



BEeS

The LifeWatch ERIC Biodiversity & Ecosystem eScience Conference

Seville
22-24/05/23



Threats and challenges to biodiversity and ecosystem conservation from an eScience perspective



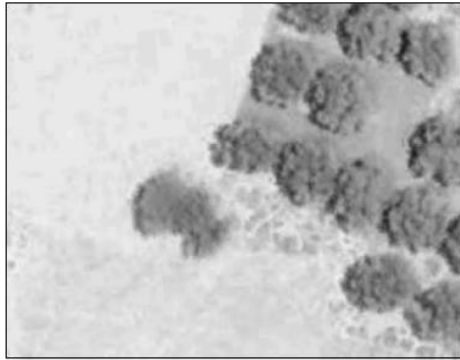
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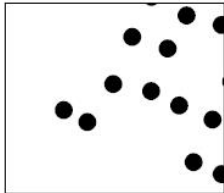
Julien Radoux, UCLouvain



All (geodata) models are wrong, but some are useful (e.g. for ecosystem accounting)

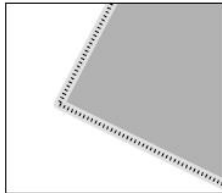


Spatial objects



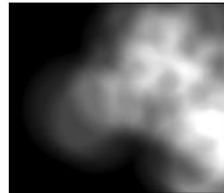
● Trees

Spatial regions



□ Pasture ■ Orchard

Field



Carbon
Low High

Spatial objects

- Categorical description
- Well defined boundaries

Spatial regions

- Arbitrary boundaries
- Quantitative description

Field

- No boundaries
- Quantitative variables



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*Threats and challenges to biodiversity and ecosystem
conservation from an eScience perspective*



Datacubes store a large amount of information in a convenient way

But are what is the best geodata model to
store biodiversity information?

Large squares : lack of details

Small pixels : lack of context



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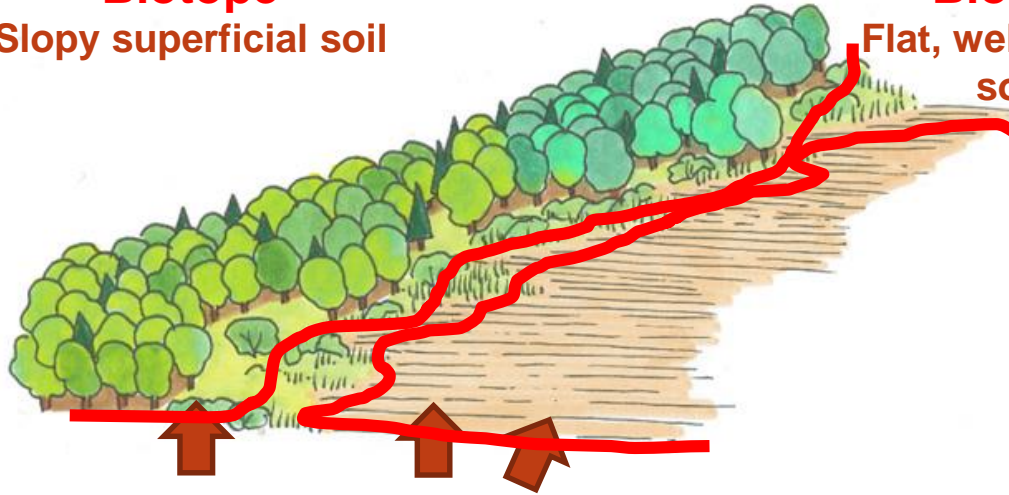
Towards an operational partition for EA

