



Connectivity of green and blue infrastructures: living veins for biodiverse and healthy cities

BIOVEINS

Roeland SAMSON (Partner 1)

Funded projects final conference, 12-13 November 2019, Brussels

BiodivERsA COFUND Call (2015-2016)

« Understanding and managing biodiversity dynamics to improve ecosystem functioning and delivery of ecosystem services in a global change context: the cases of soils and sediments, and land- river and sea-scapes »



CONSORTIUM DESCRIPTION

Partner 1 (coordinator): Samson R, University of Antwerp, Belgium (Funded by BELSPO)

Partner 2: Pinho P, Universidade de Lisboa, Portugal (FCT)

Partner 3: Tichit M[†], French National Institute for Agricultural Research (INRA), France (ANR)

Partner 4: Laanisto L, Estonian University of Life Sciences, Estonia (ERC)

Partner 5: Tryianowski P, Poznan University of Life Sciences, Poland (NSC)

Partner 6: Moretti M, WSL Swiss Federal Research Institute, Switzerland (SNSF)

Partner 7: Chiron F, Université Paris Sud, France (ANR)



PROJECT DESCRIPTION

The main objective:

to use **functional diversity (FD)** to highlight the mechanisms underpinning the link between **GBI**, **taxonomic diversity (TD)** and **ecosystem services (ESs)** provisioning, and to provide, together with **local stakeholders**, the ecological and interdisciplinary knowledge to identify the critical features of GBI, to **guide the establishment, management and restoration of GBI**, and to **mitigate the effects of major urban global challenges**, like habitat fragmentation, air pollution, and urban heat island.



PROJECT DESCRIPTION

specific objectives:

(i) to analyse, together with local stakeholders, the actual and planned GBI from an urban planning perspective, **determine representative sampling plots and derive prior actions** based on specific objectives (ii) – (iv);

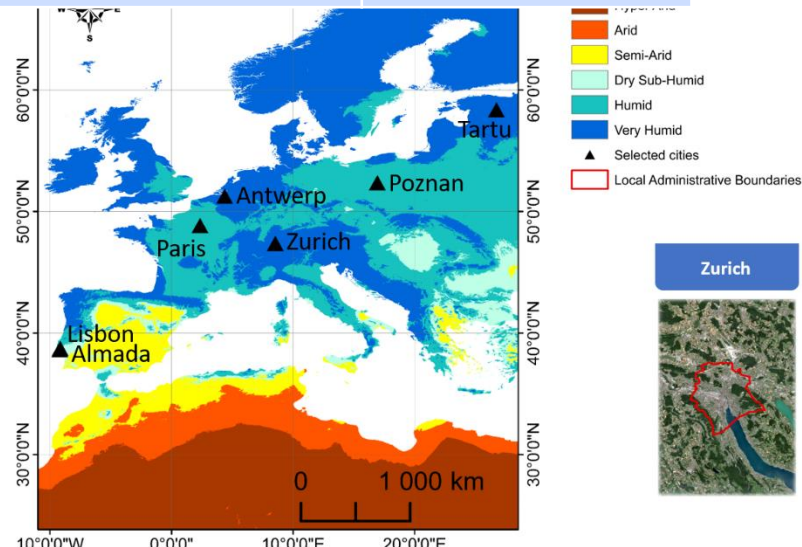
(ii) to **assess the FD for a variety of taxonomic groups** differing in dispersion ability, sensitivity to environmental conditions and use of resources within GBI to **link the considered taxa to ESs** and to **determine the importance of GBI connectivity on urban biodiversity**;

(iii) to assess the impact of proportion, configuration and connectivity of urban GBI **on provisioning and regulating ESs by an experimental and modelling approach**, and link these ESs to the data obtained in (i-ii) to assess the role of TD and FD on these ESs; and

