



BIODIVERSITY
BUILDING
BLOCKS FOR
POLICY

Standardising biodiversity data for improved policymaking: Introducing the B-Cubed project



Funded by
the European Union



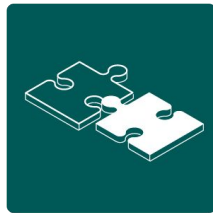
The B-Cubed Project

About



Challenges

The global biodiversity crisis requires **rapid, reliable and repeatable biodiversity monitoring data** which decision makers can use to evaluate policy.



Opportunities

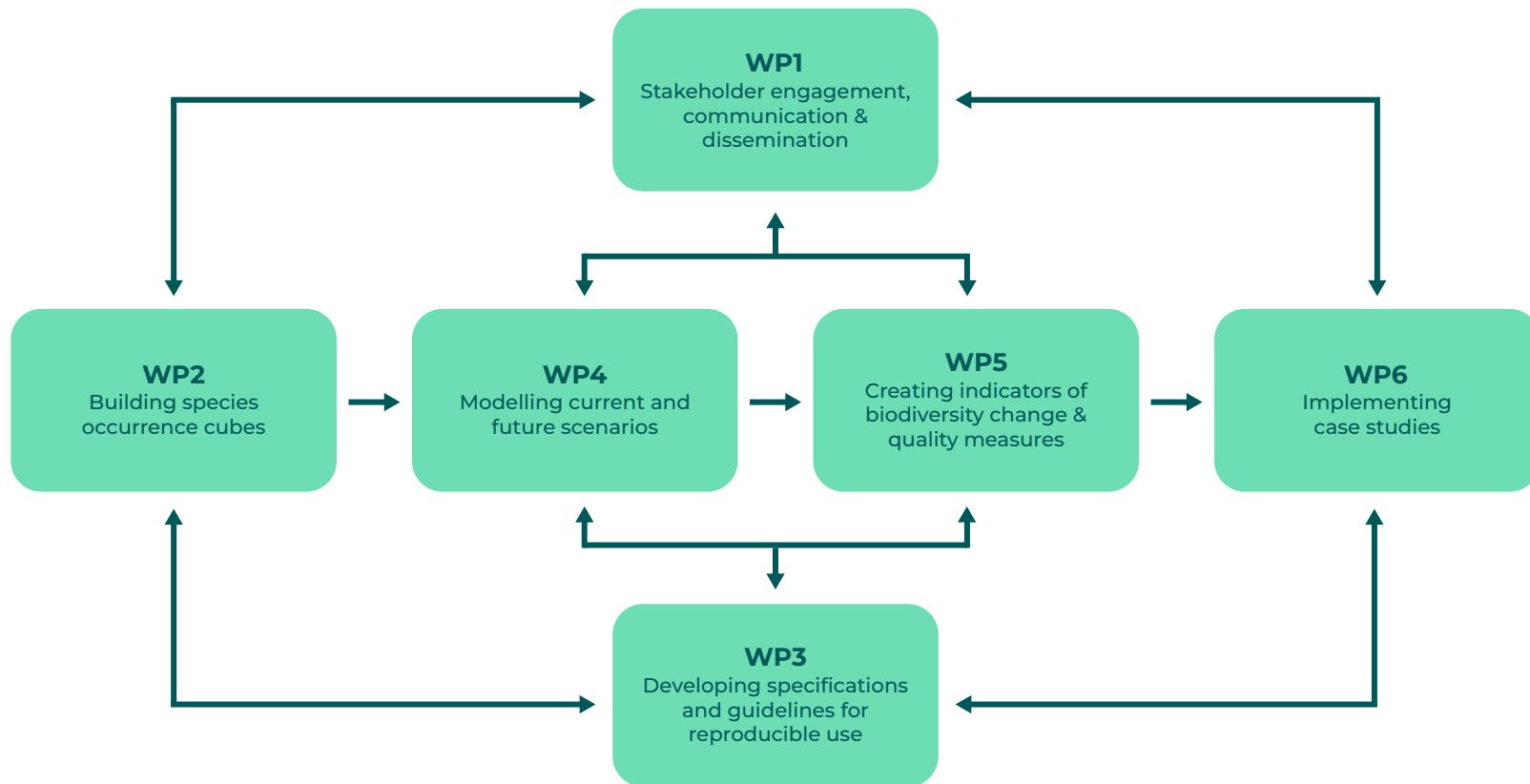
Such information – from local to global level and within relevant timescales – calls for an **improved integration of data on biodiversity** from different sources.



