



European  
Commission

# The Digital Observatory for Protected Areas (DOPA)

*Grégoire Dubois (Ph.D.)*



<http://dopa.jrc.ec.europa.eu>

 @EU\_DOPA



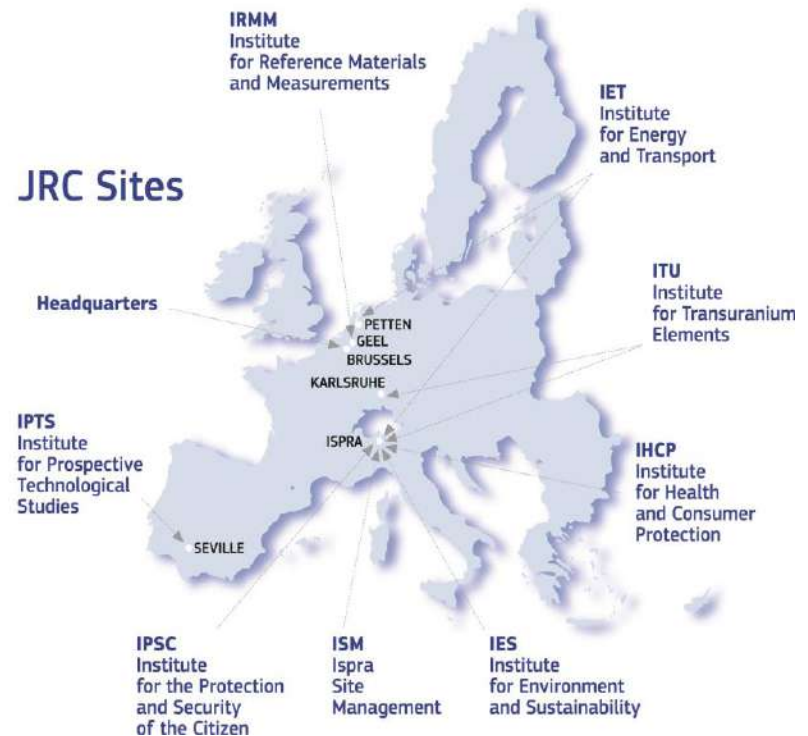
**Joint Research Centre**

the European Commission's  
in-house science service

Joint  
Research  
Centre

## What is the JRC?

- European Commission (EC) = Executive Body of the European Union (EU) based in Brussels
- Joint Research Centre (JRC) = **In-house science service of the EC**; provides independent scientific and technical support to EU policy
- JRC established in 1957
- 7 Directorates in 5 countries with over 3,000 staff (35% short-term)
- Over 1,300 publications per year

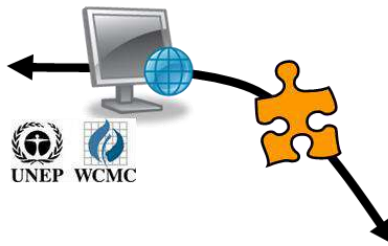


## Why DOPA a global reference system focusing on protected areas?

- Need for **global reference information system** to support decision making. *Where are protected areas with highest biodiversity and exposed to highest threats? Which are the protected areas without financial support?*
- Need for **integrated information** taking into account species, ecosystems, pressures, funding which need to be available at Country, Ecoregion and Protected Areas level.
- Need for **free, open access** services to develop web based tool for different end-users.

