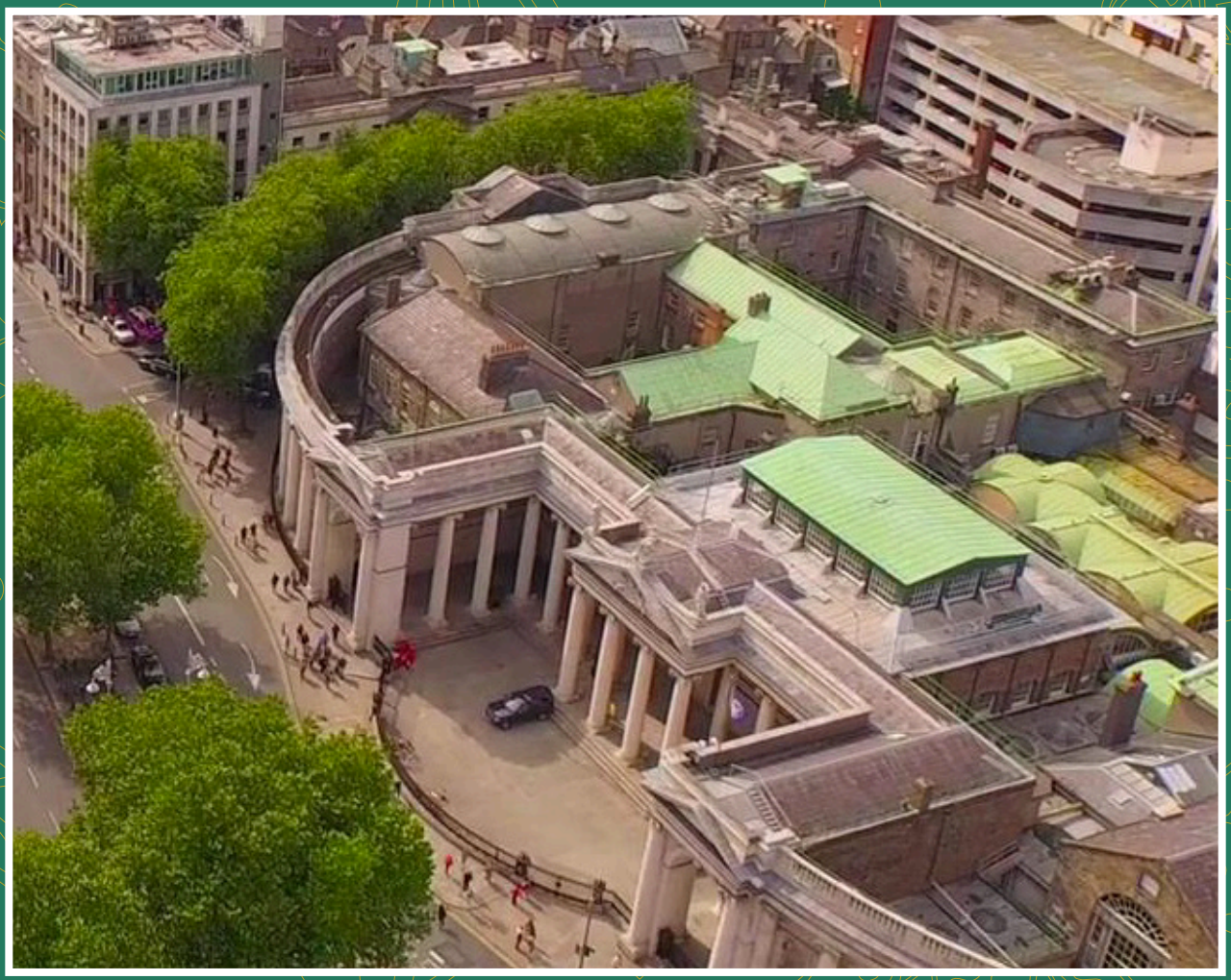
BIODIVERSITY STUDY OF THE TEMPLE BAR AREA 2018



Produced by Gavin Kenny MSc

A Biodiversity Study of Temple Bar 2018

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1. Introduction to Temple Bar

Temple Bar is one of Ireland's and Dublin's busiest nightlife areas and biggest cultural quarters. The Temple Bar Area is situated on the banks of the river Liffey and is adjacent to the bustling Dame Street city artery. This area is a cross section of an urban environment which encompasses residential areas, retail outlets, restaurants, bars, hotels, office, banks and cultural areas as well as small areas where people can gather.

Approximately 10,000 people work in Temple Bar with another 3,000 people in residence. On any given day the footfall in Temple Bar can reach 60,000 people. So, the Temple Bar biodiversity study provided a unique opportunity to assess what can be achieved in a cityscape and how to involve businesses and residents alike to address the question of creating and sustaining a pleasant and natural urban environment.

This plan should serve as a template for the whole city in general and cities throughout Ireland and Europe because it incorporates most aspects of what Irish and European cities contain.

Plate 1: A colourful street in Temple Bar.

1.1 Biodiversity

What is biodiversity?

Biodiversity refers to all life on this planet ranging from the extremely small such as bacteria to the extremely large such as the elephant and the whale. It covers the multitude of organisms including the varied plant life and winged creatures in every ecosystem. Biodiversity is not just exclusively for rare and protected animals and plant life but its rich mixture that an area can support, and it is not just contained in remote wild regions or nature reserves, but it is all around us in our countryside and our cities. We of course are an integral part of this biodiversity and we exert a major influence over it.

Plate 2: Images of the diversity of life.

Why is it important?

Economically biodiversity gives us the food we eat the clothes we wear, environmentally, biodiversity provides a stream of useful ecosystem services ranging from the provision of food, fuel, fertile soils, clean air and water to raw materials for food and medicines, regulate climate prevent the spread of diseases, fertilise crops and purify water, when these are lost they bring into focus the economic side of the equation. It also supports our cultural identity and plays an important role in our mental and physical well being. And finally, in an ethical sense we have a moral duty to look after our planet and preserve its riches for the benefit and enjoyment of the generations to come (EU 2020 Biodiversity Strategy).

With the world population growing at an ever-increasing pace, more and more people are moving to the urban centers in the hope of living a better life. Therefore, urban centers are quickly becoming the main habitat of the human species. This puts an incredible strain on the urban environment. Biodiversity is the measure and interaction of species within their own families and outside. Although it is quite difficult to measure as a piece of quantitative data, it is generally agreed that high species richness and abundance (which is the amount of types and numbers of species in one place) is a good indicator of biodiversity.

1.2 The Irish Context

Ireland has many distinct and wonderful landscapes and many very diverse ecological habitats ranging from the Burren, to the raised and blanket peat bogs to our long coastal areas which are highly important for birds. We have many Special Areas of Conservation (SACs), Special Protected Areas (SPAs), and Natural Heritage Areas (NHAs) such as National Parks which preserve and protect nature. Ireland has many native organisms, species of plants being our highest.


Plate 3: Skellig Michael (SPA) Co. Kerry and the Burren (SPA and NHA) Co. Clare.


Plate 4: Killarney National Park (SAC) Co. Kerry and the Wexford Slobs Co. Wexford.

1.3 The Dublin City Context

Dublin City saw a huge growth in development in the late 90's and early 2000's because of the economic boom at that time. Growth slowed down for a period thereafter, however with the economy in full recovery, city development has begun again in earnest.

Dublin City has many sites of natural beauty and of biological importance such as Bull Island, Howth Head, Dublin Bay for birds amongst other things and not forgetting the Phoenix Park which is the largest enclosed park in Europe (Dublin City Biodiversity Action Plan 2015-2020).

Plate 5: An aerial photograph of Dublin City with the Dublin Bay Biosphere in view.

1.4 The Dublin Bay Biosphere and Environs

In 1981, UNESCO recognized the importance of Dublin Bay by designating North Bull Island as a Biosphere because of its rare and international important habitats and species of wildlife. To support sustainable development, UNESCO's concept of a Biosphere has evolved to include not just areas of ecological value but also the areas around them and the communities that live and work within these areas.

To fulfill these broader management aims for the ecosystem, the Biosphere was expanded in 2015. The Biosphere now covers Dublin Bay, reflecting its significant environmental, economic, cultural and tourism importance, and extends to 300 sq km. Over 300,000 people live within the newly enlarged Biosphere.

Plate 6: Bull Island and the larger Dublin Bay Biosphere and the beach on Bull Island.