Biotope

Slopy superficial soil

Biotope

Flat, well drained soils



Reproduction

Food

Habitats are species specific



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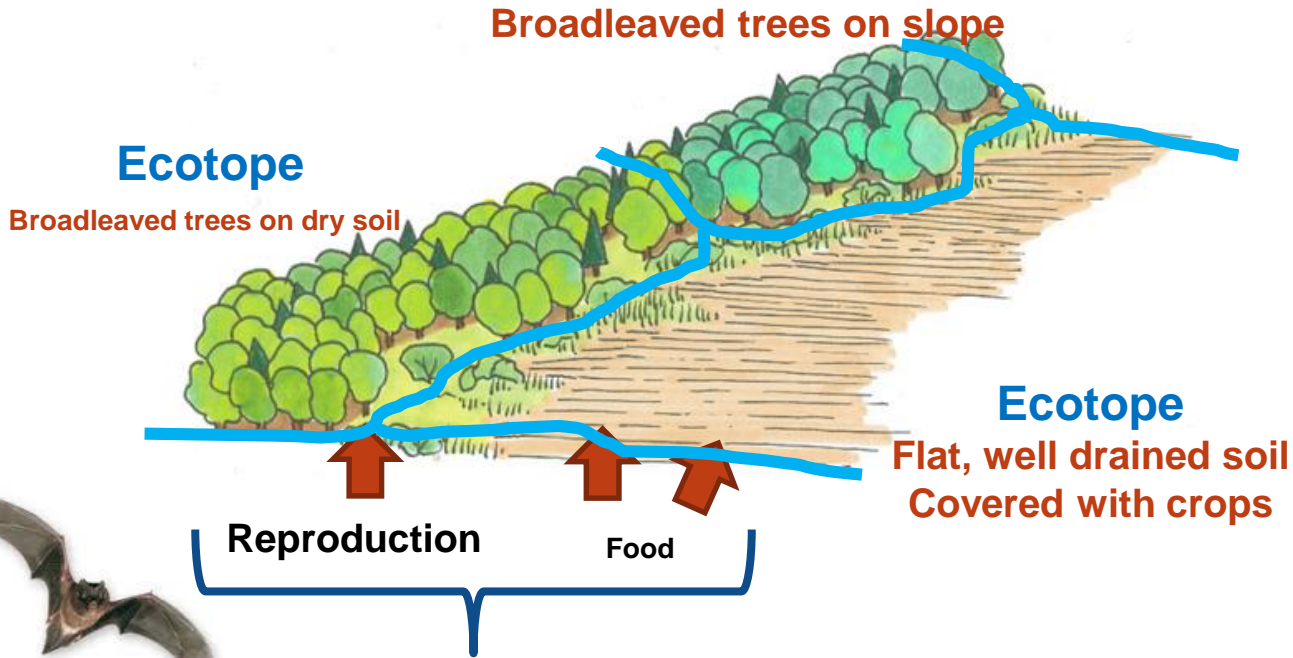
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Towards operational partition for EA

Ecotope



Habitats are species specific

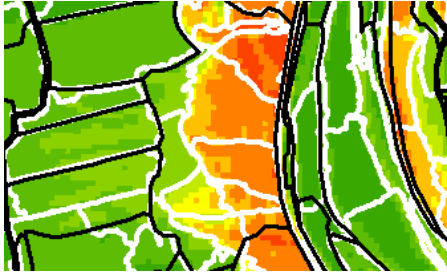


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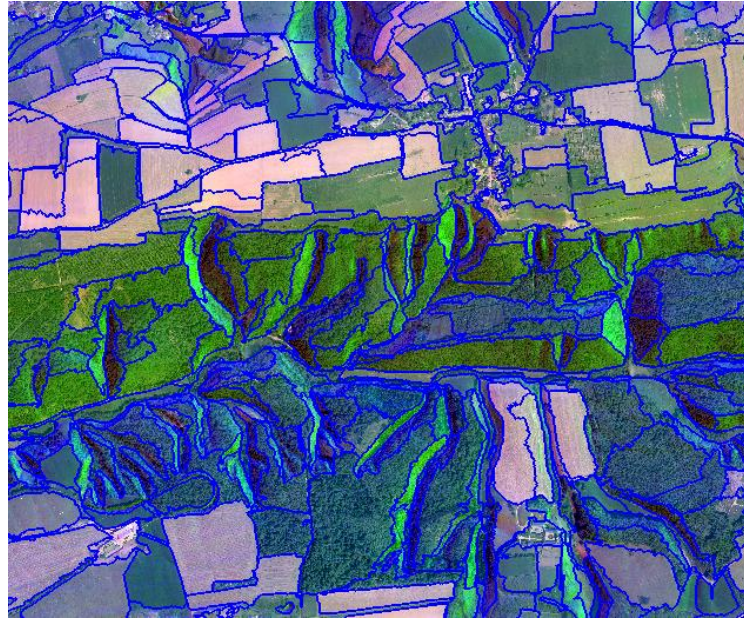
Automated ecotopes delineation with LIDAR and orthophotos

