

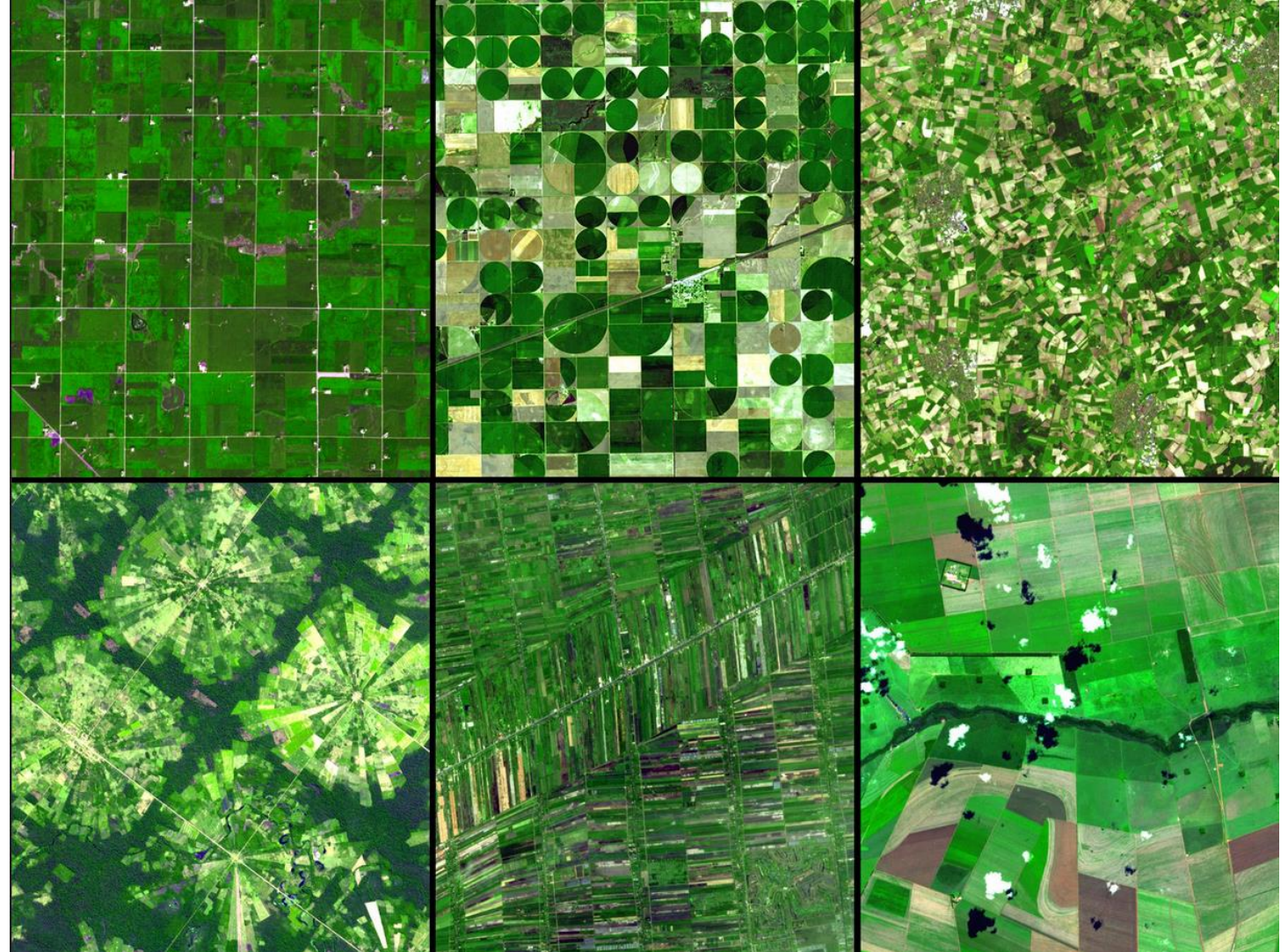
Ecotopes : dataprisms for ecological models combining remote sensing and ancillary data