# DOPA integrates global datasets managed by various actors to generate key indicators

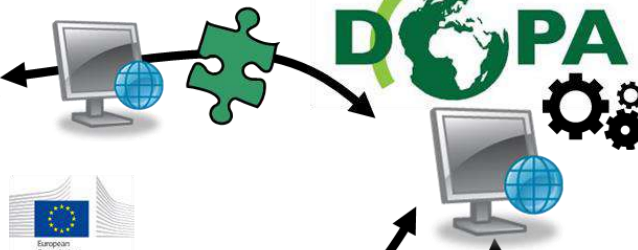
Protected Areas



THE GLOBAL EARTH OBSERVATION  
SYSTEM OF SYSTEMS



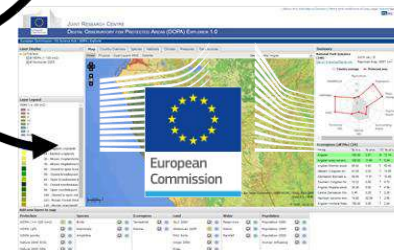
Ecosystems



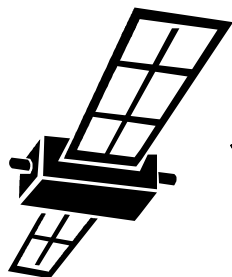
Species



Customers/Partners



## Key indicators provided by the DOPA



Key Indicators	Country	Ecoregions	Site level (50 km <sup>2</sup> )
Coverage by protected areas	☑	☑	-
Connectivity of protected areas	☑	☑	-
Land cover & change	☑	☑	☑
Forest cover & change	☑	☑	☑
Surface water & change	☑	☑	☑
Terrestrial Habitat Diversity	-	-	☑
Marine Habitat Diversity	-	-	☑
Species composition	☑	☑	☑
Built-up pressure			☑
Population pressure			☑
Agricultural pressure			☑
Population & road pressures			☑
Monthly climate	-	-	☑
EU funding for conservation	☑	-	☑



# DOPA Explorer 2.0

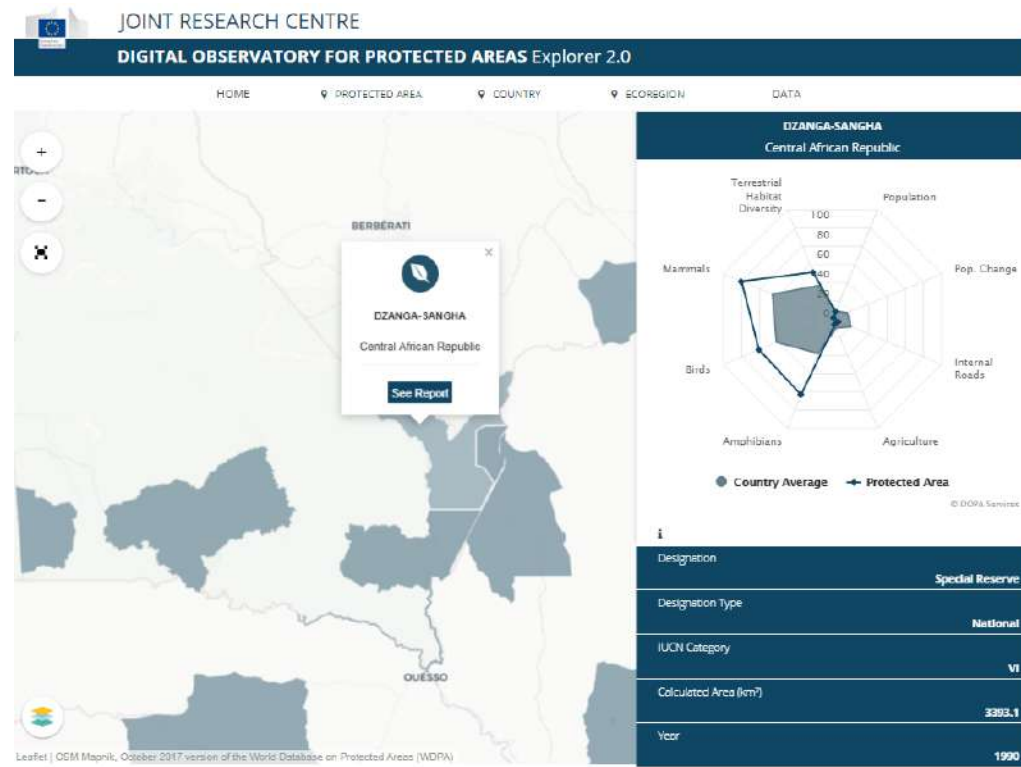
A web-based open-access application assessing PAs globally through a set of indicators at three levels:

## 1) Country

## 2) Ecoregion

## 3) Individual PAs

- ✓ All PAs of at least 50 km<sup>2</sup>
- ✓ ≈ 24000 PAs worldwide
- ✓ > 95% of global protected surface



DZANGA-SANGHA IS IN CENTRAL AFRICAN REPUBLIC, HAS BEEN DESIGNATED AS SPECIAL RESERVE AT NATIONAL LEVEL IN 1990, IT COVERS 3393.1 KM<sup>2</sup>.