Aim

B-Cubed is **standardising access to biodiversity data**, empowering policymakers to address the impacts of biodiversity change.

Approach



Consortium



RESEARCH INSTITUTE
NATURE AND FOREST



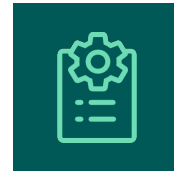
Solutions & Activities



Policy alignment to enhance the use of biodiversity indicators in policy decisions



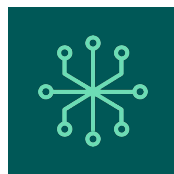
Evidence base to provide fast access to up-to-date biodiversity data for policy



Automated workflows to facilitate automated data aggregation and output



Cloud computing to enable models of biodiversity at high resolution and frequency



Capacity building to train in biodiversity informatics and cloud computing



Case studies to test solutions' applicability and unite biodiversity informaticians



B-Cubed Solutions

Data & Evidence

B-Cubed aims to improve the existing policy evidence base and contribute to better alert systems by providing fast access to **pre-aggregated and modelled biodiversity data** and **standardised biodiversity indicators** responsive to the addition of new data.

BIODIVERSITY CUBES



Species occurrence cube



Suitability cube



Dissimilarity cube

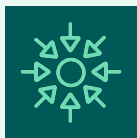


Network invasibility cube

BIODIVERSITY INDICATORS



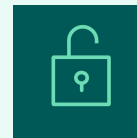
Phylogenetic indicators



Impacts of alien taxa indicators



Robustness indicators



Adoption of existing indicators

Biodiversity cubes

B-Cubed has developed a new service on GBIF for **downloading Species Occurrence Cubes**.
Tutorials are available on how to work with them.



[Use the service](#)



[View tutorials](#)

Species Occurrence Cubes

An occurrence cube is a tab-separated csv file **containing species occurrence measures** (e.g. a count) summarised by taxonomic, temporal and/or spatial *dimensions* (e.g. a given year, a specific taxonomic rank, etc).

Ready deliverables

D2.3

[Occurrence cube service](#)

D2.2

[Occurrence cube implementation](#)

D2.1

[Specification for species occurrence cubes and their production](#)



Biodiversity indicators

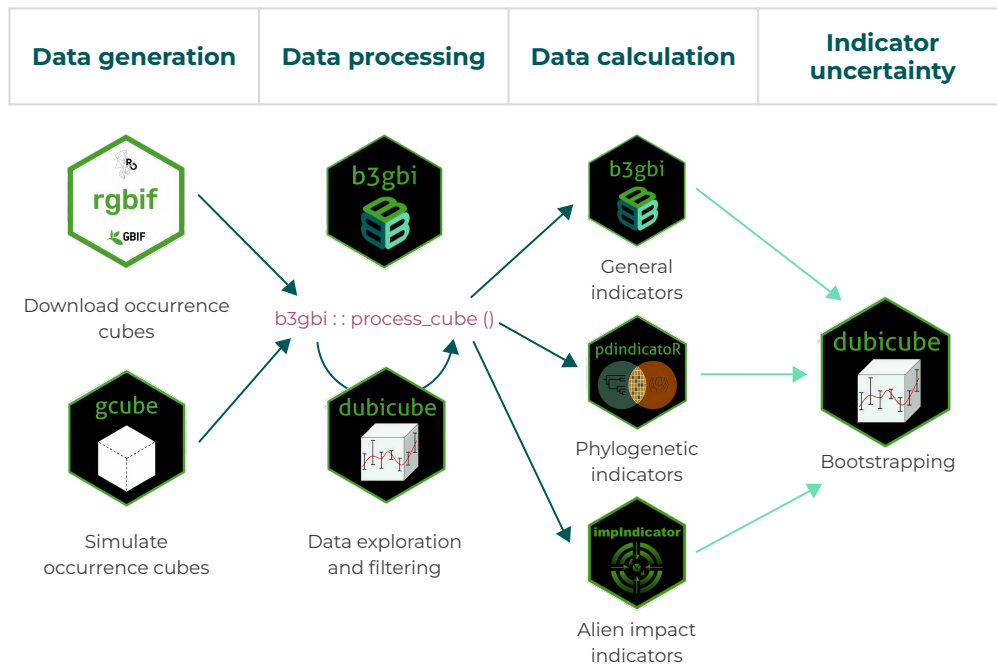
B-Cubed uses biodiversity data cubes to generate **indicators** that translate complex data into clear measures of biodiversity status and trends. To automate the calculation of these indicators, B-Cubed developed the **b3verse** – an open-source software ecosystem containing a suite of interoperable R packages.

