Report

# Urban Morphological Zones 2000 version F1v0

## Definition and procedural steps

**Prepared by:**
Roger Milego

**February 2007**

European Topic Centre
Terrestrial Environment

Universitat Antònoma de Barcelona
Edifici C – Torre C5
4ª planta
08193 Bellaterrra (Barcelona)
Spain

Contact: etcte@uab.es

European Environment Agency

# TABLE OF CONTENTS

# 1 UMZ DEFINITION

An Urban Morphological Zone can be defined as “A set of **urban areas** laying less than 200m apart”. Those **urban areas** are defined from land cover classes contributing to the urban tissue and function.

The Corine Land Cover classes used to built the Urban Morphological Zone dataset are the following ones:

- 111 – Continuous urban fabric
- 112 – Discontinuous urban fabric
- 121 – Industrial or commercial units
- 141 – Green urban areas

} **Core classes**

- 123 (Port areas), 124 (Airports) and 142 (Sport and leisure facilities), are also considered if they are neighbours to the core classes or to one of them touching the core classes. → **Enlarged core classes**
- 122 (Road and rail networks) and 511 (Water courses), when neighbours to the **enlarged core classes**, cut by 300m buffer.
- Forests & scrub (311,312,313,322,323,324), when they are **completely within** the **core classes**.

# 2 PROCEDURAL STEPS

## 2.1 CLC2000 RECLASSIFICATION

The starting point is the **reclassification** of Corine Land Cover raster data (CLC2000 for UMZ2000 and CLC90 corrected for UMZ90).

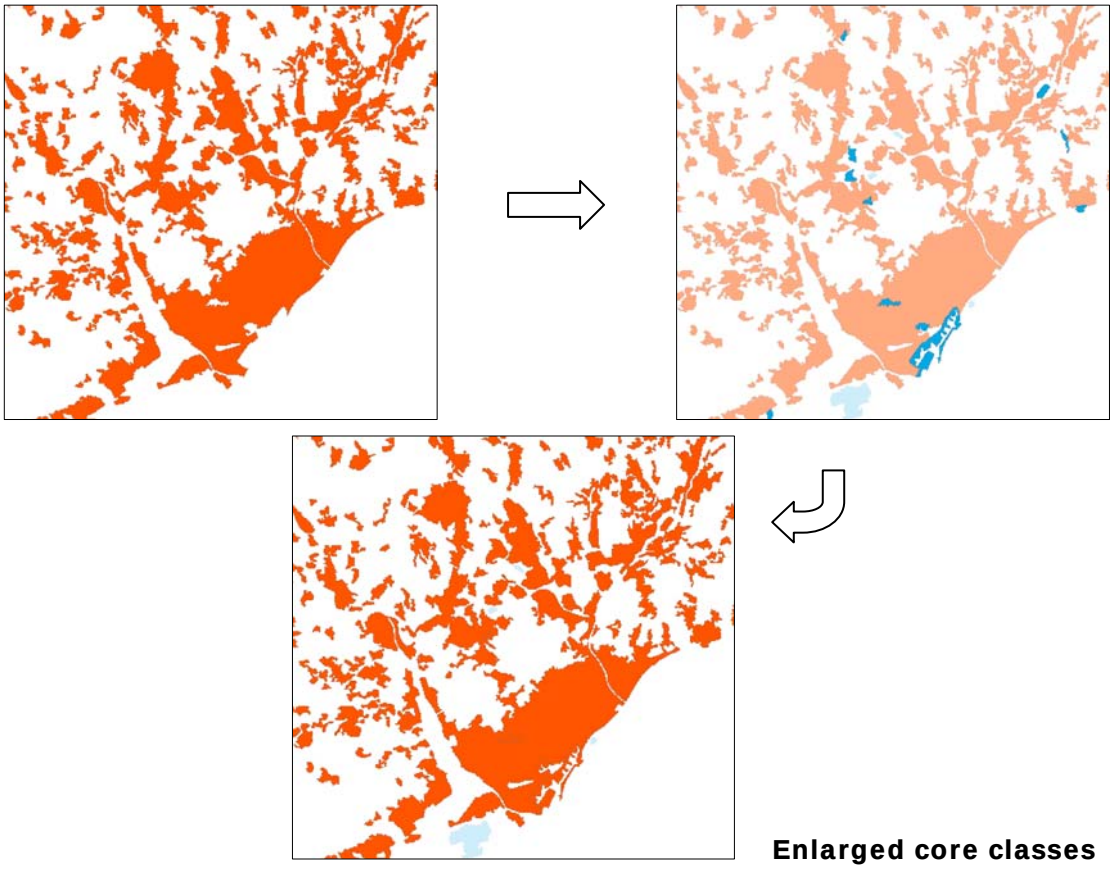
CLC is reclassified according to the definition described above to obtain the following set of land cover classes:

