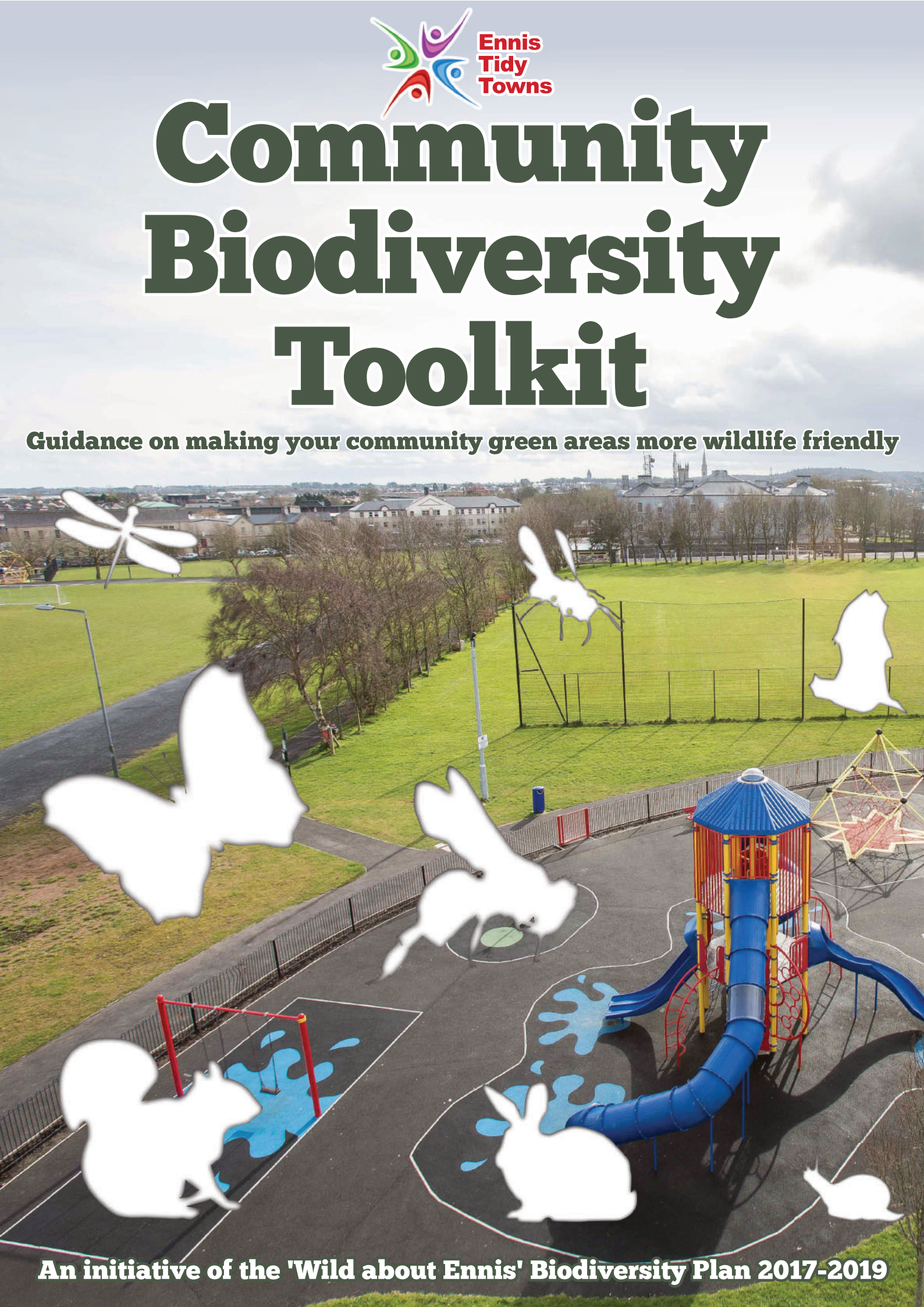
Ennis Tidy Towns

Community Biodiversity Toolkit

Guidance on making your community green areas more wildlife friendly



An initiative of the 'Wild about Ennis' Biodiversity Plan 2017-2019

Photo: Frances Giaquinto

'Look after the small and the big will look after themselves'

This document was researched and prepared by Dr Frances Giaquinto MCIEEM, Ecological Research & Practice, in consultation with Ennis Tidy Towns

COMHAIRLE CONTAE AN CHLÁIR | CLARE COUNTY COUNCIL

Roinn Cumarsáide, Gníomhaithe ar son na hAeráide & Comhshaoil
Department of Communications, Climate Action & Environment

GREENER CLARE

Part financed by Clare County Council and the Department of Community, Climate Action & Environment under Local Agenda 21 Partnership funding

CONTENTS

WELCOME NOTE

Ennis Tidy Towns are delighted to present this toolkit, an action of the 'Wild about Ennis' Biodiversity Plan 2017-2019. As a local, community-led environmental organisation we are mindful that people need guidance to help promote and protect the wildlife in and around our town. This was part of the feedback from our Biodiversity Plan and Three Year Plan process. With this in mind we sought to develop clear, concise, and practical guidance for both ourselves and interested parties.

The primary aim of this toolkit is to provide easy-to-follow guidelines for organisations, community groups, and residents' associations to manage and enhance the biodiversity of their local communal green spaces. It uses three case studies, including a GAA pitch, a well-established park used by a wide range of age groups, and a green space in the heart of a housing estate, to illustrate step by step the actions to take which will attract a rich diversity of species to green areas in urban settings.

Just like people, plants and animals want to live and flourish, and most can quickly adapt to less than perfect conditions as long as the essentials of access to food, access to water, protection from predators, and a safe place to rear their young are available. Traditionally, urban spaces have been created and managed to suit people and there has been a tendency to forget that people cannot thrive without the support of their 'natural' environment – clean air to breathe, clean water which can replenish itself, plants and animals as food. Now, the tide has turned and people all over the world are encouraging wildness back into their environments and managing green spaces in such a way that every living creature can flourish side by side.

The toolkit is divided into two main sections. The first provides an introduction to biodiversity management, explaining what biodiversity is and the main principles of management to enhance and sustain it. The second section goes through each case study in detail, showing you how to 'read' a green space for its biodiversity and the steps you can take to enhance it.

We would like to thank Clare County Council and The Department of Community, Climate Action & Environment for partial funding of this project under Local Agenda 21 Partnership funding. In addition, this would not have been possible without the dedication and hard work of our committee and project consultants, Dr Frances Giaquinto MCIEEM of Ecological Research and Practice, and Ruth Minogue of Minogue & Associates.

Most importantly, we would like to acknowledge and thank the involvement of our three case study groups who gave of their time to ensure this was a fit-for-purpose document.

We hope you find this toolkit both informative and useful.

Cormac McCarthy

Cormac McCarthy
Chairman of Ennis Tidy Towns

EXPLANATION OF TERMS

Associated species	Animals and plants do not live in isolation, but depend on others for their survival. A species that is known to interact closely with another species, or rely on it for some part of its life cycle, is known as 'associated'. See 'obligate'.
Biodiversity	The term biodiversity (biological diversity) was coined at the Convention on Biological Diversity in 1992. It is defined as the total number of species and types of organisms living on the planet, combined with the environments in which they live, and the interactions formed within and between species.
Climate change abatement	All European countries are required by law to take action to minimise carbon dioxide emissions in an effort to reduce the speed with which climate change is taking place. Abatement means the measures that a country, region, or local community takes to offset climate change. The Irish Government has a major reforestation programme underway because tracts of forest can absorb large quantities of harmful carbon dioxide and release oxygen, which is essential for our survival.
Ecosystem	A biological community of interacting organisms and their physical environment.
Ecosystem services	The many and varied benefits that humans freely gain from the natural environment and from properly-functioning ecosystems. Ecosystem services are grouped into four broad categories: provisioning, such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and oxygen production; and cultural, such as spiritual and recreational benefits. Many ecosystem services are assigned economic values to help inform decision-makers.
Green infrastructure	Green Infrastructure (GI) is based on the principle that 'protecting and enhancing nature and natural processes […] are consciously integrated into spatial planning and territorial development'. Accordingly, the Green Infrastructure Strategy defines GI as 'a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services' in both rural and urban settings (EC, 2013a).
Habitat	The place where a plant or animal normally lives and grows.
Microhabitat	A microhabitat is a small habitat, perhaps just a few centimetres in diameter, which is different from other habitats in the immediate locality.
Natural Capital	Natural capital can be defined as the world's stocks of natural assets which include geology, soil, air, water, and all living things. It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible.
Naturalised	Sycamore and fuschia are examples of plant species that are not native, but they have naturalised in Ireland; i.e., they have become well established but they are not overly damaging the environment.

