

Barcelona green infrastructure and biodiversity plan 2020. Summary



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INTRODUCTION

Barcelona is committed to preserving and enhancing the natural heritage present in the city to enable each and every one of us to benefit from and enjoy it. To achieve this in a systematic manner, we have drawn up this **Barcelona Green Infrastructure and Biodiversity Plan** setting out the goals we aim to reach and the various lines of action to engage in with a view to reaching said goals. It is vital to strive towards a city where nature and urbanity converge and enhance one another, where green infrastructure attains connectivity and where green heritage achieves continuity with the natural area surrounding it. Our aim is not for nature in the city to form a map of isolated spots; rather, we seek to forge a genuine network of green spaces. This greenery must be conceived as green infrastructure forming part and parcel of the city, serving an environmental and a social function.

From a forward-thinking approach, it is encouraging to consider that natural ecosystems, their flora and their fauna do not only belong to the city, they also constitute a collective asset of human-

kind as a whole. It is essential to realise that when enhancing urban green infrastructure the bearing we have extends far beyond the boundaries of the city. Consequently, this plan falls in line with the EU Biodiversity Strategy to 2020 and the strategies laid out along these lines by the UN by means of the Aichi targets for 2011-2020.

We should recall that for many years Barcelona has been actively committed to sustainability through its Agenda 21. Accordingly, this plan is another component of the overall endeavours the city is making in all areas, ranging from air quality to the protection of specific zones such as the Parc de Collserola, whilst likewise covering aspects directly linked to quality of life such as noise control and pet ownership. Barcelona City Council and the Metropolitan Area implement specific policies to enable nature to fit into the city and to enhance biological diversity based on the philosophy that a city with greater green infrastructure is a city where people can benefit from higher levels of health and wellbeing.

1.

WHY A GREEN INFRASTRUCTURE AND BIODIVERSITY PLAN?

Urban green areas and the biodiversity they house afford us with an excellent opportunity to witness nature thriving in a major city. These spaces serve specific environmental and social purposes – acting as a backdrop for socialising, playing games and taking strolls – which are essential to improve quality of life and personal wellbeing. **Barcelona Green Infrastructure and Biodiversity Plan** is a tool that sets out the challenges, goals and commitments of the City Council when it comes to the preservation of green infrastructure and biological diversity. Let us examine the plan in depth.

Biodiversity refers to the variety of life forms existing on Earth. It constitutes global natural heritage to be enjoyed by humankind as a whole. In the city, biodiversity is incorporated into the urban network in the same way as the constructed city (buildings, streets, etc.) and green areas play host to a vital component of biodiversity that is often overlooked: fauna, consisting of a huge variety of birds, small mammals, amphibians, insects and other organisms.

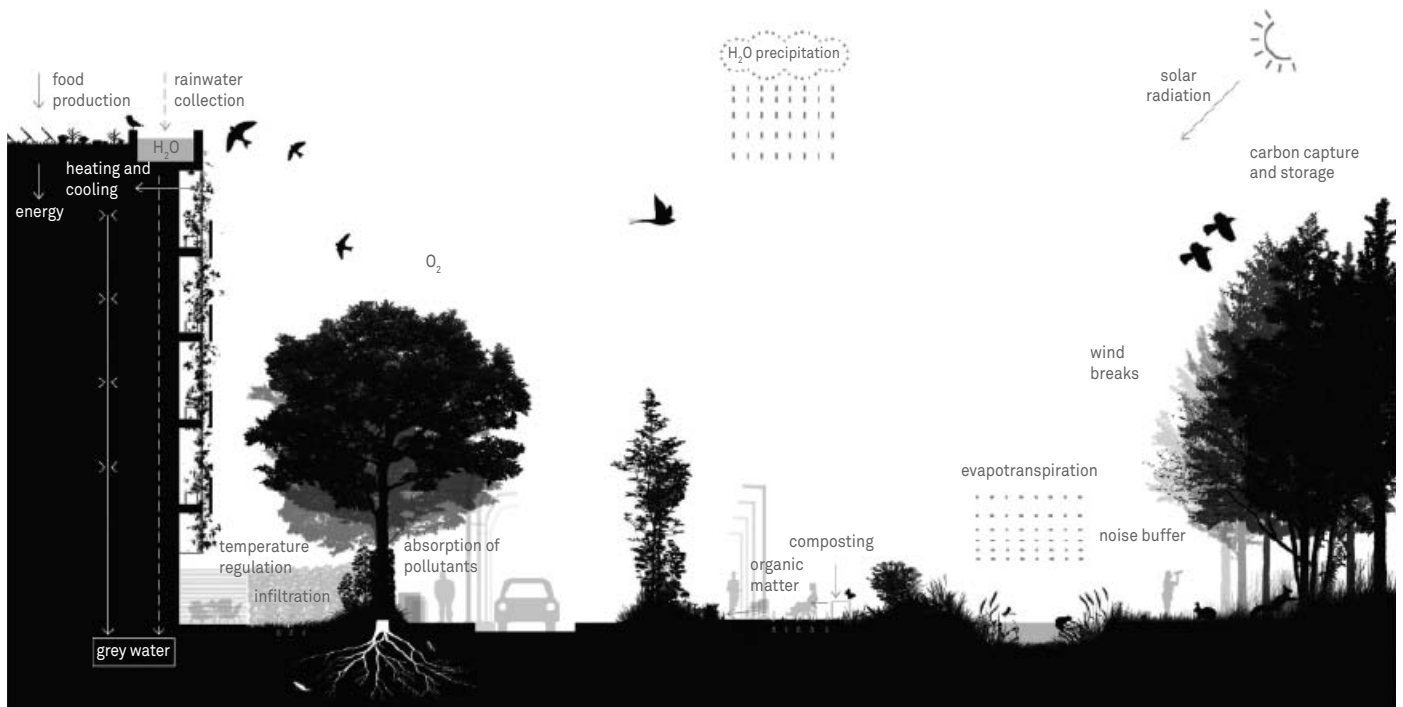
Green infrastructure refers to a life support system that carries out a vital role: enhancing the operation of a city and that of other infrastructure. The network of public and private areas with natural, agricultural and landscaped vegetation provides a host of ecological, environmental, social and even economic services. This contribution is enhanced when **connectivity** is achieved within green infrastructure, in other words, when continuity is attained with respect to green areas. This encourages the mobility of the organisms they house enabling the ecological processes and flows for which they are characterised – with regard to water, materials and creatures, etc. – to unfold undisturbed. It operates as a complete ecological system housing plant life and animal life at the same time.

Flora and fauna in the city afford major benefits to citizens. However, they are subject to many impacts and much pressure hindering their survival. The physical conditions in a city are not always the most ideal when it comes to the quality of soil and air or the availability of water and space, but the development and activities unfolding in a city – newly-constructed elements and day-to-day movement and traffic – have the greatest bearing on biodiversity. Nonetheless, some of the harm caused stems from our own bad practices: poor treatment of green areas is harmful, but introducing exotic fauna (for instance, releasing small animals such as tortoises and fish, etc.) can be damaging as well.

The need to preserve and enhance the city's natural heritage, however, is unquestionable. We as humans use the biosphere; therefore, we need to reap the maximum benefits from it in a sustainable fashion to allow future generations to witness this heritage in the best possible state. As a result, preservation is a complex task that entails the conservation, maintenance and sustainable use of resources, and the restoration and improvement of the environment.

