Tracking Biodiversity

Historical Insights and recent Student-Led Discoveries

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Introduction

Biodiversity is the rich variety of life on Earth, including ecosystems, species, and genetic diversity and is essential to the health of our planet and the resilience of human societies. It supports vital ecosystem services such as food production, clean water, climate regulation, and disease control. As such, biodiversity is a cornerstone of sustainable development and is directly addressed in the United Nations Sustainable Development Goals (SDGs), particularly Goal 14 (Life Below Water) and Goal 15 (Life on Land), while also contributing to Goal 2 (Zero Hunger), Goal 3 (Good Health and Well-being), and Goal 13 (Climate Action).

At Moulton College, sustainability is embedded across its operations, curriculum, and community engagement. The college has committed to becoming carbon neutral by 2030, guided by national frameworks such as the FE Climate Action Roadmap and the Department for Education's Sustainability and Climate Change Strategy. This commitment is reflected in initiatives that include carbon footprint measurement, renewable energy adoption, and sustainability-focused education.

Biodiversity plays a central role in Moulton College's sustainability strategy. The college estate, which includes a 456-hectare working farm, is being actively managed to enhance ecological health. Projects include rewilding efforts in the arboretum, water harvesting systems, and a transition to regenerative agriculture, with a target of converting 20% of the farm by 2026. These initiatives not only support biodiversity but also serve as practical learning environments for students, integrating climate adaptation and ecological stewardship into the curriculum.

This report brings together insights from a range of past reports, personal observations and projects within the Higher Education Animal and Zoology programs to explore and record biodiversity across the Moulton College Estate.

Pre-2020 biodiversity reports

Species lists (Appendix 1) and summaries where applicable have been drawn from the following past documents.

- Ranson, O. (1983) The Moulton Agricultural College farm wildlife survey. *Journal of the Northamptonshire Natural History Society and Field Club*, 38: (2), Issue 265.

- Littlemore, J., 2011. *Biodiversity Report on the Moulton College Estate, Northamptonshire*. 1st ed. Moulton: Moulton College Farms Directorate
    - Key points and resources within this report include:
        - Summary of observations from 2001 to 2011.
        - Maps (2001 – 2011 sightings) of:
            - Badger setts (survey in 2006)
            - Mammal, reptile and amphibian species recorded at the Moulton College farm since 2001.
            - Bird species recorded at the Moulton College farm since 2001.
        - Bat records
        - Extended Phase 1 survey and maps from 2006
        - A Management Plan for Tank Field Short Rotation Willow Coppice, Moulton College
- Littlemore, J., 2012. *Biodiversity Report on the Moulton College Estate, Northamptonshire*. 2nd ed. Moulton: Moulton College Farms Directorate
    - Key points and resources within this report include:
        - A Management Plan for Briscoe's Spinney, Moulton College Estate
        - Bat records – July & August 2011
        - Records and sightings during student practicals

Copies of the biodiversity reports from 2013 to 2016 were not available but must have been written based on the edition numbering.

- Littlemore, J., 2017. *Biodiversity Report on the Moulton College Estate, Northamptonshire*. 7th ed. Moulton: Moulton College Farms Directorate.
    - Key addition in this report include:
        - Great crested newt spot pattern photographs
        - Records and sightings during student practicals

No further biodiversity reports were produced after 2017 due to College restructures and staff turnover.

In addition, two PhD theses carried out by associate lecturers at Moulton college contributed to historical biodiversity records incorporated in this report:

- Coulthard, E. (2015) The visitation of moths to hedgerow flowering species. PhD thesis. University of Northampton.
- Howard-Williams, E. (2019) The validation of novel ecological survey methods for use in describing harvest mouse (*Micromys minutus*) autecology. PhD thesis. University of Northampton.

Ecology equipment

To monitor and assess biodiversity with the Higher Education students across animal and zoology degree programs, a range of ecological survey methods and equipment have been employed (Figure 1). Moth light traps are used to attract and record nocturnal insect species, providing insights into local invertebrate diversity. Wildlife trail cameras capture images and videos of elusive or nocturnal animals, offering non-invasive monitoring of species presence and behaviour. Pond dipping and stream sampling allow for the collection and identification of aquatic invertebrates, which serve as indicators of water quality and ecosystem health. Pitfall traps are effective for sampling ground-dwelling invertebrates such as beetles and spiders. Longworth live mammal traps have been used in the past to safely capture and release small mammals for population and habitat studies; however ethical considerations of this method have meant it has largely been replaced by use of trail cameras for presence/absence studies. Direct observations, along with searches for tracks and signs such as droppings, nests, or feeding marks, help build a broader picture of species activity. Additionally, footprint tunnels provide a simple yet effective method for detecting small mammals through inked tracks, contributing to species inventories without the need for direct capture. Together, these methods form a comprehensive toolkit for biodiversity monitoring, supporting both research and conservation efforts on the estate.

Figure 1: Selection of survey methods used: Footprint tunnels, Aquatic invertebrate surveys, wildlife trail camera.

Ad Hoc Biodiversity Surveys across 2020 to 2025

A series of ad hoc biodiversity surveys were conducted across the college estate using a combination of camera traps, footprint tunnels, and moth light traps. Species found in these studies are incorporated into the species lists in Appendix 1. These methods provided valuable insights into the presence and activity of a wide range of species, contributing to a broader understanding of local biodiversity.

Camera traps captured images and footage of several terrestrial and avian species, including badgers, foxes, rabbits, magpies, woodpigeons, carrion crows, green woodpeckers, robins, blackbirds, grey herons, mallards with chicks, moorhens, greylag geese, muntjac deer, and squirrels. Notably, otters were also recorded in summer 2023, indicating the ecological value of aquatic habitats on the estate.

Footprint tunnels revealed the presence of small mammals such as mice, voles, and shrews, alongside tracks from a hedgehog, cat, frog, and a small passerine bird. These non-invasive methods are particularly useful for detecting presence of elusive or nocturnal species.

Moth trapping yielded a diverse assemblage of nocturnal invertebrates, including species such as the Poplar Hawkmoth, Dark Arches, Dusky Sallow, Common Rustic, Deep-brown Dart, Large Yellow Underwing, Shaded Broad-bar, July Highflyer, and Dingy Footman. These findings reflect a small selection of the richness of moth species active during the summer months.

Additionally, smooth newts were observed hibernating, further highlighting the ecological diversity supported by the estate’s varied habitats.

Species records gathered through Higher Education practical's and student led assignments

A range of students projects and assignments within the Animal and Zoology Higher Education degrees have incorporated ecological surveys into the class work and assignments to enhance the practical elements of teaching. Species found in these studies are incorporated into the species lists in Appendix 1. A brief overview is provided below.

Bird Survey – Moulton College Estate Spring 2025

Second year BSc Applied Zoology Students conducted a bird survey across the college estate, combining ecological fieldwork with data analysis to assess avian diversity across a range of habitats. These surveys form part of a broader biodiversity monitoring initiative and provide students with hands-on experience in ecological research and conservation science.

The methodology employed includes fixed-radius point counts, where observers record all birds seen or heard within a defined area during short intervals; and transect walks, which involve continuous movement through habitats with real-time bird recording. To enhance species identification, students used the Merlin Bird ID app, with bird call playbacks used to verify app-detected species. To ensure data accuracy, birds detected by the app were only counted if later visually confirmed in the same area, helping to avoid double counts.

Data collected included species identity, number of individuals, detection method, and habitat type. This information was analysed using RStudio, where students calculated the Shannon Diversity Index (H') to assess species richness and relative abundance. High diversity was observed in all surveyed areas: woodland (H' = 1.98), agricultural land (H' = 1.92), anthropogenic areas (H' = 1.84), and meadows (H' = 1.67).

The results highlight the importance of habitat heterogeneity in supporting bird diversity. Features such as hedgerows, managed woodlands, and green infrastructure contribute to a habitat mosaic effect, supporting both generalist and specialist species. Notably, even anthropogenic landscapes—when thoughtfully

managed—can maintain high levels of biodiversity. These findings underscore the value of continued monitoring and adaptive management to sustain bird populations and inform conservation strategies on the estate.

