MIGR-SAFE Project

A demonstration project for biodiversity in New Aquitaine

November 2021

At the very beginning

SCO 2021

Space Climate Observatory call for innovative concepts related to climate change, 2021 theme on biodiversity

A 1st CLS response

Climate change
Biodiversity conservation
Knowledge association
Sharing information

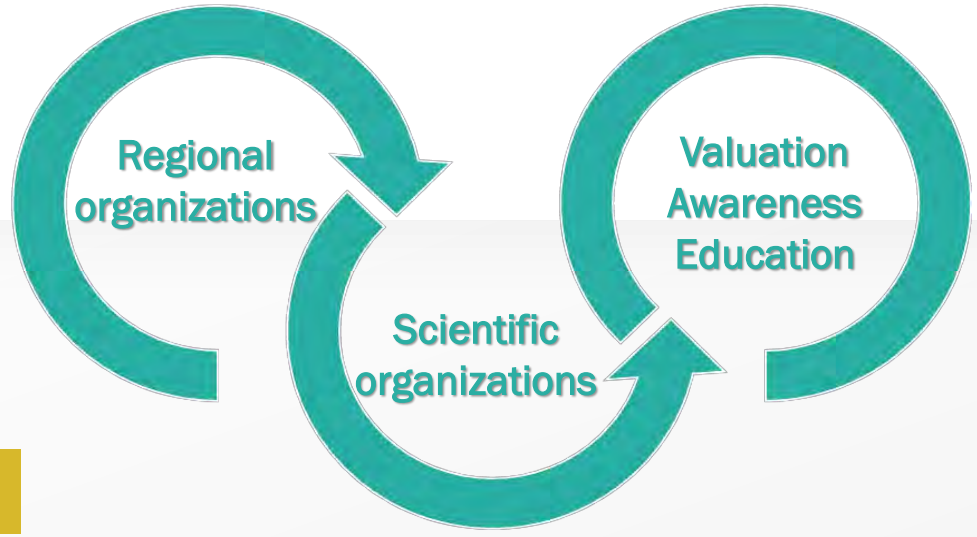
A first phase

To stabilize expectations, use cases of an operational application connected to sustainable data infrastructures (CNES contract)

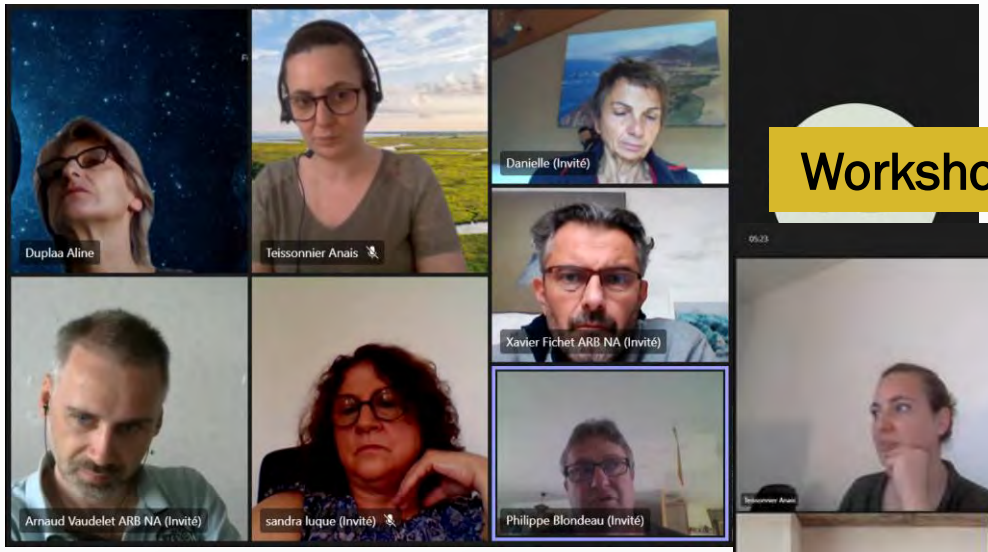
Specific adaptation to the territory of experimentation