Barcelona Green Infrastructure and Biodiversity Plan is a strategic instrument that sets out the long-term actions that are needed to attain **green infrastructure** that can serve a number of environmental and social functions, that can bring nature into the city with all the life forms it houses, that can achieve connectivity between the city and the broader territory and, lastly, that can make the city more fertile and resilient in order to face up to the very pressures and challenges it exerts. The aim is to secure a city model where **nature and urbanity interact and enhance one another** for the benefit of citizens to enable them to benefit from the natural heritage and be actively engaged in the protection and improvement of all areas.

Illustration showing the urban network with those aspects of its metabolism that are most closely related to green infrastructure and biodiversity



2. WHAT DO GREEN INFRASTRUCTURE AND BIODIVERSITY PROVIDE?

Barcelona is home to a complex system of green infrastructure comprising an extensive variety of components, ranging from natural open areas to vertical gardens grown on dividing walls and various

parks and squares. Each specific type of area or component has its own features and qualities, which can be enhanced when managed appropriately.

Summary of the main contributions of green infrastructure and biodiversity with a list of the types of areas providing these services in Barcelona

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| Values >> | Features >> |
|--|--|
| Environmental nature diversity complexity connectivity | Habitat quality Surface Soil quality Topographic diversity Permeability Presence of water |
| Sociocultural health beauty culture welfare relationships landscape | Biological quality Species richness Wealth of habitats Autochthonous/allochthonous index Density Stratification Health of flora and fauna Representation Uniqueness |
| | Environmental quality Acoustic comfort Climate comfort Air quality |
| | Sensory quality Olfactory quality Acoustic quality Colour quality Visual quality Seasonal and temporal variability |
| | Reception capacity Proximity Accessibility Calm traffic Miscellaneous uses Socialisation opportunities |
| | Cultural interest Identity Historical interest Artistic interest Educational interest |

They all provide ecological values that are vital to the city, such as wealth of species, as well as social and cultural values, such as the direct impact they have on wellbeing, health, beauty, cul-

ture and potential for socialisation. When we refer to features, we are gauging environmental and sensory-based quality, carrying capacity and cultural interest, among other aspects.

Functions



Types of spaces

Ensures the presence of nature in the city
 Preserves nature
 Preserves soil
 Produces organic matter and food
 Reduces air pollution
 Sequesters and stores carbon
 Reduces noise pollution
 Regulates the water cycle
 Provides moisture
 Moderates temperatures
 Saves on heating/cooling costs
 Creates landscaping
 Improves livability in the city
 Opens up pockets of space and contributes to pacifying the city
 Contributes to physical and mental wellbeing
 Creates environments for life and sensory enjoyment
 Creates environments for social interaction
 Provides spaces for leisure, recreation and physical activity
 Provides opportunities for cultural, educational and research activities
 Generates tourist appeal
 Promotes contact and interaction with nature
 Generates added value
 Generates business opportunities

Open natural space
 River area
 Coast
 Forest
 Park
 Garden
 Vegetable garden
 Pond
 Square
 Tree-lined street
 Landscaped street
 Green roof
 Green wall and/or vertical garden

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The following diagrams provide a quantitative overview of the values afforded by these features in certain spaces, demonstrating the various contributions each type of space provides. The accompanying photographs show features that have received a rating above five, in other words, those that stand out.

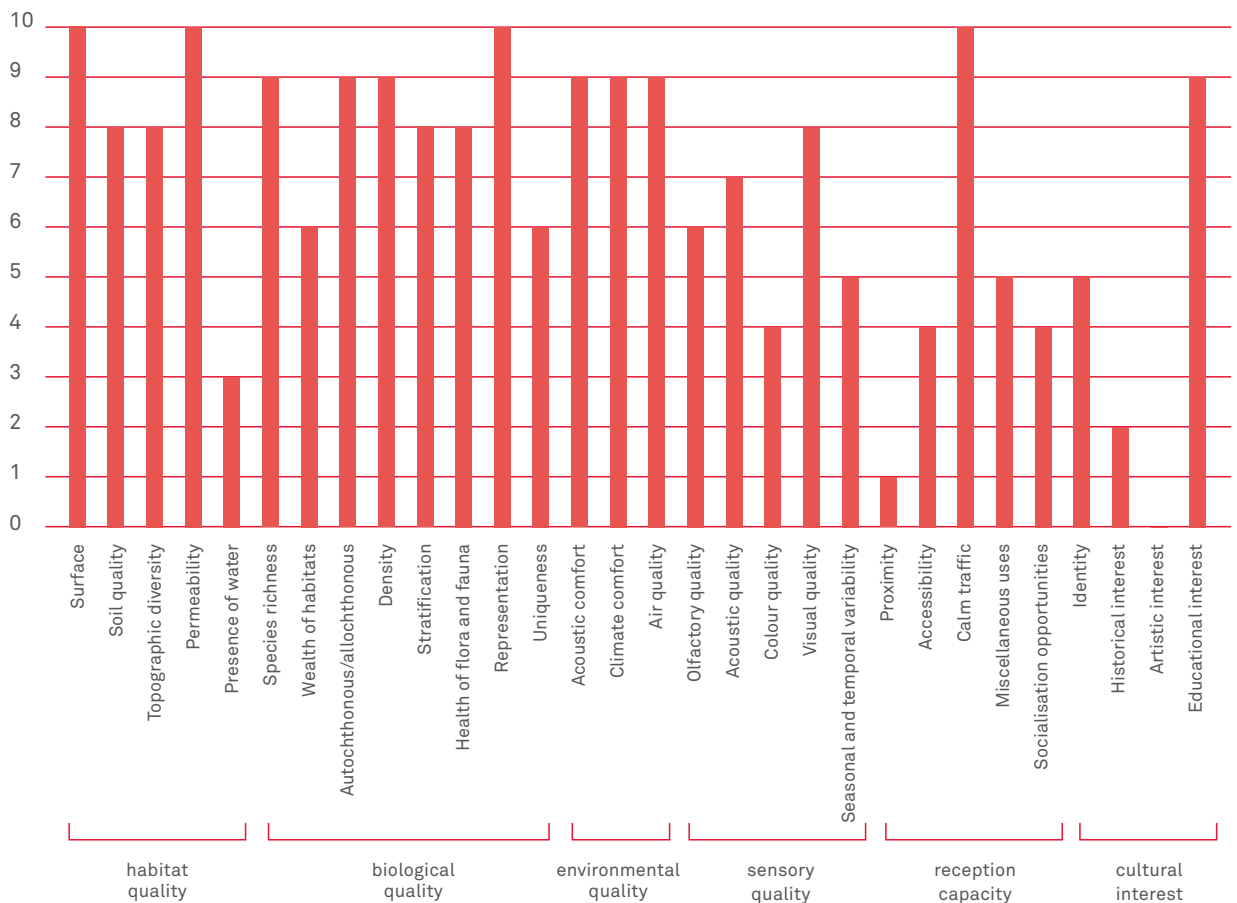
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Forest



