

ECO-INNOVATIVE SOLUTIONS FOR WASTED LANDSCAPES




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In 2012 the European Commission published a paper “Eco-innovation the key to Europe’s future competitiveness” that aim the project Repair.

What are the **Eco innovative solutions** in the context of this study?






We start from the critical review of planning paradigms focused on “resilience” rather than urban growth

The - **Eco Innovative solutions** - are to be focused to increase the resilience and therefore have to pay attention to Circularity as an innovative approach to planning manage and re-design the “wasted landscapes”





In the European context in which the consumption of materials per year is supposed of about 16 tons of materials for person (EC 2010), right in the peri-urban areas is the greater pressure of waste flow in consequence also of a non planned and chaotic land use, generating a new geographies of wasted landscapes defined Wastescapes in REPAiR project funded in the context of Horizon 2020



REPAiR Consortium and cases

Participant (Acronym)	Country
Delft University of Technology (TUD)	NL
Ghent University (UG)	BE
DiARC UNINA - University of Naples Federico II (UNINA)	I
HafenCity Universität Hamburg (HCU)	D
Institute for Regional Studies, CERS of HAS, MTA KRTK (RKI)	H
Institute of Geography and Spatial Organization Polish Academy of Sciences (IGiPZ)	PL
Joint Research Centre (JRC)	I
Geo-Col GIS and Collaborative Planning (Geo-Col)	NL
Delta Development Group (DELTA)	NL
BIOKOM Nonprofit Ltd (BIOKOM)	H
Gertz Gutsche Rügenapp Stadtentwicklung und Mobilität GbR (GGR)	D
OVAM - Public Waste Agency of Flanders (OVAM)	BE
Municipality of Haarlemmermeer (GHM)	NL
Campania Regional Authority (CRA)	I
Pheno horizon (PHH)	PL
Bauer Umwelt GmbH (BMU)	D/I
IVAGO (IVAGO)	BE
Stadtreinigung Hamburg (SRH)	D



REPAiR General Aim

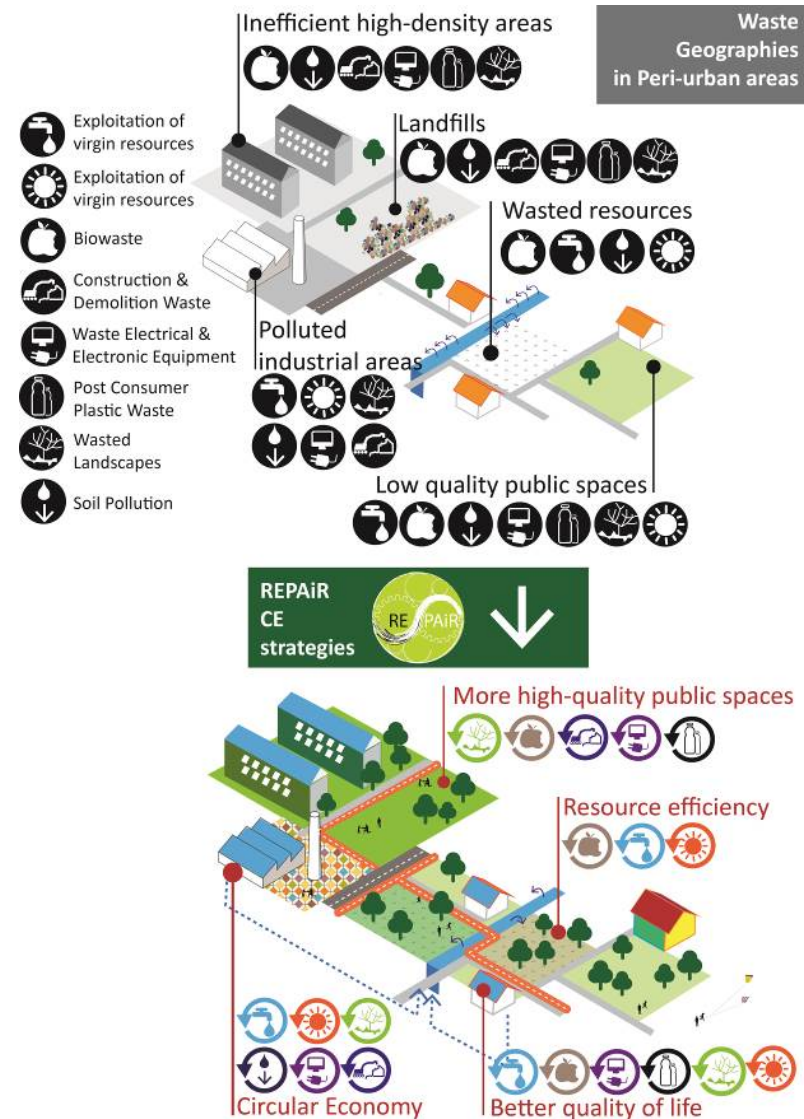
The project aims at providing eco-innovative solutions for fostering the quantitative reduction of waste flows in peri-urban areas, as well as in order to improve the quality of life in peri-urban areas object of the study.

The research focus is both on spatial regeneration strategies (especially those based on place-based and transdisciplinary approaches), as well as on the activation of circular economy processes



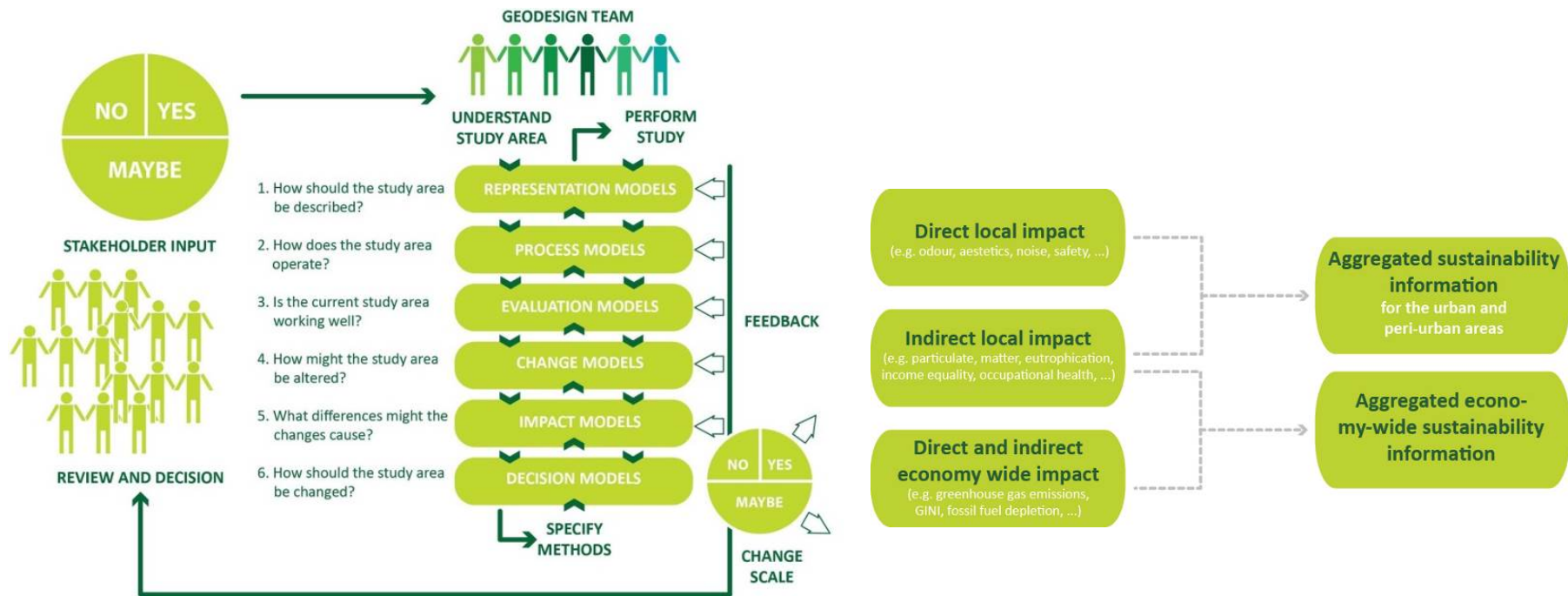
REPAiR specific Aims

- providing more sustainable waste management systems, based on **Life Cycle Thinking**.
- testing out new practices for collaborative problem solving, through the implementation of **Living Labs** (Mitchell 2003; Bilgram et al. 2008);
- supporting decision-makers, through the delivering of innovative tools, running within a **Geo-Design Decision Support Environment** (Steinitz 2012);



Approach:

- RERAIr integrates life cycle thinking and **geodesign** to operationalise urban metabolism
- Can be used the geodesign in this context?
- What do the Decision Makers need to know to be able to say “What should we do” ?



Waste:

REPAiR innovates by extending the definition of **waste by 'wasted landscapes'** (WL), which apply to open spaces as well as built entities, like buildings and infrastructure



Piana Campana, Italy. Image source: Libera Amenta, 2013.

Mapping the wastescapes:

1

polluted and/or abandoned soils and parcels



2

polluted water and compromised water canals and basins



3

damaged ecosystems

4

unauthorized, confiscated, neglected, vacant vacant buildings and/or settlements

5

abandoned, vacant, underused, dismissed industrial, commercial, militar buildings and/or settlements



6

desertified soils, quarry and unused landfills

7

derelict infrastructures and their interstitial spaces

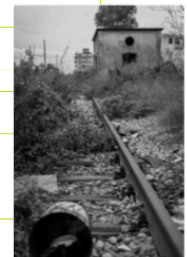
abandoned public facilities

noise landscape



8

operational infrastructure of waste



REPAiR wastescape

Source: Unina Team - Elaboration: Enrico Formato



Peri-urban:

These are “areas where new functions, uses and lifestyles arise as a result of the on-going interaction of urban and rural elements.

They cannot solely be explained as an intensification of urban functions in the rural environment, but have specific spatial and programmatic features that set them apart” (Wandl et al. 2014).



Peri-urban:

Periurban area have not the features of urban compact city, nor the suburban village ones; their features, often unprecedented, are in turn defined as:

- urban sprawl
 - dispersed urban development,
 - wide-spread city,
 - territories in-between,
- and so on.



Aim :

In this framework, this study is aimed to generate the basic assumption for implementing the Geo Design with the living Labs and the life Cycle thinking also for the landscape.

The first assumption to operate this process is to locate the focus area in with a rational and analytical process, identifying the periurban and the wastescapes



The pilot case:

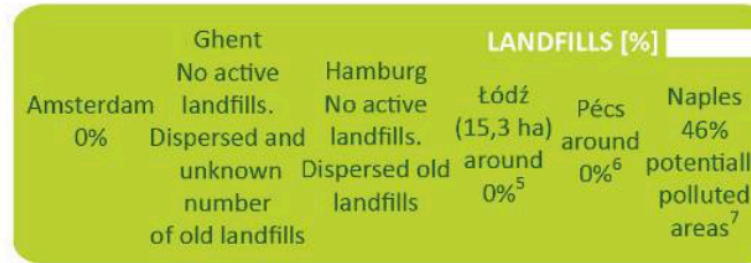
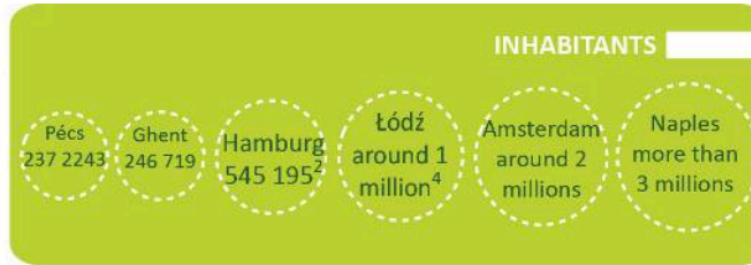
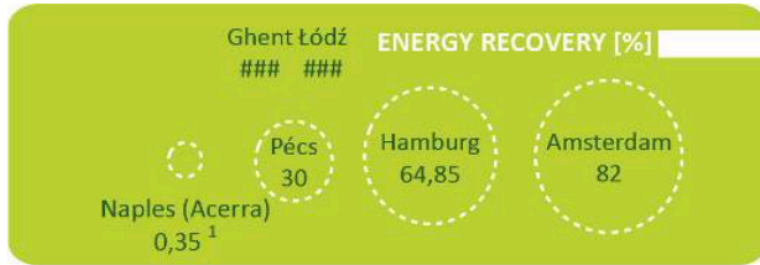
The Metropolitan Area of Naples (MAN)-is highly dense, around 3.0 million inhabitants: the boundaries of the case-study area are delimited by considering the system of transport and ecological linkages, and they contain the larger plain area that reaches the sea, the Regi Lagni to the north east of the city, and the Vesuvius and Campi Flegrei volcanos on opposite borders.

Sadly known as 'Terra dei Fuochi', or 'Land of Fires', the Metropolitan Area of Naples is increasingly losing its former values as a relevant area for agriculture and tourism. The dramatic exploitation, without future, of important agricultural habitats is the emblem of degradation.





There isn't a linear correlation with the dimension



If not specified differently, data are provided by local and regional authorities.

lack of data

1. ISPRA (2014) Urban waste Report - (High Institute for environmental protection and research)
2. Sum Hamburg case study area: District Altona, Free and Hanseatic City of Hamburg, County of Pinneberg, Schleswig-Holstein.
3. Number of inhabitants in the periurban area (156,049 inhabitants in Pécs municipality).
4. Sum of data of Łódź and Łódzki.
5. sum of landfills and illegal dumping sites in Łódź and Łódzki.

6. Active landfills less than 1km², around 0%. Rehabilitated landfills waiting for reuse: 4km², 1,5% of the periurban area.
7. Potentially polluted areas in the Province of Naples. Source: Arpac (2008) Siti Contaminati in Campania, POR CAMPANIA 2000-2006. Available: www.arpaccampania.it [last date of access 15 april 2015].
8. Data about waste per capita in Łódzki.
9. PPS - PURCHUASING POWER STANDARD PER INHABITANT Source: <http://appsso.eurostat.ec.europa.eu/nui/submitView-TableAction.do> [last date of access 15 april 2015].

The focus area:

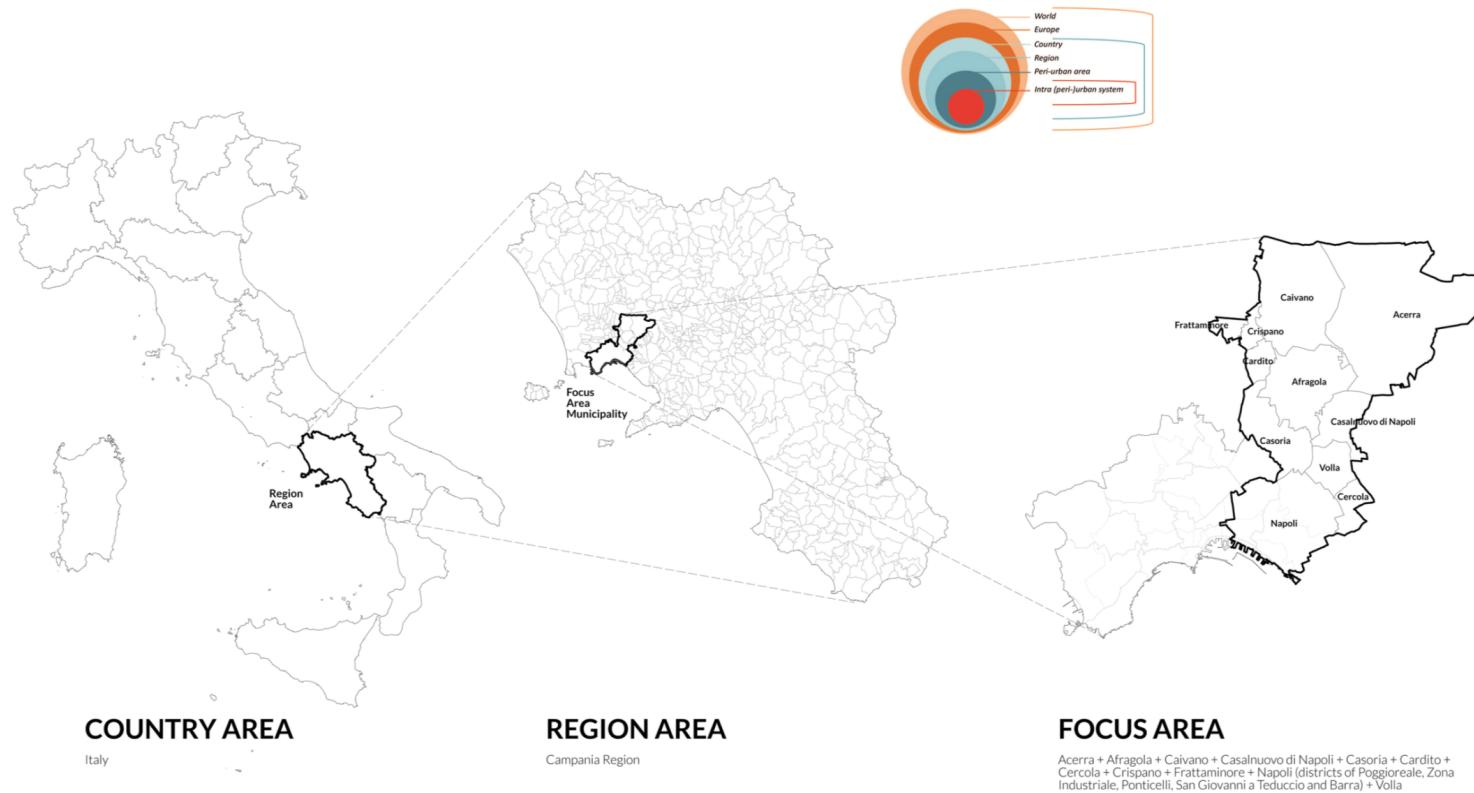
The defined area is an environmental, physical and socio-economic sample for the matter of waste and resource management. As defined in the REPAiR Internal Guidelines, the focus area should be:

- 1) representative sample of the Region area, containing: a) a mix of urban, rural and peri-urban areas, with a dominant share of peri-urban areas; b) wastescapes; c) large infrastructure networks; d) productive areas and logistic platforms.
- 2) a "paradigmatic" area having the value of a model for investigating the problems and challenges and starting to experiment the solutions.
- 3) defined based on administrative borders, sociodemographic and land cover data as well as on qualitative assessments.



The focus area:

The objective of the identification of the focus area is to co-create and test the Eco-innovative Solutions in defined and manageable boundaries, even if their effects may be spread over larger areas (Geldermans B. et al., 2017).



Peri-urban areas analysis: Identify The “City” and “Commuting zone”



Step in methods:

Step 1: Definition and individuation of city

Step 2: Individuation of Commuting zone

Step 3: Individuation Territories in between

Step 4: Peri Urban in the Focus area



Step1: Definition of city

Approach

According with “CITIES IN EUROPE, THE NEW OECD-EC DEFINITION”

Using data from Corine Land Cover 2012, “XV Censimento ISTAT sulla Popolazione” and Administrative boundary in Campania Region:

Step 1.1: All grid cells with a density of more than 1.500 inhabitants per sq km are selected.

