This project is funded by the European Union

ENI SEIS II East
Implementation of the Shared Environmental Information System (SEIS) principles and practices in the ENP East region

Regional Conference on the outcome of the CLC-Pilot project, potential benefits and way forward in ENI-East countries

Austria: national applications of CLC and other COPERNICUS data

Gebhard Banko, Environment Agency Austria

European Environment Agency

Geospatial datasets on land cover in Austria

Existing national Datasets:

- *Land cover/use in cadastral map*
- *Forest map (since 2020)*
- *Agriculture*
  - *Land parcel identification system (LPIS/IACS), yearly updates*
- *Scientific data*
  - *Sentinel-2 based, Land cover 10*10m (2017)*
- *Ecosystem type map*
  - *Aggregation of various data sources*

Planned national Datasets:

- *Land cover*
  - *Orthofotos + digital surface model (object heights)*
  - *Geometric Resolution: 0,5m*
  - *Thematic resolution: 6-8 basic classes*
  - *Start in 2021*

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Need for COPERNICUS land cover data

- Various applications call for
  - Comparability across borders
  - EU wide harmonized land cover categories
  - Defined and long-term update intervals
  - Operational production

- Usage of COPERNICUS data for environmental applications
  - CORINE Land Cover
  - High Resolution Layers
  - Local Components

CORINE Land Cover – improvements over time

CLC phase	Improvement Austria
CLC 1990	Manual digitization on paper copy
CLC 2000	Settlements
CLC 2006	Forest + golf courses
CLC 2012	Agricultural + skiing areas
CLC 2018	High valuable ecosystems (bogs, mires)

Applications of CORINE Land Cover in AT

- Water (2004)
  - Pathways of nitrogen input into running water from nearby agricultural areas
- High nature value farmland (2006-2010)
  - Definition of biodiversity rich agricultural areas based on CORINE classes
- Habitat types (Natura 2000) – area estimates (2007 + 2013)
  - Estimation of area distribution for specific habitats
  - E.g. dwarf pine, screes, glaciers
  - Mostly large area covering habitats
  - Art. 17 reporting of Fauna flora habitat (FFH) directive
  - Map of ecosystem types (2013, 2020)
- Mapping and modelling of ecological corridors (2018)

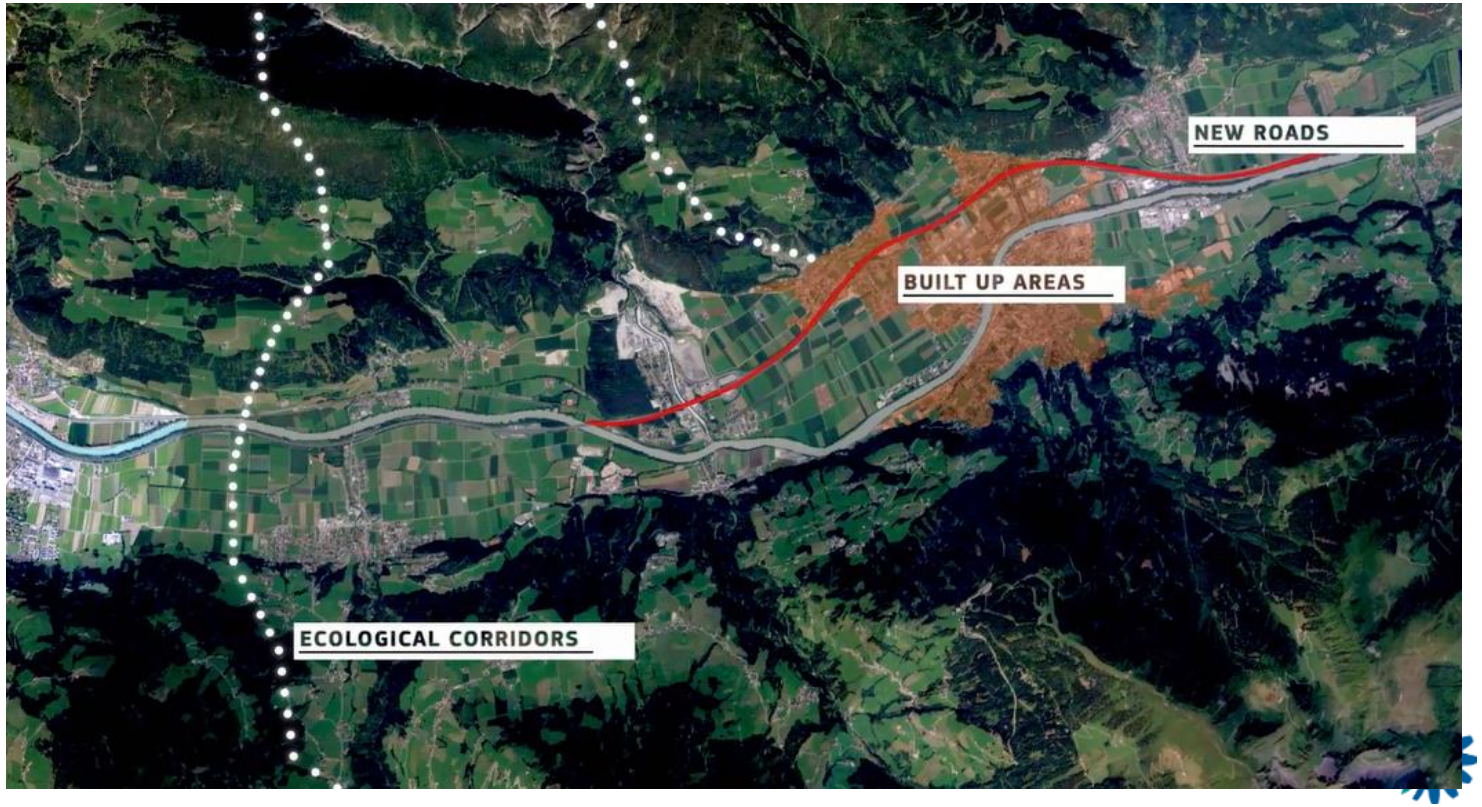
Environmental Agenda and derived applications

