

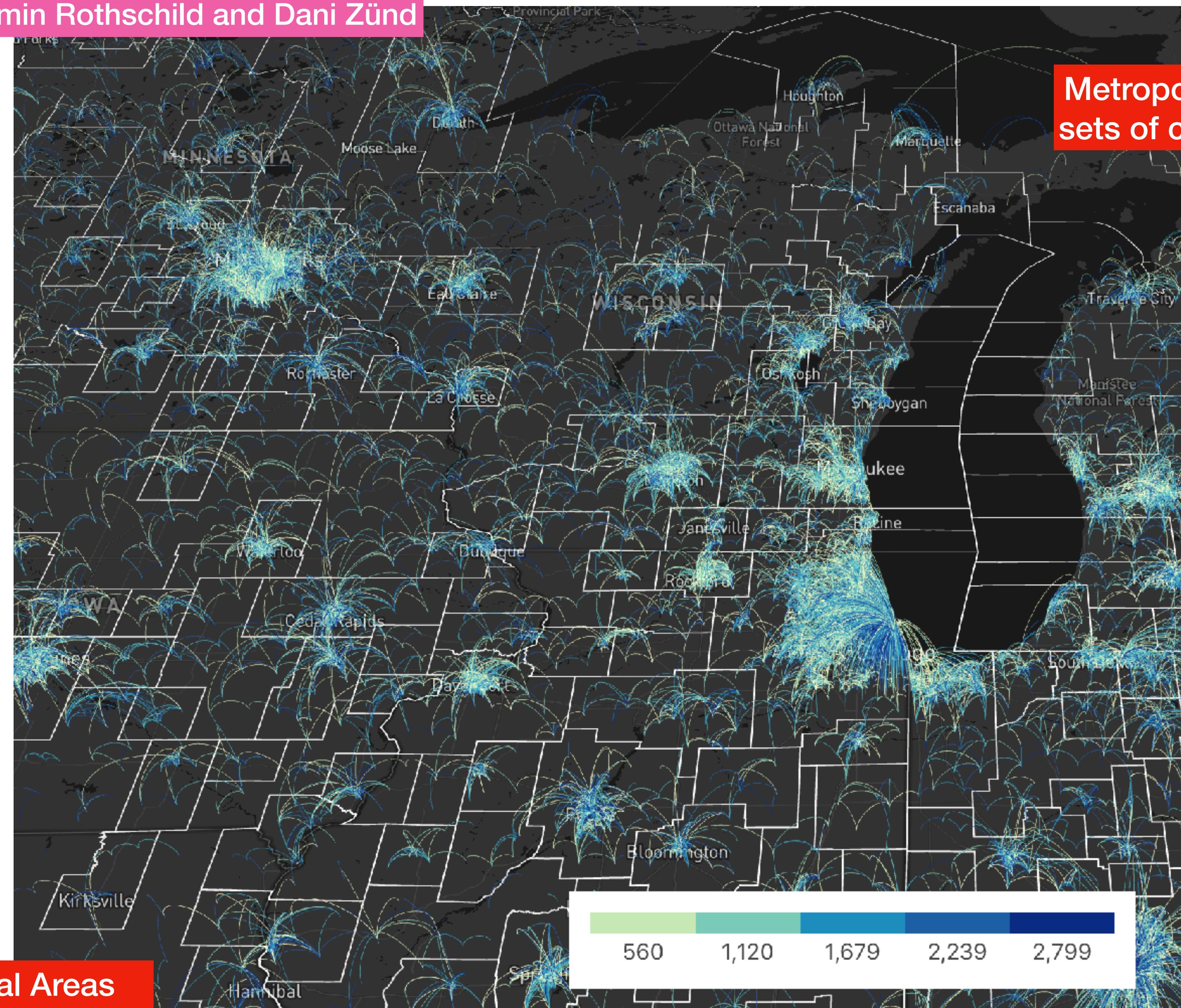
Lecture 5

5.2 Defining Functional Cities as Networks

IUS 2.3.3

What do we mean by a **city?**

credit: Benjamin Rothschild and Dani Zünd



Metropolitan Statistical Areas
sets of counties, pop > 50,000

Micropolitan Statistical Areas
sets of counties, 10K < pop < 50K

<https://lehd.ces.census.gov/data/#lodes>

Data 2002-2021

GENERALIZATION OF THE METROPOLITAN AREA CONCEPT

Brian J.L. Berry, University of Chicago

This paper presents a brief overview of a study undertaken at the Center for Urban Studies of the University of Chicago for the Committee on Areas for Social and Economic Statistics of the Social Science Research Council, under a contract between the Council and the Bureau of the Census, U. S. Department of Commerce. The study's purposes were:

- "(to) conduct an examination of existing principles of area classification for Standard Metropolitan Statistical Areas, and an examination of alternative criteria, such as the concept of Functional Economic Areas, in order to formulate new principles of area classification."
- "(to) examine the effect of applying alternative criteria of integration of central cities and their outlying areas in the delineation of Standard Metropolitan Statistical Areas and their relationship to other classification systems."
- "(to) classify the entire United States

system of area classification. This marked the first use by the Bureau of the Census of a unit other than the corporate boundaries of a city for reporting data on urban population. The Metropolitan District of 1910, defined for every city of over 200,000 inhabitants and reapplied with little alteration by the Bureau of the Census in 1920, 1930 and 1940, served basically to distinguish urban population, whether located within the central city or adjacent to it, from surrounding rural population. The idea behind the definition was in essence that stated in 1932:

" . . . the population of the corporate city frequently gives a very inadequate idea of the population massed in and around that city, constituting the greater city, . . . and (the boundaries of) large cities in few cases . . . limit the urban population which that city represents or of which it is the center . . . If we are to have a correct picture of the massing or concentration of population in extensive urban areas . . . it is necessary to establish metropolitan districts which will show the magnitude of each of the principal population centers."

