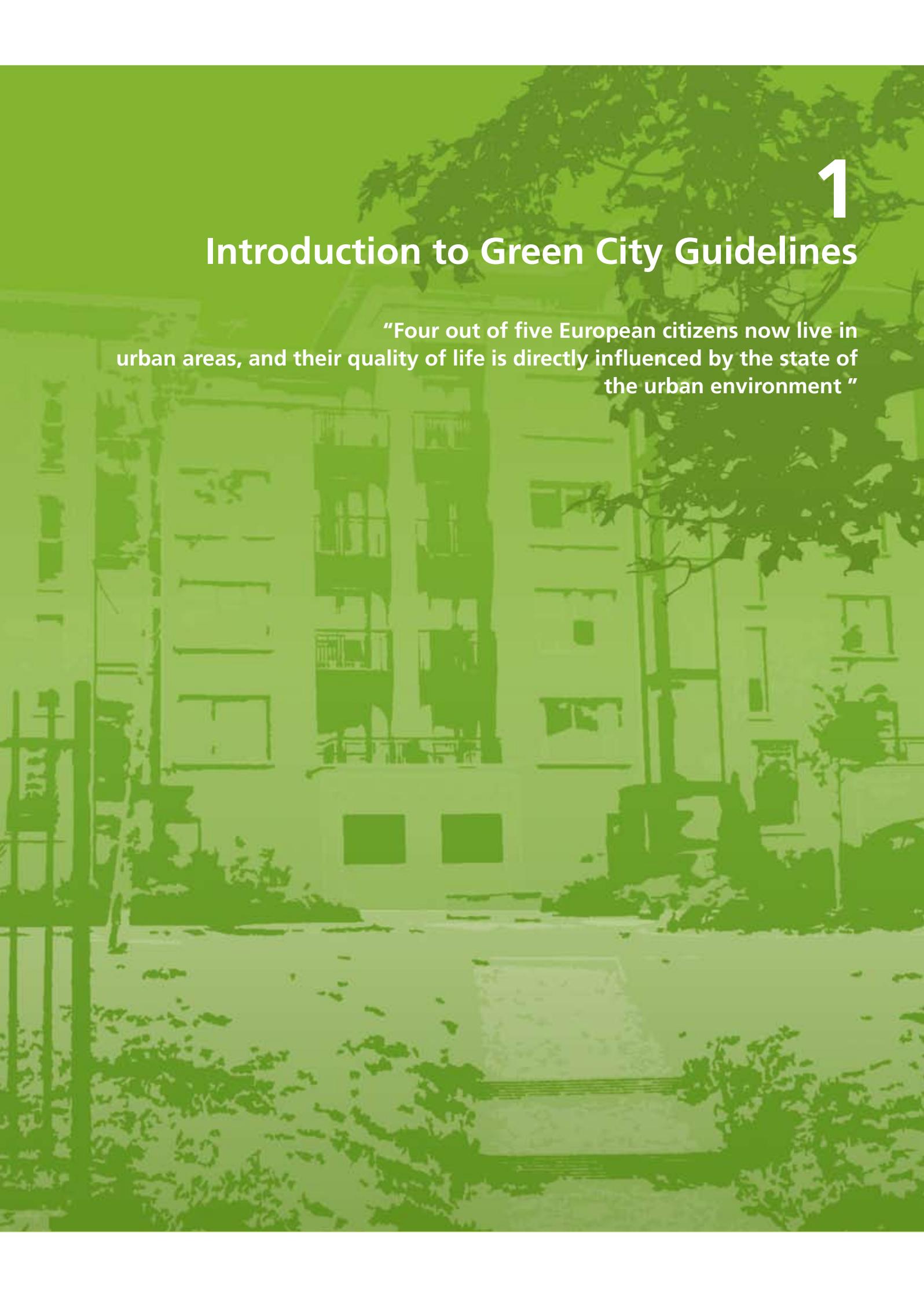# 1

# Introduction to Green City Guidelines

**"Four out of five European citizens now live in urban areas, and their quality of life is directly influenced by the state of the urban environment "**

# 1. Introduction to Green City Guidelines

## 1.1 BACKGROUND

In 2007, for the first time in human history, the world's urban population exceeded its rural population (UNEP, 2007). Four out of five European citizens now live in urban areas, and their quality of life is directly influenced by the state of the urban environment (EC, 2004). Ireland stands out in Europe in having one of the fastest rates of urbanisation at present. We are changing from a once rural population to a predominantly urban one. The associated problems of urban sprawl, a degraded urban environment and the loss of biodiversity require sustainable urban design and appropriate land-use and planning to help counteract the effects (EC, 2004).

