Biodiversity Spring Market 2023

Belgian Biodiversity Platform

Biodiversity.be

Biodiversity Spring Market 2023

11:00 -12:30: Morning Session on Biodiversity Monitoring

12:30 – 14:00: Lunch

14:00 -16:30: Biodiversity Market

16:30 – 18:00: Reception and Closing

Biodiversity.be

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Biodiversity monitoring in Europe: a new dynamics in a new policy context

Dr. Hilde Eggermont –

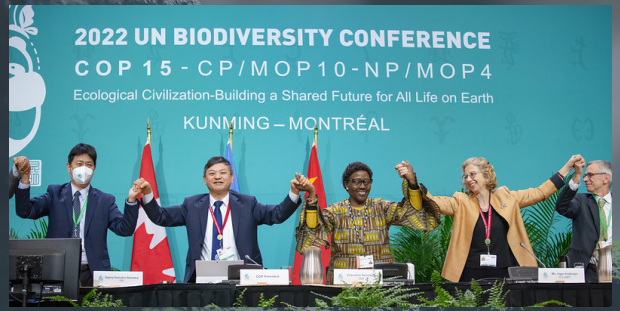
Strategic Coordinator – Belgian Biodiversity Platform

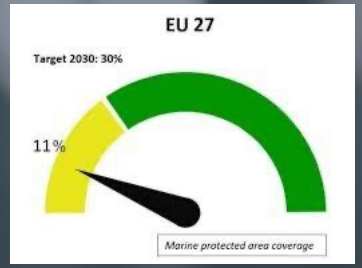
Chair & Coordinator – Biodiversa+

New policy context

Kunming – Montreal Global Biodiversity Framework

'package deal'





Convention on Biological Diversity

New policy context

EU Biodiversity Strategy

4 areas

Top challenges

- Inaccessible and insufficient raw data
- Unharmonised measurements and indicators
- Reporting and financial burden
- Confusing network of knowledge holders
- European IT infrastructure for biodiversity absent

Heterogeneous monitoring

+ Expert assessments

National integration

Harmonized reporting & quality check

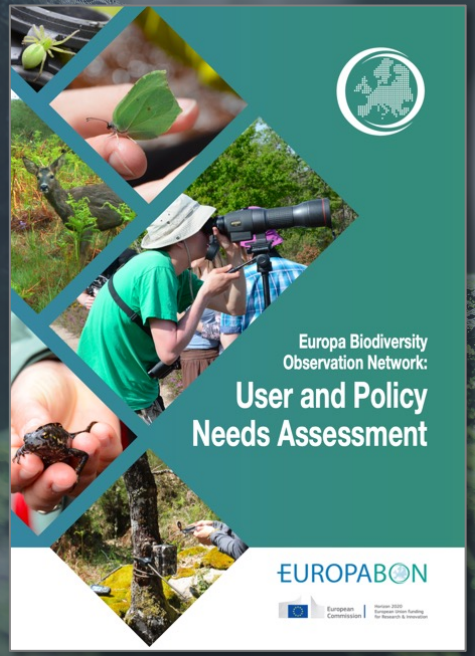
European Environmental Agency

Topic Center for Biodiversity

EU integrated information systems

~65% reporting done with limited data or solely qualitative assessments

Solutions



- Better coordination between the national & subnational biodiversity monitoring schemes
- Sustainable funding
- Harmonisation (methods, protocols, databases,…)
- Digitalisation & new technologies
- Better integration of in situ & remote sensing data
- Stronger engagement of society / citizen science approaches
- Capacity building
- …

⇒ Promoting & supporting transnational biodiversity monitoring

Organisations working hand in hand

- Assess current biodiversity monitoring efforts to identify gaps, data & workflow bottlenecks and analyse cost-effectiveness of monitoring schemes
- Demonstrate how EBV & EESVs provide timely and relevant data for Europe including policy relevant indicators to track progress towards the targets
- Assess feasibility of setting up a center to coordinate monitoring activities across Europe

EUROPABON ↕ biodiversa+

- 74 research & environmental policy actors (36 countries)
- Part of the EU Biodiversity Strategy 2030
- Pooling resources (800 M €, 2021-2028)
- Promoting link between research, monitoring & policy (incl supporting transnational biodiversity monitoring)

Towards a European Observation Network

EUROPABON

GBIF
Global Biodiversity Information Facility

Specifications and workflows for each EBV

Benefits and costs at different levels of ambition

Datasets from the showcases in the EBV Portal

biodiversa+
European Biodiversity Partnership

- Understand national and subnational biodiversity monitoring governance structures, and priorities
- Enriching and testing the EuropaBON outcomes in different countries/ contexts
- Co-developing solutions to overcome the challenges and bottlenecks identified by EuropaBON (incl governance aspects)
- Increase ownership by environmental policy actors
- Capacity building + Sustainability

Biodiversity Monitoring Coordination Center

Towards a European Observation Network

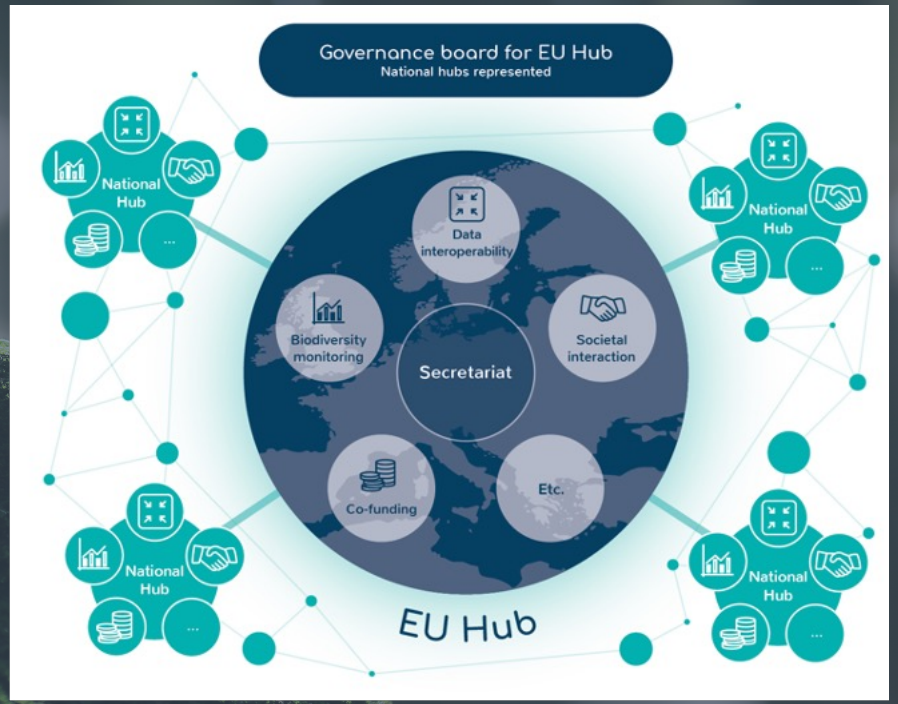
biodiversa+
European Biodiversity Partnership

EUROPABON

EEA

Joint Research Centre
JRC

GBIF
Global Biodiversity Information Facility



Thank you

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The Belgian Biodiversity Platform:

How can we facilitate science policy processes regarding biodiversity monitoring in Belgium

Dr. Sonia Vanderhoeven

Science Officer – Belgian Biodiversity Platform

The Belgian Biodiversity Platform

Why did we propose this topic for our Spring Market 2023?

Momentum for biodiversity monitoring

The Belgian Biodiversity Platform

Why did we propose this topic for our Spring Market 2023?

Biodiversity monitoring :

mainly a regional competence ...

So what?

The Belgian Biodiversity Platform

Who are we

15 experts:

Scientists, IT experts, communication officers

RBINS






DEMNA


INBO


BELSPO





3 working areas

Foresight and research framing

Knowledge brokerage

Open evidence in support of decision making

Knowledge brokerage

National focal point for :

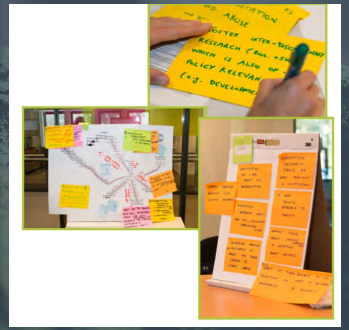
biodiversa+
European Biodiversity Partnership

