

SUSTAINABLE WATER RESOURCES MANAGEMENT PLANS IN THE TIBER RIVER BASIN FOR ENVIRONMENT PROTECTION, MINIMUM INSTREAM FLOWS REGULATION AND THE TRASIMENO LAKE ECOSYSTEM PRESERVATION (ITALY)

Demosite description

Lithology / Geochemistry

Arenaceous flysch (N), carbonate shelf and pelagic deposit (E), clastic deposits in the alluvial valley



43°06'N, 12°07' E



From the 'Autorità di Bacino del Fiume Tevere' archive

Main description:

- ▶ The length of the Tiber River is 405 km. Almost 90% of the Tiber River Basin is covered by the regions of Umbria and Lazio. More than 4 million people living in the basin of which 80% in the Province of Rome.
- ▶ The basin is mainly characterized by small farms and a leading sector in the Tiber valley is hydropower generation plants concentrated in the Nera River basin.
- ▶ Trasimeno Lake is a shallow lake which could host rare species but it is also a well-known touristic area. Since 2006, the lake is part of the international "Living Lakes".

Conserve Ecohydrological processes in natural ecosystems

✓ YES

Enhance Ecohydrological processes in novel ecosystems

✗ NO

Apply complementary Ecohydrological processes in high impacted systems

✓ YES

Ecohydrology Principles and Solutions

EH IMPLEMENTATION PRINCIPLES

* Quantification of the hydrological processes at catchment scale and mapping the impacts;

EH SOLUTIONS

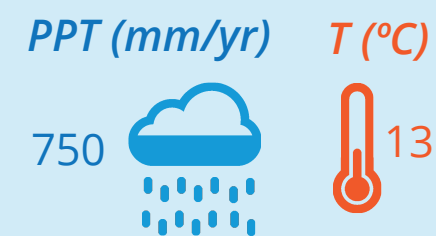
Rehabilitation of natural flows by monitoring the water withdrawals



Integrated Lake Basin Management

Lifezones

Life Zone
Warm Temperate Dry Forest



PET ratio: 1,02
Elevation: 257,33 m
Humidity: sub-humid

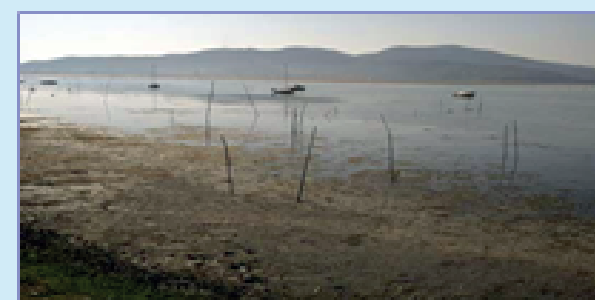
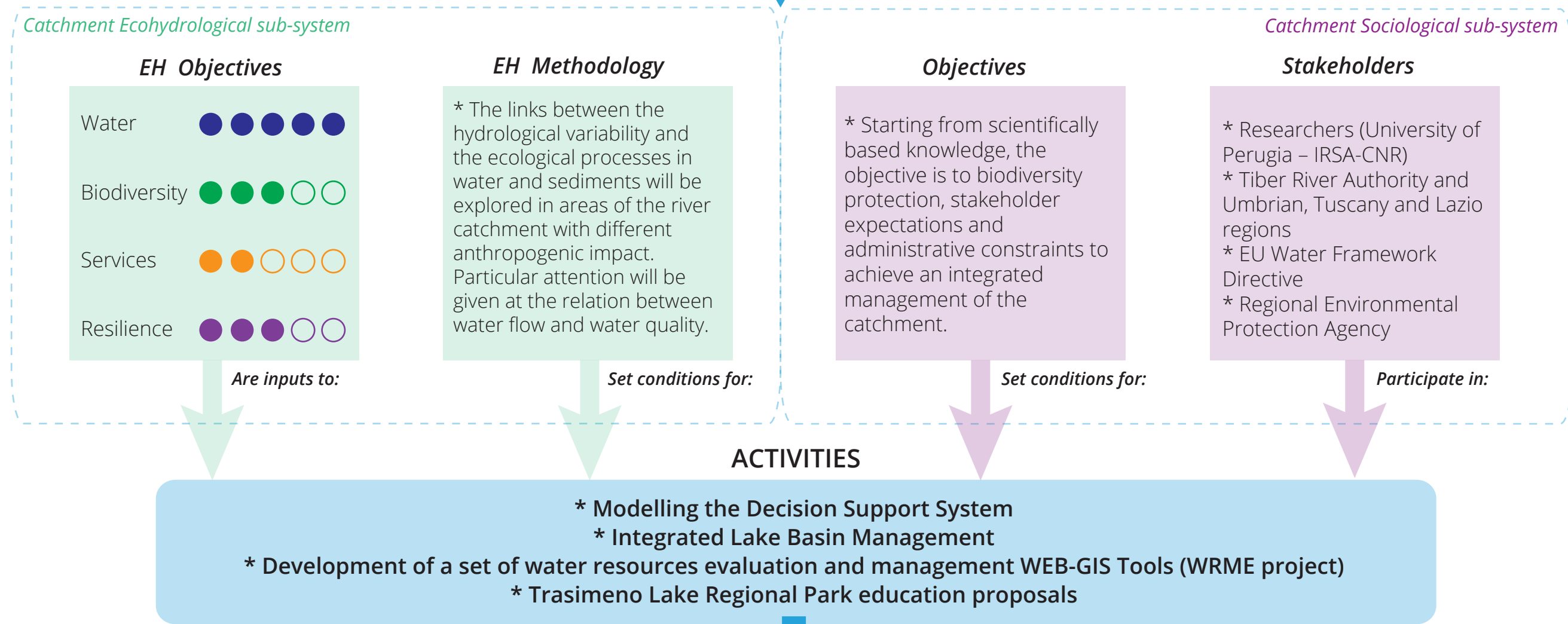


Fig.1-Trasimeno water crisis in 2003, lake level falls 1,85 m below gauge zero (Courtesy of S. Casadei)

Major Issues

- * Poor water quality due to irrational land management
- * Severe droughts due to irrational water use and possible climate change scenarios (fig.1)
- * Impact of drought on microbial processes in sediments and on carbon cycling (fig 2)

Social-Ecohydrological System



Results

MAIN EXPECTED OUTCOME

Preservation measures to minimize the periodic hydrological crisis of the Trasimeno lake

LATEST RESULTS

- ▶ The results highlight the extreme hydrological vulnerability of Lake Trasimeno in relation with climate change (for temperature, a rate of change of about **+5°C century⁻¹**, and for precipitation, about **-30% century⁻¹** for the basin) between 1969-1999 (Ludovisi *et al.*, 2013). Giardino *et al.* (2010) confirmed the **meso-eutrophic** conditions of Lake Trasimeno (average Chl-a = 8.5 mg/m3). **A reduction in macrophyte beds** from 2003 to 2008 was also observed.

[CLICK HERE TO SEE THE REFERENCES](#)



Fig.2 - Drastic changes of the lake water level highly affect microbial processes in biofilms when sediment get dry (Courtesy of S. Fazi)