- European Union
  - EU Biodiversity Strategy
    - Example: Green Infrastructure: ecological corridors
  - LULUCF Regulation
  - Agriculture: CAP & climate measures
  - Water framework directive
  - Air Quality
- National Framework
  - Soil sealing → Example: national map
  - Map of Habitat types → Example: national map using CLC
  - Grassland management

Landscape connectivity

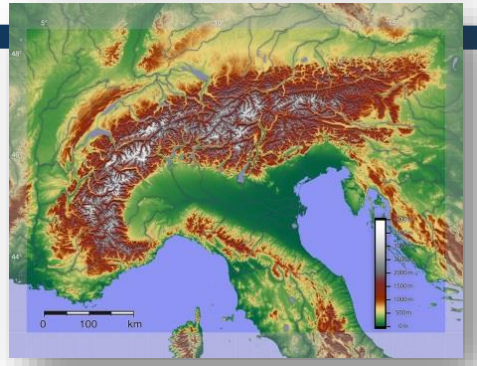
- Land take is dividing landscape into smaller and smaller pieces
  - → landscape fragmentation
  - absolute area numbers of land take in relation to Austria are still small, but
  - Spatial configuration is of major importance

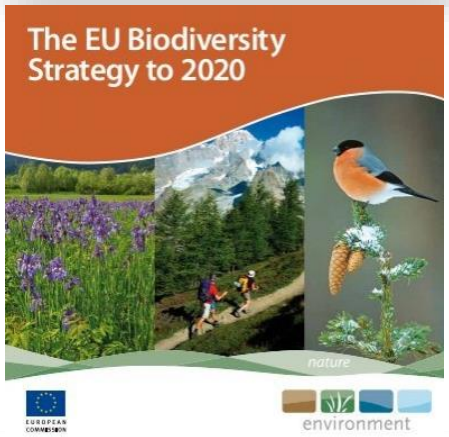
- Fragmented landscapes
  - Barriers for movement of animals
  - Barriers for human recreation



Normative references

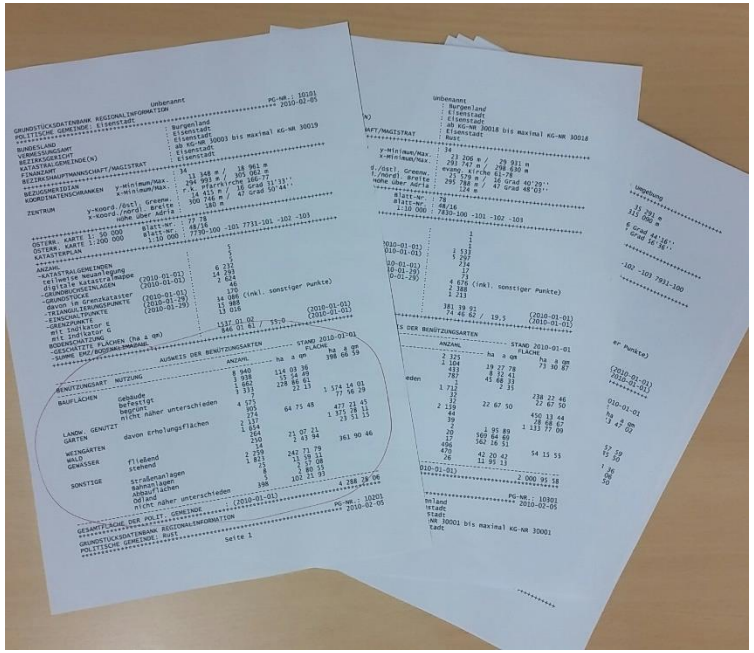
- International conventions
  - Alpine convention
  - Bern convention on conservation of European Wildlife and Natural Habitats
  - UN biodiversity convention– CBD
    - Aichi-Target 5: reduce fragmentation
- EU
  - EU biodiversity strategy 2020
  - EU biodiversity strategy 2030
  - Habitat directive
  - EU green infrastructure strategy
  - Guidance on a strategic framework for further supporting the deployment of EU-level green and blue infrastructure (SWD(2019) 193).
- Austria
  - Biodiversity strategy Austria 2020+
    - Target 10 : preserve species and habitats
    - Target 11: integrate biodiversity in spatial planning and traffic/mobility





NATURA 2000

Data Sources for land take



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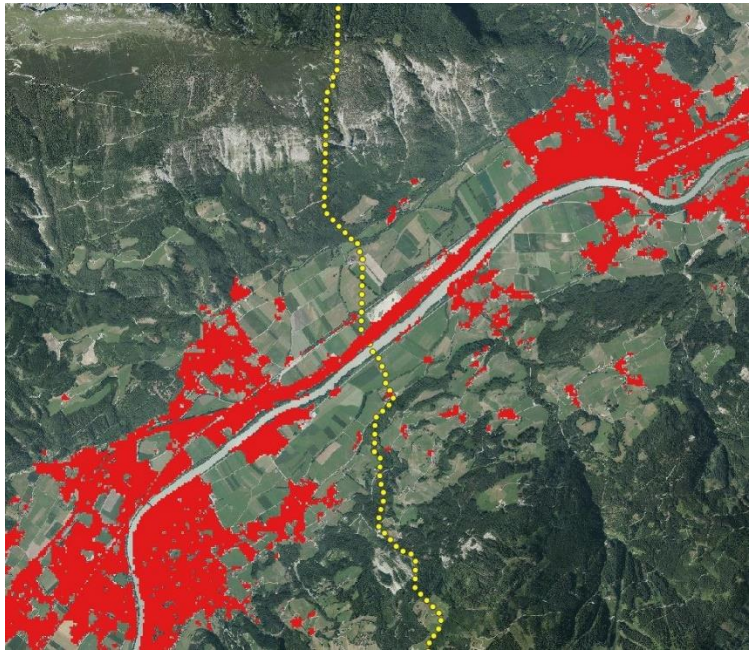