GBIF
Global Biodiversity
Information Facilitu

IUCN

ipbes
Science and Policy
for People and Nature

Foresight and research framing



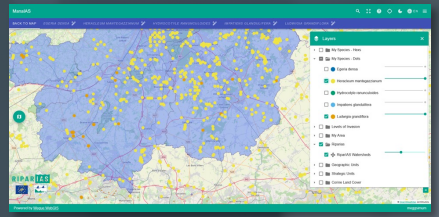
Conservation Research Matters II

December 2023

Research priorities

Open evidence in support of decision making

Decision support tools



Open data and knowledge

GBIF Global Biodiversity Information Facility

- **Data availability in Belgium**

Animalia 23,680,892 occurrences

Plantae 10,906,928 occurrences

Fungi 119,644 occurrences

Unknown 73,245 occurrences

Protozoa 8,775 occurrences

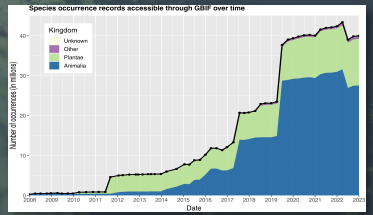
Bacteria 87,881 occurrences

Chromista 294,136 occurrences

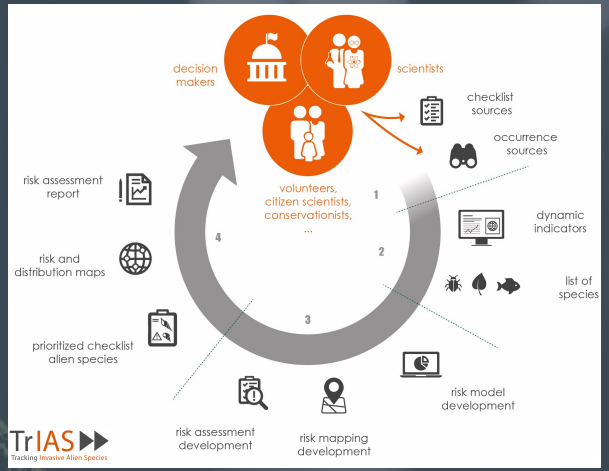
Archaea 733 occurrences

- **Data mobilization**

Institutions from **Belgium** published **-2,389,843** new occurrence records during 2022 out of a total of **369,598,378** occurrence records added globally to GBIF.org



Number of records published by institutions in Belgium, categorized by kingdom



The Belgian Biodiversity Platform

EU Biodiversity Strategy

Harmonisation

Alignement

Biodiversa+

Challenges

Opportunities

Knowledge & Data

Science

Standardisation

GBIF

Policy

Exchange of good practices

Workflows

Streamlining

Regions

Thank you

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h.Eggermont@biodiversity.be

Biodiversity monitoring @ INBO to support nature policy in Flanders (Belgium)

Toon Westra (Toon.Westra@inbo.be)

In collaboration with:
Dirk Maes, Geert De Knijf, Jeroen Speybroeck, Jo Packet, Arno Thomaes, Wouter Van Landuyt, Koen Van Den Berge, Luc De Bruyn, Ralf Gyselings, Glenn Vermeersch, Koen De Vos, Gerlinde Van Thuyne (species experts)
Patrick Oosterlynck, Steven De Saeger, An Leyssen, Luc Denys, Jeroen Vanden Borre, Bart Vandevoorde, Sam Provoost (habitat experts)
Frederic Piesschaert (Team Data)
Floris Vanderhaeghe, Hans Van Calster, Thierry Onkelinx (Team Biometry, Methodologies & Quality Control)
Dimitri Brosens (Open Science Lab for Biodiversity)
Nathalie Cools, Dries Adriaens, Cécile Herr (Team Environment and Climate)
Sam Van De Poel, Sanne Ruyts, Wim Veraghtert, Ilf Jacobs, Hannes Ledegen, Roosmarijn Steeman, Simon Feys (Natuurpunt Studie)
Leen Govaere (Forest monitoring coordination, ANB)
Marc Pollet (INBO Research manager)

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vlaanderen.be/inbo

Outline

- Overview of monitoring @ INBO
- Natura 2000 monitoring programmes in Flanders
  - Species
  - Habitats
  - Natural environment
- Biodiversity monitoring & open science

Monitoring @ INBO

Different types of monitoring @ INBO

Scale	Monitoring target	Characteristics	Example
• Regional monitoring: Flanders	• global status and trend • policy evaluation	• Random sample • Limited number of variables • Long term	• Habitat quality monitoring programme
• Monitoring in a specific area	• Status and trend for specific area • Determine effects of certain measures	• Selection of specific sites • Larger number of variables	• Forest reserve monitoring
• Site level monitoring	• Study ecological processes • Causes of change	• Limited number of sites • Very large number of variables • High frequency of measurements	• KLIVEG - Effects of environment & climate on vegetation in eLTER sites

Monitoring programme for species

Monitoring targets

- **Main goal**
  - Trends in (relative) population abundance on the scale of Flanders
- **Which species?**
  - *European priority species*: species listed on Habitats and Bird Directive
  - *Flemish priority species*: a selection of other priority species

Some of the European priority species:

Some of the Flemish priority species:

Monitoring approach

- **Long established** monitoring schemes
  - Birds, bats, common butterflies (volunteer-based)
  - Fish (professional)
  - Vascular plants of Habitat Directive (professional)

- **Recently** (2016 - present) implementation of monitoring schemes for ~70 additional species (volunteer-based)

  → ***Meetnetten*** project

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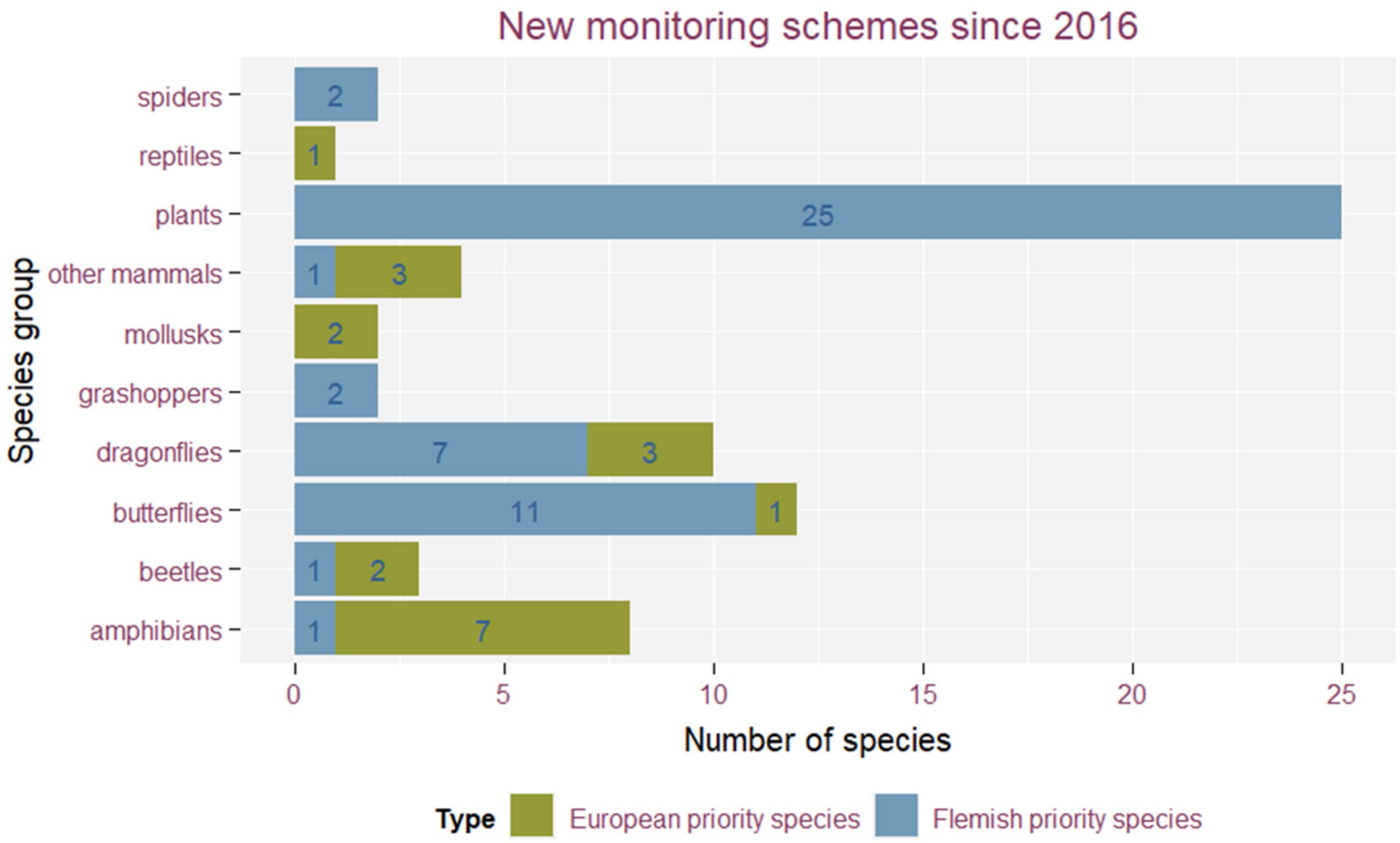
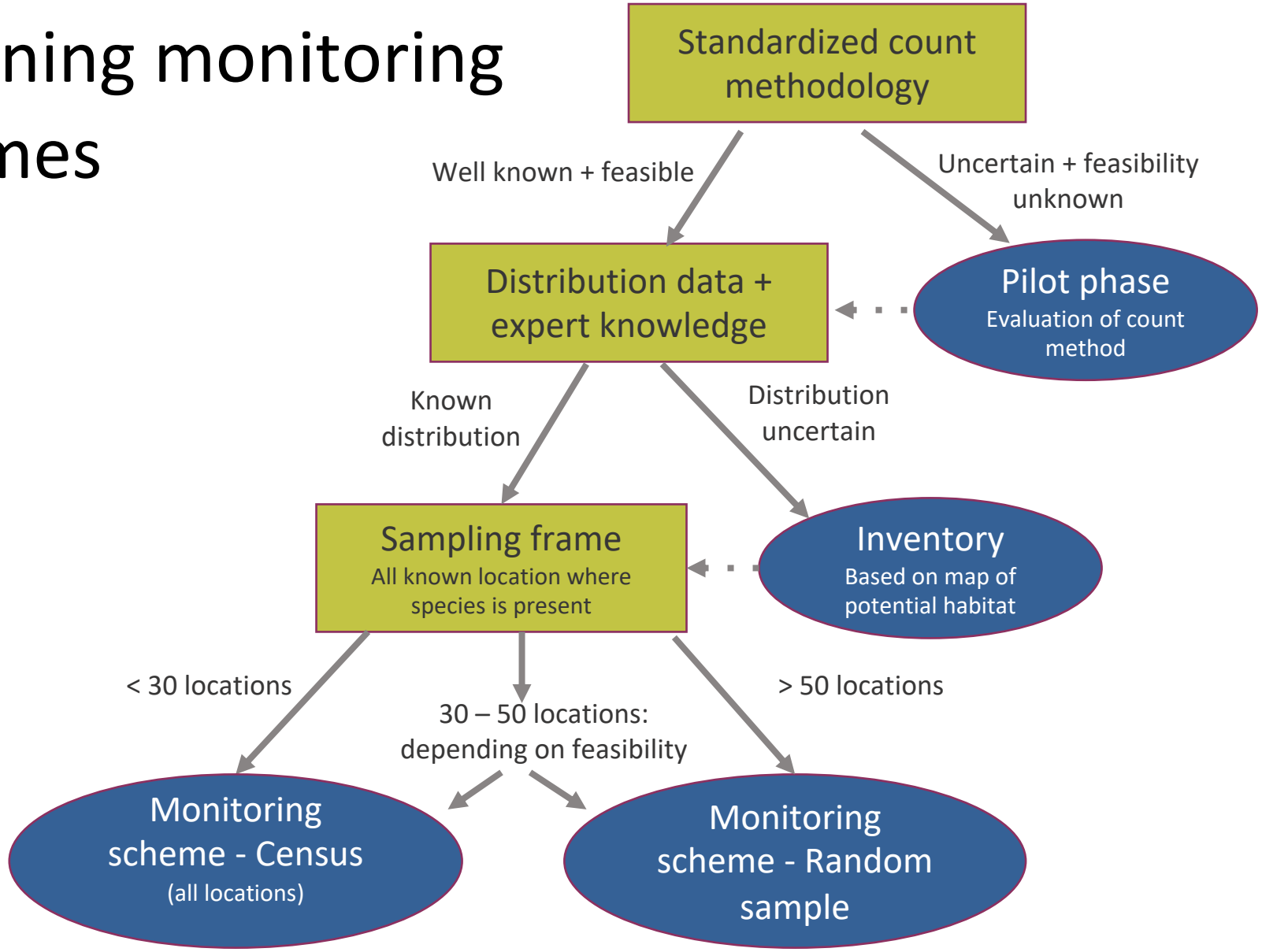
Monitoring approach