M. De Vroey, J. Radoux, T. De Maet, B. Goffart, A. Bourdouxhe, T. Coppée,
M. Dufrêne and P. Defourny

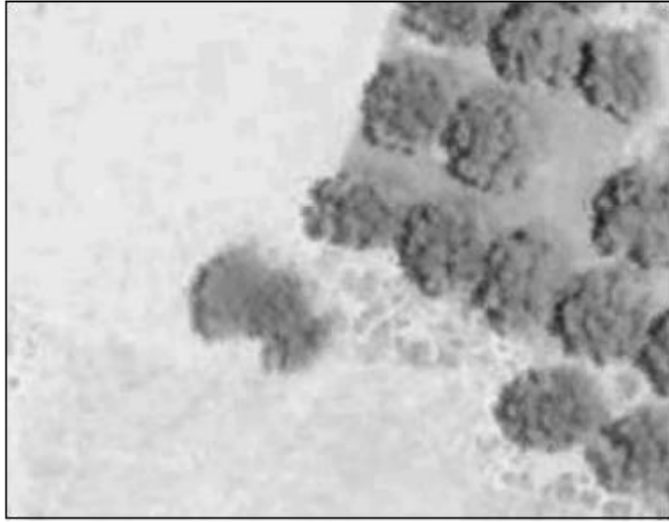
January the 26th, 2023
LifeWatch Biodiversity Day
Brussels

Datacube store a large amount of information in a convenient way

- But are squares so efficient for biodiversity monitoring ?
- If too large : lack of detail
- If too small : lack of context



All (geodata) models are wrong, but some are useful



Spatial objects

- Categorical description
- Well defined boundaries

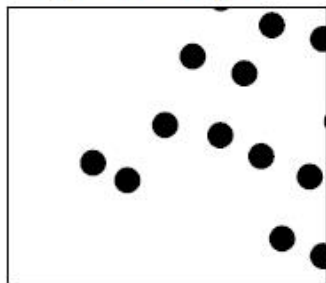
Spatial regions

- Arbitrary boundaries
- Quantitative description

Field

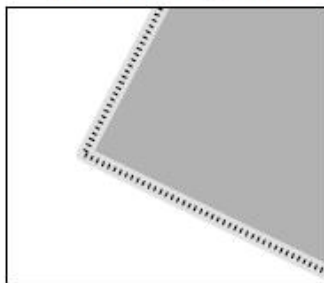
- No boundaries
- Quantitative variables

