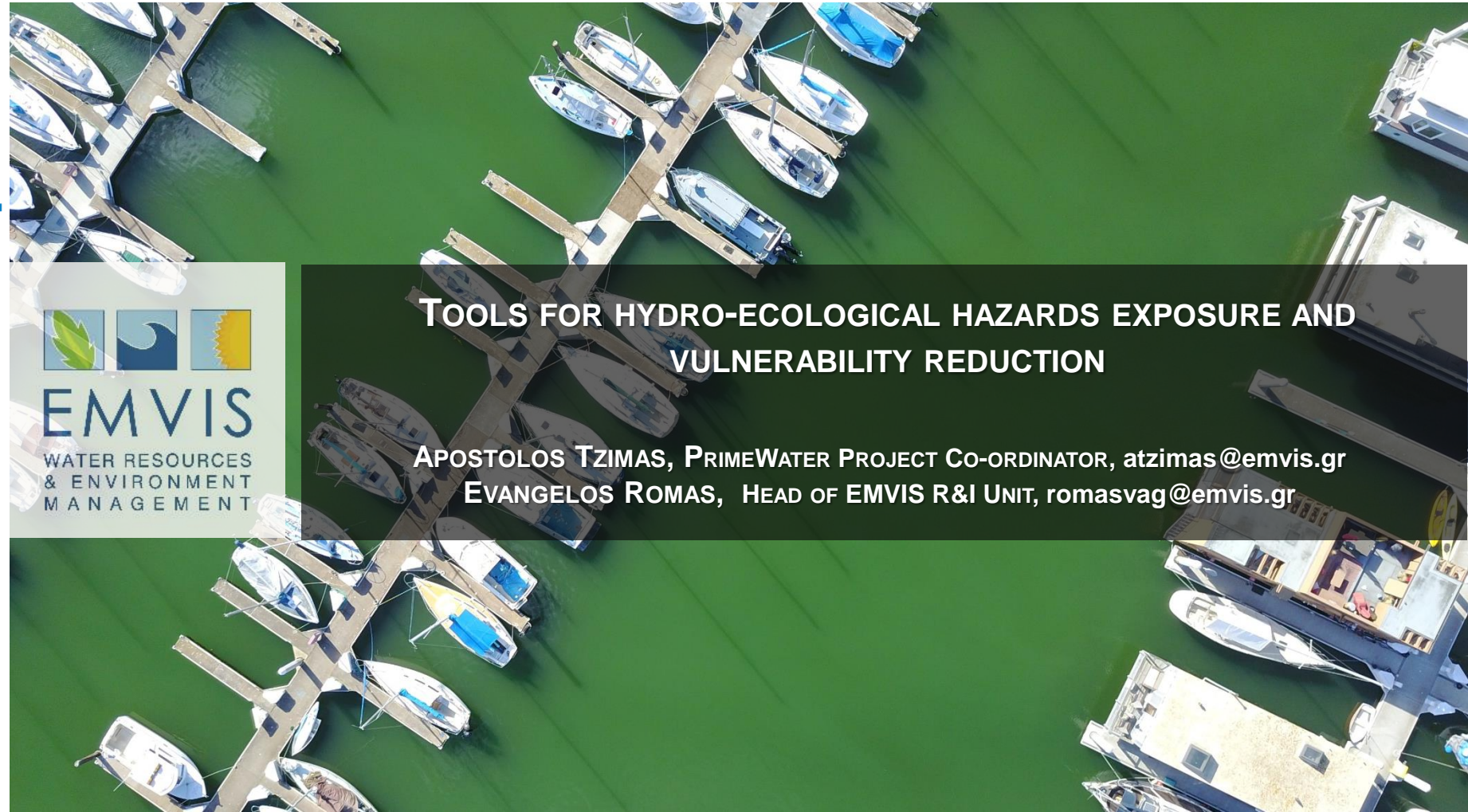




**PRIMEWATER MULTI USER PANEL WORKSHOP
& IWA EO COP MEETING**

END USER OUTLOOKS ON EARTH OBSERVATION
THURSDAY 18TH MAY 2023 | 12:00 PM BST
HYBRID WORKSHOP



EMVIS

WATER RESOURCES
& ENVIRONMENT
MANAGEMENT

**TOOLS FOR HYDRO-ECOLOGICAL HAZARDS EXPOSURE AND
VULNERABILITY REDUCTION**

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Organized by:





COMBINE

satellite data with proprietary data and hydro-ecological models

GENERATE

operational forecasts of water quantity and quality changes such as turbidity and algae blooms

INTEGRATE

forecasts into industry specific downstream services

DELIVERING HIGH RELIABILITY WATER QUALITY FORECASTS FOR THE WATER INDUSTRY



Hydrological Modelling.