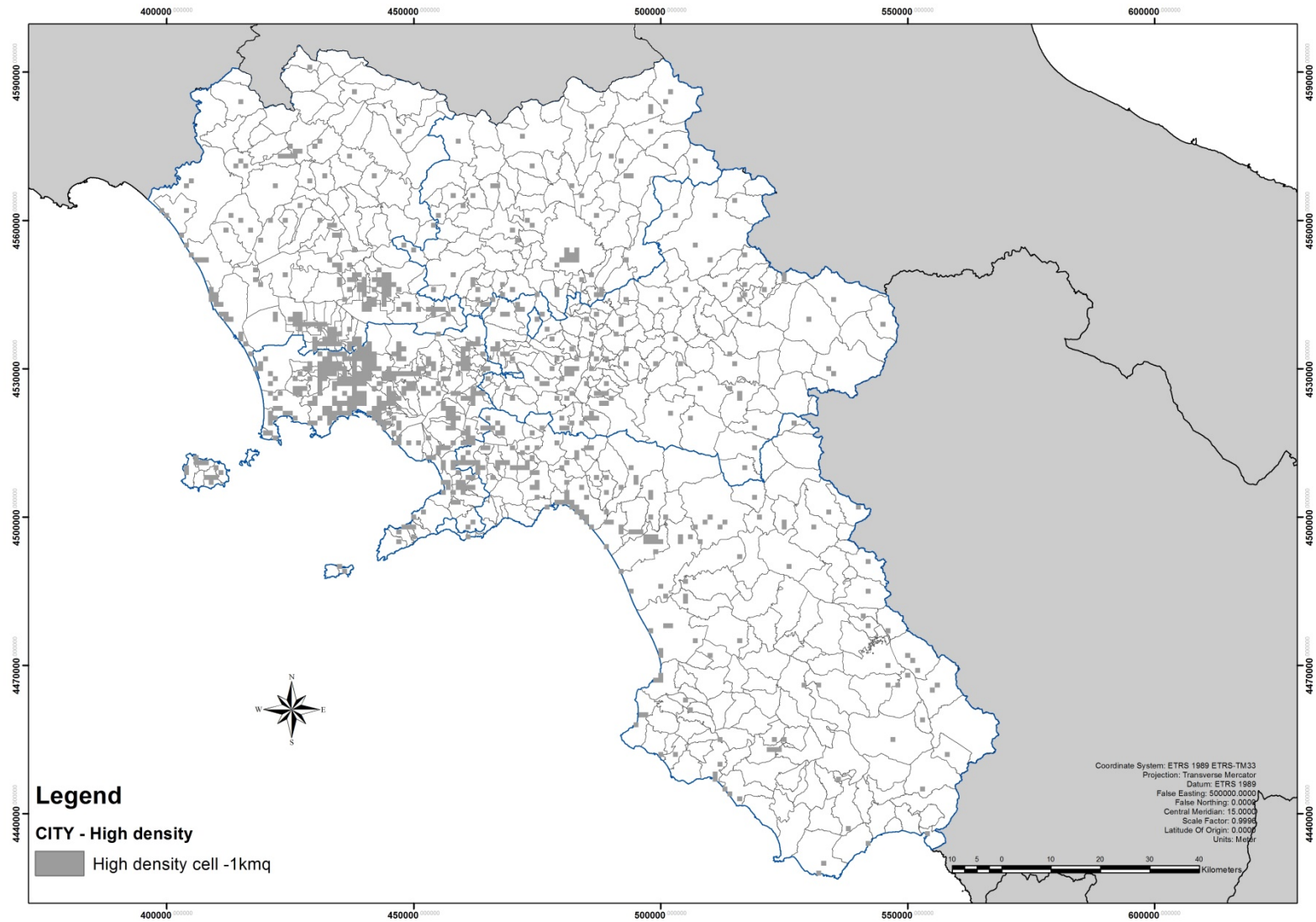
Step 1.2: The contiguous high-density cells are then clustered, gaps are filled and only the clusters with a minimum population of 50.000 inhabitants are kept as an ‘urban centre’.

Step 1.3: All the municipalities (local administrative units level 2 or LAU2) with at least half their population inside the urban centre are selected as candidates to become part of the city.

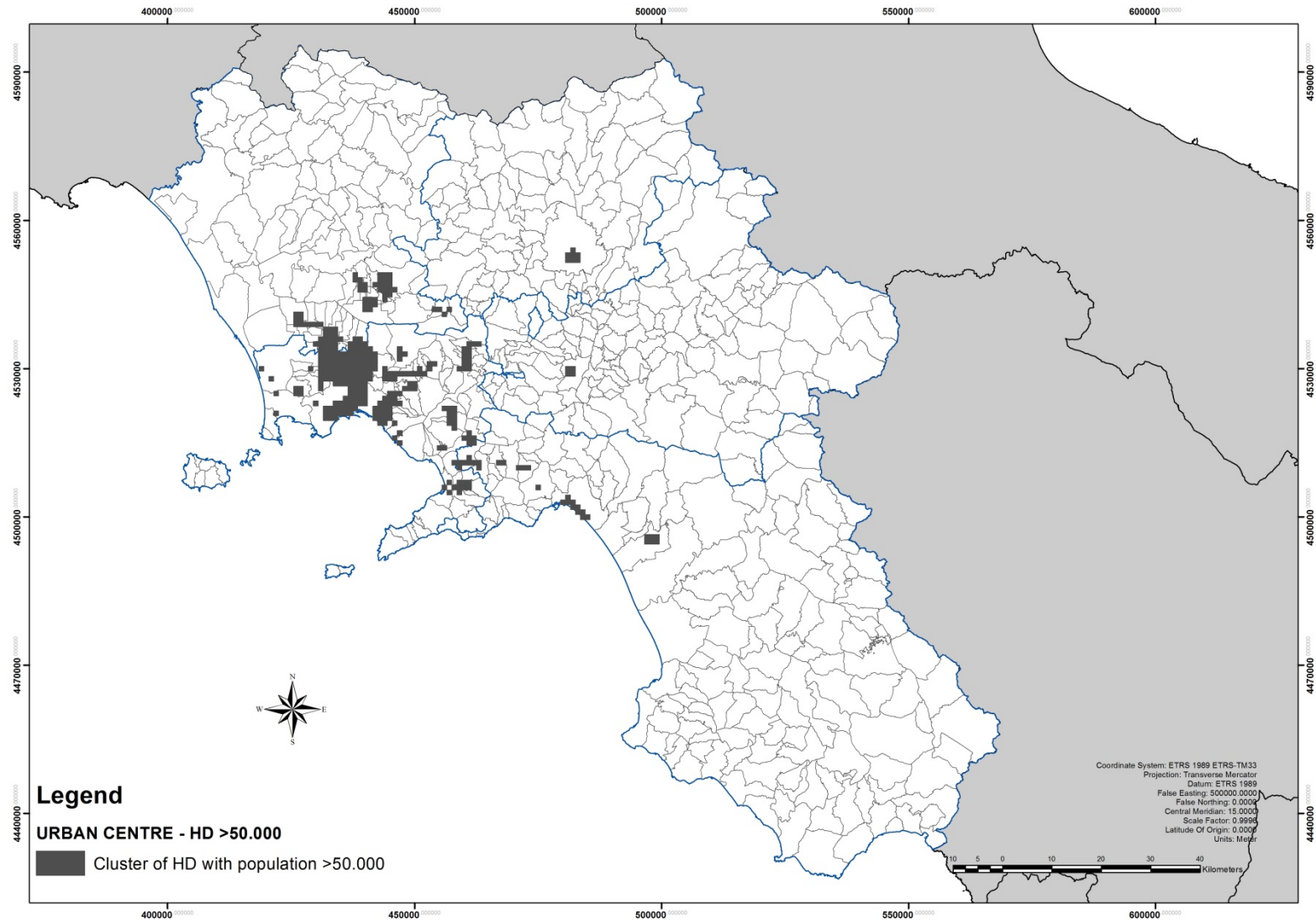
Step 1.4: The city is defined ensuring that 1) there is a link to the political level, 2) that at least 50% of city the population lives in an urban centre and 3) that at least 75% of the population of the urban centre lives in a city.



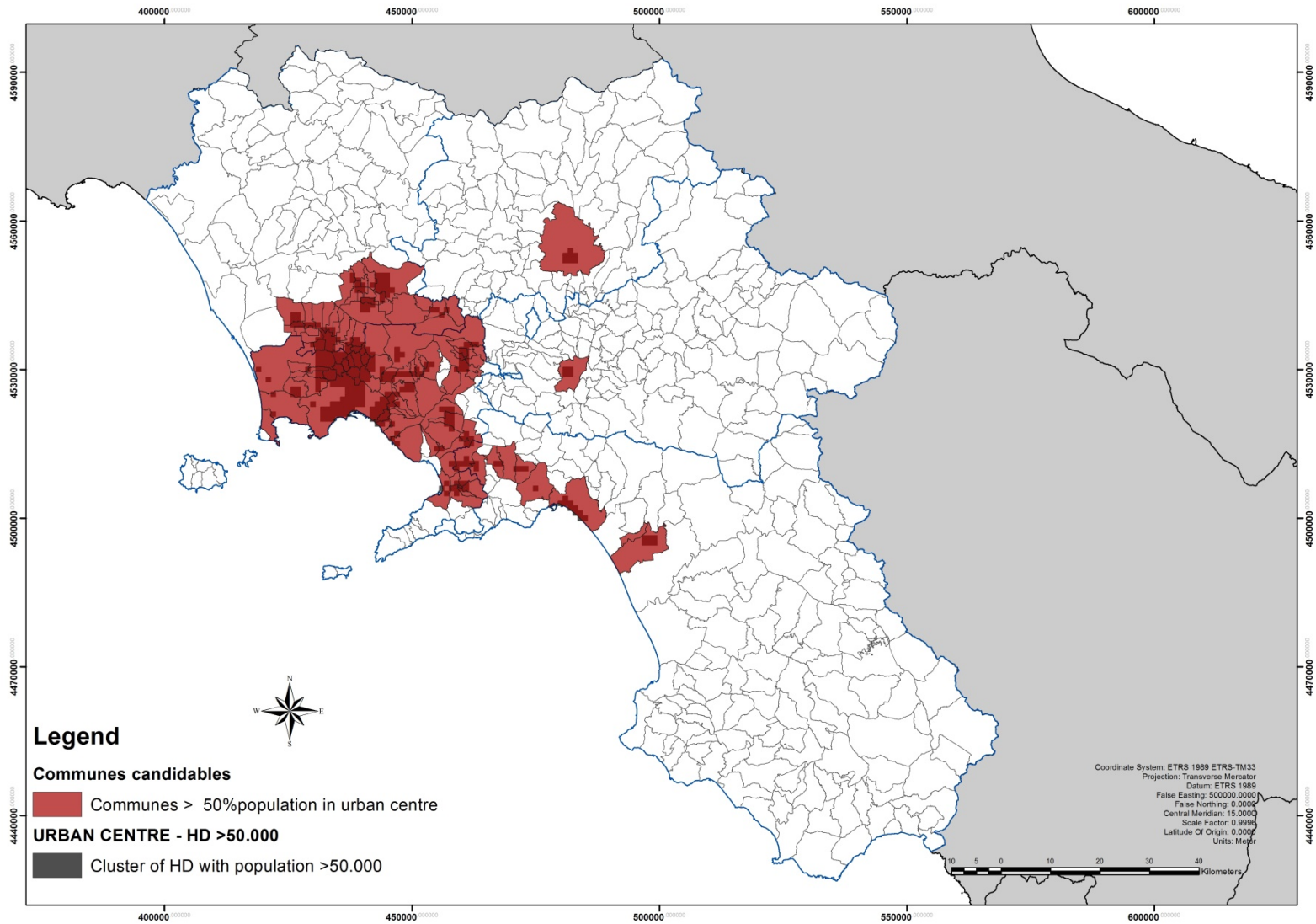
Step 1.1: Grid cells with a density of more than 1.500 inhabitants per sq km



