



TREES FOR LIFE

Master Plan of Barcelona's Trees 2017-2037

Barcelona City Council

Workshop on Implementation of
Nature-based Solutions to tackle climate change

**Session 2a: Cities, urbanization - The role of
NbS to face urban challenges**

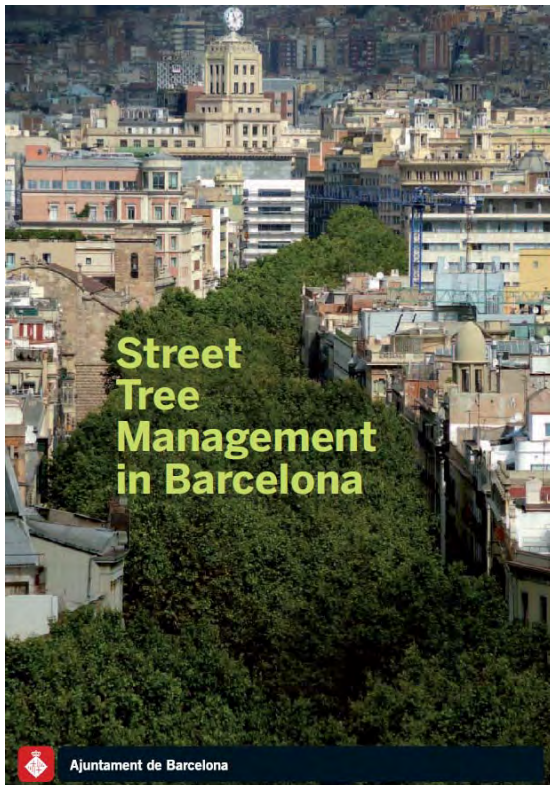
*Marseille (France)
22-24 January 2019*

Barcelona a city eco-system

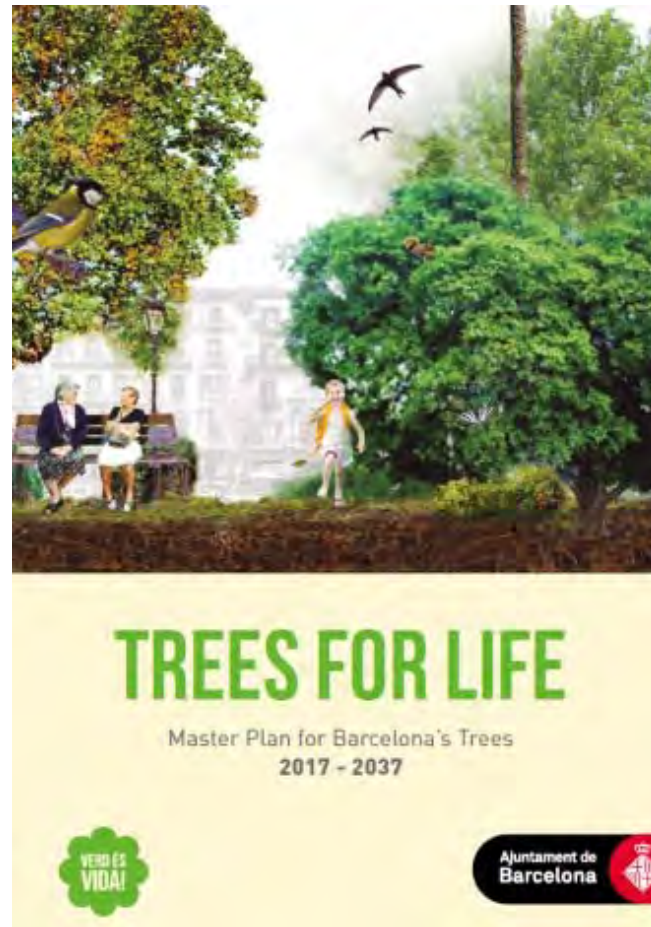
Population	1.602.386 inhabitants
Surface	102 sq km
Density	15.685 inhab. /sq km



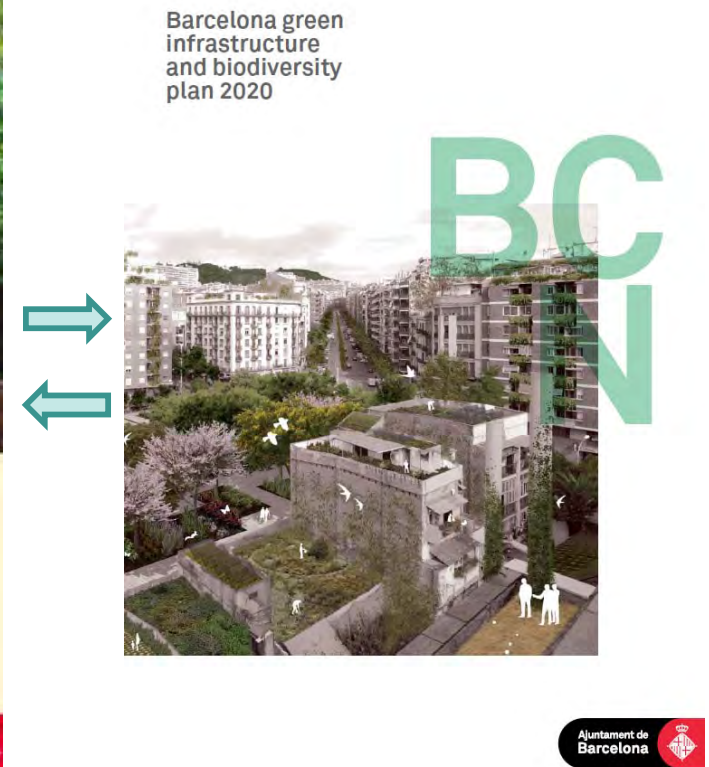
Introduction



**STREET TREE
MANAGEMENT IN
BARCELONA 2011**



**GOVERNMENT MEASURE
TREE MASTER PLAN 2017-2037**



**BARCELONA GREEN
INFRASTRUCTURE AND
BIODIVERSITY PLAN 2016**

Introduction

The Master Plan for Barcelona's Trees

Is a strategic municipal document that defines the vision, goals, strategic lines and initiatives behind the planning, **management and conservation of the city's tree population, public and private, according to their bio-geographical and urban features.**

The scope of the Plan includes all living trees in the city, whether private or publicly managed(urban areas, parks, gardens and woods).



