# UCC Biodiversity Action Plan

# 2024 – 2029

UCC
Coláiste na hOllscoile Corcaigh
University College Cork, Ireland

UCCGREENCAMPUS

## Acknowledgements

Infinite thanks go to Christina Coughlan for mapping/fieldwork support, to Colm Breslin for bat survey/ bat survey write-up & recommendations and to Magnus Malone Skolemestra for fieldwork assistance. Thank you to John Murphy, UCC Head Gardener, for his genuine passion for nature and limitless knowledge; to Barrie Curley, Paul Prendergast, Mark Poland, Michael O'Sullivan and all in Buildings and Estates; to Emma Martin, UCC Sports Administrator, Christine Moloney, CEO, Mardyke Leisure, Nora Aherne, Mardyke Operations Manager and Eamonn Connaughton, Facilities Manager, for their insights and commitment; to Dr. Dara Fitzpatrick for his ecological observations and advice; Dr. Paul Holloway for his GIS skills and general support; Dr. Fiona Cawkwell, and the UCC Community. Thanks also to Dr. Paddy Sleeman for otter advice. Special thanks to Dr. Maria Kirrane, Head of Sustainability and Climate Action, for trusting me with the coordination of this project and to my colleague Daniel Carr and all in the Sustainability and Climate Action Office for their support and encouragement. Finally, thank you to my colleagues Niamh Guiry and Topaz Shrestha for their appreciation of nature in addition to their words of wisdom.

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# 1. Introduction

## 1.1 Biodiversity and its importance

Biodiversity is an umbrella term for the variety of life on Earth. According to the definition used by the Convention on Biological Diversity, “biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems”. Biodiversity has changed over the course of the evolution of the Earth. It has an intrinsic right to exist, and the concept of “nature,” as something that human beings exist outside of or adjacent to is relatively new.

Biodiversity meets the basic needs of human beings through the provision of clean air and water, healthy living soil for food production, protection from natural disasters, materials for production of essential goods, health and wellbeing and cultural and spiritual meaning (IPBES, 2019). Every resource used in our daily lives, from toothpaste to plastic upholstery, has an origin in nature. Our dependence on biodiversity and, more broadly, the natural world, has been summarised by the concept of “Ecosystem Services,” (though this term has been criticised for its anthropocentric perspective and general oversimplification, among other reasons (Bekessy et al., 2018; Schröter et al., 2014; Lele et al., 2013)).

### 1.1.1 Biodiversity, Human health and Wellbeing

## 1.2 What is the current state of biodiversity?

### 1.2.1 Biodiversity Internationally

We are in the midst of the 6th mass extinction event (IBES, 2019); a time of unprecedented loss of nature. Approx. 30% (uncertainty range: 16–50%) of species have been made extinct or globally threated since the year 1500 (Isbell et al., 2023). Biodiversity loss will result in reduced ecosystem functioning and therefore, reduced capacity to support human needs.

According to the IPBES 2019 report, the most impactful drivers of nature loss are:

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| changes in land and sea use, e.g. destroying forest to create grazing pasture |  |
| direct exploitation of organisms, e.g. overfishing and logging |  |
| climate change |  |
| pollution, e.g. microplastics in marine environment and agricultural run-off |  |
| invasion of alien species (invasive alien species are non-native species which have a negative effect upon indigenous biodiversity), e.g. Japanese Knotweed in Ireland |  |

Human activities have been deemed to be the overarching cause behind the above factors. However, it is becoming increasingly clear that “human activities,” is an inadequate term for the complex nature of human actions which harm biodiversity. Much of human behaviour is geared towards protecting nature; from the nurturing of forests by many Indigenous Peoples to the creation of habitats in Irish housing estates.

While there are countless examples of conservation efforts taking place around the world, many of which have been or are predicted to be successful, the underlying pressures on biodiversity remain. Any efforts taken to protect biodiversity are valuable.

### 1.2.2 Biodiversity in Ireland

Ireland contains a rich diversity of species spanning marine, freshwater and terrestrial habitats. The Irish landscape supports internationally important populations of flora and fauna. More than 31,000 species have been recorded in Ireland's lands and waters; but the country is not exempt from global trends in biodiversity loss.

85% of EU-protected habitats are in unfavourable status in Ireland. Almost half (46%) are continuing to decline in quality (NPWS, 2019). Nearly a third of Ireland's semi-natural grasslands have been lost in the last decade, while half of our rivers and most of our estuaries are not in good ecological condition (NBAP of Ireland, 2023). Though 57% of Irish species are considered to be of good conservation status, Ireland comes 20th out of 28 Member States with regards to habitat quality (EPA, 2024).

## 1.3 What steps are being taken to protect biodiversity in Ireland?

### 1.3.1 International and EU Legislation

International legislation has attempted to mitigate and prevent further progression of the global biodiversity crisis. For the purposes of this Biodiversity Action Plan, which focuses on a small area of land when assessed at a national level, special acknowledgement will be given to the following for how they govern UCC's approach to biodiversity enhancement and protection:

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| **Convention on Biological Diversity (CBD)**<br>The CBD is a multilateral treaty concerned with conservation of biodiversity and sustainable use and sharing of biological resources. Signed by 150 government | **Kunming Montreal Global Biodiversity Framework (GBF)**<br>In 2022, the United Nations Biodiversity Conference (COP15) adopted an agreement to steer global nature restoration to 2030. Purpose of GBF is to curtail biodiversity loss and restore | **EU Directives**<br>Birds and Habitats Directives outline overall legal framework for protecting and managing Natura 2000 sites (areas protected for special conservation interests) and species in need of special conservation measures. | **EU Biodiversity Strategy for 2030**<br>The EU Biodiversity Strategy for 2030 is a plan to restore ecosystems and conserve nature effectively by 2030. Actions include the launch of an EU Nature Restoration Plan and the expansion of existing Natura 2000 protected sites.<br>*- EU Nature Restoration Law* |

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| leaders at 1992 Rio Earth Summit. | ecosystems while securing indigenous rights. 30% of the planet was designated for protection, while 30% of degraded ecosystems were marked for restoration by 2030. The GBF was formed under the CBD. | The European Communities (Birds and Habitats) Regulations 2011 (S.I. No. 477 of 2011) is **an Irish law that implements two key European directives** (NPWS, 2024):<br>1. Habitats Directive: Commits participating states to conservation of habitats and biodiversity. Resulted in establishment of Special Areas of Conservation and designation of habitats in need of special protection in participating states, including Ireland.<br>2. Birds Directive: Focuses specifically on protection and conservation of birds through designation of Special Protected Areas, habitat restoration measures and management of human interaction with birds in participating states, including Ireland. | The European Union adopted a European Restoration Regulation in June 2024. This legislation is the first to set legally binding restoration targets for long-term recovery of nature in Europe (IUCN, 2024). The law's purpose is to restore 20% of the EU's degraded ecosystems by 2030, with all degraded ecosystems restored by 2050. Time-specific targets for certain ecosystems, habitats, and species are included (ibid). The EU Restoration Regulation requires Member States to prepare Nature Restoration Plans to ensure they meet biodiversity recovery targets. The law also demands **no net loss in the total national area of urban green space and of urban tree canopy cover in urban ecosystem areas**. |

### 1.3.2 National legislation

The Wildlife Act (1976) and subsequent amendments govern the legal protection of wildlife and habitats in Ireland. They also regulate activities which may impact wildlife, and legislation around wildlife crime. The Wildlife (Amendment) Act 2023 introduced legislation instructing that every public body, as listed in the

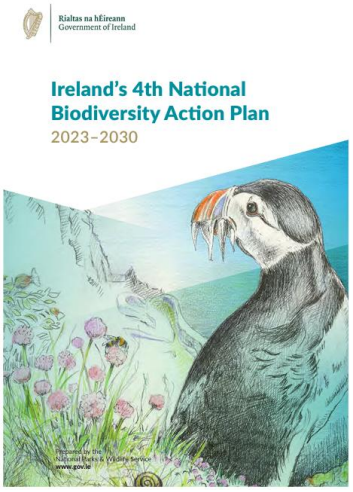
Act, is obliged to have regard to the objectives and targets in the National Biodiversity Action Plan (Irish Government, 2024).

## 1.4 National Plans and associated Actions for Biodiversity

### 1.4.1 National Biodiversity Action Plan (NBAP)

The NBAP 2023-2030 is Ireland's 4th national biodiversity action plan. It contains the following objectives:

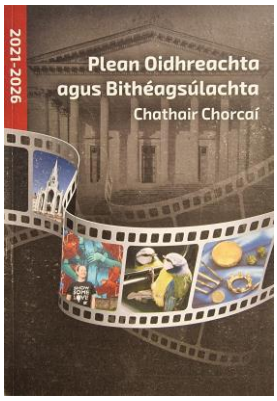
- Adopt a Whole of Government, Whole of Society Approach to Biodiversity
- Meet Urgent Conservation and Restoration Needs
- Secure Nature's Contribution to People
- Enhance the Evidence Base for Action on Biodiversity
- Strengthen Ireland's Contribution to International Biodiversity Initiatives



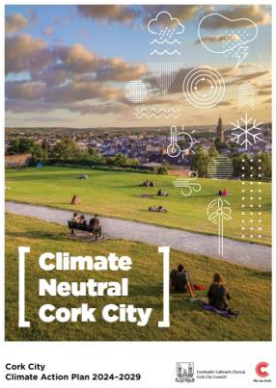

### 1.4.2 All-Ireland Pollinator Plan

The All-Ireland Pollinator Plan for 2021-2025 aims to promote, support and safeguard the protection of pollinating insects and broader biodiversity through habitat creation and restoration achieved by diverse stakeholders working in collaboration across sectors. The new Plan builds on the achievements of the first (2015-2020), while expanding ambitions. UCC's Biodiversity Action Plan 2018-2023 involved a series of actions for pollinators which have been implemented, but further opportunities and improvements will be detailed in this document.

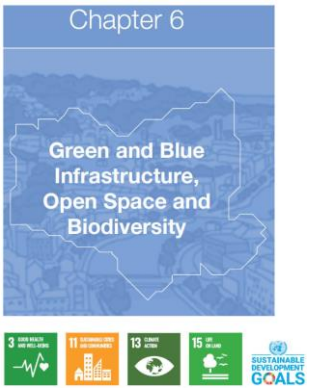
### 1.4.3 Local legislation and biodiversity action measures




**Cork City Heritage and Biodiversity Plan 2021 – 2026:** Outlines actions and associated procedures for protection, enhancement, creation and promotion of biodiversity in Cork City. Compliments Cork City Council's Tree Strategy.




**Cork City Climate Action Plan 2024-2029**: Commits to protecting, enhancing and considering biodiversity in climate adaptation and mitigation measures; recognises importance of biodiversity with regards to mitigation against climate change, and its vulnerability to climate change.

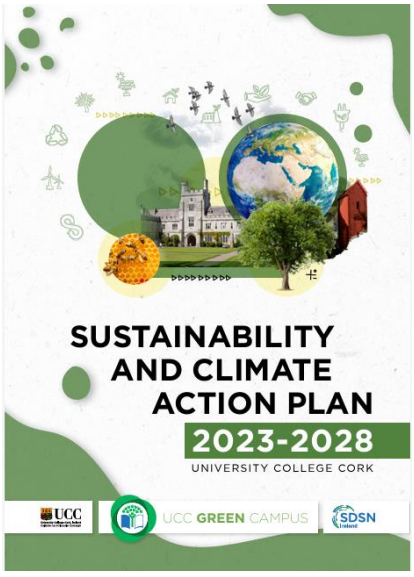



**Cork City Green and Blue Infrastructure study (2021):** Aims to "manage, protect and enhance the City's green and blue infrastructure network". The study references a strong Biodiversity network as key in the transition to a low carbon environment, and in securing ecosystem services in Cork City. Also highlights importance of green and blue spaces for good human health and wellbeing.

# 2. Biodiversity and associated measures at UCC

## 2.1 Background

University College Cork (UCC) has a clear vision, mission and goals regarding sustainability and climate action (UCC, 2023). It aims to be a Net Zero Carbon Campus by 2040, a Zero Waste Campus by 2030 and a STARS Platinum Institution by 2028. At the time of writing, UCC has been ranked 4th in the world on Sustainability under the UI Green Metric Ranking, and the university has renewed its Green Flag five times (having been the first Green Flag Campus in the world). Regarding green space and biodiversity targets within UCC's Sustainability and Climate Action Plan (2023 – 2028) a commitment has been made to:




- Prioritise protection of campus green space in line with UCC Campus Masterplan and promote restoration where possible
- Promote better integration and connection of green spaces across UCC campus and its surroundings
- Promote and enhance use of our natural resources in teaching and learning and research on sustainability as well as in everyday use and recreation. Promote and facilitate social and physical access to green space, and raise awareness of associated ecosystem, biodiversity, heritage, social and health related values, **and**
- Continue current best practices in assessment and management of campus green spaces and expand areas managed for biodiversity where possible.

Actions proposed to achieve these aims include:

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| Develop a programme with Cork City Council that would assess green space use and promote wild areas, green space, and food growing initiatives | Incorporate green infrastructure and biophilic design principles in new builds and major retrofits |
| Develop a green walls/roofs policy | Assess local opportunities to develop or regenerate new, permanent green spaces for carbon storage and assess offsetting potential |
| Further develop campus walkways and greenways to ensure accessibility of our green space | |

UCC is broadly committed to managing its estate in an environmentally friendly manner and maintaining and enhancing the biodiversity value of its green spaces, in line with local and national legislation. Achievements in nature protection on campus have resulted from strong collaboration across operations. UCC's Grounds Maintenance team has been instrumental in application of the university's BAP 2018 – 2023. Biodiversity-friendly initiatives at UCC include:

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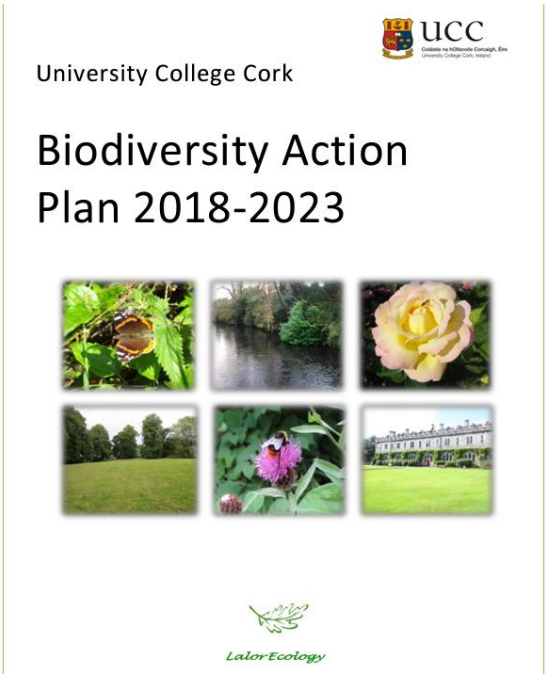
| Creation of otter habitat at main gates to UCC main campus and facilitation of otter monitoring by Paddy Sleeman | Conversion of concrete hard-standing to green space at Main Campus, at buildings along Western Road and at the Geography Building |
| Installation of bird and bat boxes across campus, including Swift boxes at North Mall and Main Campus | Use of leaf blowers only on pavements as a health and safety measure. Leaf blowers aren't used on vegetated/green areas, and leaves are blown to green areas to decompose and house invertebrates |
| Pollinator-friendly initiatives (low-mow management, meadow creation, ban on herbicide/pesticide use | Companion planting to manage pest species naturally |

## 2.2 UCC Biodiversity Action Plan 2018 – 2023 and associated projects

UCC's Biodiversity Action Plan 2018 – 2023 (Caroline Lalor) is a comprehensive document, informed by habitat, bat, bryophyte and mammal surveys. Recommendations in the plan have been, for the most part, adhered to. Recommendations yet to be implemented include:




- Further specialist biodiversity surveys (bryophyte, small mammal and invertebrate) across all campuses
- A field survey of Lough Hyne campus
- Installation of approximately six Grey Wagtail nest boxes for this Red Listed species in Main Campus, North Mall Campus and ERI Campus
- Implementation of biodiversity management recommendations from future Biodiversity Surveys within UCC Campus
- Establishment of a monitoring programme to monitor the success of the Biodiversity Action Plan
- Ensuring that all future developments in UCC enhance the environment
- Development of a policy/guidance document outlining requirements for building contractors
- Development of monitoring surveys for UCC – e.g. bat activity monitoring surveys, bumblebee monitoring surveys, butterfly monitoring surveys etc. (encouraging students and staff to get involved in these)
- Development of other monitoring schemes to assess effectiveness of the UCC Biodiversity Action Plan 2018-2023 (e.g. student and staff questionnaires etc.)

Campus-specific recommendations which have yet to be implemented are detailed in section 6 of this document, "Survey Results and Resultant Recommendations." The 2018-2023 BAP has undoubtedly resulted in increased landscape heterogeneity for biodiversity. However, a lack of monitoring data makes understanding the impact on species abundance and diversity challenging. UCC's BAP complements UCC's MasterPlan (2021), Strategic Plan, "Securing Our Future: 2023 – 2028," and UCC's Sustainability and Climate Action Plan (SCAP), 2023 – 2028. Biodiversity-related targets in the SCAP include:

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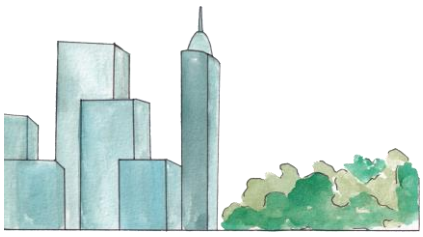
| Develop a programme with Cork City Council that would assess green space use and promote wild areas, green space, and food growing initiatives | Incorporate green infrastructure and biophilic design principles in new builds and major retrofits and develop a green walls/roofs policy | Assess local opportunities to develop or regenerate new, permanent green spaces for carbon storage and assess offsetting potential | Further develop campus walkways and greenways to ensure accessibility of our green space |

UCC has created a number of projects related to biodiversity enhancement and the human-nature connection. Some of these are briefly described below.

| Action | Description |
|---|---|
| UCC Arboretum  | UCC Arboretum has a collection of approximately 2,500 trees and was accredited internationally by Arbnet in 2020. There are approx. 120 different tree species in the collection. UCC's Campus Tree Management Strategy and Campus Tree Planting Strategy form the basis for how trees are managed, recognising the environmental, aesthetic, educational and historical importance of trees in the collection. ITEN (Irish Trees Explorers Network) established by UCC colleagues used UCC's tree collection to engage schools and the wider public with STEM subjects and nature connection. |
| Biodiversity protection in new developments  | Biodiversity has been considered very sensitively in current plans for development of Tyndall and North Mall Campus. However, there are opportunities to enhance biodiversity potential in these plans. Within UCC's built heritage, some nature has been lost as a result of renovations and new-builds; this can be addressed in future plans by considering biodiversity at project inception. |
| Community University Biodiversity Action (CUBA) Project | A partnership initiative between SECAD Partnership, Cork communities and UCC. Connected community expertise with academia to collaborate and build capacity to address Ireland's biodiversity crisis. Supported a series of coordinated Key Action Projects delivered between 2019-2023, and activities delivered through student placements and CARL(Community Research Academic Links) community-based research projects. Supported realisation of |

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|  | community Biodiversity Action Plans in Passagewest and Carrigtwohill. |
| Success: It's in your Nature  | This online module is available to UCC students. It showcases ways to engage with nature on campus to enhance mental and physical health and wellbeing. Devised in collaboration with Dr Annalisa Setti, Drs Maria Kirrane and Darren Reidy and UCC's Graduate Attributes team. |
| Green Campus Greenshoots Programme UCCGREENCAMPUS | UCC Green Campus Greenshoots Coordinator Irene Ní Shúilleabháin led the establishment of this programme to connect students to nature on campus, using UCC's green spaces as vehicles for promoting action on climate and biodiversity crises, and pro-environmental behaviours. |
| UCC Biodiversity Trail  | UCC Green Campus Greenshoots Coordinator Irene Ní Shúilleabháin created a biodiversity trail on main campus in collaboration with UCC Buildings and Estates. Further interactive signage will be created on other campuses to connect campus users with biodiversity. |

## 2.3 Purpose of BAP 2024 -2029

The purpose of this current BAP (2024 – 2029) is to build upon the achievements and gains from application of UCC's Biodiversity Action Plan 2018 – 2023 and to provide a blueprint for further actions to take across campus, with particular attention given to those that complement nature-focused actions

outlined in UCC's Sustainability and Climate Action Plan. Rather than focusing on areas of high biodiversity value, this plan takes a landscape approach to biodiversity conservation and enhancement to continue UCC's journey in becoming Nature Positive.

## 3. Broad-scope Recommendations to enhance and promote Biodiversity at UCC

Detailed habitat-specific recommendations are provided in section 6. However, broad recommendations can be summarised under three themes:

### 3.1 Holistic Action

Biodiversity losses are often treated with a species or habitat-specific approach. Actions are taken to protect species at risk of extinction or habitats in poor condition without full consideration of how humans interact with these species and places in a landscape context. True restoration requires a holistic approach. Recommendations for holistic action at UCC include:

- Incorporating **biodiversity enhancement** measures into any development, renovation or plan across campus
- Considering how biodiversity interacts with the **built environment** (e.g., apply stickers to glass walls to prevent bird deaths; protect bat roosts during construction/renovation works)
- Treating **invasive species** using a holistic management plan
- Create **new habitat** via a pond(s), scrapes and earth embankments, scrub/woodland cultivation and other opportunities
- Develop a **policy/guidance document** outlining requirements for building and landscape management contractors
- End the use of **biocides** on all sites under UCC use, including rented property, if possible (except where required for treating invasive species)
- Deepen connections with **ecological restoration and conservation organisations** and projects nationally and internationally, providing support where possible

## 3.2 Humans Are Nature

A concerted change in philosophy regarding human connection with the wider living world has left us nature deficit and ignorant to how essential biodiversity is for our existence. To address this, UCC can:

- Encourage **outdoor classes** for students of **all disciplines**
- Assess how theory across **curricula interacts with the living world**
- **Continue to research the human-nature relationship at UCC**, e.g. by expanding the work of UCC researchers in this area.
- Actively encourage students and staff to consider how they can **live in balance with nature**
- Encourage critical academic thought re. current **economic and social paradigms** which negatively impact nature (e.g. the GDP growth imperative)
- Encourage a shift **from an anthropocentric to ecocentric** perspective across curricula, i.e. universal human dignity cannot be achieved without healthy ecosystems
- Involve **local communities** in nature-focused activities in campus green spaces
- Cultivate **nature-positive** culture.