Spatial objects



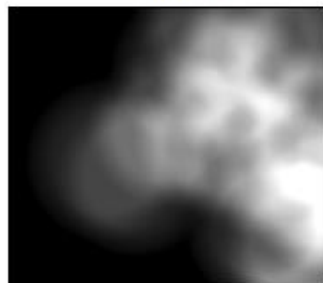
● Trees

Spatial regions



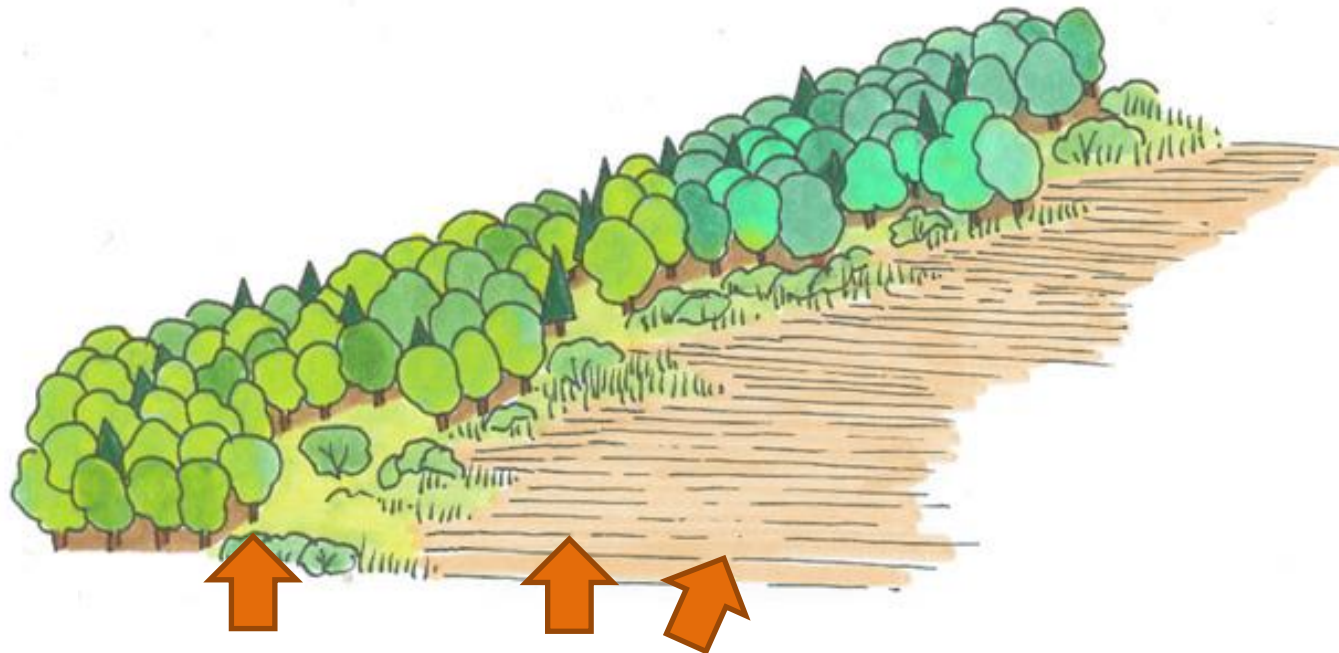
□ Pasture ■ Orchard

Field



Low **Carbon** High

Is my landscape partition unique ?



