



“FLOODS, DROUGHTS AND CLIMATE CHANGE”

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Autorità di bacino distrettuale
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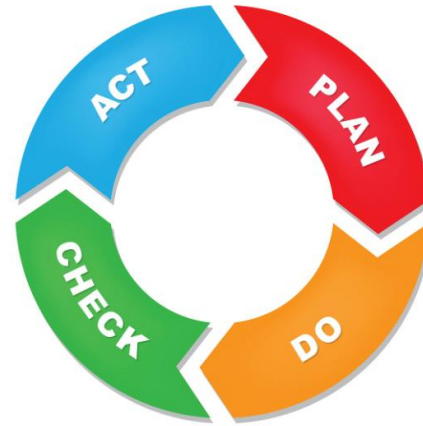
Todi, 7/26/2024

THE EUROPEAN DIRECTIVES FOR THE WATER MANAGEMENT

WATER FRAMEWORK DIRECTIVE 2000/60/CE

... establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater:

- (a) prevents further deterioration and protects and enhances the status of aquatic ecosystems;*
- (b) promotes sustainable water use based on a long-term protection of available water resources;*
- (c) aims at enhanced protection and improvement of the aquatic environment;*
- (d) ensures the progressive reduction of pollution of groundwater and prevents its further pollution*