Data flow →

Package depends on →

Learn how it works!

[View guide](#)



A large number of bees are shown in various states of flight and swarming. In the foreground, a dense cluster of bees is gathered on a light-colored, textured surface. Numerous other bees are scattered throughout the frame, some in sharp focus and others blurred, suggesting a busy, active environment. The background is a solid, vibrant green color.

B-Cubed Activities

Policy Alignment

To ensure an improved match between policy and the biodiversity data used to inform it, B-Cubed worked closely with existing European and international biodiversity initiatives to **identify and address policy needs.**



D1.5 Alignment of B3 with European Biodiversity Initiatives: Insights from EU policy

B-Cubed worked closely with other European projects to identify data needs for policies and targets aligned with the new European Green Deal.



D1.6 International Science-Policy Landscape Analysis

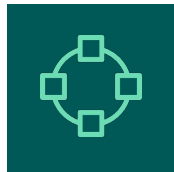
B-Cubed reviewed the existing policy and reporting needs by conducting a landscape analysis and consultation.

Capacity building

To ensure B-Cubed's tools meet openness standards and to **build better capacity in biodiversity informatics and cloud computing**, the project is developing a number of guidelines, training programs and activities.



Software requirements
and assessment



FAIR data products



Hackathon



Tutorials



Training and support

Hackathon 2-5 April 2024

B-Cubed's hackathon was a **4-day event**, bringing together **biodiversity informaticians, researchers, and practitioners** who are passionate about leveraging biodiversity data for impactful solutions. Our common goal was to **standardise biodiversity data** in order to enhance efficiency and accessibility.

D1.7

Hackathon Results



Guides and Tutorials

B-Cubed's **Guides and Tutorials platform** offers a collection of materials to support users working with biodiversity data.

[View guides and tutorials](#)

The platform shows users **step-by-step** how to apply B-Cubed tools in practice—from building workflows and understanding model outputs to supporting biodiversity assessments and decision-making processes.



**Building and
downloading data cubes**



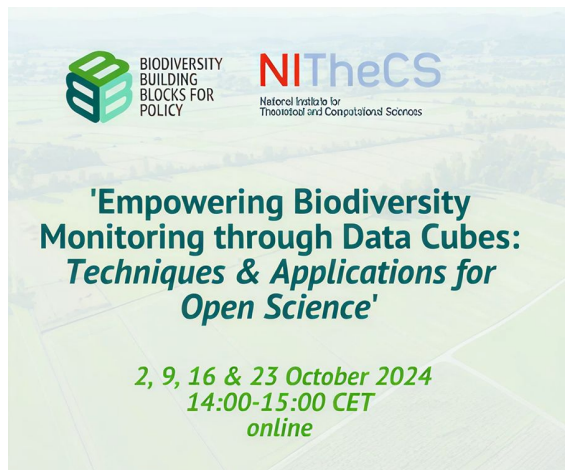
**Modelling and
analysis in R**



**Ecological
modelling**

Trainings

To ensure B-Cubed's tools are usable by the general public the project partners **organise different trainings on using biodiversity data cubes**



