Corporate Sustainability Reporting Directive ESRS 4 - Biodiversity and Ecosystems **Evaluation of biodiversity**

Ecofirst (www.ecofirst.eu)
Jean-François Godeau (jf.godeau@ecofirst.eu)
Lionel Coquelet (lionel.coquelet@ecofirst.eu)

RGI workshop: session #2 - Porto 22/11/2024

Ecofirst

CSRD Outline

- What **influence** does the company have **on biodiversity**?
- What measures does it take to **prevent, mitigate or reduce** significant **negative impacts** on biodiversity
- How does the company **adapt its business model**, strategies and plans to planetary boundaries and to EU biodiversity policies?
- What **risks, dependencies and opportunities** exist, what exactly do they look like and how does the company deal with them?
- What are the **financial implications** of impacts on biodiversity and dependencies on nature

Ecofirst

How do we evaluate the environmental value of areas ?

Define targets:

- Halt the erosion of biodiversity?
- Compensate for the loss of biodiversity induced by operator's activities

Define baseline: what do we compare? before/after implementation of operator's infrastructures, of management techniques? What geographical/time scale?

Define the tools : what, where and how measure metrics of the state of biodiversity and environment

Driver for decision making in vegetation management (IVM), additional implementations (on/under towers, outside substations, buildings)

A. Mapping of habitats

B. Monitoring of the species (fauna, flora,...)

C. Assess ecosystem services (habitat, species)

D. Carbon balance

A. Mapping the before/after situation and foresee the evolution (with IVM).

- Many existing map resources to define the baseline.
  Available per country but often inadequate on geog. or time scale for precise description.
  (see examples presentation on forest connectivity - *Corine Land cover, Walous, ressources EU*).

- Field inventorisation
  Adequate for a quick determination and to identify “sanctuary sites”.

- Remote sensing method, aerial photographs can help.
  Important to define goals to define the level of accuracy.

- Drone / LiDAR.

Characterisation of habitats using UAVs

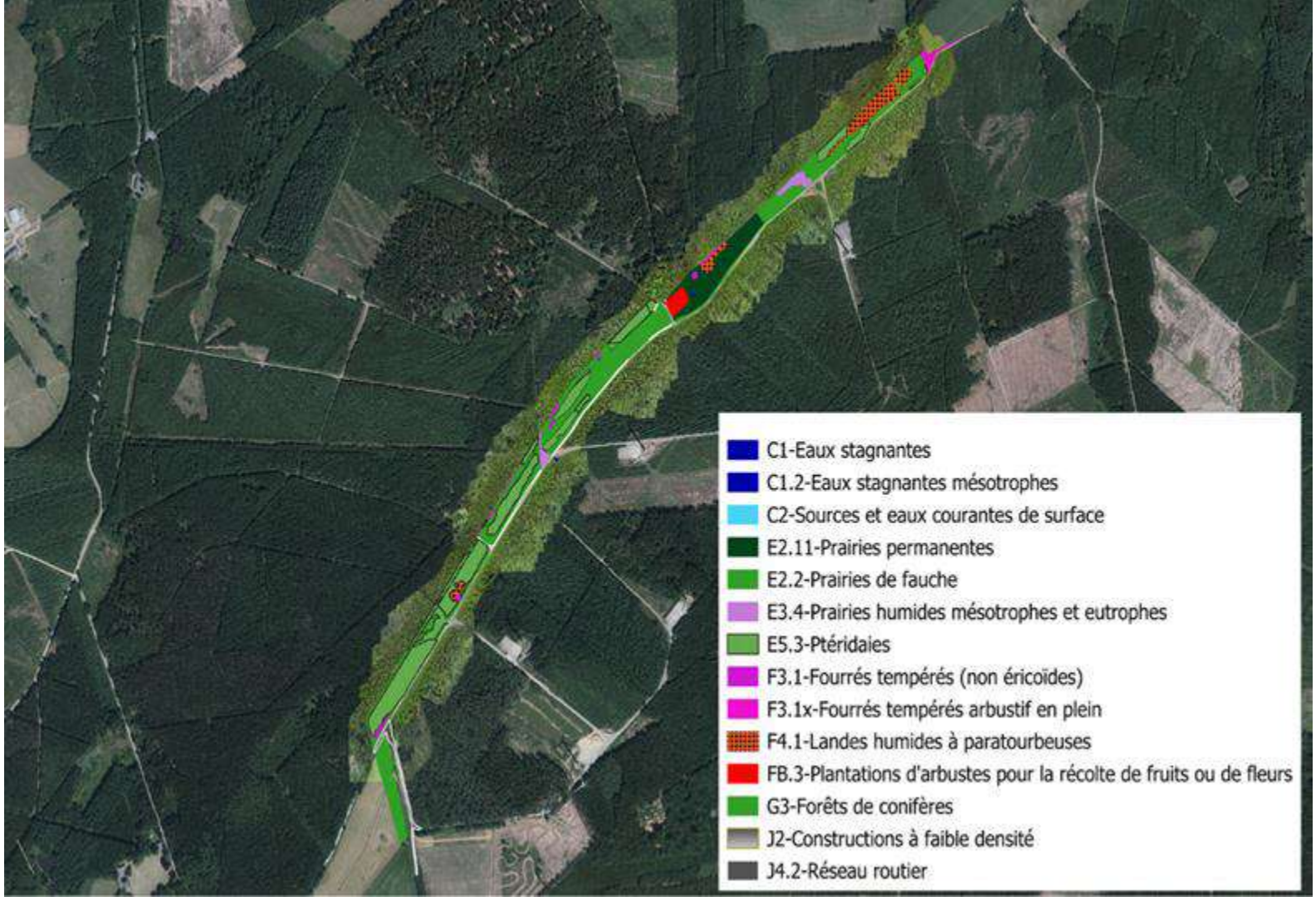
- Results obtained using UAV overflights
  - 2D models: Orthophotomosaic and Digital Surface Model (DSM)
  - 3D models of vegetation features
- Allows in particular :
  - Initial characterisation of habitats (high hierarchical level)
  - More accurate and up-to-date digitisation of habitats.

