where birds are put high on the political agenda. As a result we see many designations for birds (Figure 1). There is a tendency for other species to be ‘squeezed out’ because their interest groups have a minimal representation, such as lichens and invertebrates and in particular the latter though much interest and promotion of this group is increasing through the organisation Buglife Scotland.

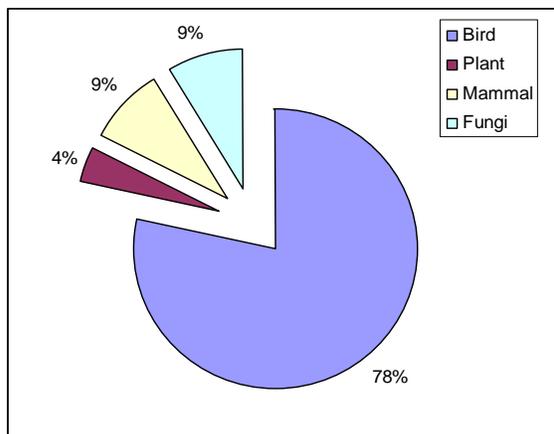


Figure 1. Accumulation of protected species across all habitat types for Craighouse Campus.

### Invertebrates

To give a structured assessment to invertebrates the sample was broken down to functional groups to help categorise the sample. This method has been used as indicators of habitat health by some entomologists though other entomologist would argue that it is perhaps better to select a group of predator species such as beetles or spiders to perform this function which may be more accurate (New, 2005). Invertebrates are a complex group and much more extensive sampling methods of other habitat types and niches

would be required to provide comparable data so that health of a habitat can be estimated. For example, other groups such as ground dwellers and flying invertebrates would be required to be sampled to provide a more all-round view of invertebrates using a habitat. Therefore, using only the swish sampling method on one habitat type within the universities campuses will not indicate whether the habitat and the invertebrate biodiversity is healthy or not.

## Plants

The north and south woodlands are not intensively managed whereas parkland and buildings areas are. Due to these differing levels of management has allowed for a higher number of plants to be recorded within parkland and buildings. The high number of species is due to the intensity of management which is holding plants in an early successional phase where it is normal for more pioneering species of plants to grow on disturbed ground as part of early colonisation. If we compare the intensively managed habitats to that of the south woodland, where there is no intensive management or edge effect such as in the north woodland, we have less species. Within the south woodland this represents a climax in woodland succession where the woodland plant growth is reduced due to succession slowing down as the woodland growth moves towards a climax situation. Also as trees and limbs fall this opens up the canopy where some species will move in to colonise these small open areas which adds to diversity. The mature trees within both the woodlands were not sampled. These will have an abundance of invertebrates living in varied niches within the bark and also throughout the canopy therefore add greatly to the biodiversity.

Overall there are 87 species of plants including grasses and ferns recorded within the habitats collectively. The varying levels of management have contributed by adding to plant diversity by creating mosaics for plants to thrive at differing levels of succession.

## Biodiversity

When taken in context of an urban area Craighouse campus has a very diverse and interesting collection of flora and fauna. The habitat types and how they are managed with minimal input has contributed greatly to its diversity and how this area is used by flora and fauna. Comparisons of taxa groups across all habitat types within Craighouse are varied according to habitat types. The two woodland habitats are similar in their assemblages of species whereas parkland and buildings both differ. Overall plant life is more diverse across all habitats sampled (Figure 2). Birds used parkland more than any other habitat type and though the north woodland had also good numbers of birds, most of these were recorded on the south east edge within an area of varying stages of earlier succession compared to the more climax vegetation within the woodland.

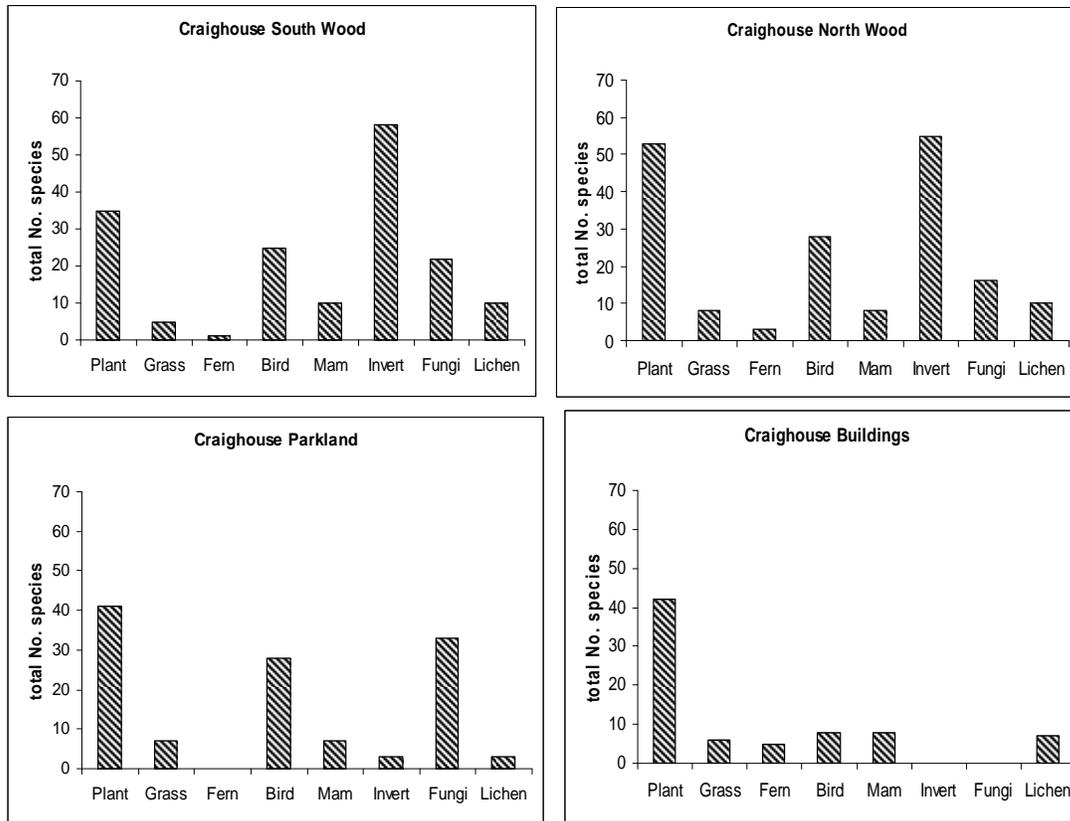


Figure 2. Taxa groups across all habitat types.

It is not species and their assemblages alone that make up biodiversity but also people who have to live and work in these environments. Most members of the public where engaged in conversation remarked on the quality of the campus as a great asset for recreation and getting away from the built environment into that resembling countryside and the enjoyment of the woods, open areas with views along with their enjoyment of the flora and fauna. It is without doubt that Craighouse has a value for both biodiversity and the people who use the campus, whether it is the public, university staff or students.



*Clavulinopsis cinereoides* Red Data Book Species & First Scottish Record

## 4. Craiglockhart Campus

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### 4.1 Summary

Craiglockhart campus area is managed by grass cutting and spraying areas around path edges, buildings and road edges with herbicide to control weeds. Shrubs are cut and kept in a tidy condition. Most trees are managed through a management plan where Arboricultural Consultants recommend a maintenance strategy for keeping trees in a safe and healthy condition. All types of management carried out will have differing degrees of impact, both positive and negative, on the diversity of species that can be found within the campus. It is mainly the current management of the campus that has resulted in one plant being a new record for Lothian's, one plant being the first record since 1934 and another only the fifth record for the Lothian's. A fungi of interesting note is *Clavulinopsis cinereoides*, which is still receiving attention among Mycologists and is now classified as a first record for Scotland. This is very impressive for such a small campus and within a built up urban area to have such rarities. Species lists and target species lists along with maps regarding habitats in Craiglockhart can be found in Appendix 2.

Table 1. Total number of designated species across all habitat types.

Species Group	No. of Species	Designation	Lothian Record	Scottish Record
Plant	107	1 ELBAP	3	
Grass	12			
Fern	5			
Bird	33	20 ELBAP/6 RL		
Mammal	9	1 WCA		
Invertebrate	92			
Fungi	59	1 RDB	1	1
Lichen	16			

ELBAP=Edinburgh Local Biodiversity Action Plan WCA=Wildlife and Countryside Act RDB=Red Data Book RL=Red Listed

## 4.2 Parkland - Phase 1 Habitat Code A3.1 SBW

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### Plants

#### Methodology

Flowering plants, grasses and ferns were recorded from February through until August to cover the growing season. Parkland was monitored towards the end of each month and any new plant found was recorded and added to the list. A transect was walked within the wooded area following paths and linear transects were walked over the larger cut grass areas and also following the hedge lines and the edges of paths and roads to maximise the sample.

Plants were identified in the field and on occasions some samples were taken for further examination to confirm identification along with images taken of some species. Grasses and ferns were also identified during the survey. Any 'priority species', or interesting plants, a GPS of their location was taken for mapping purposes.

#### Results

Most of the area of grassland is managed by mowing with few plants found within the main cut grass area (14%) with the remaining (86%) all conducive with growing in bare ground, edges of thickets and uncut areas; species such as Common Fumitory *Fumaria officinalis* and Cleavers *Galium verum*, these areas have minimal management. The edges of paths and roads are managed by herbicide spraying and this management type has created a niche for pioneering plants in an early successional phase.

There was an overall total of 89 plant species including grasses and ferns recorded from the variety of niches found within the parkland (Appendix ?). Two plants were listed within ELBAP; Bluebell *Endymion non-scriptus* and Sun Spurge *Euphorbia helioscopia*, though the former is more likely to be an escapee. Two plants, though were not currently on any lists and were rare within the Lothian's were Swine Cress *Coronopus squamatus*, which is a first record in Lothian's since 1934, and Reflexed Stonecrop *Sedum rupestre*, which is the fifth record in the Lothian's. These records were submitted to the plant recorder for the Lothian's along with details for verification.

Most of the trees within the parkland are mature with a mix of broadleaved and conifer along with shrubs and the dominant tree species is Lime *Tilia sp.*

### Birds

#### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month when weather was calm and avoiding windy and wet conditions. A transect was walked from the car park at the north end of the campus

walking south along the western side going round shrubs, around the south side of the campus beside the grassland habitat and north along the eastern edge before returning to the starting point. There were also deviations into and along shrub areas as well as following lines of trees, roads, paths and car parks and each side of the tree canopy to cover complete area. Birds seen but not identified were followed as they moved through tree canopy and into shrub areas. All habitat types were surveyed on the same visit: Parkland, SI Grassland and Buildings.

Transects were walked slowly using 8x40 binoculars to help identify species and some birds were also identified by their call. Within each transect only one record of a species was noted e.g., one blackbird even though I may have seen six on one visit. The number of same species was accumulated over the twelve monthly visits to identify the more common species using the parkland. Birds in figure one have been coded using the British Trust for Ornithology (BTO) coding system.

## Results

The most common bird was blackbird and wood pigeon followed by blue tit, jackdaw and magpie (Figure 1). Overall eleven birds were listed in the Edinburgh Local Biodiversity Action Plan (ELBAP) and five birds were red listed under JNCC/RSPB. The most

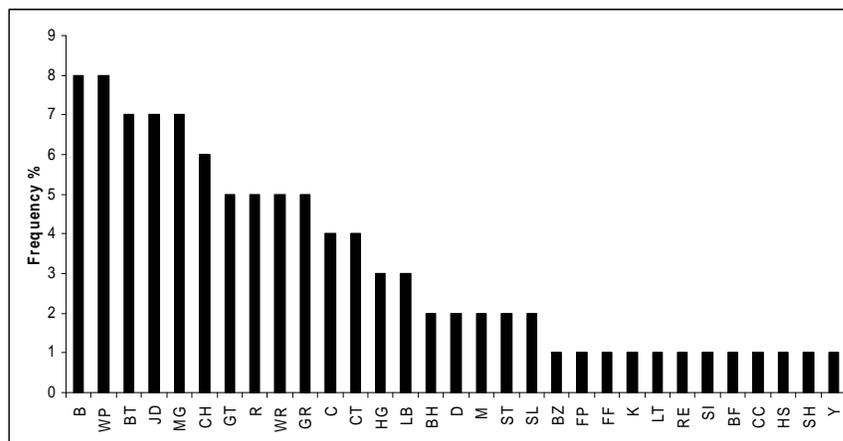


Figure 1. Frequency of birds recorded over one year within parkland habitat. BTO code: B=Blackbird WP=Wood Pigeon BT=Blue Tit JD=Jackdaw MG=Magpie CH=Chaffinch GT=Great Tit R=Robin WR=Wren GR=Greenfinch C=Carrion Crow CT=Coal Tit HG=Herring Gull LB=Lesser Black-backed Gull BH=Black Headed Gull D=Dunnock M=Mistle Thrush ST=Song Thrush SL=Swallow BZ=Buzzard FP=Feral Pigeon FF=Fieldfare K=Kestrel LT=Long-tailed Tit RE=Redwing SI=Swift BF=Bullfinch CC=Chiffchaff HS=House Sparrow SH=Sparrowhawk Y=Yellowhammer.

interesting bird was a yellowhammer found on a cold day prior to the snowy weather last winter feeding on the ground within the north-west corner where several other listed birds were found. Sixty one percent bred with the parkland and others were local summer visitors and winter migrants.

Birds were separated into their preferred feeding categories where 35% of species were omnivore, 35% insectivore, 21% granivore and 9% carnivore, the latter feeding on birds and small mammals e.g., sparrowhawk and buzzard (Figure 2).

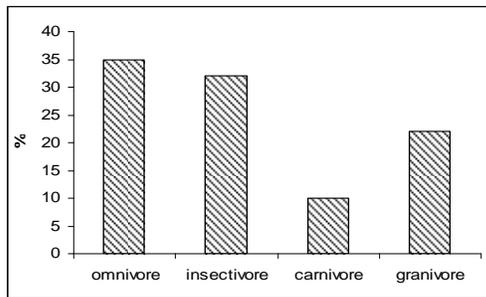


Figure 2. Bird feeding categories within parkland habitat. Accumulated data over one year.

Most birds were local and resident to the parkland, each category 42%, and there were 10% that were migrant and more global in their movements that turned up to breed in the summer and 6% were winter migrants (Figure 3).

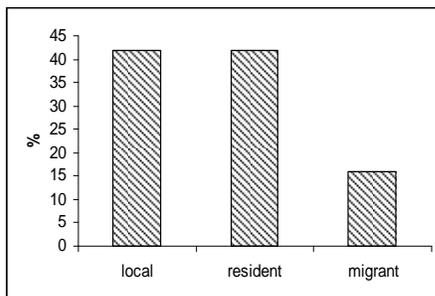


Figure 3. Bird movement within parkland habitat over one year.

Birds migrating from southern Europe and Africa where they have overwintered e.g., Swallow and Swift (insectivores) return to breed in the UK, and birds moving down from Scandinavia to overwinter in the UK e.g., Redwing and Fieldfare (omnivores) (Figure 4). Local migration and resident birds are more cosmopolitan in feeding though will differ in feeding habits between the winter when food is scarce, and in summer when food is more abundant.

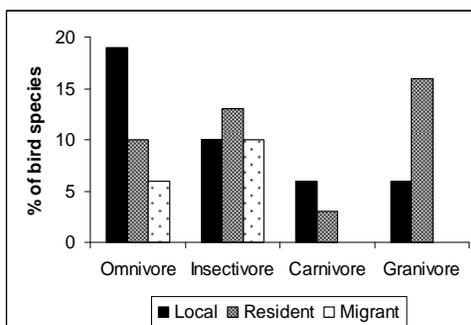


Figure 4. Food category in relation to bird movement over one year.

## Mammals

### Methodology

Most mammals were recorded on an add-hoc basis mainly using signs, such as weasel and fox foot prints in the snow, and other species by sight such as shrew and rabbit. Small mammals were not specifically surveyed as they would require a set methodology of capture and release using traps and much time commitment and was not practical given other timed survey work taking place.

A survey was carried out to count grey squirrel dreys to assess population density. The survey was carried out in January when the trees were bare to make viewing dreys easier. A 'dry run' was initiated to enable familiarisation with the differences between squirrel dreys and magpie nests, in particular old well built-up magpie nests. Some magpie nests can be large and overlap habitat with that of squirrel dreys e.g., grey squirrel dreys can be slightly out on large limbs where one would generally expect to find magpie nests and some magpie nests were within the main stem-fork of trees where one would expect to find squirrel dreys. The determining factor was width, height and overall size of the structure where there is a tendency for grey squirrel dreys to be larger than a magpie's nest or, if a grey squirrel was seen using the drey. Binoculars were used to examine the structures from different angles to assess scale. Large holes in trees were not examined where there is the possibility that squirrel dreys could be located.

It is estimated that there are two dreys per hectare of woodland given that grey squirrels will use two dreys within their territory: both as winter dreys but one will be built up in early spring to be used as the maternity drey. It is estimated that individual grey squirrels can be as high as 5 or 6 per hectare (Gurnell *et al.*, 2009). However; squirrel densities depend on various variables such as tree species type, age, structure and connectivity of woodland with that of other woodland corridors (Fitzgibbon, 1993) and this can have an influence on density.

Bats were monitored from May to August from sunset using a Magenta Bat5 Digital Precision bat detector where bat calls are recorded in kilohertz which is used to determine species given that all species echolocate at different kilohertz frequencies. Craiglockhart Castle was monitored by standing from sunset for between one and one and a half hours on several occasions when the weather was mild with little to no wind. The campus was also walked round on other occasions from sunset.

### Results

Drey counts took place within the more mature trees around the perimeter edge of the parkland and revealed only three dreys all within Lime (*Tilia sp*) therefore would suggest that there will be one pair of grey squirrel breeding in this area. Overall only five grey squirrels were seen and counted within this area over the one year survey.

