



# Eastern Alps District

## Adige River Basin Authority



### *Stakeholder engagement in flood risk management*

### *Experiences in Adige River Basin*

### *The case of Tasso torrent*

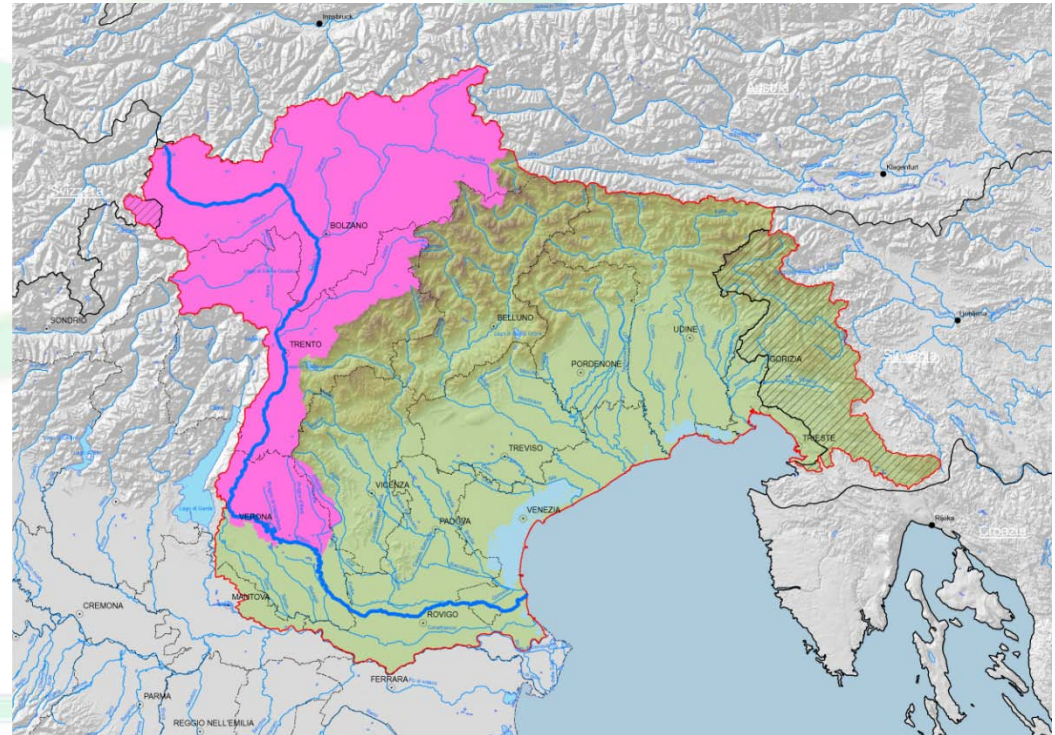
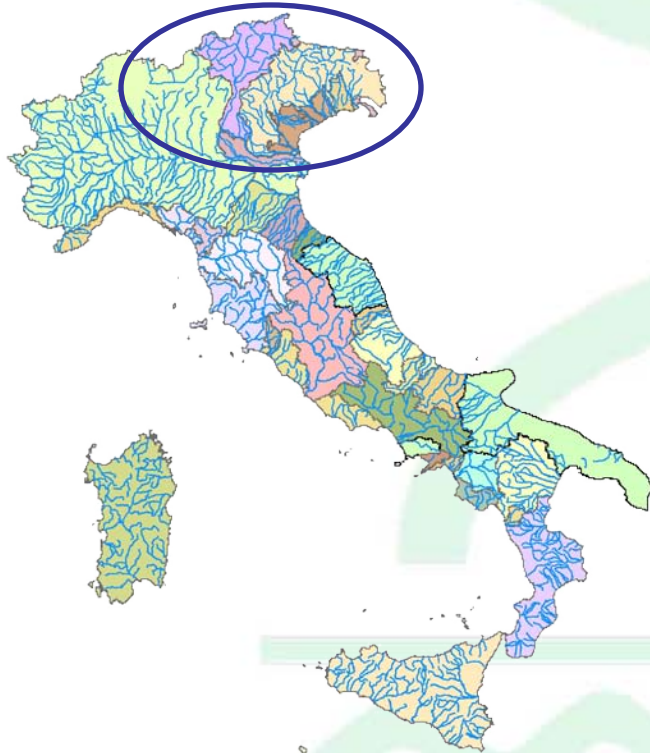


