



Barcelona, a city eco-system

between the sea, two rivers and mountains

Population 1.602.386 inhabitants

Surface 102 sq km

Density 15.685 inhab. /sq km





Government measure: Stimulus programme for the city's urban green infrastructure

- ✓ Framework
- ✓ What do we mean by green infrastructure?
- √ Why promote green urban infrastructure?
- √ What services does the green urban infrastructure offer?
- √ What do we have?
- ✓ City of Barcelona commitments
- ✓ Goals and programme
- ✓ Line 1. Increasing the green infrastructure
- ✓ Line 2. Improving the existing green infrastructure
- ✓ Line 3. Corresponsability of the general public in increasing and improving the GI
- ✓ Line 4. Studying, planning and monitoring the city's green infrastructure

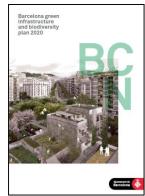




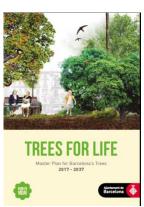
Framework

- ☐ Citizen Commitment to Sustainability 2012-2022: "Objective 1. Biodiversity: From urban green areas to the renaturalisation of the city"
- Barcelona green infrastructure and biodiversity plan 2020: "A city with a green infrastructure linking city and territory, providing environmental and social services"
- Barcelona's commitment to the climate 2030: "Establishes an increase in the city's green areas of 1 m²/inhabitant by 2030, as an adaptation objective"
- ☐ Master Plan for Barcelona's Trees 2017-37: Trees for life. "Urban trees are essential in the green infrastructure and in a configuration of quality public space".
- ☐ Commitment to eradicating the use of the Glyphosate herbicide (2016): Less phytosanitary treatments and the elimination of glyphosate, a biological pest control, and changes to the management of greenery...
- Others: government measure promoting and incentivising living terraces and green roofs, Superblock city model...









POLÍTIQUES MUNICIPALS ENVERS LA BIODIVERSITAT	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023- 2030	2031- 2037
Compromís ciutadà per la sostenibilitat													
Pla del verd i de la biodiversitat:													
Creació d'estructura municipal amb dotació de recursos humans i econòmics													
Desplegament de 68 accions. Biodiversitat al Pam i al PIM													
Mesura de Govern Activar terrats vius i Concurs de cobertes verdes													
Mesura de Govern eradicació glifosat													
Mesura de Govern Superilles: Omplim de vida els carrers													
Mesura de Govern Arbres per viure. Pla director de l'arbrat													
Mesura de Govern Programa d'Impuls de la infraestructura verda urbana													
Compromís de Barcelona pel clima. Pla resiliència i adaptació al canvi climàtic													
Pla Buits													
Pla Impuls Economia Social i Solidària. Política alimentària. Consum responsable													

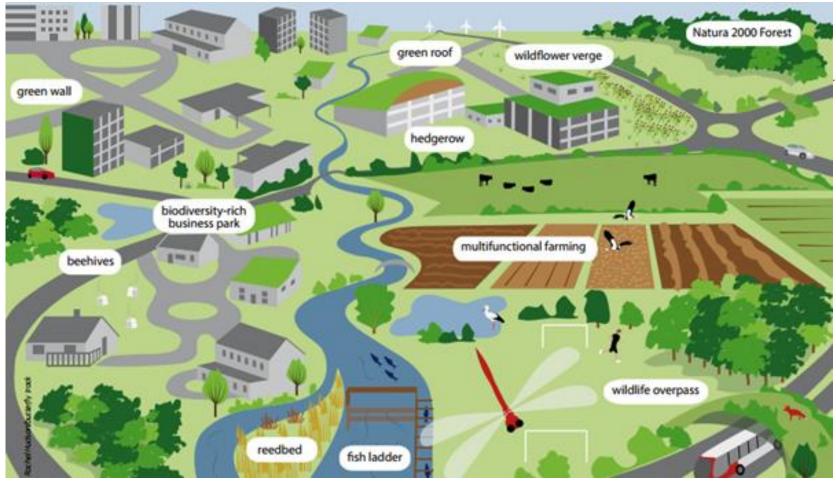


What do we mean by green infrastructure?

- ☐ Infrastructure: a set of elements, especially materials, that are fundamental for the development of a human activity
- ☐ Green urban infrastructure: a set of public and private green areas, natural spaces, trees, vegetable gardens, etc. which have natural, agricultural or garden vegetation that provide ecosystem services
- ☐ A multiscale and multifunctional concept that places our natural assets as one of a variety of urban infrastructures. This is a basic city infrastructure in the same way as its "grey" infrastructures







Source: www.biodiversity.europa.eu (Traducción: elaboración propia)

The areas may be natural, fluvial, coastal, agricultural, woodland, parks and gardens, vegetable gardens, tree-lined streets, vegetation in streets and squares. They may be in residential areas and facilities, green walls, plants on balconies, terraces, courtyards, etc.



Why promote green urban infrastructure?