Table 1. Percentage of mammal species recorded within Parkland habitat

Species/ %	Bat	Fox	G. Squirrel	Rabbit	Roe Deer	Shrew	Weasel
	16	22	28	16	6	6	6

Two protected species under the Wildlife and Countryside Act 1981 as amended (Scotland) Act 2004 were recorded: bat species and shrew species (the latter is only protected for certain trapping methods or killing). The most common mammal species recorded were grey squirrels 28% followed by fox 22% (Table 1). One species of bat were recorded: Pipistrel 45khz passing Craigmlockhart Castle coming from Craighouse direction and heading south west. The old castle was extensively monitored for roosting bats and none were found.

## Fungi

### Methodology

Fungi survey took place from September to November 2010 where two visits were made per month giving an overall total of 6 visits. These visits were spaced approximately two weeks apart. Fungi were identified in situ and occasional samples were taken away to be identified requiring microscopic or spore analyses. Fungi samples that were taken away for identification were picked from as close to the base of the stem as possible along with a variety of growth stages of the same species for comparisons in identification.

The parkland was randomly transected covering most of the mown grass area and the mature tree and shrub areas at the edge of the parkland. Any dead standing or dead wood were also examined to cover as much habitat niches used by fungi. Fungi species were identified using the field guide 'Mushrooms' by Roger Philips (2006).

### Results

Fifty seven species were recorded and identified to specific species 95% while 5% remained at family level. Most species were listed as common 58% while 6% were uncommon and 2% were Red Data species (Table 1). One species of note is *Clavulinopsis cinereoides* (Red Data Book Species) which has been verified by Professor Roy Watling, retired acting Regis keeper with the Royal Botanic Gardens Edinburgh (RBGE) and Dr. Neville Kilkenny research associate with the RBGE and fungi recorder for the Lothian's and Borders. This is the first Scottish record for this species and the sample taken from the field to help with identification is now with the Royal Botanic Gardens Edinburgh herbarium.

Table 1.

Category/ %	Common	Occasional	Frequent	Uncommon	Red Data
	58	23	11	6	2

Most species were found growing on the ground 92% and 8% found growing on tree stumps and on trees. The current management of cutting the grass around the parkland is important in maintaining the fungi species that grow there.

## Invertebrates

### Methodology

Invertebrates were caught within the vegetation using a sweep net set on a triangular aluminium frame with a stout short wooden handle. Sweeps were taken through the top portion of the vegetation taller than 15cm and below waist level using alternate backhand and forehand strokes. A set number of 6 sweeps were taken through a variety of vegetation types and habitat to maximise and diversify the catch. Invertebrates were removed from the net using a pooter and transferred into a jar containing 75% ethanol. These were later identified to Genus/species level and categorised into functional groups: *Herbivore* = insects living from plant material, *Carnivore* = insects living from eating other insects, *Detritivour* = insects living from decaying plant material and *Parasitic* = insects living from other insects. These functional groups are shown as a percentage for each habitat type. Invertebrates were caught in the month of August during dry conditions.

### Results

Herbivores are the most abundant of the functional groups (Figure 1). However, it is to be expected that herbivores as a group would be the most abundant given that their niche was vegetation and only vegetation was sampled. Carnivores 26% were also feeding within this niche preying on species across all other categories. There was a correlation with the results throughout all the other habitats on all campuses and this is discussed at the end of the Craighouse campus section.

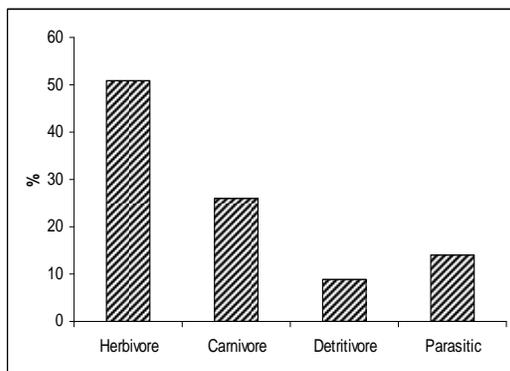


Figure 1. Functional groups expressed as a percentage that met within the survey criteria of 15cm vegetation height. Samples were taken from top portion of vegetation by sweep-netting.

True bugs (Hemiptera) were the most abundant 58% and (Hymenoptera) 50%. Predators were made up of species groups such as spiders (Arachnida), beetles (Coleoptera) and part predatory species such as hoverfly (Diptera), and parasitic wasp (Hymenoptera) (Table 1).

Table 1. Class and order of Taxa and abundance given as a percentage of individuals caught.

Class	Order	Abundance %
Arachnida	Trombidiformes	8
	Araneae	17
	Opiliones	17
Insecta	Diptera	33
	Hymenoptera	50
	Hemiptera	58
	Coleoptera	17
	Psocoptera	17
	Lepidoptera	17
	Dermaptera	8
	Plecoptera	8
Entognatha	Entomobryidae	17

## Lichen Survey

### Methodology

Samples were taken from various niches within the parkland from tree trunks, dead wood and branches. These samples were taken from the field and identified using a microscope to examine taxonomic features to help determine species. Some samples were picked up from the ground where small branches from the upper canopy of the tree were broken off by the wind to help maximise the sample. Species found were checked against the east of Scotland Index of Ecological Continuity (ESIEC) (Coppins, 2002). This index is used to help determine habitat diversity where lichens are used as an ecological indicator.

References used to identify species were: (The Lichens of Great Britain and Ireland, British Lichen Society, 2009), (a multi-access key database version 3.2, Dobson, 2010), (Ferns, Mosses and Lichens of Britain, Jahns 1983,) and a website that has affinity to the British Lichen Society <http://www.britishlichens.co.uk/>

### Results

Thirteen species of lichen were found within the woodland where more species were found on trees than on any other habitat type e.g., stones and ground within the parkland. Most species found were specific to their habitat type though some were cosmopolitan such as *Lecanora expallens* and *Chrysothrix candelaris* and can be found on other habitat types such as trees, stone walls and buildings. Using the (ESIEC) the parkland scored grade 7 and indicates that the woodland is of low interest regarding its lichens.

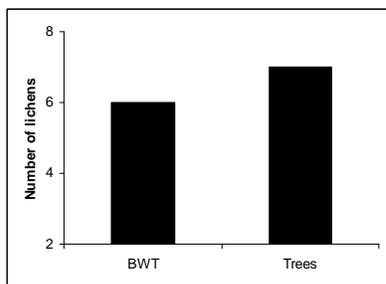


Figure 1. Habitats where lichens are found - BWT = *Buildings, Walls and Trees* where these species are cosmopolitan across these habitats and species specific to trees only.

### 4.3 Grassland - Phase 1 Habitat Code B6 SI

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#### Plants

##### Methodology

Flowering plants, grasses and ferns were recorded from February through until August to cover the growing season. Grassland was monitored towards the end of each month and any new plant found was recorded and added to the list. A transect line was walked within the grassland where each line was walked within two meters to cover as much ground as possible and maximise the recording effort.

Plants were identified in the field and on occasions some samples were taken for further examination to confirm identification along with images taken of some species. Grasses and ferns were also identified during the survey. Any protected plant such as red data species or listed in Edinburgh Local Biodiversity Action Plan (ELBAP) ‘priority species’ GPS or map reference of their location was taken for mapping purposes. Regionally rare plants currently not listed were photographed and along with details were sent to the county plant recorder for verification.

##### Results

There was a total of 59 plant species including grasses and ferns were recorded. One new species for the Lothian’s has been verified by the Lothian’s plant recorder and added to the plant list. One plant of interest which was not listed was Common Spotted Orchid *Dactylorhiza fuchsii* where there were several spikes growing in the south east corner. Most species of flowering plants were found within grassland habitat 54% and 23% within the transition area from grassland to parkland (edge effect), and 23% of species found within open area bare areas within the grassland (Figure 1). Some plants are cosmopolitan in habitat requirements and appear across other niches of the grassland. There were two ferns found and both were growing on a wall at the south end of the habitat.

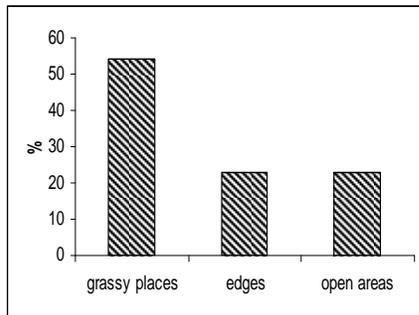


Figure 1. Grassland habitat niches where flowering plants were found.

Frequency of all plants found shows that most are flowering plants with some grasses and a few ferns (Figure 2).

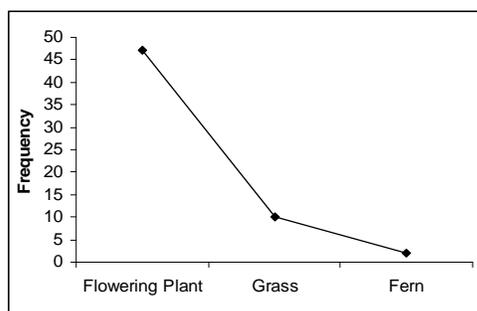


Figure 2. Frequency of all plants found within grassland habitat.

## Birds

### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month when weather was calm and avoiding windy and wet conditions. A transect was walked round the campus where all areas and habitats were visually covered. All habitat types were surveyed on the same visit: Parkland, Grassland and Buildings.

Transects were walked slowly using 8x40 binoculars to help visually identify bird species and species were also identified by their call. Within each habitat only one record of a species was noted e.g., one blackbird even though I may have seen three on one visit. The number of same species was accumulated for each habitat over the twelve monthly visits to identify the more common species. Birds (Figure 1) have been coded using the British Trust for Ornithology (BTO) coding system.

### Results

The most common bird was wood pigeon 14% and was recorded mostly from within the edges of the grassland. Kestrel 12% hunted for small mammals within the grassland and regularly caught vole species (Figure 1). Overall seven birds were listed in the Edinburgh Local Biodiversity Action Plan (ELBAP) and one bird was red listed under

JNCC/RSPB. The most interesting bird seen using the grassland was buzzard where this area was part of the buzzards territory along with the golf course area adjacent and east of the grassland.

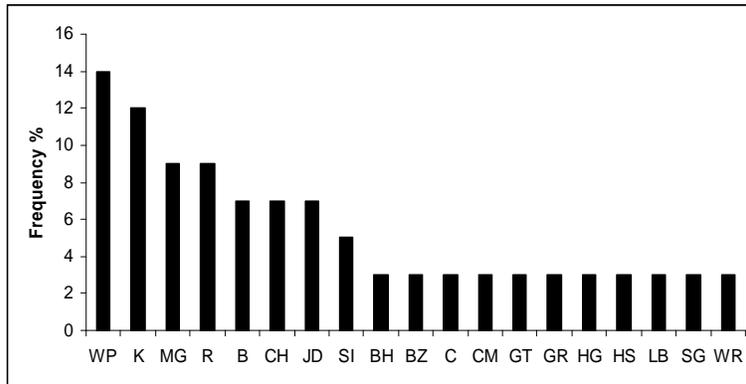


Figure 1. Frequency of birds recorded over one year within parkland habitat. BTO code: WP=Wood Pigeon K=Kestrel MG=Magpie R=Robin B=Blackbird CH=Chaffinch JD=Jackdaw SI=Swift BH=Black Headed Gull BZ=Buzzard C=Carrion Crow GT=Great Tit GR=Greenfinch HG=Herring Gull HS=House Sparrow LB=Lesser Black-backed Gull SG=Starling WR=Wren.

Birds were separated into their preferred feeding categories where 44% of species were omnivore, 22% insectivore, 22% granivore and carnivore 11%, the latter feeding on birds and small mammals e.g., kestrel and buzzard (Figure 2).

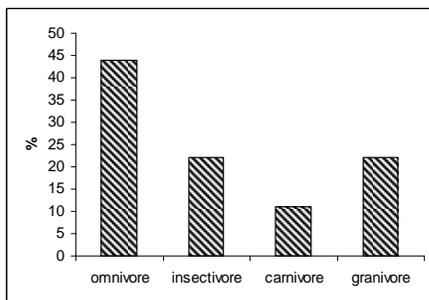


Figure 2. Bird feeding categories within grassland habitat. Accumulated data over one year.

Birds that used the grassland were resident 58% and local 37% with a small amount of migrants 5% where the latter are more global in their movements that turned up to breed or forage in the summer(Figure 3).

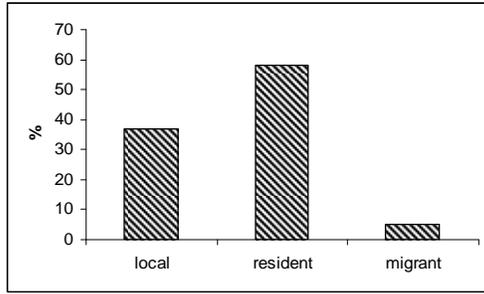


Figure 3. Bird movement within parkland habitat over one year.

Most local and resident birds were omnivorous in their diet. Summer migrants tend to be more insectivorous in their feeding. Local and resident birds are more cosmopolitan in feeding though will differ slightly in feeding habits between the winter when food is scarce, and in summer when food is more abundant.

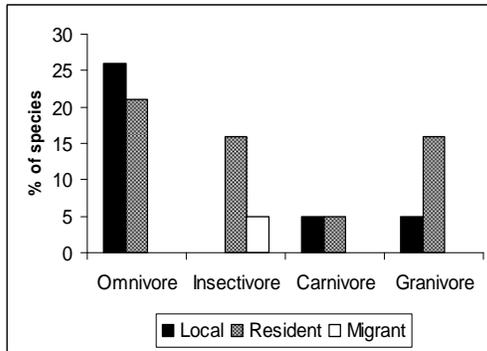


Figure 4. Food category in relation to bird movement over one year.

## Mammals

### Methodology

Most mammals were recorded on an add-hoc basis mainly using signs such as foot prints, droppings, scent marking trees e.g., Roe Deer. Some mammals were seen regularly such as rabbits and snow conditions were used to record mammal tracks. Small mammals were not formally recorded as they would require a set methodology of capture and release using traps and greater time commitment.

### Results

There was more fox activity (Table 1) than any other mammal where the fox hunts regularly through the grassland from the north west corner through the grassland to the old stone steps in the south east corner where it climbs over the wall into the golf course. Fox scent marks its territory at the bottom of the old steps where regular scats can be found. Roe deer use the grassland in the south side to lie-up perhaps in the quieter periods when less people are around. They have scent marked a few small birch trees next to this site. Rabbit signs are throughout the habitat and a field vole was seen amongst the grass on one occasion and others were seen being taken the kestrel.

Table 1. Percentage of mammal species recorded within Parkland habitat

Species/ %	Fox	Rabbit	Roe Deer	Field Vole
	46	23	23	8

## Fungi

### Methodology

Fungi survey took place from September to November 2010 where two visits were made per month giving a total of six visits overall. These visits were spaced approximately every two weeks. Fungi were identified in situ or a sample was taken away to be identified. Transects were walked in a line getting within 2 metres of each line and covering also all the shrub areas at the edge of the grassland. Fungi samples were picked and taken away for identification. These were picked from as close to the base of the stem as possible along with a variety of growth stages of the same species for comparisons in identification. A microscope was used to look at finer structural detail such as small hairs to aid identification though spores from some species were not studied due to lack of space to take spore prints. Fungi species were identified using the field guide 'Mushrooms' by Roger Philips (2006).

### Results

In total there were only five species recorded within the grassland. This is probably due to the fairly recent clearing of buildings and land being levelled at this site. Fungi species found were mostly growing on the ground in between where young birch trees are growing as part of succession at the north end of the grassland.

## Invertebrates

### Methodology

Invertebrates were caught within vegetation using a sweep net set on a triangular aluminium frame with a stout short wooden handle. Sweeps were taken though vegetation taller than 15cm and below waist level using alternate backhand and forehand strokes. A set number of six sweeps were taken through a variety of vegetation types and habitat to maximise and diversify the catch. Invertebrates were removed from the net using a pooter and transferred into a jar containing 75% ethanol. These were later identified to family/species level and categorised into functional groups: *Herbivore* = insects living from plant material, *Carnivore* = insects living from eating other insects, *Detritivour* = insects living from old plant material and *Parasitic* = insects living from other insects. These functional groups are shown as a percentage for each habitat type. Invertebrates were caught in the month of August during dry conditions.

### Results

Herbivores are the most abundant of the categories (Figure 1). However, it is to be expected that herbivores as a group would be the most abundant given that it was only

vegetation that was sampled. These results correlate with all other habitats sampled across all campuses sampled.

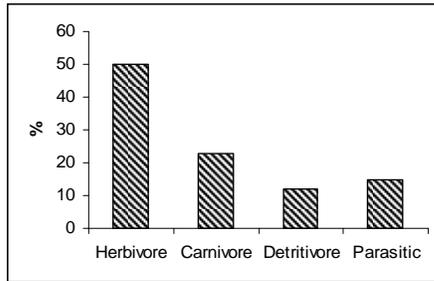


Figure 1. Comparison of functional groups expressed as a percentage.

Predators were mainly made up of species groups such as spiders (Arachnida), beetles (Coleoptera) and flies (Diptera) and parasitic wasp (Hymenoptera) (Table 1). Flies (Diptera) were the most abundant 28% and parasitic wasp (Hymenoptera) 16%.

Table 1. Class and order of Taxa and abundance given as a percentage of individuals caught.

Class	Order	Abundance %
Arachnida	Araneae	13
	Opiliones	2
	Ixodida	2
Diplopoda	Polydesmida	2
Entognatha	Entomobryomorph	2
Gastropoda	Stylommatophora	4
Malacostraca	Isopoda	2
Insecta	Diptera	28
	Hymenoptera	16
	Hemiptera	9
	Homoptera	2
	Coleoptera	11
	Lepidoptera	5
	Thysanoptera	2

## 4.4 Buildings – J3.6

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### Plants

#### Methodology

Flowering plants, grasses and ferns were recorded from February through to August which covers the growing season. Each building was walked around and plants within one meter of the building were recorded and where there was a concrete path adjacent to the edge of the building, plants were recorded to the outside edge of this structure.