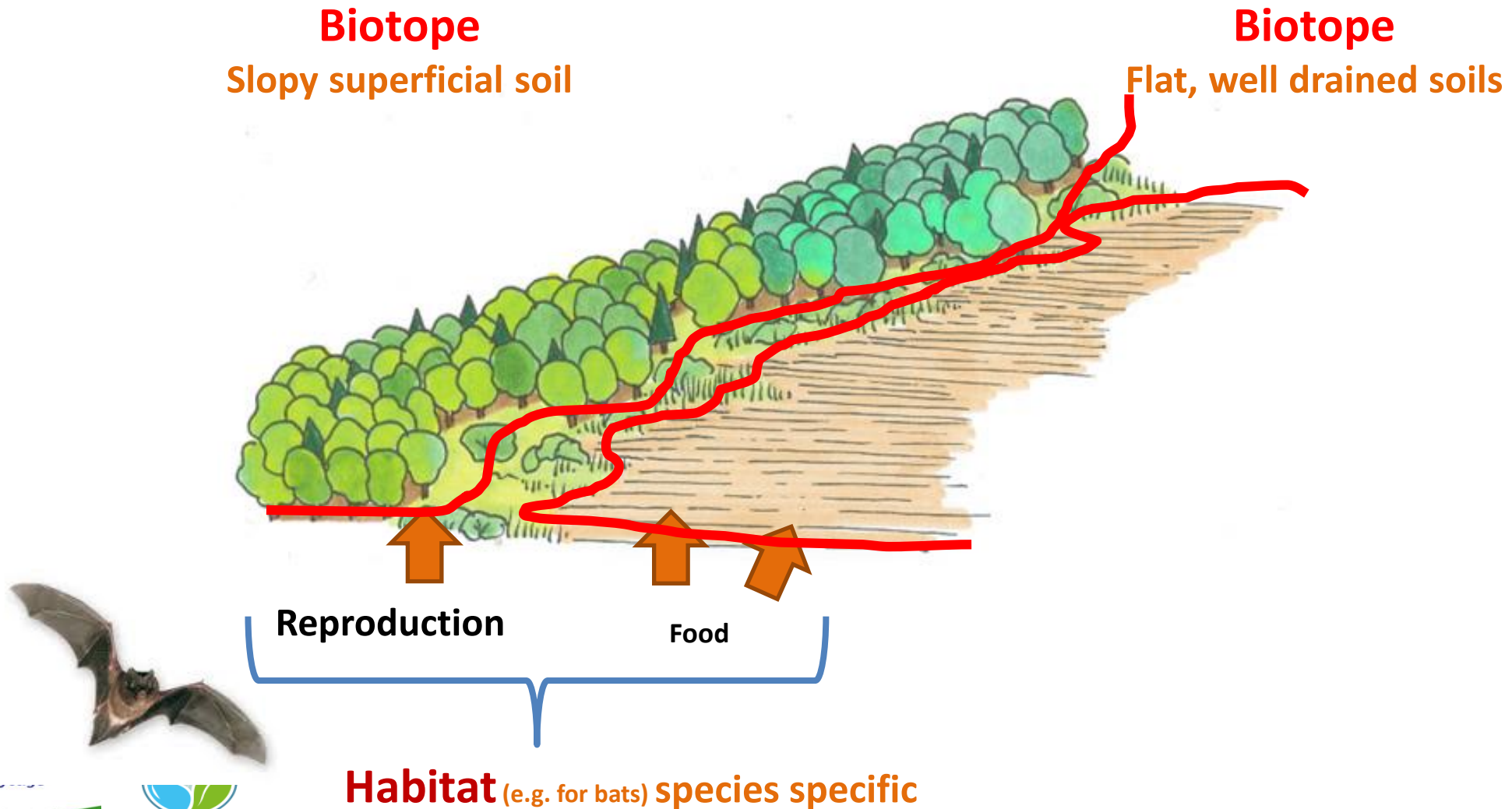
Reproduction

Food

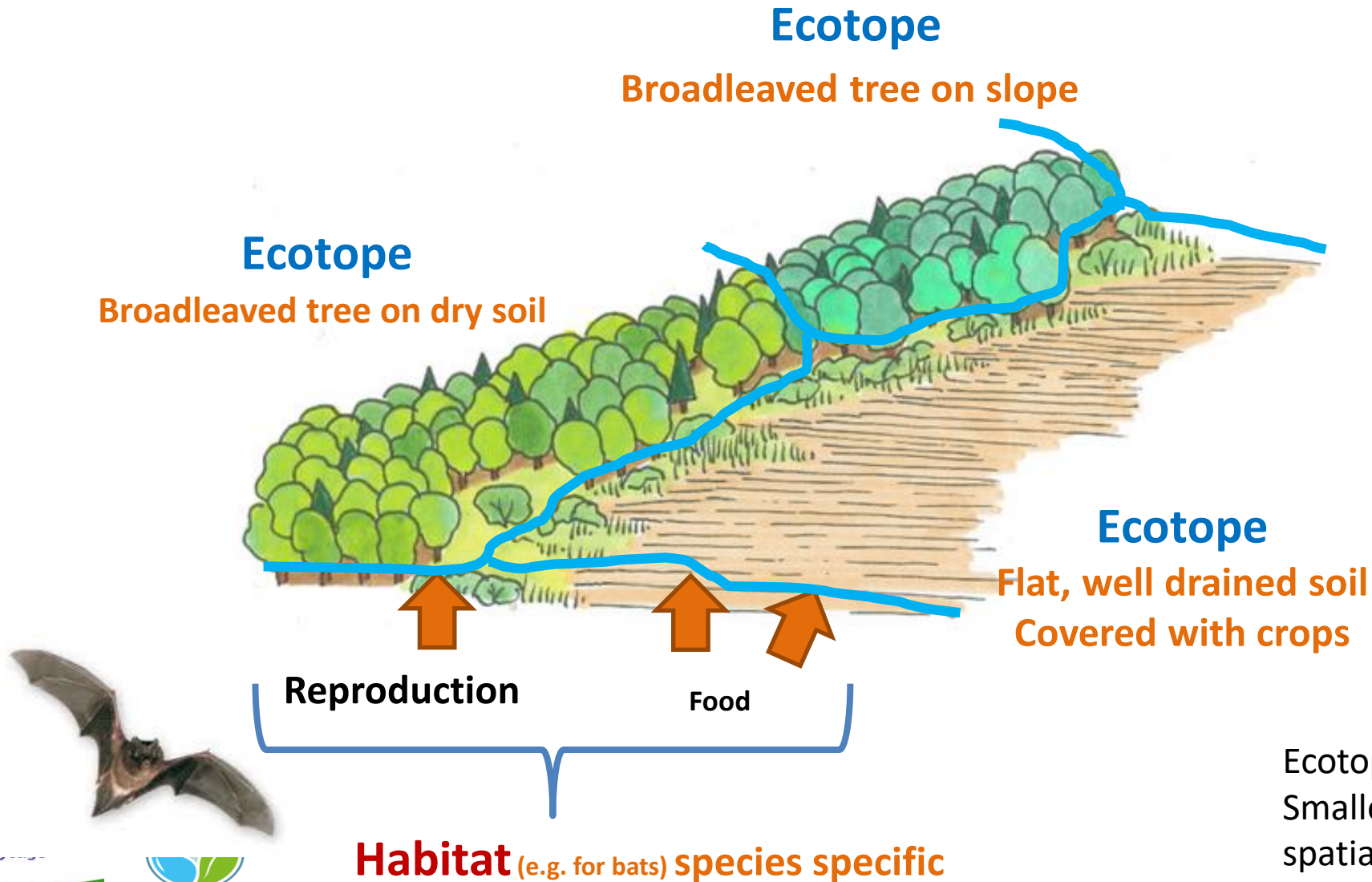
Habitats are species specific



Is my landscape partition observable?