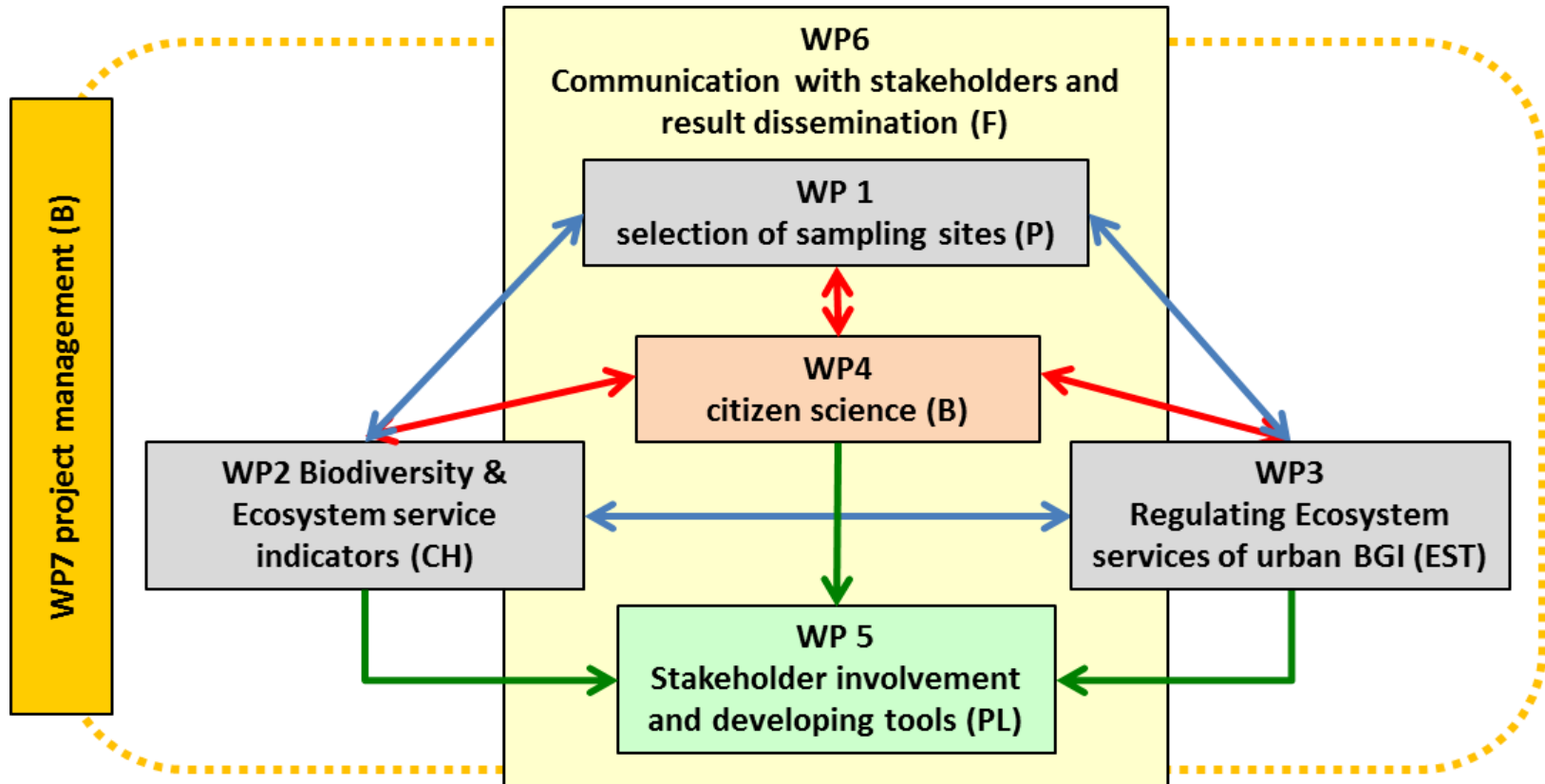
(iv) to **provide tools, best practices, and guidelines** for the stakeholders about how to improve urban GBI and how to enhance multifunctional ESs for people and nature.

PROJECT DESCRIPTION

City name	Country	Climate	Nr. of inhabitants
Lisboa	Portugal	Mediterranean	550 000
Almada	Portugal	Mediterranean	180 000
Zurich	Switzerland	Temperate	390 000
Paris	France	Temperate	2 240 000
Antwerp	Belgium	Temperate	511 000
Poznań	Poland	Temperate - transition to continental	550 000
Tartu	Estonia	Hemi-boreal	97 000