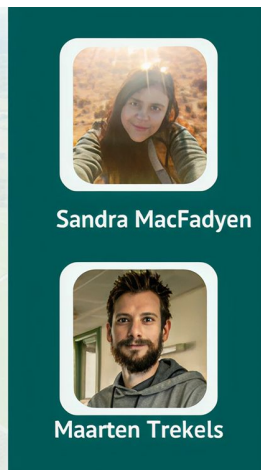
The poster features a background image of a green landscape with a river. At the top left is the BIODIVERSITY BUILDING BLOCKS FOR POLICY logo, and at the top right is the NITheCS logo (National Institute for Theoretical and Computational Sciences). The title is in large, bold, dark green font. The dates and time are in green font at the bottom.

BIODIVERSITY BUILDING BLOCKS FOR POLICY

NITheCS
National Institute for Theoretical and Computational Sciences

'Empowering Biodiversity Monitoring through Data Cubes: Techniques & Applications for Open Science'

2, 9, 16 & 23 October 2024
14:00-15:00 CET
online



The poster has a dark green background. It features two circular portrait photos of the speakers. The names are written in white text below each photo.


Sandra MacFadyen


Maarten Trekels



The poster has a background image of green foliage. At the top left is the European Union flag logo with the text 'Funded by the European Union'. At the top right is the BIODIVERSITY BUILDING BLOCKS FOR POLICY logo. The title is in large, bold, dark green font. The date and time are in green font. The social media handle is in green font at the bottom right.

 **Funded by the European Union**

BIODIVERSITY BUILDING BLOCKS FOR POLICY

How to Package Your Functions: From Standalone to R Packages (B-Cubed workshop)

 **7 November 2024**

 **13:00 - 15:00 CET**

 **@BCubedProject**



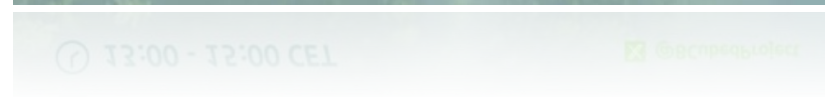
Faint version of the first training poster.

online
14:00-15:00 CET



Faint version of the second training poster.

Maarten Trekels



Faint version of the third training poster.

 **13:00 - 15:00 CET**

 **@BCubedProject**

Synergies



B-Cubed

Biodiversity Building
Blocks for Policy



USAGE

Urban Data Space for
Green Deal



AD4GD

All Data for
Green Deal



FAIRiCUBE

F.A.I.R.
Information Cubes

Joint activities

Joint policy brief



Joint workshops



Case Studies

The application and usefulness of B-Cubed's algorithms and software are demonstrated through **the project's four case studies**. They cover different locations varying in geographical extent, biodiversity richness and data availability.