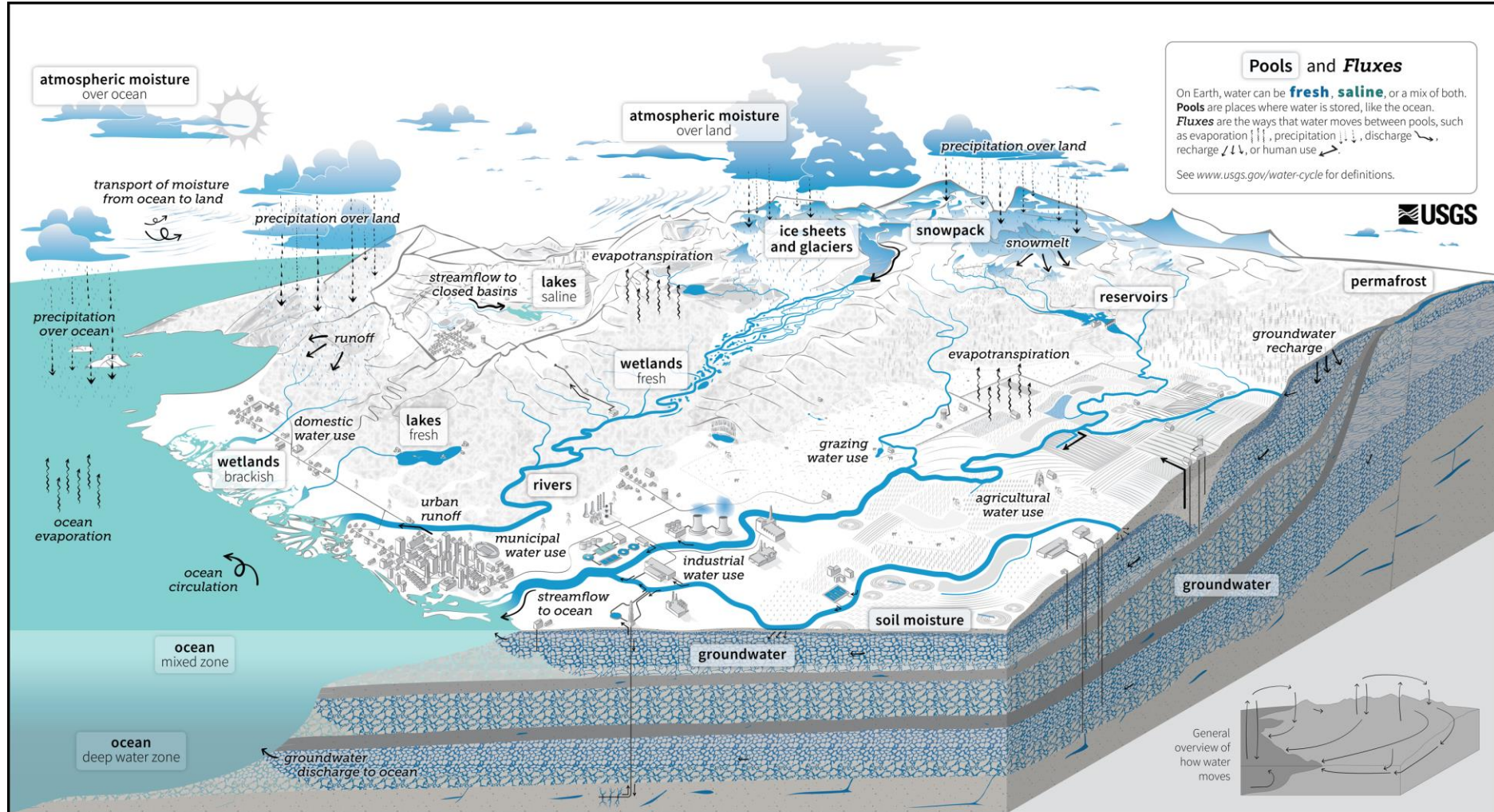


FLOODS DIRECTIVE 2007/60/CE

... establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community



THE WATER CYCLE IN THE ANTHROPOCENE AND IN THE CLIMATE CHANGE



Pools and Fluxes

On Earth, water can be **fresh, saline**, or a mix of both. **Pools** are places where water is stored, like the ocean. **Fluxes** are the ways that water moves between pools, such as evaporation ↑↑↑, precipitation ↓↓↓, discharge ↘, recharge ↙, or human use →.

See www.usgs.gov/water-cycle for definitions.



The Water Cycle

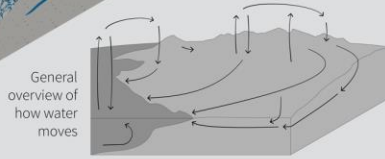
The water cycle describes where water is on Earth and how it moves. Water is stored in the atmosphere, on the land surface, and below the ground. It can be a liquid, a solid, or a gas. Liquid water can be fresh, saline (salty), or a mix (brackish). Water moves between the places it is stored. Water moves at large scales and at very small scales. Water moves naturally and because of human actions. Human water use affects where water is stored, how it moves, and how clean it is.