EXPLANATION OF TERMS (CONT)

Obligate species	The complete dependency on another species for survival is known as 'obligate'. For example, a lichen is not a single organism, but it is formed by the obligate relationship between a fungus and a blue green alga. They are so tightly knit as to appear to be one functioning organism and cannot live independently.
Rhizome	Many plants produce rhizomes, which are underground stems that can form extensive, underground root-like networks. Rhizomes are frequently more tenacious than roots. Many seriously invasive plants, such as the knotweeds, winter heliotrope, and bracken rely on their rhizome systems to disperse rapidly.
Wildlife	Animals (and sometimes plants) that live wild in an area without being introduced and managed by humans.

ABBREVIATIONS

BAP	Biodiversity Action Plan
CBD	Convention on Biological Diversity, 1992
IAS	Invasive Alien Species
NBDC	National Biological Data Centre
NPWS	National Parks and Wildlife Service

1. INTRODUCTION

Ennis Tidy Towns sought to develop a practical and inclusive toolkit and guide for organisations and community groups to enhance the biodiversity value of green spaces.
The proposal had education and awareness-raising at its core, with the aim of empowering local communities to view recreational spaces in a fresh light so that issues of habitat loss and fragmentation, loss of biodiversity, and climate change can be effectively addressed in urban settings.

The toolkit uses case studies to showcase how biodiversity enhancement of green spaces can be achieved.
This document sets out case studies for three green spaces in Ennis: the Banner GAA grounds in Shanaway Road, a residential green area in Dalcassian Park, and Tim Smythe Park (the Fairgreen), a well-maintained Green Flag accredited public park with sports facilities and two playgrounds.

1.1 Background

In 2017, Ennis Tidy Towns launched their 'Wild about Ennis' Biodiversity Plan to promote biodiversity in the many wildlife habitats in the area. The case studies presented in this report contribute to the actions stated in the National Biodiversity Action Plan 2017–2024, and the Clare Biodiversity Action Plan 2017–2023.
The aims of the case studies are to:

- Identify measures to enhance biodiversity and recommend practical, achievable measures to enhance the natural heritage and natural capital of the three sites.

- Provide detailed, evidence-based recommendations for habitat and biodiversity management.

- Recommend tools for raising awareness and education, including the use of interpretative signage and materials, topics for workshops, citizen science projects, and opportunities for volunteering.

- Recommend measures for climate change abatement and enhancement of specific ecosystem services.

1.2 Habitat types

Traditionally, people have regarded most biodiversity as existing in the 'countryside' and not in urban areas, but green spaces (parks, road verges, sports pitches, running tracks, walk-ways, and urban planting schemes) can provide important havens for wildlife, and they form an essential component of the natural capital of Ennis, the network of habitats where ecosystem services are provided. With thoughtful and well-planned biodiversity management, these green sites can make a substantial contribution towards safeguarding and enhancing biodiversity, raising awareness about its importance, offering opportunities for citizen science and education, connecting people with their natural heritage, and providing aesthetically pleasing and functional recreational spaces.

The three case studies cover typical urban green areas, including the Banner GAA grounds which is located on the western edge of Ennis; Dalcassian Park which is an open green area in one of the residential estates in the centre of town, and Tim Smythe Park, a well-managed and well-established park with sports facilities, near to the town centre and backing onto school grounds.

1.3 International framework

IN 1992, the international Convention on Biological Diversity (CBD), held in Brazil, defined biodiversity as a combination of ecosystem structure and function, as well as its components, such as species and habitats. In other words, biodiversity means the number and types of species that are found across the world, as well as the complex, dynamic environments and networks in which they live. This network is sometimes known as the 'web of life'.

Increasingly, biodiversity planners are looking through the lens of ecosystem services, the term used to describe the many and varied benefits that humans freely gain from the natural environment. Ecosystem services include the pollination of food crops and native plants by insects, carbon sequestration by trees, bogs, and grasslands, nutrient cycling, natural control of diseases, and the recreational and spiritual values of the countryside. In other words, cultural, social, and economic values must be considered in biodiversity management.

Biodiversity and wildlife are not the same thing. The traditional focus on the protection of threatened species conflicts with the principles of biodiversity management because, by the time species become threatened, the processes that maintain biodiversity are already compromised. Individual species are also regarded as generally poor indicators of biodiversity when it comes to actual planning. The connections between organisms is often a much better way to assess the healthy functioning of an ecosystem.

2. BIODIVERSITY MANAGEMENT PRINCIPLES AND APPROACHES

The case studies of the three sites have adopted the following management principles and approaches:

2.1 Favour native plant species

It is commonly believed that a plant (or a tree) is just an individual organism growing in a particular habitat, but this could not be further from the truth. All plants and, indeed, all living organisms live in association with others, and often these relationships may be very tight knit. For example, our native common ash tree (Fraxinus excelsior), which has grown in Ireland since before the last ice age, has 1028 associated species which spend at least part of their life cycles in or on ash trees, including birds, insects, invertebrates, small mammals, lichens, plants, and fungi. Forty percent (400 species) are obligate; i.e., they cannot survive without their ash host. Ash and its associated species have evolved together over thousands of years.

Non-native plants have become established in Ireland relatively recently, and they generally arrive without the many species that have evolved with them in their home country, including their natural predators. For this reason, non-native plant species tend to have far lower levels of biodiversity associated with them compared to native plants, and this is the reason why native plants are favoured over non-native in biodiversity planning. Also, it is beneficial to obtain plants that have been grown from local genetic stock. There are several tree nurseries in County Clare which supply trees and woody shrubs sourced from local seed.

The relationship between plants and other organisms is best illustrated by pollinators. The first record of insect pollination is dated 100 million years ago and, today, more than 80% of plant species rely on insects to transport pollen from male to female flowers. Often the relationship is very specific. For example, the EU protected marsh fritillary butterfly uses devil's bit scabious to lay its eggs and as a food source, so if we want to enhance the population of the butterfly, we need to do it in an area where devils bit scabious can thrive.

Plant communities are very like people communities. For instance, there is a huge variation in location preference, some like to grow by the sea and others in the woods. Some are opportunistic and dominating and some are very shy and fragile. Over time, communities of different species become established and a dynamic relationship is established one to another, based on tolerance, preference, and 'lifestyle'. Some plants can adapt to a wide variety of environmental conditions; others have specific needs which confine them to small and special niches where they can escape the competition. This is what is meant by the term, ecosystem, the variety and web of interconnecting organisms living in dynamic relationship with one another, and it is this that good biodiversity planning aims to re-establish and sustain.

2.1.2 Exceptions to favouring native species

There are times when non-native species may be appropriate. Beech is naturalised (i.e., not native, but here for a long time); yet, a beech hedge can provide a richly biodiverse habitat and a safe haven for nesting birds and small mammals. So, removing a beech hedge in order to replant with native species would not normally be a priority in biodiversity planning.

Non-native species can be sources of pollen, but often they can become pollinator thieves. Buddleja (Buddleia davidii) is an example of a pollinator thief. Its profuse flowers attract many pollinators, and there is a risk that native species nearby will be ignored and not pollinated. Therefore, it is always be preferable to use native Irish species.

2.2 Least interference

When considering the management of a site for its biodiversity, it can be helpful to remember that nature knows best, and observation and knowledge are our most effective tools. In biodiversity planning, we want to achieve flourishing, ecologically intact habitats which restore themselves with low levels of management input.

If a habitat can be maintained on a low budget it has a chance of flourishing through all the vagaries of economic upturns and downturns. So, it is often best to interfere as little as possible and start out as we mean to finish, allow nature to run her course, and intervene only when it is necessary.

2.3 Natural succession

All habitats go through natural vegetation changes without people intervention. Grassland, left to its own devices, will change into scrub, then scrub and trees and, finally, into mature woodland. Over a much longer time period, wetlands will also succeed to woodland. This natural process of succession can be considered in biodiversity planning and a decision came be made: do we maintain grassland, as grassland, or do we manage it through its natural succession? Either approach can yield rich, but different biodiversity.

The one exception would be wetlands in County Clare. These unique habitats, which have European importance, are vital habitats for migrating birds, but they are being rapidly lost because of drainage and other land management practices. Therefore, if you are fortunate enough to be set the task of managing an area of wetland for its biodiversity, focus on maintaining it as such.

2.3 Chemical free

A core biodiversity management principle is to remain chemical free. However, when herbicides and pesticides are used judiciously in a targeted manner for a specific reason, they can be beneficial and they can solve a difficult problem. However, careless use can lead to lethal damage to surrounding flora and fauna along with contamination of soil and water courses and a risk to public health.

Generally, good management means that herbicides and pesticides are not necessary; however, there are situations when application for a specific purpose is safer for the environment than other options that might be available. Removal of non-native invasive alien species (IAS) is an example (Section 2.4.5) where herbicide use can be the least harmful option.

2.3.1 If you plan to use chemical control

A core biodiversity management principle is to remain chemical free. However, when herbicides and pesticides are used judiciously in a targeted manner for a specific reason, they can be beneficial and they can solve a difficult problem. However, careless use can lead to lethal damage to surrounding flora and fauna along with contamination of soil and water courses and a risk to public health.

Generally, good management means that herbicides and pesticides are not necessary; however, there are situations when application for a specific purpose is safer for the environment than other options that might be available. Removal of non-native invasive alien species (IAS) is an example (Section 2.4.5) where herbicide use can be the least harmful option.

