DELIVER conference

12.09.2018

The use of European Land Monitoring data, methods and indicators and the example of Urban atlas for local assessments

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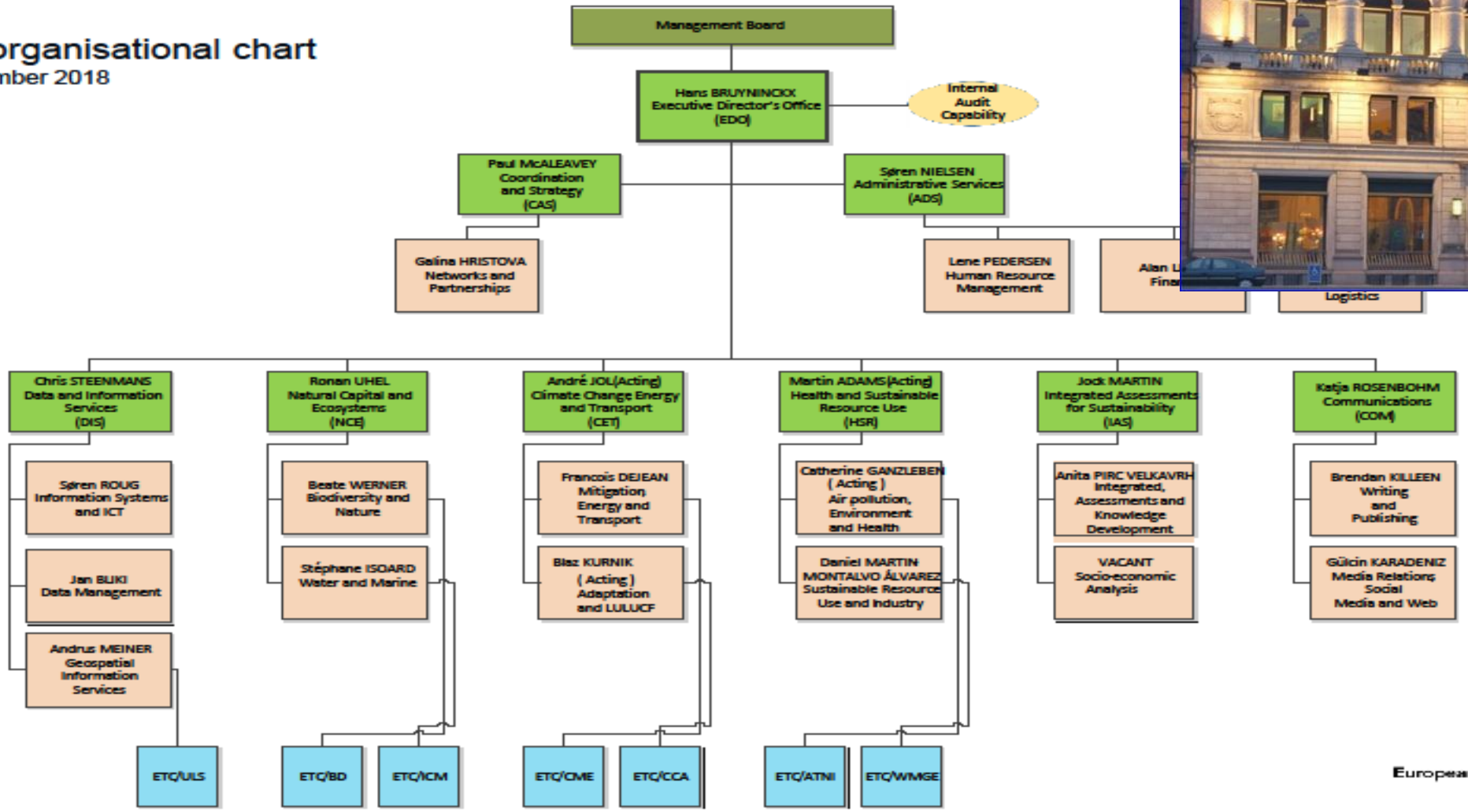
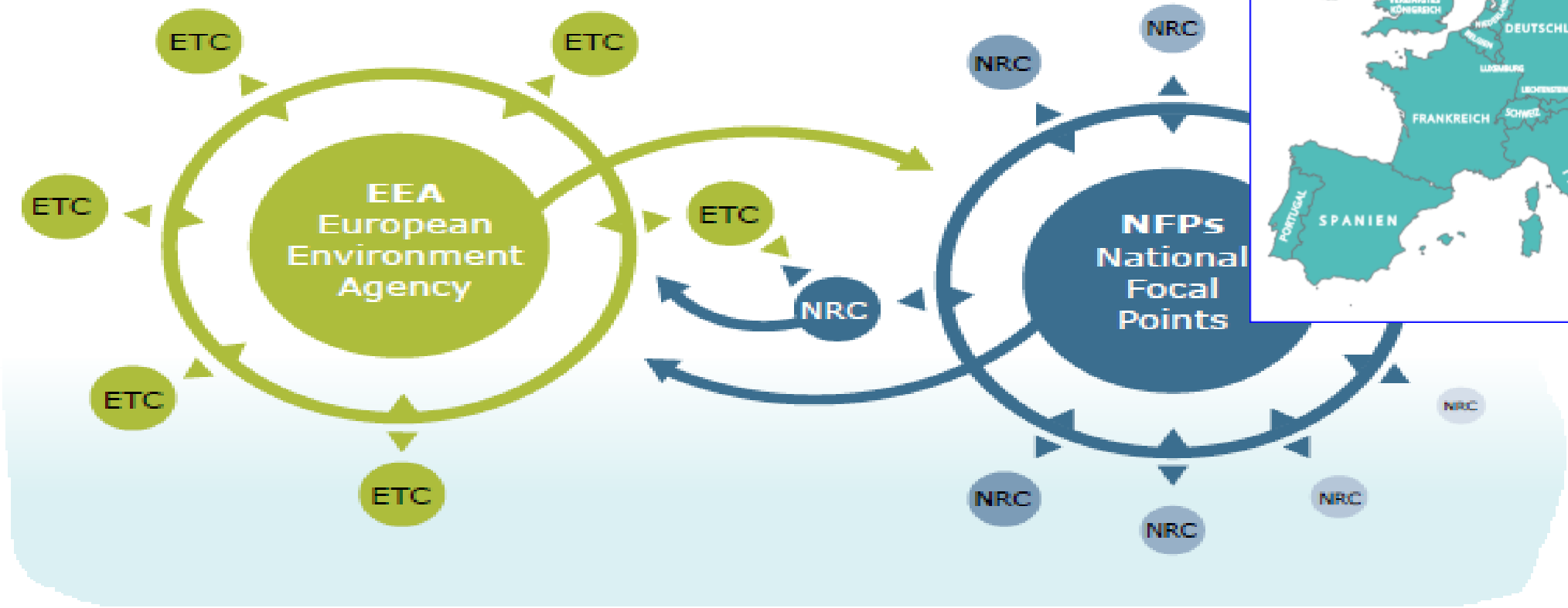
Organisation chart of the European Environment Agency

EEA organisational chart
1 September 2018



Collaboration structure



Source: EEA

Indicators

- **based on Copernicus products**
  - Corine Land cover time series (1990, 2000, 2006, 2012, 2018)
  - 5 High Resolution layers (forest, grassland, imperviousness, water & wetness,)
  - Local components: Urban Atlas, Riparian zones, Nature 2000

  EEA Indicator development
    - European land accounts and the changes based on Corine land cover time series (Flagship)
    - Landscape fragmentation/connectivity (based on CLC and TeleAtlas)
    - Urban sprawl (based on HRL imperviousness and UA)
    - Imperviousness indicator (time series based on HRL Imperviousness)
    - Land recycling indicator (based on urban atlas (all cities >100000 citizens, later 50.000)
    - Ecosystem probability map (based on (based on HRL and CLC and others)
    - Green infrastructure indicators (based on HRL and CLC)
    - Urban green infrastructure indicators (based on UA)
    - City typology indicators (based on UA)
    - Natura 2000 conditions indicator(based on HRL and CLC)
    - Urban/peri-Urban indicator (based on UA)
    - HNV farmland indicator (based on CLC)

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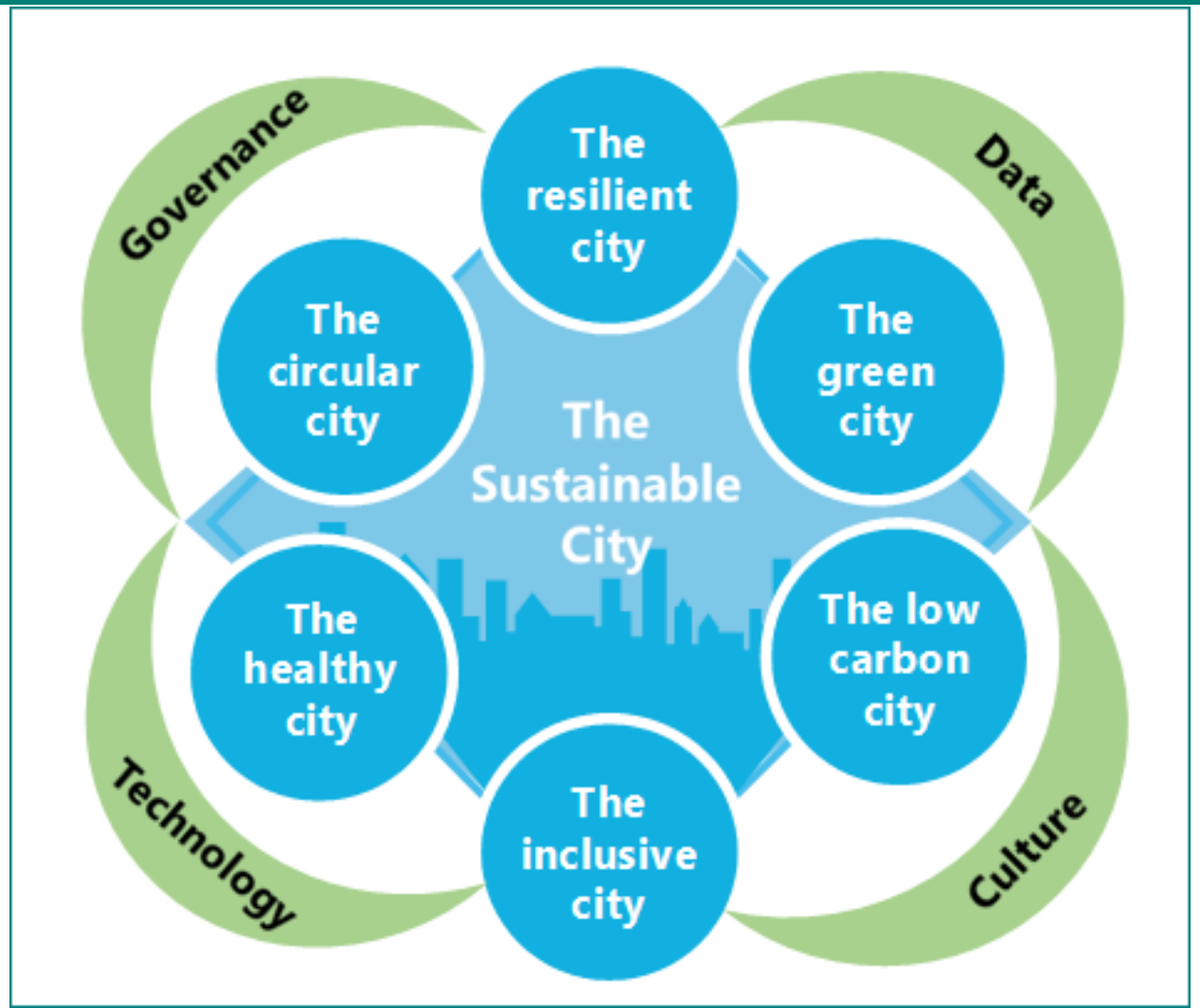
The understanding / conceptual approach



- ETC deals since 2007 with urban aspects as main actor in EEA
- IUME, Eionet NRC LUSP
- Indicator development regarding land monitoring and contributes to
- SOER

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Local Component

opernicus
Europe's eyes on Earth

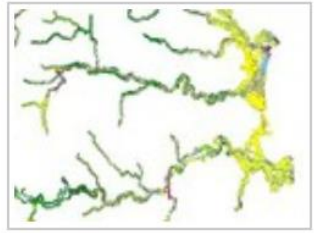
Land Monitoring Service

Global Pan-European Local Reference dat

You are here: Home / Local

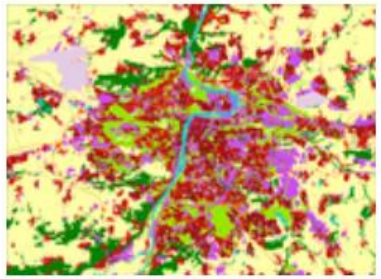
Local


Urban Atlas

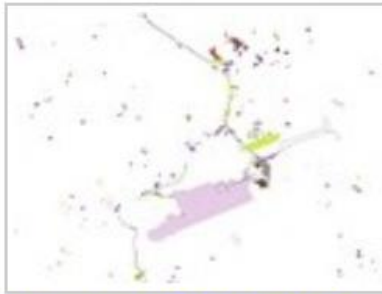

Riparian Zones

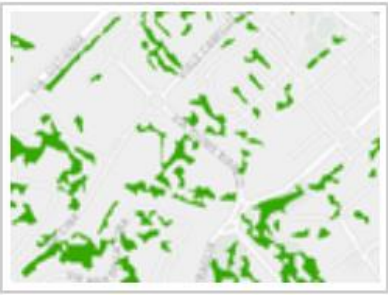

Natura 2000 (N2K)

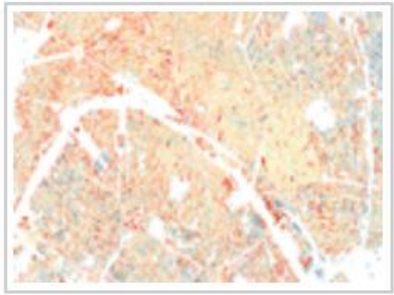
Urban Atlas


Urban Atlas 2006


Urban Atlas 2012


Change 2006-2012


Street Tree Layer (STL)


Building Height 2012

POP_UK001L2_RG_2006_2012

OID	UATL_ID	Pop_0_14
0	60-UK001L2	8
1	61-UK001L2	2
2	62-UK001L2	5
3	63-UK001L2	42
4	64-UK001L2	10
5	65-UK001L2	11

Population estimates by Urban Atlas polygon

- Contract opportunities
- EAGLE
- Use Cases
- Publications
- Technical library

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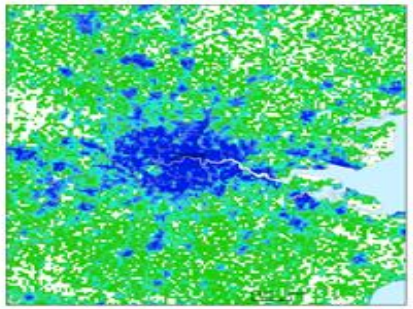
Urban Sprawl Indicator

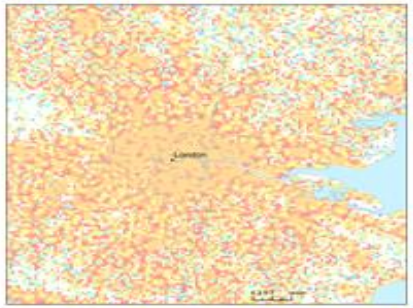
Urban Sprawl indicator components:



UP - Urban Permeation

Amount of built-up area

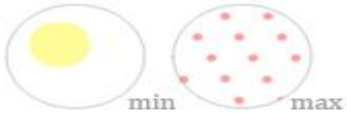
Built-up area presence based on
Copernicus HRL Imperviousness



DIS - Urban Dispersion

Dispersion of built-up area

Built-up area patterns based on
Copernicus HRL Imperviousness

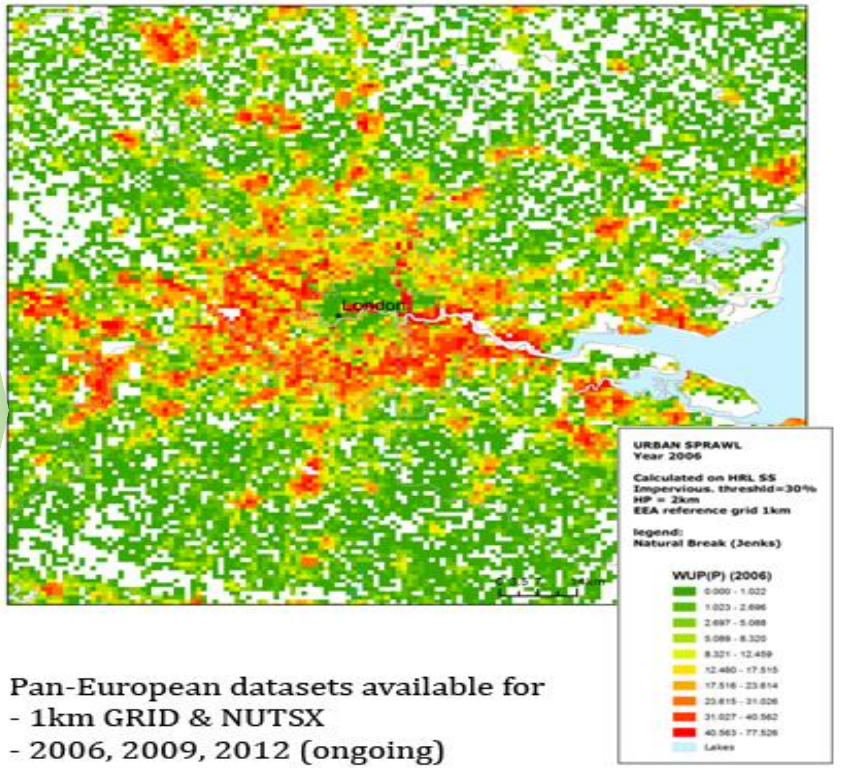


UD - Utilization Density

Utilization of built-up area

Population, Employment/Jobs based on
ESTAT GEOSTAT GRID & EU LFS

WUP - Weighted Urban Sprawl



Pan-European datasets available for
- 1km GRID & NUTSX
- 2006, 2009, 2012 (ongoing)

Concordia · die Geographen schwick+spichtig · gisat · WSL · FOEN · European Environment Agency

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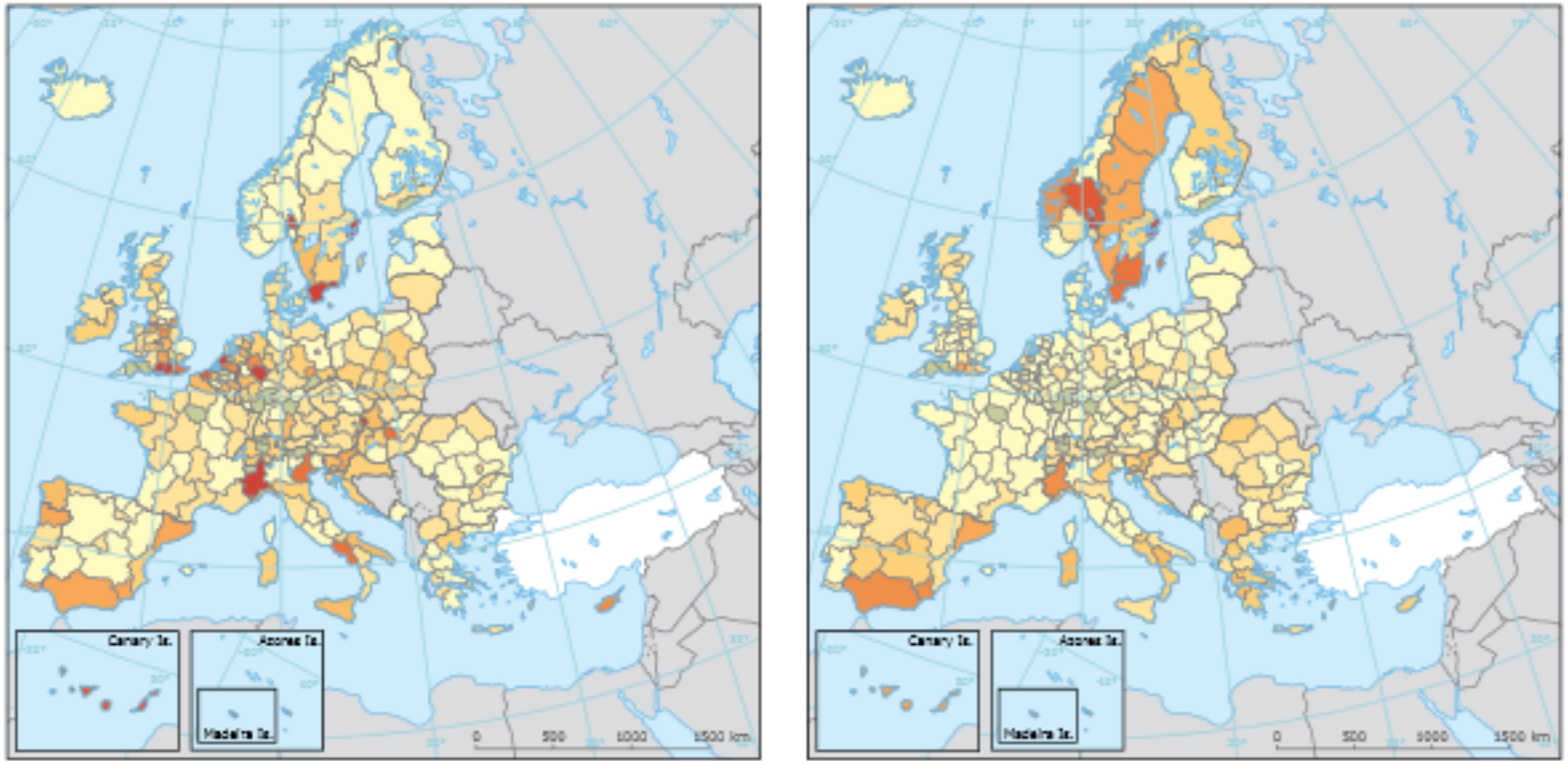
Urban sprawl