Aquatic Biodiversity Surveys – Moulton College, Spring 2025

Students surveyed two aquatic habitats (a stream and a pond) on the college estate using kick sampling and figure-eight sweep techniques to collect freshwater invertebrates. Conducted over two sessions in March, the surveys involved disturbing the substrate to capture organisms in a downstream net, followed by identification using magnifying tools.

Both habitats showed similar species richness (12 species each), but the stream supported a higher number of individuals (118 vs. 64), indicating greater population density. Dominant stream species included *Crangonyx pseudogracilis* and blackfly larvae, while the pond was home to species like water fleas and planarians. Several species were found in both habitats, reflecting shared ecological characteristics.

Trophic analysis revealed detritivores as the foundation of both food webs, with carnivores and herbivores present in smaller proportions. Environmental factors such as oxygen levels and vegetation cover influence species distribution, and thus future studies would benefit from collecting additional environmental data. Despite some limitations, the surveys highlighted the ecological value of both habitats and reinforced the importance of aquatic invertebrates as indicators of ecosystem health.

Level 6 BSc Applied Zoology - Biodiversity project

As part of their ecological studies, third year BSc Applied Zoology students at Moulton College undertook a biodiversity survey of the area surrounding the entrance to the mini farm and arboretum. The project aimed to assess the current species richness and identify opportunities to enhance biodiversity through habitat diversification. Over the course of the survey, students recorded a wide variety of flora and fauna, including invertebrates such as gazelle beetles, 22-spotted ladybirds, and springtails, as well as vertebrates like robins, dunnocks, badgers, and muntjac deer. The presence of multiple spider species, millipedes, slugs, and moths highlighted the area's microhabitat diversity, while plants such as bittersweet, bulbous buttercup, and hawthorn contributed to the structural complexity of the site.

Based on their findings, students proposed several enhancements to support greater biodiversity. These included introducing native wildflower strips to attract pollinators, installing log piles and stone refuges to support invertebrates and small mammals, and planting hedgerows to provide shelter and foraging opportunities for birds and bats. They also recommended reducing mowing frequency in selected areas to allow natural vegetation succession and creating small ponds or wetland patches to support amphibians and aquatic invertebrates. These suggestions aim to transform the entrance area into a more ecologically rich and educationally valuable space, aligning with the college's commitment to sustainability and experiential learning.

Recent research projects

Summaries of recent biodiversity focused research projects on the College estate have been collated below. Copies of the abstracts (summaries) for these projects can be found in Appendix 2.

Level 6 dissertation projects related to Biodiversity at Moulton College

- Fleming, J.J., 2023. *A comparison of avian biodiversity in the native and non-native tree habitats of a semi-natural woodland and a man-made greenspace*. BSc (Hons) Applied Zoology. Moulton College. Unpublished undergraduate thesis.
- Shepherd, S.-R., 2024. *A Review of Wildlife Surveys: Comparing Methods, Detection Rates, and Outcomes*. BSc (Hons) Applied Zoology. Moulton College. Unpublished undergraduate thesis.
- McMenzie, H., 2024. *Exploring the effect anthropogenic land use and land cover change has on native mammalian Carnivora within the Moulton College Estate*. BSc Ecology & Wildlife Conservation. Moulton College. Unpublished undergraduate thesis.
- Burt, C., 2025. *Biodiversity: Boom or Bust? Investigating the Effects of Flooding on Aquatic Macrobenthic Invertebrates in Ephemeral and Perennial Freshwater Habitats*. BSc Applied Zoology. Moulton College. Unpublished undergraduate thesis.

Level 5 Industrial projects with a biodiversity focus for Moulton College

- Evans, C., 2022. *A Comparative Study of Bedding and Bait Preferences in Wood Mice (Apodemus sylvaticus) Using Live Trapping Methods*. ANW2072 Life Sciences Industry Project. Moulton College. Unpublished undergraduate report.

- Child, J., 2025. *A Biodiversity Survey of Moulton College to Determine the Species Richness of the Holcot Campus*. ANW2072 Life Sciences Industry Project. Moulton College. Unpublished undergraduate report.
- Holland, E., 2025. *Assessing the Impact of Human Presence on Wildlife Abundance and Behaviour at Moulton College Holcot Campus.* ANW2072 Life Sciences Industry Project. Moulton College. Unpublished undergraduate report

Summary of key findings from biodiversity species records (pre- and post-2020)

The biodiversity records from the college estate include a rich and diverse range of species across multiple taxonomic groups. The dataset in Appendix 1 spans both historical (pre-2020) and recent (post-2020) records, reflecting long-term monitoring efforts and recent student-led surveys.

Species Richness by Taxonomic Group

The biodiversity records from the college estate reveal a rich and varied assemblage of species across multiple taxonomic groups. Across the full set of species data, plants represent the most diverse group, with over 250 species recorded, encompassing a wide range of trees, grasses, aquatic plants, and wildflowers. Invertebrates also show exceptional diversity, with well over 200 species identified, including beetles, moths, spiders, bees, and freshwater invertebrates. Birds are well represented, with approximately 50 species recorded, ranging from common residents to seasonal migratory visitors. Among mammals, around 30 species have been documented, including bats, rodents, deer, and carnivores such as foxes and badgers. The amphibian group includes five species, covering all native frogs and newts. Fish records consist of five primarily freshwater species; however, it should be noted that some fish species on record are from collaborative work with the Environment Agency when Hartwritghts lake was used as a holding lake. Reptiles are represented by a single species—the grass snake (*Natrix natrix*).

Temporal Coverage

Many species have records from both pre-2020 and post-2020, indicating continuity in monitoring. While some species appear in only recent records or only in historic records this may simply reflect the difference in focus and survey methods used, along with the different timeframes encompassed within the groupings used for this report. Some species appear only in recent records, suggesting either improved survey effort or changes in local biodiversity. The differentiation between pre-2020 and post-2020 records it to help reflect the source of data used and may help direct future survey efforts.

Table 1: Comparison of Pre-2020 and Post-2020 Biodiversity Records by Taxonomic Group

Taxonomic Group	Pre-2020 Records	Post-2020 Records	Notes
Plants	High	Moderate	Some species newly recorded post-2020; fungi and soil biota underrepresented
Invertebrates	High	Moderate	Rich diversity; moths, beetles, and spiders well represented
Birds	High	Moderate	Many species recorded in both periods; some migratory species only pre-2020
Mammals	High	Moderate	Includes protected and elusive species; bats and small mammals present
Amphibians	Moderate	Low	Great crested newt and smooth newt recorded in both periods
Fish	Moderate	Low	Mostly pre-2020 records; limited recent survey effort
Reptiles	Low	None	Only grass snake recorded, and only pre-2020

Notable Findings

- There is a high diversity of invertebrates recorded, especially moths and beetles, which suggests varied microhabitats and specific research focus and survey effort in recent years.

- Plants are well-represented, especially in the pre-2020 records, but some groups like fungi and soil biota remain under-sampled. A more centralised records system may facilitate incorporation of species records from other subject areas e.g. countryside management, and arboriculture
- Protected species such as great crested newt (*Triturus cristatus*), water vole (*Arvicola terrestris*), and several bat species are present, highlighting the ecological value of the site. However, these species are only reflected in the pre-2020 records and thus further surveys would be ideal to ensure these species are still supported on the College estate.
- Species richness in birds includes both woodland and farmland specialists, indicating habitat heterogeneity.
- A number of species found on the estate have national conservation status (Appendix 3).

Challenges for developing biodiversity records in a teaching Environment

Creating robust biodiversity records within a teaching environment presents a unique set of challenges, particularly when balancing educational objectives with scientific rigour. One of the primary concerns is the reliability of species identification. Student-led surveys, while valuable for experiential learning, can result in misidentifications due to limited experience. The College library is well resourced with a good range of species identification books and field guides. AI-based identification tools can also offer support, however their accuracy varies, especially for cryptic or less well-documented species. The availability of staff with specialist taxonomic knowledge can help mitigate this, but such expertise is not always accessible across all taxa.

Another challenge is the variation in the level of taxonomic resolution achieved during surveys. Students may record organisms at the family or genus level rather than species, particularly for complex groups such as beetles or fungi. This inconsistency can limit the usefulness of data for long-term monitoring or ecological analysis. Additionally, the lack of a centralised database to collate records from different student groups and subject areas hinders data integration and continuity, making it difficult to build a comprehensive picture of biodiversity across the college estate. As an example, this report focuses on work done within Higher Education programs within the land-based (pre-2020) and Animal faculties and does not incorporate any records from other faculties or levels of study.

