



MICHELE FERRI

Il progetto WeSenseit

Distretto delle Alpi Orientali





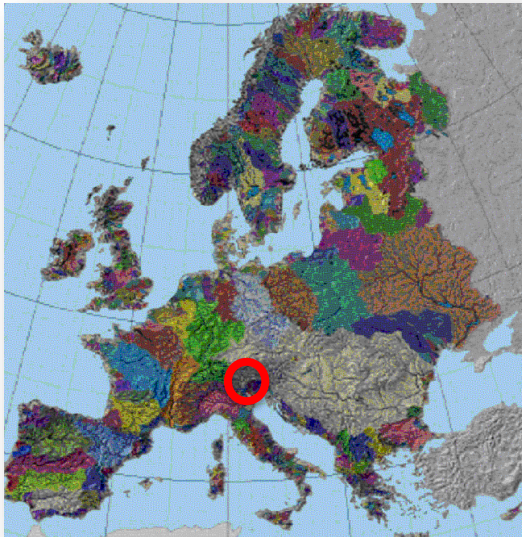
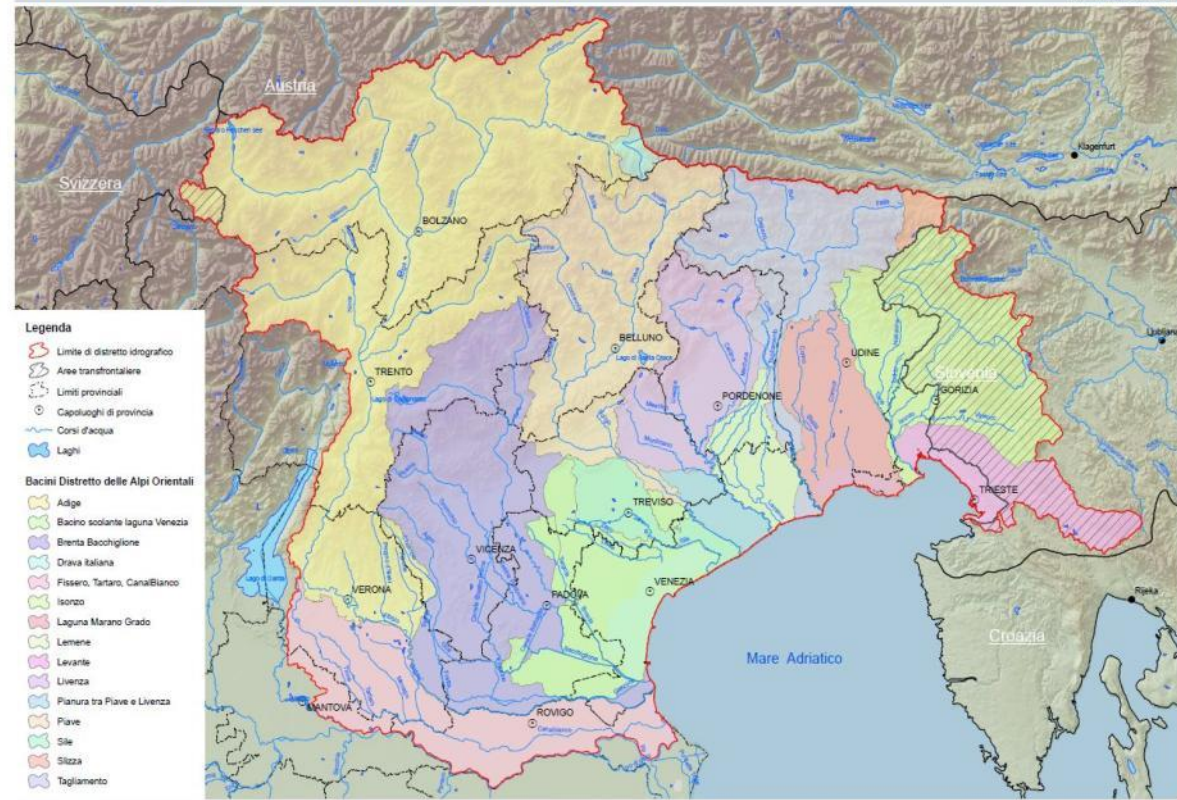
The Hydrographic District of Eastern Alps

extension of about 40,000 Km²

average rainfall ranges from 700 to 3000 mm/year

Distretto idrografico delle Alpi Orientali: Bacini idrografici

MAPPA N°2
<http://www.alpionetali.it>



Fuori Linea di distretto idrografico, aree transfrontaliere, sottobacini arretrati, Depressione Termale, Dorsale del Distretto delle Alpi Orientali, Capoluoghi di provincia, Insiemi provinciali, 01/04/2011.
Fonte e dati: IGM, Carta di Bacini e Categorie (European Commission - 1992, 2007), Fonti: Istituto Nazionale Idrografico, Geo (Fonte IGM alla scala 1:250,000), Data: IGM Data & Maps and IGM Data & