



# Web based services for Assessing, Monitoring and Forecasting Biodiversity for Conservation

The case of  **DOPA**  
a Digital Observatory for Protected Areas

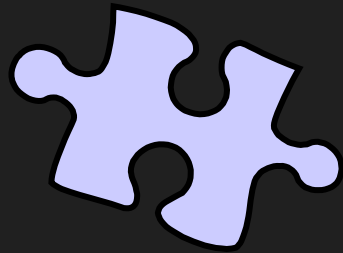
<http://dopa.jrc.ec.europa.eu>

Grégoire DUBOIS

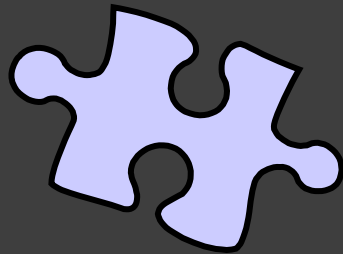
## Our knowledge about protected areas?

- List of endemic species in a protected area? How many are protected?
- Unique ecological features of a protected area?
- Pressures to which a protected area is exposed to?
- Who has been doing what in a protected area and what was the funding?
- What is the value of the protected area at the country or ecoregion level?

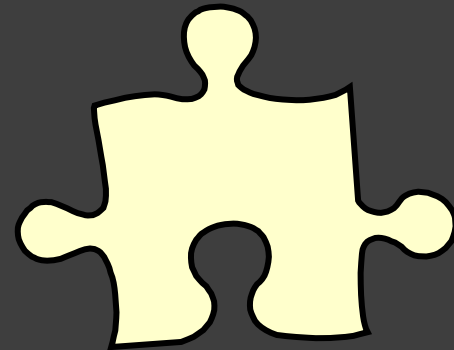