→ Calculation of the surface areas of different habitats

Saves time compared with field mapping, enabling large areas to be mapped.

Requires field validation if you wish to refine the habitat level.

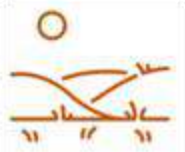

F3.1x
F3.1x
F3.1x
F3.1x
E5.3
E2.2
F4.1
E2.2
F4.1
F4.1
F4.1
E5.3
20240613 Stes pilotes Carto Step4 VC-Test A M copie copie
E2.2-Prairies de fauche
E5.3-Ptéridaies
F3.1x-Fourrés tempérés arbustif en plein
F4.1-Landes humides à paratourbeuses


C1-Eaux stagnantes
C1.2-Eaux stagnantes mésotrophes
C2-Sources et eaux courantes de surface
E2.11-Prairies permanentes
E2.2-Prairies de fauche
E3.4-Prairies humides mésotrophes et eutrophes
E5.3-Ptéridaies
F3.1-Fourrés tempérés (non éricoïdes)
F3.1x-Fourrés tempérés arbustif en plein
F4.1-Landes humides à paratourbeuses
FB.3-Plantations d'arbustes pour la récolte de fruits ou de fleurs
G3-Forêts de conifères
J2-Constructions à faible densité
J4.2-Réseau routier

Habitat description (typology) and measuring their surfaces are key quantitative indicators to assess the evolution of the environmental value of the right-of-ways (and substations).

Habitat evolution: Open habitats
EU Habitat Directive (Annex I)

Habitat EUR28	Area (ha)
6510	38.1
6410	18
6230	14.0
6230 + 4010	11.1
6210	9.1
4030	4.8
6410 + 4010	4.7
4010	5.4
6230 + 6510	3.4
6230 + 4030	2.6
Not EUR28	24.4
Sum	135.6



EUR28 Code	Full name	EU conservation status (in BE continental region)
4010	Northern Atlantic wet heaths with *Erica tetralix*	Bad
4030	European dry heaths	Bad
6210 (* priority habitat)	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	Bad
6230	Species-rich *Nardus* grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	Bad
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	Bad
6510	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)	Bad
6520	Mountain hay meadows	Bad

In Belgium we evaluated that ⅔ of the forest corridors are easy to describe, where the remaining ⅓ is worth to be mapped in details, where important populations of species can develop and spread.