Pools store water. 96% of all water is stored in **oceans** and is saline. On land, saline water is stored in **saline lakes**. Fresh water is stored in liquid form in **freshwater lakes**, artificial **reservoirs**, **rivers**, and **wetlands**. Water is stored in solid, frozen form in **ice sheets** and **glaciers**, and in **snowpack** at high elevations or near the Earth's poles. Water vapor is a gas and is stored as **atmospheric moisture** over the ocean and land. In the soil, frozen water is stored as **permafrost** and liquid water is stored as **soil moisture**. Deeper below ground, liquid water is stored as **groundwater** in aquifers, within cracks and pores in the rock.

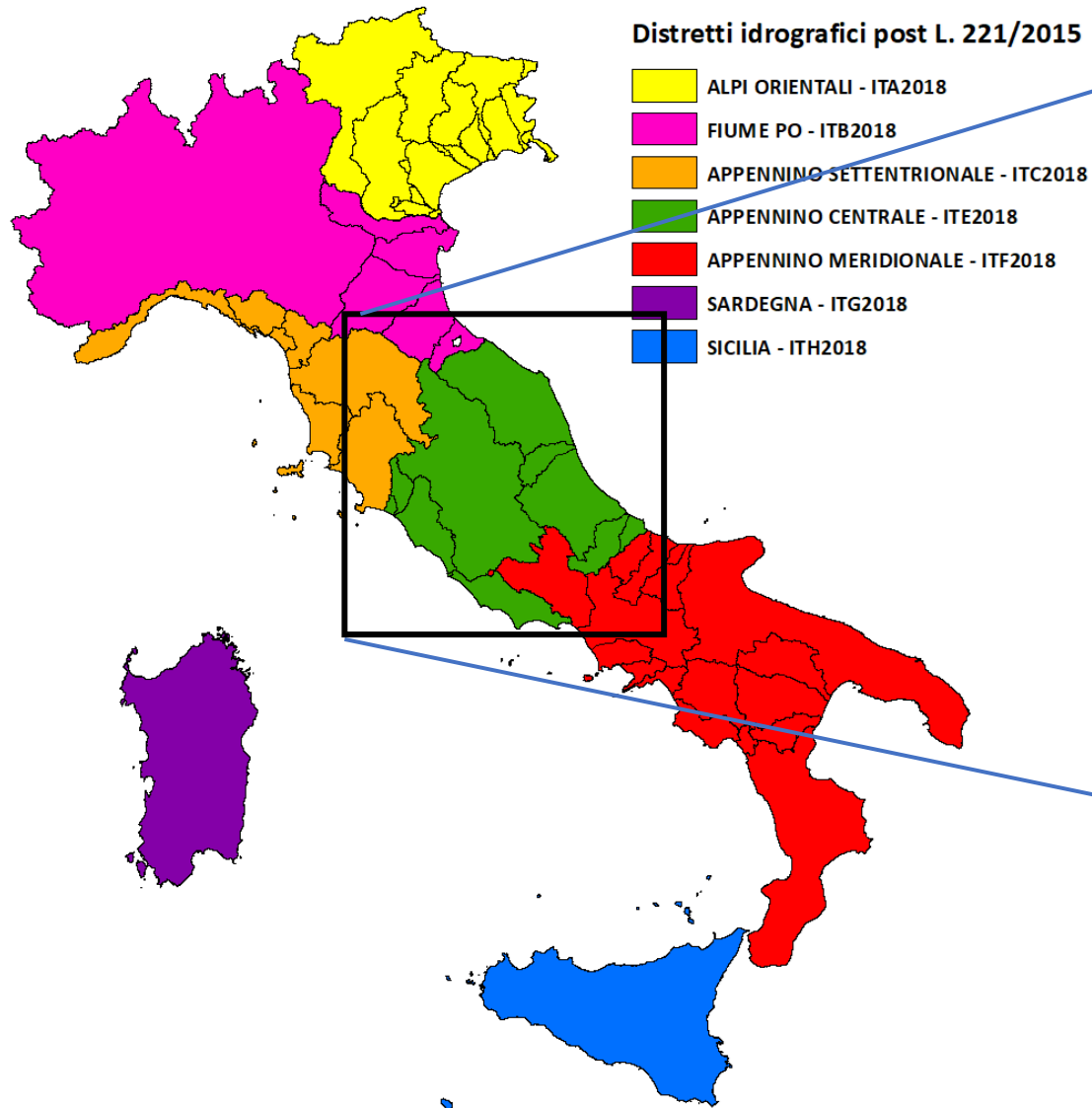
Fluxes move water between pools. As it moves, water can change form between liquid, solid, and gas. **Circulation** mixes water in the oceans and transports water vapor in the atmosphere. Water moves between the atmosphere and the surface through **evaporation**, **evapotranspiration**, and **precipitation**. Water moves across the surface through **snowmelt**, **runoff**, and **streamflow**. Water moves into the ground through infiltration and **groundwater recharge**. Underground, groundwater flows within aquifers. It can return to the surface through natural **groundwater discharge** into rivers, the ocean, and from **springs**.