Survey methods also vary widely depending on the module, tutor, or available resources, leading to inconsistencies in data collection protocols. Some surveys focus on presence/absence data, while others attempt to gather quantitative measures, such as abundance or biomass, which are more demanding in terms of time and expertise. Furthermore, legal constraints such as the need for licences to survey protected species (e.g. great crested newts, white-clawed crayfish, bats) can restrict the scope of student investigations.

When using trail cameras for wildlife monitoring, researchers often face a trade-off between capturing video footage and still images. Video provides richer behavioural data, allowing observation of movement patterns, interactions, and context that still images may miss. However, video consumes significantly more battery power and storage space, which can limit deployment duration and data collection volume. In contrast, still images are more efficient in terms of power and memory usage, making them ideal for long-term monitoring or remote locations. While stills may miss nuanced behaviours, they are often sufficient for identifying species presence and activity. The choice between video and still images depends on the specific research goals, available resources, and the ecological context of the study site.

Resource limitations also play a role. Access to specialist equipment—such as bat detectors, eDNA kits, or soil sampling tools—is often restricted, which can prevent students from exploring certain taxa or habitats in depth. The seasonality of optimal survey windows often clashes with academic term dates, meaning some species or ecological processes are underrepresented in student data. Finally, groups such as vegetation, fungi, and soil biota tend to be under-sampled due to their complexity and the time required for accurate identification, despite their ecological importance.

Next Steps for Enhancing Biodiversity Recording and Management

To improve the quality, consistency, and longevity of biodiversity records within the college environment, several strategic actions are recommended. First, the establishment of a central biodiversity reporting system, such as Microsoft Forms or integration with platforms like iRecord, would enable consistent data capture across student groups and subject areas. This would help consolidate records and reduce duplication, while also supporting long-term monitoring efforts. Refining the taxonomic groupings in the records would also enhance the level of detail and analysis available with the data.

To ensure continuity and maintain momentum, it is vital to embed biodiversity responsibilities within the college structure. The creation of biodiversity champions, potentially as a sub-group of the Sustainability Pillar, would help safeguard institutional knowledge and promote ongoing engagement, even in the face of staff turnover. Where possible, records should be submitted to national databases, contributing to wider conservation efforts and increasing the visibility of student-led research.

Standardising survey protocols and equipment use will improve data comparability and reliability. Developing long-term survey protocols that can be embedded into teaching and student projects will also support consistent data collection and provide valuable learning opportunities. A revised Extended Phase 1 habitat survey (now UKHab assessment) is recommended, as the existing map is over a decade old and may no longer reflect current ecological conditions.

Further actions include conducting targeted species group surveys to address under-recorded taxa, and exploring rewilding projects with student involvement in planning, implementation, and monitoring. These initiatives not only enhance biodiversity but also provide rich, hands-on learning experiences. Finally, aligning survey efforts with biodiversity net gain principles will ensure that ecological improvements are measurable and meaningful, supporting both educational and environmental goals.

Appendix 1 – Species lists

Table 1: Comparison of pre 2020 Biodiversity records with more recent records.

(F. Denotes identified to family level only)

Taxonomic Group	Common Name	Scientific Name	Pre-2020 records	Post-2020 records
Amphibian	Common frog	*Rana temporaria*	y	y
Amphibian	Common toad	*Bufo bufo*	y	
Amphibian	Great crested newt	*Triturus cristatus*	y	
Amphibian	Palmate newt	*Triturus helveticus*	y	
Amphibian	Smooth newts	*Lissotriton vulgaris*	y	y
Bird	Barn owl	*Tyto alba*	y	y
Bird	Blackbird	*Turdus merula*	y	y
Bird	Blackcap	*Sylvia atricapilla*	y	
Bird	Blue tit	*Cyanistes caeruleus*	y	y
Bird	Carrion Crow	*Corvus corone*	y	y
Bird	Chaffinch	*Fringilla coelebs*	y	
Bird	Chiffchaff	*Phylloscopus collybita*	y	y
Bird	Common Buzzard	*Buteo buteo*	y	y
Bird	Common Pheasant	*Phasianus colchicus*		y
Bird	Corn bunting	*Emberiza calandra*	y	
Bird	Cuckoo	*Cuculus canorus*	y	
Bird	Dunnock	*Prunella modularis*	y	y
Bird	European Robin	*Erithacus rubecula*	y	y
Bird	Goldfinch	*Carduelis carduelis*	y	
Bird	Great tit	*Parus major*	y	y
Bird	Green woodpecker	*Picus Viridis*	y	y
Bird	Grey heron	*Ardea cinerea*		y
Bird	Greylag geese	*Anser anser*		y
Bird	Hobby	*Falco subbuteo*	y	
Bird	House martin	*Delichon urbica*	y	

Bird	House sparrow	*Passer domesticus*	y	
Bird	Kestrel	*Falco tinnunculus*	y	
Bird	Kingfisher	*Alcedo atthis*	y	
Bird	Lapwing	*Vanellus vanellus*	y	
Bird	Linnet	*Linaria cannabina*	y	y
Bird	Little egret	*Egretta garzetta*	y	
Bird	Little owl	*Athene noctua*	y	
Bird	Magpie	*Pica pica*	y	y
Bird	Mallard duck	*Anas platyrhynchos*		y
Bird	Moorhen	*Gallinula chloropus*		y
Bird	Nuthatch	*Sitta europaea*		y
Bird	Pied Wagtail	*Motacilla alba*		y
Bird	Red Kite	*Milvus milvus*	y	y
Bird	Red legged partridge	*Alectoris rufa*	y	
Bird	Rook	*Corvus frugilegus*	y	
Bird	Skylark	*Alauda arvensis*	y	
Bird	Snipe	*Gallinago gallinago*	y	
Bird	Song thrush	*Turdus philomelos*	y	y
Bird	Sparrowhawk	*Accipiter nisus*	y	
Bird	Starling	*Sturnus vulgaris*	y	y
Bird	Swallow	*Hirundo rustica*	y	
Bird	Tawny owl	*Strix aluco*	y	
Bird	Tree sparrow	*Passer montanus*	y	
Bird	Treecreeper	*Certhia familiaris*	y	
Bird	Waxwing	*Bombycilla garrulus*	y	
Bird	Wheatear	*Oenanthe oenanthe*	y	
Bird	Whitethroat	*Sylvia communis*	y	

Bird	Willow warbler	*Phylloscopus trochilus*	y	
Bird	Woodpigeon	*Columba palumbus*	y	y
Bird	Wren	*Troglodytes troglodytes*	y	y
Bird	Yellow wagtail	*Motacilla flava*	y	
Bird	Yellowhammer	*Emberiza citrinella*	y	y
Fish	Bullhead	*Cottus gobio*	y	
Fish	Common Carp	*Cyprinus carpio*	y	
Fish	Roach	*Rutilus rutilis*	y	
Fish	Tench	*Tinca tinca*	y	
Fish	Three-spined stickleback	*Gasterosteus aculeatus*	y	
Invertebrate	22 spot ladybug	*Psyllobora vigintiduopunctata*		y
Invertebrate	Abax Ground Beetles	*Abax spp*	y	
Invertebrate	Alderfly larva	*Sialis lutaria*		y
Invertebrate	American signal crayfish	*Pacifastacus leniusculus*	y	y
Invertebrate	Ant bug	*Alydus calcaratus*		y
Invertebrate	Aphid spp	*F. Aphididae*		y
Invertebrate	Ashy mining bee	*Andrena cineraria*	y	y
Invertebrate	Ashy mining bee	*Andrena cineraria*	y	
Invertebrate	Azure damselfly	*Coenagrion puella*	y	
Invertebrate	Bee mimic hoverfly	*Volucella bombylans*	y	
Invertebrate	Bird cherry ermine	*Yponomeuta evonymella*		y
Invertebrate	Biting midge larva	*Ceratopogonidae spp*		y
Invertebrate	Black Ant	*Lasius niger*		y
Invertebrate	Black carpet beetle	*F. Dermestidae*		y
Invertebrate	Black Clock Beetle	*Pterostichus malanarius*	y	
Invertebrate	Black Ground Beetle	*Feronia nigrita*	y	

