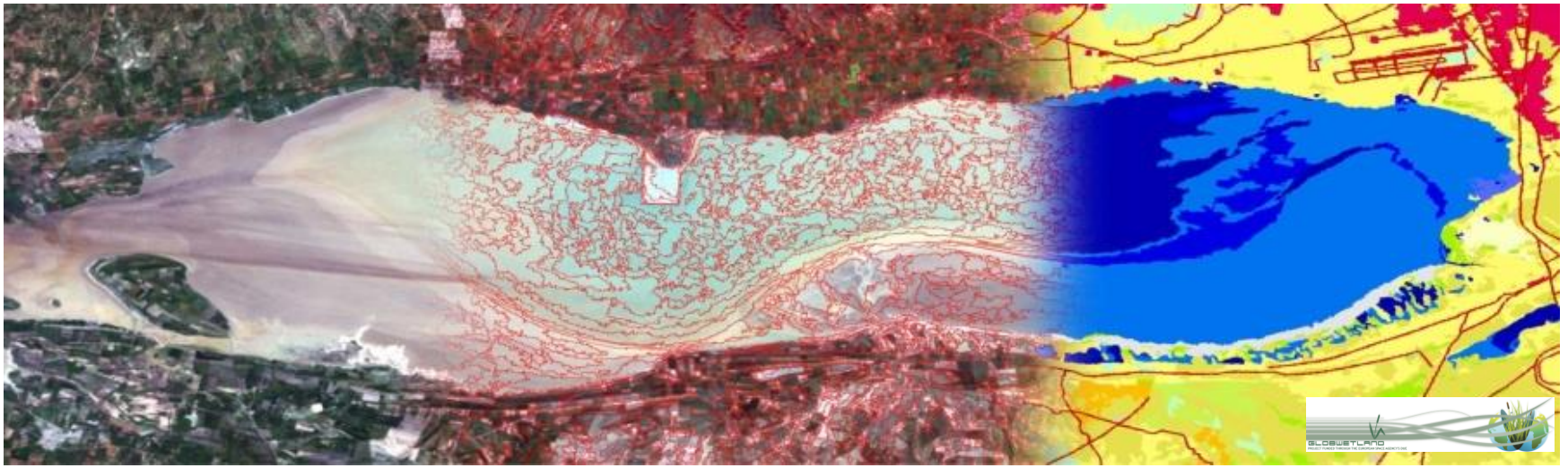
The Mediterranean Wetlands Observatory

Wetlands monitoring using spatial indicators derived from EO data (SDG 6.6.1)

Anis GUELMAMI (Tour du Valat)



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

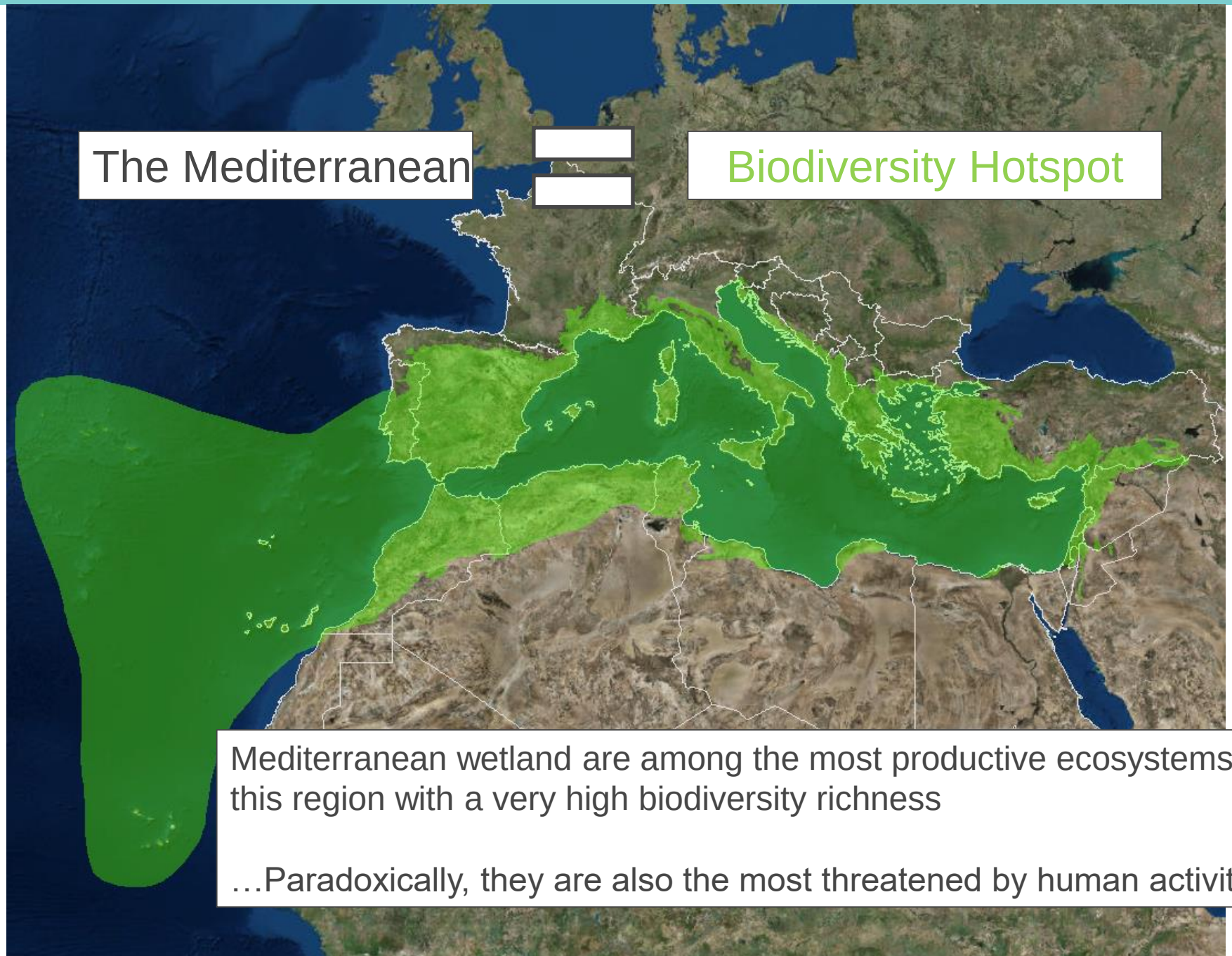
Integrated Management

Geomatics

Socio-Economics


The Mediterranean Basin

The Mediterranean Wetlands



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

…Paradoxically, they are also the most threatened by 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


Mediterranean Wetlands Observatory
Mediterranean Wetlands Outlook 2012
2012


MEDITERRANEAN WETLANDS OUTLOOK 2
SOLUTIONS FOR SUSTAINABLE MEDITERRANEAN WETLANDS
2018

What can EO-based data do for that?

Improve our knowledge about the status and trends of wetlands

Improve our knowledge about the status and trends of wetlands

…However, mapping wetland habitats and conditions is very challenging

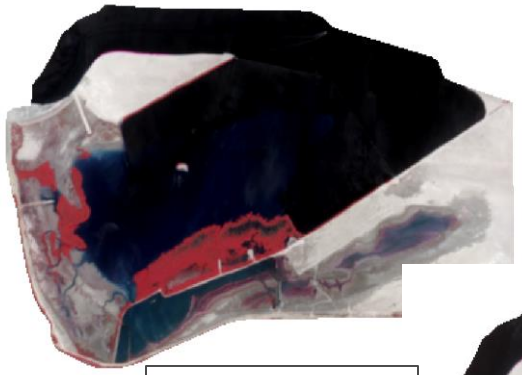
Mapping Mediterranean Wetlands With Remote Sensing: A Good-Looking Map Is Not Always a Good Map

Christian Perennou*,[1], Anis Guelmami*, Marc Paganini[†], Petra Philipson[‡], Brigitte Poulin*, Adrian Strauch[§], Christian Tottrup[¶], John Truckenbrodt[‖], Ilse R. Geijzendorffer*

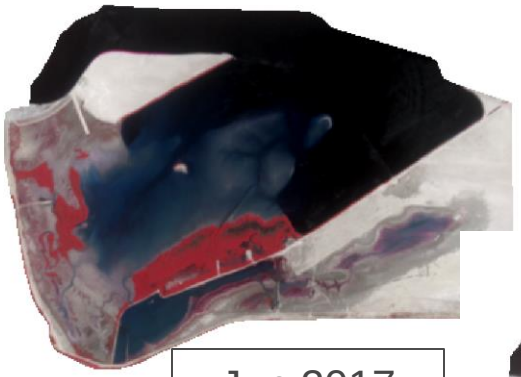
*Tour du Valat, Research Institute for the Conservation of Mediterranean Wetlands, Arles, France
[†]European Space Agency, Frascati, Italy
[‡]Brockmann Geomatics Sweden AB, Stockholm, Sweden
[§]University of Bonn, Center for Remote Sensing of Land Surfaces (ZFL), Bonn, Germany
[¶]DHI GRAS, Hoersholm, Denmark
[‖]Friedrich-Schiller-University Jena, Institute of Geography, Jena, Germany
[1]Corresponding author: e-mail address: perennou@tourduvalat.org

Advances in Ecological Research, Volume 58
ISSN 0065-2504
https://doi.org/10.1016/bs.aecr.2017.12.002