Attributes: **River discharges** in upstream catchments, **Diffuse loads** (e.g. sediments, nitrogen, phosphorus).

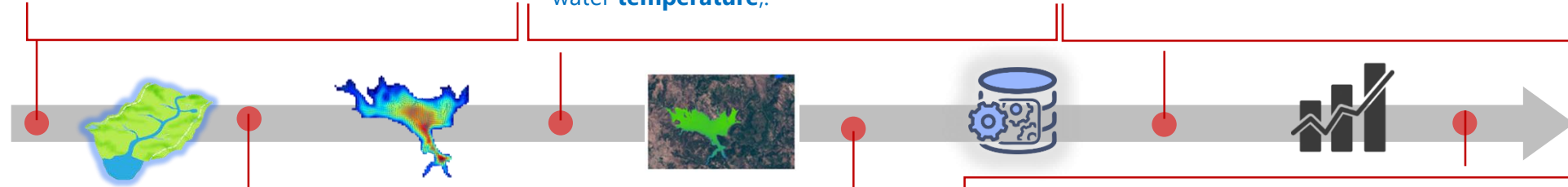
Earth Observations.

Satellite imagery: **Sentinel 2A/B** and **Landsat 7/8, PRISMA**

Attributes: **Turbidity, chlorophyll-a**, surface water **temperature**.

Data Assimilation.

Automatic real-time **assimilation of EO** to **improve forecasting skill**, (Ensemble Kalman Filter, 4dVAR, Weighted Average).



Hydrodynamic Modelling.

Attributes: **Velocity field** and **circulation pattern** of the reservoir.

Water Quality Modelling.

Attributes: **Algae growth, nutrients, sediments and dissolved oxygen**.

Operational Forecast production.

PrimeWater service line **integrates** operationally multiple scientific components & produces **short term forecasts** (up to 10 days) of **hydrological and ecological parameters** of the reservoir,

Machine Learning Models.

Machine Learning algorithms (random Forests, Gaussian Process Regression, Quantile regression forests) are used for **Water Quality predictions, assessment of prediction uncertainty** and systematic **errors correction** in forecasting systems,

Data used: **Satellite imagery, in situ monitoring data, meteorological and hydrological forecasts**

...for generating real time, short to medium range water quantity and quality forecasts for reservoirs.

