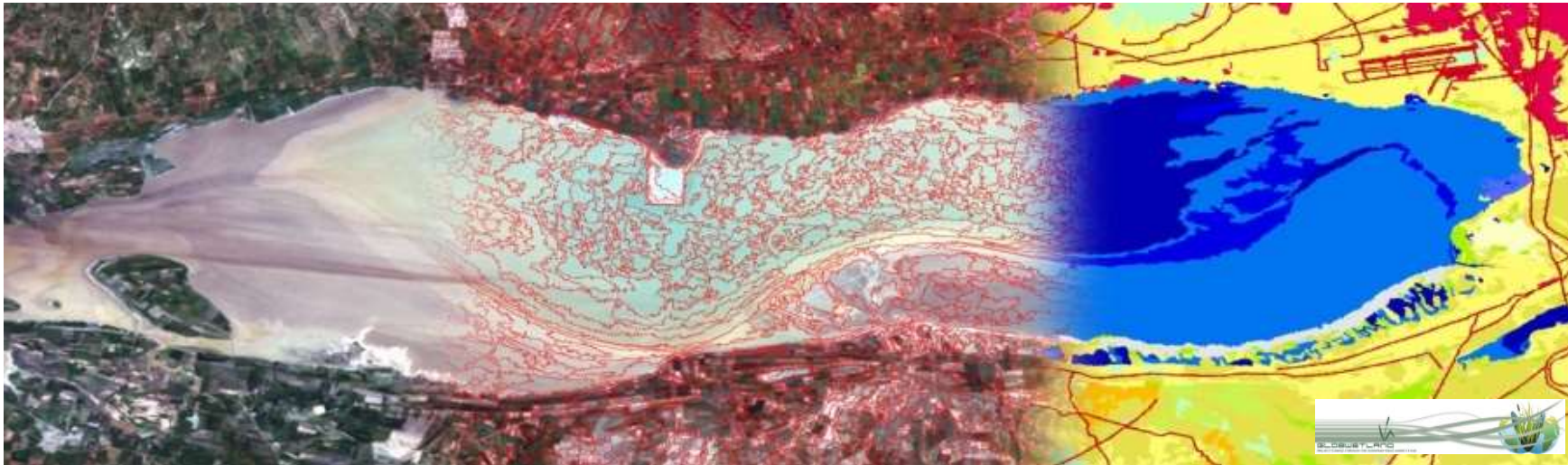


The Mediterranean Wetlands Observatory

Wetlands monitoring using spatial indicators derived from EO data

Anis GUELMAMI (Tour du Valat)





TOUR DU VALAT



Institut de recherche
pour la conservation
des zones humides
méditerranéennes



OUR EXPERTISE

A programme implemented by multidisciplinary teams

Hydrology



Ornithology

Training and Education



Aquatic fauna Ecology



Plant Ecology

Integrated Management



Geomatics



Socio- Economics



The Mediterranean Wetlands



The Mediterranean basin

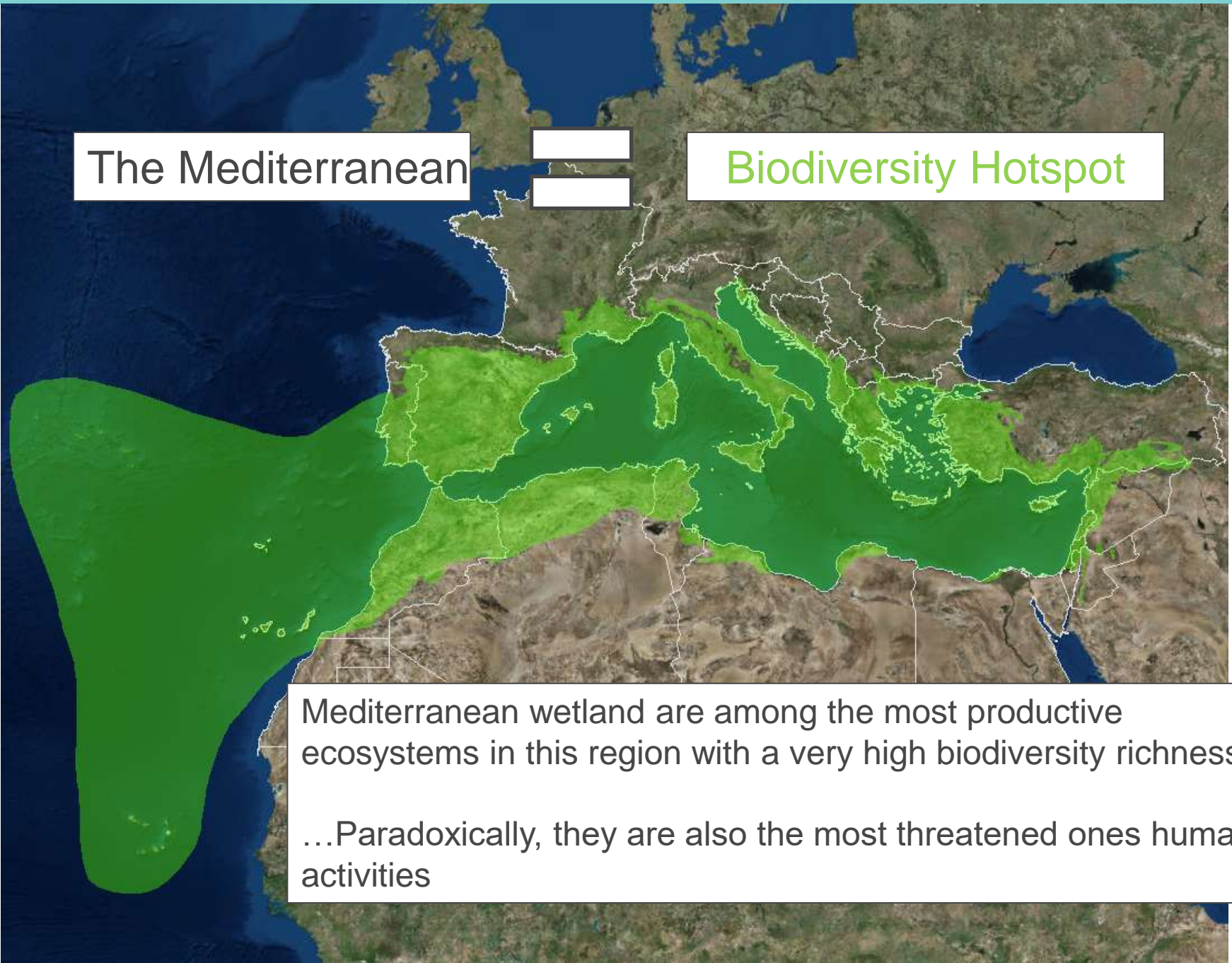


The Mediterranean Wetlands

The Mediterranean



Biodiversity Hotspot



Mediterranean wetland are among the most productive ecosystems in this region with a very high biodiversity richness

...Paradoxically, they are also the most threatened ones human activities



In addition to that...

We still need to have a regional picture of their status in order to improve their protection

- Many knowledge gaps:
 - *What is the total extent of wetland ecosystems in the Mediterranean countries?*
 - *Their water quality*
 - *What is the status of their biodiversity?*
 - *How to evaluate their ecosystem services?*
 - *What are their positions in the political agendas?*
 - ...



➔ *There is a need to develop regional assessment tools...*



In this context...

The MWO aims to monitor the status and trends of wetlands in all Mediterranean countries

Objective:

A better dissemination of the knowledge and build links between **science and policies** in order to improve the conservation and the protection of wetlands



*How ? → by developing a set of **indicators** to assess the status and trends of Mediterranean wetlands as well as their ecosystem services*



