Biodiversity Monitoring in City of Stockholm

Stockholms stad

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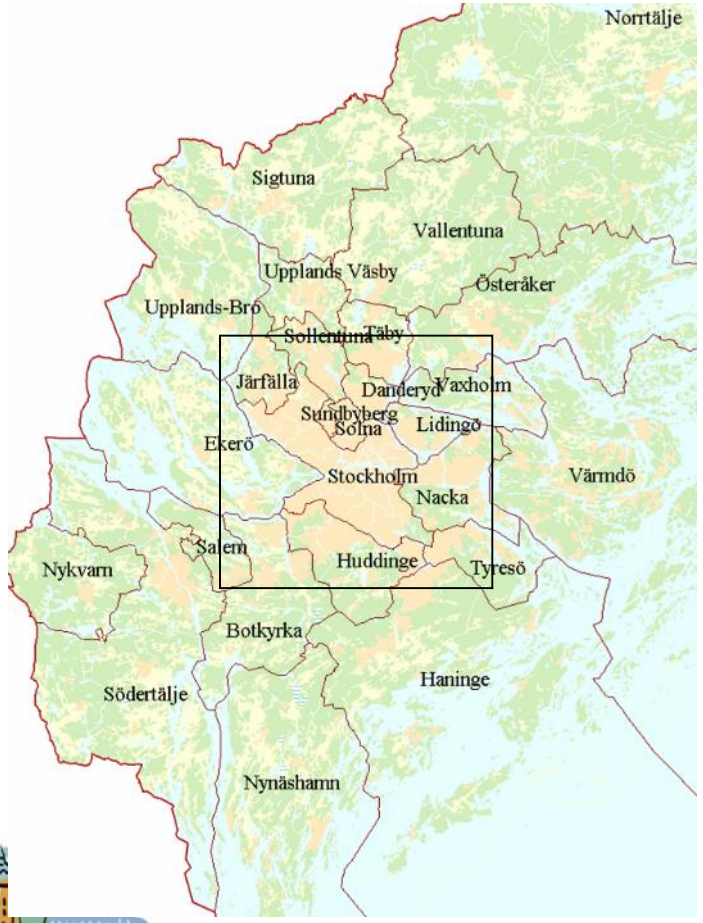
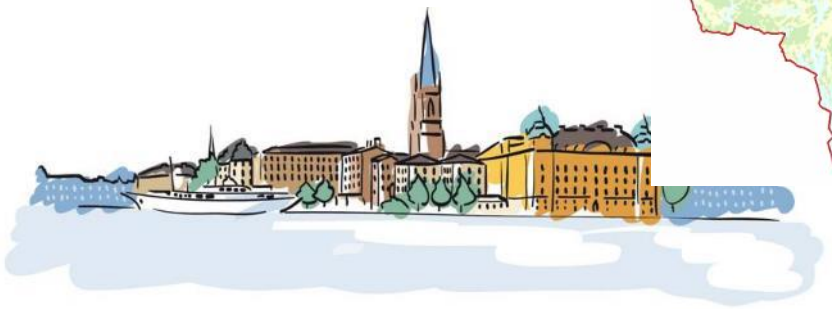
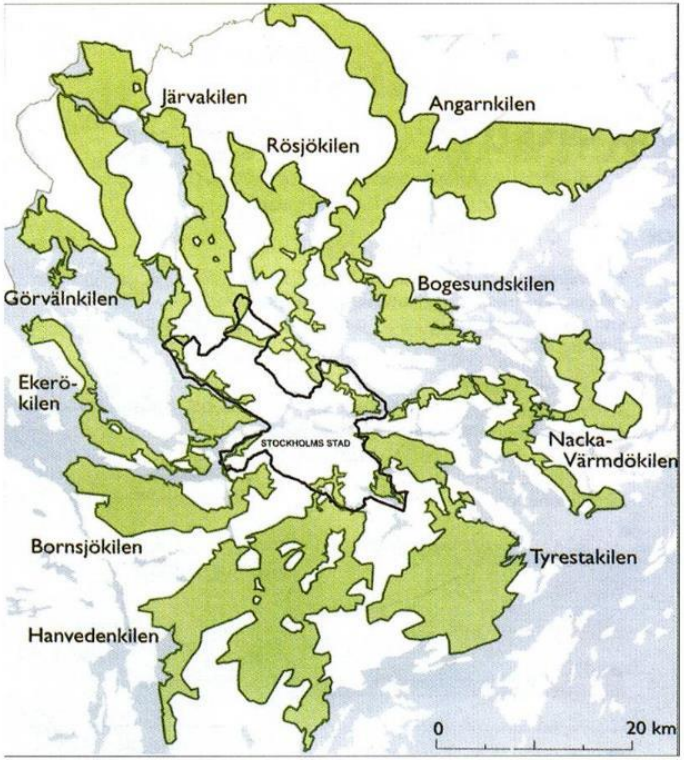
Presentation outline

1. **Ecological infrastructure in Stockholm**
2. **Guidelines**
3. **Digital tools; Biotope map, Habitat network and others**
4. **City Biodiversity Index (CBI)**

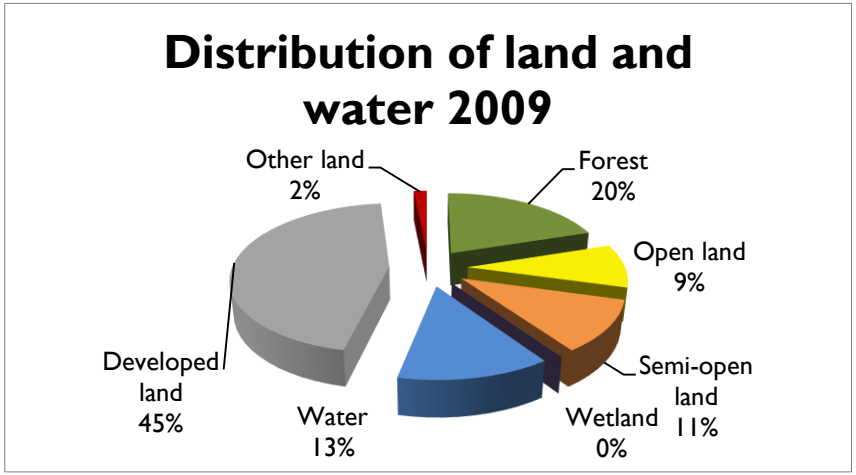




”Green Capital”



Stockholm is part of a regional green structure composed by ”green wedges”



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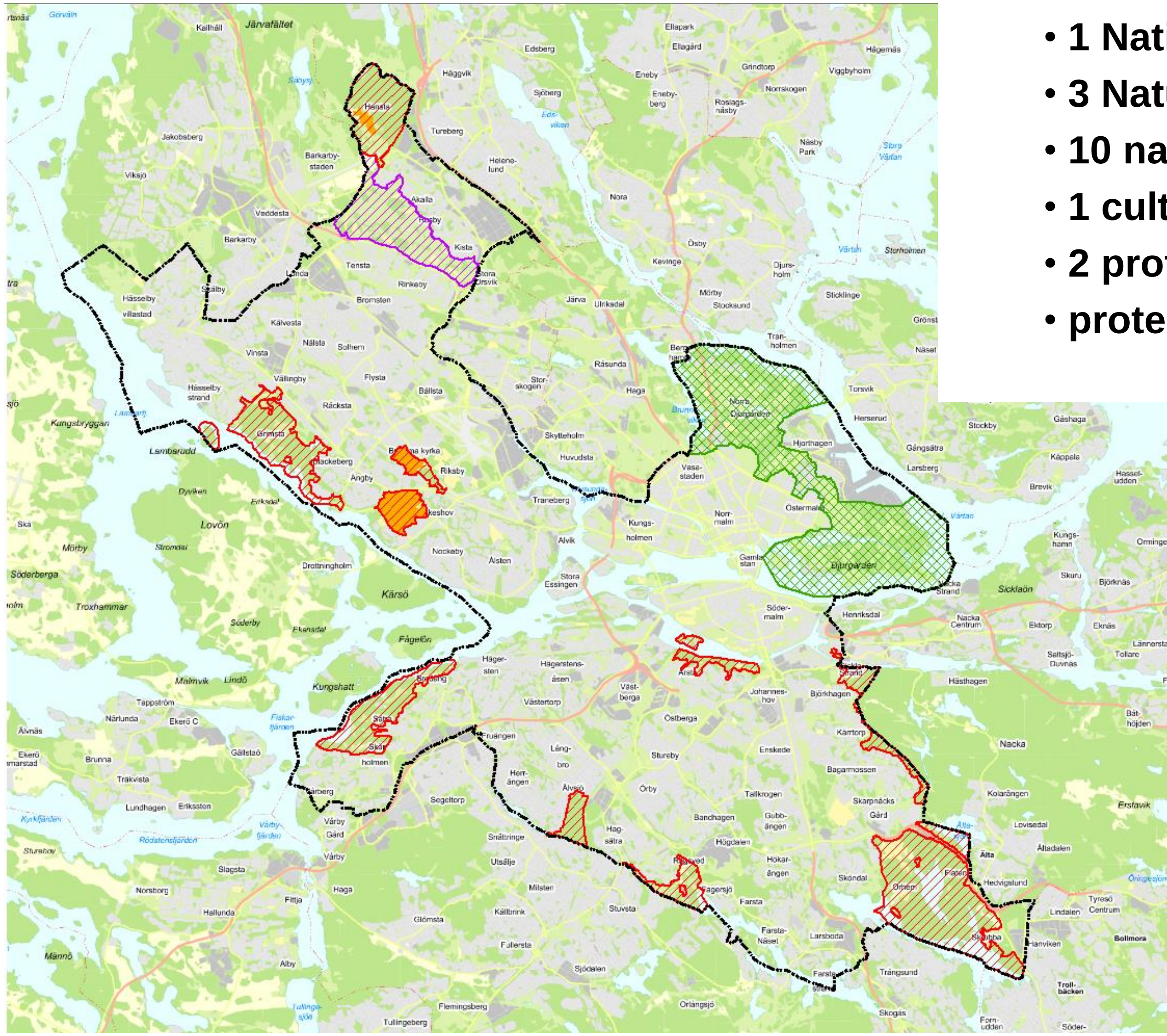
The city’s total area is 22 000 hectares. Ref: Database of biotopes in Stockholm. 2009.