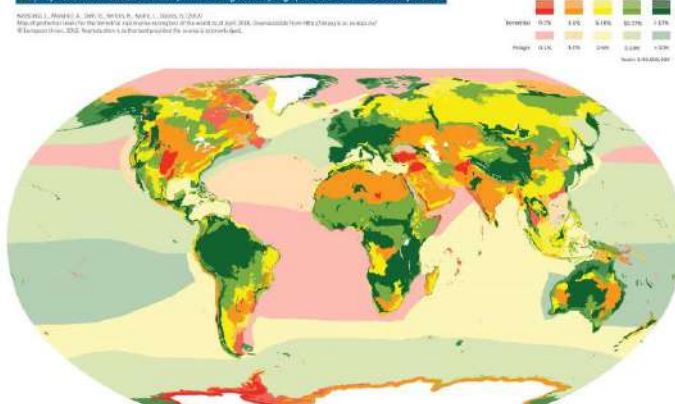
<http://dopa.jrc.ec.europa.eu/explorer>

# DOPA Explorer is mainly developed to support the EC & the UN Convention on Biological Diversity (CBD) for assessments & reporting

CBD/SBSTTA/22/INF/30  
Page 9

Research Centre (EC-JRC)<sup>27</sup> using the WDPA. Due to MPAs added by Brazil (designated in March and added to the WDPA in May 2018), two more marine ecoregions (Sao Pedro and Sao Paulo Islands and Trindade and Martin Vaz Islands) now have coverage of more than 10%. Figure 4 shows the protected area coverage for terrestrial ecoregions, marine ecoregions and pelagic provinces, as of April 2018.

Map of protection levels for the terrestrial, marine ecoregions and pelagic provinces of the world as of April 2018.



**Figure 4.** Protected area coverage of terrestrial and marine ecoregions and pelagic provinces, as of April 2018.<sup>28</sup>

32. There has been general improvement in the coverage of both marine ecoregions and pelagic provinces over the last two years (figure 5). On the other hand, there has been only limited improvement in the coverage of the terrestrial ecoregions. While many terrestrial ecoregions increased in protected area coverage, a significant number also showed decreased coverage. Figure 5 shows the changes in protected area coverage of terrestrial ecoregions, marine ecoregions and pelagic provinces over the period from April 2016 to April 2018.

## Target 6 of the EU Biodiversity strategy to 2020: Help avert global biodiversity loss

*By 2020, the EU has stepped up its contribution to averting global biodiversity loss*