Invertebrate	Black slug	*Arion ater*		y
Invertebrate	Black snail beetle	*Phosphuga atrata*		y
Invertebrate	Black tailed skimmer	*Orthetrum cancellatum*	y	
Invertebrate	Blackfly larva	*Simuliidae spp*		y
Invertebrate	Blue bottle fly	*Calliphora vomitoria*		y
Invertebrate	Blue tailed damselfly	*Ischnura elegans*	y	
Invertebrate	Broad-bodied chaser	*Libellula depressa*	y	
Invertebrate	Brown banded carder bee	*Bombus pascuorum*	y	
Invertebrate	Brown hawker dragonfly	*Aeshna grandis*	y	
Invertebrate	Buff tailed bumblebee	*Bombus terrestris*	y	
Invertebrate	Bumblebee spp	*Bombus spp*		y
Invertebrate	Carrion Beetles	*F: Silphidae*	y	
Invertebrate	Cased caddis fly larvae	*Trichoptera spp*		y
Invertebrate	Cinnamon sedge	*Limnephilus lunatus*		y
Invertebrate	Cinnabar moth	*Tyria jacobaeae*		y
Invertebrate	Clouded brindle	*Apamea epomidion*		y
Invertebrate	Large diving beetle	*Colymbetes fuscus*	y	
Invertebrate	Comma	*Polygonia c-album*	y	
Invertebrate	Common black ground beetle	*Pterostichus madidus*		y
Invertebrate	Common blue damselfly	*Enallagma cyathigerum*	y	
Invertebrate	Common centipede	*Lithobius forficatus*		y
Invertebrate	Common crab spider	*Xysticus cristatus*		y
Invertebrate	Common darter	*Sympetrum striolatum*	y	
Invertebrate	Common footman	*Eilema lurideola*		y
Invertebrate	Common Grammoptera	*Grammoptera ruficornis*		y

Invertebrate	Common grass moth	*Agriphila tristella*		y
Invertebrate	Common green lacewing	*Chrysoperla carnea*		y
Invertebrate	Common Harvestman	*Phalangium opilio*		y
Invertebrate	Common pill-bug	*Armadillidium vulgare*		y
Invertebrate	Common pygmy woodlouse	*Trichoniscus pusillus*		y
Invertebrate	Common red ant	*Myrmica rubra*		y
Invertebrate	Common Rustic	*Mesapamea secalis*		y
Invertebrate	Common striped woodlouse	*Philoscia muscorum*		y
Invertebrate	Common wainscot	*Mythimna pallens*	y	
Invertebrate	Common wave	*Cabera exanthemata*	y	
Invertebrate	Common springtail-stalker	*Notiophilus biguttatus*		y
Invertebrate	Copper Underwing	*Amphipyra pyramidea*	y	
Invertebrate	Coxcomb prominent	*Ptilodon capucina*	y	
Invertebrate	Cranefly	*Tipuloidea*		y
Invertebrate	Cuckoo bee	*Bombus rupestris*	y	
Invertebrate	Cuckoo bees	*Nomada spp*	y	
Invertebrate	Damsel bug	*F. Nabidae*		y
Invertebrate	Damselfly	*Zygoptera spp*		y
Invertebrate	Dark arches	*Apamea monoglypha*	y	
Invertebrate	Dark Arches moth	*Apamea monoglypha*		y
Invertebrate	Dark-barred twin-spot carpet moth	*Xanthorhoe ferrugata*		y
Invertebrate	Deep-brown Dart moth	*Aporophyla lueneburgensis*		y
Invertebrate	Demoiselle	*Calopteryx virgo*		y
Invertebrate	Devil's Coach Horse Beetle	*Ocypus olens*	y	
Invertebrate	Dingy Footman moth	*Collita griseola*		y

Invertebrate	Dock bug	*Coreus marginatus*		y
Invertebrate	Dusky Sallow	*Eremobia ochroleuca*	y	y
Invertebrate	Dusky Sallow	*Eremobia ochroleuca*	y	
Invertebrate	Dwarf pond snail	*Lymnaea truncatula*	y	
Invertebrate	Early mining bee	*Andrena haemorrhoa*	y	
Invertebrate	Earthworm	*Lumbricus spp.*		y
Invertebrate	Eastern Parson Spider	*Herpyllus ecclesiasticus*		y
Invertebrate	Emerald damselfly	*Lestes sponsa*	y	
Invertebrate	Emperor	*Anax imperator*	y	
Invertebrate	European armoured long jawed spider	*Metellina segmentata*		y
Invertebrate	European earwig	*Forficula auricularia*		y
Invertebrate	European Gazelle beetle	*Nebria brevicolli*		y
Invertebrate	European Wasp	*Vespula germanica*		y
Invertebrate	Flame	*Axylia putris*	y	
Invertebrate	Flame shoulder	*Ochropleura plecta*	y	
Invertebrate	Flat worm	*Platyhelminthes spp*		y
Invertebrate	Flat-backed Millipede	*Polydesmus angustus*		y
Invertebrate	Flounced Rustic	*Luperina testacea*	y	
Invertebrate	Four spotted chaser	*Libellula quadrimaculata*	y	
Invertebrate	Freshwater hog louse	*Asellus aquaticus*		y
Invertebrate	Freshwater mite	*Suborder hydracarina*		y
Invertebrate	Freshwater shrimp	*Gammarus pulex*		y
Invertebrate	Freshwater snail	*Lymnaea peregra*	y	
Invertebrate	Fungus gnat	*Bradysia spp*		y
Invertebrate	F-winged barklouse	*Graphopsocus cruciatus*		y

Invertebrate	Garden snail	*Cornu aspersum*		y
Invertebrate	Garden spider	*Araneus diadematus*		y
Invertebrate	Garden straw moth	*Agapeta hamana*		y
Invertebrate	garlic snail	*Oxychilus alliarius*		y
Invertebrate	Gatekeeper	*Pyronia tithonus*	y	
Invertebrate	Gazelle Beetles	*Nebria brevicollis*		y
Invertebrate	Globular springtail	*Sminthuridae spp*		y
Invertebrate	Great diving beetle	*Dytiscus marginalis*	y	
Invertebrate	Great pond snail	*Lymnaea stagnalis*	y	
Invertebrate	Greater water boatman	*Notonecta glauca*		y
Invertebrate	Green carpet	*Colostygia pectinataria*	y	
Invertebrate	Greenhouse millipede	*Oxidus gracilis*		y
Invertebrate	Grey spider	*Tetragnatha obtuse*		y
Invertebrate	Ground beetle	*F. Carabidae*		y
Invertebrate	Grouse wing caddisfly	*Mystacides longicornis*		y
Invertebrate	Hairy footed flower bee	*Anthophora plumipes*	y	
Invertebrate	Harpalus Ground Beetles	*Harpalus spp*	y	
Invertebrate	Heart and Club	*Agrotis clavis*	y	
Invertebrate	Heart and dart	*Agrotis exclamationis*	y	
Invertebrate	Hebrew character	*Orthosia gothica*	y	
Invertebrate	Honey bee	*Apis mellifera*	y	
Invertebrate	Hornet	*Vespa crabro*	y	
Invertebrate	House fly	*Musca domestica*		y
Invertebrate	Hoverfly	*Eristalis spp.*	y	
Invertebrate	Diving beetle	*Hyphydrus ovatus*	y	