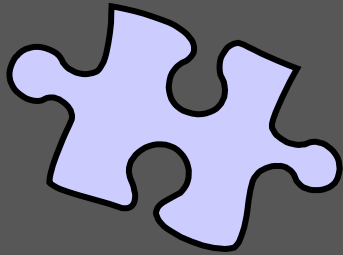
## Boundaries of PAs



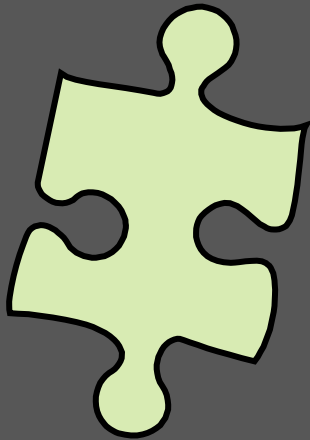
Boundaries of PAs



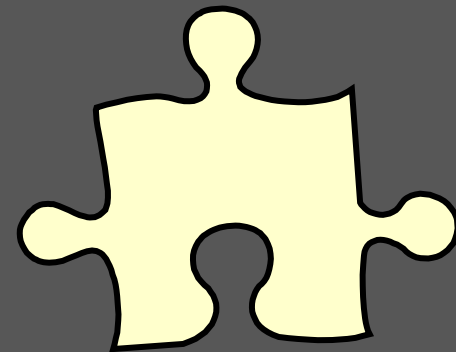
Earth observations for ecosystems



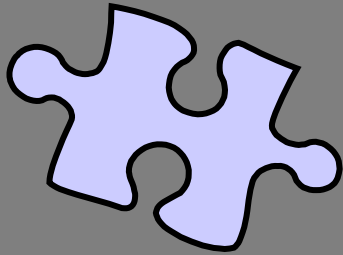
Boundaries of PAs



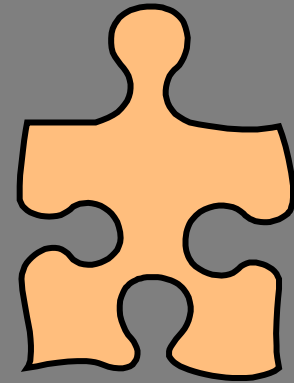
Species data



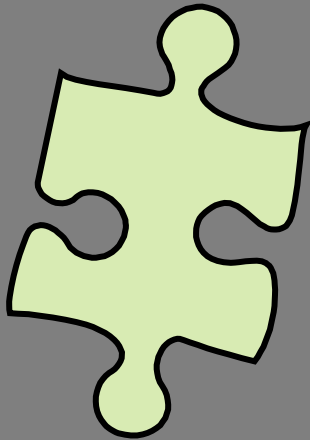
Earth observations for ecosystems



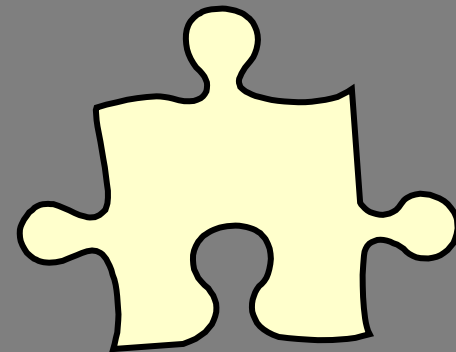
Boundaries of PAs



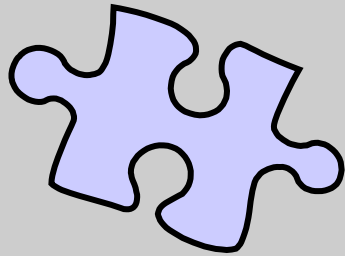
Socio economical data



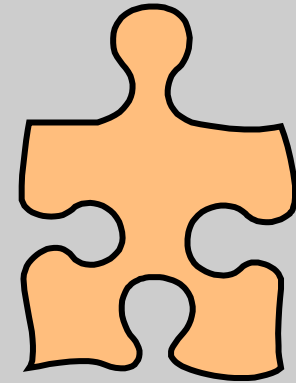
Species data



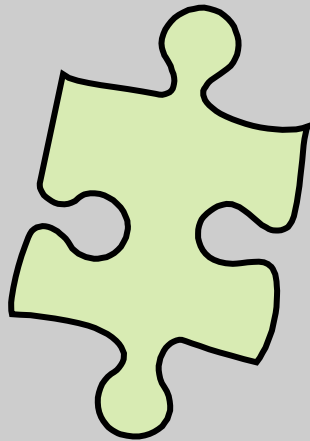
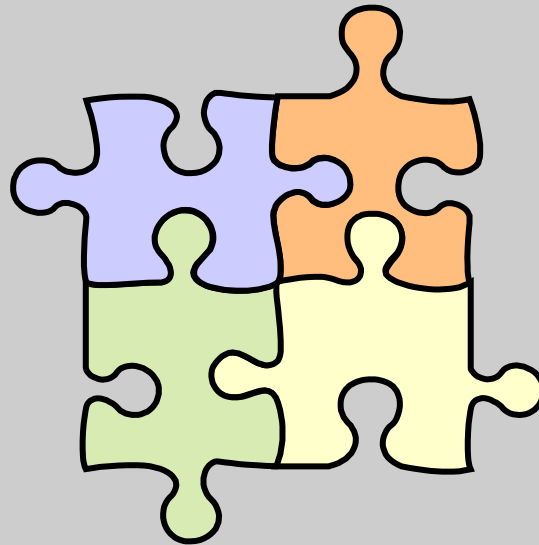
Earth observations for ecosystems