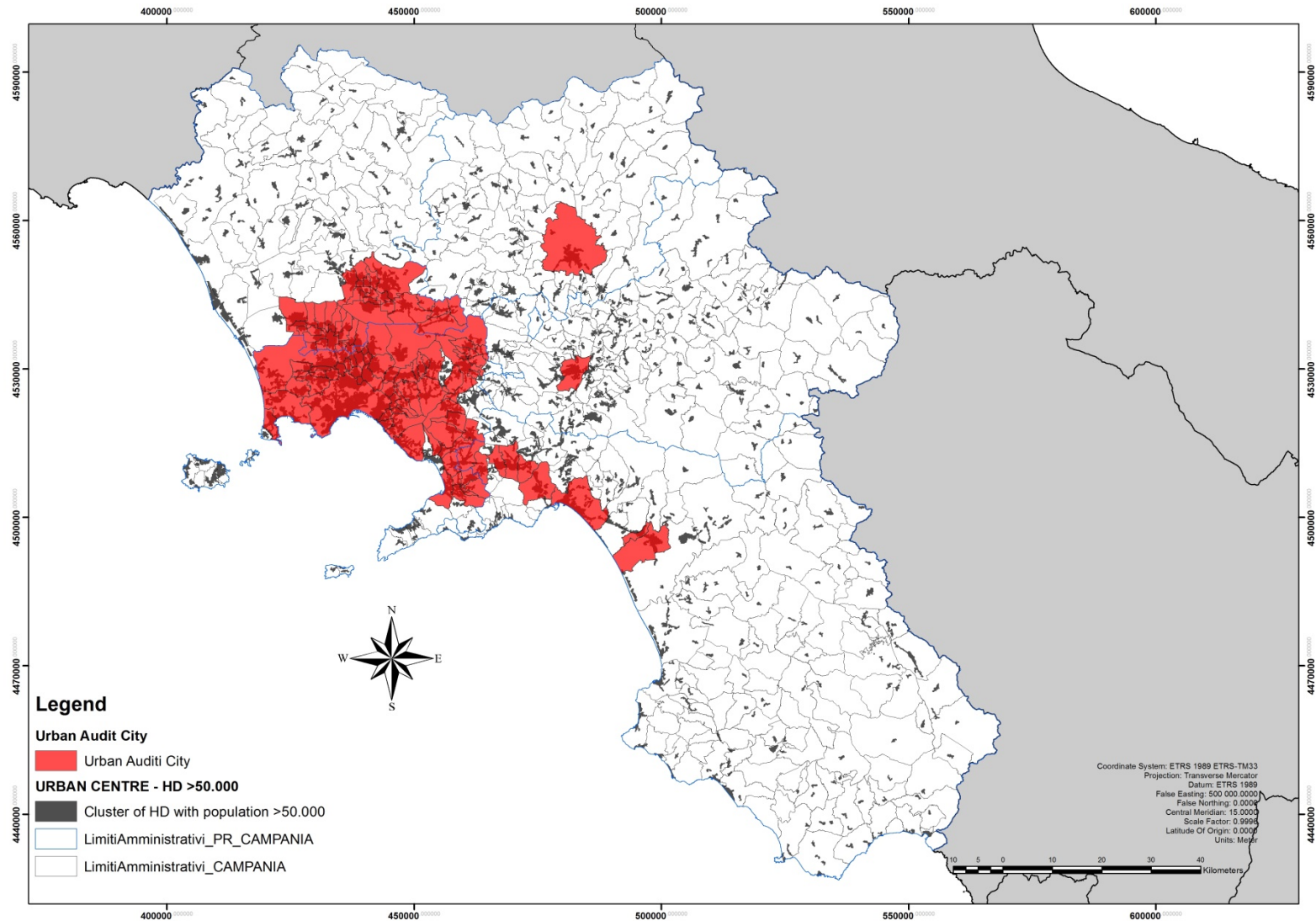
Step 1.2: Contiguous high-density cells (Gaps filled and clusters with a minimum population of 50.000 inhabitants)



Step 1.3: Municipalities with at least half their population inside the urban centre



Step 1.4: City definition (ensuring a link at political level, at least 50% of the population lives in a urban centre and at least 75% of the population of the urban centre lives in the **Urban Audit city)**



Step 2: Definition of commuting zone

Approach

According with “CITIES IN EUROPE, THE NEW OECD-EC DEFINITION”

Using data from Corine Land Cover 2012, “XV Censimento ISTAT sulla Popolazione” and Administrative boundary in Campania Region:

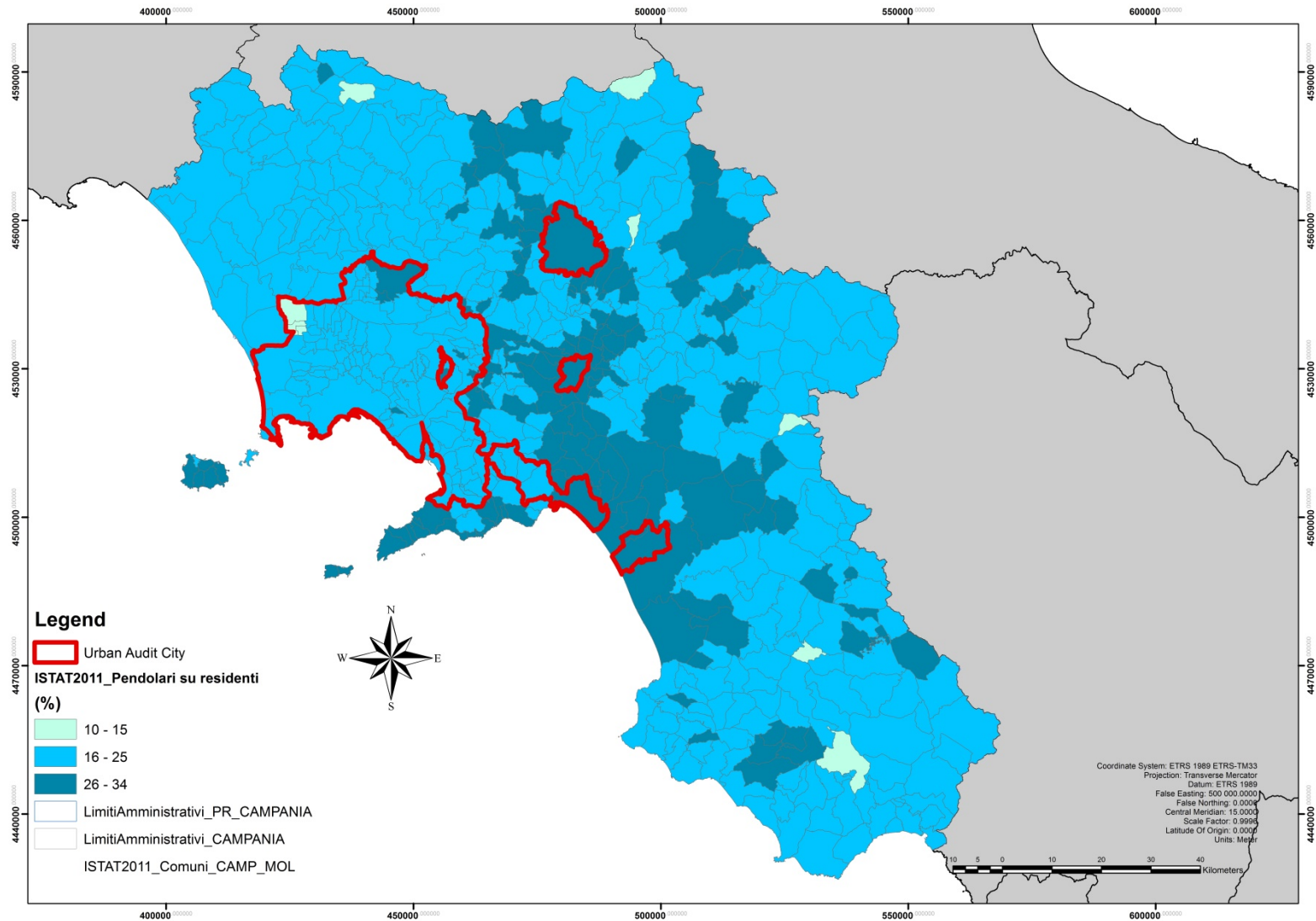
Step 2.1 If less than 15% of employed persons living in one city work in another city, these cities are treated as a **single city**.