Forest

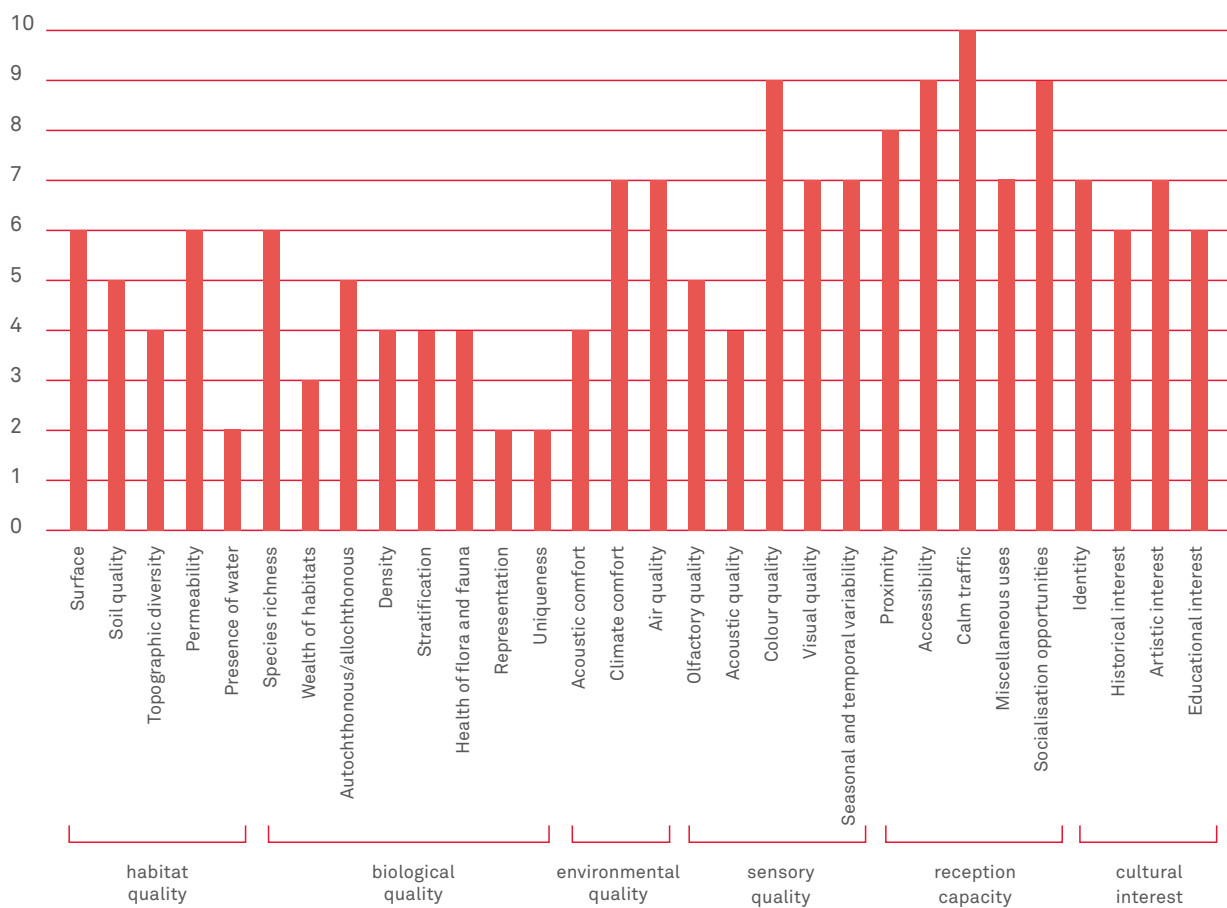


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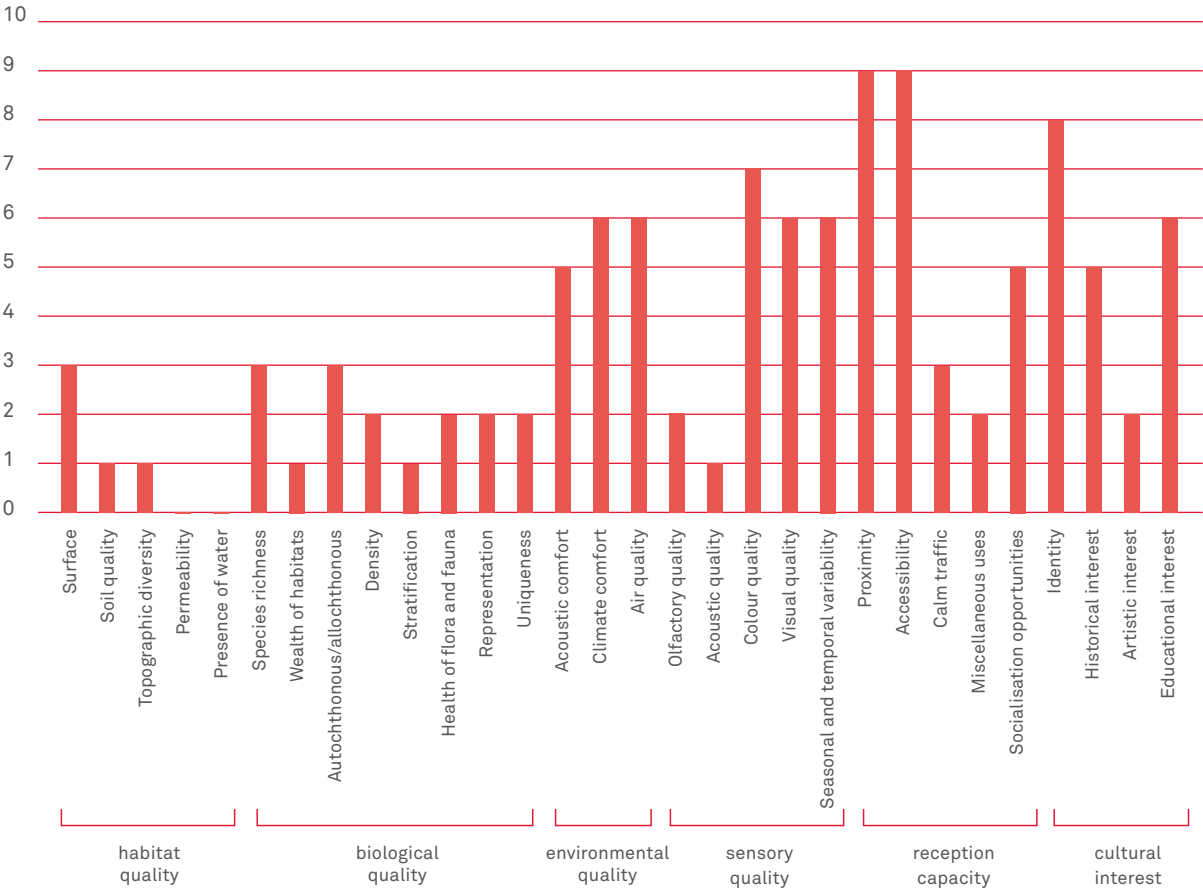
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Garden





Tree-lined street



Tree-lined street



3. WHAT HAVE WE ACHIEVED?

The municipal district of Barcelona has a surface area of nigh on 100 km² and houses a huge variety of natural spaces with typical fauna because it lies in a highly favourable location: it is aligned by two rivers (with the respective deltas), the coastline, Montjuïc mountain and the Collserola mountain range, with woods altered as a result of human action. All of this nature lends the area a host of crops, dry grasslands, scrub-