Invasive alien plant species should be mapped because they decrease the value of the habitats and require specific actions to prevent further colonisation (**prophylaxy**).

The map obtained constitute a **baseline** to compare with in the future.

B. Monitoring of the species

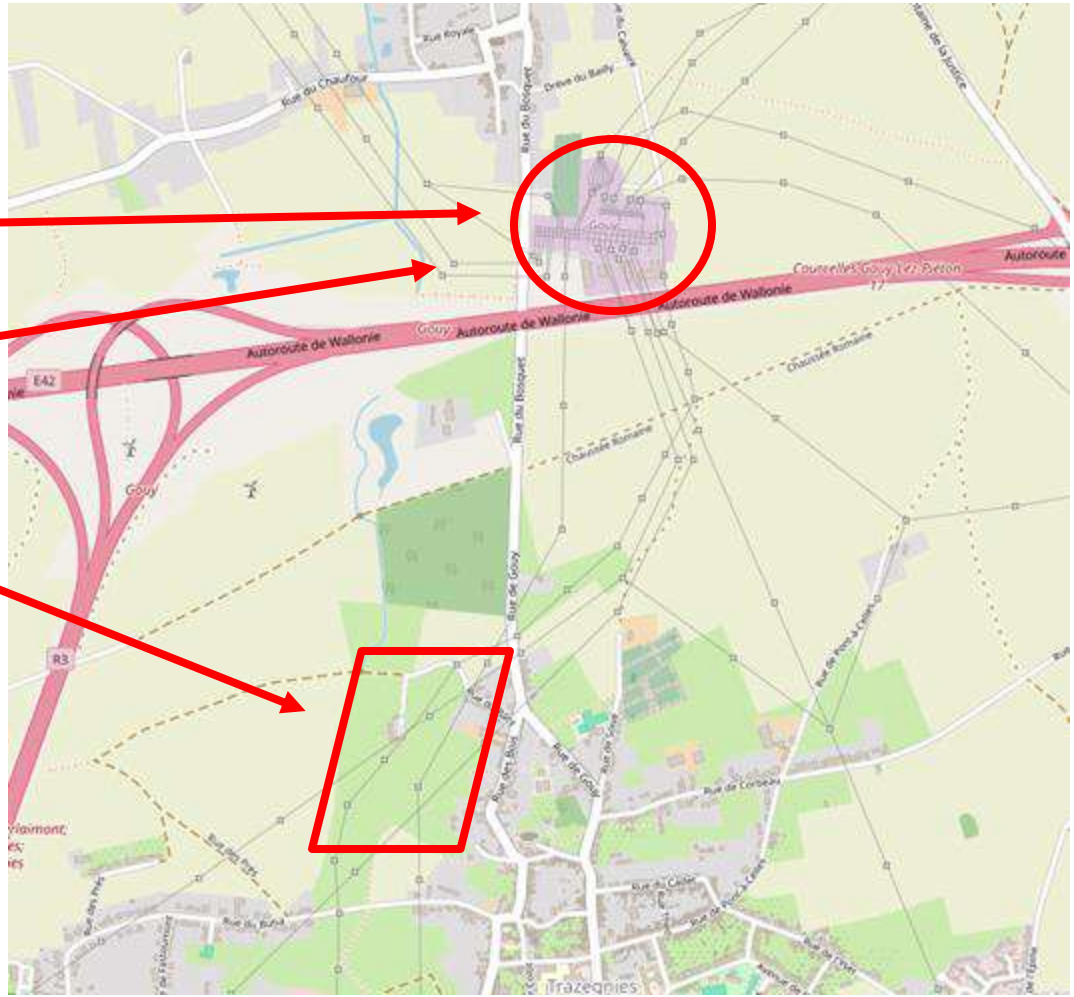
Measuring biodiversity to assess habitat quality and their ecological value.
What do we measure? Where do we start?