1.4 The Dublin Bay Biosphere and Environs *(continued)*

The Temple Bar Area is situated alongside the banks of the River Liffey which feeds directly into the Core Zone, the Buffer Zone and the Transitional Zone of the Dublin Bay Biosphere. By being situated alongside the River Liffey, the Temple Bar Area also serves as part of the river and environs corridor which runs up to the Phoenix Park Area. This corridor acts as thoroughfare and a resting stage for birds, fish and insects whilst moving around the city and to and from the Dublin hinterland to the sea and the Dublin Bay Biosphere.

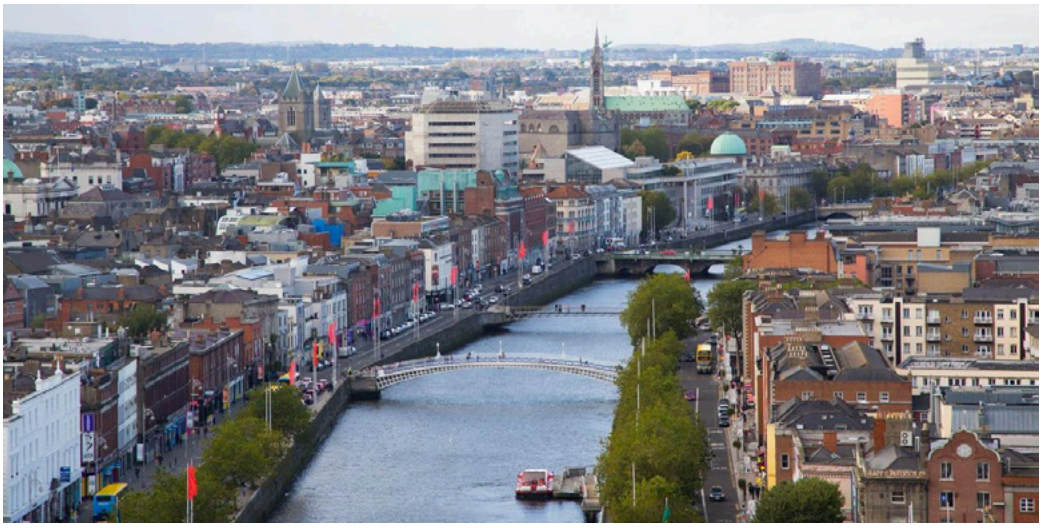

Plate 7: The River Liffey running through the City centre with the Temple Bar area on the immediate left Quay of the river.

1.4 The Dublin Bay Biosphere and Environs *(continued)*

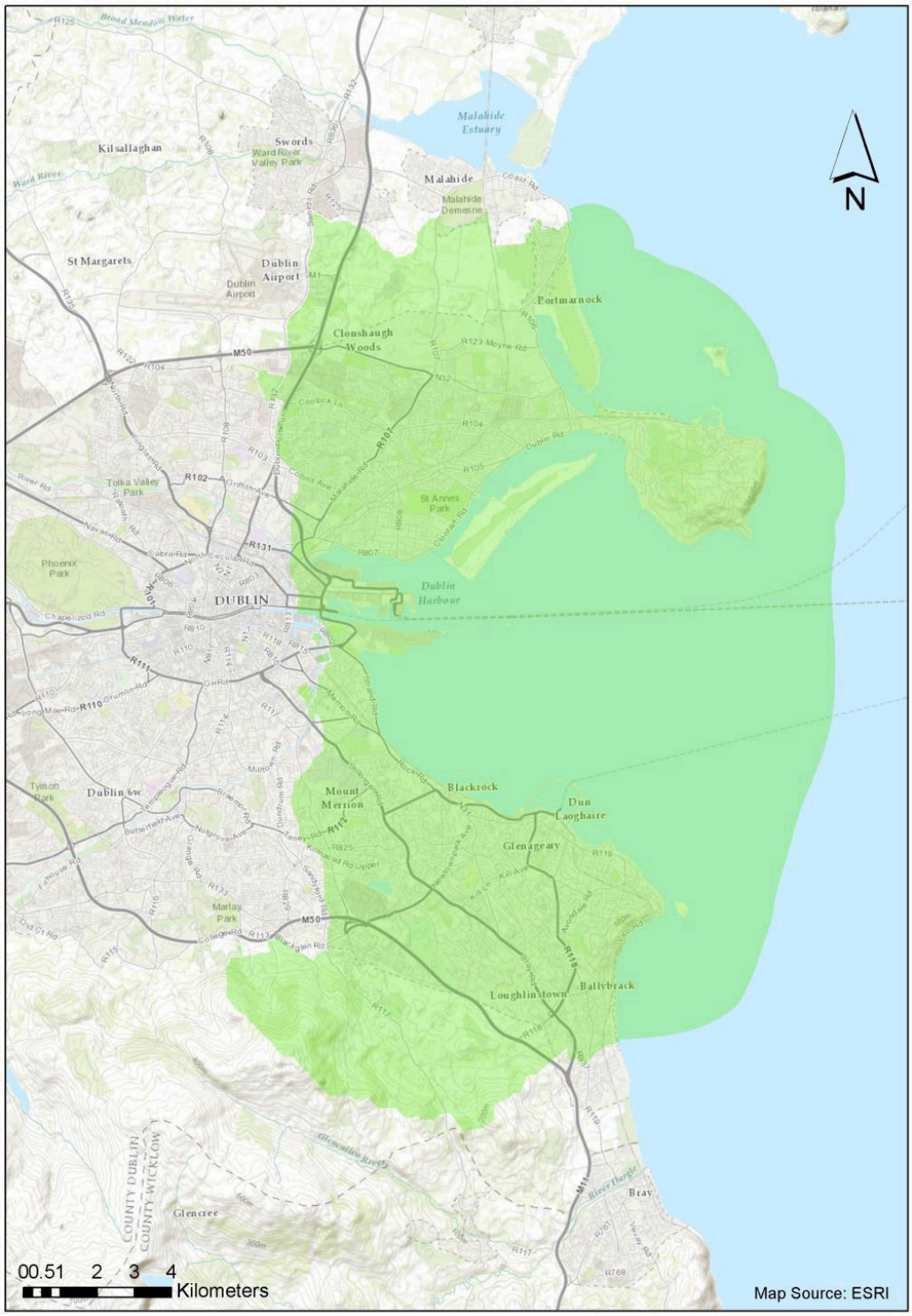

Plate 8: Overview of Dublin City and the Dublin Bay Biosphere.

2. Biodiversity Audit

The audit was carried out between the months of October, November and December of 2008. The audit was carried out mainly on plant species in the area as this was the most widespread examinable aspect of the natural world in the area. Some bird species were also noted when observed and the presence of one bird species was accounted for due to expert and local knowledge Peregrine Falcon *(Falco pereginus)*. Also, in all studies one must also be aware of the adage that "absence of evidence does not necessarily mean evidence of absence". There may be many other plant, bird and insect species using the area, but they were not observed so there is a gap in the knowledge in this respect.

2.1 Birds observed in the area:

Many bird species were spotted in the area by local enthusiasts and residents. Notably the Peregrine Falcon *(Falco peregrinus)* which is generally associated with moorland and upland areas (Cabot, 2004), was observed two to three times a week on the top of the roof of the Central Bank since February of 2007. A pair of Peregrines was seen on three occasions; however, it is believed that they use this area as a plucking post and for feeding but not breeding.

Plate 9: A Peregrine Falcon in flight, known to inhabit urban areas such as the Temple Bar Area and environs due to the abundance of food.

2.1 Birds observed in the area *(continued)*

Birds such as the Fieldfare *(Turdus pilaris)*, the Mistle Thrush *(Turdus viscivorus)* and the Redwing *(Turdus iliacus)* that are usually associated with farmland and hedgerows have been spotted in the Temple Bar Area. Migratory birds such as Swifts *(Apus apus)* and Swallows *(Hirundo rustica)* have been spotted in the area as well as riverside birds such as the Grey Heron *(Ardea cinerea)* and the Grey Wag Tail *(Motacilla cinerea).*

Birds which are commonly associated with gardens, parks and buildings such as Blue tits *(Parus caerulus)*, House Sparrows (Passer montanus), many members of the Crow species *(Corvus ssp)*, Feral pigeons *(Columba livia)* and Starlings *(Sturnus vugaris)* have been spotted in Temple Bar in large numbers.

Plate 10: A blue tit and a Mistle thrush, both seen in the Temple Bar area.

