Transnational Mapping of Green Infrastructure in Central Europe

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Introduction

- Aim: Identify the spatial distribution of GI and BI with a focus on the transnational (European) scale as a basis for further analyses (functionality, benefits)

- Following a structural, rather data-driven approach using existing spatial datasets of GI and BI elements (i.e. potential green infrastructure) as a first step (in subsequent work the elements classified as GI and BI will be qualified according to the landscape services they provide)

- Practical example: Lessons learnt from MaGICLandscapes process (limitations of data sets, solutions)

Disclaimer: The data used for these analyses refer to the processing period (mid 2017 till end of 2018). New datasets will become available, e.g. by the European programme Copernicus (like CORINE 2018) that would need a new evaluation.

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General Procedure of Mapping GI

1) Definition of GI

2) Definition of GI and BI classes representing the objects of interest from Step 1 (legend) considering the needs of the target groups

3) Research of data that already mapped the GI and BI classes, depending on the scale the study is aimed at (European, national, regional, local) and acquisition of these data

4) Evaluating the content and quality of the datasets (compared to the definition or aim)

5) Producing a map of potential GI and BI

Tested Data Sets of GI and BI Elements

Name	Source	Year	Remarks
Permanent Water Bodies (PWB)	Copernicus High resolution layers	2012	Raster
Wetlands (WET)			Raster
Natural Grasslands (NGR)			Raster
Forest Additional support layer (FAD)			Raster
Forest Type (FTY)			Raster
CORINE Land Cover (CLC)	EEA	2012	Vector
High Nature Value Farmland (HNVF)	EEA	2012	Raster, 100 m
European catchments and Rivers network system (Ecrins)	EEA	1990-2006	Vector (beta version)
EU-Hydro River Network	Copernicus	2012	Vector
European Settlement Map (ESM)	Copernicus	2012	Raster, 2.5 m
USGS Global Land Cover data layers	USGS	ca. 2010	Raster, 30 m

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Starting Point: 1st Draft Map

MaGICLandscapes - Transnational Map of Green Infrastructure in the Central Europe Programme Area

Legend

- Using most recent data and best resolution data (COPERNICUS High Resolution Layers, HRL)

- Review by regional experts: Datasets (i.e. the status of the data used) have some gaps (unclassified areas due to clouds etc.) in coverage and some classes are missing, especially related to extensive farmland