Stakeholder engagement to co-construct a demonstration project

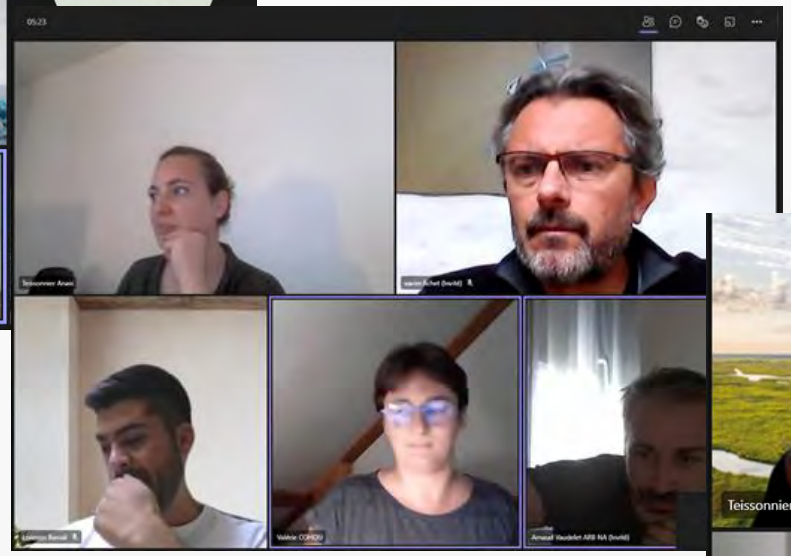
Effective tripartite participation



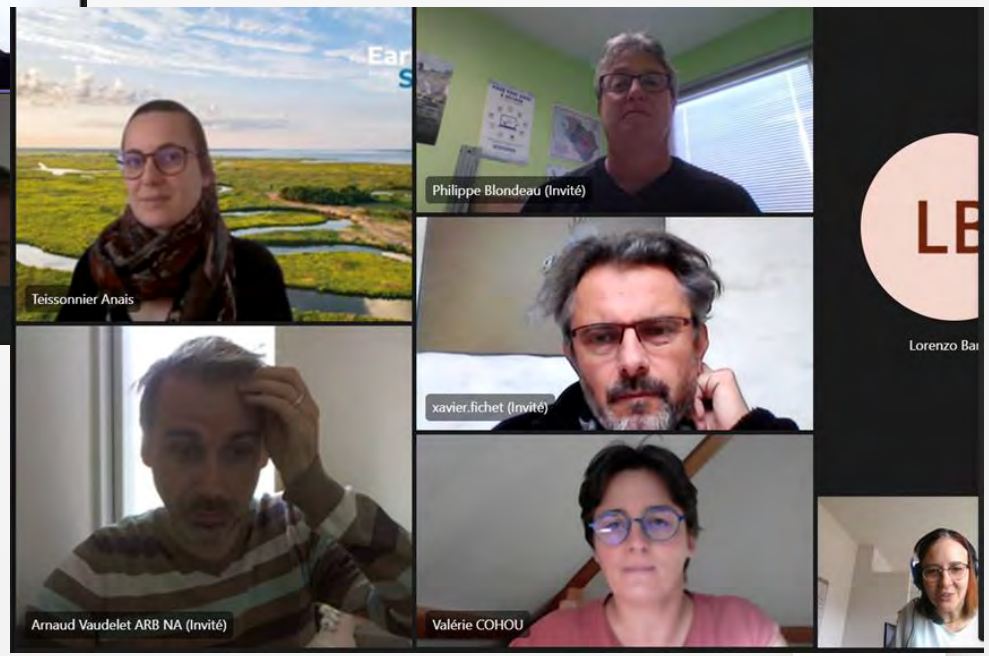
Workshop 1 - June 28, 2021



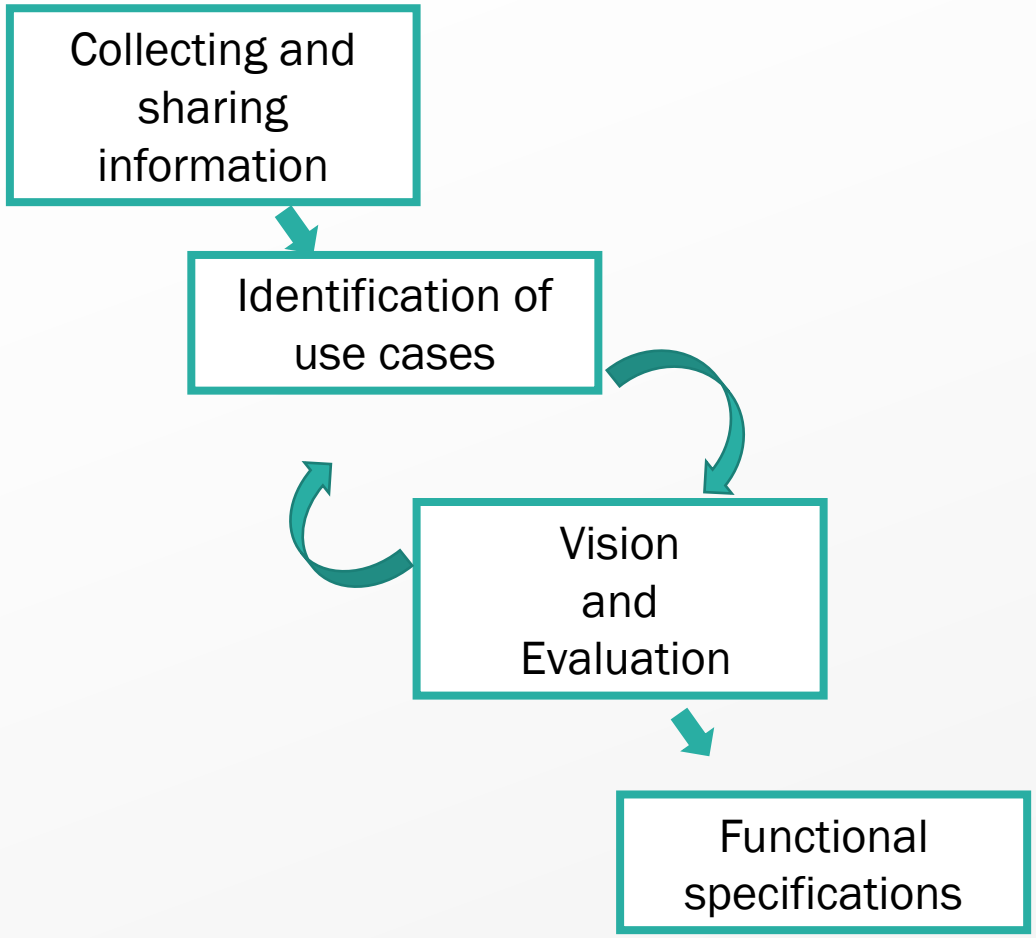
Workshop 2 - Sept 10, 2021



Workshop 3 - Oct 1, 2021



The working methodology for this first phase



June 28, 2021 - Workshop 1

- ✓ Presentation of the partners and their expectations
- ✓ Project framework, review of objectives and supporting tools
- ✓ Identification of gaps and priorities

10 sept 2021 - Workshop 2

- ✓ Restitution of individual surveys
- ✓ Review of data and use cases (needs)
- ✓ Expected results and performance indicators
- ✓ Response to individual questions

Oct 1, 2021 - Workshop 3

- ✓ Prioritization of needs by user segment
- ✓ Alignment and common value proposition
- ✓ Response scheme and functional added value
- ✓ Recommendations

Nov 18, 2021 - Final presentation

- ✓ Project set-up and role of each partner
- ✓ Viability and replicability of the solution
- ✓ Implementation plan

The deliverables of this first phase

28/05/2021 **Web page online**

03-11/09/2021 **Press release and participation to IUCN conference**

16/09/2021 **Presentation at GEODATADAYS in Grenoble**

18/11/2021 **Final report including project proposal**
users and needs, data review,
system and service architecture project set-up

PROJECT : ### MIGR-SAFE ###

Contact

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Summary of the project

The preservation of migratory birds is a major challenge. **Their migrations are strongly affected by weather conditions, landscapes, human activities and climate change**. They are driven by the need to stop over to feed, rest and reproduce, and to cross major natural obstacles.

Ensuring their journey and protecting the ports of call requires **a collaborative response between experts, local authorities and scientists,** but also the **provision of new data and tools.**

This is the challenge of the MIGR-SAFE project, to demonstrate the value of **a spatial observatory of migratory fauna,** which considers the entire spatio-temporal scale of these birds, taking into account the crossing of landscapes shaped by man and climatic variables. **Spatial data have their place** in these large-scale issues, but are not sufficient; **knowledge of bird distribution and land management actions** must also be **combined.**

Our use case project is on **the territory of New Aquitaine,** to understand the **interaction between migratory wood pigeons and agricultural crops** in order to **accelerate the decision-making process for habitat management measures**, because the situation is urgent, because the species are evolving and the landscapes of their seasonal ranges are changing rapidly.

The project objectives are twofold:
(1) To work on a generic solution that allows to merge observations and to **release the power of the available data** by giving access to scientists and territory managers to new exploitable information, a solution that can be duplicated to other species and other territories
(2) Qualify the use of wood pigeons, to promote the **study of migratory flows and regional behavior of the species**, putting them in perspective with spatial indicators of presence, agricultural landscape, and other bioclimatic parameters.

The solution will also participate in the **sensitization and mobilization of civil society** (regional organizations and school public) around the issues of biodiversity, networks of observation of birdlife less well equipped, in order to exploit, improve and disseminate the data available to the community.

The project is supported by CLS, GIFS France, the New Aquitaine Regional Chamber of Agriculture, the New Aquitaine Regional Biodiversity Agency, the GIP ATGERI for regional planning, the CNES - Education jeunesse and INRAE. The project is labelled SCO.