Invertebrate	Ichneumen wasp	*Ichneumon spp*		y
Invertebrate	Ingrailed clay	*Diarsia mendica*		y
Invertebrate	Jenkins spire snail	*Potamopyrgus jenkinsi*	y	
Invertebrate	Millipede	*Julidae spp*		y
Invertebrate	July Highflyer	*Hydriomena furcata*		y
Invertebrate	Keeled ramshorn snail	*Planorbis carinatus*	y	
Invertebrate	Kentish snail	*Monacha cantiana*		y
Invertebrate	Large nutmeg	*Apamea anceps*	y	
Invertebrate	Large red damselfly	*Pyrrhosoma nymphula*	y	
Invertebrate	Large wainscot	*Rhizedra lutosa*	y	
Invertebrate	Large white	*Pieris brassicae*	y	
Invertebrate	Large Yellow Underwing	*Noctua pronuba*	y	
Invertebrate	Large yellow underwing	*Noctua pronuba*	y	y
Invertebrate	Leafhopper spp.	*F. Cicadellidae*		y
Invertebrate	Least carpet moth	*Idaea rusticata*		y
Invertebrate	Least Yellow Underwing	*Noctua interjecta*	y	
Invertebrate	Lesser B-b Yellow Underwing	*Noctua comes*	y	
Invertebrate	Lesser Common Rustic	*Mesapamea didyma*	y	
Invertebrate	Lesser garden spider	*Metellina segmentata*		y
Invertebrate	Lesser stag beetle	*Dorcus parallelipipedus*	y	
Invertebrate	Lesser water boatman	*Corina punctata*		y
Invertebrate	Light Arches	*Apamea lithoxylaea*	y	
Invertebrate	Light crimson underwing	*Catocala promiss*		y
Invertebrate	Liopterus Diving beetle	*Liopterus haemorrhoidalis*	y	
Invertebrate	Long horned Springtails	*F. Tomoceridae*		y

Invertebrate	Longhorn beetle	*F. Cerambycidae*		y
Invertebrate	Lychnis	*Hadena bicruris*	y	
Invertebrate	Map-winged swift	*Pharmacis fusconebulosa*	y	
Invertebrate	Marbled minor	*Oligia strigilis*	y	
Invertebrate	Marsh slug	*Deroceras laeve*		y
Invertebrate	Masked bee	*Hylaeus communis*	y	
Invertebrate	Meadow brown	*Maniola jurtina*	y	
Invertebrate	Middle-barred minor	*Oligia fasciuncula*	y	
Invertebrate	Millipede	*Cylindroiulus caeruleocinctus*		y
Invertebrate	Mining bee	*Andrena carantonica*	y	
Invertebrate	Money spider	*Linyphiidae*		y
Invertebrate	Mosquito pupa	*Culex spp*		y
Invertebrate	Mottled beauty	*Alcis repandata*	y	
Invertebrate	Mottled rustic	*Caradrina morpheus*	y	
Invertebrate	Mottled rustic	*Caradrina morpheus*	y	y
Invertebrate	Mouse Moth	*Amphipyra tragopoginis*	y	
Invertebrate	Muslin moth	*Diaphora mendica*	y	
Invertebrate	Netted slug	*Deroceras reticulatum*		y
Invertebrate	Nimbus beetle	*Nimbus obliteratus*		y
Invertebrate	Non-biting midge larvae	*Chironomidae spp*		y
Invertebrate	Northern yellow sac spider	*Cheiracanthium mildei*		y
Invertebrate	Nursery web spider	*Pisaura mirabilis*		y
Invertebrate	Nutmeg	*Anarta trifolii*	y	
Invertebrate	Orange Swift	*Triodia sylvina*	y	
Invertebrate	Painted lady	*Vanessa cardui*	y	

Invertebrate	Pale prominent	*Pterostoma palpina*	y	
Invertebrate	Peacock	*Aglais io*	y	
Invertebrate	Pebble prominent	*Notodonta ziczac*	y	
Invertebrate	Peppered moth	*Biston betularia insularia*	y	
Invertebrate	Planarian	*Dugesia spp*		y
Invertebrate	Plant bug	*Miridae spp*		y
Invertebrate	Pond skater	*Gerridae spp*		y
Invertebrate	Poplar hawkmoth	*Laothoe populi*	y	
Invertebrate	Poplar Hawk-moth	*Laothoe populi*	y	y
Invertebrate	Powdered quaker	*Orthosia gracilis*	y	
Invertebrate	Privet hawkmoth	*Sphinx ligustri*	y	
Invertebrate	Pug	*Eupithecia spp.*	y	
Invertebrate	Rain Beetle	*Pterostichus madidas*	y	
Invertebrate	Red admiral	*Vanessa atalanta*	y	
Invertebrate	Red cardinal beetle	*Pyrochroa coccinea*		y
Invertebrate	Red eyed damselfly	*Erythromma najas*	y	
Invertebrate	Red mason bee	*Osmia rufa*	y	
Invertebrate	Red tailed bumblebee	*Bombus lapidarius*	y	
Invertebrate	Red twin-spot carpet	*Xanthorhoe spadicearia*	y	
Invertebrate	Red Wiggler	*Eisenia andrei*		y
Invertebrate	Ribband wave	*Idaea aversata*		y
Invertebrate	Ringlet	*Aphantopus hyperantus*	y	
Invertebrate	Roman snail	*Helix pomatia*	y	
Invertebrate	Rosy Rustic	*Hydraecia micacea*	y	
Invertebrate	Rove beetle	*F: Staphylinidae*	y	y
Invertebrate	Rove Beetles	*F: Staphylinidae*	y	

Invertebrate	Ruby tailed wasp	*Chrysis ignita*	y	
Invertebrate	Rustic	*Hoplodrina blanda*	y	
Invertebrate	Rustic shoulder-knot	*Apamea sordens*	y	
Invertebrate	Rustic Wolf spider	*Trochosa ruricola*		y
Invertebrate	Sac spider	*F. Clubionidae*		y
Invertebrate	Sage leafhopper	*Euperyx melissae*		y
Invertebrate	Scarce willow marble	*Apotomis lineana*		y
Invertebrate	Screech beetle	*Hygrobia hermanni*	y	
Invertebrate	Setaceous Hebrew character	*Xestia c-nigrum*	y	
Invertebrate	Seven spotted ladybug	*Coccinella septempunctata*		y
Invertebrate	Shaded Broad-bar moth	*Scotopteryx chenopodiata*		y
Invertebrate	Shaded tortrix	*Eucosma obumbratana*		y
Invertebrate	Short-necked Ground Beetle	*Nebria brevicollis*	y	
Invertebrate	Shoulder striped wainscot	*Leucania comma*	y	
Invertebrate	Shuttle-shaped dart	*Agrotis puta*	y	
Invertebrate	Silver ground carpet	*Xanthorhoe montanata*	y	
Invertebrate	Silver Y	*Autographa gamma*	y	
Invertebrate	Slender Springtails	*F. Entomobryidae*		y
Invertebrate	Small clouded brindle moth	*Apamea unanimis*		y
Invertebrate	Small nettle weevil	*Nedyus quadrimaculatus*		y
Invertebrate	Small skipper	*Thymelicus sylvestris*	y	
Invertebrate	Small tortoiseshell	*Aglais urticae*	y	
Invertebrate	Small white	*Pieris rapae*	y	
Invertebrate	Smooth Springtails	*F. Entomobryidae*		y
Invertebrate	Snout	*Hypena proboscidalis*	y	

Invertebrate	Soldier fly	*F. Stratiomyidae*		y
Invertebrate	Southern hawker	*Aeshna cyanea*	y	
Invertebrate	Speckled peter caddisfly	*Agrypnia varia*		y
Invertebrate	Speckled wood	*Pararge aegeria*	y	
Invertebrate	Spinach	*Eulithis mellinata*	y	
Invertebrate	Square Spot Rustic	*Xestia xanthographa*	y	
Invertebrate	Square Spotted Clay	*Xestia stigmatica*	y	
Invertebrate	Streamer	*Anticlea derivata*	y	
Invertebrate	Striped Wainscot	*Mythimna straminea*	y	
Invertebrate	Svensson's copper underwing	*Amphipyra berbera*		y
Invertebrate	Swimming mayfly nymph	*Ephemeroptera spp*		y
Invertebrate	Tawny marbled minor	*Oligia latruncula*	y	
Invertebrate	Tawny mining bee	*Andrena fulva*	y	
Invertebrate	The Drinker	*Euthrix potatoria*	y	
Invertebrate	Tortrix moth	*F. Tortricidae*		y
Invertebrate	Triple spot clay	*Xestia ditrapezium*	y	
Invertebrate	Turnip moth	*Agrotis segetum*	y	
Invertebrate	Two-Clawed Hunting Spider	*Cheiracanthium erraticum*		y
Invertebrate	Violet Ground Beetle	*Carabus violaceus*	y	
Invertebrate	Wall butterfly	*Lasiommata megera*	y	
Invertebrate	Water flea	*Daphnia pulex*		y
Invertebrate	Water mite	*Hydrachnidia spp*		y
Invertebrate	Waved umber	*Menophra abruptaria*	y	
Invertebrate	Western honeybee	*Apis mellifera*	y	y
Invertebrate	White ermine	*Spilosoma lubricipeda*	y	

Invertebrate	White-banded carpet	*Spargania luctuata*	y	
Invertebrate	White-clawed crayfish	*Austropotamobius pallipes*	y	
Invertebrate	White-lipped snail	*Cepaea hortensis*		y
Invertebrate	White-streaked streaked grass moth	*Agriphila latistria*		y
Invertebrate	Whorled snail	*Anisus vorticulus*	y	
Invertebrate	Willow Beauty	*Peribatodes rhomboidaria*	y	
Invertebrate	Winter Gnat	*F. Trichoceridae*		y
Invertebrate	Yellow ant	*Lasius flavus*		y
Mammal	American Mink	*Mustela vison*	y	
Mammal	Bank vole	*Myodes glareoluses*	y	y
Mammal	Brown Hare	*Lepus europeaus*	y	
Mammal	Brown Long-eared Bat	*Plecotus auritus*	y	
Mammal	Brown Rat	*Rattus norvegicus*	y	y
Mammal	Common pipistrelle	*Pipistrellus pipistrellus*	y	
Mammal	Common shrew	*Sorex araneus*		y
Mammal	Domestic cat	*Felis catus*		y
Mammal	Eurasian Otter	*Lutra lutra*	y	y
Mammal	European Badger	*Meles meles*	y	y
Mammal	European Hedgehog	*Erinaceus europaeus*	y	y
Mammal	European Rabbit	*Oryctolagus cuniculus*	y	y
Mammal	Fallow Deer	*Dama dama*	y	
Mammal	Field vole	*Microtus agrestis*	y	y
Mammal	Grey Squirrel	*Sciurus carolinensis*	y	y
Mammal	Harvest mouse	*Micromys minutus*	y	
Mammal	House Mouse	*Mus musculus*	y	
Mammal	Mole	*Talpa europaea*	y	y
Mammal	Muntjac deer	*Muntiacus reevesi*	y	y
Mammal	Nathusius' pipistrelle	*Pipistrellus nathusii*	y	
Mammal	Natterer's Bat	*Myotis nattereri*	y	

Mammal	Noctule bat	*Nyctalus noctula*	y	
Mammal	Polecat	*Mustela putorius*	y	
Mammal	Pygmy shrew	*Sorex minutus*	y	
Mammal	Red fox	*Vulpes vulpes*	y	y
Mammal	Soprano pipistrelle	*Pipistrellus pygmaeus*	y	
Mammal	Squirrel	*Sciurus carolinensis*	y	y
Mammal	Stoat	*Mustela erminea*	y	
Mammal	Water shrew	*Neomys fodiens*	y	
Mammal	Water Vole	*Arvicola terrestris*	y	
Mammal	Weasel	*Mustela nivalis*	y	
Mammal	Wood mouse	*Apodemus sylvaticus*	y	y
Mammal	Yellow-necked mouse	*Apodemus flavicollis*	y	
Plant	3 nerve sandwort	*Moehringia trinervia*	y	
Plant	Alder	*Alnus glutinosa*	y	
Plant	Annual meadowgrass	*Poa annua*	y	
Plant	Ash	*Fraxinus excelsior*	y	
Plant	Beech	*Fagus sylvatica*	y	y
Plant	Bitter Dock	*Rumex obtusifolius*	y	y
Plant	Bittersweet	*Solanum dulcamara*	y	y
Plant	Black bryony	*Tamu communis*	y	
Plant	Black medick	*Medicago lupulina*	y	
Plant	Blackthorn	*Prunus spinosa*	y	
Plant	Bracken	*Pteridium aquilinum*	y	
Plant	Bramble	*Rubus fruticosus agg.*	y	
Plant	Branched bur reed	*Sparganium erectum*	y	
Plant	Broad leaved pondweed	*Potamogeton natans*	y	
Plant	Broadleaf cattail	*Typha latifolia*	y	
Plant	Broadleaved dock	*Rumex obtusifolius*	y	y

Plant	Brooklime	*Veronica beccabunga*	y	
Plant	Broom	*Cytisus scoparius*	y	
Plant	Bugle	*Ajuga reptans*	y	
Plant	Bulbous buttercup	*Ranunculus bulbosus*		y
Plant	Bur-reed	*Sparganium erectum*	y	
Plant	Butterbur	*Petasides hybridus*	y	
Plant	Canadian pond weed	*Elodea canadensis*	y	
Plant	Canary grass	*Phalaris canariensis*	y	
Plant	Cock's-foot	*Dactylis glomerata*	y	
Plant	Common bladderwort	*Utricularia vulgaris*	y	
Plant	Common cat’s ear	*Hypochaeris radicata*	y	
Plant	Common chickweed	*Stellaria media*	y	
Plant	Common club rush	*Schoenoplectus lacustris*	y	
Plant	Common duckweed	*Lemna minor*	y	
Plant	Common feather moss	*Kindbergia praelonga*		y
Plant	Common field speedwell	*Veronica persica*	y	
Plant	Common hawthorn	*Crataegus monogyna*	y	
Plant	Common hawthorn	*Crataegus monogyna*	y	y
Plant	Common lime	*Tilia x europaea*	y	
Plant	Common mouse ear chickweed	*Cerastium fontanum*	y	y
Plant	Common osier	*Salix viminalis*	y	
Plant	Common reed	*Phragmites australis*	y	
Plant	Common sorrel	*Rumex acetosa*	y	
Plant	Common vetch	*Vicia sativa*	y	
Plant	Common bent grass	*Agrostis capillaris*	y	y
Plant	Copper beech	*Fagus sylvatica purpurea*	y	

Plant	Corsican pine	*Pinus nigra subsp. laricio*	y	
Plant	Couch grass	*Elymus repens*		y
Plant	Cow parsley	*Anthriscus sylvestris*	y	
Plant	Crab apple	*Malus sylvestris*	y	
Plant	Crack willow	*Salix fragilis*	y	
Plant	Creeping bent	*Agrostis stolonifera*	y	
Plant	Creeping buttercup	*Ranunculus repens*	y	y
Plant	Creeping cinquefoil	*Potentilla reptans*	y	
Plant	Creeping thistle	*Cirsium arvense*	y	
Plant	Crosswort	*Cruciata laevipes*	y	
Plant	Cuckoo flower	*Cardamine pratensis*	y	
Plant	Cuckoo pint	*Arum maculatum*	y	
Plant	Currant	*Ribes sp*	y	
Plant	Daisy	*Bellis perennis*	y	
Plant	Dandelion	*Taxaxacum agg.*	y	y
Plant	Dog rose	*Rosa canina*	y	
Plant	Dog violet	*Viota riviniana*	y	
Plant	Dogwood	*Cornus sanguinea*	y	
Plant	Downy birch	*Betula pubescens*	y	
Plant	Elder	*Sambucus nigra*	y	
Plant	English bluebell	*Hyacinthoides non-scripta*	y	y
Plant	English elm	*Ulmus procera*	y	
Plant	Eucalyptus spp	*Eucalyptus spp*		y
Plant	False oat-grass	*Arrhenathrum elatius*	y	
Plant	Field horsetail	*Equisetum arvense*	y	
Plant	Field maple	*Acer campestre*	y	

Plant	Field rose	*Rosa arvensis*	y	
Plant	Floating sweet grass	*Glyceria fluitans*	y	
Plant	Fool's watercress	*Apium nodiflorum*	y	
Plant	Fools water cress	*Apium nodiflorum*	y	
Plant	Forget me not	*Myosotis arvensis*	y	
Plant	Foxglove	*Digitalis purpurea*	y	
Plant	Garlic mustard	*Alliaria petiolata*	y	
Plant	Gean cherry	*Prunus avium*	y	
Plant	Germander speedwell	*Veronica chamaedrys*	y	
Plant	Giant redwood	*Sequoiadendron giganteum*	y	
Plant	Goose grass	*Galium aparine*	y	y
Plant	Great willowherb	*Epilobium hirsutum*	y	
Plant	Greater plantain	*Plantago major*	y	
Plant	Greater spearwort	*Ranunculus lingua*	y	
Plant	Grey sallow	*Salix cinerea*	y	
Plant	Ground ivy	*Glenchoma hederacea*	y	
Plant	Groundsel	*Senecio vulgaris*	y	
Plant	Guelder rose	*Viburnum opulus*	y	
Plant	Gypsywort	*Lycopus europaeus*	y	
Plant	Hard rush	*Juncus inflexus*	y	
Plant	Hazel	*Corylus avellana*	y	
Plant	Hedge bindweed	*Calystegia sepuim*	y	
Plant	Hedge mustard	*Sisymbrium officinale*	y	
Plant	Hedge woundwort	*Stachys sylvatica*	y	
Plant	Herb-Robert	*Geranium robertianum*	y	