The Journey-to-Work Evidence of 1960

Analysis of the small area commuting data collected as part of the 1960 census shows that a set of urban realms in fact constitutes the nation's functional economic areas. This finding leads to proposals for a revised area classification that lends itself to a range of practical applications within the framework of emerging national urban policy.

In 1960, you will recall that for the first time, the Census of Population and Housing included a question to determine the commuting behavior of the population of the United States.

Item P 28 of the Household Questionnaire read:

P28. What city and county did he work in last week?

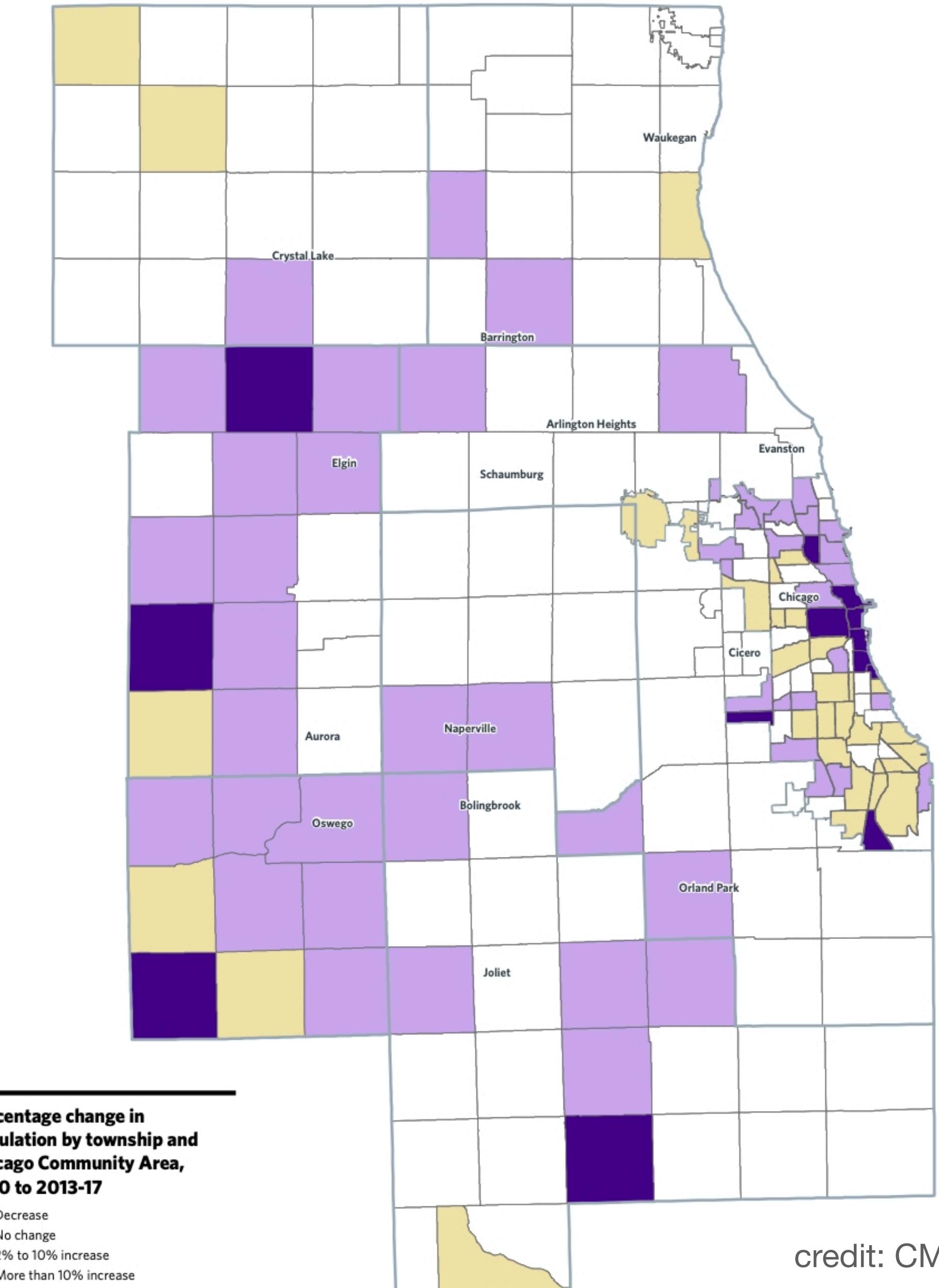
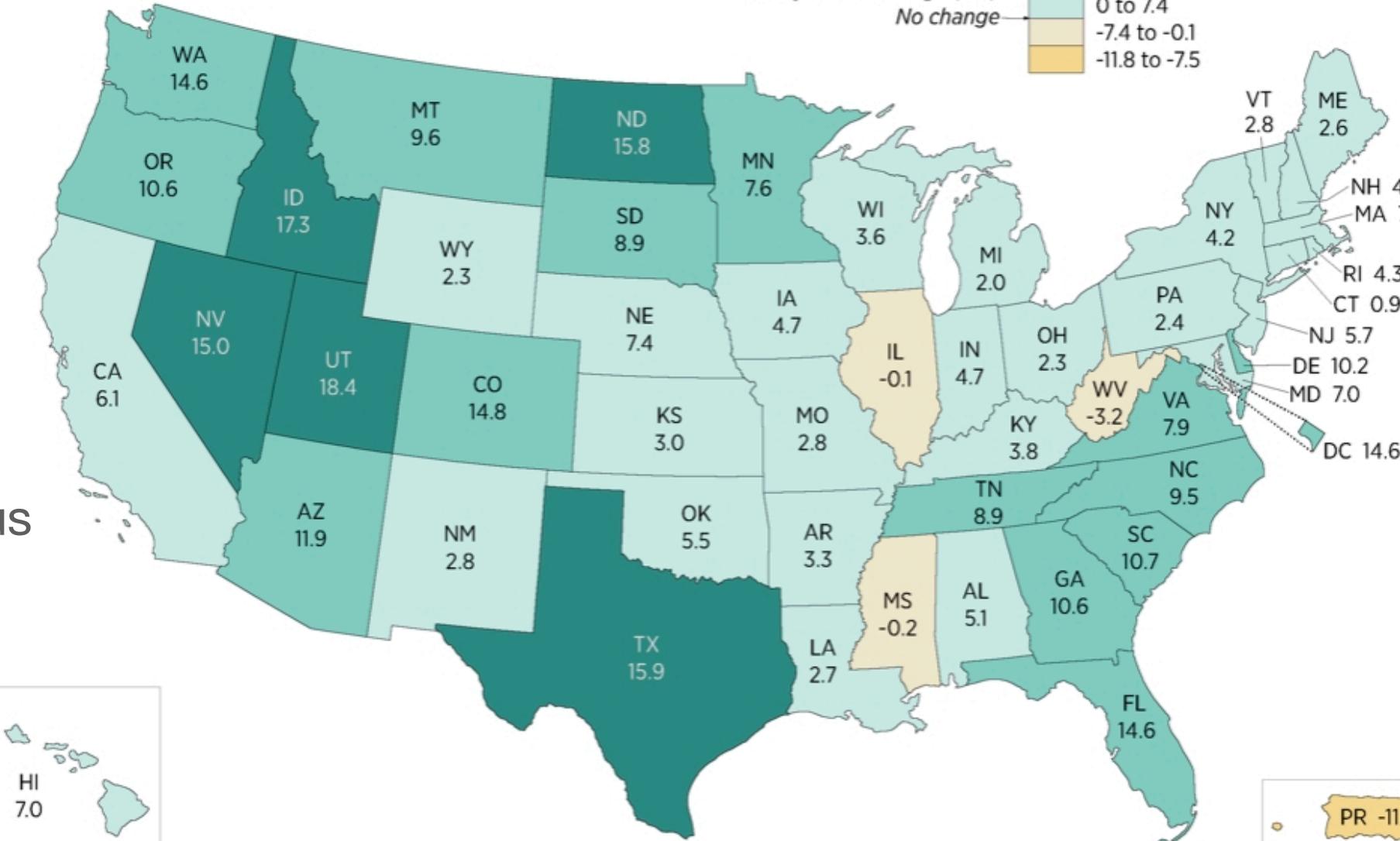
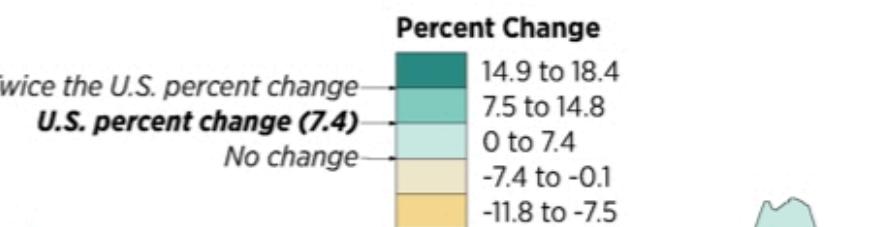
Individual and household data were assembled into totals for each of the country's 43,000 Standard Location Areas.

