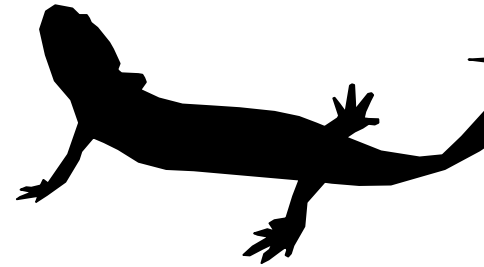


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**LOUGHBOROUGH UNIVERSITY
BIODIVERSITY ACTION PLAN (LUBAP) v.2**

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Submitted to:
BCA Landscape

Submitted by:
AMEC Earth & Environmental UK Ltd
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1 INTRODUCTION

This Biodiversity Action Plan (BAP) has been produced by Loughborough University as part of its Sustainability Agenda, which outlines the University's commitment to environmental sustainability and the way in which the Campus is managed¹. The LUBAP will ensure that biodiversity becomes an integral part of the day to day running of the University.

This BAP provides an evaluation of the status of habitats and species present on the Campus in relation to both Local and UK BAPs and identifies key objectives for maintaining and enhancing Biodiversity. The BAP also aims to promote the continued fusion between the aesthetic landscape characteristics of the site, its use for recreational and academic activities, and its biodiversity value.

WHAT IS BIODIVERSITY

The 1994 United Kingdom Biodiversity Action Plan set out a strategy for implementing the Convention of Biological Diversity (CBD) which was signed by the UK at the Rio Earth Summit in 1992. The CBD was the first treaty to provide a legal framework for biodiversity conservation and called for the creation and enforcement of national strategies and action plans to conserve, protect and enhance biological diversity. The UK Biodiversity Steering Group was created in 1994 and established the framework for identifying species and habitats of conservation concern. The aim of the national UK Biodiversity Action Plan, which includes action plans for the UK's most threatened species and habitat plans for the most vulnerable, was to focus conservation efforts towards the highest UK priorities. In addition to national priorities and targets, the UK BAP also includes action at the local level: Local Biodiversity Action Plans.

The aim of Local Biodiversity Action Plans (LBAPs) is to identify local priorities and determine the contribution they can make to the delivery of the national Species and Habitat Action Plan targets. The relevant LBAP for Loughborough University is the 'Leicester, Leicestershire and Rutland Biodiversity Action Plan'.

Each habitat type is considered individually and key species are also considered on an individual basis. However, many of the habitat objectives are also relevant to the key species objectives, and in some cases the two may overlap.

OBJECTIVES OF THE LUBAP

The key objectives of the LUBAP are:

- To enhance the quality of life for staff and students, making Loughborough University a desirable place to live, work and study;
- To utilise Biodiversity as a valuable teaching resource. Opportunities for under and post-graduate research projects could be created. This would provide

¹ As outlined in Loughborough University – Towards 2016, Strategic Plan – 2006/07 edition

students studying environmental based courses with the opportunity to gain practical experience;

- To establish potential links with industry through work experience and mentoring for those students studying environmental based courses;
- To ensure Environmental compliance – Section 40 of the Natural Environment and Rural Communities Act (2006) requires public bodies to conserve biodiversity through both conservation and enhancement. The University will be satisfying this requirement;
- To establish wider community links and benefits. The University could become a biodiversity focal point for the local community and organisations such as local wildlife groups, and help increase ‘awareness’ of the natural environment;
- To identify opportunities to raise and widen the profile of the University.
- To enhance biodiversity now, for future generations; and
- To provide the University with the opportunity to link with and complement the Local BAP, making a real contribution to biodiversity,

The ultimate aim in developing the LUBAP is to effect biodiversity enhancement and to realise the wider benefits that this brings. This is best achieved through a strategic approach that first evaluates the current ecological resource and reviews current management practices; this is then followed by a process of engaging stakeholders – including the university staff and student body, as well as local wildlife groups – in setting and ‘owning’ specific and achievable objectives for the Campus.

Enhancing biodiversity on Campus does not have to be complicated or costly; biodiversity gains can be made and built upon through relatively simple adjustments to existing management practices

TIMESCALE, MONITORING AND REVIEW

This LUBAP is divided into habitat types and species/species groups. These have been chosen based on the current wildlife value of the site and its biodiversity potential and with reference to the LBAP so that the LUBAP complements what it is going on in the local area. Advice on how to achieve the targets is presented and needs to be integrated with the day-to-day running of the site rather than specific site-enhancement recommendations.

With regard to the timescale of this BAP, the targets for the various habitats and species included have been based upon the current status of the habitat or species on the Campus and the potential for enhancement. The Campus will be managed for biodiversity in the long-term but initial timescales and targets for the plan must be realistic. In general a five year timescale is considered appropriate for achieving many of the biodiversity enhancement measures.

