NGI-Cerac collaboration

Enhancing climate risk assessment through geospatial collaboration

Eurogeographics Members Webinar Series
18/09/2025

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Cerac - Introduction

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Council of Ministers' decision in 2021

- **Climate Risk Assessment Center** (Cerac)
- **Coordination body** dedicated to risk assessment related to climate crisis; **Independent center** of multidisciplinary expertise
- Enables **Belgium** to have at all time an **adequate and updated risk analysis** in relation to climate change and by extension **all planetary boundaries**
- Reports to the **National Security Council**

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A need for complex risk assessments

- All aspects of risks are taken into account: Hazard, Exposure, Vulnerability & Response
- Multidisciplinary approach: mobilizing expertise from different fields
- Holistic approach: consider both physical risks (impact of overshooting planetary boundaries) and transition risks (impact of mitigation, adaptation, loss & damage measures)
- Mid- to long-term perspective

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Collaboration agreement

2-years collaboration agreement (2023-2024)

- Project 1 – Benchmarking
- Project 2 – Biodiversity and wildfires risks pre-analysis + static maps

Agreement to be renewed in 2025

- Future project 3 – Transversal analysis of the flood hazard at Belgian scale

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Collaboration agreement

Cerac's interests:

- Contributes to the development of the strategic vision of Cerac and its implementation
- Benefits from NGI's geospatial expertise and reference data

NGI's interests:

- Strenghthens NGI's role as geobroker at the federal level, and more specifically in the climate risks area
- Broadens NGI's expertise

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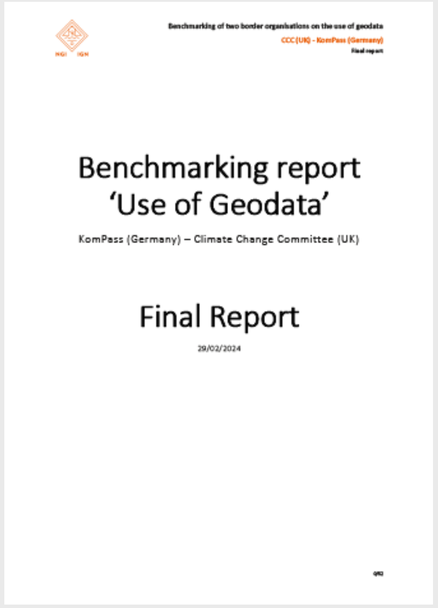
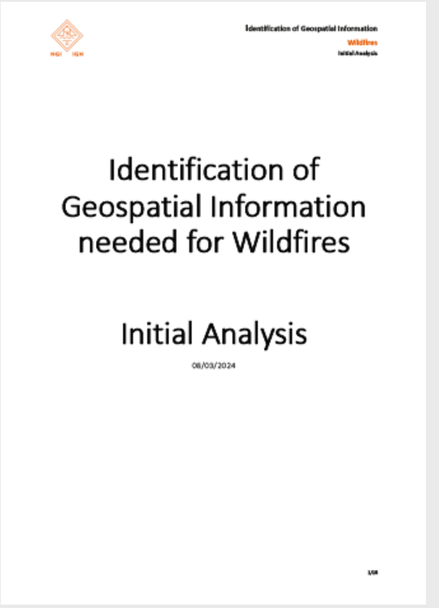
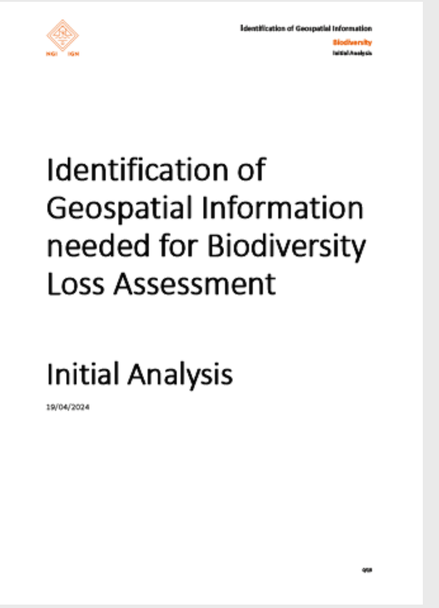
Projects