- Add CORINE Land Cover (CLC), High Nature Value Farmland (HNVF) and European catchments and Rivers network system (Ecrins)
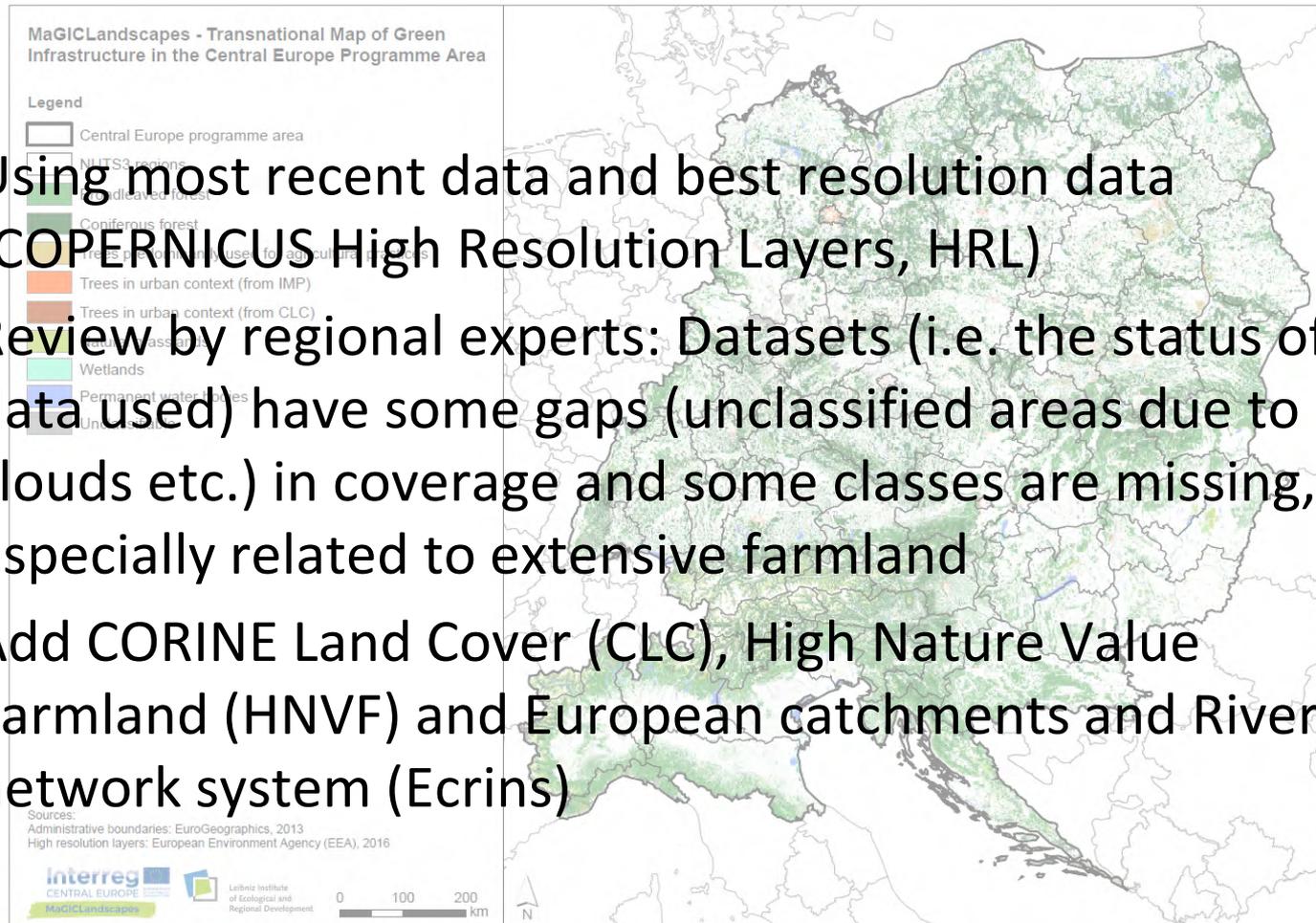