Designing monitoring schemes



Monitoring protocols

- Monitoring protocols for each species group
  - Selection of species
  - **Count methodology**
    - Count period
    - Number of counts within a season
    - Detailed description on how to count
  - **Selection of locations**

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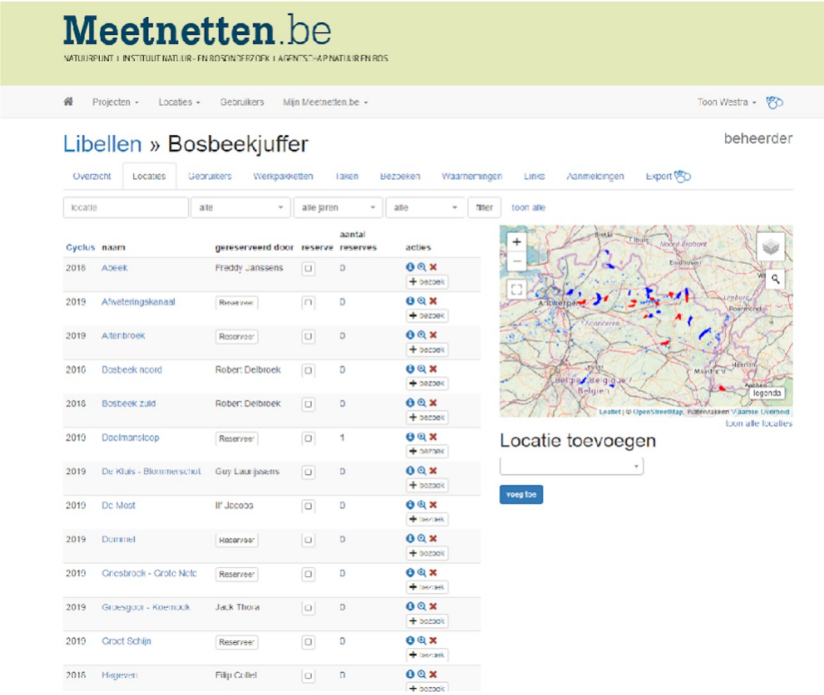
Implementation of monitoring programme

- Most counts are performed by **volunteers** → citizen science
- Nature **NGO** *Natuurpunt* is responsible for recruiting volunteers and coordination of field work (for volunteer-based schemes)
- Website (www.meetnetten.be) and mobile app
  - data import
  - coordination of fieldwork
  - volunteers can claim monitoring locations
- Datasets published on GBIF



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Results

- Volunteer-based monitoring schemes are successful
  → most of the planned locations are counted
  → professional input still needed for ‘difficult’ species and for ‘distant’ locations

- Analysis and reporting
  - Common breeding birds
  - Dragonflies
  - Butterflies

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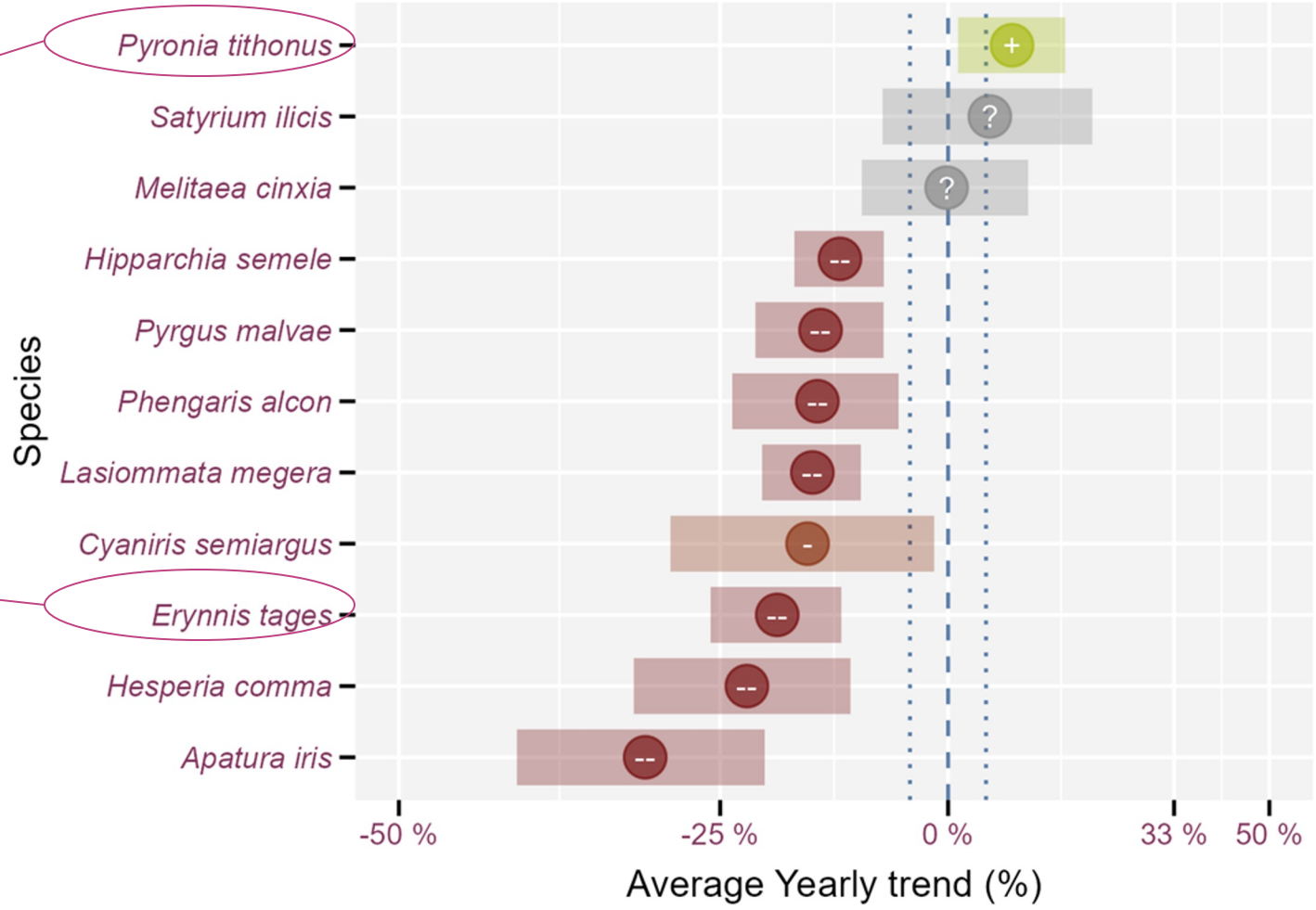
Average yearly trend (2016 - 2022) for priority butterflies