AUTORITA' DI BACINO  
DEL FIUME ADIGE

Eng. Luca Guarino



## The Adige river basin

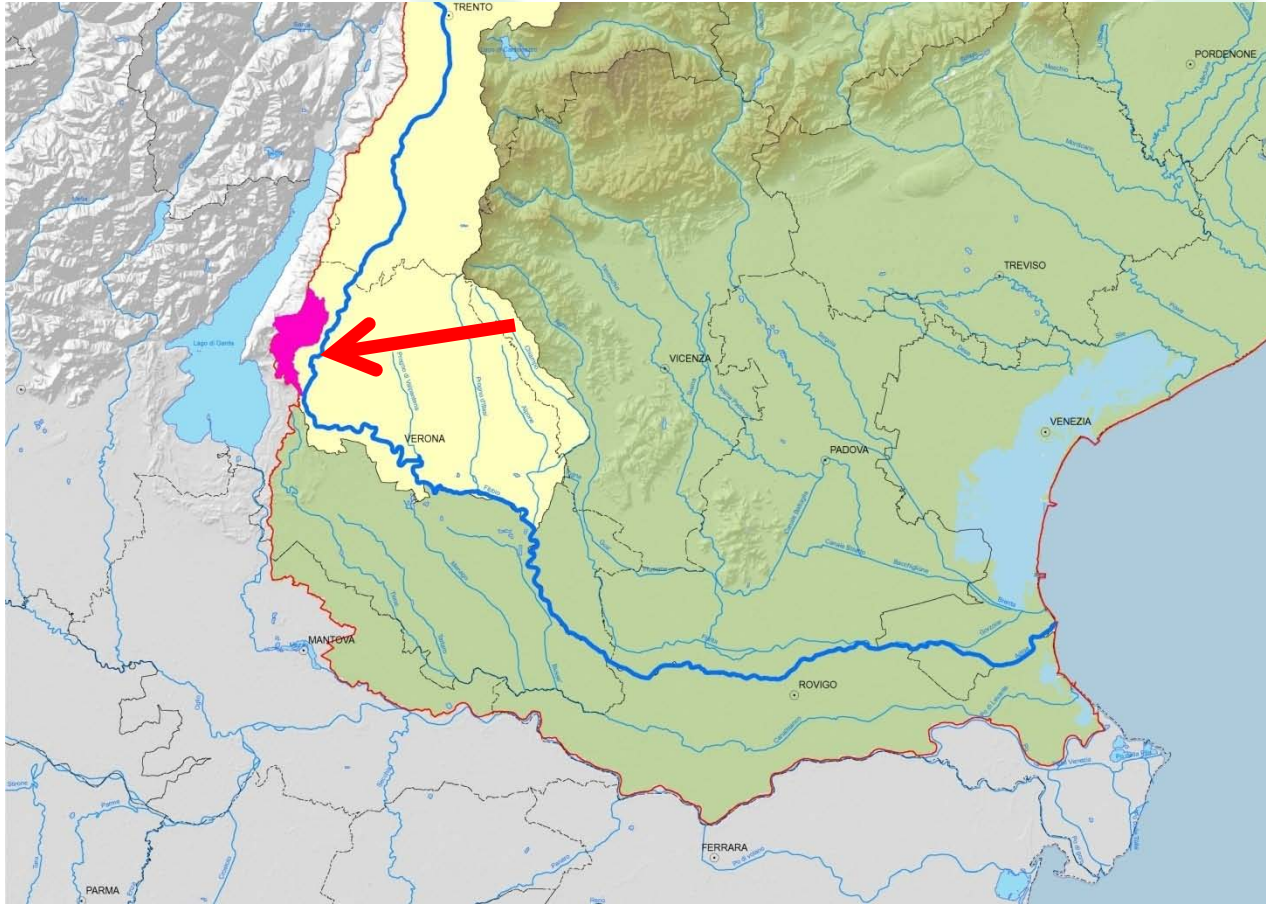


**Surface Area: 12.160 km<sup>2</sup>**

**River Length: 409 km**



## The Tasso torrent basin



It's a small basin  
(around 70 km<sup>2</sup>)