PROJECT DESCRIPTION



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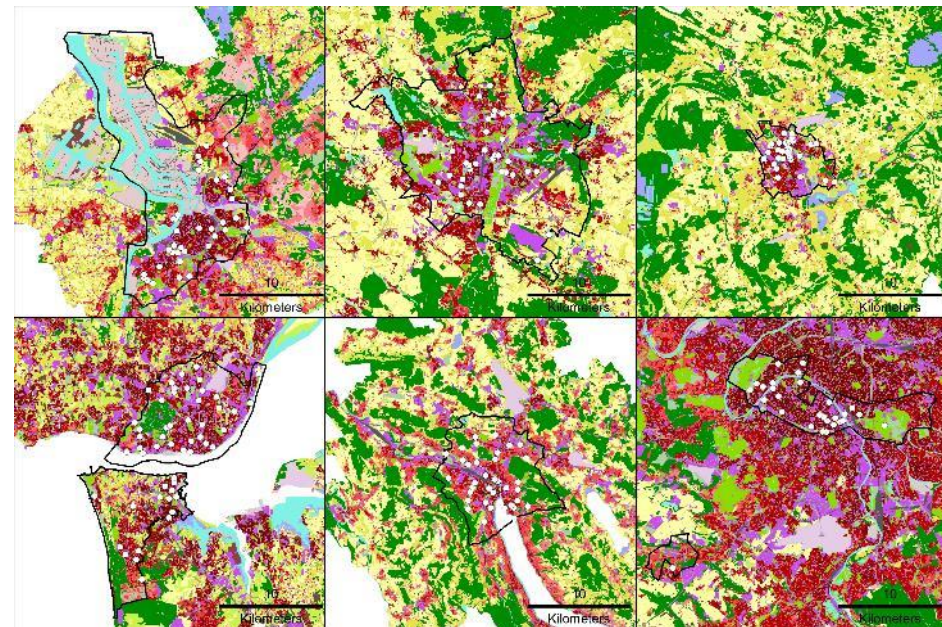
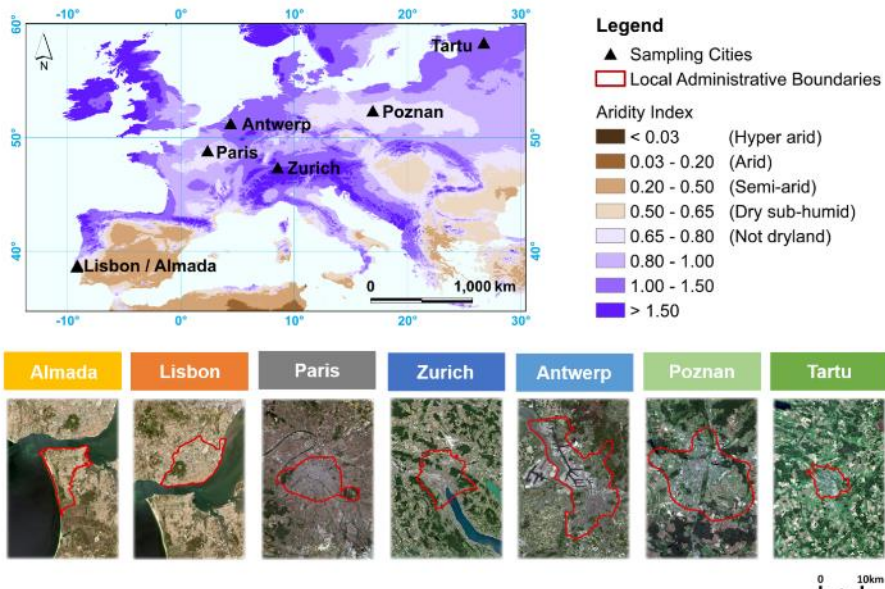
WP	Task	Taxonomic groups	Sampling methods	Countries involved					
				B	P	CH	F	PL	EST
WP1	Selection of sampling sites								
WP2	Biodiversity	Woody and flower plants	Line-intersect/quadrats						
		Lichens	Quadrata relevés						
		Leaf-dwelling bacteria	Swabs						
		Herbivorous mites	Molecular analysis						
		Arthropods: - Bees and wasps	Trap nests						
		- Spiders and carabids	Pitfall traps, Suction						
		- Saproxyllic beetles	Window traps, Suction						
		Birds	Point counts						
		Bats	Bioacoustic relevés						
		Provisioning of							
		Pollination success	Potted strawberries						
		Finess of bees and wasps	Trap nests						
		Pest-control by birds	Sentinel caterpillars						
WP3	Regulating ESs and indicators of GBI functioning								
WP4	Involving citizens								
WP5	Tool development								
WP6	Communication								
WP7	Project management								

SCIENTIFIC OUTPUTS

WP1: Selection of sampling sites (P)