2020 Census: Percent Change in Resident Population for the 50 States, the District of Columbia, and Puerto Rico: 2010 to 2020

APRIL 27, 2021



Percent Change in Resident Population for the 50 States, the District of Columbia, and Puerto Rico: 2010 to 2020



Note: No change is defined as either a population change of fewer than 100 individuals or an increase or decrease of less than two percent.

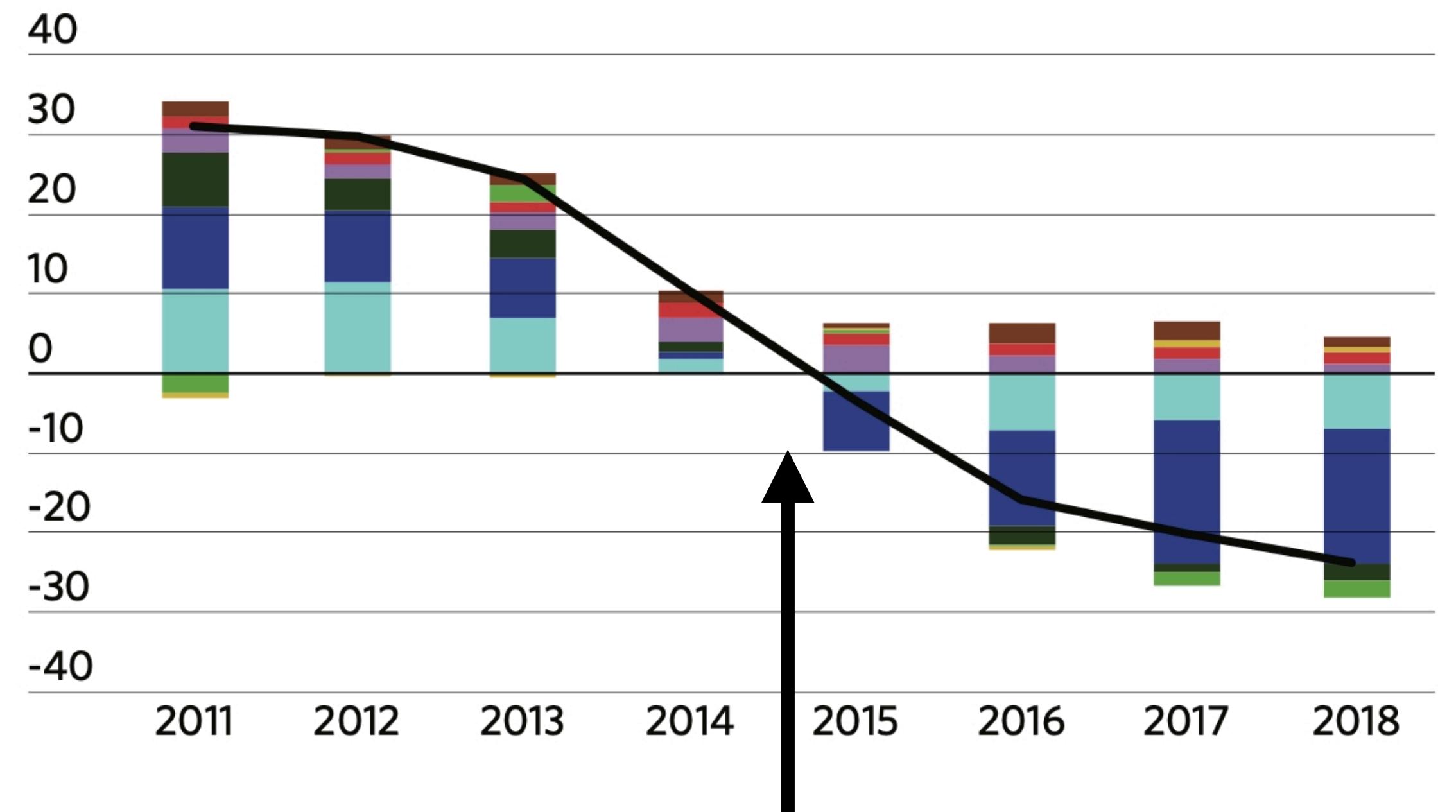
Source: Chicago Metropolitan Agency for Planning analysis of 2010 Decennial data and American Community Survey data, five-year estimates, 2013-17.