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- OLD data: statistically aggregated, not spatially explicit

- NEW data: spatially explicit, up-to-date

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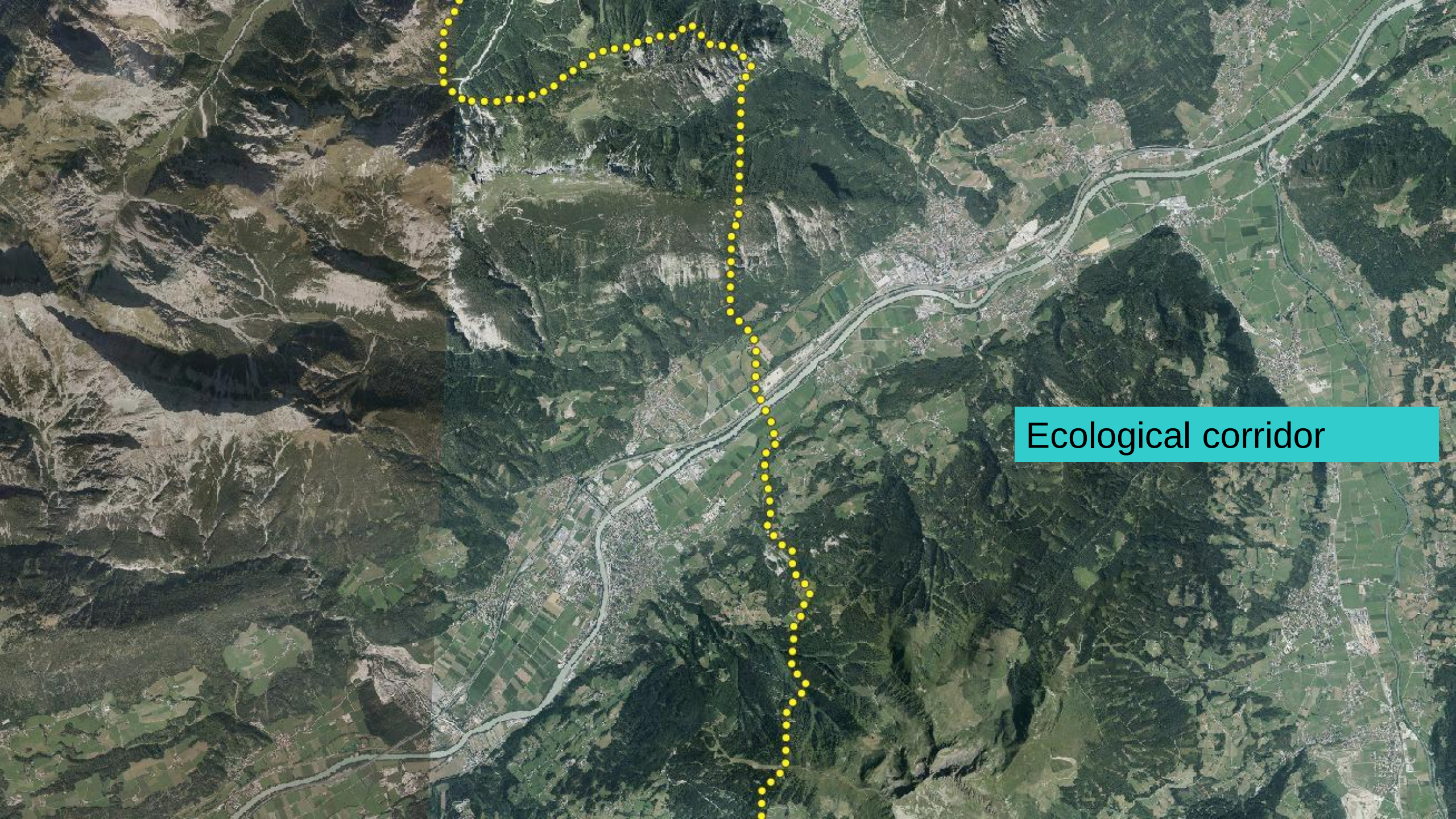
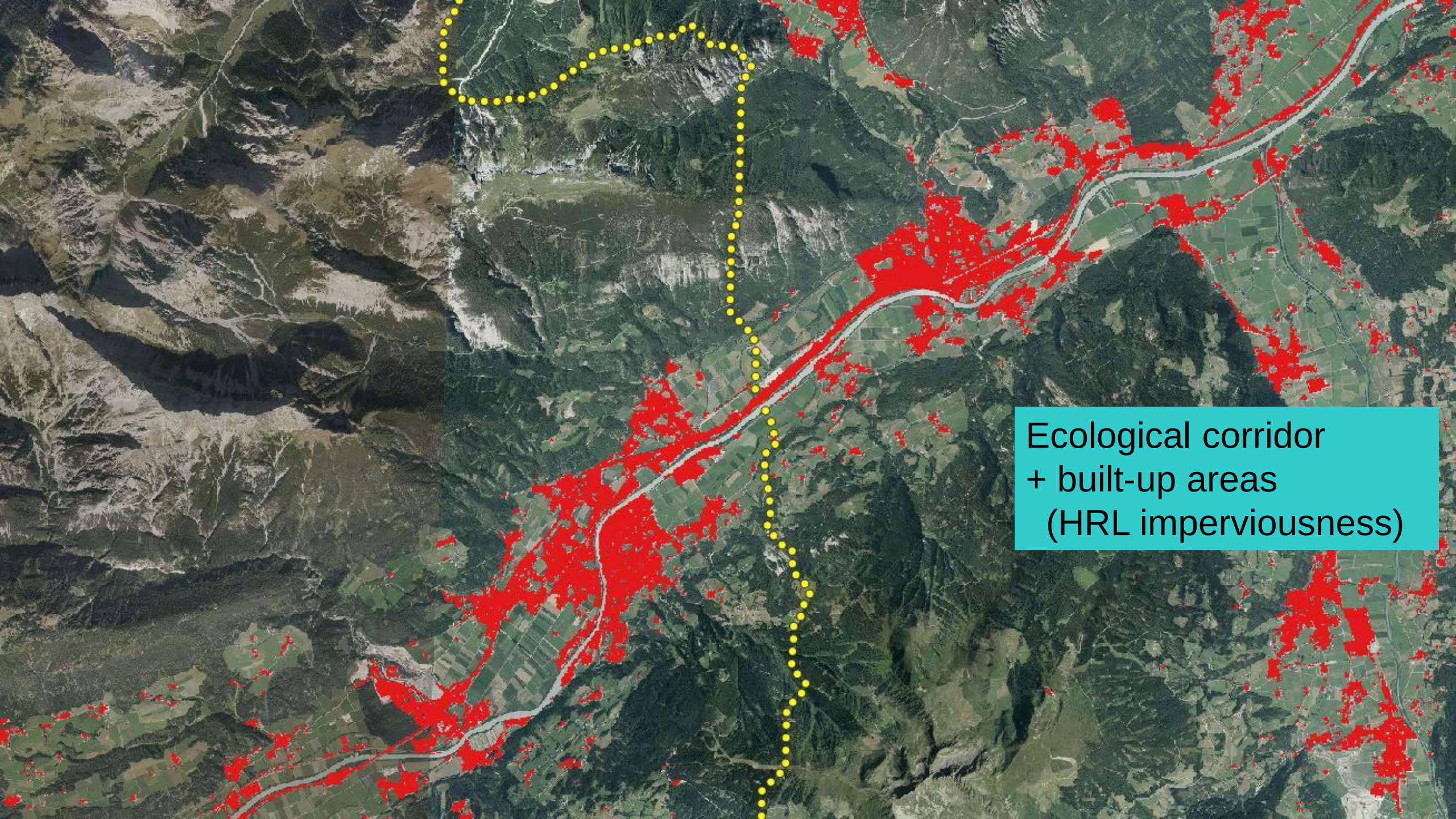
PASSING OF ALPINE VALLEY: RIVER „INN"