□ Ecosystem and socio-environmental services are the benefits that an ecosystem provides for society; they improve people's health and quality of life. These benefits are multiplied when the network of green areas and trees are connected with one another







All the types of vegetation making up an urban green infrastructure provide ecosystem services

What services does the green urban infrastructure offer?

ENVIRONMENTAL / ECOLOGICAL

- · Improved air quality
- Temperature regulation
- Carbon retention
- Infiltration and permeability
- · Ecosystem functionality
- Conservation of flora and fauna

SOCIAL

- Group and family gatherings
- Large-scale events, festivals and shows
- Employment and social services
- Environmental education

HEALTH

- Contribution to mental health
- Benefits for public health
- Active ageing
- Contribución a la salud

PSYCHOLOGICAL / SPIRITUAL

- Artistic inspiration
- Identity / History
- Reflection / relaxation
- Urban landscape
- Links to nature



TOURISM / ECONOMIC ACTIVITIES

- Tourist visits
- Valuation of surrounding economic activities

LEISURE

- Walking
- · Outdoor games
- Picnics and meals

SPORTS

- Cycling
- Running
- Sports activities

URBAN MANAGEMENT

- Sponging
- Peri-urban planning

What do we have?

1.128 ha of public green areas240.000 trees in urban areas1.698 ha in Collserola Park

7 m²/inhabitant

17,62 m²/inhabitant

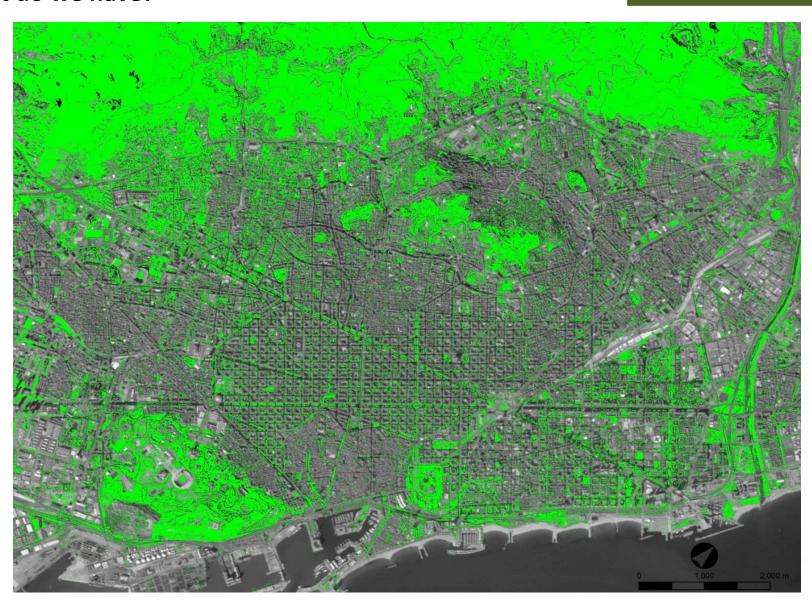


1.866 ha ha vegetation cover (public and private)
1.597 ha vegetation cover in Collserola Park

11,6 m²/inhabitant

21,6 m²/inhabitant

What do we have?





City of Barcelona commitments

Barcelona's commitment to the climate 2030:

Increase of 1 m² of green area / inhabitant. = 160 ha of new green areas

Citizen Commitment to Sustainability 2012-2022:

Naturalisation of the city

Barcelona green infrastructure and biodiversity plan 2020, Master Plan for Barcelona's Trees 2017-37, Commitment to eradicating the use of the Glyphosate herbicide, Superblock model,...





Goals and programme

GOALS

- To increase the city's green infrastructure in benefit of the general public's health
- To improve the city's green infrastructure in order to obtain more services
- Public involvement in increasing green areas and biodiversity
- Monitoring and assessing the city's green infrastructure



PROGRAMME

LINE 1. INCREASING THE GI

LINE 2. IMPROVING THE EXISTING GI

LINE 3. CORRESPONSABILITY OF THE GENERAL PUBLIC IN

INCREASING AND IMPROVING THE GI

LINE 4. STUDYING, PLANNING AND MONITORING THE GI





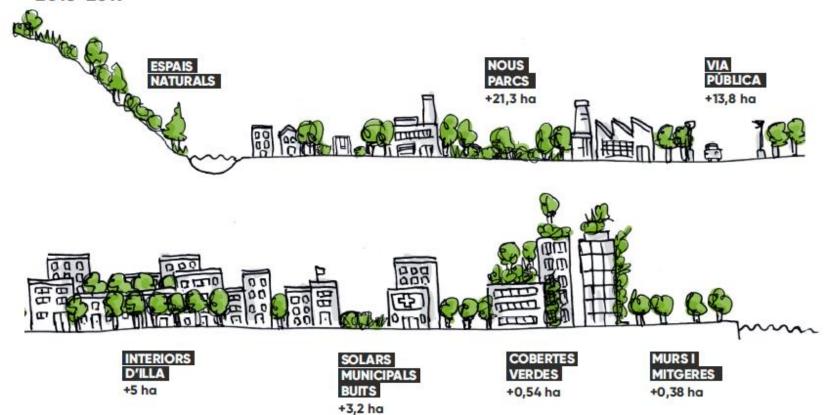
- ☐ Initiative 1. 1. Creating new public parks and gardens
- ☐ Initiative 1.2. Recovering city block interiors in built-up areas in order to gain new public green areas
- ☐ Initiative 1.3. Installing temporary gardens in empty building sites
- ☐ Initiative 1.4. Interventions in roadways to increase green features
- ☐ Initiative 1.5. Greening rooftops, terraces and courtyards
- ☐ Initiative 1.6. Greening walls and dividing walls



