



Environment (Wales) Act 2016 Part 1 - Section 6: The Biodiversity and Resilience of Ecosystems Duty - Report 2019

Introduction and context

Note: In line with the guidance received from the Minister for Environment on 4th November 2019, the following document constitutes a Short Report. The Full Report will be completed at the end of the Academic Year 2019/2020 as part of the University's report to Council and submitted to Welsh Government once approved.

Cardiff University falls into Group 2 in the Description of Organisation Relative to Biodiversity in Table 1 of the Section 6 guidance document. The University is an organisation that owns, occupies or manages its own buildings and grounds, and as such is responsible for reporting on the Nature Recovery Action Plan Objectives 1-6.

Short description of PA, its functions and context.

Founded in 1883, Cardiff University is one of the UK's leading research universities. We aim to bring about social, environmental, economic and health benefits not only to Wales but to the wider world. Cardiff University is independently audited and certified to the ISO 14001 international standard, based on an effective environmental management system, characterised by continual improvement. The University declared a climate emergency in November 2019 with the ambition of reaching net zero carbon emissions no later than 2030. As part of the declaration the University signed the EAUC (The Alliance for Sustainability Leadership in Education) global letter bringing together educational institutions and networks from across the world in recognition of the need for a drastic societal shift to combat the growing threat of climate change. Cardiff University is also a signatory of the Sustainable Development Goal (SDG) Accord. The Accord represents the university and college sector's collective response to the SDGs and our commitment to delivering these goals.

Biodiversity

Our commitment to sustainable development is reflected in our strategic direction, which includes our Environmental Sustainability Enabling Strategy. Linking to the SDGs and the Welsh Government's Wellbeing For Future Generations Shared Purpose Shared Future (SPSF) 2 goals, the enabling strategy details 'A Resilient University' as one of its underpinning goals, and 'to enhance the biodiversity of our campus by promoting pollinator planting across our green spaces' as a key priority (<https://www.cardiff.ac.uk/about/our-profile/who-we-are/sustainability>). Our green spaces are recognised as an important part of our Wellbeing Strategy, which has recently been approved. In addition, green spaces are also recognised as a key priority within the draft 'Enabling Success: A Strategy for Creating A Mentally Healthy University' which is due to be launched in the new year. We continue to review and enhance the University's physical and virtual environments to promote a culture of positive wellbeing and mental health within our community.

Spatial, scale and place

Cardiff University's campuses are primarily city centre-based, and the University commits to conserve biodiversity where possible at all of our sites whether city-based or those with larger land holdings such as Cardiff University Sports Fields (Llanrumney) and University Hall.

Cardiff University has a number of academic buildings at the Cardiff and Vale University Health Board (UHB) site (Heath Park campus). The UHB are the landlords of this site and therefore the Heath Park site is not contained within this report, however our aim is to work alongside the UHB wherever possible to enhance biodiversity. Cardiff University's estate is comprised of just under 40 hectares which have historically supported a small number of priority species and habitats as shown in Tables 1 and 2:

Table 1. Cardiff University's Priority Species					
Common name	Species name	Currently Present?	SPIB	CL BAP	CU W&W P
slow worm	<u>Anguis fragilis</u>	yes	yes	yes	yes
common pipistrelle	<u>Pipistrellus pipistrellus</u>	yes	yes	yes	yes
newt spp.	<u>Lissotriton vulgaris</u> ; <u>L. helveticus</u> ; <u>Triturus cristatus</u>	no	yes	yes	yes
black-headed gull	<u>Larus ridibundus</u>	yes	yes	yes	no
herring gull	<u>Larus argentatus</u> subsp. <u>argentatus</u>	yes	yes	yes	no
house sparrow	<u>Passer domesticus</u>	yes	yes	no	no
cinnabar moth	<u>Tyria jacobaeae</u>	yes	no	yes	no
hedgehog	<u>Erinaceus europaeus</u>	yes	yes	no	yes
swift	<u>Apus apus</u>	yes	no	no	yes
tawny owl	<u>Strix aluco</u>	yes	no	no	yes
garden bird spp.	<u>various</u>	yes	no	no	yes
pollinators	<u>various</u>	yes	no	no	yes
bluebell	<u>Hyacinthoides non-scripta</u>	yes	no	no	yes
Welsh daffodil	<u>Narcissus pseudonarcissus</u>	no	no	no	yes

Table 1 describes Cardiff University's priority species, SPIB = Species of Principal Importance for Biodiversity, CL BAP = Cardiff Local Biodiversity Action Plan, CU W&W P = Cardiff University Wildlife and Wildflower Plan.

Table 2. Cardiff University's Priority Habitats			
Common name	HPIB	CL BAP	CU W&W P
Lowland neutral grassland meadow	yes	yes	yes
Ponds	yes	yes	yes
Lowland mixed deciduous woodland	yes	yes	yes
Hedgerow	yes	yes	yes

Table 2 describes Cardiff University's priority habitats, HPIB = Habitat of Principal Importance for Biodiversity, CL BAP = Cardiff Local Biodiversity Action Plan, CU W&W P = Cardiff University Wildlife and Wildflower Plan.

Public service delivery

These species and habitats have been subject to sporadic monitoring by volunteer groups in the past, but at time of writing, the University is developing a new Biodiversity Action Plan (see section 5) to ensure that our conservation efforts are more systematic and collaborative. This will include regular monitoring of Cardiff University's biodiversity, especially in the wake of biodiversity-focussed changes to estates management practices in line with the upcoming Biodiversity Action Plan. The Biodiversity Action Plan development committee includes representation from Cardiff City Council, enabling our involvement in the Local Nature Partnership, placing an emphasis on green infrastructure resilience, and feeding into Natural

Resources Wales' South-Central Area Statement. As part of developing our Biodiversity Action Plan during 2020, Cardiff University will seek involvement in the Cardiff Public Service Board's Resilience Board, an aim of which is to deliver on Area Statements and biodiversity duty at a city scale.

Governance and actions

The University's green estate is currently managed in two ways. The formal spaces around the academic buildings are managed by an external contract. These areas largely comprise formal gardens of cut grass and shrubs. Secondly, the areas associated with our Sports fields and residences sites have been managed internally by our grounds maintenance team for the last five years. Both managed areas fall under the responsibility of our Estates and Campus Facilities Division. To date, biodiversity projects have been raised through the Environmental Management Systems Steering group chaired by the Chief Operating Officer.

The University adopted a Biodiversity Policy Statement in 2011 as part of its Environmental Management System with an associated action plan for maintaining and enhancing areas around our residences and sports sites, actions included:

- Native species used for replacement and new planting
- All trees to be inspected annually and database maintained
- Pruning/hedge cutting undertaken outside of bird nesting periods
- Grass cuttings composted where possible
- Allow habitat piles to develop (from shrub/hedge cuttings) at some sites
- Allow derelict Gateway site to regenerate with native wildflowers and grasses
- Provide bat boxes on Gateway site and other appropriate sites.

The current Biodiversity Statement can be viewed at the link below:

<https://www.cardiff.ac.uk/public-information/policies-and-procedures/health-safety-and-environment>

The new Biodiversity Action Plan will be available from the end of the current academic year (2019/2020).

The University formed a Biodiversity Steering Group in 2019, chaired by our recently appointed Dean for Environmental Sustainability and which includes representation from biodiversity academics, grounds maintenance staff responsible for managing biodiversity sensitive sites (a representative of the Cardiff Wildlife & Cardiff Wildflower staff group), the Estates department, staff from our Sustainable Places Research Institute and has representation from Cardiff City Council. The aim of the Steering Group is to develop a Biodiversity Strategy and Action Plan, this will be delivered during the academic year 2019/20. The Biodiversity Action Plan will feed directly into many of the University's activities, including the grounds and gardens contract which is due to be awarded in April 2020.

Highlights, key outcomes and issues

Key biodiversity actions

1. Cardiff University is currently developing a full Biodiversity Action Plan that will be produced during the academic year 2019/2020. The aim of this action plan is to:

- provide a holistic framework for management of biodiversity-rich and sensitive sites across the University's estate, but also sites with potential for improvement.

- launch a comprehensive assessment of the current state of biodiversity across the estate to identify ways to improve biodiversity, such as by reducing stressors, enhancing habitat connectivity and diversity, and ecosystem service delivery at key sites within the estate
- establish a long-standing protocol for year-round biodiversity monitoring
- ensure that the University's green infrastructure is resilient and connected with similar infrastructure surrounding the estate
- identify ways in which the University's green infrastructure can improve the wellbeing of its staff and students and be better incorporated into the University's teaching and research activities.

2. The University has also recently (October 2019) appointed a Dean for Environmental Sustainability (Professor Michael Bruford, School of Biosciences and Sustainable Places Research Institute), whose role is to drive change across the institution in all relevant areas, including chairing the Biodiversity Steering Group.

3. On 29th November 2019, the University declared a Climate Emergency, which has identified the development of the Action Plan as a key activity during the coming year.

Although our Biodiversity Action Plan is currently under development, our intention is to monitor not only the changes in species richness, habitat connectivity and ecosystem service delivery across the estate but also to monitor changes in perceptions and activities in staff and students during this process by means of regular online surveys. Staff and student volunteering opportunities will be extended to involve the University's community in our efforts to improve our environment, and links will be developed with Cardiff City Council and community groups to involve those stakeholders in our activities and plans.

Positive outcomes

Meadow savings

Cardiff University currently has eight functional meadows (with more planned). Most of these were surveyed in 2019 as part of our Meadow Audit, and we identified 42 wildflower species on our survey day in July. This has led to financial savings (the areas no longer need to be mown through spring and summer) and carbon savings (perennial wildflowers have much deeper roots than ryegrass lawns and therefore sequester much more carbon), as shown in Table 3.

Location	Area	Mowing costs ¹	Carbon sequestered ²
Llanrumney 3G	600m ²	£80 per year	0.35 tonnes per year
Llanrumney Environmental Area	430m ²	£280 per year	0.25 tonnes per year
Redwood Building	578m ²	£90 per year	0.34 tonnes per year
Talybont 3G	420m ²	£260 per year	0.25 tonnes per year
Cartwright Court	216m ²	£140 per year	0.13 tonnes per year
Talybont South	85m ²	£50 per year	0.05 tonnes per year
Hadyn Ellis Building	70m ²	£50 per year	0.04 tonnes per year
Senghennyd Court	76m ²	£50 per year	0.04 tonnes per year
TOTAL	2,475m²	£1,000 per year	1.45 tonnes per year

At present our savings are moderate, but since additional meadows are planned and the savings continue each year, the financial savings in particular may become more significant over time. The same is true to some extent of the carbon savings, although net carbon sequestered is thought to diminish after the first decade of restoration.

Case Study – Green Impact

Cardiff University has taken part in the NUS behavioural change programme 'Green Impact' for seven years. As part of the programme teams are encouraged to enter the 'special awards' which include 'Environment Improvement'. **In 2017 'Our Campus Facilities' won the UK Green Impact Award for Environmental Improvement:**

Leading the way in biodiversity for Cardiff University, Residences and Facilities Services (part of Campus Facilities) have delivered a number of Biodiversity initiatives across the Residences estate. In 2013, during planned refurbishment of Roy Jenkins Halls of Residence, the Facilities team worked with members of the local community and Swift Conservation to preserve a swift colony nesting in the roof spaces at the halls of residence site. The colony is thought to be one of the largest in Cardiff with 12–14 nests.

The Facilities Team engaged with Swift Conservation and local bird watching neighbours to outline the requirements for preservation of the nesting site which would also minimise the impact of the colony on the residences operation and building. The Facilities Team funded the work from an Environmental/Sustainability Fund (negotiated into the Residences Laundry services contract the previous year) and work was completed to preserve the site. This initiative sparked interest and a drive to consider other biodiversity actions which could be delivered at no/low cost to the University.

With funding from the aforementioned Environmental/Sustainability Fund, swift nesting boxes were installed at Talybont North and Talybont South Halls of Residence working in partnership with the School of Biosciences (a team researching bird conservation).

More recently, the Facilities Team and the Sport Grounds Maintenance Team have worked together on a number of initiatives including creation of a slow worm area, and wildflower planting/ bee gardens at Talybont North, Cartwright Court and Llanrumney Playing fields. Looking to the future, the team are part of the Bee Friendly University project and are considering further wildflower planting, beehives and green roofs on new build projects.



Residences and Facilities Services being presented with Green Impact Award for 'Environmental Improvement' by the Chief Operating Officer – June 2017

Action report

Objective 1: Engage and support participation and understanding to embed biodiversity throughout decision making at all levels.

