Common Implementation Strategy for the Water Framework Directive (2000/60/EC)

Integrated Testing in the Pilot River Basins

Valencia 11-12 November 2003

Tevere
Pilot River basin

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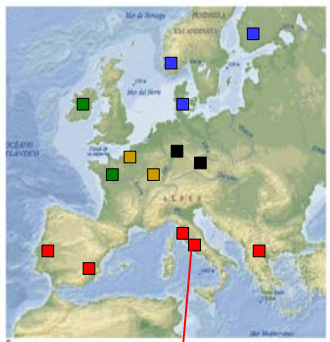
(Ufficio Studi e Documentazione per il Sistema Informativo e l'Assetto Idrogeologico)

Autorità di Bacino del Fiume Tevere

Tevere Pilot River Basin

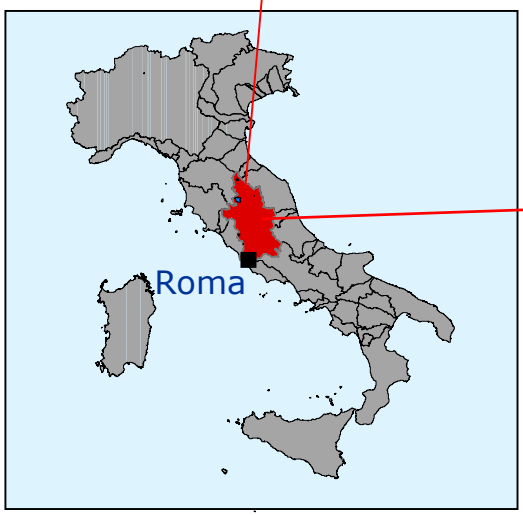
Proposals submitted by the Countries:

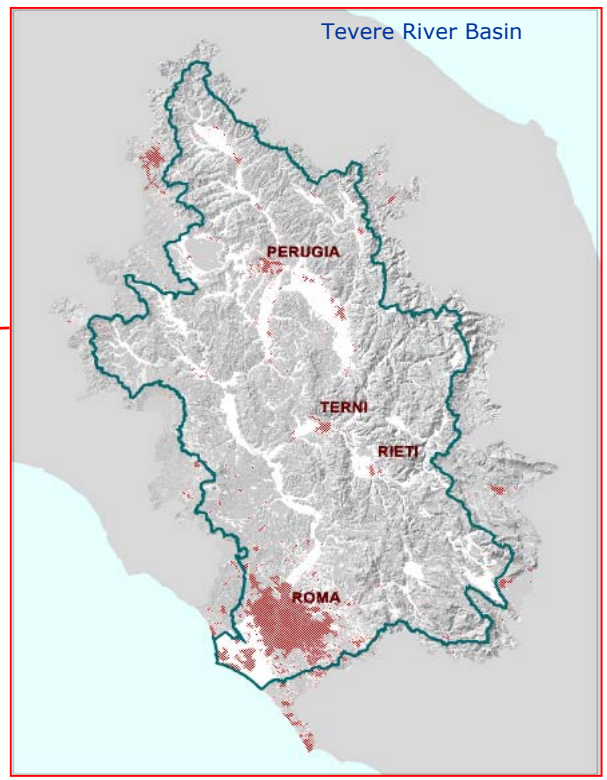
- B, F, NL (Scheldt)
- D, F, Lux (Moselle-Sarre)
- Denmark (Odense)
- Finland (Oulujoki)
- Norway(Suldalsvassdraget)
- France (Marne)
- Ireland (Shannon)
- Greece (Pinios)
- Portugal (Guadiana)
- Spain (Júcar)
- Italy (Cecina, Tevere)
- Romania Hungary (Somos)
- CZ, D, PL (Neisse)



Ecoregion 3

Basin surface area	17.374,996 km^2
Population	4.344.197 inhabitants



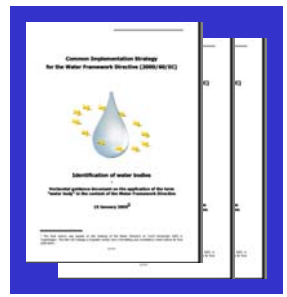


Organizations involved in the testing activity

- **Tevere River Basin Authority**
- **River Basins Authority of the Lazio Region**
- **Ministry of the Environment**
- **APAT (National Environment Agency former ANPA)**
- **ICRAM (Central Institute for Marine Waters Research)**
- **ISS (Italian National Institute of Health)**
- **University of Roma "La Sapienza"- Dipartimento di Scienze della Terra**
- **University of Roma III - Dipartimento di Scienze dell'Ingegneria civile**
- **University of Roma III - Dipartimento di Scienze della Terra**
- **Technical Offices of the Lazio, Tuscany, and Umbria Regions**
- **Technical Services Authorities of the Lazio Region**
- **ARPA Lazio (Regional Environmental Agency)**
- **ARPA Tuscany (Regional Environmental Agency)**
- **ARPA Umbria (Regional Environmental Agency)**
- **ATO 1 Lazio (Authority for the Water management)**
- **ATO 2 Lazio (Authority for the Water management)**
- **ATO 1 Umbria (Authority for the Water management)**
- **ATO 3 Umbria (Authority for the Water management)**
- **WWF**
- **Legambiente**

Organization Scheme

Common Strategy for Implementation



Tevere Working Group

Regional Administrations

Local

Environmental Agencies

Local

N.G.O.'s

Local

River Basin Authority

GIS

WebSite

Local

Environmental Ministry

Local

Research Institutes

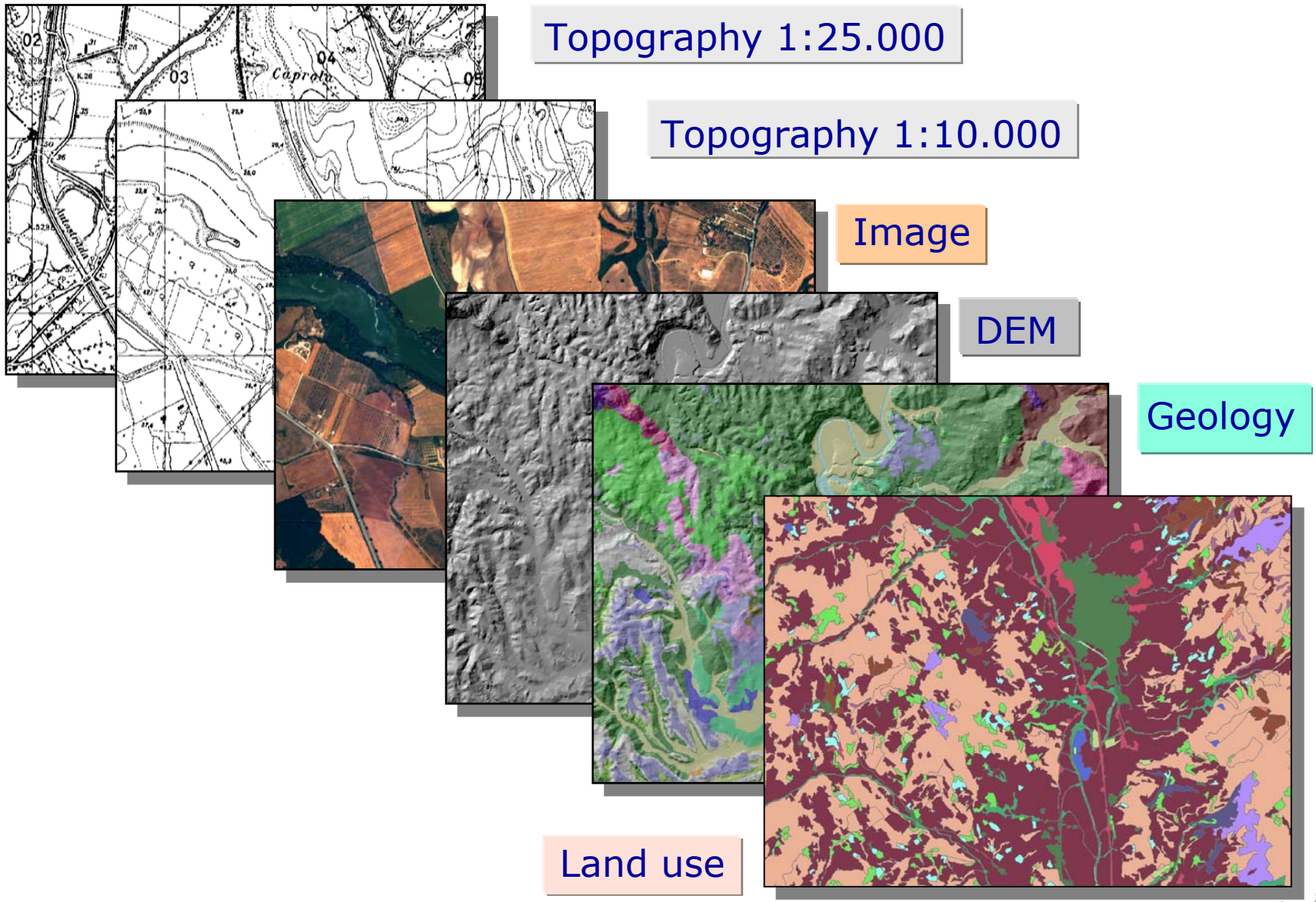
Local

Universities

PUBBLIC


Autorita' di Bacino del Fiume Tevere - Homepage
Indietro
Avanti
Interrompi
Aggiorna
Indirizzo:
http://www.abtevere.it/
vai
www.abtevere.it
Preferiti
Cronologia
Cerca
Raccoglitore
Contenitore pagine
l'ente
la pianificazione
i servizi
cartografia on-line
le pubblicazioni
le news
contatti e link
per orientarsi
Autorità di Bacino del Fiume Tevere
Pilot River Basin
WFD 2000/60/EC
Gara ex d.lgs. 157/95
- P.S.5 - avviso
appalto aggiudicato
sito ufficiale
Progetto di Piano Stralcio
del Lago di Piediluco
Avviso di pubblicazione
G.U. n. 89 del 16/04/2003
via Vittorio Bachelet
n. 12
00185
Roma
info bacino
l'ente - la pianificazione - le news - le pubblicazioni - i servizi - cartografia on-line - contatti - per orientarsi
Area Internet

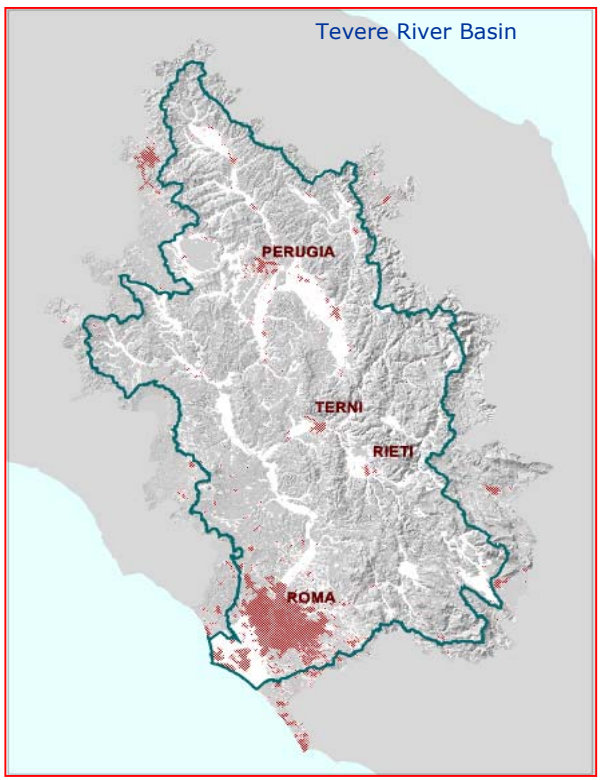
Preliminary activities - GIS organization



Climatic characteristics

Mountain area 85% of basin surface

Alluvial plains 15% of basin surface



The Mediterranean climate is marked by mainly winter precipitations and mostly dry summers