LÍNIA 1: INCREMENT DE LA INFRAESTRUCTURA VERDA

+ 44 HA DE NATURA URBANA

ACTUACIONS 2015-2019







New residential block interior at C. Còrsega 195-197



Avda. Diagonal



Sants railway encasement



Hospital Clínic micro-urbanisation



Canòpia Project Plaça de les Glòries









Examples of planned operations for 2017-19: 20 green areas and 18 city block interiors

Parque Mas Ravellat	35.777 m ²
Parque de Font Magués (Paseo de les Aigües)	26.108 m ²
Parque Central Marina del Prat Vermell	22.886 m ²
Parque Casernes Sant Andreu	22.000 m ²
Parque Colònia Castells	10.663 m ²
Marina del Prat Vermell (Sector 8)	2.500 m ²
Dipòsit Rei Martí	4.000 m ²
Plaza de les Glòries-Canòpia (Provisional Muntanya)	4.576 m ²
Plaza Duran i Reynals	1.264 m ²
Plaza de les Dones – actuación urbanización 1 Roquetes	1.986 m²
Plaza del Llagut (proyecto mejora integral)	302 m ²
Plaza del Mig de Can Clos, barrio de la Marina del Port	616 m ²
Plaza Font d'en Fargas	2.142 m ²
Plaza Raimon Casellas, fase II	160 m²
Plaza Palerm, proyecto de reurbanización	626 m ²
Jardines Menéndez Pelayo	1.601 m ²
Jardines Can Castelló	1.200 m ²
Jardines d'Elx (3ª fase)	91 m²
Edificio Jardí Vil.la Urània	171,5 m²
Pacificación entrada Hospital Clínic, C. Villarroel	40 m ²

Interior manzana Cinema Urgell	517,59 m ²
Interior manzana Lledoner-Sidó, Fase 2	156,1 m ²
Interior Fitó (C/Pere IV-C/Selva de Mar-C/Marroc-	
C/Treball)	355 m ²
Manzana C/Puigcerdà-C/Veneçuela-C/Pallars-	
C/Maresme	92 m ²
Diagonal-Poblenou (C/Granada-C/Badajoz-C/Bolivia)	1.401 m ²
c/Casp, 1-13 (Cinema Novetats)	216 m ²
Interiores manzana Guineueta (fase 2)	3.348 m ²
Interior manzana Maria Mercè Marçal	1.318,73 m ²
Interior manzana Palau Macaya	1.866 m ²
Manzana Q Turó de la Peira	4.407 m ²
Interior manzana María Callas, proyecto de arreglo	2.000 m ²
Interior manzana Cinema Niza	2.300 m ²
Interior manzana residencia de gente mayor Can Roger	1.700 m ²
Interior manzana Jardines de Tres Tombs	1.784,41 m ²
Interior manzana "La Favorita"	2.367 m ²
Interior manzana, Jardins d'Emma de Barcelona	5.996,41 m ²
Jardines interior manzana Carretera Antiga d'Horta	
(Roger de Flor/Ausiàs March/Ali Bei/Nàpols)	411,87 m ²
Plaza Dolors Piera (ver acción 1.4)	8.000 m ²