Survey was conducted towards the end of each month to maintain continuity.

Plants were identified in the field and on occasions some samples were taken for further examination to confirm identification. Grasses and ferns were also identified during the survey. Any plant listed in Edinburgh Local Biodiversity Action Plan (ELBAP) ‘priority species’, or interesting plants, their location was taken either as a map reference or GPS for mapping purposes.

#### Results

Most species around the buildings, path edges and walls are strongly influenced by the habitat, poor stony soil, lack of sunshine i.e. north side of the building, and the type of management carried out. All these areas are either sprayed with herbicide, which does not allow plant succession to progress, or the grass is cut to the edge of the stone structure limiting species that can live in this highly disturbed niche. Out of 26 species of plant recorded within this habitat 81% were plants that are found in disturbed ground were pioneering species associated with the first early flush phase of succession.

There were no ELBAP species found next to any buildings and no plants of inertest recorded. Flowering plants were more dominant than other plants such as grasses and ferns (Figure 1).

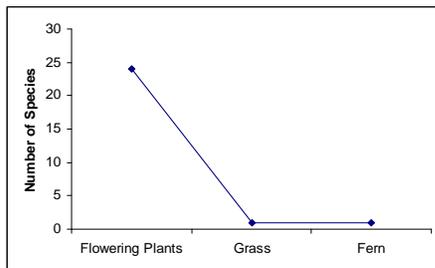


Figure 1. Flowering plants were more dominant than grasses and ferns.

## Birds

### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month when weather was calm and avoiding windy and wet conditions. Transects were walked slowly around the buildings using 8x40 binoculars to help visually identify bird species and species were also identified by their call. Only one record of each species seen was noted e.g., one Jackdaw even though I may have seen three on one visit. The number of same species was accumulated for each habitat over the twelve monthly visits to identify the more common species. Birds within figure one have been coded using the British Trust for Ornithology (BTO) coding system.

### Results

The most common bird was feral pigeon 38% and jackdaw 33% where both species used buildings as a habitat to breed in the summer and to overwinter (Figure 1). Herring gulls 9% used the buildings for resting and as a lookout for food as they would from a sea cliff. Kestrel also used the building for resting and preening and as a vantage point for viewing possible prey. Three species were listed in the Edinburgh Local Biodiversity Action Plan (ELBAP) herring gull, lesser black-backed gull and kestrel.

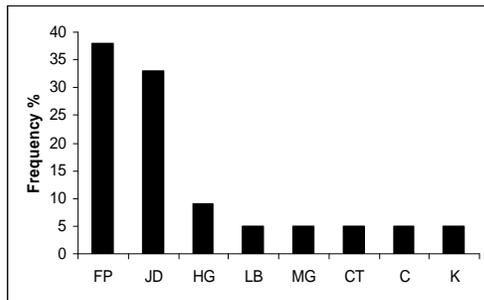


Figure 1. Frequency of birds recorded over one year within parkland habitat. BTO code: FP=*Feral Pigeon* JD=*Jackdaw* HG=*Herring Gull* LB=*Lesser Black-backed Gull* MG=*Magpie* CT=*Coal Tit* C=*Carrion Crow* K=*Kestrel*.

Birds were separated into their preferred feeding categories where most species were omnivore 62% and insectivore, granivore, carnivore were in smaller amounts at 12% (Figure 2).

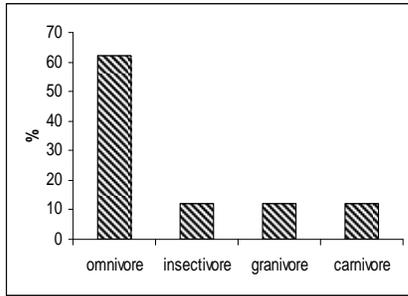


Figure 2. Bird feeding categories within buildings habitat. Accumulated data over one year.

Birds using the buildings were mostly resident 75% and local 25% and there were no migrant birds recorded (Figure 3).

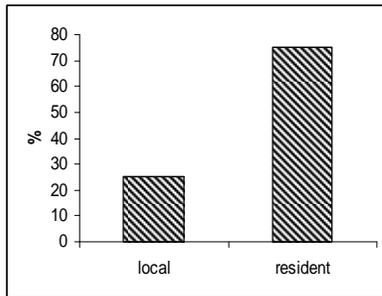


Figure 3. Bird movement within buildings habitat over one year.

Most birds were resident and omnivorous 37% and local and omnivorous 25%. Resident birds also were also recorded from all feeding types (Figure 4). Local and resident birds were more cosmopolitan in their feeding though will differ slightly in feeding habits between winter when food is scarce, and in summer when food is more abundant.

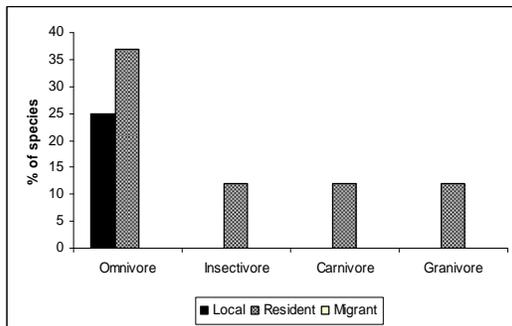


Figure 4. Food category in relation to bird movement over one year.

### Mammals, Invertebrates and Lichens

There was only a few species recorded within these three species groups and the report is brief. The methodologies used for these are the same as listed throughout this report.

## Mammals

There were only two recorded around the building – brown rat and mouse species. There are a few brown rat holes and runs along the east side of the building.

## Invertebrate

Only one species was recorded; Green-veined White butterfly sunning itself. There will be many invertebrates using the buildings and to create a species list would require a separate survey. The methodology carried out across all campuses could not be conducted around buildings due to lack of vegetation.

## Lichens

Four species of lichens were found on the west side of the main building on sandstone where this part of the building is older. Three of the species found can be found on other habitat types such as wood and one species can be found on stone but rarely on any other habitat type.

## 4.5 Discussion

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### Species with designations

Rare and protected species along with species of note have been recorded across several species groups: birds, mammals, plants and fungi (Table 1). It is exceptional that so many new records to the Lothian's were found within Craiglockhart. This may be a case of species groups being under-recorded, or where ecologists do not anticipate that areas such as Craiglockhart can reveal new records given the level of disturbance to this area?

Table 1. Species with protective designations and listed species within each habitat type. Any species listed under the WCA or Red Data Book will also automatically be listed within the ELBAP with exception to new records.

Habitat	Designation	Birds	Mammals	Plants	Fungi
Parkland	ELBAP	11		1	
	Red Listed	5			
	WCA		1		
	Lothian Record			2	
	Red Data & New Scottish Record				1
Grassland	ELBAP	7			
	Red Listed	1			
	Lothian Record			1	
Building	ELBAP	3			

WCA=Wildlife and Countryside Act 1981 as amended (Scotland) 2004  
ELBAP=Edinburgh Local Biodiversity Plan

The fungi species found within the campus have been verified by several eminent mycologists as *Clavulinopsis cineroides* and will be put forward as the first official Scottish record. There has been speculation amongst mycologists regarding the status of *C. cineroides* where in the past this species has been reported to the record keeper and verifier for the Lothian's, but no samples were given therefore no verification could be made. Discussions between mycologists continues where there are opinions that this species is *Clavulinopsis umbrinella* and not *C. cineroides*. However, Professor Roy Watling examined a sample from Craiglockhart and concludes that the spore structure is a conclusive diagnostic feature and that it is *C. cineroides*.

Protected species were discussed within Craighouse (3.6) re high percentage of bird designations compared to other species. There is a correlation between the two campuses where bird designations are seen to be considerably higher (Figure 1).

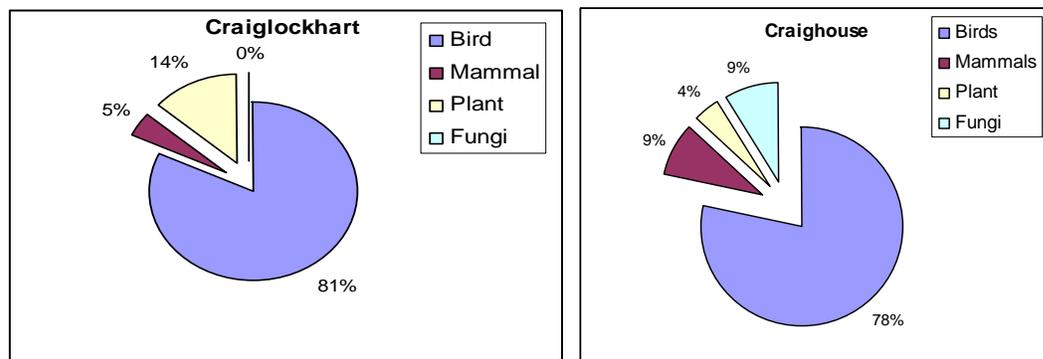


Figure 1. Number of protected species as a percentage taken from across all habitat types for Craiglockhart campus and Craighouse campus.

Birds are possibly the most recorded and monitored species in the world with a large following of people who enjoy bird watching. This species group is represented by many organisations world wide and are a 'loud voice' within conservation and politically. There is a tendency for other species to be partially squeezed out because their interest groups have less followers e.g., lichens and invertebrates.

### Biodiversity

When taken in the context of an urban area, Craiglockhart campus surprisingly has a very diverse and unique collection of flora and fauna. Having such rare and first records for the Lothian area and indeed for Scotland speaks volumes of how the minimal management input over time is having a positive impact on biological diversity. Parkland overall has more species than other habitats. Parkland is richer in sub-habitats where there is a mix of tree, shrubs, grass, and rough unmanaged areas with overlapping edges creating several niches for species and adding to the diversity of the area. Semi-improved grassland habitat being unmanaged is allowing for succession to take place and left in this state will continue producing good diversity. It is currently invertebrate rich which will attract other species such as shrews and birds along with predators. This habitat if left will eventually become woodland, initially with small seeded trees and shrubs and be rich in biodiversity. Buildings as a habitat is a harsh environment and

though may not match the diversity of parkland or grassland habitat, there is diversity of species to be found here also (Figure 2).

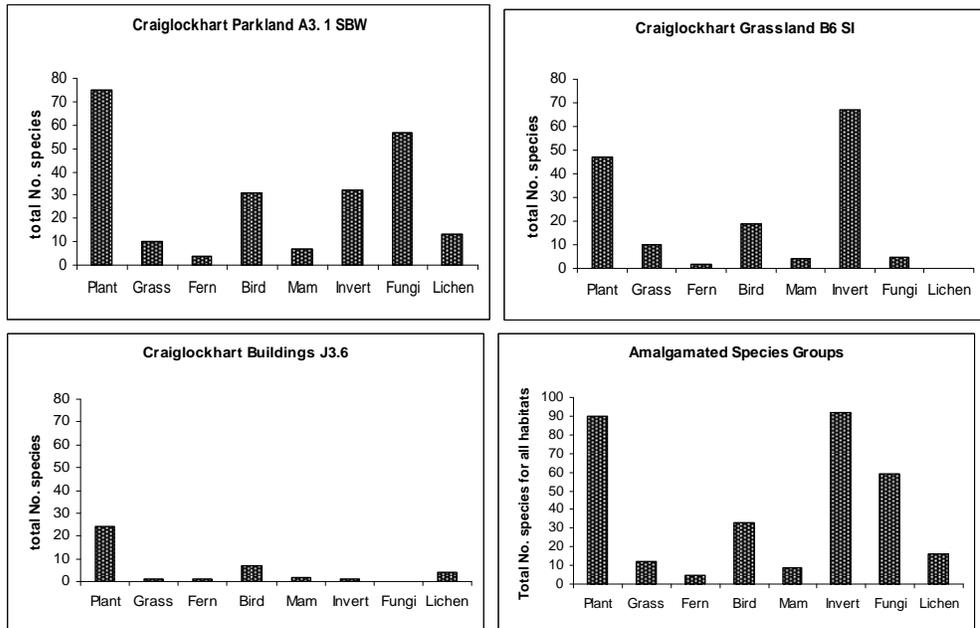


Figure 2. Taxa groups across all habitat types.



Merchiston Campus

## 5. Merchiston Campus

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### 5.1 Summary

Merchiston campus is situated within a build-up environment not far from the centre of the City of Edinburgh. It is surrounded by buildings, roads and most of the campus is under concrete creating a hostile environment for flora and fauna to live in. However, biodiversity can be found in most places and as such Merchiston is no exception.

The campus has two defined habitats which meets the criteria of the phase 1 habitat coding which are; Buildings J3.6 and Introduced Shrub J2.3.2 PHT. The small areas of grass that do exist on the campus were small patches and are strongly influenced by paths, gravel and buildings and did not qualify as a habitat under the phase 1 habitat coding. These areas are both managed with periodic herbicide spraying around buildings and paths and weeding management within the hedge beds. All trees in the area are managed where dying or dead limbs are removed for public safety leaving very little in the way of niches for species which will inhabit dead and decaying wood. There are only four mature trees within the campus quadrangle, two sycamore and two deodar cedars, and there is a row of Swedish whitebeam and lime within the hedge running parallel to Mardale Crescent.

There are no comparative data to enable an assessment of the variety of species found within Merchiston. However, considering that the campus is within a built up area surrounded by housing and roads, and a large population of people, the list is surprisingly impressive. Overall five species of bird were listed within the Edinburgh Local Biodiversity Plan (ELBAP), one Red Listed bird and also one plant within the ELBAP though it is suspect that this plant is an escapee (Table 1). Species lists and target species lists along with maps regarding habitats in Merchiston can be found in Appendix 3.

Table 1. Total number of species across both habitat types within Merchiston.

Species Group	No. of Species	Designation
Plant	41	1 ELBAP
Grass	1	
Fern	2	
Bird	11	6 ELBAP and 1 Red Listed
Mammal	4	
Invertebrate	25	
Fungi	2	
Lichen	5	

ELBAP=Edinburgh Local Biodiversity Action Plan

## Habitats

### 5.2 Buildings - Phase 1 Habitat Code J3.6

#### Plants

##### Methodology

Flowering plants, grasses and ferns were recorded from February through until late August to cover the growing season. Buildings were monitored towards the end of each month and any new plant found was recorded and added to the list. A transect was walked along the line of the buildings and path edges and each visit took place at the weekends when there was minimal disturbance.

Plants were identified in the field and on some occasions samples were taken for further examination to confirm identification. Grasses and ferns were also identified during the survey. Any plant listed in Edinburgh Local Biodiversity Action Plan (ELBAP) or interesting plants a map reference of their location was taken for mapping purposes.

##### Results

There were a total of twenty three species of plant where 83% were pioneering and 17% were a mix of more advanced successional species (Figure 1) and a few were ferns growing on walls away from herbicide spray management. The pioneering plant figure is high but this does highlight the hostile environment they are growing in. It also highlights that succession is slow to colonise areas that are intensively managed. There were no designated species found and only one plant of interest; New Zealand Willowherb *Epilobium brunnescens* growing on shortened grass within damp ground. There are several records for New Zealand Willowherb within the Lothian area (National Biodiversity Network <http://data.nbn.org.uk/>).

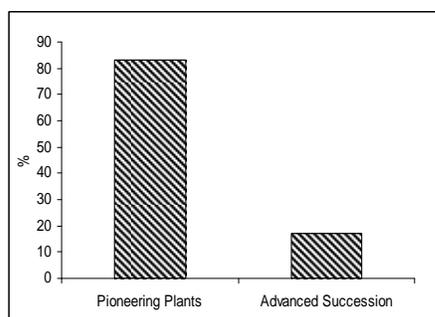


Figure 1. Succession is slow to colonise areas that are intensively managed with minimal advanced successional plants compared to pioneering species.

## Birds

### Methodology

Birds were recorded each month from August 2010 to July 2011. Timing of the survey was towards the end of the month during relatively calm weather periods avoiding windy and wet conditions. The campus was visited at weekends when few students were around to minimise disturbance.

A slow walking pace was adopted around the buildings observing birds on the buildings, the ground and within shrubs and trees. Most birds were identified by sight as there were limited birds holding territory and calling. Only one record of each species was noted per visit e.g., one feral pigeon even though I may have seen three on one visit. Numbers of same species were accumulated over the twelve monthly visits to identify the more common species using the campus.

The movement of birds were defined as local, migrant and resident. The definition of *local* is that some birds though sedentary may move a short distance from where they bred in the summer to their wintering grounds such as blackbird and robin. *Migrant* birds are seasonal and move larger distances from country to country and *resident* stay within the same area all year.

### Results

The most common species of bird were feral pigeon (27%) and Black-headed Gull (15%) (Figure 1). There were six birds that were listed within the Edinburgh Local Biodiversity Action Plan (ELBAP) and one Red Listed species. The buildings were used mainly as a roost site for most species with gulls scavenging on discarded food. There were no birds denoting breeding territories by singing.

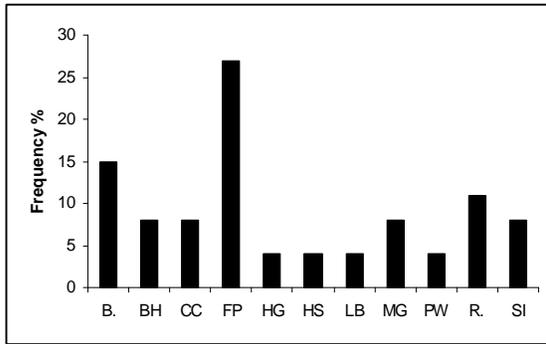


Figure 1. Frequency of birds recorded over one year. B=Blackbird BH=Black-headed Gull CC=Carrion Crow FP=Feral Pigeon HG=Herring Gull HS=House Sparrow LB=Lesser Black-backed Gull MG=Magpie PW=Pied Wagtail R=Robin SI=Swift.

Bird movement within the built up habitat were mostly resident with six birds recorded over the year (Figure 2). Four species were more local and appearing over the early and late winter period to shelter and feed before moving on. The only migrant species were swifts seen hunting for insects over the buildings in June and again in August.

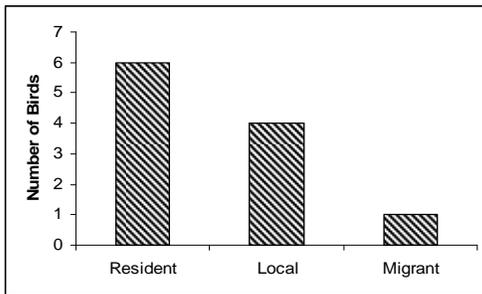


Figure 2. Bird movement within Merchiston Campus.

Resident birds were mainly omnivorous in their feeding along with feral (granivorous) and used the buildings more than any other species (Figure 3). Though insects were not abundant there were two insectivores recorded, robin *Erithacus rubecula* seen in November, March and June and pied wagtail *Motacilla alba* seen only in November. There are many gardens nearby where several of the small passerines could overwinter over a fair sized area and the campus providing some diversity for foraging.

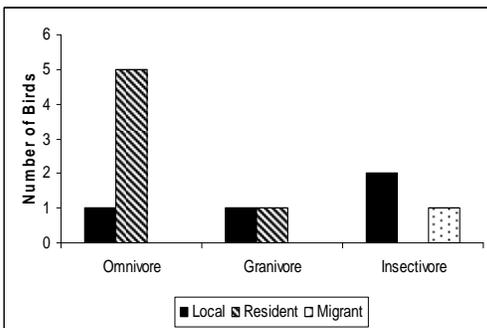


Figure 3. Bird feeding type and range of movement.

## Mammals

## Methodology

Mammals were recorded on an add-hoc basis mainly using signs such as foot prints in the snow and runs. Most mammal signs were recorded during snow conditions where their tracks were easily seen and identified. Brown rat runs were found adjacent to walls where tunnels had been created under the snow. The edges of buildings were walked around on each visit which took place towards the end of each month and during weekends to minimise disturbance from people. Small mammals were not formally recorded as they would require a set methodology of capture and release using traps and a large proportion of time commitment. Bats were monitored from sunset using a Magenta Bat5 Digital Precision bat detector where bat calls are recorded in kilohertz which is used to determine species given that all species echolocate at different kilohertz frequencies.

## Results

Mammals were very limited around the campus where only four species were recorded over the twelve months (Table 1). A bat survey was carried out from May to late August where no bats were recorded though there is potential habitat e.g., the upper part of Merchiston Tower. Fox and grey squirrel footprints were recorded in the snow mainly at the back of the campus adjacent to Mardale Crescent and rabbit prints and droppings were found on the raised grass bed within the quadrangle. Brown rat activity is confined to the area around the bins adjacent to Mardale Crescent where there are managed traps in place.

Table 1. Number of mammal species recorded within Building habitat over twelve months.

Species	Bat	Fox	G. Squirrel	Rabbit	Brown Rat
	0	2	1	1	2

## Lichen

Only three lichens were found around the campus from two niches: Trees - *Chrysothrix candelaris* and Walls - *Psilolechia lucida* and *Gyalecta jenensis*.

There was no survey of invertebrates undertaken around buildings.

## 5.3 Hedges – Phase 1 Habitat Code J2.3.2 PHT

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### Plants

#### Methodology

Flowering plants, grasses and ferns were recorded from February through until late August to cover the growing season. Hedges were monitored towards the end of each month and any new plant found was recorded and added to the list. A transect was walked along the line of the raised shrub bed and associated path edges and each visit to the campus took place at the weekends when there was less disturbance.

Plants were identified in the field and some samples were taken for further examination to confirm identification. Grasses and ferns were also identified during the survey. Any plant listed in Edinburgh Local Biodiversity Action Plan (ELBAP) or interesting plants, a map reference of their location was taken for mapping purposes.

#### Results

There were a total of thirty eight species of plant where (84%) were pioneering and (16%) were a mix of more advanced successional species (Figure 1). The pioneering plant figure is high and correlates with that of Building habitat and highlights the hostile environment they are growing in. It also highlights that succession is slow to colonise areas that are intensively managed. One ELBAP species was recorded Bluebell *Endymion non-scriptus* which was recorded growing within the shrubs adjacent to Mardale Crescent and is suspected to be an escapee.

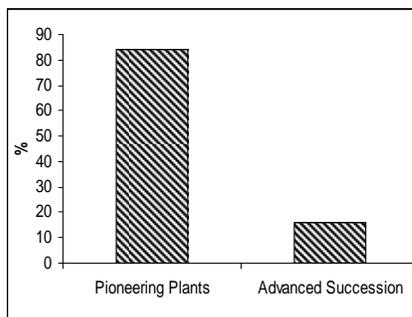


Figure 1. Succession is slow to colonise areas that are intensively managed with low advanced successional plants and high pioneering plants.

## Birds

### Methodology

Birds were recorded each month from August 2010 to late July 2011. Timing of the survey was towards the end of the month avoiding windy and wet conditions. The campus was visited at weekends when it was quiet with less students and disturbance.

The hedge areas were walked slowly observing birds on trees and within shrubs and on the ground. Most birds were identified by sight as there were limited birds holding territory and signing. The movement of birds were defined as local, migrant and resident. The definition of *local* is that some birds though sedentary may move a short distance from their summer breeding grounds to their wintering grounds, such as blackbird and robin. *Migrant* birds are seasonal and move larger distances from country to country and *resident* stay within the same area all year.

### Results

Only four birds were recorded over twelve months which highlights the poor habitat quality of this area and by comparison there was much bird activity observed within nearby gardens where habitat was more mosaic. The most common species found within the hedge habitat was blackbird (44%) and robin (33%) (Figure 1). There was one bird that was listed within the Edinburgh Local Biodiversity Action Plan (ELBAP). The shrubs and trees were used for feeding and roosting and birds also foraged for food on the ground within the shrubs. Bird feeding categories were: one granivore, two insectivores and one omnivore. Birds were mainly sedentary and only one species was migratory feeding on airborne insects above the trees tops.

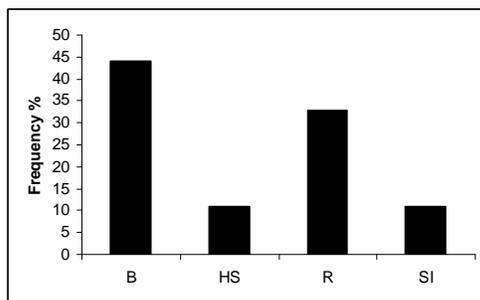


Figure 1. Frequency of birds recorded over one year. B=Blackbird HS=House Sparrow R=Robin SI=Swift.

## Mammals

### Methodology

Mammals were recorded on an add-hoc basis mainly using signs such as foot prints in the snow and droppings. Most mammal signs were recorded during snow conditions where their tracks were easily seen and identified. The hedge area was walked around on each visit which took place towards the end of each month and during weekends to avoid

disturbance from people. Small mammals were not recorded as they would require a set methodology of capture and release using traps and a large proportion of time commitment. Bats were monitored from sunset using a Magenta Bat5 Digital Precision bat detector where bat calls are recorded in kilohertz which is used to determine species given that all species echolocate at different kilohertz frequencies.

## Results

Three species of mammals were recorded by signs in the snow and one by droppings (Table 1).

Table 1. Number of mammals recorded.

Species:	Fox	Rabbit	G Squirrel	Bats
	2	1	1	0

There were no bats recorded throughout the monitoring period from May to the end of August within this habitat and the immediate area of Mardale Crescent.

## Invertebrates

### Methodology

Invertebrates were caught within hedge vegetation using a sweep net set on a triangular aluminium frame with a stout short wooden handle. Six sweeps were taken through the shrub branches at waist level using alternate backhand and forehand strokes. Invertebrates were removed from the net using a pooter and transferred into a jar containing 75% ethanol. These were later identified to family/species level and categorised into functional groups: *Herbivore* = insects living from plant material, *Carnivore* = insects living from eating other insects, *Detritivour* = insects living from old plant material and *Parasitic* = insects living from other insects. Invertebrates were caught in the month of August during dry conditions.

## Results

Herbivores were the most abundant of the functional groups (Figure 1). However, it is to be expected that herbivores as a group would be the most abundant given that their niche was vegetation. There was a correlation with the results throughout all the other habitats on all campuses and this is discussed at the end of the Merchiston campus section.

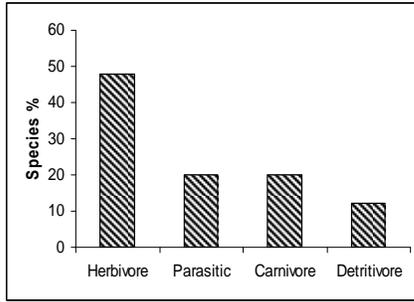


Figure 1. Functional groups expressed as a percentage. Samples taken from side portion of shrub vegetation by sweep-netting.

Hemiptera, Diptera and Hymenoptera were the most abundant and predators were made up of species groups such as spiders (Arachnida), beetles (Coleoptera) and part predatory species such as hoverfly (Diptera) and parasitic wasp (Hymenoptera) (Table 1).

Table 1. Class and order of Taxa and abundance given as a percentage of individuals caught.

Class	Order	Abundance %
Arachnida	Araneae	9
	Opiliones	4
	Trombidiformes	4
Entognatha	Entomobryomorpha	4
Insecta	Hemiptera	22
	Hymenoptera	22
	Diptera	22
	Coleoptera	4
	Dermaptera	4
	Thysanoptera	4

### Fungi and Lichens

There were only three fungi recorded: *Hygrocybe*, *Mycena* and *Boletus*. Two species were located on cut grass near the base of a sycamore tree and *Boletus* under the deodar cedars within the quadrangle.

One lichen was found growing on sycamore tree *Chrysothrix candelaris*.

## 5.4 Discussion

Buildings were species poor compared to introduced hedges though there is some biodiversity associated with buildings, mainly plants, birds and a few lichens (Figure 1). Though an invertebrate survey was not carried out on the buildings, a search between cracks, under stones and along the bottom edges of the buildings would have revealed some invertebrates. However, this procedure was not carried out mainly due to the extensive time that would have been involved. Also the roof area was not examined where several other species would have been gleaned therefore the biodiversity using buildings as a habitat could have been higher.

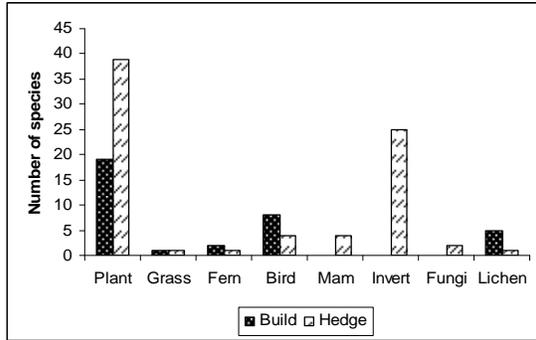


Figure 1. Buildings are species poor compared to hedges.

Invertebrate categories within Merchiston correlated with other the habitats sampled within Craighouse and Craiglockhart where trends were similar between the four category types. If other methods of capture across other niche types had been used e.g., pitfall traps and tray traps and combined with sweep netting, the categories would have been more varied and not dominated by herbivores.

Taking both habitats into account and given the harsh ecological status of Merchiston campus situation within a buildt up area, it has shown that there are reasonable biodiversity levels though we have no past data for comparisons. Overall forty one species of plant were recorded which correlates well with Craighouse buildings habitat where forty two species were recorded. Craiglockhart building habitat had twenty six species of plant recorded though the area around Craiglockhart buildings are managed more intensively with a gravel bed around the edge of the building preventing very little life to flourish.

## Acknowledgements

My thanks go to Jamie Pearson who has line-managed this project, for all his enthusiastic help and support throughout the field work and his helpful comments on writing up this report. I have met several university staff who have all been helpful, in particular the ground maintenance staff who have parted with their local knowledge and reported their sightings of species with great enthusiasm.

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# Appendix 1

# Craighouse Campus Species List

## North Woodland A1.1.2 PBW

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### Plants

Common name	Scientific Name
Birds-foot Trefoil	<i>Lotus corniculatus</i>
Bittersweet	<i>Solanum dulcamara</i>
Black Medic	<i>Medicago lupulina</i>
Bluebell	<i>Endymion non-scriptus</i>
Bramble	<i>Rubus fruticosus</i>
Broad Leaved Dock	<i>Epilobium montanum</i>
Broad Leaved Willowherb	<i>Epilobium montanum</i>
Bush Vetch	<i>Vicia sepium</i>
Canadian Golden Rod	<i>Solidago canadensis</i>
Cleavers	<i>Galium verum</i>
Coltsfoot	<i>Tussilago farfara</i>
Common Nettle	<i>Urtica dioica</i>
Common Sorrel	<i>Rumex acetosa</i>
Common Storksbill	Common Storksbill
Common Vetch	<i>Vicia sativa</i>
Cow Parsley	<i>Anthriscus sylvestris</i>
Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Curled Dock	<i>Rumex crispus</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum vulgaria</i>
Dog Rose	<i>Rosa canina</i>
Great Plantain	<i>Plantago major</i>
Great Willowherb	<i>Epilobium hirsutum</i>
Greater Stitchwort	<i>Stellaria holostea</i>
Green Alkanet	<i>Pentaglottis sempervirens</i>
Ground Elder	<i>Sambucus nigra</i>
Ground Ivy	<i>Glechoma hederacae</i>
Hedge Woundwort	<i>Stachys germanica</i>
Hemlock Water Dropwort	<i>Oenanthe crocata</i>
Herb Bennett	<i>Geum urbanum</i>
Herb Robert	<i>Geranium robertianum</i>
Hogweed	<i>Heracleum sphondylium</i>
Japanese Knotweed	<i>Reynoutria japonica</i>
Lesser Celandine	<i>Ranunculus ficaria</i>
Lesser Stitchwort	<i>Stellaria graminea</i>
Meadow Vetchling	<i>Lathyrus pratensis</i>
Mugwort	<i>Artemisia vulgais</i>
Nipplewort	<i>Lapsana communis</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Pineapple Mayweed	<i>Chamomilla suaveolens</i>
Ragwort	<i>Senecio jacobaea</i>
Ramsons	<i>Allium triquetrum</i>
Raspberry	<i>Rubus chamaemorus</i>
Ribwort Plantain	<i>Plantago lanceolata</i>

Rosebay Willow Herb	<i>Epilobium augustifolium</i>
Self Heal	<i>Prunella vulgaris</i>
Small Balsam	<i>Impatiens parviflora</i>
Snowdrop	<i>Galanthus nivalis</i>
Storksbill	<i>Erodium cicutarium</i>
Wavy St John's Wort	<i>Hypericum undulatum</i>
White Clover	<i>Trifolium repens</i>
Yarrow	<i>Achillea millefolium</i>

### Grasses

Common name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>
Cocksfoot	<i>Dactylis glomerata</i>
Common Bent	<i>Agrostis tenuis</i>
Crested Hair Grass	<i>Koeleria cristata</i>
False Oat Grass	<i>Arrhenatherum elatius</i>
Perennial Rye-Grass	<i>Lolium perenne</i>
Wood Meadow Grass	<i>Poa nemoralis</i>
Yorkshire Fog	<i>Holcus lanatus</i>

### Ferns

Common name	Scientific Name
Black Spleanwort	<i>Asplenium adiatum-nigrum</i>
Broad Buckler fern	<i>Dryopteris dilatata</i>
Horsetail	<i>Equisetum sp</i>

### Birds

Common name	Scientific Name
Blackbird	<i>Turdus merula</i>
Blue Tit	<i>Parus caeruleus</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Carrion Crow	<i>Covus corone</i>
Chaffinch	<i>Fringilla coelets</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal Tit	<i>Parus ater</i>
Dunnock	<i>Prunella modularis</i>
Fieldfare	<i>Turdus pilaris</i>
Goldcrest	<i>Regulus regulus</i>
Goldfinch	<i>Carduelis carduelis</i>
Great Spotted Woodpecker	<i>Denrocopos major</i>
Great Tit	<i>Parus major</i>
Greenfinch	<i>Carduelis chloris</i>
House Sparrow	<i>Passer domesticus</i>
Jackdaw	<i>Corvus monedula</i>
Long-tailed Tit	<i>Aegithalos caudatus</i>
Magpie	<i>Pica pica</i>
Robin	<i>Erithacus rubecula</i>
Song Thrush	<i>Turdus philomelos</i>
Sparrowhawk	<i>Accipiter nisus</i>
Swallow	<i>Hirundo rustica</i>
Swift	<i>Apus apus</i>
Tawny Owl	<i>Strix aluco</i>
Tree Creeper	<i>Certhia familiaris</i>
Willow Warbler	<i>Phylloscopus trochilus</i>
Wood Pigeon	<i>Columba palumbus</i>

Wren *Troglodytes troglodytes*

## Mammals

Common name	Scientific Name
Badger	<i>Meles meles</i>
Fox	<i>Vulpes vulpes</i>
Grey Squirrel	<i>Sciurur carolinensis</i>
Hedgehog	<i>Erinaceus europaeus</i>
Pipistrel 45	<i>Pipistrellus pipistrellus</i>
Pipistrel 55 (7 in total)	<i>Pipistrellus pygmaeus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Roe Deer	<i>Capreolus calreolus</i>