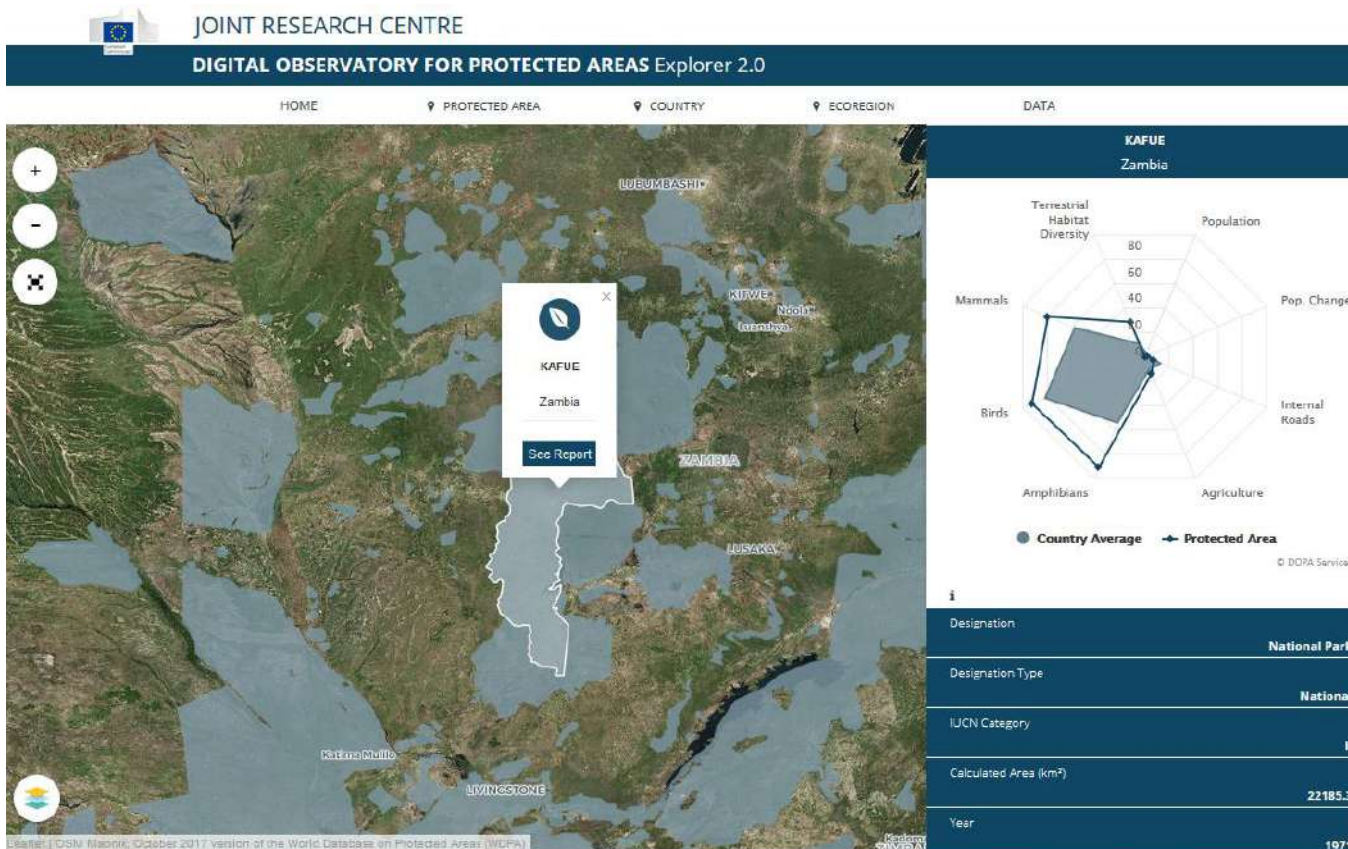


<sup>27</sup> EC-JRC (2018). The Digital Observatory for Protected Areas (DOPA), <http://dopa.jrc.ec.europa.eu/> (see section on maps and datasets)

<sup>28</sup> EC-JRC (2018).

## Global information for comparisons

In DOPA Explorer, Protected Areas are **ranked** within the country according to a set of indicators, visually (radar plots, bar charts) and numerically.



JOINT RESEARCH CENTRE  
DIGITAL OBSERVATORY FOR PROTECTED AREAS Explorer 2.0

HOME | PROTECTED AREA | COUNTRY | ECOREGION | DATA

**KAFUE**  
Zambia

See Report

Terrestrial Habitat Diversity  
Population  
Pop. Change  
Internal Roads  
Agriculture  
Amphibians  
Birds  
Mammals

● Country Average    + Protected Area

© DOPA Services

Designation	<b>National Park</b>
Designation Type	<b>National</b>
IUCN Category	<b>II</b>
Calculated Area (km <sup>2</sup> )	<b>22185.3</b>
Year	<b>1971</b>

**KAFUE IS IN ZAMBIA, HAS BEEN DESIGNATED AS NATIONAL PARK AT NATIONAL LEVEL IN 1971, IT COVERS**

**22185.3 KM<sup>2</sup>**



# DOPA Explorer & Earth Observations

## Use case 1 : Surface water

Peckel *et al.* 2016, Nature 540: 418–422 using Landsat (30 m)