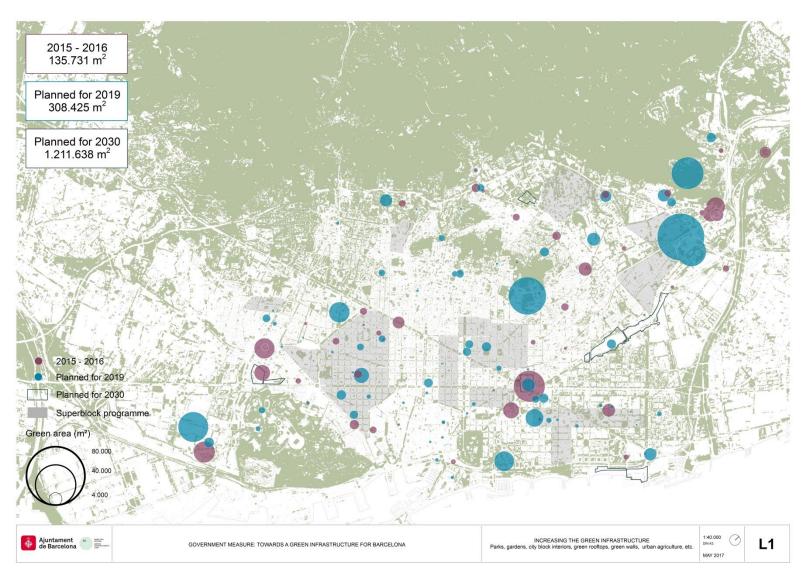


TABLE SUMMARISING ESTIMATED INCREASE IN GREEN AREAS UP TO 2030

INCREASE IN GREEN AREAS (m²)	2015-2016	2017-2019	2020-2030
Initiative 1.1 Creation of parks and gardens	74.602,24	138.710	833.238
Initiative 1.2 Recovering city block interiors	11.816,41	38.237,11	8.800
Initiative 1.3 Creating temporary gardens in empty building sites	15.946	16.754,16	30.800
Initiative 1.4 Interventions in streets and squares	32.760,46	106.060,46	304.700* ¹
Initiative 1.5 Creating green rooftops	-	5.431	22.000
Initiative 1.6 Creating green walls and dividing walls	606,3	3.232	12.100
TOTAL	135.731,41 m² (13,57 ha)	308.424,73 m ² (30,84 ha)	1.211.638 m ² (121,16 ha)
Total of new green surface area	13,57 ha	44,41 ha	165,57 ha

^{*1. 100,836} m² correspond to the objective of a 5% increase in tree cover established in the Barcelona Trees Master Plan for 2037; and 203.864 m² to interventions in public areas to increase the presence of plant life: Superblock programme, pacified streets, urban agriculture, tree pits plantations, etc. Privat green increasing must be added too to this increase total value.







Ч	Initiative 2.1. Naturalising green areas
	Initiative 2.2. Increasing the city's biomass, especially in terms of trees and bushes in parks, gardens and public areas, favouring their growth
	Initiative 2.3. Preserving and improving biodiversity in urban sites
	Initiative 2.4. Conserving and improving natural and semi-natural areas, especially open ones
	Initiative 2.5. Favouring structures for the shelter, feeding and reproduction of urban fauna: fauna corridors, beehives, insect hotels, nests, boundary walls, promontories, etc.
	Initiative 2.6. Naturalising ornamental ponds
	Initiative 2.7. Taking care of natural water present in the urban environment: channels, springs, groundwater, etc.
	Initiative 2.8. Extending Sustainable Urban Drainage Systems (SUDS), as a solution for regulating water based on natural processes
	Initiative 2.9. Promoting and strengthening public management of green areas



Naturalising existing green areas

The naturalisation of urban green areas is transforming them through management that favours natural processes and the spontaneous appearance of flora and fauna, as well as carrying out more ecological maintenance, without losing aesthetic quality, and adapting them more towards social and health benefits

Habitats:

- ✓ Creating new, diversified land and aquatic habitats.
- ✓ Favouring vegetation mosaics and diversity of environments
- ✓ Improving vegetation structure in order to produce various well-represented strata: trees, bushes, herbaceous plants, climbers
- ✓ Increasing biomass (having bigger, more mature trees)
- ✓ Improving soil (more fertile soils)
- ✓ Increasing connectivity between green areas
- Landscaping by copying nature and adapting to urbanenvironment conditions
- ✓ Favouring a landscape that gives identity
- √ Valuing the natural succession of Mediterranean vegetation

Species:

- ✓ More native / adapted species
- ✓ Greater diversification of flora
- ✓ Greater presence of friendly flora
- Conservation of flora and fauna that is protected or of interest.
- More species that offer nectar and pollen, that present late fructification and provide nutrition for butterflies



Naturalisation: how are we going to do it?

- ✓ Transforming lawns into natural meadows or grassland
- ✓ Sowing meadows with flowers that are of interest for biodiversity
- ✓ Planting bushes with flowers that attract fauna.
- ✓ Creating areas of special interest for biodiversity
- ✓ Enriching the borders of vegetable gardens with plants that favour biodiversity
- ✓ Planting stands of fruit bushes and trees in lawns
- ✓ Eliminating invasive plants
- ✓ Creating ponds that can self-regulate with their own biota
- ✓ Landscaping cork trees



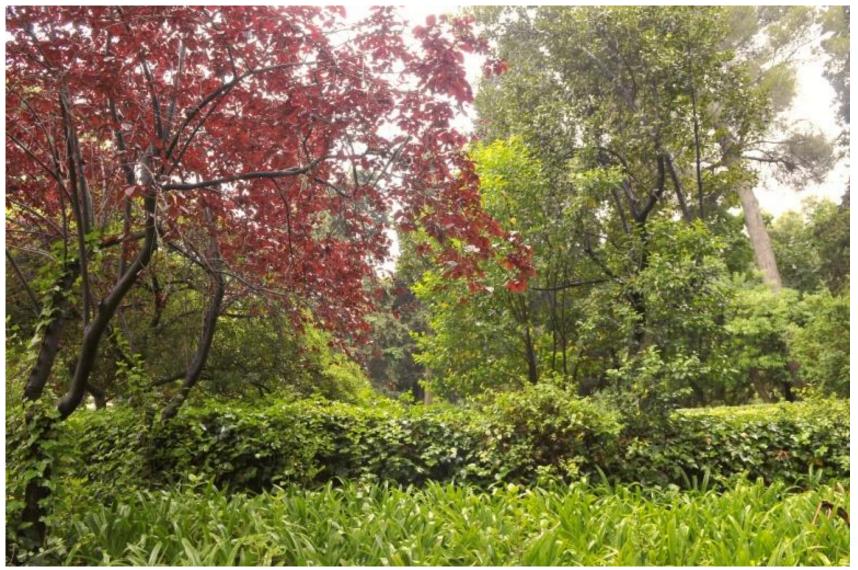


✓ Installing structures to provide biodiversity shelters:

insect hotels, dry-stone spirals with aromatic plants, rockeries, muddy areas for swallows, wooden pyramids, nesting towers or boxes for bats, nests for hedgehogs, leaving dried-up trees standing



Line 2. Improving the existing green infrastructure



Vegetation stratification in Laberint d'Horta Park





Construction of wooden pyramid in El Polvorí, Montjuïc





Cleaning ponds in the Mossèn Cinto Verdaguer Gardens





SUDS (Sustainable Urban Drainage System) in Av. Can Marcet





Sowing a meadow in Montjuïc

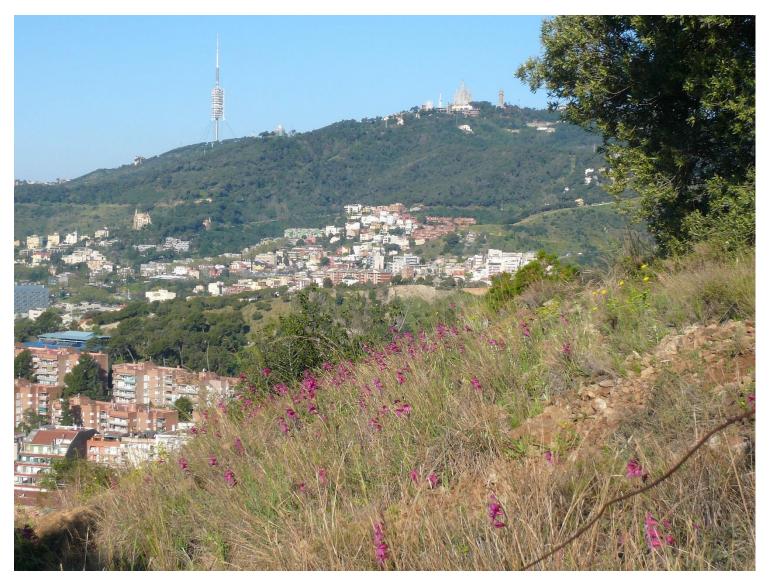




Natural meadowland in Montjuïc



Line 2. Improving the existing green infrastructure



Gladioli in Tres Turons







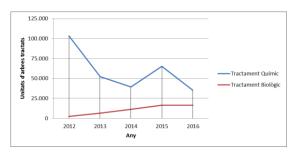
Installation of nesting towers for bats





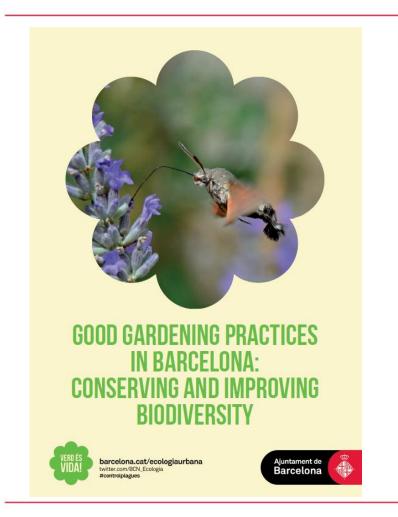


Sowing herbaceous plants in C/ Cisell





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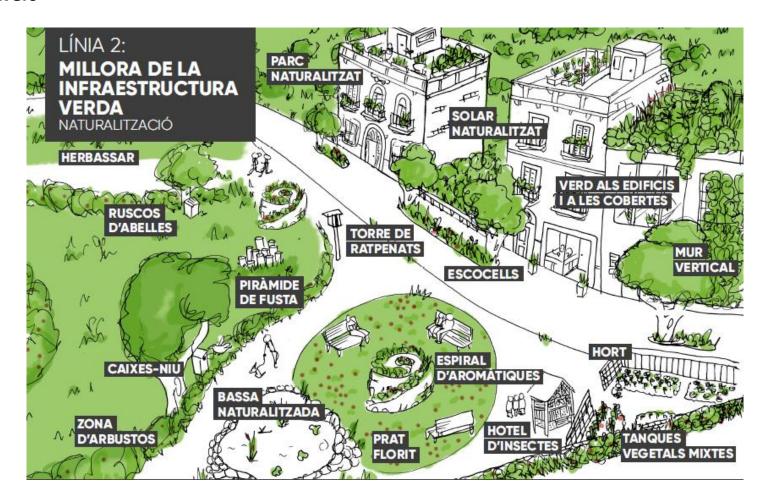