The torrent is  
usually completely  
dry, except after  
heavy rains

In the past there  
was high sediment  
transport during  
floods

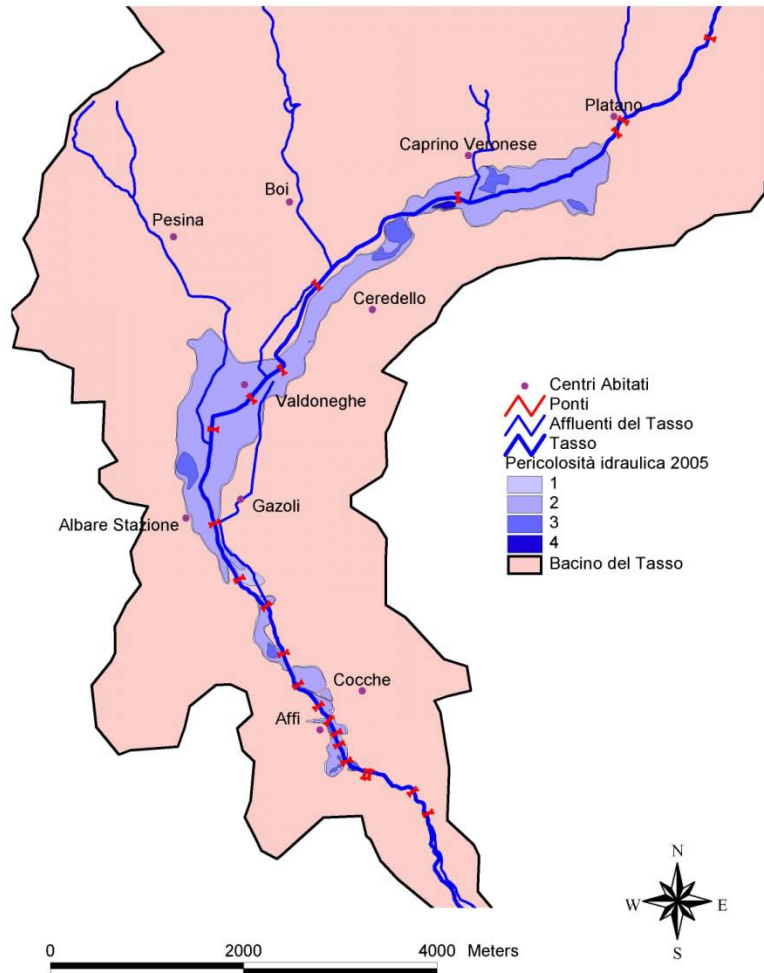
In november 1992  
a severe flood  
event occurred and  
caused heavy  
damages to the  
economy of the  
valley



# Adige River Basin Authority



Bacino del Tasso - Pericolosità idraulica vigente



## Tasso torrent – Flood hazard map in 2005

In February 2005, through a mathematical model, Adige River basin Authority created a flood hazard map for some valleys, including Tasso valley.

In Tasso valley an area of more than 3.000.000 m<sup>2</sup> resulted to be under flood hazard, due to bad condition of Tasso torrent.