## 3.3 Scientific Rigour

UCC is primarily a centre of learning, teaching, research and innovation. Positive impacts resulting from application of BAPs can't be understood without regular assessment. A scientific approach legitimises actions and highlights priority areas. Recommendations re. application of scientific rigour to this BAP include:

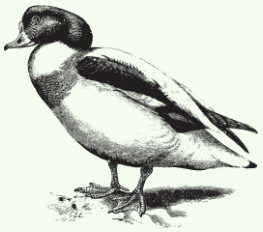
- Involving **in-house expertise** in continuous ecological assessment across campuses
- Establishing a **monitoring plan** to assess benefits/limitations of recommended actions
- Establishing annual BAP **Impact Reports**
- Completion of routine terrestrial, aquatic and species-specific **surveys** according to best-practice guidance
- Monitoring **impacts of climate change** on campus ecology
- Promoting nature and biodiversity-focused UCC research
- Involving **citizen science** via community initiatives.

# 4. Desk Study

## 4.1 Protected Sites

Sites protected under the EU Habitats and Birds Directives which have hydrological connectivity to UCC's campuses via the River Lee include the Cork Harbour SPA (Special Protection Area) and the Great Island Channel SAC (Special Area of Conservation). The Lee Valley proposed National Heritage Area (pNHA) is located up-river from the Sustainability Institute. Though no portion of the above protected areas form part of UCC's estate, it is important to recognise the potential presence of species associated with these sites in UCC grounds in this holistic BAP. For example, birds listed as qualifying interests of Cork Harbour SPA include Curlew (*Numenius arquata*), Black-headed Gull (*Chroicocephalus ridibundus*), Lesser Black-backed Gull (*Larus fuscus*), Cormorant (*Phalacrocorax carbo*) and Grey Heron (*Ardea cinerea*) (NPWS, 201), all of which have been observed on UCC's estate. Species listed as qualifying interests of the Great Island Channel Special Area of Conservation (SAC) include habitats vulnerable to pollution, meaning that UCC projects and activities should not result in pollution of the River Lee in any respect, given hydroconnectivity to this SAC. The presence of protected wildlife gives further impetus for protecting campus habitats. Conservation objectives are not available for The Lee Valley pNHA, but the site is known to contain riparian woodland and freshwater marsh (Cork City Council, 2009).



Lough Hyne is a Special Area of Conservation and supports the following qualifying interests:

- Large shallow inlets and bays
- Reefs
- European dry heaths
- Submerged or partially submerged sea caves
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

Lough Hyne SAC is monitored and protected by the National Parks and Wildlife Service. Nevertheless, UCC's activity at the site, in addition to UCC's ownership of land and infrastructure in the area, means the university has a responsibility to operate in a manner sensitive to the conservation objectives of the site.

### 4.2 National Biodiversity Data Centre Records

The National Biodiversity Data Centre (NBDC) mapping tool allows users to download lists of species recorded by citizens and experts within 1 – 100km square plots. NBDC records of species at 10km squared were viewed as reference for each campus/survey site. These lists provided an indication of biodiversity (and associated changes in abundance/diversity) across the UCC estate over years.

### 4.3 Other Surveys of UCC North Mall Campus

Ecological assessments carried out by professional ecologists at UCC to (a) inform Environmental Impact Assessment Reports and (b) identify ecological constraints are a valuable resource for this BAP. These assessments inform the potential for development plans at the North Mall to impact biodiversity. Findings of note are referenced in section 6.

## 5. Field Study

### 5.1 Surveys

Habitat surveys were conducted by Irene Ní Shúilleabháin with assistance from Christina Coughlan and Magnus Malone Skolemestra (final year UCC BSc. Ecology and Environmental Biology students). Bat surveys were carried out by Colm Breslin (Junior Ecologist at O'Donnell Environmental Ltd.; currently completing an MSc. at UCC). These surveys were conducted from August – September 2024. In 2025, a bird survey was conducted across UCC's estate. Lead by Irene Ní Shúilleabháin, on-the-ground point count surveys were carried out by Christina Coughlan, Dr. Dara Fitzpatrick and Irene at UCC's Main Campus, Western Campus, North Mall Campus, the Sustainability Institute and the Mardyke Sports Grounds. In addition, AudioMoth recorders were installed at UCC's Curraheen campus. **Not all of UCC's estate was surveyed.** Sites included in UCC BAP 2018 – 2023 were resurveyed to inform this plan. This BAP focuses on five substantial sites within or west of Cork City: Main Campus (MC), North Mall Campus (NM), Western Campus (WC), Mardyke Sports Grounds and the Sustainability Institute in addition to Curraheen Sports Pitches and Curraheen Agricultural Fields, just west of Wilton. The Renouf, John Bohane and Kitching laboratories, located at Lough Hyne, were not surveyed as part of this BAP, nor was the Skellig CRI Centre in Caherciveen.

Christina Coughlan assisting fieldwork at UCC Curraheen Sports Campus

Habitats were categorised and mapped in accordance with the classification scheme outlined in *A Guide to Habitats in Ireland* (Fossitt, 2000) and following *Best Practice Guidance for Habitat Survey and Mapping* (Smith et. al, 2011). Habitats were assessed with reference to Habitats Directive Annex 1 habitats where applicable. UCC Biodiversity surveys carried out between 2014 – 2016 (Lalor Ecology, 2018) provide a foundation for the continuation of field surveys which inform this BAP. Habitat surveys adopted a 'look-see' search approach (NRA, 2009). These surveys also aimed to record any rare plant species, with special attention given to plants listed in Annex II of the EU Habitats Directive / Flora Protection Order species (FPO, 2022) / Flora species listed in The Irish Red Data Book (Wyse Jackson et. al, 2016).

However, August is a sub-optimal time for botanical assessment and habitat assessment generally, given that foliage is beginning to die back at the start of autumn. An additional caveat should be clarified in that the author (though adept in ecological assessment broadly) is not an experienced botanist.

## 5.2 Other Surveys

During habitat surveys, evidence of invasive species, mammals, birds, readily identifiable insects and other fauna and flora were recorded. Invasive species are those introduced to Ireland which are considered to have a negative effect on native ecosystems. Particular attention was given to invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended). Invasive species are classed according to their potential impact. These are "Risk of High Impact," "Risk of Medium Impact," and "Risk of Low Impact." This are coded as RHI, RMI, RLI respectively in this document. Campus maps of invasive species were not made given the broad diversity and spread of invasive species on campus. Tackling invasive species will require a dedicated survey of all campuses as invasive species were not the primary focus of the fieldwork carried out to inform this BAP. No formal survey was done for specific species groups as part of the field work which informed this BAP, apart from bats. This was due to the sub-optimal time for field work, and limited time and capacity of the surveyors.

Mr. John Murphy, UCC Head Gardener, has kept a list of plant species records on campus since low-mow practices began in 2018. These are included in Appendix 1.

### 5.2.1 Bat Survey – Colm Breslin

Bat surveys were carried out by Colm Breslin with assistance from Magnus Malone Skolemestra. Bat activity surveys were undertaken using passive bat monitoring stations to quantify local bat activity levels, species richness and degree of interaction with the various UCC campus study sites (see table below for locations). The study sites across the various UCC campuses exist within the context of dense urbanisation with discontinuous tree cover and open green areas forming a matrix of habitats throughout. Habitats support varying degrees of vegetation cover and light levels.

Wildlife Acoustics Song Meter Mini full-spectrum ultrasonic bat detectors were utilised across all study sites. Recorders were placed in secure locations, camouflaged by foliage where possible, at or adjacent to bat-suitable habitat. Surveys took place during the active bat season in August and September. Data gathered by the same surveyors as part of another unrelated study during summer/autumn 2022 following a similar methodology also informed bat data gathered for the UCC BAP (Breslin, 2022; see table below for full deployment details). This unrelated study sought to quantify the aforementioned variables across the wider Cork City urban matrix.



Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise and the GPS locations were set on each detector. The detectors automatically adjust their start and finish times based on sunrise and sunset. Campus maps in section 6 illustrate the locations of detectors deployed. Individual bats of the same species cannot be distinguished by their echolocation alone and therefore ‘bat registrations’ are used as a measure of activity. A bat registration is defined as the presence of an individual species’ echolocation signal within a recording of maximum 15 seconds duration. All bat registrations recorded during this study follow these criteria, allowing a degree of comparison between monitoring stations. It is important to note that bat registrations do not equate to number of individuals (Collins, 2023).

Bioacoustics analysis of bat sonograms was carried out according to parameters outlined in Russ (2012; 2021) and Middleton et al. (2022). Kaleidoscope Pro software was used to aid analysis and all calls were

manually verified. Comparison of relative bat activity between sites in this instance cannot be inferred, although comparison of activity patterns (peaks and troughs etc.) can.

| Site | Grid Reference | Survey Period(s) | Total Survey Nights |
|---|---|---|---|
| North Mall (BEES) | W 66538 72034 | 15 July – 2 August 2022; 22 August – 2 September 2022 | 29 |
| Brookfield | W 65533 71138 | 23 August – 28 August 2024 | 5 |
| Curraheen | W 62527 69349 | 6 September – 11 September 2024 | 5 |
| Sustainability Ins. | W 64538 71475 | 6 September – 11 September 2024 | 5 |
| Main Campus | W 66286 71298 | 23 August – 28 August 2024 | 5 |
| Main Campus (by river) | W 66239 71503 | 18 July – 2 August 2022; 19 August – 25 August 2022 | 21 |
| Mardyke | W 65494 71427 | 30 August – 4 September 2024 | 5 |
| Mardyke (by river) | W 65879 71725 | 15 July – 2 August 2022; 19 August 2 September 2022 | 32 |
| Western Campus | W 65483 71276 | 30 August – 4 September 2024 | 5 |
| Western Campus (river) | W 65294 71337 | 2 August – 7 August 2022; 2 September – 6 September 2022 | 9 |

### 5.2.2 Bird Survey (2025)

Bird surveys of UCC's Main Campus, Western Campus, North Mall Campus, the Sustainability Institute and the Mardyke Sports Grounds were conducted in May and June. AudioMoth recorders were installed at UCC Curraheen Sports Grounds and Agricultural campus to assess diversity of species there. No on-the-ground survey effort was conducted at Curraheen. Surveys employed point count methodology. A summary of methods is attached in Appendix 5. Surveys of the Sustainability Institute, Mardyke Sports Grounds and

North Mall Campus were conducted by Irene in May and June 2025. Dr. Dara Fitzpatrick carried out surveys of UCC's Main Campus in May 2025. Christina Coughlan carried out round two of Main Campus surveys, in addition to covering Western Campus, in June 2025.

## 6. Survey Results and Resultant Recommendations

This section provides an overview of habitats at each campus surveyed and associated biodiversity enhancement recommendations. All habitats detailed below are of importance for biodiversity. Rather than organise these in order of species-richness potential, habitats and their value are described below, in association with biodiversity enhancement recommendations. This reflects a holistic approach to biodiversity management on campus. Usual practice is to describe only the dominant habitat and occasionally the next dominant habitat, but effort has been made to include all relevant habitat descriptions. Recommendations, if carried out, will contribute to the fulfillment of UCC plans in addition to meeting the criteria of local, national and international legislation.

Prior to detailing specific biodiversity recommendations for each campus, special attention is given to two specific habitats found across most of UCC's estate: Amenity Grassland (GA2) and Buildings and Artificial Surfaces (BL3).

### Amenity Grassland (Fossitt Code: GA2)

Continuing from UCC's BAP 2018-2023, this habitat still occurs throughout all surveyed campuses except Curraheen Agricultural Campus. This generally species-poor habitat occurs alongside ornamental borders/trees among buildings and carparks. GA2 also serves as sports pitches at Mardyke and Curraheen campuses. Species recorded in GA2 across campus include Perennial Ryegrass, Clover, Daisy, Plantains, Common Ragwort and Common Mouse-ear. As a result of changes in management practice recommended in UCC's BAP 2018-2023, pockets of GA2 selected for a "low-mow," approach have evolved to support a far greater diversity of species. First applied in 2017, UCC's low-mow policy applies recommendations from the All-Ireland Pollinator Plan. It encompasses most sites of GA2 on Main Campus, Sustainability Institute and North Mall campus, and also occurs in a pocket at the Mardyke Arena (behind UCC Department of Sport & Physical Activity at Ferry Lodge), and in a small patch west of the Western Gateway Building.

Areas of GA2 allowed to flourish under the low-mow approach can now be considered to be of higher local value to biodiversity due to the presence of species indicative of grassland types experiencing general widespread decline in Ireland. For simplicity, Amenity Grassland resembling grassland types of higher biodiversity value as a result of management are allocated as, *Dry Calcareous/Neutral Grassland* (GS1), *Wet Grassland* (GS4) and *Dry Meadows and Grassy Verges* (GS2) in this plan, according to species present.

Some areas of grass at Main Campus are still maintained as Amenity Grassland for their aesthetic and recreational value. UCC's President's Garden and Main Quadrangle (henceforth referred to as "Main Quad")

contain GA2, maintained using seaweed and manures. No herbicides, pesticides or artificial fertilisers are used.

**Recommendations:**

- Continuation of sensitive, biodiversity-enhancing management approach in areas of GA2 selected for low-mow policy
- Increase in number of sites included in this policy
- Expansion of this policy to all UCC sites
- Development of pollinator-friendly strips of GA2 at Mardyke, Western Gateway, and around border of sports pitches at Curraheen

### Buildings and Artificial Surfaces (BL3)

Main campus comprises buildings of various ages and functions. The Main Quad is a stone building which dates to 1849. It therefore supports a variety of cracks, small holes and crevices in its structure, which are utilised by breeding birds (e.g. Blue Tit and Woodpigeon nest in the south-facing wall of the north wing) and bats. The building also supports structurally diverse planting in Flower Beds and Borders (BC4) along its walls, in addition to climbing plants; all of which offer shelter for roosting bats and birds (e.g. Dunnock).

Newer buildings also support wildlife. A Spotted Flycatcher nest was observed on the Emergency Exit light at an exit from the Geography Building by Dr. Dara Fitzpatrick prior to renovation works on the building. Following renovation of the exit, the Spotted Flycatcher nesting site was regrettably lost.

Much of the BL3 habitat across UCC includes carparks and other concrete structures which, though species-poor, nevertheless host species such as Wall Lettuce, Daisy, Broad-leaved Plantain, Stonecrop, and various mosses and other bryophytes. Invasive species such as Butterfly Bush and Traveller's Joy readily occupy much of the Recolonising Bare Ground (ED3) on campus. UCC's most recent BAP determined that "humid areas of concrete and tarmac harbour some infrequently recorded bryophytes".

**Recommendations:**

Consider replacing more concrete infrastructure with nature-sensitive material, e.g. in areas of Recolonising Bare Ground (ED3), continuing this work by UCC Grounds Management team. Manage spread of invasive species to prevent takeover. Insert bird and bat boxes on buildings if appropriate, but prioritise monitoring of existing boxes. Experiment with Swift Callers and boxes on suitable buildings (see Whelan et al., n.d.). Expand number of green roofs. Explore potential for green walls. Map and maintain nesting sites in buildings. Replace lost Spotted Flycatcher nesting site. Carry out updated bryophyte survey to assess what species BL3 supports. Refer to Wildlife in Buildings for guidance (Sullivan and Lusby, 2021).

## 6.1 Main Campus

UCC's Main Campus contains the greatest diversity of modified built and semi-natural habitats. Most biodiversity enhancement measures recommended for Main Campus in the last BAP have been implemented, with additional efforts. These include:

| | |
|---|---|
| All grounds-staff are aware of the importance of the ER2 (calcareous stone wall) habitat and the importance of not removing any vegetation here. |  |
| All relevant data on Japanese Knotweed and Himalayan Balsam gathered during the UCC Biodiversity Surveys 2014-2016 was passed to O' Donovan Agri-Environmental Services (consultants undertaking invasive plant eradication). |  |
| Ban on the use of herbicides and pesticides. |  |
| Development of low-mow biodiversity-friendly grasslands. |  |

| | |
|---|---|
| Creation of a wildflower meadow. |  |

Biodiversity enhancement measures recommended for Main Campus in the last BAP which have yet to be implemented include:

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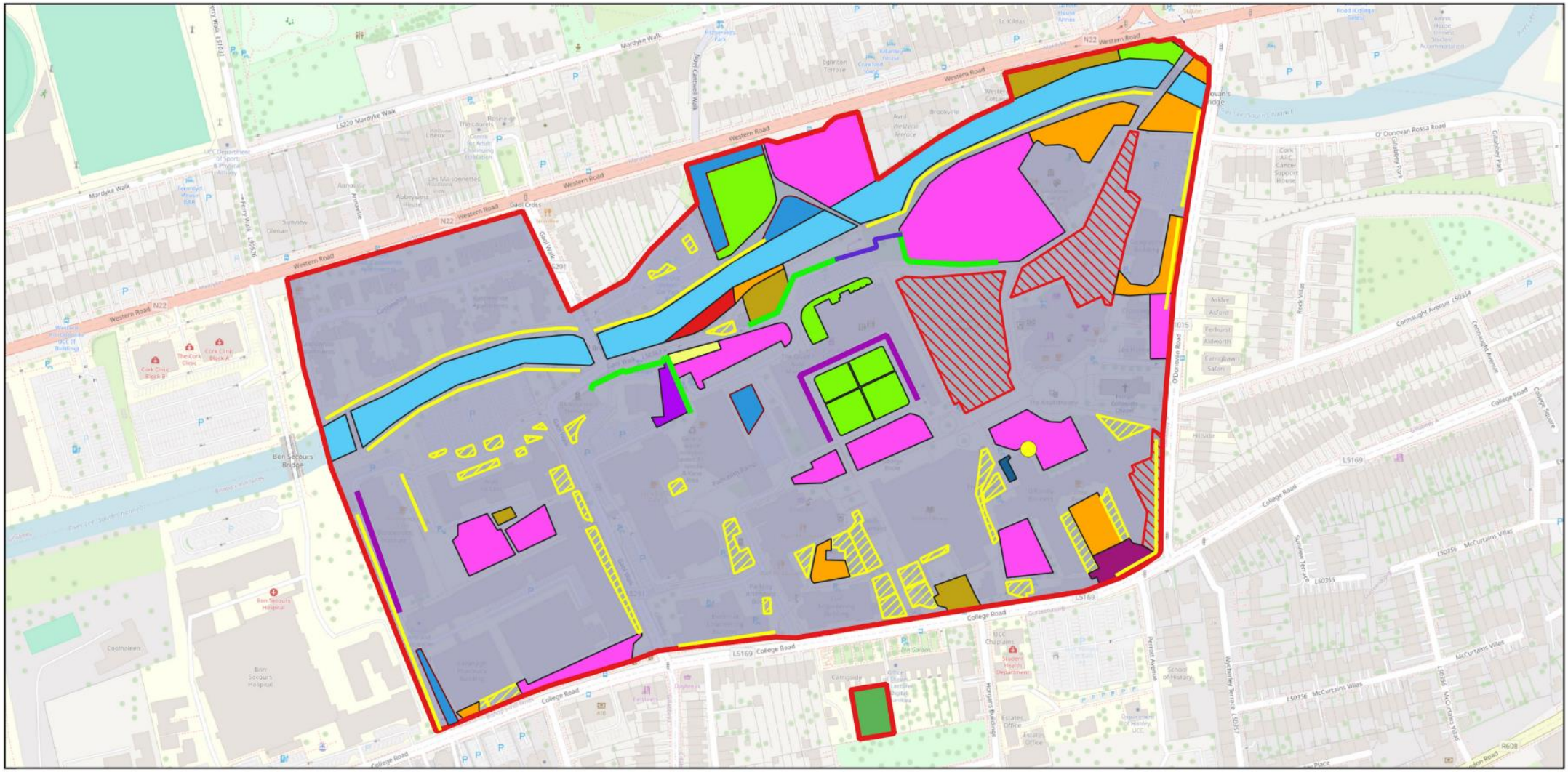
|---|---|
| Installation of two Grey Wagtail nest boxes for this Red Listed species in Main Campus. These should be mounted on a wall near the River Lee (e.g. underside of a bridge) unless there is risk of water reaching the nest site. |  |
| Installation of bat boxes/tubes on the Cavanagh Bridge, if no risk of water reaching the roost site is guaranteed. Must ensure boxes/tubes are minimum 1m above high water mark or risk trapping/drowning bats on exit. |  |
| Commission further specialist Biodiversity Surveys in future years as planned. |  |




## Main Campus Habitat Map

**Feature**

- Bat detector

**Linear Habitat**

- BC4 Flower beds and borders
- BL1 Stone walls and other stonework
- ER2 Exposed calcareous rock
- WL2 Treelines

**Habitat**

- UCC Boundary
- Community Garden
- BC4 Flower beds and borders
- BC4/WD5 Flower beds/Scattered trees
- BL3 Buildings and artificial surfaces
- ED3 Recolonising bare ground
- FW2 Depositing river
- GA2 Amenity grassland
- GS2 Dry meadows and grassy verges
- GS2/WD5 Dry meadows/Scattered trees
- WD1 Broadleaved woodland
- WD1/BC4 Broadleaved woodland/Flower beds
- WD5 Scattered trees and parkland
- WD5/GS1 Scattered trees/Dry calcareous & neutral grassland
- WD5/WS3 Scattered trees/Ornamental
- WS3 Ornamental non-native shrub