*Planning for urban biodiversity presents a number of challenges: higher population densities, strong development pressure and competing demands on space. However, cities are dynamic landscapes that present opportunity for regeneration and enhancement through incorporating innovative design and the latest best practice methods. A series of planning policies, based around optimising the sustainability of urban areas, is promoting higher densities within the Irish housing stock. These trends are likely to continue in the immediate future.*



Plate 1. View of Dublin City with high-density development in the foreground.



Plate 2. A new high-density development in South Dublin.

The Residential Density Guidelines, published by the Government in 1999, called for higher densities in urban areas. This was a response to calls for increased sustainability, particularly in relation to the location of housing relative to employment and amenities, and Local Authorities have followed suit with policies for higher densities, mixing of uses and intensification around town centres and transport hubs.

**The objectives of the Green City Guidelines are to identify the key stages in planning and development where biodiversity can be integrated into medium to high-density urban development and to highlight current best practice methods for protecting and enhancing biodiversity throughout the lifetime of the development.** The Guidelines have taken a three-tiered approach: a review of key stages in the planning system, a review of existing guidance on biodiversity integration and an examination of case studies from a selection of urban typologies in the Dún Laoghaire-Rathdown and Fingal County Council areas. The Guidelines are designed to be user friendly and accessible with examples and photographical illustrations as appropriate.

There is currently a substantial body of guidance documents from the United Kingdom, continental Europe and the United States on how biodiversity can be successfully integrated into different aspects of planning and development. The Green City Guidelines have drawn extensively on existing recommendations and best practice guidance, as they relate to urban development. Standard guidance documents are referred to throughout the text and can be consulted for specialist advice on specific areas.

Many documents are now available on-line and links to websites are provided in the bibliography section. The discipline of urban ecology and the process of integrating biodiversity into high-density developments are still relatively new in an Irish context. It is anticipated that the Guidelines will be reviewed and updated to reflect the Irish experience as the planning system and best practice methods evolve. The Guidelines examined the existing biodiversity resources within a representative sample of case study urban sites. Key biodiversity indicators were identified and described from a range of urban typologies specific to the administrative areas of Dún Laoghaire-Rathdown County Council and Fingal County Council. The resources were identified and described in terms of their current and potential value.

## 1.2 DEFINING BIODIVERSITY

Biodiversity is the shorthand for Biological Diversity and refers to the variation of all life on earth (Gaston & Spicer, 2004). It is most commonly divided into three levels of biological organisation; genes, species, and ecosystems, which relate to different aspects of living systems that can be measured in different ways. The term Biodiversity is essentially a new name for an old concept. The term was first used in the late 1980s and then came into popular use following the Convention on Biological Diversity in 1992. Whether we refer to it as nature, flora and fauna, or biodiversity, it remains the variety of all living organisms on the planet at this time.

## 1.3 THE VALUE OF URBAN BIODIVERSITY

City habitats are often viewed as being less important than their rural counterparts. However, cities support a range of natural and modified habitats in close proximity to each other. Cities are frequently located in areas where biodiversity resources are concentrated such as on rivers, hilltops and along the coast. In some cases, these have been heavily altered and have lost their ability to support the same diversity of life



Plate 3. The hill of Howth and Dublin Bay supporting diverse habitats and species.

as they once did. In other cases, through protection, restoration or by chance, they continue to support remnants of the surrounding countryside that have been incorporated into the urban environment.

Habitats that are heavily modified or artificial in origin, such as gardens and parks, feature prominently in cities. Although these areas typically support an abundance of non-native species, they can play a significant part in supporting wildlife. They are most beneficial when they support a mosaic of habitats and a diversity of fruit and nectar bearing species that can provide shelter and an abundant food source for a variety of common mammals, birds and invertebrates. Artificial water features are also common in landscaped habitats and play a vital role in encouraging wildlife. Gardens and parks represent a major biodiversity resource in urban areas that could be significantly enhanced through more wildlife-friendly management.

Urban areas support unique communities rarely found outside the urban continuum. Wastelands and abandoned industrial sites provide unusual physical conditions such as altered soils, which in turn give rise to unique communities of plants. Cemeteries, railway embankments and road verges often support species-rich communities that have evolved over time. Urban vegetation must contend with unusual and sometimes adverse conditions including wind tunnel effects, high dust levels, compacted soils and air pollution. Heat islands created by large urban areas and high levels of illumination can lead to extended growth periods and encourage a greater range of species. While urban habitats do not always mimic their rural counterparts, they provide a range of rich and often unusual communities specific to the urban environment.