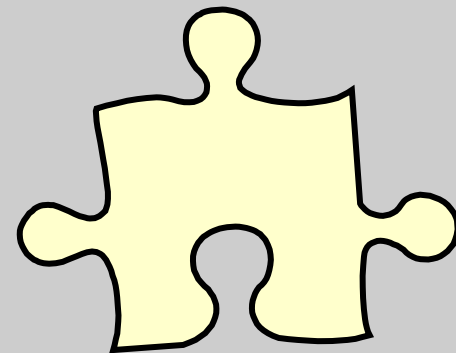
Boundaries of PAs



Socio economical data



Species data



Earth observations for ecosystems





*" 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."*

— Edward O. Wilson

# DOPA, a Digital Observatory for Protected Areas

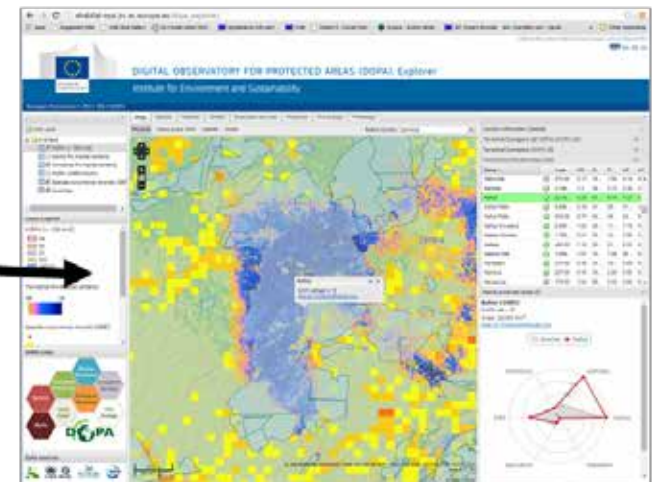
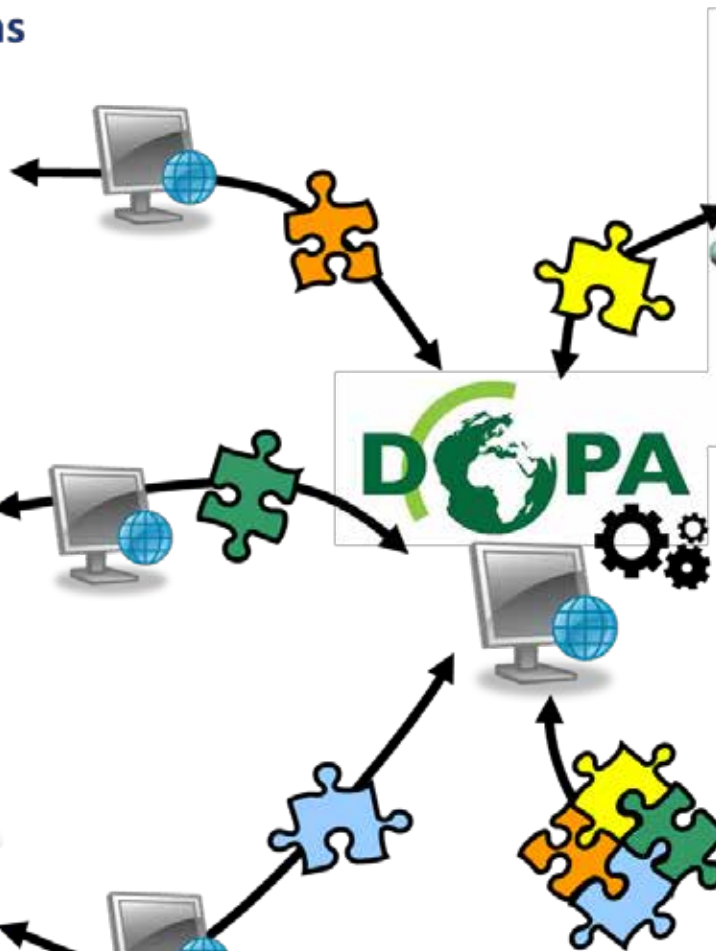
## Protected Areas



## Ecosystems



## Species





# Web Services for Biodiversity Conservation

*"Providing the right information, to the  
right people, with the right tools"*



*Park Managers*



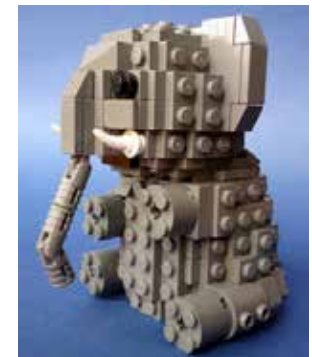
*Public*



*Researchers*



**A LEGO Toolbox for  
Biodiversity Conservation!**

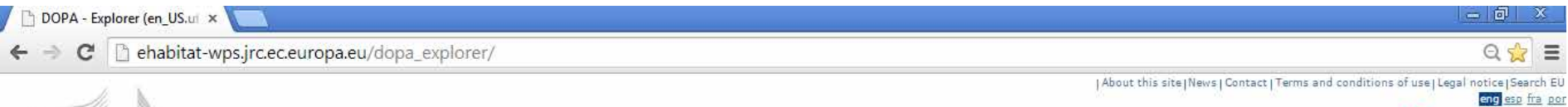


*Decision-makers*

## **DOPA Explorer 1.0 (release December 2014)**

1. Describes species indicators, unique ecological features, pressures, climate for all terrestrial and marine PAs  $\geq 100 \text{ km}^2$  (~ 17 000 PAs)
2. All information summarized at the Country, Ecoregion & protected area level
3. All web based information, freely accessible with downloadable indicators
4. All web services allowing you to develop your own tools