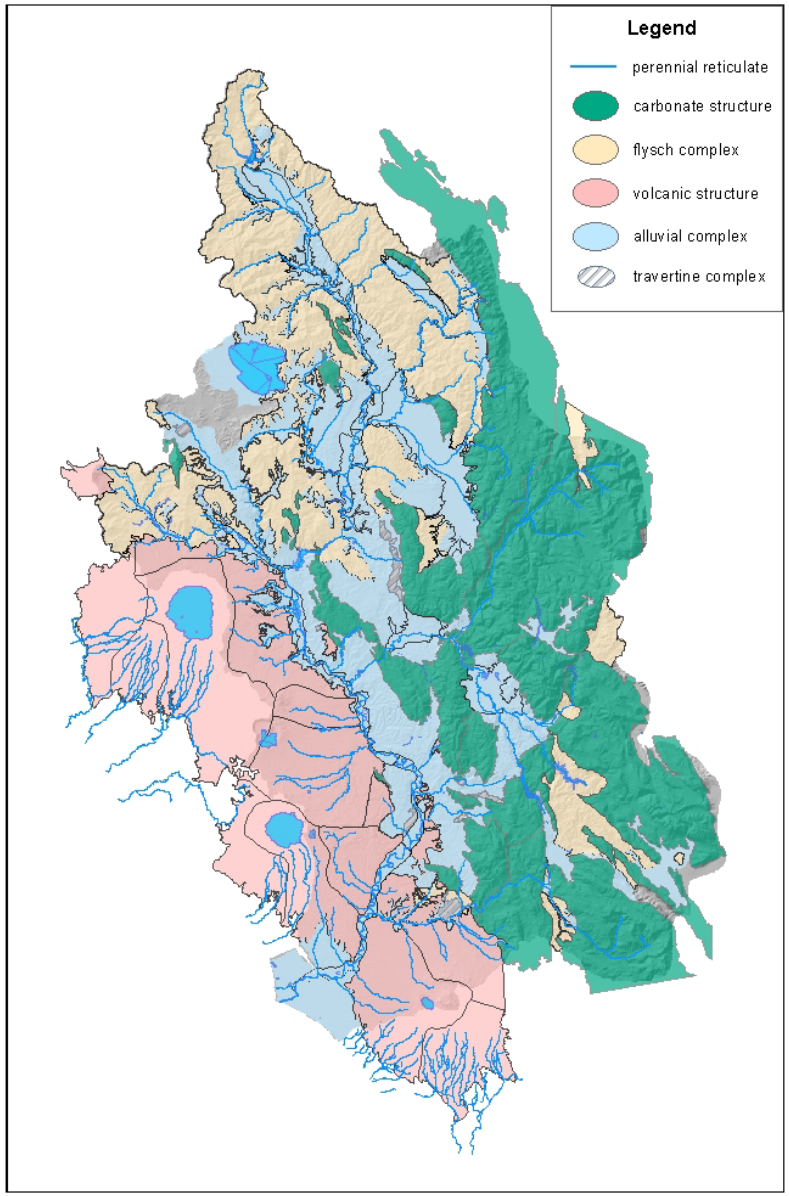
Mean annual precipitation is about 1200 mm; it ranges from 700 mm at sea level to 2000 mm along Central Ridge.

The average precipitation regime is the following:

Autumn 35% in 25 raining days;
Winter 25% in 30 raining days;
Spring 30% in 30 raining days;
Summer 10% in 10 raining days

Mean annual temperature is 16°C at sea level; 14°C at 300 m; 10°C at 1000 m; 3,2°C at 2200 m.

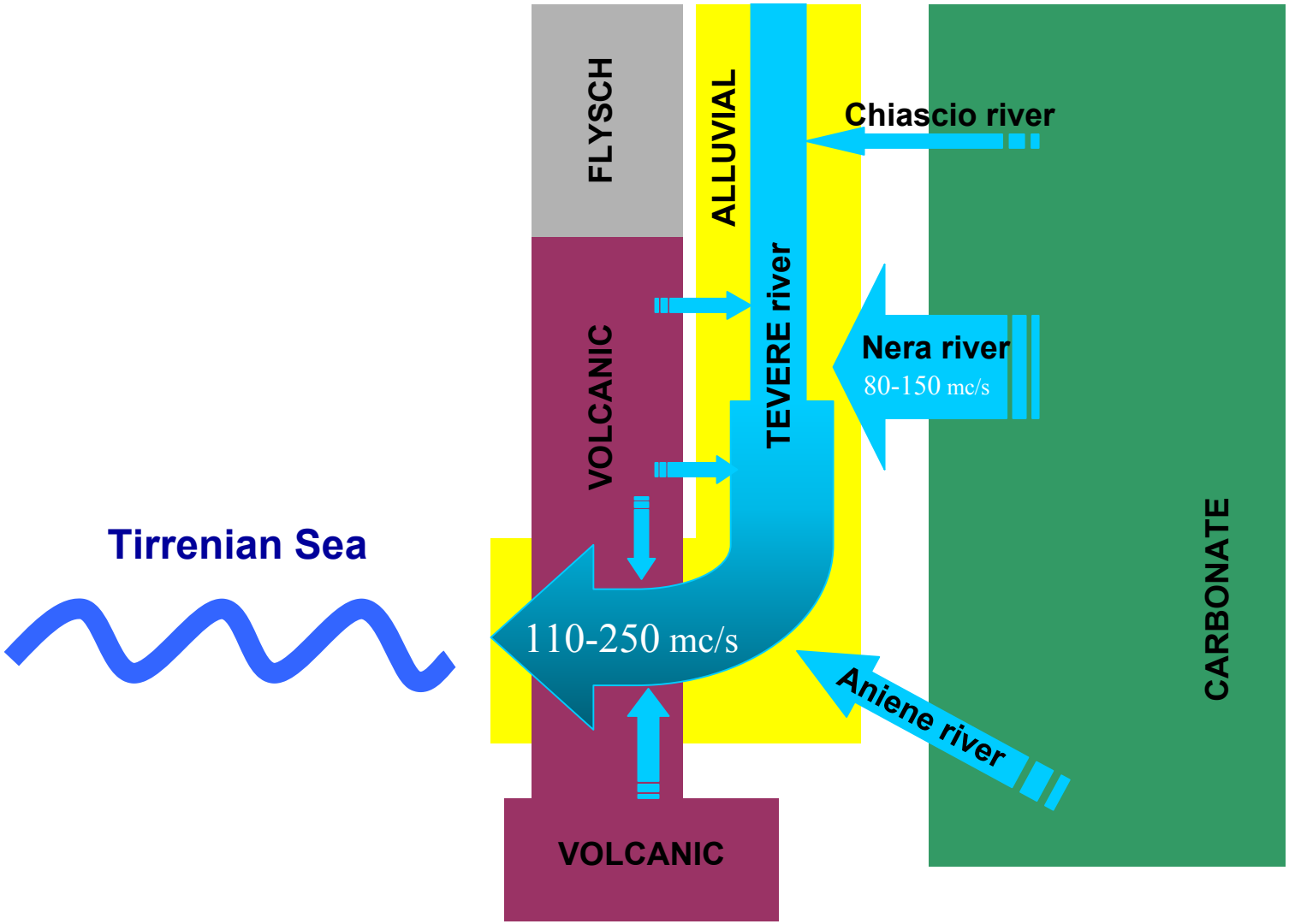
Geological characteristics



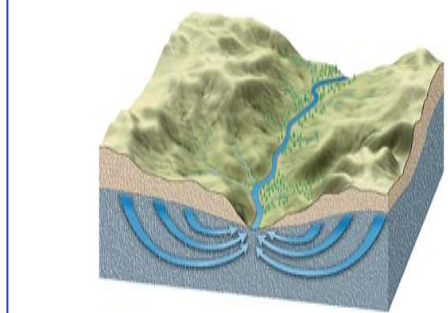
The Tevere River Basin is composed of four main geomorphological sectors:

- the karst Apennine Mountains located in the eastern and southern sector, composed of carbonate rocks;
- the Tevere's graben and its marine and continental facies deposits, the intermountainous depressions;
- the volcanic structures of the Vulsini, Cimini, Sabatini, and Albani Mountains located in the south-western sector
- the upper part of the Tevere River Basin, occupied mainly by terrigenous Flysch facies deposits from Tuscany (on the right bank, north of the Trasimeno lake) and the Umbrian and Marches Regions (left bank).

Schematic circulation model in the Tevere River Basin

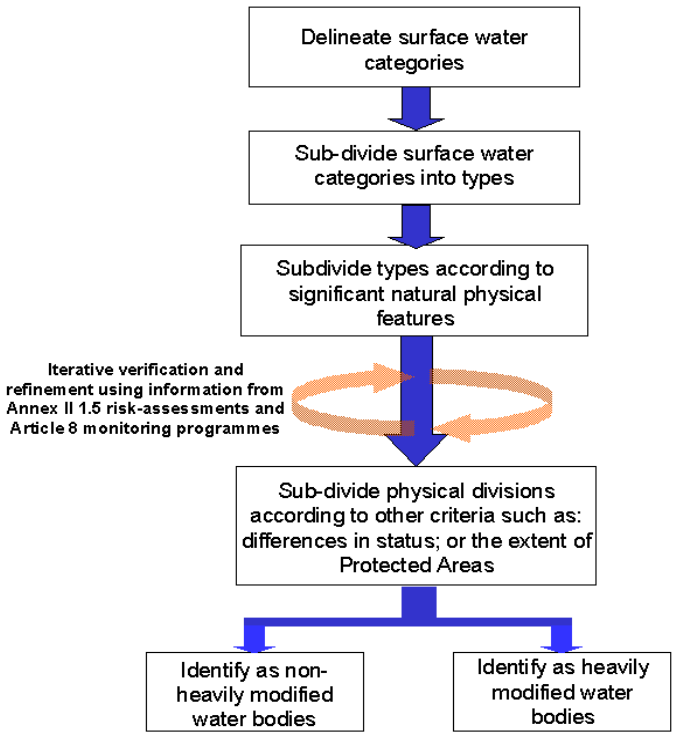


Step 1: Identification of Perennial Reticulate



Linear spring

Hierarchical approach to the identification of surface water bodies



[Annex II 1.1(i)]

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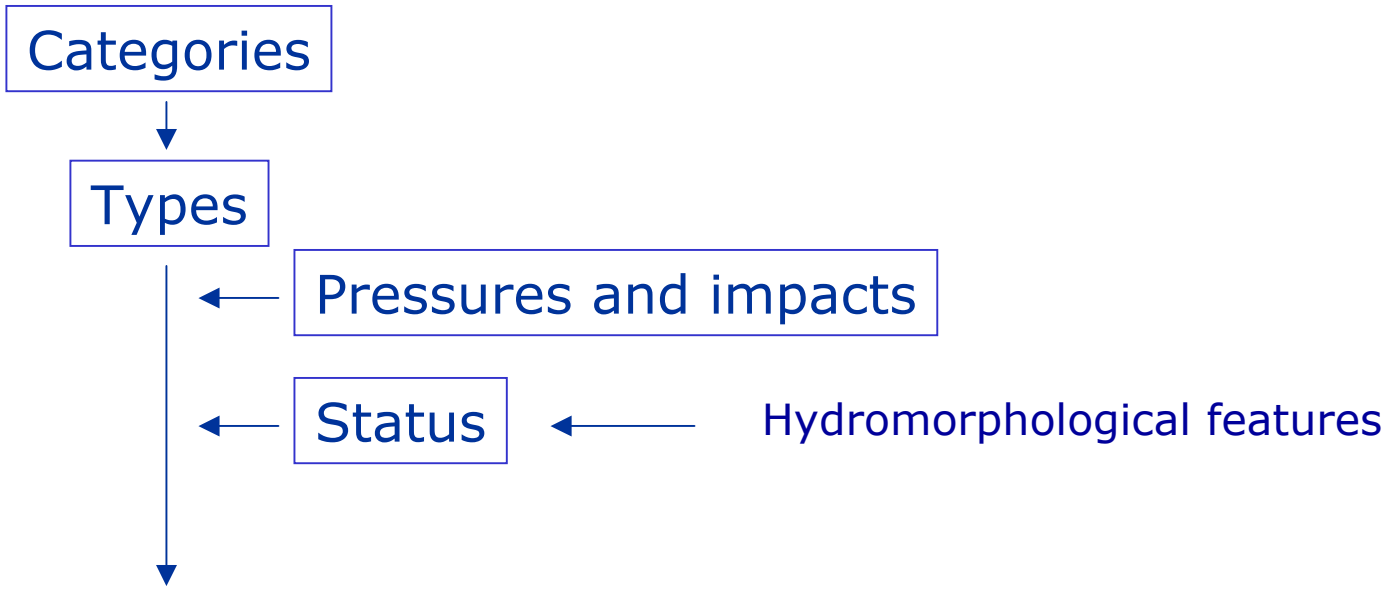
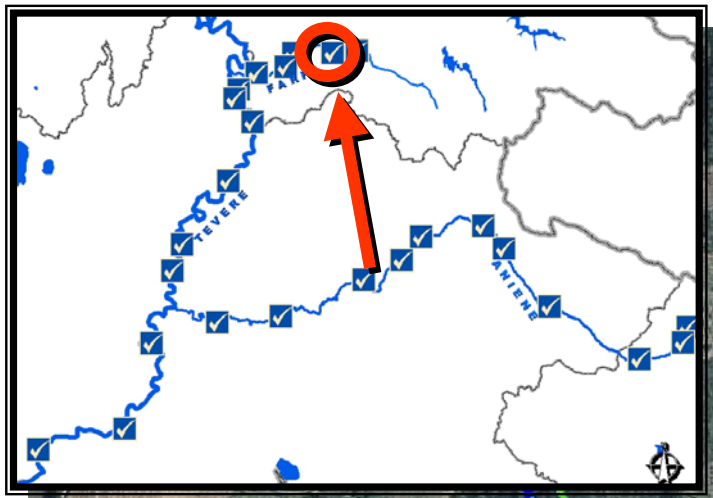
[Purpose: To improve meaningful delineation of water bodies (see section 2 and 3.3)]