seven cities
a climate and urbanization gradient

36 parks selected per city administrative
division



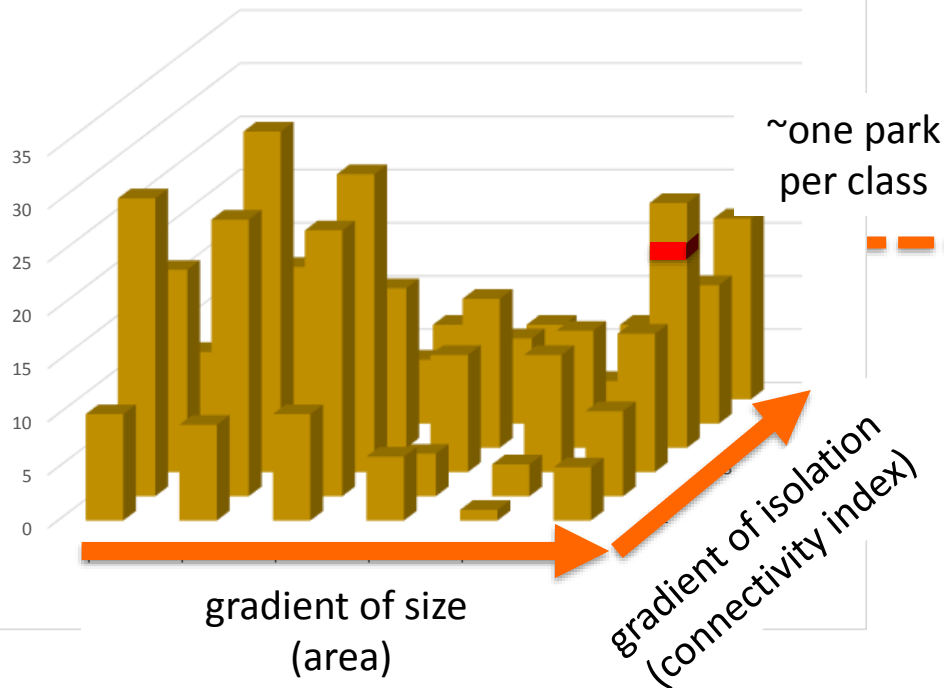
SCIENTIFIC OUTPUTS

WP1: Selection of sampling sites (P)

park selection per city using a connectivity gradient based in size a isolation

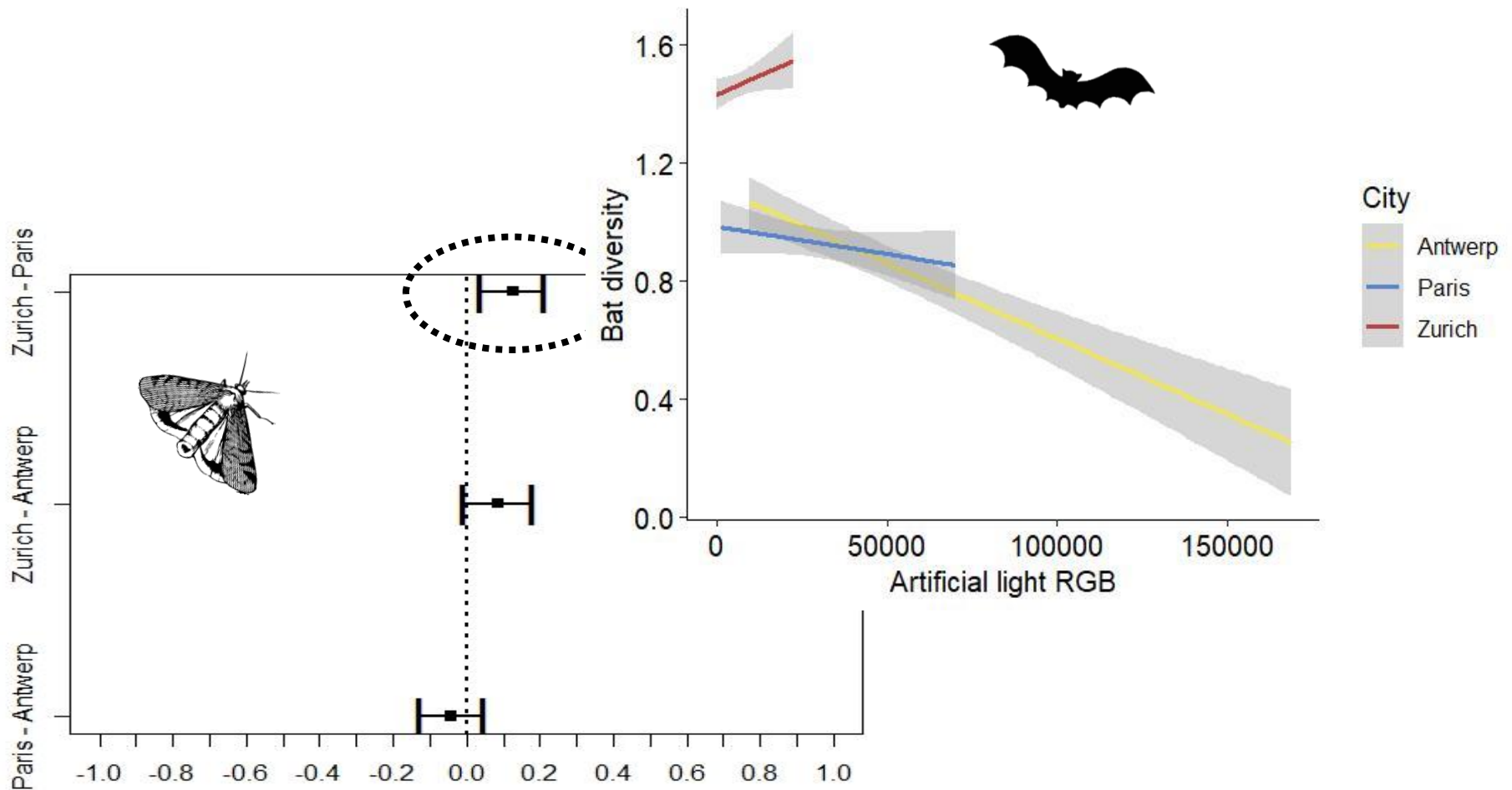
the park centroid was selected for sampling multiple taxa