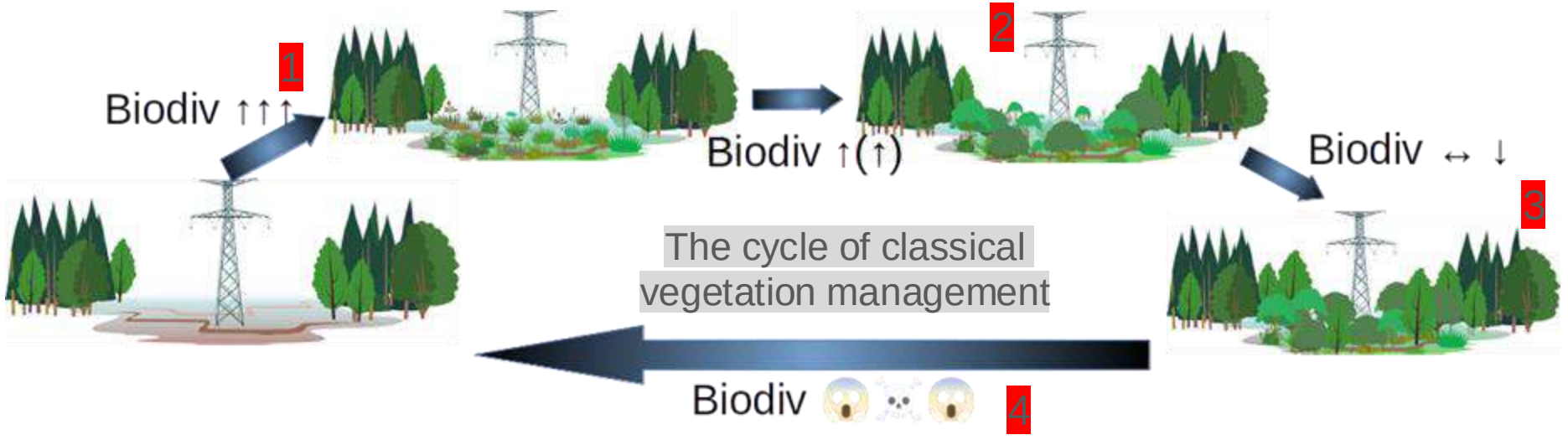
- The populations of animals or plants form **complex and dynamic assemblages**. A list of species will never be comprehensive and **do not answer by itself** the question of the “value” (quality) of ecosystems.
- Therefore, scientists look for **proxies**: sampling key taxa that are typical, closely associated the targeted habitats; umbrella species; protected/threatened/red-listed species; etc…

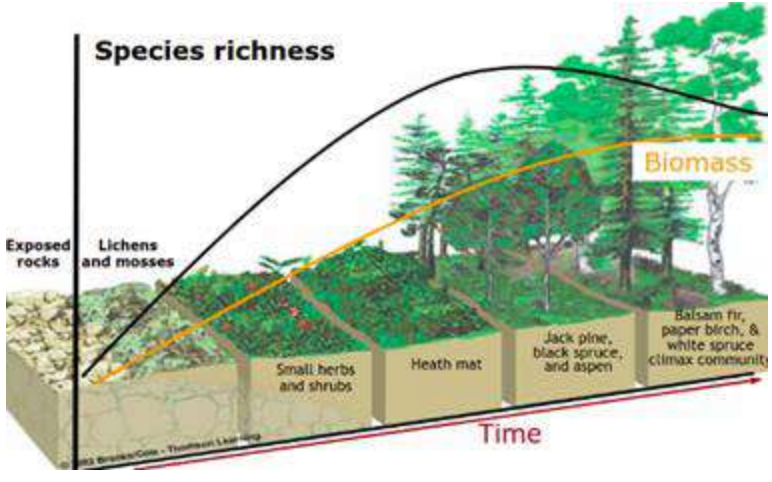
Challenges of infrastructures vegetation management.

- Substations, buildings
- Powerline towers (base)
- Forest corridors

Within forest security corridors (semi-)natural habitats can foster animal/plant populations over significant areas and time scale.