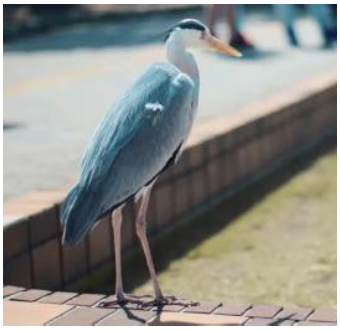

Plate 11: A Grey Heron, a Grey Wagtail and a Swallow, each of these species have been spotted in the Temple Bar Area.

2.1.1 Gulls and Other Coastal Birds

Mediterranean Gulls *(Larus melanocephalus)* have been spotted on occasion in the Temple Bar area and these birds are not very common in the Dublin Bay area. Apart from these wonderful sightings there are also many other species of birds that would be associated with the coast and a water body like the Liffey such as Cormorants *(Phalacrocorax carbo)*, Black Guillemot *(Cepphus grylle)*, Herring Gulls *(Larus argentatus)*, Black-headed Gulls *(Larus ridibundus)* which are abundant in season and the Great Black-backed Gull *(Larus marinus)*.

Plate 12: A Cormorant and the Herring Gull are daily visitors to the Temple Bar area.

2.1.2 Herring Gull *(Larus argentatus)*

The Herring Gull *(Larus argentatus)* has recently become the focus of much media attention in what has been believed to be an "invasion" of the city by this species. Herring Gulls are probably the most familiar gull species in Ireland. They have a mottled brown colouring until they are 2-3 years old when they develop the silvery-grey feathering that is most recognized.

Feeding

Up to the 1950's, Herring Gulls are thought to have been mostly coastal foragers. However, it is believed that with the advent of large landfill sites and abundant food being available in towns and cities that scavenging is an increasingly important feeding strategy for the Herring Gull. Food can be found in many ways in the city by Herring Gulls in the form of discarded takeaways, rubbish bins and flimsy black sacks containing food waste on the streets.

Although, studies have shown that urban Herring Gulls will wander larger distances to feed out at sea, at parklands and playing fields and or over farmland to avail of recently ploughed or worked fields looking for invertebrates (mostly insects and worms) (Rock, 2016).

2.1.2 Herring Gull (*Larus argentatus*) (continued)

Roof –nesting gulls

Gulls were first reported nesting on roofs in Dublin City in 1972. Numbers rose slowly and by 2001, when the first wide-ranging census was undertaken and there were an estimated 180 pairs of roof-nesting Herring Gulls in Dublin. Anecdotal evidence can suggest that this number is significantly higher, especially in the city centre area and around the Temple Bar area, as coastal areas such as Ireland's Eye with 300 pairs and Lambay Island with 900 pairs of Herring Gulls.

City Habitat

Herring Gulls are extremely adaptable, quick thinking and bold and from a gull's perspective, cities like Dublin provide a myriad of opportunities. Herring Gulls have been attracted to the cities including Dublin, because of the availability of food. Houses and offices with flat roofs clearly offer safe places for the gulls to nest and they may also resemble their natural nesting habitats on cliff-tops. Their nests on the flat roofs are safe from predators such as foxes and therefore more of their young survive (Newton, 2017).

Herring Gulls can be very protective of their young in the months of June and early July. This, unfortunately, can lead to unwanted interactions between city dwellers in Dublin and the Herring Gulls.

It's also worth noting that the Herring Gull was put on the national Red list of birds of Conservation Concern in 2002 as there was a dramatic crash in their population so the Herring Gull is a protected species in Ireland.

Plate 13: A Herring Gull with it's young on a roof top nesting site.

2.1.3 Swift (*Apus apus*)

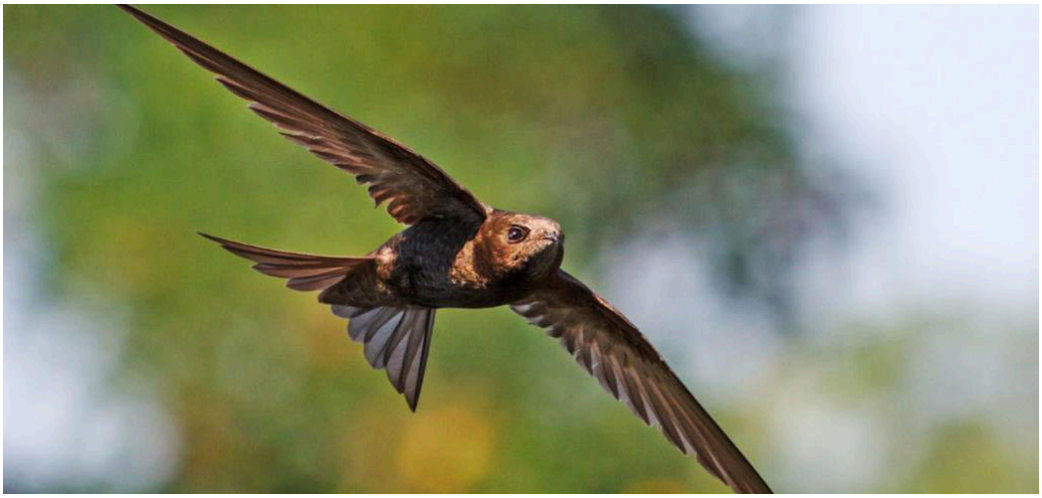

Plate 14: The Swift in flight, during its life it will fly over 3.2 million kilometres.

The unique bird species the Swift, has been spotted on many occasions in the Temple Bar area. They are excellent fliers and are famed for their aerial movement and lifestyle. They eat, drink, preen, sleep and mate while flying. It is their dark black plumage and screaming, dashing flight that distinguishes them from swallows and house martins. They fly about 800 kilometers a day and they eat flying insects such as flies, mosquitoes, midges and greenflies.

Their presence is emphasized by their low-flying, screaming displays around buildings, visible between late April and late August as they only visit Ireland for 4 months of the year from their South African wintering ground. This migration is a round trip of approximately 2,300 kilometers.

City Habitat and nesting

The Swifts are mostly found in built up areas such as Temple Bar, where they prefer tall buildings, such as Georgian houses, where they tend to nest.

Swift nests are generally located high up on the roof space under the eaves of old houses, historic buildings and industrial buildings, where the swifts can drop into the air from the nest entrance. The nest is constructed from material such as hay, paper, feathers and seeds collected in flight and then cemented together with their saliva. Once swifts have identified and occupied a nest site, they will use it for the rest of their lives, if it stays available.

Plate 15: A swift about to enter a constructed nest box and 2 young swifts waiting for their parents to return with food.

2.1.3 Swift (*Apus apus*) (continued)

Legislation

The Swift is on the Amber list of birds of Conservation Concern in Ireland because its population has declined by over 40% in the last 15 years Swift Conservation Ireland, 2018). Therefore, it is an offence to intentionally kill, injure or take any wild birds and it is also an offence to intentionally take, damage or destroy the eggs, young or nest of a swift whilst it being used or in use.

2.2 In Soil:

There was the general street tree planting regime that one would expect to find in the city center district, hornbeam *(Carpinus ssp)* and sycamore *(Plantanus ssp)* are the most common planted in the area.

These trees are planted due to their tolerance of city pollutants derived from vehicle emissions and, they have a generally small stature so are easily maintained by Dublin City Council, also their root ball size is not too intrusive so not to affect underground cables and pipes. These trees, although are not native to Ireland do provide some shelter to Feral pigeons *(Columba livia)* Crows *(Corvus corvax)* and Starlings *(Sturnus vugaris)*.

It must also be mentioned that, although not observed directly, it is the author's views that there is a community of the brown rat *(Rattus rattus)* and the house mouse *(Mus musculus)* in the area. This would reflect knowledge based on every large settlement of people and city on the planet.

Plate 16: Street trees in the Temple Bar area, improving the air quality, reducing noise pollution and creating a habitat for small birds and insects.

There were other varieties of trees found around the area in the many gardens of the residential developments and the main square of the Temple Bar area. The predominate tree species however seems to be the Birch tree (Betula ssp) which is native and provides a suitable habitat for many moths and butterflies (Lepidoptera order). Many Mountain Ash (Sorbus acuparia) were also found and this species is native and produces groups of red berries that are a very welcome source of food for birds in the winter. Firethorn (Pyracantha ssp) can also be found which is a good shrub for a wildlife garden providing dense cover for roosting and nesting birds, summer flowers for bees (Bombus terrestris) and an abundance of berries as a food source.

2.2 In Soil: *(continued)*

Plate 17: Birch trees growing in a planted court yard of Fishamble Street in Temple Bar.

The Yew tree *(Taxus bacatta)* was also quite commonly planted as a small hedge and left as a tree, this is also a native species. While the leaves are highly poisonous the fleshy berry that it produces is not and is eaten by many different species of birds, the tree can live for a long time and it is estimated that one specimen of the yew tree is in Scotland is over 2000 years old.

Plate 18: Container boxes planted with large shrubs and flowering plants on Cow's lane in Temple Bar.

2.3 In Containers:

Apart from the street trees and the gardens, roof gardens and balconies of the private residents, many of the plants that are visible from the streets are kept by most of the traders in container boxes. These boxes are the most noticed and easily procured items in the Temple Bar Area. They usually have two seasons of planting, early spring to midsummer and midsummer to late autumn.

Plate 19: Hanging basket and container planting in the streets of Temple Bar.

These plants are primarily planted for their appealing look. They are planted in such a way as to stagger the flowering of the plants to give some colourful display throughout the time limit of the container. The containers themselves contain a mixture of fresh soil, compost and osmacote which is a slow release fertiliser. In the first planting from February to April there are tulips *(Tulipa ssp)*, daffodils *(Narcissus ssp)*, primrose *(Primula ssp)*, forget me nots *(Myosotis arvensis)*, dellus perenus, Heather *(Calluna vulgaris)* which is a great plant species that is good for butterflies and moths *(Lepidoptera order)*.

In the late summer the planting consists of sophinia trails, lobelia *(Lobelia ssp)* and geraniums *(Pelargonium ssp)*. All these plants attract many different types of insects ranging from bees to butterflies to spiders and micro ecosystems can develop quite quickly.

Birds will feed off some of the new shoots on the flowering plants and will forage on some of the insect life if they are lucky enough to spot them.

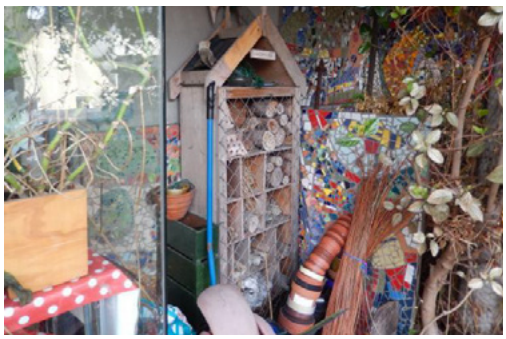

Plate 20: The container garden on the roof space of the Ark in Temple Bar offering a welcome plethora of plants and places to shelter and nest.

2.3.1 Bees

Many Bees species and numbers have been directly observed in the Temple Bar district and this has been closely associated with the large number of containers and the planting regimes in those containers, for example the brightly coloured flowers (primroses and forget-me-nots).

There are over 20,000 different species of bees in the world and Ireland is home to 97 of these bee species. There is 1 species of the honeybee, 20 species of bumblebee and 76 species of solitary bee. Bees are the most important pollinator of crops and native plant species in Ireland. They are a key component of our wildlife and one of the busiest, least appreciated work forces we have. A study from the Department of the Environment
found that bees are worth €53 million to the economy.

2.3.2 Bumblebee

Bumblebees are social bees and they live in colonies with a queen and many female workers with some males. Ireland has 20 native bumblebee species. Of these, 6 species are cuckoo bumblebees. These cuckoo species don't make their own nests, but instead lay their eggs in the nest of a true bumblebee who will inadvertently bring up their young.

As with all bees, only the female can sting, and female bumblebees can sting more than once. Four of Ireland's bumblebees are endangered and 2 are vulnerable. The Great yellow bumblebee is on the verge of extinction from Ireland.

Bumblebees are more primitive and don't make honey like honeybees. Instead they store
a little bit of nectar in wax pots in their nest for emergencies. This means that a bumblebee colony is never more than a few days away from starvation, making Ireland and its climate,
a challenging place to live.

Plate 21: A bumblebee collecting nectar.

2.3.3 Honeybee

Ireland has one species of honeybee (Apis mellifera) and there are an estimated 24,000 bee hives in Ireland. Bee keeping has become very popular in Dublin's urban area and it is becoming a very important habitat for this species.

The honeybee is native to Ireland but honeybees of French, Dutch, Italian and Russian extraction were imported here after disease wiped out many of Ireland's hives in the middle of the last century.

Worker honeybees have a barbed sting. They can only sting mammals once, the sting catches in the skin and tears loose from the bee's abdomen, leading to death in minutes. Honey bee queens have a smooth sting which they use multiple times, but they rarely leave the hive, instead using their sting to dispatch rival queens.

Plate 22: A honeybee collecting nectar and honeybees making honey.

2.3.4 Solitary bee

95% of the worlds 20,000 species of bee are solitary rather than social bees. Ireland has 98 bee species, of which 77 are solitary. Solitary bees exist as a male and a female. When a male and female solitary bee have mated and prepared a nest for their eggs, they die off leaving the eggs overwinter, and the young emerge and fend for themselves the following year.

Solitary bees look very different from bumblebees. They are much smaller and occur in a range of different shapes and colours. Some species are small and black like ants with wings, while others have black and yellow striped bodies like wasps.

Plate 23: An Ashy mining bee *(Andrena cineraria)* emerges in early spring (Solitary bee).

2.3.5 Bees species in decline in Ireland

More than half of Ireland's bee species have undergone substantial decline in their numbers since 1980. The distribution of 42 species has declined by more than 50%.

In 2006 an **Irish Bee Red List** was published, and it noted that 30% of the Irish bee species are threatened with extinction, 6 species are critically endangered, 10 species are endangered, and 14 species are vulnerable. Two species have become extinct in Ireland within the last 80 years *(Andrena rosae and Nomada sheppardana)*.

2.4 In derelict sites and in walls:

Although these sites were difficult to access some plant species were observed growing in the ground of these areas or on the adjacent walled areas. These sites traditionally have very nitrogen deficient soils but due to the brick rubble present on the site, large amounts of phosphorous, potassium, magnesium are present with calcium which reduces the high pH that is often present (Gilbert, 1991).

These minerals are very important for the establishment of plants on derelict sites and plants such as the Butterfly Bush *(Buddleia davidii)*, Sow thistles *(Sonchus arvensis)*, Common Nettle *(Urtica dioica)* and the Rosebay Willow herb *(Eqilobium angustifolium)*.

Plate 24: The Butterfly Bush, Rosebay Willow Herb and Ivy were all found in the un-used ground around the Temple Bar area.

These plants and many other wildflowers that are found on derelict sites attract a wide range of insects such as butterflies, moths and the beetles and should not be underestimated for the level of biodiversity that they offer to any given area (Wheater, 1999). Ivy *(Hedera helix)* was found growing on some of the walls in the area and this plant produces flowers which support nectar feeding insects as well as producing berries in the autumn which can support birds in the winter.

Plate 25: A Red Admiral *(Vanessa atalanta)* and the Painted Lady *(Vanessa cardui)* butterflies that can be found in and around urban habitats, attracted by the Butterfly bush *(Buddleia davidii)*, seen in picture.

3. S.W.O.T. Analysis

SWOT Analysis for the area in relation to biodiversity existence

3.1 Strengths:

- There are a lot of businesses and residents interested in growing plants in the area.
- Businesses have a vast and colourful display of window boxes and planted ornamental trees in front of their premises to attract people.
- There are a lot of interesting developments in the Temple Bar area, some designed by famous architects, so some have allowances made for balconies and roof gardens, for example the "Wooden Building".
- The Temple Bar Area has a main square which focuses around 3 silver birch which gives it that natural feeling.
- The area lies directly along the Liffey which a lot of sea birds use, and it is a nature corridor for bird species moving between the upper part of the river and the coast line.
- The area is also within very close proximity to the Phoenix Park which happens to be the largest enclosed park in Europe with 712 hectares. This area has a large abundance of flora and fauna.
- This area could be used as a staging post for birds moving throughout the city area from green spaces such as parks to parks.
- The close proximity of the buildings can create a micro climate in relation to temperature and sunlight exposure which could raise the local temperature by 2 degrees centigrade

3.2 Weaknesses:

- It is a very heavily built up urban area relaying totally on planted species by humans save for a few derelict sites.
- There is a considerable amount of human traffic travelling through the rather small area, possibly 60,000 people on a weekend night.
- Due to the close proximity of the buildings and their solar orientation many of the streets tend to be in shadow for long periods of the day affecting temperature and growth of vegetation.
- Since temple bar is an area predominately for adults apart from the Ark, there is no place where children could interact with or learn about the natural world.