0 100 200 m

**Main Campus (MC) habitats, descriptions & Recommendations:**

| Habitat Type | Description | Recommendations |
|---|---|---|
| Dry Meadows and Grassy Verges (GS2)<br>  <br>  | Developed from areas of former Amenity Grassland (GA2) on campus because of sensitive management. Co-occurs with other habitat types on main campus. Strictly these areas can be considered to be GA2/GS2. UCC Wildflower Meadow features species associated with GS2.<br><br>Plant species recorded in GS2 on MC include Sweet Vernal Grass, Cat's Ear, Self-Heal, Crested Dog's Tail, Daisy, Clover, Yorkshire Fog, Creeping Bent, Germander Speedwell, Creeping Cinquefoil, Common Centaury, Willow Herb, Redshank, Creeping Buttercup, Meadow Buttercup, Prickly Sow-thistle, Spear Thistle, Field thistle, Common Mouse-ear, Ragwort, Red Fescue, Black Meddick, Nettle, Dandelion, Cut-leaved Geranium, Ox-eye Daisy, Broad-leaved dock, Wood Avens and many others.<br><br>Insect species recorded in GS2 throughout UCC sites included numerous 6-Spotted Burnet caterpillars (Ragwort is their food plant), Common Red Soldier Beetle, Large White and Speckled Wood Butterflies and many spiders, hoverflies, moths and beetles not identified to species level, in addition to bumblebees and wasps.<br><br>Invasive species associated with these plots include Canadian Fleabane (RMI), Traveller's Joy (RMI), Harlequin Ladybird (RHI), Winter Heliotrope (LRI), Greater White-toothed Shrew and Japanese | Allow some hollow plant stems to remain in areas of GS2 designated for wildlife-friendly management to facilitate overwintering insects, such as solitary bees (AIPP, 2023) moths (Littlewood, 2008) spiders and beetles (Holland et al., 2016) by leaving small areas unmown over winter.<br><br>Monitor for presence of invasive species.<br><br>Create a pond in the area of grassland containing species indicative of GS4 beside the Glucksman gallery, which occupies the site of a former pond (see Appendix 2 for details on pond creation). The following photos, taken after rain, demonstrate that the land surrounding the Glucksman may be suitable for the creation of a pond(s) which doesn't require synthetic lining:<br>  |

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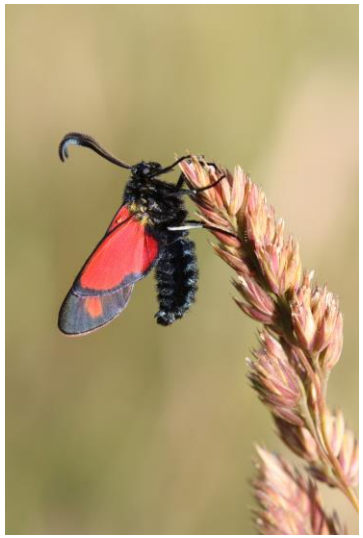
|---|---|---|
|  | Knotweed (RHI). Some species indicative of Wet Grassland (GS4) were recorded in grassland adjacent to the Glucksman. These species include Creeping bent, Yorkshire Fog, Creeping Buttercup, Silverweed and Marsh foxtail. |  |
| Neutral Grassland (GS1)<br>  | Located south-east of O'Rahilly building, GS1 occurs amongst WD5 (Scattered Trees & Parkland) and supports Self-heal, Creeping Bent and Pyramidal orchid. UCC's wildflower meadow on Main Campus also hosts plants of neutral to calcareous grassland, e.g. Yarrow, Field Scabious, Knapweed and Ox-eye Daisy. Established in 2017, this wildflower meadow is occasionally seeded with native wildflower seeds to enhance diversity. It is managed using the following approach:<br>*the meadow is cut every September with a sickle bar mower. Meadow cuttings are left to lie on the ground for three to four days to allow seeds to drop off. Cuttings are then raked and removed from meadow* | Allow some hollow plant stems to remain in areas of GS1 designated for wildlife-friendly management to facilitate overwintering insects, such as solitary bees (AIPP, 2023) moths (Littlewood, 2008) spiders and beetles (Holland et al., 2016).<br>Monitor for presence of invasive species. Allow wildflower meadow to self-seed, i.e. don't add additional species/seed-mixes; see what grows naturally. |

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| | *by hand. This ensures fertility of the soil is kept low, providing conditions for wildflower diversity to flourish.* | |
| Exposed Calcareous Rock (ER2)<br>  | Runs parallel to River Lee; marks delineation between calcareous rock and sandstone in Cork City. UCC's BAP 2018-2023 determined that this rock face is of County Importance for Bryophytes given the assemblage of uncommon bryophytes it supports. A Bryological survey is required to inform the current BAP. Plant species recorded here include self-seeded Oak saplings, Ivy-leaved Toadflax, Greater Burnet Saxifrage, Nipplewort, Dandelion, various bryophytes (unidentified), Wall lettuce, Willow herb, Ragwort, Figwort, Ivy, Lords and Ladies, Wood Avens and Hart's tongue-fern. | Monitor for specialist and infrequently recorded bryophytes. |
| Flower beds and borders (BC4) | Varies between highly manicured/maintained decorative flower beds, e.g. those in the President's Garden, and borders which contain a variety of wild plants. Where BC4 occurs with Scattered Trees and Parkland or Woodland, woodland indicator plants were record, e.g. bromes, Wild Angelica and Enchanter's Nightshade. Nettle-leaved Bellflower (very rare plant in Ireland) was recorded in BC4 adjacent to O'Rahilly Building (provenance TBC) by Head Gardener John Murphy in 2023 and again by Irene Ní Shúilleabháin in 2024. Many BC4 | Monitor BC4 for invasive species colonisation. Limit spread of invasive species where necessary. Prioritise pollinator-friendly native planting for creation of new BC4/maintenance of existing BC4. Assess native provenance of Nettle-leaved Bellflower through expert botanist; protect specimen. |

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|  | pockets contain non-native decorative and/or medicinal plants, evidencing UCC's history as a Botanical Garden. Invasive species such as Himalayan Honeysuckle (MRI), Winter Heliotrope (LRI) and Traveller's Joy (MRI) were recorded in and adjacent to BC4. Pollinating insects such as hoverflies were also recorded. | |
| Hedgerow (WL1) | One hedgerow was recorded on main campus; it borders Perrot's Inch carpark and contains Hawthorn, Holly, Traveller's Joy (MRI), Bramble, Lime, Sycamore (MRI), Tutsan and Barberry. | Contains shrubs which provide food and shelter for birds and small mammals. If possible, small holes could be cut at base of fence running through hedgerow to allow mobility of hedgehogs. Hedgerow should be monitored for dominance by Traveller's Joy and other invasive species. |
| Horticultural Land (BC2) | This combination of habitats occurs at UCC Community Garden. Located behind no. 6 Carrigside on College Road, the garden is at least 22 years old and supports vegetables, herbs and flowers. It contains 3 polytunnels, a glasshouse and a toolshed. The garden | This site is an important green space for student and staff wellbeing. It supports a high number of birds and invertebrates, in addition to providing habitat for hibernating small mammals via the compost pile (comprising clippings and waste vegetation from campus grounds). No |

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|  | supports common species e.g. Plantains, Dandelion, Broad-leaved Dock, Pineapple Weed, Bramble, Ivy, Daisy and Creeping Buttercup. A Privet hedge comprises the eastern boundary of the garden. The site is connected to well-vegetated mature gardens on its east and west boundaries. Trees include Silver Birch and Wild Cherry. Birds recorded here include Long-tailed Tit, Coal Tit, Blue Tit, Great Tit, Goldcrest, Blackbird, Song Thrush, Robin, Goldfinch, Magpie and the sharply declining Greenfinch. | biocides are used on site and organic produce is chosen for planting, where possible. This site should be maintained as an accessible green space for the UCC community, in addition to a sanctuary for wildlife. Create a long-term management strategy and funding stream for the garden in collaboration with UCC Sustainability & Climate Action, Buildings and Estates, Environmental Society and the Students' Union. |
| Ornamental/non-native Shrub (WS3)<br>  | Species recorded within this habitat on main campus included many non-invasive non-native ornamental shrubs. However, many invasive non-native shrubs were recorded also. These include Cherry Laurel (RHI), Himalayan Honeysuckle (RMI), Traveller's Joy (RMI), Butterfly Bush (RMI), Winter Heliotrope (RLI) and Japanese Knotweed (RHI). WS3 occurs most frequently with buildings and artificial surfaces on main campus, while ornamental shrubs were recorded within other habitats (e.g. woodland, grassland) also. | Monitor this habitat for the presence and spread of invasive species. Remove/treat/prevent spread of invasive species where they encroach on habitats of value for biodiversity. Choose native shrubs in future planting regimes. |

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| Scattered Trees and Parkland (WD5)<br>  <br>  | Occurs in tandem with grassland habitats on MC. Adjacent to the Glucksman Gallery, WD5 occurs with grassland under wildlife-sensitive management which supports a mix of species typical of grassy verges (GS2) and wet grassland (GS4). Mature trees here include Oak, Beech and Black Walnut. WD5 north-west of main quad contains Tulip Poplar, Elm and Elm saplings, Sycamore (RMI), Ivy, Germander Speedwell, Bramble, Hawthorn, Northern Oak, Dog Violet, Tutsan, Wood avens, Spear thistle, and Traveller's Joy. Birds included Wren and Blackbird. Chaffinch was observed nesting on a Black Walnut tree branch. WD5 also occurs north of the Student Centre, south of the O'Rahilly building, at the Observatory, at the main entrance to main campus (Alumni Bridge) and in other smaller pockets throughout main campus. | Monitor this habitat for the presence and spread of invasive species. Remove/treat/prevent spread of invasive species where they encroach on habitats of value for biodiversity. Monitor the health of trees, and diversity of woodland indicator shrubs and herbaceous plants. Enact biosecurity measures to prevent the spread of tree diseases where possible. Consider creating a Moon Garden in WD5 at the Observatory, prioritising native planting (see Appendix 3; details can be found in AIPP's guidelines for protecting nocturnal pollinators). |
| Mixed Broadleaf Woodland (WD1) | Found in pockets throughout MC. One of the largest examples runs along the stone wall between the meadow adjacent to the Glucksman and the main entrance pathway to MC. Species recorded in WD1 on main campus include Greater Burnet Saxifrage, Wood Avens, Bramble, Yew, Bay, Ivy, Chilean Myrtle, Tutsan, Ash (affected by dieback), Lime and Silver Poplar. Invasive species recorded in WD1 | Monitor for presence and spread of invasive species. Monitor the health of trees, and diversity of woodland indicator shrubs and herbaceous plants. Enact biosecurity measures to prevent the spread of tree diseases where possible. |

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|  <br>  | include Himalayan Honeysuckle (MRI), Sycamore (MRI), Winter Heliotrope (LRI) and Snowberry (LRI). Animals included Sparrowhawk, Wren, Red Squirrel, Long-tailed Tit, Blue Tit, Chaffinch, Jay, Goldcrest, Raven, Woodpigeon and Harvestmen (*Opiliones*).<br><br>A small section of immature native woodland (WS2) was planted in the green space between the School of Microbiology and Áras na Laoi. This pocket is part of a phenology experiment led by Prof. Astrid Wingler of UCC BEES. It contains a mix of native tree species only, though Harlequin Ladybird (RHI) was also recorded here. | |
| Treelines (WL2) | Includes lines of single-species trees adjacent to O'Rahilly Building, Biosciences Café, Sensory Garden, College Road border. Multi-species treelines border the River Lee. WL2 frequently occurs with BC4 (Flower Beds & Borders) on campus. Combined, they provide roosting sites for bats and birds, in addition to niches for bryophytes and invertebrates. | Maintain existing treelines. Explore potential for supplementation of non-native single-species treelines with additional native species to enhance diversity. |
| Depositing/lowland River (FW2) | The River Lee runs through main campus. Species recorded along/in the river included Hoverflies, fish (e.g. Rudd), Bramble, Nettle, Tutsan, and alluvial trees such as Alder and Willow. Invasive species such as Himalayan Balsam (RHI), Japanese knotweed (RHI) and Montbretia (LRI) were recorded during fieldwork; Mink (RHI) are also known to use the river. This stretch of river supports Red-listed Grey | Carry out full assessment of river to determine its condition under Water Framework Directive, and to understand what biodiversity it supports. Consult with OPW and associated stakeholders prior to any dredging works to prevent damage to riverbank, loss of habitat, silt accumulation and dispersal of invasive species. Create a river protection plan in consultation with relevant authorities. Explore potential for installing bat |

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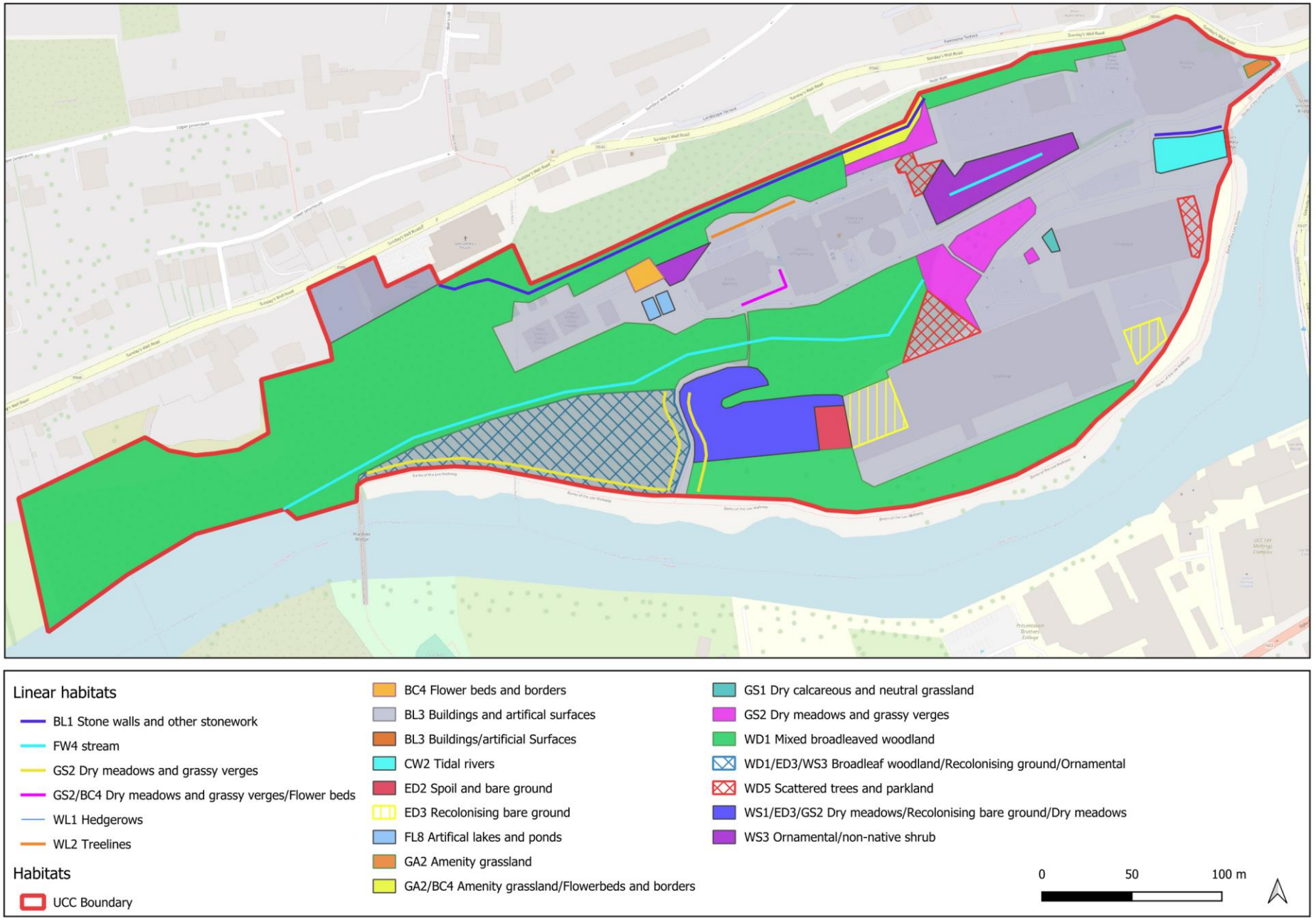
|  <br>  <br>  | Wagtail and Amber-listed Kingfisher, in addition to Otter. Marsh habitat previously recorded in the last iteration of UCC's BAP was not recorded during fieldwork which informed this plan. The marsh habitat may have been lost to flooding mitigation works (e.g. dredging) or covered with silt from works up-river. | and Grey Wagtail boxes at locations along the river, e.g. bridges (though care must be taken to ensure the boxes are above the floodline). Explore potential for restoration of marsh habitat recorded in UCC's BAP 2018 - 2023. Carry out an updated Otter survey to inform current survey record. Consider installing camera traps to monitor Otter and Mink (RHI). |
| Recolonising bare ground (ED3) | Occurs in tarmac/concrete areas on BL3, e.g. at the carpark at the north wing of the Kane building. Species included Butterfly Bush (RMI), Willow Herb, Red Valerian, Stonecrop, various mosses and succulents, Sycamore (RMI), vetch sp., False Widow Spider (invasive species; impact not classified), Ragwort, Dandelion, Daisy and Wall Lettuce. Wren was heard also. | Monitor for invasive species colonisation. Remove weeds by hand; avoid use of herbicides. |

## 6.2 North Mall Campus

UCC North Mall Campus (NMC) contains a rich mosaic of built and semi-natural habitats. NMC is bound to the south by the northern channel of the River Lee and to the north by an escarpment rising to Sunday's Well Road (Scott Tallon Walker and McCutcheon Halley, 2021). NMC is part-owned by Mercy University Hospital, so biodiversity enhancement initiatives will need to be done in consultation with the Mercy University Hospital where they are established on areas owned by them. The Mill Race watercourse divides the site. A small basin to the east of the site contains a weir which retains water when the river is in low tide (ibid.). Part of the Mill Race is culverted. Most recommendations from UCC's current BAP have been applied at NMC. Two Grey Wagtail nest boxes have yet to be installed on site, however, this may be due to the difficulty of locating a spot invulnerable to fluctuating water levels. A map of habitats followed by detailed habitat descriptions and associated recommendations are outlined below.


Linear habitats
BL1 Stone walls and other stonework
FW4 stream
GS2 Dry meadows and grassy verges
GS2/BC4 Dry meadows and grassy verges/Flower beds
WL1 Hedgerows
WL2 Treelines
Habitats
UCC Boundary
BC4 Flower beds and borders
BL3 Buildings and artifical surfaces
BL3 Buildings/artificial Surfaces
CW2 Tidal rivers
ED2 Spoil and bare ground
ED3 Recolonising bare ground
FL8 Artifical lakes and ponds
GA2 Amenity grassland
GA2/BC4 Amenity grassland/Flowerbeds and borders
GS1 Dry calcareous and neutral grassland
GS2 Dry meadows and grassy verges
WD1 Mixed broadleaved woodland
WD1/ED3/WS3 Broadleaf woodland/Recolonising ground/Ornamental
WD5 Scattered trees and parkland
WS1/ED3/GS2 Dry meadows/Recolonising bare ground/Dry meadows
WS3 Ornamental/non-native shrub
0
50
100 m

**North Mall Campus (NMC) habitats, descriptions & Recommendations:**

| Habitat Type | Description | Recommendations |
|---|---|---|
| Grassy Verges (GS2)<br>  <br>  <br>  | Developed as a result of low-mow management in Amenity Grassland (GA2). Borders pathway to North Mall from river walk; occurs with BC4; in experimental plot and along pathway leading to Cooperage, and in mosaic with WS1 (Scrub) and ED3 (Recolonising Bare Ground). Species include Yorkshire Fog, Meadow Vetchling, Nettle, Willow herb, False Oat-grass, Cut-leaved Cranesbill, Dandelion, Broadleaf Plantain, Hedge Woundwort, Self-heal, Creeping Buttercup, Greater Mullein, Salad Burnet, Musk Mallow, Ox-eye Daisy, Creeping & Common Bents, Bladder Campion, and ragwort. Animals recorded in and around GS2 include Swallow, Buzzard, Red-tailed Bumblebee. | Continue to treat areas of Amenity Grassland using low-mow, wildlife-friendly management. Record species abundance and diversity in these plots annually. Determine the provenance of the Salad Burnet. Allow some hollow plant stems to remain in areas of GS2 to facilitate overwintering insects. Monitor for presence of invasive species. |
| Tidal River (CW2) | The River Lee is tidal at UCC's NMC. A tidal mill race is present on-site. This channel was found to support a specialist bryophyte assemblage in UCC's Bryophyte Survey (2018). An otter holt was located by Ecologists | Otters are known to use the river and banks at NMC. Holts, couches and areas of cover for otters should be protected. UCC should consult with relevant stakeholders re. protection of river |

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|  | from Malachy Walsh and Partners (MWP) in a 2021 survey of the North Mall campus along the riverbank at NMC. Otter activity has also been recorded at NMC by Sleeman et al. (2019). | habitat and species prior to any flood relief works that take place here to protect the river and prevent spread of invasive species. River should be assessed for water quality under Water Framework Directive guidelines annually. Consider installing camera traps to monitor Otter and Mink (RHI) and Mink traps. |
| Riparian Woodland (WN5 amongst WD1)<br>  <br>  | WN5 occurs along either side of the river at North Mall Campus. Ash and Alder occur in the canopy layer. It is broadly classified as mixed broadleaf woodland (WD1) given that it is dominated by Sycamore (RMI). Other species include Lords & Ladies, Wood Dock, Hogweed, Bramble, Cleavers, Wild Angelica, Ground Elder, Cherry Laurel (RHI), Enchanter's Nightshade, Trailing Bellflower, Hawthorn, Remote Sedge, Holly, and Wood Avens. Himalayan Balsam (RHI) poses a significant threat to this habitat. It dominates the understorey of the woodland. Butterfly-bush (RMI) also occurs. Many trees and mature ivy provide roosting/foraging habitat for bats and birds here. | Invasive species must be managed here to ensure the continued value of this habitat for biodiversity. Monitor health of trees, and diversity of woodland indicator shrubs and herbaceous plants. Enact biosecurity measures to prevent spread of tree diseases where possible. Consult with OPW and associated stakeholders prior to any dredging works along the river to prevent dispersal of invasive species into the woodland. |