- Core classes
- Ports, Airports and sport facilities
- Transportation and rivers
- Forests & scrub

Each set of land cover classes in raster format is **vectorised** in order to obtain the corresponding vector layer.

## 2.2 ADDITION OF PORTS, AIRPORTS AND SPORT FACILITIES TO THE CORE CLASSES

Starting from the Core classes described above, the first step consists on adding those ports, airports and sport facilities which are neighbours to the core classes, as shown in the example below. This step is done iteratively until all neighbouring polygons are selected.



**Enlarged core classes**

## 2.3 ADDITION OF ROADS, RAILWAYS AND RIVERS TO THE ENLARGED CORE CLASSES

Those roads, railway and river polygons neighbours to the enlarged core classes are selected, then clipped by a 300m buffer around the enlarged core classes, and finally merged to them. The clip prevents having all UMZ merged together via linear features such as motorways or wide rivers.

The following figure illustrates this step:

Enlarged core classes + roads, etc.

Selection by neighbourhood

Cut by 300m buffer

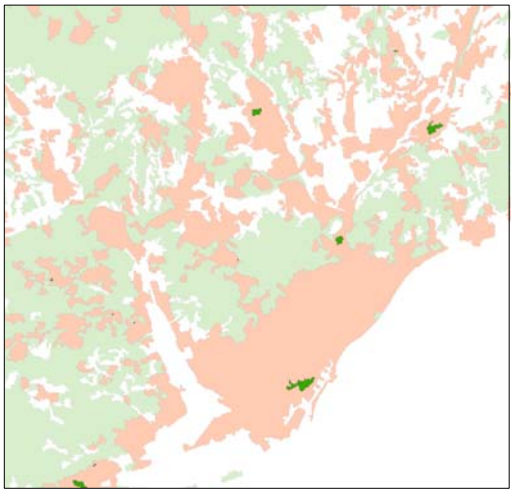
Merge to the Enlarged core classes

## 2.4 ADDITION OF FOREST AND SCRUB CLASSES FULLY WITHIN THE CORE CLASSES

Forest and scrub classes according to the definition, are added to the UMZ if they are fully within the UMZ Core classes. The following pictures shows the process step:

Enlarged core classes

Forest & scrub



Selected “fully within” features

Merge to the Enlarged core classes

With this step a pre-UMZ layer is obtained, which is **rasterised** (100m resolution) to undertake the so-called UMZ built-up, explained in the next sub-chapter.

## 2.5 UMZ BUILT-UP

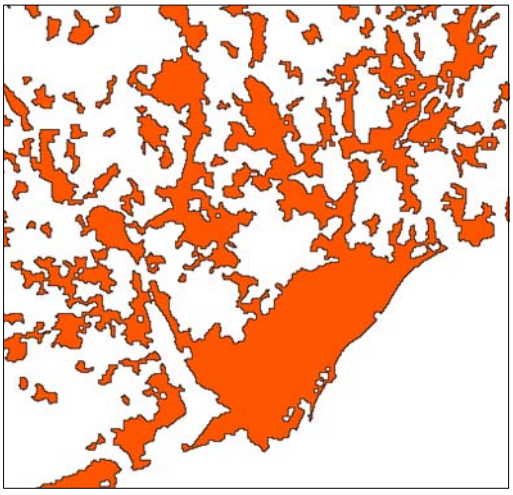
Once all the land cover classes to become part of the UMZ have been merged, it is time to apply the definition that tells us a UMZ is a set of urban areas laying less than 200m apart. The best way to put in practice this definition is through an **expansion** and **shrinking** process of the rasterised pre-UMZ by 1 pixel (i.e. 100m). Doing so, in the expansion process some areas will be in touch and will remain in touch after the shrinking process as well, while areas not touching after the expansion process will come back to their original "place" after the shrinking process. In the end, urban areas laying less than 200 m apart will be connected without any modification of their original shapes (except for the connection zones).