As a consequence of the presence of natural features, modified habitats and the range of unusual communities encountered, cities frequently support a greater diversity of species than the surrounding countryside. In many European countries where the surrounding landscape has been intensively altered, cities support a comparatively higher number of species (Laurie, 1979). However, it should be cautioned that while species diversity is an important factor, created habitats are no replacement for the loss of valuable semi-natural habitats that have evolved into stable communities over decades or centuries. The true value of biodiversity relates to more than the numbers of species and kinds of ecosystems that support life. Biodiversity provides us with an array of services and performs functions, which humans depend on for survival. **Urban areas are highly modified and complex landscapes in which biodiversity is seen as having many benefits for humans as well as wildlife (Pickett et al., 2005, 2004).**

## Environmental services and functions

In general, the range of environmental services supplied by ecological systems is extensive and includes climate regulation, water supply, erosion control, soil formation, food production, nutrient cycling, pollination and raw material supply. The perception of the city as separated from the natural processes that support life is a long-standing misconception (Hough, 2004). Plants



Plate 4. Common reed *(Phragmites australis),* an important plant in constructed wetlands.

improve air quality by removing significant amounts of pollutants and greenhouse gases and consequently improving environmental quality and human health (Nowak, 2006). Vegetation can also have positive energy effects on buildings by providing shelter or shade under appropriate conditions (Nowak, 2000).

Vegetated areas and urban wetlands serve a variety of hydrological functions. In addition to cleaning, storing rainwater in ponds and wetlands, they play a fundamental role in hydrological balance. Soil and vegetation retain moisture much longer than hard surfaces and dramatically slow down runoff to the urban sewer systems. This is particularly useful in times of heavy rainfall when systems can become overloaded and flooding occurs. **As climatic changes occur and weather events become more erratic, the role of urban vegetation and wetlands in maintaining the hydrological balance will become more important.**

## Economic value

Biodiversity supplies important economic commodities to a range of diverse sectors including agriculture, mineral extraction, pharmaceuticals and tourism and recreation. Many of these commodities are invaluable to our current way of life and ultimately our existence.

Within the urban environment, there is a new emphasis on eco-friendly developments. Incorporating sustainable features including waste recycling, energy efficiency and renewable material into new developments is becoming an accepted practice as our awareness about environmental issues increases.

However, many developments are now being designed to incorporate biodiversity-enhancing features such as mature trees and compensatory features for wildlife including bat and bird boxes.



Plate 5. Mature trees in residential development can add to the value of the property.

The impetus for this is twofold: the planning system is becoming increasingly aware of its legal obligation in relation to conserving biodiversity and mature or scenic settings can add to the value of the property.

Urban housing developments that are adjacent to natural amenities such as woodland, parks, waterways and the coastline are more attractive to buyers and this is often reflected in market prices. Several studies from the US and UK have shown that street trees and views of natural landscapes and waterways can increase property values by between 5% and 18% (Johnston & Newton, 2004, National Urban Forestry Unit, 1998).

**Ultimately, as cities become greener they create a more attractive place for people to live, work and invest, which in turn enhances the potential for job creation, inward investment and economic growth (Johnston & Newton, 2004, EC, 2004).**

## Human values

The values placed on biodiversity often arise from its ability to support human life through services and functions and other social benefits relating to recreation and amenity. These elements tend to focus on how the physical environment, such as clean air and water, affects public health (Tzoulas & James, 2004, 2005). Human contact with nature is also recognised as valuable in many ways: contact with nature is promoted as an important factor for child development (Barker and Graf 1989); it provides an immediate restorative effect following stress (Ulrich, et al, 1991) and a more long-term beneficial effect on our sense of well-being (Kaplan, 1995). At a time when more people and families are living in high-density, urban environments, there is a greater need to design new developments that can help realise the potential benefits of biodiversity on physical health and psychological well being.

## Biocentric value

Many notable environmentalists have championed the idea that all life has the right to exist and that as humans we are intrinsically connected with all other species (Leopold, 1970, Wilson, 1984). The Convention on Biological Diversity also refers to the intrinsic value of biodiversity, and underlines human responsibility toward other living things. Because human activity is now the primary reason for nearly all extinctions, some believe that our responsibilities extend further than passive interactions and we are obliged to actively protect biodiversity (Noss, 1995).