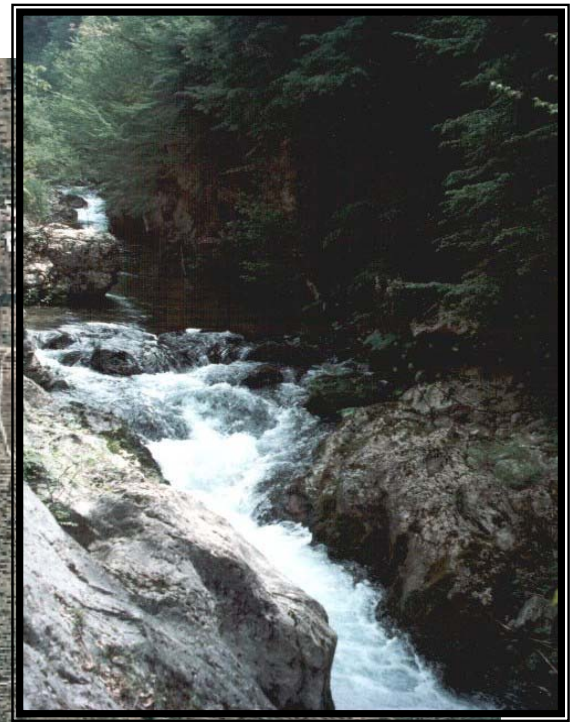
[Article 4.3 and Annex II 1.1(ii)]

Preliminary identification of surface water bodies



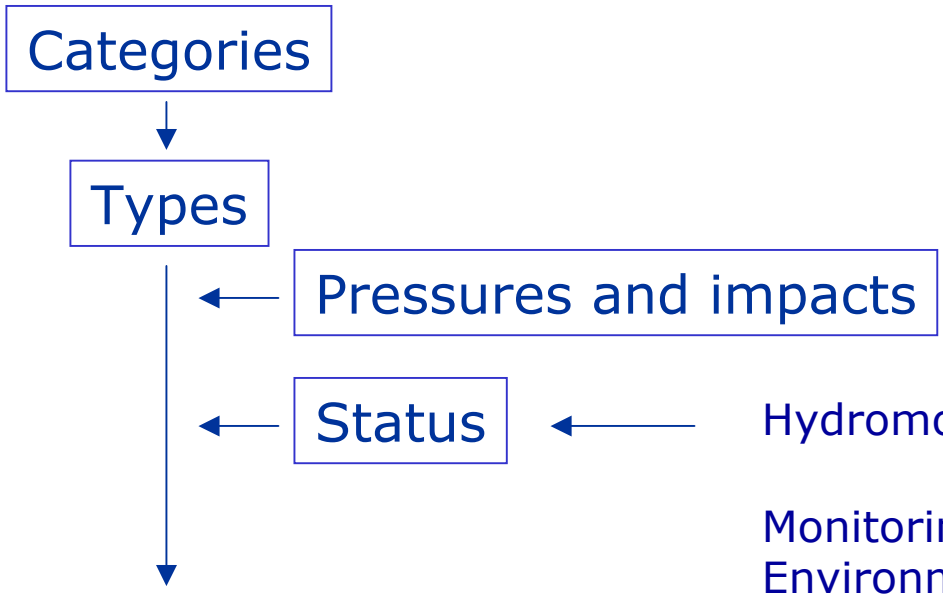
Step 3: preliminary status classification



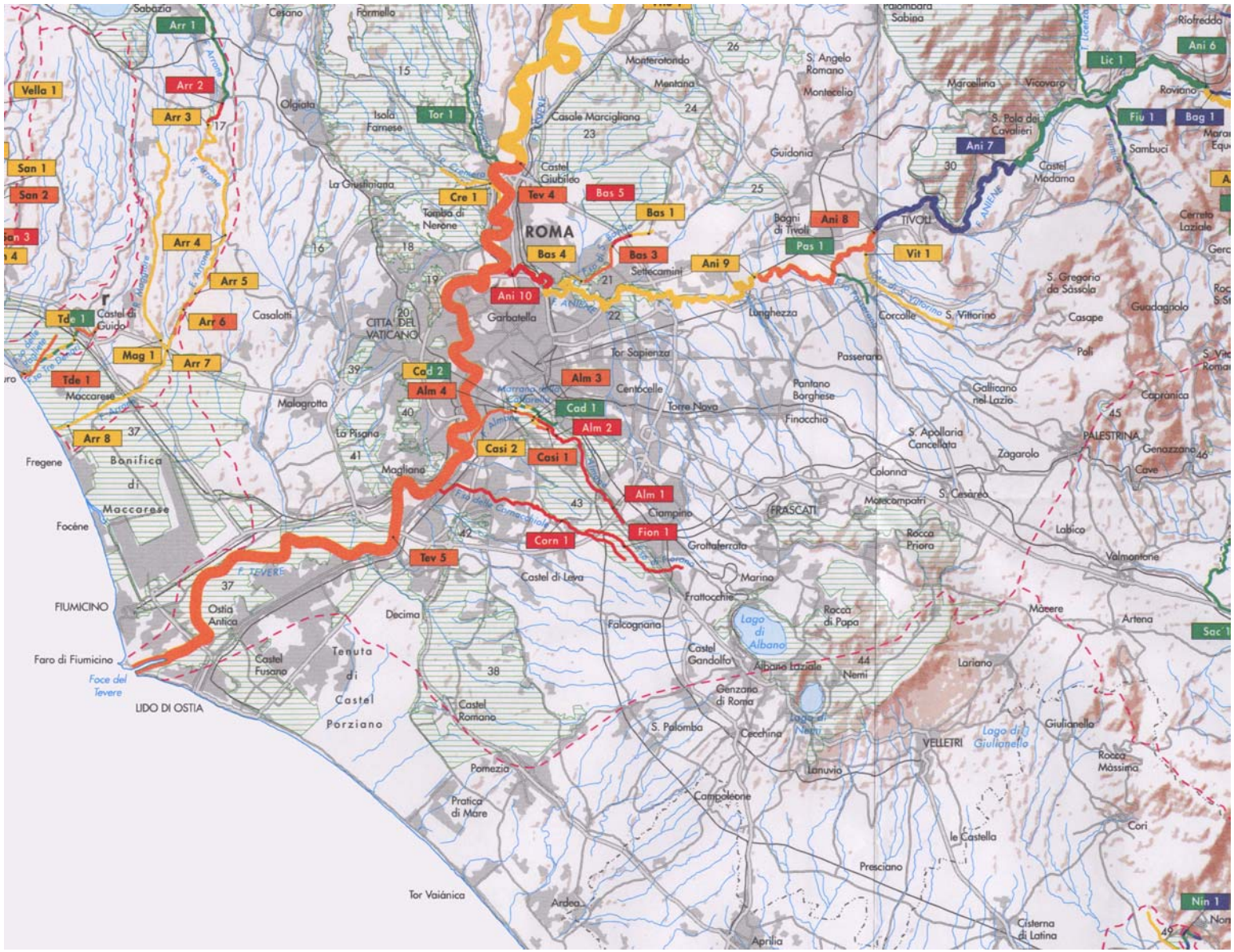


	Sponda Sx	Sponda Dx
Valore di I.F.F.	255	255
Livello di funzionalità	I-II	I-II

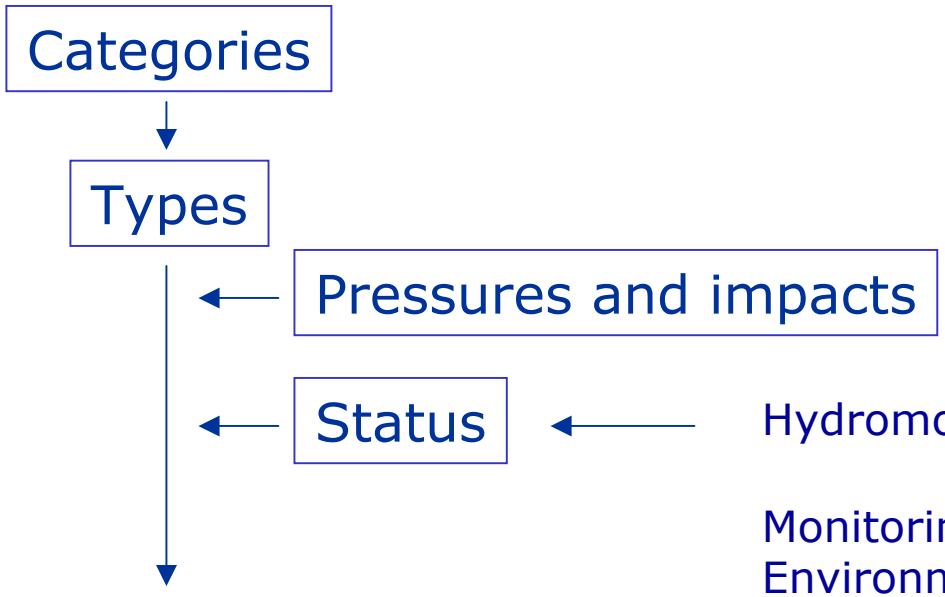
Preliminary identification of surface water bodies