Orthophotos +
Hillshade from LIDAR +
Height from LIDAR



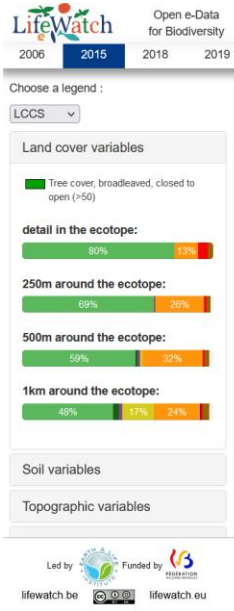
Black = Land cover
White = Ecotopes

Green = small slope
Red = steep slope



Results shown on color composite RGB + Hillshade in R and G

Dataprism based on ecotope boundaries, with land cover and biotope information



LifeWatch Open e-Data for Biodiversity

2006 2015 2018 2019

Choose a legend :
LCCS

Land cover variables

- Tree cover, broadleaved, closed to open (>50)

detail in the ecotope:

- 80%

250m around the ecotope:

- 69%

500m around the ecotope:



- 59%


1km around the ecotope:

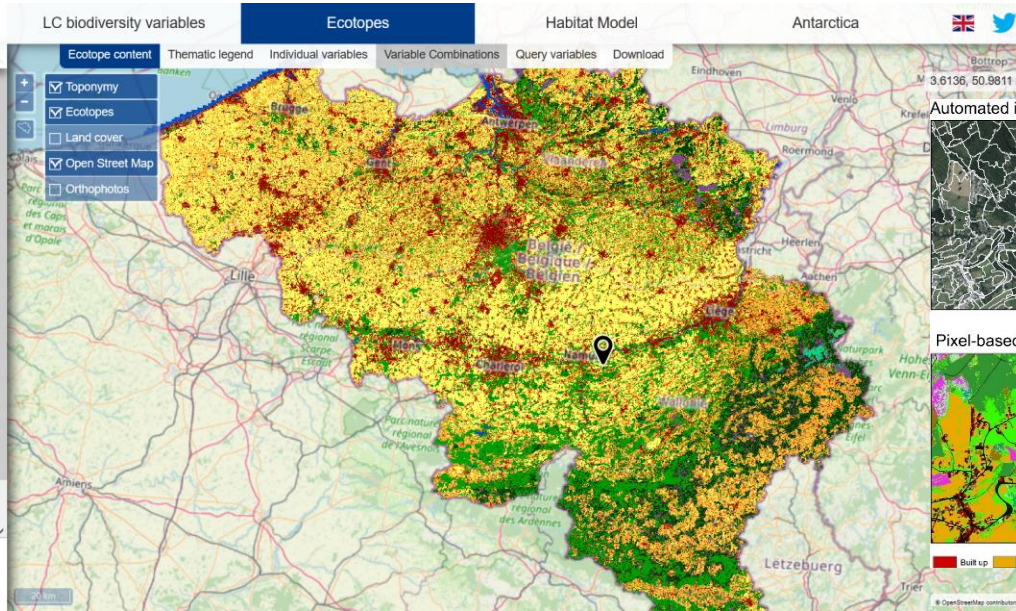
- 48%

Soil variables

Topographic variables

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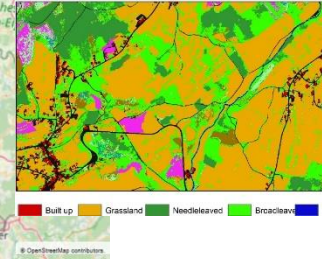
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Automated image segmentation (topography and orthophotos)



