

NGI
Nationaal
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Instituut



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Géographique
National

NGI-Cerac collaboration

Enhancing climate risk assessment through geospatial collaboration

Eurogeographics Members Webinar Series
18/09/2025

Annie Royen

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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**

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



NGI-Cerac partnership

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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

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:

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

NGI-Cerac partnership

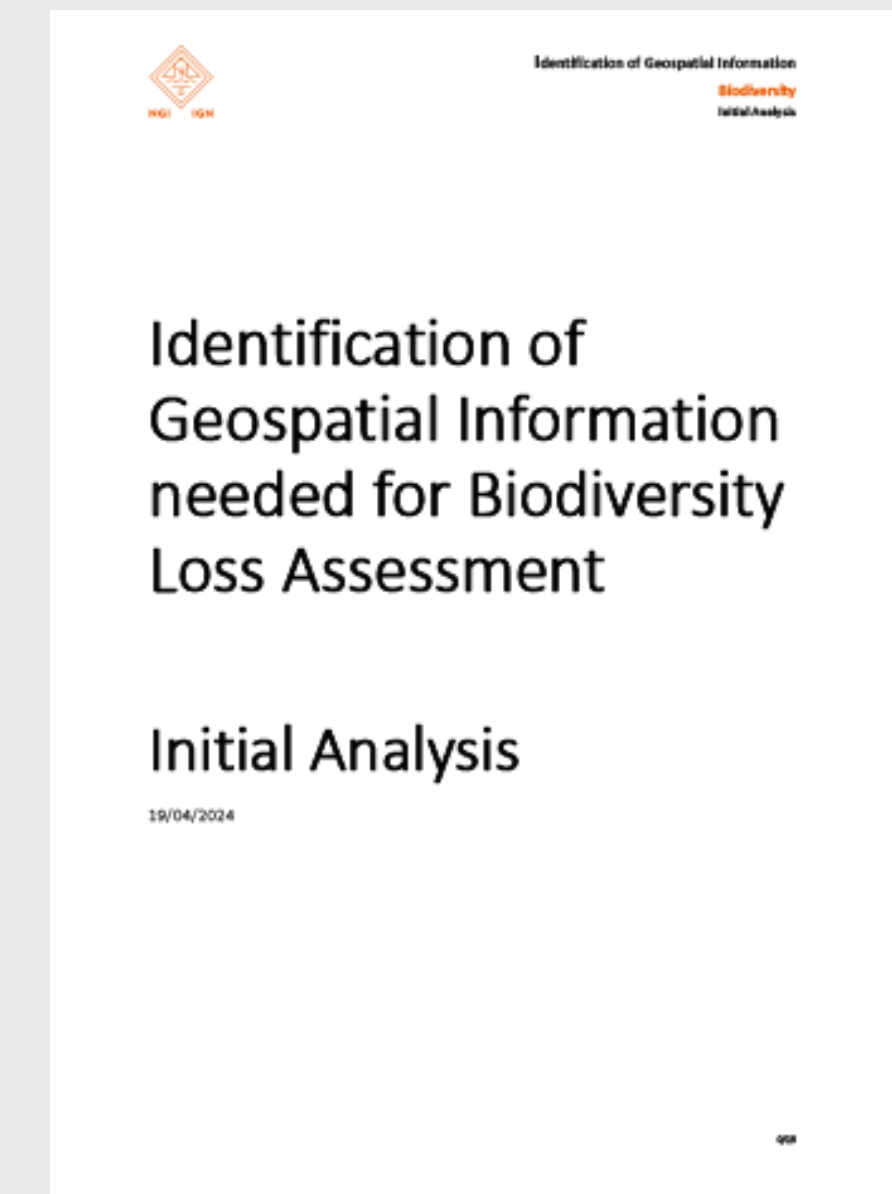
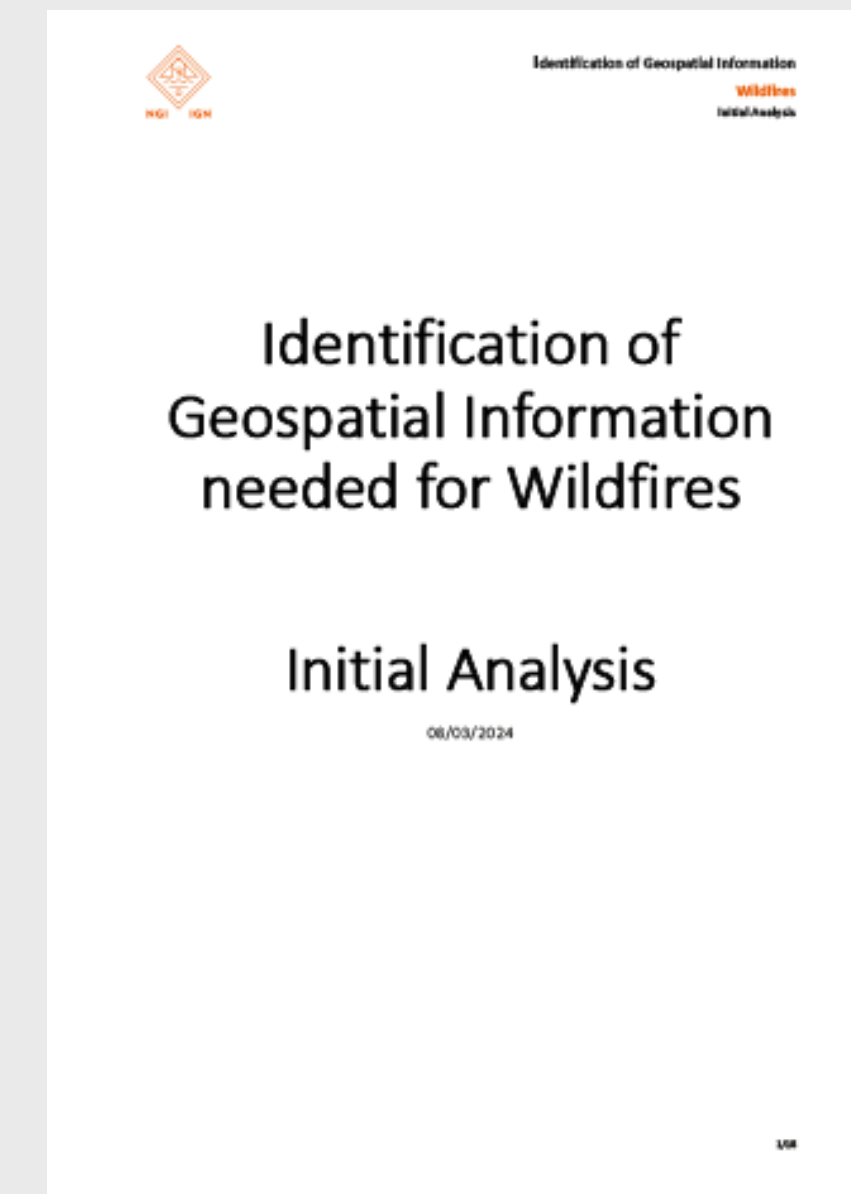
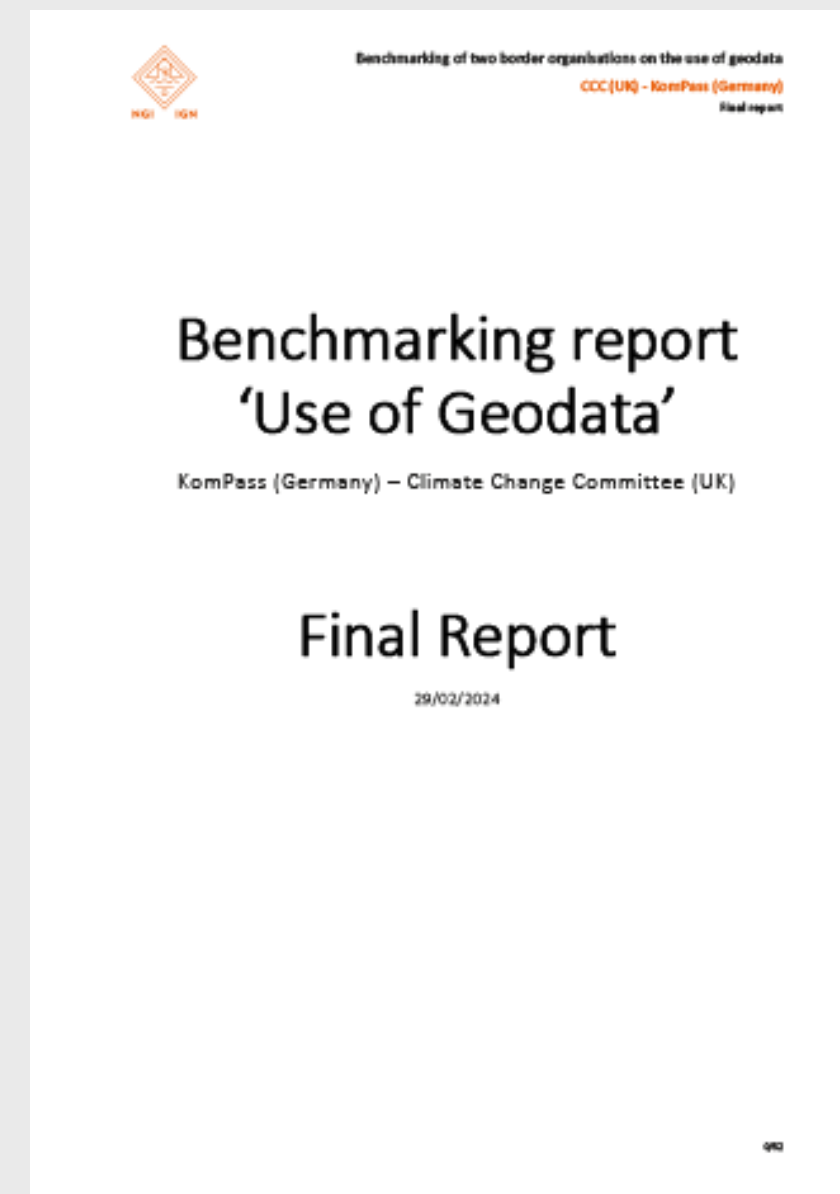
Projects