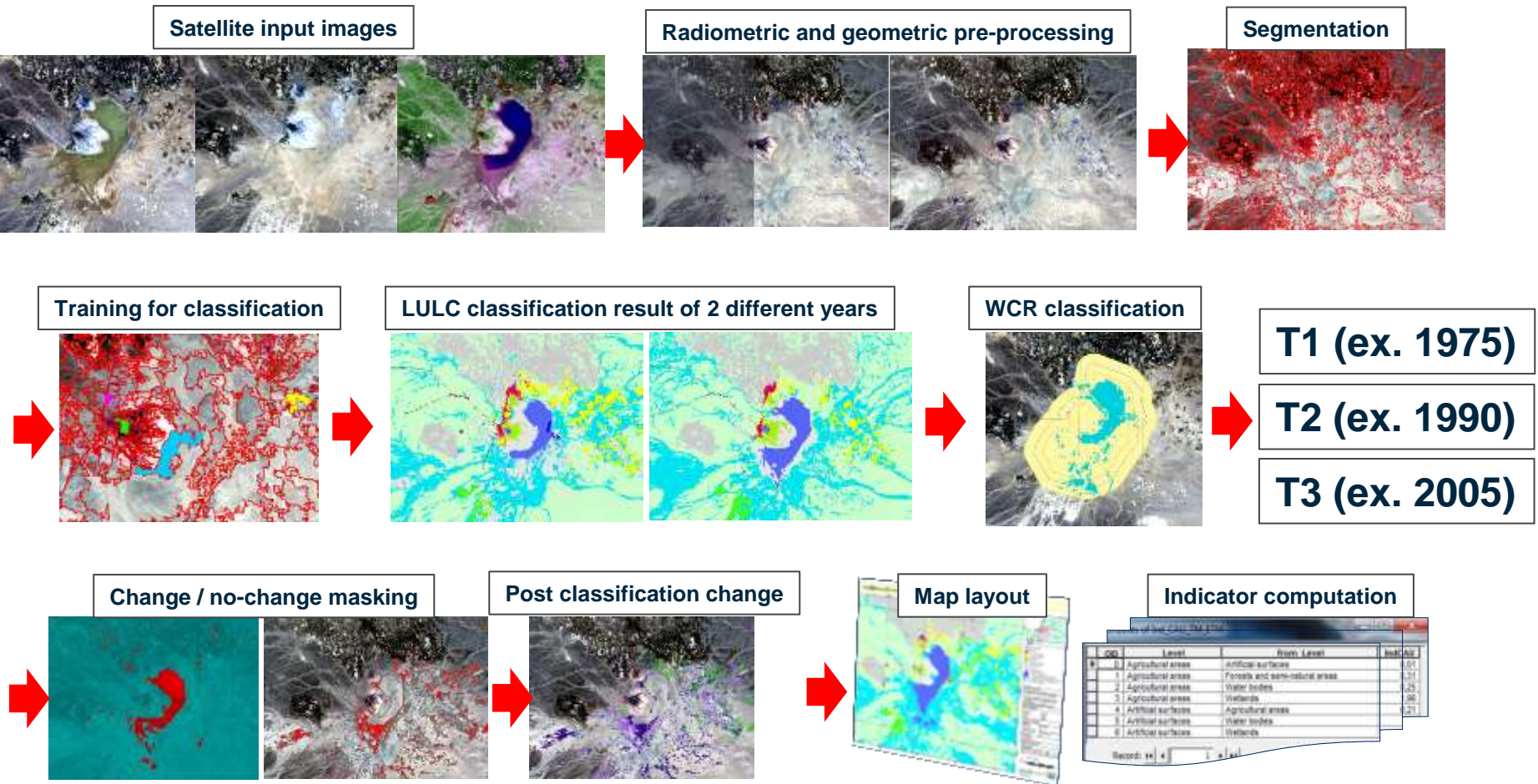
*What can Remote Sensing do for
that...?*



***Improve our knowledge about the
status and trends of wetlands in the
Mediterranean***



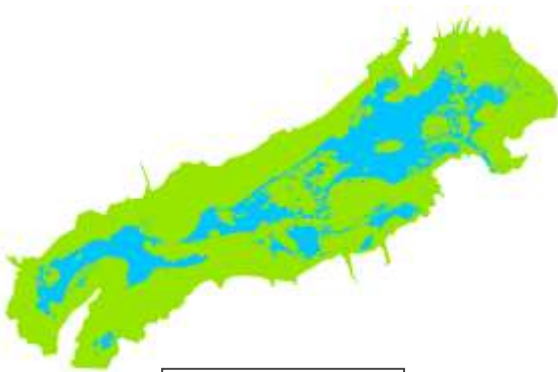
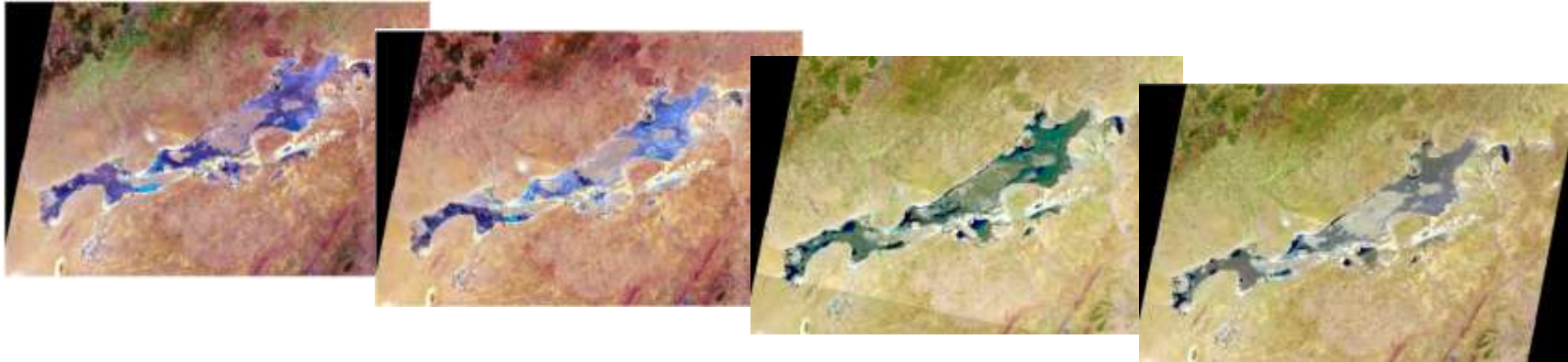
GlobWetland-II: Methodology



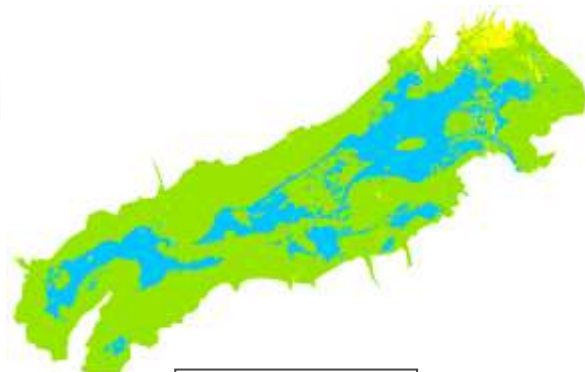


Monitoring status and trends

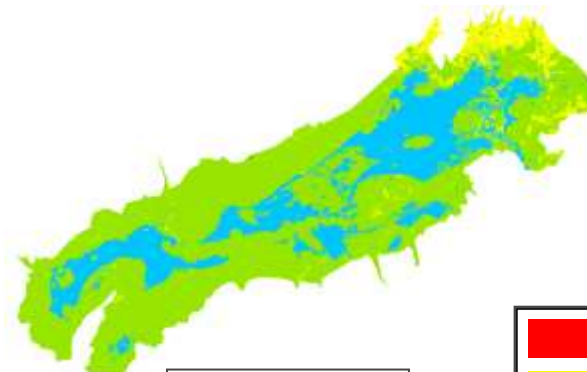
Using satellite time series → map LULC and assess changes over time
(ex. Chott Chergui, Algeria)