1st project

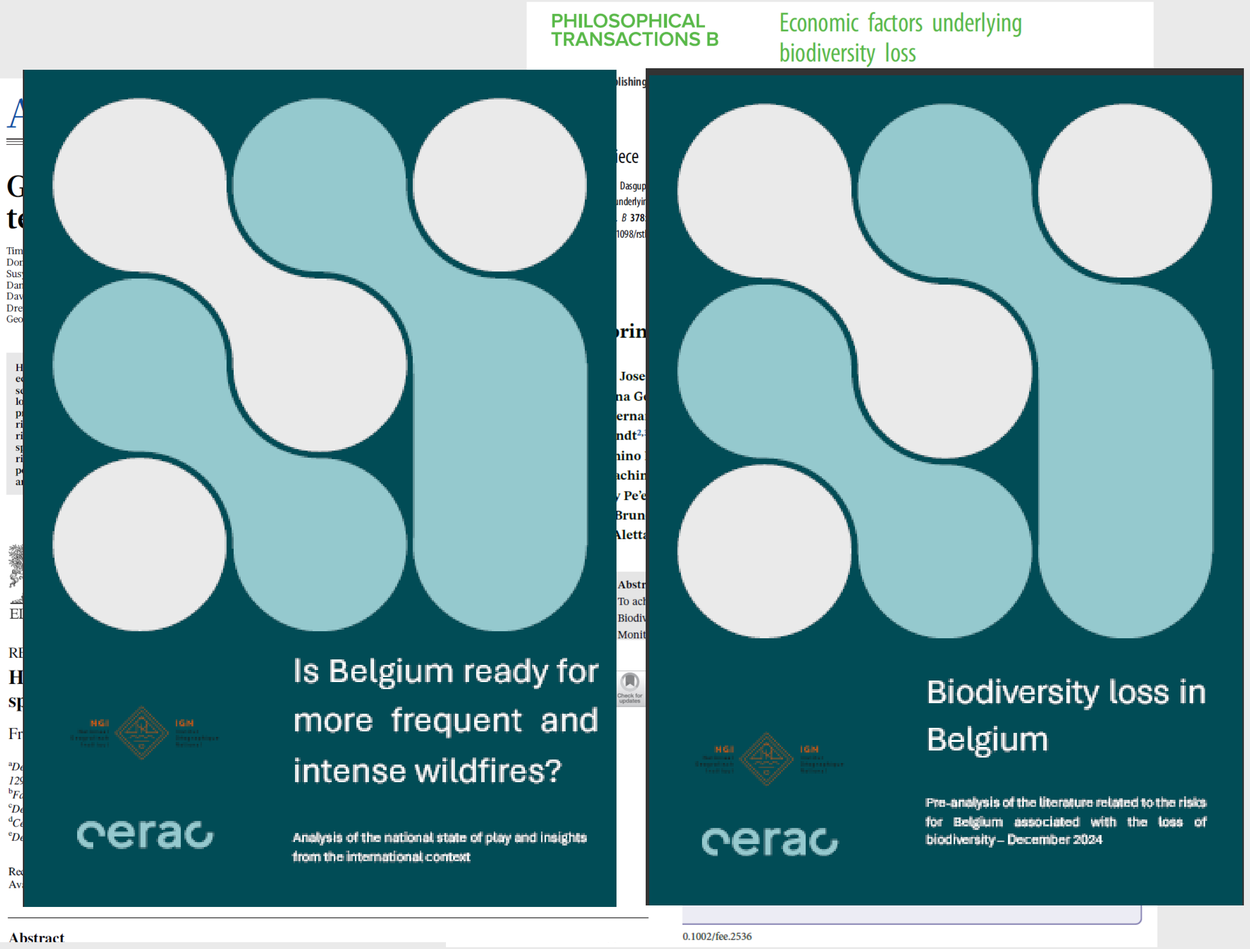
- Analysis of needs
- Benchmarking study
- GIS training
- Geospatial information identification for wildfires and biodiversity







2nd project



- Pre-analysis of **biodiversity loss** and **wildfires risks** in Belgium
  - Literature review
  - Identify state of knowledge and gaps
  - Identification of existing (and missing) relevant geospatial data
  - 2 reports as output serving as baseline reference for Belgian Climate Risk Assessment (BCRA)

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2nd project


DeMorgen.

IN HET NIEUWS | BETER LEVEN | MENINGEN | POLITIEK | TV & CULTUUR | TECH & WETENSCH

Nieuws Klimaat

België onvoldoende voorbereid op toenemend bosbrandgevaar: 'Ook Vlaanderen loopt steeds meer risico'


Meest recent Podcast Opinie De Helpdesk

De Standaard

KLIMAAT

België is niet voorbereid op natuurbranden: "Dat het de komende jaren zal branden, staat vast. Maar we weten niet waar"

In 2011 werden aan de rand van de Kalmthoutse heide 300 bewoners geëvacueerd. © belga


25/03/2025 18:38 Pourquoi déjà tant de feux de forêt en Belgique? «La saison des incendies va devenir de plus en plus longue»

LIRE MES MAGAZINES BONJOUR ELISE

Focus

le vif.

Environnement

Pourquoi déjà tant de feux de forêt en Belgique? «La saison des incendies va devenir de plus en plus longue»

Elise Legrand
Journaliste hier à 17:01 Mise à jour le: 10:57

réchauffement climatique. «La saison des incendies en milieu naturel va **commencer plus tôt** et **être plus longue** qu'aujourd'hui», confirme Rink Kruk, chercheur à l'Institut géographique national (IGN). Globalement, les **feux de végétation** pourraient d'ailleurs **«significativement augmenter» dans les 15 à 20 prochaines années**, pointe un rapport publié par le Centre d'analyse des risques du changement climatique (Cerac) le 28 février, co-rédigé par l'expert. «La hausse des températures, les sécheresses prolongées et l'intensification des phénomènes climatiques extrêmes vont **bouleverser les écosystèmes forestiers** et rendre la Belgique plus sujette à ces événements», poursuit le chercheur. Une prévision déjà établie dans un récent rapport du Centre