We alter the water cycle. We redirect rivers. We build dams to store water. We drain water from wetlands for development. We use water from rivers, lakes, reservoirs, and groundwater aquifers. We use that water to supply our **homes** and **communities**. We use it for **agricultural** irrigation and **grazing** livestock. We use it for **industrial** activities like thermoelectric power generation, mining, and aquaculture. The amount of water that is available depends on how much water is in each pool (water quantity). It also depends on when and how fast water moves (water timing), how much water we use (water use), and how clean the water is (water quality).

We affect **water quality**. In agricultural and urban areas, irrigation and precipitation wash fertilizers and pesticides into rivers and groundwater. Power plants and factories return heated and contaminated water to rivers and lakes. Downstream from these sources, contaminated water can cause harmful algal blooms, spread diseases, and harm habitats. **Climate change** is affecting the water cycle. It is affecting water quality, quantity, timing, and use. It is causing ocean acidification, sea level rise, and more extreme weather. By understanding these impacts, we can work toward using water sustainably.



THE RIVER BASIN DISTRICTS IN ITALY



I numeri del distretto

42275

Kmq di superficie

7

Regioni

22

Province

901

Comuni

9

Milioni di abitanti

49

Bacini idrografici

372

Corsi d'acqua

39

Laghi

5

Isole

52

Grandi dighe

17

Consorzi di bonifica

35

Gestori servizio idrico

THE RIVER BASIN PLANNING

a) The River Basin Plans

The planning activity carried out by AUBAC on the river basin district contains a Basin Plan and the following parts:

[Piano di gestione delle acque \(PGA\)](#) water framework directive 2000/60/CE

[Piano di gestione del rischio di alluvioni \(PGRA\)](#) floods directive 2007/60/CE