Paris: all available parks



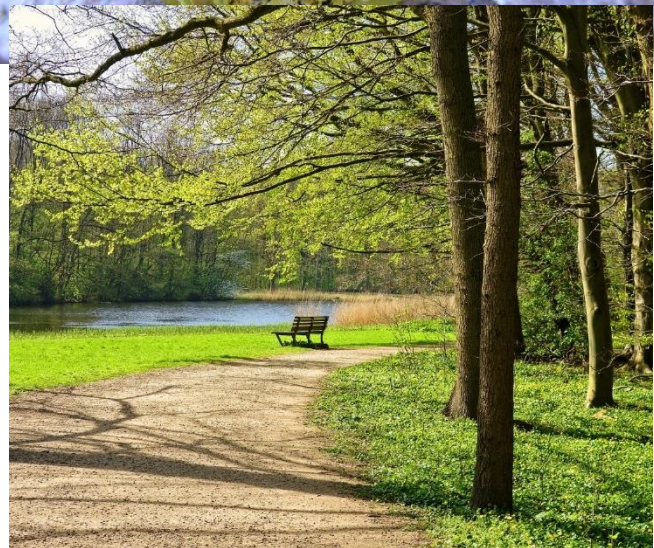
SCIENTIFIC OUTPUTS

WP2: Biodiversity and Ecosystem Service Indicators (CH)

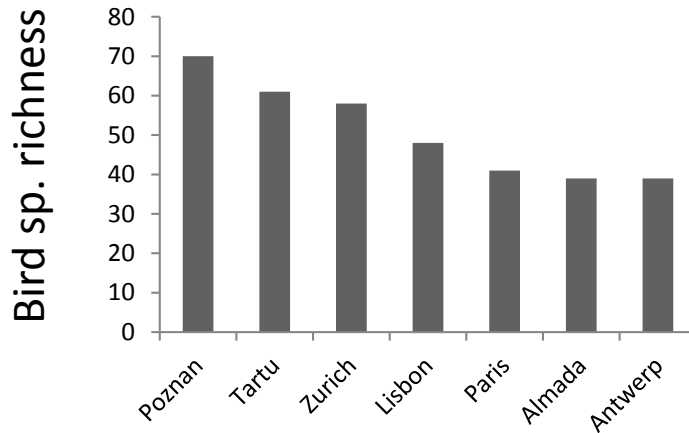


SCIENTIFIC OUTPUTS

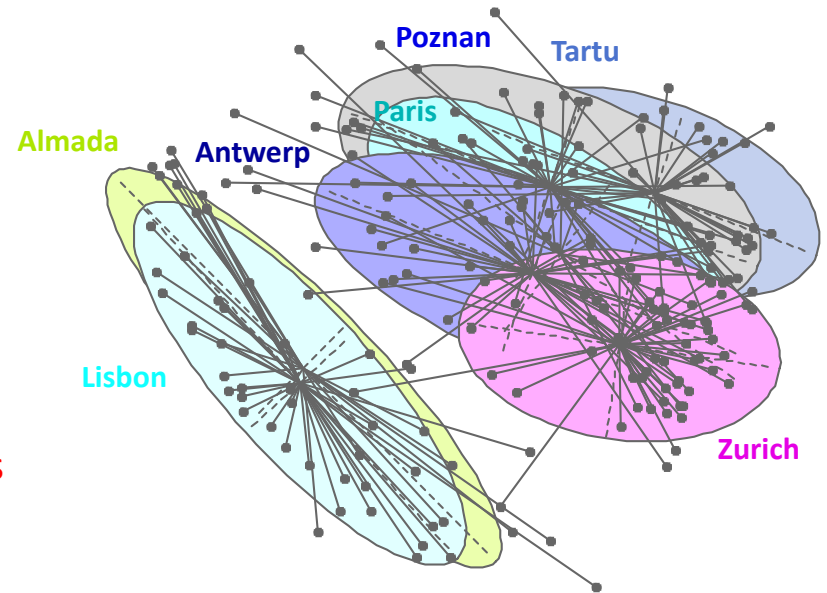
WP1: Selection of sampling sites (P)