credit: CMAP

credit: US Census

Annual population change in the Chicago Metropolitan Agency for Planning region, by county, in thousands, 2011-18

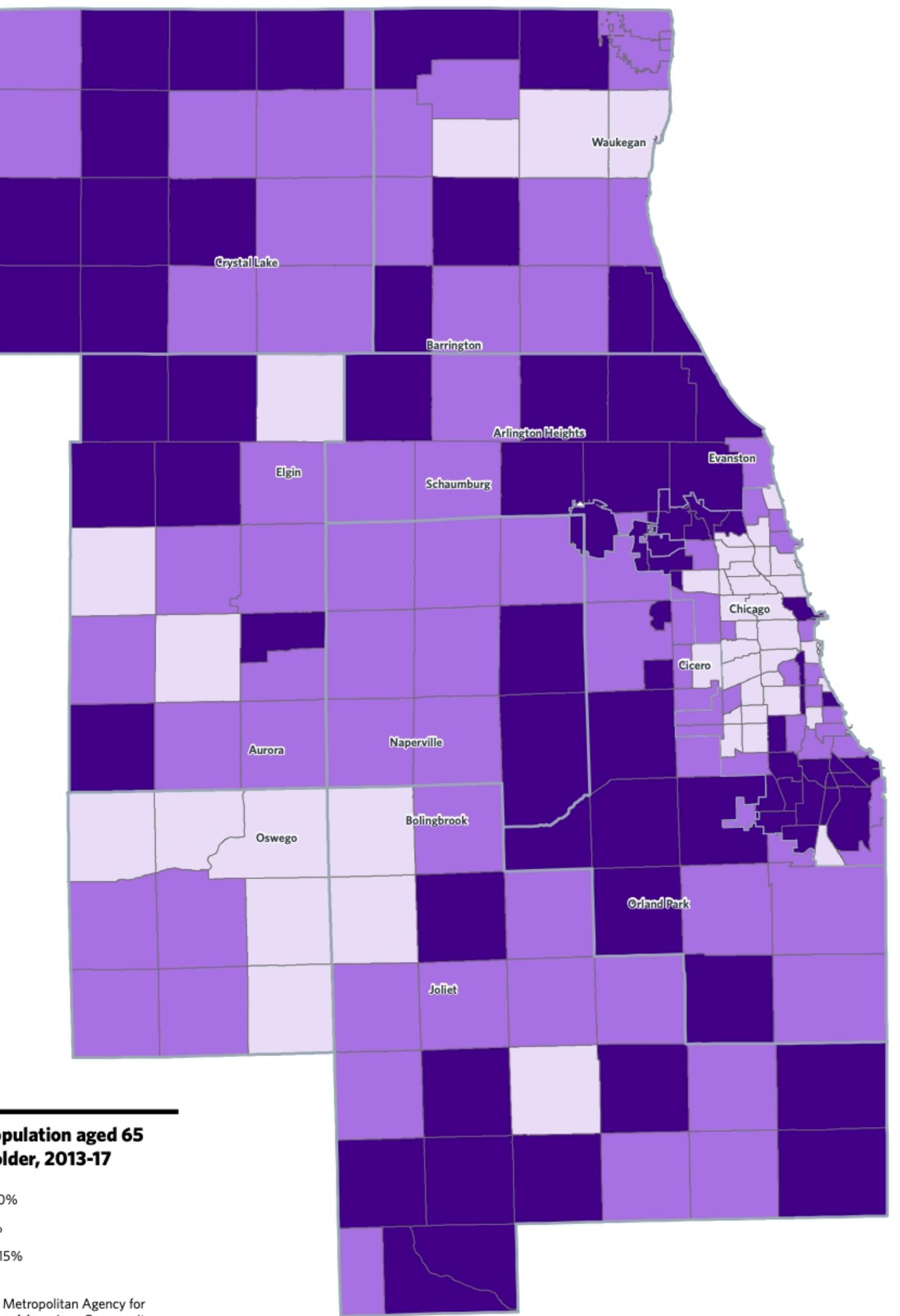
Source: Chicago Metropolitan Agency for Planning analysis of U.S. Census Population and Housing Unit Estimates, 2010-18.

