



# DSS for Water Quality

Sérgio Bruno Costa

Simbiente – Environmental Engineering and Management ([www.simbiente.com](http://www.simbiente.com))

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# Overview

- The Decision Support System (DSS) for water quality management allows users to assess current or historical water quality information throughout the river basin metering points and use this information to obtain global water quality indicators which can, in turn, be used to support planning and operational decisions.

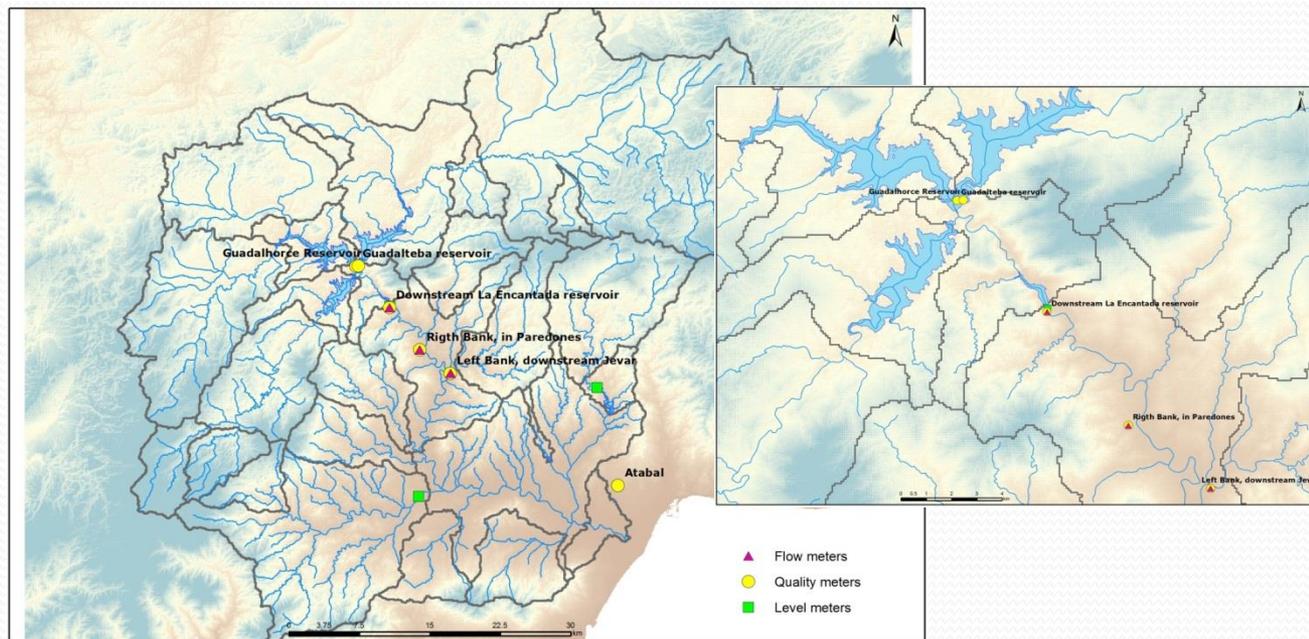
Developed by:



Co-funded by the seventh framework programme (FP7), under grant agreement no. 619132, within the Water Inno & Demo-1

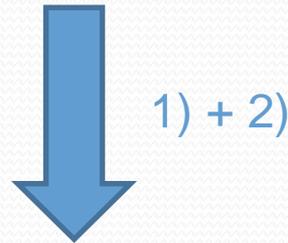
# DSS for Water Quality Design

- 1) GIS geoprocessing and data analysis in order to establish each meter influence area;



# DSS for Water Quality Design

- 2) Monitoring data analysis and legal framework compliance regarding different water uses;