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1st project

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



2nd project

PHILOSOPHICAL
TRANSACTIONS B

Economic factors underlying
biodiversity loss

Is Belgium ready for
more frequent and
intense wildfires?

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Analysis of the national state of play and insights
from the international context

Biodiversity loss in
Belgium

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Pre-analysis of the literature related to the risks
for Belgium associated with the loss of
biodiversity – December 2024

- 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)

2nd project

DeMorgen.

Abonneren

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

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

weekend

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

■ Wildfires risks report published in February 2025

[Is Belgium ready for more frequent and intense wildfires? | CERAC](#)

LE SOIR

Les programmes TV de la semaine

NOUS S »



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.

La Belgique sous-estime le risque d’incendies de forêt sur son territoire. C’est en substance l’une des conclusions du Centre d’analyse des risques climatiques (Cerac), dans un rapport dont *Le Soir* a pu prendre connaissance, et qui estime que la menace va s’accroître dans les années à venir à cause du réchauffement climatique.

Le rapport du Cerac part du constat que notre pays connaît des conditions plus chaudes et plus sèches avec des épisodes de sécheresses plus intenses : « Il est probable que le monde se réchauffe de 2, voire 3 °C, avec des extrêmes encore plus marqués en Belgique et dans le monde. Les incendies de forêt deviendront plus fréquents en raison de sécheresses accrues en été et au printemps, causées par une diminution des précipitations et une augmentation de l’évaporation. Le paysage fragmenté de la Belgique signifie que les incendies près des zones habitées ou urbaines représentent une menace potentielle. »

Si la Belgique a été relativement épargnée ces dernières années, à la faveur d’étés assez humides, les risques en sont d’autant plus importants : les forêts, prairies et bruyères qui ont pu pousser grâce à ce climat deviendront autant de carburant à d’éventuels feux – les rendant plus difficiles à combattre – lors d’une période sèche. Les conséquences d’un incendie de forêt vont bien au-delà de la végétation, des biens ou des infrastructures affectés ou détruits par les flammes, rappelle le Cerac. Sur le moment, le feu altère la qualité de l’air ; après son passage, il fragilise le sol et le rend plus sensible à l’érosion. Il détériore la qualité de l’eau et peut affecter des écosystèmes d’eau douce en rendant le sol hydrophobe…

La liste est longue et non exhaustive. Il faut mieux se préparer, préviennent les experts du Cerac, qui regrettent que l’aménagement du territoire et la planification urbaine négligent souvent la prévention des incendies de forêt « en raison d’une faible sensibilisation et préparation des principaux acteurs et du grand public ».