2nd Draft Map
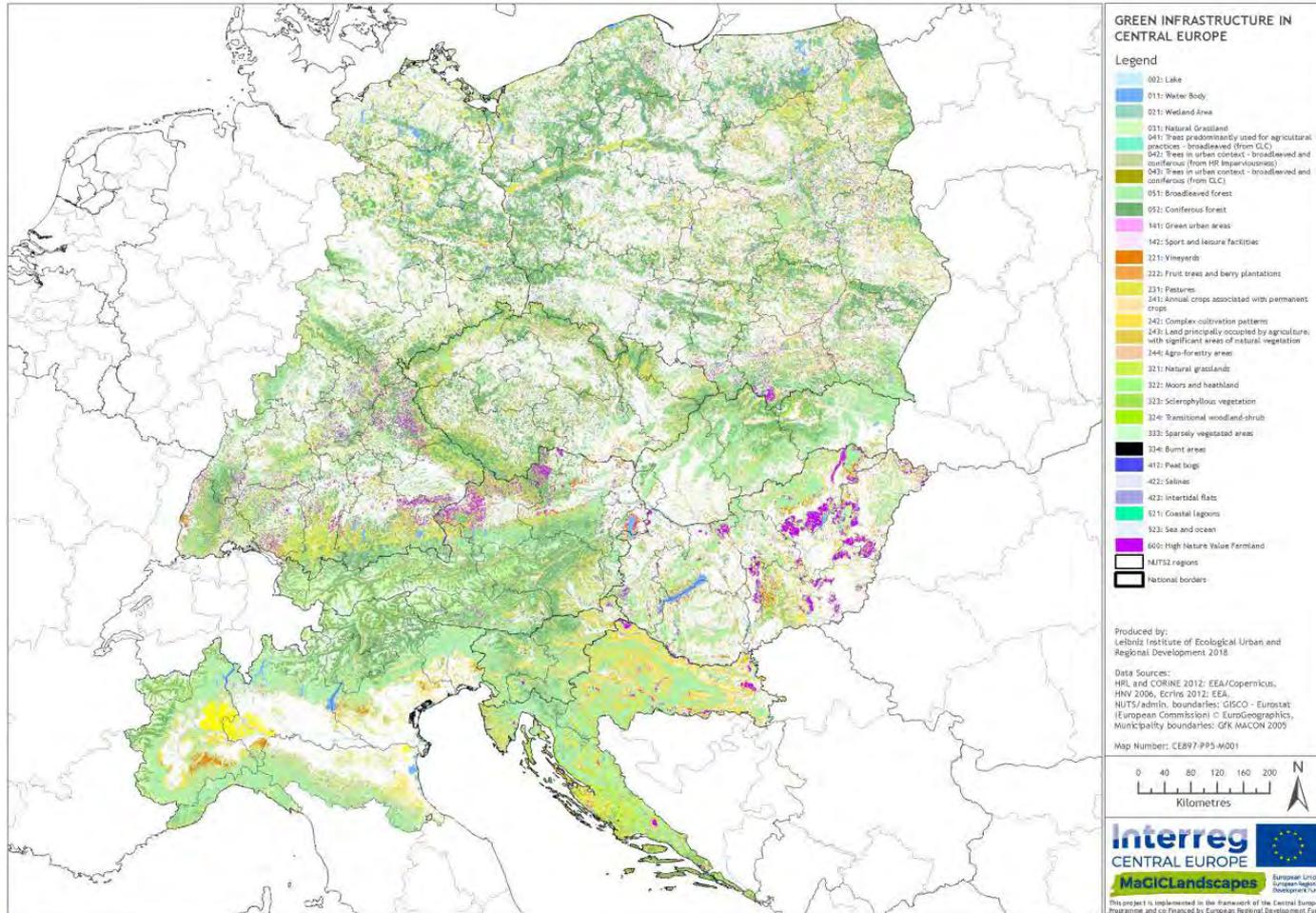
Ground Truthing
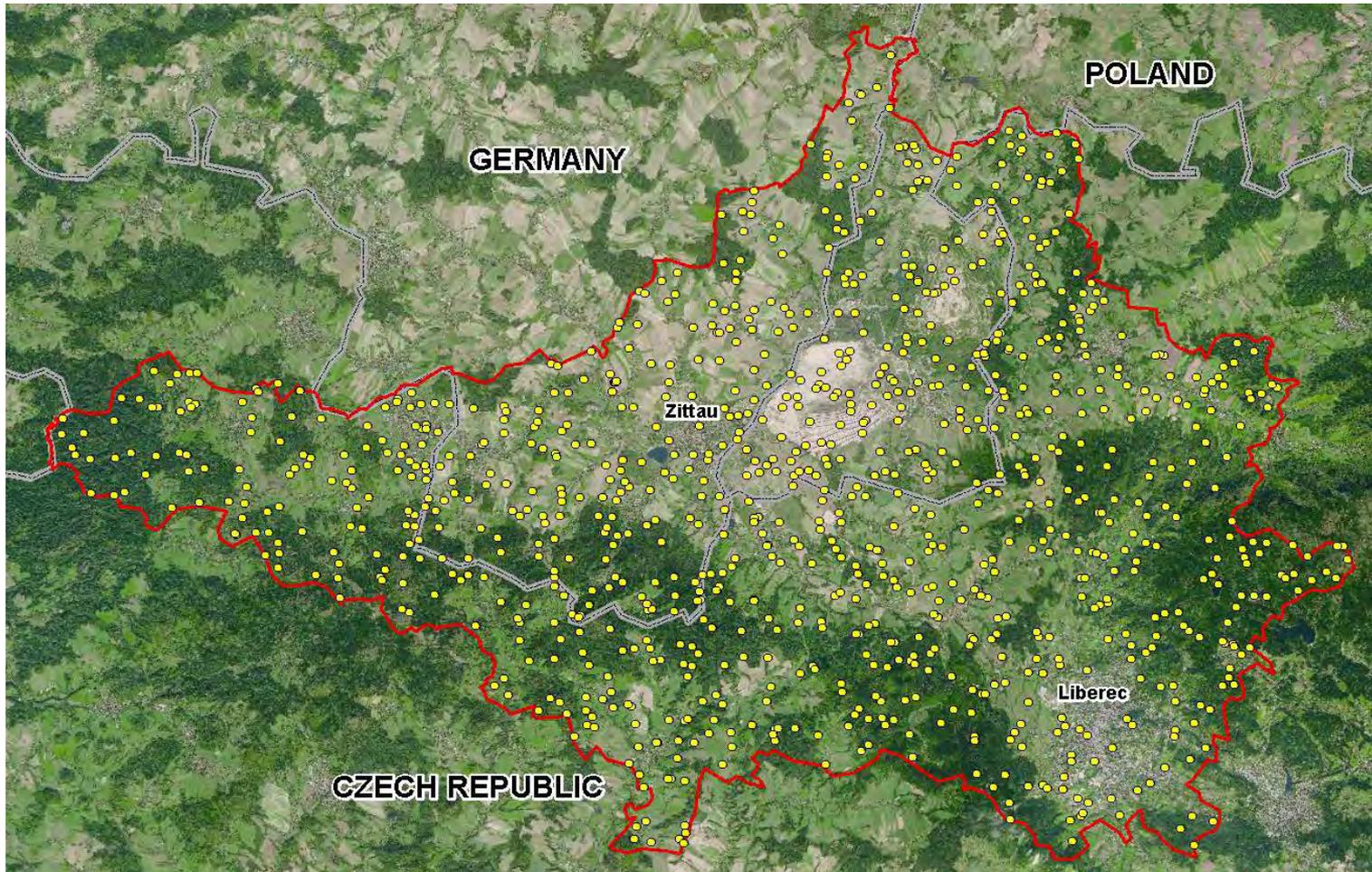
Findings Regarding Data Quality

- Water dataset **ECRINS**: **-** Generalised and outdated -> EU-Hydro River Network (Copernicus)/OSM data

- **High Resolution Layers**: **-** high amount of misclassification (no added value compared to CORINE), **-** not full coverage, **-** contains some gaps or unclassifiable areas

- **High Nature Value Farmland** layer: **-** low spatial resolution (no added value compared to CORINE), **-** high variability of mapping HNVF by enormous national differences

- **CORINE**: **+** data quality **on transnational scale**, **+** satisfactory and sufficient classification, **+** low amount of misclassifications, **+** full coverage

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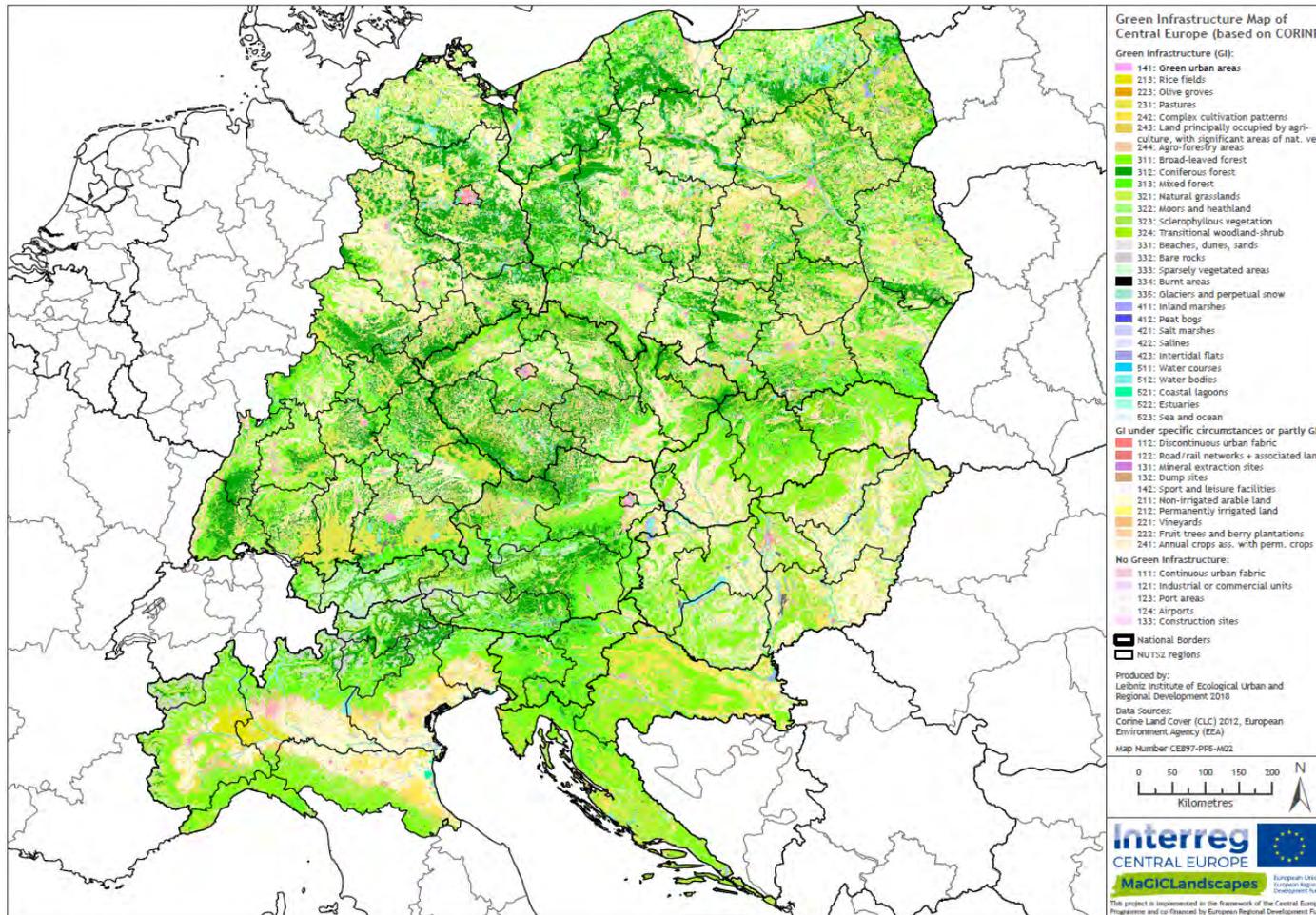Ecological Urban and
Regional Development