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|---|---|---|
| Mixed Broadleaved Woodland (WD1)<br>  <br>  | Occurs in pockets across North Mall Campus. Ground flora of the WD1 north-east of the campus is dominated by invasive species such as Traveller's Joy, Cherry Laurel, Winter Heliotrope and Snowberry. Sycamore is a dominant tree species across WD1. Lords & Ladies, ferns (e.g. Hart's tongue) and ivy occur. Hedgerow Bindweed, Cleavers, Nettle, Bramble, Elder, Ash, also occur. Probable usage by Fox, Squirrel, bats and small mammals. Many trees and mature ivy likely provide roosting/foraging habitat for bats and birds. Wren and Robin were recorded in WD1 also, in addition to various flies, butterflies and wasps. WD1 south of Bottling Plant supports mature Lime trees, Herb Robert, Wood Dock, Yellow Archangel, Wood Avens, Hogweed and Willow herb. | Eradicate invasive species where possible and prevent spread. Monitor health of trees, and diversity of woodland indicator shrubs and herbaceous plants. Enact biosecurity measures to prevent spread of tree diseases where possible. |
| Dry calcareous and neutral grassland (GS1)<br>  | Occurs in a small patch of former GA2 at western side of Cooperage. Contains Yarrow, Knapweed, False Oat-Grass, Common Bent, Red Fescue, Kidney Vetch, Wild Marjoram, Cut-Leaved Cranesbill, Wild Carrot, Yellowrattle, Black Meddick, Sweet Vernal Grass and Clover. Potential result of 'guerilla gardening,' via scattering of wildflower 'bombs,' or seeds. | Carry out soil test to determine soil pH. Record species abundance and diversity in this plot annually. Allow some hollow plant stems to remain in areas of GS1 to facilitate overwintering insects. Monitor for presence of invasive species. Continue to treat areas of Amenity Grassland using low-mow, wildlife-friendly management. |

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|---|---|---|
| Meadow (GS2), Recolonizing Bare Ground (ED3) and Scrub (WS1)<br>  | This combination of habitats occurs in areas treated for Japanese Knotweed on NMC; ED3 also occurs at the western side of the bottling plant. Species recorded include Japanese Knotweed (RHI), Greater Mullein, Bladder Campion, Sycamore (RMI), Willowherb, Bindweed, Hedge Woundwort, Creeping Buttercup, Willow, Traveller's Joy (RMI), Canadian Fleabane (RMI) and Ragwort. | ED3 is readily invaded by invasive species; monitor for these, esp. Japanese Knotweed. Consider replacing this area with a pollinator-friendly plot. Allow for continued expansion of scrub. Consider planting native species capable of competing with Japanese Knotweed and other invasives. Monitor area for expansion of invasive species. Survey area regularly. Remove weeds by hand and avoid use of herbicides in ED3. |
| Spoil and bare ground (ED2) | Located west of the bottling plant. Contains gravel and grass clippings. Supports Butterfly Bush and Traveller's Joy, in addition to common native "weeds." | Take care when dumping clippings as they may contain invasive species seeds and/or rhizomes. |
| Ornamental/non-native shrub (WS3) | Non-native shrubs occur throughout NMC in combination with other habitats. Invasive species include Himalyan Balsam, Traveller's Joy and Butterfly Bush. Japanese Knotweed continues to thrive in areas in which it was removed and treated. | Invasive species require a holistic management plan. |

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|---|---|---|
| Treeline (WL2)<br>  | Treelines at NMC offer habitat to a variety of invertebrates, birds, mammals and plants. Mature Lime trees are frequent. Other species include Wood Avens, Wood Dock, Ox-Eye Daisy, Common Bent, Perennial Ryegrass, Nettle, Self-Heal, Rowan, sedge species, Hawthorn, Enchanter's Nightshade, Wood Avens and *Cotoneaster* spp. | Maintain treelines. Allow for maturation of grasses and scrubby patches adjacent to facilitate biodiversity. Monitor for use by breeding bats. Install bird and bat boxes where appropriate. |
| Stone wall (BL1)<br>  | Provides structural diversity for wildlife to inhabit. Supports Bindweed, Nettle, Wall Lettuce, Ivy-Leaved Toadflax, Herb Robert, Forget-Me-Not, Hedge Woundwort, Bramble and Ivy, and invasive species such as Butterfly Bush, Traveller's Joy, Sycamore and Winter Heliotrope. Large White butterfly and Greater White-toothed Shrew (RMI) were recorded at this habitat where it provides a border for the NMC carpark. | Protect existing structure. Monitor for expansion of invasive species and prevent their spread. |
| Flower Beds and Borders (BC4) | Occurs beside buildings. Supports Daisy, Willowherb, Ivy, Bramble, Rhododendron cultivar, Creeping Buttercup, Clover, Sow-thistle, Broad-Leaved Plantain, Sycamore (RMI) seedlings, Dandelion, Yorkshire Fog, Self-Heal, Creeping Bent, Cat's Ear, Spear Thistle, Bay, Perennial | Enhance native planting/rewilding efforts. Monitor for expansion of invasive species and prevent their spread. Create habitat for overwintering insects and solitary bees in form of scrapes, boxes and earth embankments. |

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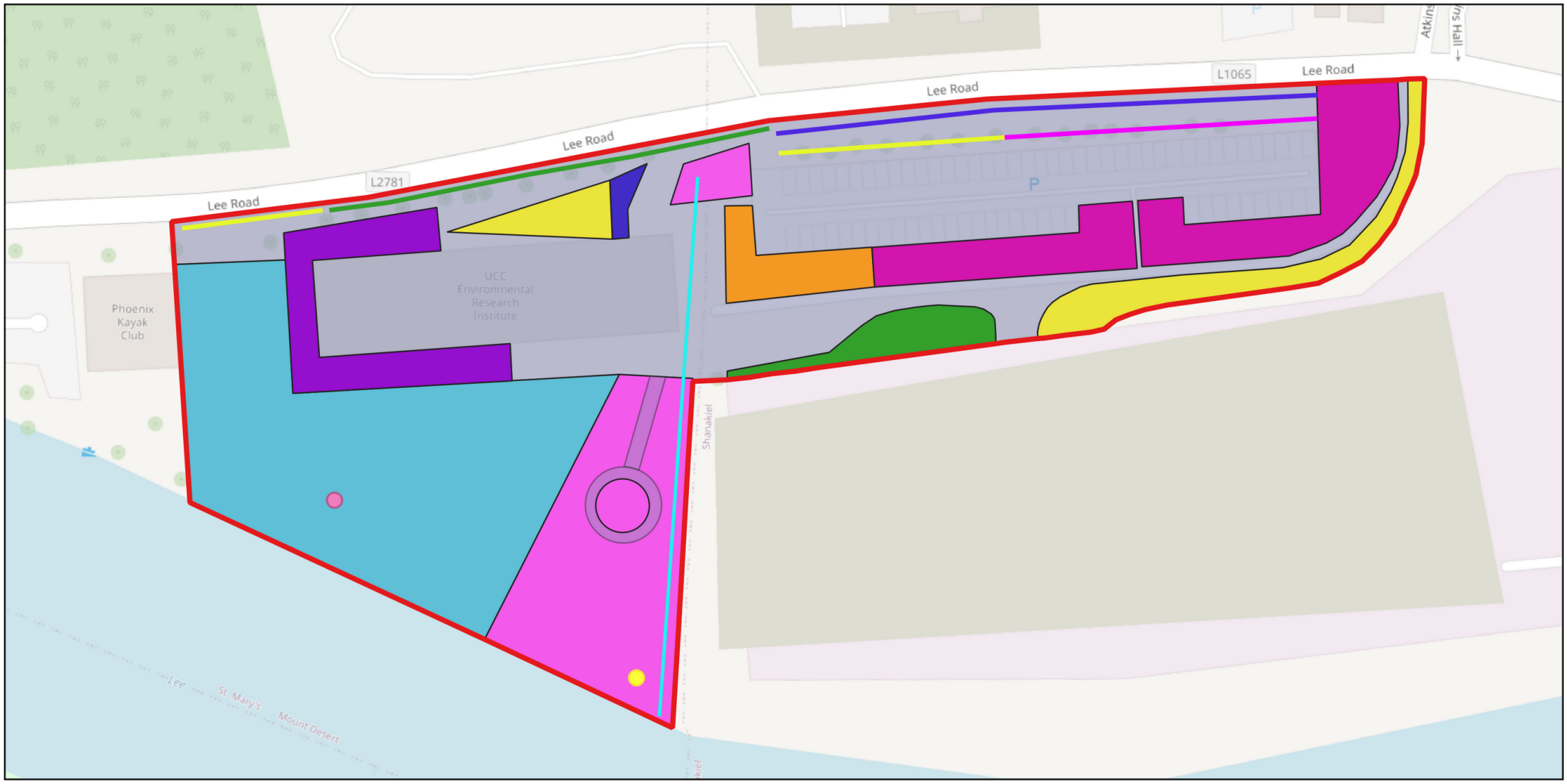
|---|---|---|
|  | Ryegrass, Crested Dog's Tail, Broad leaved Plantain, Mouse-ear Chickweed, Scarlet Pimpernel, Hogweed, Nipplewort, Smooth Hawk's Beard, Wild Angelica and Knapweed. | |
| Stream (FW4) | Culverted part of the tidal race channel. Supports Greater Burnet Saxifrage, Nettle, Wood Dock, Traveller's Joy, Bramble and Hedge Mustard. | Monitor for expansion of invasive species and prevent their spread. Carry out freshwater survey to determine water quality and species diversity. |
| Horticultural Land (BC2) | Designated for domestic and experimental use. Species include Teasel, Black Meddick, Plantain, Clover and Dandelion. Blue tit, Great Tit and Blackbird were recorded in this area. | Monitor for expansion of invasive species and prevent their spread. |
| Scattered Trees and Parkland (WD5) | Occurs at north-western side of bottling plant, and east of Cooperage. Supports Lime, Horse Chestnut, Foxglove, Lords & Ladies, Oil seed-rape, Winter Heliotrope and Ivy. | Monitor for expansion of invasive species and prevent their spread. Create habitat for overwintering insects in form of scrapes and earth embankments. |

## 6.3 Sustainability Institute

Implementation of recommendations from the 2018-2023 BAP has increased biodiversity at the Sustainability Institute (campus includes the Ellen Hutchins Building). A meadow to the south-west of the site provides habitat for a diversity of native plants, hoverflies, butterflies, moths and other pollinating insects, in addition to birds and bats. The campus is likely used by fox, squirrel and small mammals. The main habitat of conservation importance at the ERI Campus continues to be Riparian Woodland (WN5) which was classified as an Annex I habitat as defined under the EU Habitats Directive. It is a small and recently developed example of Annex I 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Lalor, 2018). 2024 habitat assessments of the site confirmed that the woodland continues to meet Annex I 91E0 criteria; however, it is vulnerable to the spread of invasive species, particularly Himalayan Balsam (HRI). A 2018 Bryophyte Survey (Nimbosa Ecology, 2018 in Lalor Ecology, 2018) identified the Riparian Woodland as the most important habitat on site for bryophytes. An oceanic liverwort was recorded growing on trees in the wet woodland (Lalor Ecology, 2018). Specialist species of flood-zone habitats which have only scattered distributions in Ireland were also found at EHI campus (Lalor Ecology, 2018). An extensive colony of Smooth Hornwort (*Phaeoceros laevis*; uncommon), was recorded at the EHI in bare soil beside the building.




**Features**

- Bat detector
- Drainage

**Linear Habitat**

- BL1 Stone walls and other stonework
- BL1/WL2 Stone walls/Treelines
- FW4 Drainage ditch
- WL2 Treelines
- WS3 Ornamental/non-native shrub

**Habitat**

- UCC Boundary
- BC4 Flower beds and boarders
- BL3 Buildings and artifcial surfaces
- BL3 Buildings and artifical surfaces
- ED3 Recolonising bare ground
- GA2 Amenity grassland
- GA2/GS2 Amenity grassland/Dry meadows
- GS2 Dry meadows and grassy verges
- WD5 Scattered trees and parkland
- WN5 Riparian woodland
- WS3 Ornamental/non-native shrub

0 25 50 m

| Habitat Type | Description | Recommendations |
|---|---|---|
| Riparian Woodland (WN5)<br>  <br>  | Continues to qualify as Annex I habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-padion, Alnion incanae*, woodland *Salicion albae*) (91E0). Species recorded include Ash, Hazel, Remote Sedge, Nettle, Willow sp., Wood Avens, Guelder Rose, Meadowsweet, Creeping Bent, Hairy Brome, Alder, Climbing Nightshade. Birds recorded included Willow Warbler, Blue Tit and Chaffinch. Invasive species include Himalayan Balsam (RHI), Winter Heliotrope (RMI).<br><br>Dense willow cover; sparse understorey.<br><br>A Hooded Crow kill (by a fox or Sparrowhawk) was also observed. | A Bryophyte survey should be commissioned across campus sites, but such a survey is particularly important for this site given the presence of 91E0 habitat and the recording of specialist and uncommon species during surveys carried out to inform the 2028-2023 BAP. Carry out annual assessments of this habitat to monitor its status and diversity. Monitor for presence and spread of invasive species. Monitor the health of trees, and diversity of woodland indicator shrubs and herbaceous plants. Enact biosecurity measures to prevent the spread of tree diseases where possible. |
| Dry Meadows and Grassy Verges (GS2)<br>  | This habitat exists within a meadow plot southwest of the Ellen Hutchins Building. Yorkshire Fog, Herb Robert, Spear Thistle, Black Meddick, Bird's Foot Trefoil, Clover, Creeping Buttercup, Chicory, Perennial Rye Grass, Scarlet Pimpernel, Broad-leaved Plantain, Smooth Cat's Ear, Petty Spurge, False Oat-grass and Red Fescue were recorded here. Animal species included Goldfinch, Speckled Wood Butterfly, Damselflies, Large White Butterfly, Cinnabar Moth. Invasive species recorded include Winter Heliotrope (LRI) and Canadian Fleabane (RMI). | Allow some hollow plant stems to remain in areas of GS2 designated for wildlife-friendly management to facilitate overwintering insects, such as solitary bees (AIPP, 2023) moths (Littlewood, 2008) spiders and beetles (Holland et al., 2016).<br><br>Monitor for presence of invasive species. |

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|  <br>  | Pockets of GA2 on-site are also beginning to grade to GS2 in terms of species composition, e.g. Creeping Cinquefoil, Creeping Buttercup, Red Fescue, *Senecio* sp., Cat's Ear, Clover, Common Centaury, Silverweed, Ribwort Plantain, Yorkshire Fog, Ox-Eye Daisy, Spear Thistle and Dandelion were recorded in these pockets. | |
| Drainage ditch (FW4) | Flows north-south onsite. Contains a culverted section adjacent to the institute. Species recorded in and adjacent to FW4 include Fool's Water Cress, Yellow Flag Iris, Alder, Butterfly Bush (RMI), Canadian Fleabane (RMI), Figwort, Bramble, and Alder. | Consider creating a pond in the meadow. Monitor for spread of invasive species, litter and pollutants. |
| Stone Wall (BL1), Treeline (WL2)<br>  | Occurs in combination along northern boundary of the institute building. Stone wall supports Maidenhair Spleenwort, Ivy-leaved Toadflax, Herb Robert, Hedgerow Woundwort, Red Valerian (LRI) and Sycamore (RMI). Treeline comprises mature Birch, Hawthorn, Holly, Ox-Eye Daisy, Willow Herb and Tutsan. | Maintain BL1 as a species-rich habitat. Maintain treeline. Monitor treeline for invasive species. |

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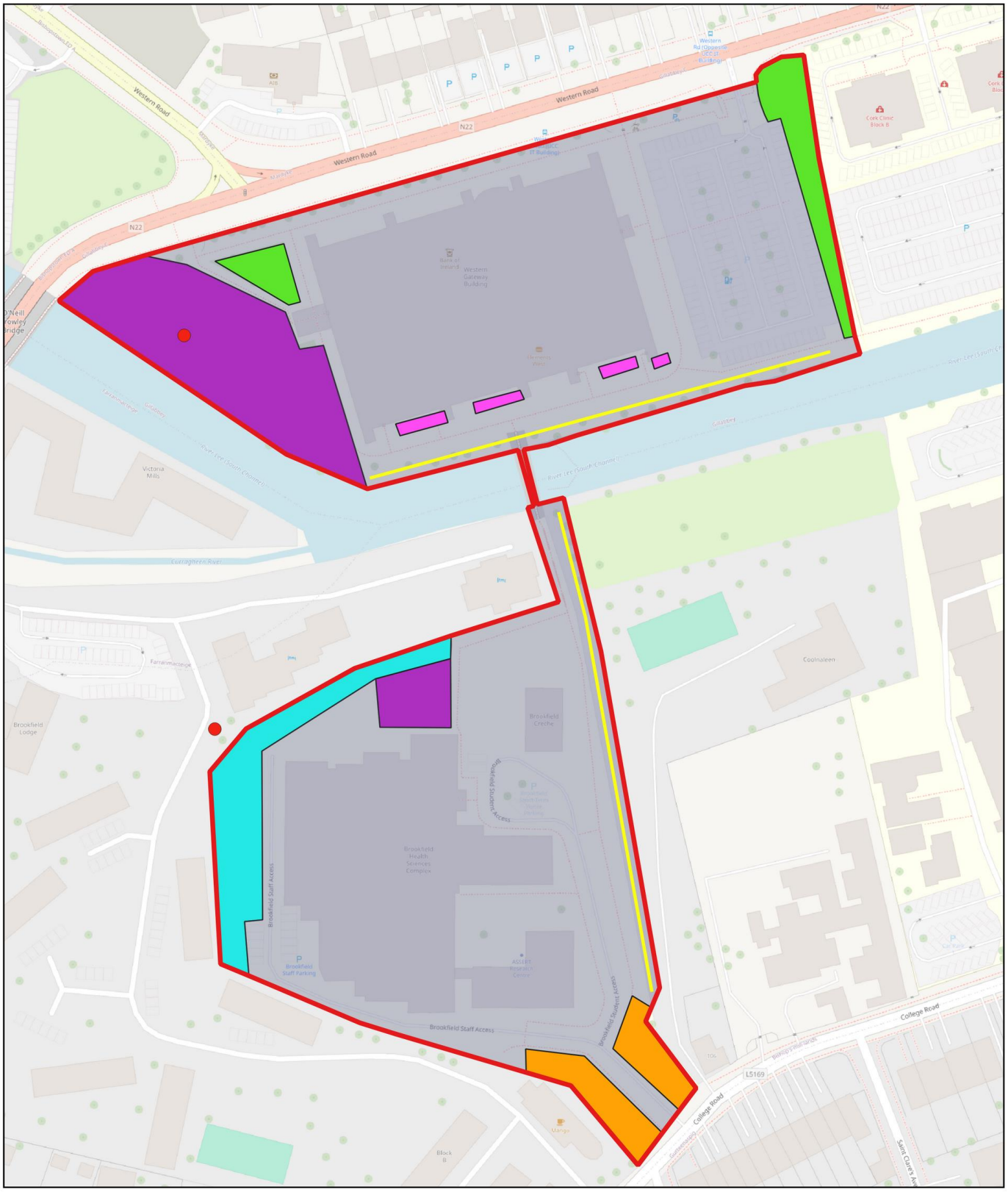
| Scattered Trees and Parkland (WD5) | Occurs in small pocket north of institute. Contains Tutsan, Willow, Birch, Herb Robert, Nettle, Wood Dock, Common Bent, Figwort and Traveller's Joy (RMI). | Monitor for expansion of invasive species and prevent their spread. Create habitat for overwintering insects in form of scrapes / earth embankments / Solitary Bee lodges. |
| Ornamental / non-native Shrub (WS3) | Traveller's Joy and Butterfly bush (both RMI) dominate the verge north of the carpark onsite. Spear Thistle, Ox-Eye Daisy, Meadow Brown butterfly, Yorkshire Fog, and Plantain also occur. | Explore options for diversifying this area with native species by removing some of the invasive T.J. and B.B. and replacing with native shrubs. |

## 6.4 Western Campus

Western Campus encompasses Brookfield Health Science Complex and the Western Gateway Building. UCC's BAP 2018 – 2023 observed that mature trees within this campus, particularly along the river, are among the best habitats for bats within this campus. Although not strictly within the campus, the River Lee provides invaluable habitat and feeding resources for biodiversity. An otter holt (resting place) was identified just west of this campus by the Cork Nature Network survey in 2017, and the area continues to be used by otters.