This initiative is unique because it allows the association of knowledge bases and knowledge, it brings together the scientific activity carried out on a large spatial and temporal scale and the land use and conservation actions carried out on a regional scale.

https://www.spaceclimateobservatory.org/migr-safe
https://www.spaceclimateobservatory.org/fr/satellites-etonnants-allies-de-la-biodiversite
https://www.youtube.com/watch?v=n2gGR07hU1k

October 15, 2021

MIGR-SAFE

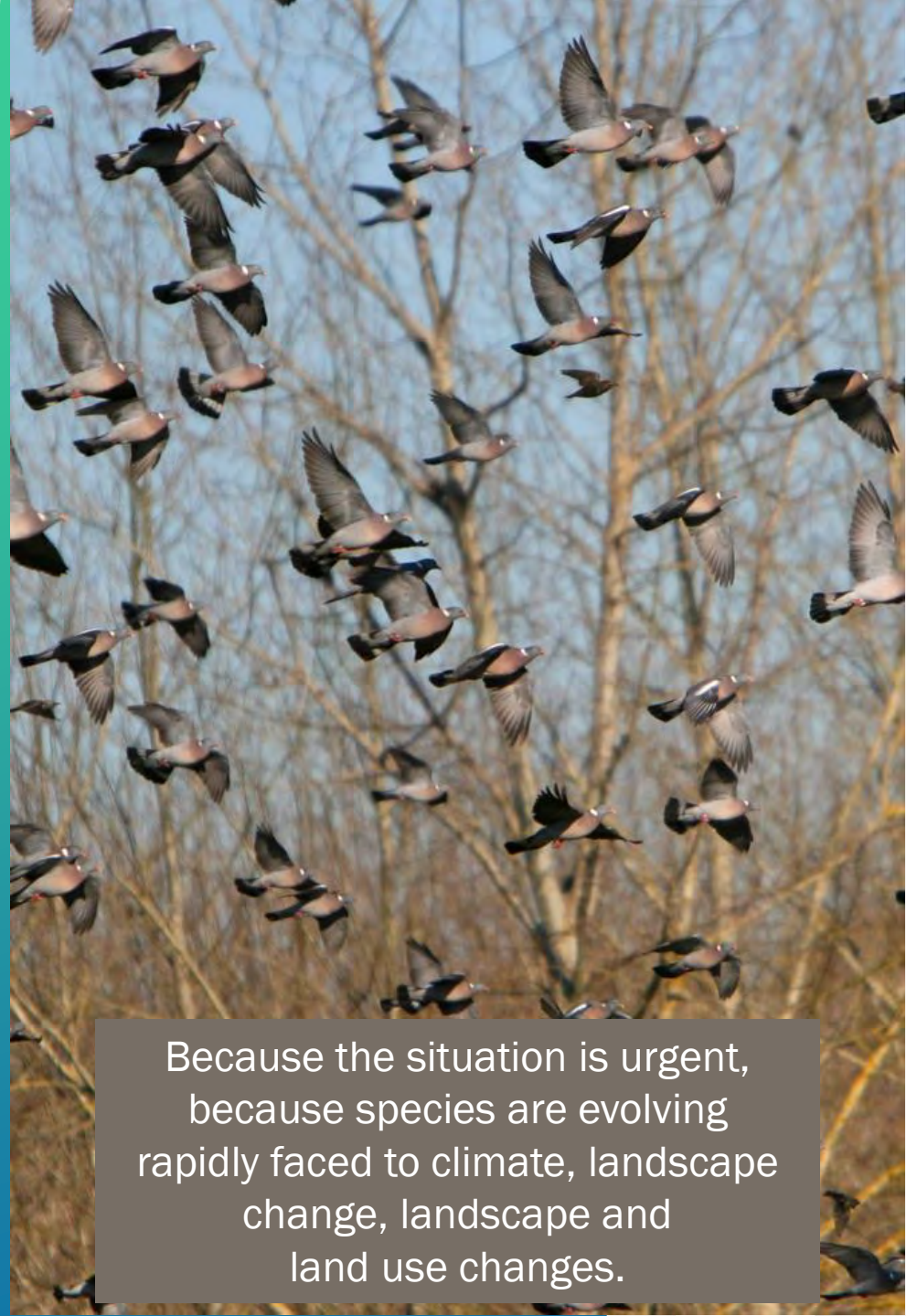
The project challenge is confirmed

Challenge : Conservation of migratory birds

Objective : Insure their travels and protect the stopovers

Methodology : Consider the different parameters that impact their mobility and regional behavior, consider the whole space-time dimension

Combine questions of local community and scientific knowledge to accelerate decision-making for conservation actions and spatial planning



Because the situation is urgent, because species are evolving rapidly faced to climate, landscape change, landscape and land use changes.

The territory of experimentation has been refined

The case of the wood pigeon

Understand the interaction of this taxon with nature and regional agriculture

A functional and duplicable use case

Use space-based data for such large-scale issues and artificial intelligence to fuse information and unleash the power of data

Support to best practices to go along territorial policies

A collaborative response in the New Aquitaine region

An issue supported in recent reports

Ecobiose MAI 2020

➔ Support for adaptation and change

Région Nouvelle-Aquitaine NEO TERRA Transition écologique et énergétique

➔ Agroecology transition

ACCLIMATERRA

The climate sentinels

➔ Anticipate with land use and seasons monitored by Sentinel satellites and climate data from Copernicus programs

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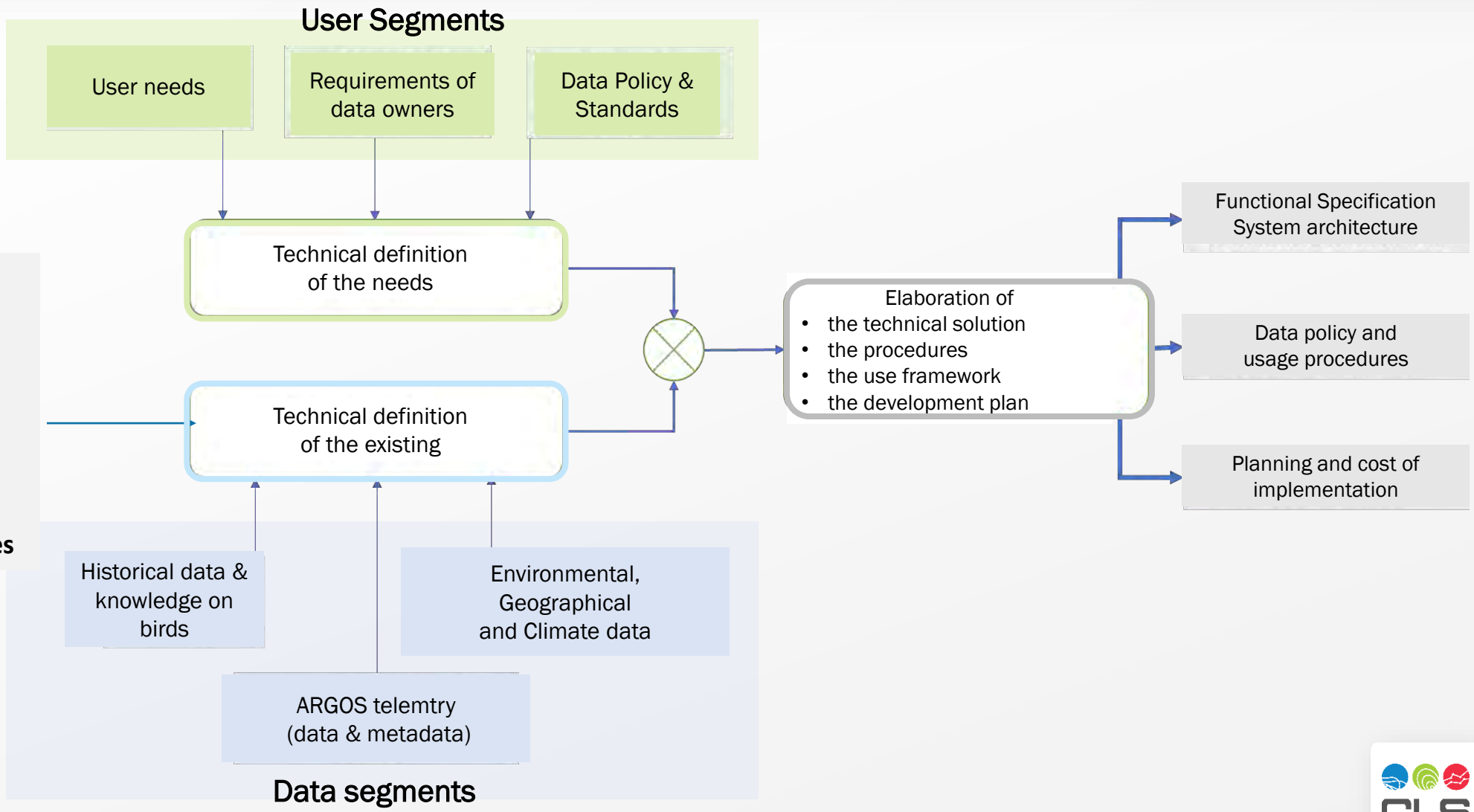
Feasibility and replicability taken into account