Gatekeeper

Photos: Valérie Goethals

Silver-spotted Skipper



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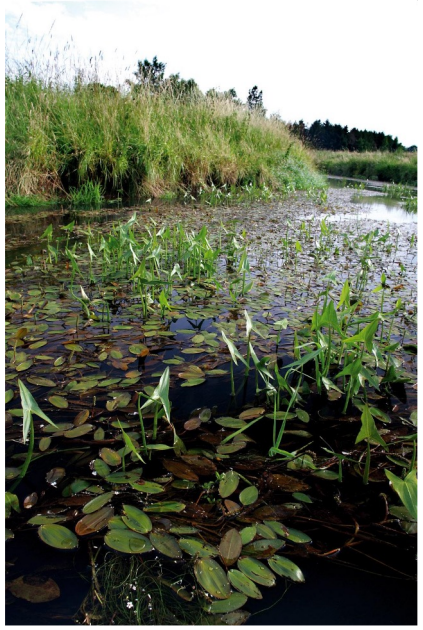
Monitoring programme for habitats

Monitoring targets

- **Main goals**
  - Status and trends of
    - **Range** and **area**
    - **Habitat quality** (what proportion of habitat is in a good condition?)
    - in-situ environmental variables that reflect important **environmental pressures**

- **Which habitat types?**
  - All Natura 2000 habitat types that occur in Flanders
    - Terrestrial (37 types)
    - Standing water (5 types)
    - Streams (2 types)
    - Subterranean (1 type)



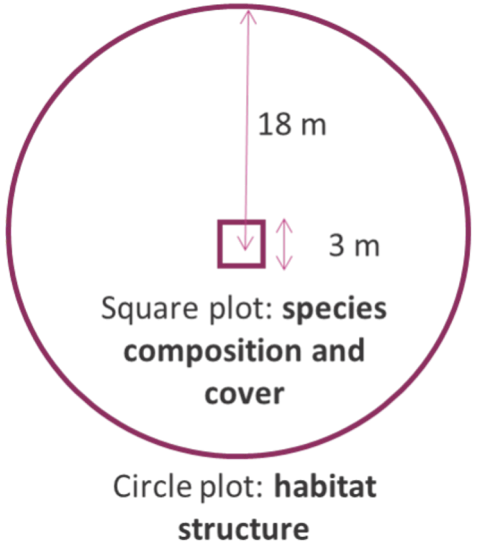
Photos: ecopedia

Habitat mapping

- **Field-based habitat mapping** → area, distribution and range
  - Inside Natura 2000 network: entirely mapped
  - Outside Natura 2000 network: only known habitat locations are mapped
  - Mapping cycle
    - Open habitats: 12 years
    - Forest habitats: 18 years

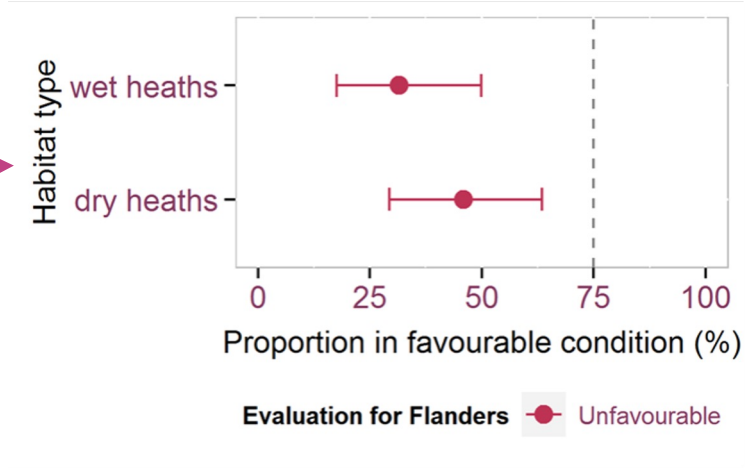
Monitoring scheme for habitat quality

Field measurements



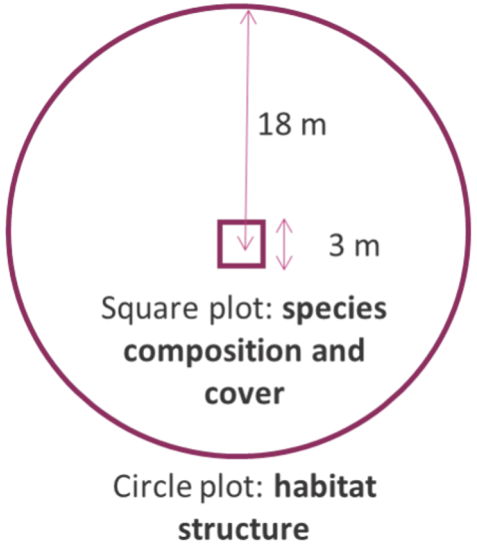
Indicators for habitat quality

Evaluation of habitat quality status



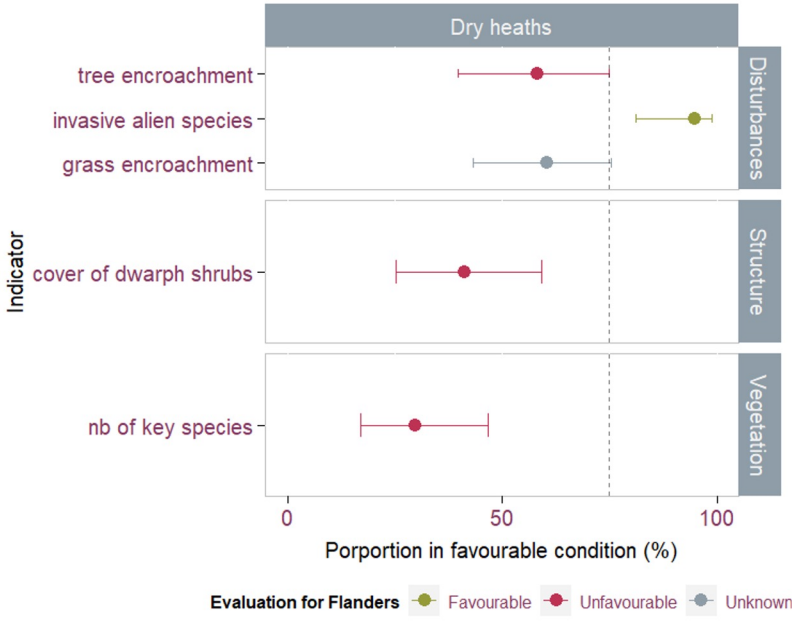
Monitoring scheme for habitat quality

Field measurements



Indicators for habitat quality

Evaluation of habitat quality indicators



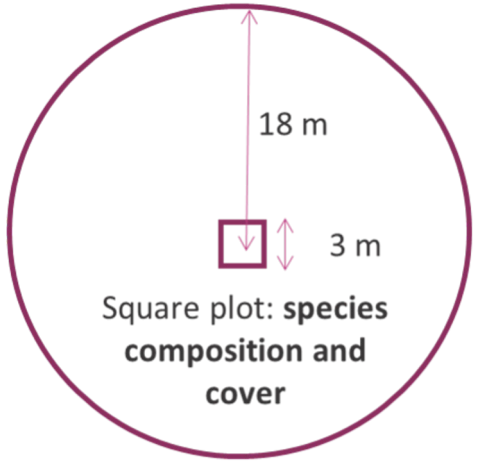
Monitoring scheme for habitat quality

Field measurements

Indicators for habitat quality

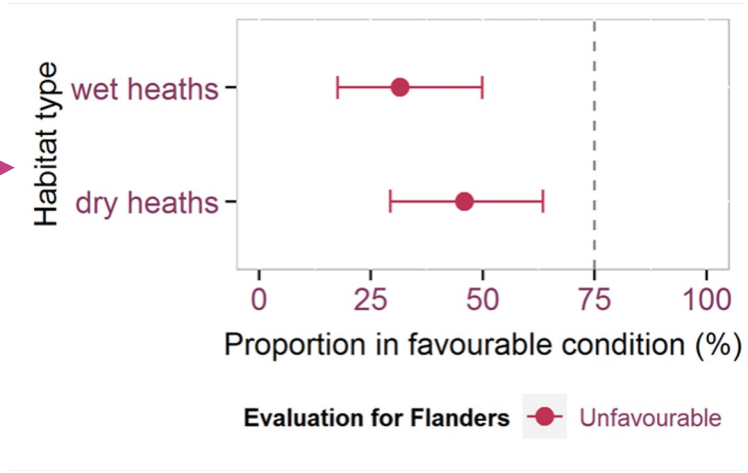
Evaluation of habitat quality status

Terrestrial

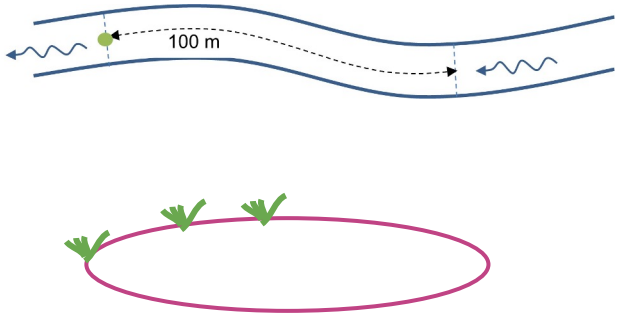


Square plot: **species composition and cover**

Circle plot: **habitat structure**



Aquatic



Monitoring scheme for habitat quality

- Spatially balanced random sample (GRTS method)
  - Terrestrial habitats: approximately 3000 sampling units
  - Standing water bodies: approximately 300 sampling units
  - Streams: approximately 100 sampling units
- Monitoring cycle
  - 6 years for open terrestrial and aquatic habitat types
  - 12 year for forest habitat types
- Data collection started in 2014
  - ANB (Agency Nature and Forest): Forest and heath habitat types
    - Overlap with forest inventory
  - INBO: other terrestrial habitat types and aquatic habitat types
- Data was used in 2019 habitat reporting for the Habitat Directive