## Invertebrates

Description	Family	Species
Mite	Acaridae	sp
Aphid	Aphidae	sp
Assassin Bug	Reduviidae	sp
Beetle	Scirtidae	<i>Microcara testacea</i>
Beetle Larvae	Carabidae	sp
Butterfly	Pieridae	<i>Pieris napi</i>
Comb-footed Spider	Theridiidae	sp
Common Flower Bug	Cimicidae	<i>Anthocoris nemorum</i>
Fly	Agromyzidae	<i>Phytomyza ilicis</i>
Fly	Agromyzidae	sp
Fly	Anthomyiidae	<i>Delia radicum</i>
Fly	Bibionidae	<i>Dilophus febrilis</i>
Fly	Chloropidae	<i>Thaumatomyia notata</i>
Fly	Chronomidae	sp
Fly	Dolichopodidae	<i>Dolichopus popularis</i>
Fly	Heleomyzidae	<i>Sullia variegata</i>
Fly	Lonchaeidae	<i>Lonchaea chorea</i>
Fly	Lonchopteridae	<i>Lonchoptera lutea</i>
Fly	Phoridae	<i>Phora atra</i>
Fly	Scatopsidae	<i>Scatopse notata</i>
Frog hopper	Aphrophoridae	<i>Philaenus spumarius</i>
Gall Wasp	Cynipidae	sp
Ground Bug	Lygaeidae	sp
Ground Bug	Lygaeidae	sp
Ground Bug	Miridae	sp
Harvestman	Phalangidae	<i>Oligolophus hansenii</i>
Harvestman	Phalangidae	<i>Oligolophus tridens</i>
Harvestman	Phalangidae	<i>Paroligolophus meadii</i>
Harvestman	Phalangidae	<i>Lacinius ephippiatus</i>
Harvestman	Phalangidae	<i>Opilio canestrinii</i>
Hoverfly	Syrphidae	<i>Melanostoma scalare</i>
Hoverfly	Syrphidae	<i>Neoasia podagrica</i>
Hoverfly	Syrphidae	<i>Episyrphus balteatus</i>
Hoverfly	Syrphidae	sp
Jumping Plant Lice	Psyllidae	sp
Land Bug	Anthocoridae	sp
Land Bug	Phopidae	<i>Rhopalus subrufus</i>
Leaf Beetle	Chrysomelidae	sp
Leaf Beetle/uncommon	Chrysomelidae	<i>Lamprosoma concolor</i>
Leafhopper	Cicadellidae	<i>Eupteryx aurata</i>

Leafhopper	Cicadellidae	sp
Midge	Mycetophilidae	<i>Sciara thomae</i>
Mirid Bug	Miridae	<i>Mecomma ambulans</i>
Mirid Bug	Miridae	<i>Stenodema laevigatum</i>
Non Biting Midge	Chironomidae	<i>Chironomus annularis</i>
Parasitic Wasp	Ichneumonidae	sp
Parasitic Wasp	Platygasteridae	sp
Parasitic Wasp	Pteromalidae	<i>Pteromalus puparum</i>
Pill Beetle	Byrrhidae	<i>Simplocaria semistriata</i>
Pollen Beetle	Nitidulidae	<i>Meligethes aeneus</i>
Soldier Beetle	Cantharidae	<i>Rhagonycha fulva</i>
Spider	Linyphiidae	sp
Spider	Liocranidae	sp
Spider	Metidae	sp
Spider	Thomisidae	sp

## Fungi

English Name

*Auricularia auricula-judae*  
*Collybia confluens*  
*Collybia maculata*  
*Ganoderma australe*  
*Hypholoma fasciculare*  
*Inocybe* sp  
*Kuehneromyces mutabilis*  
*Phlebia tremellosa*  
*Phellinus igniarius*  
*Resupinate* sp  
*Stereum hirsutum*  
*Tephrocybe confusa*  
*Trametes versicolor*  
*Tricholoma terreum*  
*Tyromyces chioneus*  
*Xylaria hypoxylon*

## Lichen

Scientific Name

*Caloplaca flavescens*  
*Chrysothrix candelaris*  
*Heterodermia leucomela*  
*Hypogymnia leucomelos*  
*Hypogymnia physodes*  
*Lecanora explallens*  
*Lecidella carpathica*  
*Parmelia sulcata*  
*Phycia adscendens*  
*Xanthoria polycarpa*

## Buildings J3.6

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### Plants

Common Name	Scientific Name
Bittersweet	<i>Solanum dulcamara</i>
Black Medic	<i>Medicago lupulina</i>
Bluebell	<i>Endymion non-scriptus</i>
Broad Leaved Willowherb	<i>Epilobium montanum</i>
Cleavers	<i>Galium verum</i>
Coltsfoot	<i>Tussilago farfara</i>
Common Chickweed	<i>Stellaria media</i>
Common Fumitory	<i>Fumaria officinalis</i>
Common Sorrel	<i>Rumex acetosa</i>
Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Curled Dock	<i>Rumex crispus</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum vulgaria</i>
Foxglove	<i>Digitalis purpurea</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Great Plantain	<i>Plantago major</i>
Ground Ivy	<i>Glechoma hederacae</i>
Groundsel	<i>Senecio vulgaris</i>
Hairy Bittercress	<i>Cardaminopsis petraea</i>
Hawkweed sp	
Hedge Mustard	<i>Sisymbrium officinale</i>
Knotgrass	<i>Polygonum aviculare</i>
Lesser Sea Spurrey	<i>Spergularia marina</i>
Marsh Cudweed	<i>Filaginella uliginosa</i>
Nipplewort	<i>Lapsana communis</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Petty Spurge	<i>Euphorbia peplus</i>
Pineapple Mayweed	<i>Chamomilla suaveolens</i>
Procumbent Pearlwort	<i>Sagina procumbens</i>
Ragwort	<i>Senecio jacobaea</i>
Redshank	<i>Polygonum persicaria</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Rosebay Willow Herb	<i>Epilobium augustifolium</i>
Scentless Mayweed	<i>Matricaria perforata</i>
Self Heal	<i>Prunella vulgaris</i>
Smooth Sow-thistle	<i>Sonchus oleraceus</i>
Soft Rush	<i>Juncus effusus</i>
Tufted Vetch	<i>Vicia cracca</i>
Tutsan	<i>Hypericum androsaemum</i>
White Clover	<i>Trifolium repens</i>
Wild Strawberry	<i>Fragaria vesca</i>
Yarrow	<i>Achillea millefolium</i>

### Grasses

Common Name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>
Crested Dogs Tail	<i>Cynosurus cristatus</i>
False Oat Grass	<i>Arrhenatherum elatius</i>

Perennial Rye-Grass	<i>Lolium perenne</i>
Wood Meadow Grass	<i>Poa nemoralis</i>
Yorkshire Fog	<i>Holcus lanatus</i>

## Ferns

Common Name	Scientific Name
Horsetail	<i>Equisetum sp</i>
Common Polypody	<i>Polypodium vulgare</i>
Maidenhair Spleenwort	<i>Asplenium trichomanes</i>
Maidenhair Fern	<i>Adiantum capillus-veneris</i>
Wall Rue	<i>Asplenium ruta-muraria</i>

## Birds

Common Name	Scientific Name
Carrion Crow	<i>Covus corone</i>
Chaffinch	<i>Fringilla coeleds</i>
Feral Pigeon	<i>sp</i>
Greenfinch	<i>Carduelis chloris</i>
Jackdaw	<i>Corvus monedula</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Magpie	<i>Pica pica</i>
Wood Pigeon	<i>Columba palumbus</i>

## Mammals

Common Name	Scientific Name
Badger	<i>Meles meles</i>
Brown Rat	<i>Rattus norvegicus</i>
Fox	<i>Vulpes vulpes</i>
Grey Squirrel	<i>Sciurur carolinensis</i>
Pipistrel 45	<i>Pipistrellus pipistrellus</i>
Pipistrel 55	<i>Pipistrellus pygmaeus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Roe Deer	<i>Capreolus calreolus</i>

## Lichen

*Scientific Name*  
*Arctoparmelia incurva*  
*Caloplaca flavenscens*  
*Chrysothrix candelaris*  
*Diplotomma alboatrum*  
*Hypogymnia leucomelos*  
*Lecanora explallens*  
*Phycia adscendens*

## Parkland A3.1 SMW

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### Plants

Common Name	Scientific Name
Bittersweet	<i>Solanum dulcamara</i>
Bramble	<i>Rubus fruticosus</i>
Broad Leaved Willowherb	<i>Epilobium montanum</i>
Butterbur	<i>Petasites hybridus</i>
Candytuft	<i>Iberis umbellata</i>
Cleavers	<i>Galium verum</i>
Coltsfoot	<i>Tussilago farfara</i>
Common Chickweed	<i>Stellaria media</i>
Common Nettle	<i>Urtica dioica</i>
Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Crocus	<i>Crocus albiflorus</i>
Curled Dock	<i>Rumex crispus</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum vulgaria</i>
Foxglove	<i>Digitalis purpurea</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Great Plantain	<i>Plantago major</i>
Great Willowherb	<i>Epilobium hirsutum</i>
Ground Elder	<i>Sambucus nigra</i>
Ground Ivy	<i>Glechoma hederacae</i>
Groundsel	<i>Senecio vulgaris</i>
Herb Bennett	<i>Geum urbanum</i>
Hogweed	<i>Heracleum sphondylium</i>
Japanese Knotweed	<i>Reynoutria japonica</i>
Knotted Pearlwort	<i>Sagina nodosa</i>
Lesser Celandine	<i>Ranunculus ficaria</i>
Lesser Stitchwort	<i>Stellaria graminea</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Pineapple Mayweed	<i>Chamomilla suaveolens</i>
Procumbent Pearlwort	<i>Sagina procumbens</i>
Purple Toadflax	<i>Linaria purpurea</i>
Ragwort	<i>Senecio jacobaea</i>
Raspberry	<i>Rubus chamaemorus</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Rosebay Willow Herb	<i>Epilobium augustifolium</i>
Self Heal	<i>Prunella vulgaris</i>
White Clover	<i>Trifolium repens</i>
Wood Forget-me-not	<i>Myosotis sylvatica</i>
Yarrow	<i>Achillea millefolium</i>

### Grasses

Common Name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>
Cocksfoot	<i>Dactylis glomerata</i>
False Oat Grass	<i>Arrhenatherum elatius</i>
Perennial Rye-Grass	<i>Lolium perenne</i>
Timothy Grass	<i>Phleum pratense</i>
Wood Meadow Grass	<i>Poa nemoralis</i>
Yorkshire Fog	<i>Holcus lanatus</i>

## Birds

Common Name	Scientific Name
Blackbird	<i>Turdus merula</i>
Black-headed Gull	<i>Larus ridibundus</i>
Blue Tit	<i>Parus caeruleus</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Buzzard	<i>Buteo buteo</i>
Carrion Crow	<i>Covus corone</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal Tit	<i>Parus ater</i>
Common Gull	<i>Larus canus</i>
Dunnock	<i>Prunella modularis</i>
Feral Pigeon	<i>sp</i>
Fieldfare	<i>Turdus pilaris</i>
Goldcrest	<i>Regulus regulus</i>
Goldfinch	<i>Carduelis carduelis</i>
Great Tit	<i>Parus major</i>
Greenfinch	<i>Carduelis chloris</i>
Herring Gull	<i>Larus argentatus</i>
House Sparrow	<i>Passer domesticus</i>
Jackdaw	<i>Corvus monedula</i>
Kestrel	<i>Falco tinnunculus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Long-tailed Tit	<i>Aegithalos caudatus</i>
Magpie	<i>Pica pica</i>
Mistle Thrush	<i>Turdus viscivorus</i>
Redwing	<i>Turdus iliacus</i>
Robin	<i>Erithacus rubecula</i>
Song Thrush	<i>Turdus philomelos</i>
Sparrowhawk	<i>Accipiter nisus</i>
Swallow	<i>Hirundo rustica</i>
Swift	<i>Apus apus</i>
Willow Warbler	<i>Phylloscopus trochilus</i>
Wood Pigeon	<i>Columba palumbus</i>
Wren	<i>Troglodytes troglodytes</i>

## Mammals

Common Name	Scientific Name
Badger	<i>Meles meles</i>
Fox	<i>Vulpes vulpes</i>
Grey Squirrel	<i>Sciurur carolinensis</i>
Pipistrel 45	<i>Pipistrellus pipistrellus</i>
Pipistrel 55 (4)	<i>Pipistrellus pygmaeus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Roe Deer	<i>Capreolus calreolus</i>

## Fungi

Scientific Name	Status
<i>Agaricus campestris</i>	Common
<i>Ampulloclitocybe clavipes</i>	Common
<i>Boletus sp</i>	
<i>Cantharellula umbonata</i>	uncommon
<i>Collybia dryophila</i>	common
<i>Collybia fusipes</i>	Common

Conocybe pubescens	Occasional
Coprinus comatus	Common
Entoloma sp	
Entoloma chalybaeum	Occasional
Entoloma clypeatum	Occasional
Entoloma lucidium	Uncommon
Hygrocybe conica	Common
Hygrocybe psittacina	Common
Hygrocybe virginea	common
Hygrophorus hypothejus	Frequent
Inocybe flocculosa	Occasional
Lactarius blennius	Common
Lactarius serifluus	Occasional
Lepista nuda	Common
Lycoperdon perlatum	Common
Marasmius oreades	Common
Mycena aetites	Frequent
Mycena galopus	Common
Mycena sp	
Paxillus involutus	common
Pholiota squarrosa	Common
Psilocybe semilanceata	Common
Ramaria sp	Red Data Species
Rhodocybe sp	
Russula ionochlora	Occasional
Scleroderma areolatum	Frequent
Xylaria hypoxylon	common

### Invertebrates

Common Name	Scientific Name
Large White	<i>Pieris brassicae</i>
Peacock	<i>Inachis io</i>
Green-veined White	<i>Pieris napi</i>

### Lichen

Scientific Name
<i>Caloplaca flavenscens</i>
<i>Chrysothrix candelaris</i>
<i>Lecanora explallens</i>

## South Woodland A1.1.1 BW

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### Plants

Common Name	Scientific Name
Bittersweet	<i>Solanum dulcamara</i>
Bluebell	<i>Endymion non-scriptus</i>
Bramble	<i>Rubus fruticosus</i>
Broad-leaved Willowherb	<i>Epilobium montanum</i>
Cleavers	<i>Galium verum</i>
Common Chickweed	<i>Stellaria media</i>
Common Storksbill	<i>Erodium cicularium</i>
Cow Parsley	<i>Anthriscus sylvestris</i>

Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Curled Dock	<i>Rumex crispus</i>
Enchanters Nightshade	<i>Circaea lutetiana</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Great Willowherb	<i>Epilobium hirsutum</i>
Greater Plantain	<i>Plantago major</i>
Ground Elder	<i>Sambucus nigra</i>
Ground Ivy	<i>Glechoma hederacea</i>
Hairy Bittercress	<i>Cardamine hirsuta</i>
Herb Bennet	<i>Geum urbanum</i>
Herb Robert	<i>Geranium robertianum</i>
Hogweed	<i>Heracleum sphondylium</i>
Honeysuckle	<i>Lonicera periclymenum</i>
Lesser Celandine	<i>Ranunculus ficaria</i>
Pink Purslane	<i>Montia sibirica</i>
Ragwort	<i>Senecio jacobaea</i>
Raspberry	<i>Rubus chamaemorus</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Rose sp	
Rosebay Willowherb	<i>Epilobium augustifolium</i>
Self Heal	<i>Prunella vulgaris</i>
Snowdrop	<i>Galanthus nivalis</i>
Stinging Nettle	<i>Urtica dioica</i>
Sweet Cicely	<i>Myrrhis odorata</i>
Welsh Poppy	<i>Meconopsis cambrica</i>
Ramsons	<i>Allium triquetrum</i>

### Grasses

Common Name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>
False Oat Grass	<i>Arrhenatherum elatius</i>
Perennial Rye-Grass	<i>Lolium perenne</i>
Wood Meadow Grass	<i>Poa nemoralis</i>
Yorkshire Fog	<i>Holcus lanatus</i>

### Ferns

Common Name	Scientific Name
Broad Buckler-fern	<i>Dryopteris dilatata</i>

### Birds

Common Name	Scientific Name
Blackbird	<i>Turdus merula</i>
Blue Tit	<i>Parus caeruleus</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Buzzard	<i>Buteo buteo</i>
Carrion Crow	<i>Covus corone</i>
Chaffinch	<i>Fringilla coelebs</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal Tit	<i>Parus ater</i>
Duncock	<i>Prunella modularis</i>
Feral Pigeon	sp
Goldcrest	<i>Regulus regulus</i>
Great Tit	<i>Parus major</i>
Great-spotted Woodpecker	<i>Dendrocopos major</i>

Jackdaw	<i>Corvus monedula</i>
Long-tailed Tit	<i>Aegithalos caudatus</i>
Magpie	<i>Pica pica</i>
Mistle Thrush	<i>Turdus viscivorus</i>
Redwing	<i>Turdus iliacus</i>
Robin	<i>Erithacus rubecula</i>
Song Thrush	<i>Turdus philomelos</i>
Tawny Owl	<i>Strix aluco</i>
Tree Creeper	<i>Certhia familiaris</i>
Willow Warbler	<i>Phylloscopus trochilus</i>
Wood Pigeon	<i>Columba palumbus</i>
Wren	<i>Troglodytes troglodytes</i>

## Mammals

Common Name	Scientific Name
Badger	<i>Meles meles</i>
Common Shrew	<i>Sorex araneus</i>
Field Vole	<i>Microtus agrestis</i>
Fox	<i>Vulpes vulpes</i>
Grey Squirrel	<i>Sciurur carolinensis</i>
Hedgehog	<i>Erinaceus europaeus</i>
Pipistrel 45	<i>Pipistrellus pipistrellus</i>
Pipistrel 55 (2)	<i>Pipistrellus pygmaeus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Roe Deer	<i>Capreolus calreolus</i>

## Invertebrates

Family	Species	Description
Agromyzidae	<i>Phytomyza ilicis</i>	Fly
Anthomyzidae	<i>Anthomyza gracilis</i>	Fly
Aphidae	sp	Aphid
Aphrophoridae	sp	Froghopper
Apionidae	<i>Apion pomonae</i>	Weevil
Aulacidae	sp	Parasitic wasp
Caeciliusidae	<i>Valenzuela flavidus</i>	Barkfly
Cecidomyiidae	<i>Taxomia taxi</i>	Gall Midge
Chalcidoidea	sp	Parasitic Wasp
Chironomidae	sp	Non Biting Midge
Chironomidae	<i>Chironomus plumosus</i>	Non Biting Midge
Cicadelidae	<i>Eupteryx aurata</i>	Leafhopper
Cimicidae	sp	Flower Bug
Coccinellidae	<i>Halyzia sedecimguttata</i>	Ladybird
Culicidae	sp	Mosquito
Curculionidae	<i>Otiorhynchus scaber</i>	Weevil
Cynipidae	sp	Gall Wasp
Dolichopodidae	sp	Fly
Dolichopodidae	<i>Sciapus platypterus</i>	Fly
Dryomyzidae	<i>Dryomyza flaveola</i>	Fly
Entomobryoidae	sp	Springtail
Forficulidae	<i>Forficula ayricularia</i>	Earwig
Ichneumonidae	sp	Parasitic wasp
Ichneumonidae	<i>Diplazon Laetatorius</i>	Parasitic wasp
Ichneumonidae	<i>Rhyssa persuasoria</i>	Parasitic wasp
Ichneumonidae	<i>Protichneumon pisorius</i>	Parasitic wasp
Labiidae	<i>Labia minor</i>	Earwig

Lathridiidae	<i>Aridius nodifer</i>	Beetle
Linyphiidae	sp	Spider
Lonchopteridae	<i>Lonchoptera lutea</i>	Fly
Lygaeidae	sp	Ground Bug
Lygaeidae	<i>Trapezonotus ullrichi</i>	Ground Bug
Metidae	sp	Spider
Miridae	<i>Phylus melanocephalus</i>	Mirid Bug
Miridae	<i>Psallus varians</i>	Mirid Bug
Miridae	<i>Orthotylus virescens</i>	Mirid Bug
Miridae	<i>Bryocoris pteridis</i>	Mirid Bug
Muscidae	<i>Hydrotaea irritans</i>	Fly
Mymaridae	sp	Parasitic wasp
Opomyzidae	<i>Opomyza germinations</i>	Fly
Phalangiidae	<i>Lacinius ephippiatus</i>	Harvestman
Phalangiidae	<i>Paroligolophus meadii</i>	Harvestman
Phoridae	<i>Phora atra</i>	Fly
Platybuninae	<i>Lophopilio palpinalis</i>	Harvestman
Pocidae	sp	Barkfly
Pteromalidae	<i>Pteromalus puparum</i>	Parasitic wasp
Ptiliidae	sp	Beetle
Reduviidae	sp	Assasin Bug
Sciaridae	<i>Sciara thomae</i>	Fly
Stratiomyidae	sp	Fly
Theridiosomatidae	<i>Theridiosoma gemmosum</i>	Spider
Thomisidae	sp	Crab Spider
Thripidae	sp	Thrip
Tipulidae	<i>Limonia nubeculosa</i>	Crane Fly
Torimidae	<i>Torymus nitens</i>	Parasitic wasp
Trichoceridae	<i>Trichocera annulata</i>	Winter Gnats
Trichogrammatidae	sp	Parasitic wasp
Vespidae	<i>Vespa vulgaris</i>	Social Wasp

## Lichen

### Scientific Name

*Lecanora explallens*  
*Caloplaca flavescens*  
*Chrysothrix candelaris*  
*Heterodermia leucomela*  
*Hypogymnia leucomelos*  
*Hypogymnia physodes*  
*Lecidella carpathica*  
*Parmelia sulcata*  
*Physcia adscendens*  
*Xanthoria polycarpa*

## Craighouse Target Notes

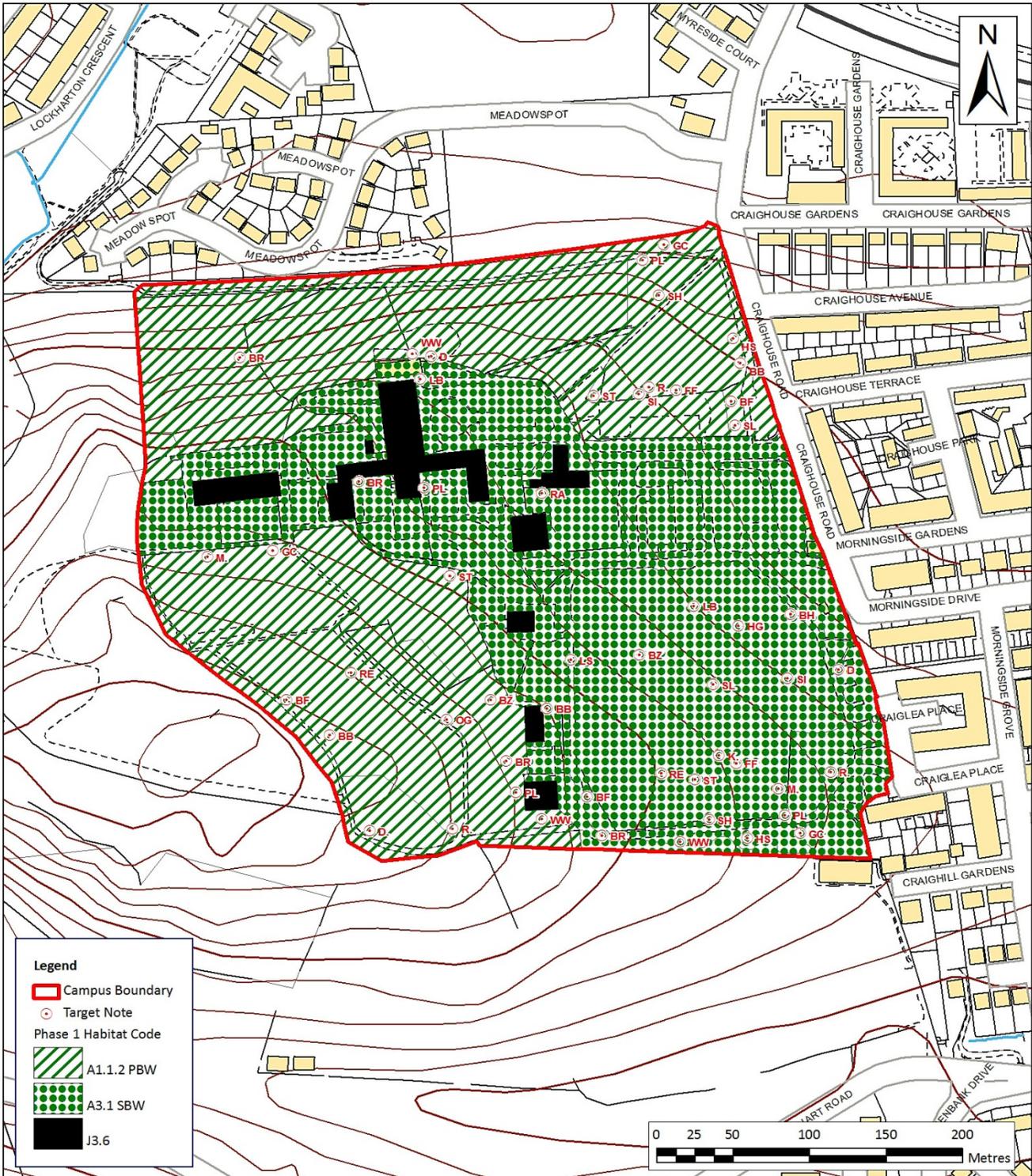
### Craighouse

### Target Notes

Note	Scientific Name	Description	Species Designation	Habitat/Code	Ref
Bluebell	<i>Endymion non-scriptus</i>	Plant	ELBAP	North Wood A1	BB
Bullfinch	<i>Pyrrhula pyrrhula</i>	Bird	ELBAP	North Wood A1	BF
Dunnock	<i>Prunella modularis</i>	Bird	ELBAP	North Wood A1	D
Fieldfare	<i>Turdus pilaris</i>	Bird	Red Listed & ELBAP	North Wood A1	FF
Goldcrest	<i>Regulus regulus</i>	Bird	ELBAP	North Wood A1	GC
House Sparrow	<i>Passer domesticus</i>	Bird	ELBAP	North Wood A1	HS
Song Thrush	<i>Turdus philomelos</i>	Bird	Red Listed & ELBAP	North Wood A1	ST
Sparrowhawk	<i>Accipiter nisus</i>	Bird	ELBAP	North Wood A1	SH
Swallow	<i>Hirundo rustica</i>	Bird	ELBAP	North Wood A1	SL
Swift	<i>Apus apus</i>	Bird	ELBAP	North Wood A1	SI
Willow Warbler	<i>Phylloscopus trochilus</i>	Bird	ELBAP	North Wood A1	WW
Robin	<i>Erithacus rubecula</i>	Bird	ELBAP	North Wood A1	R.
Badger	<i>Meles meles</i>	Mammal	Protection of Badgers Act 1992 The Conservation (Natural Habitats, &c) Regulations 1994	North Wood A1	BR
Pipistrel 45 & 55	<i>Pipistrellus pipistrellus</i>	Mammal	1994	North Wood A1	PL
Bluebell	<i>Endymion non-scriptus</i>	Plant	ELBAP	Buildings J3.6	BB
Lesser Sea Spurry	<i>Spergularia marina</i>	Plant	none (interesting plant)	Buildings J3.6	LS
Lesser Black-backed Gull	<i>Larus fuscus</i>	Bird	ELBAP The Conservation (Natural Habitats, &c) Regulations 1994	Buildings J3.6	LB
Pipistrel 45 & 55	<i>Pipistrellus pipistrellus</i>	Mammal	1994	Buildings J3.6	PL
Badger	<i>Meles meles</i>	Mammal	Protection of Badgers Act 1992	Buildings J3.6	BR
Black-headed Gull	<i>Larus ribidundus</i>	Bird	ELBAP	Parkland A3	BH

Bullfinch	<i>Pyrrhula pyrrhula</i>	Bird	ELBAP	Parkland A3	BF
Buzzard	<i>Buteo buteo</i>	Bird	ELBAP	Parkland A3	BZ
Dunnock	<i>Prunella modularis</i>	Bird	ELBAP	Parkland A3	D
Fieldfare	<i>Turdus pilaris</i>	Bird	Red Listed & ELBAP	Parkland A3	FF
Goldcrest	<i>Regulus regulus</i>	Bird	ELBAP	Parkland A3	GC
Herring Gull	<i>Larus argentatus</i>	Bird	ELBAP	Parkland A3	HG
House Sparrow	<i>Passer domesticus</i>	Bird	ELBAP	Parkland A3	HS
Kestrel	<i>Falco tinnunculus</i>	Bird	ELBAP	Parkland A3	K.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Bird	ELBAP	Parkland A3	LB
Mistle Thrush	<i>Turdus viscivorus</i>	Bird	ELBAP	Parkland A3	M.
Redwing	<i>Turdus iliacus</i>	Bird	Red Listed & ELBAP	Parkland A3	RE
Robin	<i>Erithacus rubecula</i>	Bird	ELBAP	Parkland A3	R.
Song Thrush	<i>Turdus philomelos</i>	Bird	Red Listed & ELBAP	Parkland A3	ST
Sparrowhawk	<i>Accipiter nisus</i>	Bird	ELBAP	Parkland A3	SH
Swallow	<i>Hirundo rustica</i>	Bird	ELBAP	Parkland A3	SL
Swift	<i>Apus apus</i>	Bird	ELBAP	Parkland A3	SI
Willow Warbler	<i>Phylloscopus trochilus</i>	Bird	ELBAP	Parkland A3	WW
Badger	<i>Meles meles</i>	Mammal	Protection of Badgers Act 1992 The Conservation (Natural Habitats, &c) Regulations 1994	Parkland A3	BR
Pipistrel 45 & 55	<i>Pipistrellus pipistrellus</i>	Mammal		Parkland A3	PL
Ramaria sp		Fungi	Red Data Speices	Parkland A3	RA
Bluebell	<i>Endymion non-scriptus</i>	Plant	ELBAP	South Wood A1	BB
Bullfinch	<i>Pyrrhula pyrrhula</i>	Bird	ELBAP	South Wood A1	BF
Buzzard	<i>Buteo buteo</i>	Bird	ELBAP	South Wood A1	BZ
Dunnock	<i>Prunella modularis</i>	Bird	ELBAP	South Wood A1	D.
Goldcrest	<i>Regulus regulus</i>	Bird	ELBAP	South Wood A1	GC
Mistle Thrush	<i>Turdus viscivorus</i>	Bird	ELBAP	South Wood A1	M.
Redwing	<i>Turdus iliacus</i>	Bird	Red Listed & ELBAP	South Wood A1	RE
Robin	<i>Erithacus rubecula</i>	Bird	ELBAP	South Wood A1	R.
Song Thrush	<i>Turdus philomelos</i>	Bird	Red Listed & ELBAP	South Wood A1	ST
Willow Warbler	<i>Phylloscopus trochilus</i>	Bird	ELBAP	South Wood A1	WW
Badger	<i>Meles meles</i>	Mammal	Protection of Badgers Act 1992	South Wood A1	BR

Pipistrel 45 & 55	<i>Pipistrellus pipistrellus</i>	Mammal	The Conservation (Natural Habitats, &c) Regulations 1994	South Wood A1	PL
Olive Oysterling	<i>Panellus serotinus</i>	Fungi	ELBAP	South Wood A1	OG



Ref: AP1/Napier Craighouse  
 Version: 3  
 Date: 11 November 2011  
 Cartographer: Iain Turnbull

## Edinburgh Napier University Craighouse Campus Phase 1 Habitat Survey

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# Appendix 2

# Craiglockhart Species List

## Buildings J3.6

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### Plants

Common Name	Scientific Name
Black Medic	<i>Medicago lupulina</i>
Bramble	<i>Rubus fruticosus</i>
Broad Leaved Willowherb	<i>Epilobium montanum</i>
Coltsfoot	<i>Tussilago farfara</i>
Common Chickweed	<i>Stellaria media</i>
Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Curled Dock	<i>Rumex crispus</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum vulgaria</i>
Dovesfoot Cranesbill	<i>Geranium molle</i>
Greater Plantain	<i>Plantago major</i>
Ground Elder	<i>Sambucus nigra</i>
Groundsel	<i>Senecio vulgaris</i>
Hairy Bittercress	<i>Cardamine hirsute</i>
Hairy Tare	<i>Vicia hirsute</i>
Knotgrass	<i>Polygonum aviculare</i>
Mugwort	<i>Artemisia vulgais</i>
Pearlwort	<i>Sagina procumbens</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Ragwort	<i>Senecio jacobaea</i>
Self Heal	<i>Prunella vulgaris</i>
Welsh Poppy	<i>Meconopsis cambrica</i>
White Clover	<i>Trifolium repens</i>

### Grasses

Common Name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>

### Ferns

Common Name	Scientific Name
Polypody	<i>Polypodium vulgare</i>

### Birds

Common Name	Scientific Name
Carrion Crow	<i>Covus corone</i>
Coal Tit	<i>Parus ater</i>
Feral Pigeon	Sp
Herring Gull	<i>Larus argentatus</i>
Jackdaw	<i>Corvus monedula</i>
Kestrel	<i>Falco tinnunculus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Magpie	<i>Pica pica</i>

## Mammals

Common Name	Scientific Name
Brown Rat	<i>Rattus norvegicus</i>
Mouse sp	

## Invertebrates

Common Name	Scientific Name	
Green - veined White	<i>Pieris napi</i>	Butterfly

## Lichen

Common Name	Scientific Name
	<i>Caloplaca citrina</i>
	<i>Chrysothrix candelaris</i>
	<i>Lepraria ecorticata</i>
	<i>Psilolechia lucida</i>

## Grassland B6 SI

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## Plants

Common name	Scientific Name
Black Medic	<i>Medicago lupulina</i>
Bramble	<i>Rubus fruticosus</i>
Broad-leaved Willowherb	<i>Epilodium montanum</i>
Bush Vetch	<i>Vicia sepium</i>
Cleavers	<i>Galium verum</i>
Clover Haresfoot	<i>Trifolium arvense</i>
Clover Red	<i>Trifolium pratense</i>
Coltsfoot	<i>Tussilago farfara</i>
Common Mouse Ear	<i>Cerastium arvense</i>
Common Nettle	<i>Urtica dioica</i>
Common Spotted Orchid	<i>Dactylorhiza fuchsii</i>
Common Vetch	<i>Vicia sativa</i>
Cow Parsley	<i>Anthriscus sylvestris</i>
Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Curled Dock	<i>Rumex crispus</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum vulgaria</i>
Dog Rose	<i>Rosa canina</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Greater Plantain	<i>Plantago major</i>
Ground Elder	<i>Sambucus nigra</i>
Ground Ivy	<i>Glechoma hederaceae</i>
Groundsel	<i>Senecio vulgaris</i>
Hairy Tare	<i>Vicia hirsute</i>
Hogweed	<i>Heracleum sphondylium</i>
Hop Trefoil	<i>Trifolium campestre</i>
Knotgrass	<i>Polygonum aviculare</i>
Lady's Mantle	<i>Alchemilla vulgaris</i>
Lesser Stitchwort	<i>Stellaria graminea</i>
Meadow Vetchling	<i>Lathyrus pratensis</i>
Michaelmas Daisy	<i>Aster novi-belgii</i>
Mugwort	<i>Artemisia vulgaris</i>
Nettle Dead Red	<i>Lamium purpureum</i>

Nettle White Dead	<i>Lamium album</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Pineapple Mayweed	<i>Chamomilla suaveolens</i>
Ragwort	<i>Senecio jacobaea</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Rosebay Willowherb	<i>Epilodium angustifolium</i>
Self Heal	<i>Prunella vulgaris</i>
Smooth Hawk's-beard	<i>Crepis capillaris</i>
Smooth Sow-thistle	<i>Sonchus oleraceus</i>
Tufted Vetch	<i>Vicia cracca</i>
White Clover	<i>Trifolium repens</i>
Yarrow	<i>Achillea millefolium</i>
Yellow Bartsia	<i>Parentucellia viscosa</i>