Common Legend

- Result of a questionnaire

- CLC classification scheme (44 classes at Level 3) has been discussed and agreed

- Due to generalisation (MMU 25 ha), mixed classes etc. a top-level classification was added:
  - GI/BI
  - Not GI/BI
  - GI according to specific circumstances (e.g. extensively managed "Vineyards" or "Fruit trees and berry plantations", "Discontinuous urban fabric" or "Road and rail networks and associated land"), specification on regional scale!

Group	CLC Code	Description
	141	Green urban areas
	213	Rice fields
	223	Olive groves
	231	Pastures
	242	Complex cultivation patterns
	243	Land principally occupied by agriculture, with significant areas of natural vegetation
	244	Agro-forestry areas
	311	Broad-leaved forest
	312	Coniferous forest
	313	Mixed forest
	321	Natural grasslands
	322	Moors and heathland
	323	Sclerophyllous vegetation
	324	Transitional woodland-shrub
GI	331	Beaches, dunes, sands
	332	Bare rocks
	333	Sparsely vegetated areas
	334	Burnt areas
	335	Glaciers and perpetual snow
	411	Inland marshes
	412	Peat bogs
	421	Salt marshes
	422	Salines
	423	Intertidal flats
	511	Water courses
	512	Water bodies
	521	Coastal lagoons
	522	Estuaries
	523	Sea and ocean
	112	Discontinuous urban fabric
	122	Road and rail networks and associated land
	131	Mineral extraction sites
	132	Dump sites
GI according to specific circumstances	142	Sport and leisure facilities
	211	Non-irrigated arable land
	212	Permanently irrigated land
	221	Vineyards
	222	Fruit trees and berry plantations
	241	Annual crops associated with permanent crops
	111	Continuous urban fabric
	121	Industrial or commercial units
No GI	123	Port areas
	124	Airports
	133	Construction sites

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Trans-national Map of GI (Central Europe)

Green Infrastructure Map of Central Europe (based on CORINE)

Green Infrastructure (GI):
- 141: Green urban areas
- 213: Rice fields
- 223: Olive groves
- 231: Pastures
- 242: Complex cultivation patterns
- 243: Land principally occupied by agriculture, with significant areas of nat. veg.
- 244: Agro-forestry areas
- 311: Broad-leaved forest
- 312: Coniferous forest
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- 335: Glaciers and perpetual snow
- 411: Inland marshes
- 412: Peat bogs
- 421: Salt marshes
- 422: Salines
- 423: Intertidal flats
- 511: Water courses
- 512: Water bodies
- 521: Coastal lagoons
- 522: Estuaries
- 523: Sea and ocean

GI under specific circumstances or partly GI:
- 112: Discontinuous urban fabric
- 122: Road/rail networks + associated land
- 131: Mineral extraction sites
- 132: Dump sites
- 142: Sport and leisure facilities
- 211: Non-irrigated arable land
- 212: Permanently irrigated land
- 221: Vineyards
- 222: Fruit trees and berry plantations
- 241: Annual crops ass. with perm. crops