Step 2.2 All municipalities with at least 15% of their employed residents working in a city are identified

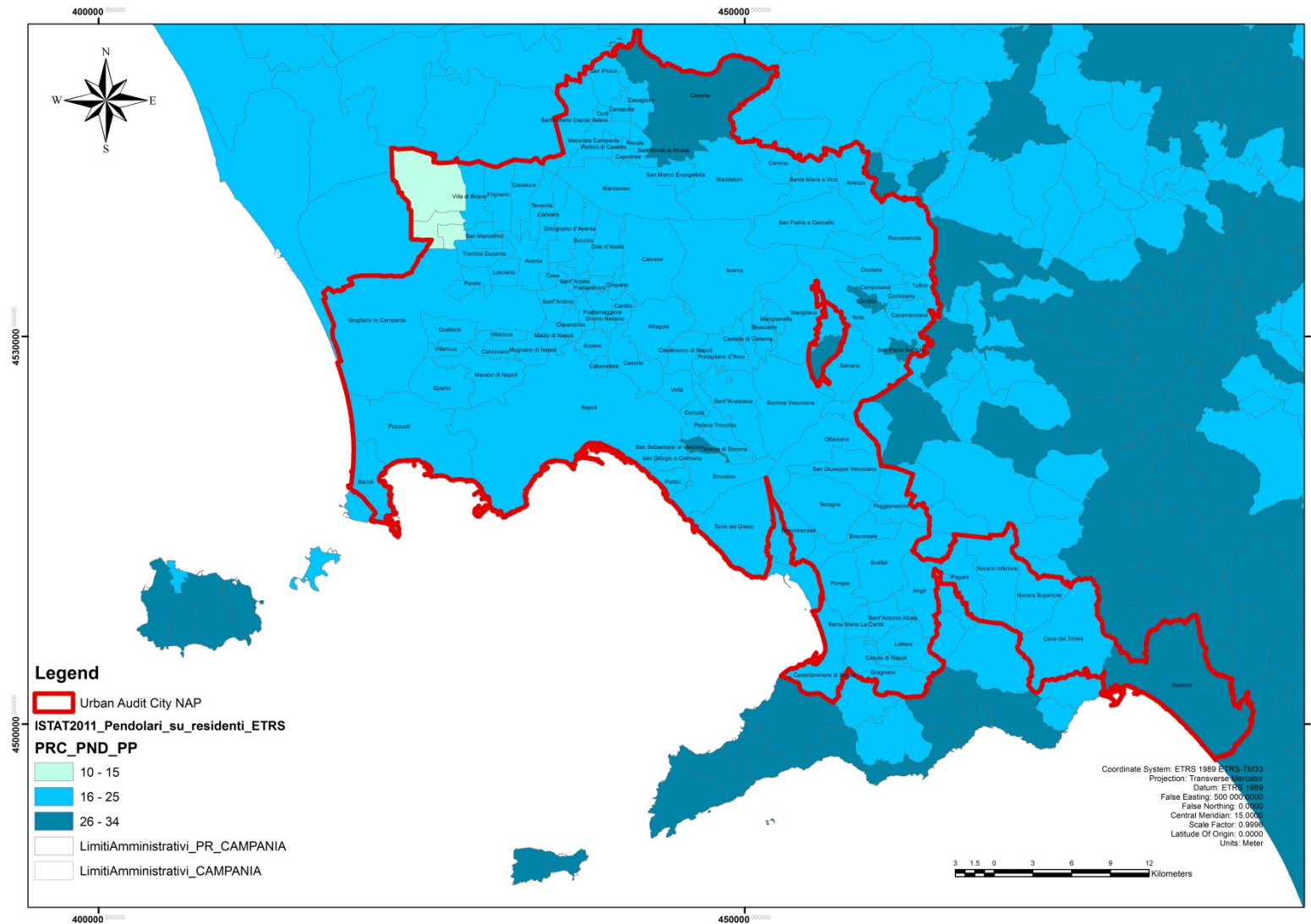
Step 2.3 Municipalities surrounded by a single functional area are included and non-contiguous municipalities are dropped



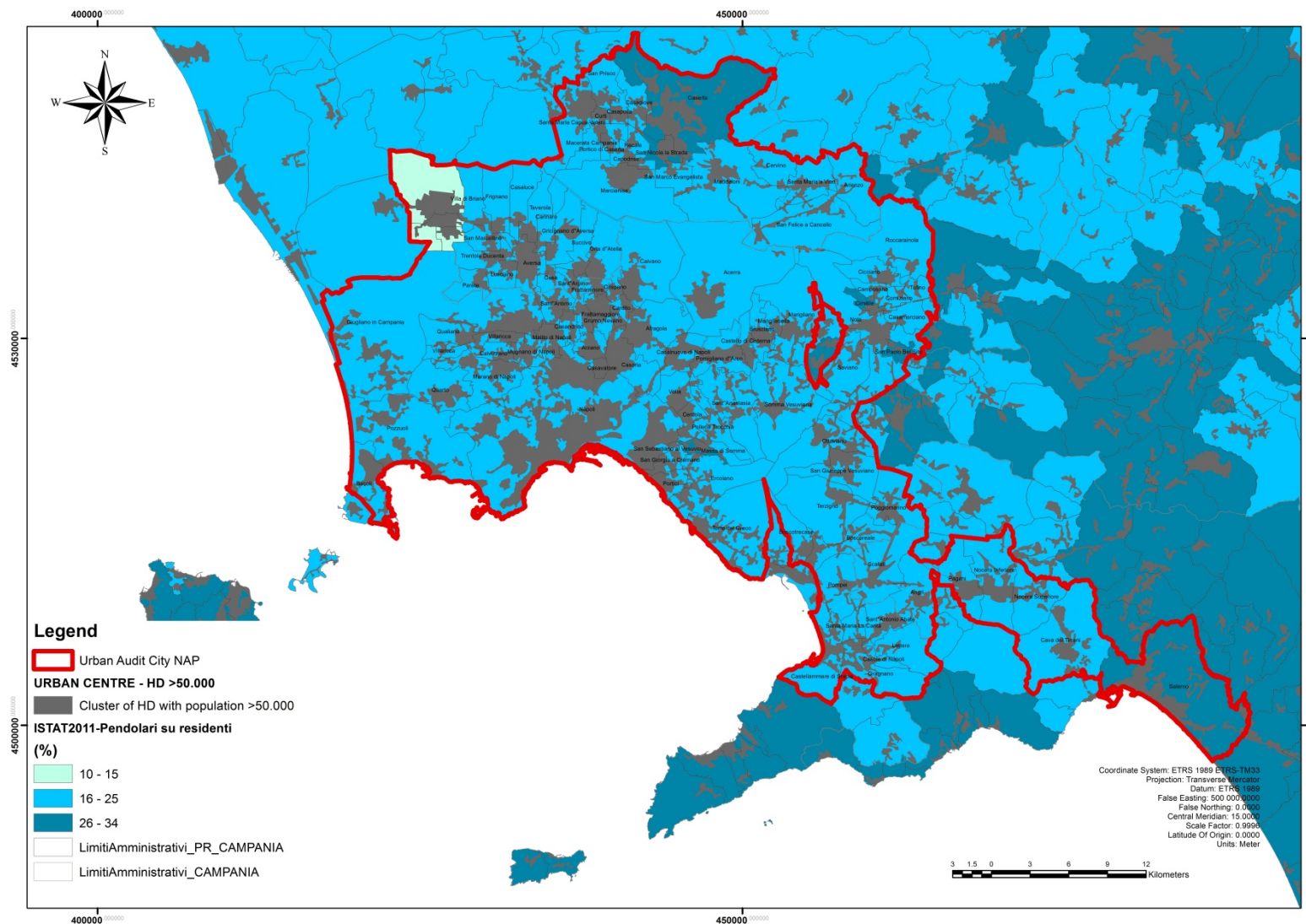
Step 2.1: Percentage of employed persons living in one city, that work in another city (source Istat)



Step 2.1: Percentage of employed persons living in one city, that work in another city (focus on Urban Audit City)

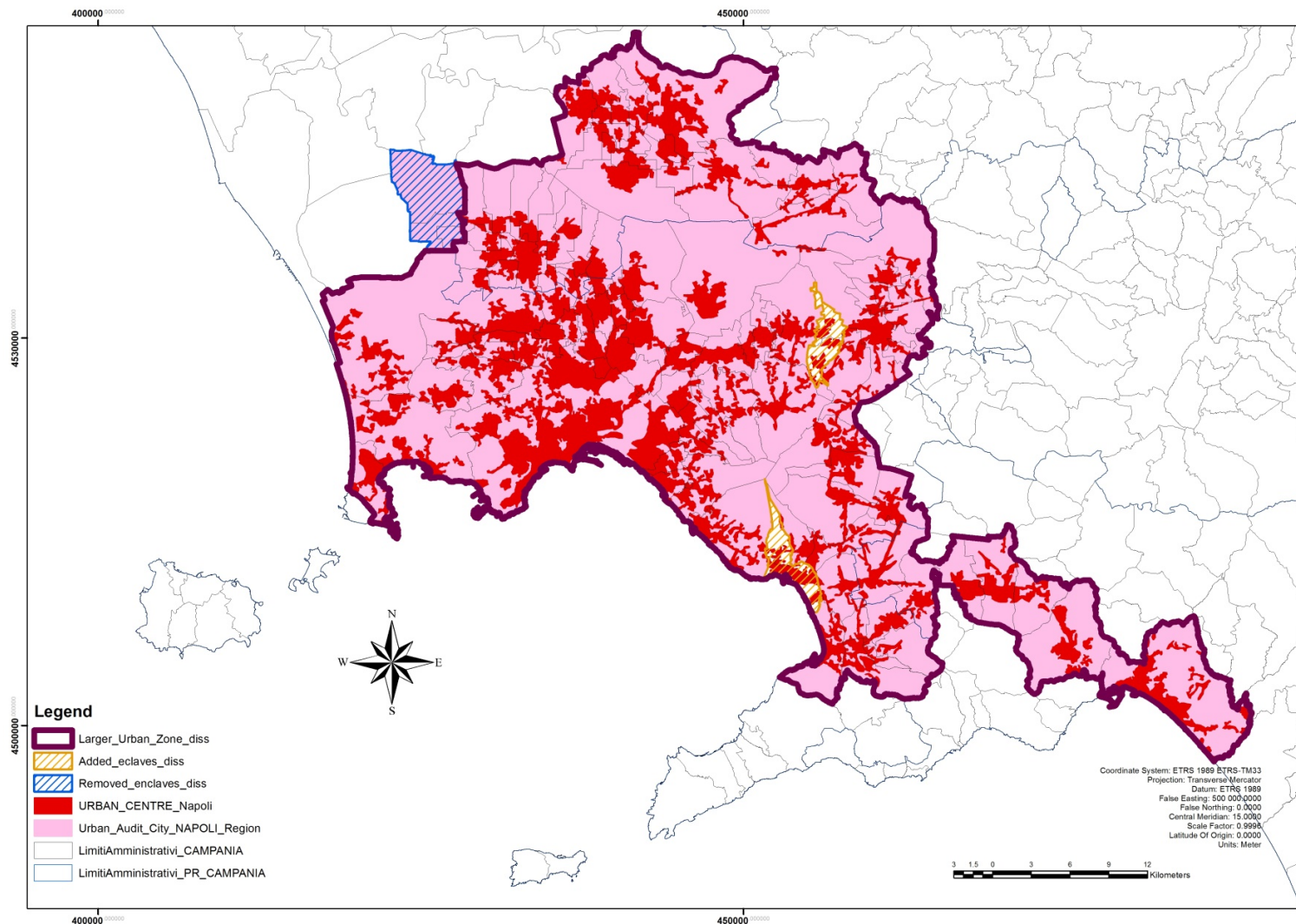


Step 2.1: If less than 15% of employed persons living in one city work in another city these cities are treated as a **single city** (the case of the municipality in light blue in NW of the Red contour)