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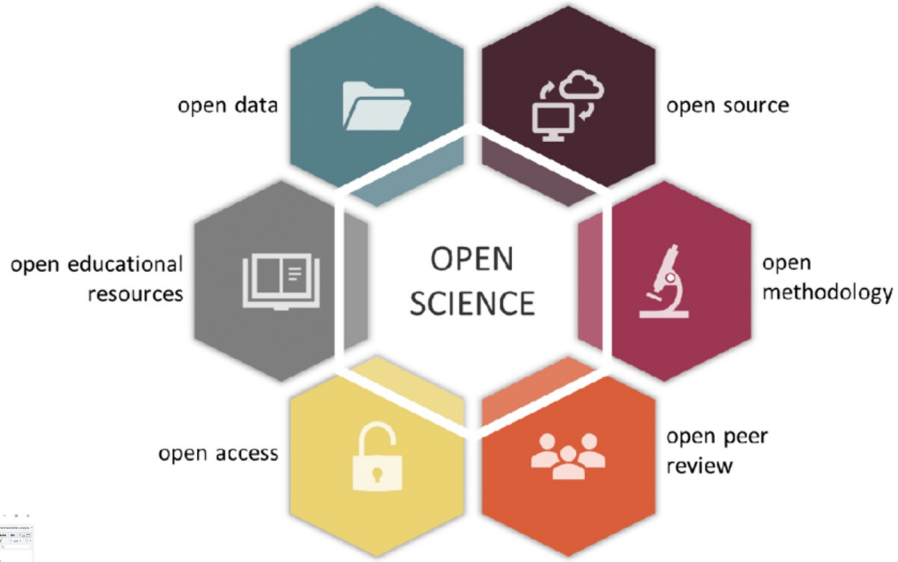
Monitoring schemes for pressures in the natural environment

- 5 compartments
  - groundwater
  - surface water,
  - soil
  - atmosphere
  - inundation water (~ flooding)

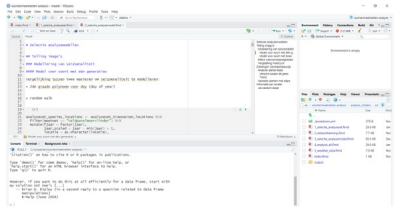
- In development
  - Power analysis for monitoring scenarios groundwater
  - Preparation of sampling frame
  - Development of measurements protocols for different compartments

Biodiversity monitoring & open science

Open science

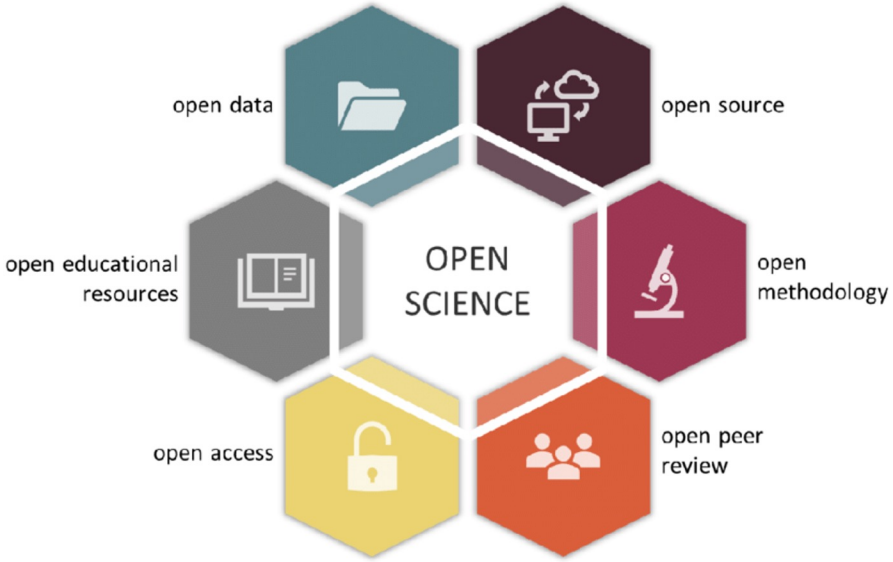


- Open and reproducible code for monitoring design, analysis and reporting: R, RStudio, Github



- Open access, open methods
  - Documentation of monitoring design
  - Standardized field protocols
- Open data
  - Species monitoring data published on GBIF
  - Important data sources on Zenodo

Open science



- Open science @ INBO is an ongoing process

- Capacity building through
  - open science café: demonstration of good practices
  - tutorials
  - R coding club

- Open science can support collaboration between biodiversity monitoring partners within Belgium and Europe

Thank you for your attention!

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Perspective from the European Commission on the needs and developments in the biodiversity monitoring landscape

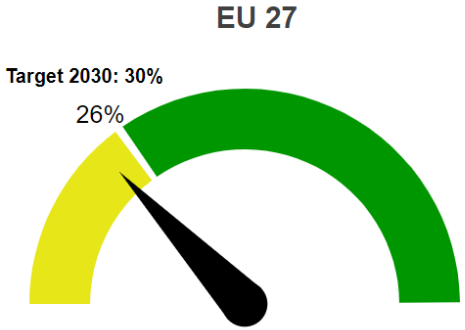
Anne Teller &Vujadin Kovacevic
European Commission
DG Environment

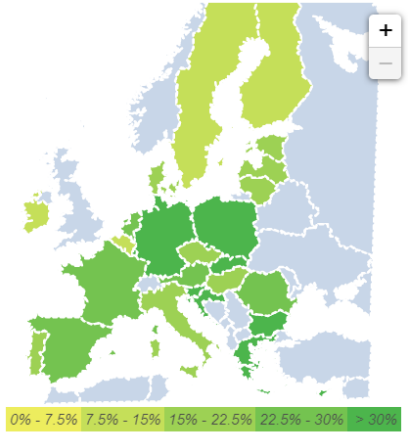
Belgian Spring Market
21 March 2023

Monitoring

the act of **observing** something (and sometimes keeping a record of it)

to watch and **check a situation** carefully for a period of time in order to discover something about it





Observation & monitoring

High quality data to support policy

Systematic observations (*in situ*/remote)

Spatial/temporal resolution

(Long-term) basic research

Monitoring policy outputs and outcomes

Assessments and modelling

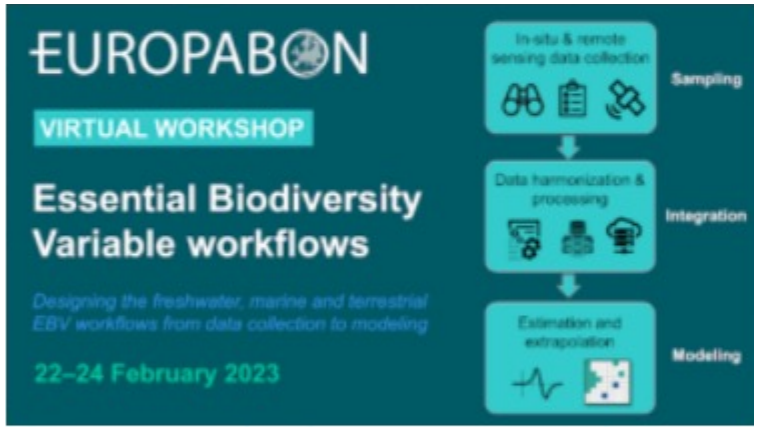
European Commission

EU Biodiversity observation

H2020 CSA EuropaBON

European Biodiversity Observation Network

Central coordination mechanism (centre) ToR



Integrated observation network

Need to go beyond the state of biodiversity

DPSIR framework (EEA)