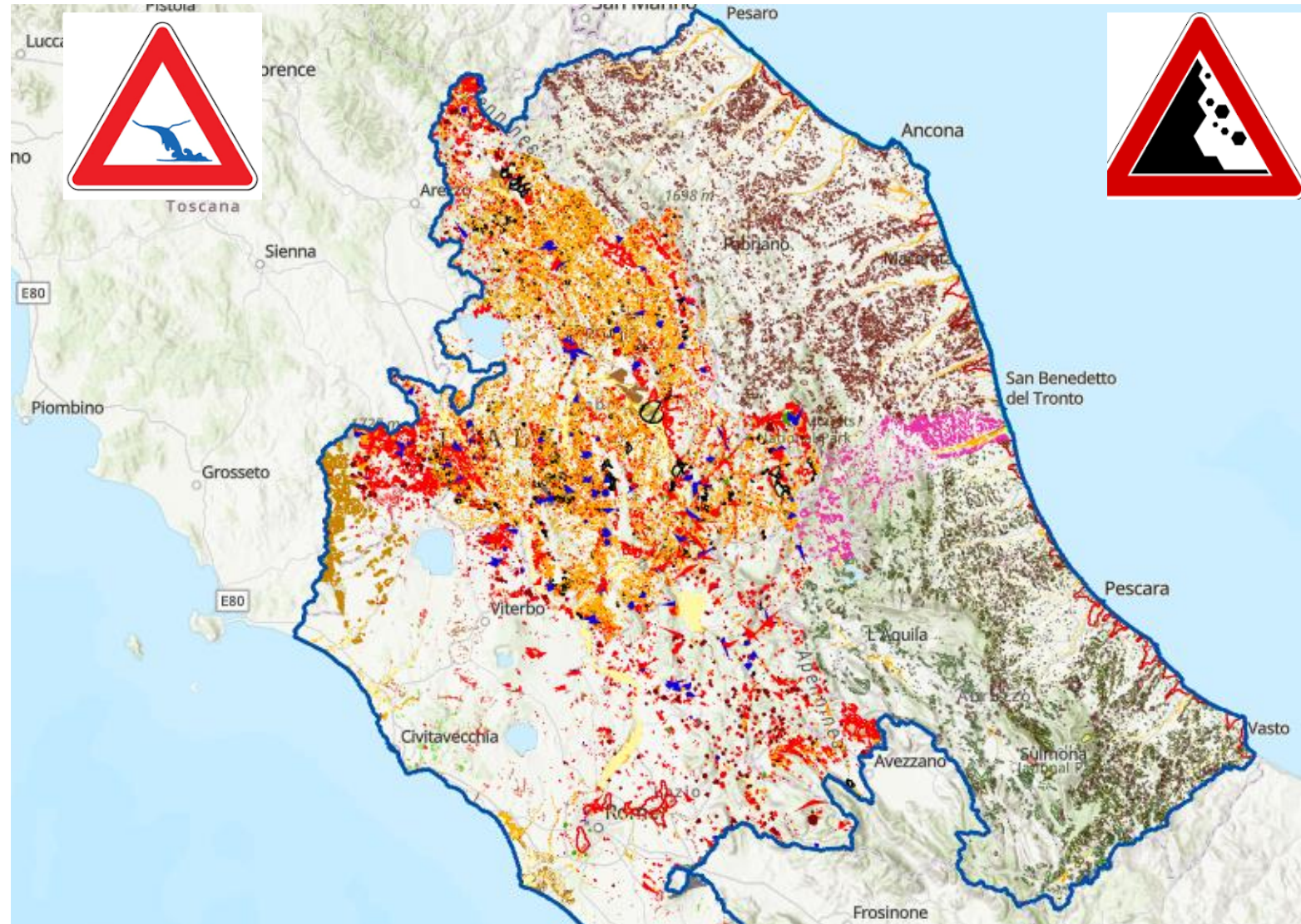
[Piani di Assetto idrogeologico \(PAI\)](#)

[Piano di gestione delle coste \(PGC\)](#)

[Piano di gestione dei Sedimenti \(PGS\)](#)