JOINT RESEARCH CENTRE

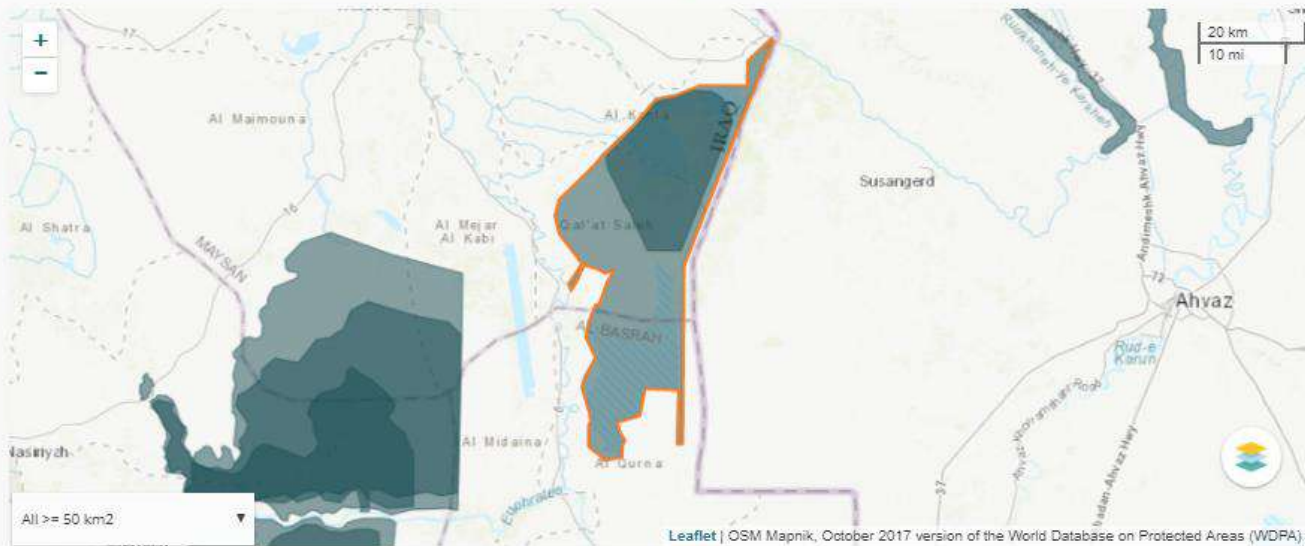
DIGITAL OBSERVATORY FOR PROTECTED AREAS Explorer 2.0

European Commission > EU Science Hub > DOPA > DOPA Explorer > Hawizeh Marsh (Haur Al-Hawizeh)

HOME MAP DATA

### HAWIZEH MARSH (HAUR AL-HAWIZEH)

Iraq



Leaflet | OSM Mapnik, October 2017 version of the World Database on Protected Areas (WDPA)

Profile

Environment

Coverage

Species

Pressures

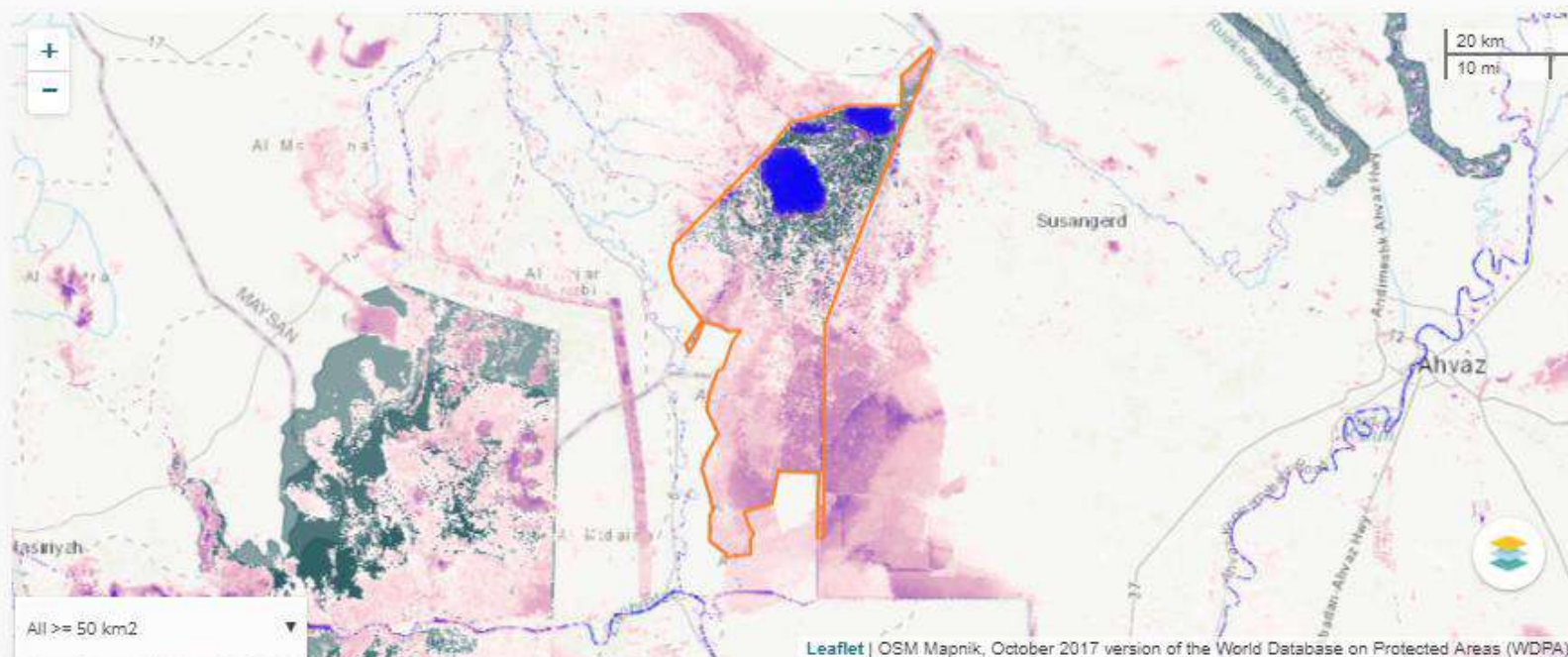
#### PROTECTED AREA PROFILE

Protected Area	WDPA ID	Country	Designation	Designation Type	Year	IUCN Category	Management Authority	Reported Area (km <sup>2</sup> )	Calculated Area (km <sup>2</sup> )	Type
Hawizeh Marsh (Haur Al-Hawizeh)	903064	Iraq	Ramsar Site, Wetland of International Importance	International	2007	Not Reported	Not Reported	1 377.0	1 373.8	Terrestrial



# HAWIZEH MARSH (HAUR AL-HAWIZEH)

Iraq



**x** Water Occurrence (1984-2015)

>0%

100%

Sometimes Water

Always Water

*The Water Occurrence dataset shows where surface water occurred between 1984 and 2015 and provides information concerning overall water dynamics. This product captures both the intra and inter-annual variability and changes. The occurrence is a measurement of the water presence frequency (expressed as a percentage of the available observations over time actually identified as water). The provided occurrence accommodates for variations in data acquisition over time (i.e. temporal deepness and frequency density of the satellite observations) in order to provide a consistent characterization of the water dynamic over time.*





# HAWIZEH MARSH (HAUR AL-HAWIZEH)

## Iraq



### Water Occurrence Change Intensity (1984-1999 to 2000-2015)



The Water Occurrence Change Intensity product shows where surface water occurrence increased, decreased or remained invariant between 1984 and 2015. Both the direction of change (i.e. increase, decrease or no change) and its intensity are documented. The occurrence change accommodates for variations in data acquisition over time (i.e. temporal deepness and frequency density of the satellite observations) in order to provide a consistent occurrence change measurement.