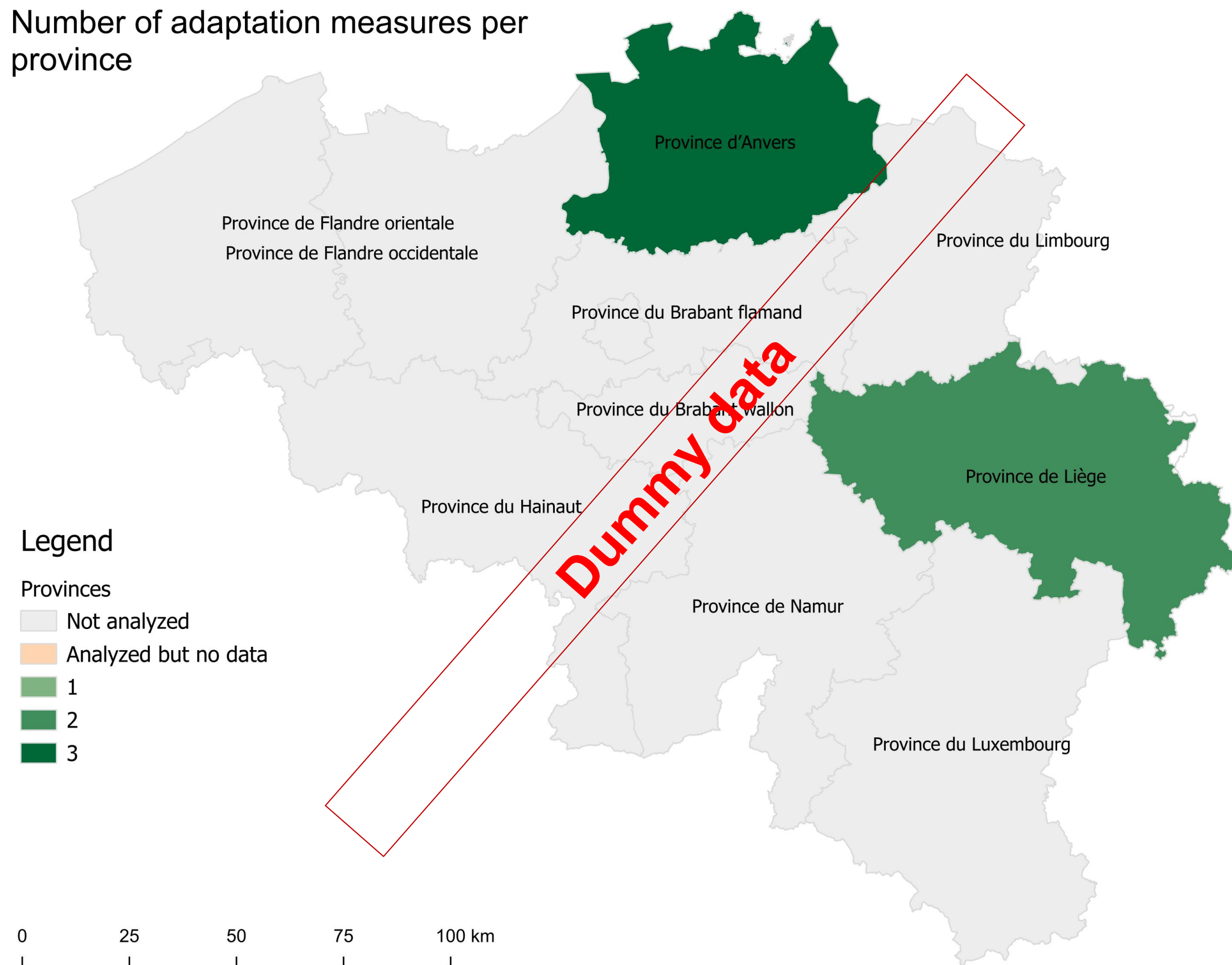
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2nd project

Number of adaptation measures per province



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

Future 3^d 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

Key findings from the biodiversity literature review

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“
Biodiversity in peril
carries the risk of a
compromised future
”

Cerac communication, October 2024

Global risks ranked by severity

"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period."

10 years

Source

World Economic Forum Global Risks

Perception Survey 2023-2024.