Step 2.2: All municipalities with at least 15% of their employed residents working in a city are identified

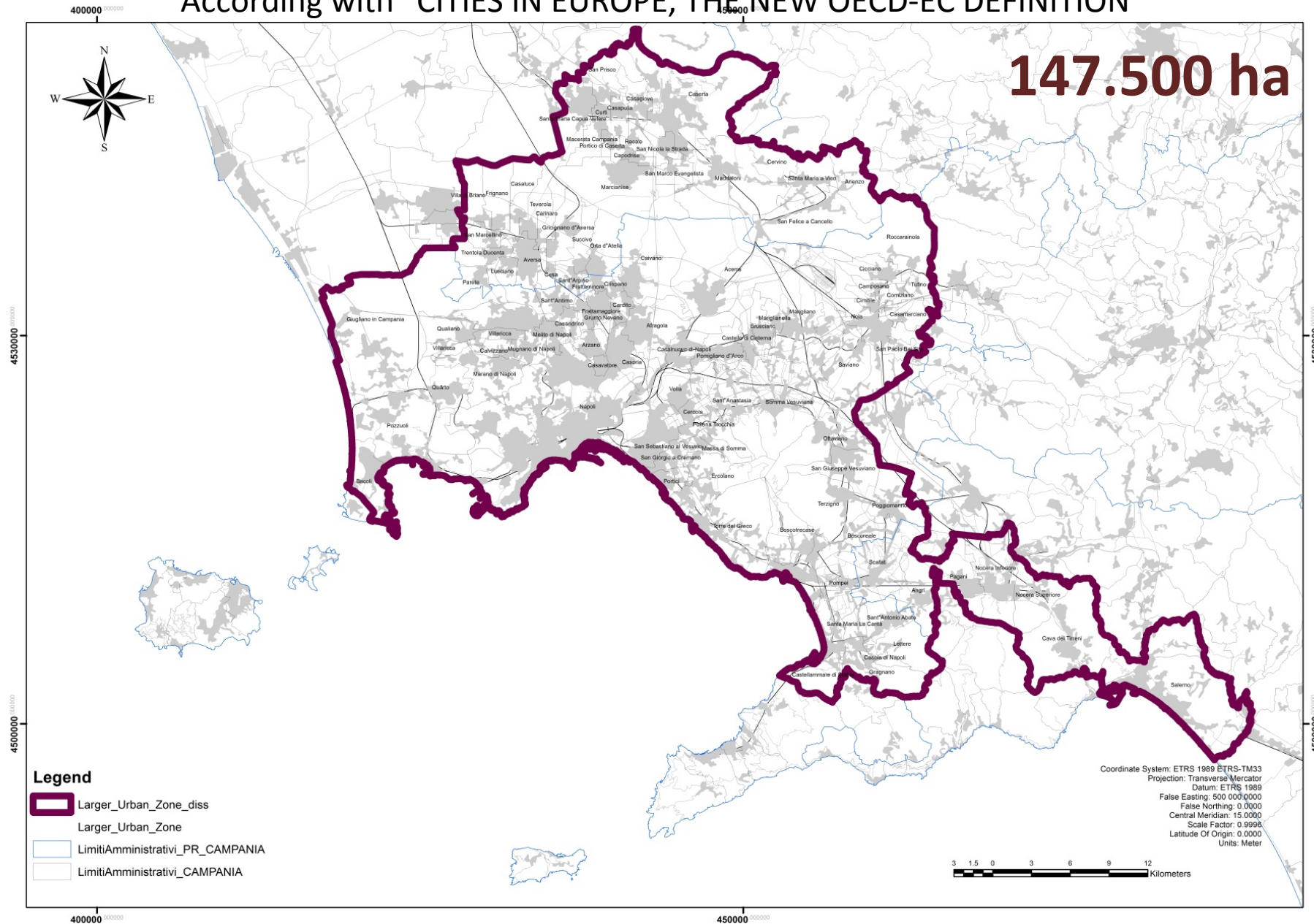
Step 2.3 Municipalities surrounded by a single functional area are included and non-contiguous municipalities are dropped



Step 2: COMMUTING ZONES

According with "CITIES IN EUROPE, THE NEW OECD-EC DEFINITION"

147.500 ha



Step 3: Individuation Territories in Between TiB

Approach: according to A. Wandl, V. Nadina, W. Zonneveldb, R. Rooija Beyond Urban-Rural Classification: Characterizing and mapping territories-in-between across Europe. Landscape and Urban planning, (130), pp 50-63

Approach based on the “**maximum population density**” statistical indicator that includes the **working population** as an additional demographic indicator, **together with the resident population**. The dataset is therefore the commuting zone considering the resident population and the working population

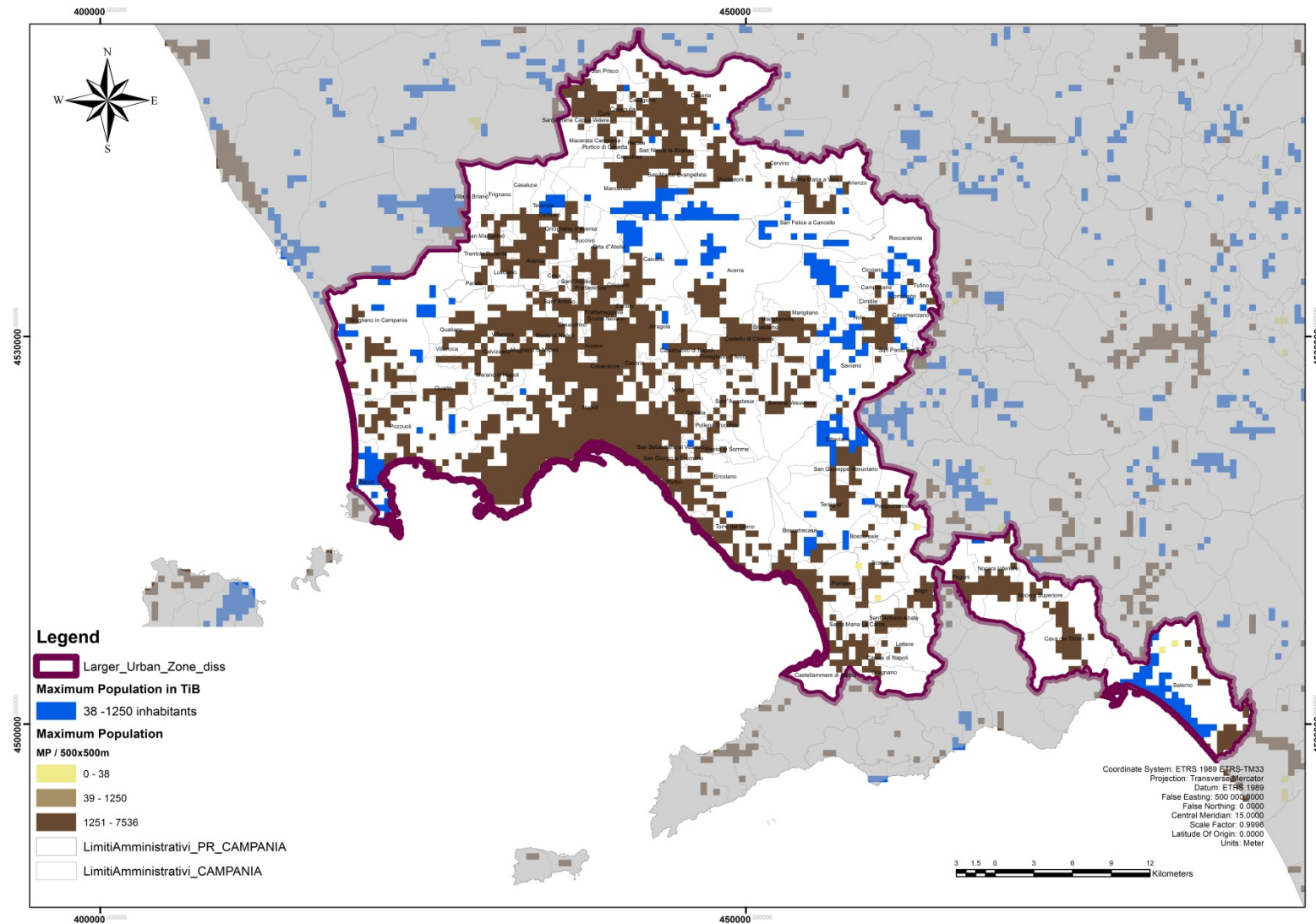
Step 3.1: Dividing the area into **500x500m** grid cells and selecting those grid cells with a maximum population **density** that is **characteristic** for territories-in-between (150-5000 In/km²)

Step 3.2: Adding those grid cells, with a maximum rural population that spatially overlap with typical **infrastructures and services**