EXAMPLE: TIROL – NEU-TERFENS:


Ecological corridor


Ecological corridor
+ built-up areas
(HRL imperviousness)

GIS MODELLING OF CONNECTIVITY

DEFINITION OF RESISTANCE VALUES FOR LANDSCAPES

High resistance

1
0,8
0,6
0,4
0,2
0

resistance

settlement 1,0 large> 9 ha
0,85 small< 1,35 ha

Bare rock 0,9

Ice 0,8

Water 0,7

Cropland 0,4

Grassland 0,3

forest 0,2 small< 1 ha
0,01 large>10 ha

low resistance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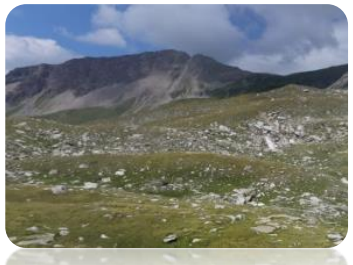
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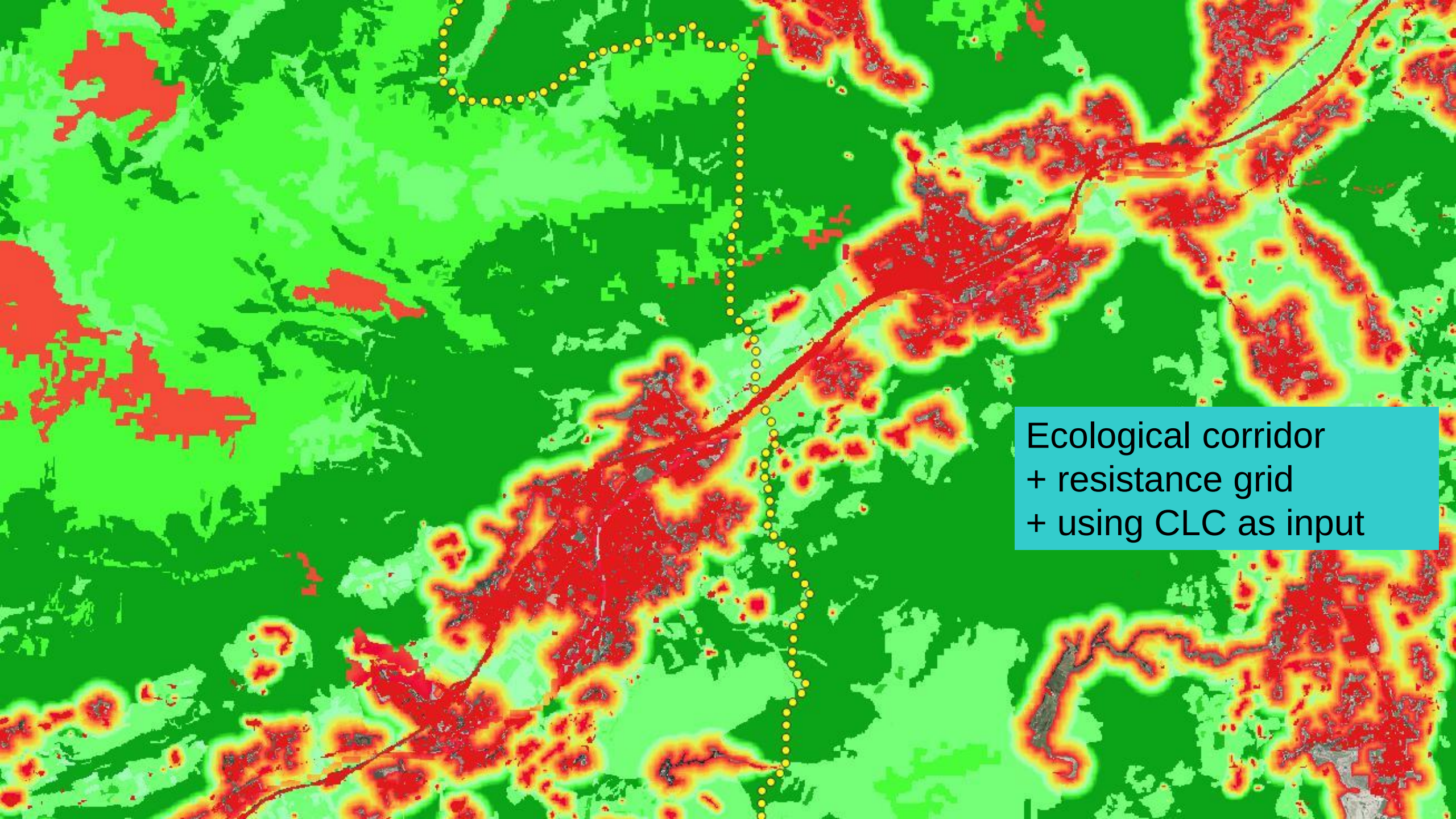
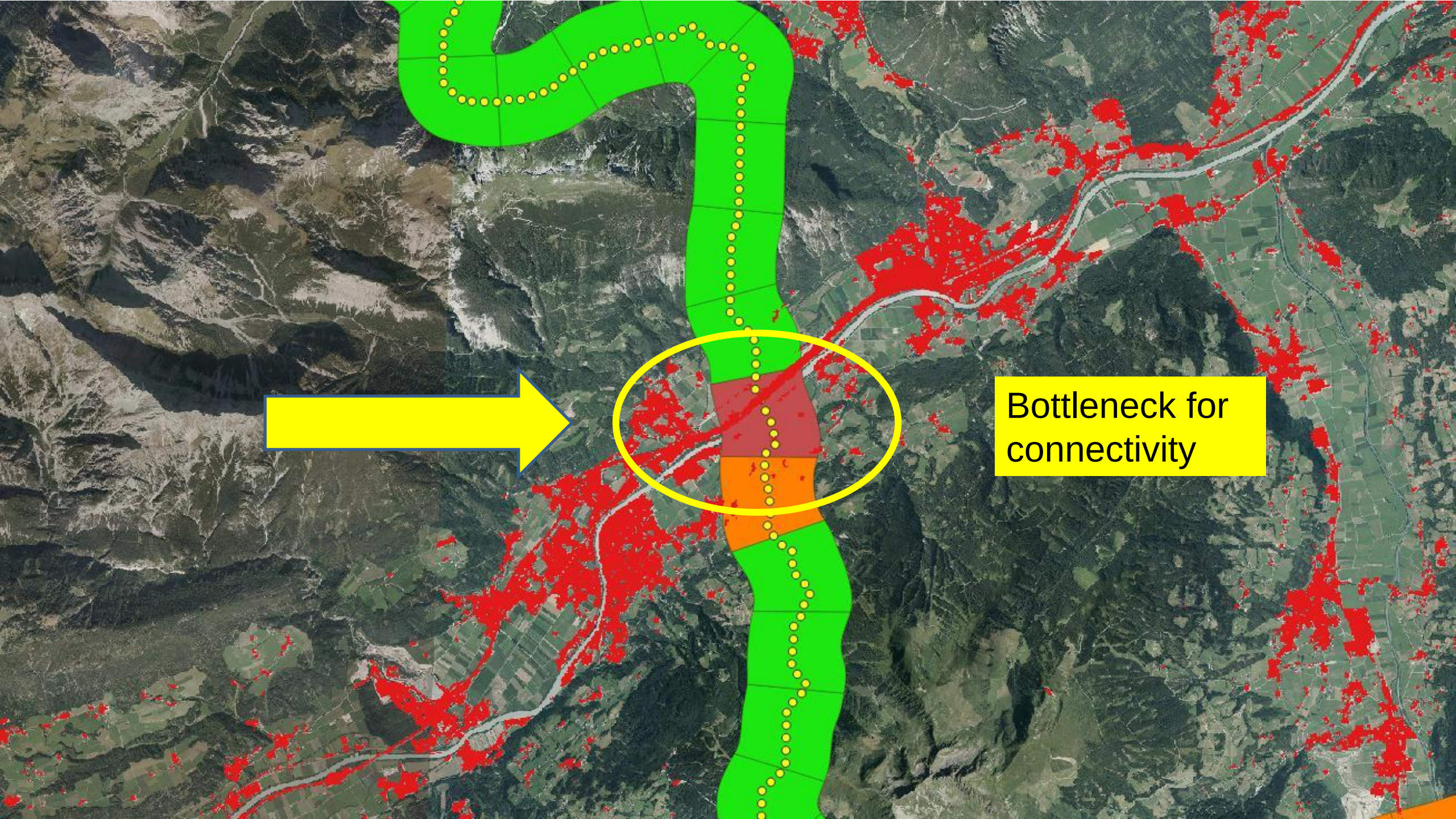