This concept is illustrated below:

Pre-UMZ

Expanded UMZ

Shrinked UMZ



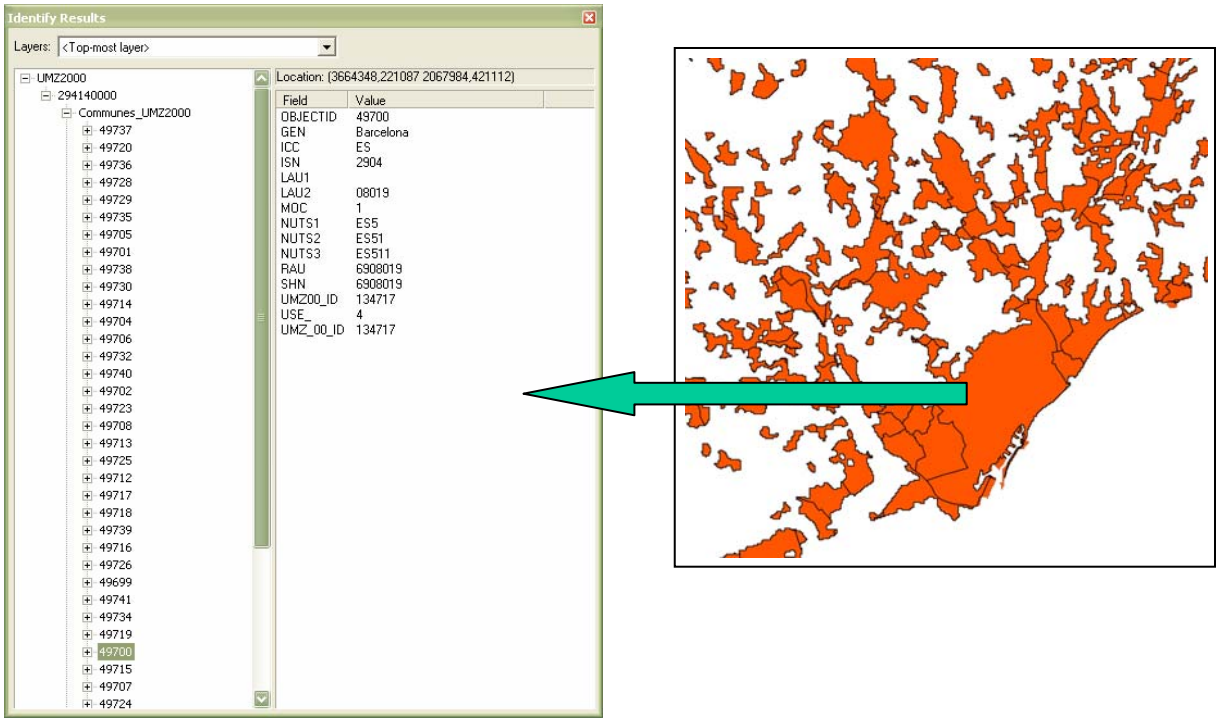
UMZ 2000 v. 2006

After this process, the final raster is **vectorised** and polygons below 25 ha (CLC limit) are removed, obtaining the UMZ2000 v.2006 dataset.