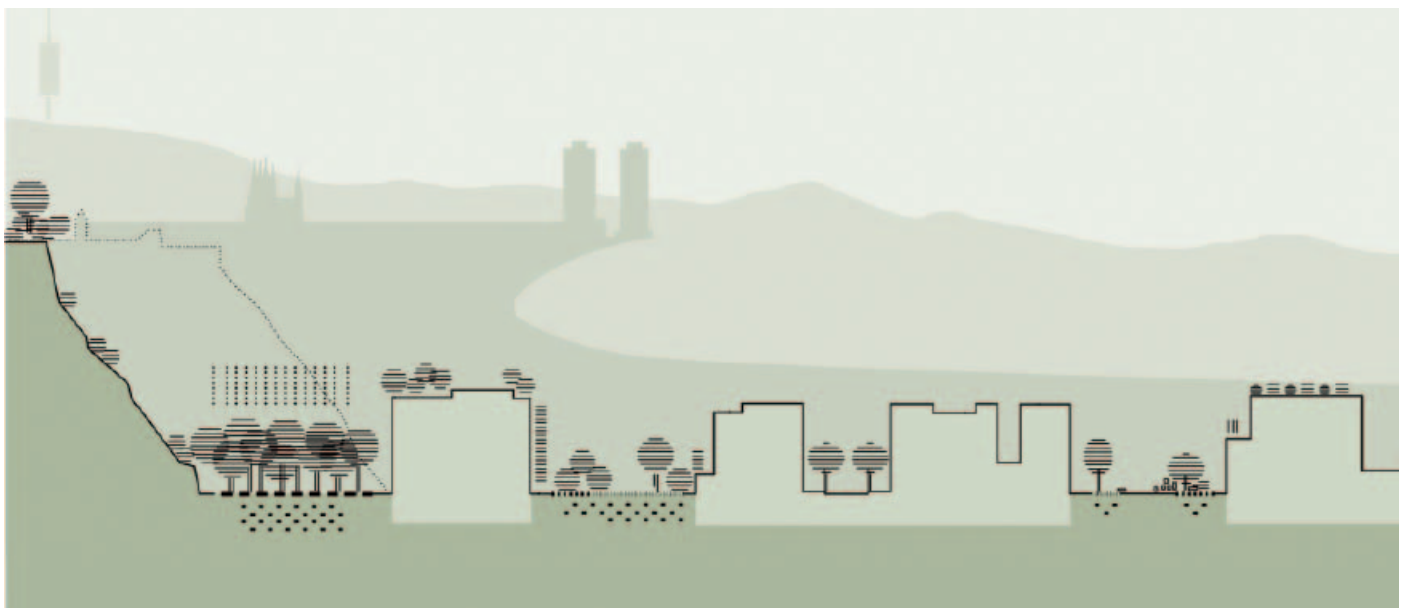
lands, maquis shrubland, pinewoods, holm oak woods (and oak woods), shore vegetation, and so on. In the Barcelona plain, as it is called, dotted with old creeks and marshes, the physical environment is barely visible because the land has been taken over by the urban fabric, which has elements of greenery in generally isolated spots with no continuity.

Barcelona's network of green infrastructure

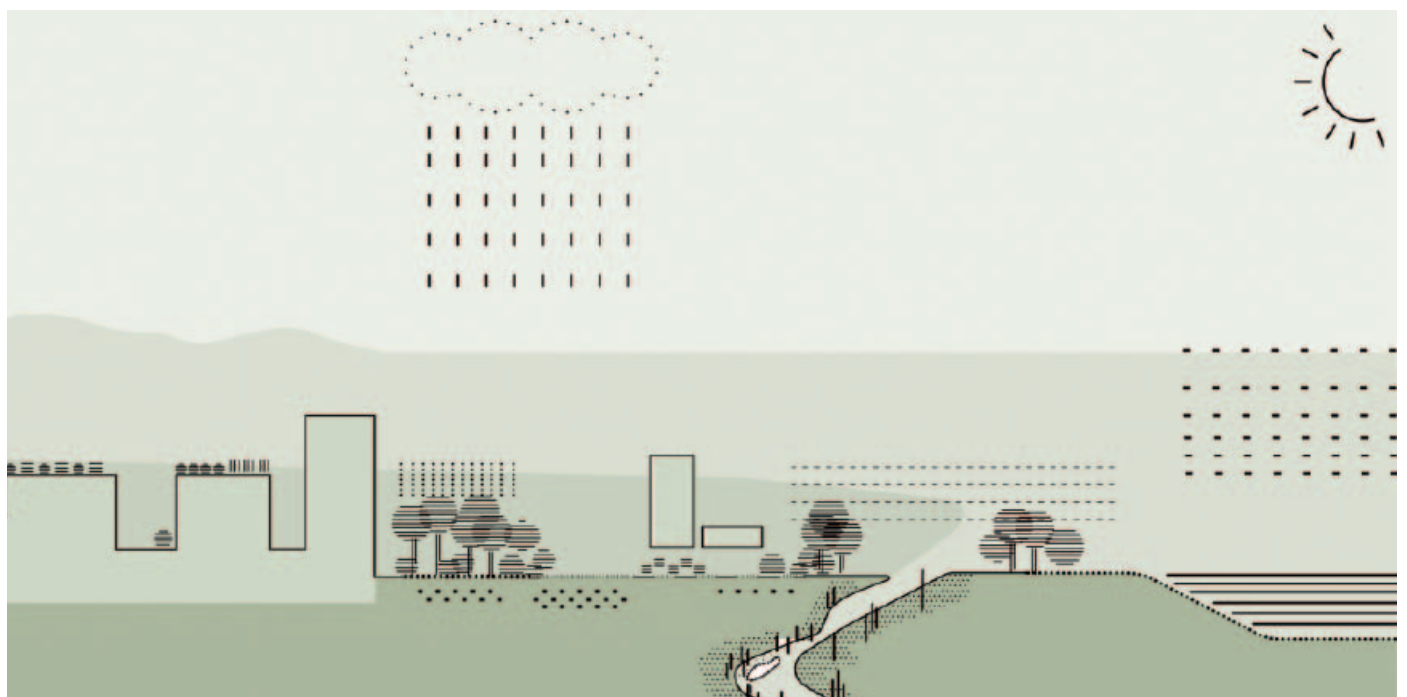


Types of spaces in town

The city's network of **green infrastructure** is formed by all green areas: natural and landscaped, large and small, public and private, simple and complex.



open natural spaces forest green roofs green walls gardens trees-lined streets squares landscaped streets



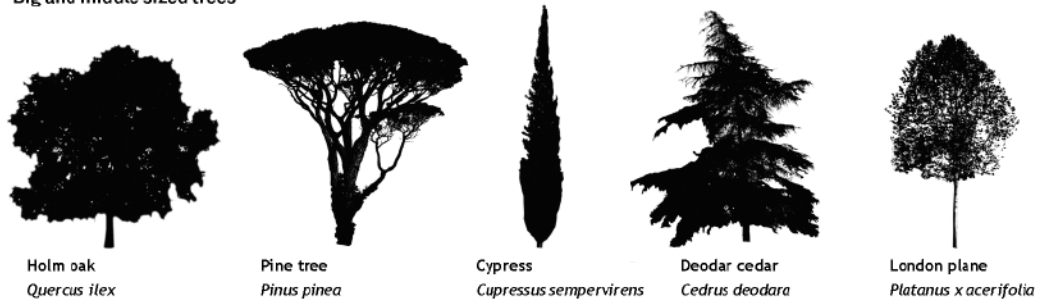
vegetable gardens parks river areas coast

Most common animal and plant species in Barcelona

We often fail to realise that the city plays host to a remarkable variety of animal and plant biodiversity forming part of

its natural heritage. Certain species are designated as being of special interest or protected.