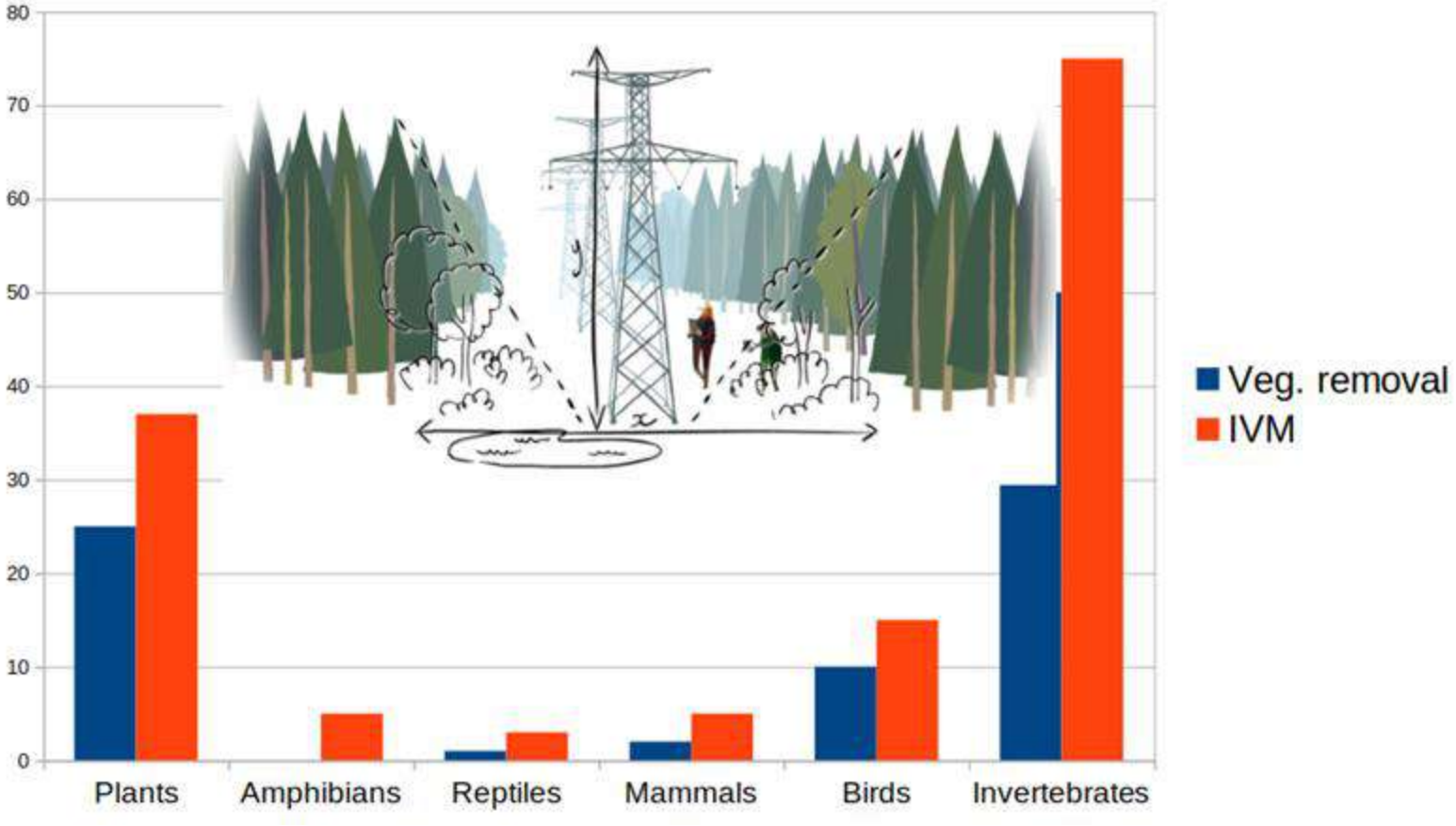






1. After vegetation removal, the natural colonisation is characterised by an **rapid increase of diversity**
2. A **high diversity of habitat structure and species composition** is reached. This transitional stage last more or less time belonging on the local conditions
3. Habitats evolve slower and the populations of species tend to **stabilise**
4. When the vegetation threatens power transmission security => **remove the entire vegetation** (eg. rotary mulching)