The Authority started planning a strategy in order to reduce flood risk



## Tasso torrent – Flood hazard levels

### LEGENDA

Classi di pericolosità idraulica [Q30-Q100-Q200](\*)

	Pericolosità molto elevata $h_{30} > 1m$ $v_{30} > 1m/s$
	Pericolosità elevata $1m > h_{30} > 0,5m$ $h_{100} > 1m$ $v_{100} > 1m/s$
	Pericolosità media $h_{100} > 0m$
	Pericolosità moderata $h_{200} > 0m$

Adige River Basin Authority identified four different levels of flood hazard, in relation to 2 different variables: velocity and depth of water in different scenarios (return periods considered: 30, 100, 200 years):

- very high flood hazard
- high flood hazard
- medium flood hazard
- low flood hazard

(\*) Pericolosità idraulica. Per ogni riga, il verificarsi di almeno una delle condizioni riportate, in assenza delle condizioni delle righe immediatamente superiori, sancisce l'appartenenza alla classe di pericolosità idraulica.



## Tasso torrent – Calculated peak liquid discharges

TR [anni]	Q [m <sup>3</sup> /s]
30	30.98
100	48.7
200	60.8
500	78.8

Tabella 1 Valori di portata al colmo calcolati alla sezione di Platano

TR [anni]	Q [m <sup>3</sup> /s]
30	60.74
100	95.97
200	119.92
500	145.61

Tabella 2 Valori di portata al colmo calcolati alla sezione di Valdoneghe

TR [anni]	Q [m <sup>3</sup> /s]
30	69.86
100	105.09
200	123.36
500	148.90

Tabella 3 Valori di portata al colmo calcolati alla sezione di Affi

Calculated liquid discharges in 3 different sections of Tasso torrent (Platano, Valdoneghe, Affi) in absence of artificial flood areas

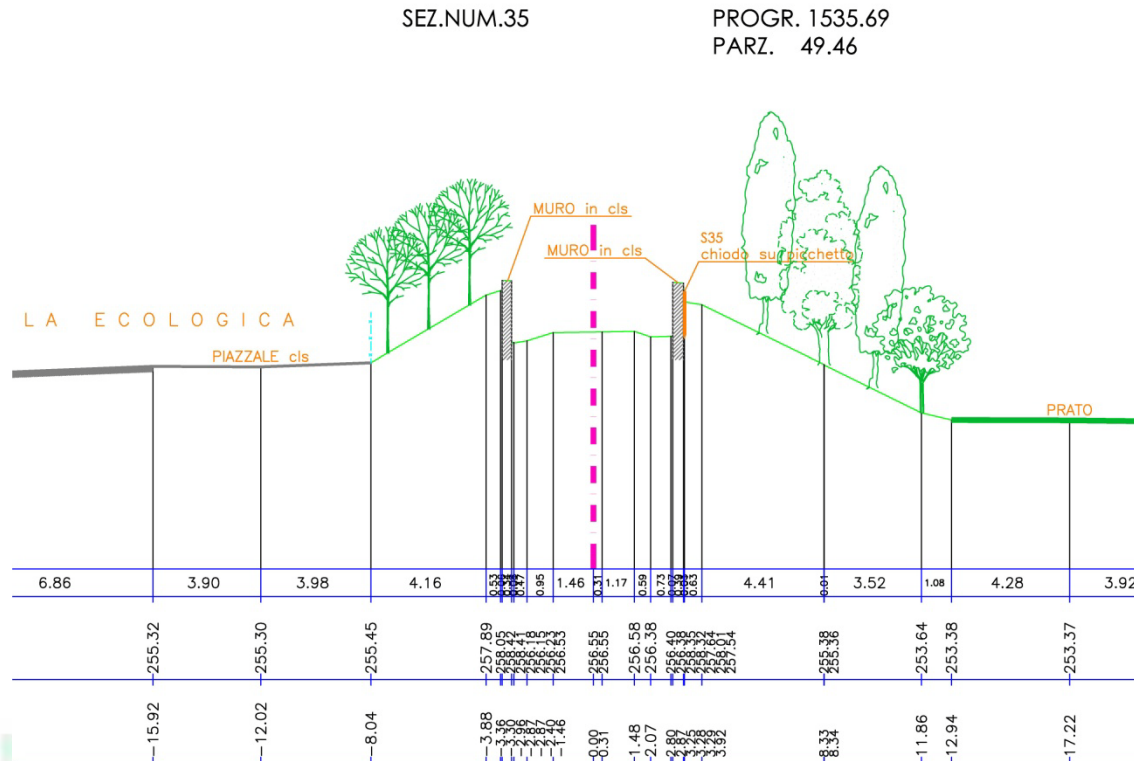
Likely return periods considered here are 30, 100, 200, 500 years