Solutions used for example for sustainable fisheries management (tested / demonstrated also for **pastoralism management**, reindeers in Russia) and AI solutions for **behavior management** and creation of **new geographical indices**



Philippe Blondeau

In charge of ECOPHYTO & Biodiversity missions

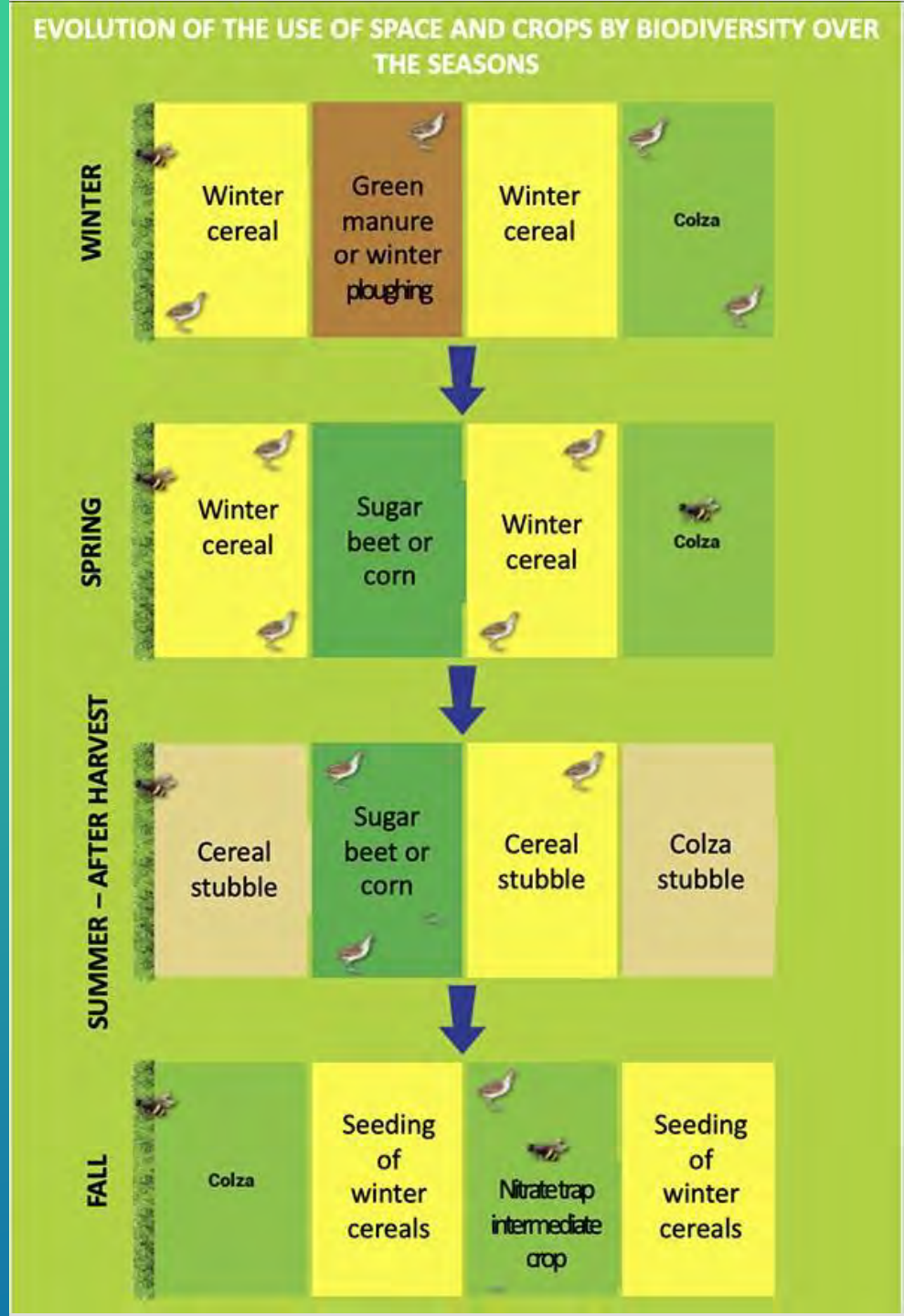
Problems identified

- ✓ Simplification and standardization of landscapes
- ✓ Use of chemical inputs (fertilizers, pesticides)
- ✓ Crop unit according to seasons / tillage

aGRICULTURES & TERRITOIRES
CHAMBRE D'AGRICULTURE NOUVELLE-AQUITAINE

➔ **Need for a solution to meet a need for knowledge to redesign favorable farming systems**

- ✓ How to obtain analyses of trends or changes in the status of this species in landscapes of large-scale crops?
- ✓ How to obtain analyses linking ecosystems, their functioning, and landscape diversity (average plot size)?
- ✓ What are the effects of tilage on this biodiversity, its response to crop rotations? Is it a real demographic effect or is it simply the cause of a displacement of birds between landscapes under different crop systems?
- ✓ Is the knowledge of the intrinsic value of crops and the reintroduction of hedgerows as a favorite place for birds sufficient to predict the carrying capacity of the landscape?
- ✓ Does the implantation of infrastructures also play a role? (pylons, wind turbines, etc.)