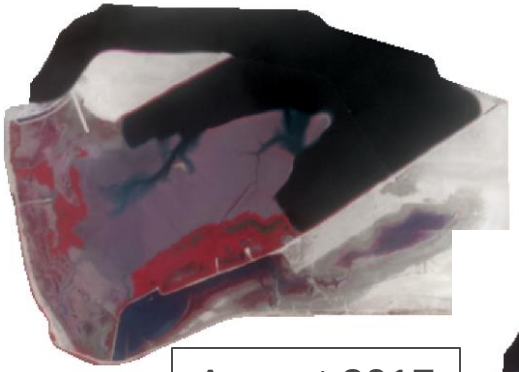
Ras Al Khor (Dubai) Sentinel-2 time series (2017)



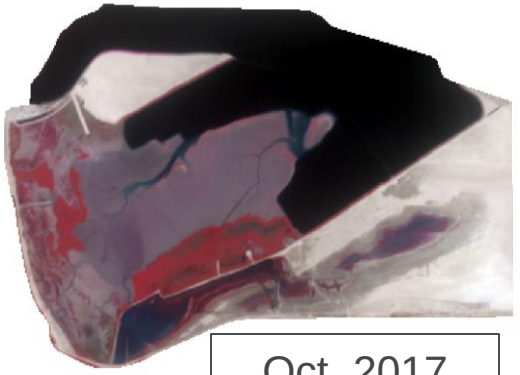
April 2017



Jun 2017



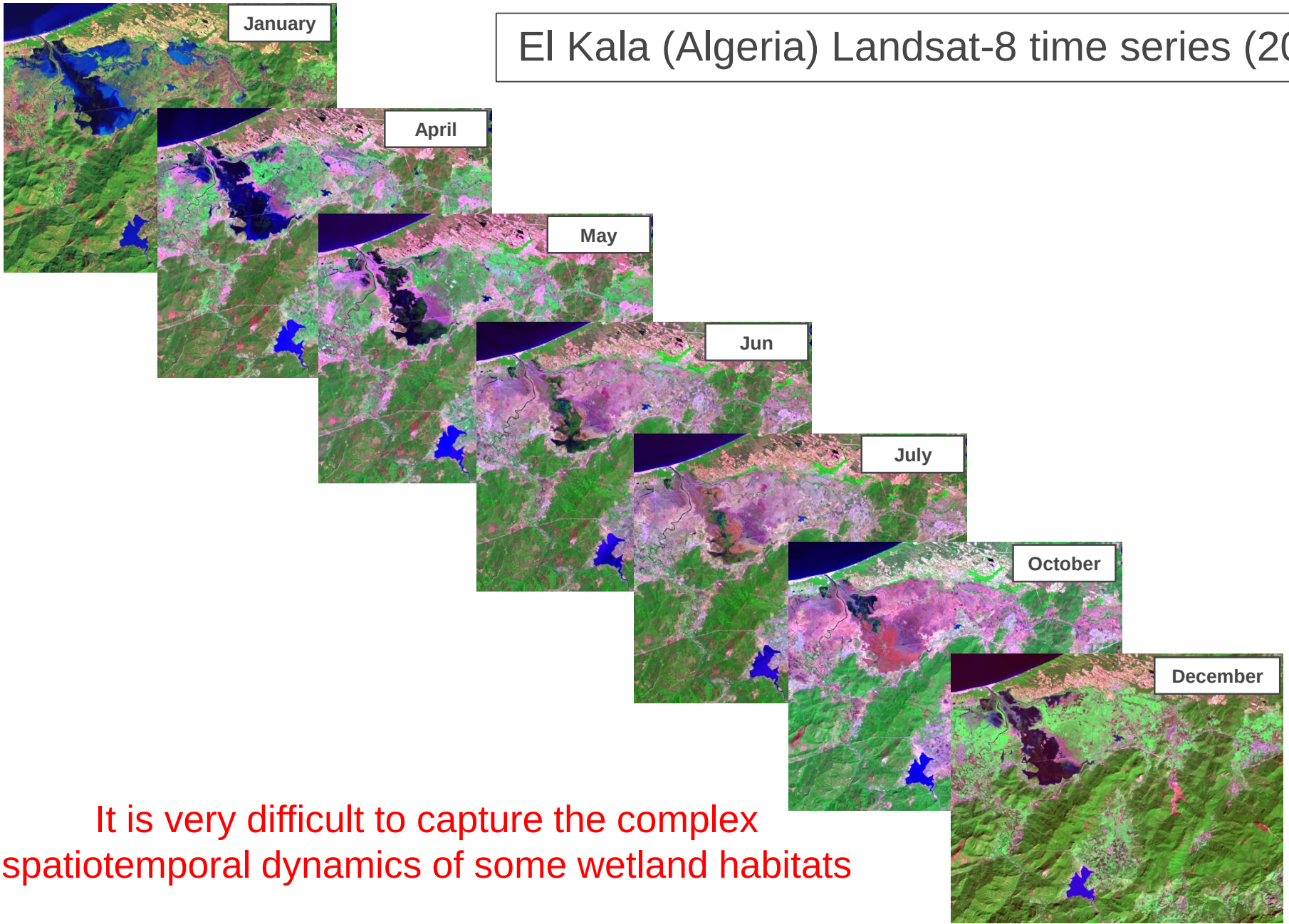
August 2017



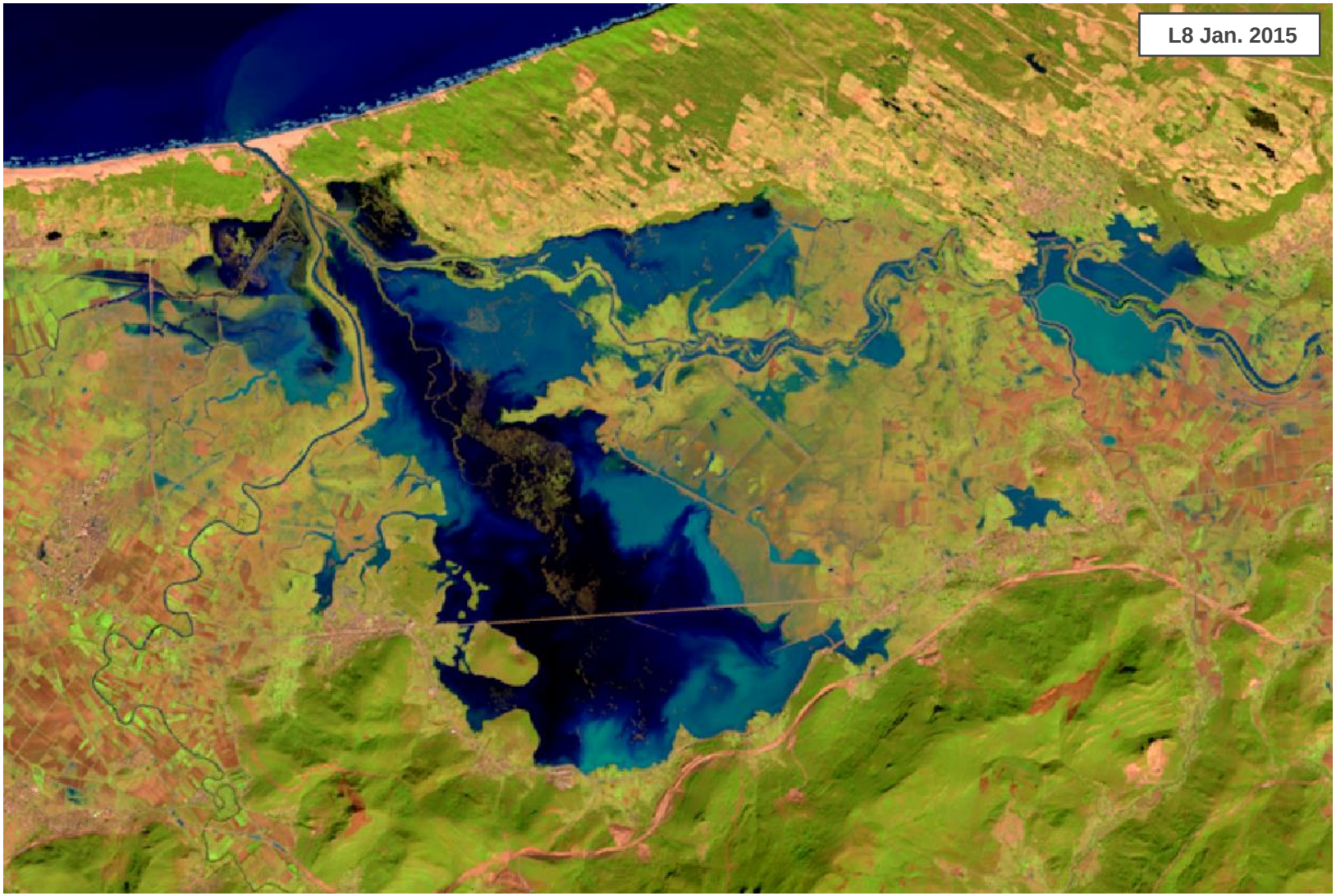
Oct. 2017

It is very difficult to capture the complex spatiotemporal dynamics of some wetland habitats