# Demo at EU pavilion!



## DIGITAL OBSERVATORY FOR PROTECTED AREAS (DOPA) Explorer 1.0



European Commission > JRC > IES > DOPA > Explorer

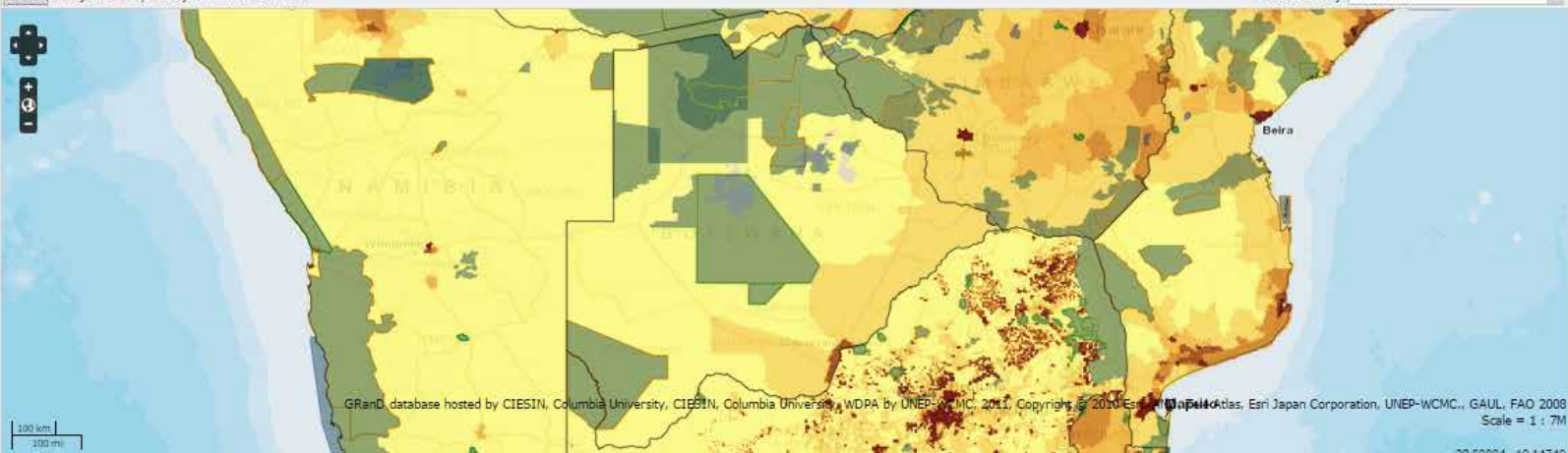
### Layer Display

- Overlays
  - WDPA (> 100 km2)
  - Population 1995
  - Dams

**Map** | Country Overview | Species | Species Coverage | Habitats | Climate | Pressures | Data sources

Street | Physical | OpenLayers WMS | Satellite

Select country: Botswana



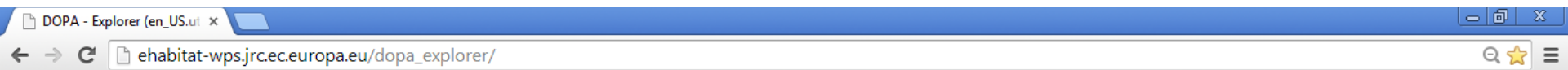
GRanD database hosted by CIESIN, Columbia University, CIESIN, Columbia University, WDPA by UNEP-WCMC, 2011, Copyright © 2010 Esri, DeLorme, GeoEye, Japan, Atlas, Esri Japan Corporation, UNEP-WCMC, GAUL, FAO 2008  
Scale = 1 : 7M  
20.83884, -19.14749