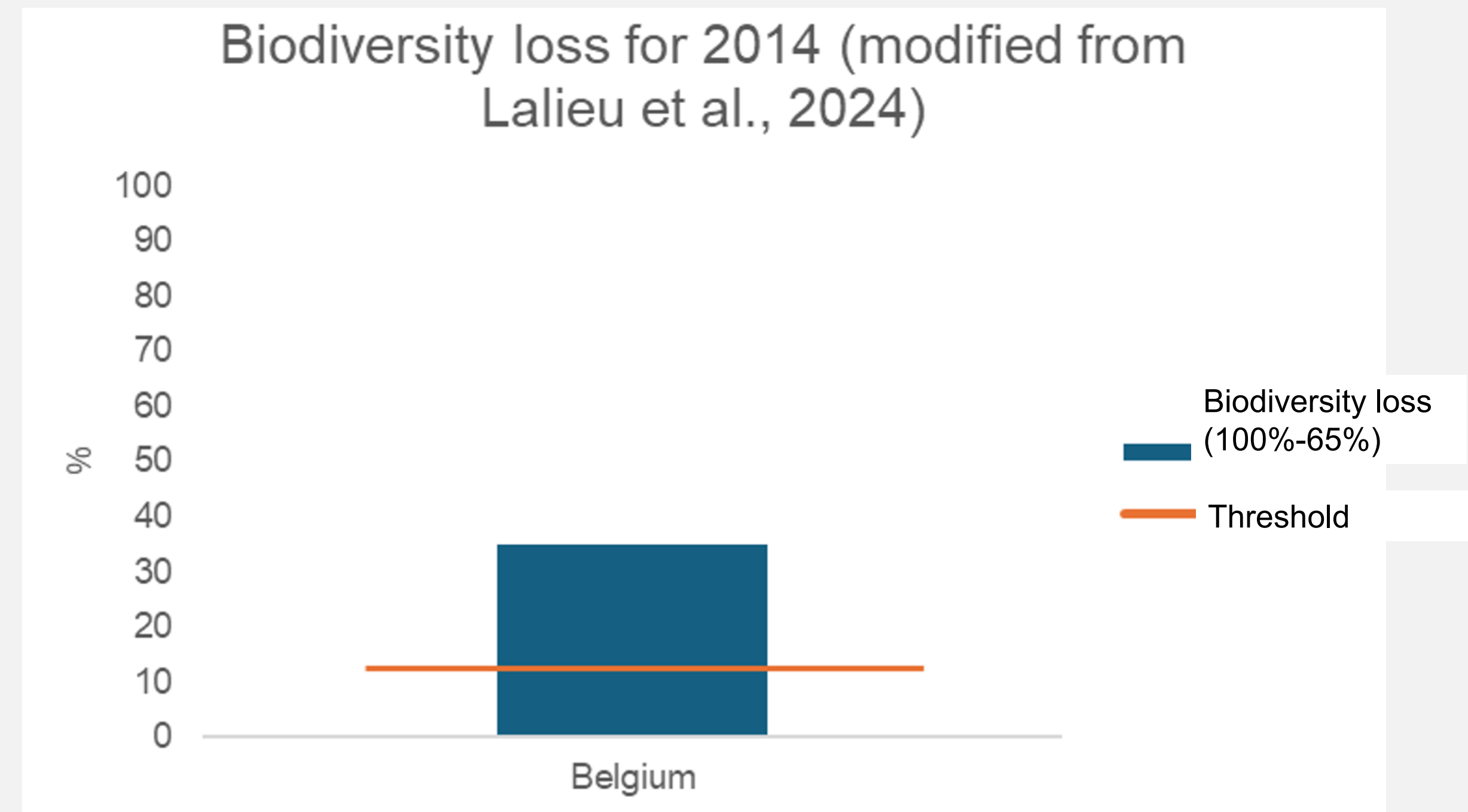
- 1st Extreme weather events
- 2nd Critical change to Earth systems
- 3rd Biodiversity loss and ecosystem collapse
- 4th Natural resource shortages
- 5th Misinformation and disinformation
- 6th Adverse outcomes of AI technologies
- 7th Involuntary migration
- 8th Cyber insecurity
- 9th Societal polarization
- 10th Pollution

State of biodiversity in Belgium

Planetary Boundary Report (Lalieu et al., 2024)

A BII¹ of 65% was calculated for Belgium's biosphere integrity (British National History Museum, 2014).

¹Biodiversity Intactness Index



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

WHO ARE POLLINATORS?



AND



In Europe, pollinators are:



Bees, the greatest pollinators

2,000 wild species in Europe

Europe hosts **10%**
of the world's bees species



Apis mellifera (or western honeybee):

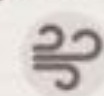
- The best-known bee species
- Managed by beekeepers for honey production and other beehive products

Pollination is the transfer of pollen (male gametes) between the male and female parts of flowers to enable plants to reproduce.