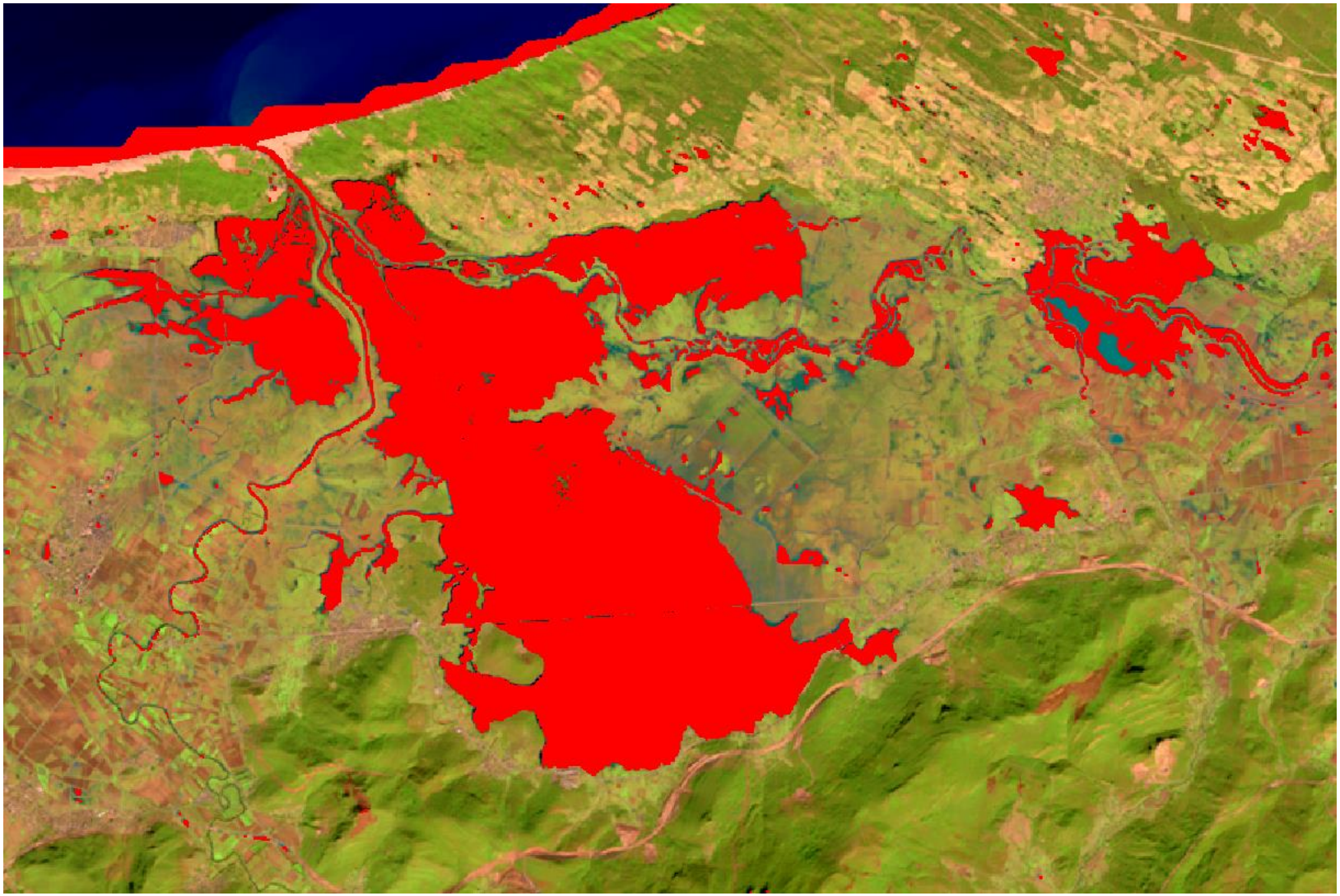
El Kala (Algeria) Landsat-8 time series (2015)



It is very difficult to capture the complex spatiotemporal dynamics of some wetland habitats

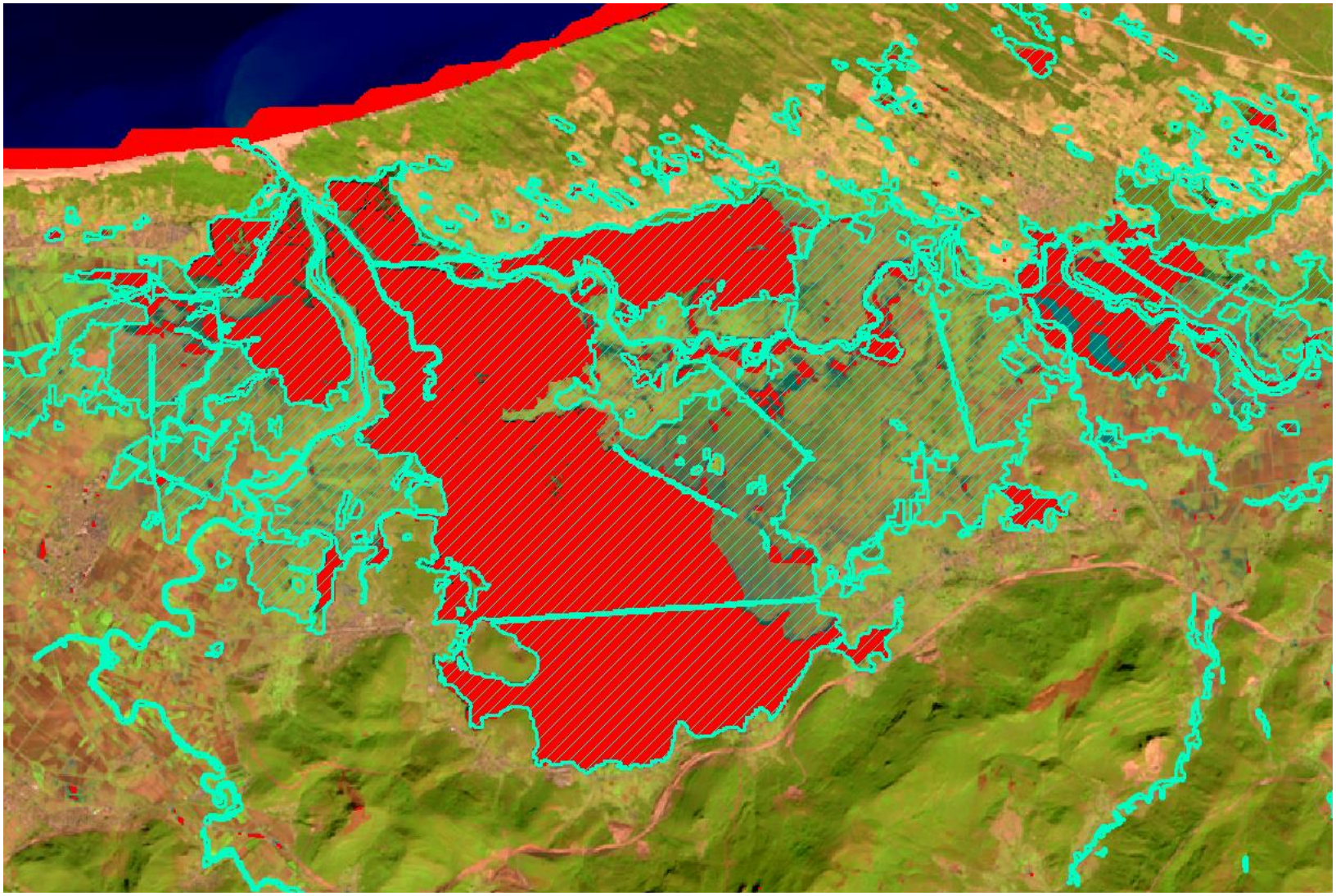


The max. flood extent in 6 years (2009-2015)



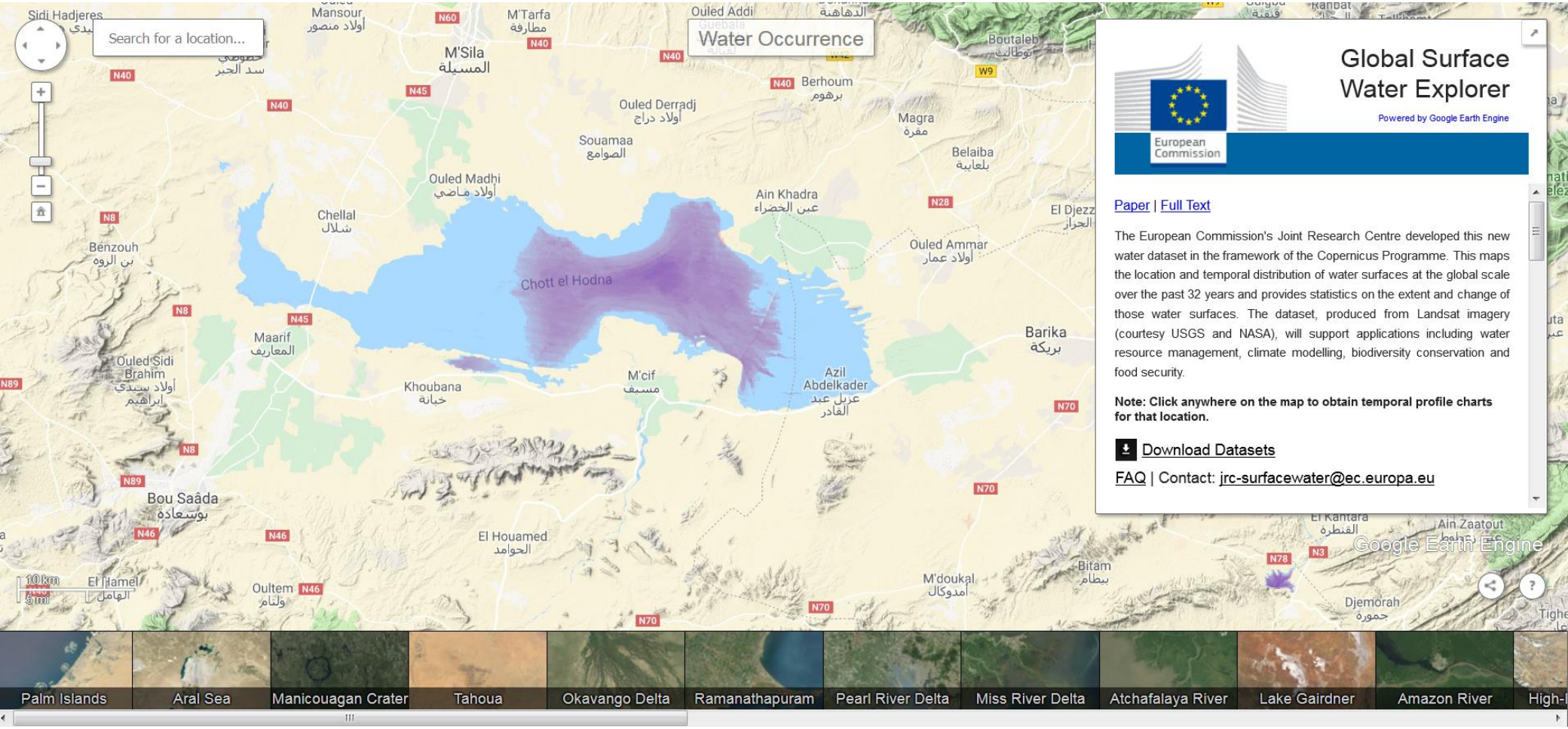
The max. flood extent in 6 years (2009-2015)

➔ Where are the wetland habitats boundaries?