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## Tasso torrent - Typical cross section in year 2005



The main cause for such flood hazard in Tasso valley was that the level of torrent bed was higher than the level of the ground (see picture)



## Tasso torrent – Works in year 2006-2007



During years 2006 and 2007, 250.000 m<sup>3</sup> of sediments were removed to lower the stream bed and to eliminate flood hazard in the middle part of the basin

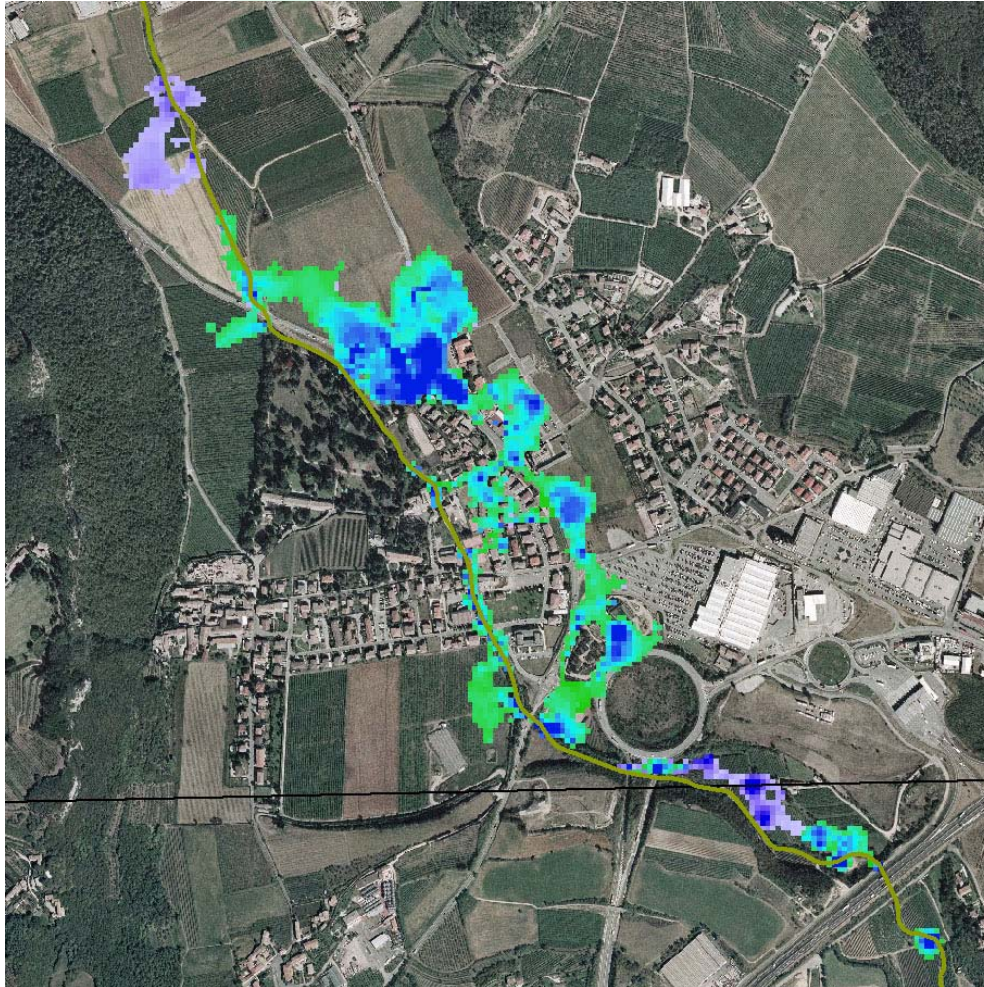
The floodable part of the valley was reduced drastically

This action caused an increase in water discharges in the lower part of the basin in case of floods





## Tasso torrent - Numerical simulations



In the lower part of the basin, Tasso torrent runs through a small city called Affi, where there's no real possibility to enlarge cross sections.