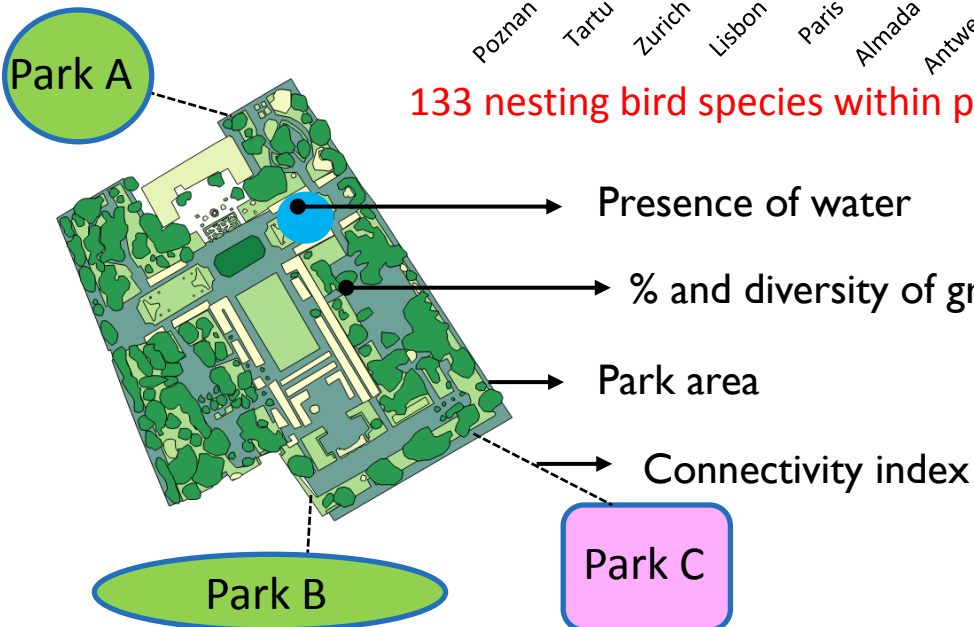
WP2: Biodiversity and Ecosystem Service Indicators (CH)



133 nesting bird species within parks



Distance in species composition (NMDS)



SCIENTIFIC OUTPUTS

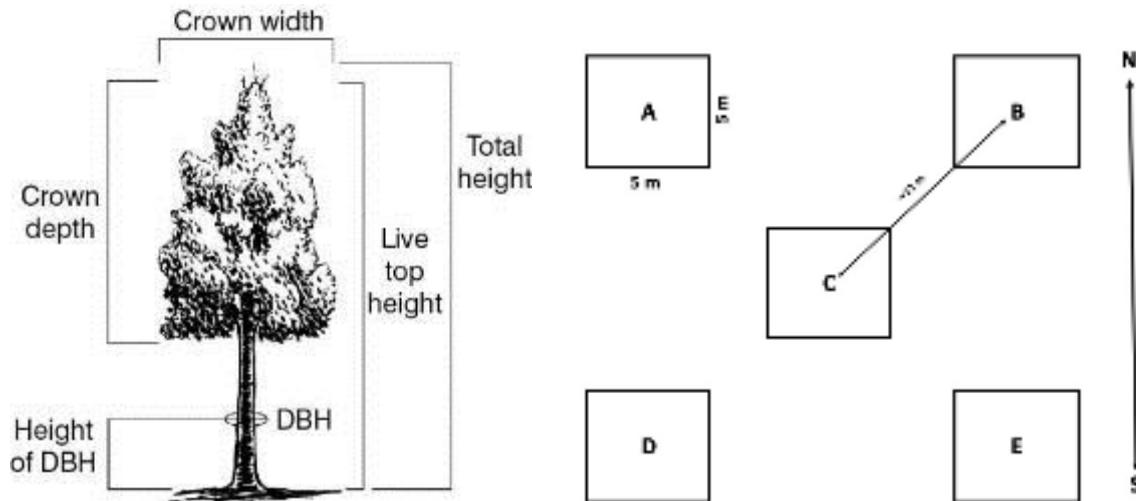
WP3: Regulating ecosystems services of urban green & blue infrastructures (EST)



Carbon stock estimations

	Storage ($\text{Kg C} \cdot \text{m}^{-2}$)			mean tree cover in parks (%)
	mean	SE	range	
Tartu	4.8	0.7	0.7 - 10.9	55.5
Antwerp	3.8	0.5	0.5 - 9.12	63.3
Zürich	4.1	0.7	0.05 - 12.7	52.7