A meeting was held between Eamonn Connaughton, Facilities Manager for UCC's Western Campus, and Irene Ní Shúilleabháin in December 2024. Eamonn's team have been applying various biodiversity-friendly initiatives at the campus over recent years, including:

- creation of a low-mow area at the western end of the Western Gateway Building
- replacement of trees felled for safety reasons
- recycling and upcycling multiple materials
- pollinator-friendly flower-beds
- bat-friendly lighting
- Stickers on windows to prevent birds flying into them




Bat detector

Linear Habitat

WL2 Treelines

Habitat

UCC Boundary

BC4 Flowerbeds and borders

BL3 Buildings and artifical surfaces

GA2 Amenity grassland

GA2/WD5 Amenity grassland/Scattered trees and parkland

WD2 Mixed broadleaved/conifer woodland

WD5 Scattered trees and parkland

0 25 50 m

| Habitat Type | Description | Recommendations |
|---|---|---|
| Treeline (WL2) | Treelines border the River Lee at the Western Gateway building and demarcate the eastern border of Brookfield Health Sciences building. Species recorded include Alder, Holly, Nettle, Sycamore, Beech and Ivy. Wren was recorded nesting in mature Ivy on the trunk of a Beech tree along the walkway between Castlewhite student accommodation and the Western Gateway building. The treelines here provide habitat for small mammals, bats, birds and invertebrates. | Monitor for expansion of invasive species recorded in the area, e.g. Winter Heliotrope. Maintain treelines. Allow for maturation of bank vegetation for biodiversity and bank stabilisation. Monitor for use by breeding bats. Install bird and bat boxes where appropriate. Protect ivy on trees. |
| Mixed broadleaved/conifer woodland (WD2) | Occupies northern section of BHSC. Species included Sycamore (RMI), Beech, Holly, Elder, Oak, Traveller's Joy (RMI), conifer species, Bramble, Hedgerow Bindweed, Ash, Hoverfly, Herb Robert, Alder, Butterfly Bush (RMI). | Monitor for presence and spread of invasive species. Monitor the health of trees, and diversity of woodland indicator shrubs and herbaceous plants. Enact biosecurity measures to prevent the spread of tree diseases where possible. |
| Lowland Depositing River (FW2)  | Rudd fish, Japanese Knotweed (RHI), breeding Moorhen, Otter, Heron, breeding Mallard, Kingfisher | Carry out a full assessment of the river to determine its condition under the Water Framework Directive, and to understand what biodiversity it supports. Consult with the OPW and associated stakeholders prior to any dredging works to prevent damage to the riverbank, loss of habitat, silt accumulation and dispersal of invasive species. Create a river protection plan in consultation with relevant authorities. Explore the potential for installing bat and Grey Wagtail boxes |

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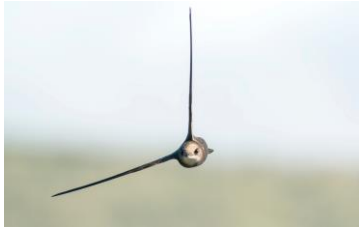
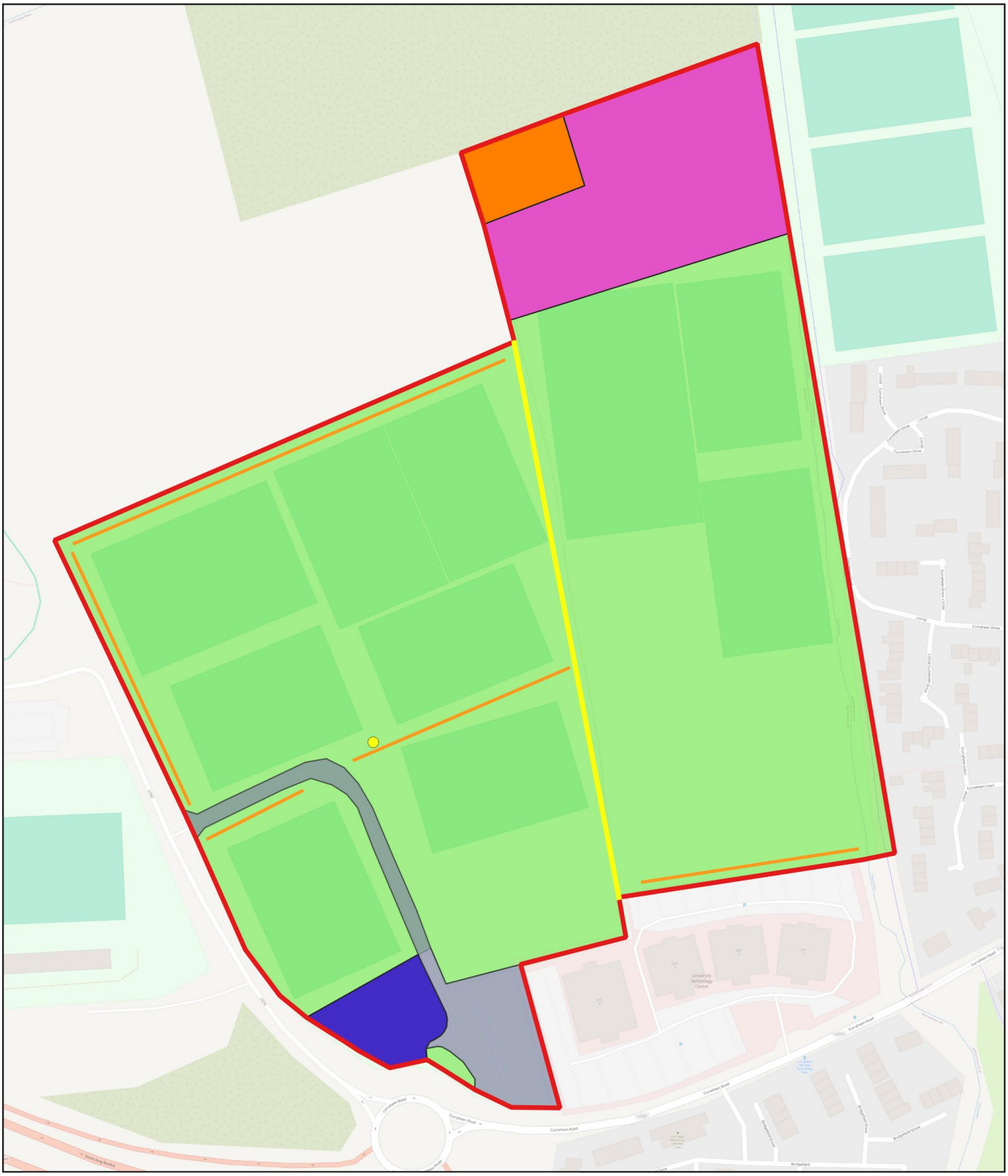
| | | at locations along the river, e.g. bridges. Carry out updated Kingfisher and Otter surveys to inform current survey record. |
| Riparian Woodland | Japanese Knotweed (RHI), Sycamore (RMI), Winter Heliotrope (LRI), Long-tailed Tits, Great Tit, Chaffinch, Woodpigeon | Treat for invasive species. Monitor health of trees. Populate with native woodland species. |
| Buildings and Artificial Surfaces (BL3)<br>  | Buildings at WC are fairly new, with little opportunities for wildlife. | Glass walls which don't already feature stickers should have stickers, to ensure birds don't fly into them. Two Kingfisher (Amber-listed species) were killed by flying into windows/glass walls (observation by Dr. Dara Fitzpatrick in 2024). Bird nest boxes should be installed where appropriate. Opportunities for breeding Swift should be explored. Though Swift boxes were installed at North Mall and Main Campuses, they failed to attract Swift. Renewed attempts with callers could be implemented where possible. |
| Flower Beds and Borders (BC4)<br>  | Small flower beds with pollinator-friendly species border Amenity Grassland in front of the Western Gateway Building, and in islands at BHSC. Echinacea, Verbena, *Agapanthus*, Lavender. *Cotoneaster* spp. hedge bordering river. | Manage Amenity Grassland for wildlife using the same methods applied on main campus. Sow Yellowrattle in the low-mow area to enhance wildflower diversity through limiting the grasses present. Monitor BC4 for invasive species colonisation. Limit the spread of invasive species where necessary. Prioritise pollinator-friendly native planting for the creation of new BC4/maintenance of existing BC4. |

## 6.5 Curraheen Sports Campus

This Campus (known as “the farm”) has been designated for sport and therefore is dominated by Amenity Grassland (GA2). However, it also contains hedgerows, treelines, scrub and grassland of high nature value. The Twopot River runs adjacent to the Curraheen Sports Campus along the eastern boundary, flowing in a northerly direction. It joins the Curraheen River further downstream (Lalor Ecology, 2018). Though part of the Twopot River, this watercourse is an artificially structured channelised stream. Rubbish was noticed in the water during the field survey. The 2018 Bryological Survey at this site recorded two uncommon Bryophyte species: *Didymodon nicholsonii* on tarmac and *Bryum donianum* on a wall near the entrance to the campus. Currently, the grounds team at “the farm,” leave branches and dead wood to decompose onsite, providing habitat for invertebrates, small mammals and birds such as Wren and Dunnock.

A meeting held between Emma Martin, UCC Sports Administrator, and Irene Ní Shúilleabháin in December 2024. Biodiversity actions taking place at Curraheen Sports Campus and Curraheen Agricultural campus include bat-friendly lighting, maintenance of hedgerow verges, wilding of the scrub and grassland to the north-west of the sports campus, maintenance of hedgerows, a ban on the use of herbicides and pesticides and the deposition of dead wood and cut material for biodiversity.


Bat detector
Linear Habitat
BL3 Buildings and artifical surfaces
WL1 Hedgerows
WL2 Treelines
Habitat
UCC Boundary
BL3 Buildings and artifical surfaces
ED2 Spoil and bare ground
GA2 Amenity grassland
GS2 Dry Meadows and grassy verges
WS1 Scrub
0
50
100 m

| Habitat Type | Description | Recommendations |
|---|---|---|
| Scrub (WS1)  | Located in the top north-western corner of the site. Runs adjacent to a treeline along the northern border which contains mostly conifer species. Blackthorn, Willow, Oak, Sycamore, abundant Willow Herb, Nettles, Wild Angelica, Meadow Buttercup, Hawthorn, Scot's Pine were recorded here. | Allow natural succession to take place, in which scrub may transition to woodland. Monitor for invasive species. Monitor regularly for use by invertebrates, birds and mammals. Consider installing camera trap to record mammal movements. Create habitat for solitary bees. |
| Dry Meadows and Grassy Verges (GS2) | Located just south and east of the WS1. Species include Perennial Ryegrass, Creeping Bent, False Oat Grass, Hedgerow Bindweed, Nettles, Willow Herb, Bramble, Creeping Thistle, Yorkshire Fog, Wasp, Docks, moth species, Creeping Buttercup, Cock's Foot, Nettle, Willow Herb, False Oat Grass, Marsh Woundwort, Greater Burnet Saxifrage, Gorse, Bramble, Willow Herb, Willow, Ragwort, Hawthorn. Raven was recorded calling. | Install a pond at this site. Manage for wildlife. Monitor diversity of species. Monitor for presence of invasive species and intervene if necessary. |
| Amenity Grassland (GA2) | Creeping bent, Ragwort, Nettle, Dock. Starlings were recorded using GA2. | Create wildlife-friendly verges around amenity grassland. Consider creating a pond in the south-east corner of the pitches. |

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| FW2 (Stream)<br>  | This section of the Twopot is narrow and shallow. It is not within UCC's boundary, however, it is connected to habitats onsite. It contains litter and is artificially channelised. Contains Hemlock Water-Dropwort and Montbretia (*Crocosmia* x *crocosmiiflora*) (LRI). | Include Montbretia in invasive species management plan and treat if appropriate. Work with Cork City Council to manage litter in the river. Carry out freshwater assessment to determine and monitor health of stream. Consult with OPW and other stakeholders prior to any dredging works upstream to prevent damage to river bank, loss of habitat, silt accumulation and dispersal of invasive species. Include Twopot in a river protection plan in consultation with relevant authorities. This is particularly important given that the sports pitches here are known to flood. |
| Treeline (WL2) | Species include Lime, Sycamore, Blackthorn, Ash, Oak, Beech, Hornbeam, Hawthorn, Elder, Bramble, Creeping Bent, Honeysuckle, Cock's Foot. Speckled Wood butterfly was also recorded. WL2 undoubtedly supports a variety of birds, bats, squirrels, invertebrates and small mammals. | Maintain treelines. Monitor for use by breeding bats. Install bird and bat boxes where appropriate. |
| Hedgerow (WL1) | Mature and of considerable value to wildlife. Supports Blackthorn, Hawthorn, mature Ash, Elder, Cock's Foot, Bramble, Nettle, Sycamore (MRI), Dock, Ivy, Gorse, Cleavers, Wild Rose, Nipplewort, Greater Burnet Saxifrage. | Monitor for presence and spread of invasive species. Monitor the health of trees, and diversity of woodland indicator shrubs and herbaceous plants. Enact biosecurity measures to prevent the spread of tree diseases where possible. |

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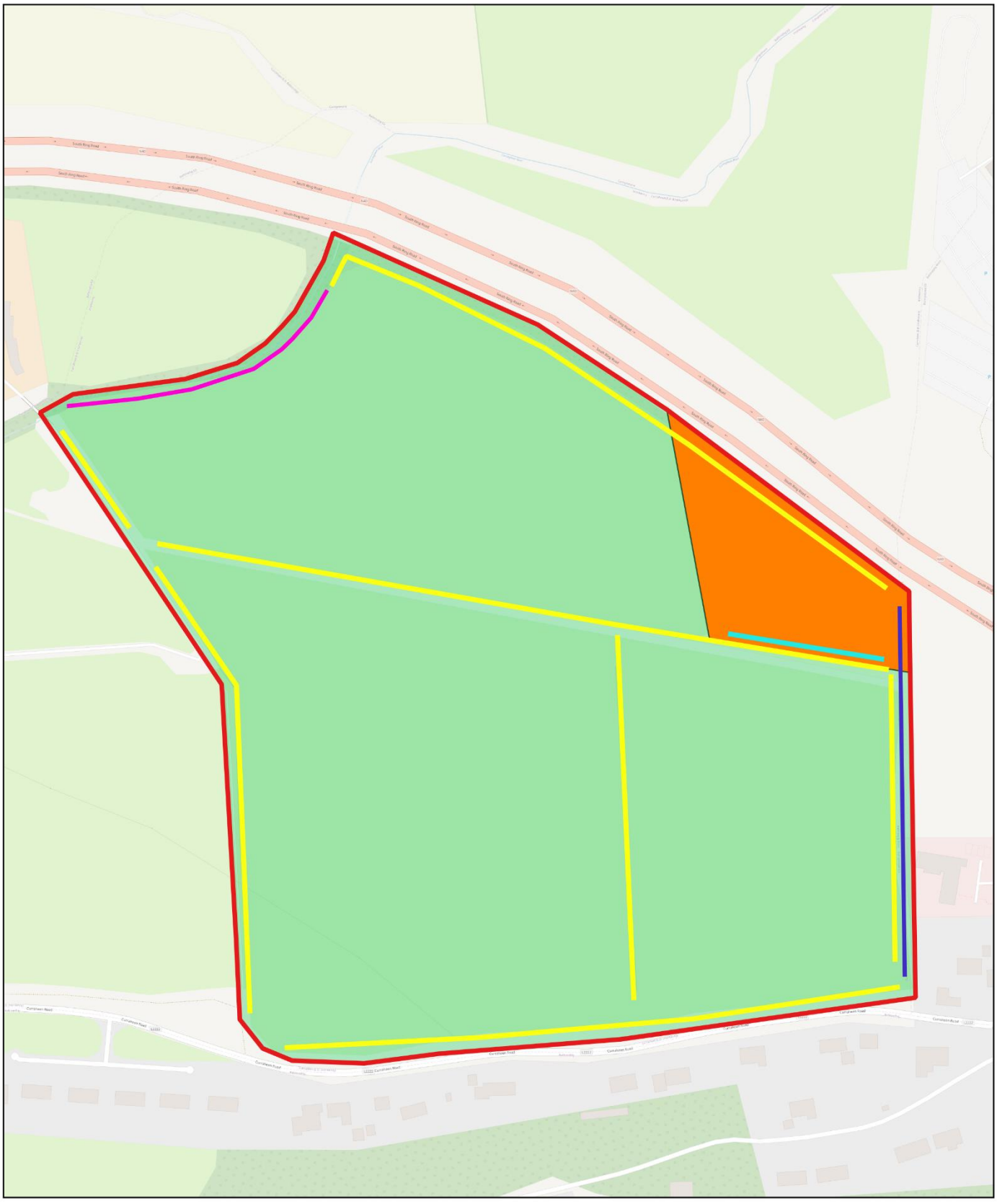
|---|---|---|
| Spoil and Bare Ground (ED2) | Adjacent to carpark. Contains Small-flowered Cranesbill, Willow herb, Clover, Canadian Fleabane (MRI). | Treat Canadian Fleabane and monitor for colonisation by other invasive species. |

## 6.6 Curraheen Agricultural Fields

UCC Curraheen Agricultural Fields are managed for agriculture. Most land is dedicated to Improved Agricultural Grassland (GA1), but habitats of higher nature value (detailed below) also occur. UCC's BAP 2018-2023 recorded possible rabbit holes and solitary bee nest holes in the hedgerow along the eastern boundary of the site, in addition to a Brown Long-Eared Bat roost west of the site. Rabbits were observed during 2024 fieldwork. A monitoring scheme for the Agricultural Campus to include pollinators and bats was established in the last BAP; however, this requires revisitation. Plans exist to construct sports pitches at Curraheen Agricultural Land. Currently, this involves the loss of most of the mature hedgerows on-site, and the laying of synthetic pitches.


Linear Habitat
BL1 Stone walls and other stonework
BL3 Buildings and artifical surfaces
FW4 Drainage ditch
WL1 Hedgerows
Habitat
UCC Boundary
GA1 Improved agricultural grassland
WS1 Scrub
0
50
100 m

| Habitat Type | Description | Recommendations |
| --- | --- | --- |
| Hedgerows (WL1)<br>  <br>  <br>  | Multiple mature, species-rich hedgerows traverse the site. They are essential ecological corridors. Species recorded in or using the hedgerows include Hawthorn, Blackthorn, Ash, Hazel, Willow, Ivy, Lime, Alder, Spindle, Elder, Guelder Rose, Bramble, Gorse, Lords and Ladies, Marsh and Hedge Woundwort, Honeysuckle, Wild Dog Rose, Hedgerow Bindweed, Cleavers, Bracken, Bittersweet, Spear Thistle, Yorkshire Fog, Nettles, Creeping Bent, False Oat-Grass and Cock's Foot.<br><br>Animals recorded using hedgerows included Stonechat, Goldfinch, Rabbit, House Martin and various Bumblebees.<br><br>Invasive species include Himalayan Honeysuckle (RMI), Sycamore (RMI) and Cherry Laurel (RHI). | Maintain hedgerows in any future development plans wherever possible. Monitor spread of invasive species, intervening if necessary. Set up camera traps to monitor use of hedgerows by mammals. Woodland species will naturally be populated by those within hedgerows (many likely of native provenance). However, potential for spread of invasive species should be monitored. Cut hedges between November and January to disrupt pollinators less and to abide by section 40 of the Wildlife Act 1976, which protects nesting birds by prohibiting hedge cutting between March and August. Monitor for Solitary Bee nests and install Solitary Bee lodges/scrapes where appropriate. |

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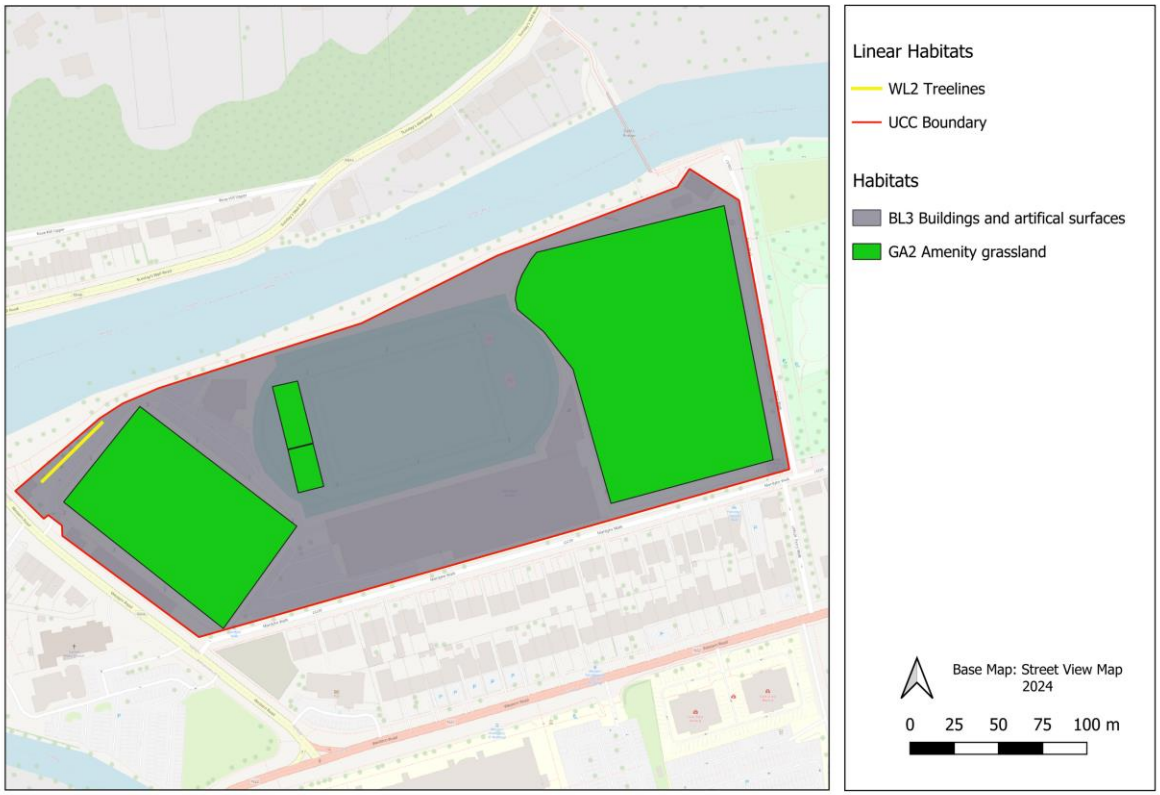
| Wet Grassland GS4 with Drainage Ditch FW4<br>  | Wet grassland with some Scrub (WS1) is situated at the north-eastern corner of this site. It accommodates run-off from a drainage ditch. Species recorded include Willows, Hawthorn, Willow herb, Yellow Flag Iris, Creeping Bent, Silverweed, Marsh Woundwort, Greater Burnet Saxifrage, Gorse, Bramble, and Ragwort. Red Bisort, House Sparrow and Pink Mallow were recorded in/around the Drainage Ditch. | Monitor drainage ditch for presence of invasive species. Allow the GS4 to continue to develop as wet grassland. Allow continuation of scrub (WS1) development. |
| Improved Agricultural Grassland (GA1)<br>  | Dominant habitat onsite. Includes Perennial Ryegrass, Broad-Leaved Plantain, Broad-Leaved Dock, Clover, Ragwort, Annual Meadow Grass, Sweet Vernal Grass and Chickweed. Birds recorded on or adjacent to GA1 include Buzzard, Robin, Bullfinch and Goldcrest. | This habitat is useful foraging habitat for some species of bird (Thrush, Robin, Blackbird and even Buzzard will use it to forage for worms).<br>Plans exist to convert this agricultural grassland to synthetic pitches for the expansion of UCC's sport facilities. Where synthetic grass is essential, borders around the pitches should be managed for wildlife. Pockets of permeable green space should be included as much as possible. |

## 6.7 Mardyke Sports Grounds

UCC's Mardyke Sports Campus is managed for sport and recreation. UCC's BAP 2018-2023 assessed the stone wall along the southern boundary of the sports grounds to be of significant importance for bryophytes due to species representative of calcareous walls, including Slender Stubble-Moss (*Gyroweisia tenuis*), which had never been recorded in the Mid-Cork Vice County before that. Bryophytes were not surveyed as part of fieldwork in 2024, however, it was observed that herbicides continue to be used to manage "weeds," along these stone walls in addition to the bases of trees and other locations on the grounds. The treeline at the north-west corner of the campus contains mature Alder and Sycamore and provides roosting and foraging habitat for bats, birds and invertebrates. The Amenity Grassland (GA2) on site which is managed for sport is species-poor. A strip of wildflower mix has been sown behind the goalposts at the north-eastern side of the grounds. Though the intentions behind this action are positive, unfortunately the species mix contains multiple non-native species which will not benefit biodiversity long-term. The base of the strip is also sprayed with herbicide.