# 3 ATTRIBUTE ASSIGNMENT

## 3.1 COMMUNE CODES

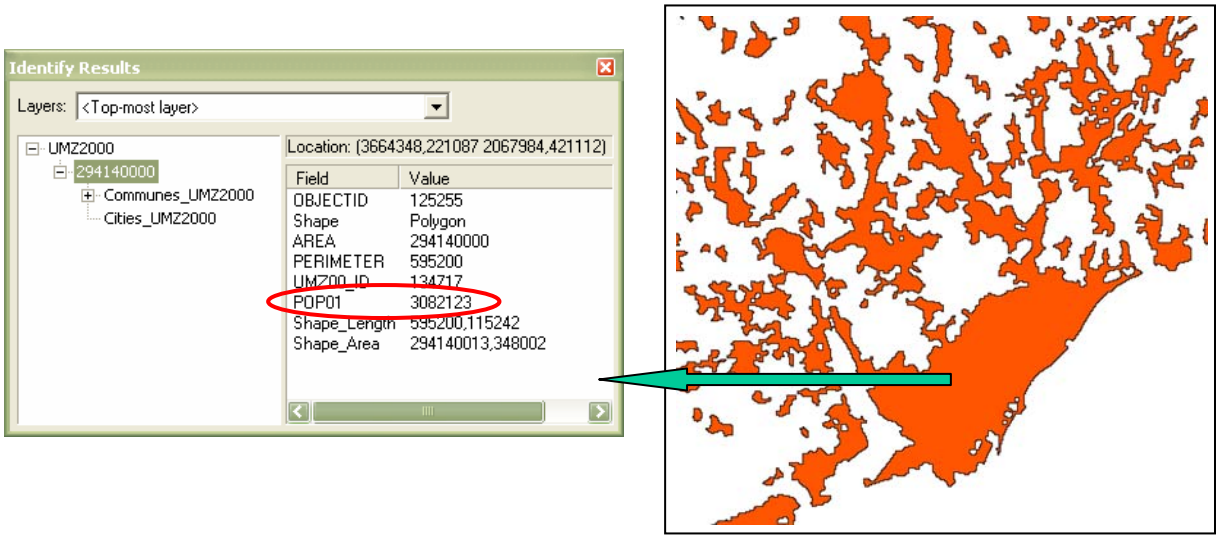
Using the EuroBoundaryMap Jan'06 dataset, commune attributes can be added to each UMZ. A relationship class between both datasets has been created in the way that once you identify a UMZ you get the list and attributes of all communes or parts of commune being part of it:



## 3.2 POPULATION FIGURES

Intersecting the UMZ polygons with JRC's 2001 Population density grid (made by Javier Gallego) we can obtain a population figure within every single UMZ. In the case of countries with missing population data (CY,BA,MK,AL), population data from citypopulation.de has been used for main cities (in general, above 5000 inhabitants).

In the end, a population attribute is added to the UMZ attribute table, as it is showed in the example below for the Barcelona UMZ:




In the case no population figures are available, the value -9999 has been recorded instead.

## 3.3 AVAILABLE ATTRIBUTES

The attributes available for each UMZ dataset are the following ones:

- UMZ2000
    - UMZ00_ID: Unique identifier of each UMZ00
    - POP01: Population number of each UMZ00
    - AREA
    - PERIMETER
- UMZ90
    - UMZ90_ID: Unique identifier of each UMZ90
    - AREA
    - PERIMETER
- UMZ CHANGES 1990-2000
    - UMZ90_ID: Unique identifier of each UMZ90
    - UMZ00_ID: Unique identifier of each UMZ00
    - CHANGES: + (Urban sprawl between 90 and 2000) or – (UMZ reduction)
    - AREA
    - PERIMETER
- UMZ00 VS. EUROBOUNDARY MAP
    - UMZ00_ID: Unique identifier of each UMZ00
    - Euroboundary Map attributes, SHN, LAU, RAU, NUTS codes, GEN (commune name).

# 4 ADDITIONAL COMMENTS

For the creation of **UMZ90**, the procedural steps have been exactly the same as the ones described above, but using CLC90 corrected instead of CLC2000 data.

**UMZ Changes** have been calculated as well, by unioning both UMZ90 and UMZ00 and looking for those polygons existing only in one year (i.e. 1990 or 2000). Most changes are Positive changes, understood as areas of urban sprawl (i.e. new UMZ areas between 1990 and 2000), while negative changes describe the reduction of a certain UMZ between 1990 and 2000 (warning: some negative changes might be due to different interpretations between 1990-2000).

**Attributes** such as commune code or population figures have only been added to UMZ2000 dataset.

Raster datasets for UMZ00 and UMZ90 have been created at a resolution of 100m. Those raster data only tells us what is or is not a UMZ, i.e. no additional attributes are included.