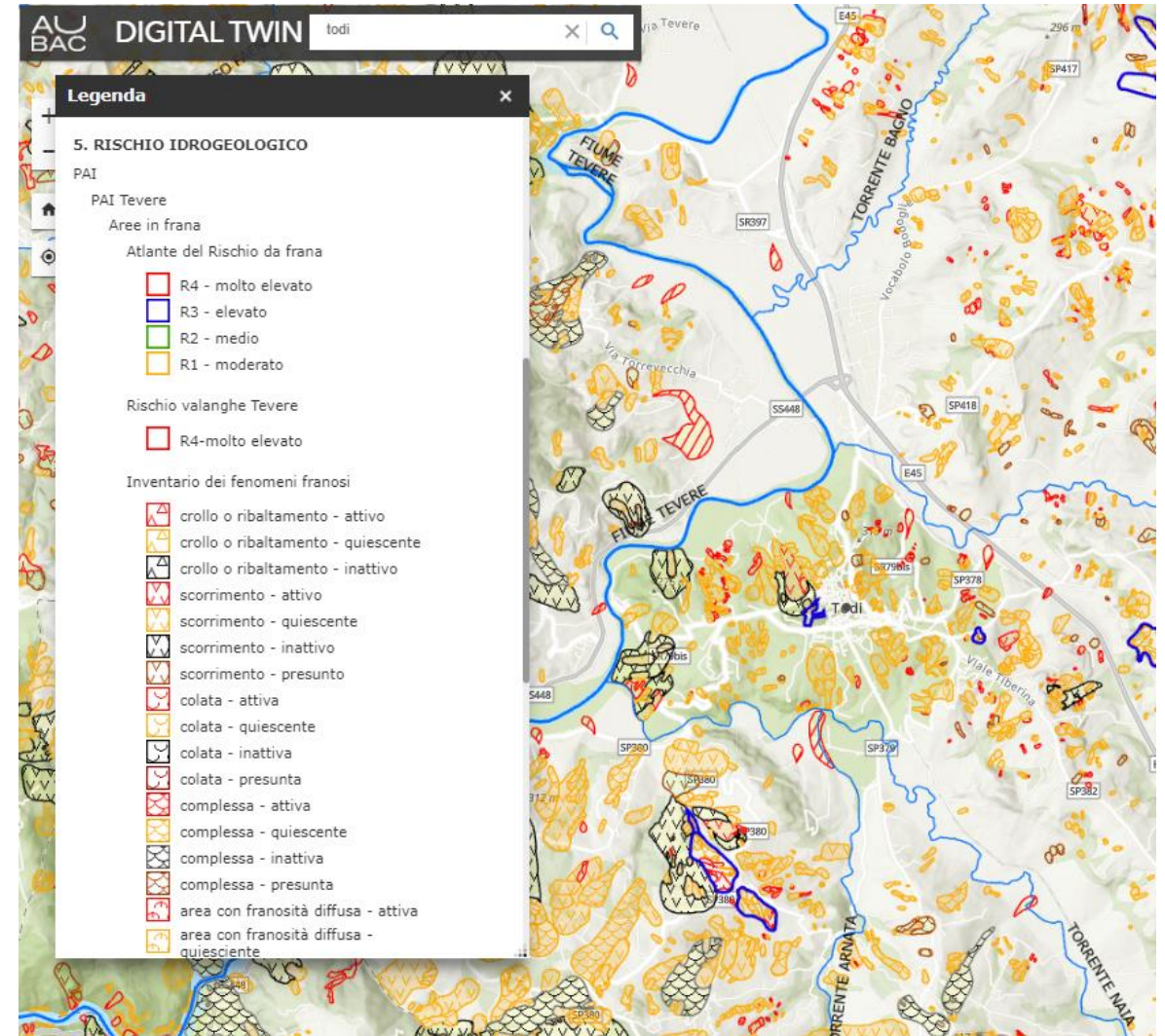
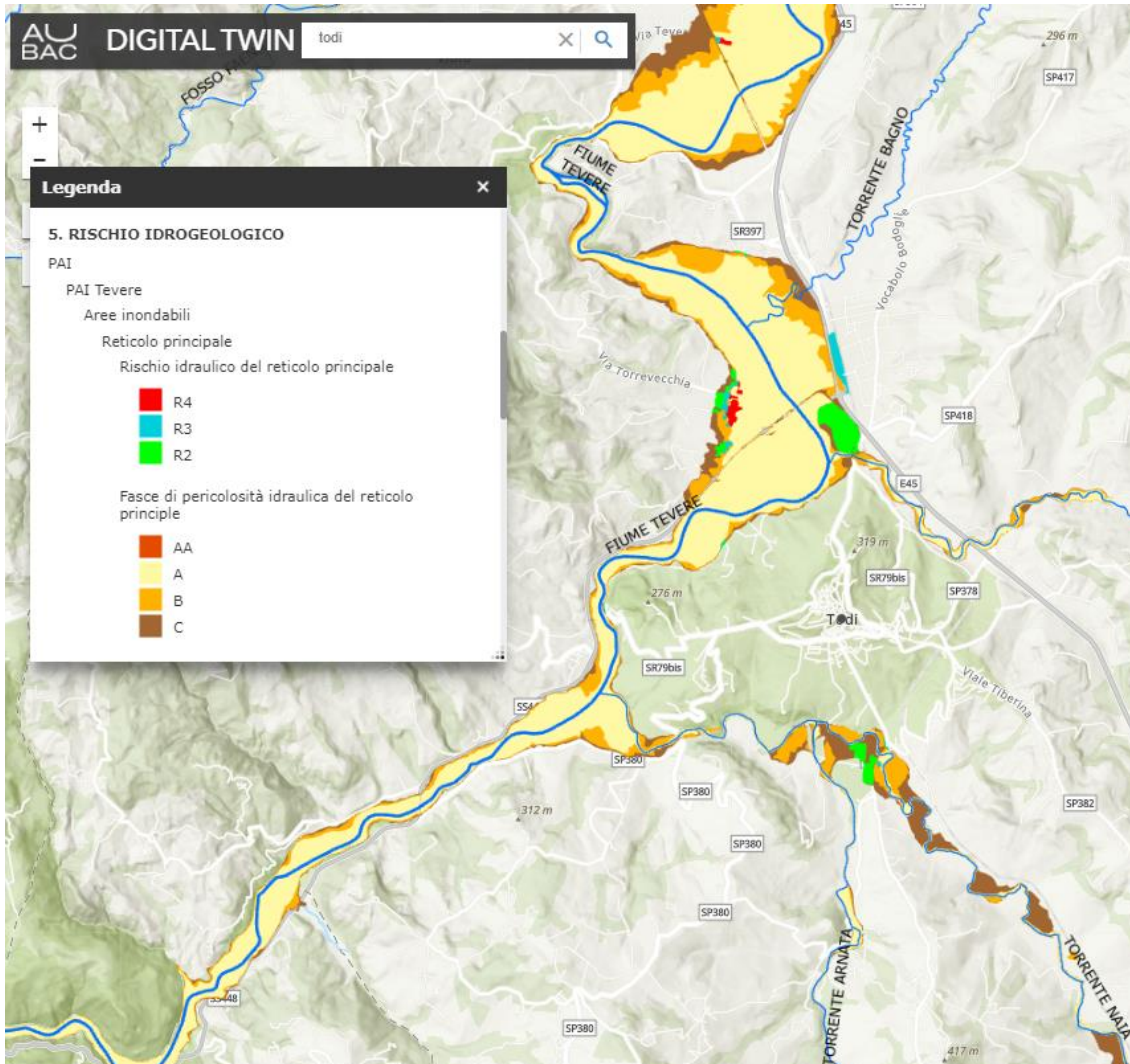
b) The planning of measures