A small area of grass adjacent to the sports pitch on the eastern half of the site is currently subject to low management and is showing a diversity of species. A low-mow "wild," area was established by Mardyke Grounds Staff in a pocket behind UCC Department of Sport & Physical Activity at Ferry Lodge; however, this is not currently being managed appropriately. It is treated with herbicide, with only a small stand of nettles remaining. Flower Beds and Borders (BC4) onsite currently contain non-native decorative plants which are not beneficial to Irish invertebrates. Finally, organic capsule fertiliser is used to maintain the grass pitches, which is positive.



Recommendations for the Mardyke:

- The use of herbicides and pesticides should be banned entirely.
- Hedgerow(s) could be created along the fence/wall bordering the north-eastern side of the site, and/or along the wall at the eastern boundary.
- The small area of grass currently subject to low management alongside the west side of the eastern pitch could be expanded to include the adjacent patch of grass. Both can be managed as a “long lawn,” or short meadow by administering long cuts every six weeks (e.g. early June, mid-July, late August). Paths can be mown through and around these patches to create a managed appearance and to facilitate match observers, preventing trampling. It’s also useful to stagger the areas cut so that some patch always remains in flower/provides habitat for insects. Set mower blades higher, and set Yellowrattle or other hemiparasitic native plants (e.g. Eyebright, Red Bartsia, Lousewort) to diversify the sward and enhance wildflower abundance.
- Allow the wild area behind Ferry Lodge to develop naturally.
- Flower Beds and Borders (BC4) onsite can be managed for biodiversity by prioritising native, insect-friendly planting and leaving old vegetation to house invertebrates over the winter months. The planters in front of the Mardyke can be replanted with native plants or at least non-invasive pollinator-friendly plants that haven't been treated with herbicides.
- The areas of bare earth along the walls at the front of the Mardyke can be let grow wild, or can be planted with native seeds from a responsible provider.
- Compacted earth at the base of trees should be aerated and topped with organic fertiliser/compost to facilitate plant growth.
- Invasive species such as Butterfly Bush (Buddleja davidii) and Old Man's Beard (Clematis vitalba) should be removed.
- Examine the potential to install Swift bird nesting boxes and callers on the Mardyke. Cork City Biodiversity Officers provide support with actions like this.
- Signage can be sourced to inform the public re. wild areas.
- The existing "wildflower," area behind the goalposts should be seeded with native wildflower mix.
- The stone wall forming the southern boundary should be allowed to grow mosses, flowers and ferns and shouldn't be sprayed.

## 6.8 Bat Survey Results

Eight of the nine resident Irish bat species have been recorded across all of the campuses surveyed. The rare Annex II species Lesser Horseshoe Bat was not recorded. Based on current knowledge, the surveyed campuses are located outside of their known range. The most proximal known Lesser Horseshoe Bat roosts to UCC are located at Ovens Cave and Blarney Castle (Colm Breslin pers. obs.).

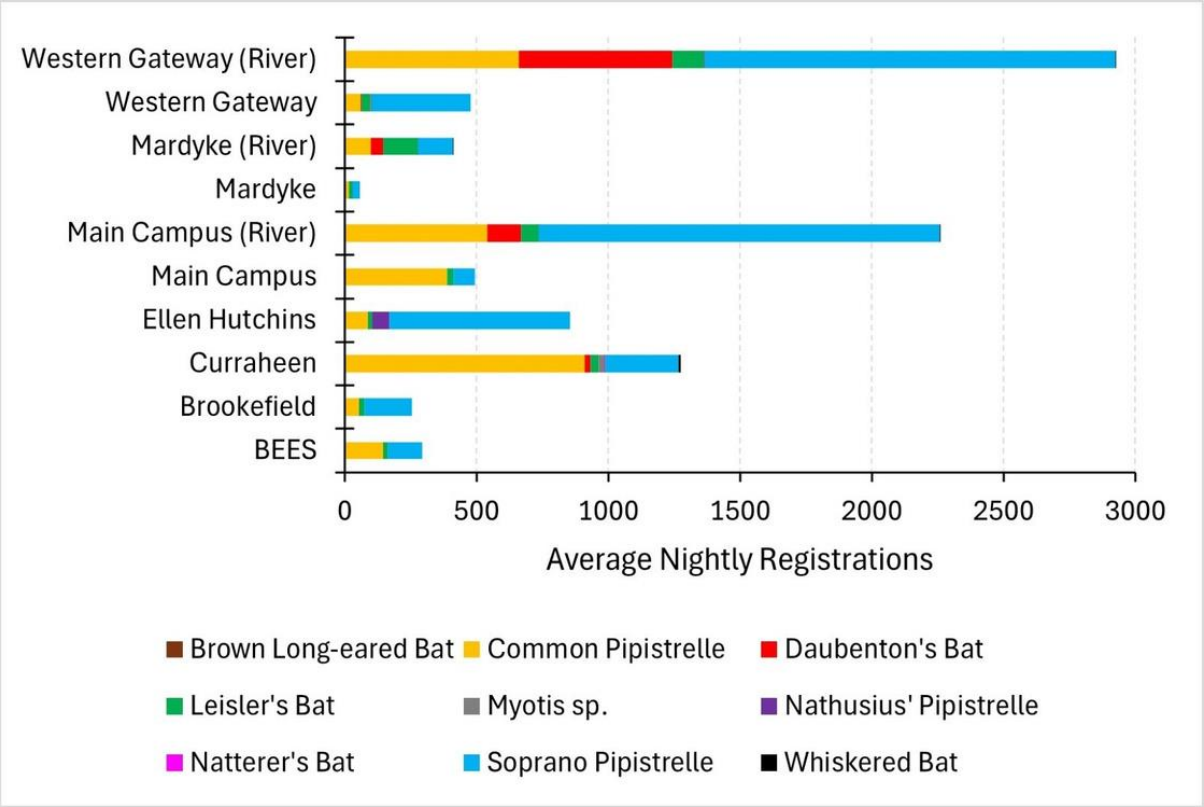
Bat species richness varies across the UCC campuses (see below). Common and widespread species in an Irish context are predictably present across all campuses surveyed (Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat). These species are more tolerant of light and urbanised landscapes and can therefore take advantage of habitat adjacent to light-spill; whereas slower-moving species accustomed to more semi-natural habitats are less likely to be found in densely urban areas (though it must be noted that artificial light negatively impacts all bat species) (Jung and Threlfall, 2018; BCT and ILP, 2023; Lewanzik et al., 2022).

Campuses experiencing lower degrees of light pollution and a higher degree vegetation cover and overall landscape connectivity see the presence of rarer and more sensitive bat species (Daubenton's Bat, Natterer's Bat, Whiskered Bat, Brown Long-eared Bat). The above environmental variables in combination with other factors are conducive to higher quality foraging and commuting bat habitat.

**Table:** Bat species presence/absence across UCC campuses surveyed.

| | Common Pipistrelle | Soprano Pipistrelle | Nathusius Pipistrelle | Leislers Bat | Daubentons Bat | Whiskered Bat | Natterers Bat | *Myotis sp.* | Brown Long-eared Bat |
|---|---|---|---|---|---|---|---|---|---|
| BEES | ✓ | ✓ | | ✓ | ✓ | | | | |
| Brookfield | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| Curraheen | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Ellen Hutchins | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Main Campus | ✓ | ✓ | | ✓ | | | | | |
| Main Campus (River) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| Mardyke | ✓ | ✓ | ✓ | ✓ | | | | | |
| Mardyke (River) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Western Gateway | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| Western Gateway (River) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |

Common Pipistrelle and Soprano Pipistrelle were the two most commonly recorded species across all campuses in general.




The highest diversity of bat species was recorded at UCC's Curraheen agricultural campus. This is likely due to the mix of hedgerows, grassland, treelines and watercourses at this site. Hedgerows and treelines are linear features which are used for navigation by bats, in addition to being foraging habitat (see Bat Conservation Ireland, n.d.). Riparian habitat is of significant importance for most bat species, supporting higher diversity at Main Campus, by the Mardyke Sports Campus, and at the Western Campus.

| Location | Species Recorded |
|---|---|
| BEES | Common Pipistrelle, Daubenton's, Leisler's, Soprano Pipistrelle |
| Brookfield | Brown Long-eared, Common Pip., Daubenton's, Leisler's, Soprano Pip. |
| Curraheen | Brown Long-eared, Common Pip., Daubenton's, Leisler's, Myotis sp., Nathusis' Pip., Natterer's Bat, Soprano Pip, Whiskered Bat |

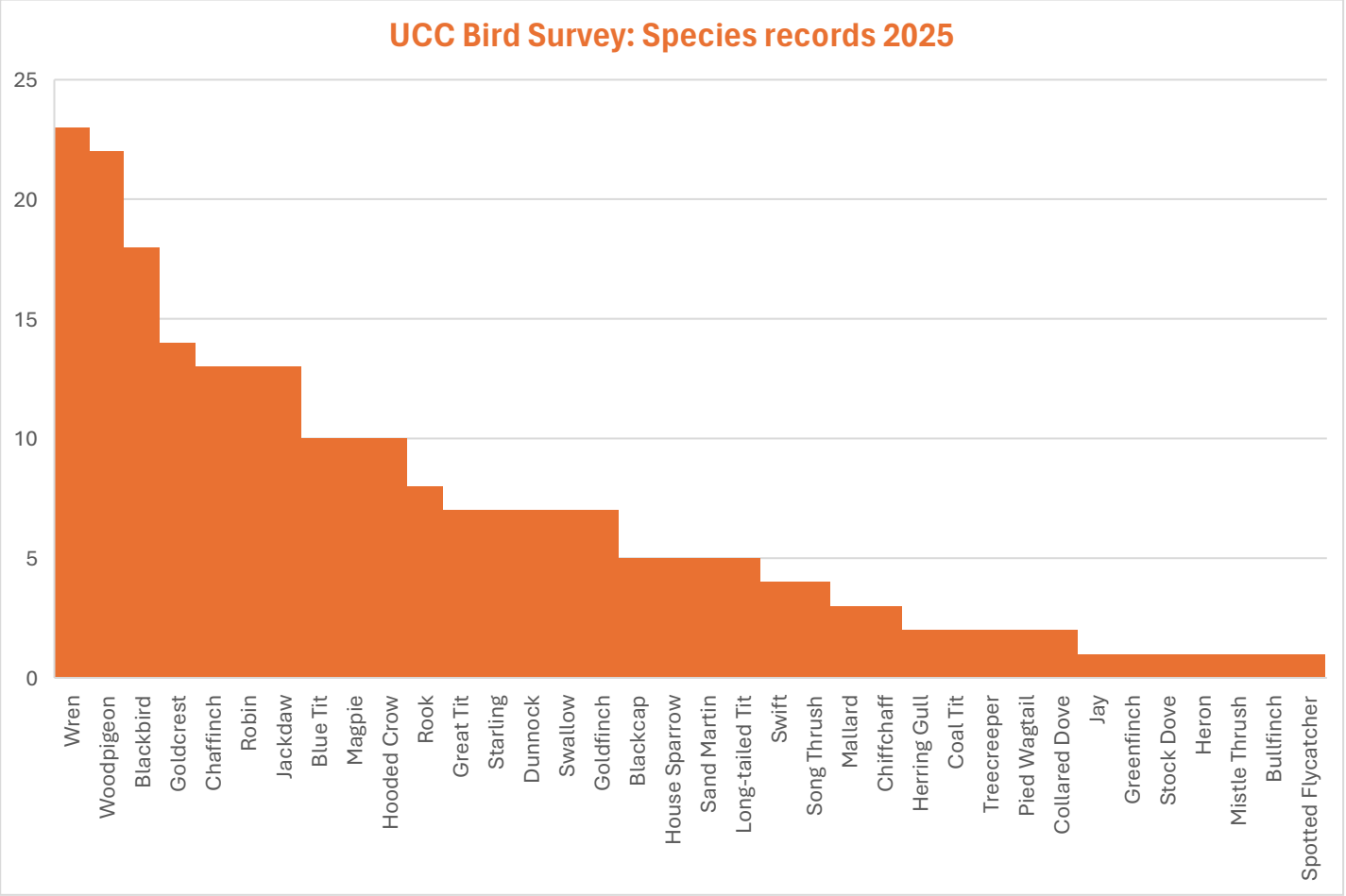
| | |
|---|---|
| Sustainability Institute | Brown Long-eared, Common Pip., Daubenton's, Leisler's, Myotis sp., Nathusius' Pip., Soprano Pip. |
| Main Campus | Common Pipistrelle, Leisler's, Soprano Pipistrelle |
| Main Campus (River) | Brown Long-eared, Common Pip., Daubenton's, Leisler's, Nathusis' Pip., Soprano Pip., Whiskered Bat |
| Mardyke | Daubenton's, Leisler's, Nathusis' Pip., Soprano Pip, |
| Mardyke (River) | Brown Long-eared, Common Pip., Daubenton's, Leisler's, Nathusis' Pip., Natterer's Bat, Soprano Pip, Whiskered Bat |
| Western Gateway | Common Pipistrelle, Daubenton's, Leisler's, *Myotis* sp., Nathusius' Pip., Soprano Pipistrelle |
| Western Gateway (River) | Brown Long-eared, Common Pip., Daubenton's, Leisler's, Nathusis' Pip., Soprano Pip., Whiskered Bat |

High levels of activity of Brown long-eared bats at Curraheen indicates that the Brown Long-eared roost here, described in UCC BAP 2018-2023, is likely still active. High levels of Common Pipistrelle activity at North Mall campus is a good indicator that the Common Pip. Roost here is still also in use (see UCC BAP 2018-2023 and Kelleher, 2016). Special care must be taken to minimise disturbance to both roosts during any future development plans / actions which may cause disturbance to bats. Loss of habitat (hedgerows, watercourses, wetland) should be avoided in these areas also.

## 6.9 Bird Survey Results

The 2025 bird survey recorded a healthy diversity of species, most of which are commonly associated with semi-urban and urban habitats. Interesting records include Spotted Flycatcher (Amber Conservation Status) at the North Mall campus (Spotted Flycatcher was also observed by Irene in UCC Community Garden incidentally in June) and breeding Stock Dove (Red Conservation Status), also at North Mall campus. The graph below illustrates the diversity of species recorded in order of how frequently they were recorded during the survey, i.e. Wren was recorded in most point-counts, while Spotted Flycatcher was only recorded

in one count. This does not give a satisfactory summary of what birds are most and least common at UCC. For example, Wrens are highly vocal and have a loud song, Woodpigeons are visually and audibly obvious and Blackbirds give loud, harsh alarm calls; whereas Bullfinches and Spotted Flycatchers are shy and both have soft vocalisations. However, the chart does give a general overview of the diversity of birds on campus. A sample of the type of data sheet used is included in Appendix 6.




Point-count methodology was chosen for this survey because it is time-efficient and gives an accurate overview of bird activity and behaviour within urban environments. However, there were discrepancies within the application of the methodology. Western Campus was only covered once, in the second round of surveys. Given that birds are generally more vocal and active from March – May than from June onwards, it is possible that some species were missed. The methodology did not include surveys specific to birds associated with freshwater habitats (e.g. Kingfisher, Grey Wagtail) nor did it include raptor surveys (e.g. Buzzard, Peregrine Falcon and Sparrowhawk are known to frequent the area in and around UCC), as both would have required more time. As a result of some minor misinterpretation by a surveyor, round two surveys of main campus and western campus took 15 minutes per point count rather than the 5 minutes recommended in the methodology. However, given the urban/semi-urban nature of most of the sites covered, it is considered unlikely that the extended length of the surveys resulted in a greater diversity of species being recorded than those captured in a five-minute window.

Special care should be taken to preserve bird breeding sites, particularly for Amber and Red-listed species (e.g. Spotted Flycatcher, Kingfisher, Grey Wagtail and Stock Dove). Development plans for the North Mall campus should be done with consideration for impact on Stock Dove which were observed nesting in the wall at the back of the main carpark at the North Mall campus.

## 7. Additional actions to enhance biodiversity

This BAP recommends a holistic approach to landscape management across UCC campuses. UCC's Sustainability and Climate Action Plan considers emissions reduction targets across "all aspects of the University's educational, research, ancillary operations, infrastructural developments and interactions with the community". The same approach should be taken to biodiversity protection and enhancement across UCC. Funding opportunities for actions may come from national and local sources.

### 7.1 Holistic Action

#### 7.1.1 A landscape approach to invasive species, water catchment management, soil health and pest control

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|---|---|
| Invasive Species Management<br>  | Make UCC Community aware of the threat of invasive species. Create page on website; create signage; provide ID training sessions. Allow for reporting of invasives. An Invasive Species Management Plan should be created, with attention given to minimising the spread of invasives species via:<br>• contaminated soil<br>• dredging and bank clearance of vegetation due to flood relief works<br>• landscape management, e.g. mowing/strimming/leaf blowers<br>• humans, i.e. movement of seeds in soles of shoes<br>Treatment of invasive species should be species and context specific. Treatment should include a step-by-step approach to site recovery. UCC should end the use of biocides on all sites under UCC use, including rented property, if possible, **except where required for treating invasive species**. The invasive species management plan should consider not just the effects and management options for invasive plants, but also mammals (e.g. Mink and Greater White-toothed Shrew) and invertebrates (e.g. New Zealand Flatworm and Noble False-Widow spider). |

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| .Water catchment management<br>  | The Irish Department of Housing, Local Government and Heritage, the Environmental Protection Agency, and the Local Authority Waters Programme created a catchment approach to freshwater quality management and restoration in Ireland. Sections of the River Lee which flow through UCC campuses are located in the Bride (River Lee) Area for Restoration. Twopot River, Curraheen River and River Lee all flow through UCC estate. It is recommended that UCC monitor the quality of these watercourses annually, liaising with national and local authorities responsible for water quality to protect and restore these freshwater bodies. Communication with relevant authorities should be made prior to flood relief schemes which involve dredging or removing bank vegetation. This is necessary to protect freshwater species from silt and other pollutants and habitat loss, in addition to preventing a reduction in water quality and spread of invasive species. |
| Soil management<br>  | Soil comprises five main ingredients: minerals, soil organic matter, living organisms, gas, and water (Needelman, 2013). Soil is home to a huge variety of species, from insects and protozoa to a wealth of soil microbes (bacteria, fungi, and archaea) (ibid.). Soils across UCC campuses vary from urban to agricultural and have been affected by the application of a variety of spoil, fertiliser, gravel and stone, added and removed by people over hundreds of years. They have also been affected by soil sealing (e.g. concrete paving), contamination and compaction. Use of biocides and artificial fertilisers has stopped across most of UCC's estate, though herbicides are used to treat invasive species. To contribute to soil health across campuses, this BAP recommends that soil samples be taken at UCC's campuses and assessed for health and biodiversity to form a baseline. An end to the application of biocides and artificial fertilisers is recommended across campuses and any buildings associated with UCC, unless where necessary for invasive species treatment. The replacement of hard surfacing with nature-sensitive surfaces where possible is also recommended. |
| Rodenticide use | Rodenticides should be used in line with guidelines provided by the Campaign for Responsible Rodenticide Use, Ireland |

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| | (CRRU), to minimise impacts to animals throughout the food chain. See CRRU's resources here. |

### 7.1.2 Vulnerable species and habitat creation

Conservation measures should be enacted to target threatened/vulnerable species, or keystone species/species groups (i.e. species/species groups which are particularly essential to overall ecosystem functioning). The following actions will benefit biodiversity generally.

| Species | Action | Assessing Impact |
|---|---|---|
| Otter  | Lighting used along watercourses should be minimal; directional lighting should be used to prevent overspill. Where possible, consideration should be given to the creation of suitable habitat (e.g. reed cover) in combination with the protection of existing holts, couches and screening. Works targeting the river should be carried out sensitively. Camera trap data should be gathered where possible, e.g. at UCC Alumni Bridge. | Carry out Otter surveys every two years to establish impact. Monitor camera-trap data. |
| Bats  | Onsite lighting should be minimised during the active bat season (March to October). Directional lighting should be used to prevent overspill. Specific lighting profiles should be applied in sensitive areas identified for bats, where lights are dimmed/turned off completely between certain hours, particularly during summer months outside of UCC's active period. An actionable area may be along the main campus river with uncontrolled light spill. Bat roosts should be protected in development plans. Any new builds/renovations should consider | A Bat Monitoring Scheme should be established. This would involve carrying out bat surveys every two years to establish impact, in addition to annual checks of bat boxes and monitoring of roosts for numbers of breeding bats, in addition to trees with a considerable number of suitable roosting sites should be monitored for the presence of roosting bats. Existing bat boxes should be catalogued as part of this monitoring scheme. |