Geographical classification  
according to water use

# DSS for Water Quality Design

## 3) Address river basin specific water quality issues



# DSS for Water Quality

## Guadalhorce Study Case

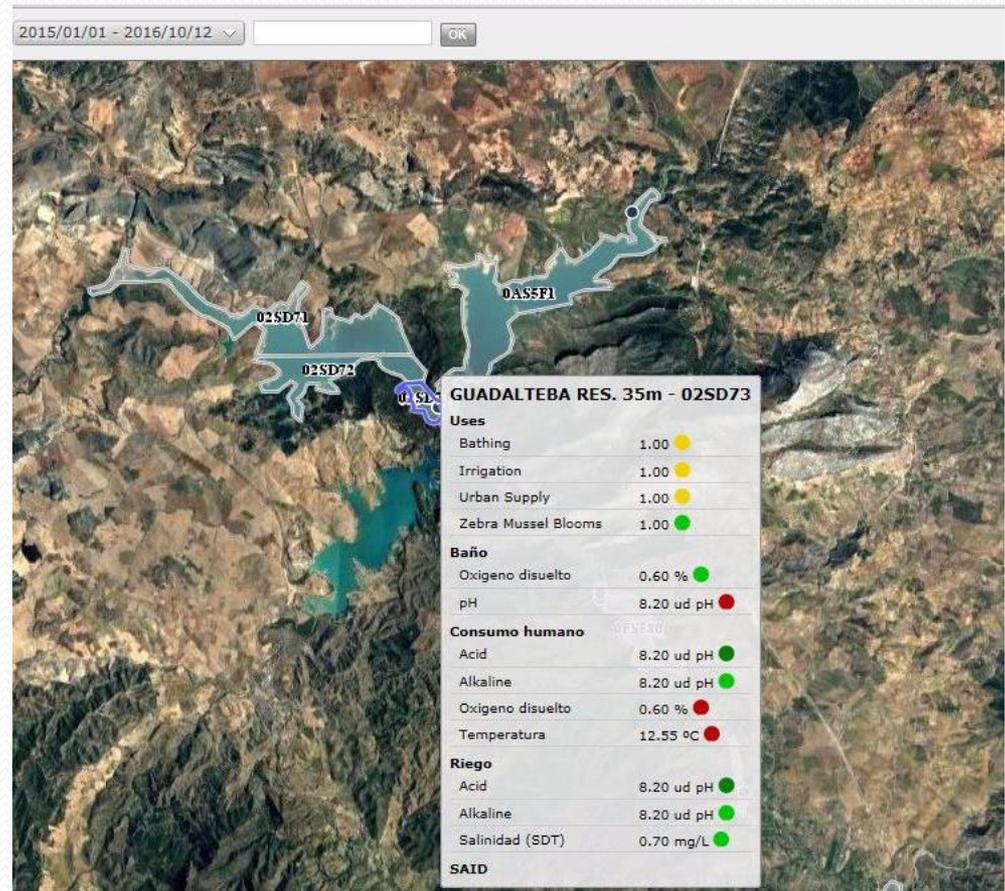
- Areas of influence for each meter are assigned considering the existing water quality monitoring networks;
- Water quality classifications are obtained for several purposes, namely:
  - Irrigation;
  - Bathing;
  - Human consumption;
  - Water Framework Directive compliance.