INTRODUCTION **LINED TREES** SHRUB GROUPS AND HEDGES GRASSES, FIELDS AND GRASSLANDS **URBAN ALLOTMENTS AQUATIC ENVIRONMENTS AND PONDS CLIFFS, WALLS AND PARTY WALLS** COURTYARDS, SMALL GARDENS, BALCONIES, TERRACES **AND GREEN ROOFS BIBLIOGRAPHY**

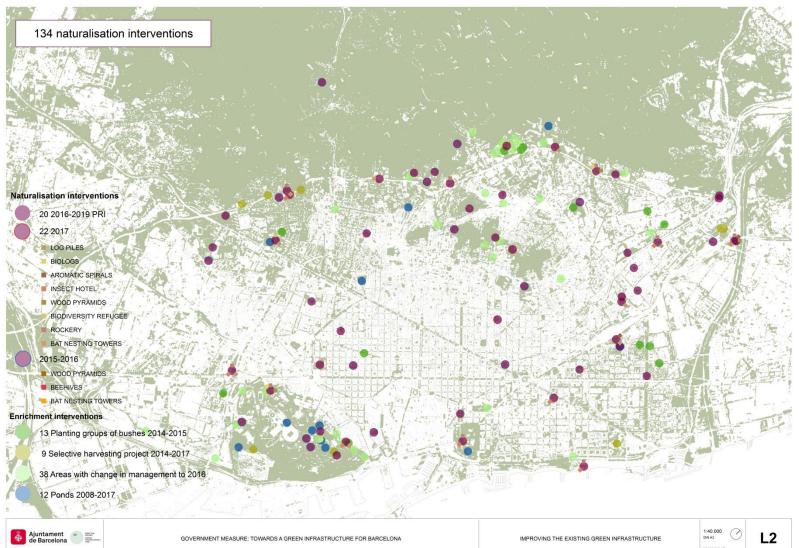


Line 2. Improving the existing green infrastructure. Planned operations 2017-19

79 naturalisation operations, 42 operations in parks and gardens, 10 rockeries, 10 log structures, 8 insect hotels, 2 aromatic spirals, 3 wood pyramids and the naturalisation of 4 ponds, the preservation of biodiversity in empty sites, 6 applications for SUDS in parks and the monitoring of 18 bat towers







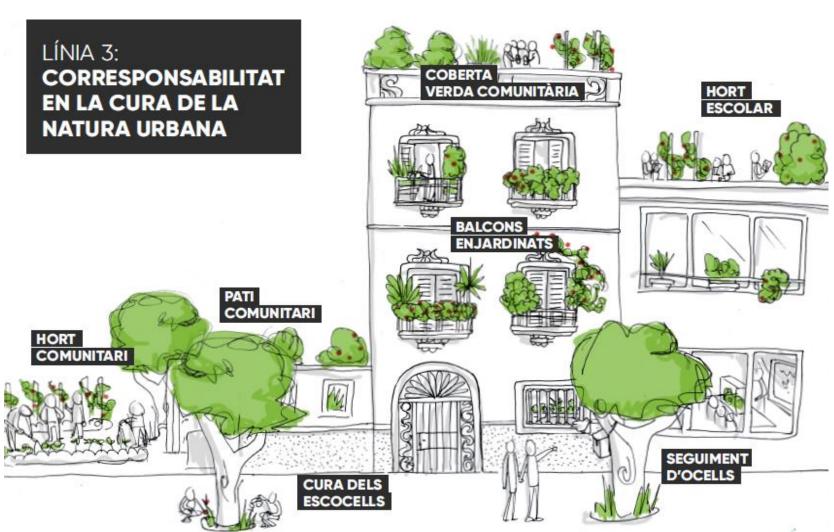
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Line 3. Corresponsability of the general public in increasing and improving the GI

- ☐ Initiative 3.1. To promote the general public's corresponsability and shared responsibility in conserving and increasing green infrastructure in parks, gardens and other green areas of the city
- ☐ Initiative 3.2. To promote urban responsibility in the expansion and conservation of the city's green infrastructure, through the city's social and community organisations
- ☐ Initiative 3.3. Promoting ecological agriculture in urban and peri-urban areas and sites
- □ Initiative 3.4. Fostering privately-owned green areas through the promotion of vegetable gardens, and gardening on balconies, terraces, roof terraces, rooftops, walls and courtyards
- ☐ Initiative 3.5. Fostering the opening of non-municipal green areas to the public
- ☐ Initiative 3.6. Disseminating knowledge about urban nature and the value of conserving it