Other means of pollination:



Self-pollination



Wind-pollination

Measuring biodiversity

How to measure biodiversity?

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



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



Sentinel-2



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



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Biodiversity Intactness Index

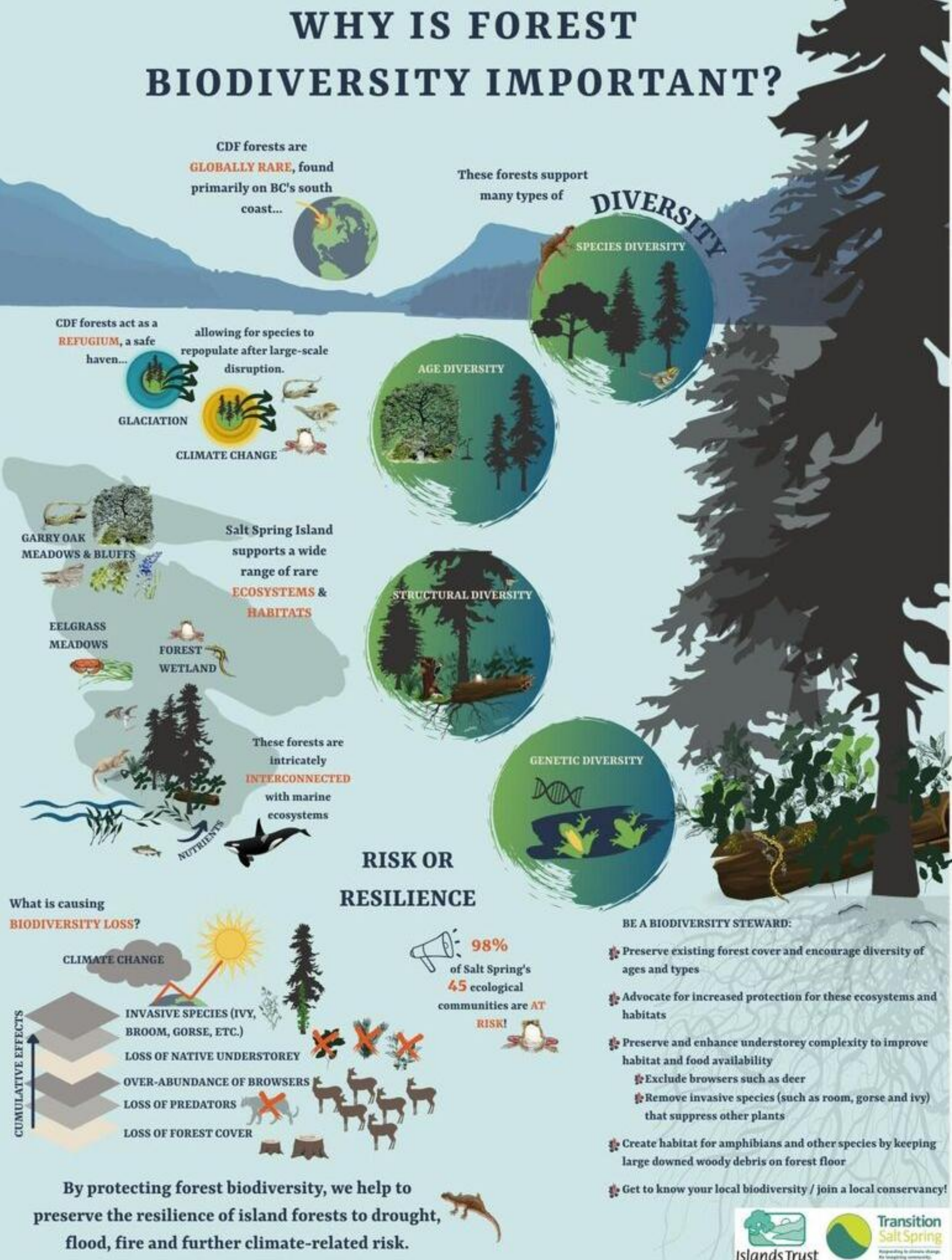


Integrate multiple indicators and combine field and satellite data to tackle the lack of global standardized biodiversity measure

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)

WHY IS FOREST BIODIVERSITY IMPORTANT?