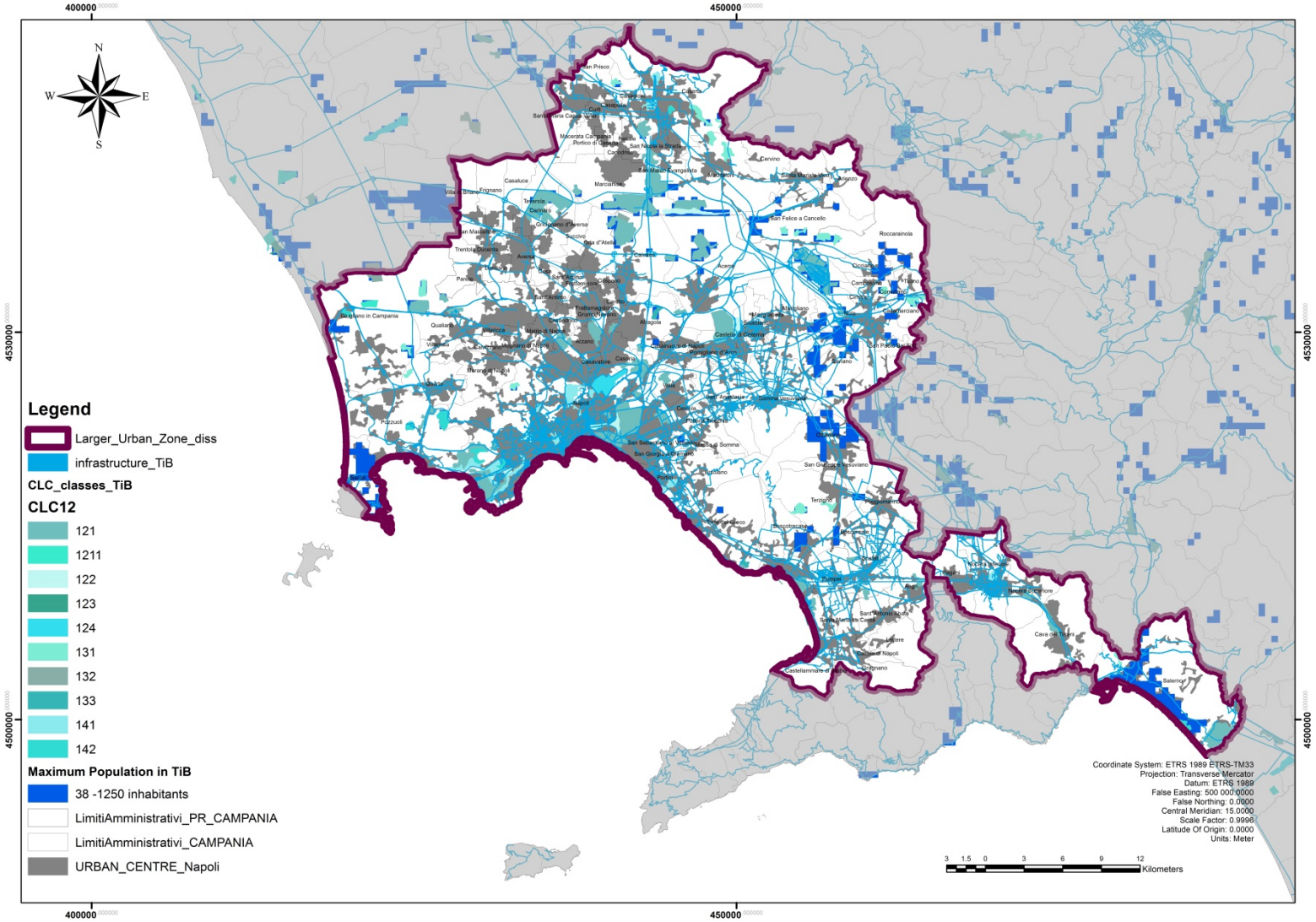
Step 3.3: Subtracting those grid cells with a Territories-in-between corresponding maximum population that are not characterized by the intermingling of built and open landscape pattern



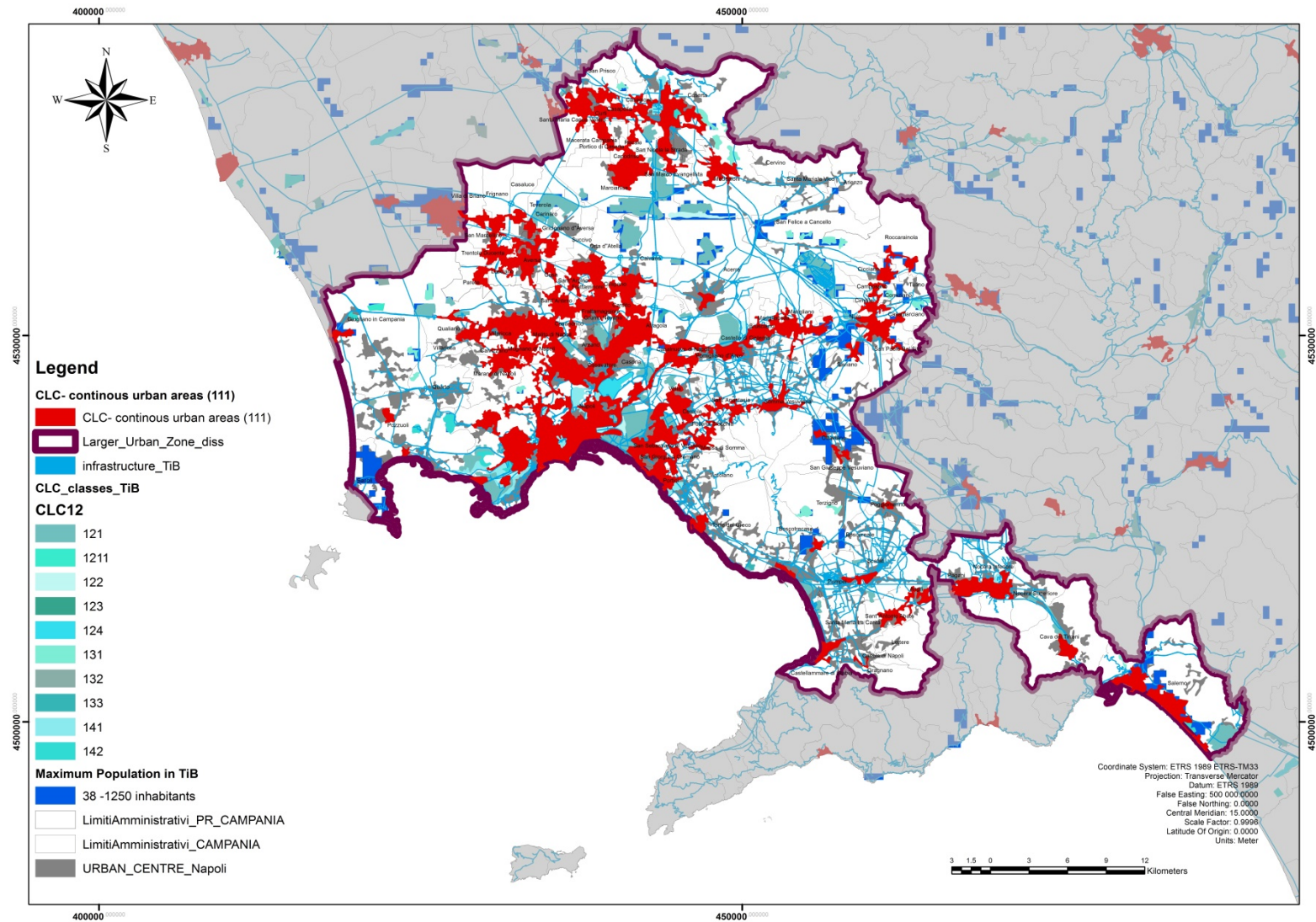
Step 3.1: Grid Cells (500*500 m) with “Maximum Population density” indicator. In Blue the Grid cells with a maximum population density characteristic (38-1250) for Territories in Between (Value in the range 38-1250 are equivalent to 150-5000 Maximum Population per square km)



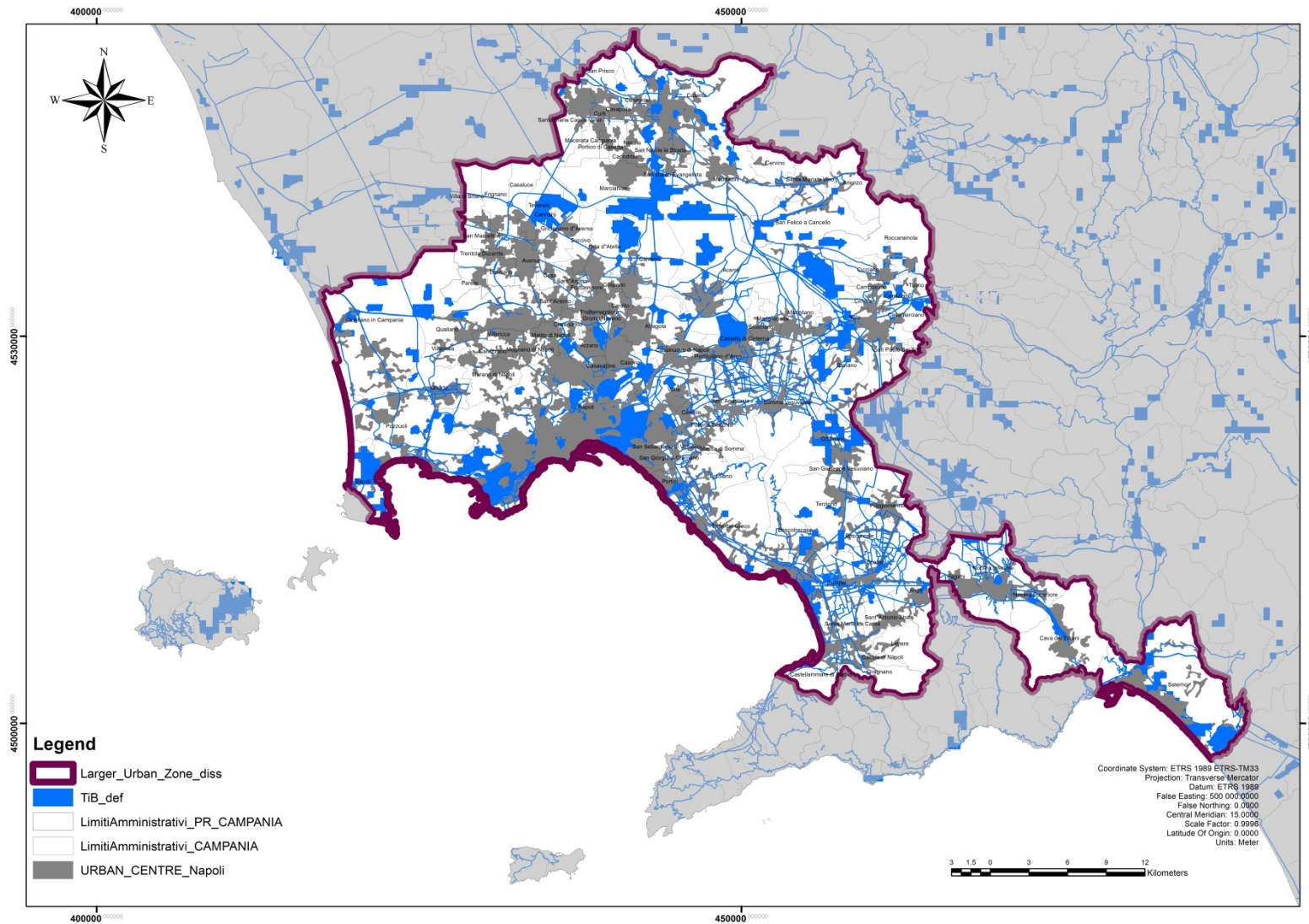
Step 3.2: Blue grid cells overlapped with typical infrastructures and services