Map 3.6 **Changes in *WUP* values at the NUTS-2 region level between 2006 and 2009 (both absolute (left) and relative (right) changes are shown)**



Maps of absolute and relative changes in the values of *WUP* in the NUTS–2 regions between 2006 and 2009

Absolute difference (urban permeation units per m²)

< 0 | 0 to 0.05 | 0.05 to 0.1 | 0.1 to 0.15 | 0.15 to 0.2 | 0.2 to 0.25 | 0.25 to 0.3 | 0.3 to 0.35 | 0.35 to 0.4 | > 0.4

No data | Outside coverage

Relative difference (percentage)

< 0 | 0 to 5 | 5 to 10 | 10 to 15 | 15 to 20 | 20 to 25 | 25 to 30 | 30 to 35 | 35 to 40 | > 40

EEA Report | No 11/2016

Urban sprawl in Europe

Joint EEA-FOEN report

ISSN 1977-8449

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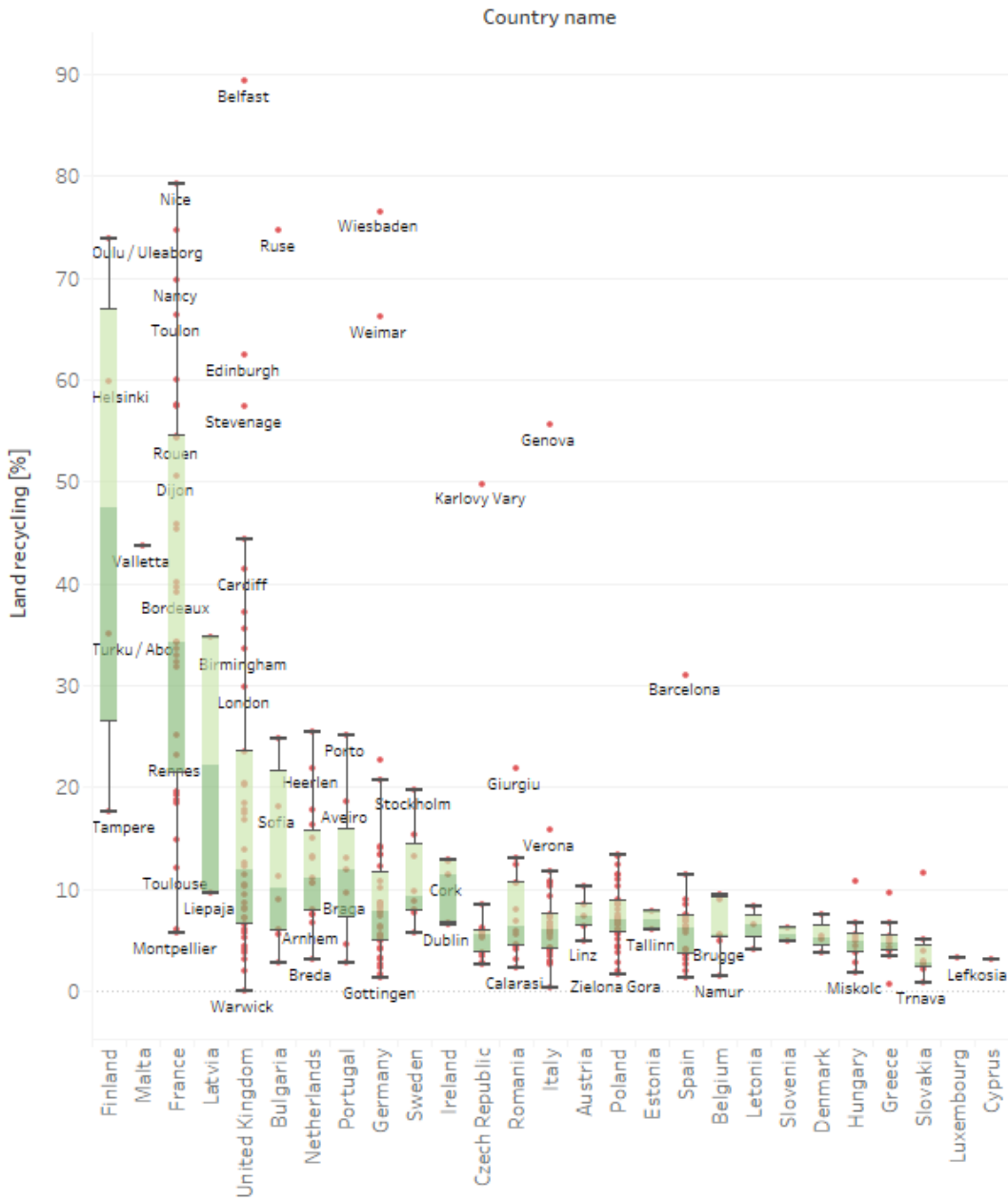
Land recycling



Land recycling boxplot, by FUAs and country: land recycling as percentage of total changes for the period 2006-2012.

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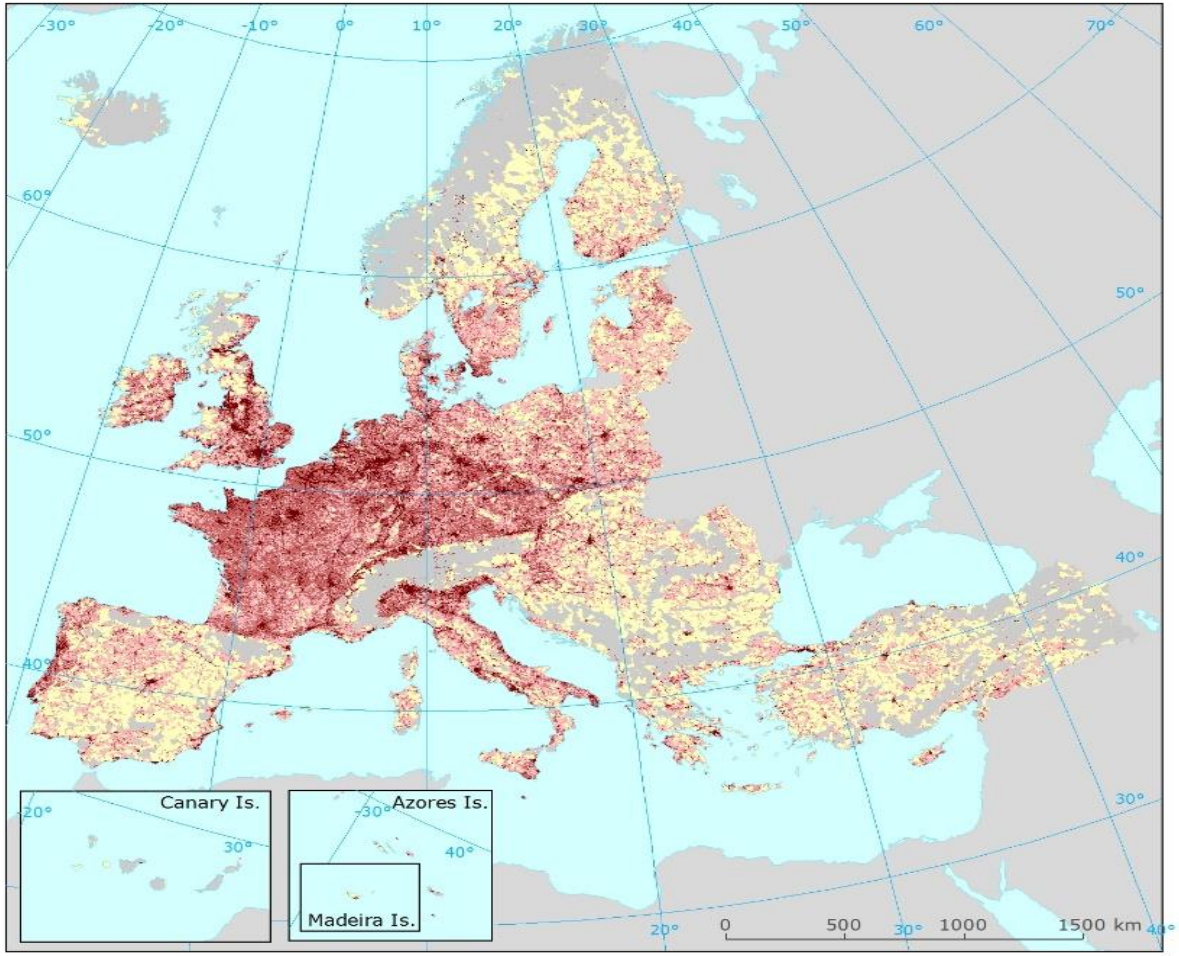
Landscape fragmentation



Landscape fragmentation classes

- Below detection limit
- Moderate
- Medium
- Strong
- Very strong

Map of landscape fragmentation classes caused anthropogenic fragmentation

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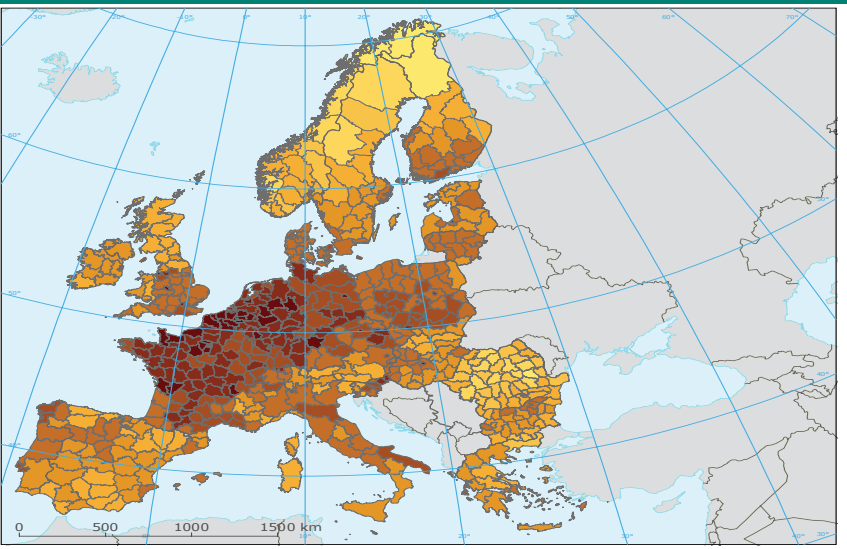
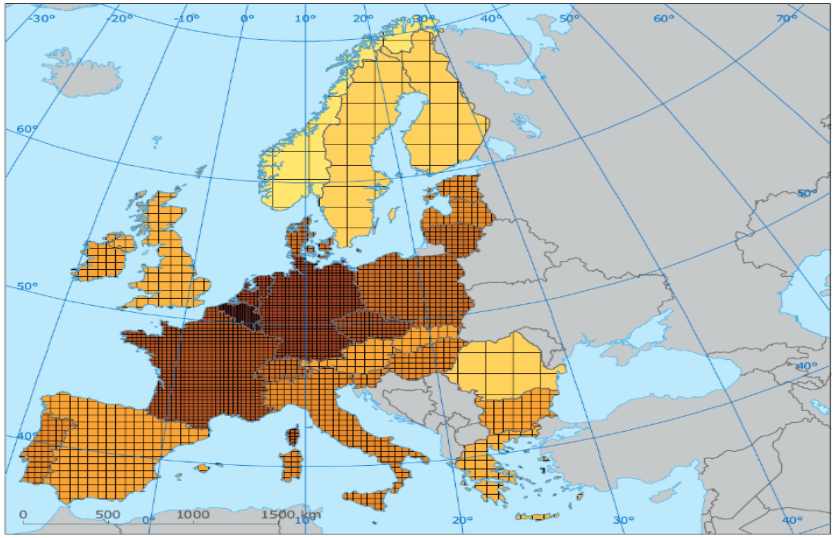
Landscape Fragmentation – update from 2009
Conflicts between transportation corridors and wildlife movement