Ecological corridor
+ resistance grid
+ using CLC as input


Bottleneck for connectivity

PASSING OF ALPINE VALLEY: RIVER „INN“

EXAMPLE: TIROL – NEU-TERFENS :

MAINTAINANCE OF OPEN LANDSCAPES

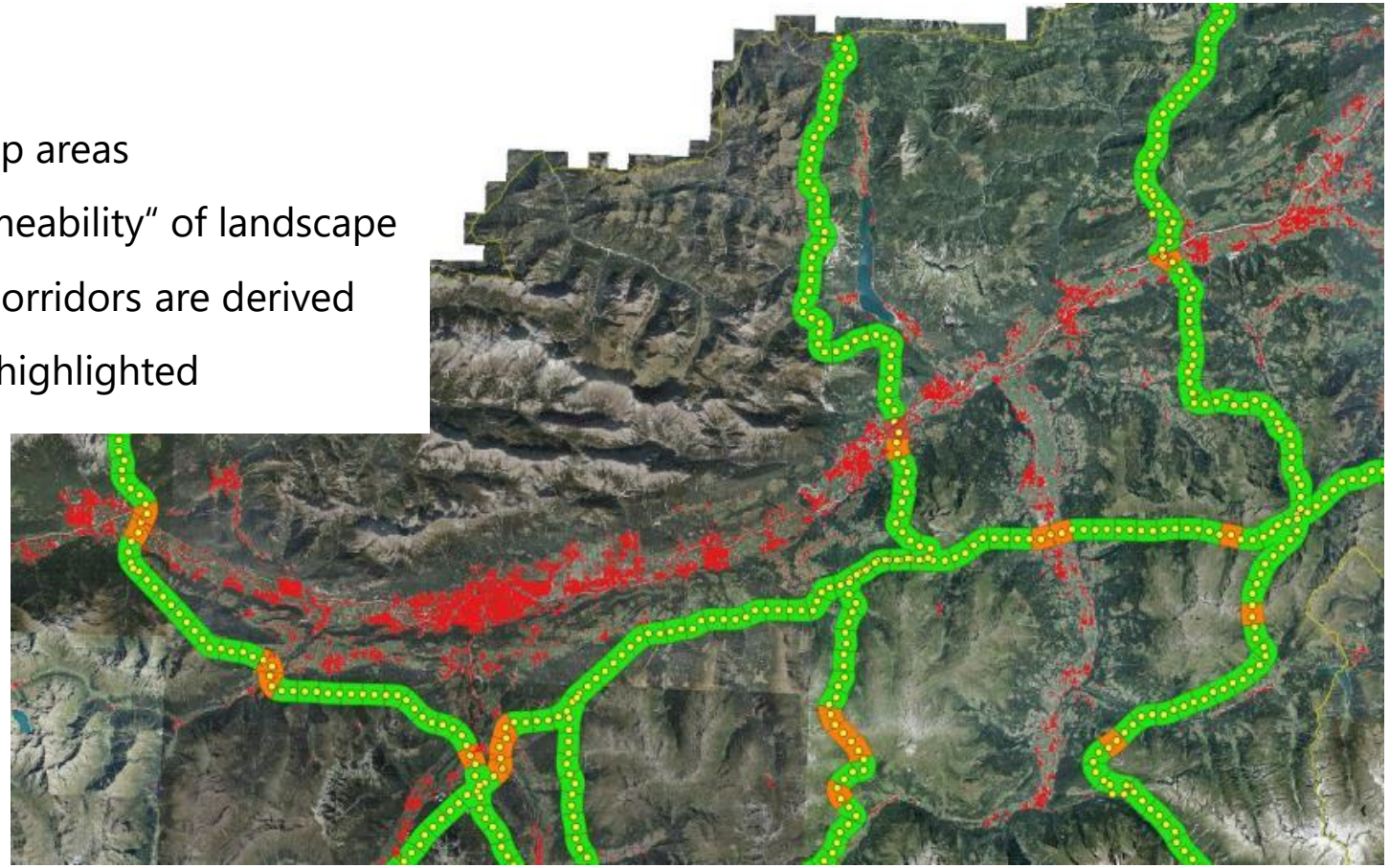
EXAMPLE: TIROL – NEU-TERFENS

Small settlement patches (red dashed areas) tend to grow and interrupt ecological corridors (green arrows)

spatial planning is needed to prevent settlement growth in sensible areas (ecological corridors)

Modelling of ecological corridors

- HRL imperviousness is used for
  - Main land cover information for built-up areas
  - Built-up areas are used to modell „permeability“ of landscape
  - from permeability map the ecological corridors are derived
  - Bottlenecks of ecological corridors are highlighted



Practical use

- Maintainance of ecological corridors using spatial planning
- Green bridges across highways
- Integration into climate change adaptation strategy
  - fragmentation