The max. flood extent in 6 years (2009-2015) does not represent the wetlands extent ➔ there are common confusions between “surface water” and “wetland habitats”

EO-based approaches

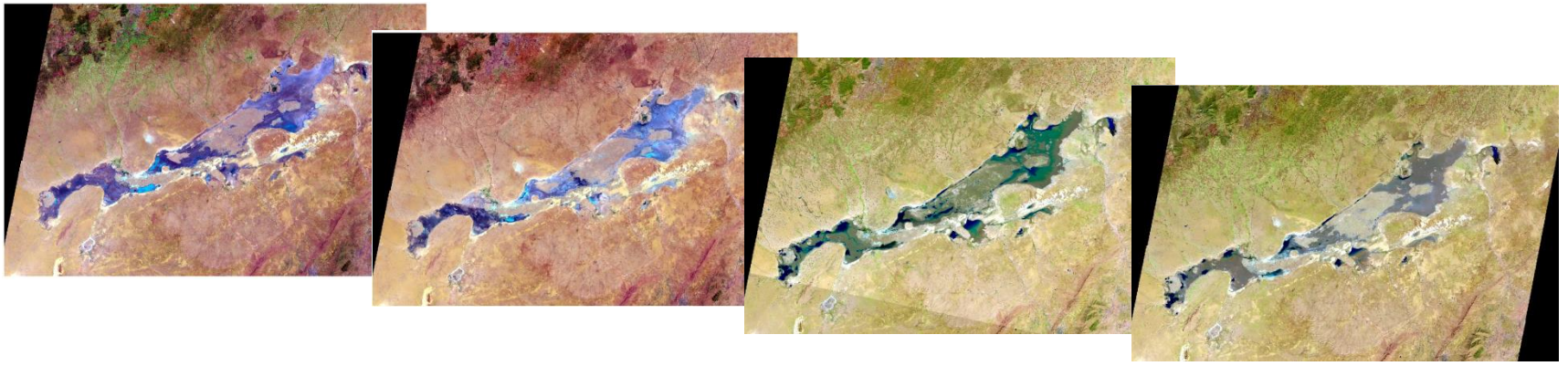


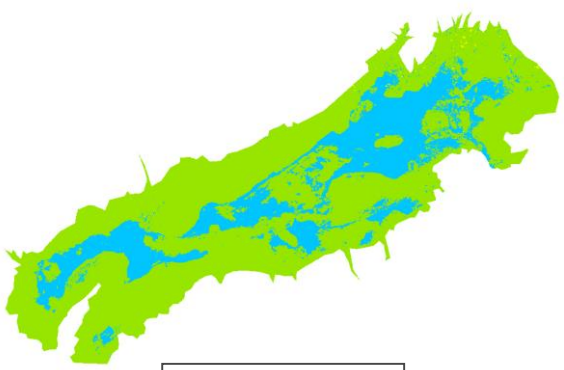
Global datasets to monitor surface water trends

➔ However, they should NOT be used as baselines to map wetland ecosystem extents and to assess their changes over time

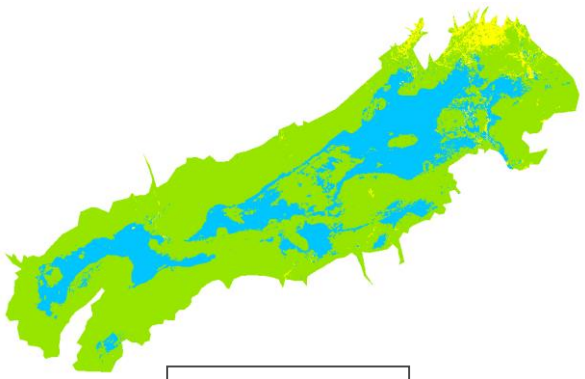
There is a need to develop reliable EO-based tools that allows the mapping of wetland habitats at wide scales and to assess their changes over time

Using satellite time series ➔ Assess inter-annual and long-term changes
(ex. Chott Chergui, Algeria)

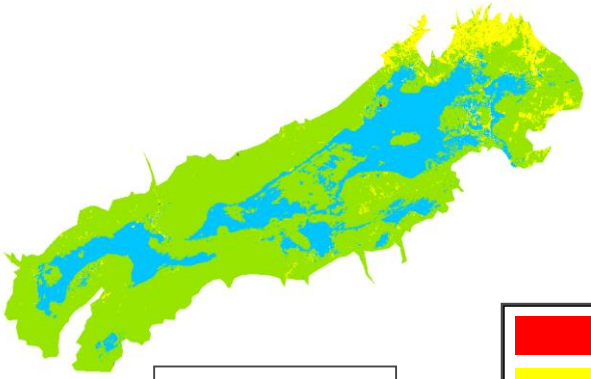




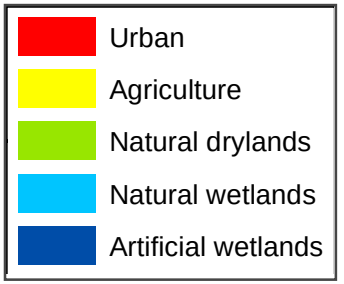
LULC 1975



LULC 1990



LULC 2005

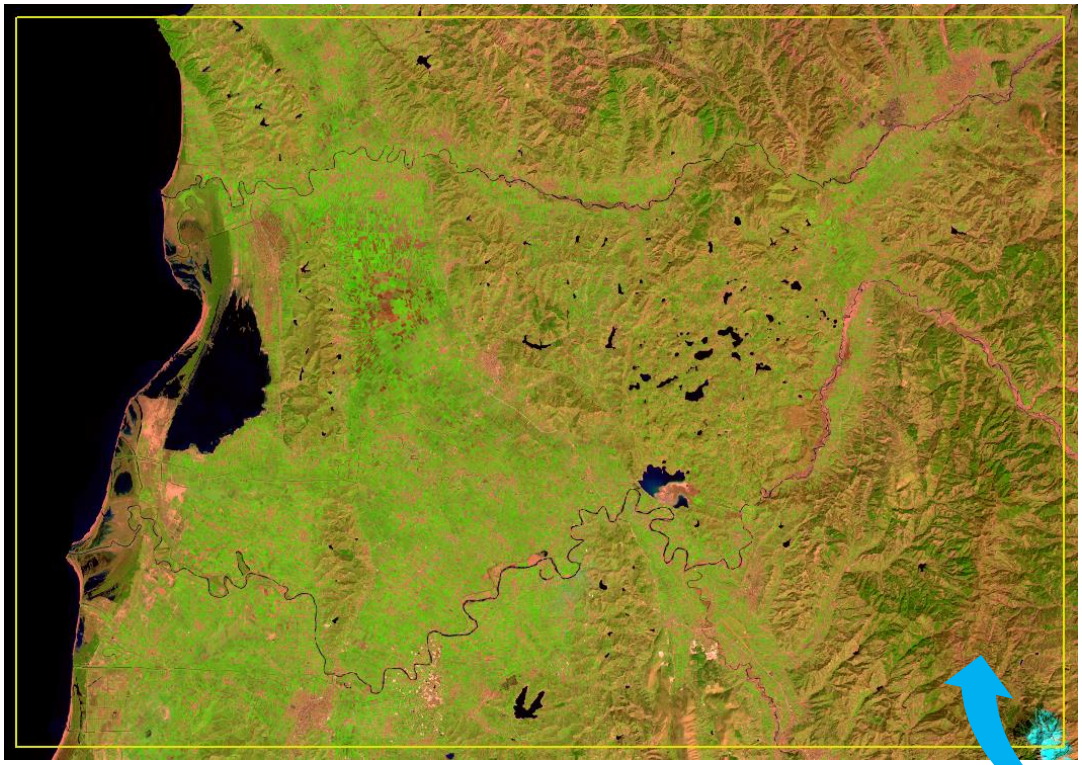


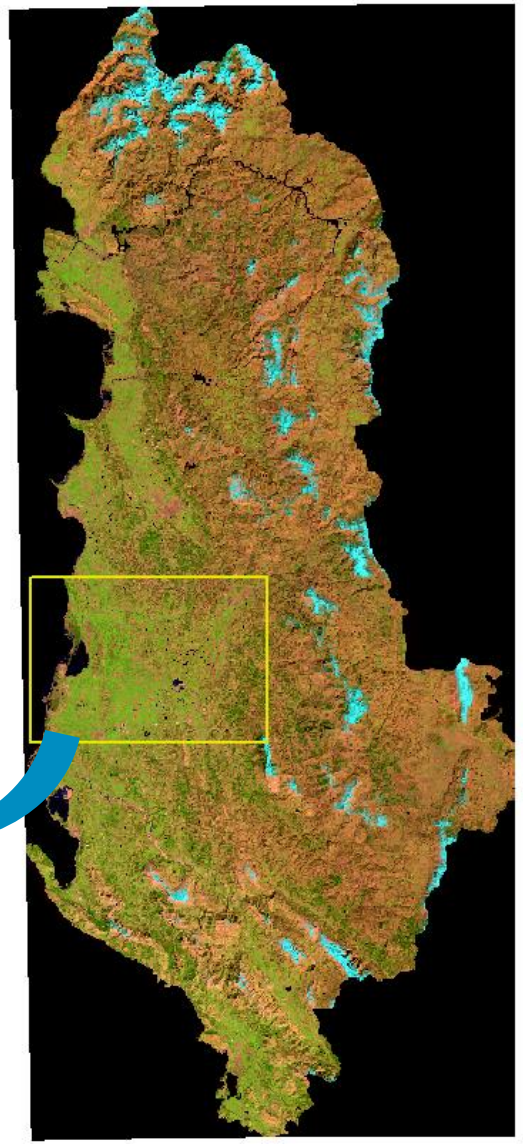
Sustainable Development Goal (SDG) Indicator 6.6.1

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 reporting obligations (e.g. **Ramsar** and **SDG's**)?