Pixel-based land cover classification (2 m)



Ecotopes (here with LCCS labels)





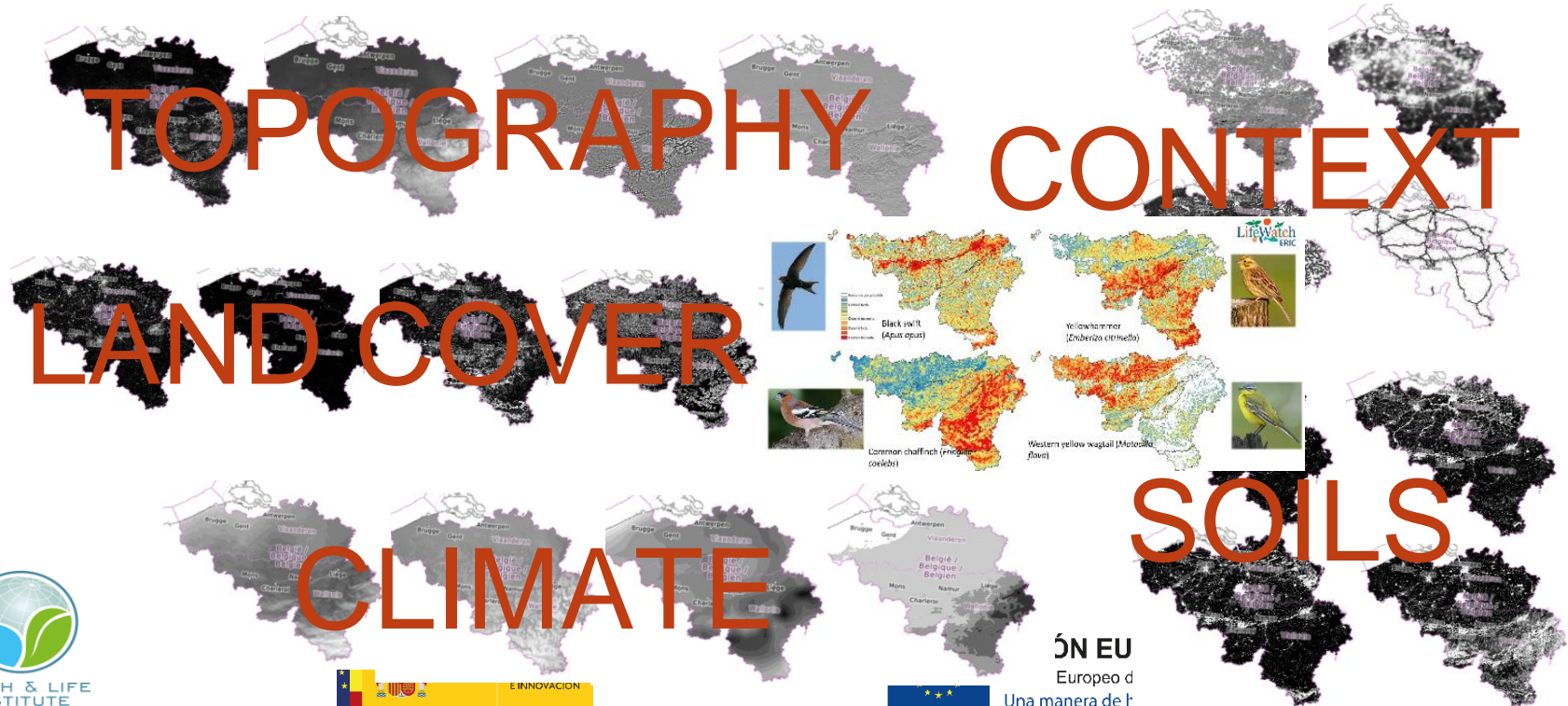
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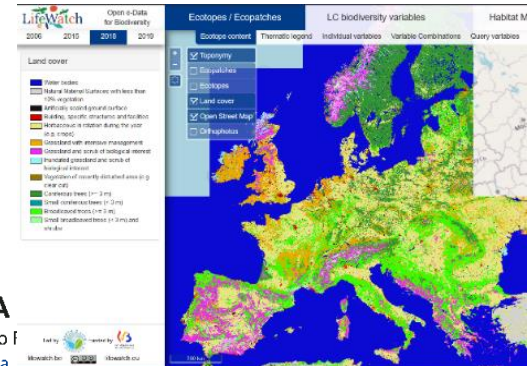
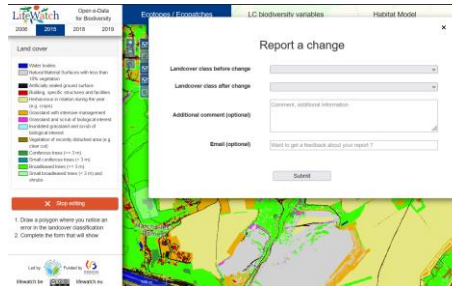