Vegetable garden in Sagrada Família

Bioblitz 2016, Montjuïc







Some performances 2017-19

- ✓ Protocol for fostering volunteer work to support the maintenance and conservation of the city's parks, gardens and green areas and the biodiversity conservation, through schools, integration organisations and other city social organisations
- ✓ Inclusion of various organisations in the Urban Vegetable Garden Network. 38 sites handed over to organisations
- ✓ Programme for sharing responsibility for the maintenance and naturalisation of the city's parterres and tree pits
- ✓ Installation of 1 insect hotel per district as part of the joint programme run by the OPAB, schools from the More Sustainable Schools Programme in the following areas: Parc de la Ciutadella, Parc de Joan Miró, Jardins de Mossèn Cinto Verdaguer, Parc del Roserar Cervantes, Jardins de Can Sentmenat, Park Güell, Jardins del Laberint d'Horta, Parc de la Guineueta, Parc de la Trinitat and Parc de Diagonal Mar



☐ Initiative 3.4. Fostering privately-owned green areas through the promotion of vegetable gardens, and gardening on balconies, terraces, roof terraces, rooftops, walls and courtyards

Green roof competition





Green roof competition

Goals

- Promoting the introduction of 10 green rooftops
- Promotion and educational information
- Monitoring
- Evaluation of benefits

Beneficiaries (prioritising existing residential buildings)

- Residential buildings (owner committees and vertical properties)
- Others with significant landscaping impact and improvements to the collective and social nature (non-profit: offices, rooftops in block interiors, facilities, car parks...)

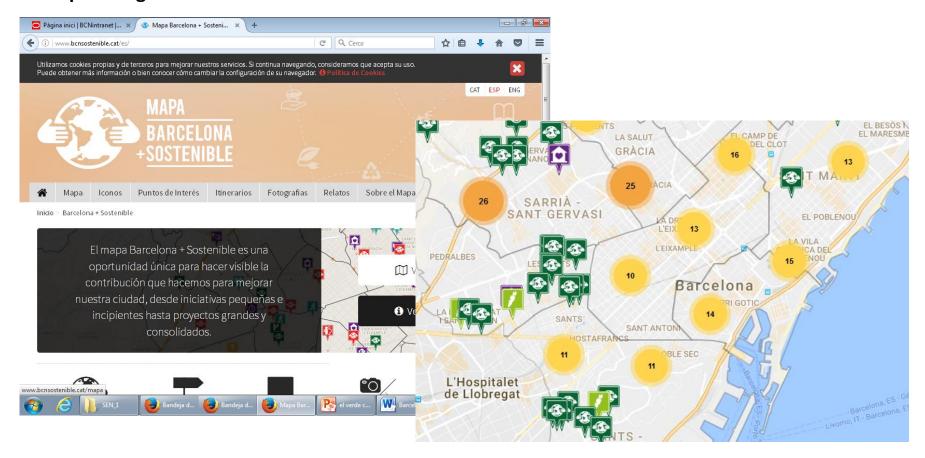
Budget

For the first pre-selected 50 rooftops: €1,500 (preliminary technical work)

For the 10 winners: **75% subsidy** maximum of €100,000



Bcn+Sostenible Map: a virtual, interactive map, linked to the Open Green Map. http://www.bcnsostenible.cat/es/. The map features a variety of green areas, including school gardens, local-resident vegetable gardens, green rooftops, bloomings of interest, private gardens and fauna









"Giving way to green" campaign

Press graphics, radio wedges, *venecianas & banderolas*, editorial "naturalisation": Ara, La Vanguardia, El Periódico, 20 Minutos, online campaign (web and social networks), signpost parks, viral video, ...









Signage for the various operations





SI US PLAU, RESPECTEU

Estem implantant petits ecosistemes a la base dels arbres per incrementar la biodiversitat de flora i fauna i afavorir la presència de depredadors naturals que eviten plagues i malalties per gaudir d'un espai comú més saludable.

Donem pas al verd, Naturalitzem Barcelona





TORRE NIU DE RATPENATS

Els ratpenats són un grup de vertebrats, protegits per normativa europea, que desenvolupen una tasca ecològica important en alimentar-se d'una gran quantitat d'insectes. Participen, doncs, en la regulació de les poblacions d'insectes i, en consequencia, contribueixen al benestar de les persones. La falta de llocs adequats per ubicar-hi les colònies de cria constitueix un dels principals problemes per al seu desenvolupament. Amb aquestes estructures n'afavorim la presència a la ciutat.



Biodiversitat del Turó Park



































Line 4. Studying, planning and monitoring the city's green infrastructure

- ☐ Initiative 4.1. Planning Barcelona's green infrastructure as a system, including the green corridor network, taking social-environmental services into account
- ☐ Initiative 4.2. Reviewing the areas recognised by planning as leisure areas with potential for increasing the percentage of plant life and permeable areas
- ☐ Initiative 4.3. Completing the study of ecosystem services in Barcelona's green areas for the whole city
- ☐ Initiative 4.4. Creating an information system on green infrastructure, green areas and biodiversity



Line 4. Studying, planning and monitoring the city's green infrastructure Study of ecosystem services in Barcelona's green areas (BR)

Ranking of the potential of the 20 green areas in 4 Barcelona districts, for 8 selected environmental services