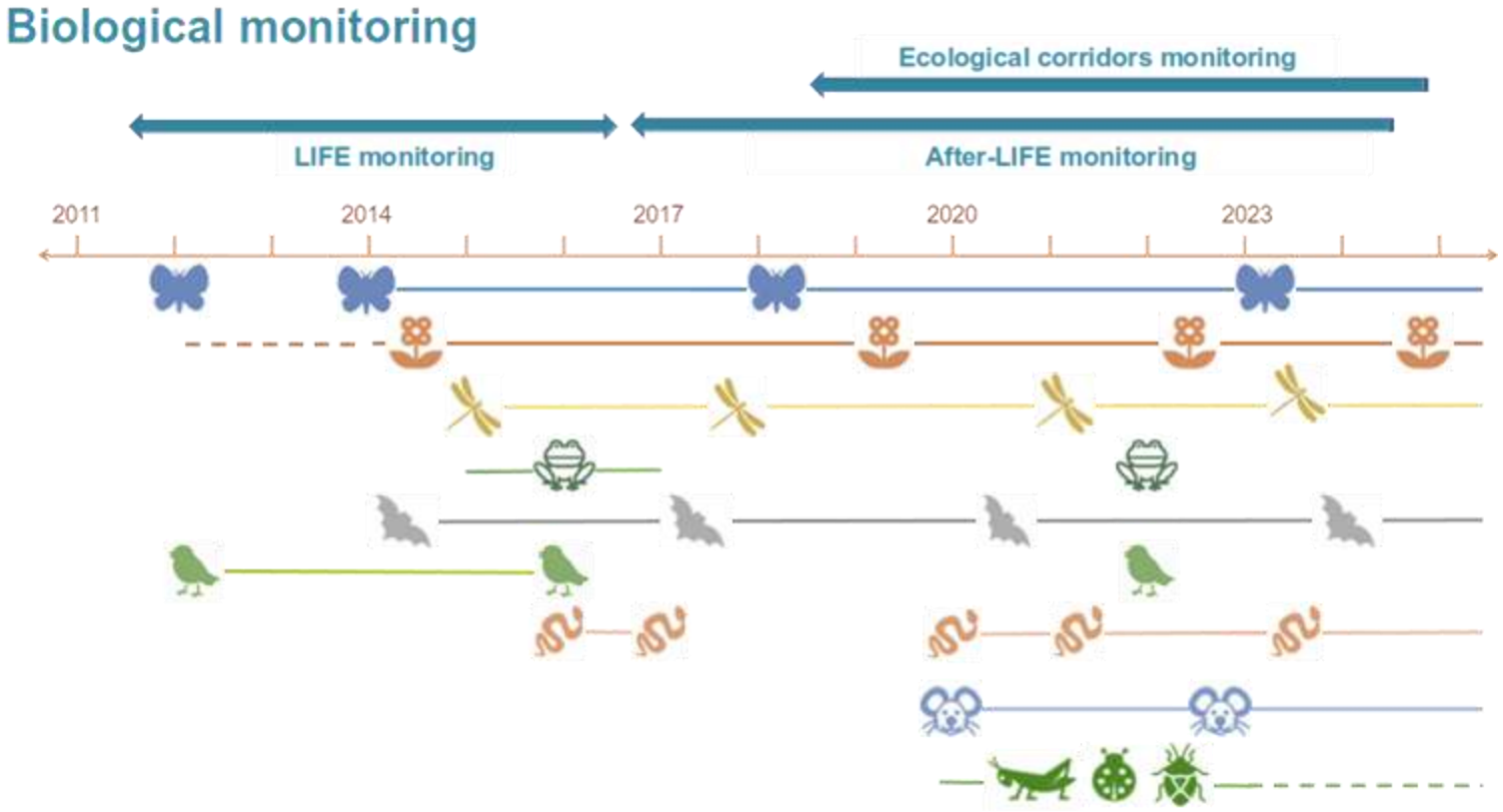
Compare the outcome of changing the vegetation management technique - theoretical results of monitoring