**Add new layers to map**

Protection	Species	Ecoregions	Land	Water	Population
WDPA (>= 100 km2) <input checked="" type="checkbox"/>	Birds <input checked="" type="checkbox"/>	Terrestrial <input checked="" type="checkbox"/>	GLC 2000 <input checked="" type="checkbox"/>	Reservoirs <input checked="" type="checkbox"/>	Population 1990 <input checked="" type="checkbox"/>
WDPA points <input checked="" type="checkbox"/>	Mammals <input checked="" type="checkbox"/>	Marine <input checked="" type="checkbox"/>	Globcover 2005 <input checked="" type="checkbox"/>	Dams <input checked="" type="checkbox"/>	Population 1995 <input checked="" type="checkbox"/>
Natura 2000 SCI <input checked="" type="checkbox"/>	Amphibia <input checked="" type="checkbox"/>		FAO Soils <input checked="" type="checkbox"/>	Rainfall <input checked="" type="checkbox"/>	Population 2000 <input checked="" type="checkbox"/>
Natura 2000 SPA <input checked="" type="checkbox"/>	All species <input checked="" type="checkbox"/>		Crops 2000 <input checked="" type="checkbox"/>		Human Influence <input checked="" type="checkbox"/>
			Fires <input checked="" type="checkbox"/>		



# Demo at EU pavilion!



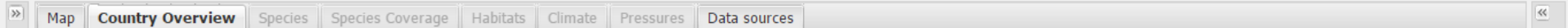
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## DIGITAL OBSERVATORY FOR PROTECTED AREAS (DOPA) Explorer 1.0

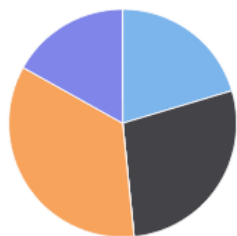


European Commission > JRC > IES > DOPA > Explorer



### Country information


Botswana  
Protected: 215940 km2, 37 %



#### IUCN category

- II: 20.39 %
- IV: 28.01 %
- VI: 0.00 %
- Not Reported: 34.72 %
- Not Applicable: 16.88 %

### Key Country statistics

-  [UN Data country profile](#)
- [UNDP country profile](#)
- [The World Bank Country Data](#)
- [FAO country profile](#)
- [CIA World Factbook Country Info](#)
- [Wikipedia Country Info](#)

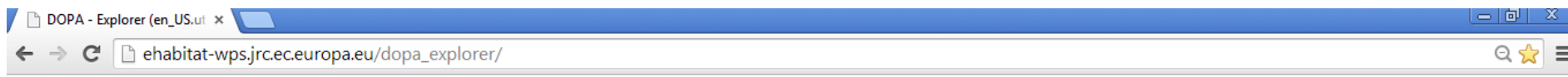
Land area (km2): **566730**  
 Population (people): **1915187** (2007)  
 Population density (people/km2 land): **3.38** (2007)  
 Population growth (annual): **1.01** % (2007)  
 GDP per capita, PPP (current \$): **12391.76** (2007)  
 GDP growth (annual): **8.68** % (2007)

### Terrestrial protected areas (>= 100 km2) (54)

Name	Area (km2)	Segment no.	Species Coverage	Popn. Pressure	Agr. Pressure	IUCN cat.
Moremi	4889	5	71.57	0.00	0.00	IV
Gemsbok	25757	9	53.37	0.00	0.00	II
CT/11	2979	8	46.90	2.02	0.35	Not Reported
CT/3	1982	1	49.12	3.71	13.13	Not Reported
NG/16	1339	6	62.04	0.00	0.00	Not Reported
NG/24	586	3	65.54	0.00	0.00	Not Reported
NG/47	1683	4	55.77	1.00	0.09	Not Reported