With regard to monitoring, this will be fundamental to the long-term success of the action plan. Reporting on the findings of the monitoring is also essential in order for the success of the measures to be appraised and the reaching of targets to be identified. It is recommended that a very basic site audit is undertaken annually, and a more comprehensive survey of the site is carried out every five years. This will allow the plan to evolve and remain relevant to the site as it develops.

Monitoring provides the ideal opportunity for wider community involvement. An action group of interested parties has already been established including the University's Sustainability Officer; representatives from the Grounds Maintenance and Estates Team; Students Union; academic staff and the local Wildlife Trust. However, this could be broadened to embrace the local community through, for example, involving local schools to monitor bird boxes; organising fungal forays and other wildlife events making the University a local 'wildlife focal point'.

A BAP is a dynamic, working document and will be subject to monitoring and review at least every 5 years. This allows the BAP to develop as targets are met, or be refined and adapted to meet the evolving needs of the University. A review process will be set in place as part of the development of the BAP. The review process, and the way this information is disseminated, is in itself a way to maintain interest and awareness into the future amongst Campus users.

2 CURRENT HABITATS ON THE CAMPUS

INTRODUCTION

The University Campus is approximately 100 ha in area, mainly comprising amenity grassland and hardstanding. The main use is recreational, with the majority of amenity grassland being managed as sports pitches.

Despite the pressures of being a recreational Campus and the intensive management required to maintain it as such there are, nonetheless, areas of wildlife interest scattered around Campus such as an area of swamp beside Oakwood Drive (see photograph 1) and opportunities exist to link these areas together which would facilitate the movement of wildlife into and around Campus.

Local BAP habitats and other ecologically valuable habitats on Campus include broad-leaved woodlands, ponds, brooks, hedgerows and mature trees. Areas of interest mainly lie away from the main trafficked and used recreational areas.

Adjacent to the Campus are the Burleigh and Holywell ancient woodlands. These are examples of lowland mixed deciduous woodland – a UK BAP Priority Habitat. Both woodlands have a rich flora and a 1992 survey of Burleigh Wood² found 25 species of fungi and 171 different moth species.

Although the biodiversity value of the Campus as a whole is limited – as the majority of the ‘non-built’ landscape comprises closely mown, amenity grassland with low species diversity – there does exist a number of potential ‘biodiversity sources’; through appropriate management of the non-built landscape, biodiversity could be enhanced, encouraged and extended throughout the Campus.

Each habitat type is considered below, based on survey data and each habitat is evaluated based on its current status in terms of Local and UK BAP priorities.

HABITATS

The Campus supports the following habitats:

- Amenity grassland
- Deciduous woodland
- Swamp
- Scattered deciduous trees
- Semi-improved neutral grassland
- Hedgerow
- Ruderal

² Burleigh Wood – Survey Results, 1992 report

- Stream
- Ponds
- Buildings
- Hardstanding

A habitat map of the Campus may be found in Appendix 1.



Photograph 1: Area of swamp beside Oakwood Drive

3 SPECIES RECORDS FOR THE CAMPUS

Birds

There are a range of habitats on the Campus providing for a variety of bird species, particularly the areas of woodland.

Over 23 bird species have previously been recorded on the Campus (Loughborough University Wildlife Strategy, 1994) including the red listed yellowhammer *Emberiza citronella*; fieldfare *Turdus pilaris*, redwing *Turdus iliacus* and a healthy bird population exists in the adjacent Holywell and Burleigh Woods.

Badger

Badger *Meles meles* are known to use the Campus for foraging and field signs were recorded during the March 2009 survey

Bats

Concurrent with the Extended Phase 1 habitat survey, a daytime visual inspection of the trees and buildings was undertaken in order to determine potential suitability for supporting bats and the presence / likely absence of them on the Campus.

Several mature trees and a number of buildings maintain features of bat roosting potential.

Records of pipistrelle *Pipistrellus sp.* and whiskered bat *Myotis sp.* exist for the Campus, but these records are over 10 years old (National Biodiversity Network web-site)

Great crested newt

The National Biodiversity Network web-site maintains records of great crested newt 3km away, however these records are over 10 years old.

The ponds at East Park and the west entrance to the Campus appear suitable for great crested newt. However, as the ponds have not been surveyed, and presence / absence has not been determined.

4 HABITAT ACTION PLANS

The aim of a Habitat Action Plan (HAP) is to identify actions that are needed to maintain and / or improve the status of habitats with conservation value.

BROADLEAVED WOODLAND AND MATURE TREES

Introduction

Woodlands represent one of the richest wildlife resources in Britain, providing a link with the wildwood and climax vegetation that once covered much of the British Isles. Human influence on woodlands over the centuries has been considerable. Woodland provides an important habitat for a variety of flora and fauna. Even small areas of woodland can support a diverse range of plant and animal species. Scrub (generally defined as local native species usually less than 5 m high) can offer good cover for mammals, breeding birds, reptiles and amphibians. It provides a breeding habitat for birds, badgers, a bat roosting habitat and terrestrial one for amphibians such as great crested newt. Dead wood and other woodland microhabitats are also a very important habitat for invertebrates.