NATURE IN STOCKHOLM
– protected areas



- 1 National City Park
- 3 Natura 2000-areas
- 10 nature reserves
- 1 cultural heritage
- 2 protected natural objects
- protected watersides

THE URBAN NATURE
- impacts and effects

Factors of influence:

- Land development
- Unfavorable management
- Environmental pollutants
- Wear, disturbances

Negative effects:

- Areal loss
- Fragmentation
- Barriers
- Loss of water
- Biotopes and populations of species change and disappear
- Ecosystem resilience and the ecosystem services change

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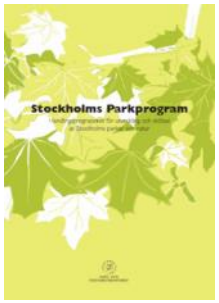
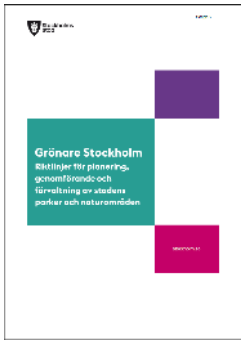
Stockholm Environmental Program 2016-2019

Objectives concerning the city's nature:

- In city development projects, ecosystem services will be supported, in order to contribute to a sound living environment
- The city will have a viable green structure with rich biodiversity
- The city's bodies of water will be strengthened and developed for both recreation and biological diversity





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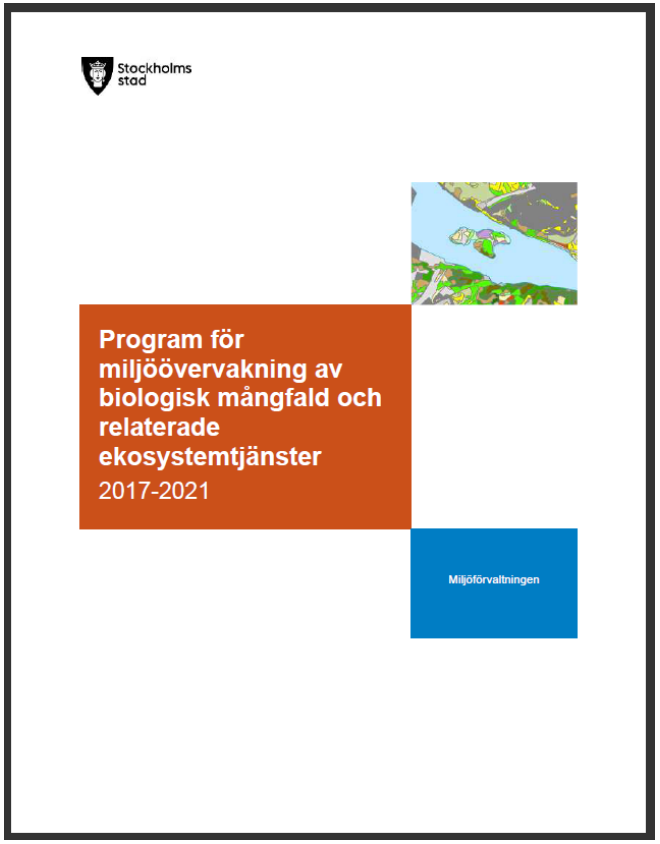
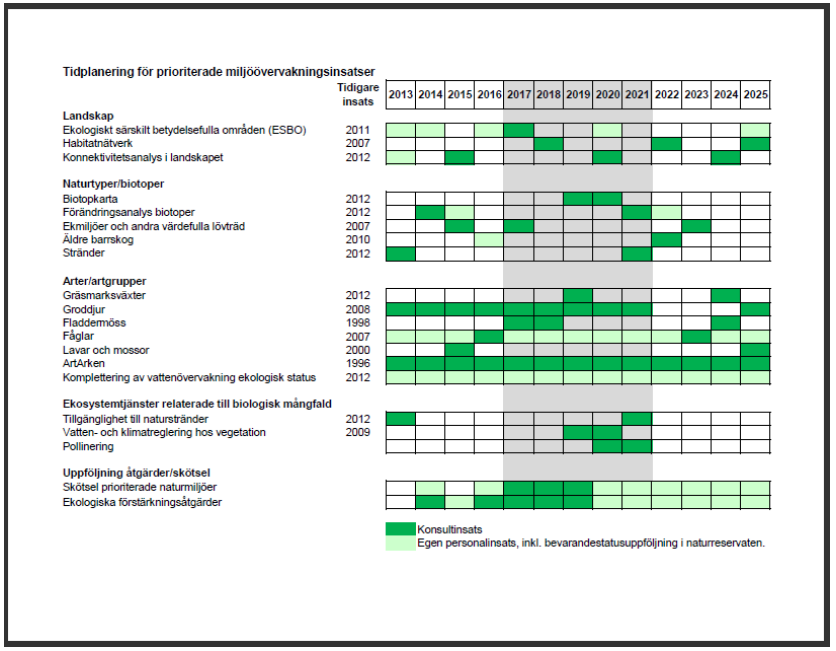
Documents with guidelines for green areas: Greener Stockholm and Park Programme

Biodiversity Monitoring Program





Landscape-, biotope- and species levels. Also follow-ups on management and improvements on green infrastructure.

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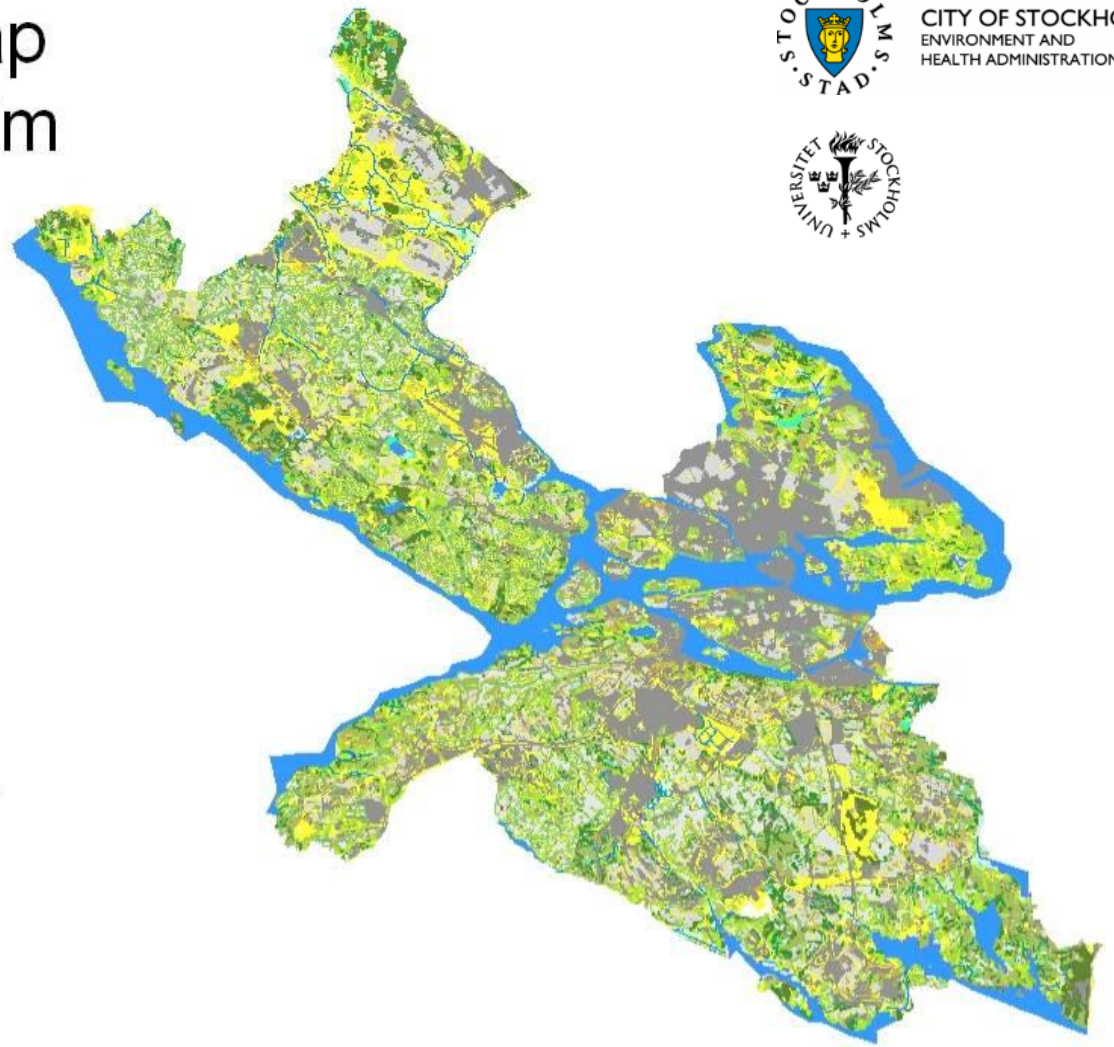
Biotope Map of Stockholm