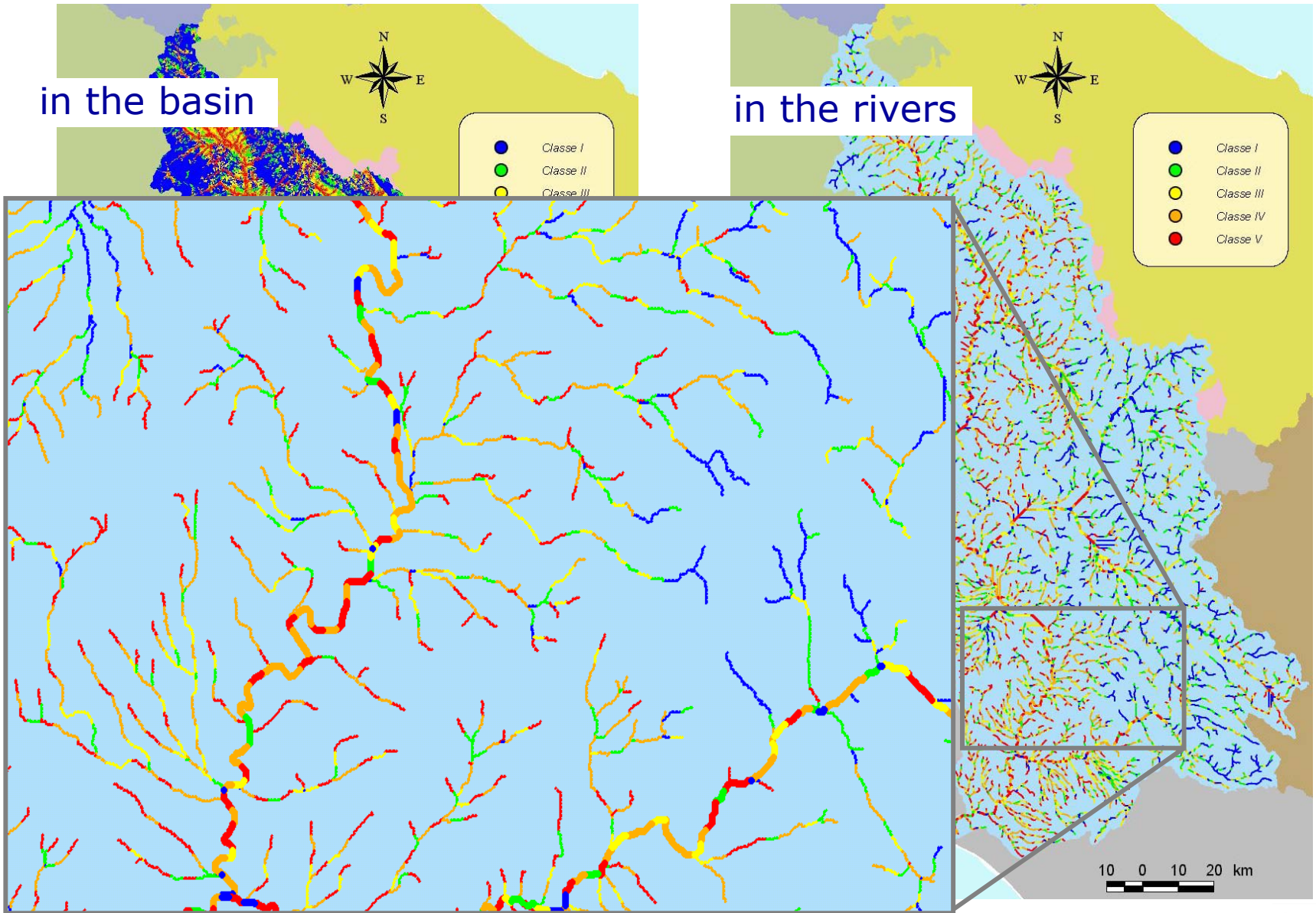
Preliminary status classification



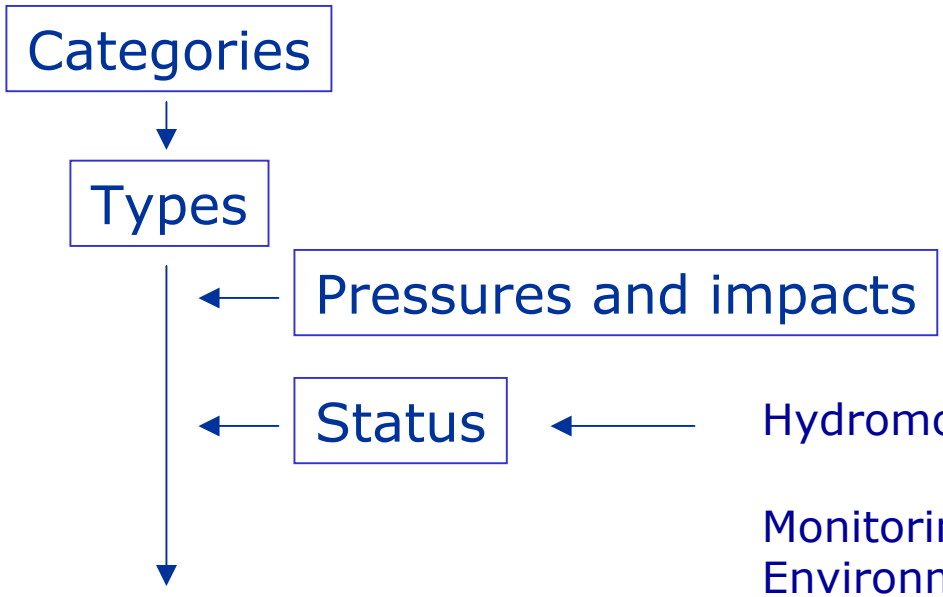
Preliminary identification of surface water bodies



Preliminary status classification



Preliminary identification of surface water bodies



Hydromorphological features

Monitoring database of Regional Environmental Agency

Extended Biotic Index (EBI) characterization

Diffuse pollution evaluation models

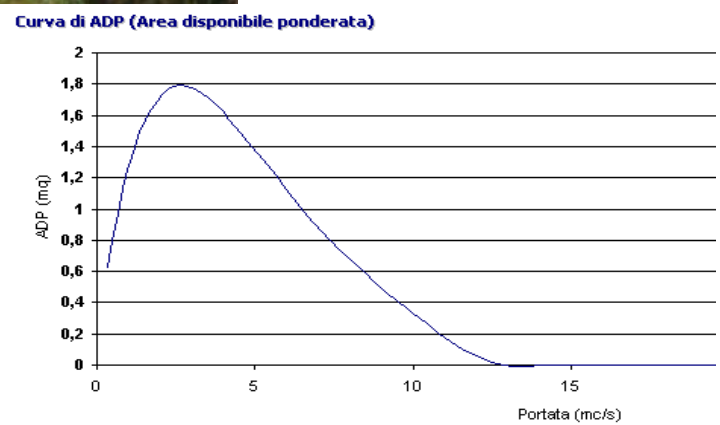
Fishfauna studies

Preliminary status classification

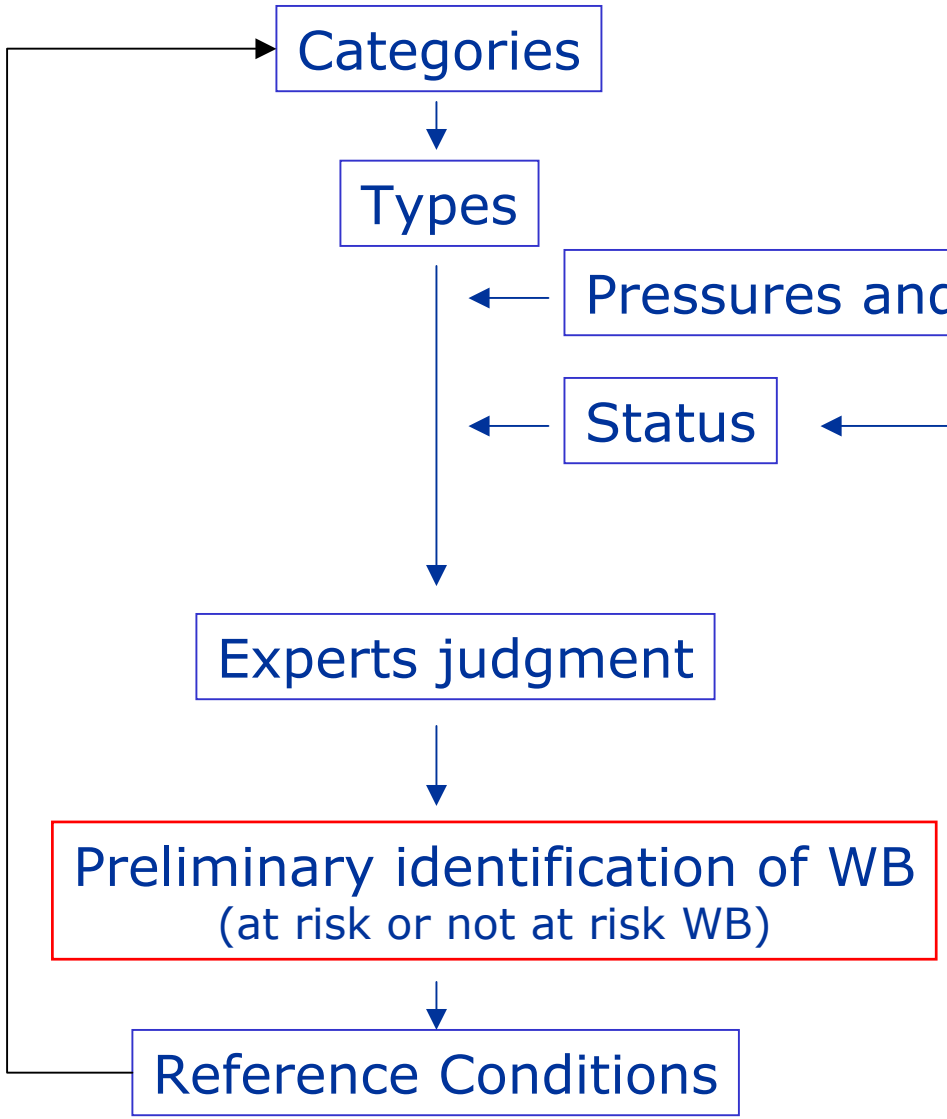
E.B.I.

Data	13/06/97
EBI	10
N° Unità Sistematiche	21
Carnivori	26 %
Erbivori	37 %
Detritivori	37 %

Ambiente non inquinato o non alterato in modo sensibile



Preliminary identification of surface water bodies



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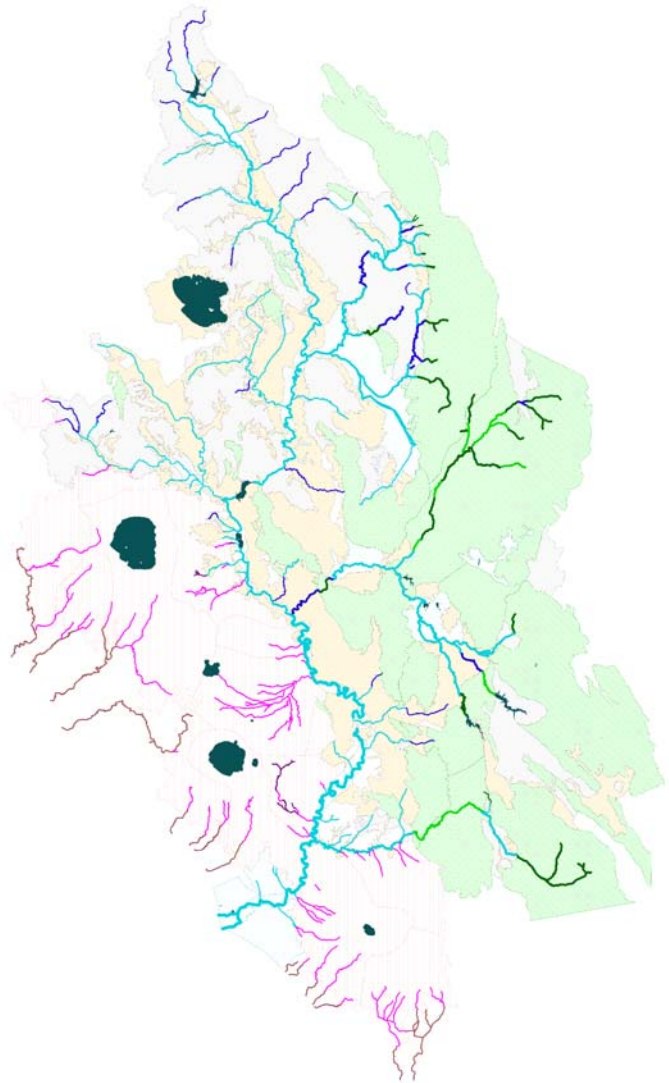
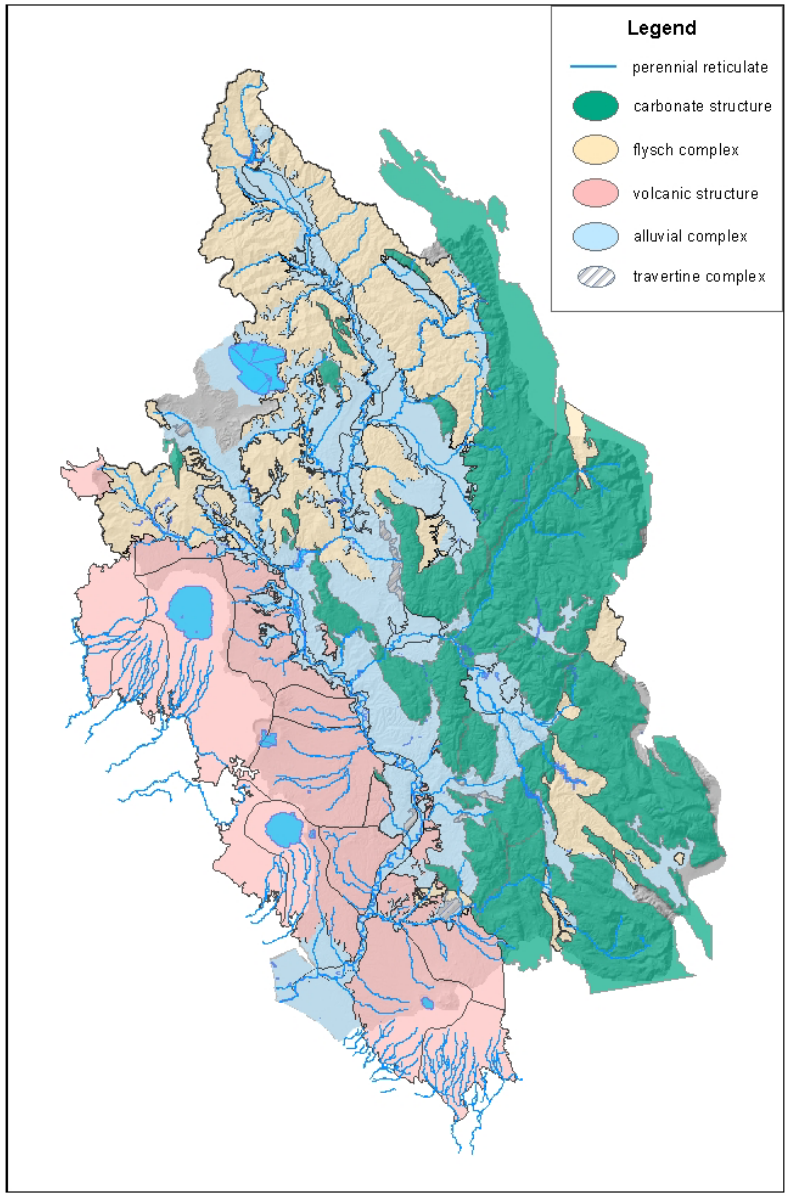
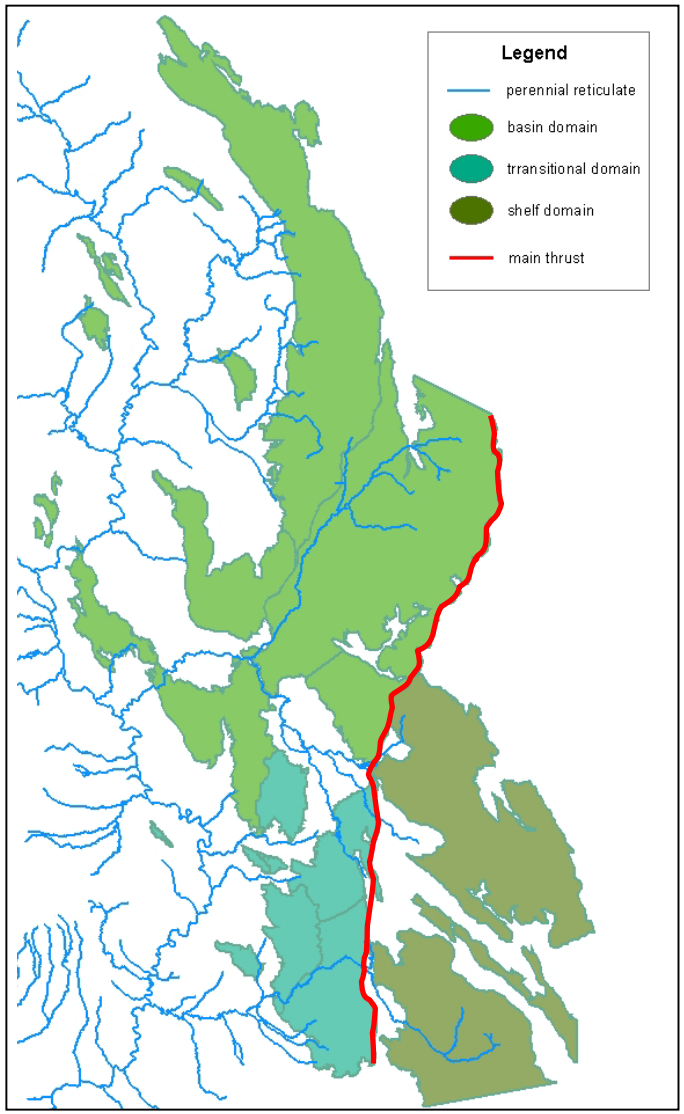