# DSS for Water Quality

## Guadalhorce Study Case

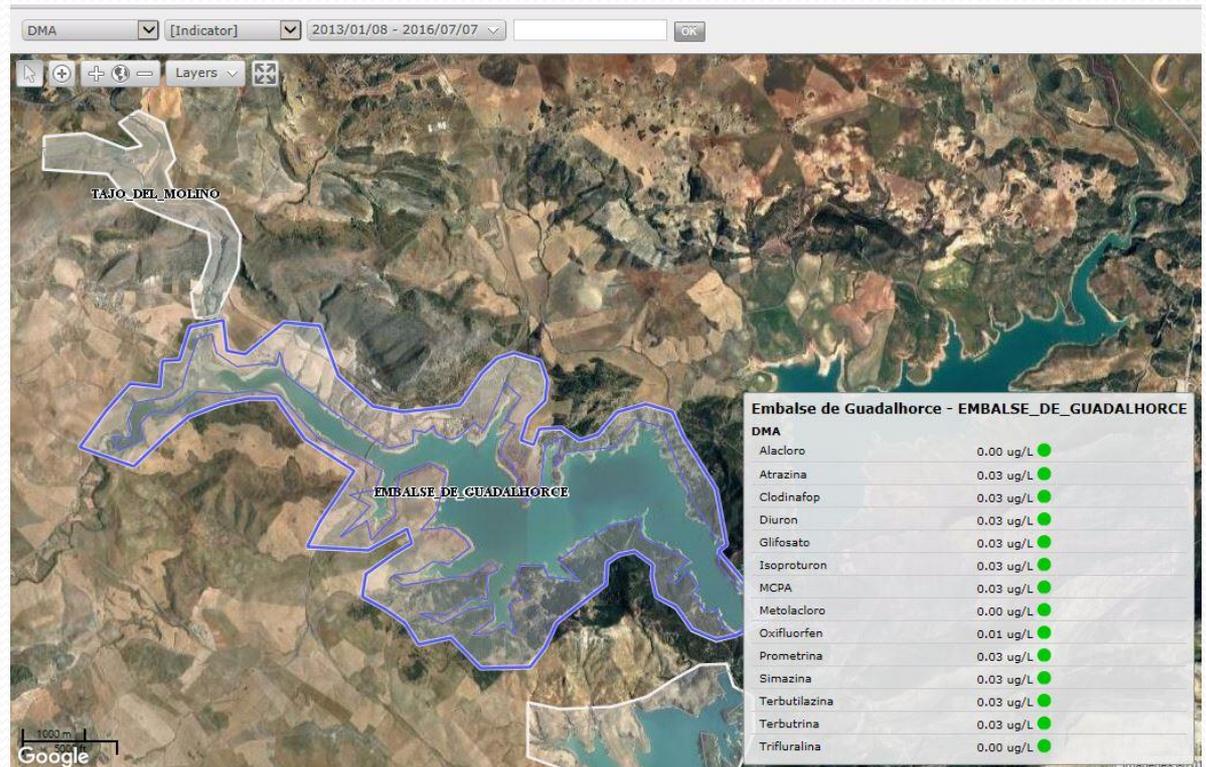
- Irrigation;
- Bathing;
- Human consumption.



# DSS for Water Quality Guadalhorce Study Case

- Water Framework Directive (WFD) compliance

- Chemical Status parameters classification.



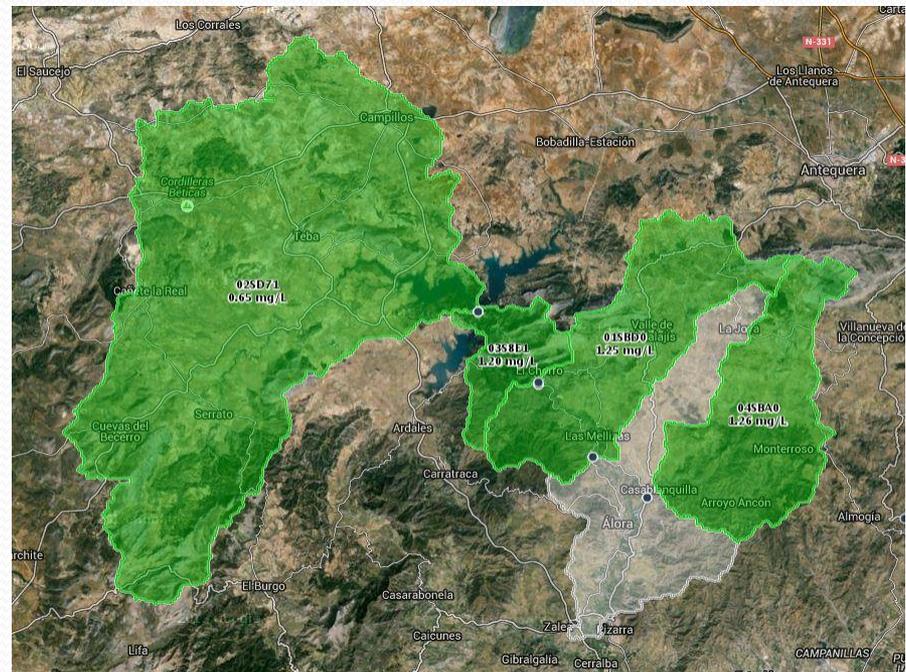
# DSS for Water Quality

## Guadalhorce Study Case

- Address Guadalhorce specific water quality issues:

- Excessive salinity
- Zebra mussels blooms

To tackle these specific issues, located at the core of the river basin – Guadalteba/Guadalhorce/Conde reservoir system – a proper real-time sensor network was implemented.