CITY OF STOCKHOLM
ENVIRONMENT AND
HEALTH ADMINISTRATION



Legend

- Mixed coniferous and decidous forest
- Coniferous forest
- Decidous forest
- Broad-leafed decidous forest
- Clear cut/Young plantation
- Bedrock
- Bedrock with scattered Scots pine
- Wet forest
- Wetland with tree cover
- Open wetland
- Dry grassland
- Mesic grassland
- Moist grassland
- Remaining bare ground
- Arable field/Allotments
- Developed land with sparse vegetation cover
- Developed land without vegetation cover
- Developed land with dense vegetation cover
- Open water
- Grassy shallow water
- Floating water vegetation
- Stream/Ditch in forest
- Open stream/Ditch
- Major culvert

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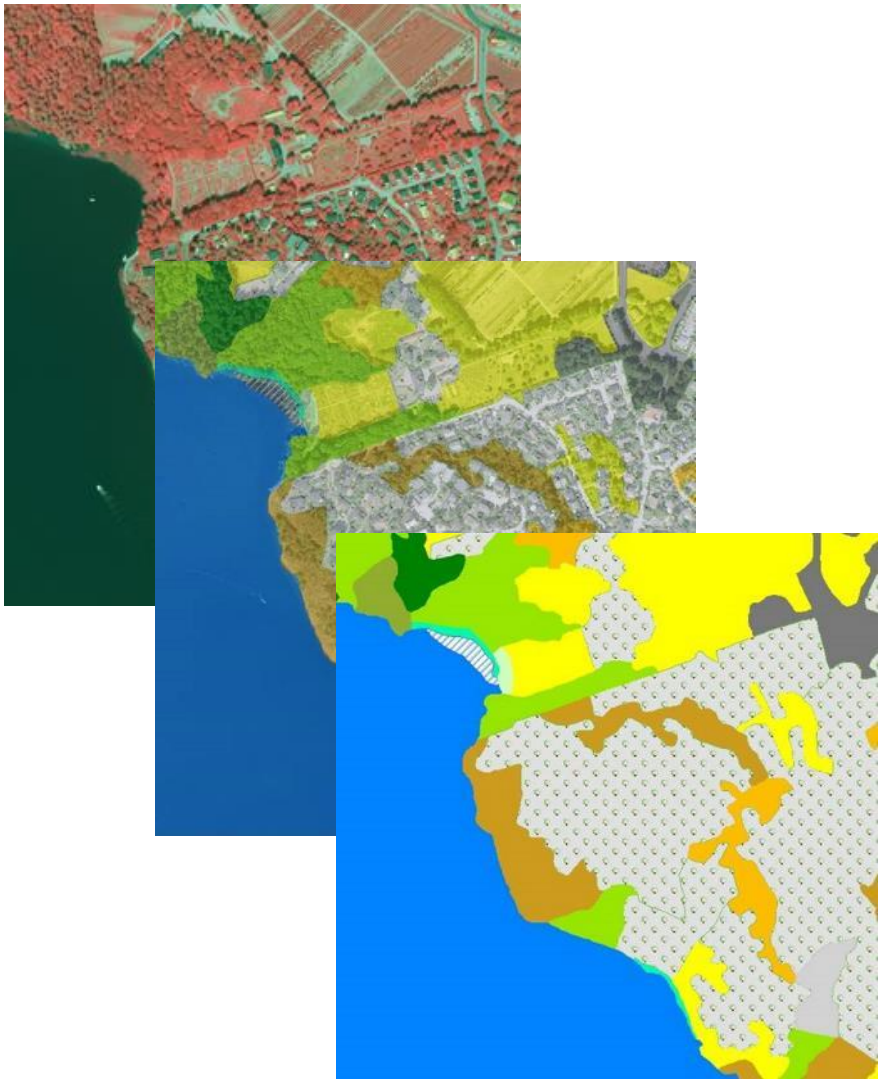
Mapping method

Developed by Katarina Löfvenhaft,
Department of Physical Geography and
Quaternary Geology, Stockholm University
Updated 2009 by Swedish State Land Service

- Colour infrared aerial photographs
- Interpretation scale: 1:30 000
- Digitalizing (map construction)
- Processing and database construction (GIS)



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The Habitat Network Tool

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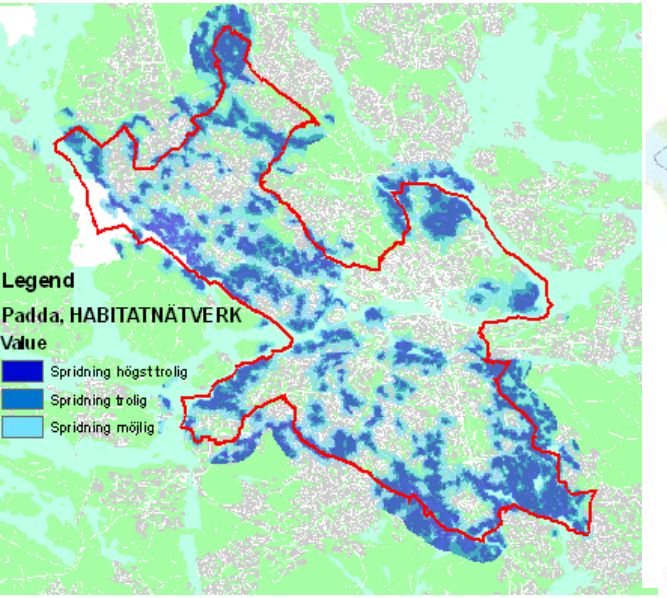
HEALTH ADMINISTRATION

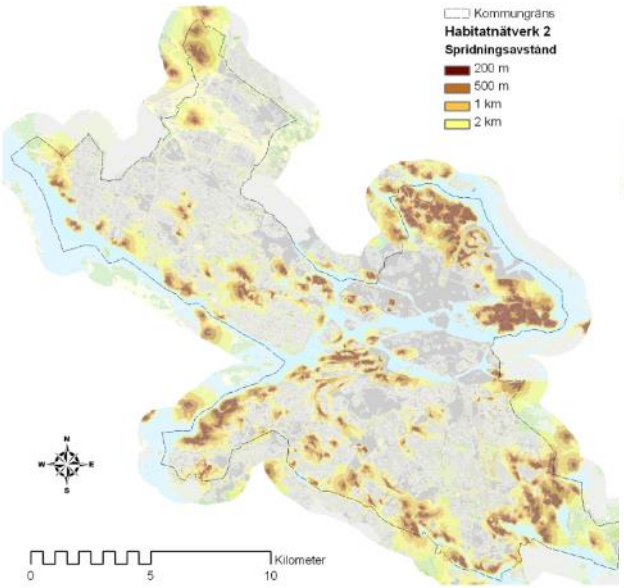
Identify important areas in Stockholm's ecological network, based on the needs of selected species:

core areas, dispersal zones, weak links etc.