As well as their importance for wildlife, woodlands are highly valued by the public and can be a valuable resource in terms of recreation, relaxation and education.

National and regional status

Broadleaved, mixed and yew woodland and Boundary and Linear Features are included in the UK BAP. The value of timber to man and clearance of woodland for agricultural purposes has resulted in the intensive management of woodlands in Britain. Present coverage stands at about 2.5 million hectares or 10% of the land area of Britain. Despite the reduction in extent, remaining woodlands are of high wildlife value, despite often being highly fragmented.

Leicestershire and Rutland are two of the least wooded counties in Britain. As such, many of the remaining woodland areas have been designated as Sites of Special Scientific Interest (SSSI's). Given the level of protection that the Counties' woodlands receive, only certain types of woodland have been identified as priority habitats including wet woodland, sessile oakwoods and pasture woodland.

Current status, extent and condition on Campus

Adjacent to the Campus are two significant areas of woodland, Holywell Wood (6.7ha) and Burleigh Wood (8.5ha). Both woodlands are included in the Leicestershire Inventory of Ancient Woodland and ground floras contain several ancient woodland indicator species including bluebell *Hyacinthoides non-scripta* and dog's mercury *Mercurialis perennis*.

The majority of deciduous woodland on Campus is confined to a narrow strip along the Burleigh Brook. Alders *Alnus glutinosa* and crack willows *Salix fragilis* occur directly beside the stream,

with occasional mature pedunculate oaks *Quercus robur* present on the slightly drier soil above the watercourse. Ash trees *Fraxinus excelsior* are quite common.

The ground flora is species-poor and dominated in many places by nettles *Urtica dioica*. This suggests that the ground is quite nutrient rich. A more natural ground flora, composed of wood avens *Geum urbanum* and false brome *Brachypodium sylvaticum*, occurs behind the John Pickford building, where the ground is better drained and there is less likelihood of nutrients accumulating.

Bird boxes have been erected in most of the woodlands and these were observed in 2008 to be used by birds such as great tits *Parus major*.

There are many mature trees scattered around the Campus, such as those shown in photographs 2 and 3 below. These mature trees provide a valuable habitat for invertebrates, birds and potential roosting opportunities for bats as well as being aesthetically pleasing.



Photograph 2: Mature Campus tree



Photograph 3: Example of standing dead tree

Factors affecting the habitat

The main issue with regard to woodland is its limited extent and isolation from other similar habitat. The areas of planted woodland are still in the early stages of establishment and as such, do not yet have a well developed ground flora.

Lack of management can also affect the diversity of woodlands. For example, coppicing can open up areas allowing the development of a diverse ground flora. Should coppicing cease, the canopy cover increases and shades out the ground flora.

The presence of invasive species such as sycamore *Acer pseudoplatanus*, may also have a negative impact.

Woodland and scrub habitat can be enhanced by positive actions, including:

- Thinning dense stands of regenerating saplings and selective removal of even-aged trees to increase the species and age diversity of the trees and shrubs present.
- Planting native species, selected to be appropriate to the area, to complement and diversify nearby habitats beyond the line side land.
- Retaining log piles and dead wood where safe to do so to provide shelter and food for other species, especially invertebrates
- Careful screening of imported soils to avoid introducing invasive non-native species into existing habitats.
- Protection of trees during construction work on campus.

Action plan objectives and targets

- Maintain the woodland on the Campus in a favourable condition i.e., with a range of tree ages to create structural diversity, open areas to encourage the development of ground flora and establish links between woodland areas.
- Ensure thinning of young, planted areas to prevent the development of a dense, dark, spindly woodland.
- To increase the usage of the woodland on Campus as breeding bird and bat roosting habitat.
- Increase available dead wood habitat for invertebrates.
- Avoid tree and scrub removal during the bird breeding season where practicable (generally March – August inclusive).
- Check for the presence of bats in trees before felling or removing dead or damaged limbs.

Proposed action to meet targets

- Carry out woodland surveys of Burleigh and Holywell Woods to establish species composition, assess general tree condition and map the extent of invasive species.
- Produce a Woodland Management Plan for Burleigh and Holywell Woods.

- The condition of the mature trees on the Campus should be assessed annually by a qualified arborist and damaged trees removed only if they pose a health and safety risk.
- Replacement of felled trees on the Campus should utilise native species which are characteristic of the local area. Local provenance stock should be used wherever practicable
- It is recommended that further bird boxes are erected on mature trees around the Campus to increase the nesting habitat available for breeding birds. A target of 100 bird boxes is realistic within the five-year timeframe of this plan.
- It is recommended that bat boxes are erected to encourage bats to use the Campus for roosting. A target of 100 bat boxes is realistic within the five-year timeframe of this plan.
- Wood from any felled trees should be retained on Campus and left within woodland areas in order to provide deadwood habitat for invertebrates and other species.