Numerical simulations demonstrated that in case of severe flood Affi could be seriously damaged



Tasso torrent in Affi

Example of a bridge causing problems



Ponte della Chiesa visto da monte



Ponte della Chiesa visto da valle



The Authority suggested some hypothesis to solve the problem of flood hazard in Affi:

- 1) Building a big artificial flood area upstream, in order to reduce discharges in the lower part of the basin
- 2) Building a number of smaller artificial flood areas along the torrent, within the basin
- 3) Building one or more artificial flood areas upstream and an artificial flood diversion channel in the city of Affi.

Adige River Basin Authority decided to plan a stakeholder engagement process in order to decide together with stakeholders which was the best solution to adopt.

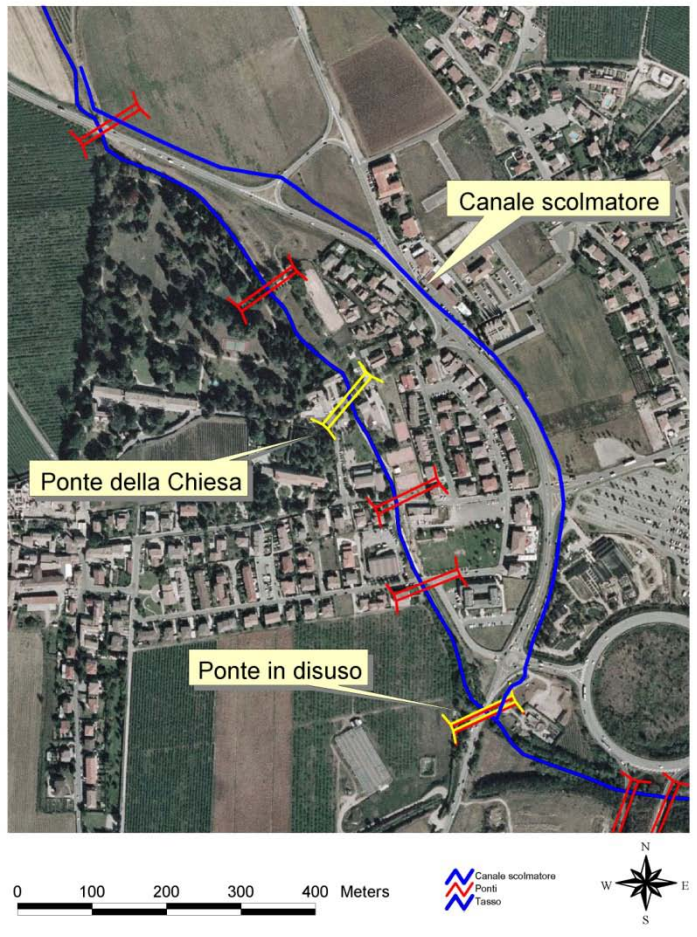
The Basin Authority explained the delicate situation of Affi during some meetings with the local authorities. The Authority was helped by the Municipality of Affi, which organized a public meeting to discuss the problem.



# Adige River Basin Authority



Torrente Tasso ad Affi  
Ponti che generano rigurgito  
Scala 1:5.000



At the end of the discussion, it was decided to adopt the third solution, which seemed to be the most immediate.

The diversion channel without any flood areas can solve the flood problem in Affi only in case of flood intensity predicted every 30 years.

The diversion channel could only be built using some private properties, whose owner accepted to collaborate with the authorities.



# Adige River Basin Authority



## Tasso Torrent in Affi – The lateral channel



The municipality of Affi proposed an exchange of benefits between the public administration and the owner of the private land, on which the channel should have been built.