2.4 Management of vegetation

2.4.1 Hedgerows

People have evolved alongside hedgerows for hundreds of years and, with a skilled eye, hedgerows can yield rich stories of land boundaries and land management practices throughout history. A recent study estimated that 90% of biodiversity in Scotland occurs in its hedgerows, providing home for many species, nesting sites for birds, bats and small mammals, nectar for pollinators, niche habitats for wild flowers, and nuts and berries as food for birds, insects, and mammals.

Hedgerows also represent edges where two environments meet, and these meeting places can be local biodiversity hotspots, as one habitat with its particular range of species and environmental conditions meets another habitat containing a different community and different microclimate.

In recognition of the important wildlife value of hedgerows, the (amended) Wildlife Act of 1976 makes it an offence to cut hedges between 1st March and 31st August to protect nesting birds.

There are some excellent resources on hedgerow management, including the well-presented and accessible guide by Hedgelink[1].

Good advice can also be sourced from Teagasc (2009)[2], and the Heritage Council[3].

2.4.2 Trees

A Europe-wide land survey in 2012 estimated that Ireland has only 13% cover of woodland, the lowest in Europe. The Irish Government has a long-term policy of planting more trees as a climate change abatement measure. In the meanwhile, the safeguarding and enhancement of our tree habitats are critical, be they hedgerow or woodland, and it represents a priority in vegetation management for biodiversity.

Over the last ten years, there has been an explosion of microbial tree pests arriving in Europe, including Ireland and the UK. Ash dieback, a lethal disease of our common ash, is one example of a non-native invasive pathogen. There are several other tree diseases which have arrived in Ireland which pose a serious threat to our native and commercial woodlands. Management of tree habitats should include monitoring for disease with reporting to the Department of Forestry if disease is suspected.

WANT TO REPORT A SUSPECTED TREE DISEASE?
CALL 053 916 3400 OR 0761 064 415
EMAIL: FORESTRYINFO@AGRICULTURE.GOV.IE

1. *http://hedgelink.org.uk/cms/cms_content/files/30_complete_good_hedge_management_guide_leaflet.pdf*
2. *http://www.teagasc.ie/environment/Publications/Leaflets.asp.*
3. *http://www.heritagecouncil.ie/fileadmin/user_upload/Publications/Wildlife/hedge.pdf.*

2.4.3 Grassland management

Ireland is called the Emerald Isle for good reason. Almost two thirds of Ireland are covered by natural or agricultural grasslands. Grasslands are a managed habitat and, like hedgerows, reflect people's relationship with nature. If a grassland is abandoned and no longer grazed or mown, it will revert first to a rank habitat with encroaching brambles, coarse grasses, and bracken, then to scrub, and then to woodland.

Unimproved and semi-improved grasslands can make very rich habitats for biodiversity, and some readers will remember the gaily colourful meadows of the west of Ireland 40 years ago, ablaze with yellow rattle, corn cockle, vetches, poppies, and speedwell. Application of fertilisers, slurry, and re-seeding with tough rye grass has destroyed most of these old meadows with all their associated species richness. For this reason, restoring and enhancing grassland habitats represents an important component of many BAPs.

There are many types of grassland: upland, lowland, coastal, acid, neutral, calcareous, unimproved, semi-improved, and improved are the main categories. In Ennis many grasslands are present as road verges, grassed roundabouts, parklands and communal green spaces. It is usually possible to determine a grassland type by its location, underlying bedrock, soil type, and plant species present. For example, devils bit scabious, tormentil, and knapweeds are characteristic of unimproved lowland acid grassland, and wild thyme, common rockrose, harebell, marjoram and fine grasses, such as the delicate quaking grass, are characteristic of limestone grasslands (the Burren represents a fine example).

Regardless of the type of grassland, wild flowers with their associated pollinators, can be restored by two steps:

1. Cut less often, and only after flowers and wild grasses have set seed.

2. Remove the cut materials to prevent nutrients returning to the soil. Many wildflowers do best in poor soils where they don't have to compete with coarse grasses that thrive in nutrient-rich habitats.

In general, cutting regimes will determine the results. Here are some examples:

- Springtime wildflower meadow - Cut from mid-June onwards after spring flowering. Reps 3 states 15th June for traditional hay meadows[4].
- Summer wildflower meadow - Cut until mid-May then leave to flower. (NB: you may need to alter the timing of cutting depending on what part of the country you are in).
- Full season wildflower meadow - One cut in autumn (late September/October depending when seeds have set).
- Amenity grassland – Regular cutting throughout the growing season. This management method usually results in low species diversity as slower and larger growing plants are not given the opportunity to establish.

Wildflowers and bulbs can be grown or planted into existing grasslands to improve biodiversity. There are many commercially available wild flower-seed mixes of native plant species on the market. It is important to ensure that the species chosen come from a local source, they are suitable for the soil conditions of the site, and that any young plants or bulbs are not taken from the wild. These actions will help to increase the number of plant species present and will provide additional food sources for invertebrates and small mammals.

If appropriate, new microhabitats can be introduced to grassland areas. For example:

- Place large stones or boulders in suitable sunny areas, to provide sunny perching spots for butterflies and other invertebrate species. Letting the vegetation grow around the edges of these will provide additional habitat features.
- Logs from tree/ shrub pruning or felling can be cut into suitable lengths and strategically stacked in piles to create shade and habitat for amphibian, reptiles, invertebrate, fungi and lichens.

In public areas, there can sometimes be a perception that grasslands being managed as wildflower meadows look 'untidy' at certain times of the year. To create a more 'managed look', a BAP can include a regime of mowing a narrow strip around the edge and one or more narrow paths through the meadow. Interpretative signage will also help to communicate the benefits of the management regime.

4. *https://www.teagasc.ie/media/website/publications/2004/repsconferenceproceedings2004.pdf*

2.4.4 Ecological corridors

An ecological corridor is generally a linear habitat, such as a hedgerow or stream, which connects habitats that are at risk of being fragmented because of human activity. Sometimes, ecological corridors are perceived as a 'road' which allows populations of mammals, birds, bats, and other organisms to freely move along it, but it is more accurate to understand an ecological corridor as a series of microhabitats that are connected together.

2.5 What causes the loss of biodiversity?

Biodiversity loss means the decline of species in a habitat and the extinction of species. Loss of biodiversity means that nature's ecosystem services to people stops functioning well (no pollinators to pollinate our crops, no forests and grasslands to oxygenate the air and absorb carbon dioxide), and this leads to food security and pollution issues. The seriousness of the situation means that all individuals and groups are being called to protect and enhance their local biodiversity.

There are many reasons for the loss of biodiversity, including habitat fragmentation, destruction of forests, pollution, and human development. The two main reasons are climate change and invasive species.

2.5.1 Climate change

An undisturbed habitat can be seen as a 'city' of different creatures, all living together, having established over many years a specific relationship with one another, which may be friendly and helpful towards some neighbours and antagonistic towards others.

Everything changes constantly, but only within certain parameters, allowing each individual species to adapt and flourish. The community lives in a dynamic, constantly-shifting relationship which ultimately suits everyone.

Climate change disrupts this. Plants and animals have adapted to live within specific temperature ranges and, as the climate warms, many species are trying to move north. This is why ecological corridors are important because they provide routes where there is access to food and water. Extreme weather events lead to flooding, or extreme cold, or drought and, just like people, animals and plants can tolerate these extremes to a point, but then they succumb.

Land degradation is also a significant contributor to climate change. Deforestation, the destruction of wetlands and other forms of land conversion can release massive amounts of carbon into the atmosphere, which may accelerate the rate of change. Climate change can continue the cycle by thawing out frozen ecosystems, creating harsher conditions for vegetation to survive, and increasing the severity of storms and other natural disasters, which can damage natural landscapes.

2.5.2 Invasive species

Growing international trade and movements of people have resulted in the global movement of plants, micro-organisms, insects, and mammals. As described in Section 2.1, this transnational movement comes with huge risks, and there is growing concern about what are termed 'invasive alien species' (IAS) because of their impact on the environment. It is estimated that, globally, IAS are the second biggest cause of biodiversity loss next to climate change. Plant, animal, and microbial IAS bring disease, they spread very rapidly, they outcompete native vegetation by their rampant growth, they steal pollen from native plants, they silt up rivers and cause riverbank erosion, and some cost thousands of euros to control and eradicate.

Ash dieback disease, for example, is caused by a non-native fungal pathogen which may have originally come from Asia. It was first detected in Poland in 1992 and, by 2012, it had spread to 25 European countries. This is an unprecedented rate of dispersal for any organism. In County Clare, common ash makes up 35% of hedgerow trees and with few control measures in place it is likely that 95% of these will succumb to the lethal disease in the next 5-8 years.

Japanese knotweed (pictured) is an IAS that can cause infrastructural damage because of its tenacious underground rhizome system which can break through stone walls and tarmac. Japanese knotweed is regulated by European legislation, which makes it an offence to knowingly disperse it, so the onus is on landowners to safely dispose of it. But it's is not that easy to do.