Monitoring

The extent of sycamore and other invasive species should be monitored on an annual basis initially for the first three years to determine the rate of spread. Monitoring frequency can then be reduced accordingly.

A bat foraging survey comprising a series of visits across the summer period under optimum conditions is also recommended.

PONDS

Introduction

As well as their aesthetic and educational value, ponds are a valuable wildlife habitat as they are an important feeding and breeding site for amphibian species, such as common frog *Rana temporaria* and nationally declining BAP and/or protected species, such as great crested newt

Triturus cristatus as well as aquatic invertebrates. They are also important habitats for aquatic plant species. Many ponds were created between the seventeenth and nineteenth century, mainly for agricultural purposes, but many of these have been lost at a dramatic rate due to agricultural intensification. Unmanaged ponds can become silted-up and heavily shaded, leading to a reduction in their biodiversity value.

National and regional status

Ponds are a Priority Habitat under the UK BAP. Although ponds are still relatively abundant (estimated to be 220,000 ponds in lowland Britain), there has been a 75% decline in the number of them over the last century, mainly due to changes in land management.

The Leicester, Leicestershire and Rutland Biodiversity Action Plan has a Habitat Action Plan specifically for field ponds.

Current status, extent and condition on Campus

There are currently three ponds on Campus although the one adjacent to the Sir Denis Rooke Building is a formal water feature and whilst being of great aesthetic value, is of limited biodiversity value.

Of particular value to biodiversity are the pond to the south of Oakwood Drive (see photograph 4 below) and the pond in Butler Court Conservation Area. These ponds have established marginal and aquatic vegetation, providing cover and food for invertebrates and amphibians. Of equal importance is the adjacent terrestrial vegetation as many organisms such as amphibians and aquatic insects develop in water then move on to land as adults. The pond at Butler Court (see photograph 5 below) has excellent surrounding terrestrial habitat in the form of a 'wildflower meadow', which has the potential for improvement.



Photograph 4: Pond at Oakwood Drive



Photograph 5: Pond at Butler Court

Factors affecting the habitat

Factors affecting the ponds on site include water levels, siltation, shading and management of marginal vegetation and draw-down zone. An apparent lack of active pond management at Butler Court has resulted in natural succession processes taking place and excessive shading.

Action plan objectives and targets

- Restore the Butler Court pond to a favourable condition and ensure that there is a program of ongoing management in the future
- Whilst the LBAP relates to field ponds, the objectives and targets refer to maintaining and enhancing such ponds. Whilst not 'field ponds' as such, the Campus ponds are of value and maintaining and enhancing these ponds indirectly links to the LBAP.
- In line with National targets, opportunities should be sought for the creation of new ponds and linkages between ponds on site
- Maintain the favourable condition of the pond at Oakwood Drive.

Proposed actions to meet targets

- The Butler Court pond should be cleared of the accumulated matter and restored to its original depth.
- Shading should be reduced by cutting back the weeping willow
- Maintenance should be undertaken on a rotational basis and a buffer zone of vegetation should be retained around the margin of the pond.

Monitoring

The status of ponds should be routinely assessed to ensure they are not becoming silted up. In addition, the plant species present should be surveyed to ensure that ponds are not becoming overgrown and/or dominated by a limited range or any invasive species. The usage of ponds on site by amphibians and invertebrates should be monitored.

GRASSLANDS

Introduction

Most of the amenity grassland on Campus is species-poor and dominated by a small number of grass species. They often have a high input of fertilisers and selective herbicides and are regularly mown. They are particularly characterised by an abundance of ryegrass *Lolium perenne* and white clover *Trifolium repens*. The biodiversity value of improved grasslands is low and they support a very limited fauna. Fertiliser use often encourages the growth of a small number of competitive species at the expense of more diverse flora. As the majority of amenity grassland on Campus is used as recreational sports pitches, the management needs to reflect this use and, as such, biodiversity focus should be on the non-sports areas.

Flower-rich grasslands can be important for insects such as bees (especially where plants such as bird's-foot trefoil are present). Areas of disturbed and bare ground within grassland also has value - some insects, for example, rely on open patches of soil within grasslands during their life-cycle.

They can also be important for ground-nesting birds, such as the skylark, which have declined in number due to habitat loss and changes in grassland management.

National and regional status

This habitat type is included under the UK BAP Habitat Action Plan Broad Habitat of improved grassland. Improved grasslands account for the majority of all grassland found in urban and rural parts of the UK. In the past 50 years improved grassland has increased by approximately 90% at the expense of other habitats of higher biodiversity value.

Improved grassland is not specifically included in the Leicester, Leicestershire and Rutland Biodiversity Action Plan.

Current status, extent and condition on Campus

The Campus has extensive areas of amenity grassland. These grasslands are very improved in nature and regularly mown.