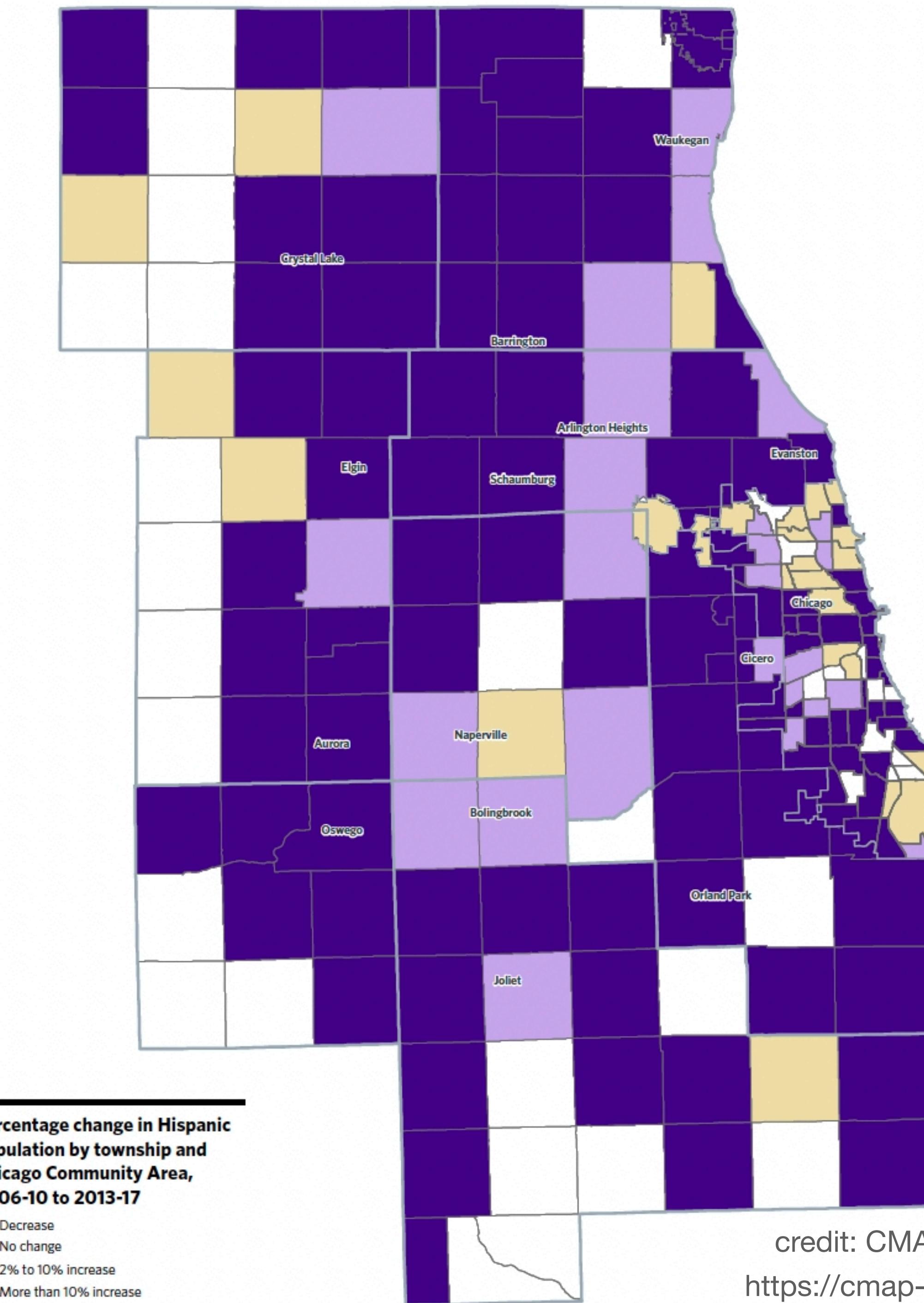


credit: CMAP

shrinking city

- Lake County
- McHenry County
- Kane County
- Kendall County
- DuPage County
- Will County
- City of Chicago
- Suburban Cook County
- CMAP Region