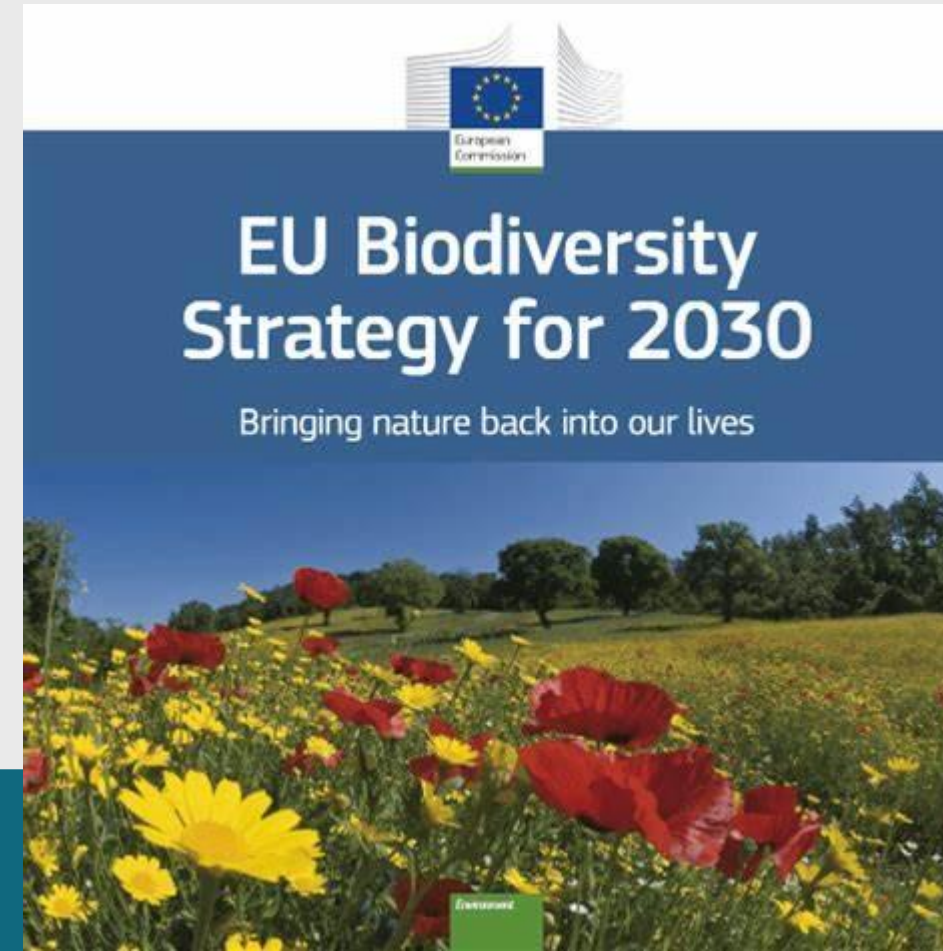


Biodiversity monitoring

Biodiversity monitoring is a cross-border challenge

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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

KUNMING MONTREAL GLOBAL BIODIVERSITY FRAMEWORK



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



Biodiversity monitoring is a cross-border challenge

Gaps

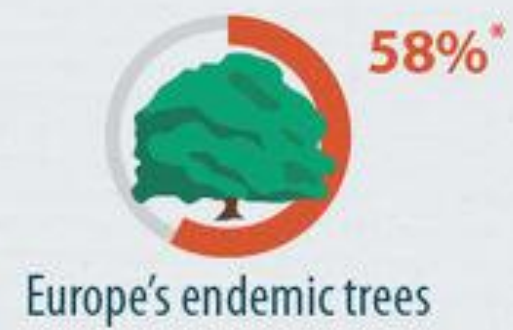
- Lack of integrated data
- Insufficient data (fragmented spatial coverage, low monitoring frequency)
- Taxonomic bias

“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 IN EUROPE

What are the most endangered species in Europe?

(% at risk)



*data from 2019

Biodiversity risks

“

Biodiversity risk is
location-specific

”

- WWF Biodiversity Risk Filter
- The ENCORE tool

→ Designed for companies and investors



WWF Risk Filter Suite

Biodiversity Risk Filter



BIODIVERSITY RISK FILTER

Explore Data & Methodology ▾

Exploring Natural Capital Opportunities, Risks and Exposure

Select ISIC Section or ISIC Division (based on the International Standard Industrial Classification of All Economic Activities) to explore dependencies and impacts on natural capital.

ISIC Section ?