There are now hundreds of animals, plants, fungal, and insect IAS which have arrived on Ireland's shores and some of them have become well established. Invasive plants are opportunistic and they will jump in to colonise any bare patch of soil. Making sure there is no bare soil available, and keeping habitats as natural and as intact as possible are the two best ways to protect a site from IAS incursion. This is one of the reasons why herbicide use is not helpful unless absolutely necessary. Foliar spraying tends to leave bare patches of soil where the native plant community has died. Almost immediately, weedy, tenacious species such as docks and ragwort jump in, followed by IAS.

Managing a site for its biodiversity should always include regular monitoring for invasive species. If they are found, there are three important actions to take:

- Don't disturb the infestation until you are sure that you know the best method to eradicate it.
- In a publicly accessible place, erect signage which explains that an IAS is present, and what is being done about it. Sometimes it may be beneficial to erect a temporary barrier around the plant, to encourage the public to leave the area undisturbed.
- Check the best method of control. Biodiversity Ireland[5] is an excellent resource, or speak to a specialist. Follow instructions. The wrong herbicide or the wrong dose at the wrong time of year can be ineffective, at best, and could make the problem much more difficult to solve. The Ennis Tidy Towns website has helpful information on how to use herbicides safely.

Some invasive species, like Japanese knotweed, are controlled by EU and national legislation. Others are not regulated; nevertheless, they can do much damage. The Ennis Tidy Towns website *(www.ennistidytowns.com)* has helpful information on the main legislation controlling IAS.

5. *www.biodiversityireland.ie/projects/invasive-species/*

2.5.2.1 Control of IAS

IAS can be very difficult and expensive to eradicate, particularly if they have been established in a habitat for several years or if they have been disturbed and dispersed. Here are the golden rules for effective control and eradication:

- Do not disturb it! Leave it alone and erect signage to warn the public and land managers to stay away. Often, the erection of a temporary barrier, which can be simple as a length of rope, can be helpful to isolate the plant. This is particularly important with rhizome-producing IAS, such as Japanese knotweed and winter heliotrope. If soil containing rhizomes of Japanese knotweed is disturbed, for example, the rhizomes may become fragmented and every tiny fragment 2 cm or larger is capable of regenerating into a new plant. This means that a single plant can rapidly become a major infestation if disturbed.
- Confirm its identification. The Biodiversity Ireland website is an excellent resource, or speak to a local invasive species specialist who should be able to confirm the ID from a photograph at no cost.
- Plan a control or an eradication programme, but speak to the experts first. A poorly-executed attempt at eradication can lead to a problem that is many-fold more serious.
- Follow instructions exactly if you decide to use chemical control. Different active ingredients are regulated for use against Japanese knotweed and other IAS. Although glyphosate has received extensive bad press, it remains the safest herbicide on the market when applied correctly, and it is the only ingredient registered for use with stem injection, and near water. Most other herbicides used against IAS herbicide contain triclopyr and fluroxypyr which can only be applied by foliar spraying. An example is Speedline Pro. Herbicides containing these active ingredients are many times more toxic than glyphosate to human health and the environment. They are stewardship products, meaning that they can be used only by suitably qualified professionals, and their purchase and use must be accurately documented.

2.6 Summary

- Biodiversity means the total number and variety of living organisms in the world combined with all the interactions between them, which is sometimes known as the 'web of life'.
- We need biodiversity, it is essential to human existence. The complex interactions between living things provide the plants and animals we use as food, oxygen to breathe, water, fertile soil, natural disease control, climate control, and the huge recreational, spiritual, and aesthetic value of the 'countryside'. Our dependency on biodiversity is commonly called nature's ecosystem services.
- We are facing a massive loss of biodiversity across the world, including Ireland (see www.ennistidy-towns.com). There are two main causes of biodiversity loss:

1. Climate change: most species are adapted to fairly specific climates, but everywhere the climate is changing and species, which can, are moving north. For example, it may soon become too warm in Ireland for beech trees to flourish.

2. Invasive species: invasive species outcompete native vegetation and prevent other species from becoming established. They also change the physical environment making it less suitable for native species. Some IAS cause disease, particularly the invasive fungal, bacterial, and insect pathogens that threaten our trees and food crops.

3. Other causes of biodiversity loss are habitat loss and fragmentation, land degradation, pollution, population growth and over-consumption, and the illegal wildlife trade.

- The best tools for biodiversity management planning are careful observation and taking a least-interference approach, in which we encourage nature's ways, but do not try to control it.
- Always use native species where possible, obtained from local genetic stock.
- Prioritise the management of hedgerows, stone walls, and grasslands.
- Adopt a chemical-free policy, using herbicides and pesticides only when absolutely necessary.

3. RESOURCES AND GUIDES FOR BIODIVERSITY PLANNING

All-Ireland Pollinator Plan - http://pollinators.ie/

The plan aims to bring people together to create an Ireland where pollinators can survive and thrive. Pollinator-friendly planting is an approach recommended by the All Ireland Pollinator Plan 2015–2020. This is an initiative of the National Biological Data Centre (NBDC) in response to the serious decline in pollinating insects in Ireland. The plan aims to address this decline and conserve pollination services which are crucial for the production of many of our crops and for the persistence of wildflowers in our landscape.

National Biodiversity Indicators - https://indicators.biodiversityireland.ie/

The plan aims to bring people together to create an Ireland where pollinators can survive and thrive. Pollinator-friendly planting is an approach recommended by the All Ireland Pollinator Plan 2015–2020. This is an initiative of the National Biological Data Centre (NBDC) in response to the serious decline in pollinating insects in Ireland. The plan aims to address this decline and conserve pollination services which are crucial for the production of many of our crops and for the persistence of wildflowers in our landscape.

Biodiversity maps - https://maps.biodiversityireland.ie/

An excellent resource and tool from the NBDC which includes interactive maps to discover which species have been recorded in 1 km, 2 km and 10 km grids throughout Ireland. This is the website to go to if you are interested in the species that live in your area.

Biodiversity recording - http://www.biodiversityireland.ie/record-biodiversity/

NBDC provides access to all validated biodiversity data, the on-line biodiversity data portal (see above).
A new smartphone app has been developed that allows quick and easy recording of biodiversity in the field. Biodiversity Data Capture app allows recorders to capture details of any species they encounter in the field, and send the records directly to NBDC's national database. The app generates a co-ordinate automatically from a GPS, so recorders only need to select the identified species and some other additional information. Records can be sent immediately, or stored until reliable internet connection is available.
Biodiversity Data Capture is free of charge and is available for iOS and Android devices.

National Parks and Wildlife Service - www.npws.ie

Another excellent resource from the National Parks and Wildlife Service which provides interactive maps of all the EU and nationally protected habitats in Ireland. Use this site if you want to find your nearest conservation area.

European Union (Birds and Natural Habitats) Regulations 2011 to 2015 https://www.npws.ie/legislation/irish-law/eu-regulations

Makes it an offence to knowingly disperse or allow to escape species that are listed in the Third Schedule.

Invasive Alien Species of Union Concern Regulation (EU) 1143/2014 http://ec.europa.eu/environment/nature/invasivealien/list/index_en.htm

The species included on the Union list are subject to restrictions and measures set out in the Regulation. These include restrictions on keeping, importing, selling, breeding and growing. Member States are required to take action on pathways of unintentional introduction, take measures for early detection and rapid eradication of these species, and to manage species that are already widely spread in their territory.

Sustainable Use of Pesticides Directive - http://www.pcs.agriculture.gov.ie/sud/

The Sustainable Use of Pesticides Directive (SUD) establishes a framework for European Community action to achieve the sustainable use of pesticides by setting minimum rules to reduce the risks to human health and the environment that are associated with pesticide use. It also promotes the use of integrated pest management.
The Directive is designed to further enhance the high level of protection achieved through the entire regulatory system for pesticides.

Section 40 of the Wildlife Act 1976 as amended by the Wildlife (Amendment) Act 2000

These Acts stipulate that it is an offence to destroy vegetation on uncultivated land between the 1st March and the 31st August each year.
This includes the cutting of trees and hedgerows.