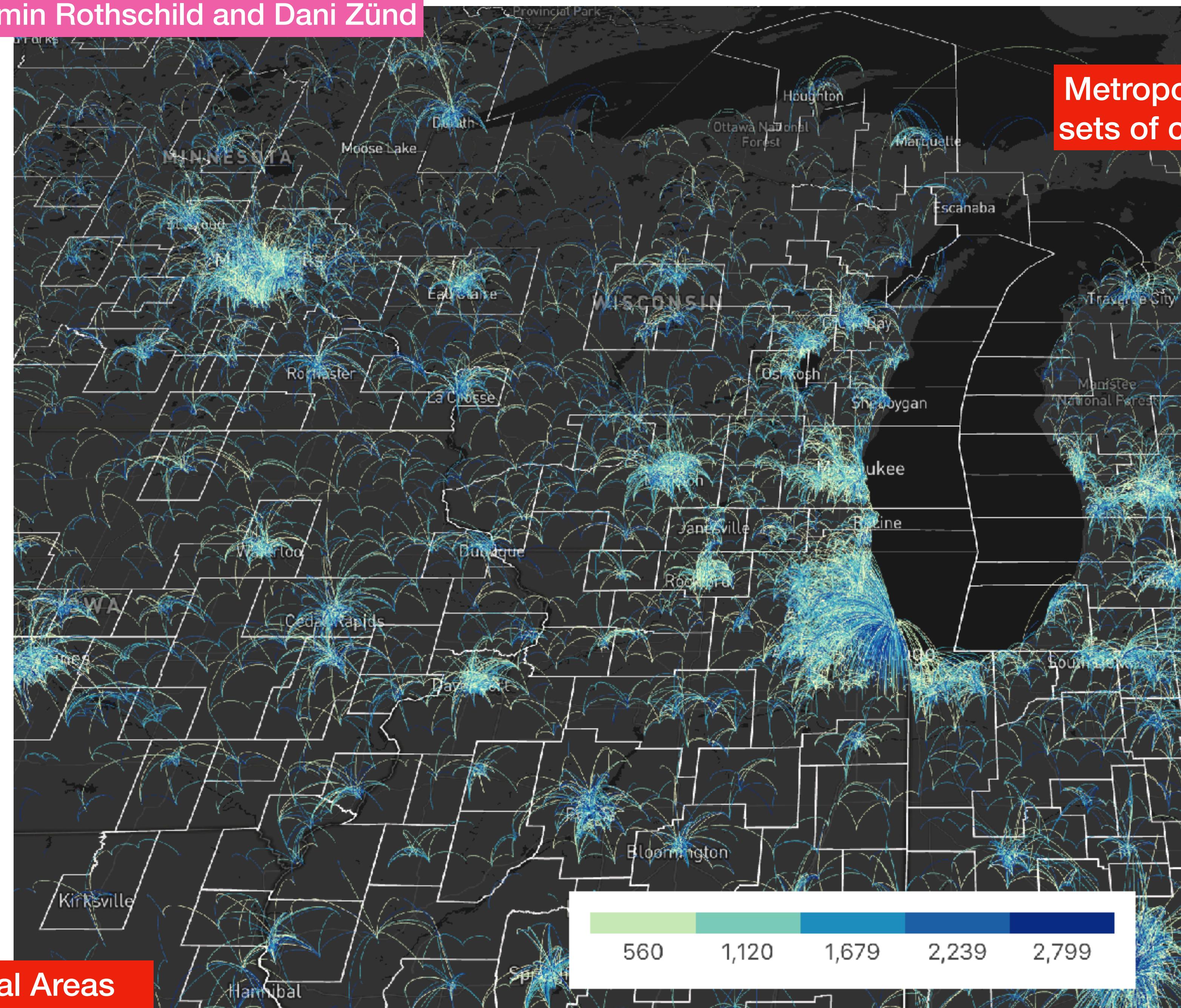


If Chicago is not to shrink,
it will become a much more Latino + (south) Asian city

credit: CMAP

<https://cmap-cmappgis.opendata.arcgis.com/documents/4c61cde2ef814d7bbaed42c3b48ff238/about>

credit: Benjamin Rothschild and Dani Zünd



Micropolitan Statistical Areas
sets of counties, 10K < pop < 50K

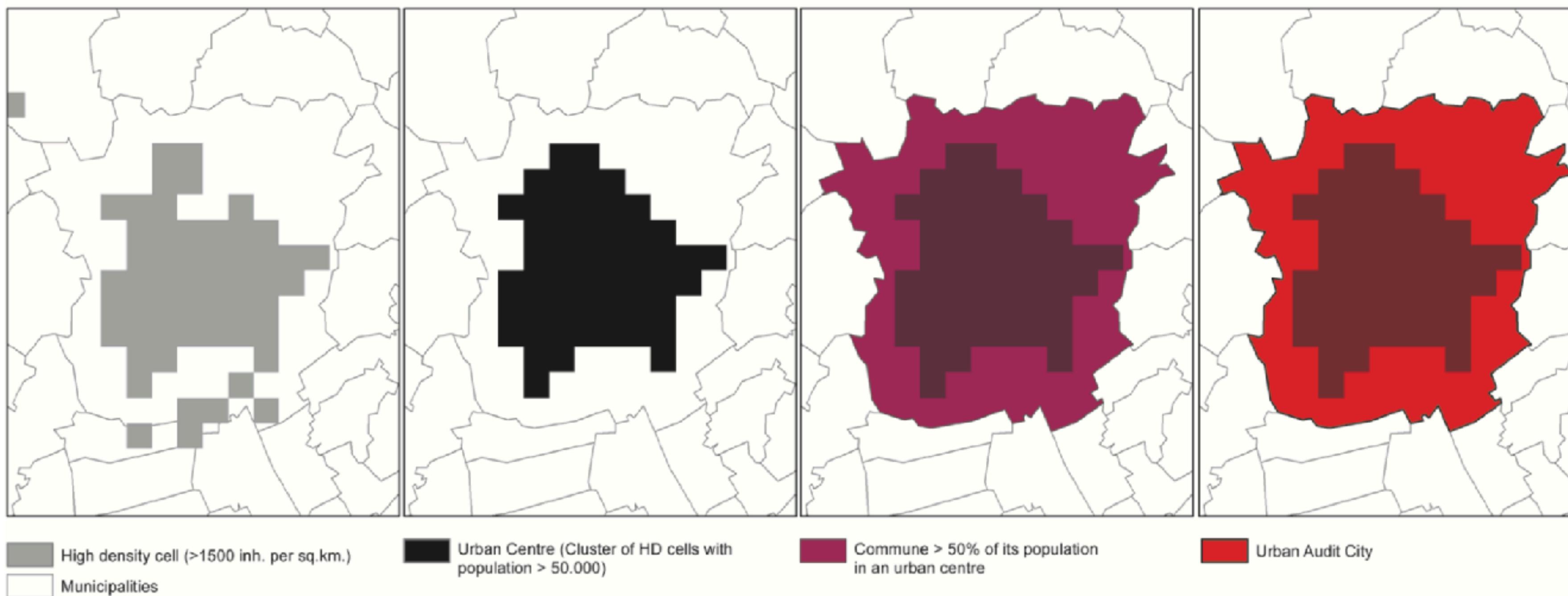
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Data 2002-2021

2.1. Definition of a city

This new definition works in four basic steps and is based on the presence of an 'urban centre' a new spatial concept based on high-density population grid cells.

Figure 1.1-4 How to define a city – High density cells, urban centre and city (Graz)



Step 1: All grid cells with a density of more than 1 500 inhabitants per sq km are selected (Figure 1.1.).