University Strategies

Environmental Sustainability Enabling Strategy

Cardiff University's Environmental Sustainability Enabling Strategy was developed in 2018. Our underpinning goals are adapted from the SDGs and the Welsh Government's Wellbeing goals including *'A Resilient University – A University which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience particularly the capacity to adapt to change'*.

One of our key priorities is *'to enhance the biodiversity of our campus by promoting pollinator planting across our green spaces'*. This priority builds on the work of the award-winning Pharmabees project (see below): we will increase the area of University estate covered by wildflower meadow. This will increase local biodiversity, provide additional forage by including pollinator friendly plants identified by Cardiff University researchers and increase carbon sequestration. The Environmental Sustainability Enabling Strategy Action Plan 2018-2023 contains a commitment to the following actions:

- Linking with the well-being strategy to develop a community garden and food growing space
- Expand the Welsh Government pollinator-friendly initiative across University buildings
- Build partnerships with our neighbours to develop biodiversity corridors across the city
- Continued creation of wildflower/bee friendly planting around University campuses.

Draft Wellbeing Strategy

The University approved a Wellbeing Strategy in December 2019. The strategy recognises the direct links between wellbeing and environmental sustainability:

This Strategy supports 'a resilient University' and the embedding of the SDGs with particular relevance to SDG 3 'Good Health and Wellbeing' and SDG 15 'Life on Land'. The University has committed to evaluate its physical working environment and impacts on wellbeing, viewing new building developments through a 'wellbeing lens' and continues to consider improvements to the current estate in line with industry wellbeing principles. This includes supporting our environmental sustainability agenda by recognising the connection between enhancing our green spaces and the positive impact this has on wellbeing through our Biodiversity Strategy.

Cardiff University strategy for creating a mentally healthy University

Drawing on the Higher Education Sector's 'Stepchange' framework approach to mental health, Cardiff University's approach will focus on five key areas including Purpose; People; Partnership; Provision and Places. The University is committed to: *'...enhance our physical and virtual environments to promote and support the wellbeing and mental health of our community. We will consider wellbeing and mental health when developing our estate and planning activities. Our environment will empower our students to mature and thrive. It will facilitate a sense of place, academic home and community to empower early intervention to support staff and students with mental health issues.'*

Estates Management

Standard Building Electrical and Mechanical Requirements (SBMER)

Estates and Campus Facilities have developed a standard building, electrical, and mechanical requirement document reviewed annually, which is used in all maintenance and refurbishment work across the estate. Within the document are sections addressing ecology and biodiversity. The following extracts are included below:

Ecology, Biodiversity and BREEAM (Building Research Establishment Environmental Assessment Method) standards

The University recognises the value of the natural environment in which it operates and the biodiversity which it supports. The landscape is a major attraction for students considering which University to attend. The University's gardens and open spaces offer a refuge from academic endeavours for student, staff and visitors. As the University develops, the natural environment needs to be protected from the impacts of light, noise, litter, physical pressures etc, in order to retain a balanced setting, in which local biodiversity is maintained and (whenever possible) enhanced.

Whenever building development takes place, compliance with BREEAM is a University agreed minimum standard. BREEAM is the leading and most widely used environmental assessment method for buildings. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. BREEAM excellent (or outstanding(aspirational)) will apply to all projects with a construction spend of over £1m. Leadership in Energy & Environmental Design (LEED®) Standards will apply for the environmental performance of all new buildings to encourage sustainable design. Passivhaus® design principles will be applied wherever possible to assist with rigorous design & construction, incorporating higher building airtightness standards and ensuring post occupancy monitoring is carried out.

For new buildings a BREEAM rating of 'Outstanding' is expected with "excellent" for all future refurbishments. The University expects all new builds to aspire to "outstanding" with "Excellent" for all future refurbishments. The University will appoint a BREEAM assessor funded from the project independently of the design team. For further information please contact the Estates Maintenance Officer (Energy & Sustainability). Legal compliance is required for certain species e.g. bats (all species), badgers, newts, slow worms etc. and therefore during the development stage External Estates must be included in discussions for them to consider the proposed site and investigate/survey for ecological significance. Lifecycle is dependent upon existing/potential habitat significance and species present.

All materials, and street furniture, will be specified in conjunction with the external designers, planning authority, ecological diversity, biodiversity and energy & sustainability teams on a project-by project specific basis. The objective is to ultimately create a sustainable, ecologically balanced landscape that is recognisably Cardiff University and broadcasts sustainability and ecological awareness. All external planting must be from native species only and conform to the local bee keeping association and Cardiff University requirements for suitable bee-friendly pollenating plants.

Trees

Whilst considering aesthetic and botanical considerations, the selection of tree varieties and positioning of new tree planting needs to correspond to the industry standard BS 5837:2012 'Trees in relation to design, demolition and construction' and the security lead 'Secured by Design'. In regard to planting positioning near structures/buildings, consideration need to be

made to ensure that the mature height, canopy spread and root spread of the selected tree species will not cause management issues in the foreseeable future and that a clearance of 1-2m from the building is maintained with the natural form of the tree.

Tree species should be native to the local environment and not imported species. Secure by Design states "open branched and columnar trees are used in a landscape scheme where natural and formal surveillance is required. Planting must not impede the opportunity for natural surveillance and avoids the creation of potential hiding places. Tree foliage below 2m is avoided and thus there is appropriate natural surveillance".

University Environmental Sustainability Induction

All staff and students are requested to undertake the University Sustainability induction which details current actions relating to Biodiversity (see below) including:

- Environment Act 2016 – Section 6
- Biodiversity Strategy and Action Plan
- Regrow Borneo
- Bee Friendly status
- Pharmabees project
- Greening Cathays
- Green Flag Community Award
- Great Bluebell Project
- Creation of natural habitat
- Slow worm project
- Wildflower planting – community gardens
- Wildlife and Wildflower Yammer group

The induction is available as a download at:

<https://www.cardiff.ac.uk/about/our-profile/who-we-are/sustainability/performance>

All new staff receive a corporate induction and are required to complete the 90-day starter kit issued by Human Resources, the environmental sustainability induction detailed above includes our biodiversity actions.

Objective 2: Safeguard species and habitats of principal importance and improve their management

Biodiversity survey

A Phase 1 survey was carried out in February 2013. Eco-explore CIC was tasked with providing assessment of the sites for biodiversity potential and ways in which any future works could optimise biodiversity (see Appendix 1). Several key sites were identified, including student residences at Talybont and University Hall. These sites are adjacent to the existing green and blue networks (for example, Bute Park, River Taff, railway networks and gardens) in Cardiff. Eco-explore CIC's principle is to involve and provide valuable active training opportunities for students. As part of the surveys, we involved students as much as possible in order to provide them with experience that can be used as part of their Continued Professional Development. Students were recruited from Cardiff School of Biosciences undergraduate and postgraduate courses. Further biodiversity inventories and assessments will be carried out via a 'bioblitz' during the University's Sustainability Week (March 2020) and later into 2020.

Residences and Facilities Services have delivered a number of Biodiversity initiatives across the Residences estate including swift conservation and wildflower planting/bee gardens have also been developed across the campus (see above).

Cardiff University Priority Species

A list of the Cardiff University priority species (including all Species of Principal Importance for Biodiversity which are found on Cardiff University land) can be seen in Table 1. As previously described, a more thorough Biodiversity Action Plan is currently in development to ensure the favourable conservation management of our priority species. At present the species are protected on an *ad-hoc* basis by local policies on each site where they are present:

1. Slow worms (*Anguis fragilis*) occur at one site at Cardiff University, in a rough grassland area. The area was previously managed as lawn but was allowed to revert to unmown rough grassland/"meadow" in 2015, and the first slow worms were seen in 2016. We have placed three refugia to monitor slow worms, and these are checked every week by a staff volunteer, and the number present is recorded. The volunteer posts regular photographs on the Cardiff University Wildlife & Wildflower social media group, to educate others about slow worms. The area where the slow worms inhabit is only mowed once a year, in November, after three consecutive weeks of no slow worms being found under the refugia. In our Biodiversity Action Plan we are going to set out a continual monitoring and mitigation strategy.
2. There are no bat roosts at Cardiff University, but at least one of our sites is regularly exploited by a colony of common pipistrelles (*Pipistrellus pipistrellus*). As part of our Biodiversity Action Plan, we are going to set out a monitoring and legal compliance strategy for bats.
3. We do not believe any newts currently live on or visit Cardiff University land. Great crested newts (*Triturus cristatus*) are a priority species in the Cardiff Local Biodiversity Action Plan, and a Species of Principal Importance for Biodiversity in Wales. Given the presence of great crested newts in Cardiff, newts have been selected as a Cardiff University priority "species" by staff to encourage creation and maintenance of habitats and refuges for these local populations. As part of our Biodiversity Action Plan, we are aiming to create a University wildlife pond and monitor it to ensure that it remains fish-free to encourage potential newt populations.
4. Black-headed gulls (*Larus ribundus*) and herring gulls (*Larus argentatus*) are very common at Cardiff University. They regularly nest on our flat roofing areas, and hundreds roost on the mown wide-open areas of one of our sites. These birds are most vulnerable as fledglings, after they have left the nest but before they can reliably fly. At this time of year, members of staff and visitors are reminded to steer clear of the birds (for their own safety as well as that of the fledglings – the adults of the colony are very protective). As part of our Biodiversity Action Plan, we will be creating a gull monitoring strategy to inform management of these populations.
5. Garden birds, especially house sparrows (*Passer domesticus*), are found around Cardiff University's garden areas. Before cutting ornamental hedges in nesting season, members of staff are asked to check for nesting garden birds, although cutting will take place outside of typical nesting periods under our new Biodiversity Action Plan. In order to encourage garden birds, as part of the Biodiversity Action Plan we aim to create an additional 1,000m² of wildflower meadow area, forbid the use of selective pesticides (except on sports turf) and forbid the use of slug pellets.
6. Cinnabar moths (*Tyria jacobaeae*) are a priority species on the Cardiff Local Biodiversity Plan. Cinnabar moths use ragwort (*Senecio jacobaea*) as a host species for their larval stage, and they have colonised our summer meadows over the last few years. Our existing meadow maintenance plan is thought to be ideal for cinnabar moths. We will extend the

successful management regimes onto more land, including the additional proposed wildflower meadows, to better provision for these populations.

7. Hedgehogs (*Erinaceus europaeus*) are known to regularly visit at least three of Cardiff University's larger sites – the number is probably much higher. As part of the new Biodiversity Action Plan we want to create a dead hedgehog reporting scheme, to track any roadkill hotspots. This will be linked to our well-developed citizen science program 'Project Splatter' (<https://projectsplatter.co.uk/>), which is run from the University's School of Biosciences. We will install hedgehog crossing warning signs on these hotspots. We also aim to create a habitat mitigation scheme, and issue bonfire-check reminders each year to staff.

8. Swifts (*Apus apus*) are an amber list UK species and have been chosen as a priority species for Cardiff University. They are currently known to nest on one site, and the building maintenance at this site is carefully managed to avoid any disturbance. We have erected swift boxes on other sites, and as part of the new Biodiversity Action Plan we hope to mandate that swift bricks or swift boxes be fitted in all major renovations and works on buildings over one story high.

9. Tawny owls (*Strix aluco*) are an amber list UK species and have been chosen as a priority species for Cardiff University. They have been heard calling on a single site at the University. We have erected a tawny owl box on this site in the hope that the site might be colonised, and also created an area of rough grassland in the field margins to provide habitat for the tawny owl's prey. As part of the new Biodiversity Action Plan we hope to establish a regular dusk survey, to continue to monitor our sites for tawny owls.

10. Pollinators species are a Cardiff University priority. To benefit pollinators, we have created our wildflower meadow areas – listed in Table 3 and reduced our use of pesticides by no longer spraying the areas adjacent to meadows. We have achieved accreditation for one university building as a Bee Friendly University. As part of our Biodiversity Action Plan we aim to plant an additional 1000 m² of wildflower meadow to support pollinators. This additional meadow space and other management changes will increase connectivity of pollinator-friendly habitat within the University and external green spaces for greater resilience of these populations.

11. English bluebells (*Hyacinthoides non-scripta*) are a Cardiff University priority species. In 2018 we realised that all the bluebells that occurred on campus were invasive Spanish bluebells (*Hyacinthoides hispanica*), we planted over 4,000 English bluebells to create a reservoir population on site. As part of our new Biodiversity Action Plan we aim to remove Spanish bluebells from all sites where English bluebells occur, and place signage on our key bluebell sites warning staff, students and visitors of their legal obligation not to trample, mow or collect bluebell flowers.