CASE STUDIES FOR BIODIVERSITY PLANNING

A two-winged fly pollinating a borage flower

4. BANNER GAA GROUNDS, SHANAWAY ROAD

4.1 Location

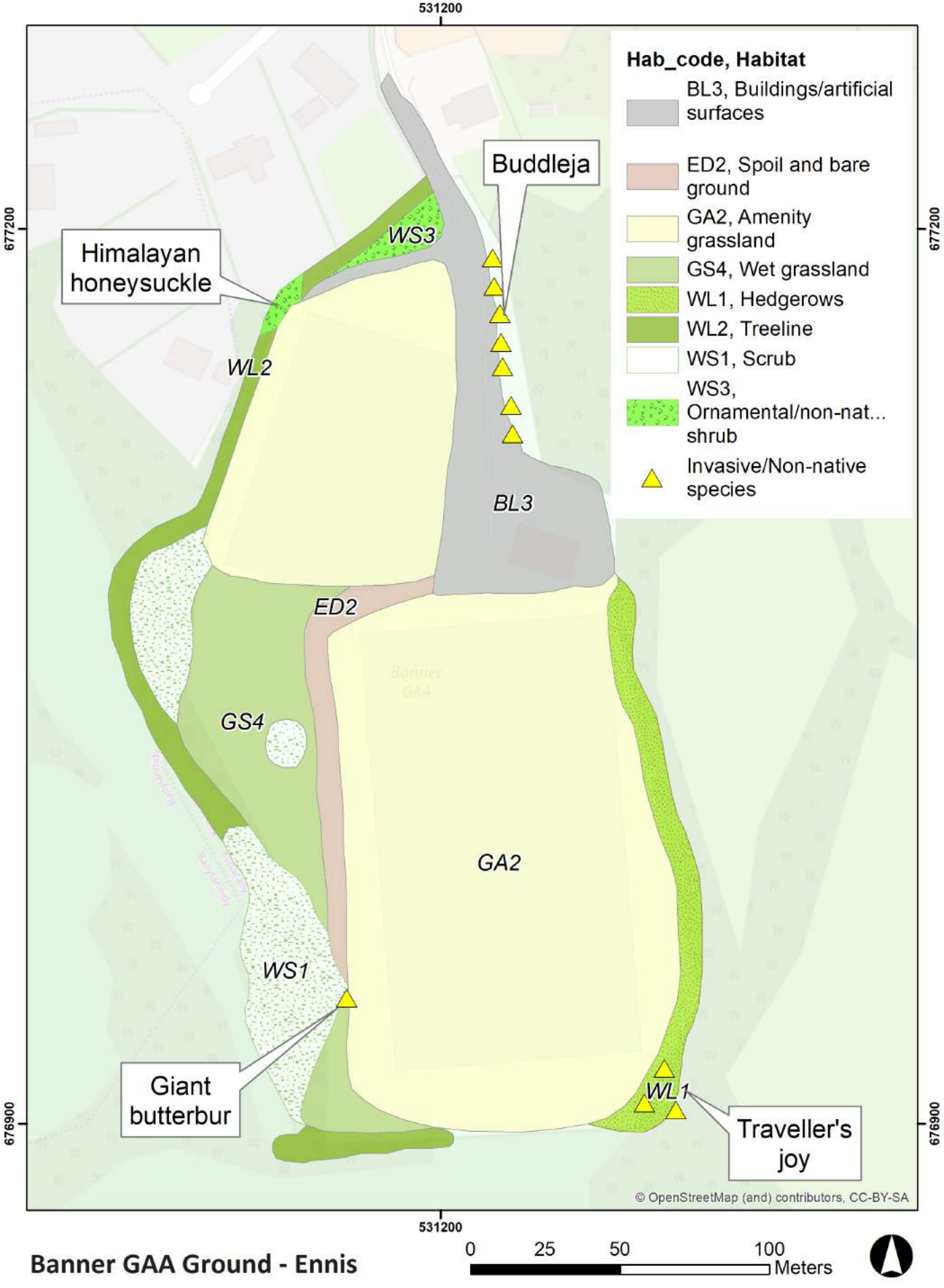
The Banner GAA grounds are located at the end of a quiet access road, approximately 2 km west of the outskirts of Ennis. There are a cluster of residential houses immediately north of the site, a golf course to the immediate west, and a landscape of grazed fields bounded by dense hedgerows to the south and east.

Figure 1 shows its location. A distinctive feature, which can be seen in the aerial view, is the extent of woodland that surround the Banner grounds to the south and east. Note, also, how these fragments of what would have once been continuous woodland are connected by dense and almost continuous hedgerows.

This is exciting to the biodiversity planner's eye because it means that the site is connected to ecological corridors, and its boundary hedgerows are joined to a wide swathe of other hedgerows which connect to the woodland areas. Also, the River Claureen is nearby, with all its associated wildlife. This means that a plan to enhance the biodiversity of the Banner GAA grounds can be achieved easily.

Figure 1 - Map showing continuous hedgerows and wooded areas around site

Figure 2 - Map showing Habitat vegetation map of Banner GAA ground



4.2 Habitat types

Figure 2 (opposite) shows the vegetation map of the Banner GAA grounds, based on the classification of Fossit[6]. The site is composed of two large GAA pitches, representing amenity grassland; an almost continuous hedgerow and treeline boundary (WL1, WL2); an area of unimproved, rank, wet grassland (GS4); some recolonising bare ground (ED3); two areas of scrub (WS1), and building with artificial surfaces (BL3). The yellow triangles in Fig. 2 represent IAS, which are Himalayan honeysuckle (*Leycesteria formosa*), Traveller's joy (*Clematis vitalba*), and Buddleja (*Buddleia davidii*).

4.2.1 Hedgerows and treelines

The hedgerows, which form the site boundary, have not been managed for many years and, in places, especially on the west boundary, the hedgerow has become a dense treeline. In other areas (e.g., to the left of the entrance road), the hedgerow is in a deteriorating state with dense encroachment by ivy, brambles, and Buddleja. On both the west and east boundaries, there is evidence of an old stone wall (Image 1) which has been encroached by species-rich woody shrubs. In the SE corner, the hedge is sporadic, and scrub and small trees within 10 metres of the boundary are densely covered with the invasive creeper, Traveller's joy (*Clematis vitalba*).

The south boundary is made up of chain-link fencing, without hedging, except for a dense row of planted, young oak trees extending for 30 metres from the SE corner. The west hedgerow boundary is overgrown, and consists almost entirely of hawthorn (*Crataegus monogyna*). These hedgerows represent species-rich habitats.

During site visits in the summer 2018 and in January 2019, there was evidence that the inner edge of the hedgerow boundary to the east and south is routinely treated with herbicide (Image 2). As described in Section 2.3.1, the ground layer within and around hedgerows can be biodiversity hotspots. The common practice of treating grass-hedgerow edges harm and disrupt the natural ground floral and faunal communities and microhabitats.

Table 1 - Species inventory of trees forming the Banner GAA boundary

Hawthorn	*Crataegus monogyna*
Blackthorn	*Prunus spinosa*
Hazel	*Corylus avellana*
Spindle	*Euonymus europaeus*
Common ash	*Fraxinus excelsior*
Sycamore	*Acer pseudoplatanus* *(can become invasive. Programme of felling is beneficial)*
Willow	*Salix sp.*
Elder	*Sambucus nigra*
Buddleja	*Buddleia davidii* *(invasive and best removed)*
Larch	*Larix decidua*
Oak	*Quercus petraea*

Image 1 - The east boundary hedgerow covers an old stone wall. A view to the adjacent property shows the extent of species-rich treelines and hedgerows in the area.

Image 2 - The south boundary has chain-link fencing. Herbicide has been applied along the inner edge here and elsewhere.

6. *http://heritagemaps.ie/documents/FossittClassification_HeritageMaps.pdf*

4.2.2 Grassland

The first steps in grassland restoration are to find out its history, how it has been previously managed, and its current nature conservation value. A detailed species inventory in the spring and summer will determine what type of management practice is best.

The species found in the grassland at the Banner grounds appear to resemble acid wet grassland which has become rank because it has not been managed. Species included devils bit scabious, sorrel, knapweeds, wild rose, and sphagnum. Towards the hedge boundary, there is a dense area of regenerating scrub, including a dense thicket of young blackthorn (*Prunus spinosa*) with wide swathes of encroaching bracken (*Pteridium aquilinum*) and brambles (*Rubus fruticosus*). It is growing on a shallow bedrock of limestone which is quite uneven in places, and may represent infill in some areas. If infill is confirmed, it will be important to systematically walk the grassland area and check for hazards that could damage grass cutting equipment or which may represent a public health hazard.

The process of restoration involves mowing in the winter months with a varying height cutting blade to safeguard the ground flora and to minimise the risk of harming invertebrate and amphibian populations. Less-mobile species can find refuge if some areas are left uncut. The timing of cutting to get the best biodiversity results will depend on the species list. This is explained in Section 2.4.3. It is important to remove cuttings to help prevent nutrients from returning to the system and to avoid the smothering of low-growing herbs and fine grasses. The woody scrub can be cut back by hand and mulched, being careful to contain all chippings in one place where it can be monitored.

4.2.3 Invasive species

A number of IAS are present in the Banner grounds (see Fig. 2).
These have been assessed by a specialist who recommends the following actions:

Image 3 - Traveller's joy ***(Clematis vitalba)***

This seriously-invasive creeper infests the SW boundary. Cut back all growth to about 30 cm from the ground, and incinerate the brush on a hard standing area on site with permission from Clare County Council. Paint the cut ends emerging from the ground with a suitable stump killer.

Image 4 - Buddleja *(Buddleia davidii)*

Infesting sections of the hedgerow, particularly near the GAA building.
Cut back growth to the stumps, and incinerate the brush on site with permission from Clare County Council. Paint the cut ends emerging from the ground with a suitable stump killer.
For Buddleja shrubs that are still standing, cut the flowers before they set seed, and incinerate.