Landscape fragmentation per NUTS-X region (2009)

Number of meshes per 1 000 km² (s_{eff})

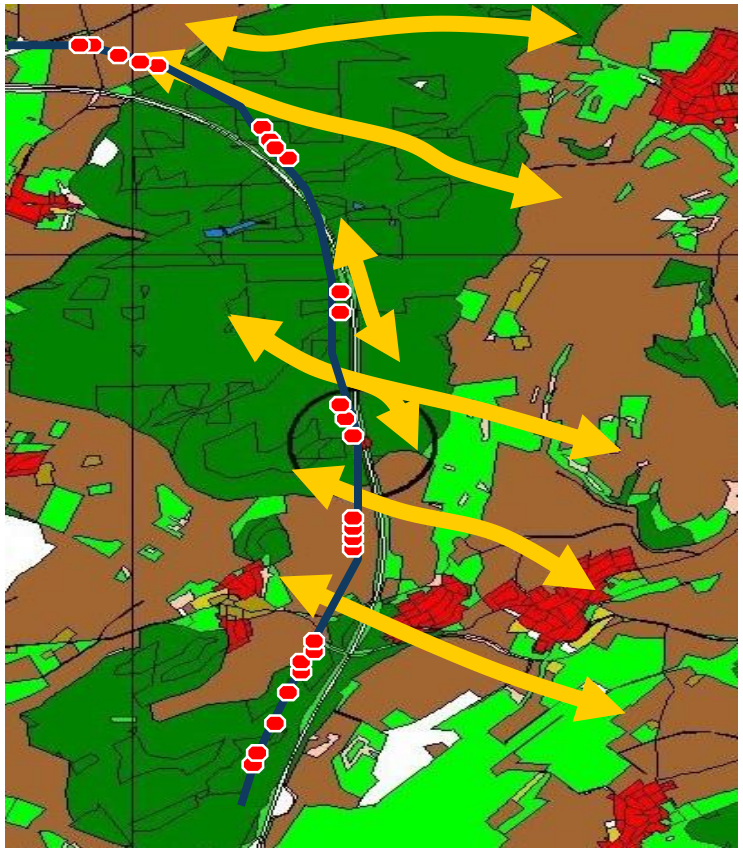
- < 0.10
- 0.11–0.25
- 0.26–0.50
- 0.51–1.00
- 1.01–5.00
- 5.01–10.00
- 10.01–25.00
- 25.01–50.00
- 50.01–100.00
- > 100
- Outside data coverage



Landscape fragmentation per country (2009)

Number of meshes per 1 000 km² (s_{eff})

- < 0.1
- 0.1–0.5
- 0.6–1.0
- 1.1–2.0
- 2.1–4.0
- 4.1–7.0
- 7.1–10.0
- 10.1–20.0
- 20.1–35.0
- 35.1–75.0
- 75.1–100.0
- > 100
- Outside data coverage



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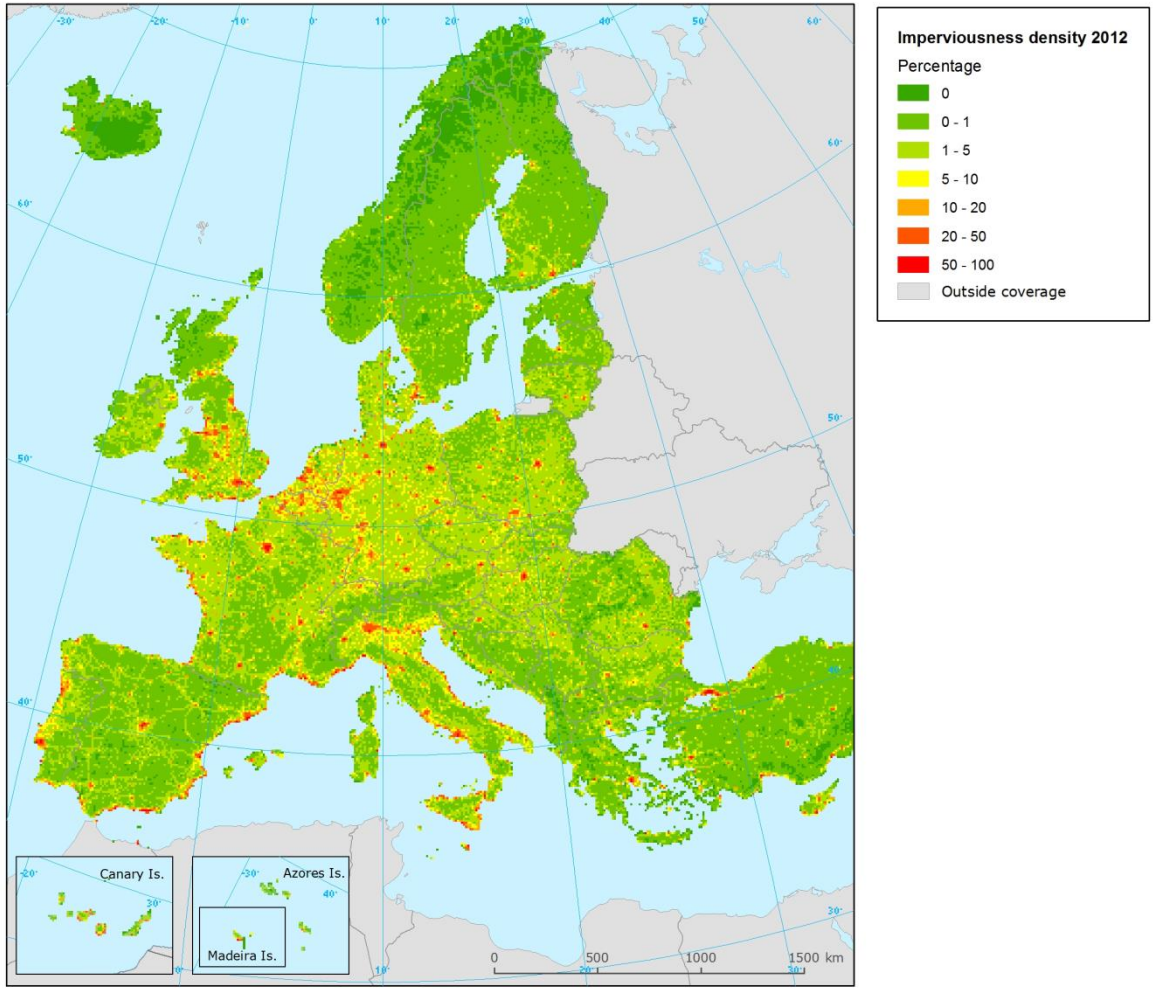
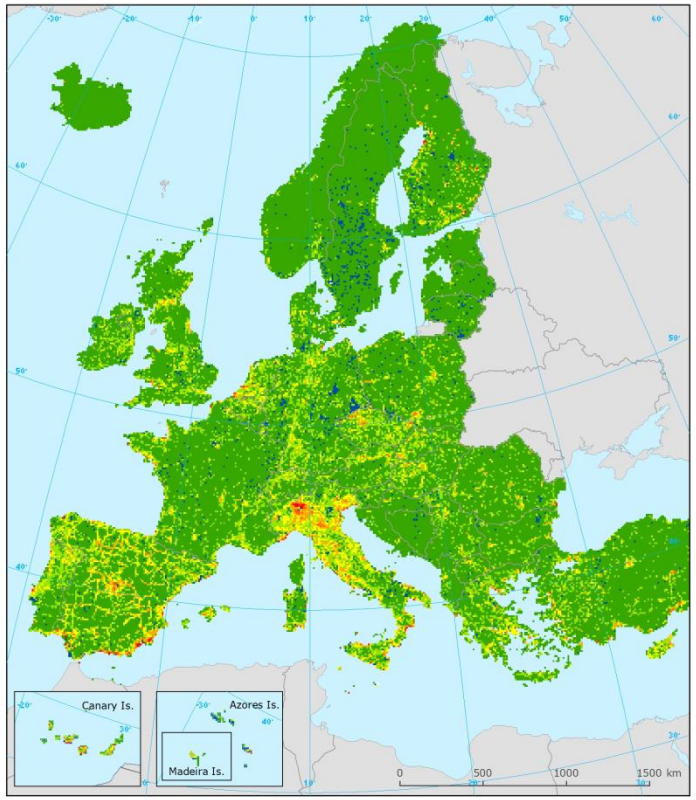
Imperviousness 2012 and change in 06-12



Imperviousness density 2012

Percentage

- 0
- 0 - 1
- 1 - 5
- 5 - 10
- 10 - 20
- 20 - 50
- 50 - 100
- Outside coverage



Average annual increase of sealing (2009 - 2012)

Percentage

- < 0
- 0 - 0.01
- 0.01 - 0.04
- 0.04 - 0.1
- 0.1 0.3
- 0.3 - 0.6
- > 0.6
- Outside coverage

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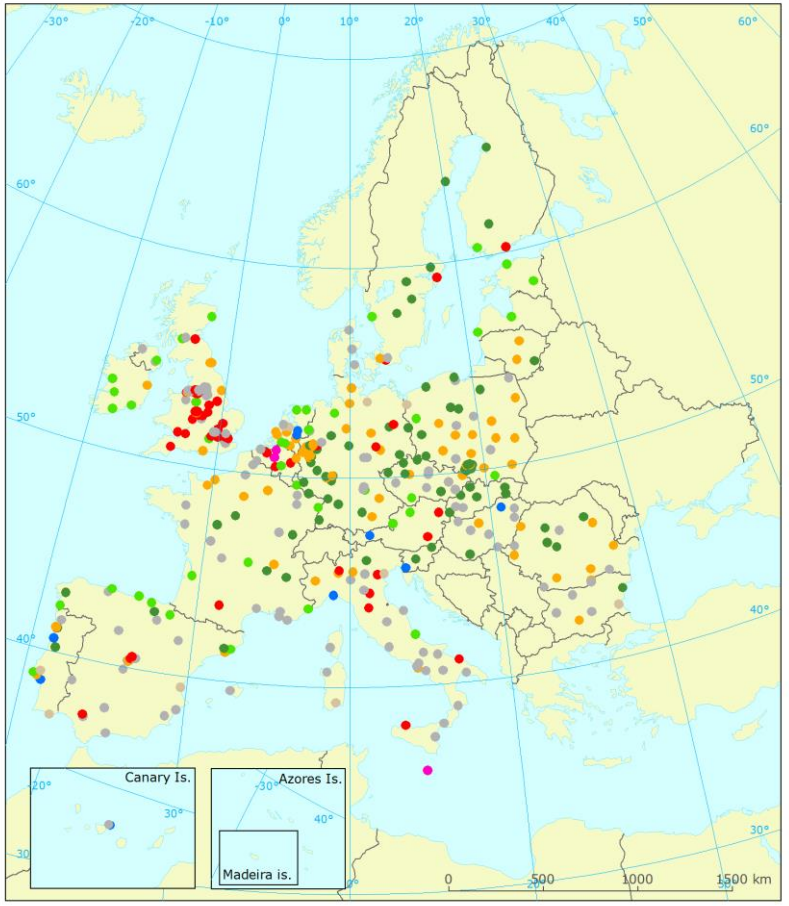
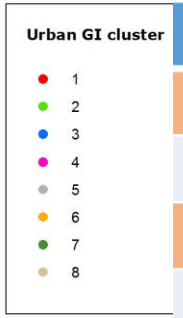
Indicators for Urban green infrastructure