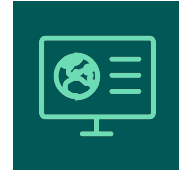
**Regional indicators
in Europe**



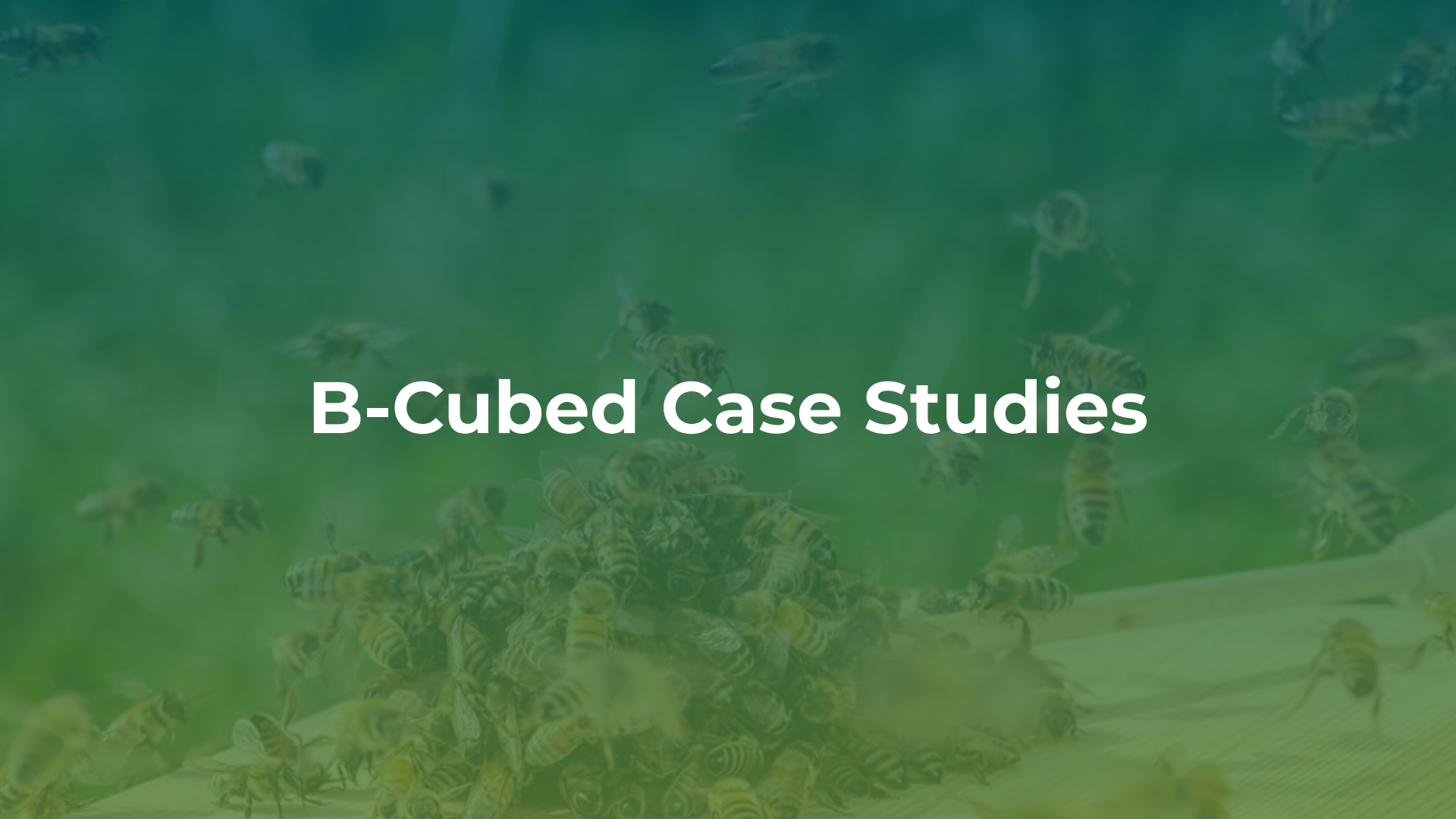
**Stakeholder-driven
case study**



**Biological invasions in
South Africa**



**Global and continental
biodiversity change**



B-Cubed Case Studies

Calculating regional indicators in Europe using the B-Cubed workflow

In this case study, the **B-Cubed workflows will be tested** for Flanders, a region of Europe where species occurrence data are abundant.

The expected results include

- Making the **selected indicators available** through a public dashboard that can serve as inspiration for other dashboards
- **Ensuring interoperability** by maintaining close contact with other dashboard maintainers, for instance, by providing all code in an R package.