Valérie Cohou

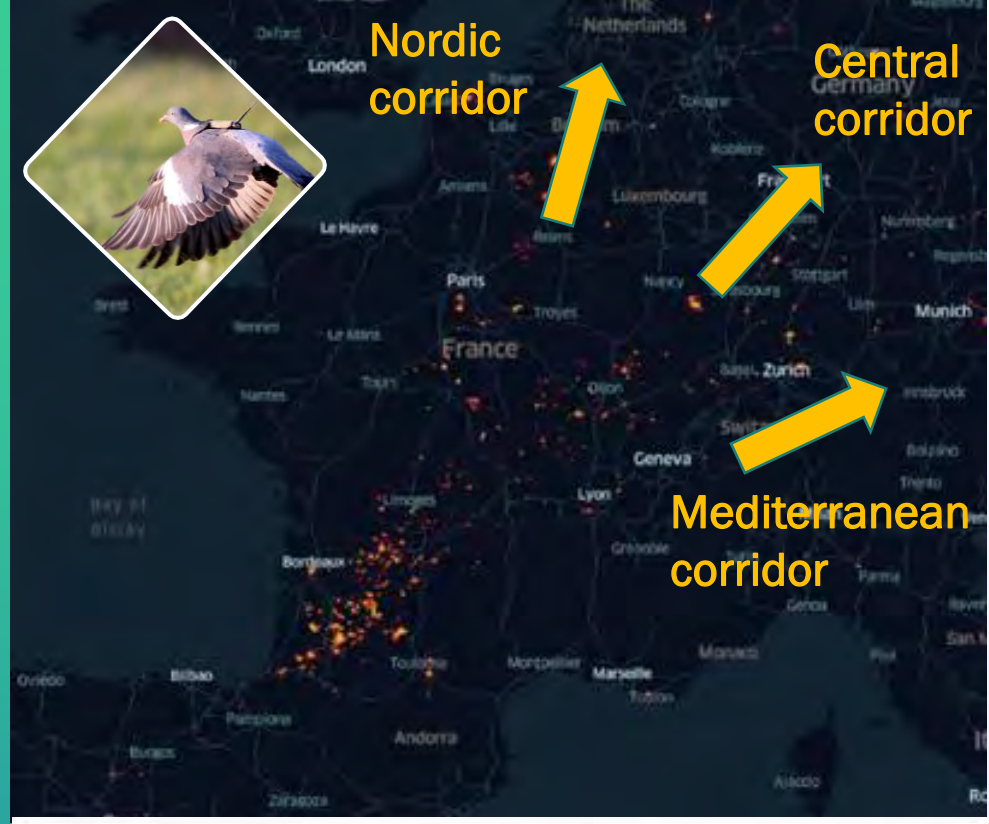
In charge of GIFS France missions

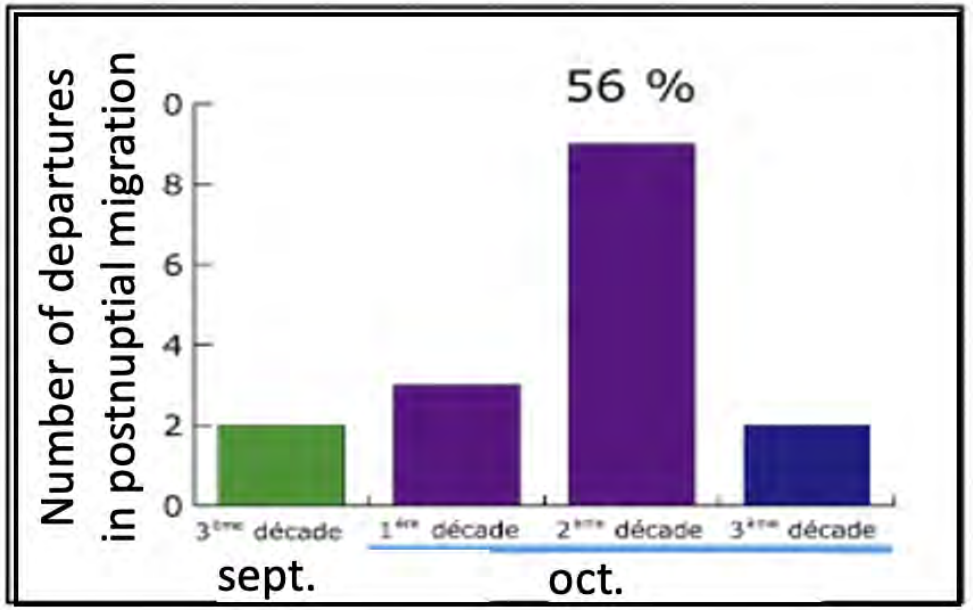
Difficulties encountered

- ✓ Refine knowledge of wood pigeon phenology, ecology and territory use
- ✓ Analyze information rapidly for simultaneous knowledge of species and natural habitats to track changes in routes, environmental conditions, landscape and climate.

➔ **Observe the past and present continuum (20-30 years) and understand their mobility, in and out of France, by reducing the time required to access information, and the level of technical expertise required**

- ✓ Differentiate between the types of habitats occupied during the different phases of the bird's life (breeding, migration, wintering) on a European scale, if they have also nocturnal or diurnal activities
- ✓ Identify the type of food resources preferred
- ✓ Compare wintering and breeding areas (surface, habitat) and characterize its evolution in time
- ✓ Put the information into perspective to understand their influence on the phenology of birds (migration dates), climate change, changes in agricultural practices