A multi-model chain for hydro-ecological forecasting

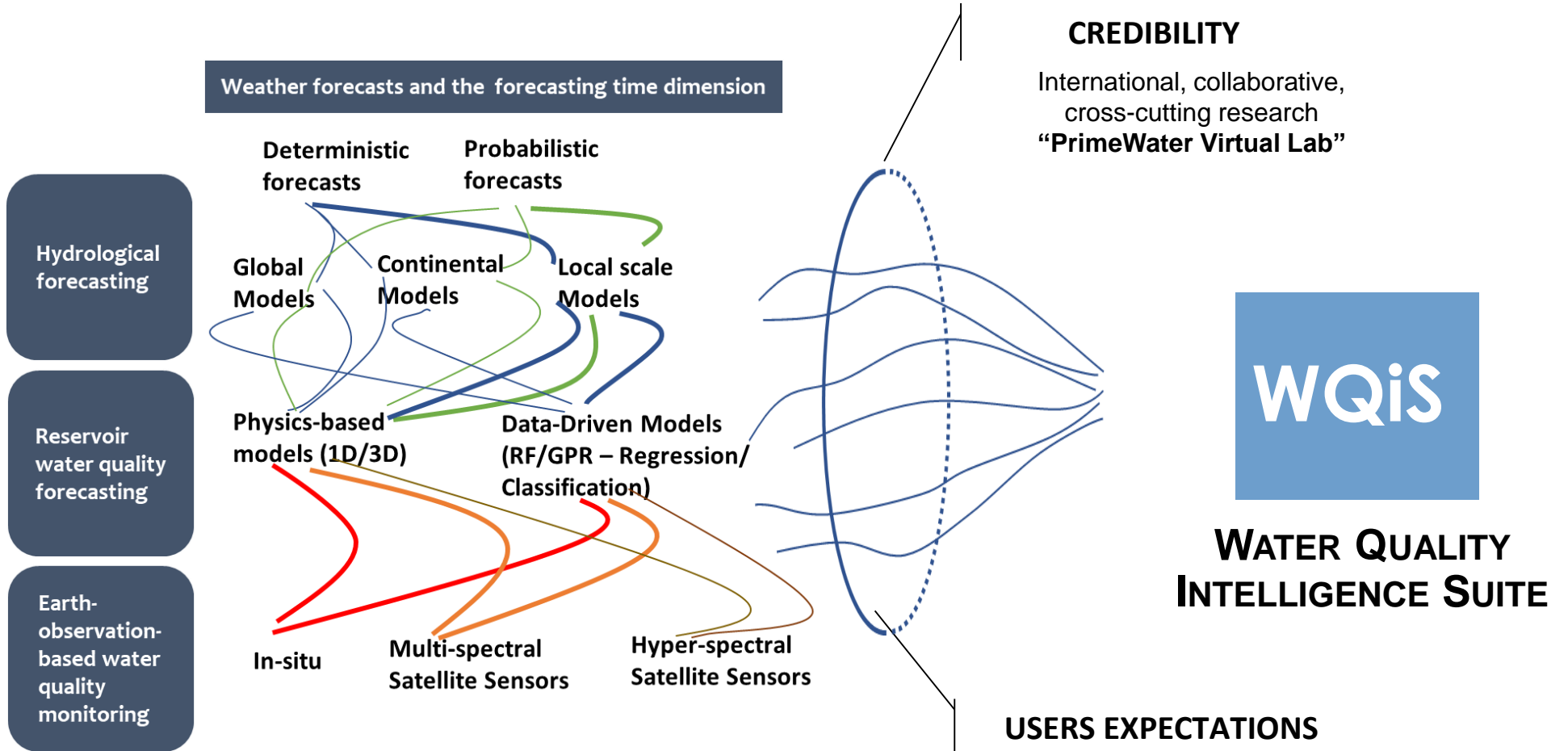
...from Satellites Imagery to high reliability water forecasts

DELIVERING HIGH RELIABILITY WATER QUALITY FORECASTS FOR THE WATER INDUSTRY



Intelligent Services Value Model

From Science to Operational Services for the Industry





WQIS facilitates Water Industry to identify Hydro-ecological Risks at an early stage and...

Key features

Connect

Bring into your decision-making data from any sensor, anytime, anywhere

Monitor

Filling in Water Quality information gaps in time and space with satellite-based measurements