3.3 Opportunities:

There are many opportunities to avail of in the Temple bar area.

— Due to the large interest of business and residents in planting flowers and plants there may be a chance to encourage and empower them to plant native species instead of non-native ornamental species.

— In relation to residents in the area there could be a chance for people to become interested in planting an edible landscape such as vegetables and herbs.

— There are also many open and unused roof spaces on some of the commercial, cultural and residential buildings that could be willing to develop them for recreational purposes.

— Due to the fact that Temple Bar has been involved with the Tidy Towns completion in recent years there is an impetus to green the area.

— The general understanding of the natural environment as being important is quite prevalent and it's in the media.

— Planting schemes have been tackled by wildflower planting businesses before, these actions show that it can be possible to use wildflower planting schemes in an urban setting.

3.4 Threats

— Some light damage has occurred to some street planting in the past.

— The commercial landscapers in the area may resist change, they have their own plant suppliers who may not be able to produce wildflower arrangements for example.

— Some businesses believe that biodiversity is not a priority and that at the end of the day the reason for the container planting is to make their premises look pleasant to attract more European Clientele, not butterflies.

— Maintenance is something that must be addressed on a business level, it may be easier to influence the high earning residents as the environment is quite fashionable now.

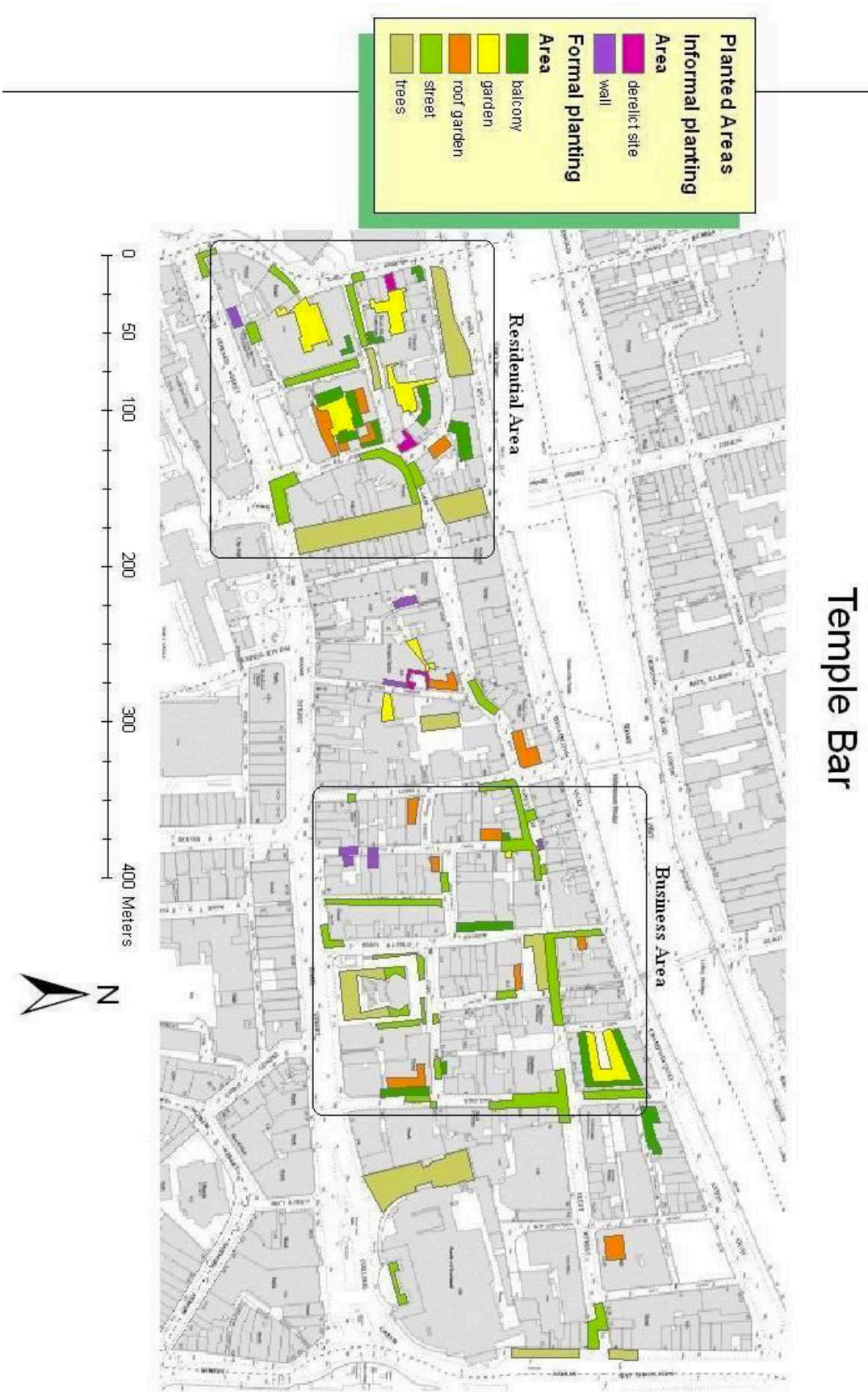

Plate 26: Shows the two main areas involved in the study (Residential and Business areas) and the type of small ecological habitats that were present in the area.

4. Geographical Information Systems Map

The information that was gathered from a previous biodiversity audit is now presented on the Geographical Information Systems Map on the previous page. Dublin is now in the process of an economic recovery, however there have not been any major developments constructed in the Temple Bar area in recent years, so the information displayed in the image and consequent study still is very relevant.

Due to the intrinsically difficult nature of mapping an ecological concept such as biodiversity, the information portrayed on the map is divided into two main categories; **informal planted areas and formal planted areas.**

The **informal planted areas** represent places where vegetation has seeded and grown without the aid of people. The two main areas in this category are derelict sites and on and in walls.

The **formal planted areas** represent places where the vegetation has been planted and managed by people for various reasons. The five main areas in this category are the balcony, garden, roof garden, street areas and trees. It must be noted that the street area represents container planted trees, container window boxes and hanging baskets.

4.1 Results

Where it is difficult to ascertain the extent to which each area or category contributes to promoting biodiversity it is generally accepted that the larger and more diverse a planted area is, the more life it can possibly sustain. There appear to be two main clusters of planting in the Temple Bar district. One loosely centering around the Central Bank and Temple Bar Square area which is a business zone and the second loosely centering around the Cow's Lane area which is a residential zone.

The business zone contains mostly street planting with some roof gardens and a garden in the periphery. The residential zone contains four garden areas surrounded by roof gardens, balconies and street areas; there is a notably tighter concentration of the formal planting areas and the informal planted areas in this zone.

4.2 Conclusions drawn from the G.I.S map

Both zones have a mixture of planting areas but contribute different ecological niches to the overall existence of biodiversity in this urban setting.

The business zone contains some mature trees which are important for roosting for bird species. The business zone also contains many flowering species for insects and also the possibility for feeding for the birds on the associated insect species during the late spring, summer and early autumn months. However, this zone contains the most human disturbance ranging from people traffic in the street especially at the weekend to the cars and mainly commercial vehicles making deliveries to the businesses in the area.

The residential zone contains more trees that have fruiting bodies such as berries that can sustain bird species throughout the late autumn, winter and early spring months. Also, the residential area contains many balconies, gardens and roof gardens which would be planted with flowering species, albeit to a lesser extent than the business zone but with the same ecological effect. The residential

4.2 Conclusions drawn from the G.I.S map (*continued)*

zone has notably less human and vehicle traffic during the day and night time apart from the residents themselves who would possibly only spend a fraction of their time in the planted areas.

The informal planting in the derelict sites and walls must also be factored into the scenario. They only cover a very small area in relation to the formal planting but have been noted as having a very diverse number of invertebrates (insects) as there is a natural continual change in the plant and insect species with time (succession). Therefore, these plant areas contribute a high amount to the overall diversity to the biodiversity of this urban setting.

With these factors in mind it could be suggested that it is the combination of the informal planted areas with the formal planted areas, residential and business zones included that could enhance the biodiversity of the Temple Bar Area. However, to achieve the enhancement of the biodiversity in this urban area it must be noted that different approaches for each of the planted areas may need to be implemented in order to fulfil this task.

Plate 27: Private garden in the residential area which could benefit from bird feeders and bird boxes.

4.3 Limits of the G.I.S map data

The biodiversity audit was carried out in autumn, winter and spring and this limited the observation of the flora and fauna in the area as well as the leaf cover in photographs. Due to the lack of green areas and low temperature, studies on invertebrates were taken by direct observation and anecdotal information.