Although the current standard of the amenity grassland must be maintained in line with the landscape management principles and requirements of the University, some opportunities exist for the creation of more species-rich grassland/wildflower areas. Selected locations within the current improved grassland areas on the complex such as in areas associated with linear tree planting or other peripheral areas have the potential to maintain such habitats. This would not need to detract from the well-maintained image of the site.



Photograph 5: Area of tufted hair grass, beside the Ashby Road

Factors affecting the habitat

The current maintenance regime of regular mowing and input of chemicals is required to maintain the highly 'manicured' standard of the soft landscaping associated with a sports University, and this intensive management is limiting the species composition.

Other factors that have the potential to affect this habitat type include:

- Disturbance to or loss of grassland (also affecting other species such as ground-nesting birds and reptiles) during operational works, including construction, earthworks and laying of new services.
- Reduction in the variety of grassland species present due to inappropriate management, such as cutting at the wrong time of year. Other factors which reduce the variety of grassland species present include nutrient-rich soils which allow a few species to dominate, and invasive species.
- Grassland replaced over time by trees and woodland due to tree re-growth and scrub encroachment.

Grassland habitat can also be enhanced by positive actions, including:

- Well timed cutting to allow plants to flower and set seed.

- Creation and maintenance of new areas of species-rich grassland as linking habitat through intensively built-up areas.

Action plan objectives and targets

- Create dedicated areas of wildflower grassland to increase biodiversity and attract a range of invertebrates.

Proposed action to meet targets

- Obtain a species list for the grassland area adjacent to Ashby Road.
- Reduce the intensity of management in the proposed wildflower grassland areas by stopping input of chemical herbicides and fertilisers and mowing less regularly to increase species diversity.
- Within established swards, species diversity may be increased by slot-planting species of local provenance wherever practicable.
- In addition, a wildflower mix of seeds of local provenance can be sown within the dedicated areas to increase species richness. In order to maximise the success of such a process it would be necessary to reduce the fertility of the soils which may require the stripping of topsoil to expose the lower fertility sub-soils. Commercial wildflower seed mixes characteristic of the local area are available (See Appendix A for suppliers).
- Allow the sward to grow to a height of approximately 350mm before mowing; mowing should not be undertaken earlier than mid- to late July when the plants have set seed. The cuttings should be removed from the site and composted to prevent nutrient enrichment of the soil.
- A margin of long grassland should be left alongside any linear features such as ditches and should be mown no more frequently than every 2-3 years to prevent scrub developing.
- Wildflower grassland areas should be kept free of invasive and pernicious weeds such as common ragwort *Senecio jacobaea*, spear thistle *Cirsium vulgare* and creeping thistle by spot weeding.

Monitoring

The species diversity of the grassland areas could be monitored, though essentially these areas will require little attention other than occasional mowing and possibly local weeding.

HABITAT CORRIDORS

Over time, human impact on the environment has resulted in a fragmented landscape of roads, buildings, towns and cities interspersed with remnant patches of natural or semi natural habitats. Linear features such as ditches, rivers, tree lines etc. have a value for conservation both as habitats in their own right and as potential wildlife corridors. The importance of these features has been elevated due to extensive habitat loss and fragmentation of natural habitats in Britain. The connection of patches of isolated habitat allows species movement and dispersal between them. However habitat corridors also allow the dispersal of invasive animal species such as American mink and plant species such as giant hogweed, Japanese knotweed and Himalayan balsam.

National and regional status

There is no specific habitat action plan for wildlife corridors but many of the other action plans indirectly relate to them, particularly, the Boundary and Linear Features and the Rivers and Streams UK BAP Broad Habitat Action Plans.

Leicester, Leicestershire and Rutland has a specific Habitat Action Plan for hedgerows.

Current status, extent and condition on Campus

There are a number of important wildlife corridors on the Campus. The most relevant of these are the Burleigh Brook and hedgerows. Habitat corridors are important for a range of species including birds, bats, water vole, otter and the native white-clawed crayfish. Corridors are important because they allow species to move freely between suitable habitats.

Factors affecting the habitat

On the Campus, the main problem is the severance of corridors due to the built-up nature of the environment and the current management regime. The main example of this is the tightly mown nature of the amenity grassland throughout the campus with few un-mown strips or areas which has the potential to hinder the movement of species around the Campus



Photograph 6: Example habitat corridor

Action plan objectives and targets

- Identify key corridors across the Campus and seek to protect and maintain these routes.
- Manage the wildlife corridors on site in as complete a form as possible by an appropriate maintenance regime.
- Create new wildlife corridors between areas of semi-natural habitat on the site e.g. connections between the areas of woodland.

Proposed action to meet targets

- Maintain the current status of Burleigh Brook as a habitat corridor for wildlife, including white-clawed crayfish.
- Plant new sections of species-rich native species hedgerows.

- Consider linking wildlife corridors as and when opportunities arise, for example by incorporating planting in the design of new developments.