Introduction

Issue of Climate change: heat, pollution, sustainability, citizens wellness

- **Type of ecosystem:** river, forest, coast, etc.
- **Type of NbS:** ecosystem based management,
- **Project leader and partners:** Municipality, collaborations with Universities
- **Calendar:** 2017-2037
- **Funding:** Municipality

Introduction

WHY TREES ARE SO IMPORTANT FOR BARCELONA?

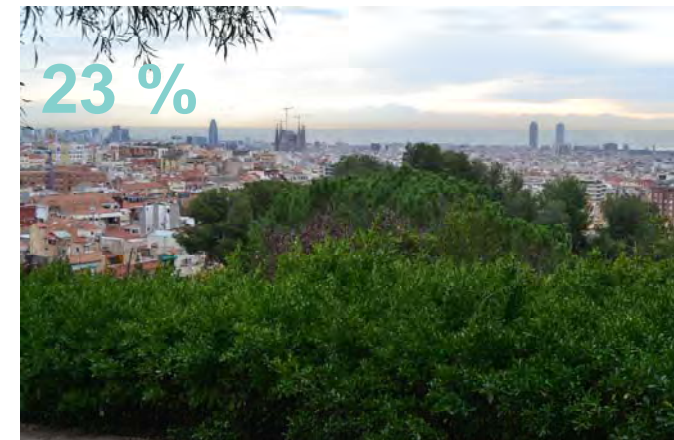
The tree heritage management by the City Council : **315. 000 IU**



Street's Trees: 202.000 IU



Park's Trees: 40.000 IU

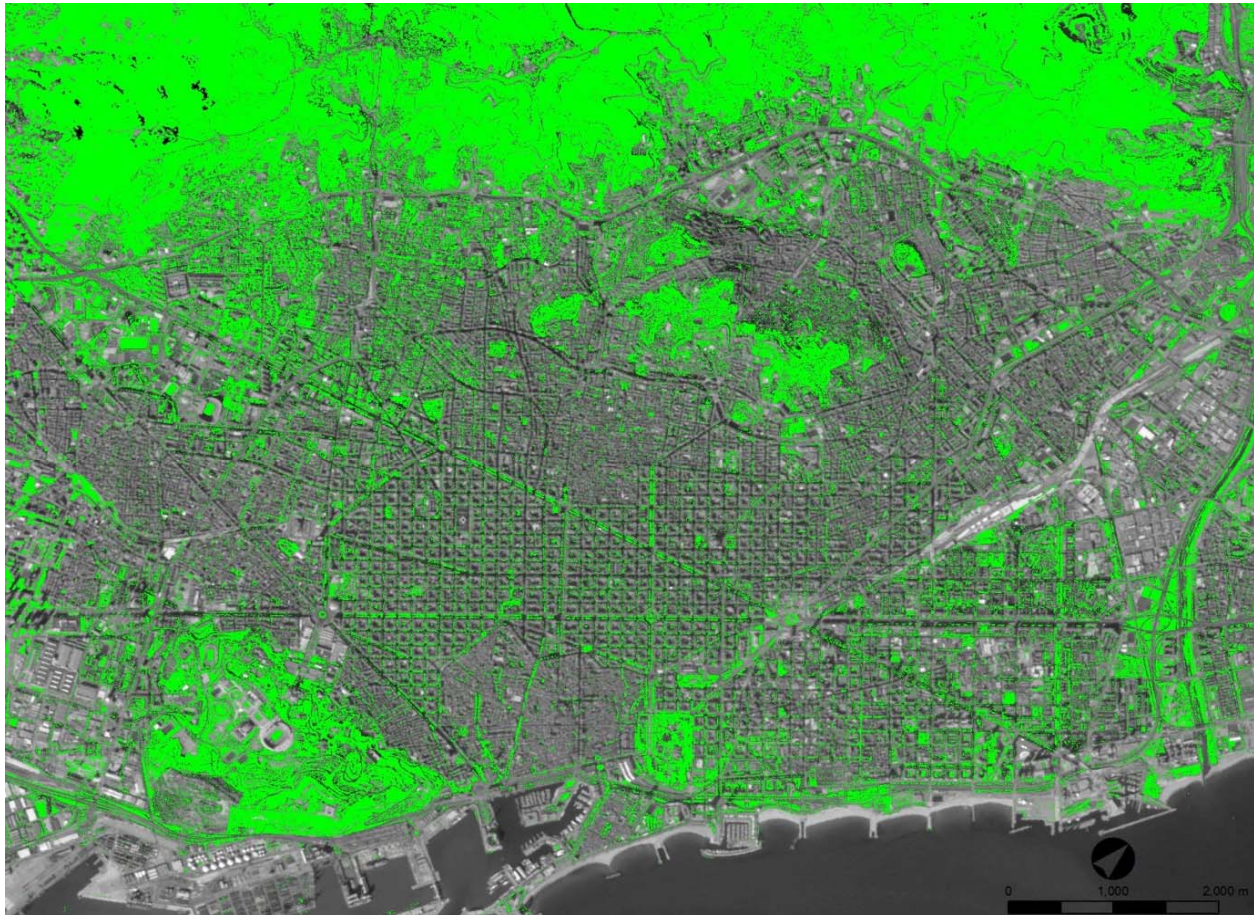


Forretal's Trees: 73.000 IU

Objectives

5 OBJECTIVES

1. Having a tree population that forms a real green infrastructure, achieving the maximum value and connectivity with its surroundings (urban and natural).