Educació ambiental	Esponjament	Ordenació periurbana	Funcionalitat ecosistemes	Regulació tèrmica	Retenció carboni	Millora qualitat de l'aire	Infiltració i permeabilitat
Jardí Botànic Històric	Parc del Guinardó	Parc del Guinardó	Parc del Guinardó	Parc de l Guinardó	Parc del Laberint d'Horta	Parc del Laberint d'Horta	Parc del Laberint d'Horta
Turó Parc	Parc del Turó de la Peira	Jardins de Can Sentmenat	Jardins del Palau de Pedralb	Parc del Laberint d'Horta	Parc del Guinardó	Parc Güell	Jardins del Palau de Pedralb
Jardins de la Universitat	Parc de la Ciutadella	Parc Güell	Parc del Laberint d'Horta	Jardins del Palau de Pedralb	Parc Güell	Parc del Guinardó	Parc del Guinardó
Jardins del Palau de Pedralb	Parc del Poblenou	Parc Central de Nou Barris	Turó Parc	Parc de la Ciutadella	Parc Font del Racó	Parc del Turó de la Peira	Parc del Poblenou
Parc del Guinardó	Parc Güell	Parc Font del Racó	Jardins de Laribal	Parc Güell	Jardí Botànic Històric	Jardí Botànic Històric	Turó Parc
Parc de la Ciutadella	Jardins del Palau de Pedralb	Jardins de Miramar	Jardí Botànic Històric	Parc del Turó de la Peira	Parc del Turó de la Peira	Jardins de Laribal	Parc de la Ciutadella
Jardins de la Tamarita	Parc Central de Nou Barris	Jardins del Palau de les Heu	Parc de la Ciutadella	Jardí Botànic Històric	Jardins del Palau de Pedrali	o Jardins del Palau de les Heu	ıı Parc Güe ll
Parc del Laberint d'Horta	Parc de Diagonal Mar	Parc del Laberint d'Horta	Jardins del Palau de les Heu	Jardins de Laribal	Jardins de Laribal	Jardins del Palau de Pedrall	o Jardins del Palau de les Heur
Jardins del Palau Robert	Parc de Carles I	Parc del Turó de la Peira	Parc Güell	Turó Parc	Jardins del Palau de les Heu	Parc Font del Racó	Parc del Turó de la Peira
Parc Font del Racó	Parc de l'Estació del Nord	Jardins de Laribal	Parc Font del Racó	Jardins del Palau de les Heu	Jardins de la Tamarita	Turó Parc	Plaça Sagrada Família
Jardins de Laribal	Parc de la Trinitat	Jardí Botànic Històric	Parc del Turó de la Peira	Jardins de Can Sentmenat	Turó Parc	Jardins de Can Sentmenat	Parc de la Pegaso
Parc Güell	Parc del Laberint d'Horta	Jardins del Teatre Grec	Jardins de Can Sentmenat	Parc de Diagonal Mar	Jardins del Palau Robert	Parc de la Ciutadella	Parc de l'Estació del Nord
Plaça Sagrada Família	Parc Esportiu Can Dragó	Parc del Pla de Fornells	Parc de Diagonal Mar	Parc de la Trinitat	Plaça Sagrada Família	Jardins de la Tamarita	Jardí Botànic Històric
Jardins de Can Miralletes	Jardins de Laribal	Plaça Baró de Viver	Jardins de la Universitat	Parc Central de Nou Barris	Parc del Poblenou	Plaça Sagrada Família	Jardins de Can Sentmenat
Jardins del Palau de les Heu	Parc de Sant Martí	Parc de Josep Maria Serra i N	Parc de Joan Miró	Parc Font del Racó	Parc de Carles I	Jardins de la Universitat	Jardins de la Tamarita
Parc de l'Estació del Nord	Jardí Botànic Històric	Plaça de l'Esquirol Volador	Parc Central de Nou Barris	Parc de Joan Miró	Parc de Diagonal Mar	Parc de la Pegaso	Parc de Carles I
Parc de Sant Martí	Parc de Joan Miró	Complex Esportiu Ciutat Me	Jardins de la Tamarita	Parc del Poblenou	Jardins de Can Sentmenat	Parc Central de Nou Barris	Jardins del Palau Robert
Jardins de la Massana	Turó Parc	Plaça Salvador Puig Antich	Parc de la Pegaso	Jardins de la Tamarita	Jardins de la Universitat	Parc de Diagonal Mar	Parc de Diagonal Mar
Parc del Turó de la Peira	Jardins de Can Sentmenat	Passeig Via Favencia	Parc de la Guineueta	Parc de la Pegaso	Parc de la Trinitat	Parc del Poblenou	Parc Central del Poblenou
Plaça de Fra Juniper Serra	Parc del Maresme	Plaça Isabel Villena	Plaça Sagrada Família	Parc de la Guineueta	Parc de la Ciutadella	Parc de la Guineueta	Jardins de la Universitat

Parque	Parque	Interior de	Plaza
histórico	urbano	manzana	



Line 4. Studying, planning and monitoring the city's green infrastructure







Les més frequents

Poblacions en augment

Les més escasses



Les més rares



Poblacions en regressió



We are still working...



Participative working session for the 2037 Tree Master Plan



Installation of bio-trunks on parks and vegetable gardens