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| | integration of bat roosting spaces i.e. sectioning off attic spaces, integrated bat boxes flush with walls etc. Install additional long-lasting woodcrete bat boxes where appropriate. | |
| Red Squirrel | Safeguarding woodland health will result in benefits to Red Squirrel populations. | Impacts will be established from mammal survey results (see section 6.3). |
| Grey Wagtail | Nest boxes should be installed where appropriate. Efforts should be taken to maintain the River Lee which flows through UCC in as natural a manner as possible. Any flood-relief works or maintenance of vegetation along the river bank should be conducted sensitively to minimise disturbance to Grey Wagtail. | Grey Wagtail was not observed during the 2025 bird survey, however, it is frequently observed on campus and is likely breeding on Main Campus. Annual bird surveys should be conducted to monitor trends in numbers and behaviour of Grey Wagtail. |
| Swift | Callers and nest boxes should be installed on all campuses in an effort to provide breeding habitat for these threatened birds. Though Swift boxes were installed at North Mall and Main Campuses, they failed to attract Swift. Renewed attempts with callers could be implemented where possible. UCC should liaise with Cork City Council Biodiversity Officers to take action for Swift. | Swift were observed on Main Campus and the Sustainability Institute during the 2025 bird survey. Annual bird surveys should be conducted to monitor trends in numbers and behaviour of Swift. |
| Spotted Flycatcher | The British Trust for Ornithology (BTO), which measures bird populations through ringing, tagging and catching birds and recording their biometric data across Britain and Ireland, have observed a 93% decrease in Spotted | Spotted Flycatcher were observed adjacent to UCC Community Garden and at the North Mall Campus during the 2025 bird survey. Annual bird surveys should be conducted to monitor trends |

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| | Flycatcher abundance from 1967 to 2023. In Ireland, they are on BirdWatch Ireland's Amber list of Conservation Concern, but are on the BTO's Red List. Spotted Flycatcher could be breeding at UCC. It is vital therefore to maintain existing habitat (woodland, hedgerows, scrub, semi-natural grassland) and continue the ban on pesticides and herbicides across campus to ensure this species has access to food and nesting sites. | in numbers and behaviour of Spotted Flycatcher. |
| Stock Dove | Though Europe has seen an increase in Stock Dove numbers since recovery from the effects of organochlorine seed-dressings used in the 1950s and early 1960s, Stock Dove has undergone serious decline in Ireland due to habitat loss and pesticide use. Stock Dove are known to forage in wildflower meadows, making the conservation and continuation of these habitats in UCC to be of utmost importance. | Stock Dove were observed exhibiting breeding behaviour at the North Mall campus during the 2025 bird survey. Annual bird surveys should be conducted to monitor trends in numbers and behaviour of Stock Dove. |
| Bryophytes  | Suitable habitat should be maintained. Regularly bryophyte surveys should be carried out, particularly in areas where rare/uncommon species were recorded. | Impacts will be understood over survey years; external factors such as climate change will affect results regardless of conservation effort. |
| Insects | Suitable habitat for insects in the form of native wildflowers, old hollow stems of overwintering vegetation, solitary bee lodges, dead wood, sand and soil piles and scrapes and naturally | Impacts will be understood over survey years; external factors such as climate change will affect results regardless of conservation effort. |

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|  | occurring meadows/grassy verges are vital for insect species. Of the 77 species of solitary bees in Ireland, two have disappeared and 24 species are threatened with extinction (Fitzpatrick, 2020). E.g. All-Ireland Pollinator Plan recommends scraping back some bare earth or drilling holes 10cm deep in unvarnished wood for solitary bees. | |
| Nocturnal Pollinators<br>  <br>  <br>  <br>  | Nocturnal pollinators would benefit from targeted planting of species. Create a Moon Garden (comprising nocturnal-pollinator attracting plants) e.g. at the Observatory if lighting is not impactful. This would connect the biotic world with the abiotic world; physics with biology; Earth appreciation with space exploration. 1/3 of Irish moths' conservation status has been assessed; 8% are threatened with extinction. It is necessary to reduce light and noise pollution and blue-rich light as it's very damaging to nocturnal pollinators. Moths attracted to these lights don't forage for food and don't pollinate effectively. Some native plants which are important nectar sources for nocturnal pollinators include Honeysuckle, Hemp-agrimony, Ivy, Red campion, Marjoram, Rosebay willowherb, Bird's-foot trefoil and Willow. Many of these plants occur naturally on campus. Hawthorn, Oak, Hazel, Alder, Birch, Holly, Ivy, Nettle, Willow and Dog-Rose are also important food plants for moth caterpillars. Leave areas of dead leaves and other plant matter on campus for | Impacts will be understood over survey years; external factors such as climate change will affect results regardless of conservation effort. |

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| | moths to hide in, and caterpillars and pupae to overwinter in. | |
| Ponds<br>  | Damselflies, Dragonflies, beetles, frogs, newts and many other species would benefit hugely from the installation of ponds across campus. Potential sites include on Main Campus beside the Glucksman; at the Sustainability Institute in the meadow; at Curraheen Agricultural Fields; at Curraheen Sports Fields. | Annual pond diversity surveys will provide an insight, however, impacts will be understood over survey years. External factors such as climate change will affect results regardless of conservation effort. |
| Pocket Forests | Explore potential to create small native forests across campus. E.g. a pocket of amenity grassland could be dedicated to this purpose at Mardyke Sports Campus. | Impacts will be understood over survey years; external factors such as climate change will affect results regardless of conservation effort. |
| Rewilding at Curraheen<br>  | Create grassy verges in strips around playing fields to accommodate wildlife. Create a pocket forest at Curraheen Sports ground. Prioritise “Biodiversity Net Gain (BNG),” in any development of Curraheen Agricultural fields. For example, BNG could be achieved through maintenance of as much of the existing hedgerows as possible in combination with the removal of invasive species from hedgerows, the creation of a pond, minimal-input rewilding (with attention given to invasive species) of a section of the site, creation of a meadow and creation of a small woodland with native tree planting. | Survey annually. Impacts will be understood over survey years; external factors such as climate change will affect results regardless of conservation effort. |

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| Connect UCC-owned gardens for biodiversity | Rewild where possible; monitor for invasive species and eradicate where necessary. Use the garden behind Askive, created by colleagues in the Sociology dept. and UCC's grounds team, as an example for food growing in combination with nature-friendly planting. | Survey annually. Impacts will be understood over survey years. |
| More Green Roofs and Walls  | Survey UCC's buildings for their potential to host living walls and roofs. | Given limitations to species suitable for such infrastructure, biodiversity will be challenging to assess. Surveys are recommended to gauge use by invertebrate species. |
| SUDs Measures | Establish Sustainable Draining Systems at any new developments or renovations. | Ensure SUDs systems do not replace natural wetlands. Do not direct run-off to areas which are naturally wet as these sites are biodiversity-rich and vulnerable to eutrophication. Natural wetlands should only accommodate SUDs where consultation has been made with ecologists knowledgeable about the use of natural wetlands as wastewater sequestration and filtering systems. |
| Maintaining Ivy | Though it has an unjust reputation as a problematic species for trees, Ivy does not "leach nutrients," from trees. It generally only causes harm to trees if the tree is diseased, dying or subject to stormy weather. It is a vital winter food source for many animals and provides roosting and nesting habitat for birds and bats. | Maintain Ivy at UCC wherever possible. |

## 7.2 Humans are Nature

We are in an extinction crisis, but many people are so removed from nature that they are oblivious to the extent of its demise. They are also removed from the exponential benefits accrued from connecting with the wider living world. We desperately need a shift in contemporary philosophy which acknowledges human beings as components of living ecological systems; creatures which have the power to create positive as well as negative impacts on biodiversity. Suggestions for connecting the UCC community and wider public to nature are detailed in the table below.

| Action | Assessing action impact |
|---|---|
| Engage UCC Community and wider public in Citizen Science initiatives focused on recording species within different campuses, and targeting specific groups in surveys conducted by the National Biodiversity Data Centre e.g. Butterfly/Bumblebee monitoring, or a survey of Greenfinch, a bird in severe decline in Ireland. | Share records publicly; carry out Citizen Science surveys annually to understand impact of recording effort over time; compare against National Biodiversity Data Centre records (or applicable organisation e.g. BirdWatch Ireland Garden Bird Survey). |
| In any development of Curraheen Agricultural Fields, prioritise Biodiversity Net Gain. | Annual biodiversity surveys will provide insight into biodiversity value. Surveys of park users will provide insight into human-nature-connection value. |
| Engage UCC Community and wider public in Citizen Science initiatives focused on recording invasive species within different campuses | Knowledge of invasive species distribution will assist eradication while giving an insight into spread of these species over time. Some species may be managed without biocides if they remain localised to a small plot, for example. Knowledge will inform impact of invasive species mngmt. plan |
| Encourage lecturers to hold classes outside, using nature as a metaphor to interpret theoretical concepts | Casual survey of lecturers and students to ascertain whether outdoor setting benefited teaching & learning. |

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| Create a university-wide module in basic ecological education, in the same vein as UCC's *Sustainability* and *Planet* modules | Module assessment will provide insight re. depth of appreciation and understanding of ecology/holistic systems amongst participants. |
| Highlight our complete dependence on nature across curricula, emphasising that the living world provides the most fundamental support systems that facilitate human and non-human life (clean air, clean water, food, shelter etc.) | Module assessments/surveys will provide insight re. depth of appreciation and understanding of nature dependence amongst participants. |
| Host at least one nature-connection focused event per school per year which highlights the connection between UCC's degree programmes and the living world | Survey participants re. pro-environmental perspectives and behaviours before and after selected event(s). |
| Host fun, nature-oriented events on campus that showcase green and blue spaces. These do not have to be costly, e.g. nature meditations, nature walks, tours of biodiversity trail(s) | Survey participants re. pro-environmental perspectives and behaviours before and after selected event(s). |
| Collaborate with local Residents Associations, Tidy Towns groups, nature-conservation organisations and Cork City Council in raising awareness on themes such as the harmful use of biocides; gardening for biodiversity; nature for wellbeing etc. | Survey participants re. pro-environmental perspectives and behaviours before and after selected event(s). Monitor biodiversity impact from baseline. |
| Celebrate seasonal changes in university-wide, secular events which highlight the joy found in nature through seasonal foraging, dawn choruses, bioblitzes, picnics, winter feasts etc. | Survey participants re. pro-environmental perspectives and behaviours before and after selected event(s). |
| Engage UCC community and broader public where applicable in habitat creation, e.g. dig ponds by hand, create a trained Meitheal for removing invasive species | Survey participants re. pro-environmental perspectives and behaviours before and after selected event(s). Monitor biodiversity impact from baseline. |

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|---|---|
| Create a campaign to connect private gardens for biodiversity in UCC surrounds, collaborating w Cork Healthy Cities, Cork Green Spaces for Health and others | Monitor biodiversity impact from baseline. Survey participants re. pro-environmental perspectives and behaviours before and after selected event(s). |
| Use UCC's position as a reliable institute for learning to advocate for nature on a national scale. Encourage UCC students and staff with expertise to recruit the wider UCC community and local residents in campaigns on nature protection, e.g. expanding marine conservation areas, banning biocides unless under licensed use for invasive species treatment etc. | Record campaign involvement and share widely via media |
| Host monthly "pint of science," style events at UCC showcasing the university's work on biodiversity (research, on-the-ground, policy and other). | |
| Create a long-term management strategy and funding stream for UCC Community Garden to ensure continued engagement with this space. | |
| Following the work of UCC's Green Campus Greenshoots Coordinator, continue to prioritise access to and engagement with good quality green and blue spaces on campus for student and staff wellbeing. | |

## 7.3 Scientific Rigour

Any approach to biodiversity enhancement should be informed by an up to date, best-practice approach, which draws upon expert opinion where necessary. Suggestions on how to ensure biodiversity actions applied are supported by a robust scientific foundation are detailed below. All surveys recommended should be started in 2025. Recommended frequency of surveys is given arbitrarily; consultation with relevant literature should inform specialist surveys. Potential exists for expanding UCC's carbon sequestration capacity via green infrastructure (e.g. roofs and walls), habitat creation (e.g. ponds across campuses) and rewilding (e.g. woodland creation at Curraheen agricultural fields). While the concept of carbon offsetting is subject to just criticism, understanding the carbon sequestration capacity of biodiversity on campus may provide further impetus for creating new habitats. In-house expertise can be drawn upon for scientific assessment by students and staff across ecology, plant science, physics, engineering and more disciplines at UCC.

| Survey Type | Location | Frequency |
|---|---|---|
| Bird Survey | Across UCC's estate. Attention should also be given to known nesting sites, e.g. the Ravens' nest opposite UCC Crows Nest and the Stock Doves' nest at North Mall campus. | Annually, following preliminary surveys to establish baselines in 2025. Bird diversity and abundance are useful indicators for overall ecosystem health. |
| Bryophyte Survey | 91E0 habitat at Sustainability Institute; Calcareous rock face on Main Campus; Lough Hyne. | Every two years. Bryophytes provide useful information on habitat quality and local phenology. |
| Mammal survey | Across campus habitat. Provides insight re. distribution of Greater White Toothed Shrew (RMI) & native species such as badger. | Every three years, following preliminary surveys to establish baselines. An example of a project which could be coordinated between UCC, an NGO and citizens is a Mink eradication programme. Effects of mink on wading birds could be measured by carrying out bird surveys in areas populated by Mink before and after their eradication (Paddy Sleeman, pers. obs. 2024). |

| | | |
|---|---|---|
| Freshwater Assessment | At Twopot River and River Lee (North Mall and Main Campus). | Annually, following preliminary surveys to establish baselines. |
| Invertebrate Survey | Across campuses. | Every two years, following preliminary surveys to establish baselines. |
| Monitoring of habitat creation for biodiversity and potential carbon sequestration | Across campus. Semi-natural and natural habits such as ponds, grassland, rewilding plots, pocket forests and native woodland should be assessed for their biodiversity value and carbon sequestration potential. This data could contribute to UCC's carbon reduction targets. | Annually, following preliminary surveys to establish baselines. |
| Low-mow area surveys | Survey biodiversity of low-mow areas (plants, invertebrates and soil microecology) using research of Paula O'Mahony (see Appendix 4) as a contribution to baseline data. | Annually, following preliminary surveys to establish baselines. |
| Map Cork City Green and Blue spaces in collaboration with Cork City Council | City-wide. | The map can be revisited every 5 years or so to reflect data changes. |

## 8. Ensuring Impact

To effectively implement this Biodiversity Action Plan, a structure to manage and communicate the Plan is required. Annual BAP Impact Reports are also recommended. This BAP recommends a steering group be established between UCC Buildings and Estates (with key input from UCC grounds management team), UCC University Leadership Team (ULT) on Sustainability and Climate Action, UCC Office of Sustainability and Climate Action and UCC School of Biological, Environmental and Earth Sciences in 2025. The steering group should present on progress at every iteration of UCC's Green Forum and should present to UCC Green Campus Committee twice annually. The steering group lead (also the progress presenter) should rotate annually between departments. Recommended actions per site should be allocated to on-the-ground teams (be they surveyors, researchers or grounds managers) within a realistic timeframe following consultation with grounds management staff, and acquisition and allocation of funding and other resources. However, **all recommendations made in this BAP should be at least in initial phases by 2029 unless they are deemed unrealistic or impossible by the steering group**.

To ensure recommended actions are carried out efficiently, an Action Timeline should be created once funding is sourced. For example:

| Action | Location | Frequency | Funding Source | Personnel | Deadline |
|---|---|---|---|---|---|
| Bird Survey | Across campus. Attention should also be given to known nesting sites, e.g. the Ravens' nest opposite UCC Crows Nest. | Annually, following preliminary surveys to establish baselines. | From funding allocated via small grants schemes, e.g. NPWS, if needed. | UCC School of BEES, with external ecological expertise where needed; ideally with citizen involvement. | September 2025 for preliminary survey |
| Establishment of meadow, pond and forest habitats | Curraheen Agricultural campus | Once-off (with follow-up biodiversity monitoring) | Project development funding | UCC Grounds Management & Buildings & Estates | January 2027 |
| Creation of a Moon Garden | location TBC | Once-off (with follow-up monitoring) | e.g. Tidy Towns or other small funding body | UCC Grounds Management | June 2025 |

## Conclusion

UCC Biodiversity Action Plan 2024 - 2029 provides key recommendations for conserving, enhancing and promoting biodiversity across UCC's estate. However, buy-in across departments is required to achieve these outcomes. Recommendations can only be applied through an Implementation Plan which charts action deadlines against appropriate staffing and funding.

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# Appendices

Appendix 1.

Head Gardener John Murphy's plant species list

| **Wildflowers Documented in No Mow areas since 2018.** |
| --- |
| Dandelion, Taraxacum officinale. Yellow |
| Common Daisy, Bellis perennis. White |
| Meadow Buttercup, Ranunculus acris. Yellow |
| Creeping Buttercup, Ranunculus repens. Yellow. |
| Oxeye daisy, Leucanthemum vulgare. White |
| Cowslip, Primula veris. Yellow |
| Primrose, Primula vulgaris. Yellow |
| Cuckoo flower Lady's smock, Cardamine pratensis. White/pink |
| Cow parsley, Anthriscus sylvestris. White |
| Bluebell, Hyacinthoides non-scripta. Blue |
| Yarrow, Achillea millefolium. White |
| Black medick, Medicago lupulina. Yellow |

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| White clover, Trifolium repens. White |
| Red clover, Trifolium pratense. Pink/reddish/purple |
| Birdsfoot trefoil, Lotus corniculatus. Yellow. |
| Foxglove, Digitalis purpurea. Pink/Purple |
| Nettle, Urtica dioica. Green |
| Meadowsweet, mead wort, Filipendula ulmaria. White |
| St Johnswort square stalk, Hypericum tetrapterum. Yellow |
| Common Ragwort, Jacobaea vulgaris. Yellow |
| Three cornred leek, Allium triquetrum. White |
| Pyramidal orchid, Anacamptis pyramidalis. Pink |
| Common spotted orchid, Dactylorhiza fuchsia. Pink/white |
| Bramble, Rubus fructicosus. White/pink |
| Dock, rubex odtusifolius. Brown |
| Marsh forget me not, Myostis scorpioides. Blue |
| Thistle, Cirsium vulgare. Purple |

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| Smooth Sow thistle, Sonchus oleraceus. Yellow |
| Common Vetch, Vicia sativa ssp. Segetalis. Purple/pink |
| Self heal, Prunella vulgaris. Blue/purple/violet |
| Blue bugle, Ajuga reptens. Blue |
| Herb Robert, Geranium robertianum. Pink |
| Knapweed, Centaurea nigra. Purple |
| Willow herb, Chamaenerion angustifolium. Pink |
| Dog violet, Viola riviniana. Blue/violet |
| Speedwell, Veronica persica. Blue |
| Coltsfoot, Tossilago farfara. Yellow |
| Greater Plantain, Plantago major. Brown |
| Ribwort Plantain, Plantago lanceolata. Brown |
| Pink Sorrell, Oxalis articulata. Pink |
| Fools parsley, Aethusa cynapium. White |
| Wild Carrott, Daucus carota. White |

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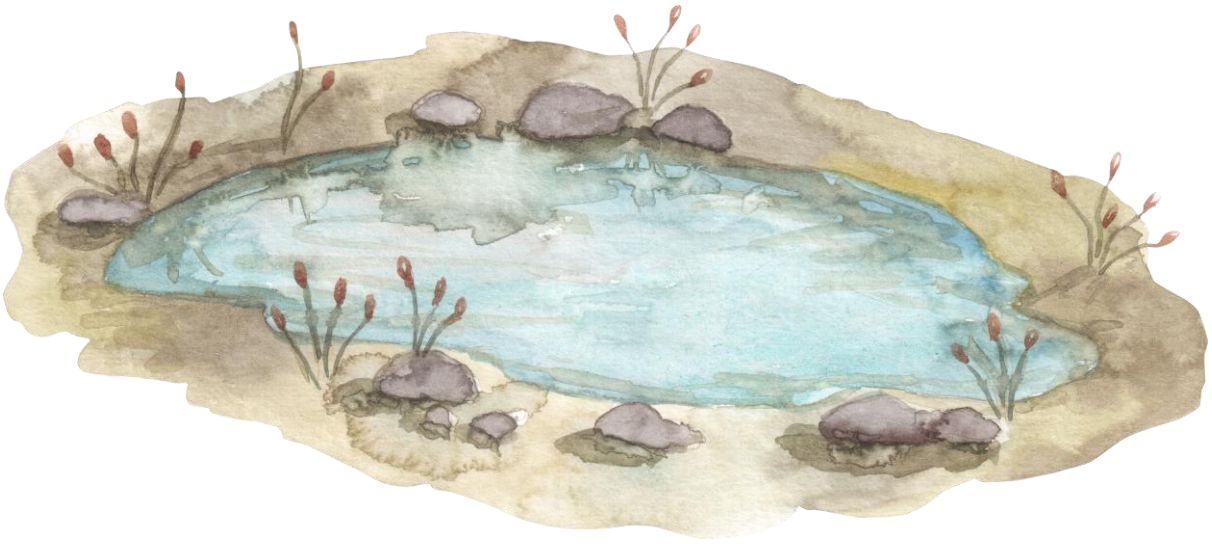
| Centaury common, Centaurium erythraea. Pink |
| Greater Burnet saxifrage, Pimpenella major. White |
| Bittersweet, Solanum dulcamara. Purple |
| Nettle leaved bell flower, Campanula trachelium. Blue/violet |
| Wild Angelica, Angelica sylvestris. White |
| Common broom rape, Orobanche minor. Pinky/yellow/purple |
| Wild garlic, Ramsons, Alliumursinum. White |
| Cats ear, Hypochaeris radicata. Yellow |
| Fox and cubs, Pilosella aurantiaca. Orange |
| Hogweed, Heracleum sphondylium. White. |

Appendix 2. Pond Creation

The following is a summary of key points for pond creation from An Taisce's "The Irish Pond Book: a Guide to the Creation and Management of Ponds," (O'Rourke and Loughran, Eds., 2024).