Increasing the city's tree cover by 5%, so that 30% of the city's surface area is covered by trees.

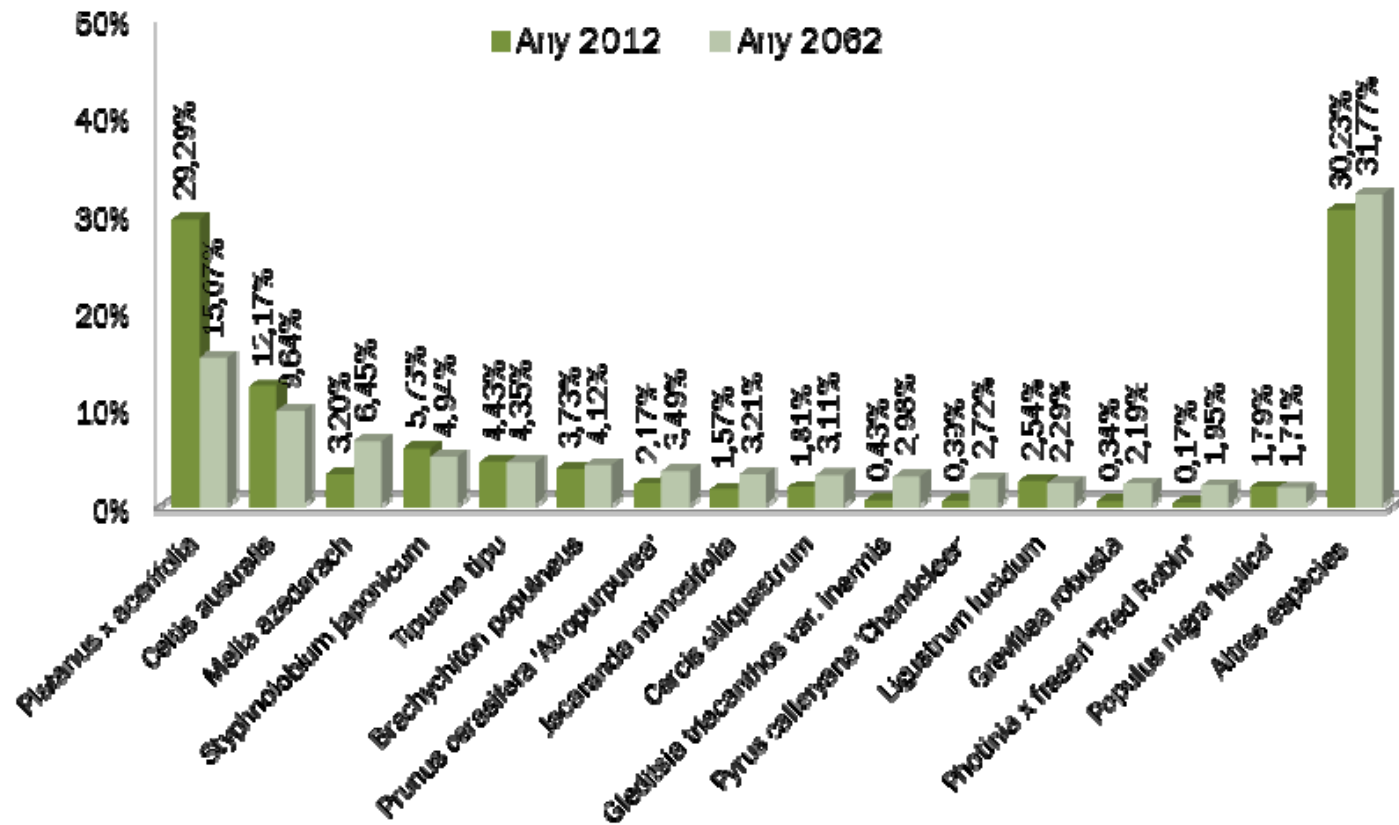
Objectives

2. Getting the maximum environmental, social and economic services from the tree population.



Objectives

3. Having a tree population that is biodiverse, in good condition, protected, safe and which provides the city with identity, through the most efficient and sustainable management possible.



Achieve a biodiverse tree heritage in which no single tree species accounts for more than 15% of the total population within the urban area.

Objectives

4. Having a tree population that is adapted, resilient and which can be used as a tool for adapting to climate change.



Ensuring that within urban areas, 40% of tree species are adapted to climate change, as opposed to the current 30%.