12. Welsh daffodils (*Narcissus pseudonarcissus*) are a Cardiff University priority species. All daffodils currently present on campus are of a cultivated stock, and most are not *N. pseudonarcissus*. As part of our Biodiversity Action Plan we aim to plant 5,000 new Welsh daffodils and phase out the planting of non-native daffodil varieties.

Wildflower and Wildlife Plan 2019 (Appendix 2)

The Wildflower and Wildlife Plan was developed by the Cardiff Wildlife & Cardiff Wildflower staff group at Cardiff University, January-February 2019. The consultation document has to date been read by 308 people, and attracted 167 contributions, which could be divided into 36 separate ideas. Only the most popular ideas were included in the plan. The plan has also been informed by Cardiff University policy. A key aim was to put the principles of the University's

Biodiversity Statement (2016) into practice. The plan is intended to fit within and expand upon the University's five-year Environmental Sustainability Action Plan (2018). For this reason, at the top of each page we have included the relevant action points from the Strategy. The Plan represents a list of the University's biodiversity priorities, together with cost-effective solutions for encouraging our priority species and habitats on campus. Because there is currently no central budget for biodiversity at Cardiff University (a budget will be developed for the Biodiversity Action Plan), the plan draws heavily on volunteer labour, and on the potential for leverage of conservation funding. Finally, the Plan also draws on the Cardiff Council's Biodiversity Action Plan (2008), using the same terminology (i.e. 'priority species', 'priority habitat'). It is not, however, intended to constitute a full Biodiversity Action Plan as defined by the Convention on Biological Diversity (1994), which is currently being developed (see above).

Meadow audit

On the 14th July 2019, nine meadow areas that had previously been planted by the Grounds Maintenance team were assessed at Cardiff University. For each of these meadows we identified all of the plants present and divided them into grasses, desirable wildflowers and invasive plants or weeds. These lists allowed us to categorise the meadows, assign them a grade, and make recommendations for their future care. In total across all the University meadows we identified 42 wildflower species, 11 common grasses, and 9 undesirable plants. This indicates our meadows are beginning to have a high biodiversity value. The figure is especially impressive considering that (a) we only visited at one point in the year, so missed some plants not currently in flower, and (b) these meadow areas were mostly lawns with a low biodiversity only five years ago.

Objective 3: Increase the resilience of our natural environment by restoring degraded habitats and habitat creation

Pharmabees project

In addition to the activities detailed above, the award winning Pharmabees project traces its roots back to Dr Jenny Hawkins, a former student of the School of Pharmacy who in 2015 completed a PhD entitled 'Apothecary Bee's, using the bee as a tool for drug discovery'. Jenny discovered a 'super honey' from Tywyn in North Wales which killed hospital superbugs and determined that this activity was due to specific plants the bees visited during foraging. To recreate super honey, beehives were installed on the roof of the Pharmacy (Redwood) Building and Tywyn plants were planted to provide the 'super' food for the bees (<https://youtu.be/tQctVn4QQQU>).

Using the experience from the Pharmacy Building, Pharmabees engaged with the wider University resulting in the installation of hives on more University buildings. Interest came from beyond the university campus, resulting in engagement on biodiversity, antibiotics and antibiotic resistance with 12 secondary schools, 30 primary schools as well as six community projects in South Wales and overseas (Windhoek, Namibia). The human fascination with honeybees provides a vehicle to capture and hold the attention of a broad demographic. This enabled the development of structured evidence-based engagement with schools, campus and community. The team has evidenced increases in knowledge and understanding which highlight positive behavioural and value changes relating to biodiversity, bees, the environment, science and wellbeing.

To engage with communities on the importance of this work, a website was created highlighting how university research is having a real-world impact and how the public can contribute (<https://www.cardiff.ac.uk/pharmabees>). The website hosts a link to spin-out citizen science project 'spot-a-bee' in which the public use mobile phones to build a map of bee friendly plants in Cardiff.

The Pharmabees project is now recognised as part of the University's Environmental Sustainability Strategy. Over 1,000m² of pollinator friendly, carbon-sequestering plants have been planted at the university. The University was also awarded Bee Friendly Status by the Welsh Assembly Government due to the Pharmabees work. In 2017 the project received a number of national awards which included sustainability awards from the Guardian and Sustain Wales.

The Pharmabees project has developed a range of public benefits and outcomes including reported increases in knowledge, involvement and understanding of biodiversity, antibiotics and anti-microbial resistance for the public. These outcomes are leading to action changes. High numbers of participants state they are planting or are involved in projects planting the pollinator friendly plants required to make the 'super honey' and are more involved in environmental activities. There is also an improved understanding of public need in the communication and engagement of Pharmabees research, and this has led to changes in behaviour from engaged communities regarding biodiversity e.g. encouraging wildflowers for pollination, guerrilla gardening and supporting beehives.

Through the project, changes in public values have been evidenced regarding the importance of bees, the environment and antibiotics with an increased online engagement with the Pharmabees website, digital/social media and the citizen science project 'spot-a-bee'. Pharmabees has seen an increased involvement with community-based initiatives across the region. The project has engaged with a diverse range of organizations such as community gardens, schools, industry, health boards, Welsh Assembly Government and the Women's Institute.

The project has also enhanced links with partner organizations from across South Wales to enrich the biodiversity of green spaces beyond the confines of the University and to encourage more engagement and pollinators across the region. They co-created bee-friendly, plant-rich environments to make the University and Cardiff a better place to work and live. These developments led to the co-creation of wellbeing space with health boards. Wellbeing space at Llandough Hospital was recently cited as an example of good practice by the Auditor General for Wales. Increased engagement with Welsh Government led to Pharmabees developing a conference on behalf of Welsh Assembly Government Pollinator Action Group entitled 'Bee Well Cardiff, Joining the Dots'.

Pharmabees Collaborating Institutions comprise:

1. **University community projects:** Grangetown, CEAR Heritage, Phoenix project in Namibia;
2. **Community groups:** Fairwater Gardens; Bute Park; Greening Cathays;
3. **Primary schools** – Clytha; Glasllwch; Gaer; Tredegar Park; Pill; Maesglas; St Woolos and Ysgol Gymraeg Cwmbran, Allensbank; St. Monica's; Gladstone; Ysgol Mynydd Bychan; Albany; Muslim Primary; Rumney; Meadowlane; Pen-y-Bryn; Llandough; Bryn Hafod; Willowbrook; Greenway and Trowbridge;
4. **High Schools:** Fitzallen; Cathays High School; Radyr Comprehensive; Mountain Ash Comprehensive; Treorchy; Ferndale; Ebbw Fawr Learning Community; Bryncelynog Comprehensive School; Heolddu Comprehensive School; Ysgol Gyfun Gymraeg Llangynwyd; Ysgol Gyfun Cwm Rhymini, Nantgwyn School;
5. **Further Education:** Nantgarw; Ystrad Mynach; Bridgend College;
6. **Universities:** Cardiff Met; Aberystwyth; Greenwich;
7. **Welsh Health Boards:** Cardiff and Vale; Anuerin Bevin; Abertawe;
8. **Councils:** Cardiff Council; Caerphilly Council;
9. **Welsh Assembly Government:** Pier head building; Cathays building;

- 10. **German Army:** Institute of Microbiology of the Bundeswehr;
- 11. **Not for profit organisations:** Wellcome Trust; Women's Institute of Wales; RSPB; Keep Wales Tidy; Buglife; Welsh Centre of Voluntary Action, Waterloo Foundation;
- 12. **For profit organisations:** Pharmavet; Bang on Brewery; Welsh Brew Tea; Wilmot Dixon; Hensol Castle Distillery; Bee1; Blossom and nectar.

Community Gardens

In 2019, the School of Pharmacy, in collaboration with The Wildflower and Conservation Society were awarded £2000 from Grow Wild (a wildflower lottery funded project) to distribute to 10 community gardening projects on the Cardiff University estate. Blue hearts are being distributed to the new gardens as a symbol of 'rewilding'. See:

<https://www.growwilduk.com/community-projects/growing-wild-cardiff-university-community-gardens>

The newly created gardens cover the whole of the Cardiff University site, with planting on the Sports Fields; the Health Park Campus; the Queen's Building Site; the Cathays site and the new Maindy Road site. The project culminated with a talk from the prestigious academic Professor David Goulson who is one of the foremost bumblebee researchers. The project engaged in the region of 500 people from within and around Cardiff University. There are now 10 areas that can be further developed over the next few years with the involvement of staff and student societies.

Objective 4: Tackle key pressures on species and habitats

One of the key actions implemented over the last couple of years to address resource use and limit our impact on deforestation has been to address paper use and associated printing. The following three initiatives show some of our actions towards reducing, reusing and recycling:

Recycled Paper

As a means to reduce the University's carbon footprint, in 2014 it was identified that a significant environmental impact within the University was caused by the use of paper. There are many ways of reducing this, and colleagues from several departments across the University agreed one of the most effective was to change the University's standard paper for day-to-day printing and photocopying, to 100% recycled. A Task and Finish Group was set up, involving University IT, Library Service, Procurement, and Safety and Staff Wellbeing. The Group and colleagues worked with academic schools to ensure the performance, quality and acceptability of the replacement paper, and also in ensuring the switch was cost-neutral to the University. There was also support from the University Executive Board, the University's Environmental Management Steering Group and from the University Environmental Compliance Officers (ECOs) network. The change was agreed and rolled out the same year. In the second half of 2017, we received the first confirmation from our supplier, Antalis, of the resulting reduction of environmental impact. This was done using the *Bilan Carbone* methodology, which is compliant with ISO 14064, a standard for carbon accounting. The headline environmental savings resulting from this switch are given below, for the majority paper used at Cardiff University: A4 Bright White 100% recycled, 80 grams. The amount purchased was 25,175,000 sheets, or 50,350 reams. Environmental savings due to the switch to 100% recycled paper for the whole of Cardiff University, for financial year 2016-17 were the equivalent of:

- 154,630 kg of landfill
- 22,862 kg CO₂ and greenhouse gases
- 228,616 km travel in the average European car

- 4,145,235 litres of water
- 424,573 kWh of energy
- 251,226 kg of wood

Similar savings are expected to be accrued every year while our paper usage remains significant.

XMA Toner cartridge recycling

XMA provide free of charge, toner recycling boxes across the University. When full, the boxes are collected and sent for remanufacturing, where all moving parts are replaced but the main plastic chassis is refilled, as opposed to going to landfill. To date, the University has recycled over 10,000 ink and toner cartridges (equating to over 6,000kg) responsibly via this system.

Personal Printers

The University IT department are currently undertaking a process to review and remove all unnecessary personal printers and replace with 'follow me' printing.

Climate change mitigation/decarbonisation

Cardiff University has established a carbon mitigation scheme (Regrow Borneo - <https://www.justgiving.com/fundraising/regrowborneo>) linked to reforestation and habitat restoration in the Lower Kinabatangan Wildlife Sanctuary, Sabah, Malaysia. The University manages a research station at this site and is working with local communities to reforest previously degraded and abandoned floodplain forest and has recently launched a Scheme offering this activity for carbon mitigation. The Scheme has already raised more than £12,500 and is set to achieve its Year 1 Target of £15,000 within 4-5 months of launch.

The University Procurement and Catering departments are currently reviewing current suppliers to ascertain palm oil used in products supplied to the University and whether it is sustainable (RSPO certified). 'Real Wrap' and 'Matthew Algie' have stated that any palm oil in products they sell is sustainable. The University is currently installing sustainability messaging in catering outlets advising customers where products are palm oil free. A tender is currently being prepared for ambient, chilled and frozen products. The use of exclusively sustainable palm oil will be integrated into the tender document.

Green Infrastructure

The Biodiversity Action Plan currently under development will include a full analysis of the state of the University's green infrastructure including ecosystem service (ES) provision, following analysis in line with local authorities in Wales (using a full tree audit and ES analysis following a process similar to the iTREE ECO methodology).

A green roof has been installed at our Cochrane building on the Heath Park site. In addition to the increase in biodiversity, this also has benefits for surface water run-off. The drainage layout confirmed that surface water runoff from the development will be discharged at a rate of 20% less than the pre-development rate (to the public sewer), with the additional benefit of extensive green roof space and rainwater harvesting.

Pesticides

Over the last two years the Cardiff University Sports Grounds Maintenance team has been experimenting with different chemical treatment options at the student residence sites to reduce the use of glyphosate for ordinary weed control around built up areas:

- Around buildings they have replaced two of the yearly weed spraying visits to each site with strimming or hoeing weeds
- On play areas such as tennis courts they have been experimenting with acetic acid (highly concentrated vinegar) to kill moss and lichen. Acetic acid is thought to be safer than glyphosate because it is quickly made harmless through dilution if it runs off into watercourses, whereas glyphosate remains harmful to aquatic life even when thoroughly diluted. This has proved to be effective.