Plant	Hogweed	*Heracleum sphondyllium*	y	
Plant	Holly	*Ilex aquifolium*	y	
Plant	Honeysuckle	*Lonicera periclymenum*	y	
Plant	Hornbeam	*Carpinus betulus*	y	
Plant	Hornwort	*Ceratophyllum spp.*	y	
Plant	Horse chestnut	*Aesculus hippocastanum*	y	
Plant	Ivy	*Hedra helix*	y	
Plant	Knotgrass	*Polygonum aviculare*	y	
Plant	Lady's bedstraw	*Galium verum*	y	
Plant	Larch	*Larix decidua*	y	
Plant	Lesser burdock	*Arctium minus*	y	
Plant	Lesser celandine	*Ranunculus ficaria*	y	
Plant	Lesser stitchwort	*Stellaria graminea*	y	
Plant	Male fern	*Dryopteris filix-mas*	y	
Plant	Marsh marigold	*Caltha palustris*	y	
Plant	Marsh marigold	*Caltha palustris*	y	
Plant	Meadow buttercup	*Ranunculus acris*	y	
Plant	Meadow foxtail	*Alopecurus pratensis*	y	
Plant	Meadowsweet	*Filipendula ulmaria*	y	
Plant	Milfoil	*Myriophyllum spp.*	y	
Plant	Mouse ear hawkweed	*Hieracium pilosella*	y	
Plant	Nipplewort	*Lapsana communis*	y	
Plant	Norway spruce	*Picea abies*	y	
Plant	Oak tree	*Quercus robur*	y	y
Plant	Ox-eye daisy	*Leucanthermum vulgare*	y	

Plant	Perennial ryegrass	*Lolium perenne*	y	
Plant	Pineapple weed	*Matricaria matricaroides*	y	
Plant	Poplar	*Populus spp*	y	
Plant	Poplar - balsam	*Populus trichocarpa*	y	
Plant	Prickly sow-thistle	*Sonchus asper*	y	
Plant	Privet	*Ligustrum vulgare*	y	
Plant	Purple dead-nettle	*Lamium purpureum*	y	y
Plant	Ragwort	*Senecio jacobaea*	y	y
Plant	Red campion	*Silene dioica*	y	
Plant	Red fescue	*Festuca rubra*	y	
Plant	Reed sweet grass	*Glyceria maxima*	y	
Plant	Reed sweet-grass	*Glyceria maxima*	y	
Plant	Reedmace	*Typha latifolia*	y	
Plant	Ribwort plantain	*Plantago lanceolata*	y	y
Plant	Robins Plantain	*Erigeron pulchellus*		y
Plant	Rosebay willowherb	*Chamerion angustifolium*	y	
Plant	Round-leaved Crane's-bill	*Geranium rotundifolium*		y
Plant	Rowen	*Sorbus aucuparia*	y	
Plant	Saxifraga spp	*Saxifraga spp*		y
Plant	Scentless mayweed	*Tripleurospermum inodorum*	y	
Plant	Scot’s pine	*Pinus sylvestris*	y	
Plant	Sedge spp.	*Carex spp.*	y	
Plant	Sedge spp.	*Carex spp.*	y	
Plant	Self-heal	*Prunella vulgaris*	y	
Plant	Shepherd’s purse	*Capsella bursa-pastoris*	y	
Plant	Shining cranesbill	*Geranium lucidum*		y

Plant	Silver birch	*Betula pendula*	y	
Plant	Silverweed	*Potentilla anserine*	y	
Plant	Smooth cats ear	*Hypochaeris glabra*		y
Plant	Smooth hawk's beard	*Crepis capillaries*	y	
Plant	Smooth meadowgrass	*Poa pratensis*	y	
Plant	Soft rush	*Juncus effusus*	y	
Plant	Spear thistle	*Cirsium vulgare*	y	y
Plant	St John's Wort	*Hypericum spp*	y	
Plant	Starwort	*Callitriche sp.*	y	
Plant	Starwort	*Callitriche spp.*	y	
Plant	Stinging nettle	*Urtica dioica*	y	y
Plant	Sweet vernal	*Anthoxanthum odoratum*	y	
Plant	Sweet violet	*Viola odorata*	y	
Plant	Sweetbriar rose	*Rosa rubiginosa*		y
Plant	Sycamore	*Acer pseudoplatanus*	y	
Plant	Teasel	*Dipsacus fullonum*	y	
Plant	Timothy	*Phleum pretense*	y	
Plant	Tormentil	*Potentilla erecta*	y	
Plant	Tufted hair grass	*Deschampsia cespitosa*	y	y
Plant	Tufted vetch	*Vicia cracca*	y	
Plant	Turkey oak	*Quercus cerris*	y	
Plant	Water crowfoot	*Ranunculus fluitans*	y	
Plant	Water mint	*Mentha aquatica*	y	
Plant	White campion	*Silene latifolia*	y	y
Plant	White clover	*Trifolium repens*	y	y
Plant	White dead-nettle	*Lamium album*	y	
Plant	White willow	*Salix alba*	y	

Plant	Wood avens	*Geum urbanum*	y	
Plant	Wood meadowgrass	*Poa nemoralis*	y	
Plant	Wych elm	*Ulmus glabra*	y	
Plant	Yarrow	*Achillea millefolium*	y	
Plant	Yellow flag	*Iris pseudacorus*	y	
Plant	Yellow flag	*Iris pseudacorus*	y	
Plant	Yellow flag iris	*Iris pseudacorus*	y	
Plant	Yellow water lily	*Nuphar lutea*	y	
Plant	Yorkshire fog	*Holcus lanatus*	y	y
Reptiles	Grass snake	*Natrix natrix*	y	

Appendix 2 – Student research abstracts

Fleming, J.J., 2023. *A comparison of avian biodiversity in the native and non-native tree habitats of a semi-natural woodland and a man-made greenspace*. BSc (Hons) Applied Zoology. Moulton College. Unpublished undergraduate thesis.

Biodiversity is in global decline due to human mediated land-use change and the anthropogenic effects of urbanisation and unsustainable use of natural resources, causing accelerated climate change, altering seasons and the biological timings and geographical distribution of flora and fauna. Non-native species have been increasingly spread by man since the 20th century and their effect on the ecosystem is said to be detrimental, yet further long-term studies are required. As urbanisation spreads and natural habitats are lost, man-made greenspace may become increasingly important for mitigating problems of noise, air quality, heat, and mental health, and may function as a refuge for nature where species can adapt to the changing conditions. The UK is significantly depleted of nature and agricultural practice has had a detrimental effect on farmland birds, biodiversity, and ecosystem services. The semi-natural woodland habitats that remain of once larger, wooded areas, are fragmented "islands" consisting of native and naturalised tree species which provide habitats for birds and wildlife in a relatively wild state. This study aims to determine if a semi-natural woodland of predominantly native tree species supports greater avian biodiversity than a man-made greenspace of predominantly non-native tree species. Tree species were surveyed at a semi-natural woodland and a greenspace. The native, non-native, and naturalised status of the trees were recorded to identify any significant difference between tree communities. Veteran trees were noted for their importance to biodiversity. Avian surveys were then conducted over 20 days on over-wintering birds to identify any significant differences between avian communities. Both sites were measured for approximate diameter and area via aerial maps. Whilst there was a very highly significant difference between Shannon diversity indices for tree species at the semi-natural woodland and greenspace ($p<0.001$), there was no significant difference between the mean number birds ($p>0.05$), or Shannon diversity indices for birds ($p>0.05$) between sites, and no relationship was found between Julian date and total number of birds ($p>0.05$) or between mean temperature and total number of birds ($p>0.05$). Results indicated that a man-made greenspace could support the same avian biodiversity as a semi-natural woodland but requires a greater diversity of non-native tree species and a larger geographical area.