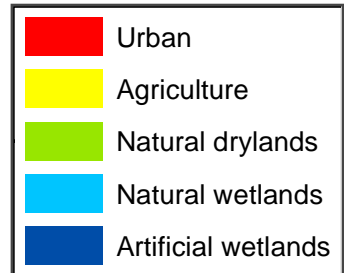
LULC 1975



LULC 1990



LULC 2005



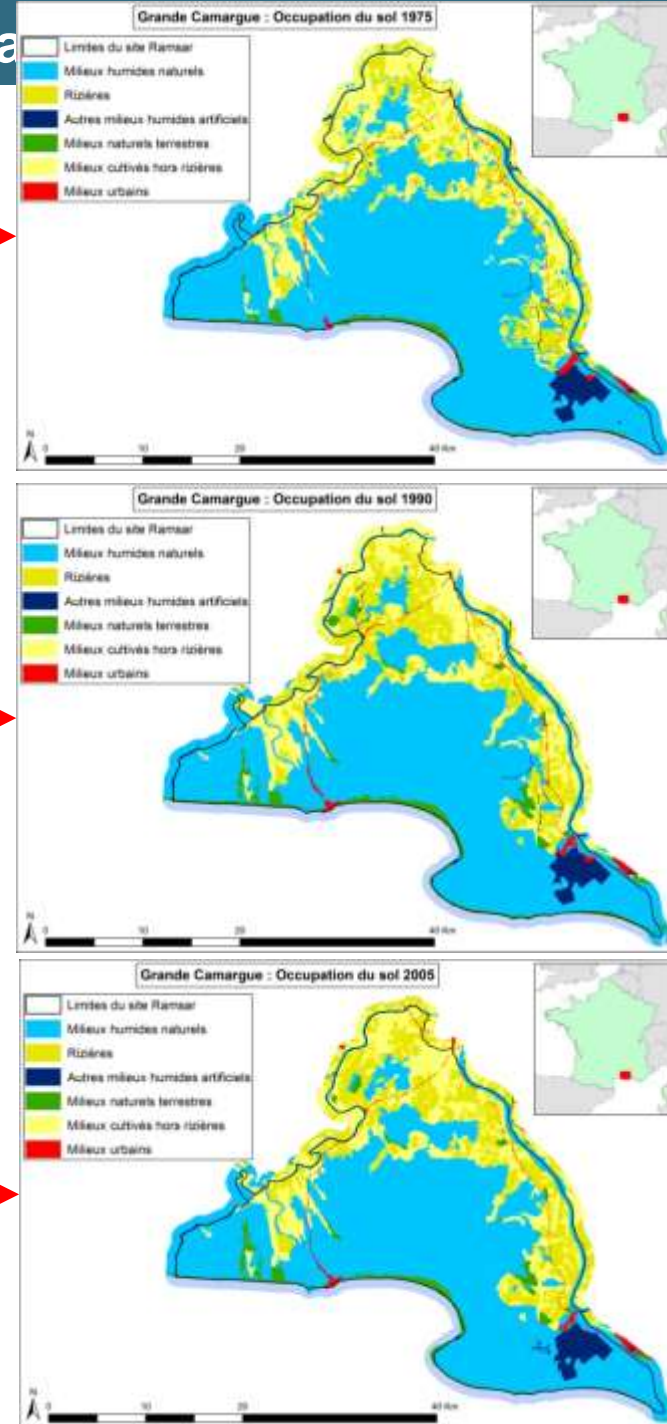


Monitoring status a



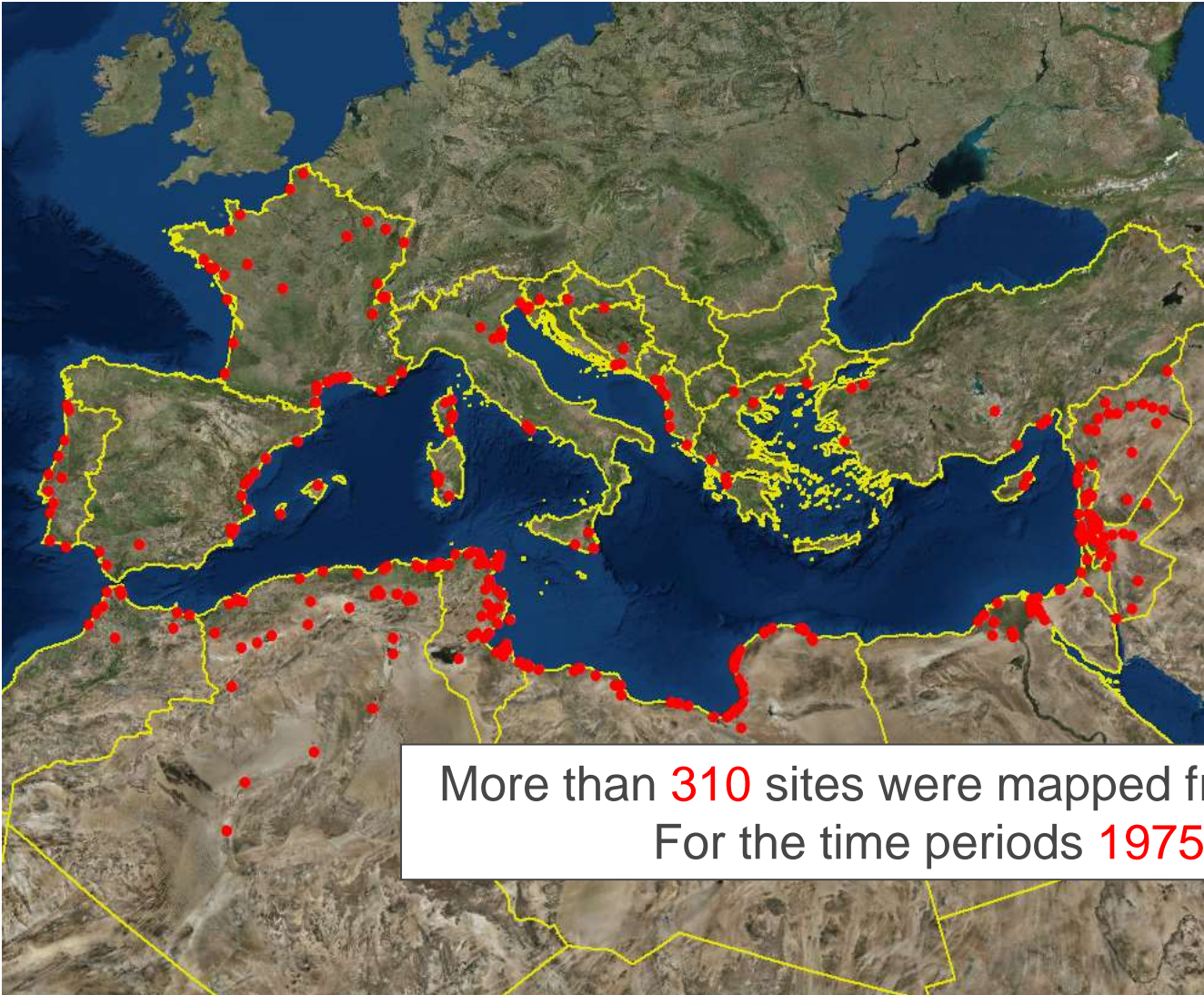
Camargue (France)

Evolution of **Natural** and **Artificial** wetland surfaces





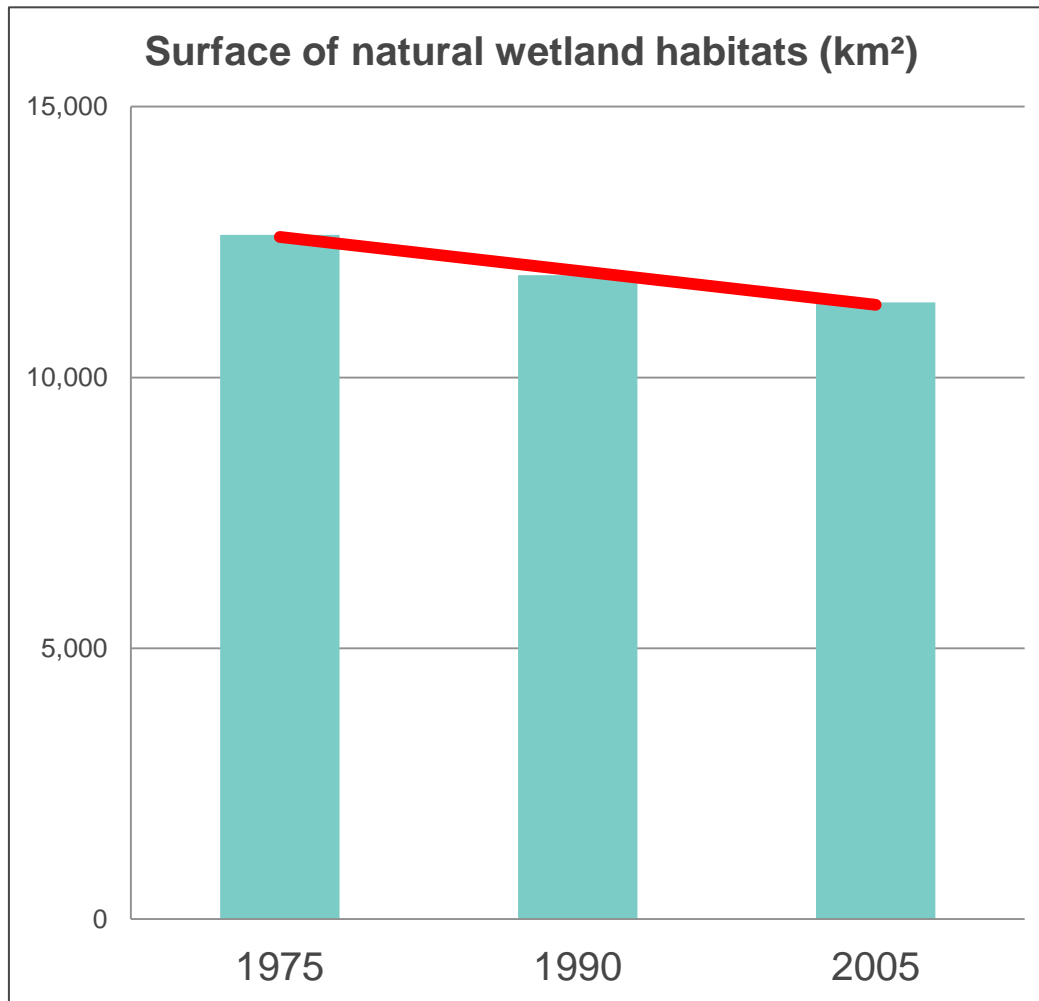
Monitoring status and trends



More than **310** sites were mapped from Morocco to Portugal
For the time periods **1975, 1990 et 2005**