Category	N. Water Bodies	Minimum Size	Maximum Size
River	160	0.5 km	66 km
Lake	13	0.3 km	124 km^2
HMWB	Testing under way		
AWB	Testing under way		
Transitional	1	25 km	
Coastal	2	30 km	
Wetlands	7		

Hydrogeological characteristics



Karst aquifers

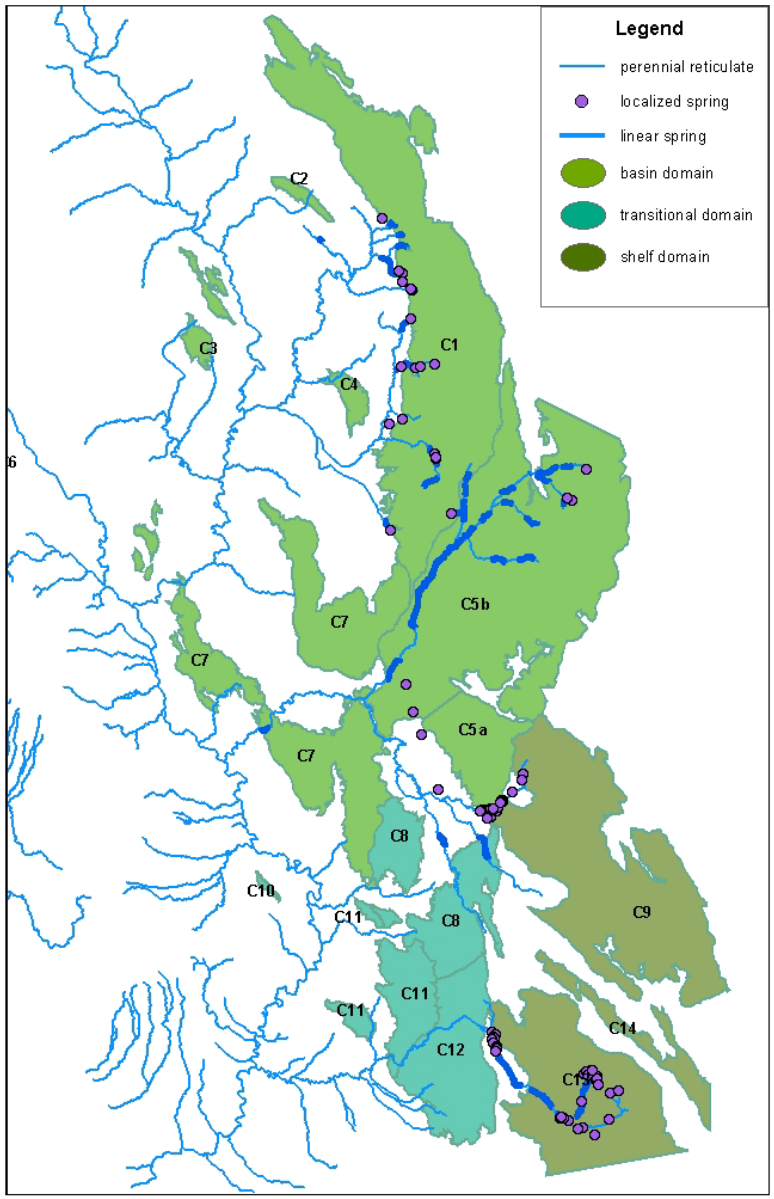


Karst aquifers of the Tevere River Basin occur in mesozoic carbonate rocks.

Several hydrogeological structures can be identified, in which there are various overlapping aquifers and clear-cut hydrostructural borders, mainly with a meridian direction.

There are many suspended and basal aquifers which supply small and big springs situated in circumscribed areas (localized springs) and distributed along the perennial rivers (linear springs).

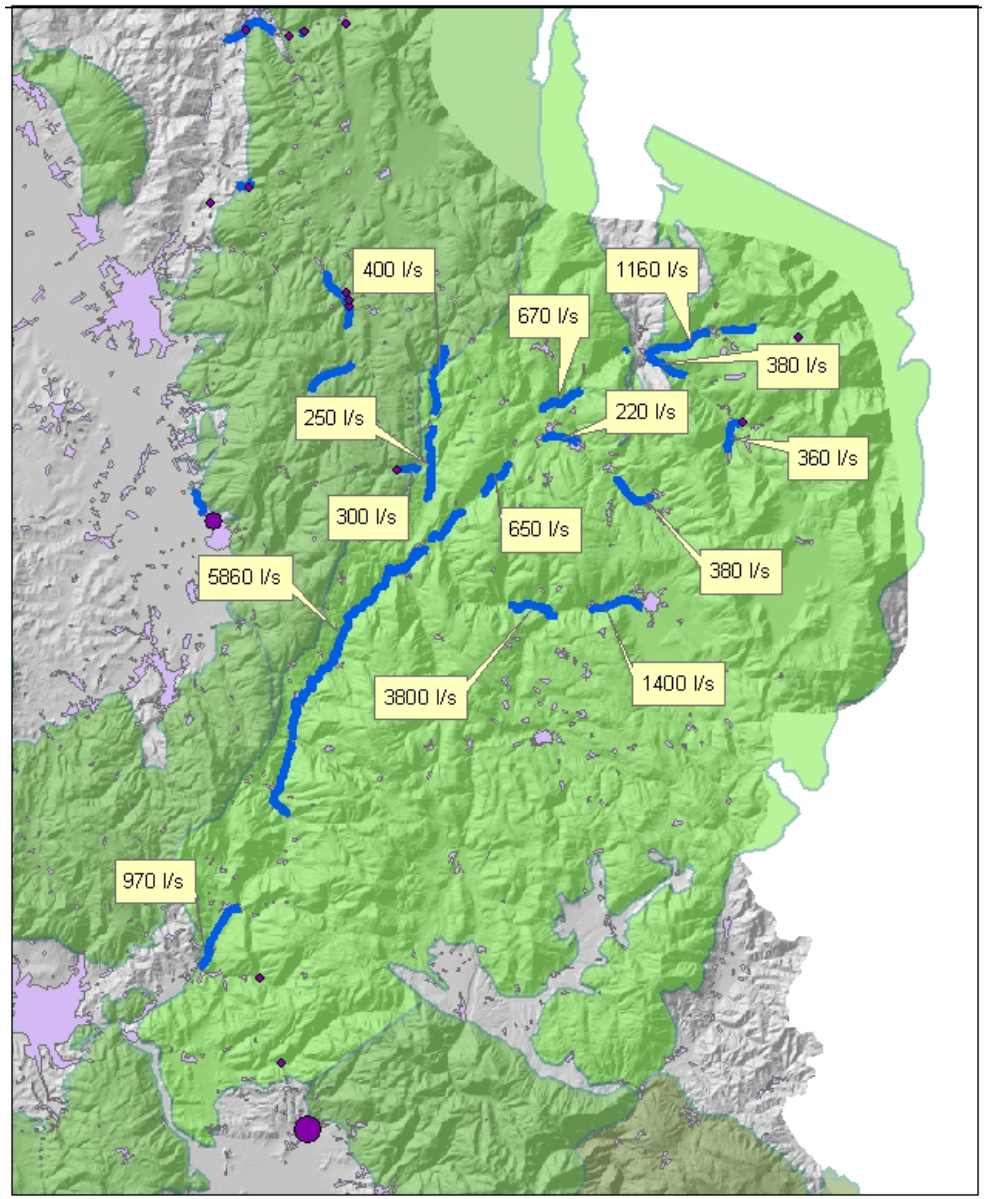
Groundwater bodies in the carbonate domain



15 groundwater bodies (hydrogeological structures) can be identified

Structure	Surface area km^2	Mean discharge m^3/s	Minimum discharge m^3/s
C1	1382	6,5	3,5
C2	24	*0,2*	
C3	60	*0,8*	
C4	41	*0,7*	
C5a	224	6,0	4,6
C5b	1610	19,0	15,0
C6	24	*0,4*	
C7	858	13,5	10,0
C8	371	5,5	4,5
C9	1032	32,0	22,0
C10	5	*0,1*	
C11	210	6,0	4,0
C12	378	*2-4*	
C13	666	14,0	7,5
C14	124	out of the basin	
Total	**7009**	**> 100**	**> 70**

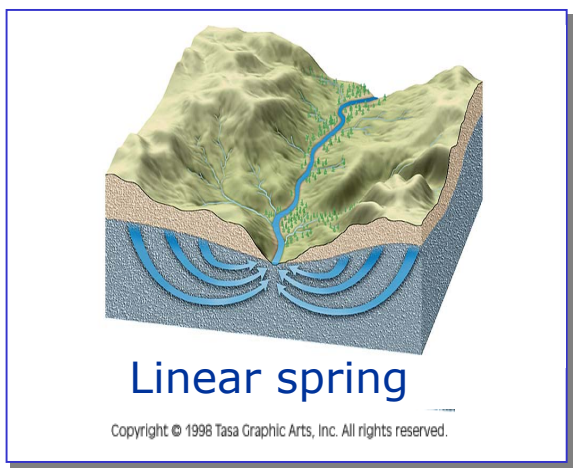
Perennial Reticulate - linear and localized springs