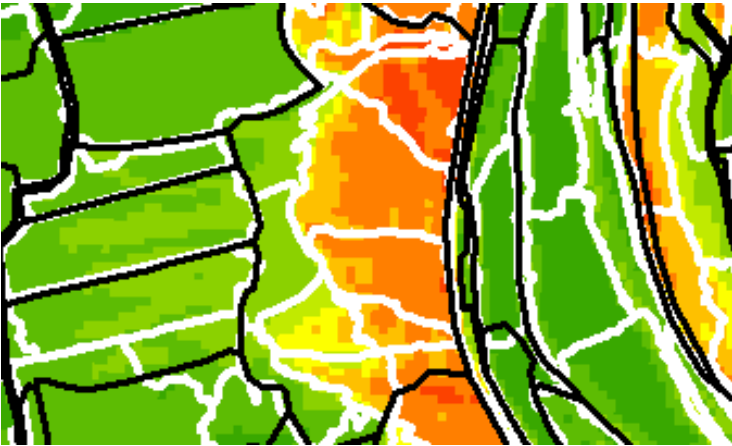


Homogeneous partition could make sense



Ecotope concept (Ellis 2007)
Smallest ecologically distinct
spatial unit

The partition based on LIDAR and aerial imagery follows the terrain and the land cover



Black = based on image only

White = based on image + LIDAR

Green = small slope

Red = steep slope



Color composite RGB + Hillshade in R and G

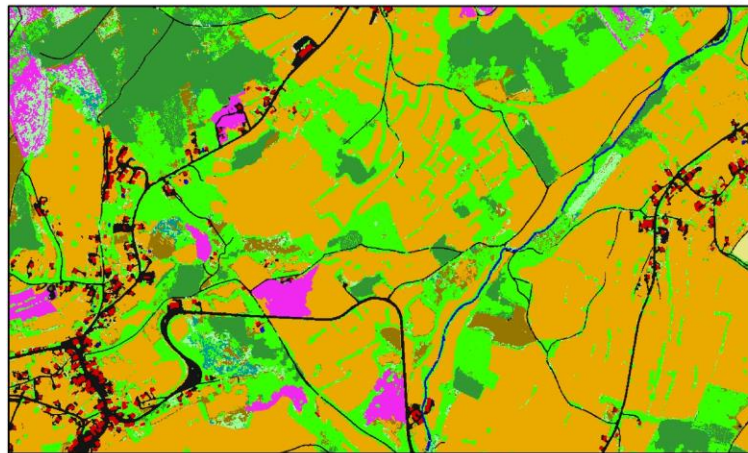
Ecotopes: integrating land cover and biotopes variables

Delineation of homogeneous polygons

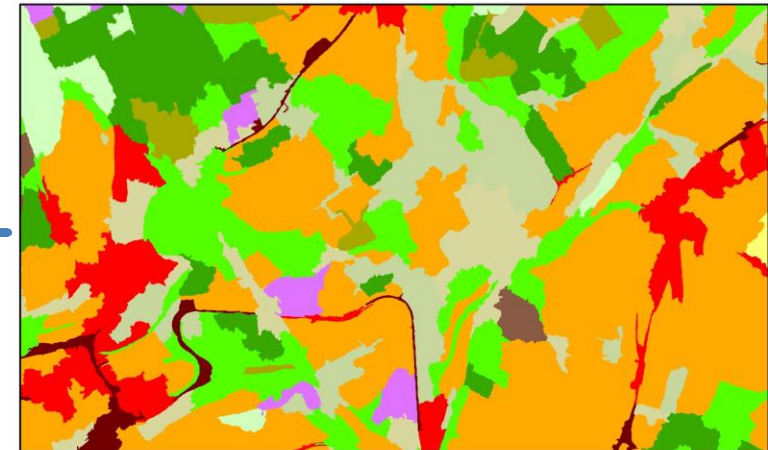
Automated image segmentation (topography and orthophotos)



Pixel-based land cover classification (2 m)



Ecotopes (here with LCCS labels)