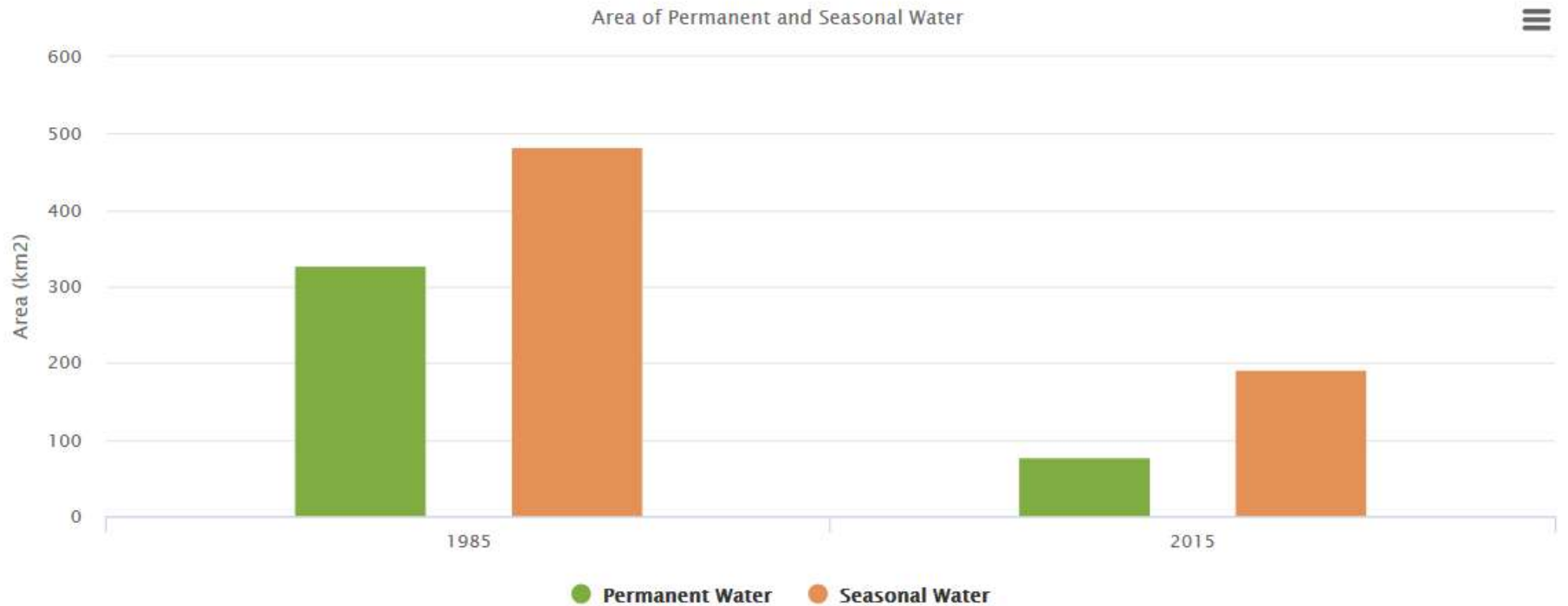
## Inland Surface Water



Areas of inland permanent and seasonal surface water and their changes over time (1985 - 2015) are expressed in km<sup>2</sup> and percentages. Click on the map symbol to add the layer.



Area (km <sup>2</sup> ) of permanent surface water (2015)	Area (km <sup>2</sup> ) of seasonal inland water (2015)	Net change (km <sup>2</sup> ) of permanent surface water (2015 - 1985)	Net change (km <sup>2</sup> ) of seasonal inland water	Net change (%) of permanent surface water (2015 - 1985)	Net change (%) in surface area of seasonal inland water
77.9	192.4	-249.2	-291.7	-76.2	-60.26



GSW 2016, WDPA 2017/10, © DOPA Services

Water Occurrence (1984-2015) Layer

Water Occurrence Change Intensity Layer

Water Transitions Layer



# DOPA Explorer & Earth Observations

## Use case 2 : Built up areas

Built-up areas are derived from the Global Human Settlement (GHS) built-up layer at 30 m resolution developed by the JRC for years 1975, 1990, 2000, 2014 (Pesaresi *et al.*, 2015)