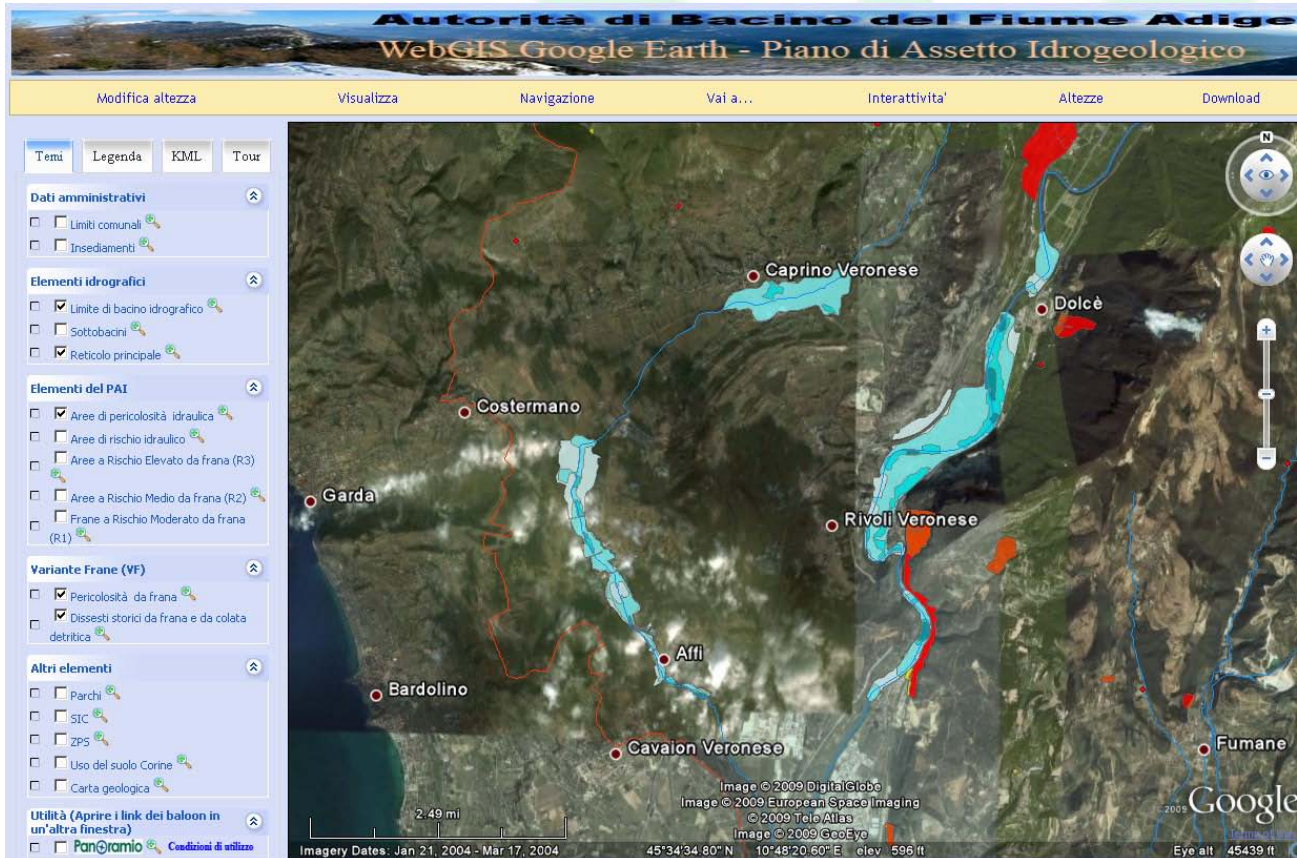
An agreement was reached and now the diversion channel has been built.