The planning activity carried out by AUBAC also includes the identification of structural and non-structural measures, that are required for risk prevention and mitigation



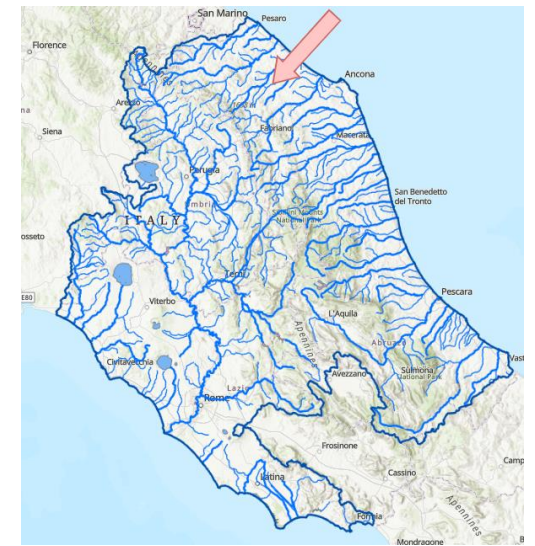
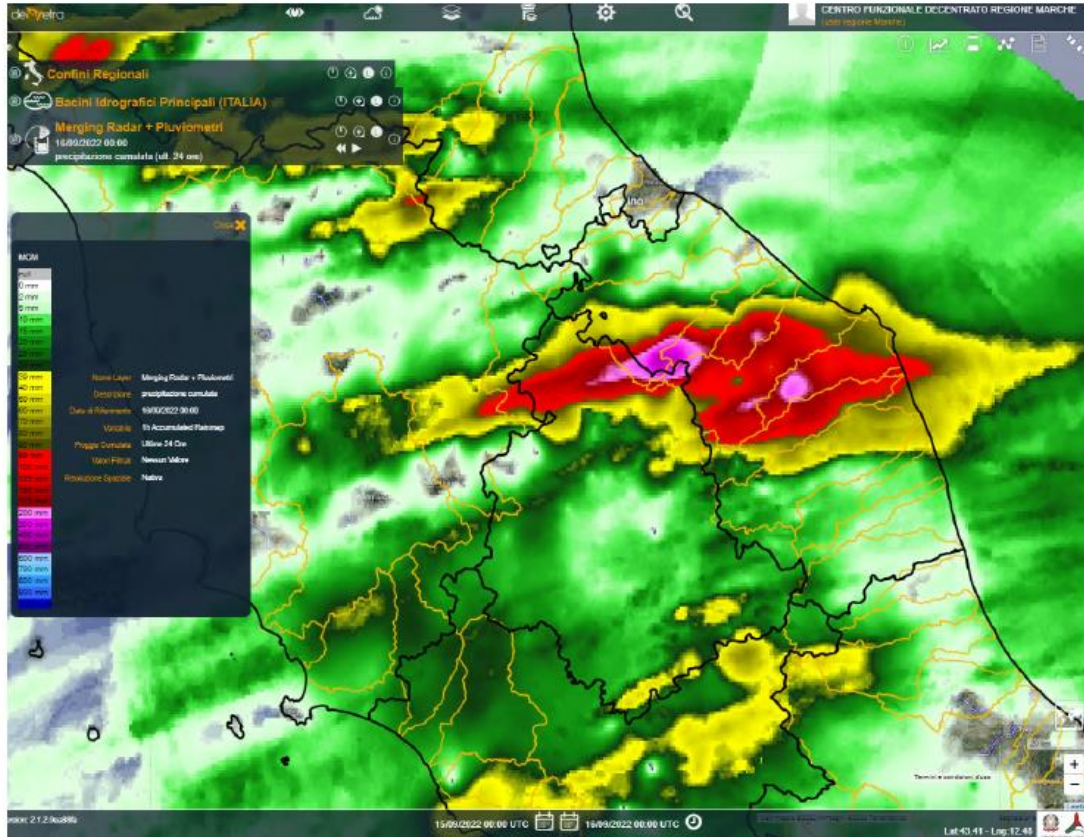
FLOOD AND LANDSLIDE RISK PLANS

$$\text{Risk} = \text{Hazard} \cdot \text{Damage}$$



IMPACT OF CLIMATE CHANGE ON FLOODS

River Floods in Marche Region (15 september 2022): a «Medicane»-like event



IMPACT OF CLIMATE CHANGE ON FLOODS

Flash floods: a rapid flooding of low-lying areas

Formia (29 september 2022) Rio d'Itri flood



IMPACT OF CLIMATE CHANGE ON DROUGHTS

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Osservatorio permanente utilizzi idrici
Bollettino Informativo n. 4 Giugno 2024