Loss of Natural wetland habitats

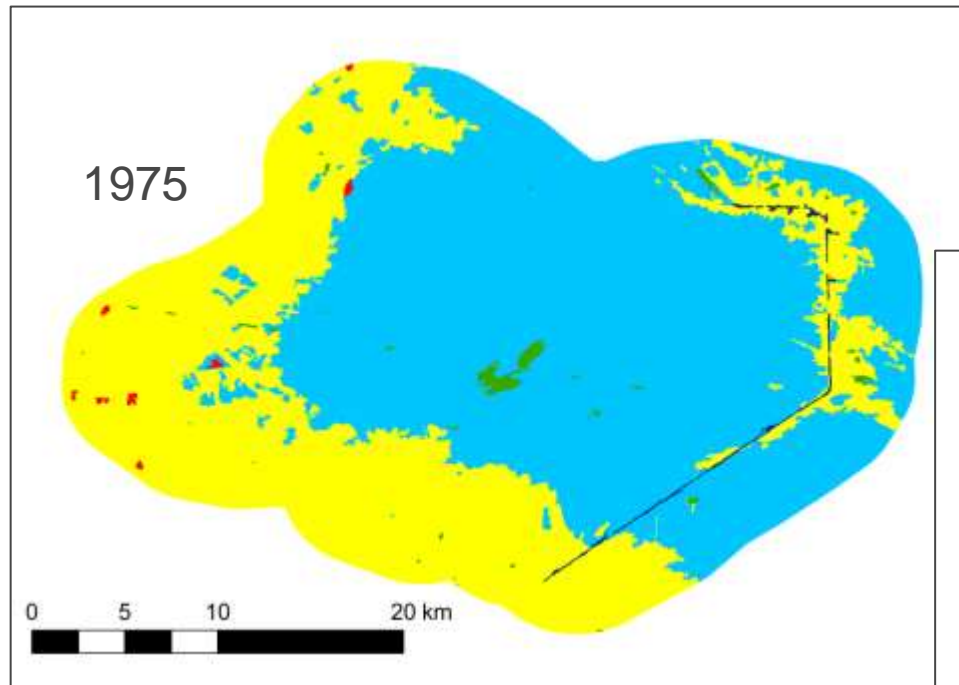


-13% of the total area of natural wetland habitats was lost between 1975 – 2005

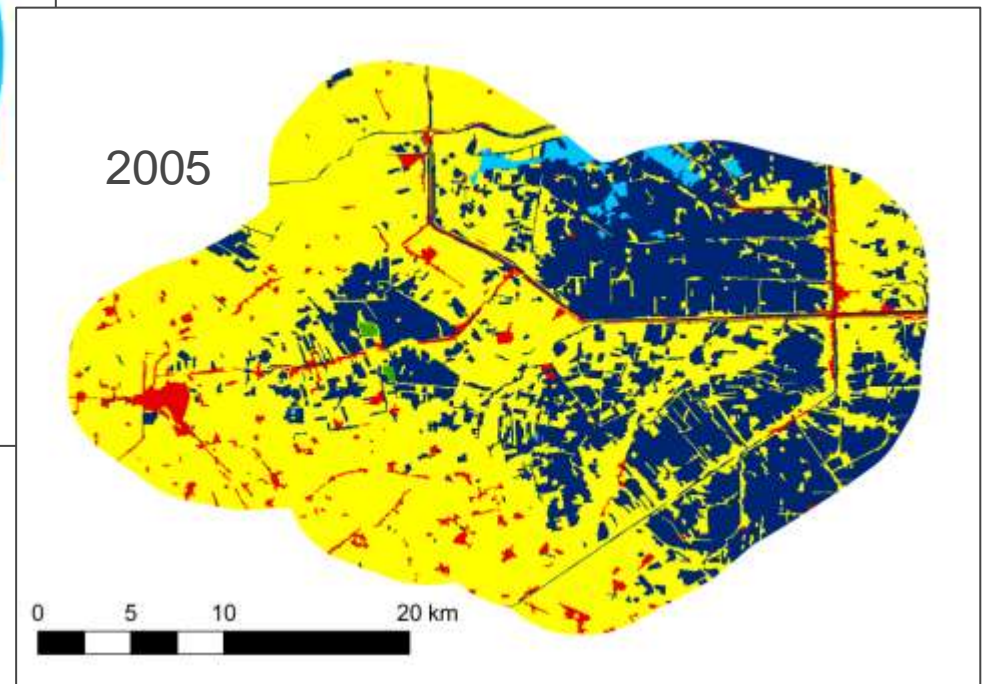
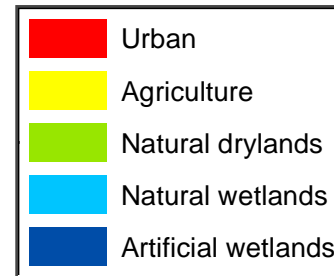


Main drivers...

1) Artificialization (conversion from Nat. to Art. Wetlands)



Sinnéra et San El-Hagar (Egypte)

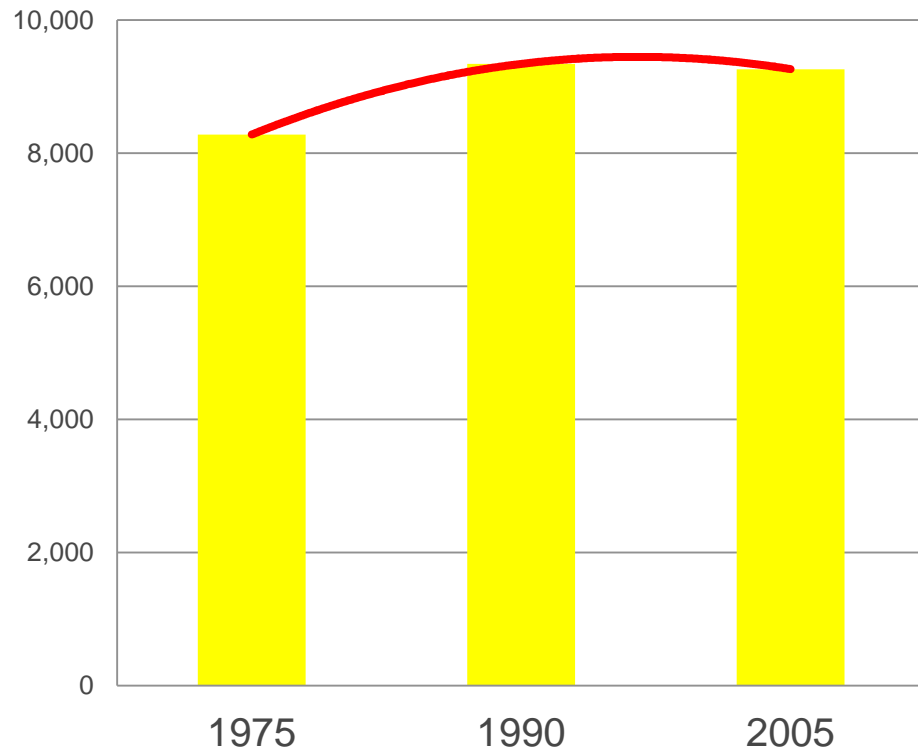




Main drivers...

2) Agricultural development

Area of agricultural lands (km²)



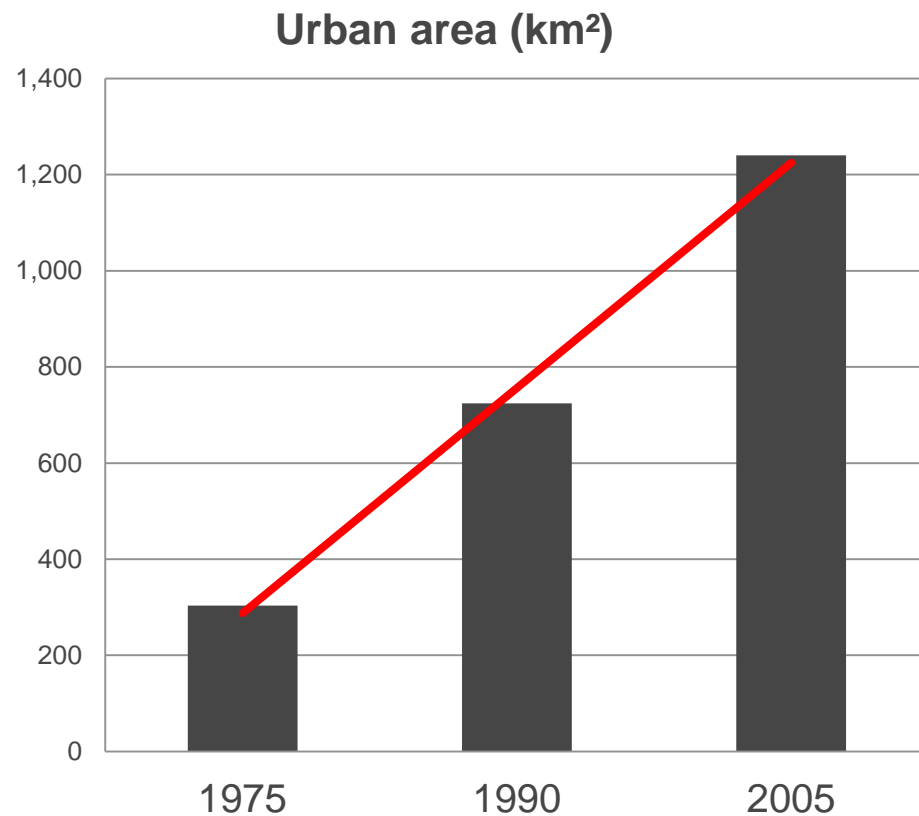
+12% de of agricultural lands

7% of the total natural wetland habitats were converted into agriculture between 1975 and 2005



Main drivers...

3) Urbanization



+ 309% between
1975 – 2005



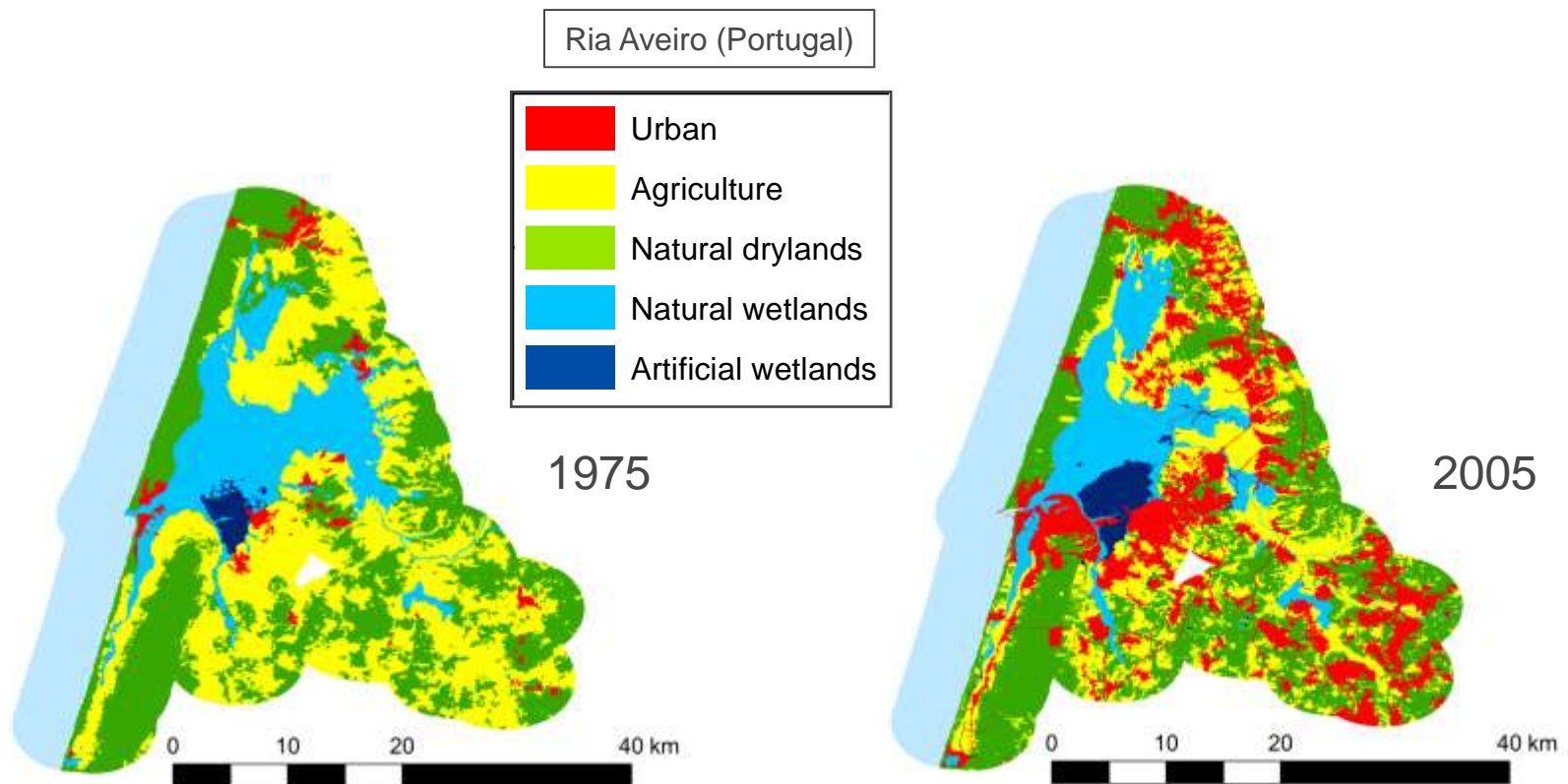
Monitoring status and trends

Main drivers...

3) Urbanization

...An **indirect** impacting driver

→ Urban expansion to the detriment of agricultural lands that are “pushed” to natural areas

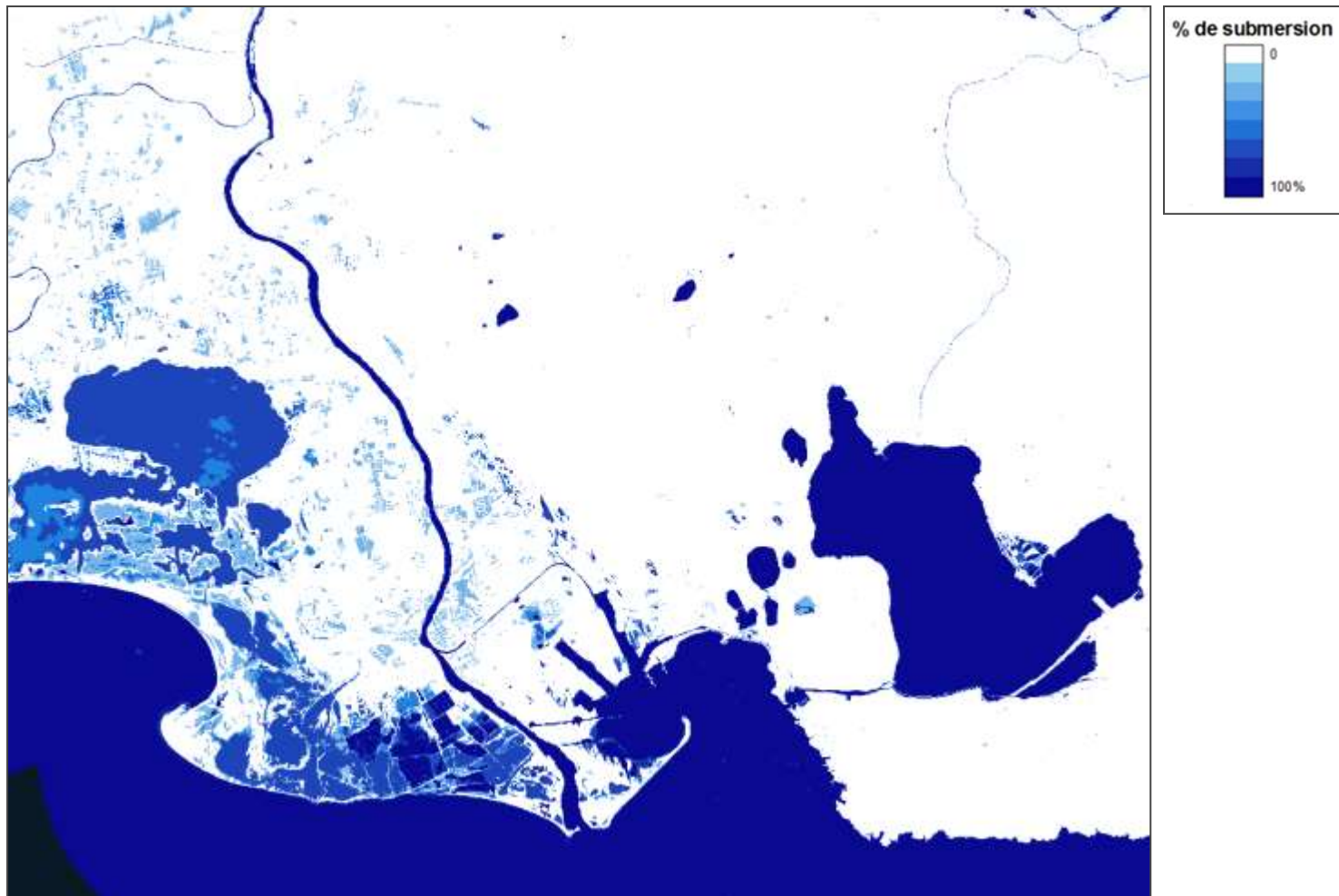




***Provide tools for the development of
the wetlands extent indicator at the
Mediterranean scale***



Open water surface dynamics in the Camargue





However...

Wetland habitats and flooded areas are NOT 100% the same ?



There is a need to develop reliable EO-based tools that allows the mapping of Mediterranean wetland **habitats** at wide scales and to assess their changes over time



Sustainable Development Goal (SDG)

Indicator 6.6.1

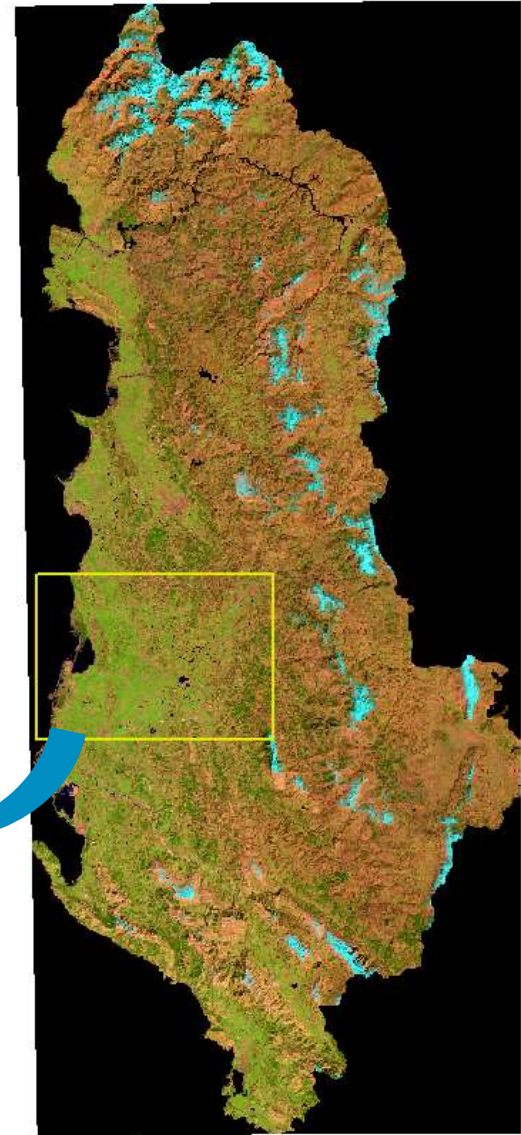
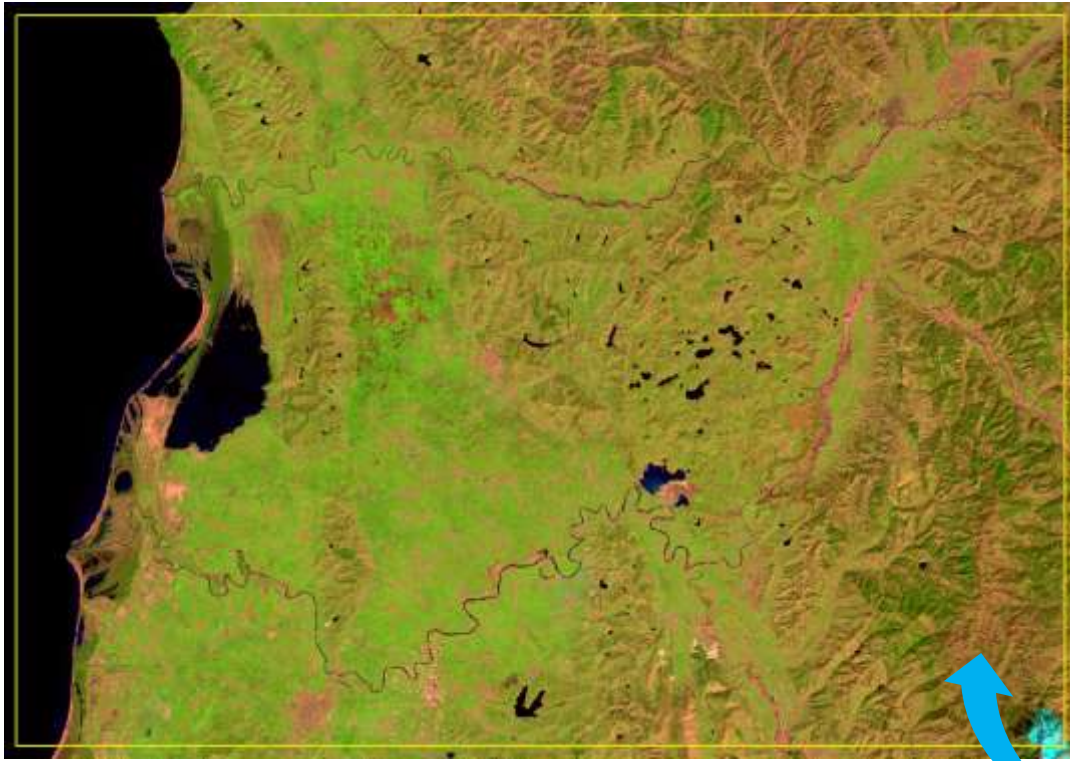
Change in the extent of water-related
ecosystems over time