Objectives

5. To achieve good coexistence between the general public and trees, and encourage society to value trees more.



10 STRATEGIC LINES

1 - TREE HERITAGE AND BIODIVERSITY

Conserving the tree population, making it more sustainable and turning it into a biodiverse habitat

2 - KNOWLEDGE

Increasing knowledge about trees and their values and services

3 - COMMUNICATION AND PARTICIPATION

Inform the general public about the services and disservices provided by trees, encouraging them to participate in their conservation

4 - PLANNING AND CONNECTIVITY

Planning the tree population as a more powerful, more interconnected green infrastructure which can provide more services

5 - PRESERVATION AND PROTECTION

Preserving the tree population and its heritage and identity values, ensuring its protection

6 - TREE HEALTH

Caring for the health of the trees, considering biodiversity and the general public

7 - PLANT MATERIAL AND PLANTING

Working towards a good supply and appropriate planting of trees

8 - PRUNING AND SAFETY

Pruning as little as possible while ensuring people's safety and tree growth

9 - THE SOIL

Providing trees with a greater volume and higher quality of soil, developing strategies that make urban surfaces more permeable

10 - WATER

The sustainable management of irrigation water, while obtaining maximum services

Objectives

10 STRATEGIC LINES

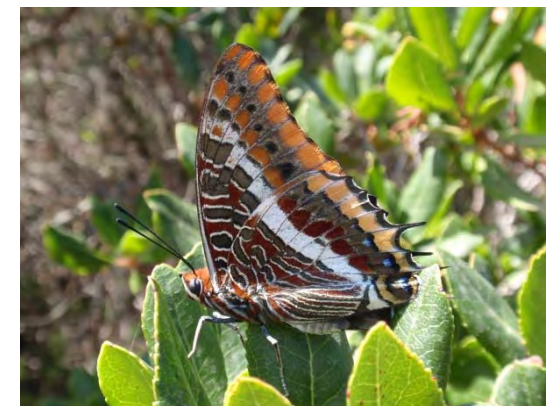
1 - TREE HERITAGE AND BIODIVERSITY

Action 1.1 – Getting to know Barcelona's tree heritage and producing a complete inventory

Action 1.2 – Balancing out the abundance of all species of trees and palm trees in the city

Action 1.3 – Strengthening the tree population as part of an ecosystem with native fauna and flora

Action 1.4 – Planning the replacement of trees



10 STRATEGIC LINES

3 - COMMUNICATION AND PARTICIPATION

Action 3.1 – Producing and applying a communication strategy for the tree population

Action 3.2 – Promoting educational projects on the tree population in education centers and for the general public

Action 3.3 – Promoting and supporting projects for involving the general public

Action 3.4 – Using new technologies to inform people about the city's tree heritage



Objectives

10 STRATEGIC LINES

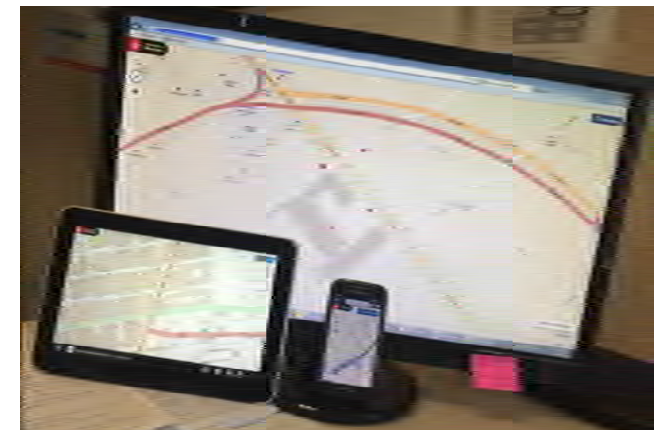
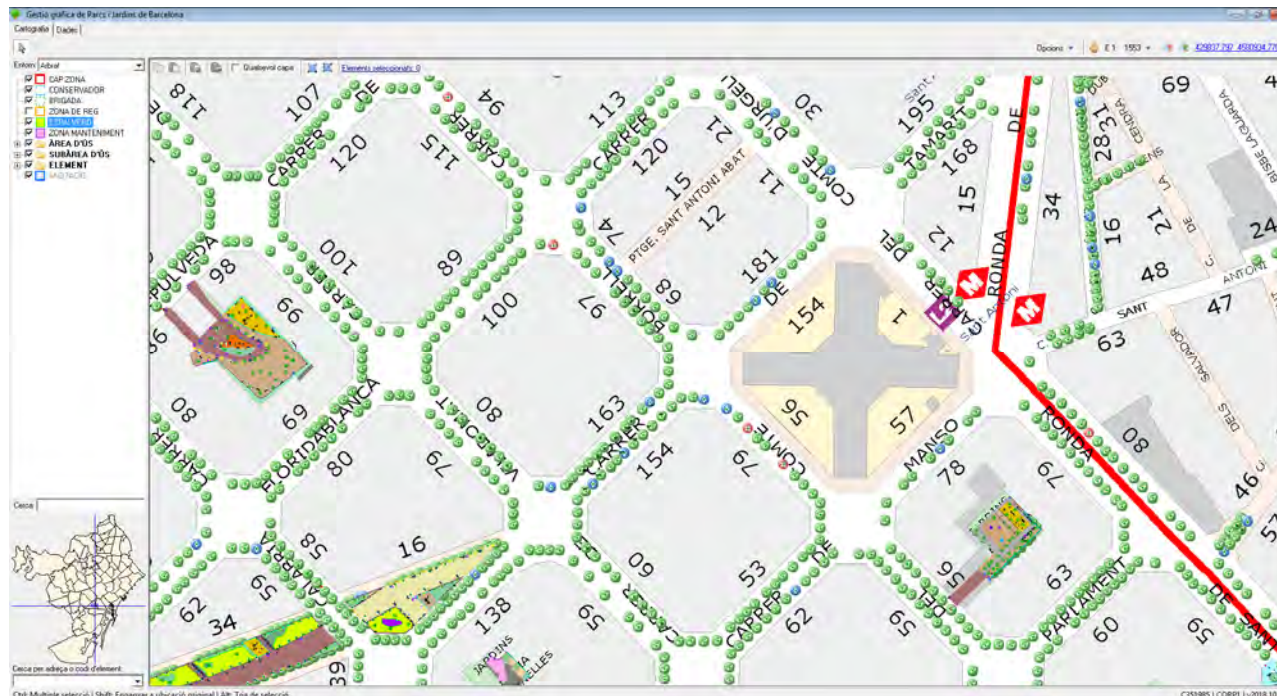
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10 STRATEGIC LINES