No Green Infrastructure:
- 111: Continuous urban fabric
- 121: Industrial or commercial units
- 123: Port areas
- 124: Airports
- 133: Construction sites

National Borders
NUTS2 regions

Produced by:
Leibniz Institute of Ecological Urban and Regional Development 2018

Data Sources:
Corine Land Cover (CLC) 2012, European Environment Agency (EEA)

Map Number CE897-PP5-M02

0 50 100 150 200
Kilometres

N

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This project is implemented in the framework of the Central Europe Programme and co-financed by European Regional Development Fund

■ Based on the transnational CORINE map incl. common classification scheme and colour code

Trans-national Map of GI (Central Europe)

Green Infrastructure Map of
Central Europe (based on CORINE)

Green Infrastructure (GI)
GI under specific circumstances or
partly GI
No Green Infrastructure:

National Borders
NUTS2 regions

Produced by:
Leibniz Institute of Ecological Urban and
Regional Development 2018
Data Sources:
Corine Land Cover (CLC) 2012, European
Environment Agency (EEA)
Map Number CE897-PP5-M03

0   50   100   150   200
Kilometres

■ Reduced
legend with 3
classes
(GI/maybe
GI/ not GI)

Resulting Regional GI Maps (Transnational Scale)
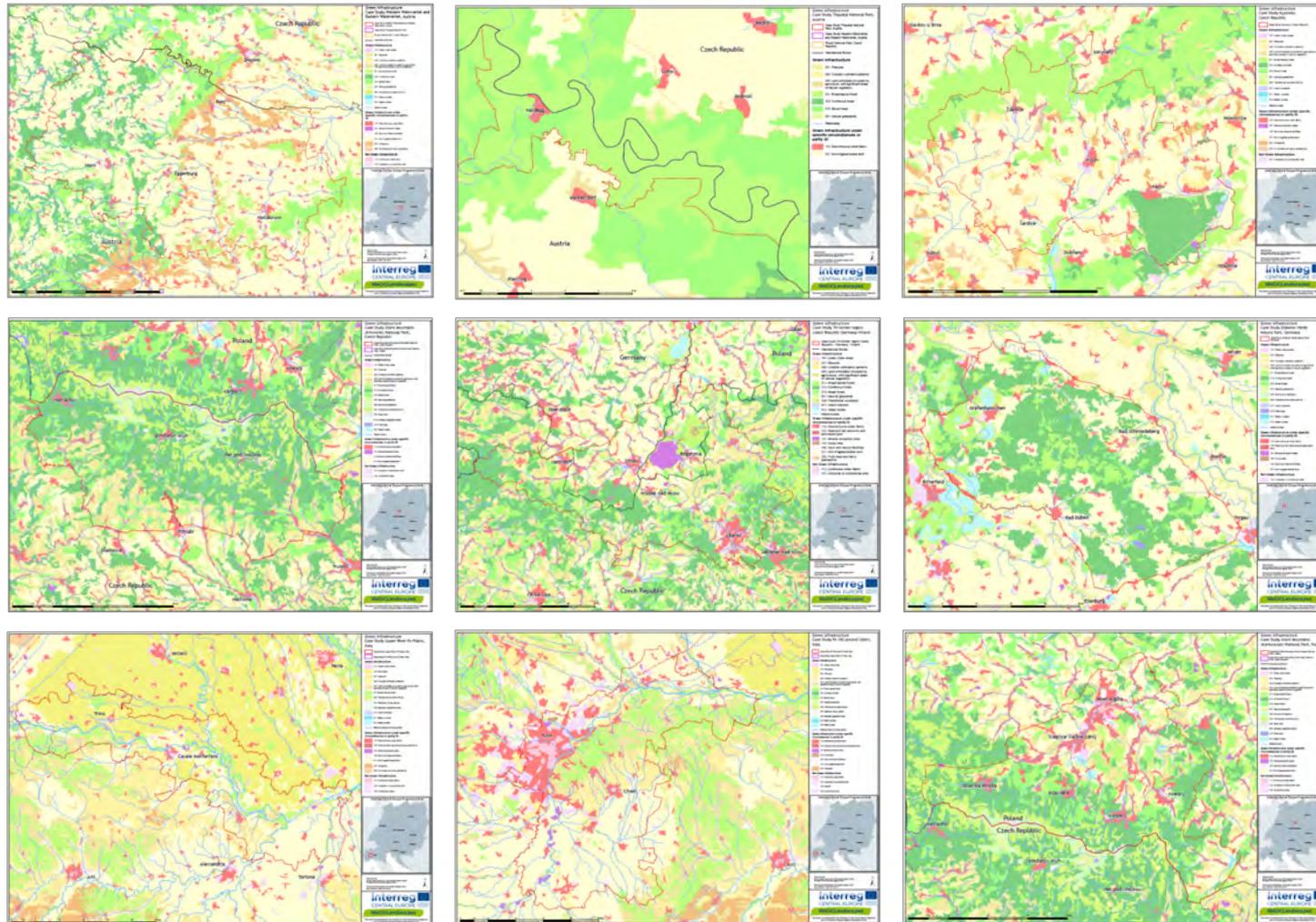
Shortcomings of Transnational Data (CORINE)