Image 5 - Himalayan honeysuckle *(Leycesteria Formosa)*

Several plants were recorded in the NW corner of the GAA grounds.
Typically found on the edge of woodland and beside hedgerows, this invasive species is still being sold as an ornamental plant for gardens.
It can be eradicated by treating with herbicide applied by stem injection, as for Japanese knotweed.

Image 6. Giant butterbur *(Petasites japonicus)*

The SW edge of the site is composed of a rough slope covered with weedy perennials and shrubs. Giant butterbur was recorded on the slope (black arrow).
Giant butterbur is closely related to another invasive plant called winter heliotrope which is severely threatening Ireland's hedgerows and road verges because of its rampant growth.
If possible, excavate the infestation including the soil around it and bury at a depth of >1 metre.

BANNER GAA BIODIVERSITY ACTION PLAN

Image 7 - Treeline at Banner GAA grounds.

OBJECTIVE ONE	**Restore hedgerow and treeline habitats. Create ecological corridors which are harmonious with hedgerows and woodland on adjacent property.**
ACTION 1	Using a citizen science approach, conduct a detailed survey of the existing hedgerows and treeline. An excellent guide for assessing current hedgerow biodiversity has been prepared by the Organic Research Centre in the UK. You could also print out and use the leaf dial developed by the Woodland Trust and leverage support from players and supporters. A survey is best done between April and October.
ACTION 2	Consider inputting the recorded data at the National Biodiversity Data Centre (NBDC)
ACTION 3	Using the findings of the survey, identify microhabitats and areas of hedgerow that are particularly interesting from a biodiversity perspective and build a plan of restoration around them.
ACTION 4	The restoration plan can be phased over several years, with priority actions completed first. Table 2 describes the actions that can be taken. Decide on which actions are most important in year 1.
ACTION 5	Control and removal of invasive species are essential. Remove Buddleja, Traveller's joy, Giant butterbur, and Himalayan honeysuckle as described in Section 4.2.3.

OBJECTIVE TWO	Become chemical free and allow biodiversity to become established along hedgerow edges.
ACTION 6	Herbicide use can have a devastating effect on biodiversity, particularly around hedgerows and trees. Consider making a commitment to stop using herbicides unless it is absolutely necessary, particularly within 1 metre of the hedgerow boundaries.
ACTION 7	Regrowth may be rank with many opportunistic species, initially, but mowing once or twice a year with a high cutter blade followed by raking to remove cuttings will allow native wild perennials to become established. Interpretative signage can be effectively used to allay the public's concerns about the area appearing untidy in the first year.

Yellowhammer

The yellowhammer nests in the shrub layer or in the ground vegetation of hedgerows and feeds its young on invertebrates caught in grassy and flower -rich margins.
They seek refuge from predators and adverse weather in the shrubs, and use trees as song posts. In the winter, seeds in the field margins form a valuable part of their diet.

Marsh Fritillary Butterfly

The rare, European-protected Marsh fritillary butterfly feeds on devils bit scabious which was found at Banner GAA.

Table 2 Top management principles for restoration of the hedgerow[7]: Action 4

CONSIDER THE COMPLETE HEDGE AND ITS MICROHABITATS

Resist the temptation to think of the hedgerow as just a line of shrubs and trees. It does represent an ecological corridor, but it is much more than that. It is better, from a biodiversity perspective, to see it as a series of joined-up microhabitats with edge effects between habitats, each consisting of a community of flora and fauna. Mark the most interesting microhabitats you find so that landscapers and the public know not to disturb them. Studying and monitoring hedgerow microhabitats can make a fascinating citizen science project.

PROMOTE A JOINED-UP HEDGEROW LANDSCAPE

In your plan for hedgerow restoration, consider the hedgerows on adjacent property. The Banner GAA site is surrounded by dense, species rich hedgerows. Identify an area at the boundary where you can enhance the connection between the GAA hedgerow to a hedgerow on adjacent property.

It may require some clearing of undesirable vegetation such as brambles and ivy, and clearing out dead wood to create gaps for a replanting regime.

Use the same native species that already occur in the hedgerow and source saplings from local genetic stock.

REMOVE NON-NATIVE INVASIVE SPECIES

Buddleja, Himalayan honeysuckle, and Travellers joy infest the hedgerows. Buddleja can be manually cut out, but be careful to burn all brush as even small sections of branches can regenerate into new plants.

The Buddleja stumps can be treated with an herbicide stump killer. Please follow instructions exactly, it is particularly important to make sure you have the right herbicide dose.

Traveller's joy can be manually cut at the ground and as much of the aboveground growth removed as possible to free the trees it is suffocating.

A stump killer can be used to treat the basal cut ends.

ADOPT THE MANAGEMENT CYCLE

Adopt a management cycle which leads to good structural diversity with a mix of hedge heights to encourage birds. For example, whitethroats prefer short hedges (1.5 metres height), while bullfinches prefer taller ones (> 4 metres). Hedgelink has produced an excellent guide on hedgerow management.

KEEP THE SHRUB LAYER DENSE AND ALLOW SHRUBS TO FLOWER & FRUIT

Encourage the hedgerow to grow very dense right down to ground level by adopting good trimming practice. Trimming is best conducted on rotation, so divide the hedgerow boundary into sections for the rotation. Cut once every 3 years, raising the cutting height each time. Hedges that are cut every 3 years produce more than three times as many berries as those that are trimmed every year, and 40% more berries than those cut every 2 years. Raising the cutting height by 10-15 cm will increase the berry crop and improve overall health.

Do not cut during the breeding season (see *www.ennistidytowns.com* for legislation related to cutting hedgerows).

LOOK AFTER MATURE TREES AND ENCOURAGE NEW ONES

Scattered mature trees are of great importance to wildlife. For instance, our common ash, which forms 35% of hedgerow trees in County Clare, has 1028 species associated with it, who all depend on ash for at least some stage of their lifecycles.

Identify maturing, healthy trees in the hedgerow. Mark them out using interpretative signage and take appropriate action to ensure their health. This may include removal of ivy, and monitoring for disease.

ALLOW AND ENCOURAGE OUTGROWTHS

Clumps of brambles and wild roses with suckering blackthorn can form a soft edge between the hedgerow and the unimproved grassland at the west boundary, which will encourage many birds, butterflies and small mammals.

ENCOURAGE THICK BASAL VEGETATION

Encourage tussocky grass-rich growth to develop at the base of the hedgerow, so there's at least 1 metre of growth at the hedgerow edge. This can be achieved by discontinuing herbicide use, mowing after plants have set seed, and cutting out shading growth. Perennial herbs such as native hogweed, angelica and cow parsley are valuable to pollinators like hoverflies; woundworts, and knapweeds are important for bees, and fleabane and knapweed are loved by butterflies.

KEEP FERTILISERS & PESTICIDES AWAY FROM HEDGEROW BASES & EDGES

Fertilisers result in dense growth of cleavers, nettles, docks and other undesirable ground layer flora, and result in the loss of many flowers. Herbicides result in bare soil which is rapidly colonised by opportunistic and invasive species and leads to rank vegetation. Stay chemical-free as much as possible, and avoid practices that leave soil bare and exposed.

OBJECTIVE THREE	Restore and enhance area of acid grassland
ACTION 8	Mow before spring growth starts, using a mower with a high cutting blade. Rake up the cuttings as much as possible.
ACTION 9	Conduct a spring and summer inventory of the species found in the grassland, and decide on the management cycle that will be best suited to the grassland type. This will make an interesting citizen science project.
ACTION 10	Implement the management cycle.
ACTION 11	Erect interpretative signage to tell the story of the grassland, with images of plant and insect species that can be found. Involve the public in a monitoring scheme to identify what plant, insect, and butterfly species are found.

OBJECTIVE FOUR	Remove invasive species
ACTION 12	Please follow the guidelines given in Section 4.2.3.

[7] *www.hedgelink.org.uk*

OBJECTIVE FIVE	Restore vegetation to the bare soil slope beside the GAA pitch.
ACTION 13	A steep slope beside the GAA pitch has been kept free of vegetation by regular herbicide use. Allowing recolonization will support biodiversity and the resulting swathe of vegetation will be aesthetically pleasing. Agree to stop using herbicide and erect interpretative signage to explain that this is another project to enhance biodiversity of the Banner GAA grounds. Introduce a citizen science project to monitor the plants that colonise first, and carry out a selection process to remove fast-growing weed species, such as docks, to allow slower-growing species to become established. Over 3 or 4 seasons, a beautiful swathe of perennial native plants will become established. If this is too long, consider a scheme for planting with locally-sourced native plants suitable for the slope conditions.