How to use EO-based tools to collect information about wetlands, at a **national scale**, and support national and international reporting obligations (e.g. **Ramsar** and **SDG's**)?



SWOS approach: National Service Case - Albania

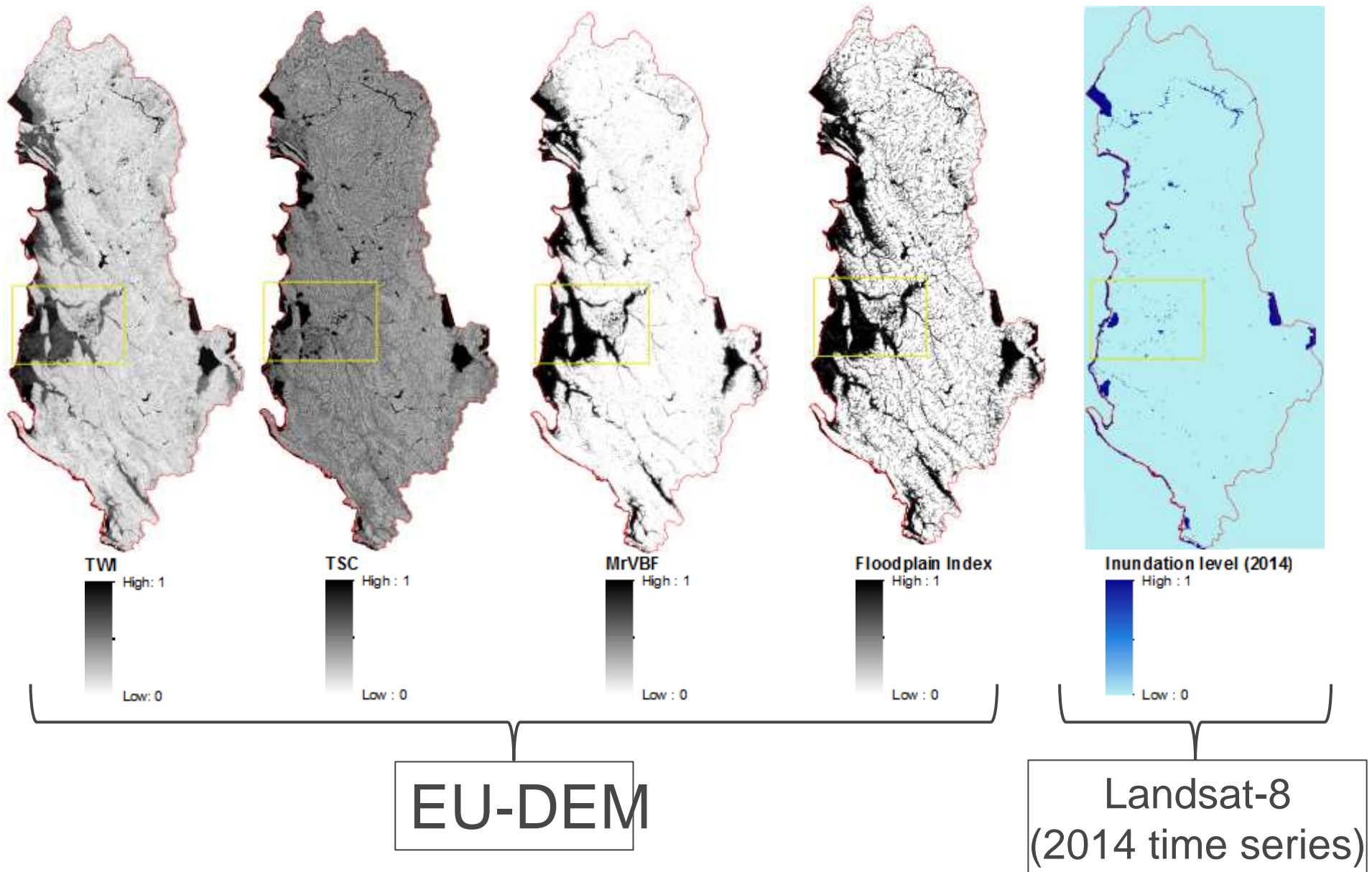


Demonstration for a national case (Albania) with a high diversity of natural and human-made wetlands (lagoons, coastal/inland marshlands, rivers, dams/reservoirs, canals, natural lakes, riparian forests...)



Wetlands extent mapping

SWOS approach: National Service Case - Albania

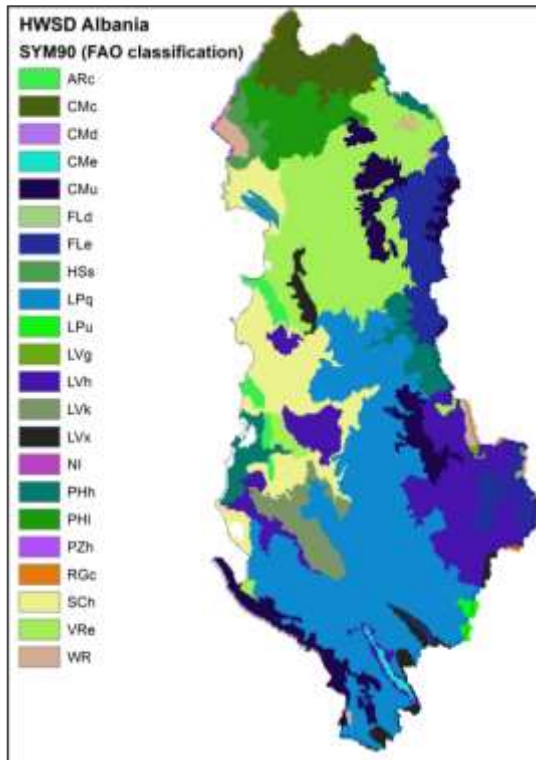




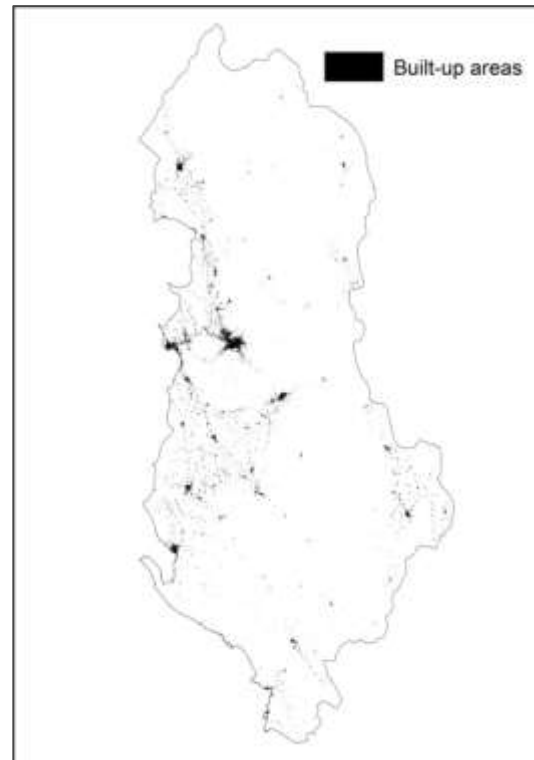
Wetlands extent mapping

SWOS approach: National Service Case - Albania

Additional ancillary data...