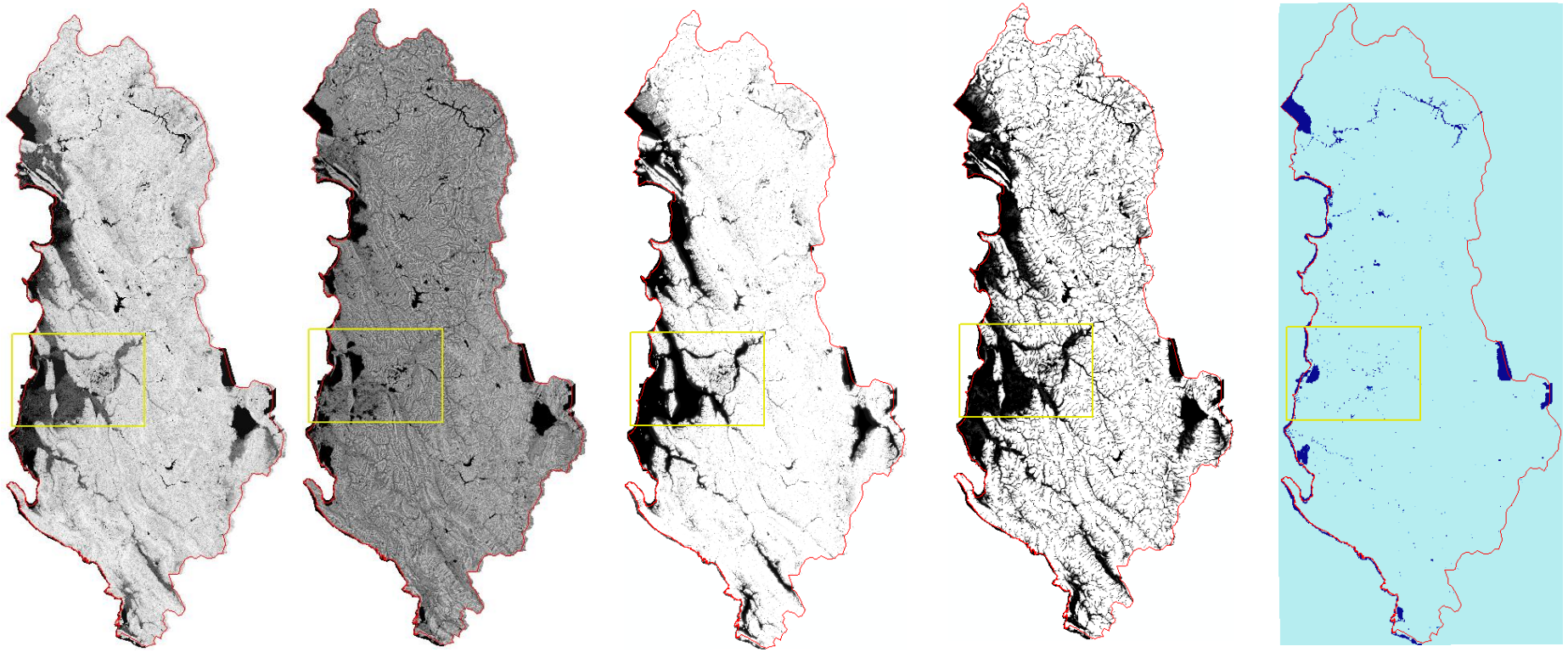
SWOS approach: National Service Case - Albania





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…)

SWOS approach: National Service Case - Albania

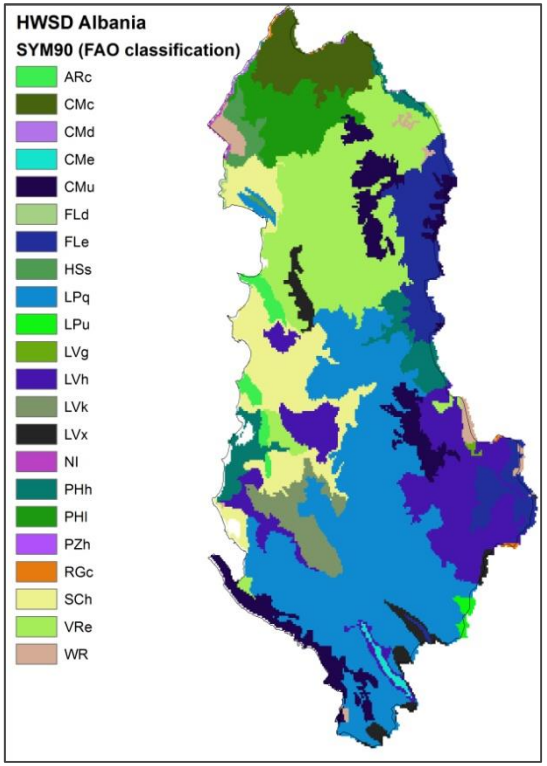


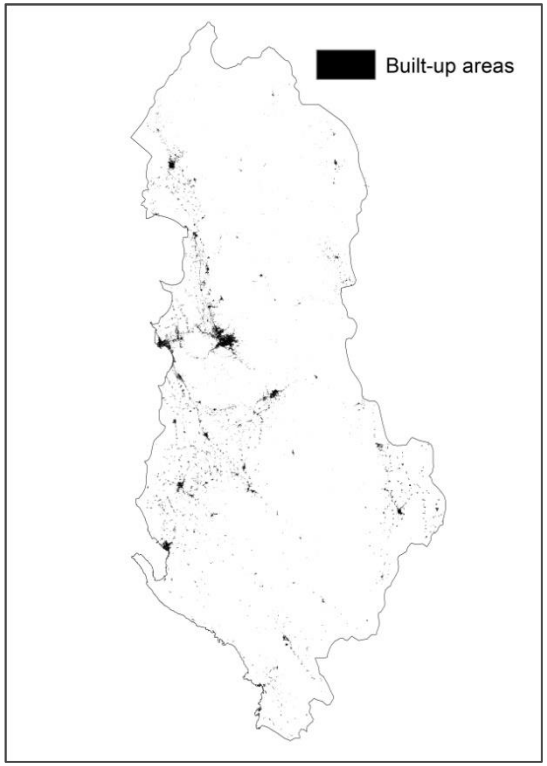
EU-DEM

Landsat-8
(2014 time series)

SWOS approach: National Service Case - Albania

Additional ancillary data…





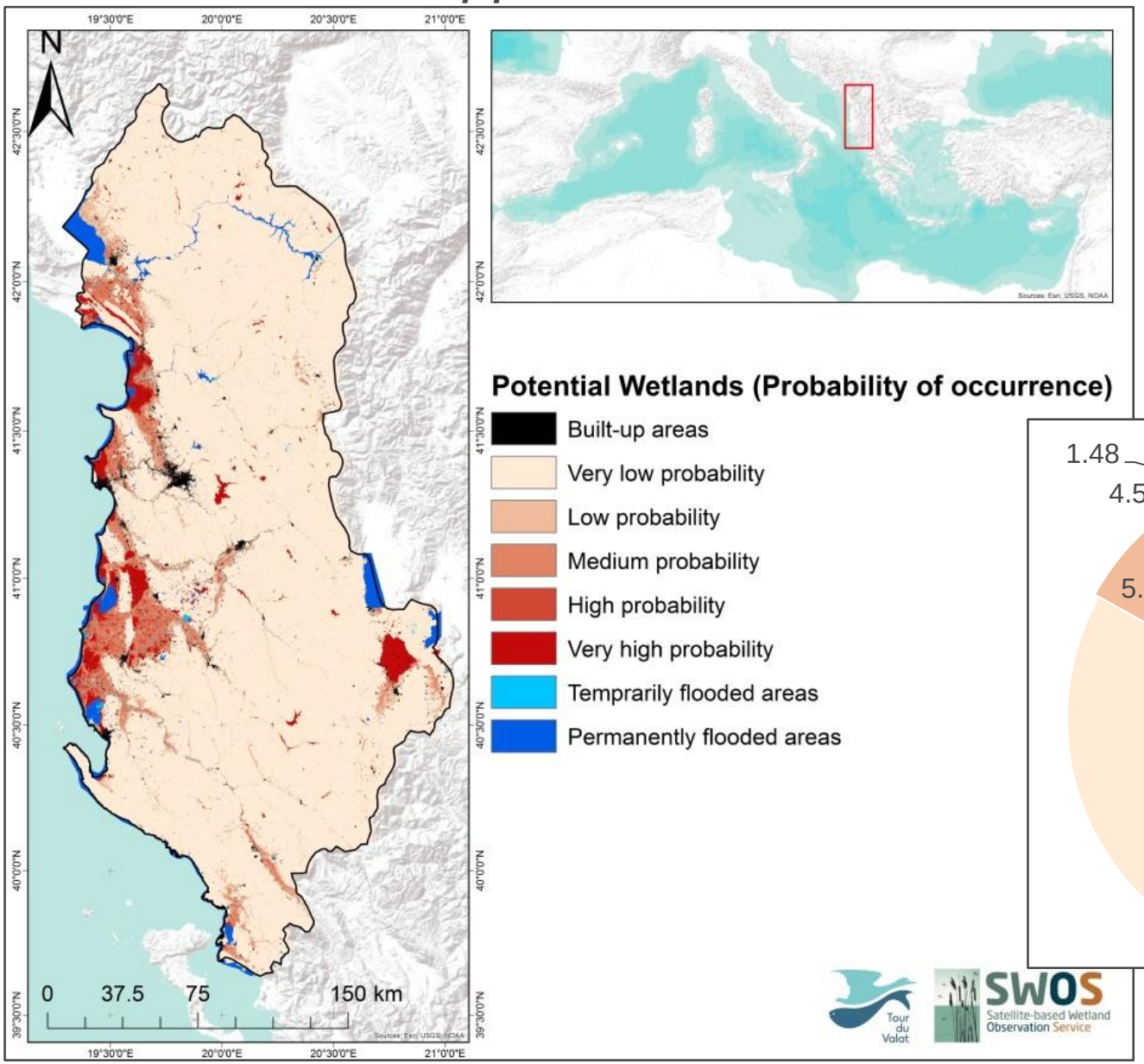
Precipitation time series (1950-2014)