LE SOIR

Les programmes TV de la semaine

CLIMAT

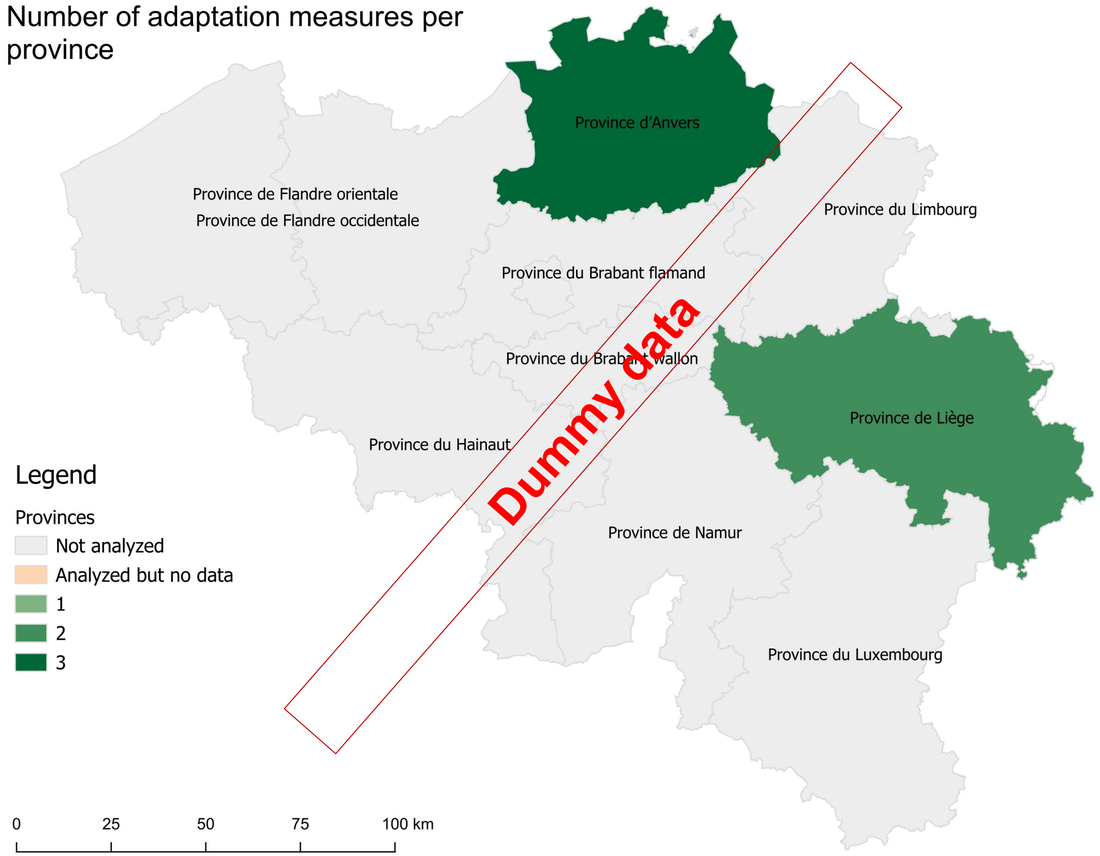
La Belgique pas assez préparée pour faire face aux incendies

Le risque de multiplication d'incendies de forêt dans notre pays augmente en raison du réchauffement du climat. Et nous ne sommes pas suffisamment équipés, selon un rapport dont « Le Soir » a pris connaissance.

- **Wildfires risks** report published in February 2025

Is Belgium ready for more frequent and intense wildfires? | CERAC

2nd project



- Production of static maps – Belgian municipalities and provinces
- Delivering of python codes for re-use

Future 3d project – drafting phase

- Analysis of flood hazard at Belgian scale
- **Phase 1**: Identify key stakeholders and relevant existing geospatial data
- **Phase 2**: Preliminary cartographic representation
- **Phase 3**: Recommendations and further work

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Key findings from the biodiversity literature review

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“

Biodiversity in peril carries the risk of a compromised future

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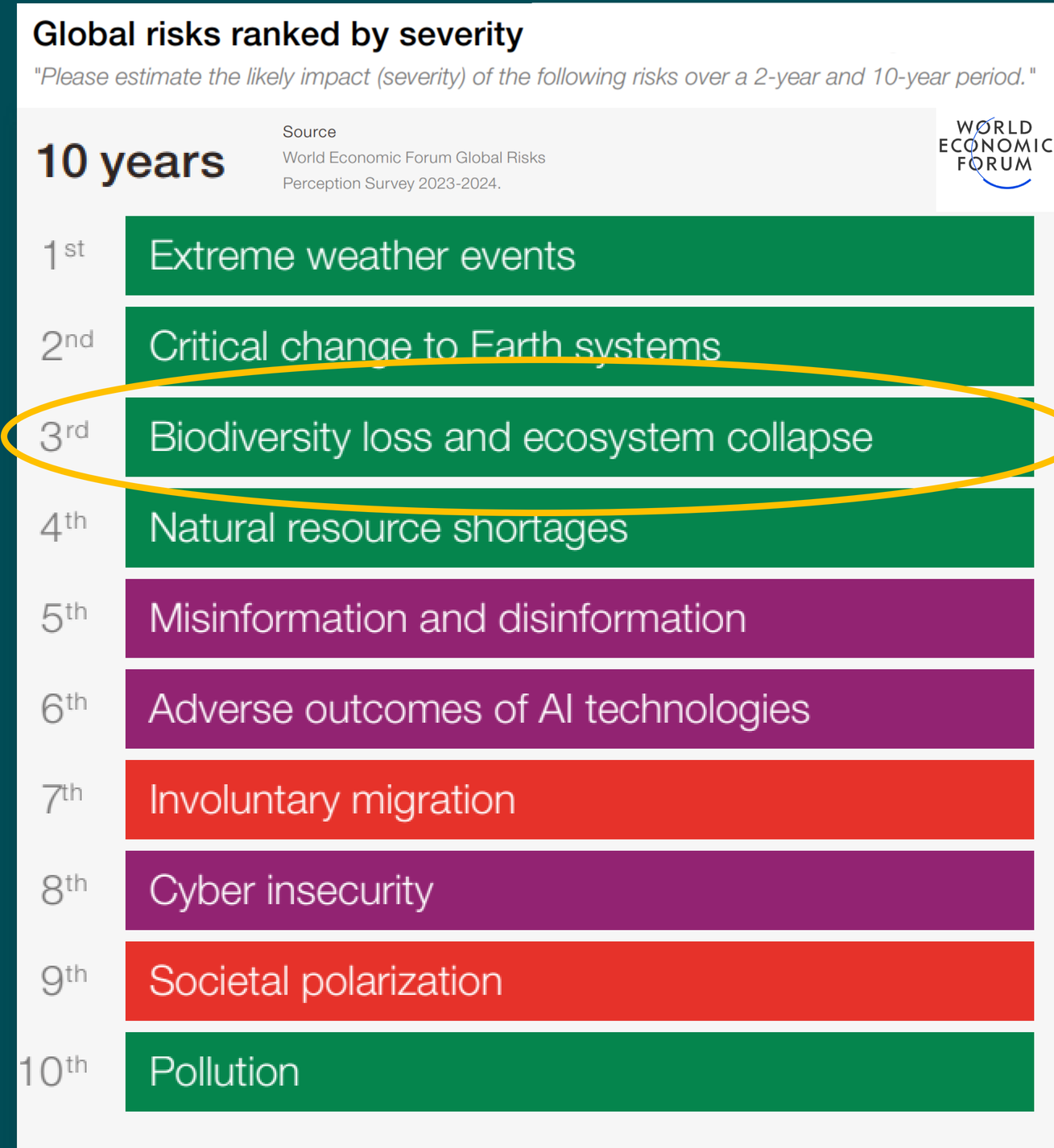
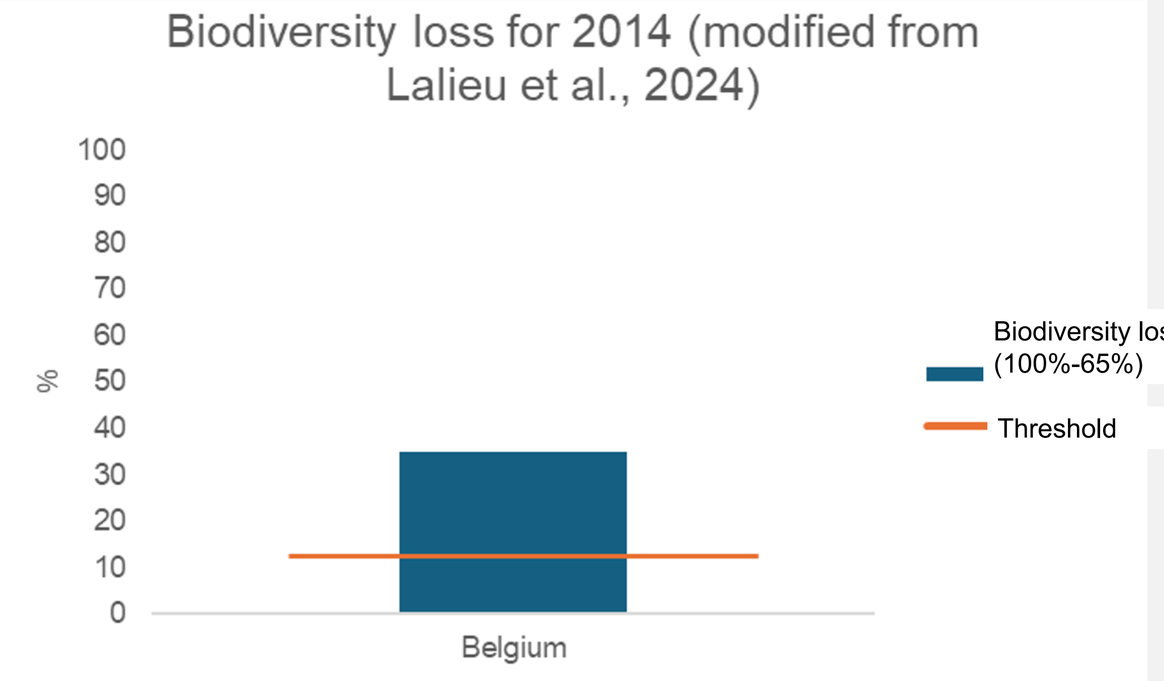
Cerac communication, October 2024