Monitoring

The continuance of the habitat corridors on site should be ensured. The aquatic corridors should be checked for the presence of invasive species.

NEW DEVELOPMENT

In line with the Strategic Plan, the University's priority is 'to develop and maintain a sustainable and attractive campus that will provide the optimum environment for students, staff and key partners.'

Current status, extent and condition on Campus

At approximately 100 ha in area, the Campus has the potential for growth and development. The Strategic Plan has identified the following actions:

- The University will undertake a structured building/renewal programme for academic departments
- The University will realise the full potential of Holywell Park to develop a Science and Enterprise Park
- Working with key partners the University will make best use of its land, including land designated for the 'Sports Park', to the advantage of sport in the UK and the University itself

Action plan objectives and targets

- Adopt environmentally sustainable practices across the Campus and incorporate into any new development including new buildings, sports fields, footpaths etc.

Proposed action to meet targets

As per the Strategic Plan:

- Work with in-house academics, and others across the sector, to ensure that innovative ideas are considered for application in the management of the Campus
- Play a full role in the activities of the Higher Education Carbon Management Group
- Use in-house expertise in transport and sustainability to make a major contribution to the sustainability agenda in the East Midlands
- Enhance the sustainability of the Campus by the adoption of appropriate techniques and technologies, for example, consider the use of renewable energy through the installation of solar panels and / or wind turbines.

Also:

- Aim to achieve BREEAM accreditation for new builds, which will identify opportunities for biodiversity enhancement such as green roofs and nesting bricks
- Aim to use native species in planting schemes and identify opportunities to 'link up' areas of biodiversity value through development schemes.

Monitoring

The Estates Department will ensure that sustainability and biodiversity are key considerations in all new developments and the success of this may be demonstrated through the BREEAM process.

SPECIES ACTION PLANS

The aim of a Species Action Plan (SAP) is to identify actions that are needed to promote the conservation of a species.

BADGER

Introduction

The badger is a nocturnal mammal which feeds mainly on earthworms but also on grains, acorns, insects and fruit. They live in social groups of young adults and cubs, sometimes known as clans and these social groups will defend territories. Within their territories badgers live in a number of underground tunnel systems called setts. Some setts are always occupied and are also used for breeding and raising young in the winter and spring. These main setts can be extensive, with over forty entrances while others can have as few as two entrances. Badgers are extremely loyal to these main setts and will continue to occupy them regardless of disturbance. Other types of setts may be classified as annex, subsidiary or satellite according to how often they are used and how important they are to the social group. Badgers are creatures of habit and tend to use the same pathways to foraging areas and will continue to do so despite any obstacles such as fences being placed in their way. Badgers do not hibernate but may spend long periods below ground in the winter months.

National and regional status

Badgers and their setts are protected under the protection of Badgers Act 1992. This means that it is unlawful to knowingly kill, capture, disturb or injure an individual or intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering by badgers. Badgers are not considered endangered in the UK and the legislation is essentially animal welfare law. However, the badger is a species of conservation concern on the basis of its rarity in some regions.

The badger is a relatively rare species in the local area, although they are present and known to have setts in the area.

Current status, extent and condition

Badgers are known to use the Campus. Setts and field signs have been recorded during previous surveys. Badger setts have been previously found within hedgerows and records of foraging activity has been noted along the hedgerow line to the south of the Campus. As a relatively mobile species, it is always possible that new setts could be established on Campus in the future.

Factors affecting the species

The key factors affecting this species on the Campus are the continued presence of a suitable mix of habitat types for shelter and feeding and adequate connectivity both within the site and to similar such habitats off site. Human disturbance can significantly affect the level of badger

presence on a site. In particular ongoing construction works and the pattern of human movement across the site will influence how badgers may locate relatively undisturbed places to create setts and feed.

Action plan objectives and targets

- To protect the badger setts on Campus and maintain the current population.
- To maintain foraging habitat and suitable habitat corridors between foraging areas and setts.

Proposed action to meet targets

- Ground workers should be made aware of the potential presence of badgers on Campus, particularly when cutting back hedgerows which may conceal a badger sett, and should know the diagnostic characteristics of a badger sett.
- An ecological consultant should be contacted prior to any maintenance work in the vicinity of a badger sett.

Monitoring

The use of the Campus by badgers can be monitored by an ecologist and typically involves searching for field signs such as paths, hairs and latrines. In addition, the status of the setts on Campus can be monitored by an experienced ecologist to check whether they are currently in use and establish if they are main, subsidiary, annexe or satellite setts.

BATS

Introduction

There are 16 native species of bats in the UK, which is more than any other group of mammal. Throughout the UK, bat populations have declined dramatically in recent years. Six of the native species of bat have been identified as needing special conservation effort and have Species Action Plans as part of the UK BAP. Bats feed exclusively on insects and the main cause of their decline is changes in agricultural practices. The loss of hedgerows and ponds, and the disappearance of woodland habitats, including old trees have resulted in fewer insects being available for foraging bats.