- Mixed classes: i.e. land principally occupied by agriculture, with significant areas of natural vegetation (243) and complex cultivation patterns (242) ➔ rather subjectively defined and delineated

- Differentiation of forest types

- Woodlots and woody strips in agricultural landscapes are not represented (due to MMU of 25 ha), generalization issue

- Regional issues/misclassifications: IT: rice fields (213) and poplar plantations (forest/agriculture?), CZ/PL: mountainous forests (mountain pines)

- Land use intensity (vineyards)

➔ Using national/regional data (biotope maps, land use maps etc.), applying the same legend/colour scheme

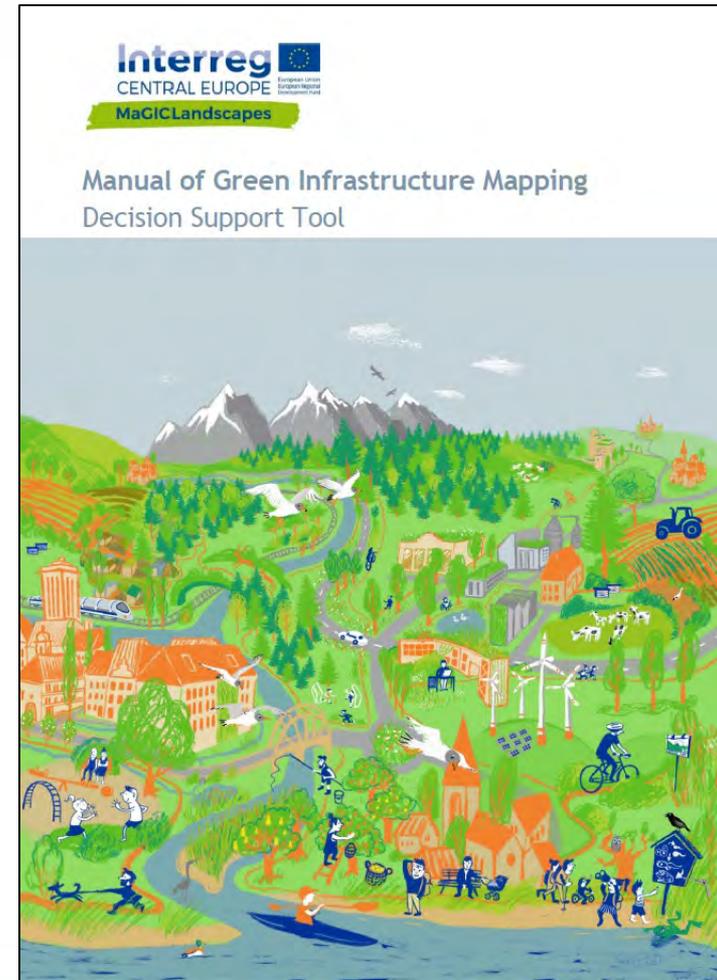# Resulting Regional GI Maps (Regional Scale)
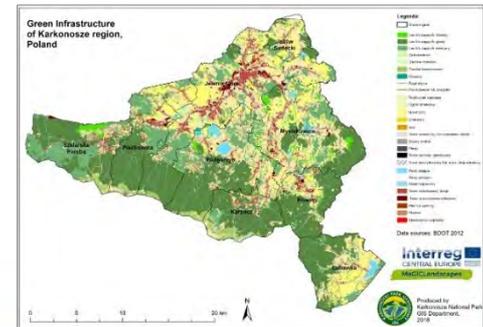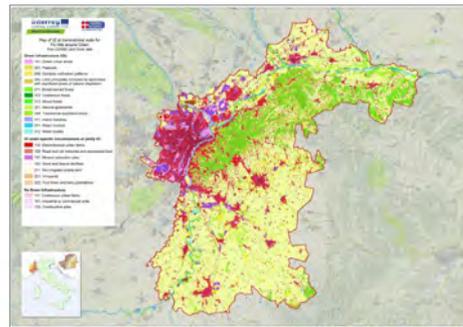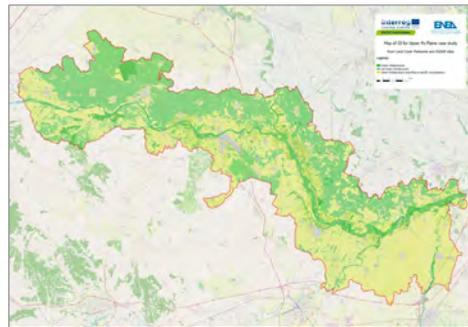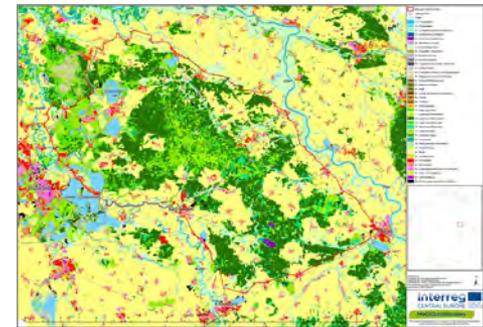