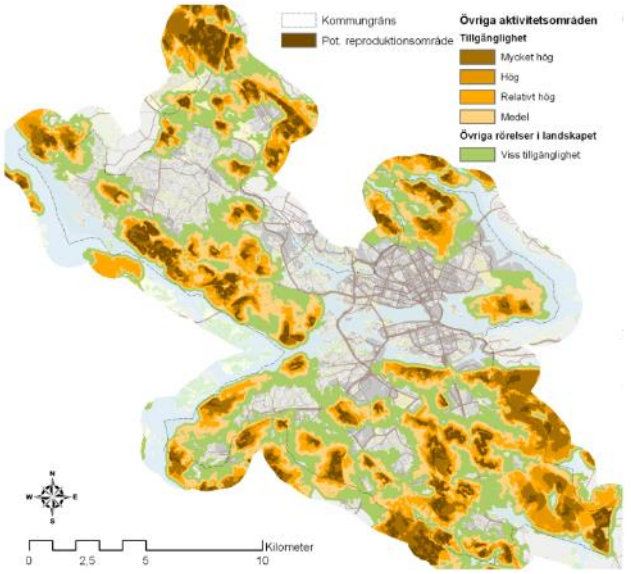
Amphibians

Focal species: Common Toad



Oak-living species

Sensitive insects



Species of coniferous forests

Crested Tit

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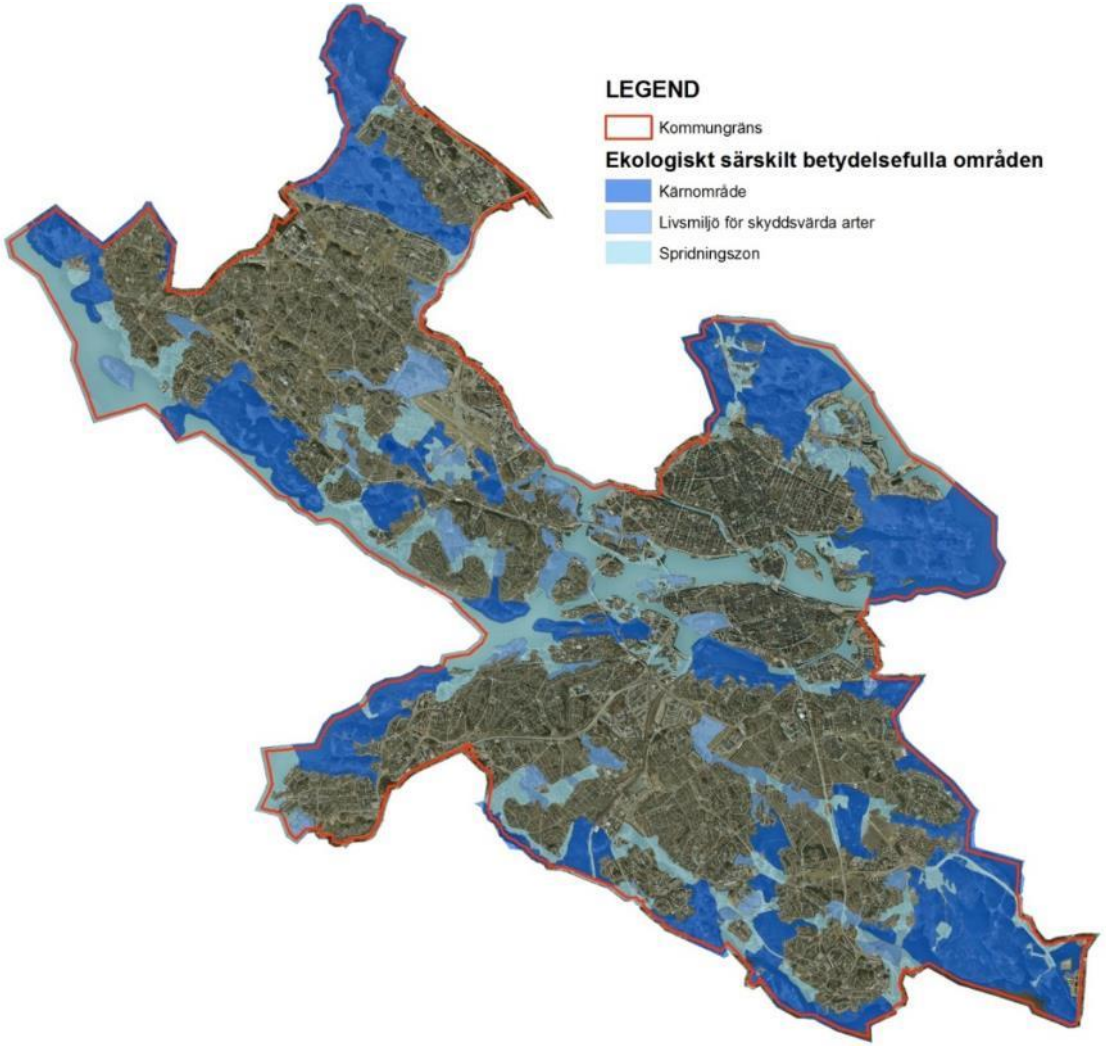
Local Ecological infrastructure

Ecologically significant

- core areas and dispersal zones
- biotopes
- prioritized species and their habitats



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The analysis is mainly based on the Habitat network tool. Environmental Administration, 2012.

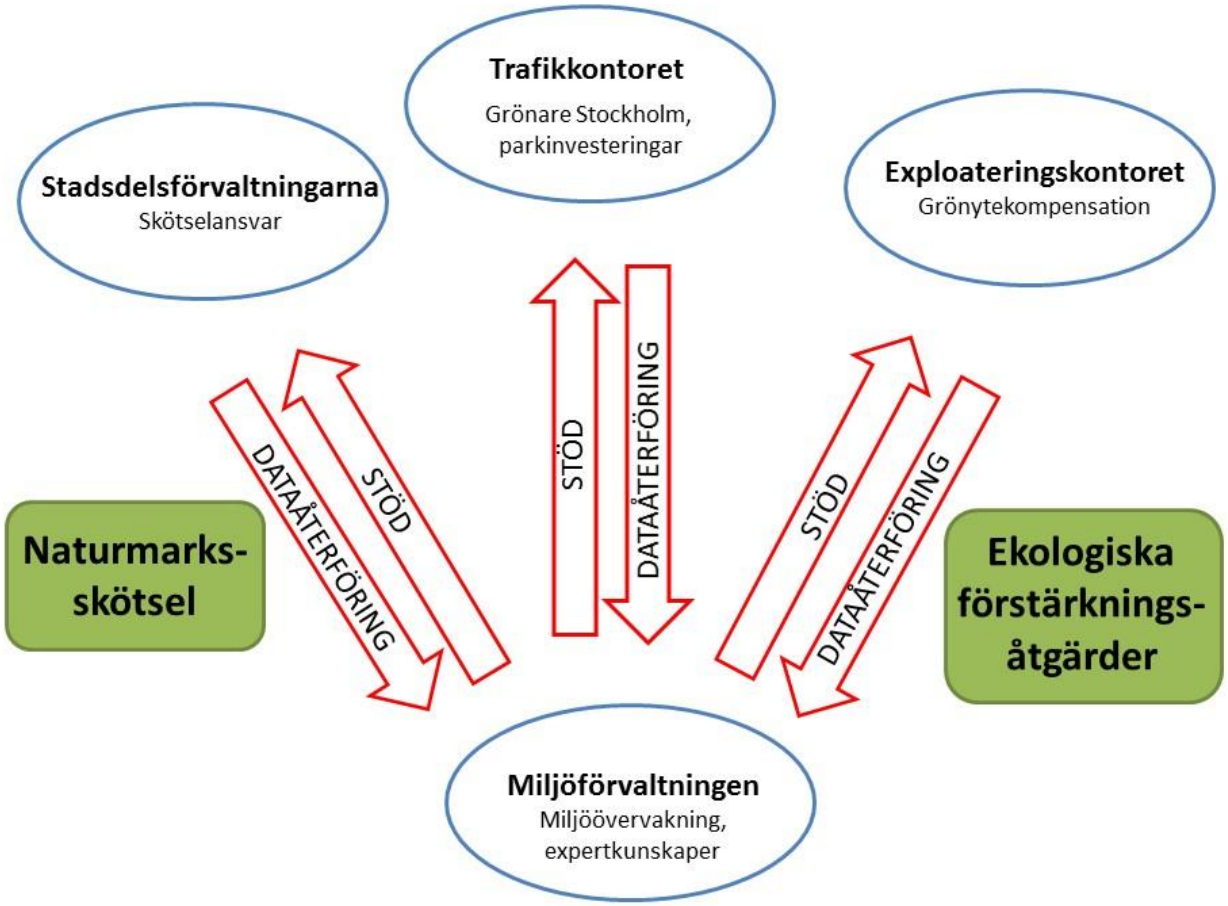
Areas of use

- Land use city planning
- Biodiversity monitoring
- Management of green spaces
- Public information
- Supervision of nature reserves

Preliminary study for improved nature monitoring (FEM project)

- Purpose: To achieve a common approach within the city for prioritizing and monitoring nature management and monitoring of measures to improve green infrastructure
- Methods are investigated for data collection and data exchange on nature management and ecological improvement measures.
- A prototype for digital map support for prioritization and follow-up of important management sites is developed for one part of the city.
- Prototype will be ready before end of 2018