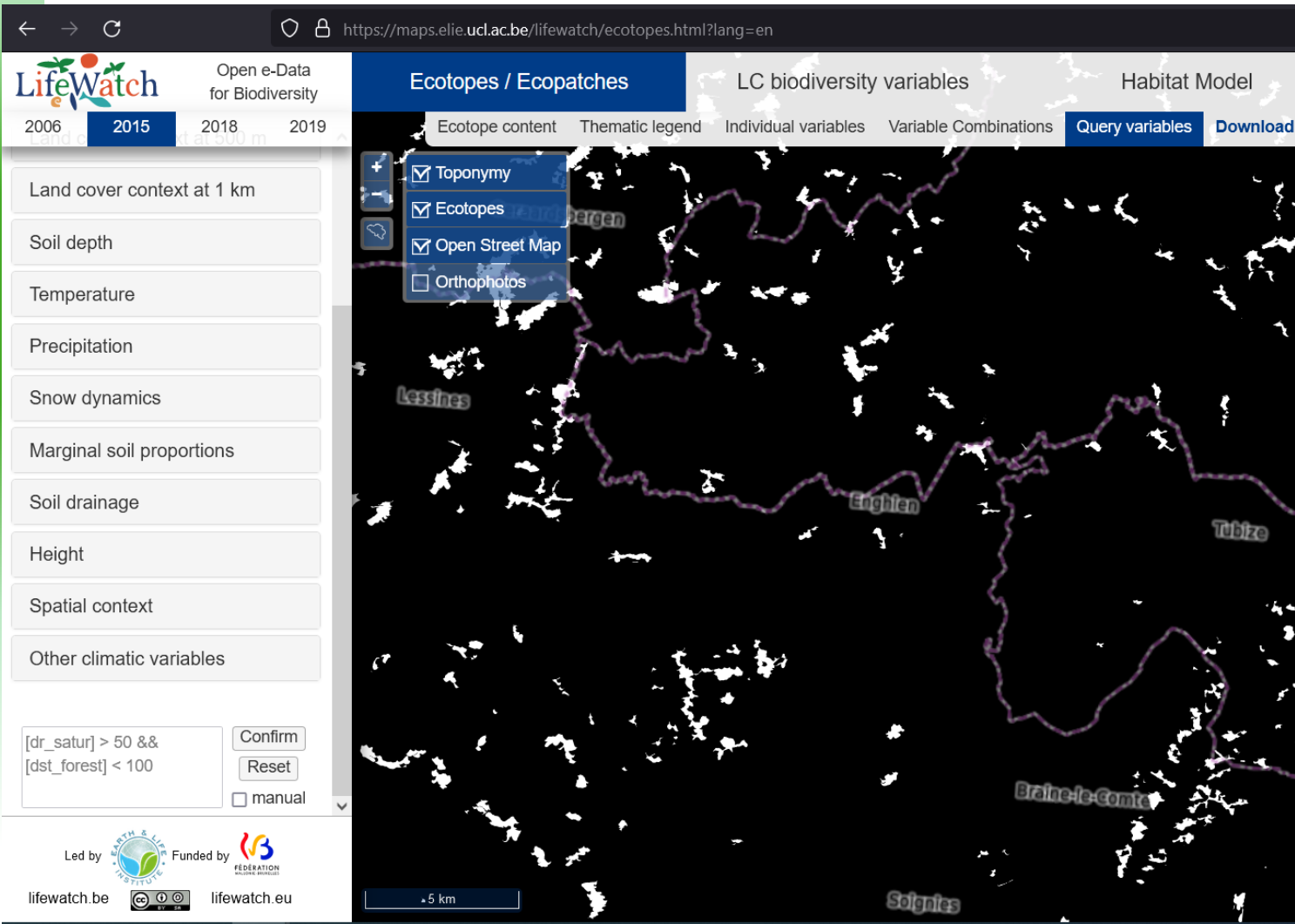
0 0,25 0,5 1 1,5 Kilometers

High quality (OA >93%) land cover map of Belgium

■ Built up
 ■ Grassland
 ■ Needleleaved
 ■ Broadleaved
 ■ Water

Ecotope description integrates 100+ variables harmonized across Belgium

Example query : saturated soils near at least 100 m from a forest patch



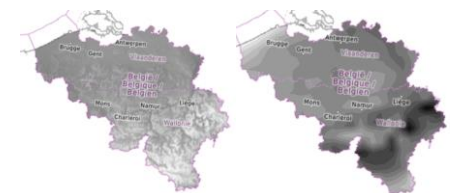
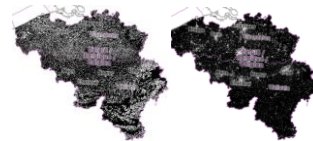
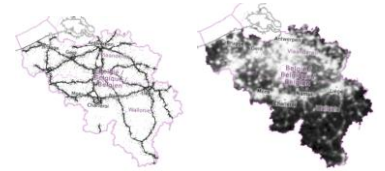
TOPOGRAPHY