# DSS for Water Quality

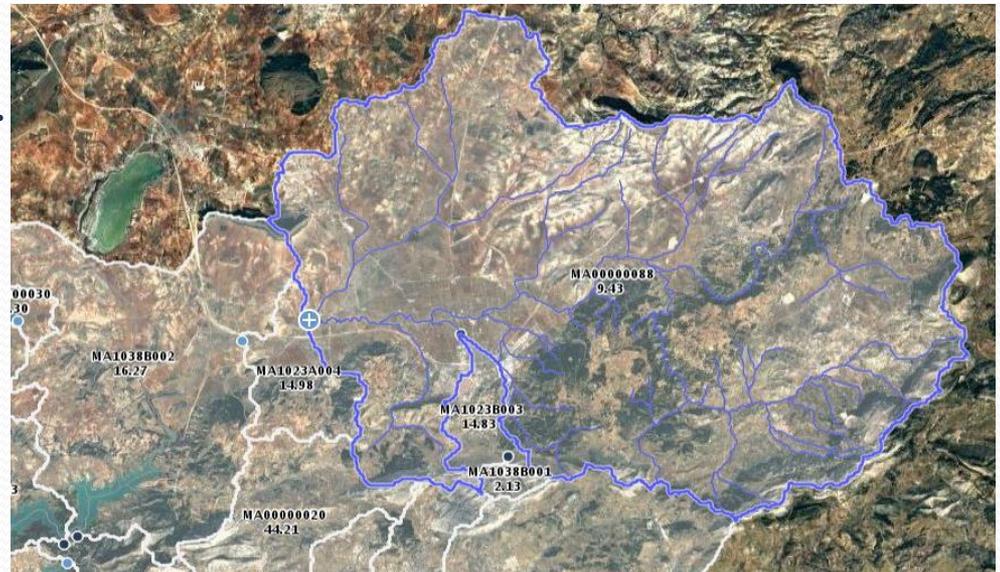
## Guadalhorce Study Case

### A. Excessive salinity

Given the presence of an **upstream saline aquifer** to the Guadalhorce reservoir, water salinity for irrigation purposes can be compromised. To address this issue a dilution procedure using Guadalteba and Conde reservoirs water is undertaken.

This assures a correct amount of salinity for irrigation purposes.

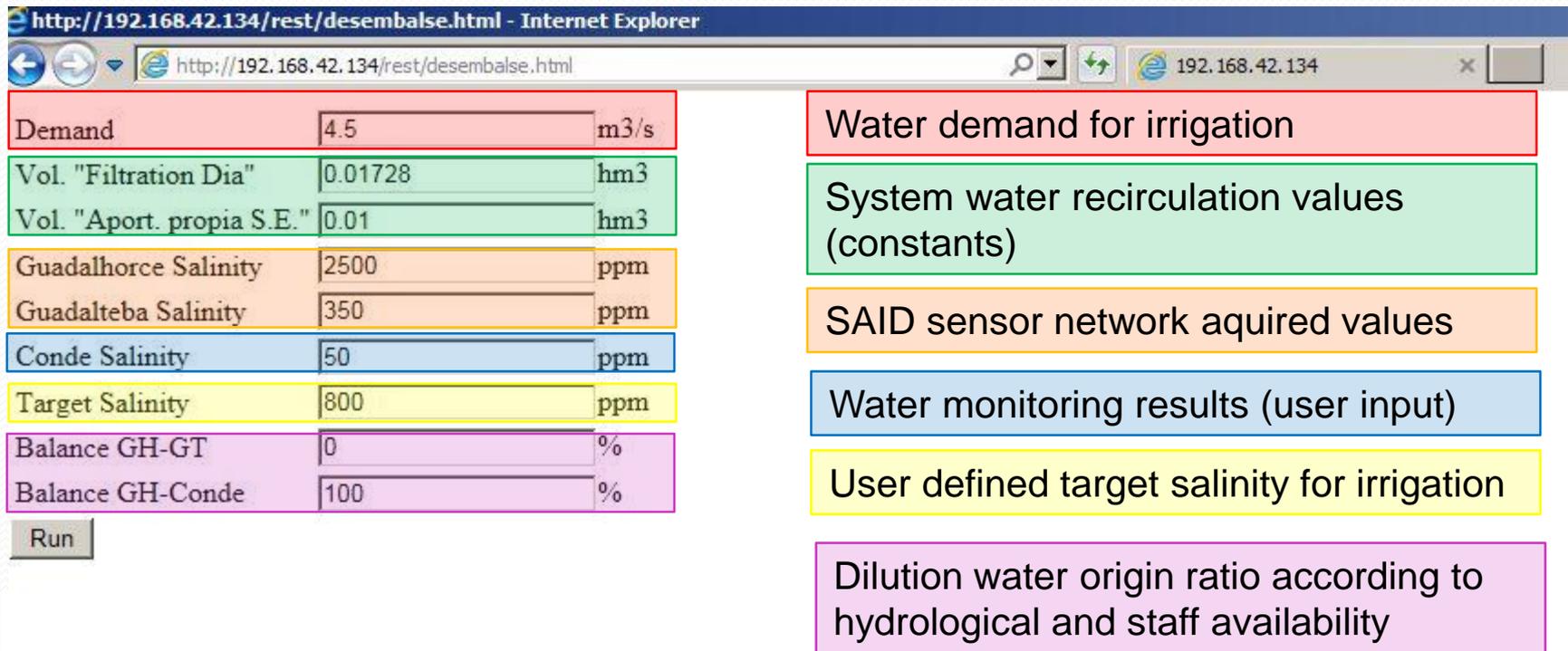
The DSS for Water Quality automates the dilution procedure incorporating data from the SAID real-time sensor network.