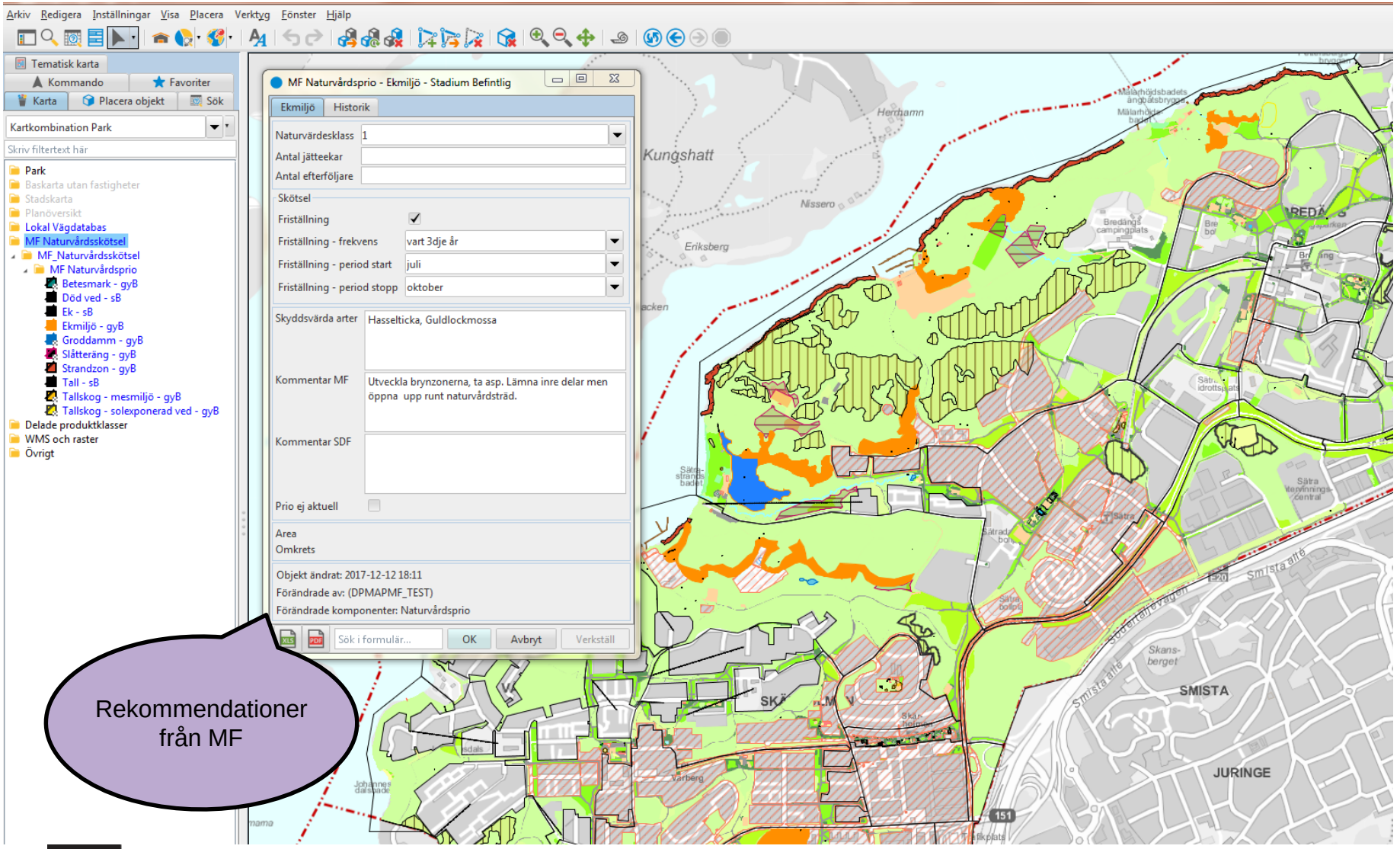
Map support and data feedback within the city's organisation



Benefits of the project

- Systemstöd för genomtänkt, konsekvent och kontinuerlig skötsel av stadens naturvärden
- Prioritering av det allra viktigaste att sköta (finns idag inte i Parkdata)
- Användbart i budgetplanering för stadsdelarna
- Digitalt underlag i stadens gemensamma kartsystem – lättillgängligt för alla berörda
- Enkel möjlighet till fortlöpande dokumentation av naturvård – kontinuitet
- Hantera naturvärden över hela staden – ej endast skyddade områden
- Stöd för att uppnå liknande arbetssätt för naturmarksskötsel i alla stadsdelar
- Ej personberoende – viktigt vid utbyte av personal, entreprenörer etc.
- Transparens inom staden; lätt för alla berörda att se vad som görs
- Stöd till stadsdelarna för att kommunicera naturmarksskötsel till medborgarna
- Viktigt underlag för både uppföljning av skötselinsatser och miljöövervakning
- Användbart i parkinvesteringsprojekt; hur kan en viss plats utnyttjas/förändras?
- Betydelse även som kunskapsunderlag för plan- och exploateringsprocessen

Prioriteringsstöd naturmarksskötsel – exempel ”Ekmiljö”



Rekommendationer från MF

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City Biodiversity Index (CBI)

"*A self-assessment tool for cities to evaluate and monitor the progress of their biodiversity conservation efforts against their own individual baselines*".

The CBI comprises:

a) the "**Profile of the City**", which provides background information on the city; and

b) 23 indicators measuring native biodiversity, ecosystem services from biodiversity, as well as governance and management of biodiversity based on guidelines and methodology provided in the User's Manual.

Singapore proposed the CBI in COP-9 (Conference of the Parties) of 2008. The National Parks Board of Singapore (NParks), together with experts from various countries, assisted the Secretariat of the CBD to develop the Index.

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Convention on Biological Diversity

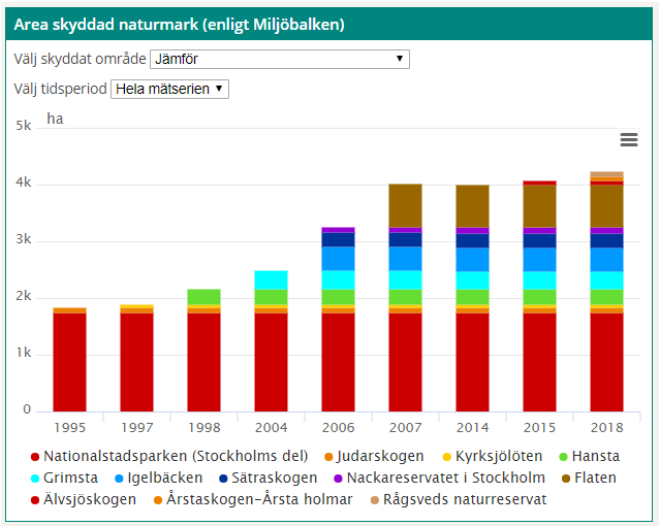
City Biodiversity Index (CBI)

Convention on Biological Diversity

PART II - Indicators

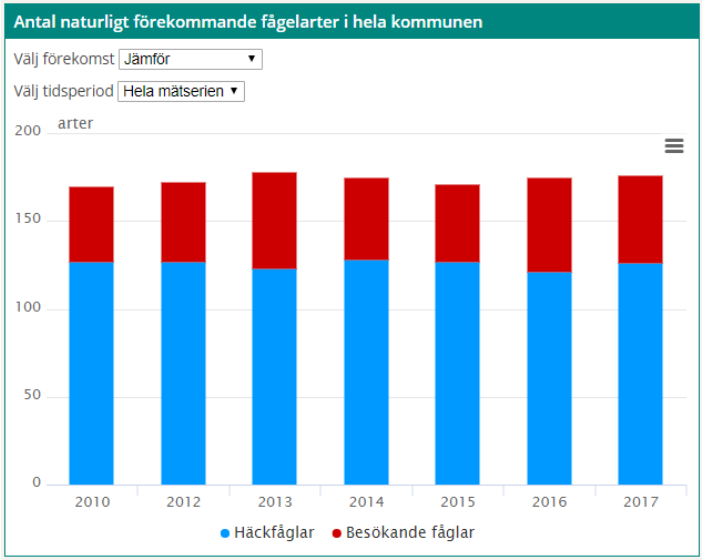
Core Components		Indicators		Maximum Score	
Native Biodiversity in the City	X	1.	Proportion of Natural Areas in the City	4 points	4 points
	X	2.	Connectivity Measures	4 points	1 point
	X	3.	Native Biodiversity in Built Up Areas (Bird Species)	4 points	? points
		4.	Change in Number of Vascular Plant Species	4 points	
	X	5.	Change in Number of Bird Species	4 points	? points
		6.	Change in Number of Butterfly Species	4 points	
		7.	Change in Number of Species (any other taxonomic group selected by the city)	4 points	
		8.	Change in Number of Species (any other taxonomic group selected by the city)	4 points	
	X	9.	Proportion of Protected Natural Areas	4 points	4 points
		10.	Proportion of Invasive Alien Species	4 points	
Ecosystem Services provided by Biodiversity	X	11.	Regulation of Quantity of Water	4 points	2 points
	X	12.	Climate Regulation: Carbon Storage and Cooling Effect of Vegetation	4 points	2 points
		13.	Recreation and Education: Area of Parks with Natural Areas	4 points	
		14.	Recreation and Education: Number of Formal Education Visits per Child Below 16 Years to Parks with Natural Areas per Year	4 points	
Governance and Management of Biodiversity		15.	Budget Allocated to Biodiversity	4 points	
		16.	Number of Biodiversity Projects Implemented by the City Annually	4 points	
		17.	Existence of Local Biodiversity Strategy and Action Plan	4 points	
		18.	Institutional Capacity: Number of Biodiversity Related Functions	4 points	
		19.	Institutional Capacity: Number of City or Local Government Agencies Involved in Inter-agency Co-operation Pertaining to Biodiversity Matters	4 points	
		20.	Participation and Partnership: Existence of Formal or Informal Public Consultation Process	4 points	
		21.	Participation and Partnership: Number of Agencies/Private Companies/NGOs/Academic Institutions/International Organisations with which the City is Partnering in Biodiversity Activities, Projects and Programmes	4 points	
		22.	Education and Awareness: Is Biodiversity or Nature Awareness Included in the School Curriculum	4 points	
		23.	Education and Awareness: Number of Outreach or Public Awareness Events Held in the City per Year	4 points	
			Native Biodiversity in the City (Sub-total for indicators 1-10)	**40 points**	
			Ecosystem Services provided by Biodiversity (Sub-total for indicators 11-14)	**16 points**	
			Governance and Management of Biodiversity (Sub-total for indicators 15-23)	**36 points**	
			Maximum Total:	**92 points**	