- VIDEO: https://youtu.be/bIbC9Lbu-sk

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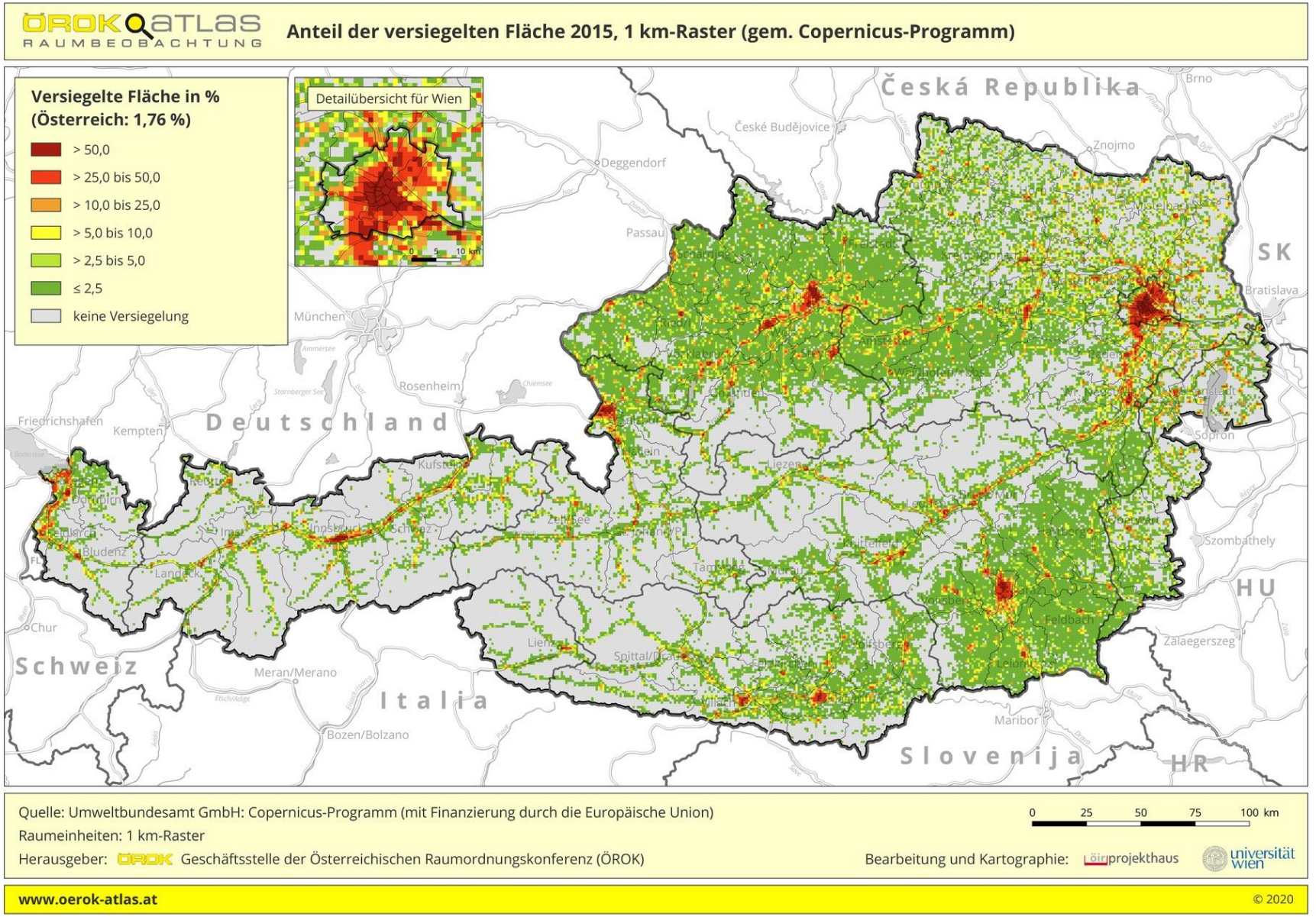
National Soil Sealing Map

- Soil sealing:
  - covering of the ground by an impermeable material (e.g. roads-asphalt, buildings, …)
- National atlas on spatial planning
  - Integration of a map on sealed areas
    - → HRL imperviousness
    - https://www.oerok-atlas.at/#indicator/61