Over the next three years the team aims to continue with its experiments with mechanical weed control and acetic acid. Most of the grounds maintenance for the residences team is going to be taken over by an external contractor, but the importance of using less chemicals has been embedded into the new contract.

Invasive Species Management

Over the last two years, the Sports Grounds Management team has developed a central strategy for dealing with invasive non-native species. All sightings of Japanese knotweed and Himalayan balsam along with invasive native species such as mare's tail and bracken are reported to the grounds manager and tagged. Each species has been allocated a treatment plan to be followed, consisting of a recommended chemical, number of treatments, and follow-up monitoring. This strategy has been effective at reducing the number of areas still affected by invasive species. Regular monitoring integrated into the new Biodiversity Action Plan will survey for invasive species, including any invasive or ecologically-destructive invertebrates, alongside the regular monitoring of flora already underway.

Recent building construction and biodiversity consideration

The recently constructed Cochrane, Hadyn Ellis and CUBRIC Buildings all achieved BREEAM Excellent accreditation. As part of this process, Ecology Credits were targeted for all 3 schemes.

Cochrane Building

At the Cochrane Building, one of the stated aims was to increase biodiversity. The area of ground available to achieve this was limited on the hospital site, so not all credits could be achieved. However, the inclusion of a green roof enabled the number of species to be increased to improve Biodiversity. The following areas and species numbers both pre- and post-construction have been evaluated:

Habitat Type	No of Species	Pre-development Area (m2)	Post- development Area (m2)
Bare ground	0	1502	1174.3
Building	0	892	1236
Amenity grassland	11.6	864	183
Wildflower lawn mix	14	0	210

High diversity wildflower area	31	0	32.7
Green roof	11	0	422

This information was entered into the BREEAM Ecology calculator and a change in ecological value of the site of +0.21 species estimated. No negative change in ecological value of the site was observed. Activities included providing flowering wildflower areas and an area of green roof supporting up to 11 species of *Sedum*. These habitats have direct benefits for nectarivorous invertebrates and attract invertebrates, bats and birds that feed on them. An Extended Phase 1 habitat survey was undertaken prior to construction being undertaken on site. The contractor was required to implement the surveying ecologist's general recommendations in respect of enhancement and protection of the site's ecology. As a positive change in ecological value of the site of up to 6 species (see table above) has been estimated, one further credit was awarded.

The ecological report confirmed that, after consultation, all relevant UK and EU legislation relating to protection and enhancement of ecology will be complied with. This includes removal of vegetation ensuring no nesting birds will be disturbed under the Wildlife and Countryside Act 1981 (as amended), by clearing outside the bird nesting season (clearance to take place September to March inclusive). A landscape and habitat management plan was provided. This is a five-year management plan and includes:

1. Management of any protected features on site
2. Management of any new, existing or enhanced habitats
3. A reference to the current or future site level or local Biodiversity Action Plan.

Hadyn Ellis Building

Wildflowers were planted as part of the scheme and also extensive work undertaken to ensure a suitable habitat for bats – including boxes and appropriate external luminaires to prevent light spillage into flight zones. Recommendations were made for the enhancement and protection of the site's ecology. The landscape architect's planting schedule included the recommendations of the ecological report, formed part of the tender documentation and stipulated the following:

1. All legal requirements with respect to breeding birds, reptiles and bats were adopted
2. All planted trees were native
3. New hedgerows and trees were installed to link existing habitats
4. Bird and bat boxes were installed on the external walls of new buildings
5. Creation of butterfly and moth gardens.

CUBRIC Building

Measures included the use of native species and increased diversity, green roofs and inclusion of bat and bird boxes. An Extended Phase 1 Habitat Survey was conducted on 12th June 2012 by David Clements Ecology Ltd. An interim report by David Clements Ecology Ltd confirmed the existing ecological value of the site as 8.03 species. The Extended Phase 1 Habitat Survey [4] made the following recommendations:

1. Installation of bat boxes in suitable locations in the developed site
2. Installation of bird boxes in suitable locations within the landscaping of the site
3. Landscaping should utilise native trees and shrubs which are indigenous to the region
4. New amenity grassland or lawn areas should include plug-plants of common rosette forming native species such as ribwort plantain, daisy, self-heal and common cat's ear.

As a result, 3 Schwegler bat boxes and 16 Schweglar bird boxes were fixed to large trees along Maindy Road. The planting scheme included the majority of native species as recommended within the David Clements Ecology Ltd report. The only grassland areas within the scheme were the green roof systems on the building and the recommended plug plant species were accommodated within the planting mix. A subsequent ecological assessment by David Clements Ecology Ltd confirmed the ecological value of the site based on the following proposed landscape plans:

The ecological value of the site prior to development was confirmed as 0.09.

The ecological value of the site post development was confirmed as 3.39.

The change in ecological value was therefore an increase of 3.3.

Objective 5: Improve our evidence, understanding and monitoring

The development of the Biodiversity Action Plan will embed evidence in the University's biodiversity decision making by, among other actions:

1. Two-way sharing of data with the South East Wales Biodiversity Records Centre (SEWBREC) to inform University biodiversity management and improve regional natural recording;
2. Implementing a full biodiversity monitoring program;
3. Using our ecologically-trained staff and students in a voluntary capacity to collect evidence on trends in biodiversity across the University's estate, forming both research and monitoring opportunities.

Objective 6: Put in place a framework of governance and support for delivery

The University's Biodiversity Strategy and Action Plan is currently being developed and progress reported through The Environmental Management Systems (EMS) Steering group, which is chaired by the Chief Operating Officer (COO). Approval will be sought through the Health, Safety and Environment Committee, chaired by the Deputy Vice Chancellor.

Monitoring and Review

The University has an integrated Health, Safety and Environmental (SHE) management system accredited to ISO 14001 (Environmental Management systems) and ISO 45001 (Health and Safety Management systems). As part of this the University are required to maintain and update a legal register and carry out an evaluation of compliance against all relevant legislation. To demonstrate compliance with the management system, the University has developed a two yearly internal audit cycle where all academic schools and departments are visited and audited for compliance against their local SHE management system. The internal audit system has been amended for the 2020-2022 audit cycle to include monitoring of local biodiversity actions with schools and departments. The University is also subject to an external annual audit to maintain certification to the management standards.

Review of S6 Duty

This review will be carried out as part of the development of our Biodiversity Action Plan, which will be finalised by the end of academic year 2019/2020.

Appendix 1 – Eco-Explore Biodiversity Survey



Report for Cardiff University Biodiversity Audit

February 2013

A.L.Pollard

Introduction

Cardiff University's Estate is comprised of many buildings and areas which support or could support in the future, a wealth of wildlife species. Eco-explore CIC was tasked with providing assessment of the sites for biodiversity potential and ways in which any future works could optimise biodiversity.

Several key sites were identified by the University, principally the student residences at Talybont and University Hall. These sites are adjacent to the existing green and blue networks (for example, Bute Park, River Taff, railway networks and gardens) in Cardiff.

Eco-explore CIC's principle is to involve and provide valuable active training opportunities for students. As part of the surveys, we have involved students as much as possible in order to provide them with such experience, that they can use as part of their Continued Professional Development. Students were recruited from Cardiff School of Biosciences undergraduate and postgraduate courses.

Limitations

Sites were assessed from November to January, working within the timescales set. As such the species present are not representative of those that may be present throughout the year, for example breeding birds, active bats and invertebrates. This report includes references to species that have been recorded as present in and around the sites on previous surveys.

Identified Priorities

In order to ensure sustainable biodiversity outcomes, whilst complying with budgetary constraints and maintaining site usage, we have identified several key areas of work which can be implemented. These are discussed below.



1) Planting of native wildseeds and plants

We identified 301 (University Hall, CF23) and 306 (Talybont CF14) native flora species which are garden-worthy (Natural History Museum, London). Of these, our analysis shows that 47 of these are of particular biodiversity interest to pollinators. Please see Appendix 1 for the full list.

Benefit

These plantings will benefit a variety of pollinators, especially bees, moths and butterflies, helping to meet national plans for supporting pollinators. Aphid-eating insects will also be encouraged, supporting the service that these insects provide to other gardens. The presence of lower trophic levels will support predatory insects, birds and bats. All of these animals will add value once in the area, by consuming pest species, for example biting midges, further enhancing the site.

Aesthetically pleasing planting enhancements will promote a sense of pride in students living in the residences, encouraging them to look after their surroundings. They will also be easy maintain and reduce the need for large regularly mown areas, saving on staff time and costs.



2) Bee Hives

Pollinators are key organisms to encourage across the Cardiff University Estate. They underpin the survival of most plants and animals, and provide us with a valuable ecosystem service, for example, through food production.

Benefit

Bees will be the direct beneficiary of hive placement, with added pollination benefits to a host of plant species within the local area, raising plant productivity.

Hives will support honey production (small scale), managed by the beekeeper in conjunction with a series of hives. This can be valuable for PR as well as directly supporting local food production.



3) Bat and Bird Boxes on site

In addition to encouraging suitable plants to provide sustenance for wildlife, installing wildlife shelters (such as bird and bat boxes) or encouraging natural roost and nest spaces is vital to ensure that a variety of species use the sites. Several bat species (noctule, soprano pipistrelle, common pipistrelle and brown long eared) are documented to use the sites for foraging. They are likely to also roost in the natural spaces and man-made structural spaces (many small crevices along fascia boards, tiles etc. exist in most of the Estates structures) across the sites.

Benefit

Involvement with local community groups and visible conservation effort in the form of nonnatural box erection will be seen positively, with potential for media attention. Active mitigation and natural nest space creation exhibits best practice.



4) Ongoing Monitoring

Essential to ensuring that Cardiff University demonstrates good practice in biodiversity management and conservation, is a long term monitoring strategy. This can be done as an ongoing concern of Eco-explore, providing students with experiences in surveying. Licensed activities, such as bat roost visits (once roosts have been identified) can be done in collaboration with Cardiff Bat Group.

Benefit

Monitoring effectively will make sure that Cardiff University are knowledgeable about the species using the Estate, and any works arising or planned can be accommodated around the needs of the species using the site. For example, roof works may need to be timed to reduce the impact on a bat roost and tree removal works may need to be timed to prevent nest damage. This knowledge will reduce the cost of any works being delayed, if the monitoring can feed into the site management and works plan.



5) Staff Engagement

We recommend that all members of staff are made aware of biodiversity action plans and activities to enrich biodiversity on site. This will provide staff with the chance to contribute, to understand the need for conservation and how they can take forward biodiversity awareness in their roles and at home. This would help to feed into work planning for future scheduled procedures, ensuring greater biodiversity benefit, efficient works and greater staff motivation.

Action Plan

1) Pollinator Friendly Planting:

Areas of low/no use – grass to be mown and raked (earth to be exposed), seeds to be sown in March/ April or August/ September. Mowing regime for spring flowering mix: cut after midsummer after seed heads formed. Let risings lay to allow seeds to dissipate into ground. Remove risings to promote/ maintain a low soil fertility. Mowing regime for summer flowering mix: cut on high blades in spring, leave to flower and cut after seed heads formed. Let risings lay to allow seeds to dissipate into ground. As before, remove risings to promote/ maintain a low soil fertility. Please see Appendix 2 for a map of a site which has been identified as suitable for native seed planting.

Areas of higher use and traffic – hardy plants of greater biodiversity importance, able to withstand heavy traffic and disturbance include ivy, wild thyme, broom, blackthorn, bell heather and rock rose. Non-native lavender is also of interest to pollinators and is low maintenance. These can be planted along paths and in garden areas to enable a more cohesive pathway for pollinators to use.

Grassland areas – sowing of Yellow Rattle. This is a native semi-parasitic grassland annual plant. After mowing in autumn and creation of exposed areas of soil, sowing at a rate of 0.5g m⁻² will promote germination (this species needs exposure to cold over winter to germinate) in the following spring. Mowing regime – this plant does not cope well with municipal mowing regimes and mowing should only be completed after July to allow the seed heads to drop and seeds to enter the ground.

Areas of grassland mown to standard schedules adjacent to “islands” of wildseeded grass will maintain a level of biodiversity interest whilst looking neat.

Pesticide/ Herbicide

Pesticide and herbicide usage should be kept at a minimum, especially in wildseeded areas. If necessary, carefully targeted applications (low pressure spot spraying or weed-wiping) or selective herbicides can be used to minimise damage to non-target species.

Monitoring

Ongoing monitoring should be carried out to ensure that the plantings are successful, and used by a variety of pollinators (measure of success would be a higher diversity than in non-seeded areas).