## Grasses

Common name	Scientific Name
Annual Meadow Grass	<i>Poa anna</i>
Chewings Fescue	<i>Festuca rubra</i>
Cocksfoot	<i>Dactylis glomerata</i>
Common Bent	<i>Agrostis capillaris</i>
False Oat Grass	<i>Arrhenatherum elatius</i>
Meadow Fescue	<i>Festuca pratensis</i>
Perennial Rye Grass	<i>Lolium perenne</i>
Red Fescue	<i>Festuca rubra</i>
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>
Yorkshire Fog	<i>Holcus lanatus</i>

## Ferns

Common name	Scientific Name
Maidenhair Spleenwort	<i>Asplenium trichomanes</i>
Hart's Tongue	<i>Phyllitis scolopendrium</i>

## Birds

Common name	Scientific Name
Blackbird	<i>Turdus merula</i>
Black-headed Gull	<i>Larus ridibundus</i>
Buzzard	<i>Buteo buteo</i>
Carrion Crow	<i>Corvus corone</i>
Chaffinch	<i>Fringilla coelebs</i>
Common Gull	<i>Larus canus</i>
Great Tit	<i>Parus major</i>
Greenfinch	<i>Carduelis chloris</i>
Herring Gull	<i>Larus argentatus</i>
House Sparrow	<i>Passer domesticus</i>
Jackdaw	<i>Corvus monedula</i>
Kestrel	<i>Falco tinnunculus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Magpie	<i>Pica pica</i>
Robin	<i>Erithacus rubecula</i>
Starling	<i>Sturnus vulgaris</i>
Swift	<i>Apus apus</i>
Wood Pigeon	<i>Columba palumbus</i>
Wren	<i>Troglodytes troglodytes</i>

## Mammals

Common name	Scientific Name
Fox	<i>Vulpes vulpes</i>

Rabbit	<i>Oryctolagus cuniculus</i>
Roe Deer	<i>Capreolus calreolus</i>
Field vole	<i>Microtus agrestis</i>

## Invertebrates

Family	Species	Description
Agromyzidae	<i>Phytomyza ilicis</i>	Fly
Aphidae	Sp	Aphid
Aphrophoridae	Sp	Froghopper
Aphrophoridae	<i>Philaenus spumarius</i>	Froghopper
Apionidae	Sp	Weevil
Asilidae	Sp	Robber Fly
Berytidae	<i>Berytinus minor</i>	Stilt Bug
Bibionidae	<i>Bibio hortulanus</i>	Fly
Bibionidae	<i>Bibio marci</i>	Fly
Calliphoridae	Sp	Blow Fly
Carniidae	<i>Carnus hemapterus</i>	Fly
Chamaemyiidae	Sp	Fly
Chironomidae	Sp	None Biting Midges
Chrysomelidae	Sp	Leaf Beetle
Cicadelidae	Sp	Leaf Hopper
Cicadelidae	<i>Eupteryx aurata</i>	Leaf Hopper
Clubionidae	Sp	Spider
Colombola	Sp	Springtail
Curculionidae	Sp	Weevil
Curculionidae	<i>Apion sp</i>	Weevil
Cynipidae	<i>Neuroterus quercusbbaccarum</i>	Gall Wasp
Cynipidae	Sp	Gall Wasp
Dictynidae	Sp	Mesh-web Spider
Polydesmidae	<i>Polydesmus sp</i>	Millipede
Formicidae	<i>Lasius niger</i>	Black Garden Ant
Gastrododontidae	<i>Oxychilus alliaris</i>	Molusc
Heleomyzidae	<i>Suillia variegata</i>	Fly
Helicidae	<i>Helix aspersa</i>	Molusc
Ichneumonidae	<i>Amblyteles armatorius</i>	Parasitic Wasp
Ichneumonidae	<i>Apanteles glomeratus</i>	Parasitic Wasp
Isopoda	<i>Porcellio scaber</i>	Wood Louse
Ixodidae	Sp	Parasitic Tick
Lathridiidae	Sp	Mould Beetle
Leiodidae	Sp	Scavenger Beetle
Linyphiidae	Sp	Money Spider
Lygaeidae	Sp	Ground Bug
Lygaeidae	<i>Neidaes tipularius</i>	Assassin Bug
Miridae	<i>Stenodema laevigatum</i>	Capsid Bugs
Miridae	<i>Stenodema laevigatum</i>	Mirid Bug
Muscidae	Sp	Fly
Nocyuidae	<i>Catocala nupta</i>	Moth
Nymphalidae	<i>Polygonia c-album</i>	Butterfly
Nymphalidae	<i>Inachis io</i>	Butterfly
Nymphalidae	<i>Maniola jurtina</i>	Butterfly
Oligolophinae	<i>Oligolophus tridens</i>	Harvestmen Spider
Oonopidae	Sp	6 Eyed Spider
Opomyzidae	<i>Opomyza germinations</i>	Stilt-legged Fly
Philodromidae	Sp	Running Crab Spider
Phoridae	<i>Phora atra</i>	Scuttle Fly
Pieridae	<i>Pieris napi</i>	Butterfly
Pieridae	<i>Pieris brassicae</i>	Butterfly
Platygasteridae	Sp	Parasitic Wasp
Pteromalidae	Sp	Parasitic Wasp
Reduviidae	Sp	Assassin Bug

Salticidae	Sp	Jumping Spider
Scatopsidae	Sp	True Fly
Sphaeroceridae	<i>Copromyza similis</i>	Small Fly
Stafilinidae	Sp	Beetle
Tenthredinidae	<i>Potania proxima</i>	Sawfly
Thomisidae	Sp	Spider
Thripidae	Sp	Thrip
Tinidae	<i>Tingis cardui</i>	Lace Bug
Tipulidae	Sp	Crane Fly
Torymidae	Sp	Parasitic Wasp
Torymidae	<i>Torymus nitens</i>	Parasitic Wasp
Trichogrammatidae	Sp	Parasitic Wasp

## Fungi

<i>Scientific Name</i>	Status
Collybia sp	
Coprinus comatus	Common
Entoloma nidorosum	Occasional
Lactarius torminosus	Common
Paxillus involutus	Common

## Parkland A3.1 SBW

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### Plants

Common name	<i>Scientific Name</i>
Black Medic	<i>Medicago lupulina</i>
Bluebell	<i>Endymion non-scriptus</i>
Bramble	<i>Rubus fruticosus</i>
Broad Leaved Willowherb	<i>Epilobium montanum</i>
Broad Leaved Dock	<i>Epilobium montanum</i>
Cleavers	<i>Galium verum</i>
Coltsfoot	<i>Tussilago farfara</i>
Common Chickweed	<i>Stellaria media</i>
Common Dog Violet	<i>Viola riviniana</i>
Common Fumitory	<i>Fumaria officinalis</i>
Common Nettle	<i>Urtica dioica</i>
Cow Parsley	<i>Anthriscus sylvestris</i>
Cowslip	<i>Primula veris</i>
Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Crocus	<i>Crocus albiflorus</i>
Curled Dock	<i>Rumex crispus</i>
Cut-Leaved Cranesbill	<i>Geranium dissectum</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum vulgaria</i>
Feverfew	<i>Tanacetum parthenium</i>
Field Forget-me-not	<i>Myosotis arvensis</i>
Fool's Parsley	<i>Aethusa cynapium</i>
Foxglove	<i>Digitalis purpurea</i>
Garlic Mustard	<i>Alliaria petiolata</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Golden Rod	<i>Solidago virgaurea</i>
Greater Plantain	<i>Plantago major</i>
Ground Elder	<i>Sambucus nigra</i>
Ground Ivy	<i>Glechoma hederaceae</i>
Groundsel	<i>Senecio vulgaris</i>

Hairy Bittercress	<i>Cardamine hirsute</i>
Hairy Tare	<i>Vicia hirsute</i>
Herb Bennett	<i>Geum urbanum</i>
Hogweed	<i>Heracleum sphondylium</i>
Hop Trefoil	<i>Trifolium campestre</i>
Knotgrass	<i>Polygonum aviculare</i>
Lesser Celandine	<i>Ranunculus ficaria</i>
Long-headed Poppy	<i>Papaver dubium</i>
Mugwort	<i>Artemisia vulgaris</i>
Nipplewort	<i>Lapsana communis</i>
Oxlip <i>sp escapee</i>	<i>Primula sp</i>
Procumbent Pearlwort	<i>Sagina procumbens</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Pignut	<i>Conopodium majus</i>
Pineapple Mayweed	<i>Chamomilla suaveolens</i>
Plantain Greater	<i>Plantago major</i>
Welsh Poppy	<i>Meconopsis cambrica</i>
Prickly Lettuce	<i>Lactuca serriola</i>
Primrose	<i>Primula vulgaris</i>
Ragwort	<i>Senecio jacobaea</i>
Raspberry	<i>Rubus chamaemorus</i>
Red Clover	<i>Trifolium pretense</i>
Red Dead Nettle	<i>Lamium purpureum</i>
Reflexed Stonecrop	<i>Sedum rupestre</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Rosebay Willow Herb	<i>Epilobium augustifolium</i>
Scentless Mayweed	<i>Matricaria perforate</i>
Self Heal	<i>Prunella vulgaris</i>
Shepherds Purse	<i>Capsella bursa-pastoris</i>
Snow Drop	<i>Galanthus nivalis</i>
Sticky Mouse Ear	<i>Cerastium fontanum</i>
Sun Spurge	<i>Euphorbia helioscopia</i>
Swine-cress	<i>Coronopus squamatus</i>
Wall Lettuce	<i>Mycelis muralis</i>
Welsh Poppy	<i>Meconopsis cambrica</i>
White-dead Nettle	<i>Lamium album</i>
Ramsons	<i>Allium ursinum</i>
Wild Strawberry	<i>Fragaria vesca</i>
Willowherb Broad Leaved	<i>Epilobium montanum</i>
Willowherb Great	<i>Epilobium hirsutum</i>
Willowherb New Zealand	<i>Epilobium brunnescens</i>
Wood Anemone	<i>Anemone nemorosa</i>
Yarrow	<i>Achillea millefolium</i>

## Grasses

Common name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>
Chewings Fescue	<i>Festuca rubra</i>
Common Bent	<i>Agrostis tenuis</i>
Cocksfoot	<i>Dactylis glomerata</i>
Crested Hair-Grass	<i>Koeleria cristata</i>
False Oat Grass	<i>Arrhenatherum elatius</i>
Meadow Fescue	<i>Festuca pratensis</i>
Perennial Rye-Grass	<i>Lolium perenne</i>
Wood Meadow Grass	<i>Poa nemoralis</i>
Yorkshire Fog	<i>Holcus lanatus</i>

## Ferns

Common name	Scientific Name
Common Horsetail	<i>Equisetum arvense</i>
Common Polypody	<i>Polypodiumn vulgare</i>
Broadbuckler	<i>Dyopteris dialata</i>
Maidenhair Spleenwort	<i>Asplenium trichomanes</i>

## Birds

Common name	Scientific Name
Blackbird	<i>Turdus merula</i>
Black-headed Gull	<i>Larus ribidundus</i>
Blue Tit	<i>Parus caeruleuns</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Buzzard	<i>Buteo buteo</i>
Carrion Crow	<i>Covus corone</i>
Chaffinch	<i>Fringilla coeleds</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal Tit	<i>Parus ater</i>
Dunnock	<i>Prunella modularis</i>
Feral Pigeon	Sp
Fieldfare	<i>Turdus pilaris</i>
Great Tit	<i>Parus major</i>
Greenfinch	<i>Carduelis chloris</i>
Herring Gull	<i>Larus argentatus</i>
House Sparrow	<i>Passer domesticus</i>
Jackdaw	<i>Corvus monedula</i>
Kestrel	<i>Falco tinnunculus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Long-tailed Tit	<i>Aegithalos caudatus</i>
Magpie	<i>Pica pica</i>
Mistle Thrush	<i>Turdus viscivorus</i>
Redwing	<i>Turdus iliacus</i>
Robin	<i>Erithacus rubecula</i>
Song Thrush	<i>Turdus philomelos</i>
Sparrowhawk	<i>Accipiter nisus</i>
Swallow	<i>Hirundo rustica</i>
Wood Pigeon	<i>Columba palumbus</i>
Wren	<i>Troglodytes troglodytes</i>
Yellowhammer	<i>Emberiza citronella</i>

## Mammals

Common name	Scientific Name
Fox	<i>Vulpes vulpes</i>
Grey Squirrel	<i>Sciurur carolinensis</i>
Pipistrelle 45	<i>Pipistrellus pipistrellus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Roe Deer	<i>Capreolus calreolus</i>
Shrew sp	<i>Sorex</i>
Weasel	<i>Mustela nivalis</i>

## Invertebrates

Family	Species	Description
Agromyzidae	Sp	Fly
Anthocoridae	<i>Anthocoris nemorum</i>	Flower Bug
Aphidae	Sp	Aphids
Aphrophoridae	Sp	Froghopper

Aphrophoridae	<i>Philaenus spumarius</i>	Froghopper
Cercopidae	Sp	Cuckoo Spit
Cimicidae	<i>Oeciacus hircundinis</i>	Parasitizes Hirundine Birds
Cimicidae	<i>Anthocoris nemorum</i>	Flower Bug
Cucujidae	<i>Monotoma picipes</i>	Beetle
Dolichopodidae	<i>Dolichopus popularis</i>	Fly
Entomobryidae	<i>Orchesella cincta</i>	Springtail
Forficulidae	<i>Forficula Auricularia</i>	Earwig
Formicidae	Sp	<i>Lasius niger</i>
Gasteruptiidae	Sp	Parasitic Wasp
Ichneumonidae	Sp	Parasitic Wasp
Leiodidae	Sp	Scavenger Beetle
Leuctridae	<i>Leuctra fusca</i>	Stonefly
Linyphidae	Sp	Spider
Miridae	Sp	Mirid Bugs
Miridae	<i>Capsus ater</i>	Hot-bed Bug
Mymaridae	Sp	Minute Parasitic Wasp
Ologolophinae	<i>Oligolophus tridens</i>	Harvesterman
Opomyzidae	<i>Opomyza germinationis</i>	Small Fly
Phalangiidae	<i>Mitopus morio</i>	Harvesterman
Platygasteridae	Sp	Parasitic Wasp
Psocidae	Sp	Book Lice
Pteromalidae	<i>Pteromalus puparum</i>	Parasitic Wasp
Rhophalidae	Sp	Land Bug
Scathophagidae	Sp	Dung Fly
Tetranychidae	<i>Panonychus ulmi</i>	Red Spider Mite
Theridiosomatidae	Sp	Spider
Tomoceridae	<i>Tomocerus vulgaris</i>	Springtail
Nymphalidae	<i>Vanessa atalanta</i>	Red Admiral
Pieridae	<i>Pieris napi</i>	Green-veined White
Nymphalidae	<i>Inachis io</i>	Peacock

## Fungi

### Scientific Name

*Agaricus bisporus*  
*Agaricus campestris*  
*Agrocybe pediades*  
*Boletus luridiformis*  
*Boletus sp*  
*Citocybe houghtonii*  
*Clavaria fumosa*  
*Clavulina cinerea*  
*Clavulinopsis cinereoides*  
*Clavulinopsis corniculata*  
*Clitocybe adora*  
*Clitocybe clitocybe*  
*Clitocybe fragrans*  
*Clitocybe gibba*  
*Clitocybe phyllophila*  
*Collybia confluens*  
*Collybia dryophila*  
*Conocybe sp*  
*Coprinus atramentarius*  
*Coprinus comatus*  
*Coprinus disseminatus*  
*Coprinus sp*  
*Entoloma nidorosum*  
*Hebeloma sinapizans*  
*Hygrocybe psittacina*

*Hygrocybe reidii*  
*Hygrocybe virginea*  
*Laccaria laccata*  
*Laccaria sp*  
*Lactarius fluens*  
*Lepiota cristata*  
*Lepista nuda*  
*Leucopaxillus giganteus*  
*Lycoperdon pyriforme*  
*Marasmius wynnei*  
*Melanoleuca cognata*  
*Melanoleuca polioleuca*  
*Mycena aetites*  
*Mycena alcalina*  
*Mycena epipterygia*  
*Mycena galericulata*  
*Mycena galopus*  
*Mycena leptocephala*  
*Naucoria bohemica*  
*Panaeolina foenisecii*  
*Panaeolus fimicola*  
*Paxillus involutus*  
*Pluteus salicinus*  
*Psathyrella candolleana*  
*Psathyrella obtusata*  
*Psilocybe crobulus*  
*Psilocybe semilanceata*  
*Russula Intermedia*  
*Stropharia aeruginosa*  
*Tricholoma cingulatum*  
*Tricholoma terreum*  
*Tricholoma virgatum*

## **Lichen**

*Caloplaca chalybaea*  
*Caloplaca chrysodeta*  
*Chrysothrix candelaris*  
*Evernia prunastri*  
*Lecanora conizaeoides*  
*Lecanora expallens*  
*Parmelia sulcata*  
*Phycia adscendens*  
*Pleurosticta acetabulum*  
*Porpidia speirea*  
*Ramalina fraxinea*  
*Xanthoria candelaria*  
*Xanthoria polycarpa*