# Adige River Basin Authority

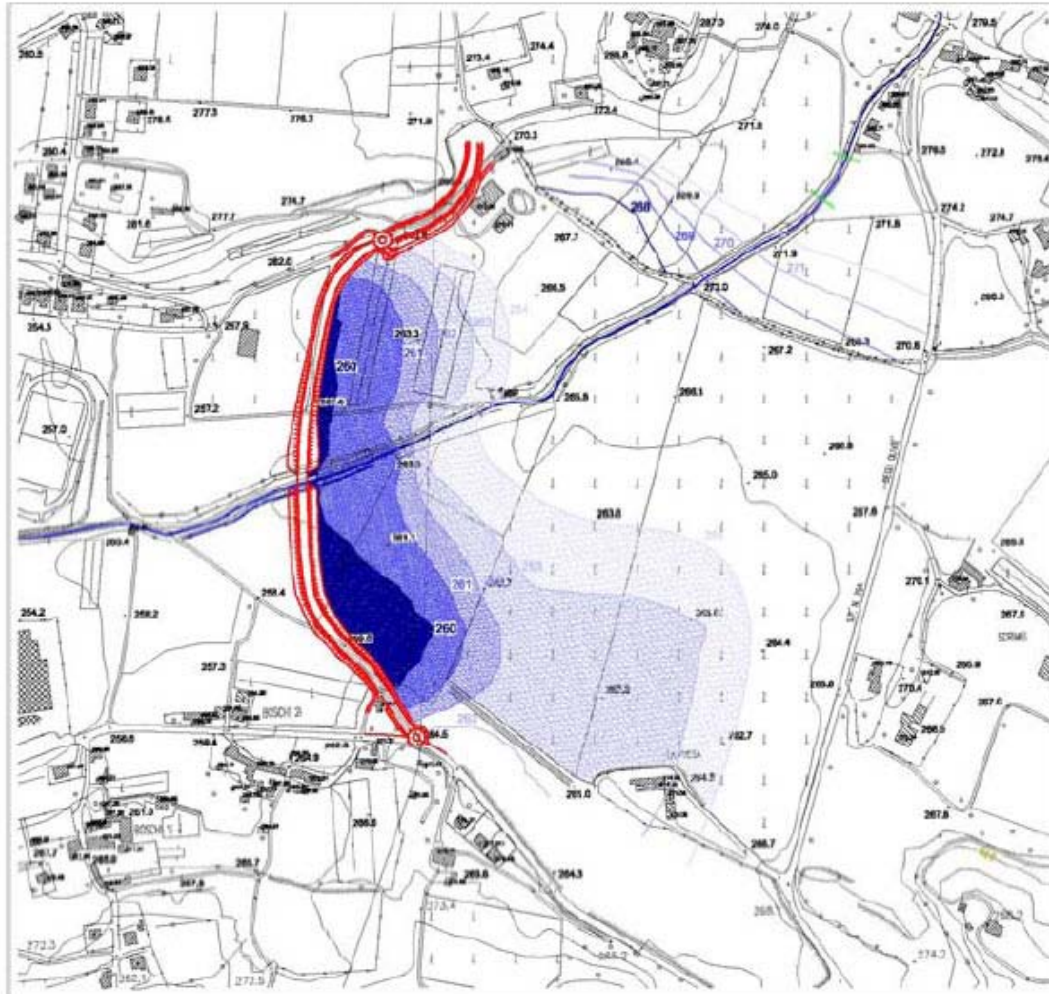


## Tasso Torrent – Flood hazard map in 2009



Flood hazard in Tasso valley has been reduced in recent years but not completely eliminated

The picture shows the current situation (on left side of picture)



It is important to remember that in the case of 100 years or 200 years floods, there's still need to build artificial flood areas upstream to solve the problem.

The Basin Authority is now still working with the Municipalities and their urbanistic planning, to find a way to protect urban zones from 100y o 200y floods.

A new process of stakeholder engagement in flood risk planning started with good results.

New developments and achievements are expected in the near future.

Hoping to be able in the future to avoid situations like this.....



**Thank you  
for your  
attention**





**THE END**

For further information, please contact:  
[luca.guarino@bacino-adige.it](mailto:luca.guarino@bacino-adige.it)