2) Bee hive placement

We would recommend that in suitable areas, siting of bee hives to help to support pollination. One area identified is adjacent to the Glasshouse Area. Liaison with local bee keepers (persons identified) to maintain the hive and bees will need to occur once permission has been granted to site the hive(s). The combination of hives with increased native wildflowers will optimise pollinator benefits.

3) Bird and bat box installation

Natural spaces – Ivy, trees, thickets and hedgerows will provide shelter and nest space for many species of birds (robin, blackbird, song thrush, blue tit, great tit, long tailed tit, nuthatch, treecreeper, dunnock and house sparrow) and older trees for bats. Ensuring management plans take into consideration the breeding season and

maintaining foliage cover , trees and hedgerows (or ensuring that mitigation is in place when removal of natural nest space) will aid all nesting or roosting species. Non-natural spaces – Placement of bat and bird boxes in collaboration with local conservation groups (for example Keep Wales Tidy and Cardiff Bat Group) will help to add to the natural spaces available, reducing competition for space and supporting larger numbers of birds and bats.

Siting boxes should be done in autumn to allow boxes chance to weather before the breeding season (birds); and at any time of year for bats.

Boxes can be manufactured either by community groups or by a contractor at low cost (from £4 per box). As a cost is involved in the purchase of either materials or the box, scheduling any financial commitment to this scheme needs to be considered at an early stage.

Monitoring

Boxes monitoring should be done throughout the year, in collaboration with Eco-explore and other local groups. Measure of success: a scheme would be successful with an uptake of 30% after 3 years.

4) General ongoing monitoring

Timely and species appropriate surveys to be carried out throughout the year, for example, bat surveys to be undertaken in March, June and September; breeding bird surveys to be undertaken in April and May; and butterfly surveys to be undertaken in April and May.

5) Staff engagement

A bi-annual informal seminar/workshop session and walk to showcase the wildlife supported by the University Estate, and how their work can or does feed into conservation plans.

Appendix 1 – Native Plants suitable for University Hall and Talybont Sites, Cardiff University, and any special wildlife appeal

Site	Plant	Scientific Name	Form	Special Wildlife Appeal
UH	Black Medick	<i>Medicago lupulina</i>	Annual	
UH	Bugloss	<i>Anchusa arvensis</i>	Annual	
UH	Common Cow-wheat	<i>Melampyrum pratense</i>	Annual	
UH	Common Poppy	<i>Papaver rhoeas</i>	Annual	insects, bees
UH	Corn Chamomile	<i>Anthemis arvensis</i>	Annual	

UH	Cut-leaved Crane's-bill	<i>Geranium dissectum</i>	Annual	
UH	Dove's-foot Crane's-bill	<i>Geranium molle</i>	Annual	
UH	Fairy Flax	<i>Linum catharticum</i>	Annual	
UH	Field Forget-me-not	<i>Myosotis arvensis</i>	Annual	
UH	Field Gentian	<i>Gentianella campestris</i>	Annual	
UH	Field Pansy	<i>Viola arvensis</i>	Annual	
UH	Field Woundwort	<i>Stachys arvensis</i>	Annual	
UH	Fool's Parsley	<i>Aethusa cynapium</i>	Annual	
UH	Grass Vetchling	<i>Lathyrus nissolia</i>	Annual	
UH	Hare's-foot Clover	<i>Trifolium arvense</i>	Annual	
UH	Henbit Dead-nettle	<i>Lamium amplexicaule</i>	Annual	
UH	Herb-Robert	<i>Geranium robertianum</i>	Annual	
UH	Hop Trefoil	<i>Trifolium campestre</i>	Annual	
UH	Knotted Clover	<i>Trifolium striatum</i>	Annual	
UH	Long-stalked Crane's-bill	<i>Geranium columbinum</i>	Annual	
UH	Night-flowering Catchfly	<i>Silene noctiflora</i>	Annual	
UH	Red Dead-nettle	<i>Lamium purpureum</i>	Annual	
UH	Rough Poppy	<i>Papaver hybridum</i>	Annual	
UH	Scented Mayweed	<i>Matricaria recutita</i>	Annual	
UH	Shining Crane's-bill	<i>Geranium lucidum</i>	Annual	
UH	Slender Thistle	<i>Carduus tenuiflorus</i>	Annual	
UH	Stinking Chamomile	<i>Anthemis cotula</i>	Annual	
UH	White Ramping-fumitory	<i>Fumaria capreolata</i>	Annual	
UH	Yellow Vetchling	<i>Lathyrus aphaca</i>	Annual	
UH	Yellow-rattle	<i>Rhinanthus minor</i>	Annual	
UH	Yellow-wort	<i>Blackstonia perfoliata</i>	Annual	
UH	Foxglove	<i>Digitalis purpurea</i>	Biennial	bees
UH	Great Mullein	<i>Verbascum thapsus</i>	Biennial	
UH	Harebell	<i>Campanula rotundifolia</i>	Biennial	bees
UH	Musk Thistle	<i>Carduus nutans</i>	Biennial	
UH	Pale Flax	<i>Linum bienne</i>	Biennial	
UH	Rough Chervil	<i>Chaerophyllum temulum</i>	Biennial	
UH	Rough Hawk's-beard	<i>Crepis biennis</i>	Biennial	
UH	Sheep's-bit	<i>Jasione montana</i>	Biennial	
UH	Spear Thistle	<i>Cirsium vulgare</i>	Biennial	
UH	Weld	<i>Reseda luteola</i>	Biennial	
UH	Wetted Thistle	<i>Carduus crispus</i>	Biennial	
UH	Wild Carrot	<i>Daucus carota</i>	Biennial	

UH	Wild Mignonette	<i>Reseda lutea</i>	Biennial	aphid-eating insects
UH	Wild Parsnip	<i>Pastinaca sativa</i>	Biennial	
UH	Wild Teasel	<i>Dipsacus fullonum</i>	Biennial	birds, bees
UH	Wood-sorrel	<i>Oxalis acetosella</i>	Biennial	
UH	Honeysuckle	<i>Lonicera periclymenum</i>	Climber	moths, insects, butterfly caterpillars, birds, shelter
UH	Hop	<i>Humulus lupulus</i>	Climber	
UH	Ivy	<i>Hedera helix</i>	Climber	bees, insects, birds, shelter (late nectar, early berries)
UH	Traveller's-joy	<i>Clematis vitalba</i>	Climber	birds, moths
UH	Bluebell	<i>Hyacinthoides non-scripta</i>	Geophyte	
UH	Broad-leaved Helleborine	<i>Epipactis helleborine</i>	Geophyte	
UH	Butterbur	<i>Petasites hybridus</i>	Geophyte	
UH	Common Spotted-orchid	<i>Dactylorhiza fuchsii</i>	Geophyte	
UH	Early-purple Orchid	<i>Orchis mascula</i>	Geophyte	
UH	Enchanter's-nightshade	<i>Circaea lutetiana</i>	Geophyte	
UH	Heath Spotted-orchid	<i>Dactylorhiza maculata</i>	Geophyte	
UH	Herb-paris	<i>Paris quadrifolia</i>	Geophyte	
UH	Italian Lords-and-Ladies	<i>Arum italicum</i>	Geophyte	
UH	Lily-of-the-valley	<i>Convallaria majalis</i>	Geophyte	
UH	Limestone Fern	<i>Gymnocarpium robertianum</i>	Geophyte	
UH	Lords-and-Ladies	<i>Arum maculatum</i>	Geophyte	
UH	Marsh Helleborine	<i>Epipactis palustris</i>	Geophyte	
UH	Marsh Woundwort	<i>Stachys palustris</i>	Geophyte	
UH	Moschatel	<i>Adoxa moschatellina</i>	Geophyte	
UH	Pignut	<i>Conopodium majus</i>	Geophyte	
UH	Ramsons	<i>Allium ursinum</i>	Geophyte	
UH	Snowdrop	<i>Galanthus nivalis</i>	Geophyte	
UH	Yellow Iris	<i>Iris pseudacorus</i>	Geophyte	
UH	Agrimony	<i>Agrimonia eupatoria</i>	Herb Perennial	
UH	Black Horehound	<i>Ballota nigra</i>	Herb Perennial	
UH	Brooklime	<i>Veronica beccabunga</i>	Herb Perennial	
UH	Bugle	<i>Ajuga reptans</i>	Herb Perennial	
UH	Bulbous Buttercup	<i>Ranunculus bulbosus</i>	Herb Perennial	
UH	Columbine	<i>Aquilegia vulgaris</i>	Herb Perennial	Bees
UH	Common Dog-violet	<i>Viola riviniana</i>	Herb Perennial	
UH	Common Meadow-rue	<i>Thalictrum flavum</i>	Herb Perennial	
UH	Common Sea-lavender	<i>Limonium vulgare</i>	Herb Perennial	
UH	Creeping-Jenny	<i>Lysimachia nummularia</i>	Herb Perennial	
UH	Crosswort	<i>Cruciata laevipes</i>	Herb Perennial	

UH	Daisy	<i>Bellis perennis</i>	Herb Perennial	
UH	Early Dog-violet	<i>Viola reichenbachiana</i>	Herb Perennial	
UH	Fragrant Agrimony	<i>Agrimonia procera</i>	Herb Perennial	
UH	Germander Speedwell	<i>Veronica chamaedrys</i>	Herb Perennial	
UH	Globeflower	<i>Trollius europaeus</i>	Herb Perennial	
UH	Great Willowherb	<i>Epilobium hirsutum</i>	Herb Perennial	
UH	Ground-ivy	<i>Glechoma hederacea</i>	Herb Perennial	
UH	Hairy Violet	<i>Viola hirta</i>	Herb Perennial	
UH	Heath Speedwell	<i>Veronica officinalis</i>	Herb Perennial	
UH	Lady's-mantle	<i>Alchemilla xanthochlora</i>	Herb Perennial	
UH	Lesser Celandine	<i>Ranunculus ficaria</i>	Herb Perennial	
UH	Marsh Violet	<i>Viola palustris</i>	Herb Perennial	
UH	Meadow Buttercup	<i>Ranunculus acris</i>	Herb Perennial	
UH	Meadowsweet	<i>Filipendula ulmaria</i>	Herb Perennial	aphid-eating insects, birds (seed)
UH	Monk's-hood	<i>Aconitum napellus</i>	Herb Perennial	Bees
UH	Oxeye Daisy	<i>Leucanthemum vulgare</i>	Herb Perennial	aphid-eating insects
UH	Pale Dog-violet	<i>Viola lactea</i>	Herb Perennial	
UH	Primrose	<i>Primula vulgaris</i>	Herb Perennial	bees, insects
UH	Salad Burnet	<i>Sanguisorba minor</i>	Herb Perennial	
UH	Selfheal	<i>Prunella vulgaris</i>	Herb Perennial	bees, insects
UH	Skullcap	<i>Scutellaria galericulata</i>	Herb Perennial	
UH	Sneezewort	<i>Achillea ptarmica</i>	Herb Perennial	
UH	Sweet Violet	<i>Viola odorata</i>	Herb Perennial	
UH	Tansy	<i>Tanacetum vulgare</i>	Herb Perennial	
UH	Thrift	<i>Armeria maritima</i>	Herb Perennial	
UH	White Dead-nettle	<i>Lamium album</i>	Herb Perennial	
UH	Wild Basil	<i>Clinopodium vulgare</i>	Herb Perennial	
UH	Wild Marjoram	<i>Origanum vulgare</i>	Herb Perennial	butterflies
UH	Wild Strawberry	<i>Fragaria vesca</i>	Herb Perennial	
UH	Wood Anemone	<i>Anemone nemorosa</i>	Herb Perennial	
UH	Wood Avens	<i>Geum urbanum</i>	Herb Perennial	
UH	Wood Sage	<i>Teucrium scorodonia</i>	Herb Perennial	
UH	Wood Speedwell	<i>Veronica montana</i>	Herb Perennial	
UH	Yarrow	<i>Achillea millefolium</i>	Herb Perennial	Moonshine Variety - good for aphideating insects
UH	Yellow Archangel	<i>Lamiaeum galeobdolon</i>	Herb Perennial	
UH	Yellow Pimpernel	<i>Lysimachia nemorum</i>	Herb Perennial	
UH	Alder Buckthorn	<i>Frangula alnus</i>	Shrub/Tree	
UH	Buckthorn	<i>Rhamnus cathartica</i>	Shrub/Tree	