Predict

Get Hydro-ecological forecasts just like weather forecasts

Pro-act

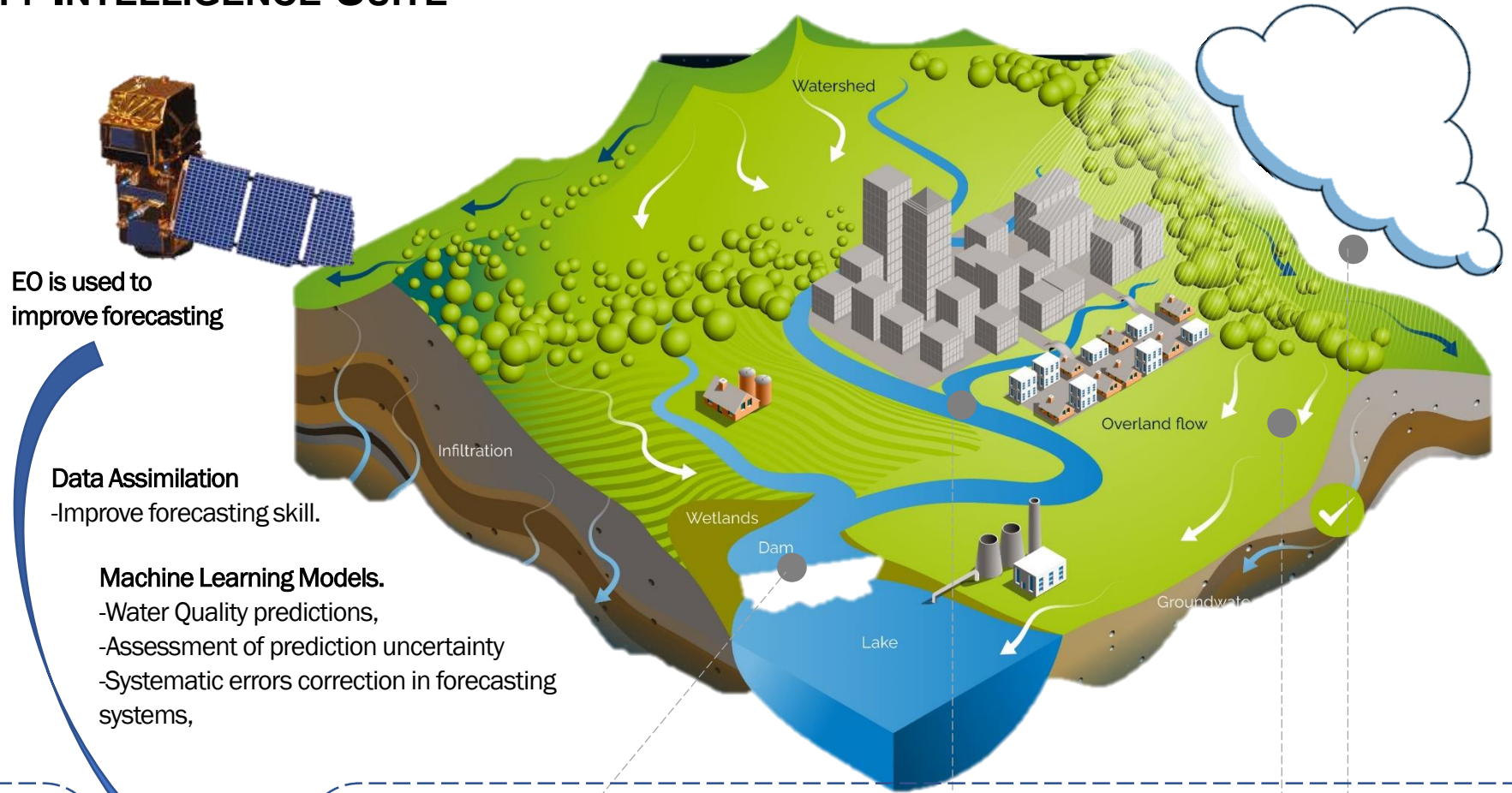
Get advantage of the time lead with downstream services for preventive management of WQ threats

...Pro-act instead of Re-act





WATER QUALITY INTELLIGENCE SUITE



EO is used to improve forecasting

Data Assimilation
-Improve forecasting skill.

Machine Learning Models.
-Water Quality predictions,
-Assessment of prediction uncertainty
-Systematic errors correction in forecasting systems,

Watershed Digital Twin

From Science to Operational Services for the Industry

Downstream applications

- Early warning systems
- Proactive in-lake management of water-related hazards (e.g. algal blooms)
- Optimization of water operations (e.g. treatment plants, aquaculture, energy production)

In-lake hydrodynamics
Forecasts of the water temperature, lake mixing and circulation patterns

In-lake water quality
Forecasts of chlorophyll-a, nutrients, sediments and dissolved oxygen