100+ variables for 3 millions polygons,
successfully used for birds, plants and butterflies models



Dataprism version of Europe : the ecopatches

- Coarser spatial resolution than ecotopes, but still high resolution (10 m)
- Made using remote sensing data and the best available sources
- Could be further improved with contributions of Lifewatch nodes and VGI
- Thriving to achieve the best quality that an infrastructure can offer
 - Long term vision
 - Continuous upgrades
 - 12 million polygons



Land cover view



Open e-Data
for Biodiversity

2006 2015 **2018** 2019

Land cover

- Water bodies
- Natural Material Surfaces with less than 10% vegetation
- Artificially sealed ground surface
- Building, specific structures and facilities
- Herbaceous in rotation during the year (e.g. crops)
- Grassland with intensive management
- Grassland and scrub of biological interest
- Inundated grassland and scrub of biological interest
- Vegetation of recently disturbed area (e.g. clear cut)
- Coniferous trees (≥ 3 m)
- Small coniferous trees (< 3 m)
- Broadleaved trees (≥ 3 m)
- Small broadleaved trees (< 3 m) and shrubs

Ecotopes / Ecopatches

LC biodiversity variables

Habitat Model

Antarctica

Ecotope content

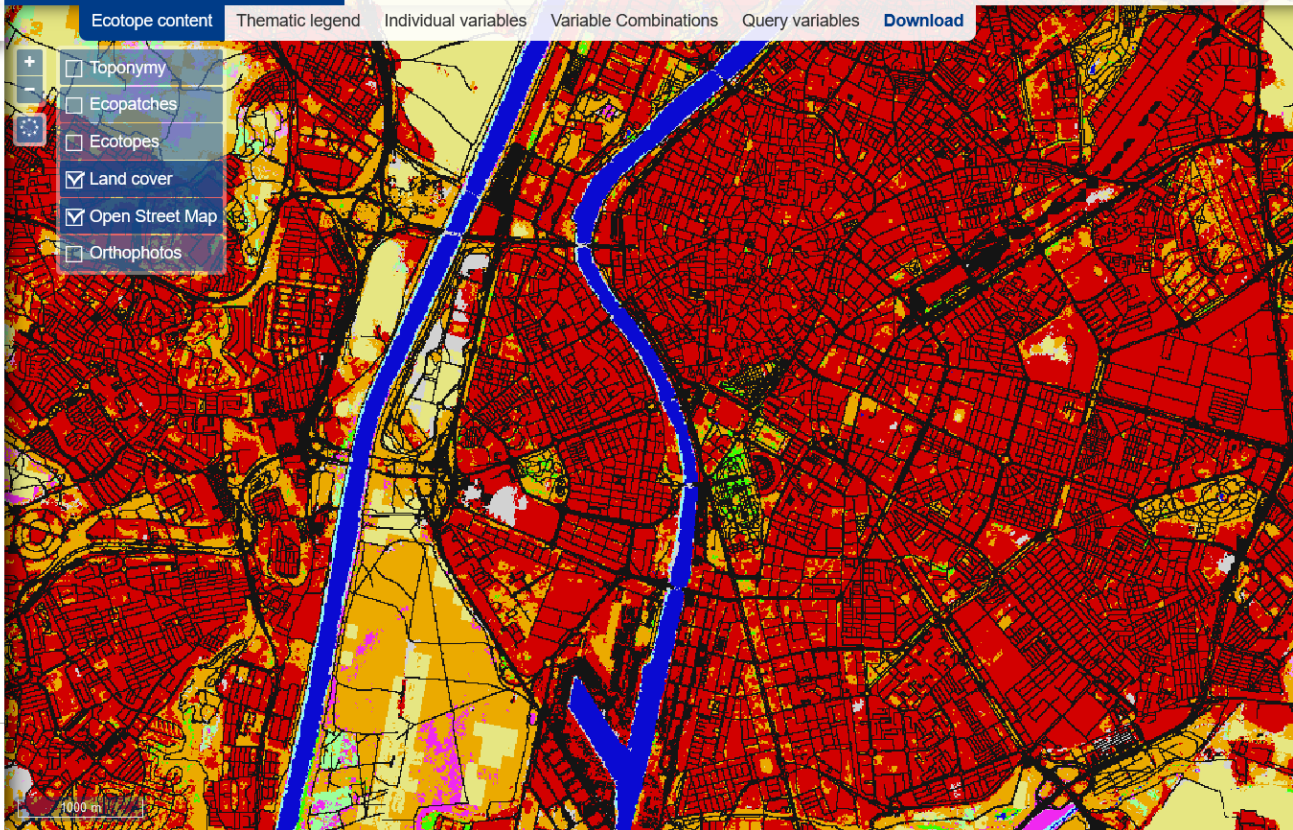
Thematic legend

Individual variables

Variable Combinations

Query variables

Download



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Dataprism view with LCCS land cover

Lifewatch Open e-Data for Biodiversity

2006 2015 **2018** 2019

Choose a legend :
LCCS

Land cover variables

- Dense Urban areas

detail in the ecopatch:

13%	16%	27%	44%
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Topographic variables

Other

Ecotopes / Ecopatches

- Toponymy
- Ecopatches
- Ecotopes
- Land cover
- Open Street Map
- Orthophotos

LC biodiversity variables

Habitat Model

Ecotope content Thematic legend Individual variables Variable Combinations Query variables **Download**