UH	Crab Apple	<i>Malus sylvestris</i>	Shrub/Tree	bees, birds
UH	Dogwood	<i>Cornus sanguinea</i>	Shrub/Tree	butterflies, butterfly caterpillars, bees, shelter
UH	Elder	<i>Sambucus nigra</i>	Shrub/Tree	insects, birds
UH	Goat Willow	<i>Salix caprea</i>	Shrub/Tree	Kilmarnock variety recommended especially
UH	Grey Willow	<i>Salix cinerea</i>	Shrub/Tree	Bees, insects, butterfly caterpillars, moth caterpillars
UH	Guelder-rose	<i>Viburnum opulus</i>	Shrub/Tree	insects, birds
UH	Hawthorn	<i>Crataegus monogyna</i>	Shrub/Tree	bees, birds
UH	Hazel	<i>Corylus avellana</i>	Shrub/Tree	

UH	Holly	<i>Ilex aquifolium</i>	Shrub/Tree	bees, birds, butterfly caterpillars
UH	Osier	<i>Salix viminalis</i>	Shrub/Tree	Bees, insects, butterfly caterpillars, moth caterpillars
UH	Purple Willow	<i>Salix purpurea</i>	Shrub/Tree	Bees, insects, butterfly caterpillars, moth caterpillars
UH	Spindle	<i>Euonymus europaeus</i>	Shrub/Tree	birds (especially robins)
UH	Wayfaring-tree	<i>Viburnum lantana</i>	Shrub/Tree	insects, birds
UH	Wild Privet	<i>Ligustrum vulgare</i>	Shrub/Tree	moth caterpillars, insects , birds
UH	Yew	<i>Taxus baccata</i>	Shrub/Tree	
UH	Bogbean	<i>Menyanthes trifoliata</i>	Marsh Plant	
UH	Compact Rush	<i>Juncus conglomeratus</i>	Marsh Plant	
UH	Creeping Forget-me-not	<i>Myosotis secunda</i>	Marsh Plant	
UH	Cyperus Sedge	<i>Carex pseudocyperus</i>	Marsh Plant	
UH	Flowering-rush	<i>Butomus umbellatus</i>	Marsh Plant	
UH	Marsh Cinquefoil	<i>Potentilla palustris</i>	Marsh Plant	
UH	Marsh St John's-wort	<i>Hypericum elodes</i>	Marsh Plant	
UH	Marsh-marigold	<i>Caltha palustris</i>	Marsh Plant	
UH	Purple-loosestrife	<i>Lythrum salicaria</i>	Marsh Plant	
UH	Sea Aster	<i>Aster tripolium</i>	Marsh Plant	
UH	Soft-rush	<i>Juncus effusus</i>	Marsh Plant	
UH	Tufted Forget-me-not	<i>Myosotis laxa</i>	Marsh Plant	
UH	Woodruff	<i>Galium odoratum</i>	Marsh Plant	
UH	Yellow Loosestrife	<i>Lysimachia vulgaris</i>	Marsh Plant	
UH	Barren Strawberry	<i>Potentilla sterilis</i>	Perennial	
UH	Betony	<i>Stachys officinalis</i>	Perennial	
UH	Biting Stonecrop	<i>Sedum acre</i>	Perennial	
UH	Black Bent	<i>Agrostis gigantea</i>	Perennial	
UH	Bladder Campion	<i>Silene vulgaris</i>	Perennial	
UH	Broad Buckler-fern	<i>Dryopteris dilatata</i>	Perennial	
UH	Burnet-saxifrage	<i>Pimpinella saxifraga</i>	Perennial	

UH	Bush Vetch	<i>Vicia sepium</i>	Perennial	
UH	Cat's-ear	<i>Hypochaeris radicata</i>	Perennial	
UH	Cock's-foot	<i>Dactylis glomerata</i>	Perennial	
UH	Common Bent	<i>Agrostis capillaris</i>	Perennial	
UH	Common Bird's-foot-trefoil	<i>Lotus corniculatus</i>	Perennial	moths, butterflies
UH	Common Bistort	<i>Persicaria bistorta</i>	Perennial	
UH	Common Comfrey	<i>Symphytum officinale</i>	Perennial	
UH	Common Figwort	<i>Scrophularia nodosa</i>	Perennial	
UH	Common Fleabane	<i>Pulicaria dysenterica</i>	Perennial	
UH	Common Knapweed	<i>Centaurea nigra</i>	Perennial	
UH	Common Mallow	<i>Malva sylvestris</i>	Perennial	
UH	Common Milkwort	<i>Polygala vulgaris</i>	Perennial	
UH	Common Restharrow	<i>Ononis repens</i>	Perennial	
UH	Common Toadflax	<i>Linaria vulgaris</i>	Perennial	
UH	Common Valerian	<i>Valeriana officinalis</i>	Perennial	
UH	Corn Mint	<i>Mentha arvensis</i>	Perennial	

UH	Cow Parsley	<i>Anthriscus sylvestris</i>	Perennial	
UH	Cranberry	<i>Vaccinium oxycoccos</i>	Perennial	
UH	Creeping Bent	<i>Agrostis stolonifera</i>	Perennial	
UH	Creeping Cinquefoil	<i>Potentilla reptans</i>	Perennial	
UH	Cuckooflower	<i>Cardamine pratensis</i>	Perennial	
UH	Devil's-bit Scabious	<i>Succisa pratensis</i>	Perennial	
UH	Dwarf Elder	<i>Sambucus ebulus</i>	Perennial	
UH	Field Eryngo	<i>Eryngium campestre</i>	Perennial	
UH	Field Scabious	<i>Knautia arvensis</i>	Perennial	
UH	Giant Fescue	<i>Festuca gigantea</i>	Perennial	
UH	Goat's-beard	<i>Tragopogon pratensis</i>	Perennial	
UH	Goldenrod	<i>Solidago virgaurea</i>	Perennial	butterflies, insects
UH	Greater Celandine	<i>Chelidonium majus</i>	Perennial	
UH	Greater Knapweed	<i>Centaurea scabiosa</i>	Perennial	
UH	Greater Stitchwort	<i>Stellaria holostea</i>	Perennial	
UH	Greater Tussock-sedge	<i>Carex paniculata</i>	Perennial	
UH	Hairy St John's-wort	<i>Hypericum hirsutum</i>	Perennial	
UH	Hard Shield-fern	<i>Polystichum aculeatum</i>	Perennial	
UH	Hard-fern	<i>Blechnum spicant</i>	Perennial	
UH	Hart's-tongue	<i>Phyllitis scolopendrium</i>	Perennial	
UH	Hedge Bedstraw	<i>Galium mollugo</i>	Perennial	
UH	Hedge Woundwort	<i>Stachys sylvatica</i>	Perennial	
UH	Hedgerow Crane's-bill	<i>Geranium pyrenaicum</i>	Perennial	
UH	Hemp-agrimony	<i>Eupatorium cannabinum</i>	Perennial	
UH	Hoary Plantain	<i>Plantago media</i>	Perennial	

UH	Ivy-leaved Bellflower	<i>Wahlenbergia hederacea</i>	Perennial	
UH	Lady-fern	<i>Athyrium filix-femina</i>	Perennial	
UH	Lady's Bedstraw	<i>Galium verum</i>	Perennial	
UH	Lesser Stitchwort	<i>Stellaria graminea</i>	Perennial	
UH	Maidenhair Fern	<i>Adiantum capillus-veneris</i>	Perennial	
UH	Maidenhair Spleenwort	<i>Asplenium trichomanes</i>	Perennial	
UH	Marsh Valerian	<i>Valeriana dioica</i>	Perennial	
UH	Marsh-mallow	<i>Althaea officinalis</i>	Perennial	
UH	Meadow Barley	<i>Hordeum secalinum</i>	Perennial	
UH	Meadow Foxtail	<i>Alopecurus pratensis</i>	Perennial	
UH	Meadow Saxifrage	<i>Saxifraga granulata</i>	Perennial	
UH	Meadow Vetchling	<i>Lathyrus pratensis</i>	Perennial	
UH	Mouse-ear-hawkweed	<i>Pilosella officinarum</i>	Perennial	
UH	Musk-mallow	<i>Malva moschata</i>	Perennial	
UH	Narrow-leaved Everlastingpea	<i>Lathyrus sylvestris</i>	Perennial	moths
UH	Orpine	<i>Sedum telephium</i>	Perennial	
UH	Pale Toadflax	<i>Linaria repens</i>	Perennial	
UH	Pepper-saxifrage	<i>Silaum silaus</i>	Perennial	
UH	Purple Moor-grass	<i>Molinia caerulea</i>	Perennial	
UH	Quaking-grass	<i>Briza media</i>	Perennial	

UH	Ragged-Robin	<i>Lychnis flos-cuculi</i>	Perennial	
UH	Red Champion	<i>Silene dioica</i>	Perennial	
UH	Red Clover	<i>Trifolium pratense</i>	Perennial	
UH	Red Fescue	<i>Festuca rubra</i>	Perennial	
UH	Rock Samphire	<i>Crithmum maritimum</i>	Perennial	
UH	Rough Hawkbit	<i>Leontodon hispidus</i>	Perennial	
UH	Rough Meadow-grass	<i>Poa trivialis</i>	Perennial	
UH	Round-leaved Mint	<i>Mentha suaveolens</i>	Perennial	
UH	Rustyback	<i>Ceterach officinarum</i>	Perennial	
UH	Sanicle	<i>Sanicula europaea</i>	Perennial	
UH	Saw-wort	<i>Serratula tinctoria</i>	Perennial	
UH	Sea Wormwood	<i>Seriphidium maritimum</i>	Perennial	
UH	Sheep's Fescue	<i>Festuca ovina</i>	Perennial	
UH	Silverweed	<i>Potentilla anserina</i>	Perennial	
UH	Slender St John's-wort	<i>Hypericum pulchrum</i>	Perennial	
UH	Soft Shield-fern	<i>Polystichum setiferum</i>	Perennial	
UH	Southern Polypody	<i>Polypodium cambricum</i>	Perennial	
UH	Square-stalked St John's-wort	<i>Hypericum tetrapterum</i>	Perennial	
UH	Stinking Iris	<i>Iris foetidissima</i>	Perennial	
UH	Strawberry Clover	<i>Trifolium fragiferum</i>	Perennial	

UH	Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>	Perennial	
UH	Tormentil	<i>Potentilla erecta</i>	Perennial	
UH	Tufted Hair-grass	<i>Deschampsia cespitosa</i>	Perennial	
UH	Tufted Vetch	<i>Vicia cracca</i>	Perennial	
UH	Wall-rue	<i>Asplenium ruta-muraria</i>	Perennial	
UH	Water Figwort	<i>Scrophularia auriculata</i>	Perennial	
UH	Water Mint	<i>Mentha aquatica</i>	Perennial	
UH	Wavy Hair-grass	<i>Deschampsia flexuosa</i>	Perennial	
UH	White Campion	<i>Silene latifolia</i>	Perennial	
UH	White Clover	<i>Trifolium repens</i>	Perennial	
UH	Wild Angelica	<i>Angelica sylvestris</i>	Perennial	
UH	Wild Clary	<i>Salvia verbenaca</i>	Perennial	insects, birds
UH	Wild Thyme	<i>Thymus polytrichus</i>	Perennial	Bees
UH	Wood Melick	<i>Melica uniflora</i>	Perennial	
UH	Wood Millet	<i>Milium effusum</i>	Perennial	
UH	Wood Spurge	<i>Euphorbia amygdaloides</i>	Perennial	
UH	Wood Vetch	<i>Vicia sylvatica</i>	Perennial	
UH	Wormwood	<i>Artemisia absinthium</i>	Perennial	
UH	Yellow Oat-grass	<i>Trisetum flavescens</i>	Perennial	
UH	Zigzag Clover	<i>Trifolium medium</i>	Perennial	
UH	Bell Heather	<i>Erica cinerea</i>	Shrub	Bees
UH	Bilberry	<i>Vaccinium myrtillus</i>	Shrub	
UH	Bittersweet	<i>Solanum dulcamara</i>	Shrub	
UH	Blackthorn	<i>Prunus spinosa</i>	Shrub	early nectar, bees, moths, shelter
UH	Bog-myrtle	<i>Myrica gale</i>	Shrub	