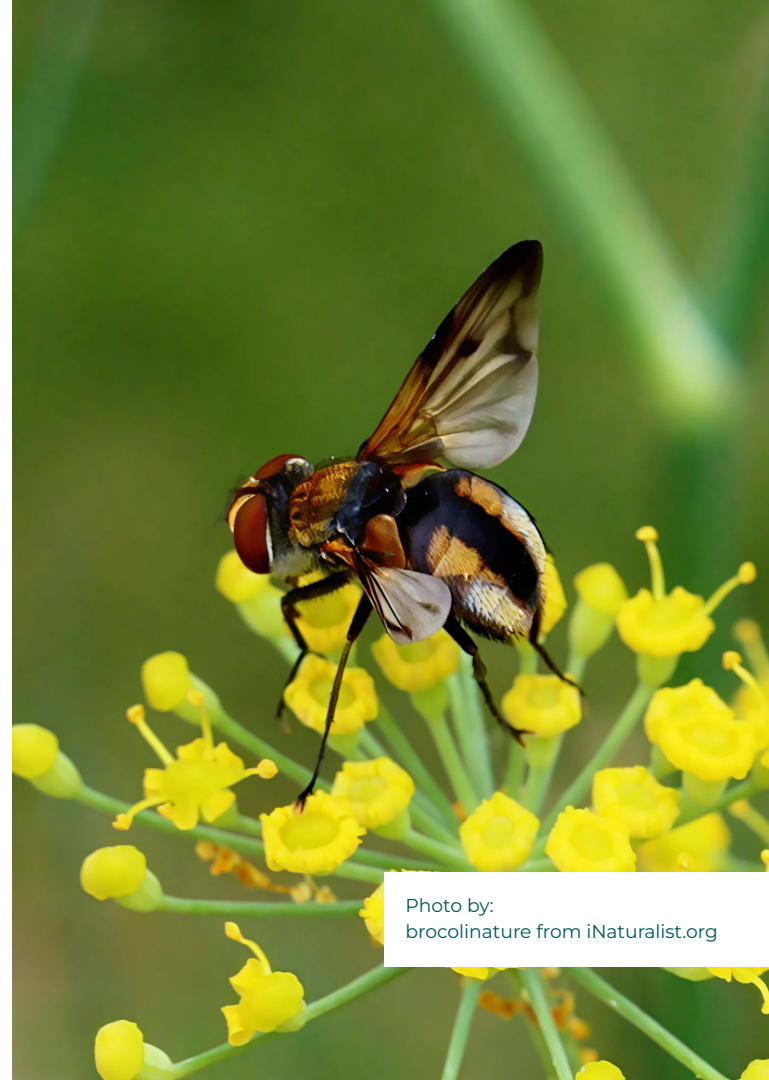


Photo by:
brocolinature from iNaturalist.org

The status of biological invasions and their management in South Africa in 2025

In this case study, the indicators **will build upon the key gaps** in the last status report (SANBI and CIB, 2020) on invasive alien species in South Africa.

The expected results include

- **Revised indicator fact** sheets for South Africa
- **Automation and standardisation** of the process for species and site indicators that require spatial data (e.g., workflows)
- **Key graphical outputs** of the report