9. Proportion of protected natural areas



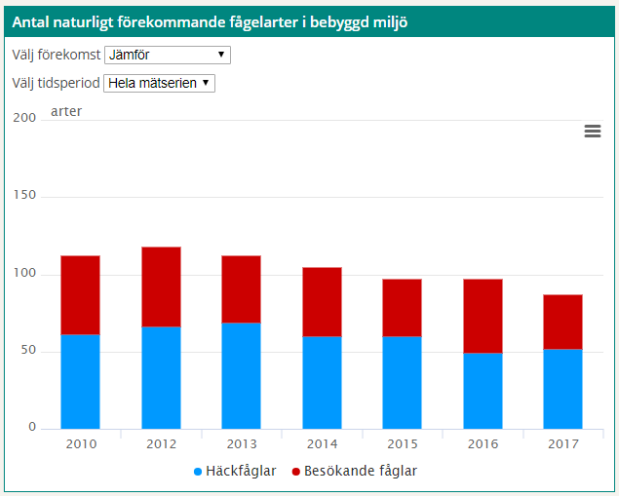
About 20% of Stockholm's area is protected (35% of the green and blue areas)

5. Change in number of native bird species



Varies between 170 and 178 species, of which 68 - 75% are breeding.

3. Number of native bird species in built-up areas



Number seems to have declined with about 12 species, but we suspect it's caused by less people observing.

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Project 2017:
EO4CBI

Satellite data from Sentinel 2
Resolution: 10 m

ESA DUE Innovator III

Earth Observation in support of the City Biodiversity Index

Project deliverable D2.1:
Product Delivery Documentation
Stockholm

space 4 environment

Concordia

1

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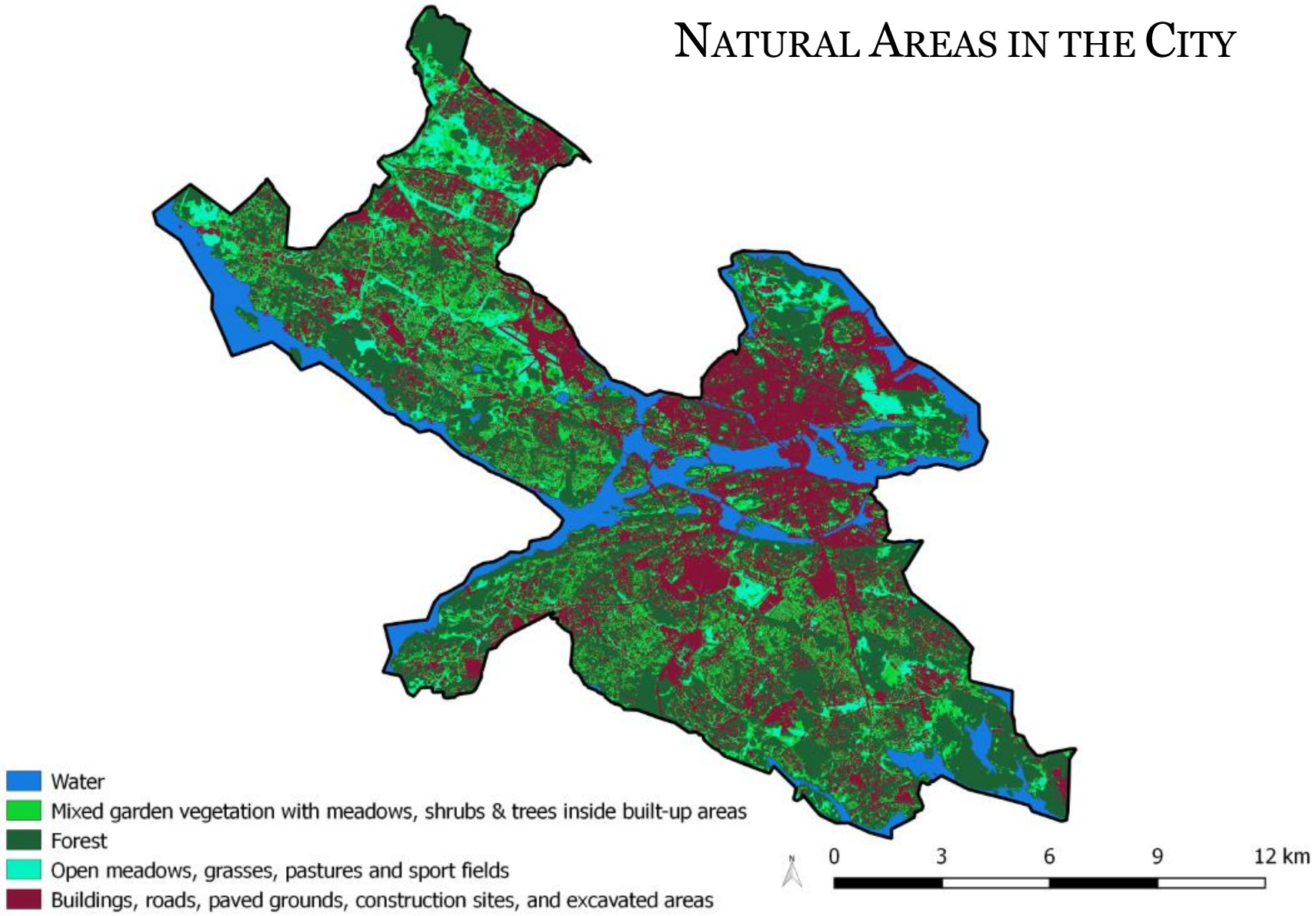
Indicator 1 – Proportion of Natural Areas in the City