UH	Broom	<i>Cytisus scoparius</i>	Shrub	bees
UH	Cross-leaved Heath	<i>Erica tetralix</i>	Shrub	Bees
UH	Dewberry	<i>Rubus caesius</i>	Shrub	
UH	Dyer's Greenweed	<i>Genista tinctoria</i>	Shrub	
UH	Eared Willow	<i>Salix aurita</i>	Shrub	Bees, insects, butterfly caterpillars, moth caterpillars
UH	Field-rose	<i>Rosa arvensis</i>	Shrub	insects, birds
UH	Gooseberry	<i>Ribes uva-crispa</i>	Shrub	birds
UH	Gorse	<i>Ulex europaeus</i>	Shrub	
UH	Heather	<i>Calluna vulgaris</i>	Shrub	butterflies, bees, shelter
UH	Petty Whin	<i>Genista anglica</i>	Shrub	
UH	Raspberry	<i>Rubus idaeus</i>	Shrub	
UH	Spiny Restharrow	<i>Ononis spinosa</i>	Shrub	
UH	Spurge-laurel	<i>Daphne laureola</i>	Shrub	
UH	Tutsan	<i>Hypericum androsaemum</i>	Shrub	
UH	Western Gorse	<i>Ulex gallii</i>	Shrub	

UH	Alder	<i>Alnus glutinosa</i>	Tree	
UH	Ash	<i>Fraxinus excelsior</i>	Tree	
UH	Beech	<i>Fagus sylvatica</i>	Tree	
UH	Common Whitebeam	<i>Sorbus aria</i>	Tree	
UH	Crack-willow	<i>Salix fragilis</i>	Tree	Bees, insects, butterfly caterpillars, moth caterpillars
UH	Downy Birch	<i>Betula pubescens</i>	Tree	
UH	English Elm	<i>Ulmus procera</i>	Tree	
UH	Field Maple	<i>Acer campestre</i>	Tree	
UH	Hornbeam	<i>Carpinus betulus</i>	Tree	
UH	Pedunculate Oak	<i>Quercus robur</i>	Tree	
UH	Rowan	<i>Sorbus aucuparia</i>	Tree	insects, birds
UH	Sessile Oak	<i>Quercus petraea</i>	Tree	
UH	Silver Birch	<i>Betula pendula</i>	Tree	
UH	Small-leaved Lime	<i>Tilia cordata</i>	Tree	
UH	White Willow	<i>Salix alba</i>	Tree	Bees, insects, butterfly caterpillars, moth caterpillars
UH	Wild Cherry	<i>Prunus avium</i>	Tree	insects, birds
UH	Wych Elm	<i>Ulmus glabra</i>	Tree	
UH	Arrowhead	<i>Sagittaria sagittifolia</i>	Water Plant	
UH	Branched Bur-reed	<i>Sparganium erectum</i>	Water Plant	
UH	Bulrush	<i>Typha latifolia</i>	Water Plant	
UH	Thread-leaved Water-crowfoot	<i>Ranunculus trichophyllus</i>	Water Plant	
UH	Unbranched Bur-reed	<i>Sparganium emersum</i>	Water Plant	
UH	Water-plantain	<i>Alisma plantago-aquatica</i>	Water Plant	
UH	Yellow Water-lily	<i>Nuphar lutea</i>	Water Plant	
UH	Common Rock-rose	<i>Helianthemum nummularium</i>	Woody Perennial	aphid-eating insects
TB only	Black Medick	<i>Medicago lupulina</i>	Annual	
TB only	Bugloss	<i>Anchusa arvensis</i>	Annual	
TB only	Common Cow-wheat	<i>Melampyrum pratense</i>	Annual	
TB only	Common Poppy	<i>Papaver rhoeas</i>	Annual	
TB only	Corn Chamomile	<i>Anthemis arvensis</i>	Annual	

Appendix 2 – Talybont South – Rear of House 8, Section 2.2 Works identified

Currently the rear of House 8 at Talybont South has been managed by removing weeds and scrub. This area is not easily accessible by students and the general footfall is low (if any at all). The area is approximately 450m² of uneven cleared scrub, grass and exposed earth. Tree cover is partial (due to cutting). Seeding this area with a wildseed mix at a rate of 1.5g per m² would be sufficient. A mix (such as Naturescape's NV4F Value Summer Flowering Butterfly & Bee Mix Flowers Only*, made up of *Achillea millefolium* - Yarrow 4%, *Anthyllis vulneraria* - Kidney Vetch

3%, *Centaurea nigra* - Common Knapweed 13%, *Centaurea scabiosa* - Greater Knapweed 4%,

Daucus carota - Wild Carrot 11%, *Galium verum* - Lady's Bedstraw 13%, *Knautia arvensis* - Field Scabious 4%, *Lathyrus pratensis* - Meadow Vetchling 2%, *Lotus corniculatus* - Birdsfoot Trefoil 10%, *Prunella vulgaris* - Self Heal 13%, *Rhinanthus minor* - Yellow Rattle 10%, *Scabiosa columbaria* - Small Scabious 2%, *Stachys officinalis* - Betony 3%, *Succisa pratensis* - Devilsbit Scabious 1%, *Trifolium pratense* - Wild Red Clover 3%, *Verbascum nigrum* - Dark Mullein 2%, *Vicia cracca* - Tufted Vetch 2%) would be appropriate for a reasonably fertile soil.

Proposed series of works:

Before October - ensure vegetation is mown/cut. Expose earth. Sow seed

Spring – mow to 25mm and remove cuttings

Mar – October – first growing season

October – mow and remove cuttings

Second year – ensure sufficient growth of wildflowers – may need reapplication of seeds in October

No fertiliser to be added.

Typical cost: £12.10 per g (1.5g m⁻²) = £84.70

*Other seed mixes are available.

Appendix 2 – Wildflower and Wildlife Plan 2019



Cardiff University Wildlife & Wildflower Plan

2018-2023

CARDIFF WILDLIFE & CARDIFF WILDFLOWERS
GROUP

Contents

Introduction	2
Shrubs, hedges & trees	3
Hedgehogs	4
Garden birds	5
Wildflower meadows	6
Wild pollinators	7
Bluebells	8
Welsh daffodils	9
Slow worms	10
Mini-ponds	11
Newts	12
Our twilight visitors	13
Swifts	13
Bats	13
Tawny owls	13
Annotated Bibliography	14

Introduction

This plan was developed by the Cardiff Wildlife & Cardiff Wildflower staff group at Cardiff University in January-February 2019. The consultation documents were read by 308 people, and attracted 167 contributions, which could be divided into 36 separate ideas. Only the most popular ideas have been included in this plan. The plan has also been informed by Cardiff University policy. A key aim was to put the principles of the University's *Biodiversity Statement* (2016) into practice¹. Our plan is intended to fit within and expand upon the University's five-year *Environmental Sustainability Action Plan* (2018). For this reason, at the top of each page of our plan I have included the relevant action points on the *Strategy*.

The Wildlife & Wildflower Plan represents a list of the university's biodiversity priorities, together with low-cost solutions for encouraging our priority species and habitats on campus. Because there is currently no central budget for biodiversity at Cardiff University, the plan draws heavily on volunteer labour, and on the potential for conservation funding.

Finally, our Plan also draws on the Cardiff Council's *Biodiversity Action Plan* (2008), and it uses the same terminology (i.e. 'priority species', 'priority habitat'). It is not, however, intended to constitute a full Biodiversity Action Plan as defined by the *Convention on Biological Diversity* (1994). The Wales Biodiversity Partnership is currently considering how the *Environment (Wales) Act* 2016 will impact on the duties of universities to produce such plans.

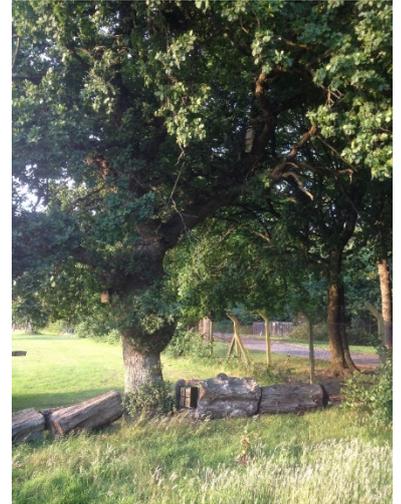
¹ See Annotated Bibliography (p.14) for a description of all documents consulted.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.
4. Continued creation of wildflower/bee friendly planting around University campuses	Funding dependent

Shrubs, hedges & trees

The first priority habitat for Cardiff University includes the largest plants: shrubs, hedges and trees. This was identified as a priority in the Cardiff University *Biodiversity Statement* (2016).

Trees, especially hedgerow trees have very long lifespans and have heritage value as a link to previous generations. Like meadows they also have value as carbon sinks and help prevent flooding on a local level. Trees, shrubs and hedges also function as vital nest-building habitat for many species of bird and mammal. Hedgerows and woodlands are priority habitats on the *Cardiff Biodiversity Action Plan* (2008) and habitats of principal importance under the *Environment (Wales) Act* 2016.



At Cardiff University, over half of our priority species are dependent on shrubs, hedges and trees for at least part of their lifespan.

2018-2023 Targets:

- Plant native shrubs and trees in preference to non-native species.
- Visually inspect all hedgerows before trimming during the nesting season (March-July, in compliance with the Wildlife & Countryside Act, 1981). Avoid trimming low-profile hedges during this period.
- Hedges to be allowed to develop along the fence-lines of green sites.

Hedgehogs

The first Cardiff University priority species is the hedgehog (*Erinaceus europaeus*). This is a species of principal importance under the *Environment (Wales) Act 2016*.

Hedgehogs are in decline in the UK, but still regularly visit all of our larger and greener sites to forage for food during the evenings. Because they are nocturnal and furtive, most hedgehogs are only recorded on site when they are sick or dead.



Hedgehogs are expected to benefit from the creation of new wildflower meadow areas and the continued maintenance of hedgerows.

2018-2023 Targets:

- Place at least three hedgehog hibernation boxes on Cardiff University's largest green sites.
- When building or renovating fence-lines around green areas, ensure a 'hedgehog hole' is included.

Practical Thinking: how can we meet this target?

Hedgehog boxes are most simply constructed by cutting an entrance hole and a ventilation hole in a plastic box, before covering it with leaves. Smarter hedgehog boxes can be made of wood.

The sites where hedgehogs have been recorded at Cardiff University are University Hall, Talybont North and Cardiff University Sports Fields. We recommend placing boxes at these locations.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
1. Linking with the Well-being strategy develop a community garden and food growing space	£3,000 pa
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.

Garden birds

The second group of Cardiff University priority species are our garden birds. These are very diverse, but can all be helped by the same targets. Garden birds and their nests are protected under the *Wildlife and Countryside Act (1981)*.

Several species of garden bird are included on the *Cardiff Biodiversity Action Plan (2008)*, but none are currently reported on Cardiff University land, with the exception of the herring gull (*Larus argentatus*) which breeds across the campus, and regularly visits garden areas. Because most garden birds are diurnal, noisy and brightly coloured, they represent some of our more visible and well-regarded resident species. They are adapted to living alongside humans and can be encouraged with a minimum of effort.

Garden birds are expected to benefit from the wise management of hedges, trees and shrubs.

2018-2023 Targets:

- Visually inspect all hedgerows before trimming during the nesting season (March-July, in compliance with the Wildlife & Countryside Act, 1981). Avoid trimming low-profile hedges during this period.
- Allow staff to put up bird feeders for use during winter months.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
2. Expand the Welsh Government Pollinator friendly initiative across University buildings	£2,000 pa
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.
4. Continued creation of wildflower/bee friendly planting around University campuses	Funding dependent

Wildflower meadows

There are three key priority habitats for biodiversity at Cardiff University, and the most important habitat of these (as selected by the Staff Wildlife & Wildflower group) is wildflower meadow. This is a habitat of principal importance under the *Environment (Wales) Act 2016*. It is also one of the key habitats described in the Cardiff University Biodiversity Statement (2016).



Cardiff has been known for its meadows for centuries and John Leland referred to meadows between Rhymney River and the Taff in 1538. Lowland meadow is one of the 'neutral grassland' priority habitats on the *Cardiff Biodiversity Action Plan* (2008), and a priority habitat on *The Action Plan for Pollinators in Wales* (2013). Meadows also help offset our carbon footprint and sequester additional carbon each year in their deep roots. Unfortunately, the area covered by lowland meadows is in steep decline and the vast majority of lowland meadows have been lost over the last century.

At Cardiff University over half of our priority species are at least partially dependent on wildflower meadows.

2018-2023 Targets:

- Create 1,000m² of additional single-mow meadow areas [provisional on funding].
- Consider priority species (bluebells, Welsh daffodils) when selecting wildflowers.

Practical Thinking: how can we meet this target?

1,000m² is approximately 15% of a football pitch. Suggested areas are around Trevithick Building, the Temple of Peace and possibly Bute Building and the ditch area of Talybont North.