Collection of data + interoperability

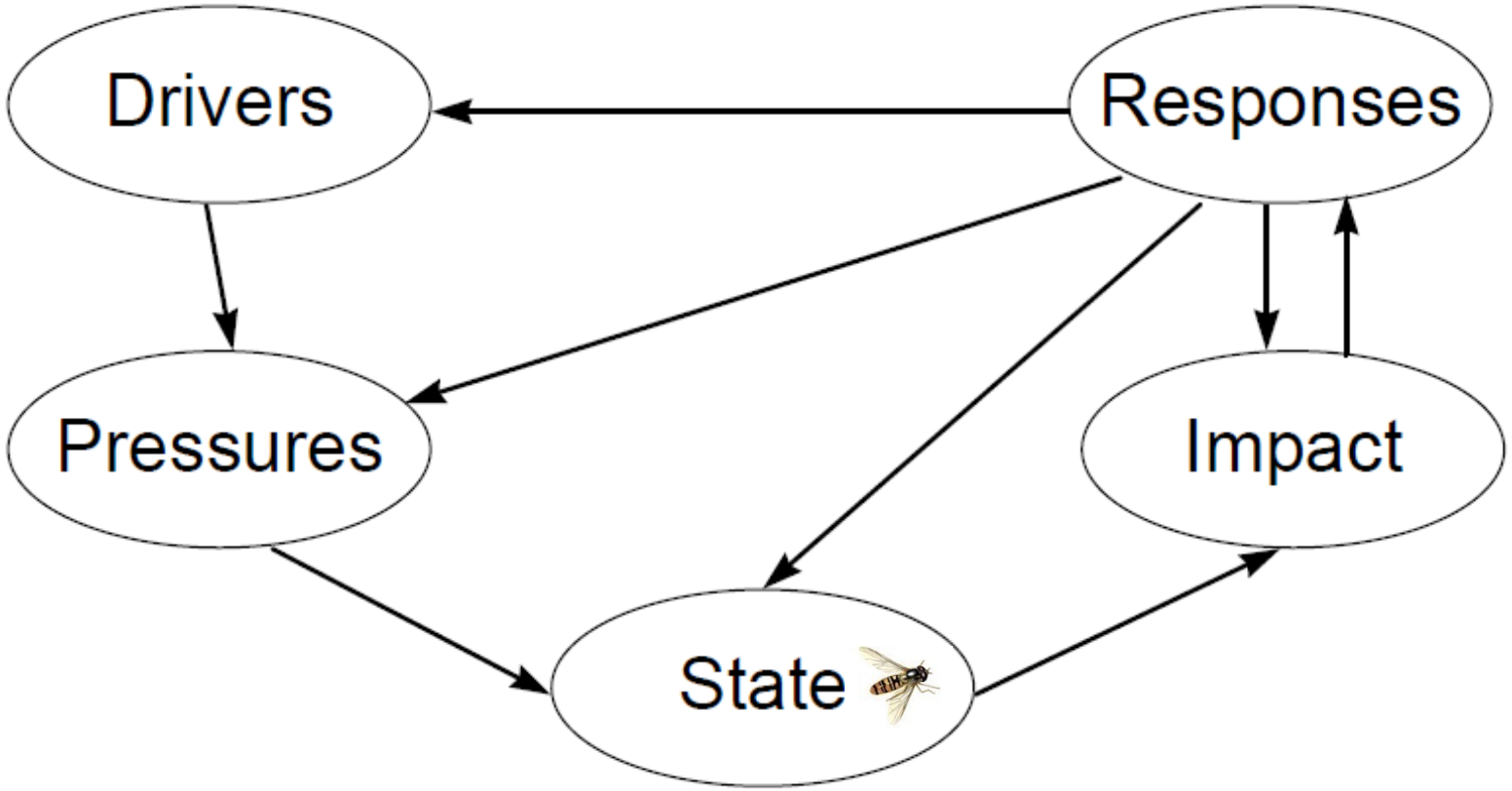
A working example:

EU Pollinators Initiative

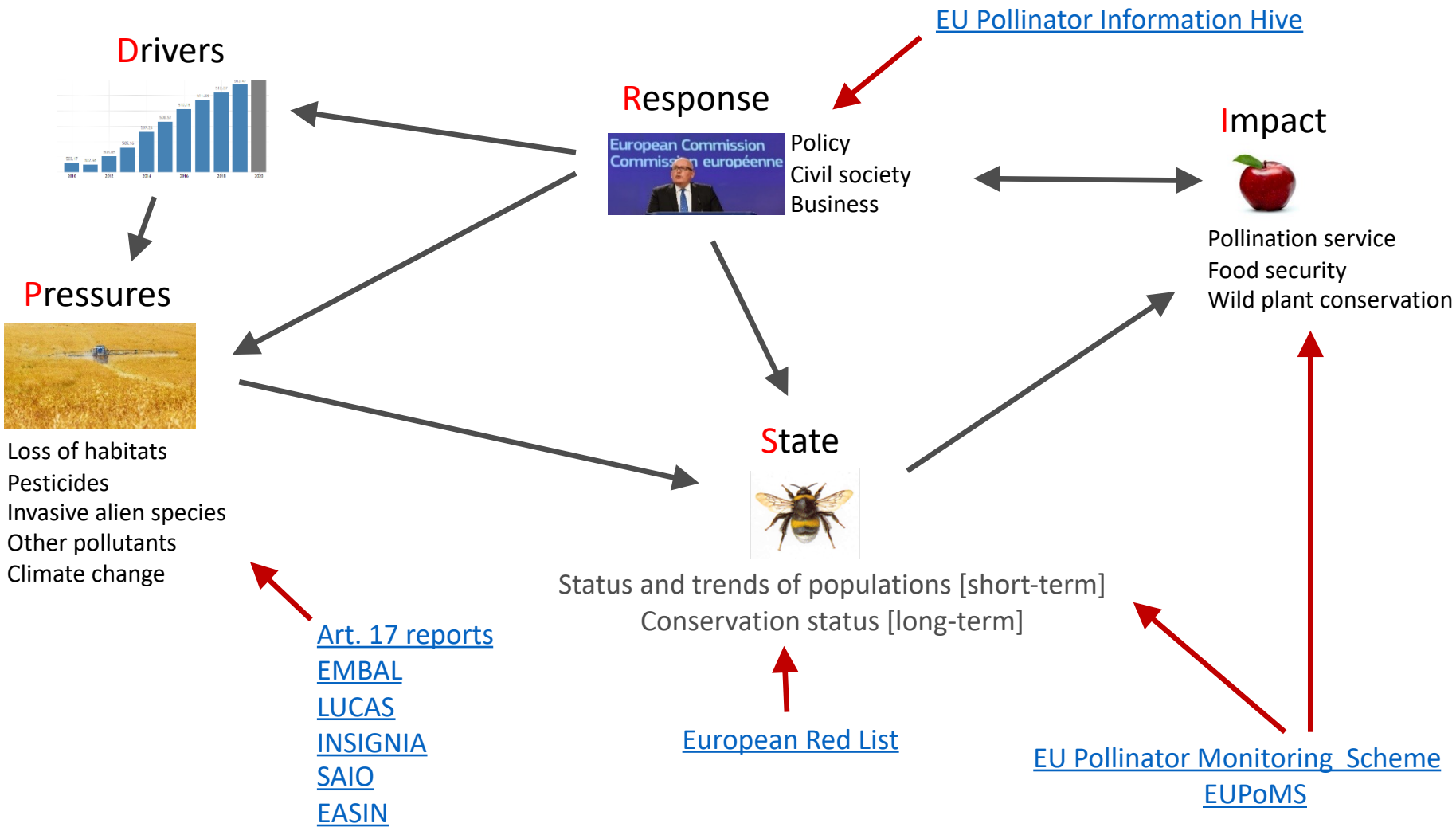
A New Deal for Pollinators

European Commission

DPSIR framework



EU Integrated Pollinator Monitoring Framework



European Commission

Integrated pollinator observation network in the making…

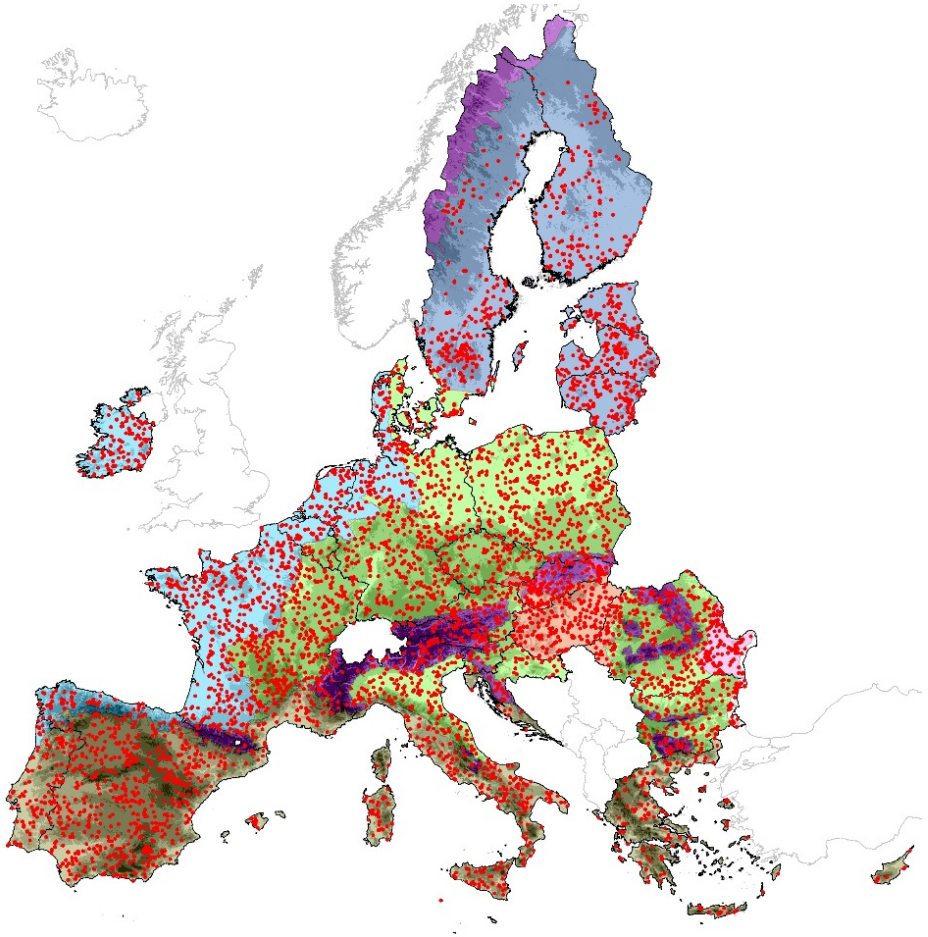
SPRING/EMBAL/INSIGNIA:

- Stratified sampling frameworks
- Brought together in 2023 campaigns

Contributes to integrated biodiversity observation:

- Conceptually (model)
- Practically (data)

Needs: financial/expert/administrative capacity



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Towards an integrated biodiversity observation network

- Biodiversity change can only be understood and tackled in a **social-ecological context**
- Lot of progress in our understanding of **biodiversity change**, its **direct and indirect drivers** and its **consequences**
- Need for **transformative change and governance op**tions also have become clearer (IPBES, 2019)
- However, most of this progress is based on insights provided by, and assessments across, individual projects
- Despite progress **many knowledge gaps**

European Commission

Needs & developments

- Research needed especially on **mechanisms, indicators, successes, failures, scenarios**
- Current research programs typically **too small, too short-lived, too narrow in scope, not sufficiently inter- or transdisciplinary, and not designed integratedly**
- Biodiversity-related monitoring **too narrowly focused on biodiversity change** (of quite few indicators)
- Monitoring of the **whole social-ecological system** is needed
- **Integrated monitoring designs are largely missing**, very much compromising knowledge gain
- **Research and monitoring are synergistic**, but could be much more so

Thank you!