Step 3.3: Subtracting those grid cells that are not characterized by the intermingling of built and open landscape pattern (111 CLC12 class)



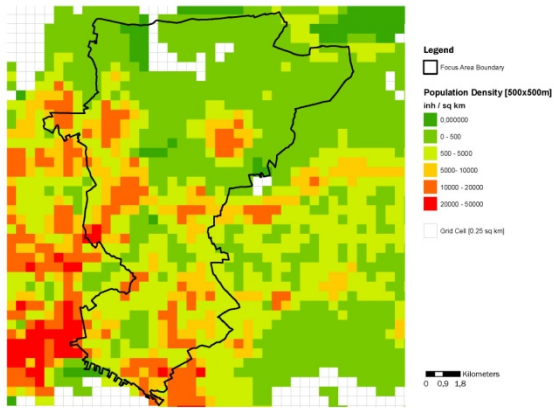
Step 3: Territories-in-between



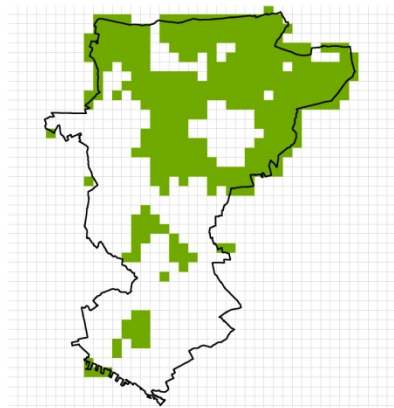
Step 4: Peri Urban in the Focus area

We have also tested a further approach consisting in increasing for Territories in Between the “population density range”, from 150-5000 inh/km² to 500-10000 inh/km², due to the specific feature of the Metropolitan Area of Naples



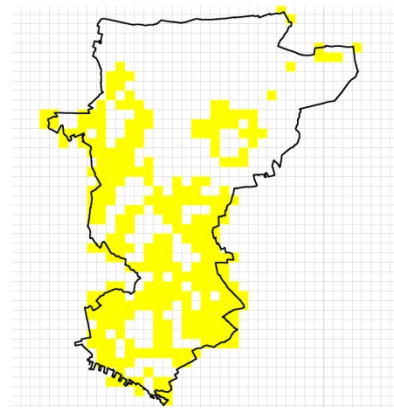


PD
population density



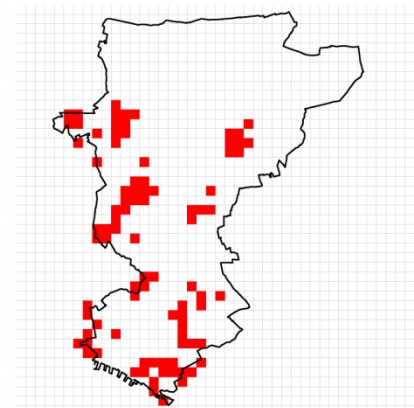
PR
predominantly rural

< 500 inh/sq km
87.25 sq km
4982 inh



IN
intermediate

>= 500 AND <= 10000 inh/sq km
75.75 sq km
286822 inh



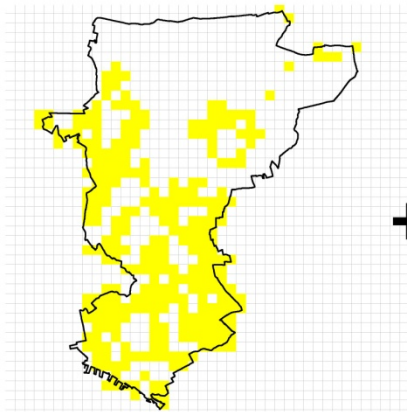
PU
predominantly urban

> 10000 inh/sq km
22.25 sq km
311156 inh

Urban - rural classification. Source: UNINA team

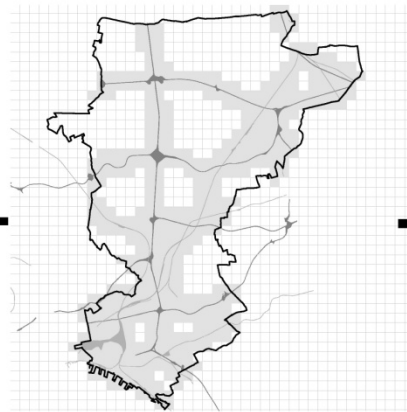
Elaboration: Pasquale Inglese





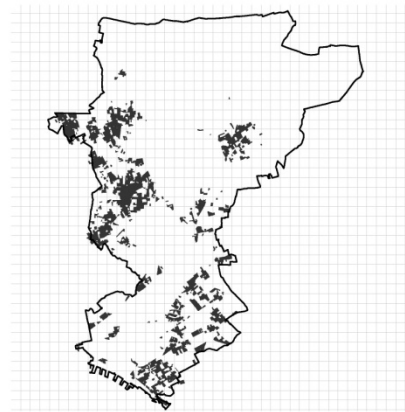
IN
intermediate

+



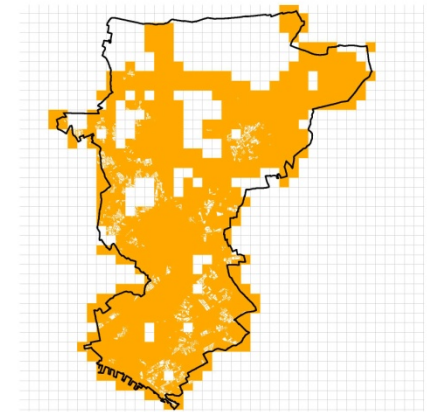
INFRA
road and rail network

-



CUF
continuous urban fabric

=



Peri-Urban
draft analysis

Peri-urban areas identification. Source: UNINA team

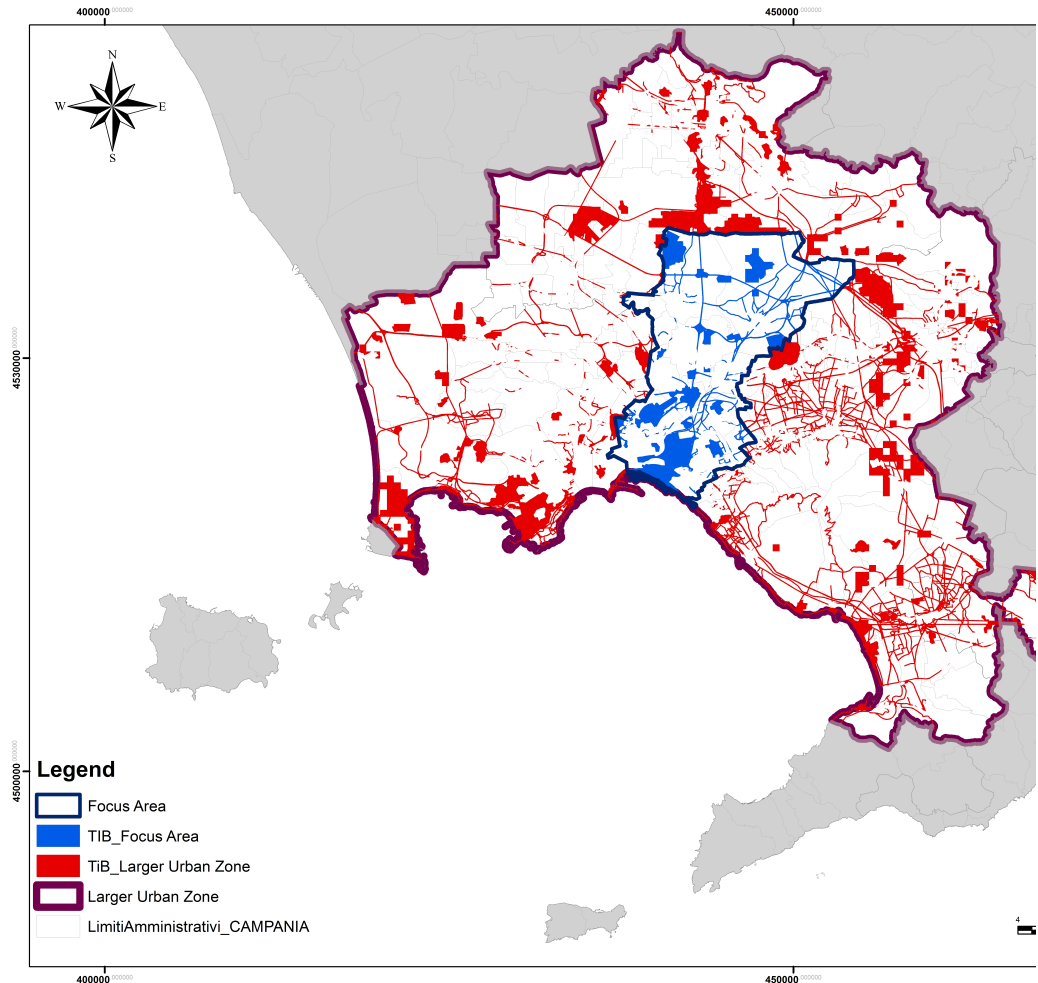
Elaboration: Pasquale Inglese



Results and discussion:

The main results are related to the definition of the focus area, including its spatial requirements that have been proved in the Naples case-study area. Such area is defined by:

- High density, sprawl and lack of public spaces.
- High amount of in-between spaces, abandoned and disused areas in central and peri-urban areas clearly connected with waste management.
- The need of recovering the value of former agricultural land in peri-urban areas, now used as landfills and contaminated, hence connected with illegal dumping and waste management.



Results and discussion

For the Focus area:

- Focusing on the in between areas
- Rethinking the waste cycle: mapping existing wasted landscapes AND mapping existing waste flows
- Organizing the living labs
- Provide experiences for Geo Design according to the REPAiR model



Main results

Key elements for the further approach

- The existence of some key spaces 'in transition' (the eastern part of Naples, the fringe area of Casoria and Afragola, the vast plain around Caivano or Acerra).
- This combination of 'stand-by-spaces' ended their lifecycle: they are spaces with a strong potentiality for urban regeneration.
- Different temporal cycles co-existing in the focus area.
- Residual rural-scapes that could be immediately re-used to create a network to connect the urban fabric through a green network of temporary uses



Thanks for your kind attention



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