Basic statistics of all clusters		
Parameter code	Parameter alias	Mean
S01_02	Share of green urban areas	58.97
S01_04	Degree of soil sealing	24.94
S01_03	Distribution of green urban areas	19.87
S01_08	Effective green infrastructure (urban hinterland)	38.97
S01_09	Hotspot ratio (hinterland)	4.01
S01_10	Terrestrial urban blue areas	3.01
S02_03	Low density areas	5.96
S01_11	Share of urban forest	14.33
S01_12	Share of Natura 2000 sites	7.62





cluster4	cluster5	cluster6	cluster7	cluster8
-1.72523	0.788129	-0.87675	0.611276	-0.8
0.325906	-0.59768	0.367082	-0.19948	-0.42177
1.594463	-0.7618	1.096244	-0.49961	-0.50794
-1.03814	-0.24268	-0.44097	0.488393	0.09529
6.610568	-0.43778	0.171291	-0.27776	0.090589
0.583347	-0.21691	-0.13087	-0.02384	4.447779
-0.67791	-0.27242	-0.57148	1.535039	-0.6086
0.117695	-0.01611	-0.42531	0.056422	2.44041
0.74635	-0.17782	-0.45422	-0.50055	-0.63176

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Interactive map - Green infrastructure indicators

GIS Map Application — Published 24 Mar 2017 — Last modified 18 Jul 2017

Indicators to characterise green infrastructure at the city level and in the peri-urban area

1 Share of Green Urban Areas

The map shows green urban areas as a proportion of total area inside the core cities. It is defined as the proportion of all vegetated areas within the city boundaries in relation to the total area.

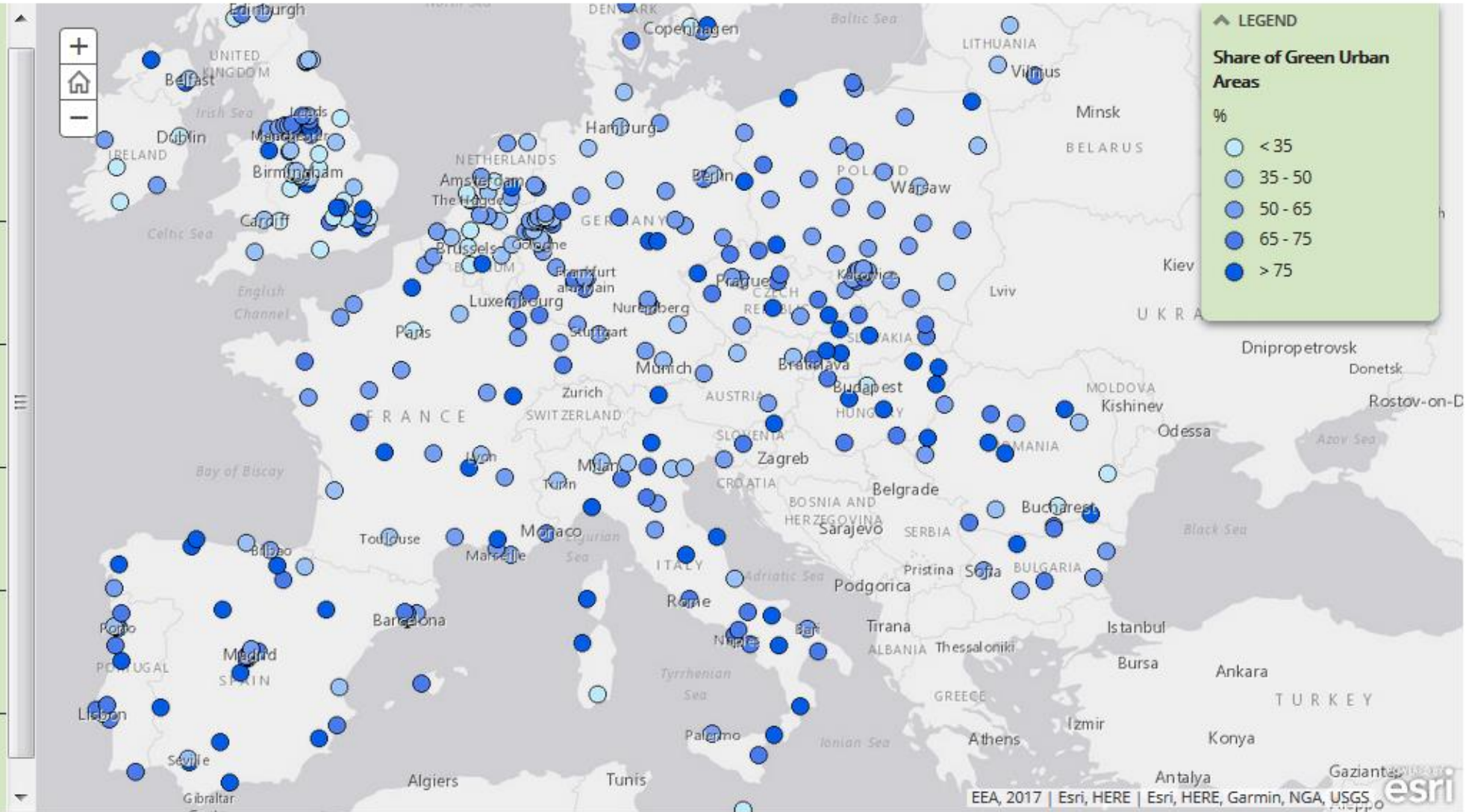
2 Distribution of Green Urban Areas

3 Effective Green Infrastructure

4 Competition for space at the urban–rural interface

5 Green Infrastructure typology of cities

6 GI factsheet of cities



Urban vulnerability map book

https://climate-adapt.eea.europa.eu/knowledge/tools/urban-adaptation/introduction

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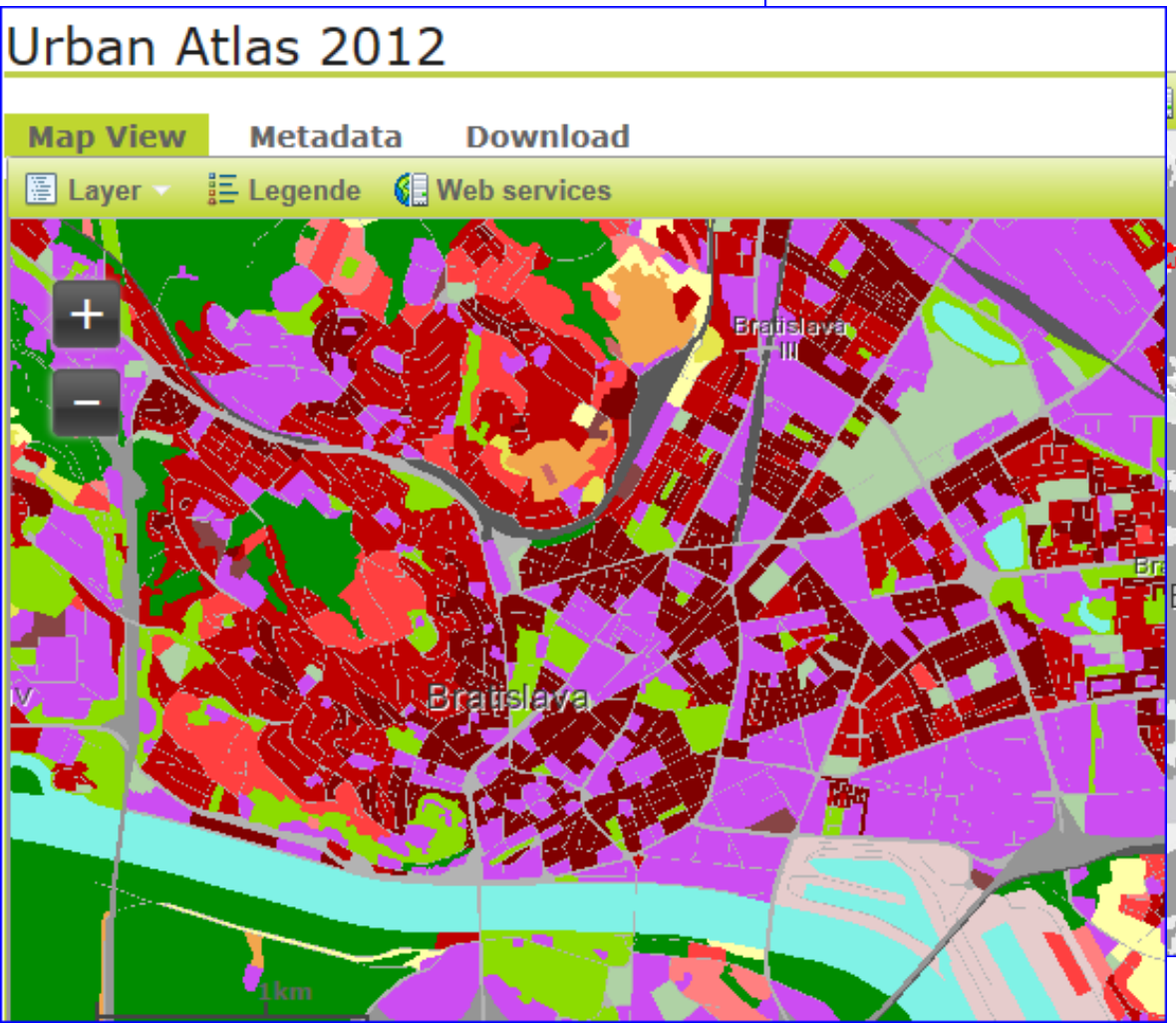
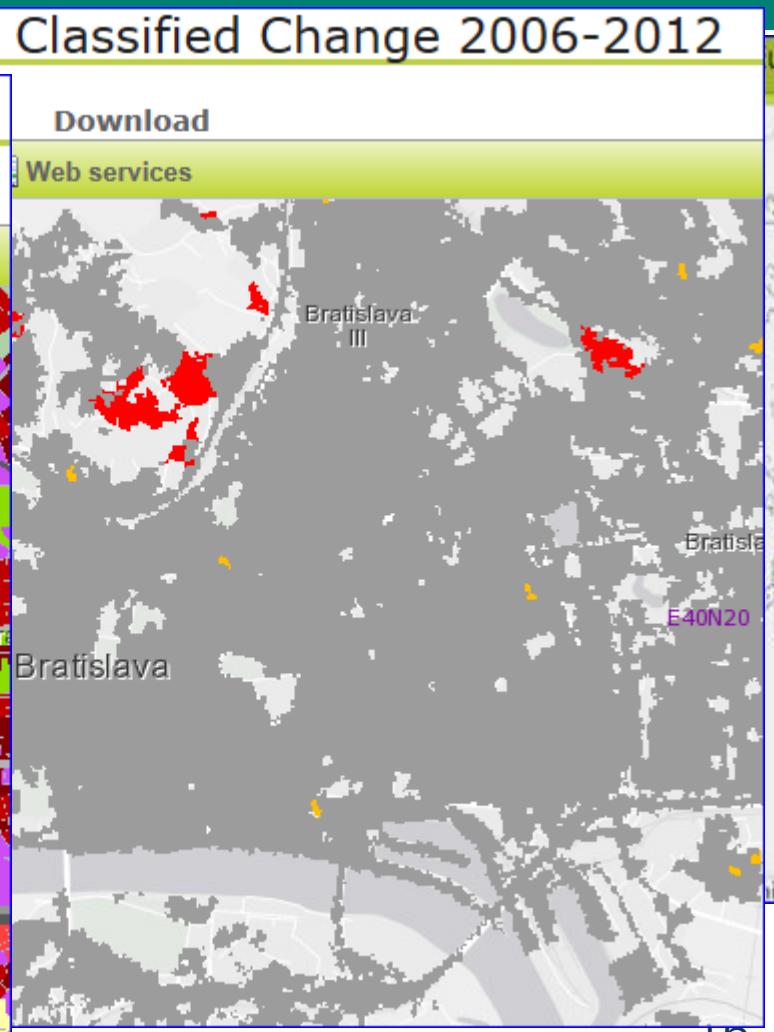
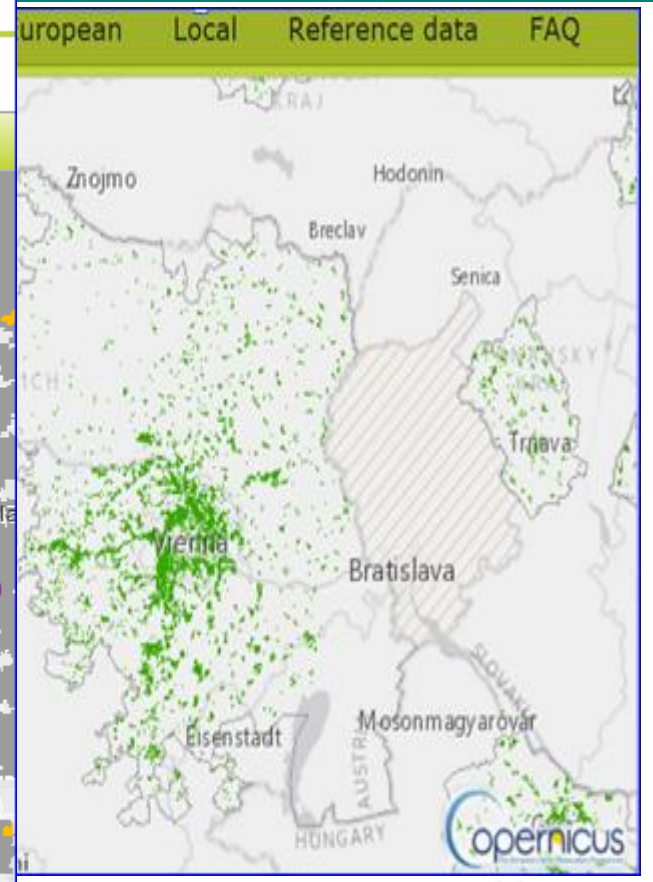
European monitoring of urban areas (FUAs), HRL Imperviousness, STL