Big and middle sized trees

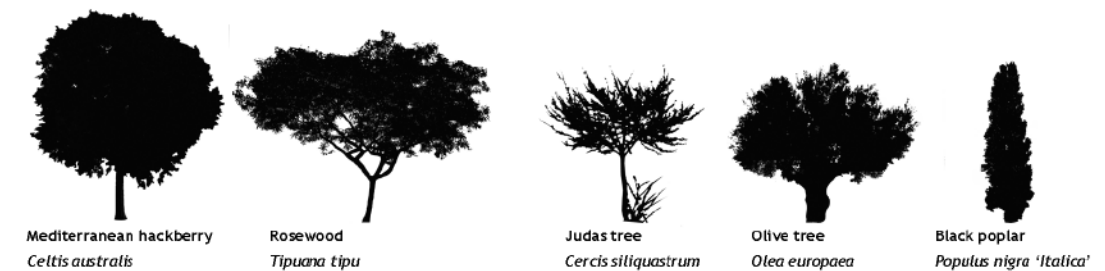


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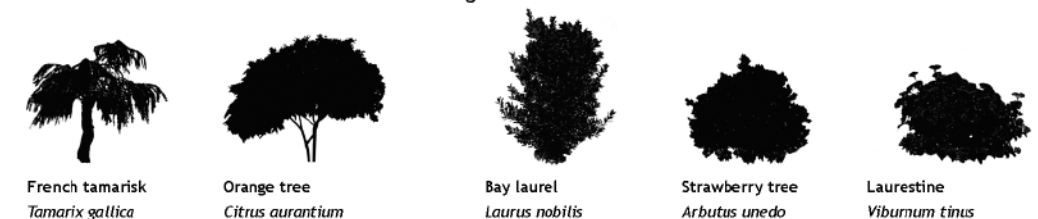
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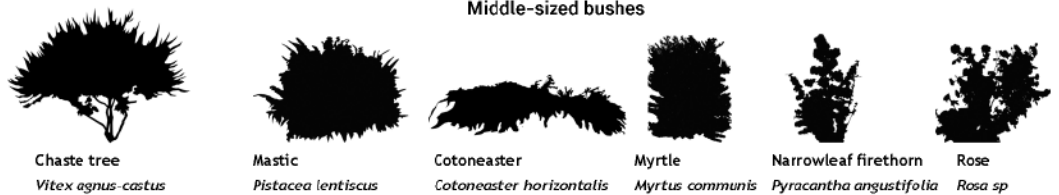