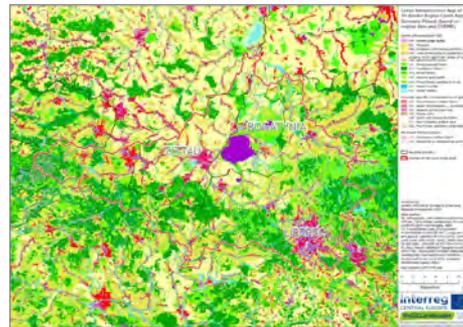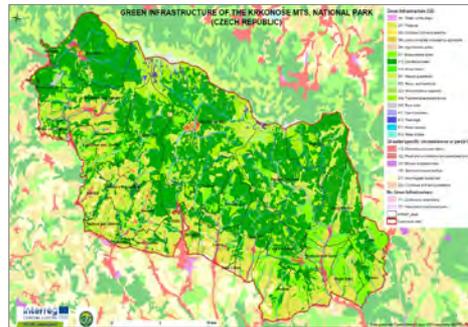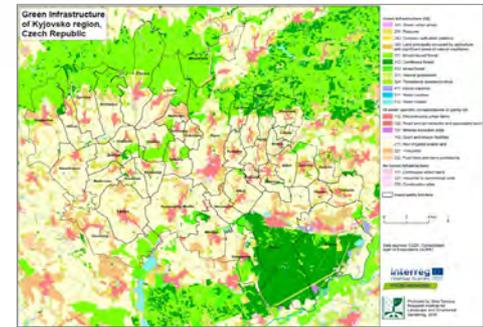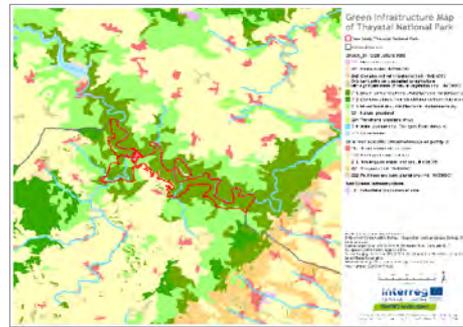
Conclusions

- CORINE is still an important data set on transnational scale (but has shortcomings)

- There might be useful new upcoming datasets in future on European level (Copernicus program, Sentinel satellites)

- On regional scale it is more appropriate to use regional data (accessibility, costs, coverage, comparability)

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Output

- 50 pages manual

- General Procedure of Mapping Green Infrastructure

- Generating a Transnational GI Map – Lessons from MaGICLandscapes

- Generating Regional GI Maps

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Manual of Green Infrastructure Mapping
Decision Support Tool

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