Sandra Luque
Research Director

INRAE
tetis

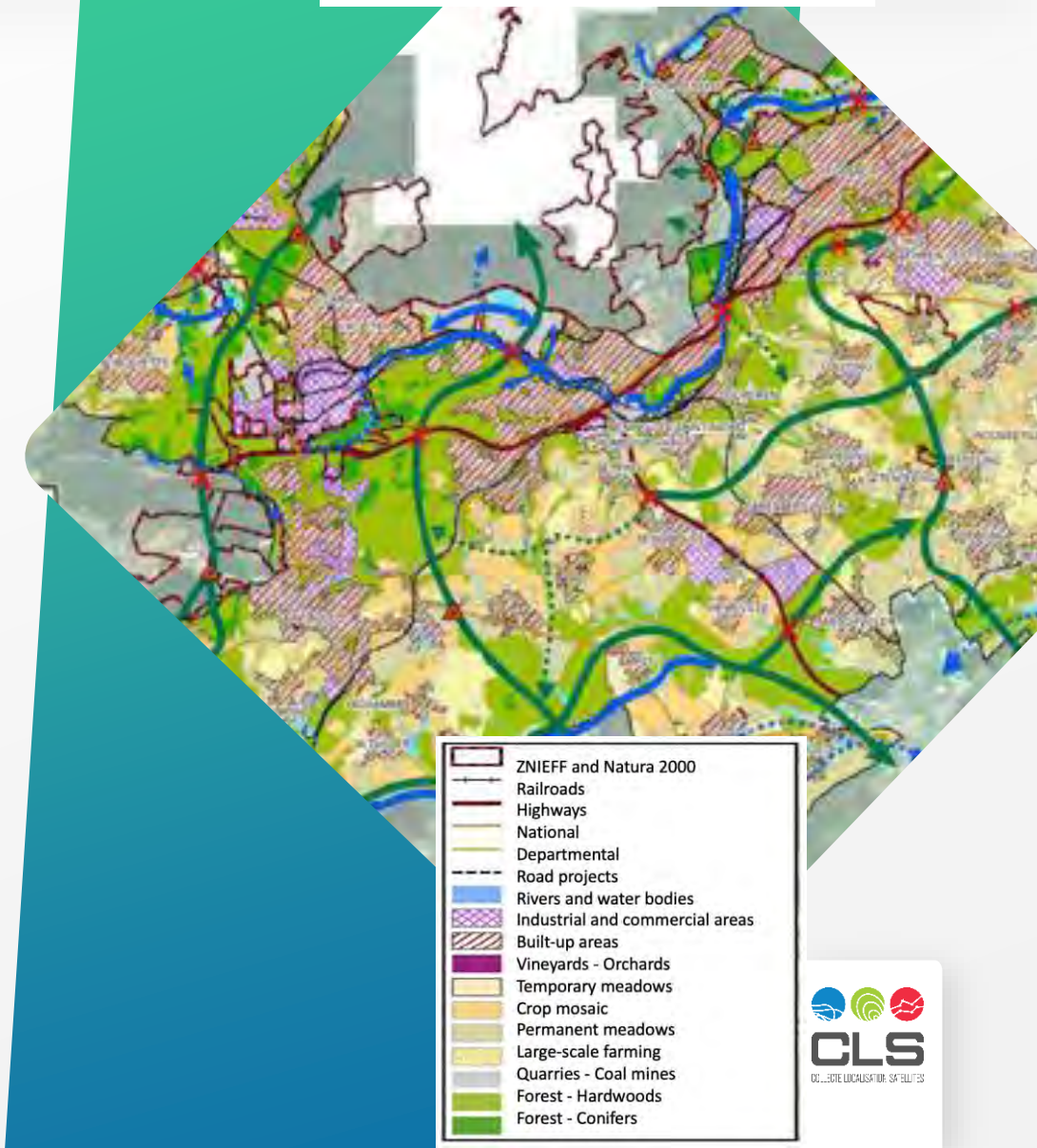
Difficulties

- ✓ National data are too aggregated and obtained after a long delay
- ✓ Taxon is often not filled in
- ✓ Raw tracking data, national or not, are difficult to access
- ✓ There is duplication of data

➔ **Produce new information processed at the source (indicators, maps) for non-expert and public use**

- ✓ Work at the source and at the global scale
- ✓ Document the data
- ✓ Continuously refresh data with access to the image of the past (10 years retrospective)
- ✓ Work on the coding of land use grids
- ✓ Collection of best practices to expand the implementation of the MIGR-SAFE project on 2-3 species/territories,
- ✓ Use case for university teaching
- ✓ Implement habitat models

SCoT of the Rosselle valley
Green and blue network



CLS

Estelle Raynal
Youth Education Officer

Issues
- ✓ Raising awareness & mobilizing schoolchildren
- ✓ Impact of climate change on biodiversity
- ✓ Valuation of spatial data

➔ **Creation and provision of data and educational resources**

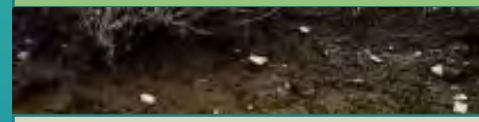
- ✓ Centralization and sharing of resources
- ✓ Link between scientific research and teachers
- ✓ Valorization and adaptation of scientific resources:
  - Pedagogical support
  - Digital data platform to use / combine in situ data with satellite data





WATER

BIOSPHERE



EARTH

AIR

Frédérique Blanc
Integrated projects

Issues
- ✓ Simplify
- ✓ Share
- ✓ Save time

➔ **Duplicable functional solution**

- ✓ To have information on the nature of the routes taken, the duration of flights and stopovers, the modalities of the crossing of the large natural obstacles
- ✓ To characterize the types of habitats of the breeding and wintering areas of equipped wood pigeons (wood, moorland, fallow land, cultivation...)
- ✓ To provide a solution to compare wintering and breeding areas (surface, habitat) and characterize their evolution in time
- ✓ To put into perspective the information to understand their influence on the phenology of the birds) climate change, change of agricultural practices

Xavier Fichet
Animation of the biodiversity pole

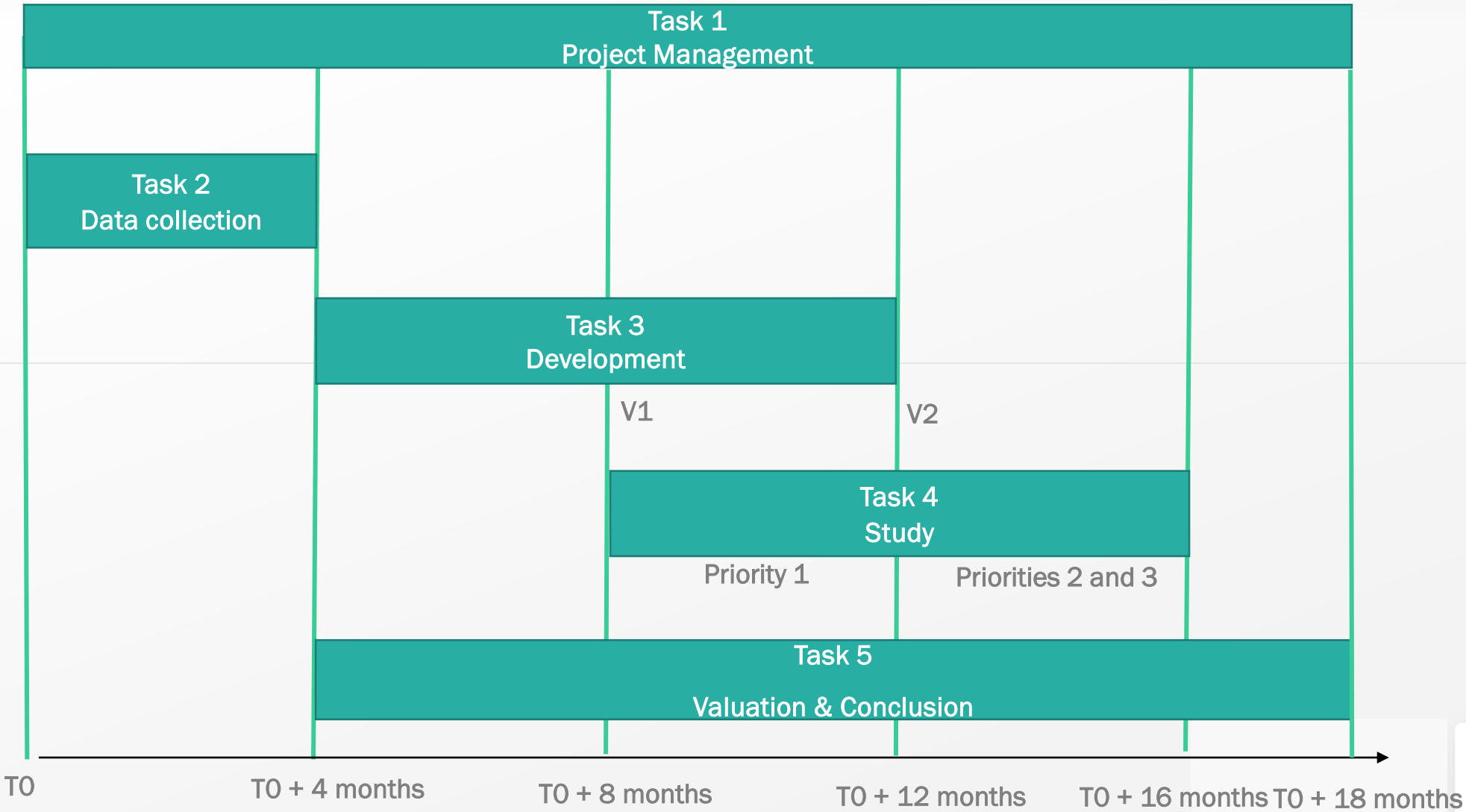
Issues
- ✓ Know if the available data (quantity and quality), the solution, and the expertise are sufficient