State of biodiversity in Belgium

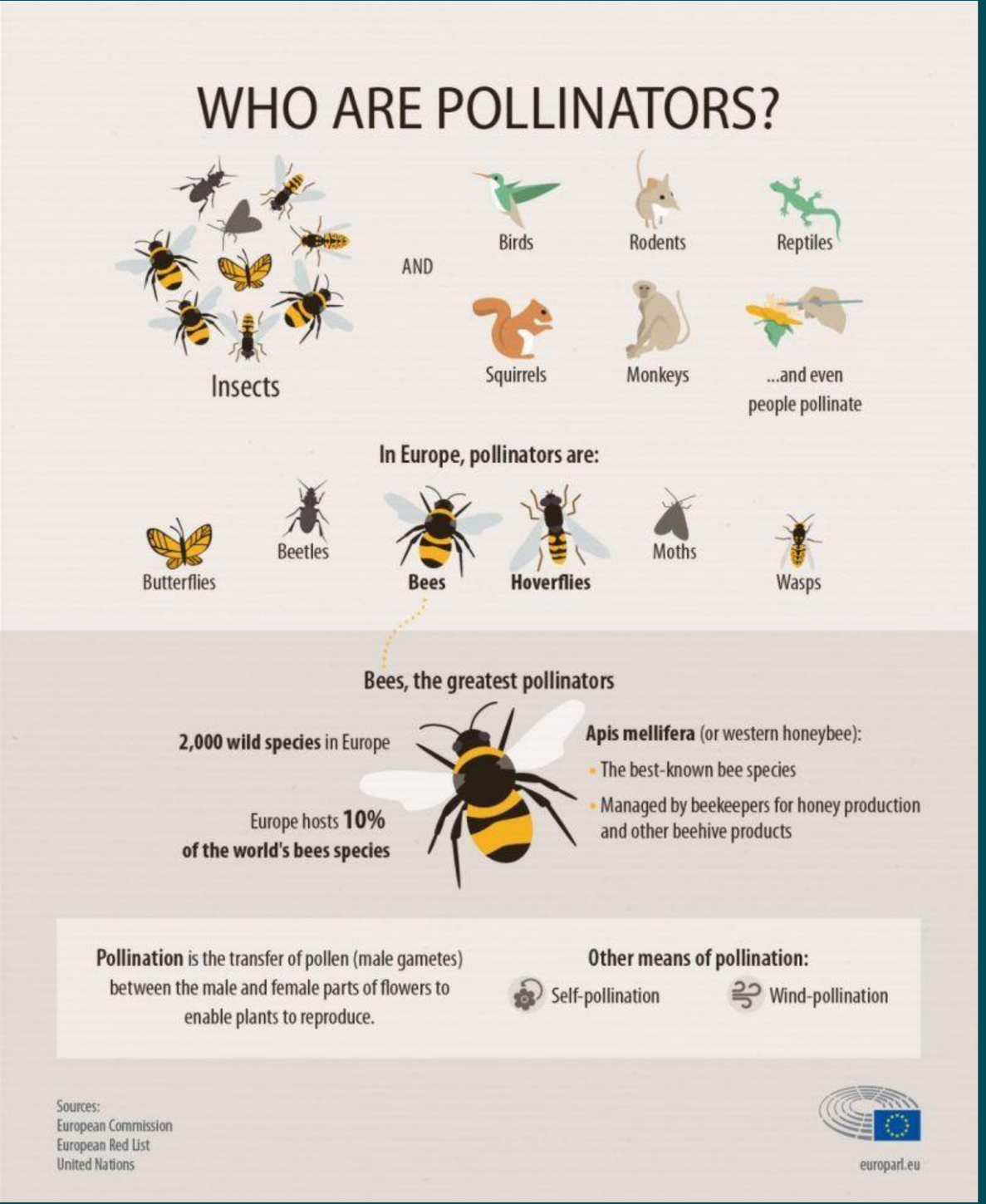
Planetary Boundary Report (Lalieu et al., 2024)

A BII[1] of 65% was calculated for Belgium's biosphere integrity (British National History Museum, 2014).



[1]Biodiversity Intactness Index

➔ the maximal boundary has been exceeded by **3.5** - surpassing its safe operating space



Measuring biodiversity

How to measure biodiversity?

- Multiple control variables are used in the literature for assessing the multidimensional complexity of biodiversity

WWF (2020)

How to measure biodiversity?

Ground-sourced measurements:

- Abundance
- Occurrence
- Species richness

Remotely-sensed measurements:

- Land cover
- Vegetation indices (e.g. NDVI)
- Canopy height (LiDAR)

How to measure biodiversity?

Remotely-sensed measurements

KEY POINTS

- Mainly used for forests and environmental applications
- Potential to transpose remote sensing data into biodiversity metrics
- Potential for improving the monitoring of biodiversity over time in some ecosystems (e.g. woody vegetation)

EXAMPLES OF SATELLITE IMAGES USED IN ENVIRONMENTAL APPLICATIONS

ICESat-2
ICE, CLOUD, AND LAND ELEVATION SATELLITE-2

Sentinel-2

NASA Landsat

NASA MODIS
MODERATE RESOLUTION IMAGING SPECTRORADIOMETER

Biodiversity indicators

Using indicators to understand change over different timescales and different aspects of biodiversity.