Step 2: The contiguous ⁽²⁾ high-density cells are then clustered, gaps ⁽³⁾ are filled and only the clusters with a minimum population of 50000 inhabitants (Figure 1.2) are kept as an 'urban centre'.

Step 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 (Figure 1.3).

Step 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 (Figure 1.4) ⁽⁴⁾.

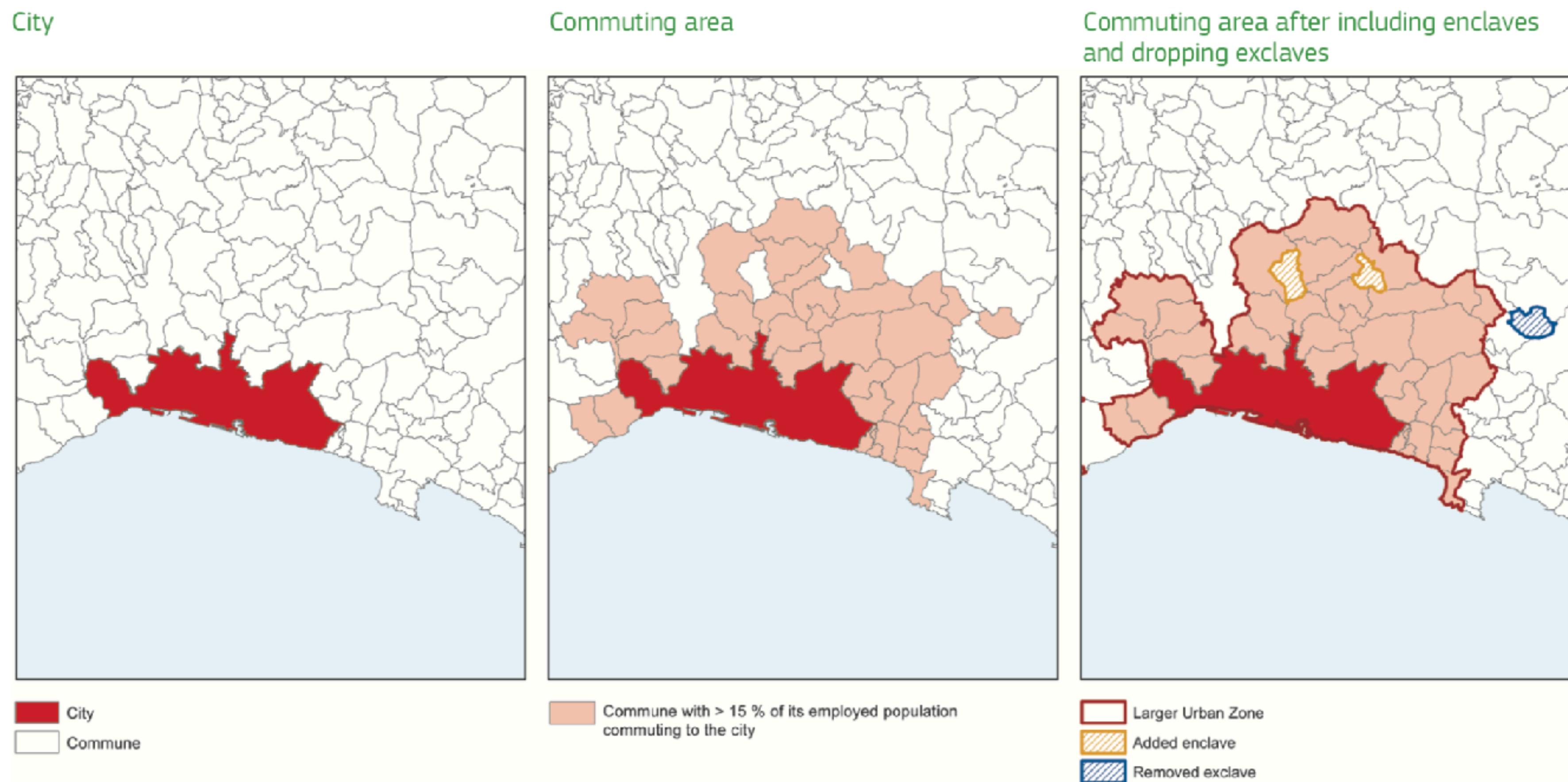
2.2. Definition of a commuting zone

Once all cities have been defined, a commuting zone can be identified based on commuting patterns using the following steps:

- If 15% of employed persons living in one city work in another city, these cities are treated as a single city.
- All municipalities with at least 15% of their employed residents working in a city are identified (Figure 2.2)
- Municipalities surrounded ⁽⁵⁾ by a single functional area are included and non-contiguous municipalities are dropped (Figure 2.3).