OBJECTIVE SIX	Promote achievements and raise awareness
ACTION 14	Because the Banner GAA grounds are surrounded by species rich hedgerows, pastures, and woodland, biodiversity will quickly return. A citizen science project can be set up to compile all the information that is collected from inventorying and monitoring with the aim of producing a booklet to teach local residents and the public about the biodiversity project and what has been achieved. An interpretative poster could also be hung in the changing and meeting rooms.
ACTION 15	Promote the ground's rich biodiversity by giving talks on the wildlife of the Banner GAA grounds and the actions that are being taken to enhance biodiversity. Biodiversity Week is held in May every year and could be an ideal time to host a guided walk of the grounds.

5. DALCASSIAN PARK, ENNIS

5.1 Location

Dalcassian Park is a half-acre, amenity space in the well-established Dalcassian Park housing estate in Clonroad Beg, Ennis (Fig. 3). It is surrounded by quiet residential roads.

Figure 3 - Dalcassian Park

5.2 Habitat types

The park consists of amenity grassland which is favoured by dog walkers, and this has led to reduced use as a recreational area for children. A well-tended grotto is located in the SW corner, which is surrounded by planted shrubs, perennials, and some annual bedding plants, and cordoned off by metal railings. Over a dozen trees have been planted along the edge of the green space. The habitat vegetation map is shown in Fig. 4.

The success of biodiversity planning for a park of this kind will be largely dependent on balancing the recreational use with improvements for biodiversity. Involvement of the local residents and County Council, which manages the area will be important. A citizen science project can be organised to conduct a survey and hold a meeting in which residents can express their views. Their ideas could become a core part of the BAP. The objectives and actions described here are ideas that can be presented to residents to obtain their approval and interest, but there are many other possible projects, which they may suggest.

5.2.1 Amenity grassland

The amenity grassland can be enhanced for its biodiversity by planting native-stock daffodils and snowdrops near to the trees. Native Irish genetic stocks of snowdrops are commercially available and they can be purchased easily. They tend to flower for longer, and they are hardier than many commercial varieties.

There are two types of wild daffodil that would enhance biodiversity in the park: a traditional Irish cultivar, known as Narcissus Rip van Winkle, and the wild daffodil, sometimes known as the Lent lily. Both varieties readily naturalise. They are short-stalked and suffer less from wind and rain damage than newer commercial varieties. Interpretative signage can be erected to explain what makes these daffodils special. Both can be purchased in bulk[8].

Two benches could be installed near the bulbs so that residents can relax and enjoy their beauty.

5.2.2 Planting to enhance biodiversity

Currently, the park has hard edges which reduce its aesthetic value. Its appearance could be improved by planting an orchard of traditional apple varieties to create structure and soften the park's rectangular appearance. Residents can benefit from the beautiful spring blossoms; they can harvest the fruit; sit in their shade, and enjoy the biodiversity that will be quickly attracted to the trees. Urban orchards are being established in schools in Ireland with success. An excellent resource for the development of urban orchards has been developed by Garden of Eden Ireland and The Orchard Project which restores and plants orchards, and provides training, events, and practical advice on their website (*www.theorchardproject.co.uk*).

Image 8 - Creating community-based orchards rapidly attracts biodiversity to an area, and can be a great source of fun and learning for children and adults. *Reproduced from The Orchard Project website: https://www.theorchardproject.org.uk/what-we-do/project-a-celebration-of-orchards/*

5.2.3 Lichens and citizen science

Some of the trees have interesting lichens on their bark. These could create an exciting citizen science project to identify and monitor the lichens on the trees in Dalcassian Park and other trees and stone walls in Ennis, providing an opportunity to teach how lichens are used as pollution indicators.

8. *www.shiptonsbulbs.co.uk*

Figure 4 - Dalcassian Park habitat vegetation map

DALCASSIAN PARK BIODIVERSITY ACTION PLAN

Image 9 - Dalcassian Park Grotto

OBJECTIVE ONE	Enhance the use of the green space for all residents
ACTION 1	Install dog poop bins to make it safe for children to enjoy the green space. Erect interpretative signage, available from Ennis Tidy Towns, encouraging residents to use the bins for the benefit of all.
ACTION 2	Install benches to encourage residents to use and enjoy the green space. This would also be complementary to the Clare Age Friendly Strategy.

OBJECTIVE TWO	Become chemical free
ACTION 3	Agree with the Council to stop using herbicides, where appropriate, and maintain a chemical-free main green space for the benefit of residents and wildlife.

OBJECTIVE THREE	Enhance biodiversity
ACTION 4	Plant a copse of trees to soften the rectangular appearance of the park. A small orchard of 8-20 traditional hardy apple variety trees would create beauty in the spring, and provide a free source of fruit for local residents. Local residents might be encouraged to learn how to take care of the orchard for the benefit of all. The blossoms in spring will provide nectar for pollinators, and fallen apples will provide an autumn and winter food source for birds and invertebrates.
ACTION 5	Wild native bulbs (daffodils and snowdrops) can be planted in clusters to enhance the appeal of the park, and provide nectar and pollen for pollinators. Interpretative signage can be used to explain the value of native species over non-native commercial bulbs.
ACTION 6	The grotto in the SE corner with its associated planting is attractive and well-managed. The two conifers may require removal over time, and when this occurs, pollinator-friendly plants could be planted instead. For example, Tutsan (*Hypericum androsaemum*) is a beautiful native shrub with attractive flowers and berries, which requires very little management. Plants such as this can create structure and form, they are aesthetically pleasing, and they enhance biodiversity. Biodiversity can be substantially enhanced by planting calendula, borage, and other traditional annual plants, rather than F1 hybrid bedding plants which do not set seed. They can be as beautiful to look at and will become a hive of activity for bees and other pollinators. These traditional varieties can also be used in hanging baskets to beautiful effect.

Image 10 - Dalcassian Park, showing its trees.

OBJECTIVE FOUR	Engage local residents in taking care of their park
ACTION 7	A school-based citizen science project could be introduced to identify, monitor, and learn about the lichens on the trees in Dalcassian Park and elsewhere in Ennis. Lichens are a tool to 'read' a landscape, particularly as a method to detect air pollution.
ACTION 8	The success of the BAP will depend on active engagement by local residents. A survey and a forum to hear local residents' views may be a beneficial first step. With the incentive of a much more pleasing green space, attractive to all residents, some local people may be encouraged to form a volunteer group who can support Tidy Towns to achieve a green space that is vibrant, biodiversity-rich, and a model of good practice for biodiversity in this type of green space.

6. TIM SMYTHE PARK (THE FAIRGREEN)

6.1 Location

Tim Smythe Park, also known as the Fairgreen, has been actively redeveloped in recent years as part of the Active Ennis initiative. It offers a children's playground, a teen activity playground, an outdoor gym, pitches, and a 400-metre running track, along with pleasant, accessible green spaces, walkways, trees, and shrubs. Its location in the centre of town, close to schools, hospital services, and the court house means that it is used and enjoyed by a wide range of residents and visitors to the town.

Image 11 - A veteran London plane *(Platanus x hispanica)* at the boundary of Tim Smythe Park.

6.2 Habitat types

The Tidy Towns initiative has already taken action to enhance biodiversity, and public awareness of biodiversity, by planting a row of native trees, each of which has interpretative signage. Areas have also been managed for pollinators. Swift nest boxes have been erected on the outside wall of the court house facing the park. These actions represent an excellent start to enhancing and promoting biodiversity in this urban setting.

The park consists of the following habitat types (Fig. 5):

- A variety of native and non-native trees of mixed ages, including a veteran London Plane, shown in the image above, and a delightful small copse of native silver birch (Betula pendula) trees.
- Amenity grassland of generally low species diversity.
- Stonewalls at the boundary of the parks.
- Shrub borders.
- Dead trees, earth banks, and wilder unmanaged areas beneath trees.
- Running track and other amenity facilities.

Figure 5 - Habitat vegetation map of Tim Smythe Park (Fairgreen)

6.2.1 Trees

The park has a delightful combination of mature trees, such as the London Plane (assumed to be *Platanus x hispanica*) which sits magnificently on the west boundary; weeping birch (*Betula pendula 'Youngii'*) and a yew (*Taxus baccata*) on the east boundary. The line of planted native trees, each with its own interpretative signage, provides an excellent source of information, so that walkers can note the characteristics of each tree all through the seasons. Using the park to educate the public about trees would be an inspired BAP theme, and could include some of the following ideas.