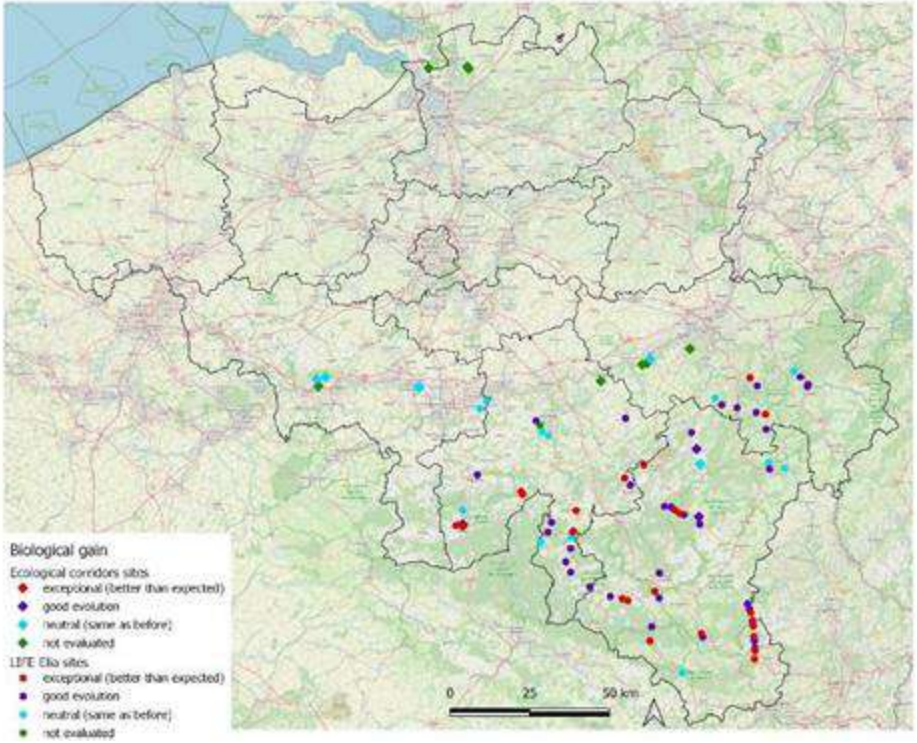
Sampling of species:

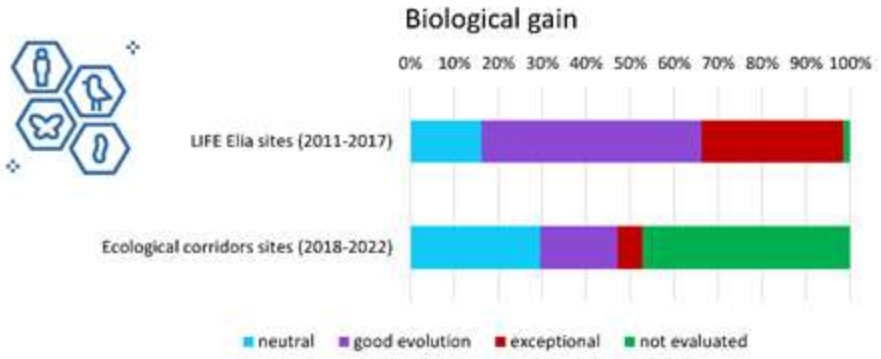
-> complex and time/$ consuming ***vs.*** lack of accuracy/comparability/repeatability !?

In Belgium the conclusion of our experience shows that, depending on the habitats, we should select the groups to monitor for the sake of cost efficiency.



The monitoring ended with encouraging results.
A new monitoring methods is under development
(to be continued …)





Evidence of biological benefit in 82% of the LIFE Elia sites.

www.ecofirst.eu/en/our-publications

What about new techniques for monitoring?

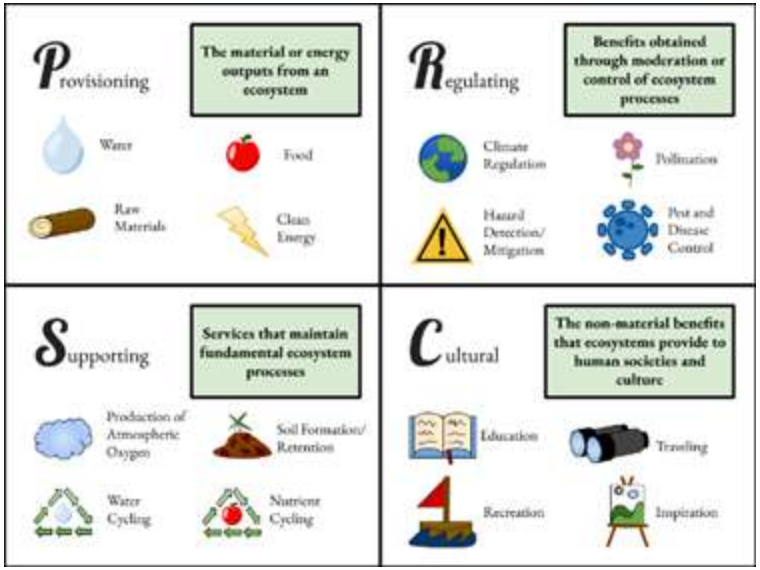
The good good ideas:

- PAM (passive acoustic monitoring): multi taxa, rapid development since few years, still a lot to discover!
- Citizen sciences: sensitisation + open data + huge potential

The bad good ideas:

- eDNA -> unless you want to find A LOT of strange stuff (like african species, rotifera creatures and Homo sapiens)
- Acoustic monitoring of pollinators

C. Evaluation of the services of ecosystems



Joint Research Centre Science for policy report

Mapping and assessment of Ecosystems and their Services: an EU ecosystem assessment (report + annexes + datasets)

This assessment presents **the changes in pressures and ecosystem condition in the EU** and its marine regions using the **year 2010 as a policy baseline**. The following **ecosystems** are analysed: urban ecosystems, agroecosystems (croplands and grasslands), forests, wetlands, heathlands and shrub, sparsely vegetated lands, rivers and lakes, and marine ecosystems.

Focus on **forests**:

- The **area** of forests has **increased** by 13 million hectares in the period 1990-2015
- **14.1%** of forest habitats are in a **favourable** conservation status. The remaining habitats are in **poor status (53.9%)**, a **bad status (30.6%)** or unknown (1.3%)
- The condition of forest is, **on average**, considered as **degraded**
- The **ratio** between forest available for wood supply and protected forests in the EU is **6:1**

The response should aim at **more ambitious, clear and measurable goals and targets** at EU scale to **enhance biodiversity and the provision of forest public goods** in support of **more sustainable forests**, along with an appropriate monitoring framework.
Applying an IVM is a way to address those goals!

Joint Research Centre Science for policy report
Mapping and assessment of Ecosystems and their Services: an EU ecosystem assessment (report + annexes + datasets)

Main conclusions:

- Pressures on **ecosystems** exhibit different trends.
- **Land take, atmospheric emissions of air pollutants and critical loads of nitrogen are decreasing** but the absolute values of all these pressures **remain too high**.
- Impacts from **climate change** on ecosystems are **increasing**.
- **Invasive alien species** of union concern are observed in all ecosystems, but their impact is particularly high in urban ecosystems and grasslands.
- Pressures from **overfishing** activities and **marine pollution** are still high.
- In the long term, **air and freshwater** quality is **improving**.
- In forests and agroecosystems, which represent over 80% of the EU territory, there are improvements in structural condition indicators (biomass, deadwood, area under organic farming) relative to the baseline year 2010 but some key bio-indicators such as tree-crown defoliation continue to increase. This indicates that **ecosystem condition is not improving**.
- **Species-related indicators show no progress or further declines, particularly in agroecosystems.**


DUST

Is there an offset between some ES paradigm and the actual situation?

- ES should be based on assumptions
- Models need simplification
- Can lead to misunderstanding: bee vs. bees!
- Monetary valuation of nature:

a stairway to Heaven

a highway to Hell?

Ecofirst

Thank you for you attention !

D. Carbon balance (vegetation management operations):

- Dynamic Vegetation Models (DVMs) such as LPJ-GUESS for simulating the carbon dynamics, by projecting forest carbon sink capacities (age, species structure, and wood harvest impacts on carbon stocks). → https://gmd.copernicus.org/articles/14/6071/2021/
- Carbon Sequestration Metrics: quantifying the net annual increment (NAI), Dry Matter Productivity (DMP), harvest rates, and mortality within forest ecosystems (EU forests sequester approximately 10% of the region's greenhouse gas emissions).
- Data Collection and Monitoring Technologies: advanced data collection techniques, such as remote sensing and GIS, can provide accurate assessments of vegetation cover and health. → see Ecosystem Services valuation