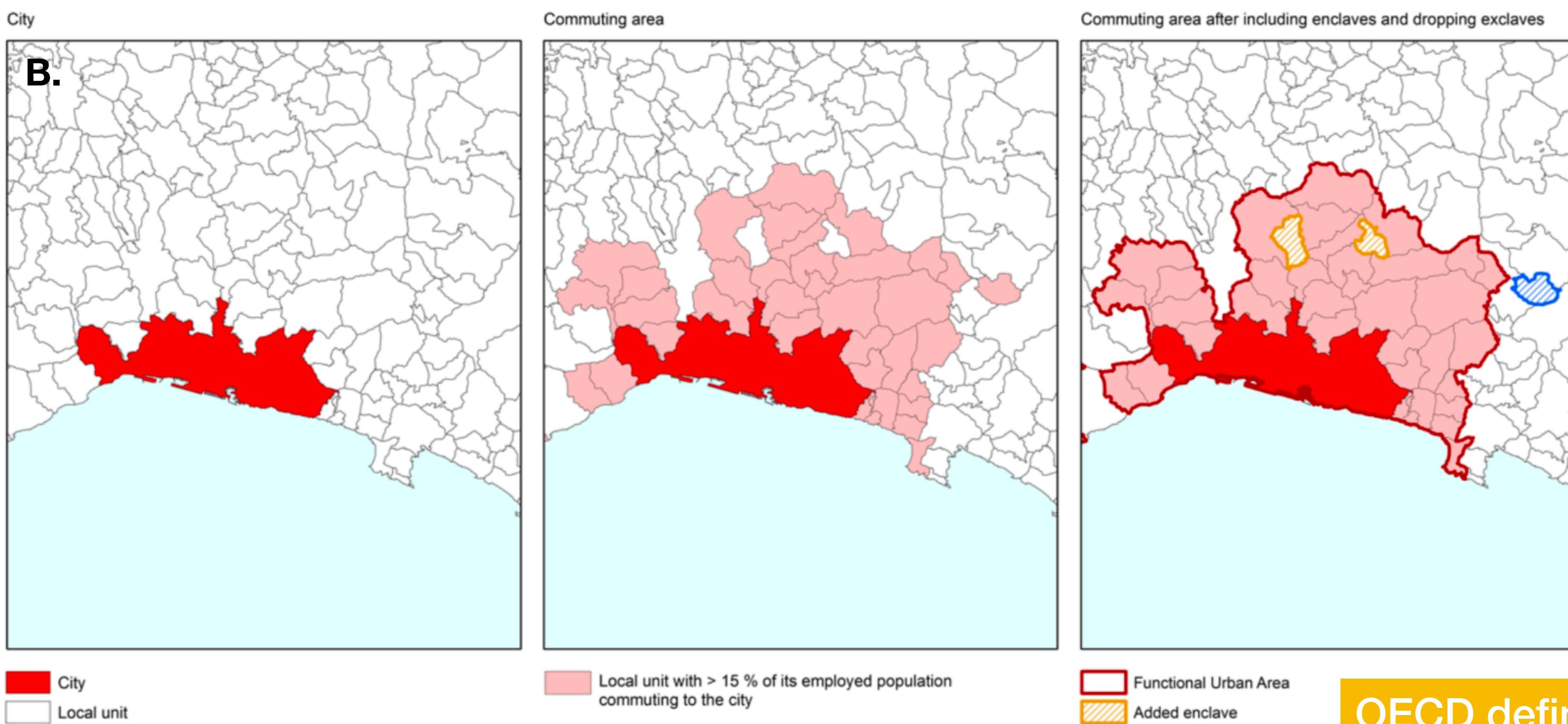
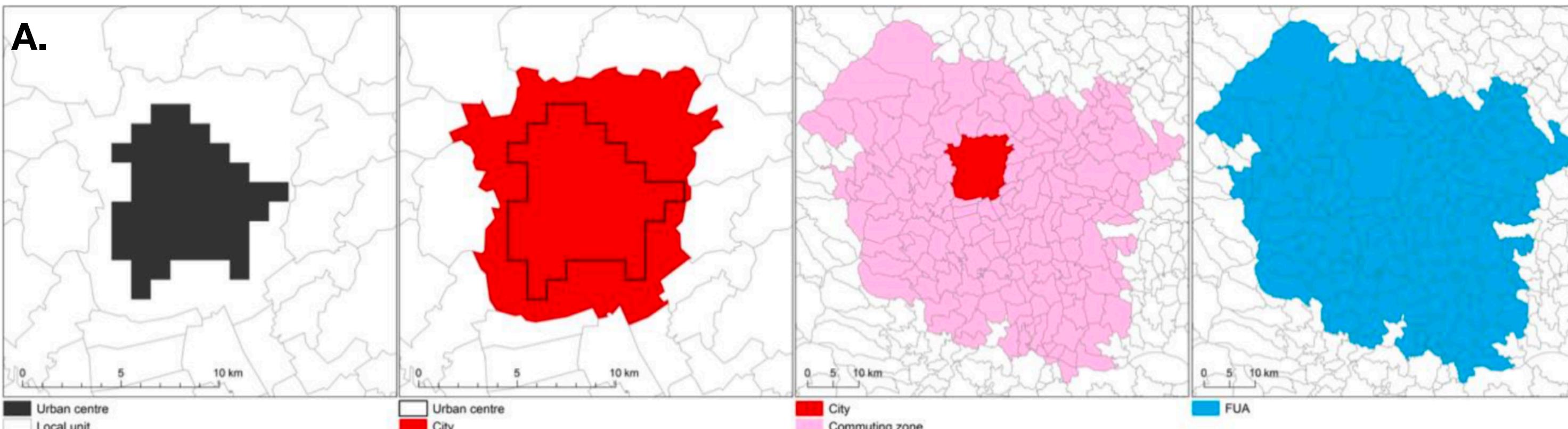
The Larger Urban Zone consists of the city and its commuting zone.

Figure 2.1-3 How to define a commuting zone – City and its commuting zone (Genova)



Definition of Functional Cities

metropolitan areas



OECD definition

Procedure

1. A **spatialized residential population map**, in their case a given number of people per 1-square kilometer cell. Over the same scale one usually also has a share of built surfaces, from multispectral satellite data.
2. **Digital shape boundaries** for local political or administrative units (these typically vary by nation).
3. **Data on commuting flows** between these local units and employment per unit.

The subtlest step has to do with using commuting ties. The EU/OECD procedure goes as following:

1. Include area in the set representing the functional urban area if 15% of employed persons living in one unit, work in another unit. This includes **commuting between suburbs and the CBD (in both directions), as well between suburbs and other peripheral units**, so that the city need not be monocentric.
2. Some exceptional units, such as enclaves – disconnected units entirely surrounded by other local units that belong to a commuting zone-- are included to form a convex hull, while non-contiguous local units are dropped from the set. This is not necessary as part of the definition, but has the virtue of creating a single compact boundary line.