➔ **Answer the following questions and evaluate the results**

- ✓ Do the available data make it possible to answer the question about the link between climate change and wood pigeon migration?
- ✓ What data would allow to answer this question (crossing of Pyrenean passes, migration dates, length of stay ...)?
- ✓ Have the wintering and staging areas changed spatially and temporally?
- ✓ What are the other possible causes of the observed variations (food resources, length of the day, position of the sun, anthropic infrastructures (pylons, windmills, urbanized areas, ...)?

And the rest

Precursor → Demo project → Duplication



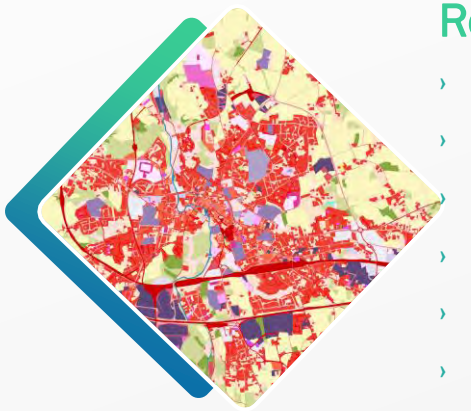
Data need

Data & Information on Birds

- Monitoring of population
  --- Past and present
- Individual monitoring
  -- ringing, ARGOS/GPS
- Knowledge on the phenology and ecology of the bird
- Synthesis information
  -- Publications

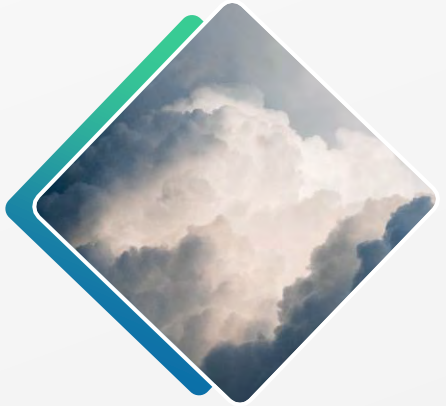
Copernicus Land Service (European coverage and more)

- Referential
  -- Land use / Land cover
  -- Elevation and slope (DEM)
  -- Natura 2000 sites
- Parameters monitored
  -- « Small woody features » (SWF)
  -- Raw vegetation index (NDVI)
- -- Water mass, water points



Regional geographic data

- Large Scale Referential (RGE)
- Land Use / Land Cover (OCS)
- Agricultural parcel register (RPG)
- Vegetation monitoring (hedges)
- Infrastructure data
- Complementary survey per Agricultural parcel

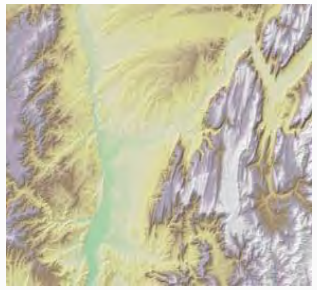


Copernicus Climate Service

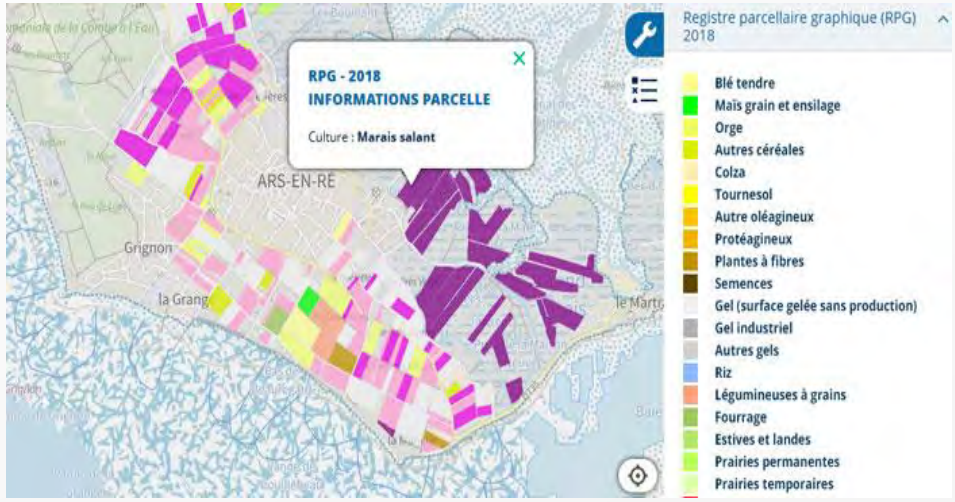
- Meteorological indicators
- Environmental indicators