2 km

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Ecosystem view

The screenshot displays the 'Ecosystem view' interface of the LifeWatch Open e-Data for Biodiversity platform. The interface is divided into several sections:

- Header:** Features the LifeWatch logo and the text 'Open e-Data for Biodiversity'. It includes a year selector with options for 2006, 2015, 2018 (selected), and 2019.
- Navigation:** A top menu bar contains three main sections: 'Ecotopes / Ecopatches' (highlighted in dark blue), 'LC biodiversity variables', and 'Habitat Model'. Below these are sub-menus: 'Ecotope content', 'Thematic legend', 'Individual variables', 'Variable Combinations', 'Query variables', and a 'Download' button.
- Legend:** A 'Choose a legend :' section includes a dropdown menu for 'Ecosystem majority'. Below it are three expandable categories: 'Land cover variables' (containing 'Inland saline and brackish marshes'), 'Topographic variables', and 'Other'. A legend panel on the left side of the map lists layers with checkboxes: 'Toponymy' (checked), 'Ecopatches' (checked), 'Ecotopes' (unchecked), 'Land cover' (unchecked), 'Open Street Map' (checked), and 'Orthophotos' (unchecked).
- Map:** A large map area showing a colorful, multi-layered representation of an ecosystem. A blue location pin is placed on the map. A scale bar at the bottom left indicates '20 km'.
- Footer:** Contains the text 'Led by' with the Earth & Life Institute logo, 'Funded by' with the Federation Wallonie Bruxelles logo, the website 'lifewatch.be', and the Creative Commons Attribution-NonCommercial-ShareAlike license logo.



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Interested or just curious :
uclouvain.be/lifewatch



(Ecopatches are still in beta version, official release end of June)



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