It wasn't possible to view and catalog many of the balconies and roof gardens of many of the residential buildings which could harbor many interesting native species.

5. The Human Dimension

This report so far has focused on what members of the animal kingdom have been present and why, in the Temple Bar area. It would be an erroneous assumption to believe that the people in the Temple Bar area have no input regarding what plants, animals and insects are present there, and just as importantly, what does the future hold for the biodiversity in that area.

Previous studies with several residents, business owners, commercial planters and cultural bodies about perceived barriers to managing and enhancing the level of biodiversity present in the urban setting of Temple Bar suggested certain trends.

The residents believed that the main barriers to improving biodiversity were:

— Space constraints, considering that some of the apartments don't have access to garden areas, roof gardens or balconies.

— Some of the residents have access to gardens but are not allowed to grow anything.

— Age constraints, some of the residents in the area are less mobile than they used be.

— No contact between the property management companies and resident associations in the Temple Bar Area.

The businesses believed that the main barriers to improving biodiversity were:

— That DCC will not allow any more street tree planting due to possible damage to underground infrastructure and possible litigation from the public.

— That budget constraints influence such issues, however with the economic up-turn, there may be a renewed interest in the liveability and amenity aspect of the area.

The commercial container planters

— When using wildflower seeds, the seeds don't always germinate.

— The businesses want guaranteed successful flowering and that's what they pay for and what they demand.

The cultural bodies believed that the main barriers to improving biodiversity were:

— The division amongst the local authorities regarding the Temple Bar Area. There doesn't seem to be a constructive cohesion between the main actors in the area.

— Until recently, there was no apparent plan for the future development of the area.

— They believe that awareness and knowledge are the main barriers to enhancing biodiversity.

All the groups expressed the opinion that the constraints of time, money and the possibility of anti-social behaviour could seriously hamper the enhancement of biodiversity in the Temple Bar Area.

6. Conclusions of the overall biodiversity study

The examination of the physical environmental of the Temple Bar showed that although this district is highly developed, there were many bird, plant and insect species present.

Some of these species, especially the birds, such as the Herring Gulls which need to be managed and the Swifts, which need to be enhanced in a very careful manner. Also, some of the bee species need to be protected and enhanced again in a very careful manner.

The GIS map graphically represents where the vegetation is to be found and suggests that there are two distinct areas in the Temple Bar Area where they can be found (Residential & Business).

Both areas have different parts to play in the temporal and spatial aspect of biodiversity.

The different groups of people involved in the study have different and similar ideas on what constitutes barriers in relation to enhancing biodiversity in the Temple Bar area.

Time, budgetary constraints and anti-social behaviour are issues that affect the enhancement of biodiversity.

7. Recommendations for managing and encouraging Biodiversity within Temple Bar

With all the information gathered from the biodiversity audit, the subsequent Geographical Information Systems map and the previous studies concerning the stakeholders in the Temple Bar area, recommendations can be proposed for the managing and the enhancement of the district.

7.1. Herring Gull Management Projects and Posters

As mentioned in the Biodiversity audit, Herring gulls have been getting a lot of media attention recently and for all the wrong reasons. Many local Councilors and Senators have made public announces to the effect of reducing the species of this bird in the city centre by an open cull of their population.

This concept has been put forward into the public realm without any scientific or ecological study to back up the claims that the open cull would reduce the Herring gull numbers in the long term, apart from the fact that the Herring gull is a protected species. If the gull numbers were reduced, it may be possible that the rat population in the city centre would sharply increase due to the amount of discarded and easily available food on the streets. It may also be possible and more probable that many Herring gulls from neighbouring areas would move in to the area and fill the niche, as the adage goes “nature abhors a vacuum”.

The Herring gulls are more active around the months of June and early July because they are very protective of their young at this time as they are about to leave the nest. People cannot change this pattern as it is part of Herring gull behaviour and basic parenting behaviour across all species on this planet.

7.1. Herring Gull Management Projects and Posters (*continued*)

Plate 28: Example signs from beach fronts to raise awareness of gull activity.

A more sensible approach to reduce and manage the numbers of Herring gulls in the city and the Temple Bar area would be to reduce their food resource.

An idea could be to create signs or posters reminding people not to throw their half finished take away onto the ground as they are inadvertently feed the Herring gull population (in the morning).

These signs or posters could be placed inside the windows of "Take Aways" in and around Temple Bar. These signs or posters could not only potentially reduce the food recourse for Herring gulls but could also help reduce littering, reduce rodent problems, reduce distress for the residents of the area and their complaints but it would also improve the aesthetic and amenity value of the area.

Plate 29: This is a more directed approach to hinder gull feeding by advising people what to do with their unwanted food.

The promotion of heavy duty black bags (as used in construction) to contain the food waste from the food outlets, is one way of reducing the food resource for these ever-foraging Herring Gulls.

This humane management of Herring gull numbers could have a "Big Day" launch with invited guests form ornithologists to the local councillors and a prize giving ceremony for the best 3 posters.

This would attach a lot of media attention and it would also put the Temple Bar Company and area on the map as the first group to tackle this issue in Dublin and Ireland.

7.2 Swift Action

As mentioned in the Biodiversity audit, swifts have been observed in the Temple Bar area over the last number of years. It has been noted that the Swift population in Ireland has declined by 40% in the last 15 years and therefore they are on the **Amber list of birds of Conservation Concern.**

The main threat to Swifts is the considerable loss of suitable nesting sites. Swifts are an extremely vulnerable species as they are very site specific for nesting. Nest sites can be destroyed via buildings being demolished, renovated, reroofed, or even being repaired. The use of PVC or plastic fascia's and soffits (protective features where the roof is attached to the building) are not viable for swift nests unless holes are cut to replicate the original nest sites before the PVC was fitted.

Providing nest boxes is the best way to help the Swifts and to help increase their numbers. In a highly developed area such as Temple Bar, nest boxes can be placed on buildings providing the sites are suited for this endeavour.

Plate 30: Wooden Swift nest boxes in place and decorated by local school children.

Plate 31: Wooden Swift boxes can be easily assembled.

Swift nest boxes are of a particular shape and size and must be placed on a North facing wall (East and West facing if shaded) at least 5 meters from the ground. Hotels, residential blocks, cultural agencies and businesses could be asked to join in to enhance the area by increasing the number of Swifts that will live there for the summer months. Swifts eat millions of insects each summer in order to feed their young.

Plate 32: Wooden Swift nest boxes in place and decorated by local school children.

Again, there could be a "Big Day" event to raise Swift awareness in the Temple Bar area and to bring the local stakeholders together.

7.3 Temple Bar Pollinator Plan

Many bee species were directly observed, and anecdotal evidence suggests great numbers in the Temple Bar district. However, one third of Ireland's bee species are threatened with extinction. This is because the areas that the bees nest in and the areas that they found food in have been drastically reduced.

There is an All-Ireland Pollinator Plan 2020 in action now and over the next 5 years this Plan aims to build a foundation to bring about a landscape where pollinators can flourish. The Plan proposes taking specific actions across five objectives:

— Making Ireland pollinator friendly (public land and private land).

— Raising awareness of pollinators and how to protect them.

— Managed pollinators- supporting beekeepers and growers.

— Expanding knowledge on pollinators and pollination services.

— Collecting evidence to track change and measure success.

The Temple Bar area can assist the Pollinator Plan by selecting some of the objectives from the Plan and adapt them to what is feasible regarding time and budget constraints.

Bee Nesting Hotels

To survive and thrive, wild pollinators need safe nesting habitats. Nesting sites provide pollinators with shelter and protect them from predators and allow next year's pollinators to grow and develop. Natural habitats suitable for wild bee nesting are not as common in the landscape as they once were. Fortunately, creating new nesting habitats is incredibly simple, inexpensive and safe.

Wild bees (bumblebees and solitary bees) nest in small colonies and are completely focused on collecting food for themselves and their young. They have no interest in interacting with humans, are not aggressive and pose no threat to the public, even while nesting.

Plate 33: A small Bee Hotel and a "not so small" Bee Hotel.

10 species of Solitary Bees will nest in the Bee Hotels. The Bee Hotels must be located close to a good food source (flowers). Some Solitary bees will only travel a few hundred meters to find food. The Bee Hotels must be in full sun (south or south-east facing), kept dry all the time and be at least a meter off the ground.