- Name all the trees in the park, and provide interpretative signage about their history which can also act as an acknowledgement of how well the park has been managed and developed. A tree biodiversity trail could be created.
- Create interpretative signage to illustrate the biodiversity of different tree species. Appendix 1 illustrates the different biodiversity associated with different tree species. The web of life, the inter-connecting threads between all forms of life, is a fascinating subject which can quickly engage people and inspire fresh thinking about their local environments.
- Many native and ornamental trees in Ireland and elsewhere are threatened by non-native invasive fungal, insect, and bacterial diseases. It is becoming increasingly important to monitor trees for disease and to report it to the Department of Forestry should disease be found (Section 2.4.2). A citizen science project on the presence and threat of tree diseases in Ennis could be fascinating because it weaves together the topics of climate change and invasive species as the two main causes of loss of biodiversity.
- There are some dead standing trees in the park. Interpretative signage can be erected to explain the value of dead and decaying trees for biodiversity.
- The delightful silver birch copse can be used for interesting interpretative signage. Birch trees and their surroundings create a very interesting ecosystem, and signage can be used to teach about the succession of vegetation, soil improvement, mutually-beneficial interactions between organisms, and the benefits of birch trees to people.
- Native snowdrops and traditional or wild daffodils can be planted beneath the birch trees, which will lead to a pleasing effect. Information on wild bulbs is given in Section 5.2.1.
- Mature trees and treelines provide important feeding habitats for bats. Five bat species (Daubenton's, Soprano Pipistrelle, Pipistrelle, Lesser Horseshoe, and Brown long-eared) are recorded in a 2 km grid that contains Tim Smythe Park. An important theme for the BAP may be to enhance bat roosting sites, by carefully managing the trees and erecting bat boxes in appropriate locations.

Image 12 - A copse of silver birch trees (red arrow). Note the stone wall boundary, which could become a haven for wildlife with some careful management.

6.2.2 Amenity grassland

The amenity grassland has low species diversity, primarily because it is mown regularly which makes it pleasant for recreational users. An area of the park, such as shown in Image 10, could be left for wild flowers and grasses following the guidelines given in Section 2.4.3. The grassy area beneath the birch trees would be ideal for this.
There are other areas where groups of trees could be used to create a habitat of native perennials that naturally live in the shade of trees, such as native bluebells, celandine, and primroses. Interpretative signage can be erected to explain to park users the actions that are being taken to enhance the biodiversity and amenity value in the park.
A citizen science project could be delivered where participants monitor the changes in vegetation and associated insect life over two or three seasons.

Image 13 - The grassy verge beneath the trees will make an ideal area for reduced mowing, bulb planting, and encouragement of native annual and perennial plant species.

6.2.3 Stonewalls

The limestone boundary walls represent another important source of biodiversity, particularly for lichens, molluscs, spiders, beetles, and native plants, such as the rusty back fern (*Asplenium ceterach*). The outer edge of the NE boundary wall already has a range of species and these can be encouraged and enhanced by leaving the walls undisturbed without cleaning. Over time, more species will colonise and become established.

Image 14 - Stone walls in Tim Smythe Park.

6.2.4 Shrub borders

The shrub borders on the north boundary and elsewhere look tired. Trimming of native trees, such as hawthorn, into topiary has not enhanced their appearance and will prevent them from producing their soft white May flowers and red berries in autumn.

The borders are wide and well-proportioned and could become a haven for wildlife if the management approach is changed. Some ideas are:

- Stop trimming shrubs and trees into topiary and allow them to take on a more natural and pleasing form.
- Assess the existing plants in the shrub border, take out those which are not flourishing or have low biodiversity value, and plan for a replanting scheme with native and useful shrubs and plants. Tutsan (*Hypericum androsaemum*) is a delightful native shrub with yellow flowers and dark berries which attracts many pollinators.

Traditional varieties of Blackcurrants and redcurrant have attractive flowers, and the berries are loved by people, birds, small mammals, and insects. Native herbs, such as marjoram, attract bees and will establish in most soil conditions. The management of a native and traditional variety shrub border can attract hedgehogs if small piles of brush and logs are left on the ground to provide a shelter and nesting space. Planning for the shrub border could make an interesting project for Tidy Town groups.

Image 15 - Shrub border in Tim Smythe Park

6.2.5 Running track

There is a large amenity grassland area within the bounds of the running track, which could lend itself to a fenced-off and landscaped path for walkers with their dogs

TIM SMYTHE PARK BIODIVERSITY ACTION PLAN

Image 16 - Tim Smythe Park (The Fairgreen)

OBJECTIVE ONE	Enhance biodiversity associated with the trees
ACTION 1	Make use of the many interesting trees in the park to create a tree biodiversity trail. Consider the suggestions given in Section 6.2.1. A tree biodiversity trail can be used as an educational resource to help people distinguish between different tree species, and it can also be used to teach about climate change abatement, and the biodiversity associated with trees. Talks and workshops can be delivered to encourage park users to learn more about their local environment, the importance of nature's ecosystem services, and to establish Ennis-wide engagement in biodiversity activities.
ACTION 2	Use the space beneath the trees to plant wild bulbs and initiate a less frequent mowing regime to encourage native flowering annuals and perennials. Erect signage to explain the changed mowing regime to the public in order to allay fears about the park looking untidy.

OBJECTIVE TWO	Become chemical free
ACTION 3	Agree with the Council to reduce/stop using herbicides to encourage biodiversity.

OBJECTIVE THREE	Enhance biodiversity associated with the shrub border
ACTION 4	The shrub border is not working well aesthetically or for biodiversity purposes. Agree to stop the method of shrub pruning which is currently being used. Take out biodiversity-poor or otherwise unhealthy shrubs, and plan a replanting regime to create a biodiversity garden. This can include planting with native shrubs and perennials, traditional annual and perennial species such as calendula, and fruit bushes and trees.
ACTION 5	Wild native bulbs (daffodils and snowdrops) can be planted in clusters to enhance the appeal of the park, and provide nectar and pollen for pollinators. Interpretative signage can be used to explain the value of native species over non-native commercial bulbs.
ACTION 6	Remove sycamore. Sycamore is a naturalised tree species in Ireland, and it outcompetes other trees by its fast growth. Selective felling will be advantageous, including in the shrub border, and at the east boundary where sycamore trees are crowding out a veteran cedar tree. Sycamore saplings are also evident in the stone wall where they will cause damage; these should be removed.

OBJECTIVE FOUR	Engage local residents in taking care of their park
ACTION 7	A school-based citizen science project could be introduced to identify, monitor, and learn about the trees in the park and to monitor the results of the biodiversity enhancement actions.
ACTION 8	The success of the BAP will depend on active engagement by local residents. A survey, and an opportunity to hear local resident's views are beneficial first steps, and to act on the suggestions that are practical and achievable.

7. SUMMARY

The three sites selected for the case studies present excellent examples of different types of green space in urban settings. Each site has the potential to attract a rich biodiversity with some minor changes in management. The suggestions made in this document are all practical, achievable, and inexpensive, and they are compliant with the most recent evidence of best practice. For example, biodiversity management of the hedgerows and treeline at the Banner GAA grounds could be achieved for a few hundred euro a year if a team of actively-engaged volunteers was available to assist. A tree theme at Tim Smythe Park could link in with other Clare-based initiatives which provide training in tree identification, and tree and woodland management. Workshops and talks can be given to raise awareness of the fascinating and complex biodiversity associated with trees, and citizen science projects could encourage people to take a caring interest in their local woodland and parks.

Sadly, climate change and the threat of non-native invasive species, including non-native tree diseases, are real and immediate threats to the loss of biodiversity. Planting trees and maintaining hedgerows are two key measures that help in climate change abatement, and the BAP for each site emphasises projects that are associated with trees and hedgerows. Each of the three sites offers several opportunities for meaningful citizen science projects, including the monitoring of changes in biodiversity over time as a result of changed management practices. There are also volunteering opportunities in which local people can actively engage with Tidy Towns and Clare County Council to bring biodiversity projects to fruition.

In May 2019, the project consultants will conduct surveys of the plant species found in the three green areas to start the process of monitoring the biodiversity.

Image 17 - Natural spring biodiversity in East Clare

8. APPENDIX 1: BIODIVERSITY ASSOCIATED WITH TREES

Reproduced from An Introduction to British Woodlands and their Management.
Available from: *http://www.countrysideinfo.co.uk/woodland_manage/index.htm*

The Value of Different Tree Species for Invertebrates and Lichens

The table below shows the number of insects and epiphytic (growing on plants) lichens which have been recorded in association with common trees and shrubs in Britain. The figures in brackets include mite species as well as insects.

Tree or shrub	Associated Insect Species	Associated Lichen Species
Oak (pedunculate & sessile)	**284 (423)**	**324**
Willow species	**266 (450)**	**160**
Birch (silver & downy)	**229 (334)**	**126**
Hawthorn	**149**	**no data**
Blackthorn	**109**	**no data**
Poplar species (including aspen)	**97**	**no data**
Crab Apple	**93**	**no data**
Scots Pine	**91**	**132**
Alder	**90**	**105**
Elm	**82**	**187**
Hazel	**73**	**160**
Beech	**64 (98)**	**206**
Ash	**41**	**255**
Spruce*	**37**	**no data**
Lime	**31**	**83**

** Introduced Species*

Tree or shrub	Associated Insect Species	Associated Lichen Species
Hornbeam	28	44
Rowan	28	125
Field Maple	26 (51)	93
Juniper	20	no data
Larch*	17	no data
Fir*	16	no data
Sycamore*	15	183
Holly	7 (10)	96
Sweet Chestnut*	5	no data
Horse Chestnut*	4	no data
Yew	4	no data
Walnut*	4	no data
Holm Oak*	2	no data
Plane*	1	no data
Rhododendron*	0	no data

** Introduced Species*


Ennis Tidy Towns