# Demo at EU pavilion!



## DIGITAL OBSERVATORY FOR PROTECTED AREAS (DOPA) Explorer 1.0



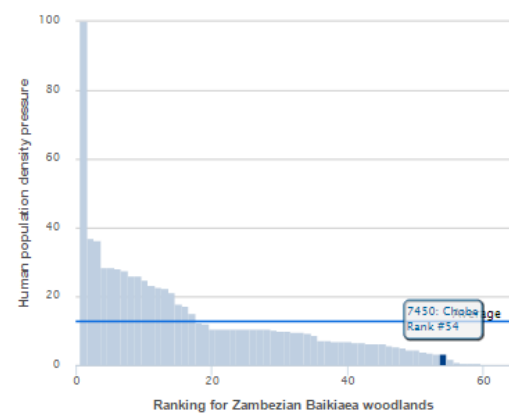
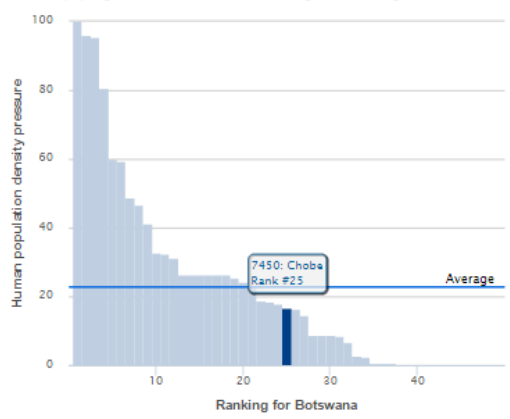
European Commission > JRC > IES > DOPA > Explorer

- Map
- Country Overview
- Species
- Species Coverage
- Habitats
- Climate
- Pressures**
- Data sources

This component of DOPA aims to rank the Protected Areas (PAs) according to the level of threats the Protected Areas (PAs) are exposed to by (i) estimating the population pressure (PA) in the surrounding area and by (ii) quantifying the amount of agriculture found in the immediate vicinity of the PA.

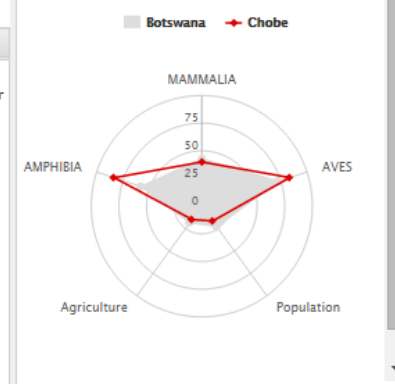
- Population pressure**
- Agricultural pressure

The premise for the population pressure index is that high population density within and around the PA implies: (i) High pressure for land use conversion (conversion to agricultural use) in the buffer zone around the PA and within the PA itself as well as reduced connectivity with natural ecosystems (ii) Higher levels of fishing and hunting in and around the PA. (iii) Higher risk of small scale deforestation (thinning) for timber and fuel. (iv) Higher risk of intentional burning and clearing.



### Summary

**Chobe (7450)** IUCN cat.: Not Reported  
[See on ProtectedPlanet.org](#) Area: 1422 km<sup>2</sup>



### Terrestrial Ecoregions (PAs >= 100 km<sup>2</sup>) (7)

Sh Name	% of ...	% pro...	% ecoreg...
<input type="checkbox"/> Kalahari xeric savanna	38.32	24.34	11.36
<input type="checkbox"/> Kalahari Acacia-Baikiea...	37.22	41.03	28.26
<input type="checkbox"/> Southern Africa bushveld	8.00	0.00	5.37
<input type="checkbox"/> Zambeian and Mopane ...	5.00	82.39	37.79
<input type="checkbox"/> Zambeian flooded gras...	4.26	100.00	57.75
<input type="checkbox"/> Zambeian halophytics	3.82	47.26	35.02
<input checked="" type="checkbox"/> Zambeian Baikiaea wo...	3.38	70.37	41.81

## 1. Assessing protected areas

*DOPA Explorer: Release of version 1.0*  
*Describing all PAs  $\geq 100$  km<sup>2</sup> (~17 000 PAs).*  
*Top down approach.*

## 2. Monitoring and validating assessments

*DOPA Validator (2014): beta release for*  
*demonstration purposes.*  
*Bottom up approach*

## 3. Predicting & forecasting changes in and outside protected areas

*DOPA Analyst (2015):*  
*Simulating changes to PAs, on the fly computation*



To work **better & faster**, DOPA needs more

- data sharing (political)
- interoperability (technical)
- science & integration for new products (scientific)
- infrastructure & resources (funding)

Achieved by more collaboration and coordination if we have a shared vision



In 2014, we have no excuses anymore  
unless we want to close our eyes

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