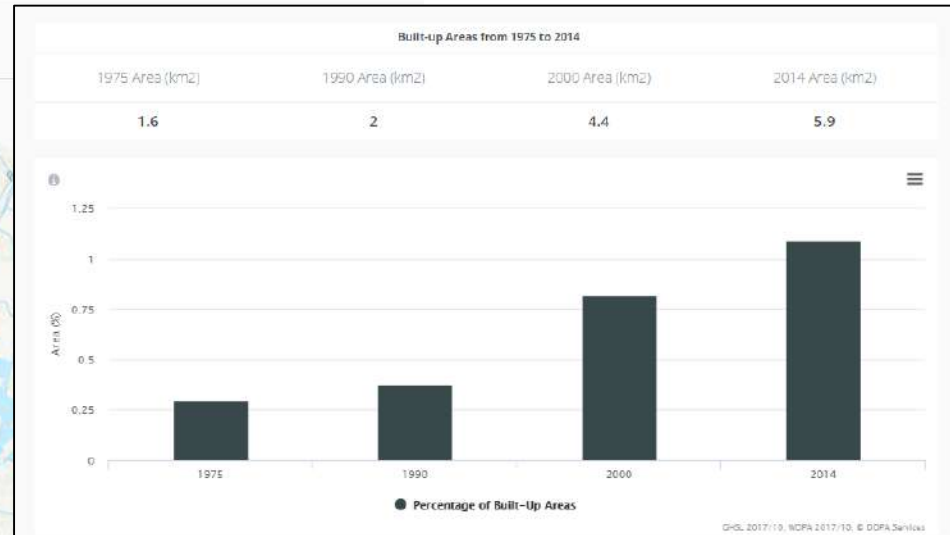
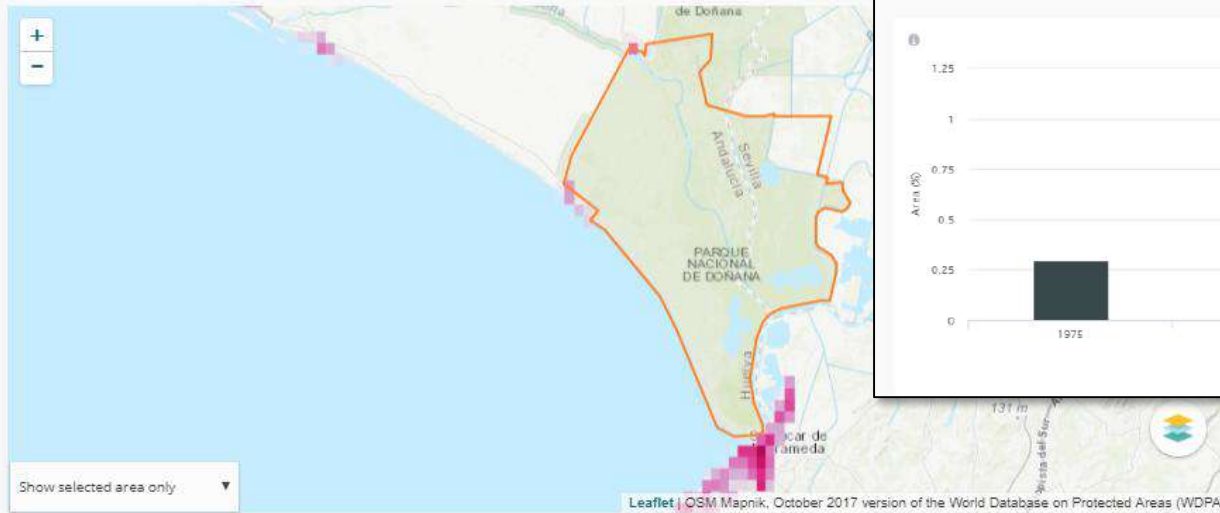
JOINT RESEARCH CENTRE

DIGITAL OBSERVATORY FOR PROTECTED AREAS Explorer 2.0

European Commission > EU Science Hub > DOPA > DOPA Explorer > Doñana National Park

HOME MAP DATA

### DOÑANA NATIONAL PARK Spain



GHS Built-Up Grid

0

1

Built-up presence, values are expressed as decimals (Float) from 0 to 100

Built-Up 1975

Built-up 1990

Built-Up 2000

Built-Up 2014

## Conclusions (1/2): Main challenges...

- DOPA uses only global datasets: it is a **compass**, not a GPS.
- DOPA is processing data automatically: **rubbish in = rubbish out**.
- DOPA is free and open access but many datasets managed by third parties present **licensing issues**.
- Earth observations are essential for large scale assessments but are not sufficient for effective decision making (e.g. local threats, empty forest syndrome, ...). **Need for ground truth**
- Many new initiatives and platforms, clear **need for coordination and orchestration**

## Conclusions (2/2): ... and next steps

- **DOPA Explorer 3.** More indicators, more automation, higher resolution (November 2018).
- **Move towards Open DOPA ?** Most systems adopt a top-down approach. An additional bottom-up effort would improve information and develop bridges between actors on the ground and policy makers



Towards bidirectional  
exchanges



*“We are drowning in information, while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices wisely.”*

E. Wilson, 1998, Consilience



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