Soil data
(HWSD)



Built-up areas
(GUF v04)

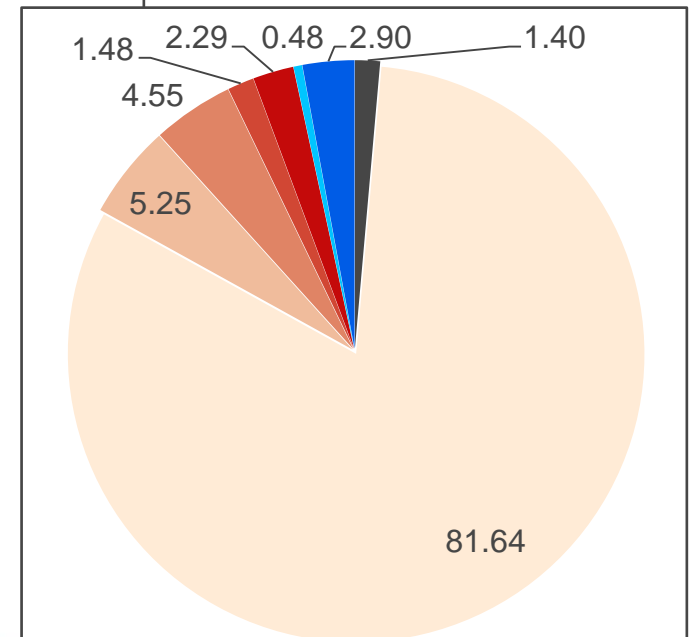
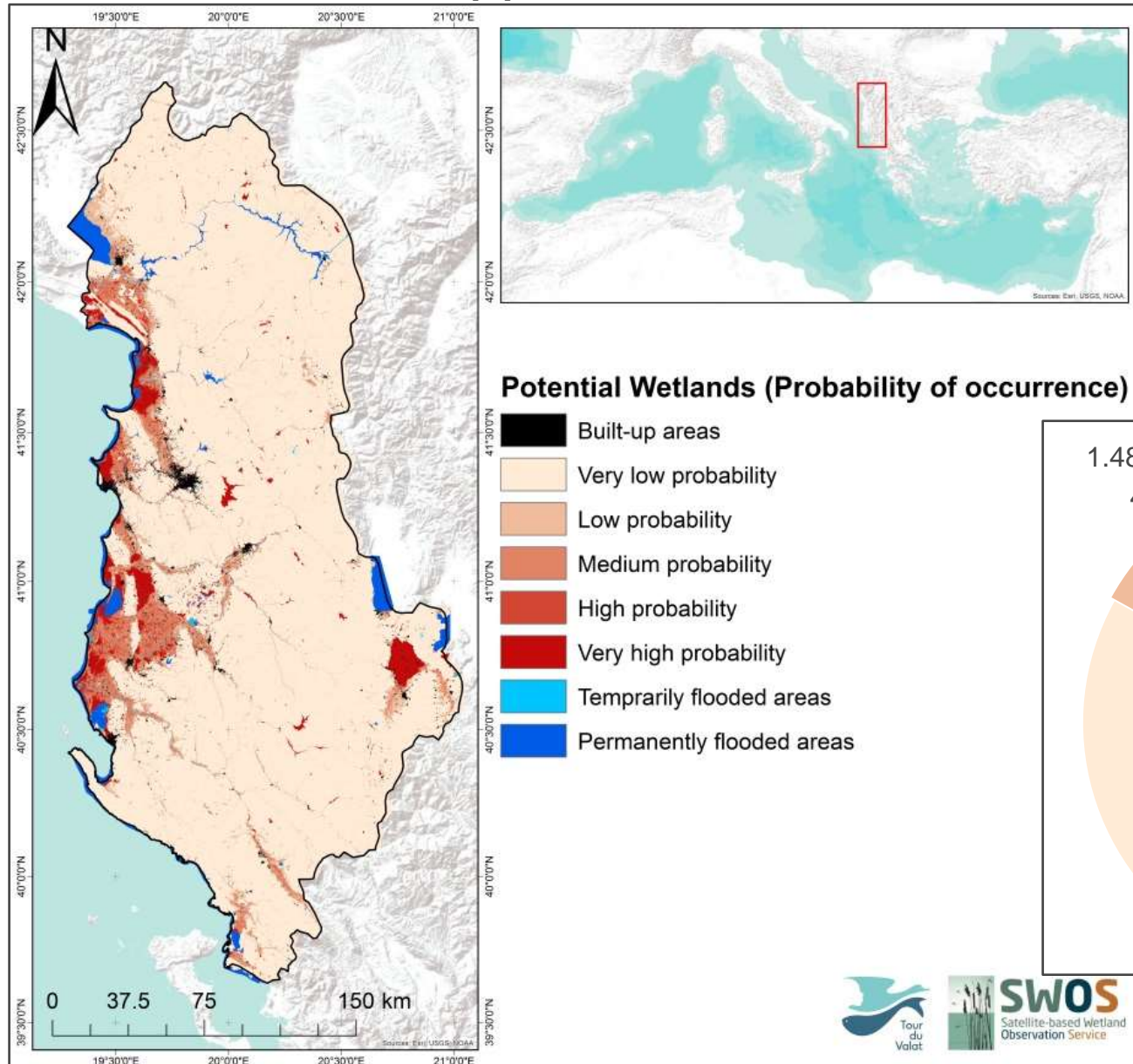
Precipitation time
series (1950-2014)

Updated gridded climate
dataset (CRU TS3.10)



Wetlands extent mapping

SWOS approach: National Service Case - Albania





Wetlands extent mapping

SWOS approach: National Service Case - Albania

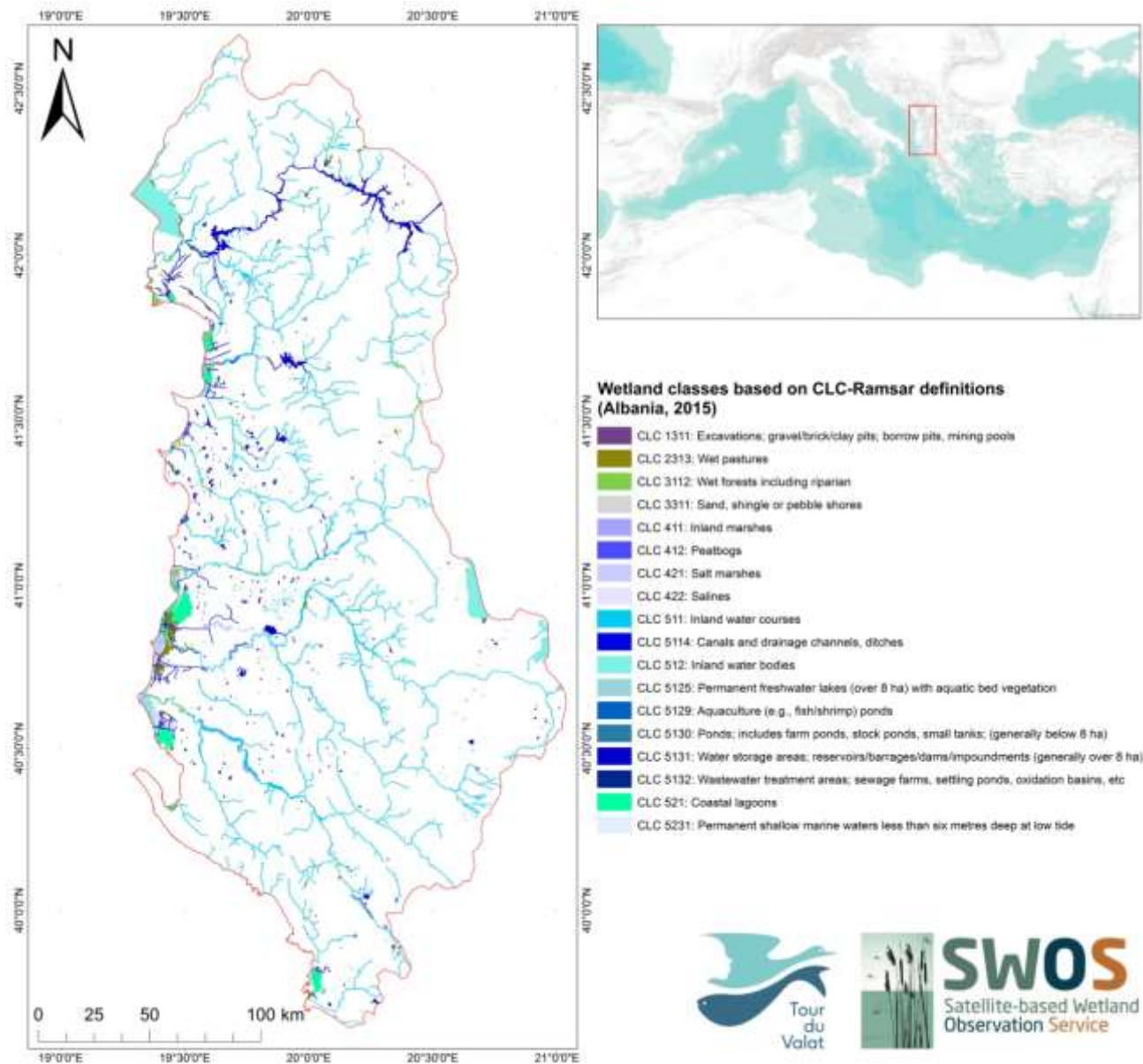


Delimitation of the areas to be mapped
for wetlands habitats delineation
(18% of the national territory)