# DSS for Water Quality

## Guadalhorce Study Case

### A. Excessive salinity – calculation routine



Parameter	Value	Unit
Demand	4.5	m <sup>3</sup> /s
Vol. "Filtration Dia"	0.01728	hm <sup>3</sup>
Vol. "Aport. propia S.E."	0.01	hm <sup>3</sup>
Guadalhorce Salinity	2500	ppm
Guadalteba Salinity	350	ppm
Conde Salinity	50	ppm
Target Salinity	800	ppm
Balance GH-GT	0	%
Balance GH-Conde	100	%

Run

- Water demand for irrigation
- System water recirculation values (constants)
- SAID sensor network aquired values
- Water monitoring results (user input)
- User defined target salinity for irrigation
- Dilution water origin ratio according to hydrological and staff availability

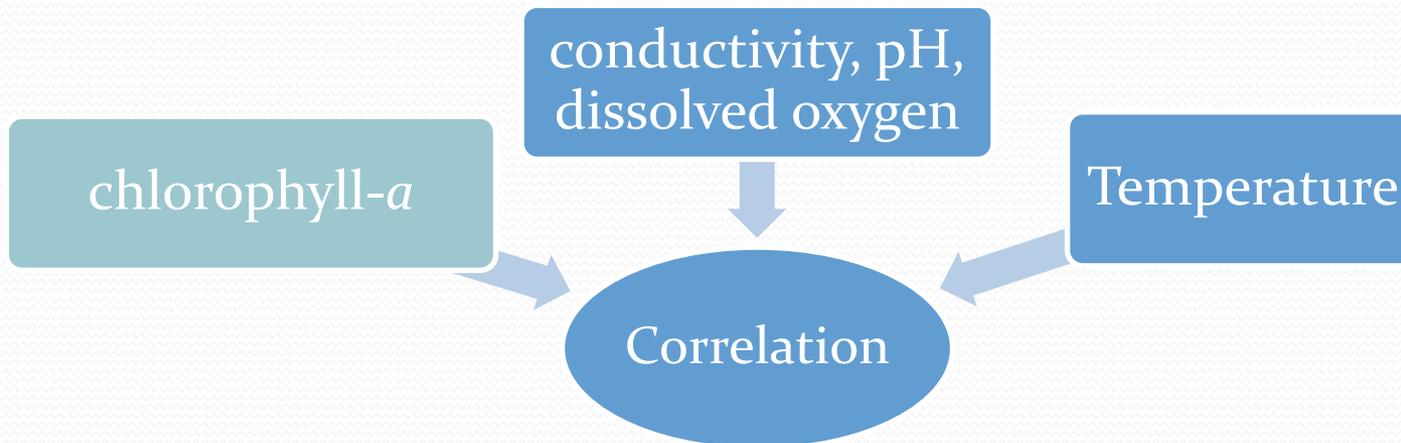
The weekly water values are to be daily turbinated according to the Energy DSS (most profitable way)