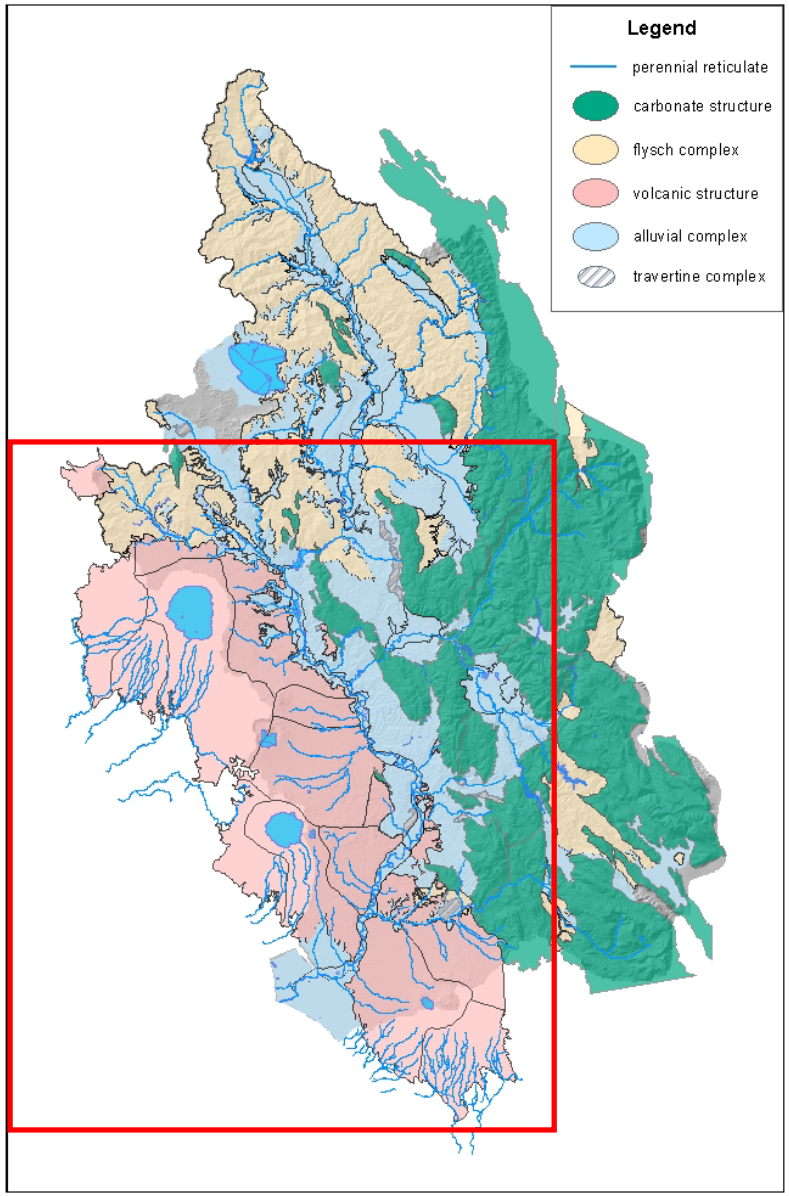
In the Nera's hydrosctructure the total mean discharge is about 19 m^3/s:

- 17 m^3/s supplied by the linear springs
- 2 m^3/s supplied by localized springs

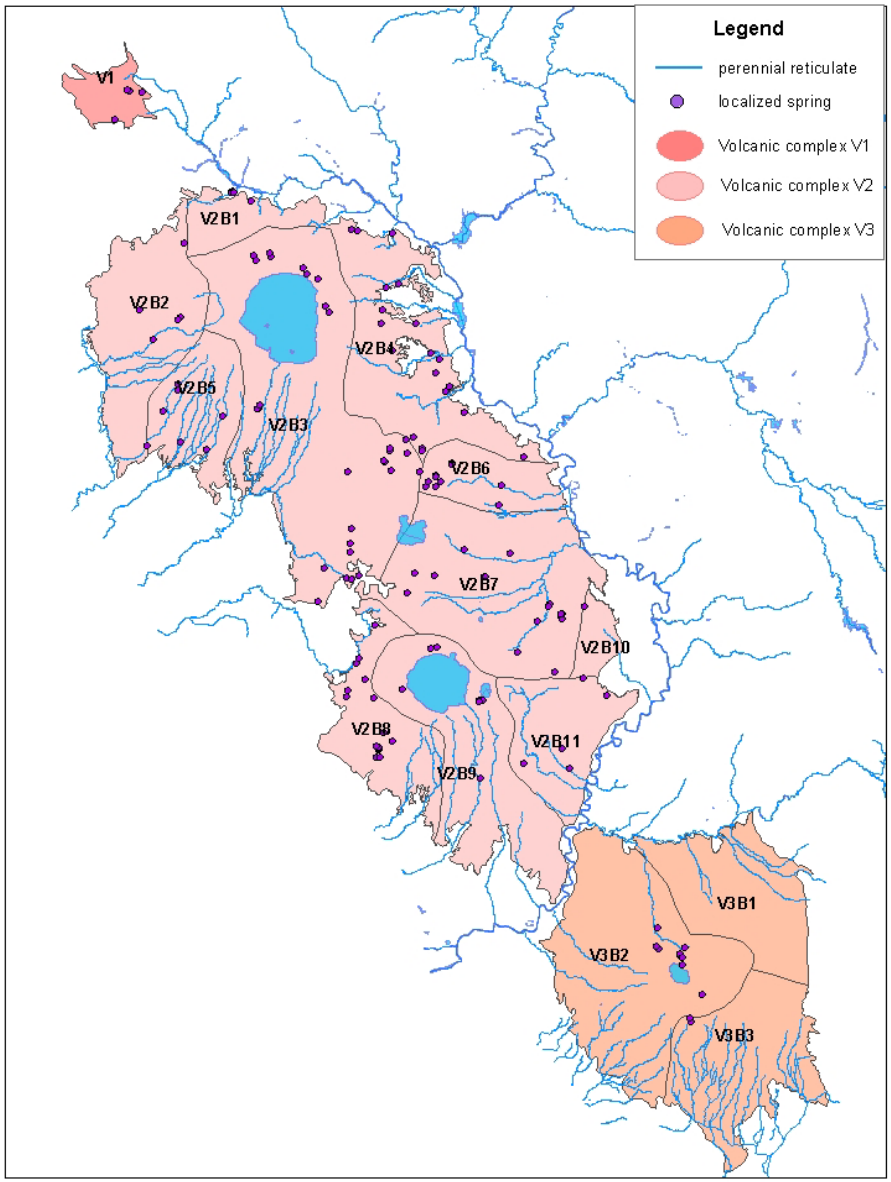
For this reason it is very important to consider this kind of resources in order to identify the features of both groundwater and superficial water bodies



Volcanic aquifers



Volcanic acquifers



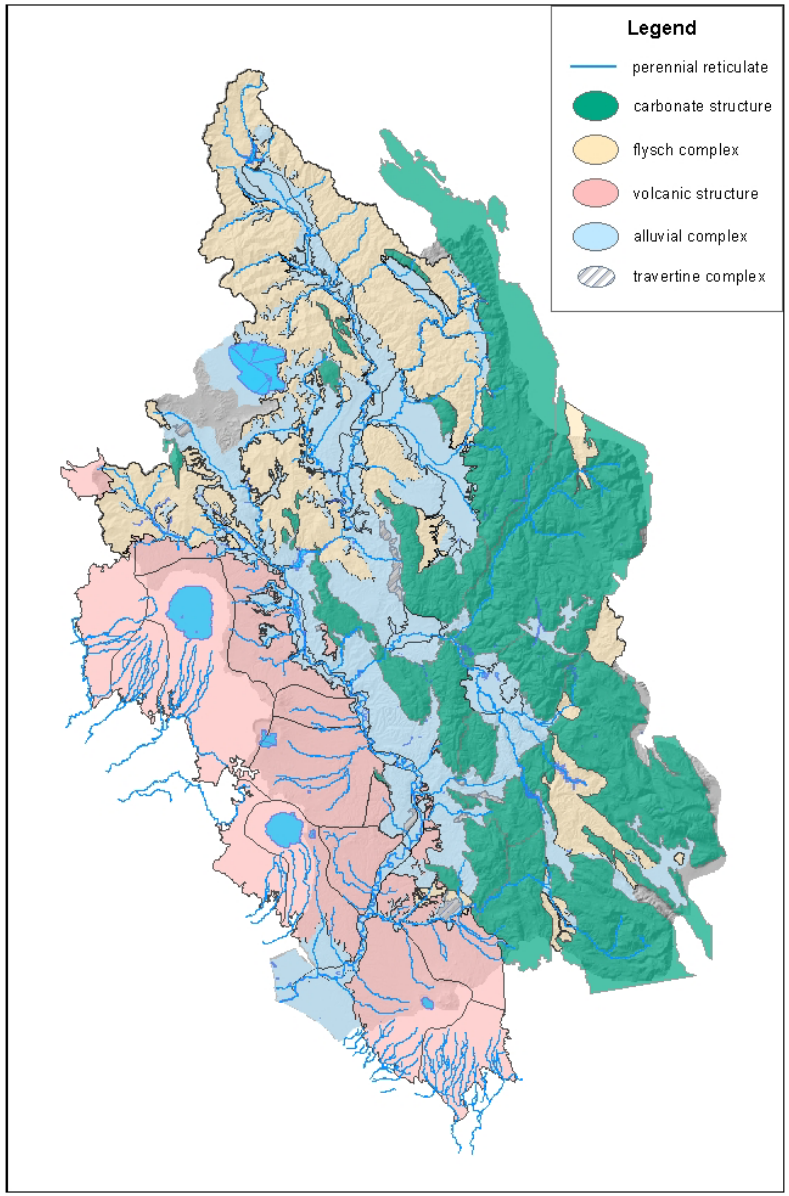
Volcanic rocks (pyroclastites, ignimbrites and lava flows) contain many perched aquifers of limited extension and a very important extensive basal aquifer.

The basal aquifer feeds the base flow of a large number of perennial rivers and streams, characterized by a regular flow regime.

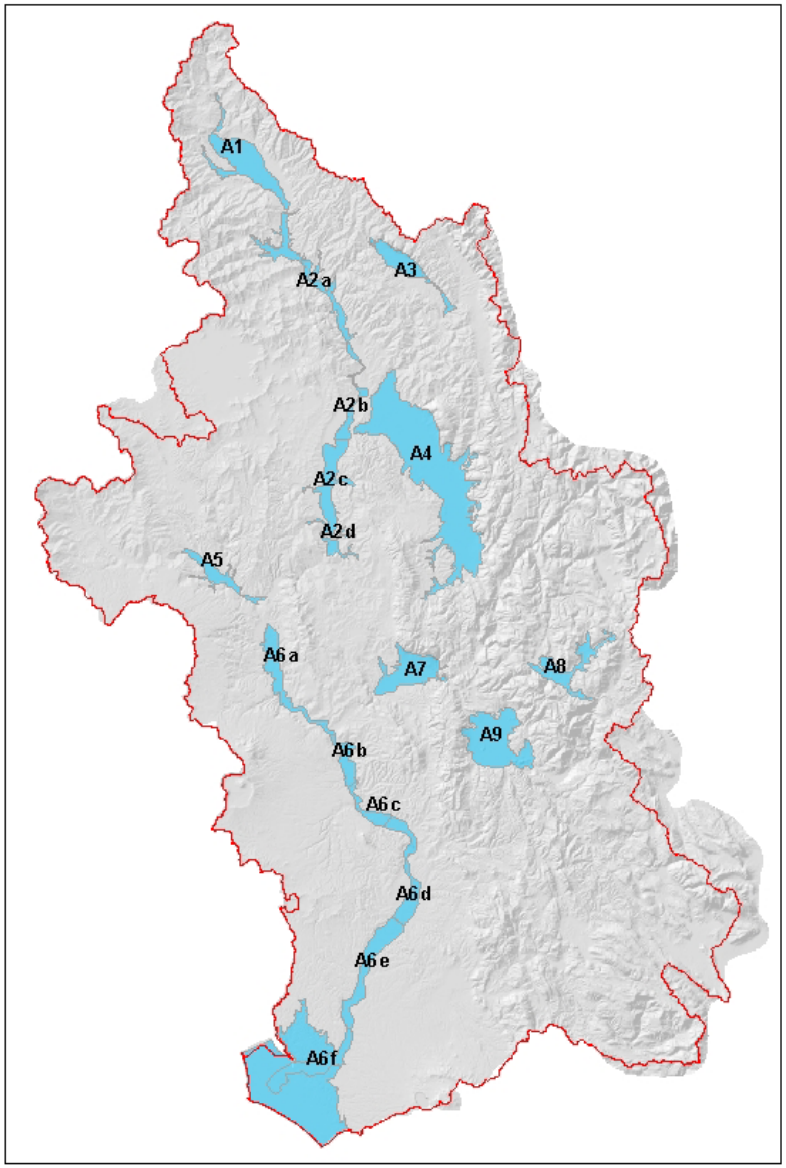
16 groundwater bodies (3 volcanic structures) can be identified

Structure	Surface area km^2	Mean discharge m^3/s
V1	80	1,5
V2	3550	31,5
V3	1500	15,0
Total	**5130**	**48,0**

Alluvial aquifers



Alluvial aquifers

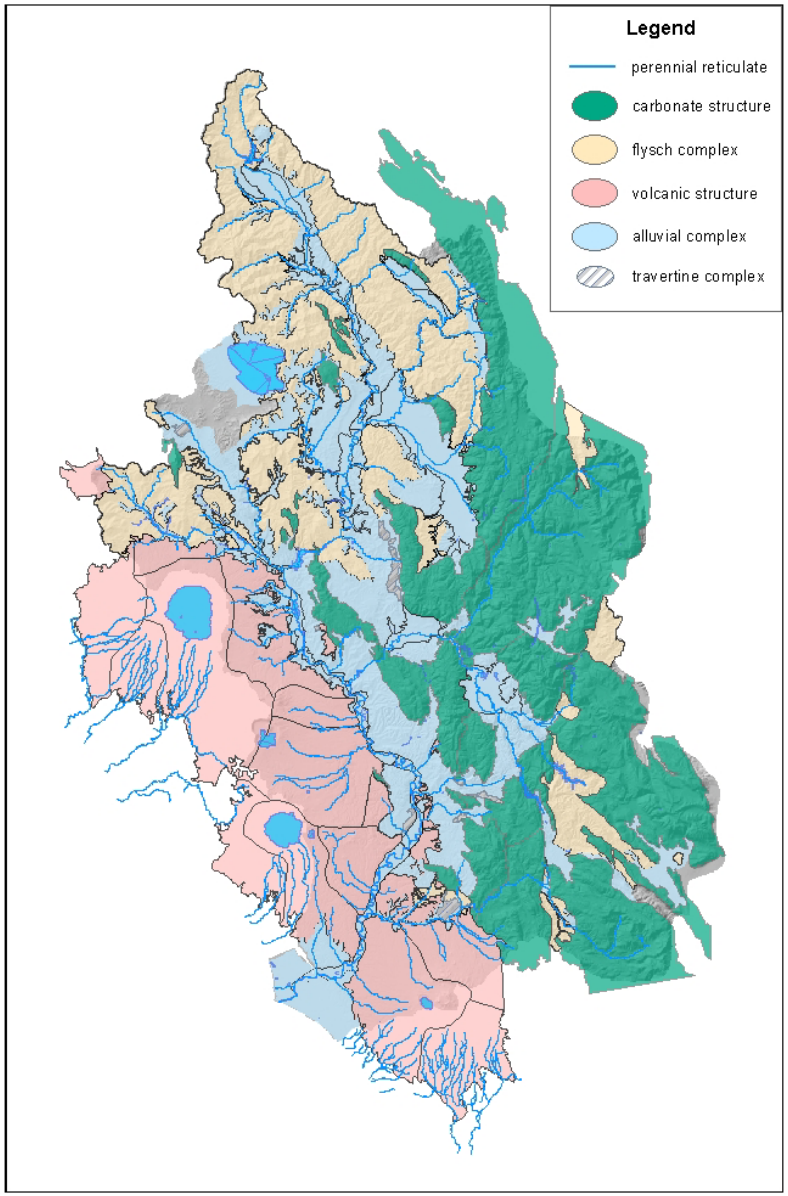


The alluvial aquifers occur in predominantly continental deposits (clay, sand and gravel) with marine coastal deposits (clay, sand, gravel and calcarenites) filling subsiding depressions.

The complex contains free aquifers, their extension and importance depending on the extremely variable permeability and irregular geometry of water bearing deposits. The best aquifers are located in the alluvial deposits of the main rivers.

9 alluvial and 1 coastal aquifers can be identified, supplying a mean discharge of about 9 m^3/s

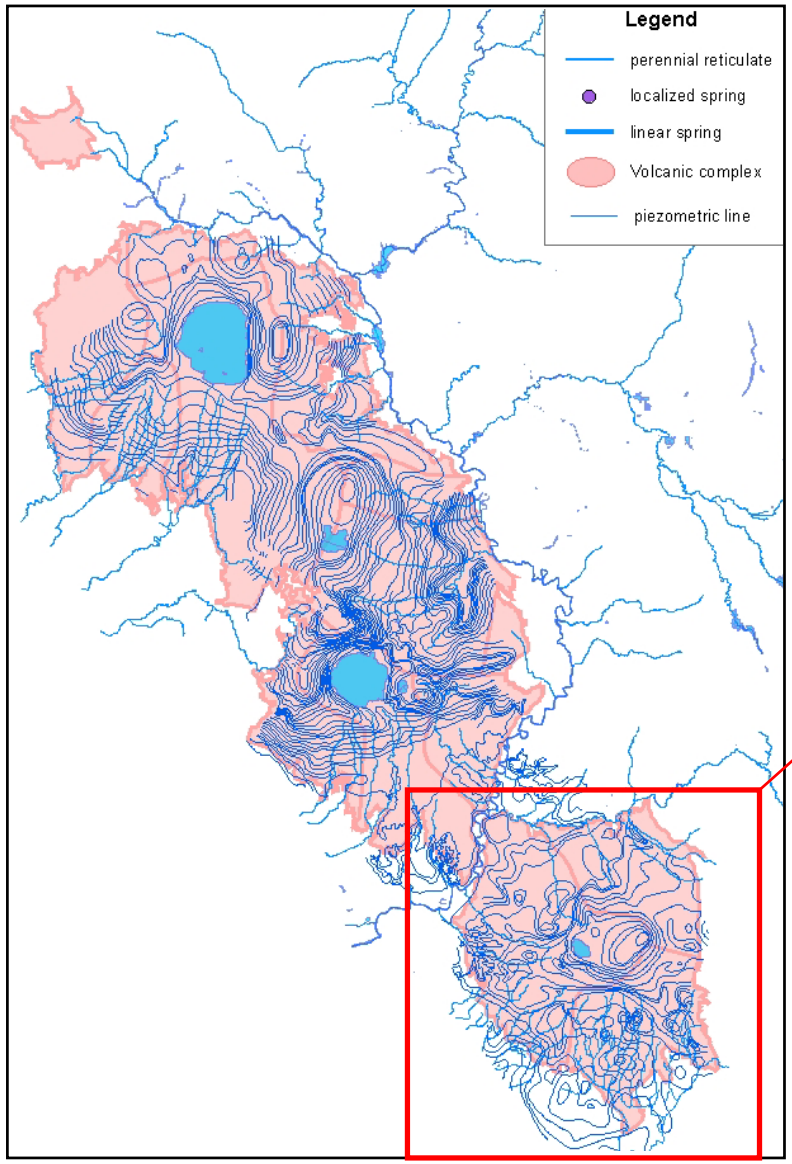
Preliminary identification of groundwater bodies



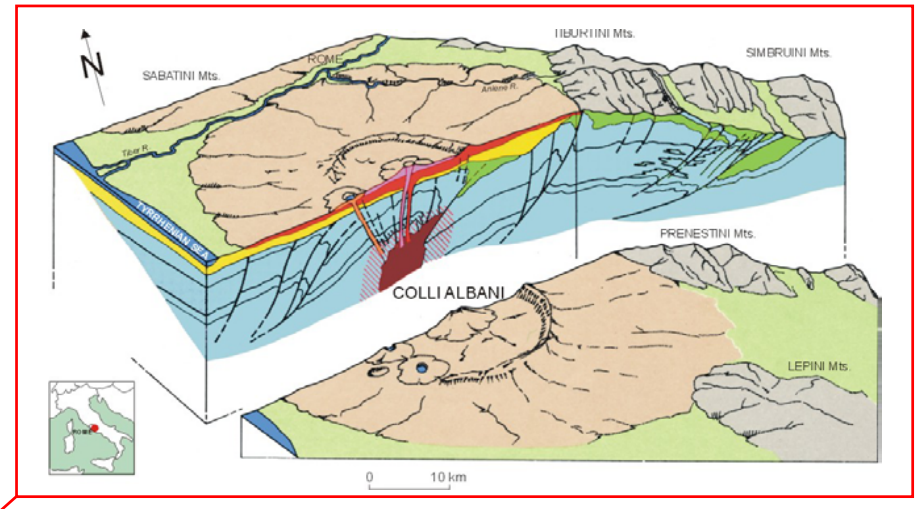
In the Tevere river basin there are a lot of available groundwater resources. For this reason we preferred to identify water bodies at a regional level first and to leave eventual further analysis to another phase of the characterization.

We totally identified 41 groundwater bodies

Pressures and impacts in the volcanic acquifers



Albano system



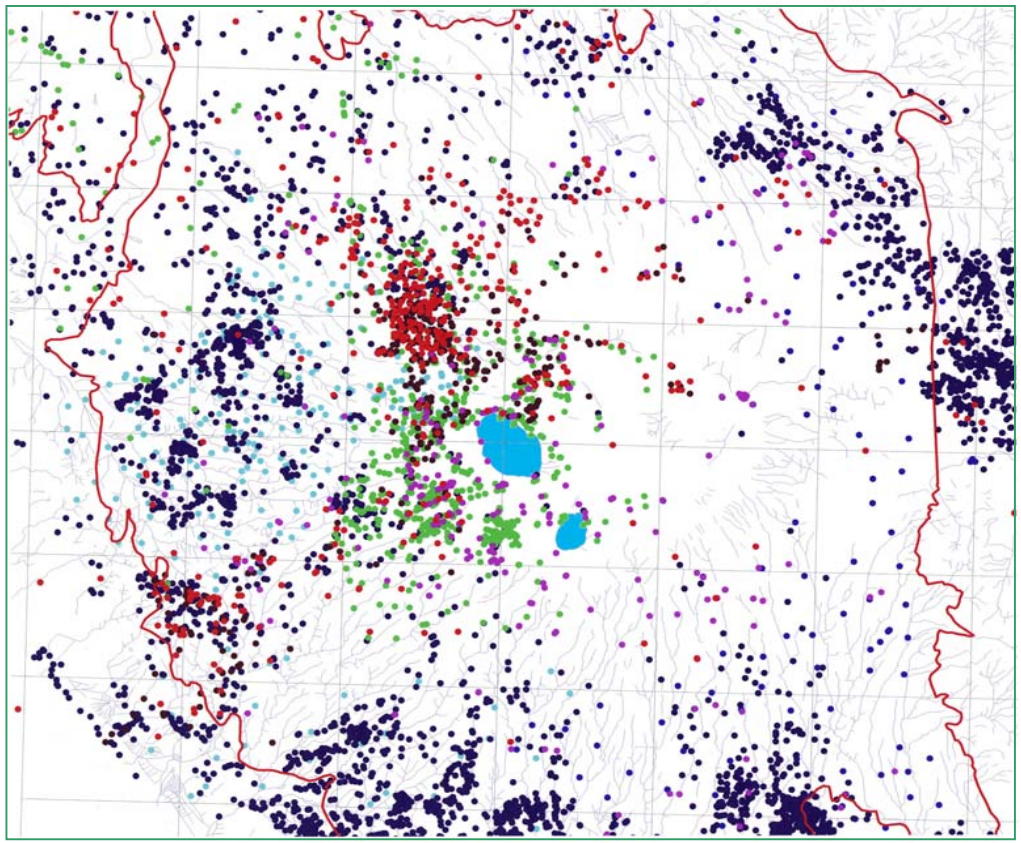
We are defining hydrogeological balance for each structure; as far as the volcanic balance is concerned we are in an advanced phase.