Shepherd, S.-R., 2024. *A Review of Wildlife Surveys: Comparing Methods, Detection Rates, and Outcomes*. BSc (Hons) Applied Zoology. Moulton College. Unpublished undergraduate thesis.

> Wildlife surveys have given a strong value toward biodiversity, conservation and research. Performing these surveys has allowed ecologists to learn about the diversity of species held in habitats and how to monitor wildlife effectively. This study aimed to investigate and compare the efficacy held between three wildlife survey methods at Moulton College estate. Focused elements included camera trapping, field tracks and signs, and direct sightings. It was predicted that camera trapping would most effectively detect species richness and abundance. Results showed that camera trapping was most successful in capturing high species richness and abundance rates compared to the alternative methods. Field signs had discovered more mammal presence in contrast to direct sightings which recorded more avian presence. However, camera footage captured a mix of both mammal and bird presence, holding the highest count in species diversity. This could be due to the independent function of camera traps, continuous recording, or the lack of human presence. Further research recommendations include performing longer monitoring periods over different seasons to capture detection patterns and to place down various bait for any new differences or outcomes between the surveys. This study foregrounds the effectiveness of multiple wildlife surveys, and which is the most reliable in detecting wild UK fauna.

McMenzie, H., 2024. *Exploring the effect anthropogenic land use and land cover change has on native mammalian Carnivora within the Moulton College Estate*. BSc Ecology & Wildlife Conservation. Moulton College. Unpublished undergraduate thesis.

> Anthropogenic Land use and land cover change (LULCC) is a global phenomenon, responsible for converting over 32% of all global land surfaces since 1960. Terrestrial ecosystems are predicted to be most at threat from the effects of anthropogenic LULCC by the year 2100. The purpose of this study was to observe the effect anthropogenic LULCC had on the species richness and abundance of both native mammalian carnivora and prey species within two anthropogenically distinct habitats; the agricultural East Long field and the wooded Briscoe's Spinney, located within the grounds of the Moulton College Estate. Trail cameras were utilised to structure a visual record of species in order to analyse and produce data concerning the species richness, abundance, biodiversity index and relative abundance index of each habitat.

Trail camera observations revealed Briscoe's Spinney had a greater biodiversity index of 1.33 compared to East Long field with 0.59. Briscoe's Spinney had a greater abundance of native mammalian carnivora, with nine and six *V. vulpes* and *M. meles* respectively, compared to the seven and one from East Long field. The study concludes that the species richness and abundance of mammalian carnivora is affected by the degree of anthropogenic LULCC per habitat.

Burt, C., 2025. *Biodiversity: Boom or Bust? Investigating the Effects of Flooding on Aquatic Macrobenthic Invertebrates in Ephemeral and Perennial Freshwater Habitats*. BSc Applied Zoology. Moulton College. Unpublished undergraduate thesis.

This study investigated the impact of flooding on aquatic macrobenthic communities in an ephemeral pond against a perennial stream on the Moulton College Campus, Moulton, Northamptonshire. The biodiversity of both habitats was compared using the Shannon's Diversity Index (H') and a Hutchinson's t-test to decipher if flooding of ephemeral systems impacts species richness and evenness. The results obtained were statistically significant, showing differences between the species richness and evenness of both habitats ($t = 13.998$, $df = 663$, $p<0.0001$****). Many ecological variables, for example complexity of habitats, resource availability, dispersal methods, timing of the active hydroperiod, and anthropogenic influences such as urbanisation and habitat fragmentation, were identified as the main drivers influencing community composition. The findings of this study support the alternative hypothesis that flooding has significant impact on biodiversity, supporting the macroinvertebrate community of the ephemeral pond.

Evans, C., 2022. *A Comparative Study of Bedding and Bait Preferences in Wood Mice (Apodemus sylvaticus) Using Live Trapping Methods*. ANW2072 Life Sciences Industry Project. Moulton College. Unpublished undergraduate report.

This study examined small mammal preferences for bedding and bait using Longworth live traps at Moulton College over 12 nights between January and March. Traps were placed in woodland and open areas, each containing either hay or shavings, and baited with bird seed or oats and peanuts. Data were collected and analysed using bar charts.

Results showed more wood mice were captured in hay traps, with oats and peanuts slightly preferred in hay bedding, and bird seed more successful in shavings. Vole data were excluded due to low numbers. Seasonal timing and potential recaptures may have influenced results. The study highlights the

importance of trap setup and environmental factors in small mammal trapping and suggests future research include seasonal comparisons and behavioural observations.

Child, J., 2025. *A Biodiversity Survey of Moulton College to Determine the Species Richness of the Holcot Campus*. ANW2072 Life Sciences Industry Project. Moulton College. Unpublished undergraduate report.

Species biodiversity has currently been on a steady decrease throughout the world (Liu *et al.*, 2025), this can be primarily linked to human intervention as we have expanded and developed as a population we have taken more and more from the world weather damaging animal populations by introducing invasive species and destroying habitats through rising levels of urbanisation. This report aims to conduct a wildlife survey in the Moulton College campus to determine if the surrounding area contains a diverse range or a poor range of species through the utilisation of camera traps and footprint tunnels to document signs of wildlife allowing for an overall relative abundance of these animals to be conducted.

Holland, E., 2025. *Assessing the Impact of Human Presence on Wildlife Abundance and Behaviour at Moulton College Holcot Campus.* ANW2072 Life Sciences Industry Project. Moulton College. Unpublished undergraduate report

This study explored the wildlife at Moulton College's Holcot Campus to assess whether human presence, including that of campus residents, influenced species abundance and animal behaviour. Camera trap images collected during both summer and term time were analysed to compare species presence, and statistical methods were used to evaluate differences between the two periods.

The Holcot Campus environment is characterised by natural open spaces and abundant greenery, offering suitable habitats for wildlife to forage and shelter. Camera traps were deployed to capture data, which was then organised into a spreadsheet detailing the date, time, and species observed. The hypothesis proposed that species richness would be higher during the summer due to reduced human activity, allowing animals greater freedom of movement.

However, analysis using the Shannon Diversity Index revealed that species richness was higher during term time (H = 1.48) compared to summer (H = 1.01), contrary to expectations.

In conclusion, the study suggests that human presence may not negatively impact species richness as initially hypothesised. For future research, it is

recommended to expand data collection and incorporate additional methods such as ethograms to better understand behavioural responses to human proximity and interspecies interactions.

Appendix 3 – Species of national conservation status sighted in the last five years

Taxonomic group	Scientific Name	Common Name	Wildlife and Countryside Act Status	UK BAP Status	IUCN Red List Status	UK Birds of Conservation Concern
Bird	*Tyto alba*	Barn owl	Schedule 1 - Protected	Not Listed	Least Concern	
Bird	*Prunella modularis*	Dunnock	Not Listed	Priority Species (formerly listed)	Least Concern	Amber
Bird	*Linaria cannabina*	Linnet	Not Listed	Priority Species	Least Concern	Red
Bird	*Anas platyrhynchos*	Mallard duck	Not Listed	Not Listed	Least Concern	Amber
Bird	*Gallinula chloropus*	Moorhen	Not Listed	Not Listed	Least Concern	Amber
Bird	*Turdus philomelos*	Songthrush	Not Listed	Priority Species	Least Concern	Amber
Bird	*Sturnus vulgaris*	Starling	Not Listed	Priority Species	Near Threatened	Red
Bird	*Columba palumbus*	Woodpigeon	Not Listed	Not Listed	Least Concern	Amber
Bird	*Troglodytes troglodytes*	Wren	Not Listed	Not Listed	Least Concern	Amber
Bird	*Emberiza citrinella*	Yellowhammer	Not Listed	Priority Species	Not Listed	Red
Mammal	*Lutra lutra*	Eurasian Otter	Schedule 5 - Protected	Priority Species	Globally: Near Threatened UK: Least Concern	
Mammal	*Erinaceus europaeus*	European Hedgehog	Not Listed	Priority Species	Vulnerable	
Plant	*Hyacinthoides non-scripta*	English Bluebell	Schedule 8 - Protected	Not Listed	Not Listed	