European Commission

Thanks!

You can find us at:

- www. biodiversity.be
- contact@biodiversity.be

NATURAL HERITAGE AND BIODIVERSITY OBSERVATORY OF CATALONIA

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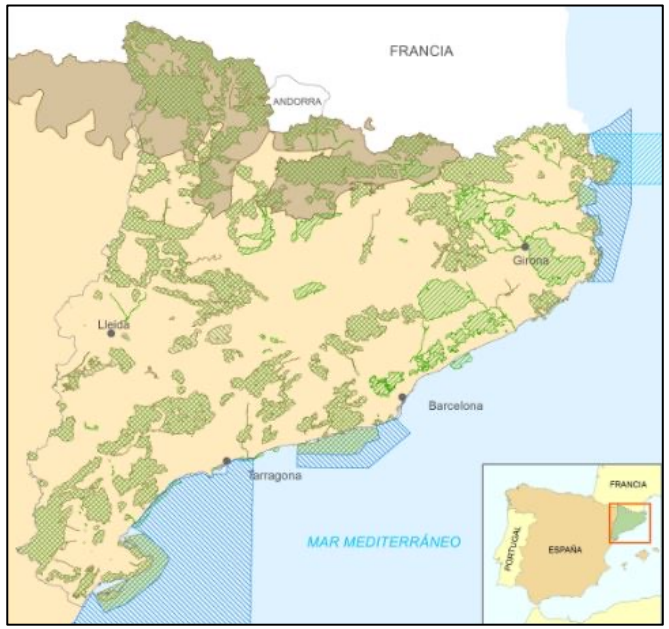
Generalitat de Catalunya
Departament d'Acció Climàtica, Alimentació i Agenda Rural
DIRECCIÓ GENERAL DE POLÍTIQUES AMBIENTALS I MEDI NATURAL

OBSERVATORI DEL PATRIMONI NATURAL I LA BIODIVERSITAT

Catalonia, some context

Natura 2000 sites 117
Natura 2000 (km²) 10.676
% of land area 30,59%



Territory and land surface		Population (million inhabitants and density)	Natura 2000 % terrestrial	Number HIC DH	Number sp HD	Number sp BD
Ireland	70.280 km²	4,8- 69 hab./ km²	**14%**	**59**	**26**	**38**
Croatia	56.594 km²	4,2- 74 hab./ km²	**36%**	**74**	**135**	**140**
Catalonia	32.105 km²	7,5- 234 hab./ km²	**31%**	**99**	**146**	**100**
Slovenia	20.273 km²	2,1-102 hab./ km²	**38%**	**60**	**114**	**122**
Wallonia	16 844 km²	3,6- 215 hab./ km²	**13%**	**41**	**69**	**64**

The Observatory of natural heritage and biodiversity: a necessity

Deficiencies and gaps in the knowledge of the state of nature in Catalonia

Deficit in coordination and knowledge transfer between information producers

Lack of accessibility of information

Difficulties in maintaining and updating existing platforms

Dispersed and little integrated information

Information generated not always adapted to the needs

OBSERVATORI DEL PATRIMONI NATURAL I LA BIODIVERSITAT

The Natural Heritage and Biodiversity Observatory of Catalonia is one of the priority lines of action planned for the period 2019-2022 in the Natural Heritage and Biodiversity Strategy (EsNatura) of Catalonia 2030.

ÉSNATURA

The Observatory of natural heritage and biodiversity: a necessity

Participation in the **Interreg Europe BID-REX project "From Biodiversity Data to Decisions: enhancing natural value through improved regional development policies**" 2016-2021 has played a very relevant role in establishing the foundations of the future Observatory for Natural Heritage and Biodiversity of Catalonia . These bases were collected in an Action Plan resulting from the project.

BID-REX

Interreg Europe

European Union
European Regional
Development Fund

Constitution

July 6, 2022, public presentation.

March 7, 2023. The Government approves the legal constitution of the Observatory.

A real science policy interface

20 organizations from the scientific world and administrations that manage the natural environment in Catalonia.

Meeting space between scientific knowledge and public policies for the management of natural heritage. It is the place to debate the main issues that the Observatory must develop.

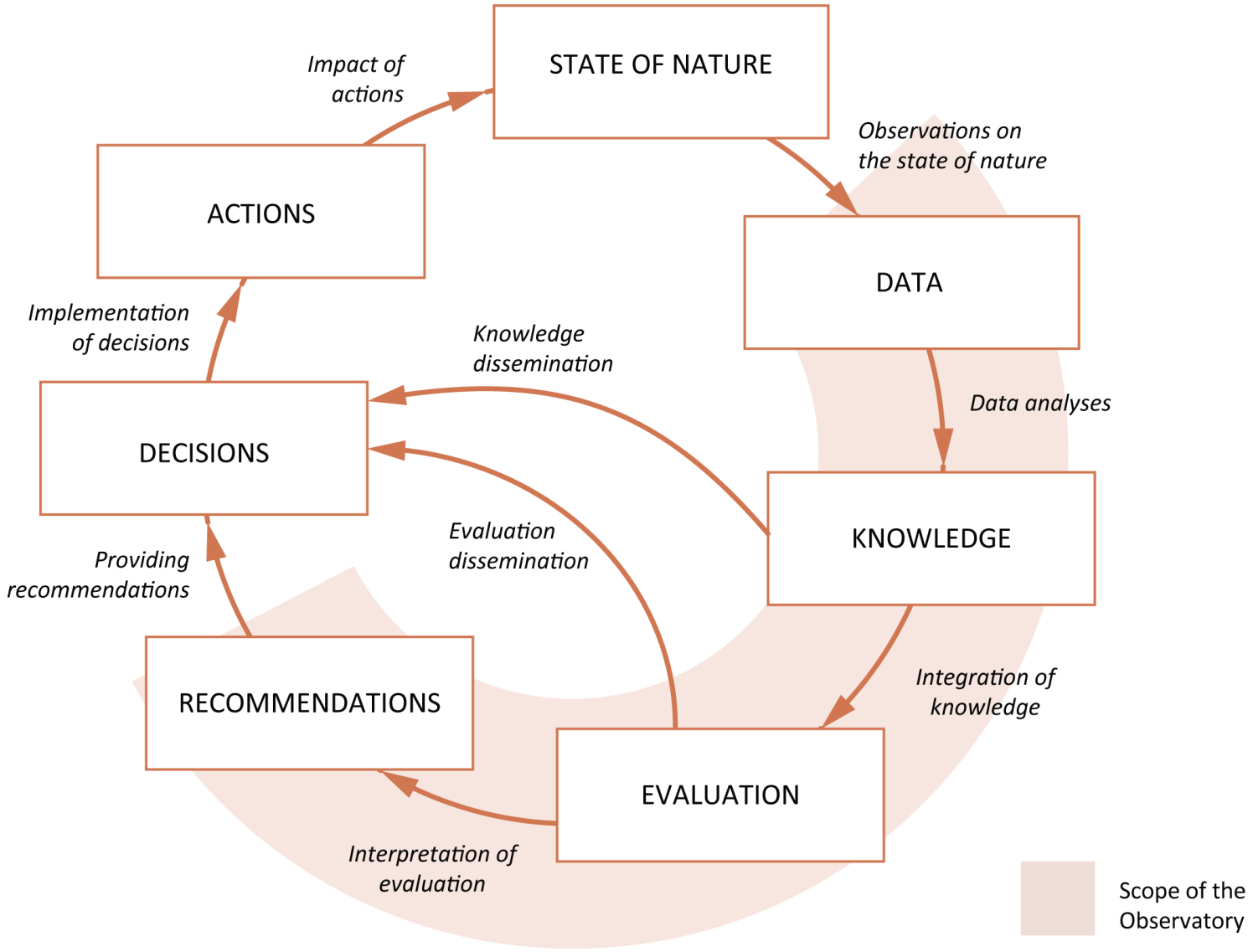
CEAB exploring aquatic ecosystems
CTFC
CREAF Excelencia Severo Ochoa
Institut Català de Recerca per a la Governança del Mar
Universitat de Girona Departament de Ciències Ambientals
IRBio Institut de Recerca de la Biodiversitat
GEA Research Group Aquatic Ecology UVIC·UCC
ICHN Institució Catalana d'Història Natural
ICO Institut Català d'Ornitologia
Zoo Barcelona
Institut de Ciències del Mar
Institut d'Estudis Catalans
IRTA Institut de Recerca i Tecnologia Agroalimentàries
nat museu de ciències naturals de Barcelona
UdG
Institut d'Ecologia Aquàtica
Societat Catalana d'Herpetologia
Museu de Ciències Naturals de Granollers
Diputació Barcelona
Diputació de Girona

Objectives and functions

- **Identify, collect, organize, process and integrate** existing information on natural heritage from various sources.
- Promote initiatives to **improve knowledge** based on the detection of existing **gaps** in information on natural heritage.
- Periodically evaluate the **state of the natural heritage** and the degree of compliance with certain instruments and strategic plans for nature conservation.
- **Transfer the information** collected to the agents who manage the natural environment and those who make decisions and respond to specific demands for information prior to decision making.
- **Make information accessible** and disseminate to various sectors of society, contributing to increasing the social value of natural heritage.