National and Regional Status

All bat species are protected in accordance with Schedule 5 of the Wildlife and Countryside Act (1981, as amended). This protection extends to both the species and roost sites. Likewise, bat roosts are protected at all times of the year, regardless of whether bats are present at the time. In addition, all bat species are also listed under Annexe II of the European Union Habitats and Species Directive (No. 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora).

The pipistrelle bat is a UK BAP Priority Species. While still the most abundant and widespread species in the UK, it is thought to have undergone a significant decline in numbers this century. It is the smallest of the European bats and utilises a variety of habitats including open woodland, parks, marshes, farms and other urban areas. It roosts in buildings, bat boxes and trees and hibernates between mid November and April.

In addition the Barbastelle bat, Bechstein bat, Greater Mouse-eared bat (currently extinct in the UK), Greater Horseshoe bat and Lesser Horseshoe bat are also UK BAP Priority species.

11 of the 16 species resident in the British Isles can be found in the Leicestershire and Rutland region, with 7 species being recorded in Loughborough itself³ In line with the rest of the UK, all species are becoming increasingly rare.

Current status, extent and condition on Campus

Interrogation of the National Biodiversity Network web-site showed records of pipistrelle *Pipistrellus sp.* and whiskered bat *Myotis sp.* within 3km of the Campus, although these records are over 10 years old.

On the Campus, there are potential foraging and roosting opportunities for bats and their presence is highly likely.

³ Source Leicestershire & Rutland Wildlife Trust / Leicestershire & Rutland bat group

Bats need sites that are within the vicinity of habitats that produce a large number of insects such as woodland, scrub, wetlands and waterways. The Campus environment can provide suitable conditions for:

- feeding (woodland and grassland , ditches and ponds provide insect food sources);
- linking flyways (e.g. hedgerows) between roosts and other feeding areas; and,
- roost sites (potentially in trees, structures, or buildings).

Factors affecting the species

The use of chemical treatments on the site may reduce the number of insect prey for foraging bats. The lighting used on site may also have an influence on the social and foraging behaviour of bat species. For example, continuous lighting along roads may create barriers that bat species do not cross. Daubenton's bats will alter their flight paths to avoid crossing street lights. In contrast pipistrelle bats will swarm around street lights, feeding on the insects attracted to the light. Daubenton's are more likely to use the more sheltered aquatic habitats for foraging.

Flight lines that bats follow to and from feeding areas and roosts may also be fragmented or interrupted through the loss of habitat links provided by vegetated areas known as 'green corridors'.

Action plan objectives and targets

- Gather baseline data to determine the use of the Campus by bats and identify important features.
- To increase the usage of the site by bats for foraging.
- To create suitable roost opportunities to encourage usage of the site by roosting bats.
- To encourage use of the site by a greater number of bat species, by creating favoured habitats for certain species (e.g. sheltered waters which are not subject to excessive disturbance are the favoured feeding habitat for Daubenton's).

Proposed action to meet targets

- Undertake a bat survey following Bat Conservation Trust survey methodologies.
- Maintain habitat corridors and linear features on site which are utilised by bats, such as Burleigh Brook and the hedgerows which act as wildlife corridors and are used by bats to link foraging and roost areas.
- Erect bat boxes in the woodland areas and on selected buildings to encourage use of the site by roosting bats. Bat roosting opportunities could also be incorporated into any new developments on the Campus.

Monitoring

The presence of bat roosts can be confirmed by an experienced ecologist and may involve a dusk emergence survey using an ultrasonic bat detector. Signs of roosting bats may be indicated by one or more of the following:

- Staining beneath or around a hole caused by the natural oils in bat fur.
- Scratch marks around a hole caused by bat claws.
- Bat droppings beneath a hole, or resting area.
- Bat droppings and/or insect remains beneath a feeding area.
- Audible squeaking from within the hole, especially on hot days or at dusk.
- Insects (especially flies) around a hole.
- Dead bats - usually young from a nursery roost site.

Counts of bats along fixed transects at regular intervals can be carried out on an annual basis. This will allow the status of the bat population, and the way in which bats use the Campus, to be determined and, over the long-term, will show any effects of management practices on the bat population.

BIRDS

Introduction

The habitats on Campus provide birds with both feeding and nesting opportunities, and both Holywell and Burleigh woods support healthy bird populations. The presence of a variety of bird species around the Campus undoubtedly enhances the environment, and simple measures can encourage birds to utilise the Campus.

National and Regional Status

Under the Wildlife & Countryside Act 1981 (as amended) all wild birds, their nest and eggs are protected by law. Under this legislation it is an offence to:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while it is in use or being built;
- Take or destroy the egg of any wild bird.

Birds in the UK are split into three categories of conservation concern – red, amber and green. Those species on the red list are of the highest conservation priority and urgent action may be required for some species. The amber list identifies the next critical group of species, followed by the green list.