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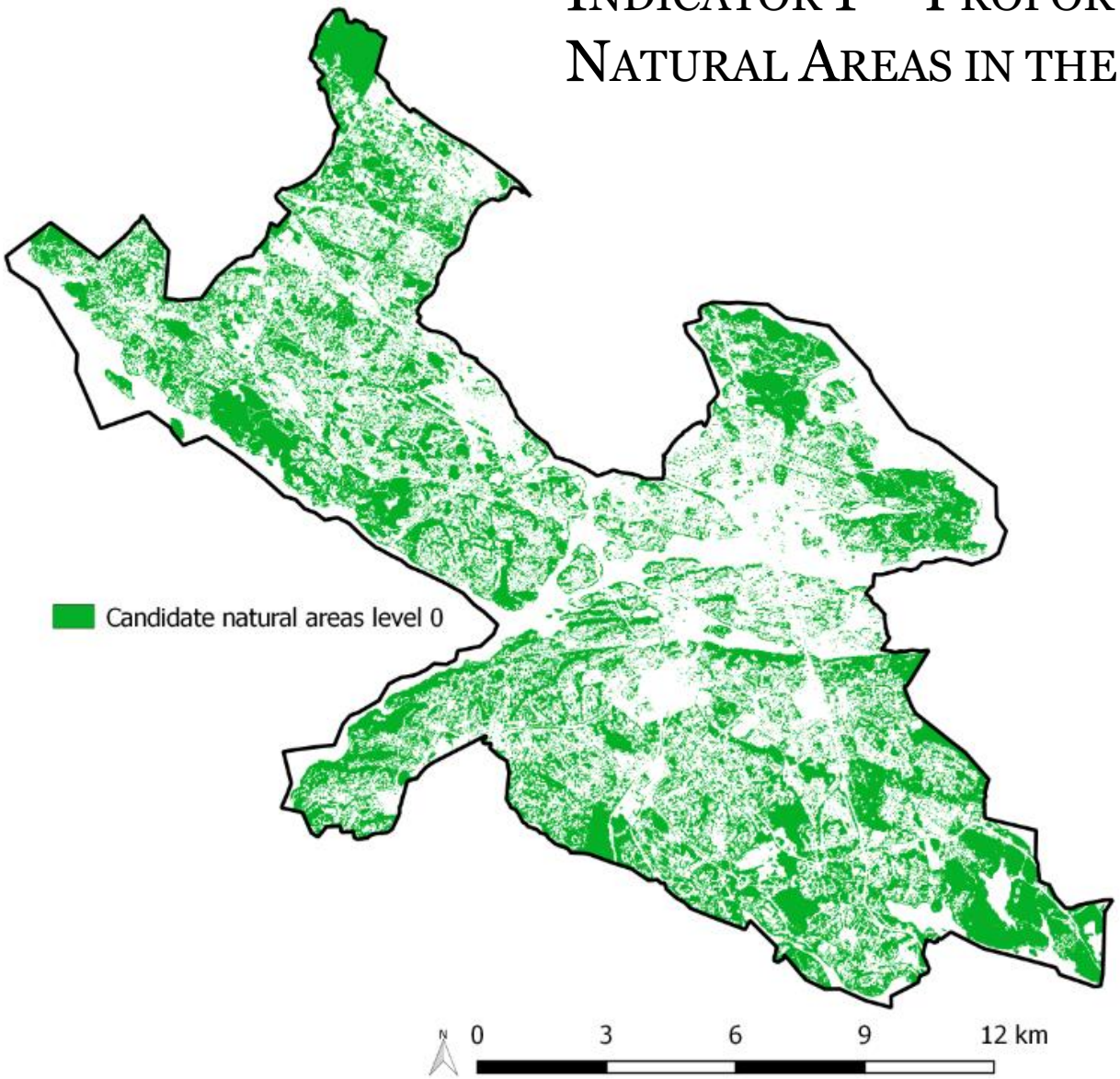

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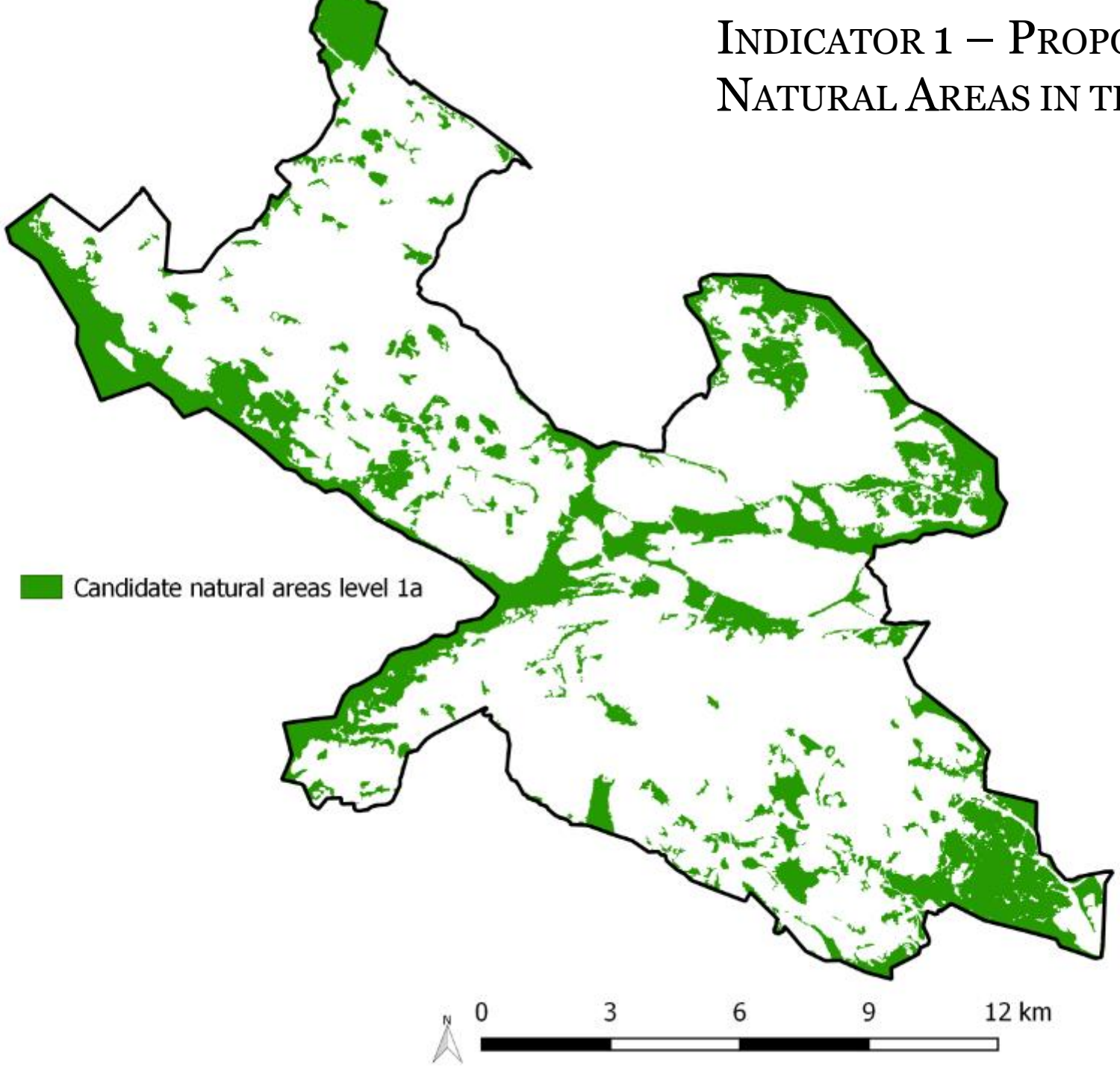
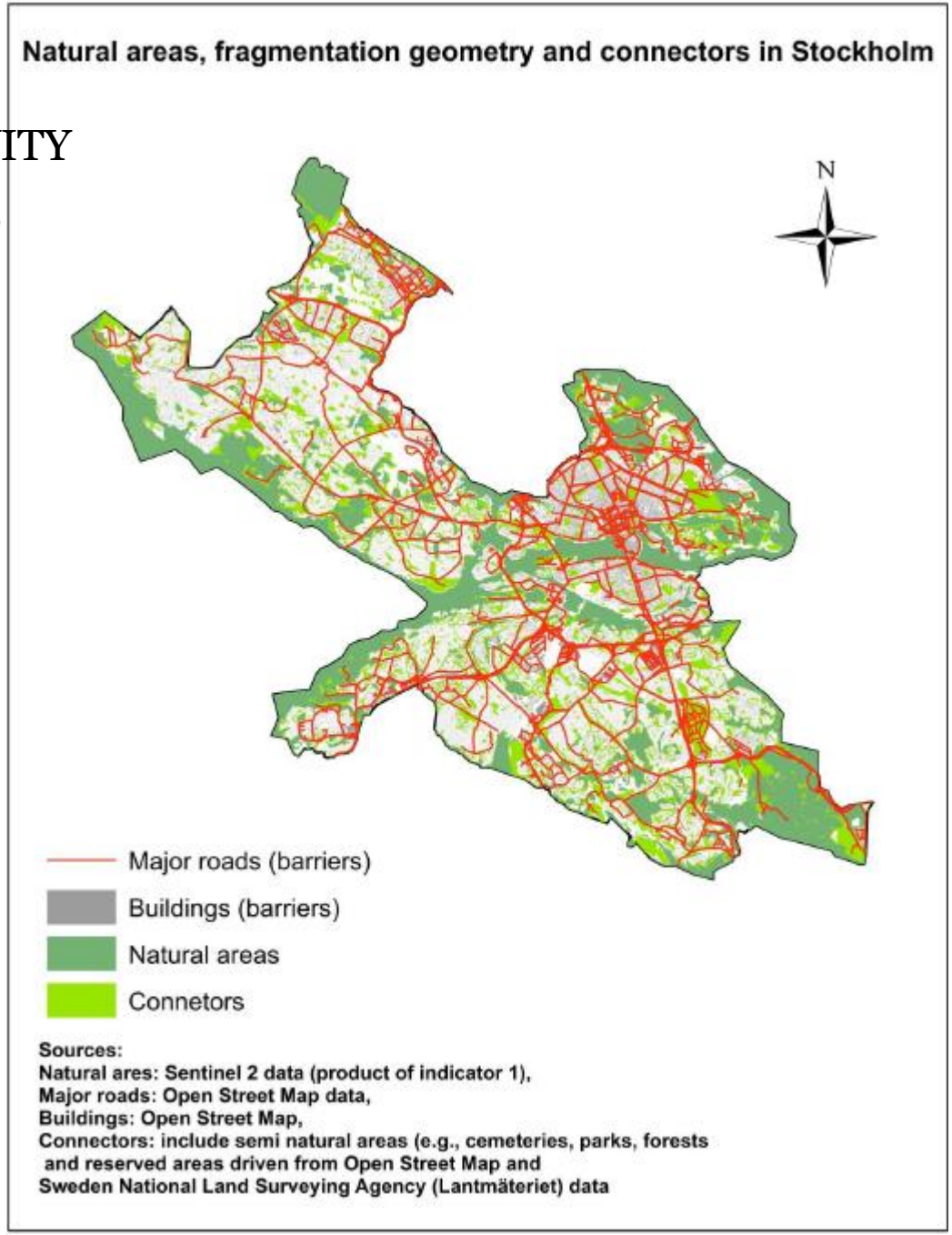