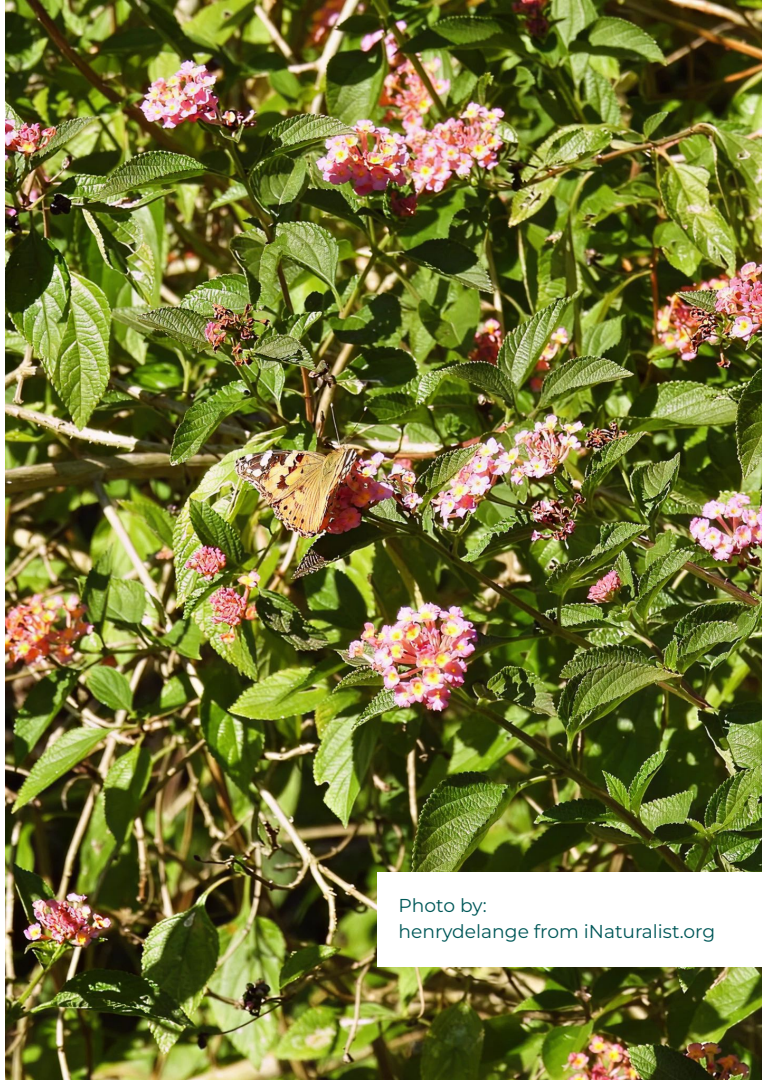


Photo by:
henrydelange from iNaturalist.org

Optimising top-down and bottom-up assessment and reporting of the Habitat Directive in Europe

In this case study, the objective is to establish a workflow that promotes the **integration of data** reported in the scope of the **Habitat Directive** with data from other sources, in particular GBIF, as well as to improve the reproducibility and consistency of biodiversity data reported by member states.

The expected results include

- **Increasing stakeholders' confidence** and literacy for integration of GBIF data
- Developing **tools to evaluate the effectiveness of Natura 2000 sites** across Europe
- Improving **mobilisation and accessibility of biodiversity data** into FAIR-compliant formats