4 - PLANNING AND CONNECTIVITY

Action 4.1 – Increasing the city's tree biomass by planting more trees and bushes and improving the quality of existing trees

Action 4.2 – Including the value of the tree population in planning

Action 4.3 – Connecting the tree population with urban and natural environments

Action 4.4 – Reviewing the planning and design criteria for tree planting in city projects

Action 4.5 – Ensuring that each tree species is provided with the best possible agronomic conditions in the urban environment



Objectives

10 STRATEGIC LINES

6 - TREE HEALTH

Action 6.1 - Applying integrated control of pests and diseases

Action 6.2 - Promoting and informing the general public about the value of beneficial plants, fostering the growth of spontaneous vegetation

Action 6.3 - Seeking alternatives to herbicides for the control of spontaneous vegetation

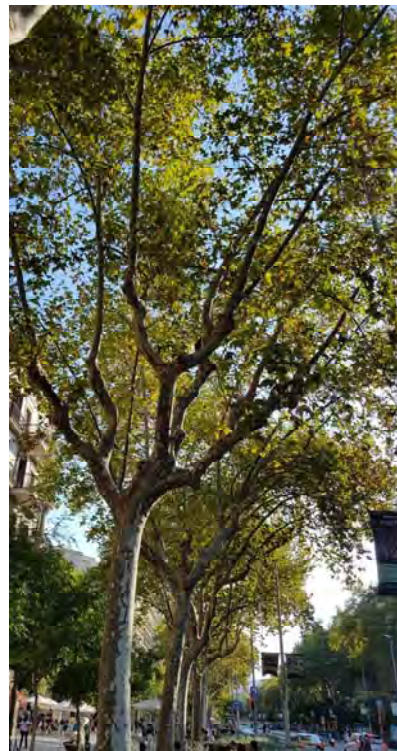
Action 6.4 - Applying the strategy to combat and control the red palm weevil



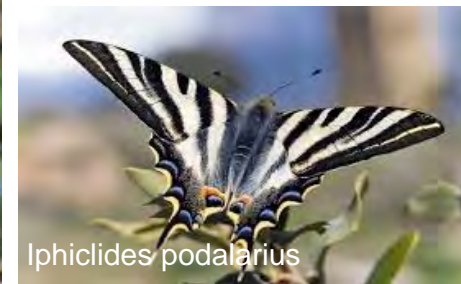
10 STRATEGIC LINES

8 - PRUNING AND SAFETY

- Action 8.1 – Reviewing and unifying pruning criteria for trees
- Action 8.2 – Pruning young trees to shape them
- Action 8.3 – Improving risk evaluation for trees and palm trees
- Action 8.4 – Finding new uses for plant residue



Fam. Syrphidae



Iphiclides podalarius



Cyanistes caeruleus

What is next

Schedule's implementation of 10 strategic lines

Schedule:

Start of the action
Continuation of the action

N.	ACTION	2017	2018	2019	2020 - 2025	2026 - 2037
1.1	Getting to know Barcelona's tree heritage and producing a complete inventory					
1.2	Balancing out the abundance of all species of trees and palm trees in the city					
1.3	Strengthening the tree population as part of an ecosystem with native fauna and flora.					
1.4	Planning the replacement of trees					
2.1	Studying the tree population's functions, values, services and disservices					
2.2	Assigning an economic value to the benefits of the tree population					
	Studying the effects of climate change on the urban microclimate and its impact on trees					
2.3	Studying how to tackle the scarcity of natural resources in the tree population's management					
2.4	Minimising the environmental impact of tree management based on pertinent studies					
2.5	Improving training for specialist personnel related to the tree population and fostering ways of collaborating with other municipal departments.					
2.6	Creating knowledge and experience-exchange networks with other national and international cities					
2.7	Studying the social perception of trees					
2.8	Searching for and applying new technologies for controlling and monitoring the physiological state of trees (infra-red, drones, sensors, etc.)					
2.9	Selecting tree species with an eye to the future (resistance to urban environment, size and shape, flowering)					
2.10	Producing and applying a communication strategy for the tree population					
3.1						

N.	ACTION	2017	2018	2019	2020 - 2025	2026 - 2037
3.2	Promoting educational projects on the tree population in education centres and for the general public					
3.3	Promoting and supporting projects for involving the general public					
3.4	Using new technologies to inform people about the city's tree heritage					
4.1	Increasing the city's tree biomass by planting more trees and bushes and improving the quality of existing trees					
4.2	Including the value of the tree population in planning					
4.3	Connecting the tree population with urban and natural environments					
4.4	Reviewing the planning and design criteria for tree planting in city projects					
4.5	Ensuring that each tree species is provided with the best possible agronomic conditions in the urban environment					
5.1	Producing a plan for preserving iconic tree species in Barcelona					
5.2	Improving and informing the general public about trees of local interest in Barcelona					
5.3	Evaluating and putting into practice the most appropriate physical-protection systems on city streets and squares					
5.4	Ensuring the protection of trees during construction work					
5.5	Reviewing the evaluation and economic compensation criteria for trees and transplanting					
5.6	Organising and reviewing technical and regulatory documents concerning trees and their protection					
6.1	Applying integrated control of pests and diseases					
6.2	Promoting and informing the general public about the value of beneficial plants, fostering the growth of spontaneous vegetation					