Wetlands extent mapping

SWOS approach: National Service Case - Albania





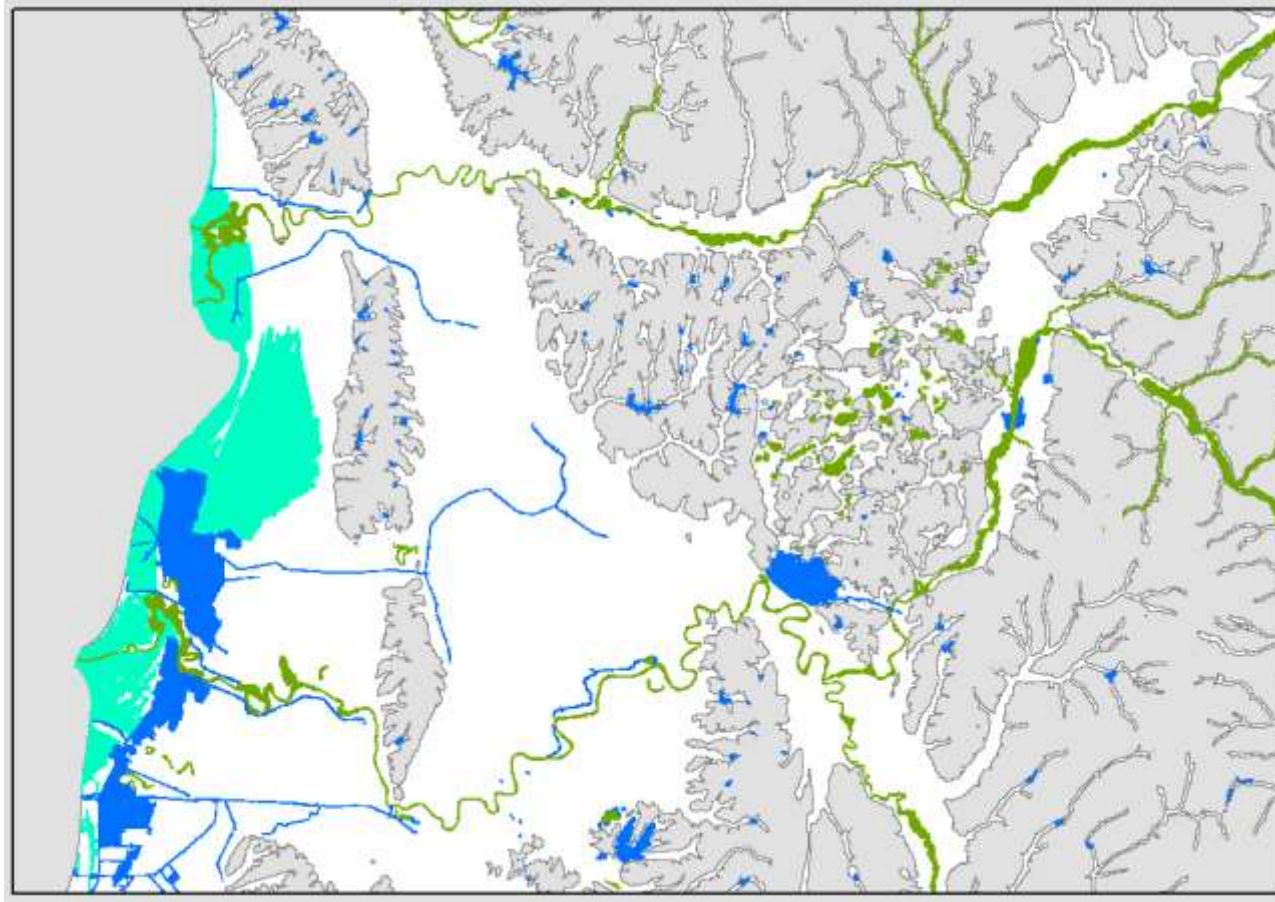
3) Reporting indicators



Wetlands extent mapping

SWOS approach: National Service Case - Albania

Ramsar: Total wetlands extent reporting indicator



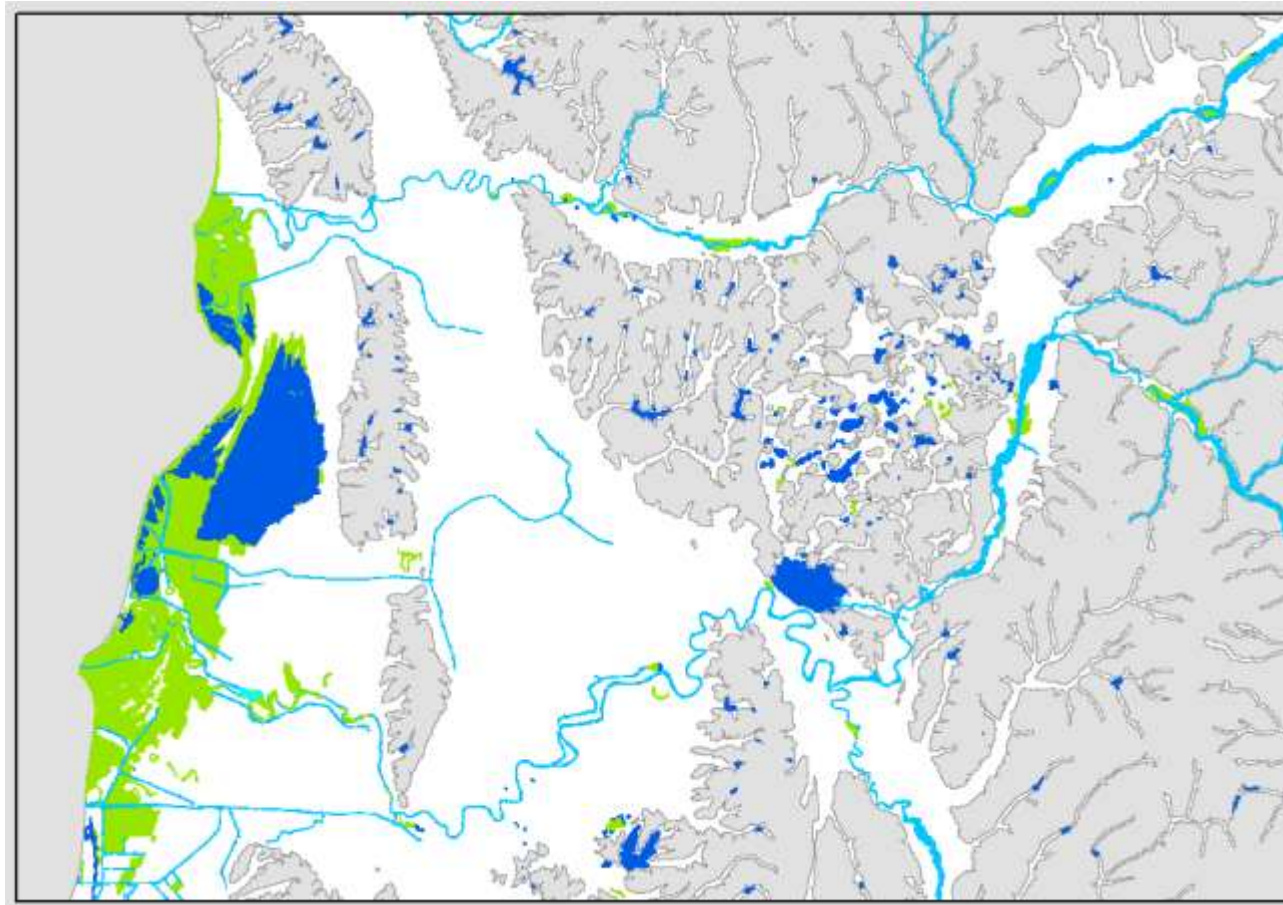
 Coastal wetlands  Inland wetlands  Man-made wetlands



Wetlands extent mapping

SWOS approach: National Service Case - Albania

SDG 6.6.1: Wetlands and water related ecosystems extent



Vegetated wetlands



Open water bodies



River water bodies



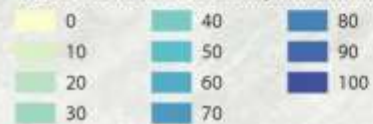
Wetlands extent mapping

Algeria, Tunisia | Coastal watershed
Wetland Inventory

GlobWetland-Africa tools



Water Wettness Probability Index WWPI [%]



0 25 50 km

GeoVille



Wetlands extent mapping

Algeria, Tunisia | Coastal watershed
Wetland Inventory

GlobWetland-Africa tools



Wetland Probability

- Permanent Water
- Wetland - High Probability
- Wetland - Medium Probability
- Wetland - Low Probability

0 25 50 km



What do we need now...?



Development of a harmonized pan-Mediterranean wetlands database as a support to national inventories



The ultimate objective is to...

Promote a regional framework for wetland protection and conservation through national legislations or through a Mediterranean agreement

How?

By providing a harmonized **pan-Mediterranean general picture** of wetland status regarding their:

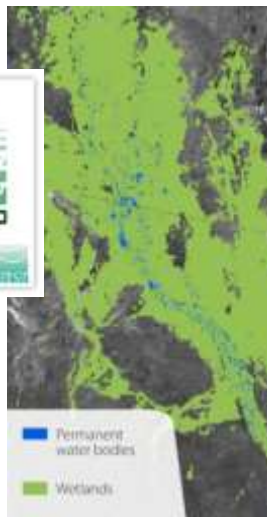
- location;
- delineation;
- main ecological characteristics;
- Threats; and
- conservation status



This general picture should be...

- Developed using a **broad definition** of wetland ecosystems
- Generated through geo-referenced layers and maps linked to a **regional** datasets
- “Downscaled” and **adapted** by each country according to its national specifications (e.g. using their proper wetlands definition)
- Used as a **baseline** to help countries to:
 - start, finalize or update their national inventories;
 - use their up-to-date inventories as a significant tool for the implementation of appropriate conservation and/or restoration measures

We need to set-up a regional platform (for data providing and processing) on Mediterranean wetlands, integrating existing datasets and products based on tools and approaches that have been already developed





Thank you

Contact :

Tour du Valat | Le Sambuc, 13200 Arles - France

www.tourduvalat.org / www.medwetlands-obs.org

Anis Guelmami | Tel. +33 4 90 97 06 32 / Email guelmami@tourduvalat.org