Geographic data - Regional -

RGE

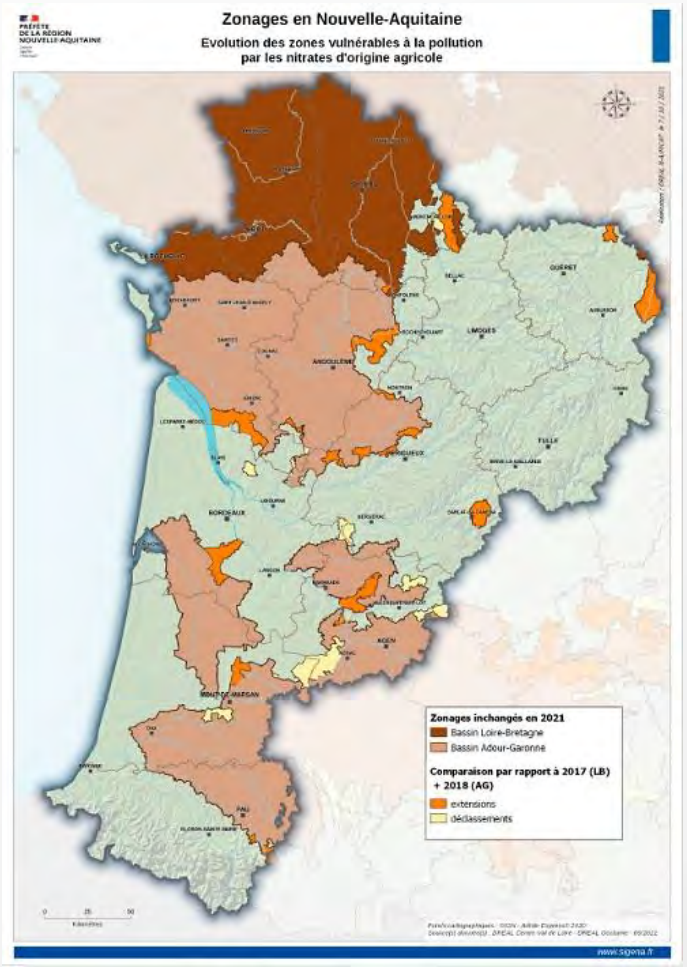


RPG



OCS 2015

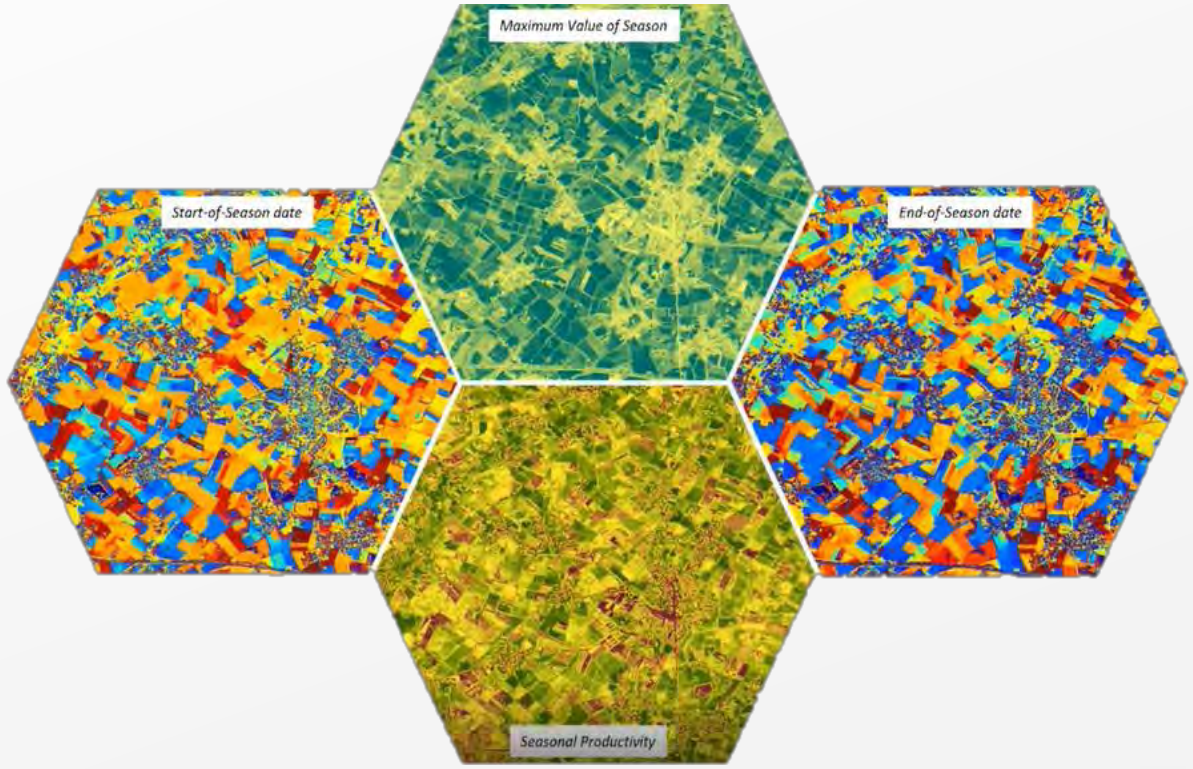
VULNERABLE ZONES 2021



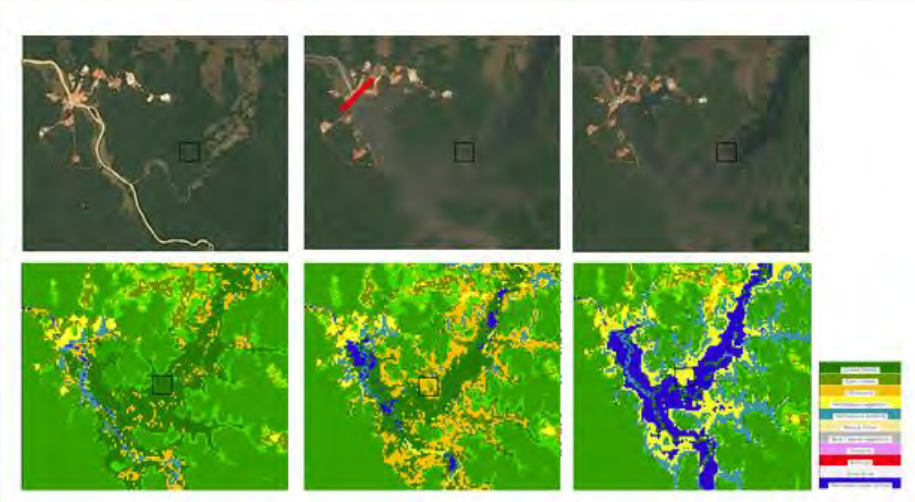
Data - Copernicus time series -

SWF and more

Phenology of the vegetation



Annual change



Technology to be involved – Part 1

MIGR-SAFE

Organise the collaboration

➔ Identify observation programs covering the region or create new one

Identify automatically migration routes and stopovers

➔ Get key informations to manage-preserve-restore

Add graphic éléments and annotate

➔ Share scientific information on phenology

Set up alerts

➔ Plan your monitoring and surveillance of species or area

Put into perspective / crossing maps (past and present)

➔ Reduce the complexity of access to environmental data

CLS decision-making tools available for the study of migratory routes and regional behaviors of species, for land use planning

CLS

Technology to be involved – Part 2

MIGR-SAFE

Map the presence, abundance/passage…

➔ Get information for the ecological transition and spatial management of habitat, a new classification for land use / land cover

Provide summary indicators, animated maps and diagnostic reports

➔ Save time for analysis
or to regularly inform sponsors and partners

Added value and services by user segment

To know, understand mobility / drop-off points, in interaction with the territory

Tracking + Service

-

Status and change indicators
Habitat characterization
Alert functions
Geographic annotations
Right management
Sharing data

Take measures to protect and manage habitats (eg. timing and location of nesting)

Regional Service

-

Knowledge of programs and experts
Sharing of processed information
OCS evolution
(agriculture and biodiversity)

Share knowledge and present data and use cases to better explain things

Valuation Service

-

Case studies
Resources and means to better understand and apprehend

For a first regional demonstrator

Role of agriculture
Ecological transition
Adaptive management

Federating project
Association of knowledges / know how
Academic participation
Making it equal

Contribution of space
Nesting of scales
Climate change

Species Conservation

Climate change

RÉGION Nouvelle-Aquitaine

Focus on migratory birds and regional refuge

New geographical indicators
Information sharing
Management measures

Precursor project
Test in the real world
Method duplicable to other species, in France, Europe, abroad

Save time in analysis
Putting into perspective (past and present)

Awareness
Pedagogical scenario

CLS

MIGR-SAFE Project

Find us on the network

https://www.spaceclimateobservatory.org/migr-safe

https://www.spaceclimateobservatory.org/satellites-amazing-allies-biodiversity

https://www.youtube.com/watch?v=n2gGR67hU1k

If you wish to support the future demonstrator, contact Frédérique Blanc.