N.	ACTION	2017	2018	2019	2020 - 2025	2026 - 2037
6.3	Searching for alternatives to herbicides for the control of spontaneous vegetation					
6.4	Applying the strategy to combat and control the red palm weevil					
7.1	Ensuring the long-term supply of trees					
7.2	Ensuring the purchase of high-quality trees					
7.3	Improving tree planting					
7.4	Rethinking tree nurseries					
8.1	Reviewing and unifying pruning criteria for trees					
8.2	Pruning young trees to shape them					
8.3	Improving risk evaluation for trees and palm trees					
8.4	Finding new uses for plant residue					
9.1	Trying out and applying new types of soil and permeable surfacing					
9.2	Improving the quality of soil in new plantings					
9.3	Improving soil quality for existing trees					
9.4	Resolving the compatibility between tree wells and accessibility					
9.5	Designing new tree wells and surfacing, rationalising services					
10.1	Adjusting the amount and frequency of watering to each species					
10.2	Applying the most efficient irrigation technologies					
10.3	Prioritising the use of alternatives to drinking water					
10.4	Making use of run-off water in parks and woodland areas, and also for street trees					
10.5	Seeking appropriate alternative resources for future water availability.					

Results

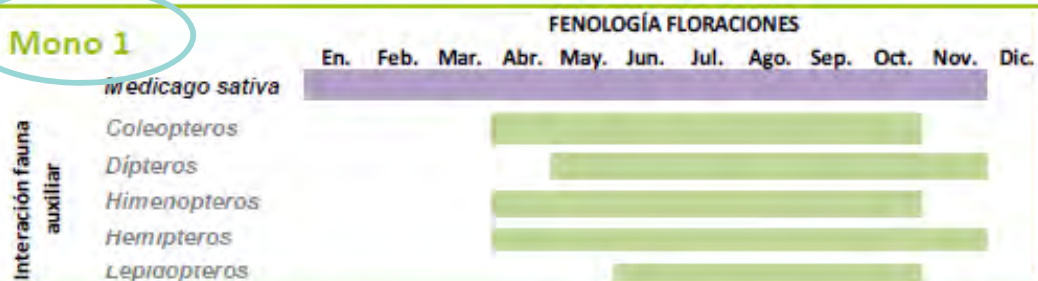
NATURALIZING TREE PIT



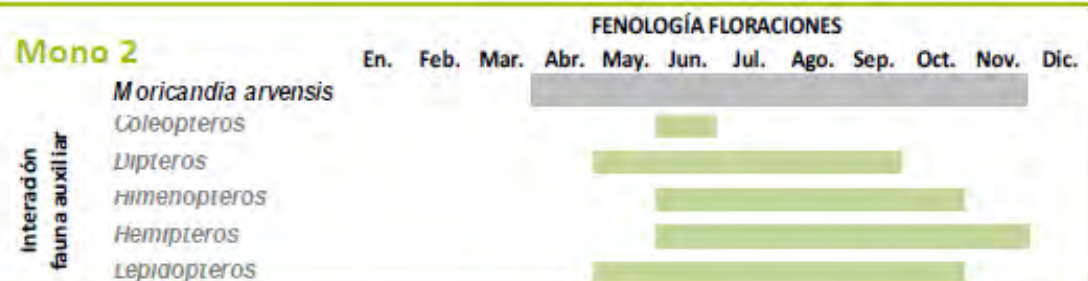
© Lorena Escuer Constante

Results

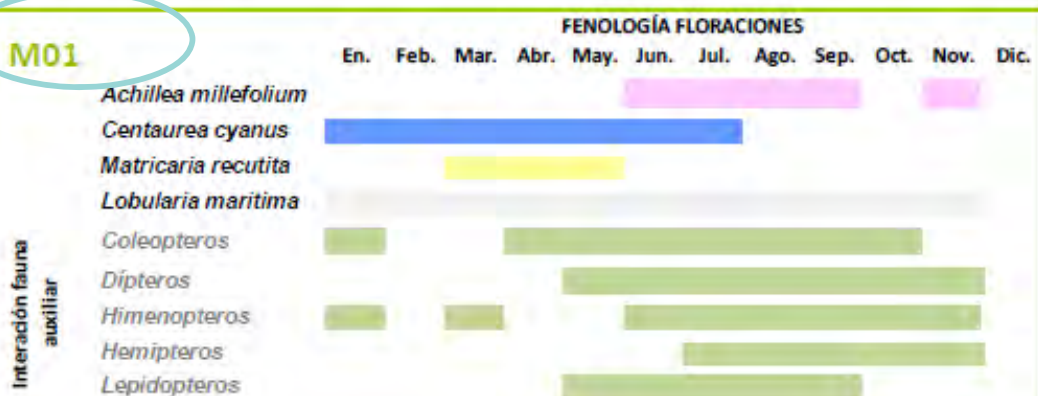
Mono 1



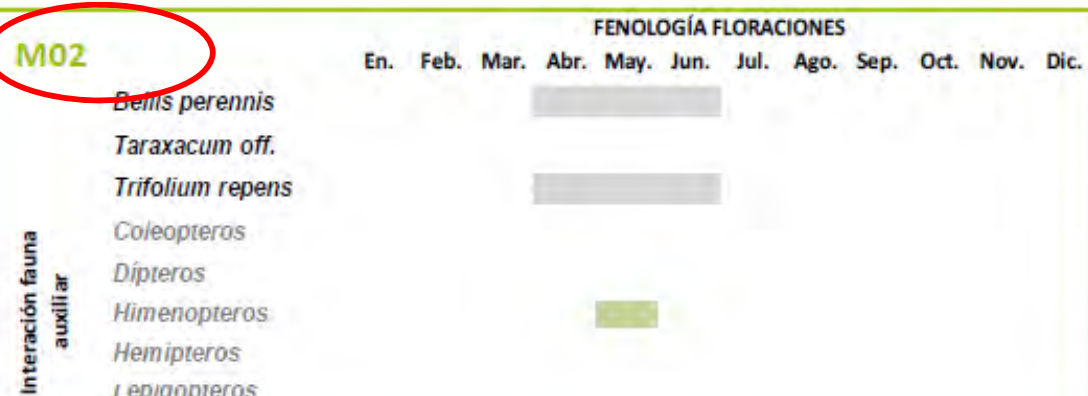
Mono 2



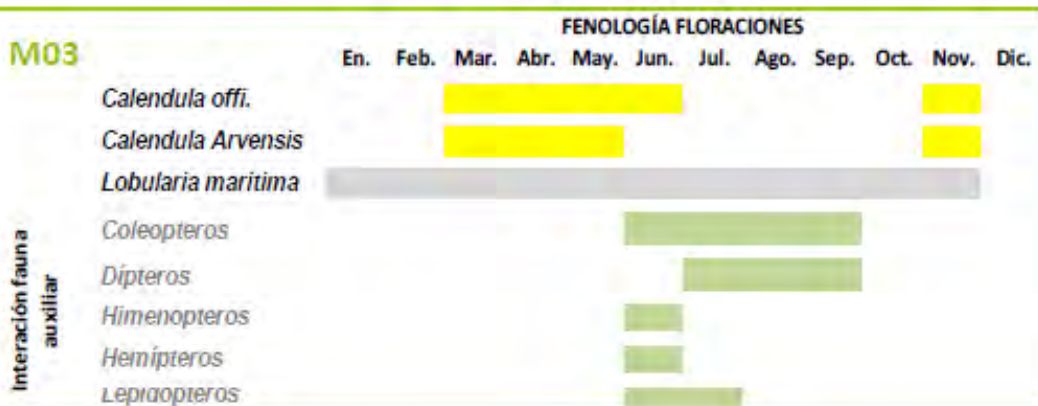
M01



M02



M03

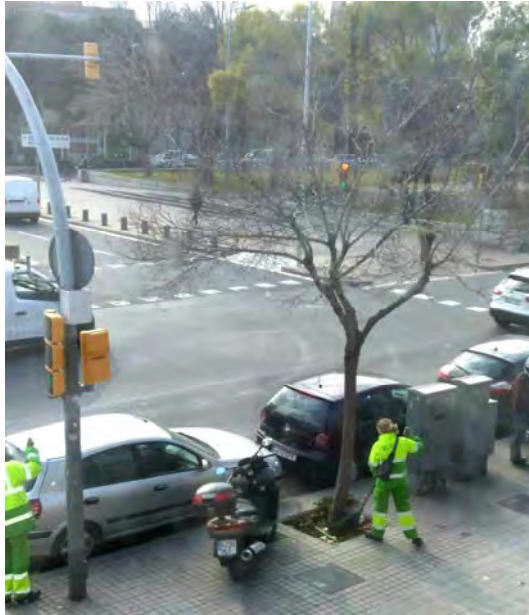


Source: Puy Alonso Martínez, Bióloga y Paisajista
Lorena Escuer, Bióloga y Asesora en GIP



Implementation challenges

NOT CLEANING/CLEARING TREE PIT



Implementation challenges

GENERAL



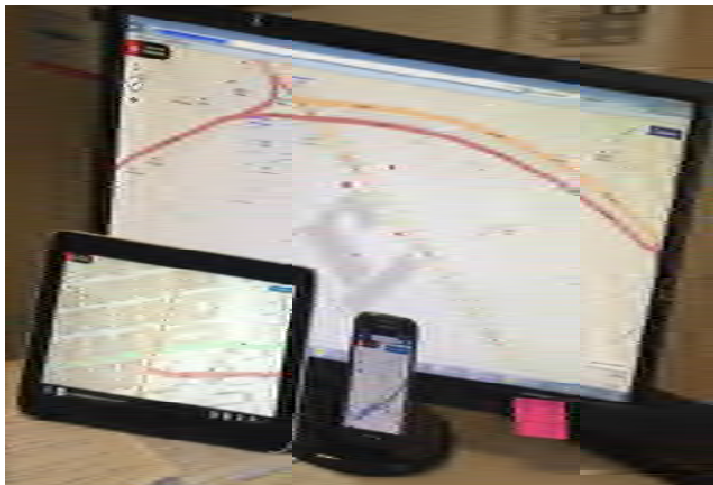
PUNCTUAL



Best practices

MONITORING AND MANAGEMENT

Pla de Risc			
Accions Realitzades			
Anàlisi visual de l'artefact mostrats del 1 al 7 de 7			
Acció	Data inspecció	Tipus de feina	Prioritat
	23/02/2016	Mantenir	NORMAL
	01/07/2016	Mantenir	
	20/10/2014	Mantenir	
	13/03/2013	Mantenir	
	06/09/2012	Mantenir	
	20/02/2011	Mantenir	
	24/07/2009	Mantenir	



Conclusions

What aspects from research should be looked at before setting a NbS project?