- **Red List Index** (IUCN)
    - Extinction risk of species
- **Biodiversity Intactness Index** (NHM, UK)
    - Change in population abundance compared to pre-industrial era
- **Living Planet Index** (WWF)
    - Change in vertebrate population abundance

Biodiversity Intactness Index

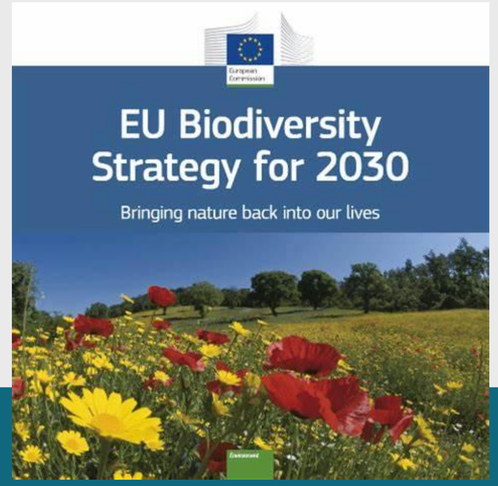
Integrate multiple indicators and combine field and satellite data to tackle the lack of global standardized biodiversity measure

Example of work

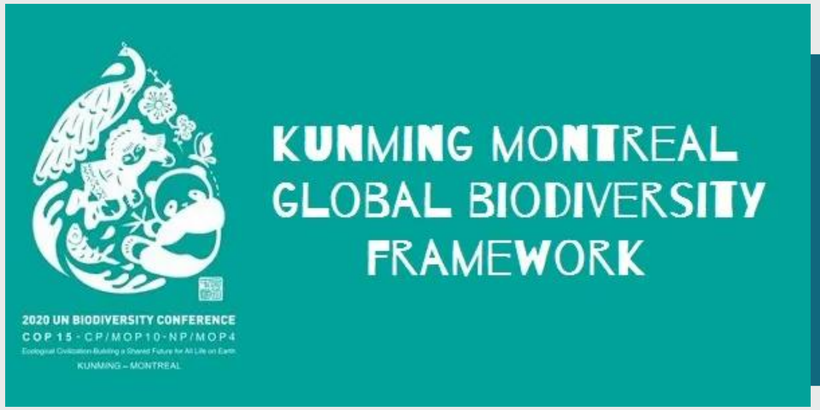
- **SEED framework**: consolidates the multiple dimensions of biodiversity (genetic, species and ecosystems) across various taxa (plants, animals and microbial) into a single measure of biocomplexity at every location (McElderry et al., pre-print)
- **GEO BON** Essential Biodiversity Variables (EBVs)
- **Natural Capital Metrics** (Norton et al., 2018)

Biodiversity monitoring

Biodiversity monitoring is a cross-border challenge



Stratégie nationale pour la biodiversité



The Birds Directive

EU measures to protect Europe's wild bird species

The Habitats Directive

EU measures to conserve Europe's wild flora and fauna

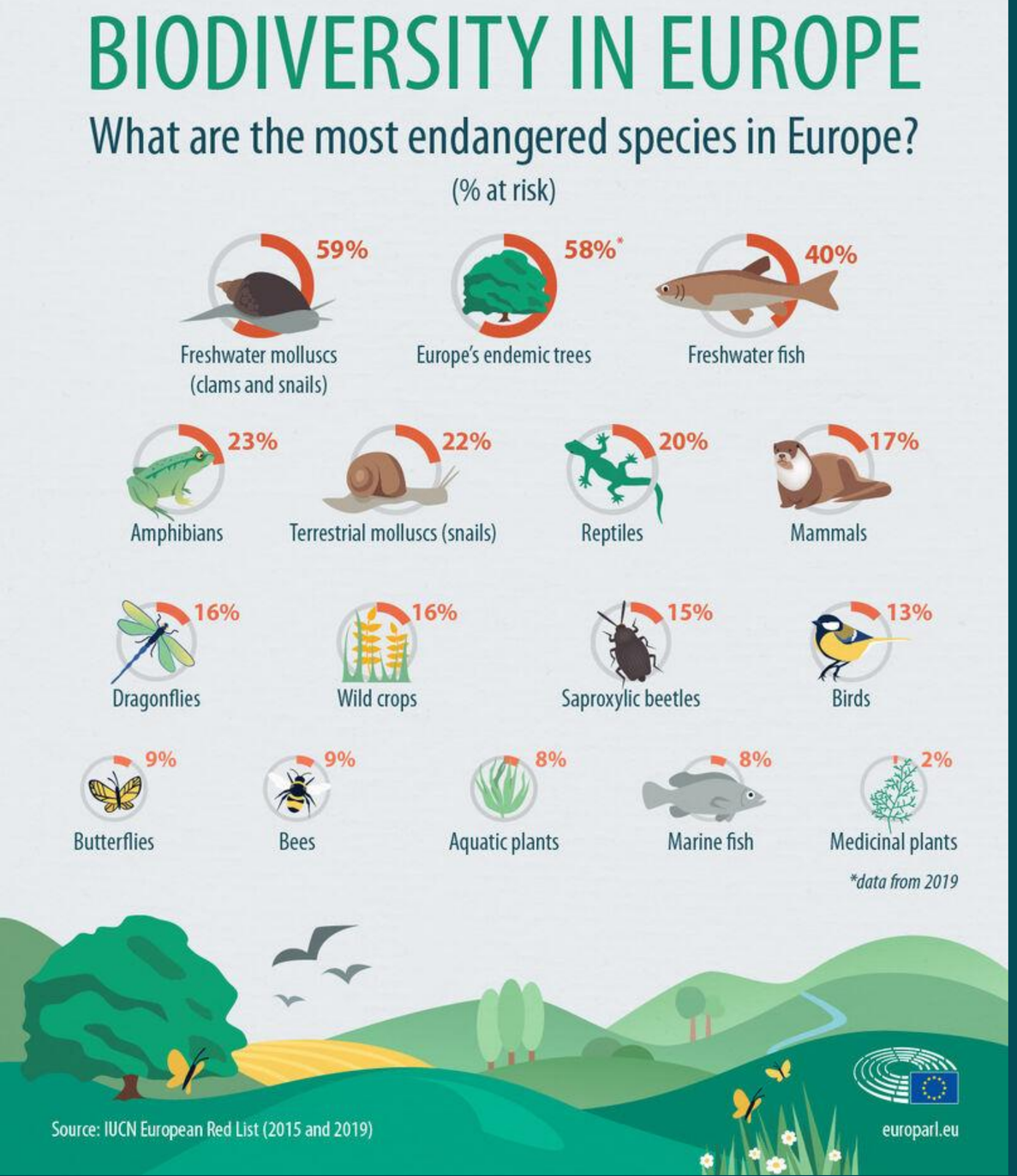
These policy tools requires common way of reporting and assessing progress towards targets.