River flow forecasting
Forecasts of water depth and velocity

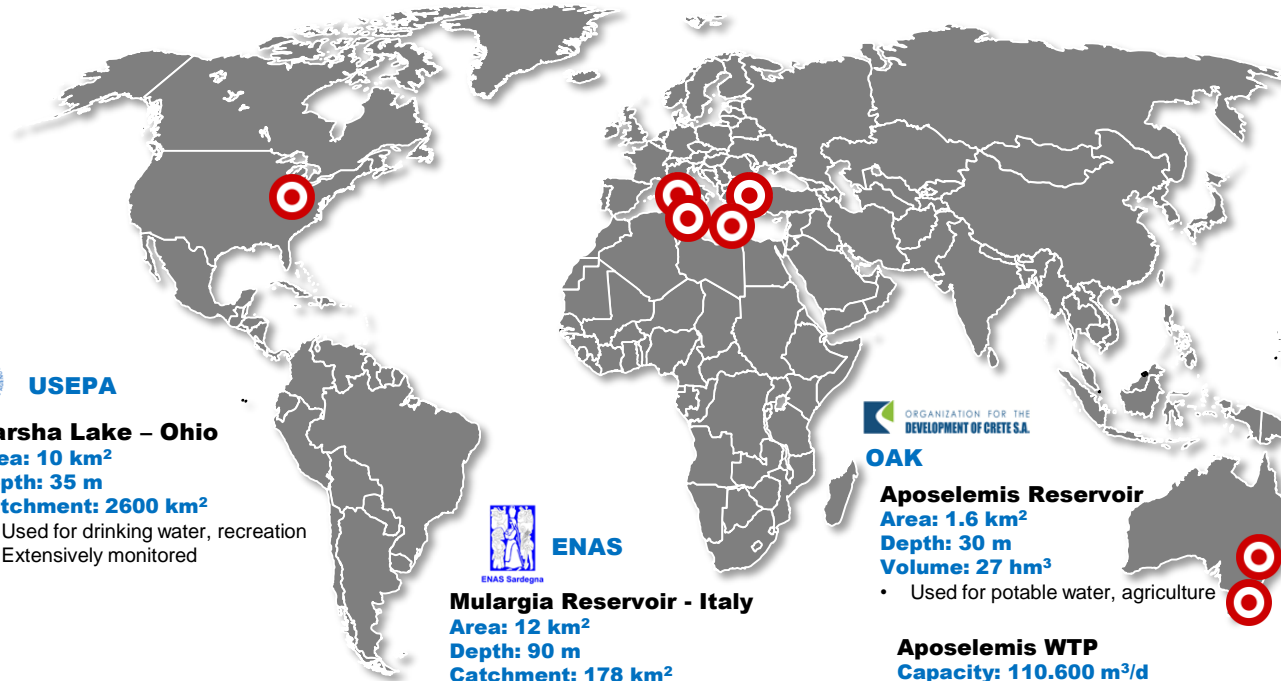
Hydrologic forecasting
Forecasts of river discharges, water temperature, sediment and nutrient loads into downstream lakes

Weather forecasts
Forecasts of wind, rainfall and other atmospheric variables



IDENTIFY YOUR NEEDS IN OUR SHOW CASES

WQiS is deployed in freshwater and coastal waters across Europe, United States and Australia



Advanced services for the Water Sector

Demonstrating the capabilities of cross-cutting, data-driven applications

Discover our Operational Show Cases at:

<https://www.primewater.eu/operational-platform/>



USEPA

Harsha Lake – Ohio

Area: 10 km²
Depth: 35 m
Catchment: 2600 km²

- Used for drinking water, recreation
- Extensively monitored



ENAS

Mulgaria Reservoir - Italy

Area: 12 km²
Depth: 90 m
Catchment: 178 km²

- Used for potable water, industry, agriculture
- Series of interconnected reservoirs
- In-situ monitoring stations and sampling campaigns

ABBANOVA S.p.A.

Abbanoa

Simbirizzi WTP, Cagliari - Italy

Max flow: 1.5 m³/s
Served pop.: 320.000 PE
Capacity: 155.000 m³/d

- Provides drinking water for the town of Cagliari and metropolitan area, and 20 villages in the greater area



OAK

Aposelemis Reservoir

Area: 1.6 km²
Depth: 30 m
Volume: 27 hm³

- Used for potable water, agriculture

Aposelemis WTP

Capacity: 110.600 m³/d

- Provides drinking water to Heraklion, Hersonissos and Agios Nikolaos



RO Desalination Plant

Capacity: 7.000 m³/day

Provides potable and demineralized water for MOTOR OIL HELLAS – Corinth Refineries.



CSIRO

Lake Hume - Australia

Area: 200 km²
Depth: 40 m
Catchment: 15300 km²

- Used for flood mitigation, hydro-power, irrigation, water supply
- Hydrodynamic modelling and early warning system based on remote sensing from previous project



MW

Melbourne Water Western Treatment Plant

Lagoon-based WWTP

- Provides Class A and Class C water
- Lagoon depth ranges from 3 to 5m



PrimeWater

Thank you for attending!

PrimeWater Team:



The project has received funding from the European Union's Horizon H2020 Research and Innovation Programme under Grant Agreement No 870497