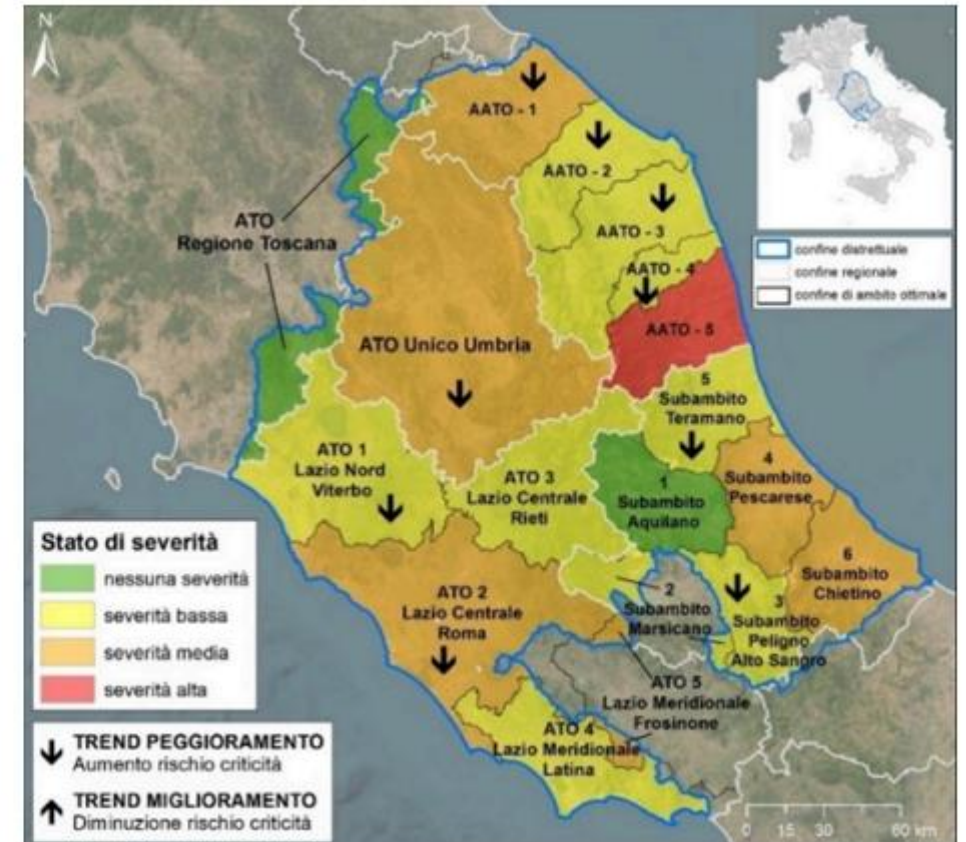


Osservatorio permanente utilizzi idrici Appennino Centrale

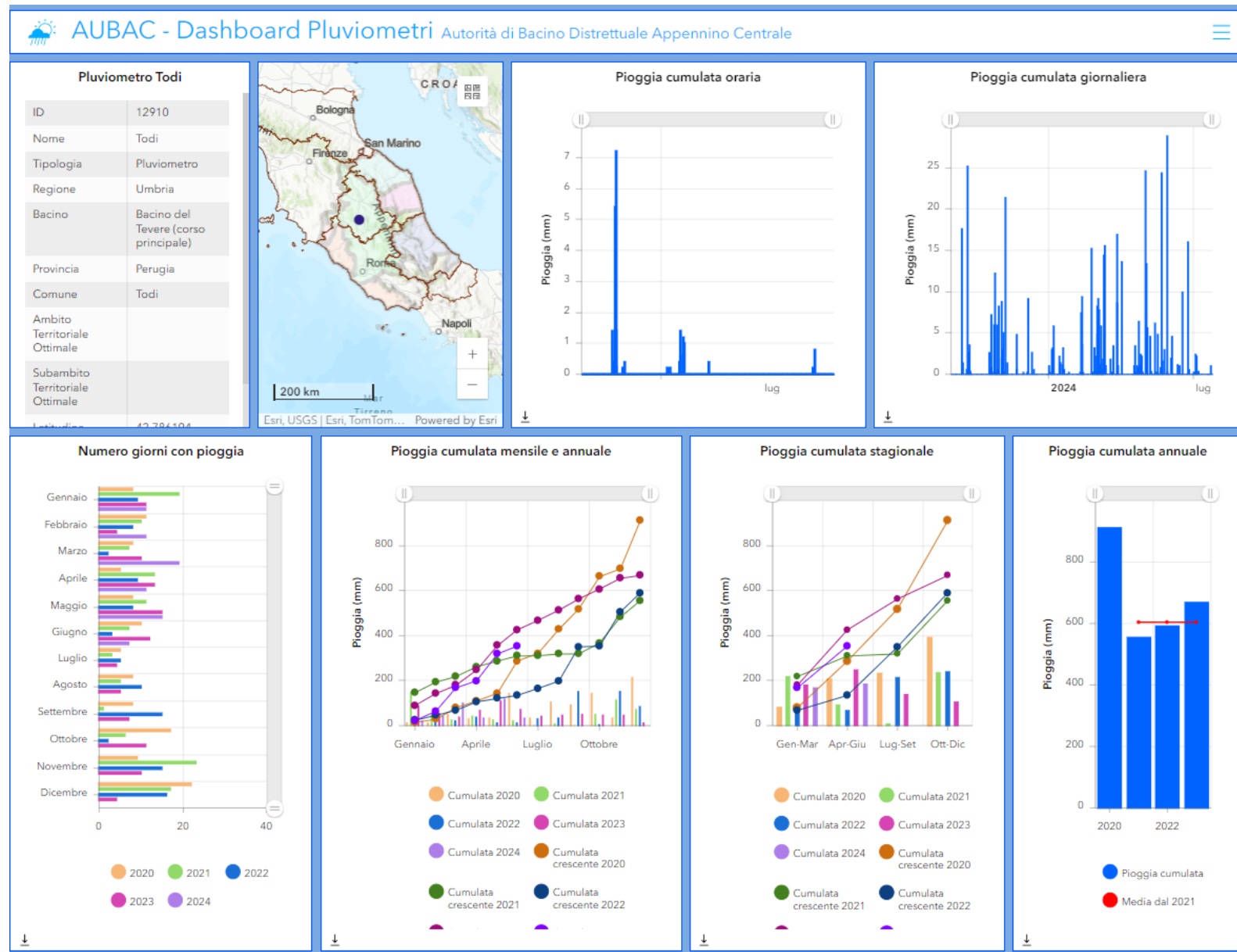
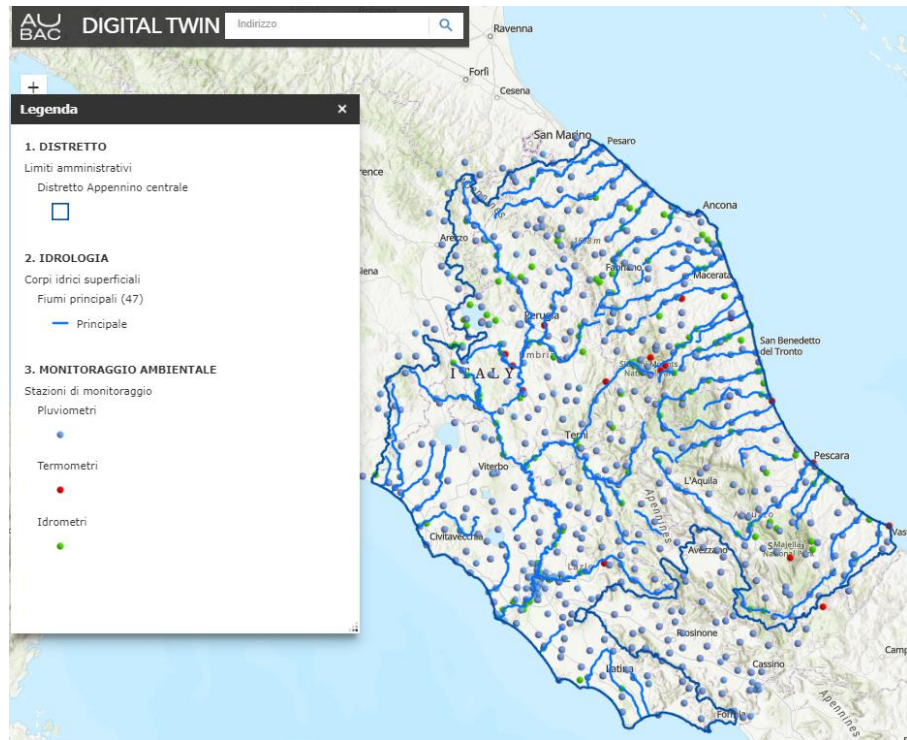
Bollettino informativo n. 4/2024

Documento informativo per le Amministrazioni Pubbliche, i portatori di interessi e i cittadini. Informazioni tecniche e report sugli scenari di "severità idrica" e sullo stato di efficienza del sistema delle infrastrutture idriche.

Osservatorio 24 giugno 2024



THE KNOWLEDGE AND THE MONITORING OF RIVER BASINS





THANKS FOR YOUR ATTENTION

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