Vegetation sampling design



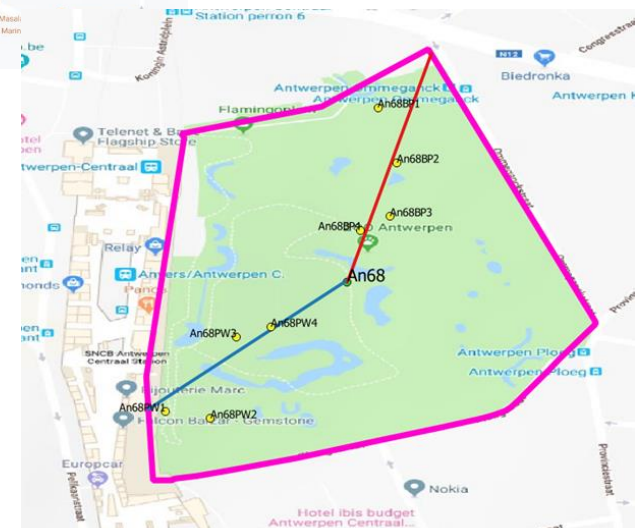
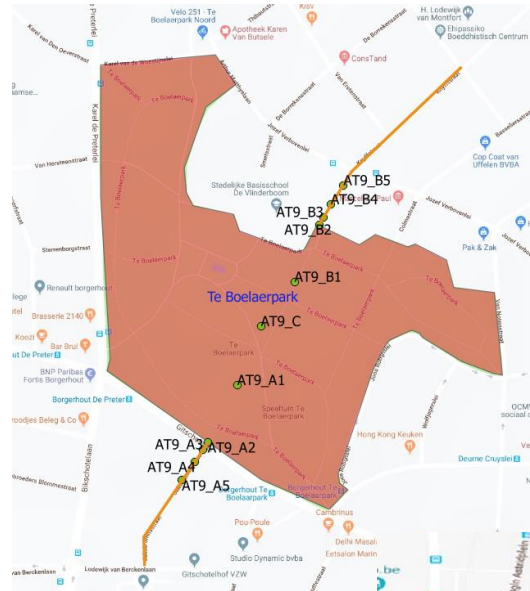
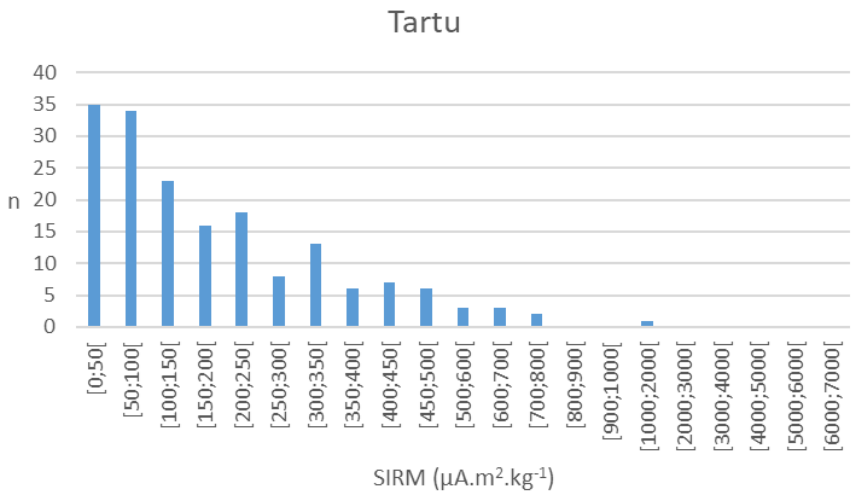
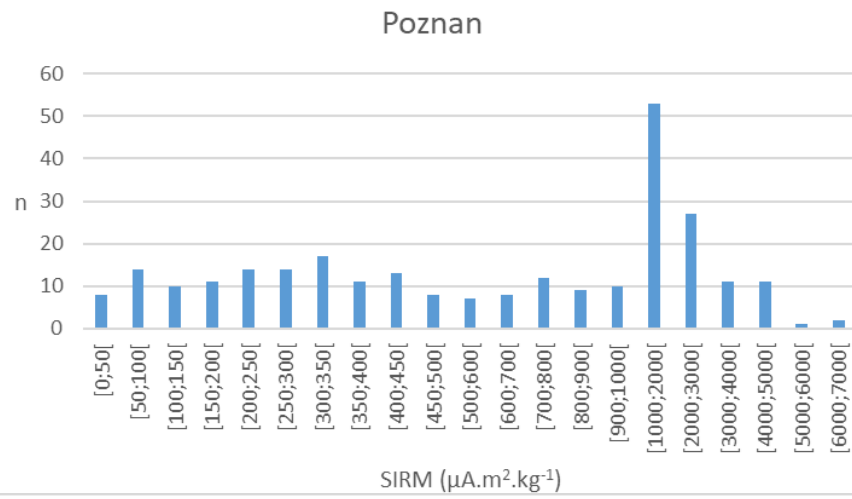
Species richness

	woody species richness (n)		
	mean	SE	range
Tartu	14.4	1.1	4-29
Antwerp	8.9	0.6	2-18
Zürich	12.4	1.3	4-27