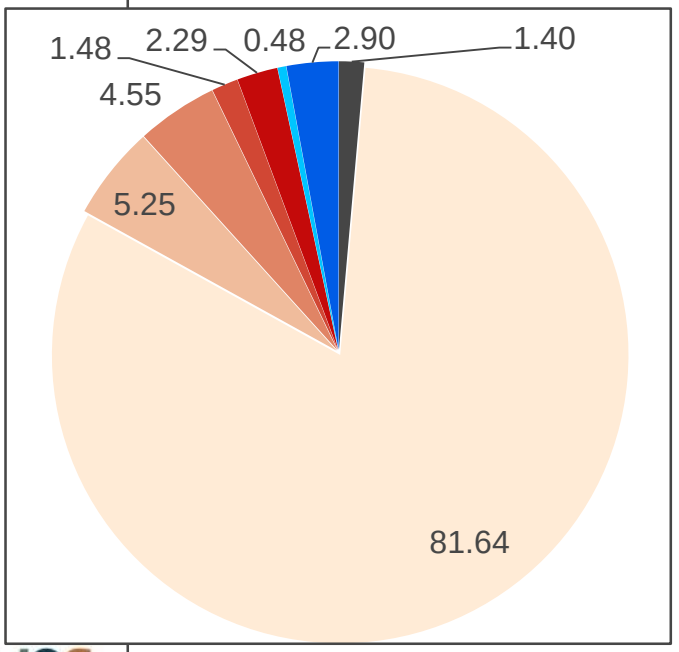
Soil data (HWSD)

Built-up areas (GUF v04)

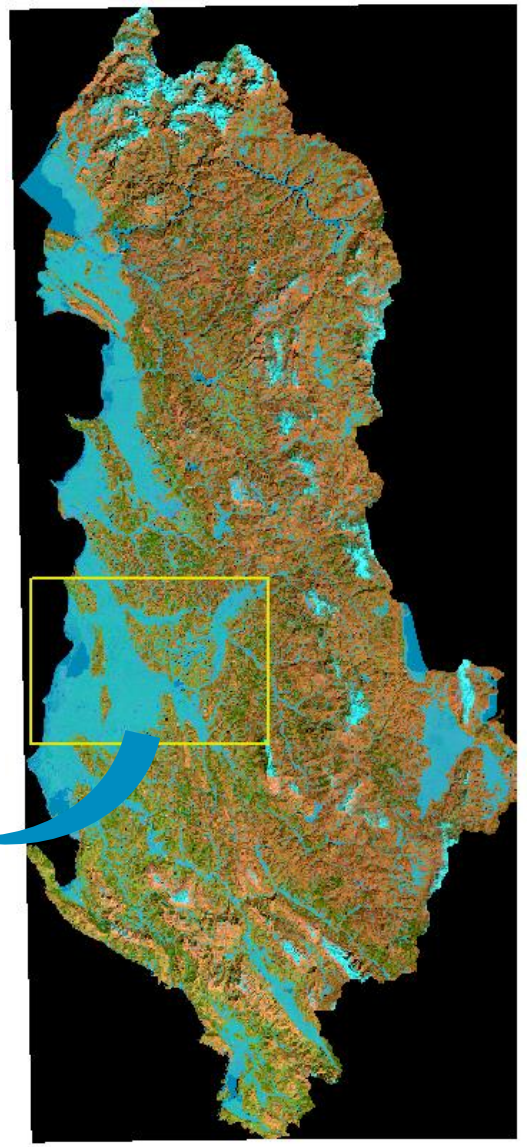
Updated gridded climate dataset (CRU TS3.10)

SWOS approach: National Service Case - Albania



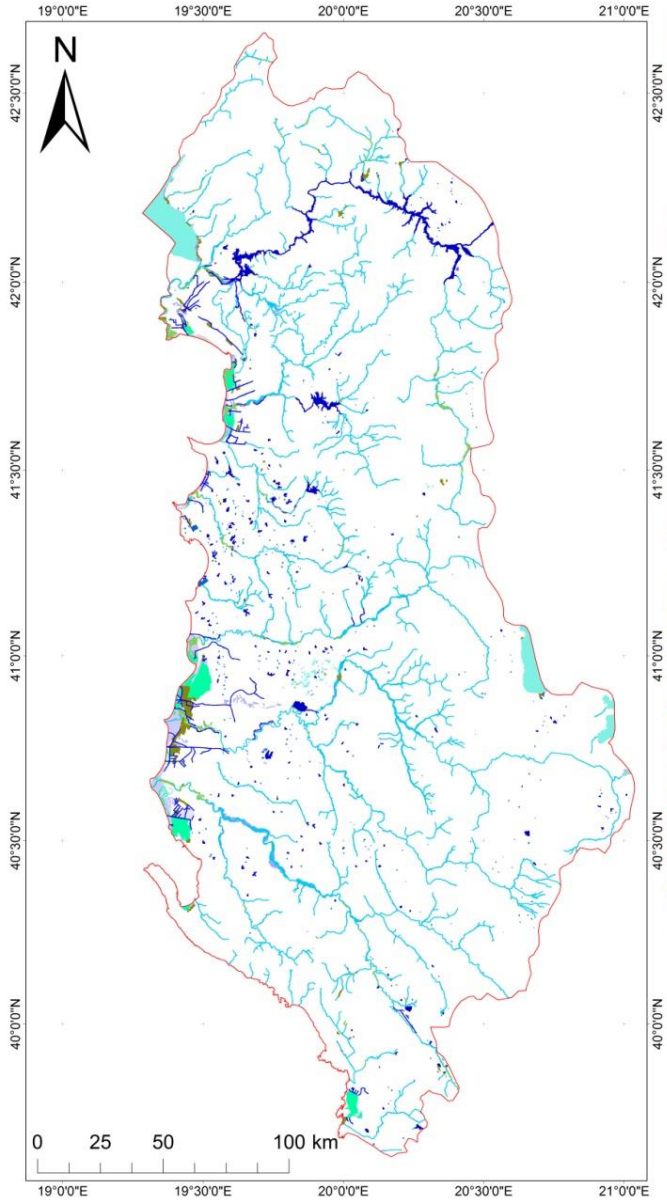


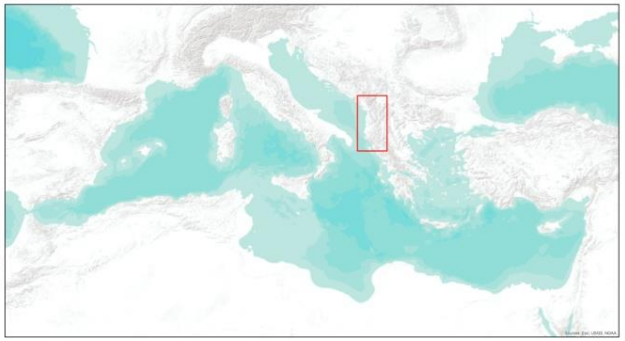
SWOS approach: National Service Case - Albania



Delimitation of a “functional” area that could be used to map and monitor water-related ecosystems
(18% of the national territory)

SWOS approach: National Service Case - Albania





Wetland classes based on CLC-Ramsar definitions (Albania, 2015)

- CLC 1311: Excavations; gravel/brick/clay pits; borrow pits, mining pools
- CLC 2313: Wet pastures
- CLC 3112: Wet forests including riparian
- CLC 3311: Sand, shingle or pebble shores
- CLC 411: Inland marshes
- CLC 412: Peatbogs
- CLC 421: Salt marshes
- CLC 422: Salines
- CLC 511: Inland water courses
- CLC 5114: Canals and drainage channels, ditches
- CLC 512: Inland water bodies
- CLC 5125: Permanent freshwater lakes (over 8 ha) with aquatic bed vegetation
- CLC 5129: Aquaculture (e.g., fish/shrimp) ponds
- CLC 5130: Ponds; includes farm ponds, stock ponds, small tanks; (generally below 8 ha)
- CLC 5131: Water storage areas; reservoirs/barrages/dams/impoundments (generally over 8 ha)
- CLC 5132: Wastewater treatment areas; sewage farms, settling ponds, oxidation basins, etc
- CLC 521: Coastal lagoons
- CLC 5231: Permanent shallow marine waters less than six metres deep at low tide