CONTEXT

LAND COVER

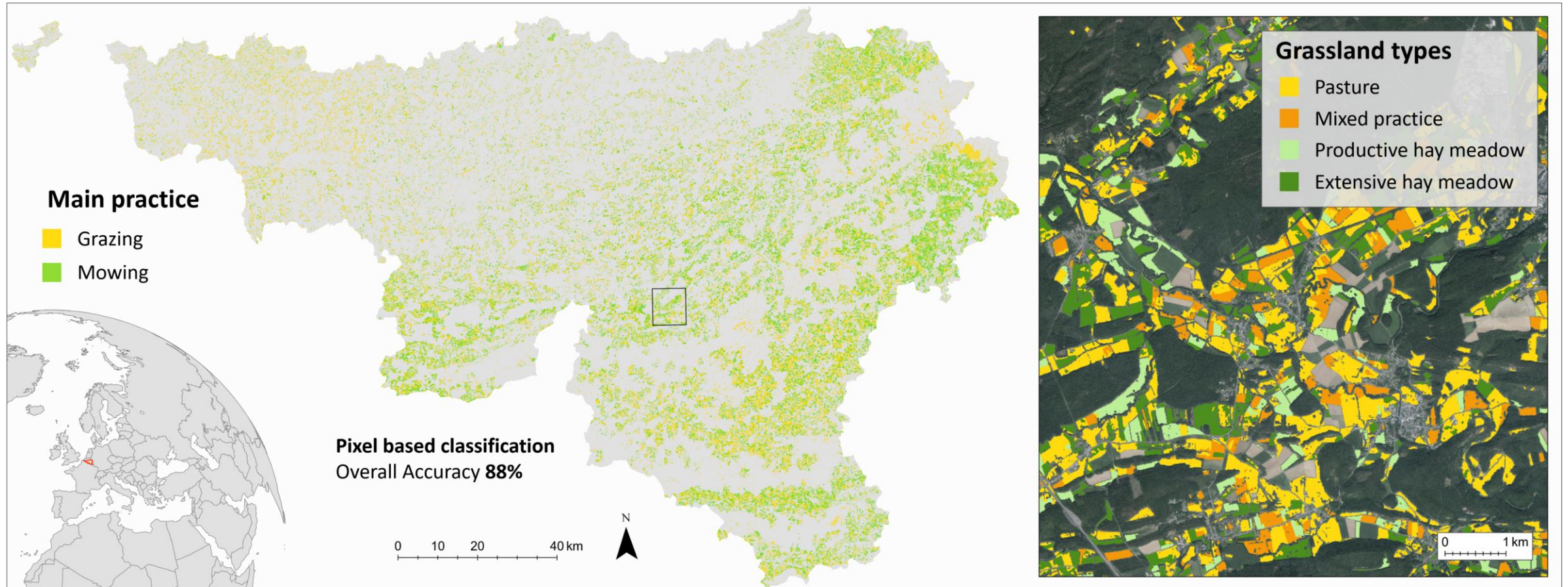
SOILS

CLIMATE

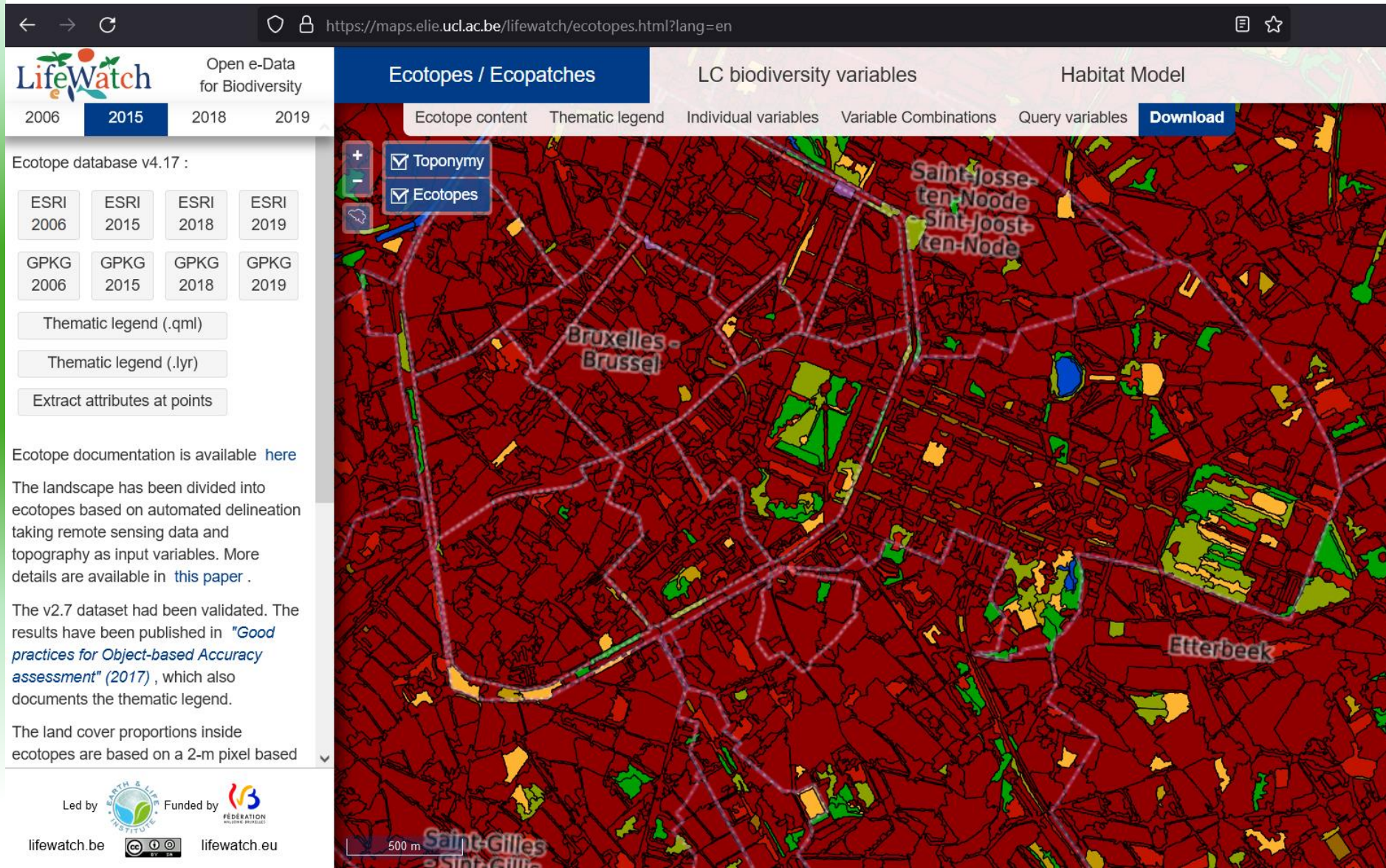


More info coming from mowing and grazing detection

Sentinel-1 (SAR) coherence data fill the gap of Sentinel-2 (optical) data



Uclouvain.be/Lifewatch



The screenshot displays the web application interface for Uclouvain.be/Lifewatch. The browser address bar shows the URL: <https://maps.elie.ucl.ac.be/lifewatch/ecotopes.html?lang=en>.

The interface includes a sidebar on the left with the LifeWatch logo and navigation options: "Open e-Data for Biodiversity", "2006", "2015" (selected), "2018", and "2019". Below this, it states "Ecotope database v4.17 :" and provides buttons for "ESRI 2006", "ESRI 2015", "ESRI 2018", "ESRI 2019", "GPKG 2006", "GPKG 2015", "GPKG 2018", and "GPKG 2019". There are also buttons for "Thematic legend (.qml)", "Thematic legend (.lyr)", and "Extract attributes at points". A note mentions "Ecotope documentation is available [here](#)".

The main content area features a map of Brussels with various data layers. The "Ecotopes / Ecopatches" tab is selected, showing a map with red, green, and yellow areas. A legend on the left indicates "Toponymy" and "Ecotopes". The map is labeled with "Bruxelles - Brussel", "Saint-Josse-ten-Noode", "Sint-Joost-ten-Node", and "Etterbeek". A scale bar at the bottom left indicates "500 m".

At the bottom of the sidebar, it states: "The v2.7 dataset had been validated. The results have been published in *'Good practices for Object-based Accuracy assessment' (2017)*, which also documents the thematic legend." and "The land cover proportions inside ecotopes are based on a 2-m pixel based".

The footer includes logos for "LIFE & LIP INSTITUTE" and "FEDERATION WALLONNE BRUXELLES", along with the text "Lifewatch.be" and "lifewatch.eu".

Feel free to download !