Indicator 2 – Connectivity Measures or Ecological Networks to Counter Fragmentation



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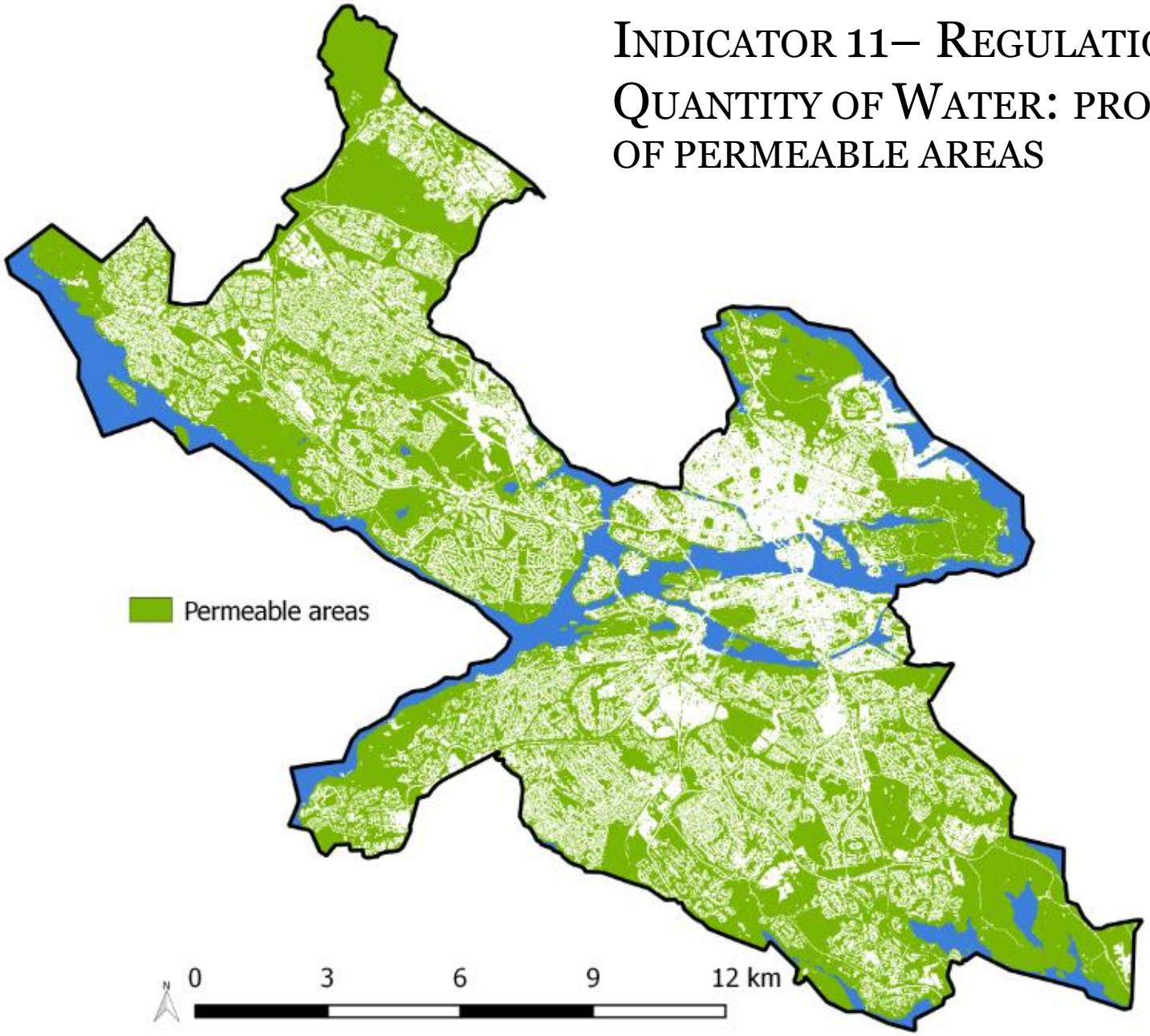
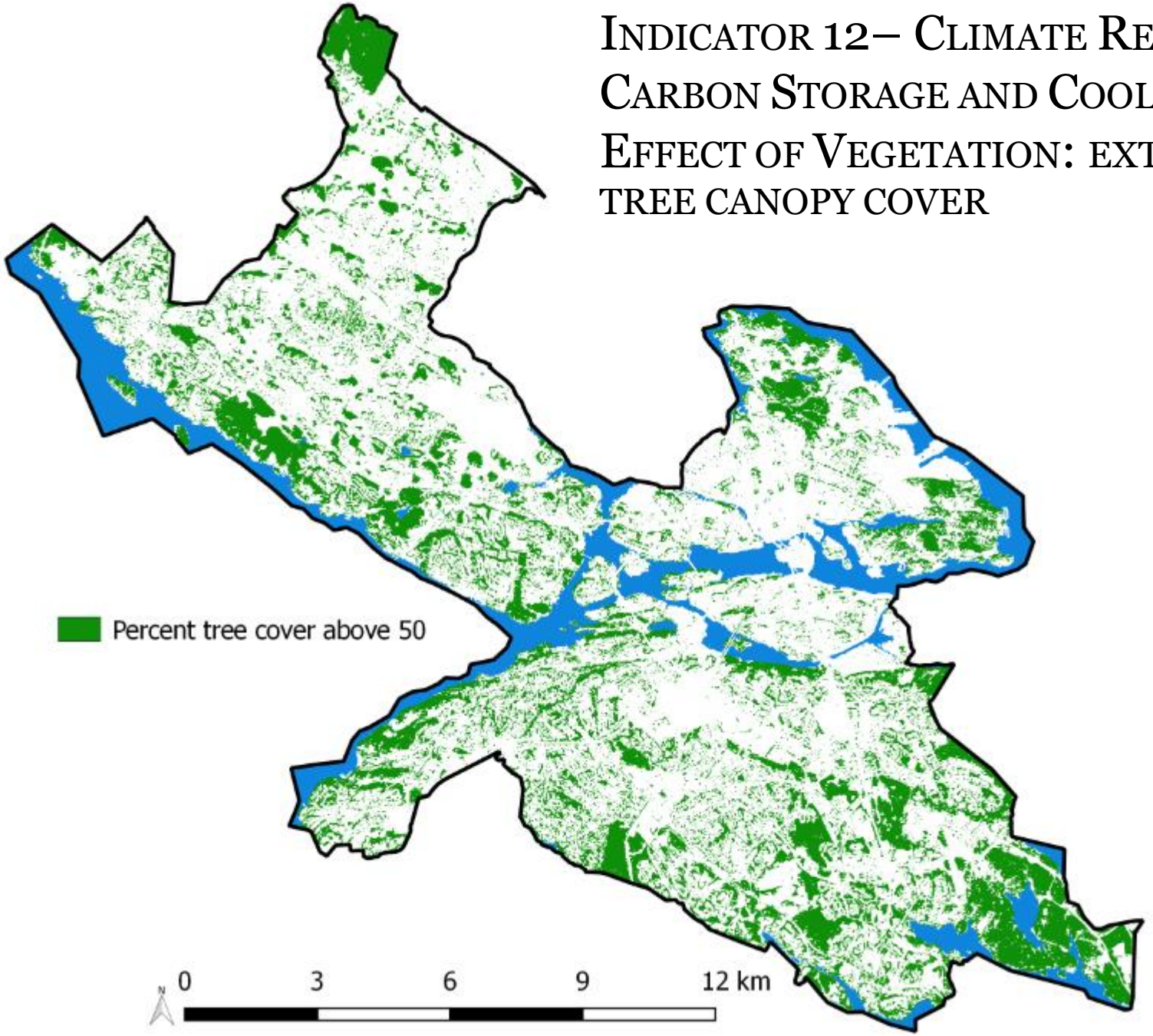
Indicator 11– Regulation of Quantity of Water: proportion of permeable areas



Indicator 12– Climate Regulation: Carbon Storage and Cooling Effect of Vegetation: extent of tree canopy cover



Thank you!

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