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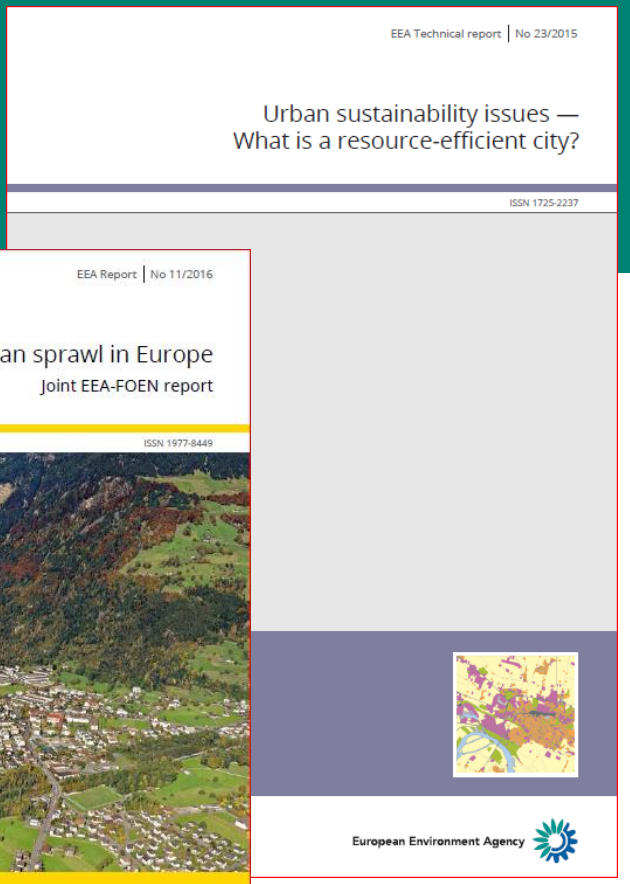