Small-sized trees



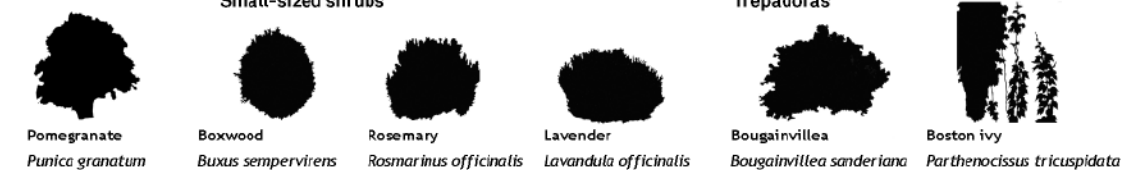
Big-sized bushes

Middle-sized bushes

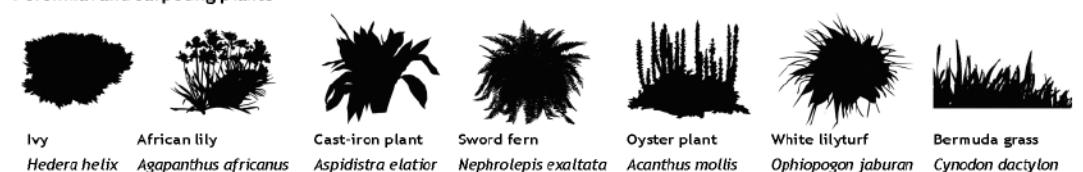


Small-sized shrubs

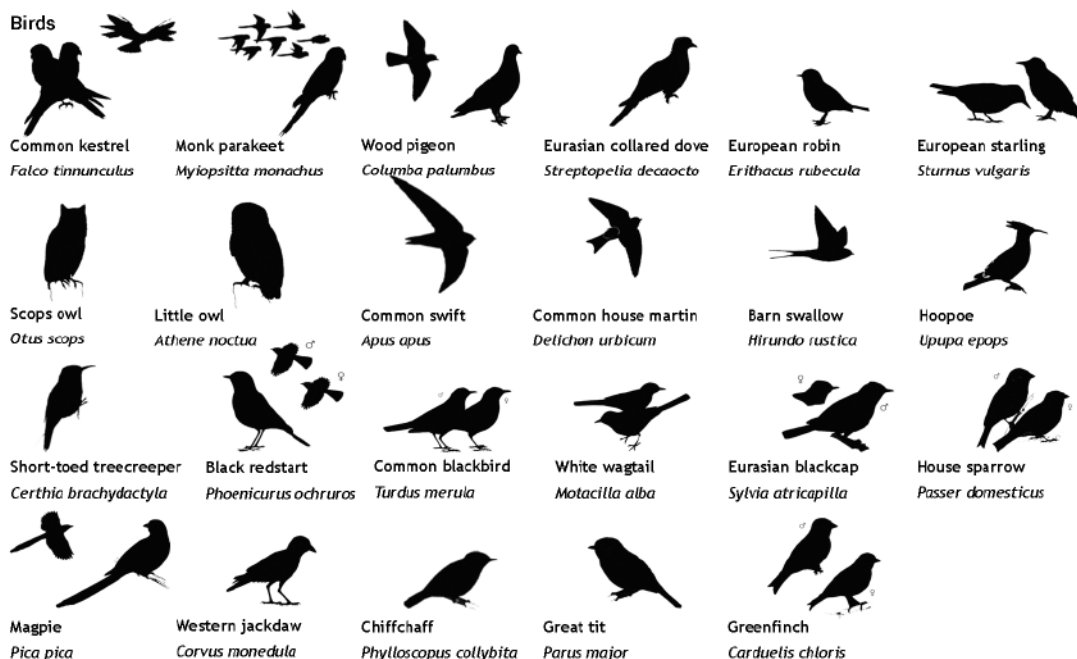
Trepadoras



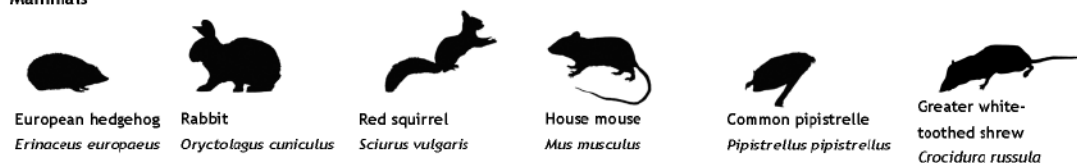
Perennial and carpeting plants



Birds



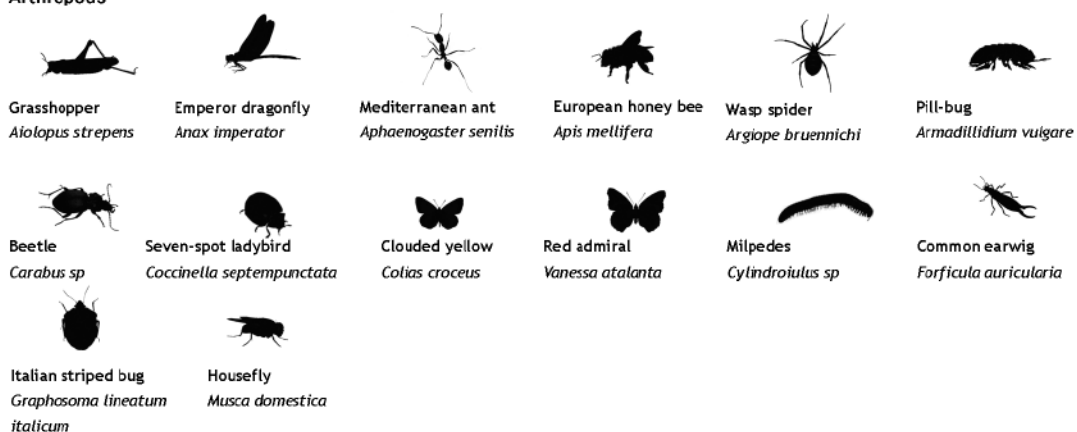
Mammals



Amphibian and reptiles



Arthropods



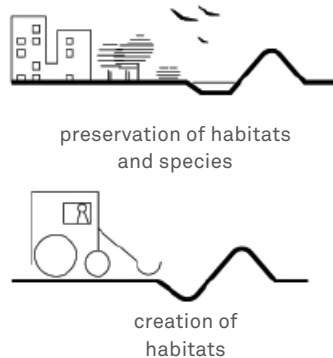
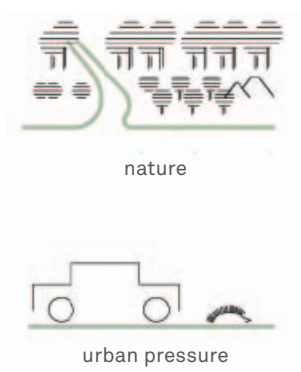
Barcelona is home to the following green infrastructure

- The Collserola Nature Park (1.698 ha in Barcelona and more than 8.000 ha in total), the Llobregat river, the Besòs river and the sea, bordering the municipal district; Collserola is a nature park that is part of the Xarxa Natura 2000 network.
- Barcelona plain, as it is called, essentially occupied by the urban fabric.
- Public parks and gardens (82) and the remaining urban green areas (1.102 ha in total) equate to 6,82 m² greenery/inhabitant in the urban fabric, 17,33 m²/inhabitant including Collserola.
- Natural areas of special interest for biodiversity within the urban fabric include: Montjuïc mountain, Els Tres Turons and Parc de la Ciutadella (including the Zoo).
- Parks of historical interest, such as Park Güell, Parc de la Ciutadella, Parc del Laberint d'Horta, Palau de Pedralbes, Turó Park and Jardins de la Tamarita, all included in Barcelona City Council Architectural Heritage Listing (a total of 27).
- Parks of thematic interest (botanic collections): Mossèn Costa i Llobera, Cervantes-Roserar, Mossèn Cinto Verdaguer, Aclimatació and the Jardí Botànic.
- Private green infrastructure (740 ha).
- Beaches (30 ha) and sea habitats such as reefs (83 ha).
- Crops (30 ha) and urban vegetable gardens (13 vegetable gardens with a total of 343 plots).
- Trees (more than 160.000 trees lining the streets and some 75.000 trees in parks and gardens; a total of 200 species in the city).
- 138 sheets of trees included in Barcelona Listing of Trees of Local Interest.
- Flora present in parks and gardens, including native and exotic species (1.172 species of trees, shrubs, climbing plants and persistent perennial plants).
- Vegetation in buildings (green walls, balconies, terraces and landscaped roofs) with its associated fauna, particularly birds (alpine swifts, swifts, swallows and western jackdaws).
- Fauna present in the city: 103 native species of vertebrates; 72 vertebrates protected by law: 2 amphibians, 8 reptiles, 55 birds and 7 mammals.

4. WHERE CAN WE IMPROVE?

The review carried out has highlighted the fact that the following aspects should be subject to specific improvements:

Natural heritage



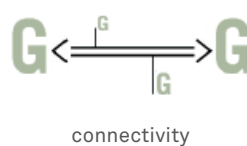
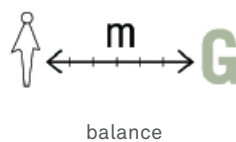
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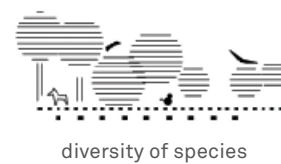
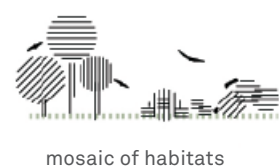
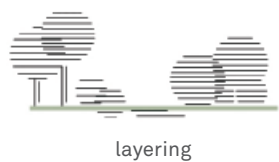
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Territory



Structure and ecological services



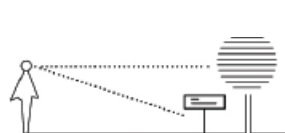
Quality of life



Cultural heritage



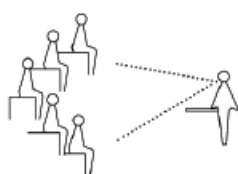
Communication and education



educational activities



dissemination



education



debate and reflection

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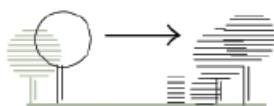
Management and maintenance



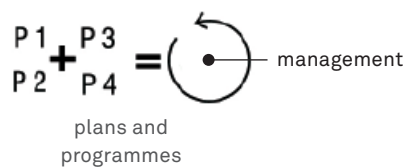
maintenance



eco-efficiency



preservation of street trees



plans and programmes

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Commitment



global commitment



knowledge of biodiversity



citizen involvement



networking

5. WHAT KIND OF GREEN INFRASTRUCTURE AND BIODIVERSITY DO WE WANT?

Barcelona Green Infrastructure and Biodiversity Plan envisages the city in 2050 as a place where nature and urbanity **interact and enhance one another** by ensuring the **connectivity** of greenery. In other words, it envisions a city where urban green infrastructure will be connected to the broader territory and offer more social and environmental services; where biodiversity will be appreciated as collective heritage and, in short, a city where every opportunity will be taken in order to make way for nature and encourage people to come into contact with natural elements, based on the conviction that a greener city is a healthier city.

Accordingly, this plan sets out the strategic lines for developing green heritage as a comprehensive system whilst proposing a city model where greenery is incorporated as basic ecological infrastructure.

This is defined in two key concepts: **connectivity** of green infrastructure and the **renaturalisation** of the city.

- **Green corridors** are the tool aimed at achieving connectivity, defined within the urban fabric as belts with abundant vegetation where pedestrians and cyclists must be given priority. These belts must ensure connectivity is achieved between the various "spots" of green infrastructure in the city by means of natural structures, dense vegetation and soft, pervious surfaces. This network aims to ensure green infrastructure is firm and functional.