# DSS for Water Quality

## Guadalhorce Study Case

### B. Zebra mussels blooms (*Dreissena Polymorpha*)



# DSS for Water Quality

## Guadalhorce Study Case

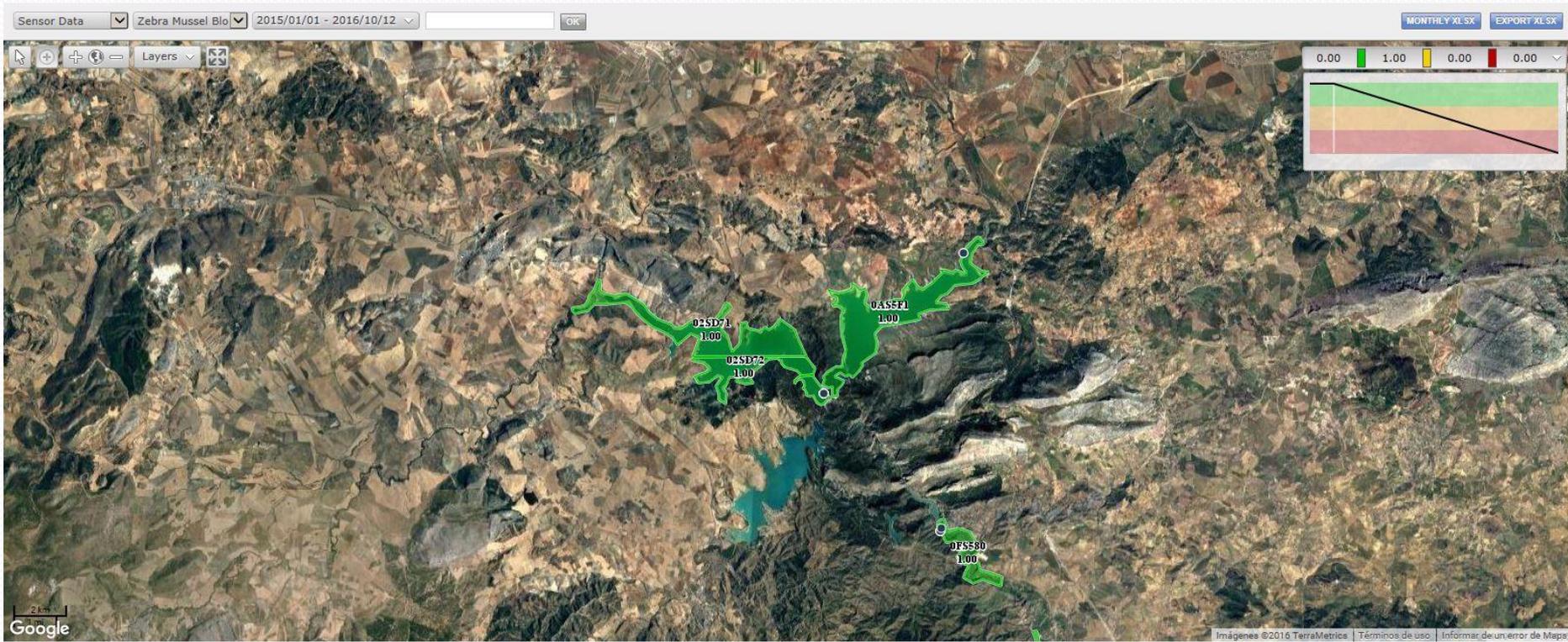
### B. Zebra mussels blooms (*Dreissena Polymorpha*)

- Correlation with chlorophyll-*a* levels – at this stage Cla real-time sensor is regarded as a future development;
- Correlation with conductivity, pH and dissolved oxygen;
- Correlation with water temperature.



# DSS for Water Quality Guadalhorce Study Case

## B. Zebra mussels blooms (*Dreissena Polymorpha*)



# DSS for Water Quality Outputs

- Water quality classification for different uses based on historical or real-time data;
- Emit alerts when favourable water quality conditions for Zebra mussel blooms are gathered;
- Advice on salinity dilution procedures.



# Thank you for your attention

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