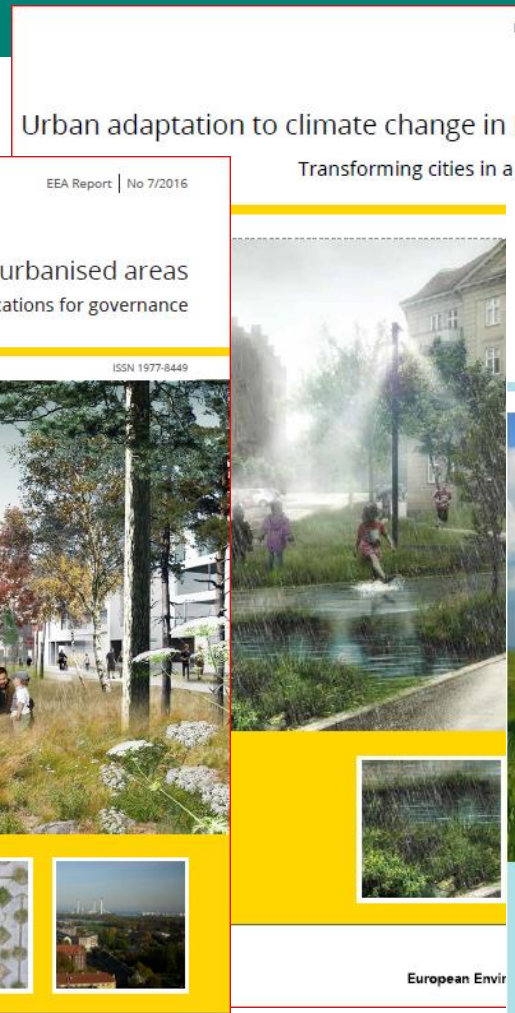

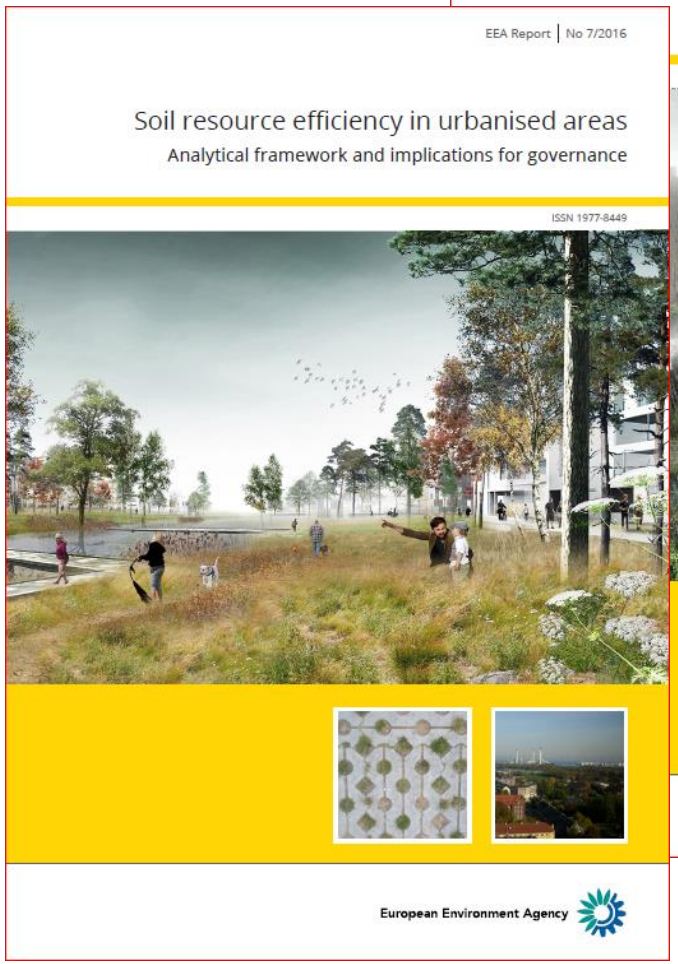

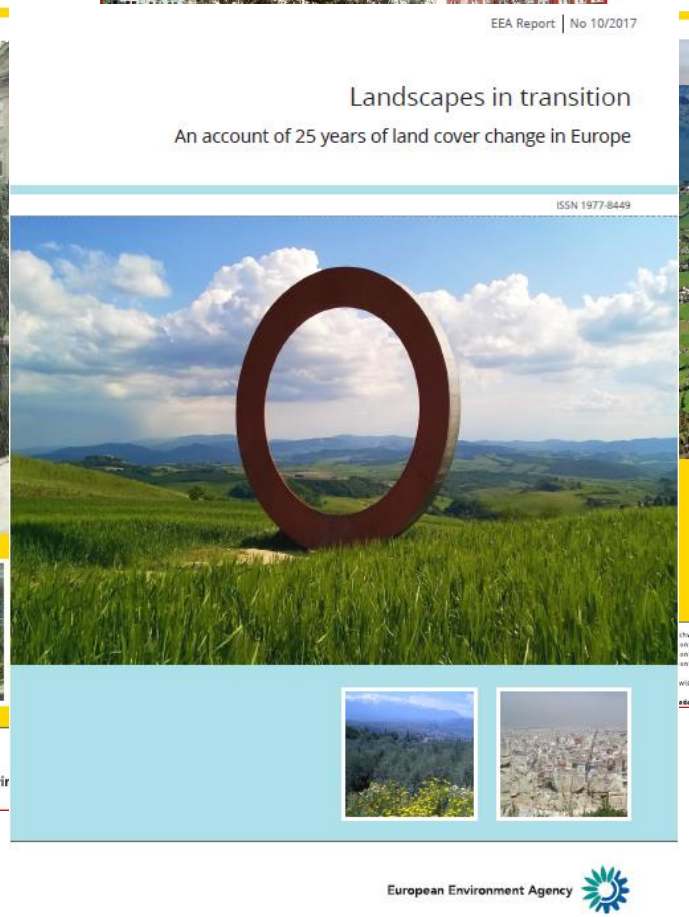

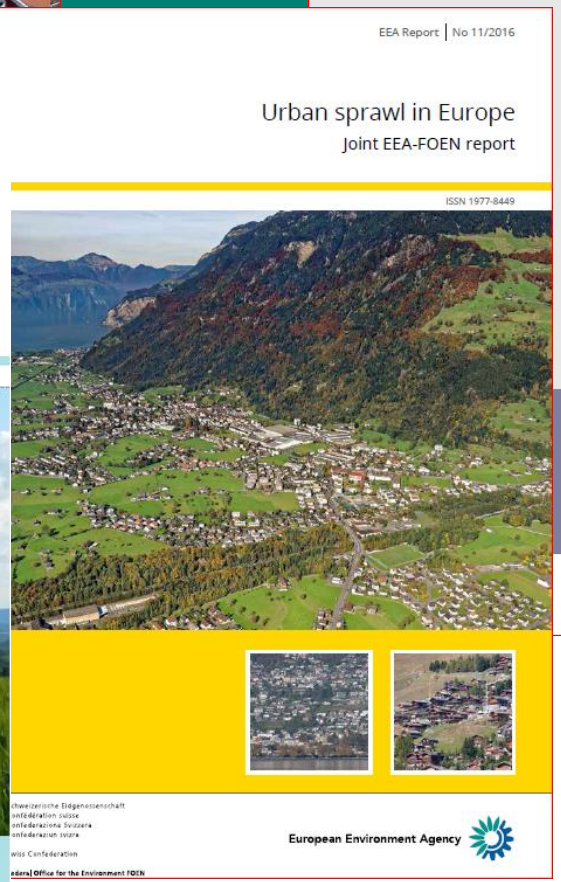

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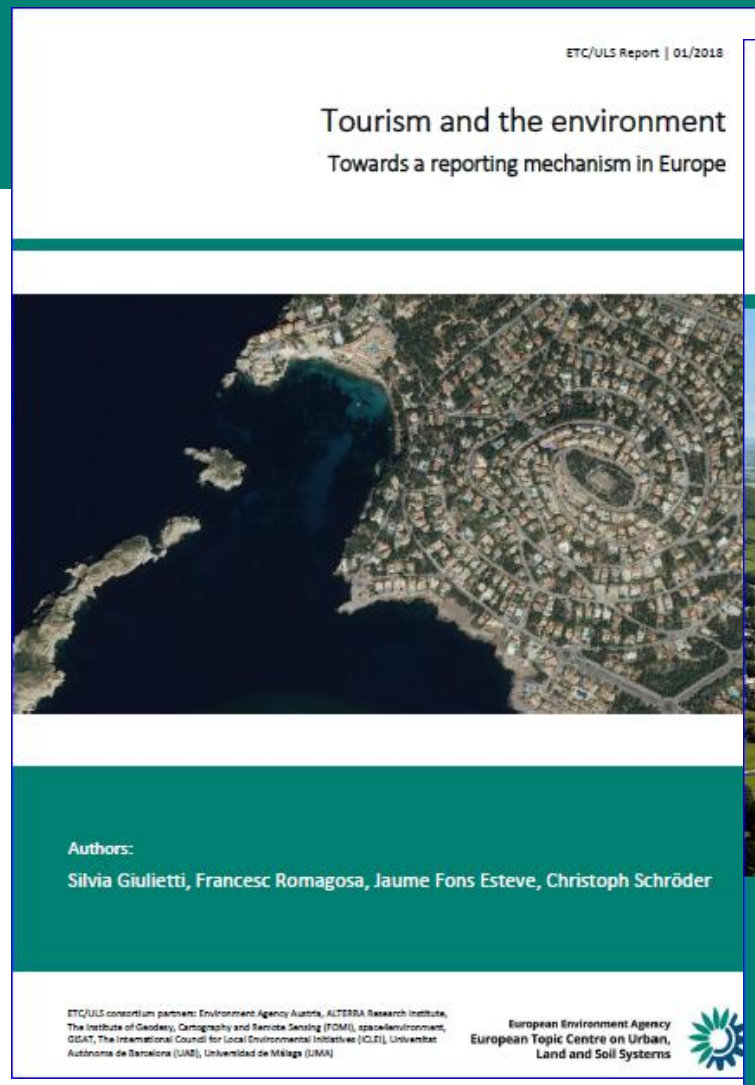