Green corridors stand out on account of their quality, both visually and as a place for strolling or resting. They make the city more pleasant, provide appealing habitats for fauna and boost the social and environmental benefits afforded. Consequently, green corridors play a strategic role in building a healthy, ecological city.

- **Opportunity areas** vary in terms of size and type, although they are present in all neighbourhoods: unoccupied plots, roofs, balconies, and generally speaking all areas that can sustain and house flora and fauna. They are vital to naturalising the city and bringing nature into it to the greatest extent possible. Green areas also afford major opportunities for increasing and improving the presence of greenery and biodiversity as a whole, creating more welcoming, healthy areas for citizens.

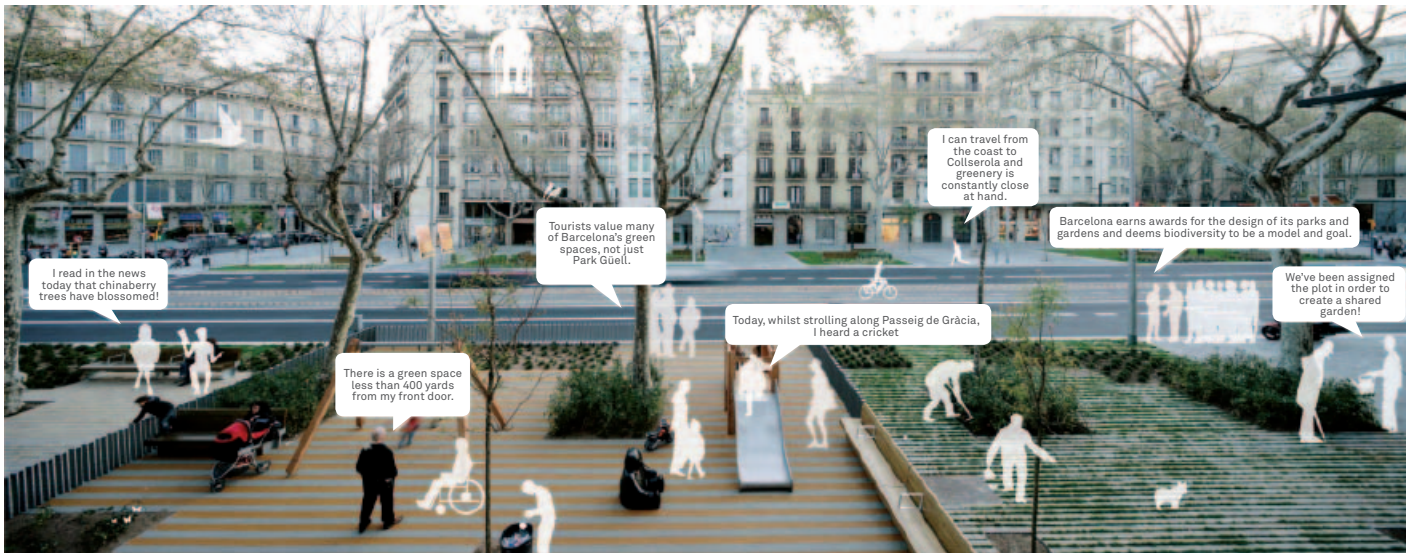
Urban green corridors



Urban green corridors provide continuity with outlying natural spaces, supporting green infrastructure within the city

There are many advantages to implementing this policy. Plant cover absorbs dust and pollutant particles in the air; reduces noise pollution; regulates dampness; balances the water cycle; reduces energy consumption in buildings; creates ecological connectivity, and serves as a habitat for more biodiversity. It also

affords a more pleasant urban landscape and can serve as a place for socialisation or gatherings, and as a location for taking a stroll or engaging in sports and leisure activities in the open air. These characteristics make it possible to view the city as a source of health and, therefore, progress must be made towards them.



Barcelona in 2050 may look something like this

Opportunity areas

Traditionally, green infrastructure in Barcelona has developed in the city's parks and gardens, making use of wasteland or enhancing existing gardens. At present, one strategy for progress is to incorporate nature into all available gaps within the urban fabric. Roofs, balconies and walls are all likely to be transformed into gardens or vege-

table gardens for use by the community or into spaces for carrying out healthy activities, thereby becoming **new forms of urban green infrastructure**. Streets can also be dynamic, lively places, settings for strolls and socialising, provided conditions for traffic calming are established and pleasant and quality green infrastructure is envisaged.



Parks and gardens are privileged spots for animal and plant life. They house the species that spontaneously arrive, live and reproduce there. Ecological man-

agement fosters biodiversity and, therefore, enhances the cultural and social interest of these areas.



6.

GOALS, STRATEGIC LINES AND ACTIONS

The **goals** of Barcelona Green Infrastructure and Biodiversity Plan are as follows:

- Preserving and enhancing the natural heritage of the city and preventing species and habitats from disappearing.
- Achieving the maximum amount of green infrastructure and ensuring its connectivity.
- Obtaining the maximum number of social and environmental services from green infrastructure and biodiversity.
- Making progress in educating society to place greater value on green infrastructure and biodiversity.
- Making the city more resilient in the face of future challenges such as climate change.

This plan is organised into ten **strategic lines** which are defined in terms of priority actions.

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1. Preserving the city's natural heritage

This is one key challenge in sustainable development. The aim is to implement actions in order to preserve biodiversity by adopting measures intended to correct activities, behaviour and presence – of excessive or invasive flora and fauna, for instance – that have a detrimental effect. It is vital to draw up protocols for preserving biodiversity for those public and private spaces having the greatest interest.

- 1.1** To develop biodiversity preservation protocols for areas of major interest and to implement associated guidelines.
- 1.2** To implement preventive and corrective measures for activities in public spaces that may have an impact on biodiversity.
- 1.3** To identify and implement measures to preserve biodiversity in private gardens and other areas of special interest.
- 1.4** To consolidate vertebrate conservation programmes.
- 1.5** To prepare action plans for the conservation of special interest flora and fauna and to implement associated guidelines.
- 1.6** To launch measures to control exotic, invasive flora.
- 1.7** To prevent and control invasive and excessive animal populations.



2. Planning green infrastructure to ensure connectivity and strike a balance in distribution

In order to strengthen green infrastructure it is necessary to re-conceive and complete urban greenery to transform it into a network where green spaces are inter-connected and linked to natural areas. The balance can be struck by examining the potential for incorporating green infrastructure into those neighbourhoods where nature is scant.

- 2.1** To identify the city's green infrastructure.
- 2.2** To boost projects in the city outskirts and metropolitan area for connecting green infrastructure and preserving biodiversity.
- 2.3** To implement the green corridor network project.



3. Designing the city and its green spaces taking into account environmental services and integrating criteria to enhance biodiversity

Careful design makes it possible to enhance the effects of nature on the setting and on natural elements (water, the microclimate, fauna, etc.) within that setting. Actions such as promoting diversity in urban trees or redesigning the coastal vegetation to adapt it to the specific environmental conditions to which it is exposed improve the quality and potential of green infrastructure. Small initiatives, such as making the ground in public places pervious, can prove to be highly ecological.

- 3.1** To develop a Green Infrastructure and Biodiversity Charter.
- 3.2** To make ground in public areas permeable.
- 3.3** To diversify street tree species.
- 3.4** To incorporate efficient landscaping criteria in areas with limited water resources and maintenance.
- 3.5** To adapt coastal vegetation to environmental conditions.