## 1.4 THREATS TO BIODIVERSITY

*"I think we have an obligation in our generation and in foreseeable generations, to try to protect every species, because virtually every species that is going extinct now is going extinct due to human activity not because of natural processes".*
*(R. Noss, 1995)*

The expansion of life has not been a steady progression. To date, it has been punctuated by five mass extinctions and it is becoming increasingly evident that we are currently in the early stages of a new event. While extinction is a natural process, the current rate of extinction is much higher than "background" or expected rates. This extinction event differs from previous events in that it is caused by the unsustainable management of the planet by just one species: humans (Stuart, 1999). **The most common causes of species loss are: habitat destruction and degradation, over exploitation, pollution,disease, invasions of alien species, and most recently, the impacts of global climate change (IUCN, 2004). The process of urbanisation contributes to each of these common causes and is becoming a significant global problem in terms of biodiversity loss.**

## 1.5 HALTING THE LOSS OF IRISH BIODIVERSITY

In recognition of increased biodiversity loss, the 1992 Convention on Biological Diversity (Rio Convention) was dedicated to finding global policies to halt the decline. **Ireland as a signatory to the Convention undertook to implement its principles at national and local levels by formulating a strategy as set out in the National Biodiversity Plan.** This identifies 87 actions that are to be undertaken, including the integration of biodiversity into all sectors. Implementation of this plan requires the integration of policies at national and local level and cross-sectoral co-operation. This means that all sectors, directly or indirectly connected with biodiversity, must examine their activities and minimise any negative impacts they are likely to cause.
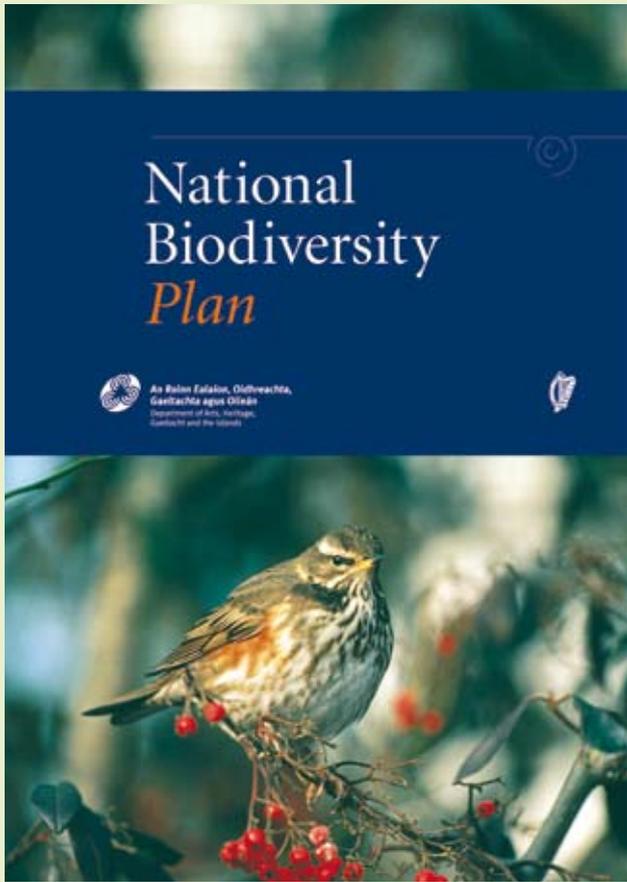
In Ireland, many sites and species of national and international biodiversity value are designated as Natural Heritage Areas, Special Areas of Conservation and Special Protection Areas. These are protected under law and through the planning system. However, they account for only a small amount of the landmass. Substantial areas with high biodiversity value remain unprotected, and in some cases, unrecorded.

**Local Biodiversity Action Plans (LBAP) set out the objectives for biodiversity conservation within the county.** They bring together existing knowledge on the state of local habitats, flora and fauna and identify the conservation needs within the county. As part of local biodiversity strategies, several biodiversity initiatives are ongoing within the country to identify areas of local biodiversity value. This work will feed into and inform the planning process, helping to identify sensitive areas where development would be damaging and areas suitable for new development. New development sites will require further investigation to identify, not just the potential biodiversity losses, but also the opportunities and gains that can be made through good planning and design.

Plate 6. The first National Biodiversity Plan sets out Ireland's strategy towards halting biodiversity loss.

One of the actions identified in the National Biodiversity Plan is the promotion of biodiversity among the public. Cities provide an ideal opportunity for people to become acquainted with their local biodiversity and become involved with initiatives in their areas.