Areas of action

Decision making requires rigorous information. In this sense, the Observatory can provide value from **4 levels** of information **synthesis**.



Organization – Framework

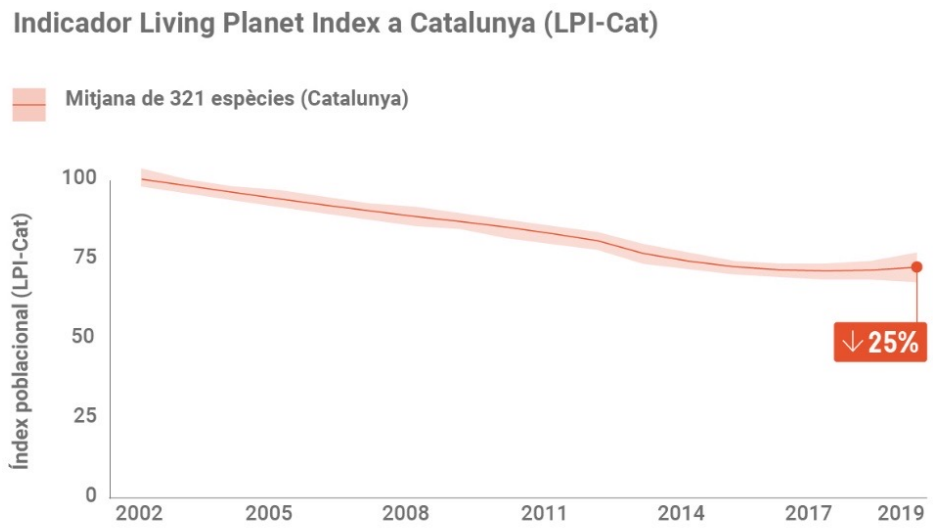
Information Synthesis Level

Analyses → Integration → Interpretation

Thematic axes of the information	1st level Data	2nd level Knowledge	3rd level Evaluation	4th level Recommendations
Distributions & populations	*Inventories, catalogs, sampling, casual data*	*Species distribution, population estimates, conservation índices*	*Assessment of the state of nature*	*Support for strategic planning for nature conservation. Response to European directives, international conventions...*
Trends	*Monitoring of populations, communities, habitats*	*Trends for species, taxonomic groups, habitats, conservation status*		
Pressures	*Ecology and sensitivity studies, risk and pressure maps*	*Impact indicators of change of uses, climate change, invasive species*		
Conservation actions	*Information gathering on conservation actions*	*Identification of priorities for conservation, use of resources, indicators of objective achievement*		

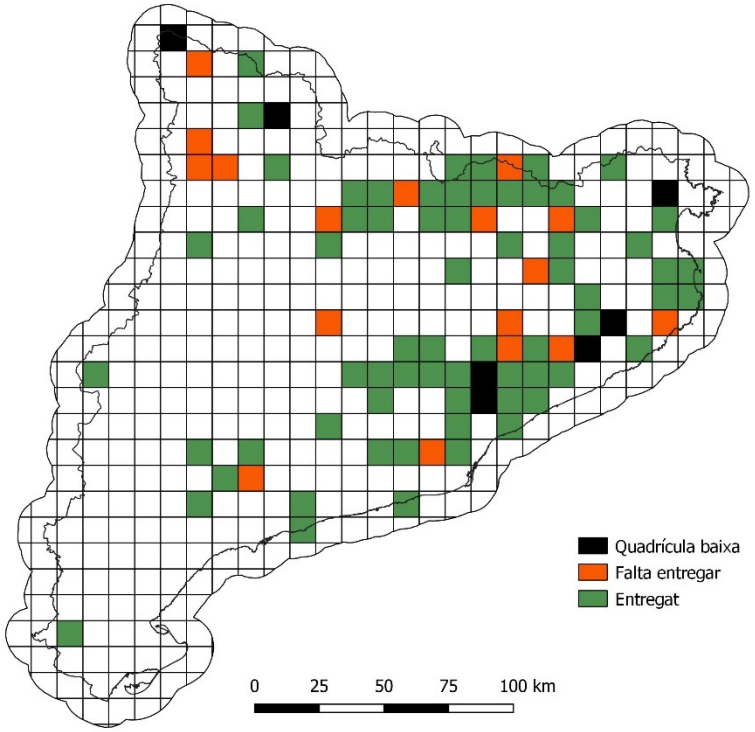
First results of the Observatory

Periodically the Observatory will assess **the state of nature in Catalonia** based on the integration and interpretation of the data available at all times. This exercise was already carried out in 2020, and work will begin together with the Participation Forum for the next edition.



First results of the Observatory

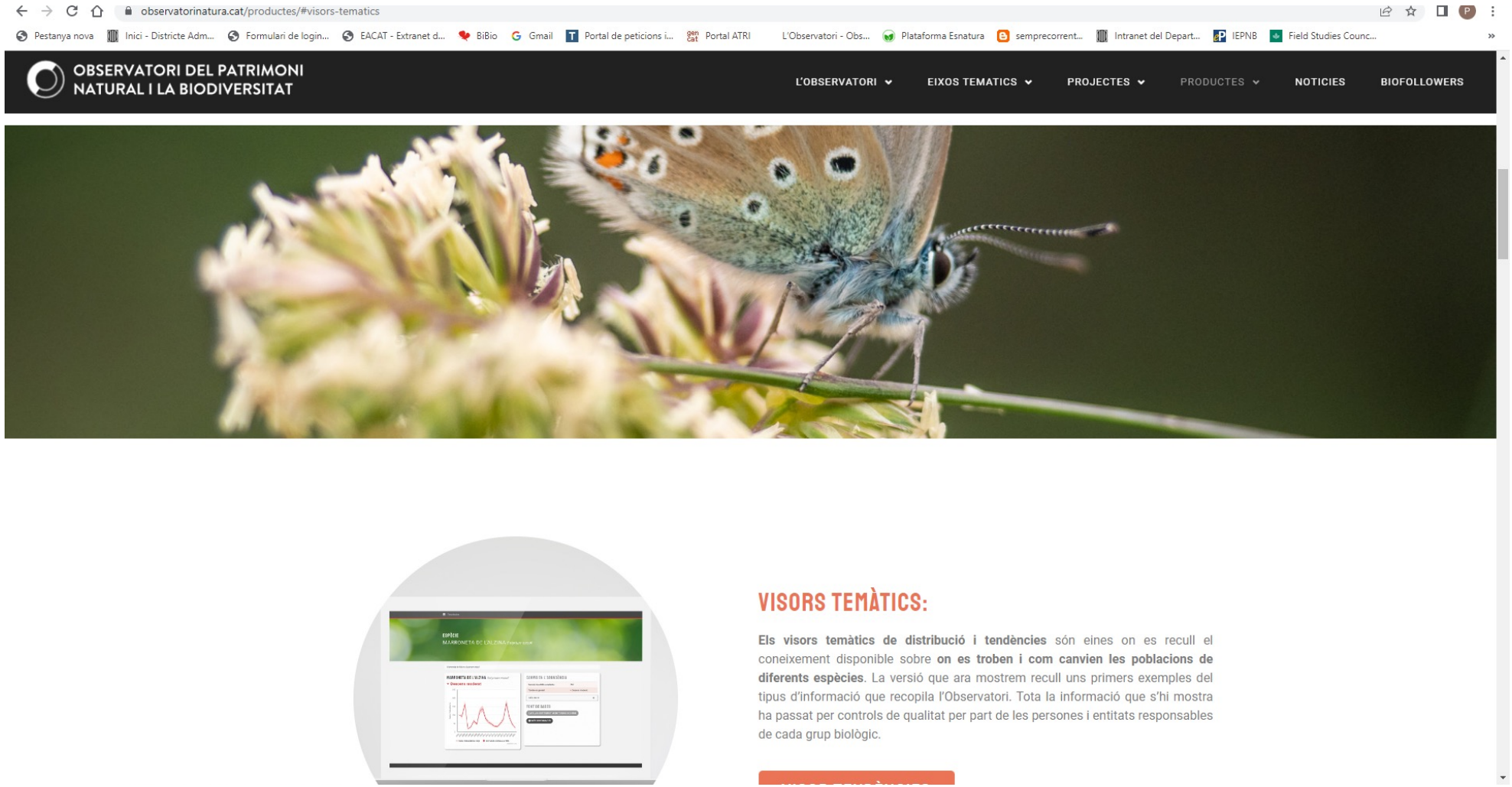
In 2022 the Observatory promotes the project of the 1st Atlas of Mammals of Catalonia.



Under the protection of the Generalitat de Catalunya with the collaboration of various scientific institutions of the Observatory Participation Forum, and with the participation of volunteers (**citizen science**) who have carried out field work in the 10 x 10 km squares.

First results of the Observatory

https://observatorinatura.cat/



Dank u wel!
Merci beaucoup!

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