Exists also in a **MAES** version ☺

Tour du Valat

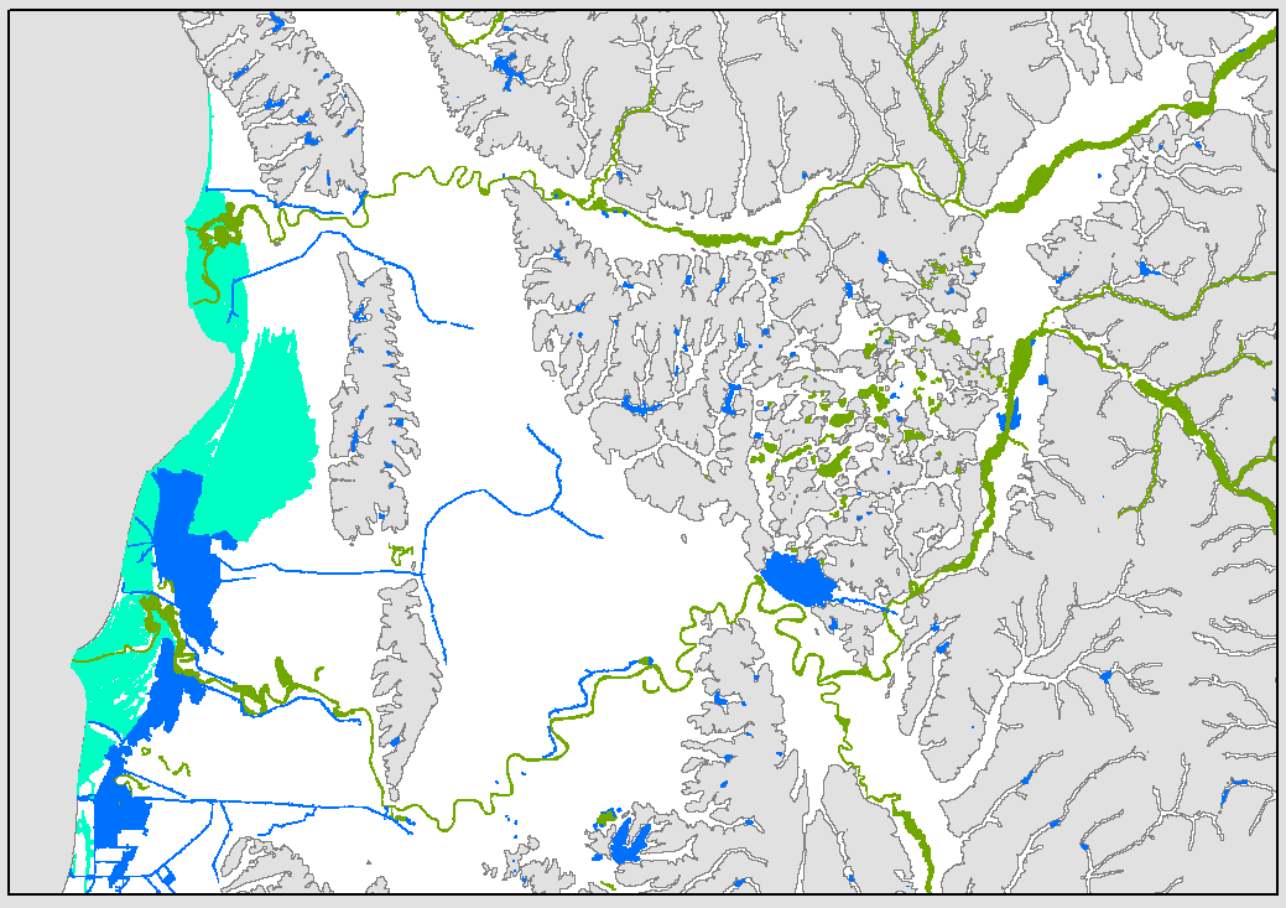
SWOS Satellite-based Wetland Observation Service

What could be the links with SDG's indicators and the SEEA framework?

Reporting indicators

SWOS approach: National Service Case - Albania

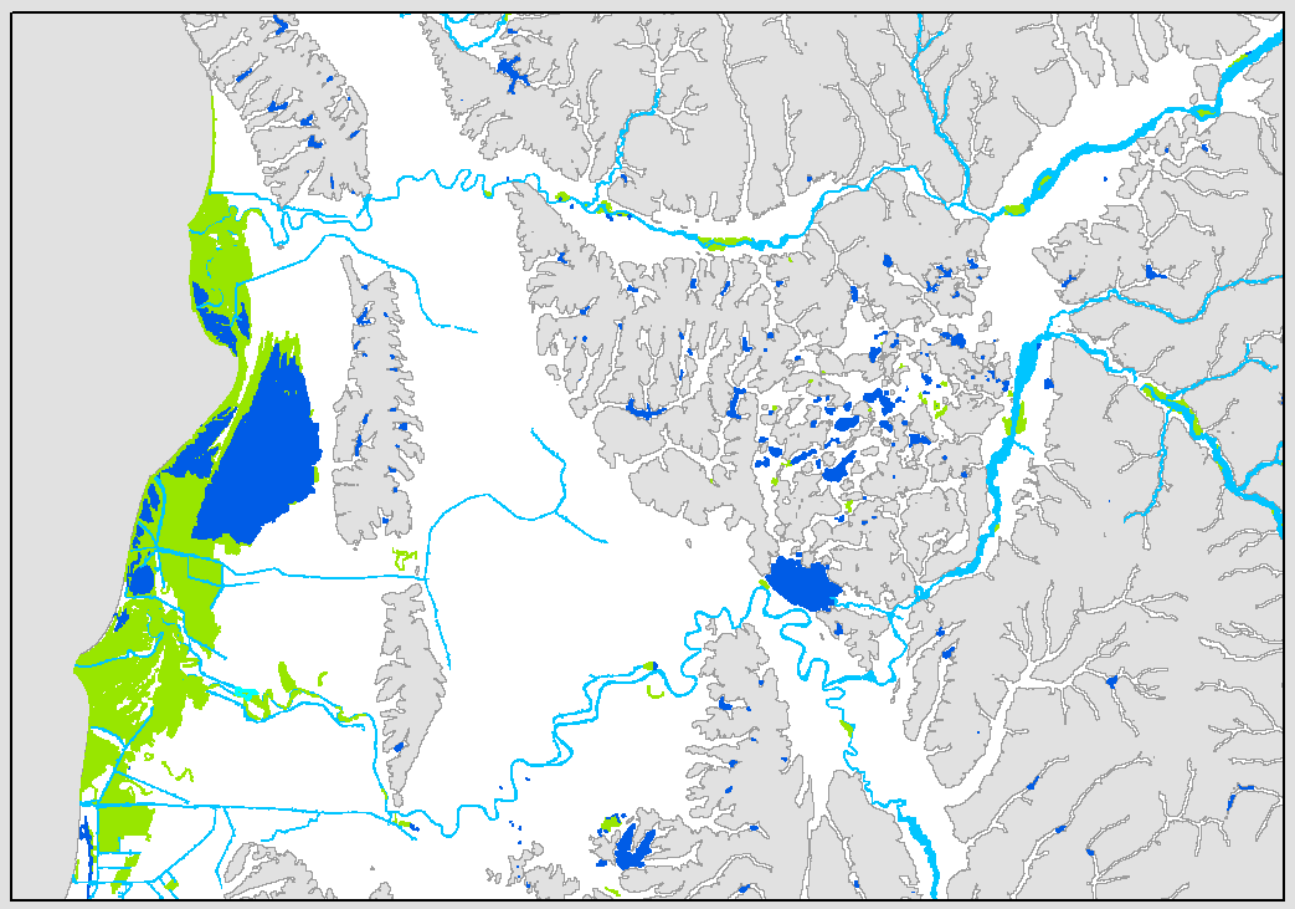
Ramsar: Total wetlands extent reporting indicator