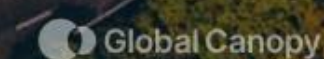
ISIC Division

View: ☒ Dependencies ☐ Impacts

- Enter a ISIC Section -



EXPLORE

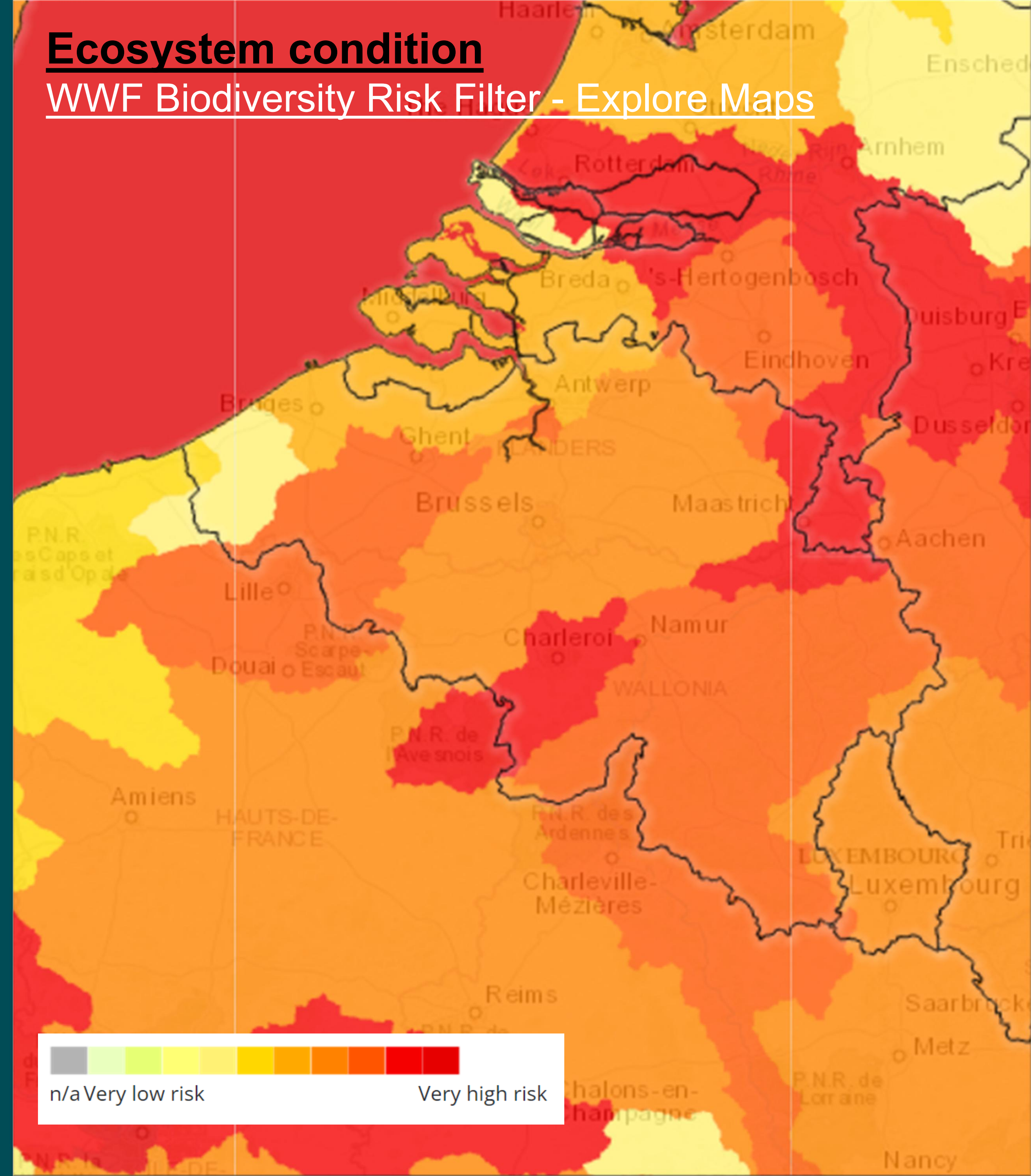


The Biodiversity Risk Filter (WWF)

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

Ecosystem condition

WWF Biodiversity Risk Filter - Explore Maps



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 NGL- Cerac collaboration

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Conclusions from the NGI-Cerac collaboration

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- ✓ **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

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Questions ?