The Urban Buzz project has now been restarted by the RSPB, and we have been invited to accept some free seeds. The Pharmabees project has also recently been awarded £2,000 to plant seeds this year.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
2. Expand the Welsh Government Pollinator friendly initiative across University buildings	£2,000 pa
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.
4. Continued creation of wildflower/bee friendly planting around University campuses	Funding dependent

Wild pollinators



The first and most important of the priority species groupings for the wildflower meadows is wild pollinators. This is a broad category which includes bumblebees, solitary bees, butterflies and moths and some beetles. Pollinators have special conservation importance under *The Action Plan for Pollinators in Wales (2013)*.

Cardiff has a strong background in caring for pollinators. Several species of butterfly and moth are included on the *Cardiff Biodiversity Action Plan (2008)*, of which only the cinnabar moth (*Tyria jacobaeae*) has been regularly reported on University land.

The Pharmabees project in the Cardiff University School of Pharmacy gained Bee Friendly accreditation in 2017, and has set up hives and planted pollinator-friendly wildflowers around the city. As part of the *Environmental Sustainability Action Plan*, we are aiming to expand this initiative across University Buildings.

2018-2023 Targets:

- Plant additional wildflower meadows and maintain flower-rich lawns, as appropriate to the site.
- Plant pollinator-friendly wildflowers to provide additional forage across the university and develop biodiversity corridors. E.g. preserve some ragwort for cinnabar caterpillars.
- Incorporate bee-bricks into new builds.
- Plant especially bluebells, dandelions, white clover and sweet woodruff to help bees.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
2. Expand the Welsh Government Pollinator friendly initiative across University buildings	£2,000 pa
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.
4. Continued creation of wildflower/bee friendly planting around University campuses	Funding dependent

Bluebells



We also have two specific priority wildflowers, and the first of these is the native bluebell (*Hyacinthoides non-scripta*). The bluebell is a protected species under Schedule 8 of the *Wildlife and Countryside Act* (1981, as amended).

The UK is home to over half of the world's population of English bluebells. However, they are under threat due to hybridisation with Spanish bluebells (*Hyacinthoides hispanica*), which have self-seeded from garden populations. In Glamorganshire generally and Cardiff in particular, the density of Spanish bluebells is especially high, so establishing a strong population of native bluebells is a local priority and responsibility.

2018-2023 Targets:

- Consider including native bluebells in all shady wildflower meadow areas.
- No Spanish bluebells are to be planted.
- A no-mow policy around native bluebells for six weeks after they have flowered to ensure legal compliance.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
2. Expand the Welsh Government Pollinator friendly initiative across University buildings	£2,000 pa
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.
4. Continued creation of wildflower/bee friendly planting around University campuses	Funding dependent

Welsh daffodils

The second priority wildflower is the Welsh daffodil (*Narcissus pseudonarcissus*).

Cardiff University is regularly planted with cultivated daffodils in spring to add colour and celebrate Welsh culture. However these species are not native to Wales, and the Welsh daffodil is currently under threat due to hybridisation with these cultivated varieties. Although the Welsh daffodil is not threatened, protected, or on the *Cardiff Biodiversity Action Plan* (2008), it has been delegated a priority species by the Cardiff University Wildlife & Wildflowers group for its cultural importance.

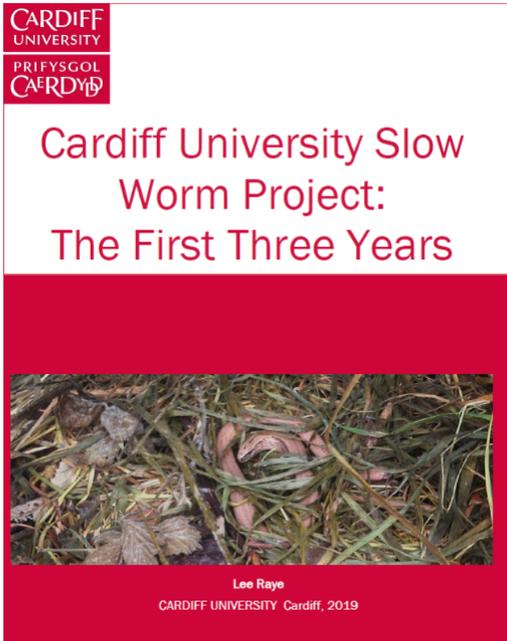
This species should be included in new wildflower areas where appropriate. Encouraging Welsh daffodils is also expected to help encourage wild pollinators.

2018-2023 Targets:

- No non-native daffodils to be planted on campus.
- Consider planting daffodils in all appropriate meadow areas.
- A no-mow policy around native daffodils for six weeks after they have flowered.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
1. Linking with the Well-being strategy develop a community garden and food growing space	£3,000 pa
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.

Slow worms



The final Cardiff University priority species for Wildflower Meadows is the slow worm (*Anguis fragilis*). The slow worm is a harmless legless lizard which eats mainly slugs and worms. This is a species of principal importance under the *Environment (Wales) Act 2016*.

The slow worm is in decline in Wales, and is currently the only species of amphibian & reptile regularly found on campus. It is also a priority species on the *Cardiff Biodiversity Action Plan (2008)*. A population of slow worms was established at a secret site on campus as part of the Cardiff University Slow Worm

Project in 2016 (see *Cardiff University Slow Worm Project: The First Three Years*, 2019). This project is being run by the Grounds Maintenance Team in co-operation with Residences.

Slow worm habitat in Cardiff is highly fragmented at present, but where a neighbouring population is present, slow worms may colonise new meadow areas, especially where there is an adjoining hedgerow or wooded area.

2018-2023 Targets:

- Continue to maintain the protected slow worm area and report sightings of slow worms.
- Check for the presence of slow worms in future wildflower areas.
- Wildflower meadow areas with slow worms should not be mowed until November.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.
4. Continued creation of wildflower/bee friendly planting around University campuses	Funding dependent

Mini-ponds

The third priority habitat for Cardiff University is mini-wetland.

Unlike the other GW4 Universities, Cardiff University does not have a strong history of ornamental ponds. The only large university pond was filled in several years ago due to concerns about health and safety. However, according to the *1997-8 Cardiff Pond Survey*, Cardiff has significantly more (full-sized) ponds with high conservation value than other counties, and these are part of the *Cardiff Biodiversity Action Plan (2008)*.



Mini-ponds have become more popular in recent years. They can be as small as a washing-up bowl, and are very cheap to set up. They are also generally very safe since they are shallow, small and can be easily protected with barrier fencing. Despite their small size these wetlands are still attractive to wildlife and regularly attract frogspawn in spring.

2018-2023 Targets:

- Create five new mini-pond areas.
- Record any signs of amphibians using the ponds.
- Incorporate the pond into monthly site checks to ensure that the ponds remain intact and the safety features are in place.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
1. Linking with the Well-being strategy develop a community garden and food growing space	£3,000 pa
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.

Newts

The only priority species group for the mini-pond is newts. This includes our three native species: the smooth newt (*Lissotriton vulgaris*) the palmate newt (*Lissotriton helveticus*) and the great crested newt (*Triturus cristatus*).

Of these species, only the great crested newt is present on the *Cardiff Biodiversity Action Plan* (2008), and this is also the only newt protected from disturbance under Schedule 9 of the *Wildlife and Countryside Act* (1981) and Schedule 2 of the *Conservation of Habitats and Species Regulations* (2017). However, great crested newts only generally spawn in large, deep ponds, so they are unlikely to colonise mini-ponds.

All three species of native newt are becoming less widespread in the UK, due to drainage of wetland areas. The increase in popularity of garden ponds has helped to slow this decline. Palmate and smooth newts adapt easily to breeding in garden ponds, and with increased habitat connectivity in urban areas, new populations can be created.

2018-2023 Targets:

- Create five new mini-pond areas.
- Record any signs of amphibians using the ponds.

Relevant Action Points in the <i>Environmental Sustainability Action Plan</i>	Central Budget
3. Build partnerships with our neighbours to develop biodiversity corridors across the city	n.a.

Our twilight visitors

Our final priority for the 2018-2023 Wildlife & Wildflower plan is to gather evidence about a group of species of high conservation concern. These are crepuscular (active at twilight) and nocturnal species which may be regular visitors to Cardiff University but are rarely seen by members of staff due to their secretive nature. By surveying these species we can help inform future conservation efforts and build a truly biodiverse campus.

Swifts

These migrating birds (*Apus apus*) are present only in summer and can only be surveyed at dusk when they form 'screaming parties' at street level. They are protected under the *Wildlife & Countryside Act* (1981) and are an Amber List species on *Birds of Conservation Concern* 4 (2015). Cardiff is one of the RSPB's Swift Cities.

Bats

Pipistrelle bats (*Pipistrellus pipistrellus*) are known to be present at two Cardiff University sites. They are protected under the *Wildlife and Countryside Act* (1981) and the *Conservation of Habitats and Species Regulations* (2017). They are a species of principal importance under the *Environment (Wales) Act* (2016)

Tawny owls

Tawny owls (*Strix aluco*) have been recorded at only one Cardiff University site. They are dependent on woody habitat. They are protected under the *Wildlife and Countryside Act* (1981) and are an Amber List species on *Birds of Conservation Concern* 4 (2015)

2018-2023 Targets:

- Site management to allow four 'dusk surveys' each year. These dates are for conservation volunteer groups to visit the sites and survey for the species mentioned above.
- Consider placing swift and bat bricks in new-build buildings close to existing roosts.
- Moth-friendly plants to be included in any new wildflower meadow areas.

Practical Thinking: how can we meet this target?

We recommend the four dusk surveys are carried out in May, June, July and November in order to maximize the chances of detecting each species, but the dates should be arranged in advance to fit in with site management. The surveys would probably be carried out by either the staff Wildlife & Wildflower group or the student Wild Society. Any outside organization would need to have proof of liability insurance. Bat surveys (around dusk) involve walking slowly with a bat detector to listen for bat calls, or watching the emergence of known roosts, swift surveys (before dusk) involve walking quickly listening for swift calling parties & trying to see their nests and tawny owl surveys (after dusk) involve sitting or walking while listening for owls hooting.

Annotated Bibliography

The Action Plan for Pollinators in Wales (2018)

This is an action plan written to investigate and plan to encourage pollinators in Wales. The first plan was launched in 2013, and it was updated in 2018. Among other things, the Action Plan created the Bee Friendly initiative for communities and community organisations. The Cardiff University School of Pharmacy earned Bee Friendly status in 2017, and a central part of the Cardiff University *Environmental Sustainability Action Plan (2018)* is to extend this status to the rest of the university.

Biodiversity Statement (2016)

This is Cardiff University's official statement about how we are acting to conserve wildlife & wildflowers on site. The key priorities of the statement are that we should comply with relevant legislation, work with staff, students contractors and community to develop wise practices, to conserve existing habitats and consider ecological opportunities in development. This Wildlife & Wildflower Plan can be considered an outcome of and a successor to the *Biodiversity Statement*.

Birds of Conservation Concern 4 (2015)

This is the official Red List for birds in Britain. It was written by the British Trust for Ornithology. The list is updated regularly based on national increase and decline in birds. Birds which need urgent conservation intervention are placed on the Red List, and birds with currently unfavourable conservation status are placed on the Amber List.

Cardiff Biodiversity Action Plan (2008)

This is a Biodiversity Action Plan written by Cardiff Council, which includes a list of priority habitats and species, and goals to improve the conservation status of these species, as required under the *Convention on Biological Diversity (1994)*. It has not been renewed since 2008, possibly because Wales has new priorities under the *Environment (Wales) Act (2016)*.

Cardiff University Slow Worm Project: The First Three Years (2019)

This is the latest report on Cardiff University's slow worm project, which involves the creation and maintenance of an area of habitat for slow worms.

Conservation of Habitats and Species Regulations (2017)

This is the second main piece of legislation covering wildlife in the UK. It is based on the *EU Habitats Directive* (1992). It sets up some rare species of wildlife and some critical habitats as European protected which means they cannot be harmed and we have a duty of care towards them.

Environmental Sustainability Action Plan (2018)

This is Cardiff University's current five year (2018-2023) strategy for the environment. All the biodiversity targets are included under the 'Resilient University' section. The relevant targets are included at the top of each page in our Wildlife & Wildflower plan. Funding for this strategy has been approved by Council.

Environment (Wales) Act (2016)

This is the newest piece of legislation covering wildlife. It allows the Welsh Government to register some species as 'species of principal importance for conservation'. These species are supposed to be prioritised in conservation efforts, but the duties of universities towards these species have not yet been clarified.

Wildlife and Countryside Act (1981)

This is the most important piece of legislation covering wildlife in the UK. It is based on the *EU Birds Directive* (2009, originally 1979), and the international *Bern Convention* (1979). It has been amended several times since being passed, but protects many species of wildlife and wildflower from harm.