BUDGET FOR MASTER PLAN FOR BARCELONA' TREES : 9 MILION EUROS

Number of fauna and flora species in Barcelona

GRUP	ESPÈCIES					
VEGETACIÓ	1.172 sp o varietats ornamentals d'arbres, arbusts, coníferes, palmeres, enfiladisses, agaviformes, crasses i aquàtiques		77,4% dels tàxons correspon a sp al·lòctones 22,6% " " " autòctones			
FAUNA	ORDRE	SP AUTÒCTONES TRAMA URBANA	SP INTRODÜIDES TRAMA URBANA	SP AUTÒCTONES COLLSEROLA	SP AUTÒCTONES BARCELONA	SP PROTEGIDES TRAMA URBANA
	Mamífers	17	0	28	28	7
	Ocells	75	7	176	184	55
	Rèptils	8	3	16	16	8
	Amfibis	3	0	10	10	2
	Peixos	0	3	4	4	0
	Papallones	24	-	57	57	-

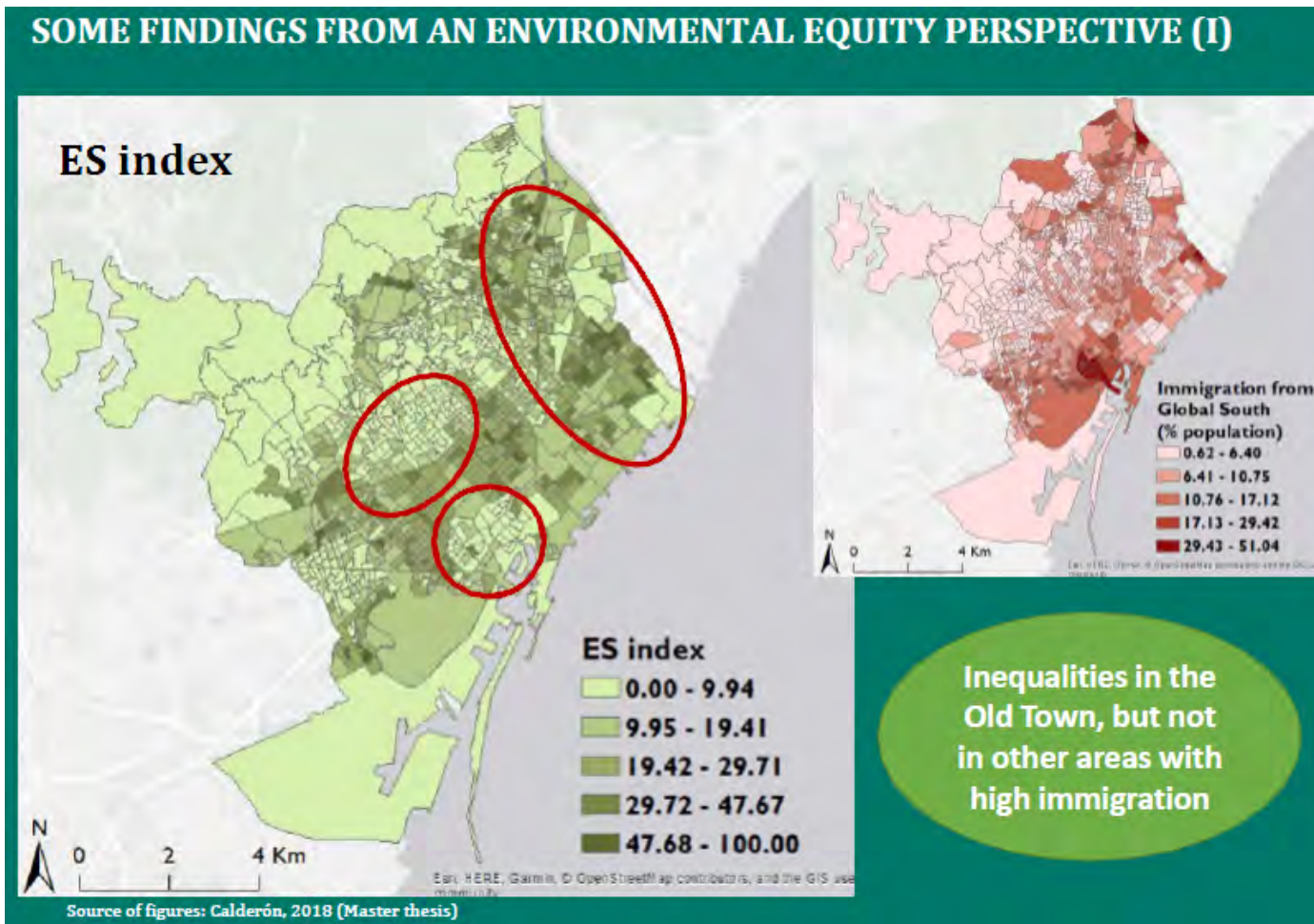
Number of structures of wildlife and situation

Installation of 25 nesting boxes for insectivore birds, in Park Güell
Installation of 3 nesting boxes for owls and 3 scops owl boxes in Montjuïc
Installation of insect hotels in urban allotments and green spaces: Trinitat Vella Vegetable Garden, Torre Melina Vegetable Garden, Parc del Roserar de Cervantes, Park Güell, Parc del Clot Parc de Joan Miró, Jardins de Joan Brossa, Parc de la Ciutadella, Parc de Diagonal Mar, Parc del Putxet, Jardins de Mossèn Cinto Verdaguer, Parc de la Trinitat
Installation of biotrunks in Parc de la Trinitat, Jardí de Petra Kelly, Font d'en Fargues and Parc Zoològic (2)
Installation of 18 bat towers, 40 per cent of which are currently occupied
Installation of 260 external nests and 61 integrated nests in buildings
Installation of wooden pyramids in the Polvorí area and in the Jardí de Valent Petit
Installation of a bog for swallows and an aromatic spiral in the Jardí de Valent Petit

Monitoring projects: BEFORE /DURING/ AT THE END

Conclusions

Which type of monitoring is needed to highlight NbS benefits for biodiversity and climate change adaptation?



STREET TREE BENEFITS:
Assessing socio-spatial inequalities in Barcelona

Co-authors: Amalia Calderón & Johannes Langemeyer



Ajuntament
de Barcelona

Thank you

For more information :

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Links

<http://ajuntament.barcelona.cat/ecologiaurbana/en/what-we-do-and-why/green-city-and-biodiversity>