Biodiversity monitoring is a cross-border challenge

Gaps

- Lack of integrated data
- Insufficient data (fragmented spatial coverage, low monitoring frequency)
- Taxonomic bias

“Monitoring efforts in Europe, however, suffer from gaps and biases in taxonomy, spatial coverage, and temporal resolution, resulting in fragmented and disconnected data”
(Moersberger et. al, 2024).



Biodiversity risks

“

Biodiversity risk is location-specific

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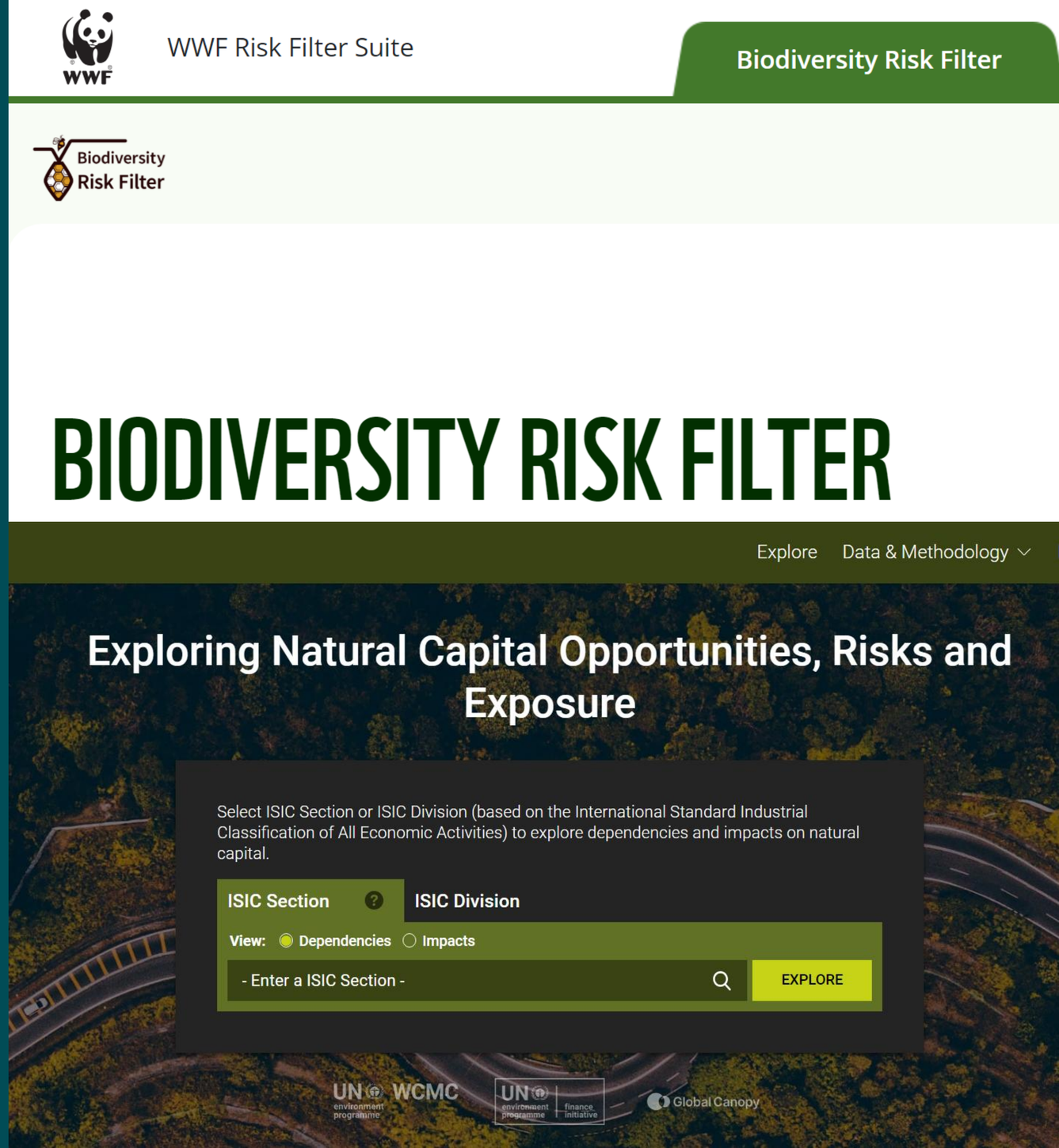
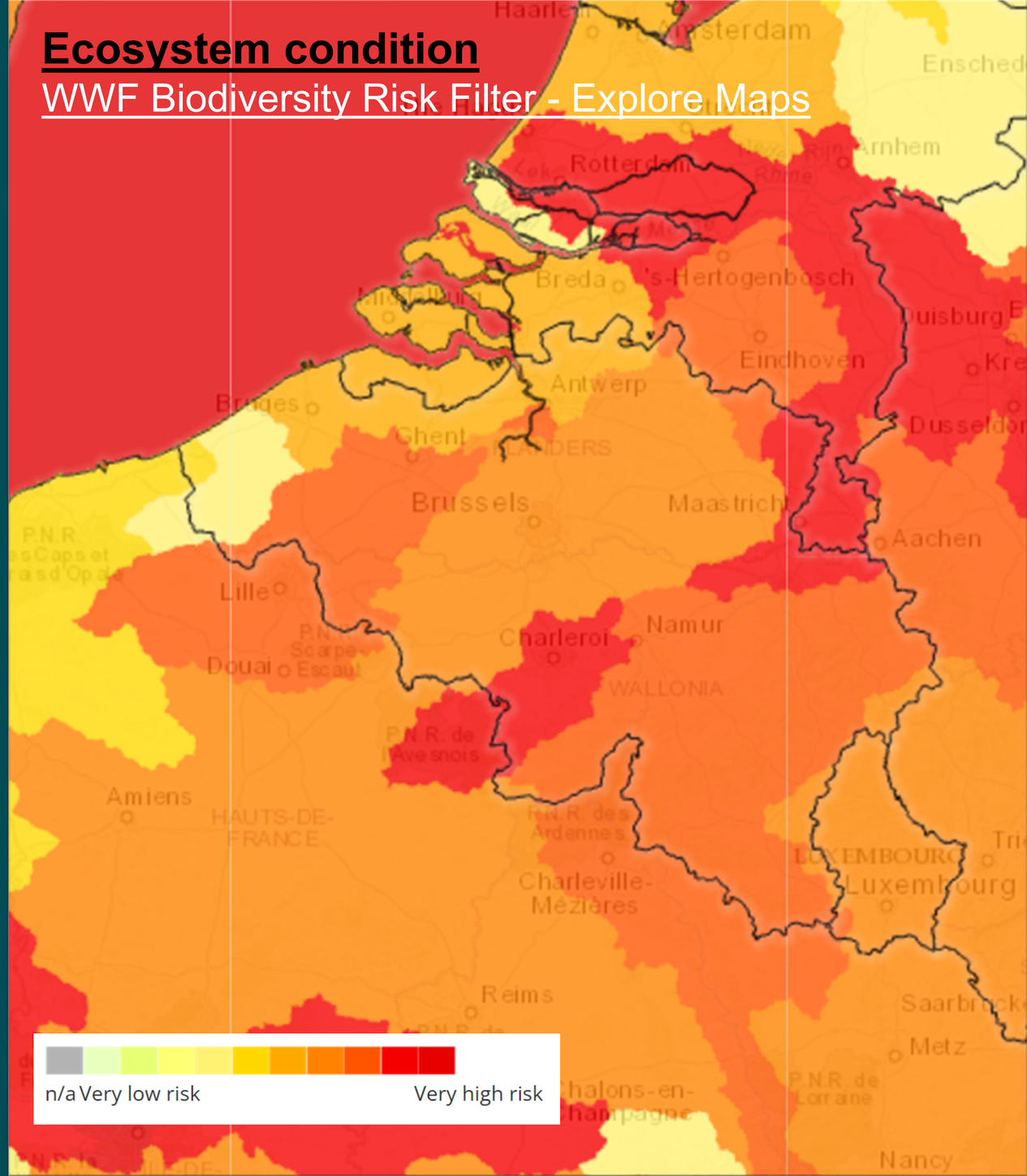
- WWF Biodiversity Risk Filter
- The ENCORE tool