They are relatively easy to make and can just comprise of cut up bamboo canes of different diameter and something to keep them together and dry like the coffee mug above. Again, this could be a great project for children and adults alike to design and create different shapes and sizes of Bee Hotel.

7.3 Temple Bar Pollinator Plan (*continued*)

Container planting with wildflower mixes

Generally planting containers with flowering plants is better than the absence of these but if the containers were planted with wild flower mixes it would create a huge difference to the bee population.

Plate 34: Seed Bombs can be made or purchased quite easily and then placed in a container full of compost and watered to produce the desired effect....a native wildflower container.

Plate 35: Wildflower container planting in full bloom.

This practice of using Irish made Seed Bombs could be started off on a trial basis to see what works where and these containers could be placed close to Bee Hotels for maximum effect.

Overall, these practices to improve the bee population in the Temple Bar area and to align the area with the All Ireland Pollinator Plan are not very expensive and are easy to manage and trial on a small scale to monitor results.

7.4 Other considerations for Biodiversity improvement in Temple Bar

The development of green roofs in the Temple Bar Area.

This can be implemented with 3 issues in mind:

1. Purely for the reduction of the heat island effect and grow sedum plants and wildflowers for increased insect abundance.

2. For public access to roofs for recreational purposes such as relaxing.

3. This same initiative can be done in conjunction with hotels, bars and restaurants.

- Introducing a standalone Biodiversity Competition with discrete categories business types (café, bar & restaurants) for outside displays and roof gardens with a tangible and well publicised prize and ceremony.
- The linking of the residential zone with the business zone using trees in containers to create a bio-cultural avenue ending at Handel's Garden.
- Initiatives like the Community Employment Scheme should be started back up not to keep people off the live register but to create jobs through a community garden scheme for the whole area.
- The organising of more "Big Day Events" to bring people into the area and make them aware of biodiversity in an urban context while generating publicity and interest in the Temple Bar Area.
- Making the Temple Bar Area the main driver of biodiversity in an urban context through the Tidy Towns Competition.
- Making Temple Bar the first show case example of the "Vertical Garden" which would be a huge tourist attraction in itself.
- Use an educational environmental organization such as ECO UNESCO to tie-in schools with an urban ecology project such as design an "Urban Ecological Garden".
- The development of derelict sites in the area could benefit from planting. Encouraging the growth of climbing plants at certain locations.
- The businesses could be brought together and work as a community to formulate plans to address the needs of an area together and implement these plans if needs be by themselves.
- Bringing all the different organisations in the Temple Bar Area together under one roof in a forum and agree on some real action and project and not to just "Green Wash" the area.
- There should be a concerted drive to get Dublin City Council and the local businesses to come together and try an experiment to plant the Temple Bar Area using wild flower species, even for just one year.
- The idea of first step concept that everything must begin somewhere and that everything is the first step in a long process that build on top of each other that eventually can create something that is realistic in the future.

7.5 Beneficial Trees, Hedges/Shrubs, Flowers, Herbs and Bulbs for Wildlife in an Urban Area

The built environment of city centers such as the Temple Bar Area, can place a huge stress on the capacity of that area to accommodate wildlife. The effects of the highly developed area can be mitigated by planting trees, hedges/shrubs, flowers, herbs and bulbs that will attract and retain wildlife.

Trees

When planting trees in the city center, much consideration must be paid to "the right tree planted in the right place". This means, selecting the correct tree (whether it is native or not) that suits the local environment, that is beneficial to the local wildlife and has certain growing attributes such as a small to medium size and can tolerated pollution. The right place for a tree is some where it will have enough light and room to grow properly and a place where it won't get badly damaged. Below is an introduction to some of the trees that can be planted in city center areas.

Plate 36: The Mountain Ash *(Sorbus aucuparia)*, the Hawthorn *(Crataegus monogyna)* and the Alder *(Alnus)* are native Irish small trees which support an abundance of bird and insect species throughout the year.

The **Mountain Ash** tree is a native to Ireland and it can be used as a street tree quite easily as it can survive in moderately fertile soils (slightly acidic) and can tolerate pollution. In the early summer it produces an abundant number of small, white, nectar-rich flowers which attract large amounts of bees and in the Autumn the red berries produced by the plant support a wide range of birds. Moths, such as the brimstone and underwing, also feed on the leaves.

The **Hawthorn** tree/hedge is also native to Ireland and it also can be used as a street tree as it can grow in dry and wet soil and it too can tolerate pollution. Hawthorn supports many insects the caterpillars of over 70 species of moth and is an important nectar source for bees early in the year. The berries also provide vital winter food supplies for birds such as redwings and field fares.

As well as the two trees above, there are other trees which can be considered for urban planting: **Alder** *(Alnus):* this fast-growing native tree grows well in wet conditions and it provides an excellent habitat for birds and wildlife for shelter, nesting and as a food source for moths.

Silver Birch *(Betula pendula):* this attractive native tree can be used in an urban setting as it is fast growing and it can grow in water logged soil. The seeds attract finches and many other small birds. The caterpillars of about 30 moth species as well as many other insects feed on the leaves.

7.5 Beneficial Trees, Hedges/Shrubs, Flowers, Herbs and Bulbs for Wildlife in an Urban Area *(continued)*

Hedging

Hedges in an urban area can be used effectively to create small habitats for wildlife when there is not enough room for trees. Hedge plants can be planted in a continuous row to give the "Hedge" appearance, or they can be planted as a shrub. Below are some of native and non-native hedging plants.

Plate 37: A Holly hedge in Autumn with ripe red berries which attract many foraging birds.

Holly *(Ilex aquifolium)* is a native species and it can be grown in an urban area. It can tolerate shade and it requires a slightly acidic soil. It is slow growing, so it is best used in a mixed hedge scenario. Its small white flowers in spring are packed with nectar which attract many insects including the Holly Blue Butterfly and the red berries are eaten by Robins and Thrushes in the winter.

Beech *(Fagus sylvatica)* is not native to Ireland, however, it can be used effectively as a hedge in urban areas as it is shade tolerant and it can grow in a wide range of soil types. Beech nuts are attractive to squirrels and birds and the leaves provide food for caterpillars of over 20 moth species.

Hazel *(Corylus avellane)* is a native tree/hedge and it can grow in most soils and in partial shade. It is an important plant for wildlife as it can support many species of birds, insects and mammals. Bees feed on the early source of pollen and birds eat the nuts.

Plate 38: The Mountain Ash *(Sorbus aucuparia)*, the Hawthorn *(Crataegus monogyna)* and the Alder *(Alnus)* are native Irish small trees which support an abundance of bird and insect species throughout the year.

7.5 Beneficial Trees, Hedges/Shrubs, Flowers, Herbs and Bulbs for Wildlife in an Urban Area *(continued)*

The following plants can be grown in a mixed hedge or simply by themselves. **Cotoneaster** *(Cotoneaster lacteus),* **Firethorn** *(Pyracantha coccinea)* and **Elderberry** *(Smabucus nigra)* produce nectar rich flowers which attract bees and other insects and insect eating birds. They also produce copious amounts of berries which are eaten by finches, blackbirds and sparrows.

The following plants can again by simply grown by themselves. **Common Lilac** (Syringa vulgaris), **Butterfly Bush** *(Buddleia davidii)* and **Skimmia** *(Skimmia japonica)* produce a vast amount of nectar rich flowers which are very popular with bees, hoverflies and butterflies. The seeds and fruits are eaten by birds when food becomes scarce in Autumn and the plants are often used for nesting.

Wildflowers

Planting wildflowers is an amazing way of greatly increasing the abundance and variety of wildlife in any area. It is also notably an easy way of increasing the amenity value of an area as a beautiful array of different shaped and coloured flowers is always pleasing to the eye. The annual, biennial and perennial flowers below create a huge resource for insects and birds. All the flowers are laden with nectar and attract a vast abundance of pollinating honeybees, bumblebees, hoverflies, day-flying moths and butterflies. In turn, these insects will attract insect eating birds and birds will feed on the seeds of certain flowers. Some of these flowers, such as the Foxglove, also provide an over wintering habitat for certain insects. Below is a list of some of the beneficial flowers that can be planted and grown in an urban area such as the Temple Bar District. All of these flowers can be grown in window boxes, large containers and plant pots with ease. The wildflower plants below are divided here into two sections due to their life cycles.

1. Annuals and Biennials: which are plants that complete their lifecycles (lives, flowers and dies) in a single year or two years respectively. Below is a list of some of the best wildlife enhancing flowers that can be grown in an urban area.