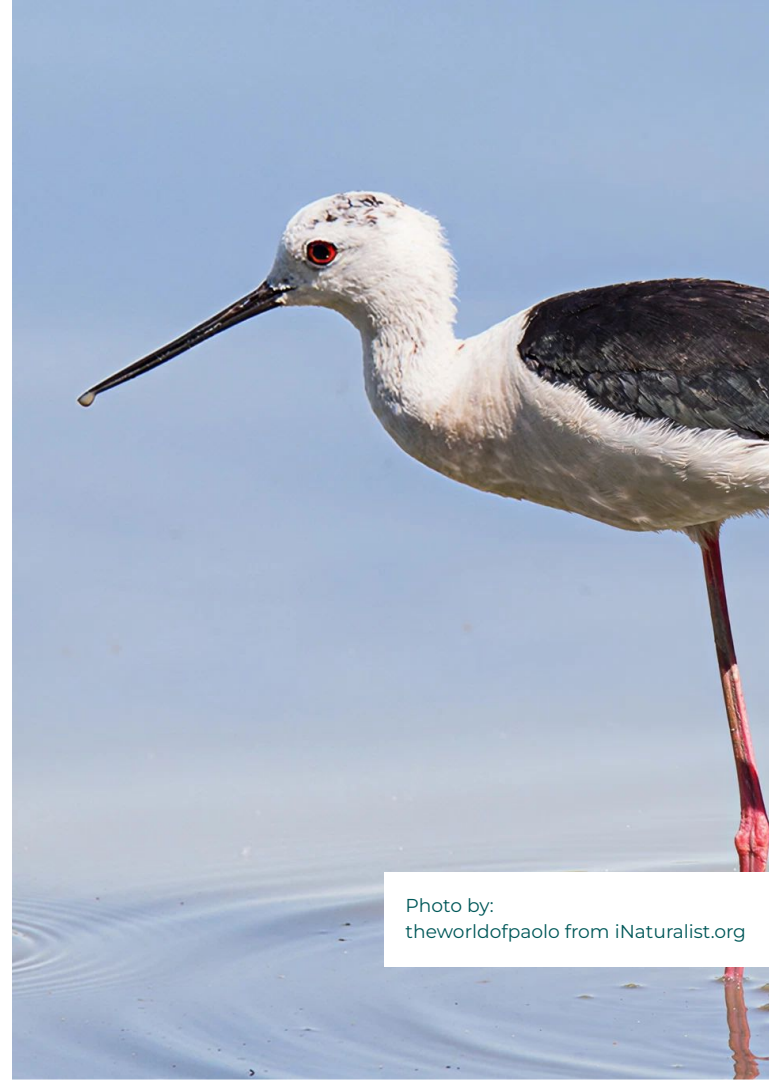


Photo by:
theworldofpaolo from iNaturalist.org

Status and trends of biodiversity at Ramsar sites assessed using GBIF data cubes

In this case study, **species occurrence data at Ramsar sites** from GBIF will be gathered and the status and trends of biodiversity in Ramsar sites will be explored. Then the biodiversity trends in Ramsar sites across regions will be compared.

The expected results include

- Insights about the **feasibility of applying** B-Cubed's the workflows
- Insights into the **variation of data availability** across regions
- **A comparative analysis** of biodiversity status and trends across Ramsar sites and regions

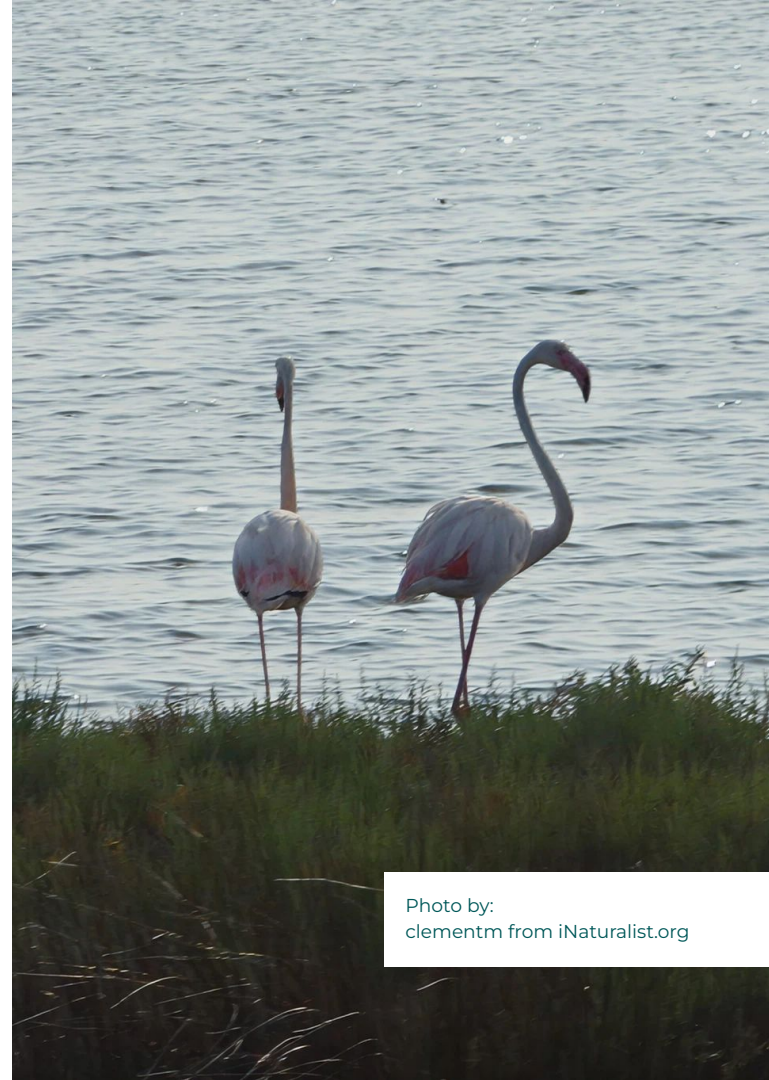


Photo by:
clementm from iNaturalist.org



b-cubed.eu



@BCubedProject



B-Cubed Project



B-Cubed Project



@b-cubed.eu

Thank you!



B-Cubed Newsletter



This project receives funding from the European Union's Horizon Europe Research and Innovation Programme (ID No 101059592). Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the EU nor the EC can be held responsible for them.



Funded by
the European Union