Prior to creating a pond, background checks re. legal requirements and any existing archaeological or wildlife interests. Unpolluted water is essential for a wildlife pond. Sites which will not require use of an artificial liner are best. If needed, check access for excavating machinery. Sites close to existing waterbodies are best, as associated freshwater life may colonise the pond. A series of ponds in proximity to one another is beneficial to biodiversity. Avoid links to stream or ditch inflows to prevent eutrophication and pollution. Avoid urban run-off and any run-off from land that may contain pollutants. Prioritise quality; a shallow or seasonal pool with clean water is more valuable to biodiversity than a deep polluted pond. It is usually safer, from a biodiversity conservation perspective, to dig a new pond close to (but not directly linked with) an existing wet area. An exception is a wet patch has been repeatedly ploughed, reseeded, and fertilized.



A summary of steps for pond construction are as follows:

- Assess the surface levels, soil type and water source for the site.
- Calculate the amount of spoil to be removed and identify a safe location for the spoil.
- Mark the outline of the pond.
- Estimate costs, timelines and the need for machinery or a meitheal accounting for weather.
- Remove topsoil and avoid putting it up-gradient of the pond to minimise nutrients flowing into the pond.
- Maximise the efficiency of machinery working in tandem (excavator + dumper).

For full instructions on pond construction and maintenance, see the "The Irish Pond Book: a Guide to the Creation and Management of Ponds," (O'Rourke and Loughran, Eds., 2024) available online.

3. Moon Garden Creation

If possible, native planting for nocturnal pollinators should be established in a "Moon Garden," in an area of campus which has minimal lighting. The scattered trees and parkland adjacent to the Observatory on Main Campus could be a suitable location as long as lighting is adjusted accordingly. Lighting in the surrounding area, and the urban nature of the setting, may mean that this site is not the most suitable plot for a Moon Garden. Curraheen Agricultural Fields may be more appropriate. The following species are considered attractive to moths and other nocturnal pollinators:

| | | | | | |
|---|---|---|---|---|---|
| Butterfly-orchid | Field Scabious | Honeysuckle | Bilberry | Red Campion | Hemp-agrimony |
| Marjoram | Bird's-foot-trefoil | Willow | Ivy | Rosebay Willowherb | |

Moth caterpillars benefit from the following native foodplants:

| | | | | |
|---|---|---|---|---|
| Hawthorn | Oak | Hazel | Alder | Birch |
| Holly | Ivy | Nettle | Willow | Dog Rose |

*Taken from the All Ireland Pollinator Plan's "How-to-guide: Protecting nocturnal pollinators."*

4. Paula O'Mahony's research on plant-pollinator interactions

## BLÁTH – Biodiversity on urban Landscapes Assessing Trimmed Habitats and wild zones within the UCC campus.

**Preliminary findings – project summary, figures 1 – 4**

BLÁTH aims to investigate the effects of the 'no mow' initiative on plant-pollinator interactions across four different types of management in the UCC campuses: highly managed (HM), fig.1, no-mow (NM), fig. 2, planted meadow (PM), fig. 3, and unmanaged meadow (UM), fig. 4. Sites were selected from two campuses of University College Cork (UCC), specifically the main campus and the North mall campus. Each site featured continuous vegetation with various plant species, ranging from three to over fifteen species.

Different management approaches resulted in varying numbers of pollinator visits. The data demonstrates that highly managed meadows attract very few pollinators, while both the 'no mow', planted and unmanaged meadows show a significantly higher amount of pollinator activity.

Among the three active pollinator sites studied, (NM, PL, UM) four common plant species were identified: clover, buttercup, common knapweed, and birds-foot trefoil. Clover and common knapweed provide resources throughout the summer, from June to September, across all meadows, ensuring continuous support for pollinators, with peaks observed in the (UM) during July and August.

The highly managed meadow recorded the fewest total pollinator visits to the common daisy and hawkbit plant species, with only 13 observations noted during July and August. The no-mow area followed with 236 visits, while the unmanaged and planted meadows totalled 766 and 808 visits respectively, these observations were taken during the summer season June – September.

July and August were the busiest months for all sites, with the no-mow area showing an increase in pollination numbers during September. The no-mow management approach highlighted the significant impact of the hawkbit plant from the Asteraceae family on pollinator counts later in the season early September.

**Pollinator activity, fig. 5**

Hoverflies displayed consistent activity throughout the year. In late summer (August), C. carder was the dominant species, while Redtail Bees and Honey Bees were most active in July. The highest level of pollinator activity occurred in August, reaching a total of 308 counts, with C. carder being the dominant species during that time.

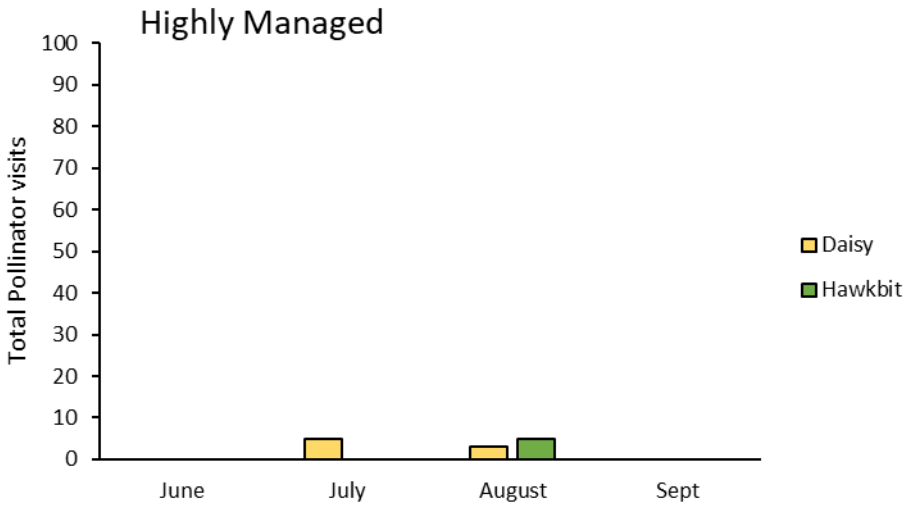



Figure 1: Total pollinator visits during July - September 2024 on two highly managed meadows on main campus UCC.

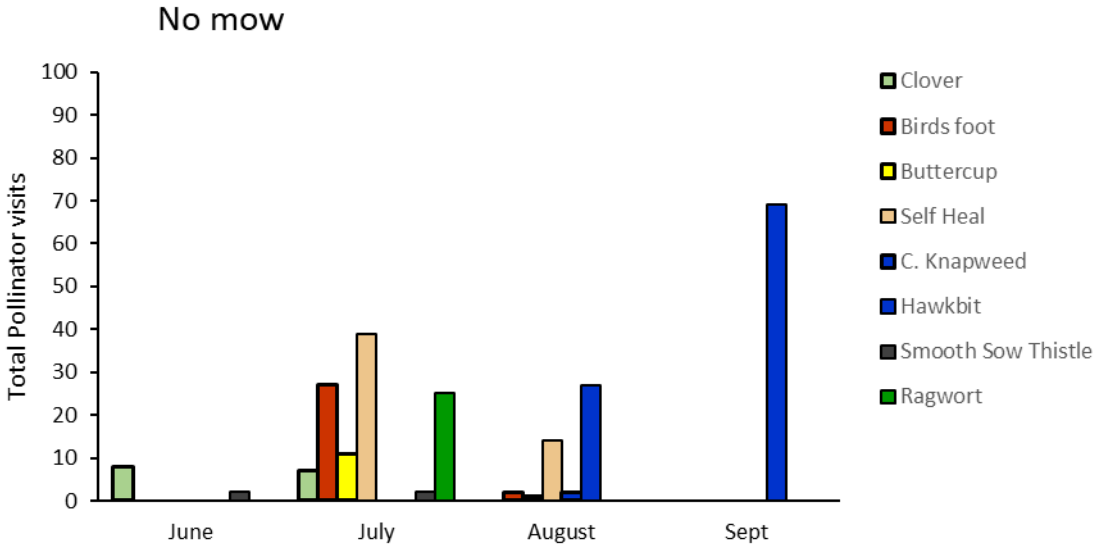



Figure 2: Total pollinator visits during July - September 2024 on two meadows under the 'no mow' initiative on main campus UCC.

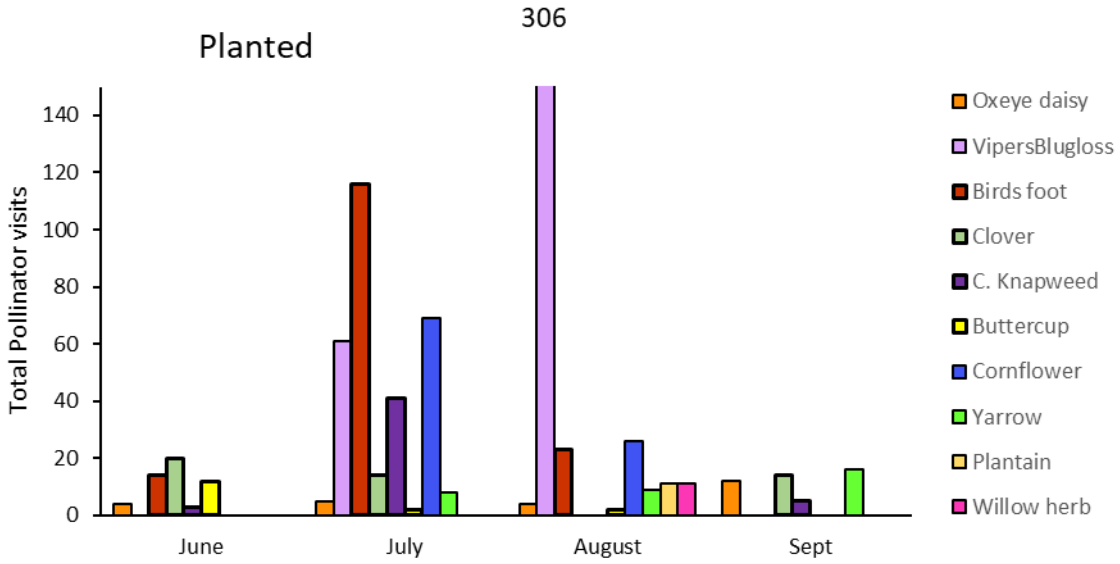



Figure 3: Total pollinator visits during July - September 2024 on two planted wildflower meadows on main campus and north mall campus UCC.

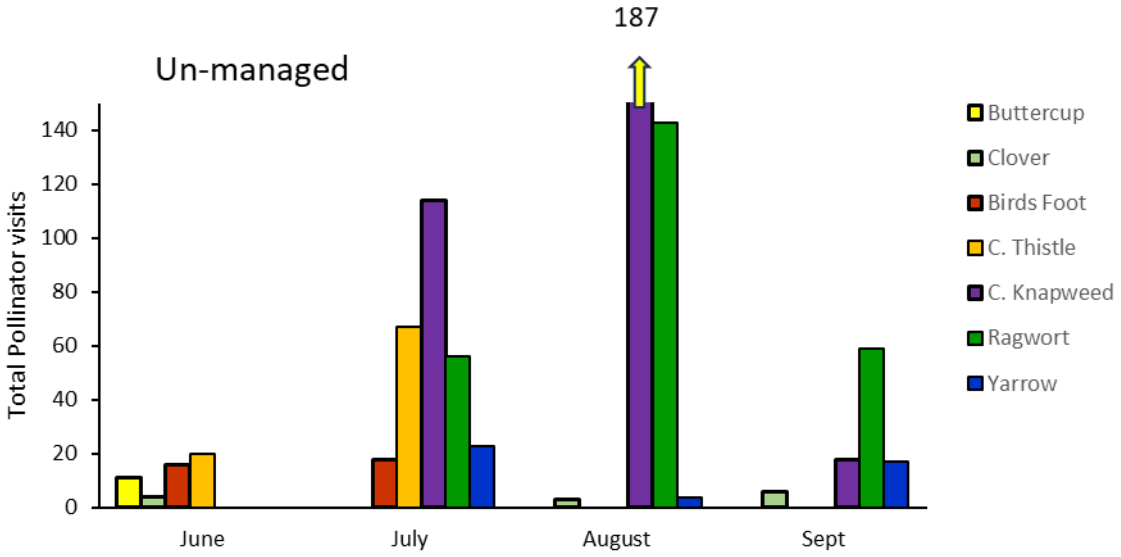



Figure 4: Total pollinator visits during July - September 2024 on two meadows that have been left unmanaged since 2018 on the north mall campus UCC.

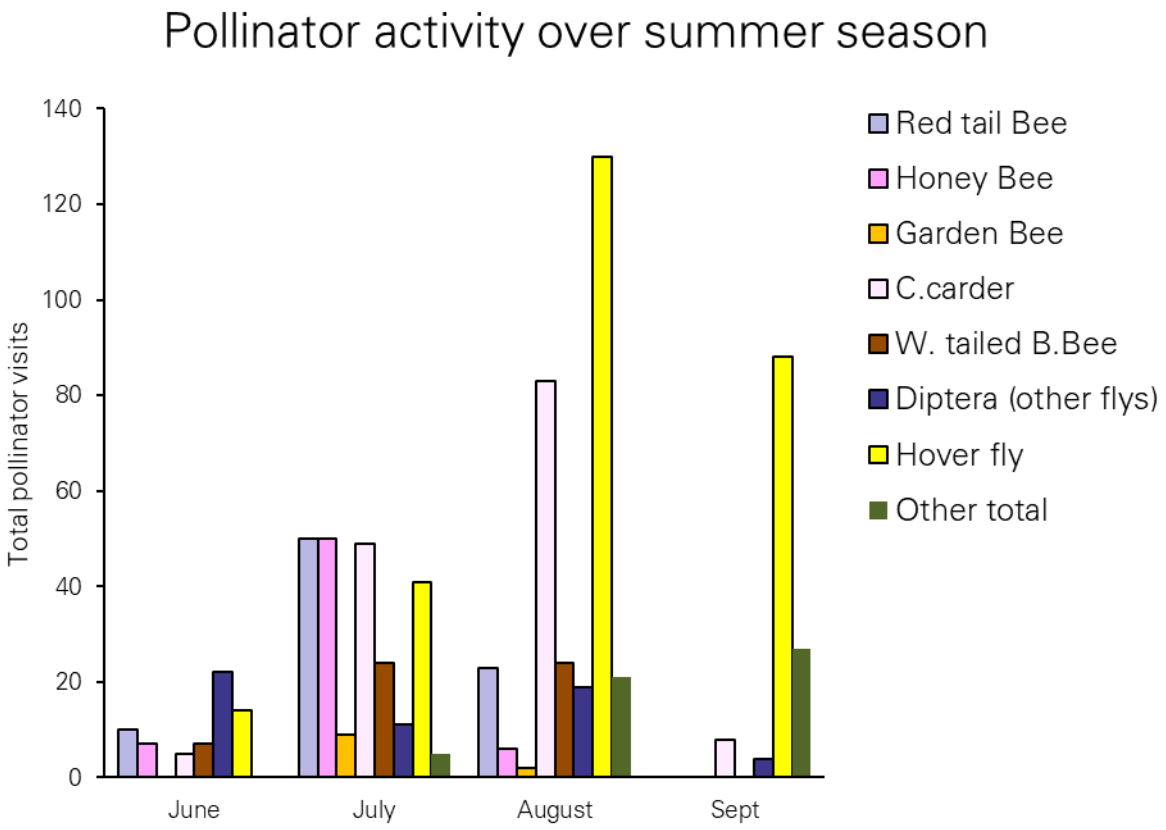
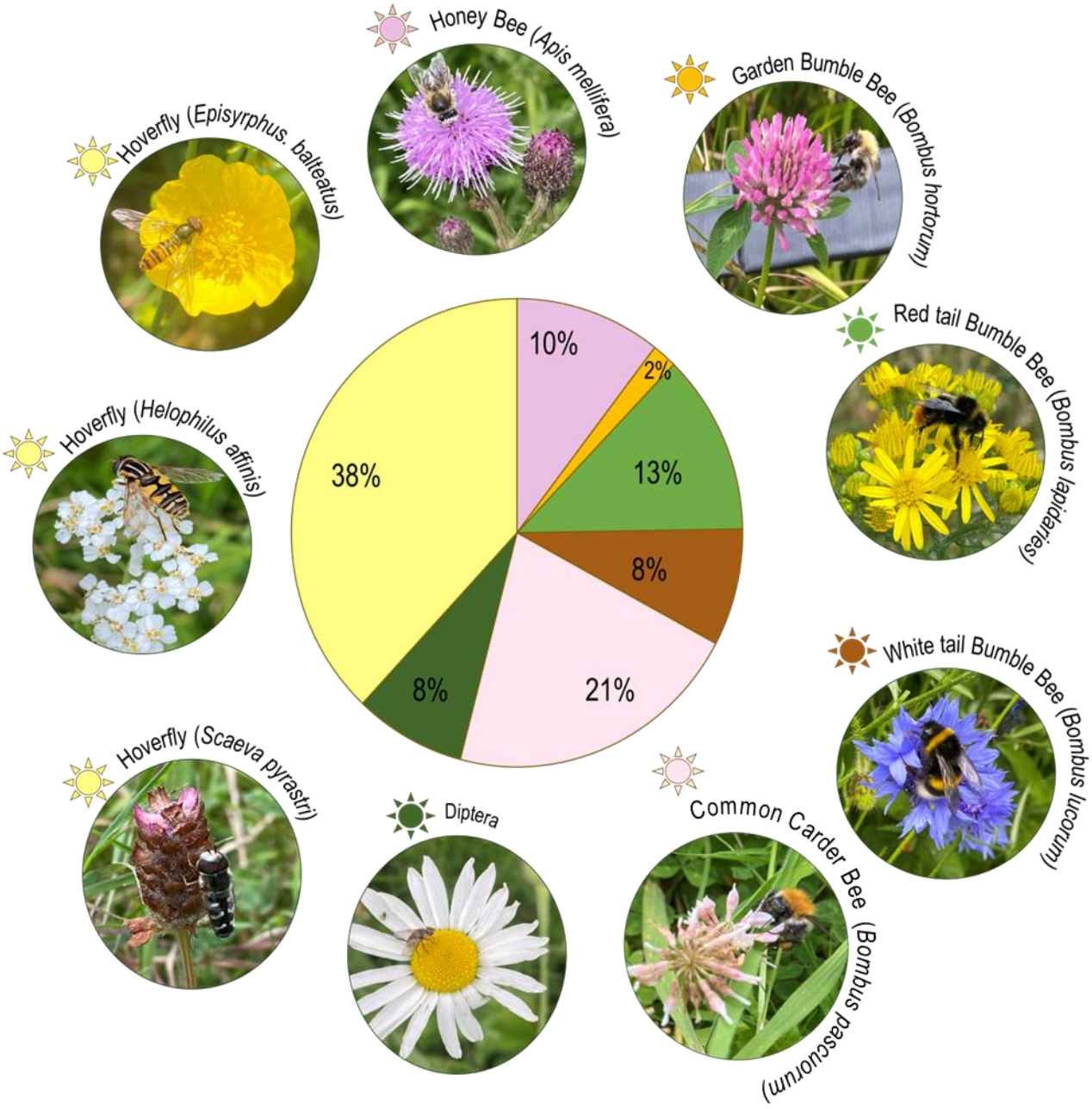



**Figure 5: Total pollinator activity observed during July – September 2024 on all meadows across UCC main campus and north mall campus.**




Diversity of pollinator taxa observed around University College Cork campus during June – Sept 2024. Images © Paula O' Mahony 2024.

5. Bird Survey methods

## UCC Bird Surveys: Point Count Methodology 2025

Point count methodology involves **counting all birds that are heard and seen within a defined radius of a selected point**. For the purposes of these surveys, counts were conducted within a **50m radius** of selected points at UCC Main Campus, North Mall Campus, the Sustainability Institute/Ellen Hutchins Building, Mardyke Arena and Western Campus. Surveyors were invited to use Google Maps/Bing Maps to estimate the 50m radius if needed. Surveyors stood at the approximate point of the red dot(s) on the maps provided to carry out surveys. All observations were recorded in the data sheets using British Trust for Ornithology codes or full species names.

Point counts were done in the morning, **ideally commencing between 7 and 8am, but no later than 9am**. They were not done in unsuitable weather conditions, i.e. rain or high winds. The point count surveys lasted for **five minutes, with a one minute settling period**. I.e., after arriving to selected points, surveyors stood for one minute before commencing the survey to allow flushed and disturbed birds to settle. They then recorded all birds they could see and hear within 50m of the point within five minutes. In the survey design, points at and adjacent to habitats where abundance and diversity should be highest were intentionally selected. This was because a broad understanding of the abundance and diversity of birds using UCC's campus was required.

In the data sheets, a section for casual observations of species which were not recorded within the point counts was provided. E.g., if Long-tailed Tit was not recorded within the 50m radius of a selected point, but was observed while walking to or from the selected point, it was included within the casual observations section. By including this section, the survey design provided surveyors with the opportunity to record species which are important to include for conservation purposes, e.g. Kingfisher.

Re. assessing the **weather conditions**, we applied BirdWatch Ireland Countryside Bird Survey methods of classification:

Wind: 1 = Calm, 2 = Light, 3 = Breezy
Rain: 1 = None, 2 = Drizzle, 3 = Showers
Cloud: 1 = 0-33%, 2 = 33-66%, 3 = 66-100%
Visibility: 1 = Good, 2 = Moderate, 3 = Poor.

6. Bird Survey data sheets sample

| **7. University College Cork Bird Survey 2025** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| **Point ID** | **Campus Name** | **Surveyor Name** | **Start Time** | **End Time** | **Date** |
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| **Cloud:** | **Rain:** | **Wind:** | **Visibility:** | | |
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| **Species Observed (use BTO code)** | **Number of Individuals** | **Behaviour** | | **Casual observations** | |
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