Lobelia *(Lobelia erinus),* **Sunflower** *(Helianthus annus),* **Foxglove** *(Digitalis purpurea)*, **English Marigold** *(Calendual officinalis)*, **Borage** *(Borage officinalis)*, **Sweet William** *(Dianthus baratus)*, **Wallflower** *(Erysimum cheiri)*, **Poached Egg Plant** *(Limnanthes douglasii)*, **Petunia** *(Petunia x hybrida)*, **Nasturtium** *(Tropaeolum majus)*, **Tall Verbena** *(Verbena bonariensis)*, **French Marigold** *(Tagetes patula)*, **Phacelia** *(Phacelia tanacetifolia)* and **Love-Lies-Bleeding** *(Amaranthus caudatus)*.

Plate 39: Sunflowers, Foxgloves and Nasturtiums in flower attracting bees, butterflies and hoverflies.

7.5 Beneficial Trees, Hedges/Shrubs, Flowers, Herbs and Bulbs for Wildlife in an Urban Area *(continued)*

2. Perrenials: which are plants that continue to live where they are planted for many years. Below is a list of some of the best wildlife enhancing flowers that can be grown in an urban area. These flowers are longer living and therefore would favour a permanent planting site such as a large container box.

Lupin *(Lupinis nootkatensis)*, **Dahlia** *(Dahlia Collerette Group)*, **Perennial Cornflower** *(Centaura momtana)*, **Geranium** *(Geranium maculatum)*, **Coneflower** *(Rudbekia fulgida),* **Cowslip** *(Primula veris)*, **Scabious** *(Scabiosa caucasia)*, **Golden Rod** *(Solidagio virgaurea)*, **Mullein** *(Verbascum olympicum)*, **Sweet violet** *(Viola odorata)*, **Ice Plant** *(Syn. Sedum spectabile)*, **Red Valerian** *(Centranthus ruber)*, **Yellow Chamomile** *(Anthemis tinctorial)* and **Yellow Alyssum** *(Aurinia saxatilis)*.

Plate 40: Lupins, Geraniums and Coneflowers all in flower, creating nectar rich food source for many insects and also providing food for the birds who feed on the insects.

Herbs

Herbs have been grown and used for thousands of years to flavor and preserve food, treat ailments, ward off pests and diseases, freshen the air, and decorate and enhance people's lives. These herbs can also create a bountiful array of nectar rich flowers for a vast number of bees, hoverflies and butterflies, and again can create habitats for spiders, beetles and hibernating insects. Herbs such as Lavender and Spearmint also provide a welcome food source with their seeds in Autumn for birds. The herbs below can be grown in container boxes and plant pots.

Rosemary *(Rosmarinus officinalis),* **Common Sage** *(Salvia officinalis)*, **Thyme** *(Thymus vulgaris)*, **Dill** *(Anethum graveolens)*, **Caraway** *(Carum carvi)*, **Lavender** *(Lavandula angustifolia)*, **Lemon Balm** *(Melissa officinalis)*, **Tansy** *(Tanacetum vulgare)*, **Sweet Marjoram** *(Origanium majorana)* and **Spearmint** *(Mentha spicata)*.

Plate 41: Rosemary, Sage and Thyme, tasty and medicinal herbs that are also beneficial to the local wildlife.

7.5 Beneficial Trees, Hedges/Shrubs, Flowers, Herbs and Bulbs for Wildlife in an Urban Area *(continued)*

Bulbs

Bulbs are commonly planted in gardens and parks to create a low maintenance riot of colour for a period of time. However, bulbs can also be grown in plant pots and containers, so they can be cultivated in city centre areas once they have full sun or partial shade. They can produce early nectar rich flowers, which attract bees and butterflies as well as introducing a much-loved splash of colour and sweet smell to its immediate surroundings. Below is a list of some bulbs that can be considered for urban planting.

Bluebells *(Hyacinthoides non-scripta)*, **Wild Daffodil** *(Narcissus pseudonarcissus)*, **Tulip** *(Tulipa biflora)*, **Grape Hyacinth** *(Muscari armeniacum)*, **Crocus** *(Crocus chrysanthus)*, **Ornamental Onion** *(Allium giganteum)*, **Glory Of The Snow** *(Chionodoxa luciliae)*, **Winter Aconite** *(Eranthis hyemalis).*

Plate 42: Bluebells, Tulips and Crocuses in flower proving nectar laden flowers for bees and hoverflies.

Climbers

Climbing plants are usually associated with residential gardens, however, they can grow very well in full sun or partial shade in large container boxes or large plant pots in a well-drained fertile soil compost mix. Therefore, these plants can be trained to grow on balconies and in areas of hard surfacing such as the Temple Bar Area. These plants produce sweet smelling nectar laden flowers, which attract bees and butterflies during the day and night visiting moths at night. Common Ivy produces flowers buds that can be eaten by caterpillars and nectar for bees and butterflies. Ivy also produces berries that can provide valuable winter food for birds, particularly thrushes and finches. A lot of these climbers provide ideal foliage and branch structure for nests and foraging. Below is a list of some climbers to consider in an urban area.

Common Ivy *(Hedra Helix)*, **Clematis** *(Clematis tangutica)*, **Common Jasmine** *(Jasminum officinale)*, **Common Honeysuckle** *(Lonicera periclymenum)* and **Chinese Wisteria** *(Wisteria sinensis)*.

Plate 43: Common Jasmine, Clematis and Common Honeysuckle providing nesting sites and food for insects and birds.

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9. Appendix

Birds observed in the Temple Bar Area

1. Mute Swan (regular) *Cygnus olor*
2. Brent Goose (flying over) *Branta bernicla hrota*
3. Cormorant (daily) *Phalacrocorax carbo*
4. Grey Heron (regular) *Ardea cinerea*
5. Little Grebe (occasional) *Tachybaptus ruficollis*
6. Peregrine Falcon (2-3 times a week on the top of the Central Bank, since February 2009, a pair seen on 3 occasions. Used as a plucking post. Nest unlikely.) *Falco peregrinus*
7. Mediterranean Gull (occasional) *Larus melanocephalus*
8. Black-headed Gull (abundant in season) *Larus ridibundus*
9. Lesser Black-backed Gull (nesting in area) *Larus fuscus*
10. Herring Gull (nesting in area) *Larus argentatus*
11. Great Black-backed Gull *Larus marinus*
12. Mallard *Anus platyrhynchos*
13. Common Tern, 18 May 2008 *Sterna hirundo*
14. Black Guillemot (regular under the Ha'penny bridge, nesting under IFSC HQ)) *Cepphus grylle*
15. Swift (in season) *Apus apus*
16. Swallow (in season) *Hirundo rustica*
17. Grey Wagtail (regular on the top of the ESB substation) *Motacilla cinerea*
18. Pied Wagtail (100 roosting on Westmoreland St, regular in 2009, previously in 2008 they roosted on bachelor's Walk) *Motacilla alba*
19. Blackbird *Turdus merula*
20. Fieldfare – occasional in season *Turdus pilaris*
21. Song Thrush *Turdus philomelos*
22. Redwing – occasional in season Turdus iliacus
23. Mistle Thrush – frequent (birds also seen in Trinity and on O'Connell St) *Turdus viscivorus*
24. Waxwings (heard in January 2009 at the Crampton Buildings) *Bombycilla garrulous*
25. Blue Tit *Parus caerulus*
26. Magpie *Pica pica*
27. Jackdaw *Corvus monedula*
28. Rook *Corvus frugilegus*
29. Hooded Crow *Corvus corone*
30. Starling *Sturnus vulgaris*
31. House Sparrow (12 in 2007, 18 in 2008 coming to feeder and otherwise around Temple Bar) *Passer montanus*
32. Linnet (only once May 2008 on the roof of the ESB substation, possibly passing through) *Carduelis cannabina*

9. Appendix

Plant Species of interest observed in the Temple Bar Area

1. Hornbeam trees *(Carpinus ssp)*
2. Sycamore trees *(Plantanus ssp)*
3. Birch trees *(Betula ssp)*
4. Mountain Ash trees *(Sorbus acuparia)*
5. Firethorn *(Pyracantha ssp)*
6. Yew tree *(Taxus bacatta)*
7. Heather *(Calluna vulgaris)*
8. Butterfly Bush *(Buddleia davidii)*

These species contribute to enhancing the biodiversity in the Temple Bar Area through creating areas for birds to roost at night, producing flowers for a wide range of insects and therefore creating food for birds through the insect populations and the berries some them produce for birds during the winter