➔Designed for companies and investors



The Biodiversity Risk Filter (WWF)

- 50 global datasets
- Watershed spatial unit (HydroBASINS level 7)



Conclusions from the review

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Main conclusions from the biodiversity literature review

- A lot of effort in finding a common framework for assessing biodiversity
- Biodiversity loss risks is an issue already partially tackled by financial institutions
- **3-dimensional axes of improvement:**

1) Spatial coverage

Some ecosystems are not well studied, i.e. the current focus is on vulnerable ones.

2) Taxonomic coverage

The ordinary biodiversity is in the blind spot.

3) Temporal coverage

More frequent and long-term monitoring is needed.

Conclusions from the NGI-Cerac collaboration

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Conclusions from the NGI-Cerac collaboration

- ✓ **Strategic leadership**: Reinforced NGI's position as Belgium's federal geobroker and a key contributor to national climate resilience, safety and security.
- ✓ **Capacity building**: Trained CERAC staff in geospatial tools, enhancing their analytical capabilities.
- ✓ **Enhanced preparedness**: Delivered reports addressing biodiversity loss and future wildfire risks to guide long-term strategies.
- ✓ **Collaboration foundation**: Laid the groundwork for a collaboration agreement to extend the partnership beyond 2024, making sure that Climate Risk Assessments in Belgium do not lack essential geospatial information.
- ✓ **Effective communication**: Use of advanced maps and visualisations to clearly convey complex risk analyses to diverse audiences, ensuring the findings resonate with both experts and non-experts.
- ✓ **Strengthened policy-making and public awareness**: Provided actionable insights and accessible tools, including impactful visualisations, to enable the National Security Council, policymakers, and the public to better understand and anticipate climate risks.

Thank you for your attention

Questions ?

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