Pressures and impacts in the volcanic acquifers

Growth of urbanization in this area in the last 20 years

Pressures and impacts in the volcanic acquifers

The increasing demand for water was in great part satisfied through the abstraction of groundwater

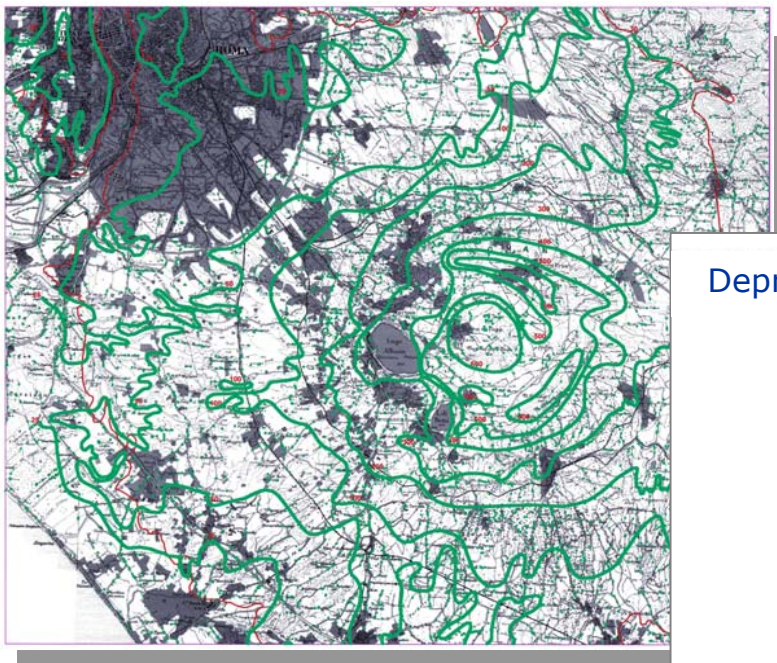


about
20.000 wells

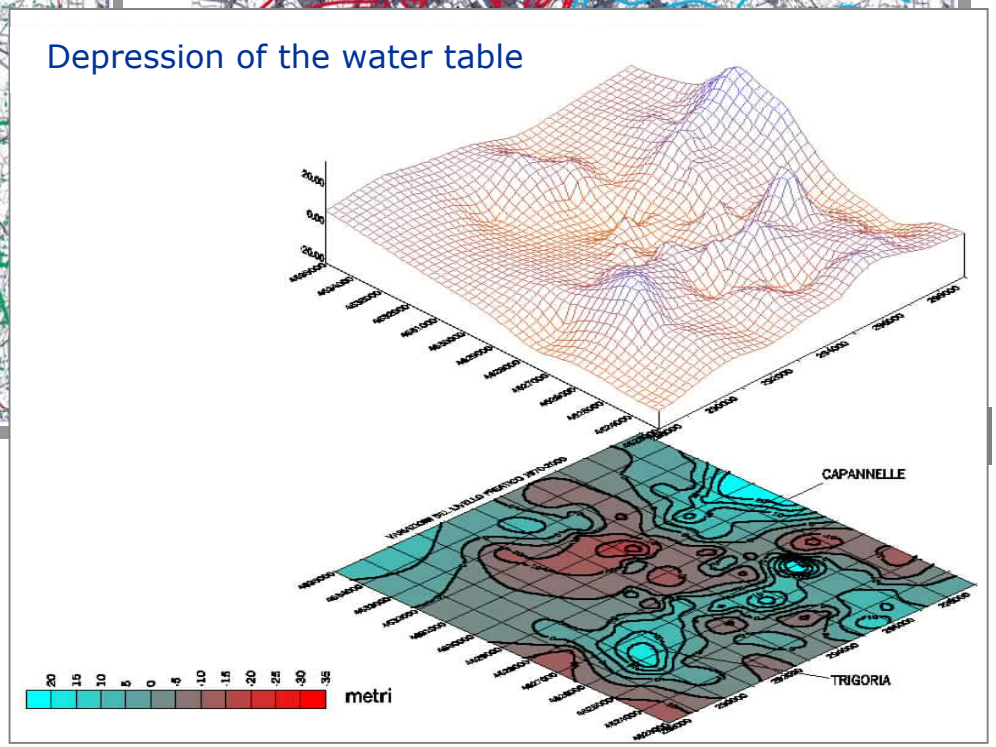
Wells for water supply, agricultural, industrial demand

Pressures and impacts in the volcanic acquifers

Difference between Water table in 1970 and in 2002

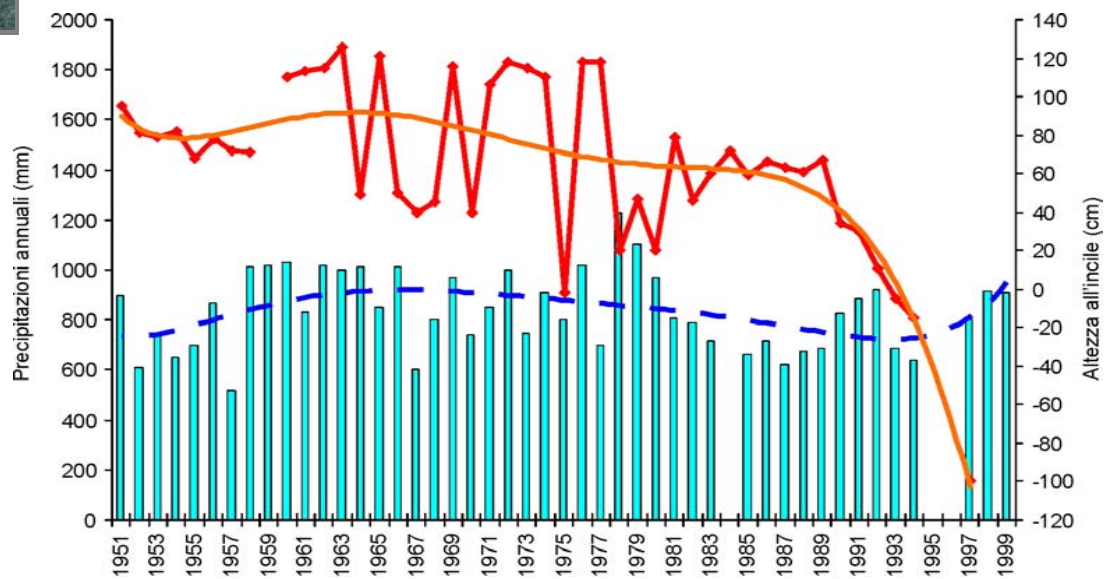


Depression of the water table

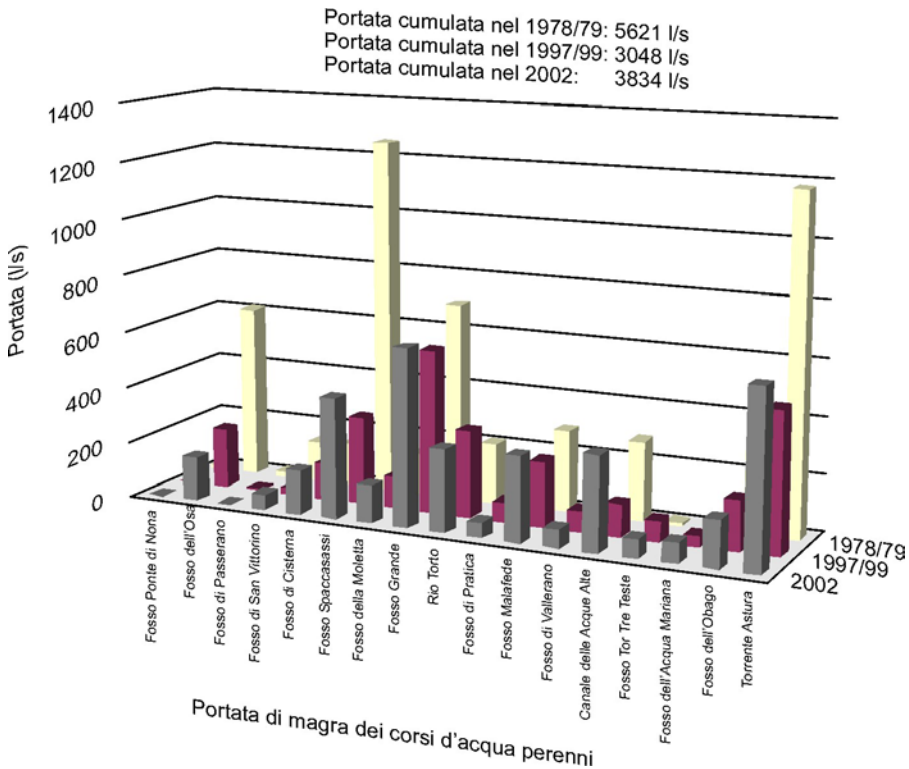


Pressures and impacts in the volcanic acquifers

Hydrometric measurements of the Albano Lake between 1995-1999 compared with mean annual rainfall measured at the Frascati pluviometric station during the same period.
The lake level dropped by 2 m, indipendently from the rainfall

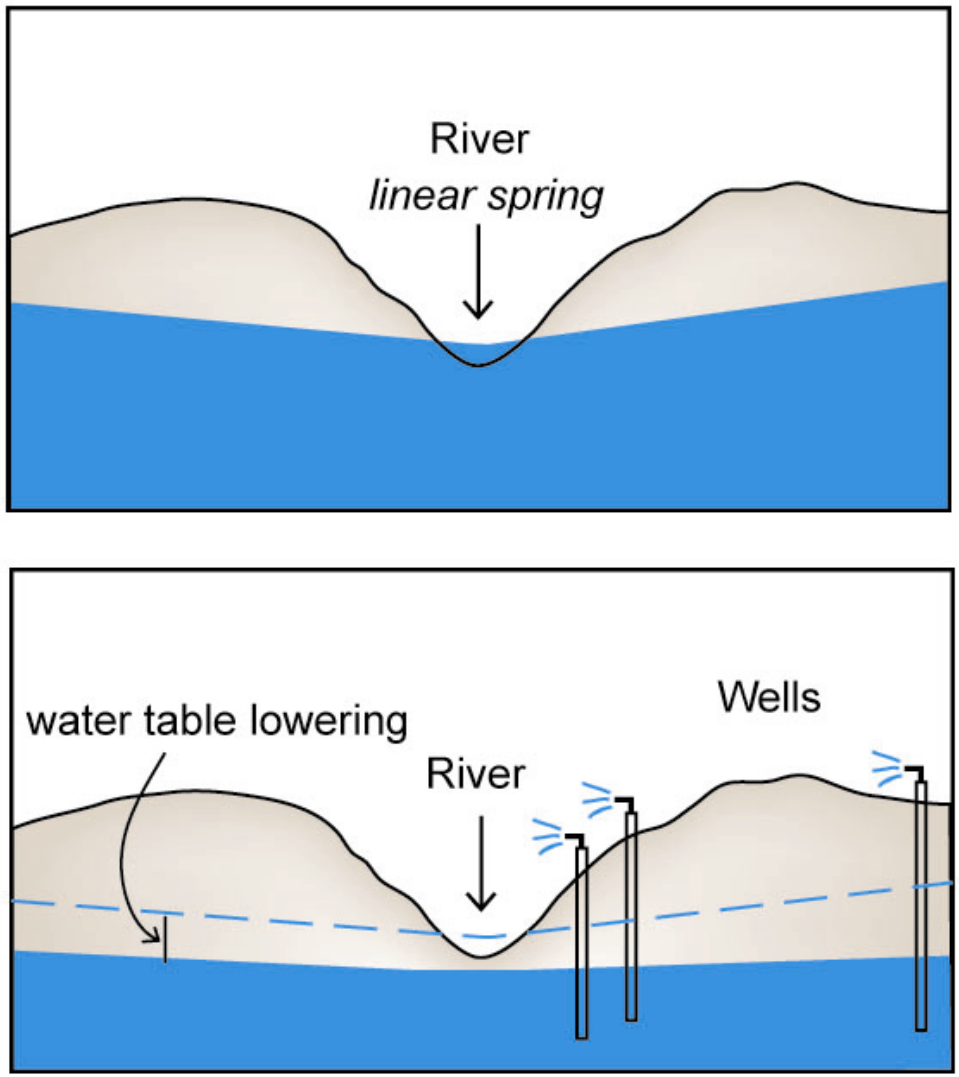


Pressures and impacts in the volcanic acquifers



The diagram shows a drastic decrease of the base flow discharge values by 50% in the last twenty years.

Interaction between surface and groundwater bodies



Integrated Testing in the Tevere Pilot River Basin

River Basin	ART 5 Water Bodies	ART 5 IMPRESS	HMWB	ART 5 REFCOND	ART 5 COAST	Inter calibration	ART 5 WATECO	Monitoring	ART 5 Ground Water	ART 5 Public Participation	Planning Process	GIS	Wetlands
Odense/Fjord													?
Oulujoki													?
Moselle-Sarre													?
Marne													?
Nisse													?
Somes/Szamos													?
Scheldt													?
Pinios													?
Shannon													?
Guadiana													?
Jucar													?
Tevere													?
Cecina													?
Suldalsvassdraget													?
Ribble													?
		The PRB is testing the GD.											
Legend		The PRB is not testing the guidance.											
	?	To be clarified.											

Table 1: Overview GDs tested by the PRBs