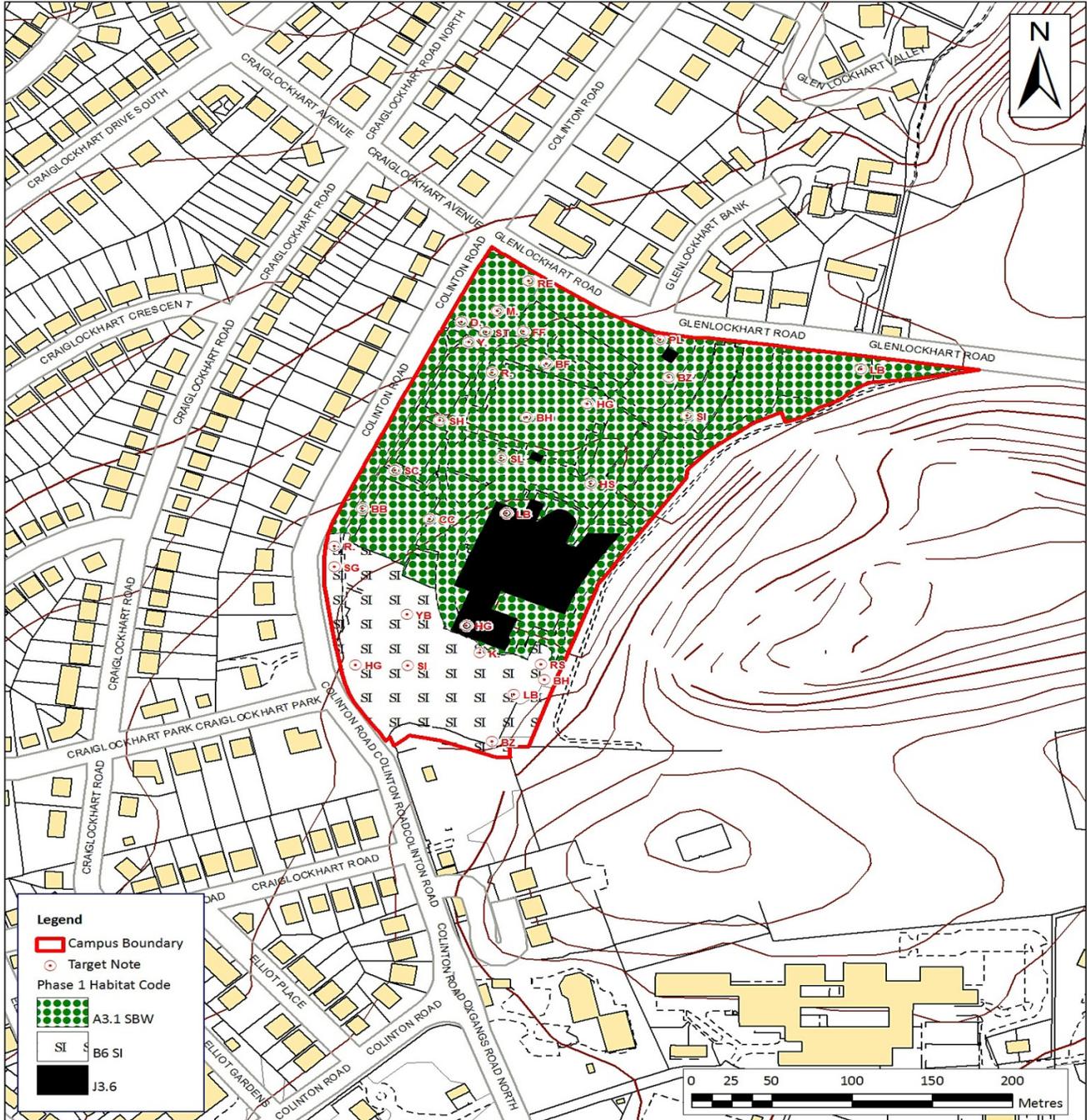
# Craiglockhart Target Notes

## Craiglockhart

## Target Notes

Note	Scientific Name	Description	Species Designation	Habitat/Code	Ref
Herring Gull	<i>Larus argentatus</i>	Bird	ELBAP	Building&Paths J3.6	HG
Lesser Black-backed Gull	<i>Larus fuscus</i>	Bird	ELBAP	Building&Paths J3.6	LB
Kestrel	<i>Falco tinnunculus</i>	Bird	ELBAP	Building&Paths J3.6	K
Yellow Bartsia	<i>Parentucellia viscosa</i>	Plant	First Record for Lothian's	Grassland B6 SI	YB
Black-headed Gull	<i>Larus ribidundus</i>	Bird	ELBAP	Grassland B6 SI	BH
Buzzard	<i>Buteo buteo</i>	Bird	ELBAP	Grassland B6 SI	BZ
Herring Gull	<i>Larus argentatus</i>	Bird	ELBAP	Grassland B6 SI	HG
Kestrel	<i>Falco tinnunculus</i>	Bird	ELBAP	Grassland B6 SI	K.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Bird	ELBAP	Grassland B6 SI	LB
Robin	<i>Erithacus rubecula</i>	Bird	ELBAP	Grassland B6 SI	R.
Starling	<i>Sturnus vulgaris</i>	Bird	Red List	Grassland B6 SI	SG
Swift	<i>Apus apus</i>	Bird	ELBAP	Grassland B6 SI	SI
Bluebell	<i>Endymion non-scriptus</i>	Plant	ELBAP	Parkland A3	BB
Reflexed Stonecrop	<i>Sedum rupestre</i>	Plant	5th Record for Lothians	Parkland A3	RS
Swine-cress	<i>Coronopus squamatus</i>	Plant	1st Record since 1934 for Lothians	Parkland A3	SC
	<i>Clavulinopsis cinereoides</i>	Fungi	Red Data Book 1st record for Scotland)	Parkland A3	CC
Black-headed Gull	<i>Larus ribidundus</i>	Bird	ELBAP	Parkland A3	BH
Bullfinch	<i>Pyrrhula pyrrhula</i>	Bird	ELBAP	Parkland A3	BF
Buzzard	<i>Buteo buteo</i>	Bird	ELBAP	Parkland A3	BZ
Dunnock	<i>Prunella modularis</i>	Bird	ELBAP	Parkland A3	D.
Fieldfare	<i>Turdus pilaris</i>	Bird	Red List	Parkland A3	FF
Herring Gull	<i>Larus argentatus</i>	Bird	ELBAP	Parkland A3	HG
House Sparrow	<i>Passer domesticus</i>	Bird	Red List	Parkland A3	HS
Lesser Black-backed Gull	<i>Larus fuscus</i>	Bird	ELBAP	Parkland A3	LB
Mistle Thrush	<i>Turdus viscivorus</i>	Bird	ELBAP	Parkland A3	M.

Redwing	<i>Turdus iliacus</i>	Bird	Red List	Parkland A3	RE
Robin	<i>Erithacus rubecula</i>	Bird	ELBAP	Parkland A3	R.
Song Thrush	<i>Turdus philomelos</i>	Bird	Red List	Parkland A3	ST
Sparrowhawk	<i>Accipiter nisus</i>	Bird	ELBAP	Parkland A3	SH
Swallow	<i>Hirundo rustica</i>	Bird	ELBAP	Parkland A3	SL
Swift	<i>Apus apus</i>	Bird	ELBAP	Parkland A3	SI
Yellowhammer	<i>Emberiza citrinella</i>	Bird	Red List	Parkland A3	Y.
Pipistrel 45	<i>Pipistrellus pipistrellus</i>	Mammal	The Conservation (Natural Habitats, &c) Regulations 1994	Parkland A3	PL



Ref: AP1/Napier Craiglockhart  
 Version: 3  
 Date: 11 November 2011  
 Cartographer: Iain Turnbull

## Edinburgh Napier University Craiglockhart Campus Phase 1 Habitat Survey

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# Appendix 3

# Merchiston Species List

## Buildings J3.6

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### Plants

Common Name	Scientific Name
Biting Stonecrop	<i>Sedum acre</i>
Cleavers	<i>Galium verum</i>
Common Chickweed	<i>Stellaria media</i>
Dandelion	<i>Taraxacum vulgaria</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Greater Plantain	<i>Plantago major</i>
Groundsel	<i>Senecio vulgaris</i>
Hairy Bittercress	<i>Cardamine hirsuta</i>
Knotgrass	<i>Polygonum aviculare</i>
Lesser Stitchwort	<i>Stellaria graminea</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Pineapple Mayweed	<i>Chamomilla suaveolens</i>
Plantain Greater	<i>Plantago major</i>
Procumbent Pearlwort	<i>Sagina procumbens</i>
Prickly Lettuce	<i>Lactuca serriola</i>
Redshank	<i>Polygonum persicaria</i>
Thyme-leaved Sandwort	<i>Arenaria serpyllifolia</i>
White Clover	<i>Trifolium repens</i>
Willowherb Broad Leaved	<i>Epilobium montanum</i>
Willowherb New Zealand	<i>Epilobium brunnescens</i>

### Grasses

Common Name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>

### Ferns

Common Name	Scientific Name
Wall Rue	<i>Asplenium Ruta-muraria</i>
Maidenhair Spleenwort	<i>Asplenium trichomanes</i>

### Birds

Common Name	Scientific Name
Black-headed Gull	<i>Larus ribidundus</i>
Blackbird	<i>Turdus merula</i>
Carrion Crow	<i>Covus corone</i>
Feral Pigeon	<i>sp</i>
Herring Gull	<i>Larus argentatus</i>
House Sparrow	<i>Passer domesticus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Magpie	<i>Pica pica</i>
Pied Wagtail	<i>Motacilla alba</i>
Robin	<i>Erthacus rubecula</i>
Swift	<i>Apus apus</i>

## Lichens

### Scientific Name

*Psilolechia lucida*  
*Gyalecta jenensis*  
*Chrysothrix candelaris*  
*Gyalecta jenensis*  
*Psilolechia lucida*

## Introduced Shrub J2.3.2 PHT

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### Plants

Common Name	Scientific Name
Hairy Bittercress	<i>Cardamine hirsuta</i>
Black Medic	<i>Medicago lupulina</i>
Bluebell	<i>Endymion non-scriptus</i>
Bush Vetch	<i>Vicia sepium</i>
Common Chickweed	<i>Stellaria media</i>
Cleavers	<i>Galium verum</i>
White Clover	<i>Trifolium repens</i>
Common Nettle	<i>Urtica dioica</i>
Creeping Buttercup	<i>Ranunculus bulbosus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Dandelion	<i>Taraxacum vulgaria</i>
Feverfew	<i>Tanacetum parthenium</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Greater Plantain	<i>Plantago major</i>
Ground Elder	<i>Sambucus nigra</i>
Ground Ivy	<i>Glechoma hederacae</i>
Groundsel	<i>Senecio vulgaris</i>
Hairy Tare	<i>Vicia hirsuta</i>
Hedge Mustard	<i>Sisymbrium officinale</i>
Herb Bennett	<i>Geum urbanum</i>
Knotgrass	<i>Polygonum aviculare</i>
Lesser Stitchwort	<i>Stellaria graminea</i>
Prickly Lettuce	<i>Lactuca serriola</i>
Wall Lettuce	<i>Mycelis muralis</i>
Fool's Parsley	<i>Aethusa cynapium</i>
Procumbent Pearlwort	<i>Sagina procumbens</i>
Perennial Sow Thistle	<i>Sonchus oleraceus</i>
Pineapple Mayweed	<i>Chamomilla suaveolens</i>
Plantain Greater	<i>Plantago major</i>
Ragwort	<i>Senecio jacobaea</i>
Redshank	<i>Polygonum persicaria</i>
Self Heal	<i>Prunella vulgaris</i>
Smooth Sow Thistle	<i>Sonchus oleraceus</i>
Creeping Thistle	<i>Cirsium arvense</i>
Thyme-leaved Sandwort	<i>Arenaria serpyllifolia</i>
Willowherb Broad Leaved	<i>Epilobium montanum</i>
Yarrow	<i>Achillea millefolium</i>

## Grasses

Common Name	Scientific Name
Annual Meadow Grass	<i>Poa annua</i>

## Birds

Common Name	Scientific Name
Blackbird	<i>Turdus merula</i>
House Sparrow	<i>Passer domesticus</i>
Robin	<i>Erithacus rubecula</i>
Swift	<i>Apus apus</i>

## Invertebrates

Family	Species	Description
Aphidae	<i>sp</i>	Aphids
Aphrophoridae	<i>Philaenus spumarius</i>	Froghopper
Braconidae	<i>sp</i>	Parasitic Wasp
Chironmidae	<i>sp</i>	None biting Midge
Chloropidae	<i>Oscinella Frit</i>	Frit Fly
Clubionidae	<i>sp</i>	Foliage Spider
Curculionidae	<i>sp</i>	Weevil
Dolichopododidae	<i>Dolichopus popularis</i>	Fly
Entomobryidae	<i>Entomobrya nivalis</i>	Springtail
Fanniidae	<i>Fannia canicularis</i>	Lesser House-fly
Forficulidae	<i>Forficula auricularia</i>	Earwig
Formicidae	<i>Lasius niger</i>	Garden Ant
Ichneumonidae	<i>sp</i>	Parasitic Wasp
Linyphiidae	<i>sp</i>	Money Spider
Miridae	<i>Campyloneura virgula</i>	Mirid Bug
Miridae	<i>sp</i>	Mirid Bug
Nitidulidae	<i>Meligethes aeneus</i>	Sap Beetle
Ologolophinae	<i>Oligolophus tridens</i>	Harvestman
Phoridae	<i>Phora atra</i>	Fly
Pteromalidae	<i>sp</i>	Parasitic Wasp
Rhopalidae	<i>Rhopalus subrufus</i>	Land Bug
Tenthredinidae	<i>sp</i>	Sawfly
Tetranychidae	<i>Panonychus ulmi</i>	Red Spider Mite
Thripidae	<i>sp</i>	Thrip
Coccidae	<i>Pulvinaria innumerabilis</i>	Scale

## Fungi

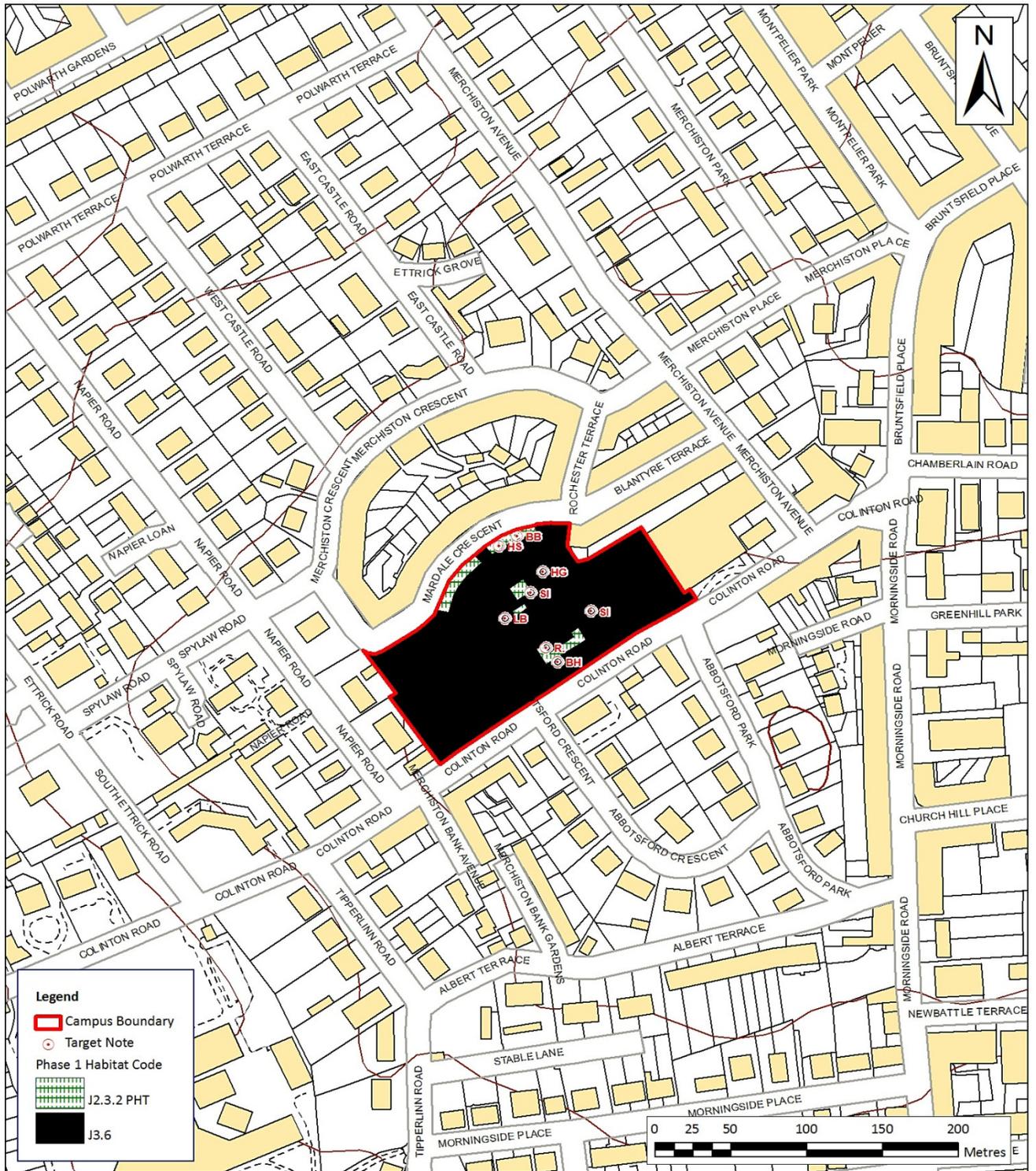
Scientific Name
<i>Hygrocybe virginea</i>
<i>Mycena galopus</i>
<i>Boletus sp</i>

## Merchiston Target Notes

### Merchiston

### Target Notes

Note	Scientific Name	Description	Species Designation	Habitat/Code	Ref
Black-headed Gull	<i>Larus ribidundus</i>	Bird	ELBAP	Buildings&Paths J3.6	BH
Herring Gull	<i>Larus argentatus</i>	Bird	ELBAP	Buildings&Paths J3.6	HG
Lesser Black-backed Gull	<i>Larus fuscus</i>	Bird	ELBAP	Buildings&Paths J3.6	LB
Swift	<i>Apus apus</i>	Bird	ELBAP	Buildings&Paths J3.6	SI
Bluebell	<i>Endymion non-scriptus</i>	Plant	ELBAP	Introduced Shrub J1.4	BB
House Sparrow	<i>Passer domesticus</i>	Bird	Red List	Introduced Shrub J1.4	HS
Robin	<i>Erithacus rubecula</i>	Bird	ELBAP	Introduced Shrub J1.4	R.
Swift	<i>Apus apus</i>	Bird	ELBAP	Introduced Shrub J1.4	SI



Ref: AP1/Napier Merchiston  
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## Edinburgh Napier University Merchiston Campus Phase 1 Habitat Survey

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