Current status, extent and condition on Campus

Over 23 bird species have previously been recorded on the Campus (Loughborough University Wildlife Strategy, 1994) including the red listed yellowhammer *Emberiza citronella*; fieldfare *Turdus pilaris*, redwing *Turdus iliacus* and a healthy bird population exists in the adjacent Holywell and Burleigh Woods.

Factors affecting the species

A range of factors can affect the bird population including felling and / or lack of woodland management; loss of hedgerows and fragmentation of breeding sites and loss of good foraging habitat.

Action plan objectives and targets

To encourage birds to use the Campus for nesting and feeding by providing a range of suitable habitats such as grass swards, hedgerows and woodland.

Proposed action to meet targets

- Incorporate native seed and berry bearing plants and shrubs into any planting regimes associated with new developments.
- Selective thinning of woodland areas to create open glades.
- Erect additional bird boxes in the woodland areas. A target of 100 bird boxes is realistic within the five-year timeframe of this plan.
- Launch a 'Birds on your Campus' event to encourage students to participate in RSPB campaigns such as the spring Garden Bird Survey.
- Avoid carrying out tree and hedge work during the bird nesting season (generally March – August inclusive). If works are necessary, checks should be made for nests by an experienced ecologist before work starts.

Monitoring

The woodland areas should be monitored for the presence of breeding birds so annual comparisons of numbers and species can be made. Bird box usage should be monitored annually by an experienced ecologist.

GREAT CRESTED NEWT

National status and regional status

The great crested newt *Triturus cristatus* is an internationally important species. It is listed in Annexes II and IV of the EC Habitats Directive and Appendix II of the Bern Convention. It is protected under Schedule 2 of the Conservation (Natural Habitats, etc) Regulations 1994 (Regulation 8) and Schedule 5 of the Wildlife and Countryside Act 1981. In Section 9(4) of the Wildlife and Countryside Act it is stated that it is an offence to intentionally damage, destroy or obstruct access to any structure or place which these species use for shelter or protection.

The great crested newt is a UK BAP priority species and is widespread throughout much of England and Wales, but occurs only sparsely in south-west England, mid Wales and Scotland.

Current status, extent and condition on Campus

There are no records of great crested newt on Campus. Interrogation of the National Biodiversity Network web-site showed the closest record to be 3 km away, however this record is over 10 years old.

The ponds to the south of Oakwood Drive and in Butler Court both have some potential to support great crested newt and have available terrestrial habitat in the vicinity.

Factors affecting the species

Despite their protected status the breeding ponds of the great crested newt and surrounding terrestrial habitats are still being lost or fragmented, often caused by development. Sites are also threatened by water-borne pollution from industry and roads and a decline in the value of breeding ponds through neglect, insensitive management and natural succession are further threats. Park-style maintenance of terrestrial habitats for example through 'amenity' mowing regimes renders terrestrial habitat unsuitable and hinders dispersal. Fish stocking also threatens the viability of populations.

Action plan objectives and targets

- Establish great crested newt presence/ absence on Campus.
- Maintain the variety of favourable habitats on Campus, particularly the ponds at Oakwood Drive and Butler Court and associated terrestrial habitat.
- Maintain connectivity between suitable ponds and terrestrial habitat by avoiding amenity mowing around the ponds and leaving strips of longer vegetation between the ponds and terrestrial habitat.

Proposed action to meet targets

- Commission a licensed ecologist to undertake gcn surveys of suitable ponds.
- Ongoing maintenance of the ponds, particularly reducing shading from overhanging trees.
- Increase the availability hibernacula on the Campus by, for example, creating log piles after any tree maintenance works.

Monitoring

Should great crested newt be present, or attracted to the Campus, the population can be monitored by a licensed ecologist. This will involve the standard survey techniques of torching, egg searches and bottle trapping.

5 CONCLUSION

Biodiversity enhancement in harmony with the academic, recreational and sustainability aims of the University is the major aim of the development of a Biodiversity Action Plan for the Campus. Work undertaken on the species and associated habitats described in this BAP will have wider benefits for a much greater number of related species.

The Loughborough University Campus is a continuously evolving wildlife resource. All targets suggested in the Biodiversity Action Plan should be readily achievable given the favourable starting point and will develop the Campus as a valuable wildlife habitat in the local and regional context. Regular review of objectives and achievements will allow continuous improvement and a wider awareness by all who use the Campus of the biodiversity interest on the site.

It is anticipated that the document will continue to aid the promotion of a continued fusion between the aesthetic landscape characteristics of the Campus and its increasing biodiversity value, resulting in a desirable and rewarding learning and working environment as well as a valuable ecological resource. The success of the enhancement measures and the forward thinking approach to ecological issues on the Campus will position Loughborough University as an outstanding example of the biodiversity gains that can be achieved for a site such as this.