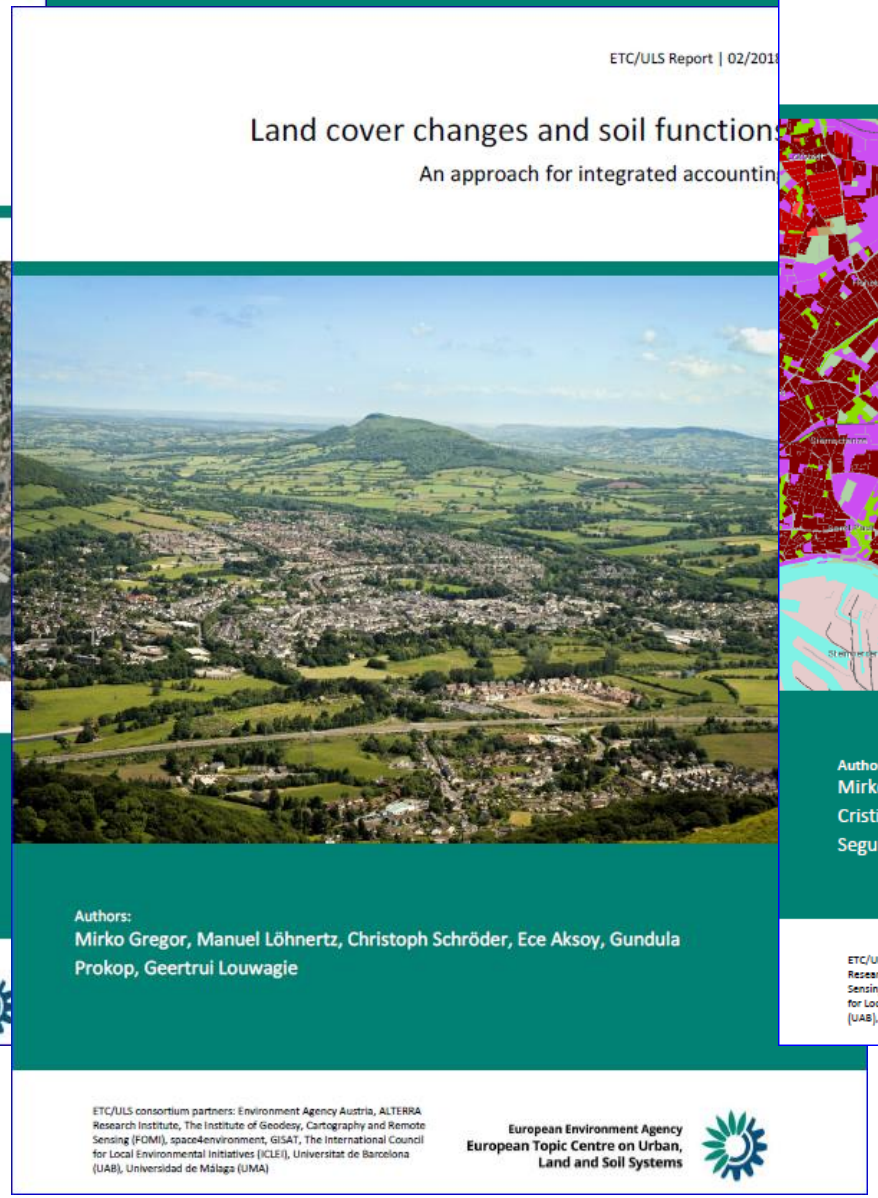

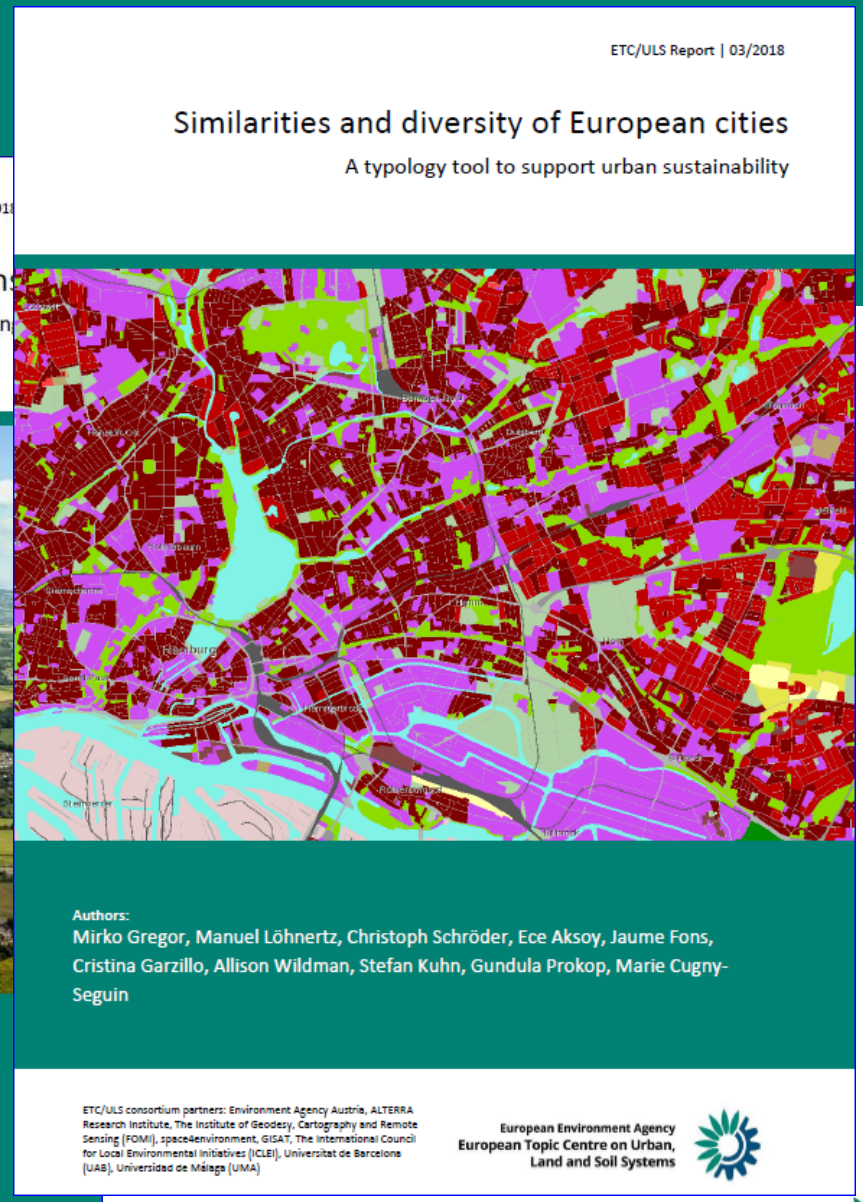

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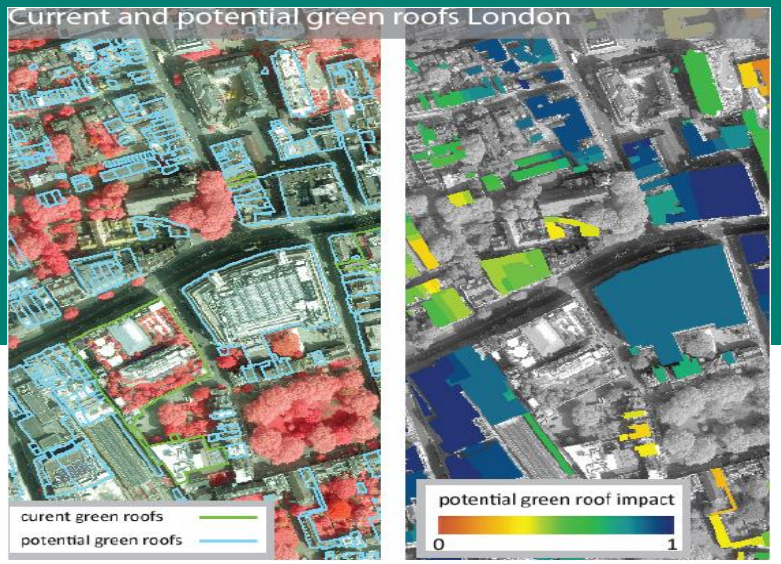
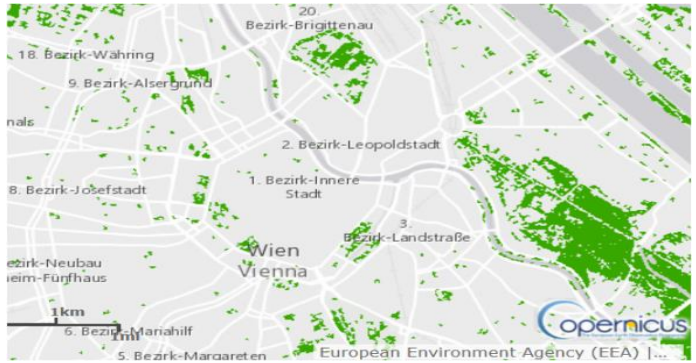
Potential thematic aspect
Urban green infrastructure



Source:FP 7 Project Decumanus

- Green infrastructure
  - Street trees
  - Green roofs
  - Accessibility of green space
  - Urban gardening
  - Urban agriculture
  - Current status and potential

Source: MA 22, Wien



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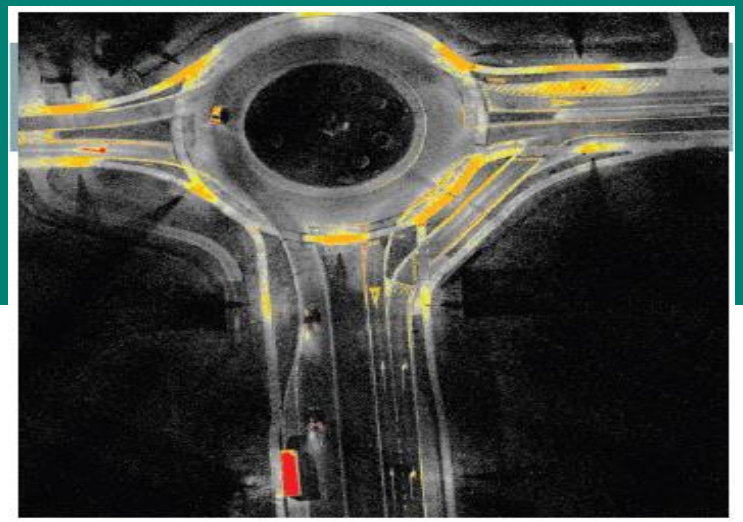
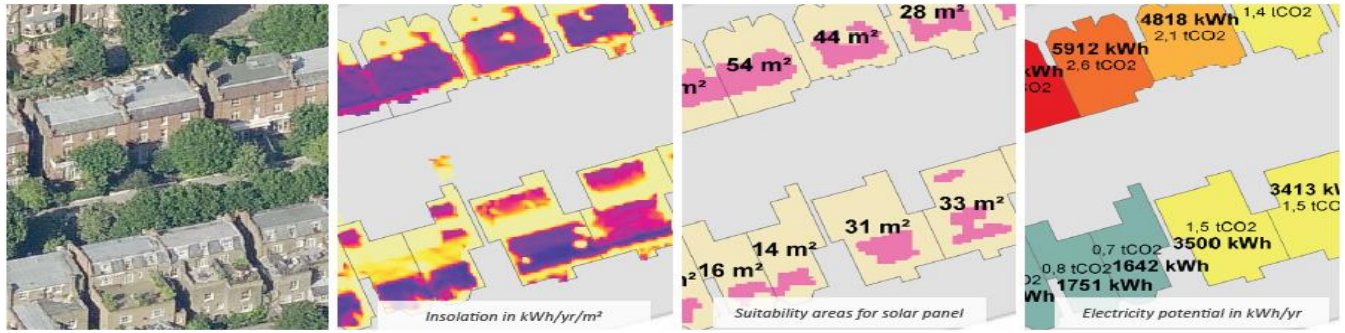
Potential thematic aspect Energy and mobility



Luminance map (cd/m²)

- Lightning
- Photovoltaic potential
- Transport optimization
- Infrastructure
  - Current status and potential



Source:FP 7 Project Decumanus

Example of a Milan neighborhood before (left) and after (right) conversion to LED street lighting. *Source: communication with Municipality of Milano*

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Potential thematic aspect space planning

- Urban sprawl
- Fragmentation / Connectivity
- Mobility network
  - Current status and potential

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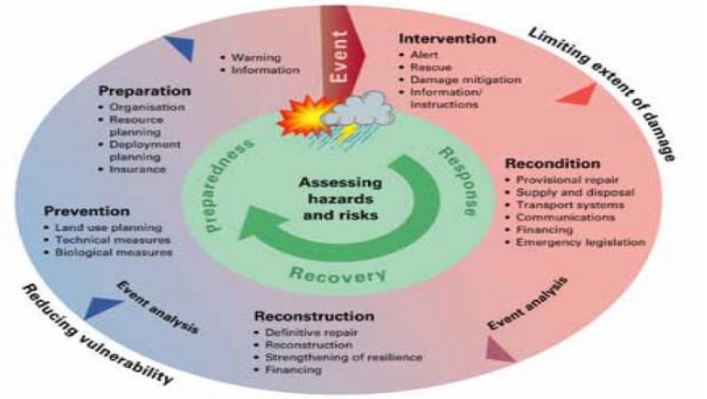
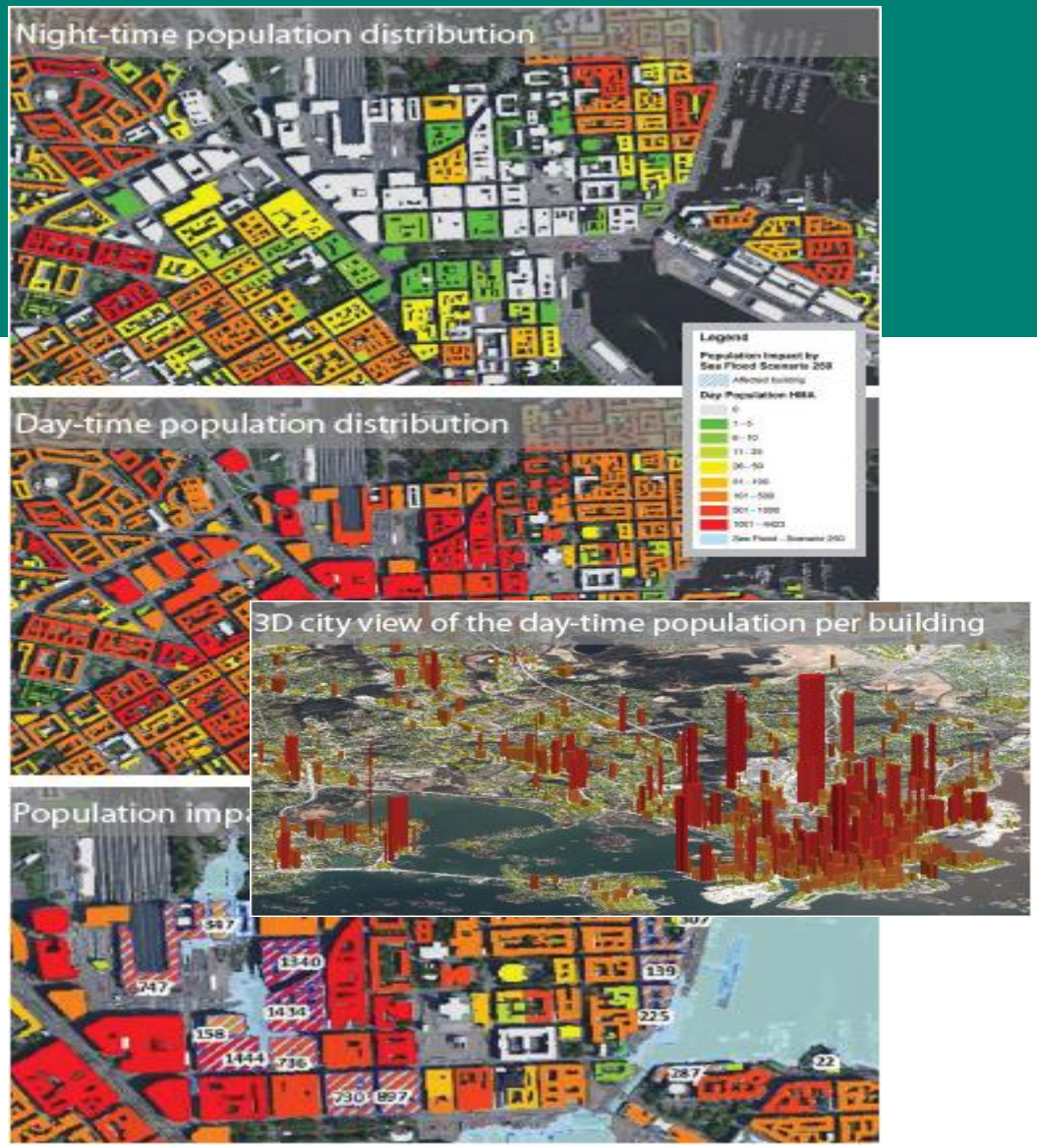
Potential thematic aspect vulnerability and risk reduction

- Flood risk
- Land slide exposure
- Other risks (Storm, drought, heat…)
- risk management
- Current status and potential



Source: Swiss Federal Office for Civil Protection FOCP, 2010.



Source:FP 7 Project Decumanus

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Summary

- A huge number of data and indicators are available for different scales
- The combination of satellite and in situ data will allow better land monitoring and assessments
- European (land monitoring) indicators can give some guidance, but allows comparability across Europe
- Satellite imagery provide new data and data time series and will close the gap between scientific and governmental communities

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Thank you

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