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4. Creating new sauces for nature and increasing the presence of green infrastructure and biodiversity

Barcelona is a compact, dense city with very few natural areas but one where the effects of its green infrastructure can be enhanced by promoting local nature reserves, providing existing areas with more vegetation, encouraging landscaped areas to serve as a habitat, incorporating organic agriculture practices and expanding on the variety of green spaces present by taking advantage of new opportunities (roofs, decks, façades, walls, etc.).

- 4.1** To organise and create a network of local nature reserves by restoring sites of natural interest.
- 4.2** To create new green spaces in the city.
- 4.3** To increase biomass in the city by increasing the number of trees and shrubs in parks, gardens and public spaces.
- 4.4** To enrich existing green infrastructure and to enhance its habitat function.
- 4.5** To promote silence in parks so people can enjoy soundscapes.
- 4.6** To promote green decks, rooftops, walls and courtyards.
- 4.7** To create green spaces in temporarily unused plots.
- 4.8** To promote organic agriculture in urban and peri-urban areas.
- 4.9** To create seasonal gardens in urban squares.
- 4.10** To provide more soil space for street trees.

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5. Managing parks and gardens and other green spaces with sustainability and efficiency criteria, fostering biodiversity

In order to benefit from quality urban heritage with reduced environmental and economic costs, various strategies are in place: reducing the demand for water in green areas, conducting comprehensive pest and illness controls, using suitable soils, making the most of plant remains and, in general, applying the most suitable procedures to each type of vegetation.

- 5.1** To improve the management of green spaces and street trees.
- 5.2** To prepare park dossiers.
- 5.3** To develop a park and garden rehabilitation programme following rationalisation criteria.
- 5.4** To optimise irrigation carried out in green areas.
- 5.5** To implement a biodiversity-friendly pest, disease and weed management programme.
- 5.6** To replace high water consumption lawns with warm climate cespitosa plants and carpeting plants.
- 5.7** To develop a protocol of action for greenery management in the event of weather-related incidents.

Galanthus



6. Preserving and enhancing the value of cultural heritage, especially in historical gardens

Some of the city's parks and gardens, their sculptural and architectural elements, as well as certain species of trees, all form part of Barcelona's cultural and historical heritage. These spaces entail specific preservation requirements calling for special protection measures.

- 6.1** To prepare management plans for historical and themed parks and gardens.
- 6.2** To review local and national heritage listings so that they include all relevant historical gardens.
- 6.3** To designate Montjuïc as the benchmark of Barcelona's landscaped heritage.
- 6.4** To develop a plan for the preservation of Barcelona's distinguishing tree species.
- 6.5** To preserve and promote Barcelona's trees of local interest.

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7. Improving knowledge for the Management and conservation of green infrastructure and biodiversity

The preservation of natural heritage must be managed on the basis of scientific and technical criteria. Expanding in the knowledge of biodiversity, of the behaviour and needs of the species present in the urban setting and of the environmental and social benefits generated is the most appropriate way to suitably plan and manage natural heritage. This challenge is shared by other cities with which Barcelona exchanges knowledge and experiences.

- 7.1** To undertake monitoring on the state and development of natural heritage by implementing a database and system of indicators on green infrastructure and biodiversity.
- 7.2** To prepare and update the map of green infrastructure and biodiversity.

- 7.3** To extend and pursue studies on the environmental benefits associated with green infrastructure and biodiversity.
- 7.4** To gain greater applied knowledge about the effects of green infrastructure on health.
- 7.5** To encourage research on the effects of climate change on natural heritage.
- 7.6** To determine the water demand needed to ensure the quality of vegetation.
- 7.7** To seek out and test new plant species in cooperation with research institutions and centres.
- 7.8** To gain greater knowledge of the impact of the city on global biodiversity.



8. Spreading knowledge of green infrastructure and biodiversity and their values, fostering training

Concepts related to nature tend to arouse interest among people in general. It is important to ensure the value, complexity and contributions afforded by nature are more widely known. The variety of green heritage housed in the city bears major potential when it comes to disseminating values and, accordingly, educating citizens. In this respect, schools must play a vital role.

- 8.1** To develop and implement a communication strategy on green infrastructure and biodiversity.
- 8.2** To promote green spaces as settings for education and knowledge.
- 8.3** To set up and provide a green infrastructure and biodiversity interpretation centre in Barcelona.
- 8.4** To foster the Parc del Laberint Training Centre as a platform for promoting gardens and landscaping.
- 8.5** To promote BioBlitz-style citizen initiatives for build collective knowledge in a festive mood.
- 8.6** To raise awareness about the value of biodiversity among professionals.
- 8.7** To create resources for and provide support to schools.
- 8.8** To educate citizens in managing conflicts in coexisting with animals based on conservation criteria.

Galanthus



9. Fostering green spaces as places for health and enjoyment as well as promoting citizen involvement in their creation and in the conservation biodiversity

Green urban spaces help to improve the quality of life and health of people. The diversity of profiles of users and needs in green spaces in Barcelona is an important factor when it comes to planning them. The major challenge posed for the coming years is to secure greater citizen involvement as a key to the preservation, management and design of green areas. Indeed, it is necessary to draw up a plan on social uses, to improve the availability of recreational facilities in parks and, similarly, to promote private greenery as an element that is part and parcel of the city's natural network.

9.1 To prepare and implement a plan on social uses of green spaces in Barcelona.

9.2 To increase and improve the number of recreational and health facilities offered in parks.

9.3 To improve and diversify children's playgrounds by involving schools, associations and the community.

9.4 To promote private greenery by encouraging landscaped vegetable gardens, balconies, terraces, roofs, decks, walls and courtyards.

9.5 To open private green spaces for public use.

9.6 To set up a volunteer programme for the conservation, information and dissemination of green infrastructure and biodiversity.

9.7 To design and implement a programme of accessible neighbourhood-run flower and vegetable gardens.

9.8 To organise idea contests related to green infrastructure and biodiversity open to various groups.



10. Strengthening local leadership, networking and the commitment to the conservation of green infrastructure and biodiversity

Barcelona must serve as a benchmark for urban green infrastructure and biodiversity because it is the city's calling and commitment. The city's footprint causes an impact on nature beyond the limits of the municipal district. Working to reduce this impact entails working for the benefit of the natural heritage of humankind. In order to make further progress in local leadership it is necessary to strengthen institutional relations with the associations involved in the preservation of biodiversity and urban green infrastructure. At the same time it is necessary to actively take part in city networks committed to addressing the issue of the preservation of nature all over the globe.

- 10.1** To turn Barcelona into a green benchmark.
- 10.2** To actively take part in city networks and with the foremost bodies committed to addressing biodiversity issues.
- 10.3** To strengthen cooperation with the network of institutions and work hand in hand with the authorities involved.
- 10.4** To foster networking with organisations and secure their commitment to biodiversity.
- 10.5** To engage economic stakeholders in sponsorship programmes for the conservation of green infrastructure and biodiversity.
- 10.6** To promote a land stewardship system as a tool for nature conservation.
- 10.7** To make progress towards an environmentally friendly procurement policy.

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Barcelona green
infrastructure and
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2020





BARCELONA GREEN INFRASTRUCTURE AND BIODIVERSITY PLAN 2020. SUMMARY

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