>224 sampling sites across 7 cities

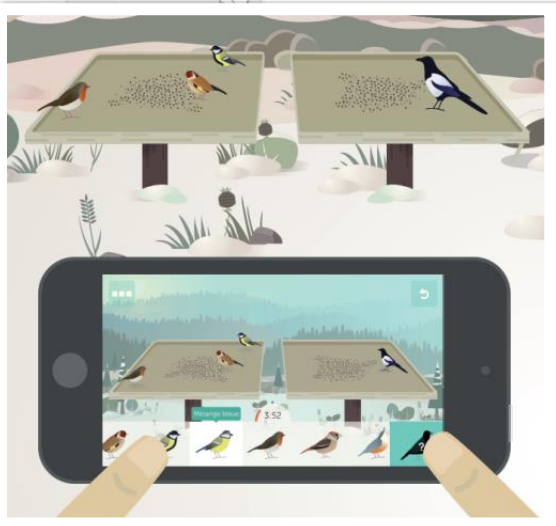
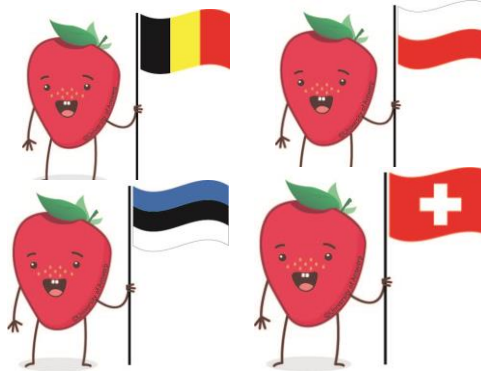
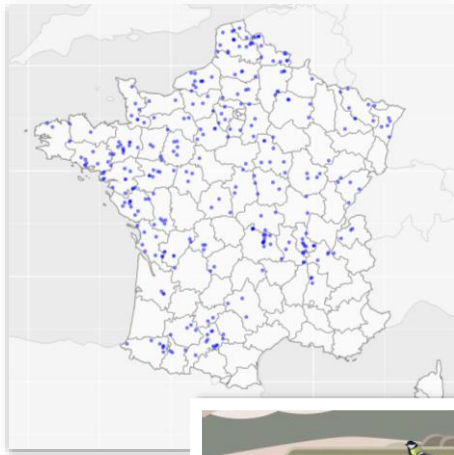
SCIENTIFIC OUTPUTS

WP3: Regulating ecosystems services of urban green & blue infrastructures (EST)



SCIENTIFIC OUTPUTS

WP4: Citizen Science (B)



BIRDLAB



SCIENTIFIC OUTPUTS

WP5: Stakeholder involvement and developing tools (PL)

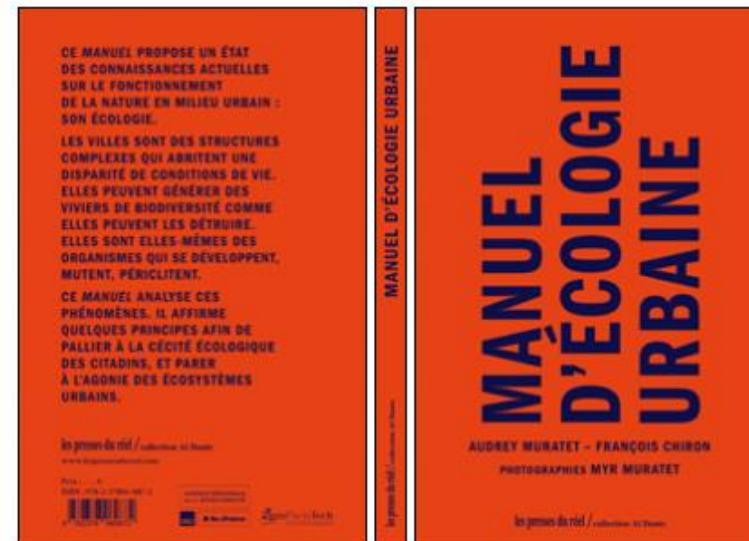
WP6: Communication with stakeholders and result dissemination (F)

Activities undertaken independently by each partner:

- Contact with stakeholders for permission for field work in public places

Activities undertaken simultaneously by all partners:

- Survey for governmental and non-governmental institutions (leader: Poland)
- Survey for city citizens about urban public green spaces (leader: Portugal)
- strawbAIRies project (leader: Belgium)





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FCT

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