National Soil Sealing Map



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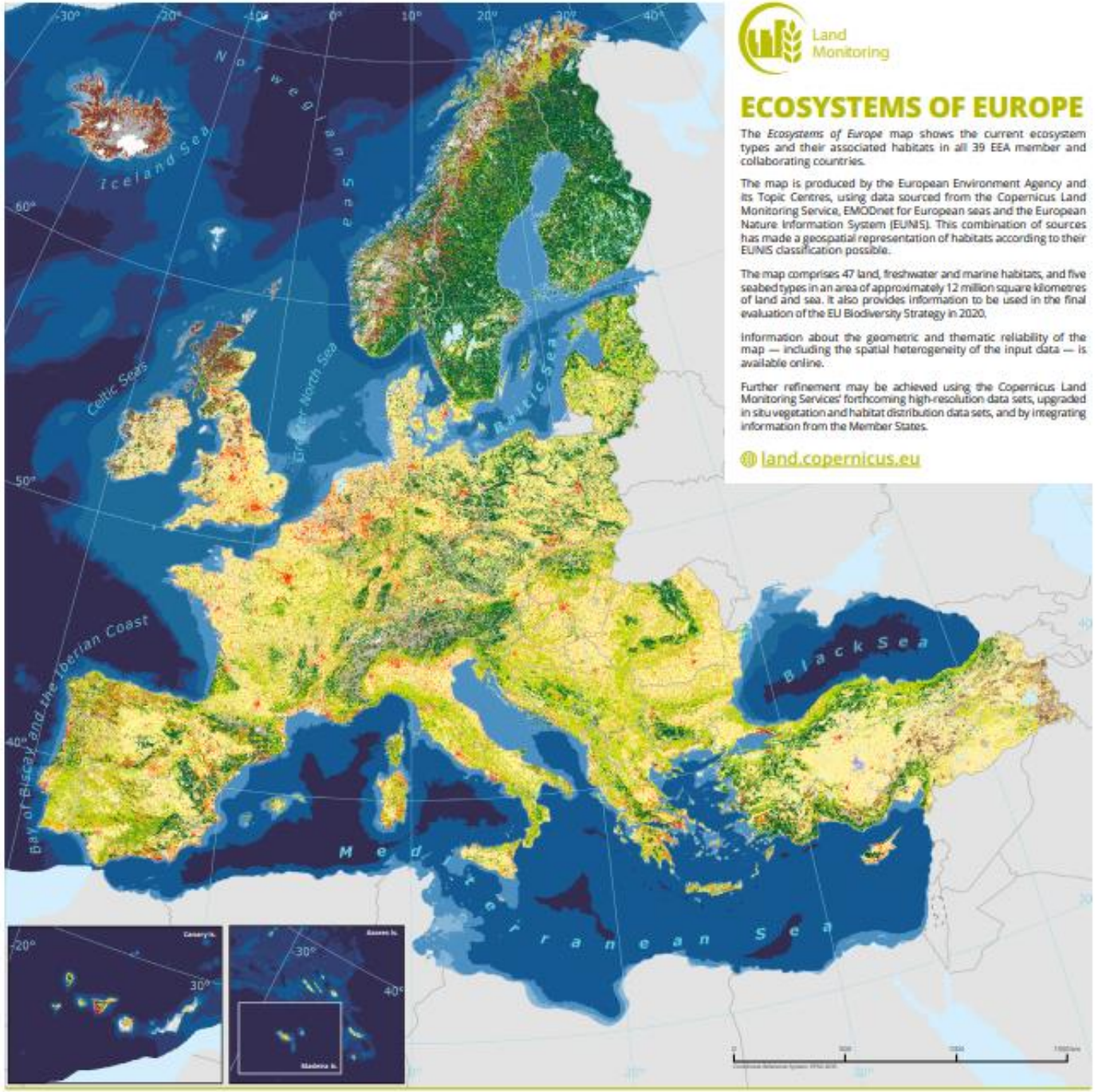
National ecosystem type map

- EU biodiversity strategy
  - MAES – mapping and assessment of ecosystems and their services
    - Assembling national data for European habitats level 3-5
      - Inventories nature protection (bogs, mires, dry grassland)
      - Biotope mapping inventories
      - IACS/LPIS
      - Forest map
      - CORINE Land Cover
      - HRLs
      - Etc.
    - EU-wide map
      - https://biodiversity.europa.eu/maes/maes-digital-atlas
    - Austrian wide national map

Map of MAES habitats



ECOSYSTEM MAP WITH EUROPEAN REGIONAL SEAS AND EUNIS HABITAT CLASSIFICATION

https://biodiversity.europa.eu/maes/mapping-ecosystems/map-of-european-ecosystem-types

LULUCF National Work

LULUCF: Land Use, Land Use Change and Forestry

- Main task: summary statistics on land summing up to 100%
  - Balancing different national statistics on main land use categories and changes in between
    - » Forest land (forest inventory)
    - » Grassland (agricultural parcel identification system)
    - » Arable land (agricultural parcel identification system)
    - » Wetland (nature conservation inventories)
    - » Settlement (cadastral information)
    - » Other Land
  - Tier 1 calculation
    - Overall statistics

Land Monitoring

Estimation of LULUCF emissions/removals

- Fundamental equation

For main carbon pools
- Biomass (above, below)
- Dead organic material
- Soil (organic, mineral)
- Harvested Wood Products (HWP)

Emission/removal (t CO2eq) = Area (ha) * Emission factor (t C/ha) * (-44/12)

Approaches
1
2
3

Tiers
1
2
3

- Differentiation between
  - „immediate“ carbon stock changes in the year of the land use change (e.g. carbon losses due to deforestation)
  - carbon accumulation/losses over time (e.g. carbon stock increase due to afforestation) => IPCC default transition period: 20 years

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Approaches: representing land-use areas

Land Monitoring

- Approach 1:
  - Total land use area, no data on conversion between land uses
- Approach 2:
  - Total land use area, including changes between categories
- Approach 3:
  - **Spatially explicit land use conversion data**
    - Sampling systems or
    - Remote sensing

Approach 1	Systems which identify the total area for each individual land use category within a country, but does not provide detailed information on the nature of conversions between the land uses. The boundary of the unit is often on a political/administrative level (municipality, country) and only net changes in the land area can be tracked (year to year change of total area). Typical datasets are national area statistics e.g. from an agricultural census which are often prepared for other purposes
Approach 2	Systems which identify total area for each individual land use category as well as the net losses and net gains of each land use category (i.e. the changes both from and to each land use category). The data are only available at an aggregated territorial level; the locations of specific land use and land use changes are not known.
Approach 3	Systems which allow land use and land use conversions to be tracked over time on a spatially explicit basis. According to the 2006 IPCC Guidelines such systems include wall-to-wall mapping using remote sensing as well as national sampling systems which track land use at specific point locations. Considering the latter means that **national forest inventories or land surveys that monitor land use and land use change at fixed locations should be considered approach 3**.

Thanks a lot for your attention

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