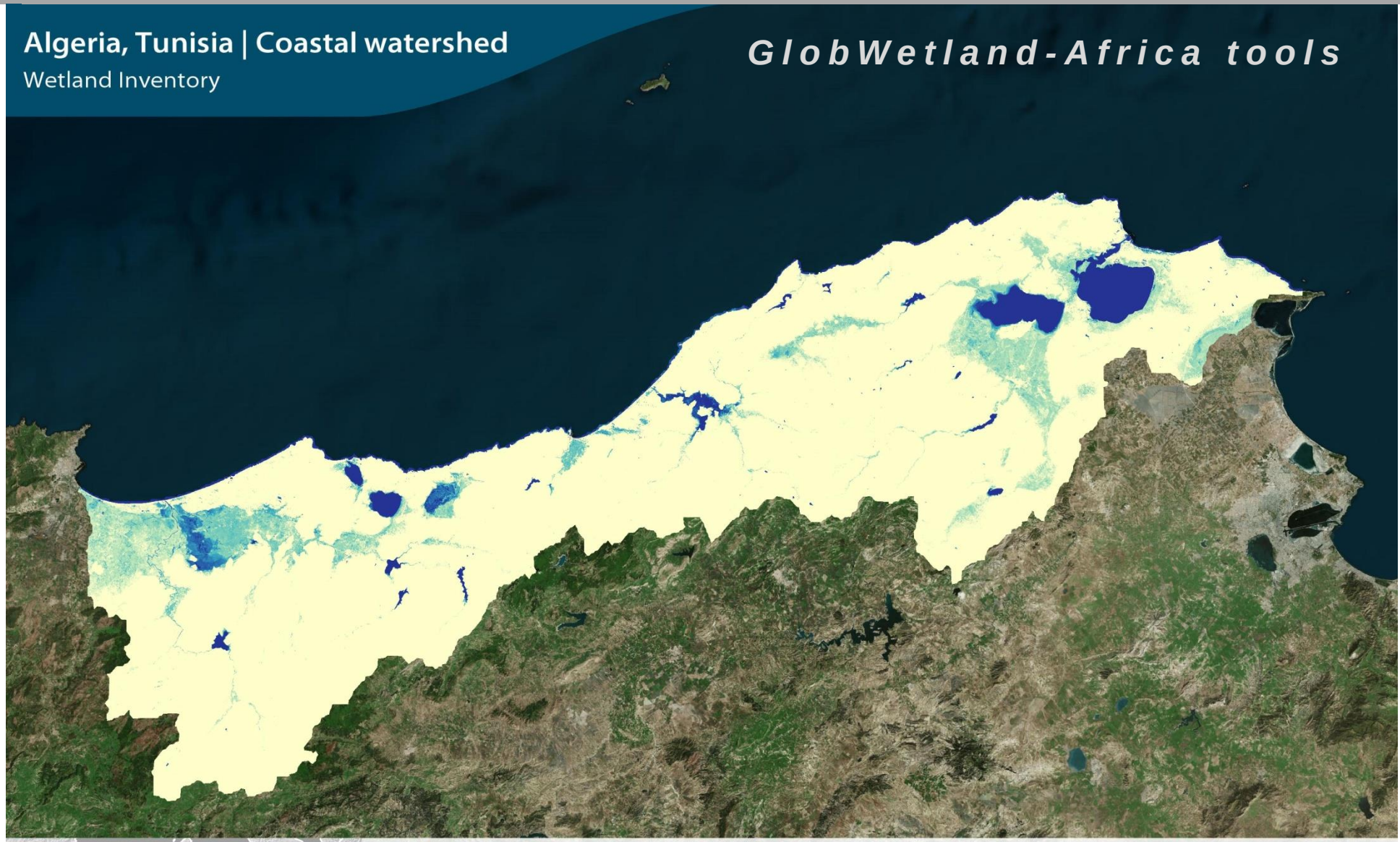
Coastal wetlands Inland wetlands Man-made wetlands

SWOS approach: National Service Case - Albania

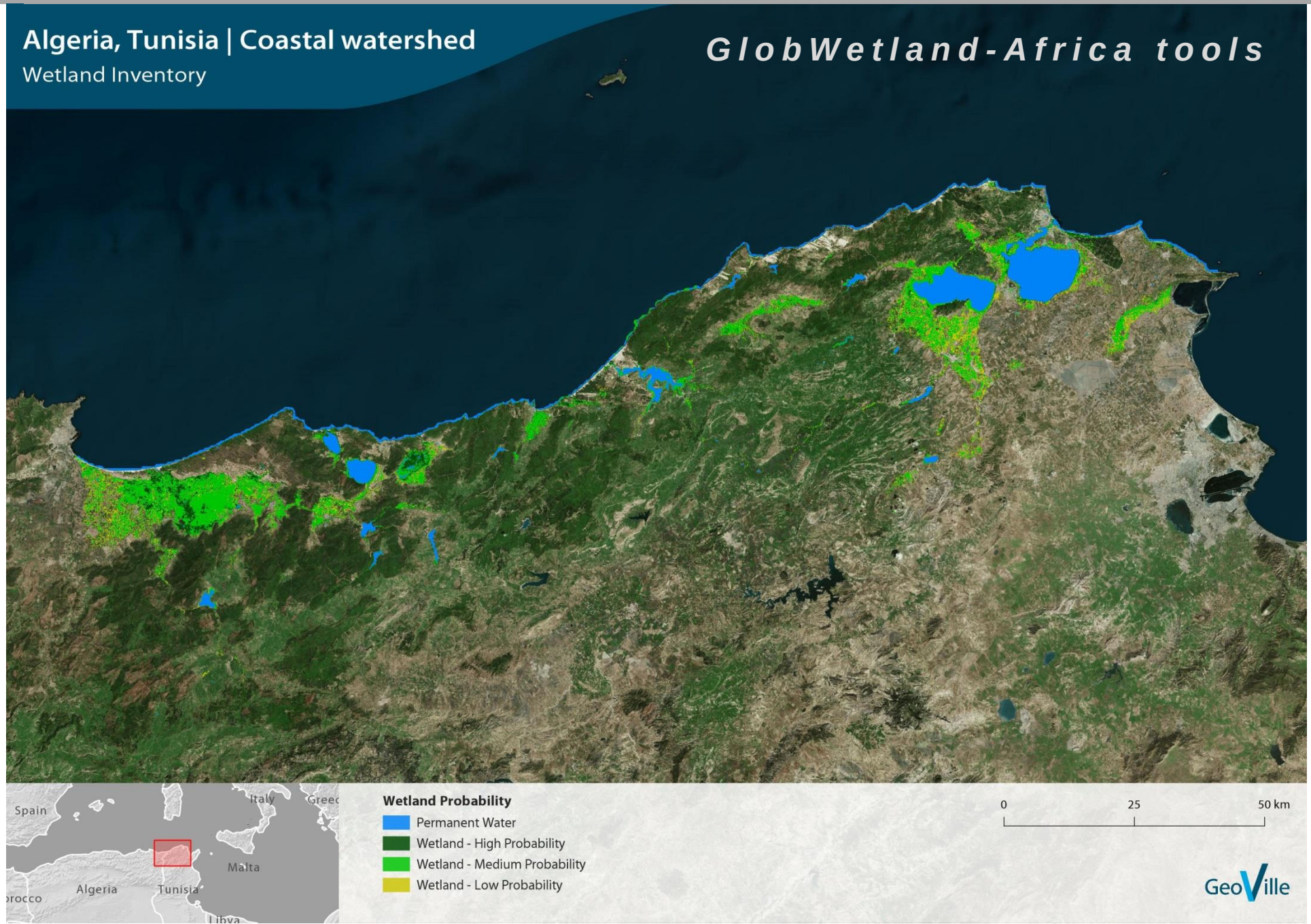
SDG 6.6.1: Wetlands and water related ecosystems extent



Vegetated wetlands Open water bodies River water bodies


Algeria, Tunisia | Coastal watershed
Wetland Inventory
GlobWetland-Africa tools
Spain
Italy
Malta
Algeria
Tunisia
Water Wettness Probability Index WWPI [%]
0
10
20
30
40
50
60
70
80
90
100
0
25
50 km
GeoVille

Wetlands extent mapping



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 multilateral agreements

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

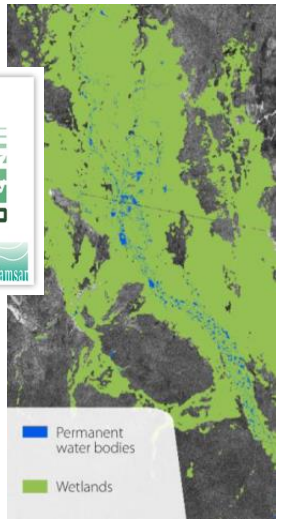
- "Downscaled" and adapted by each country according to its national specifications (e.g. using their proper wetlands definition)

- 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

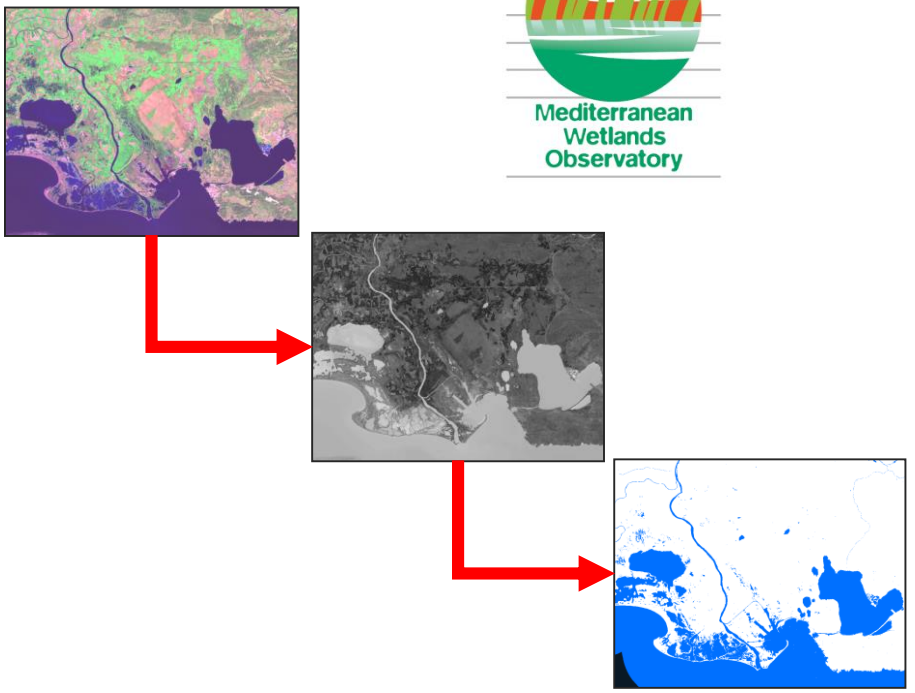
We need to set-up a regional platform (for data providing and processing) on Mediterranean wetlands, integrating existing datasets and products based on tools and approaches that have been already developed

SWOS
Satellite-based Wetland Observation Service

GLOBWETLAND AFRICA
esa



Mediterranean Wetlands Observatory



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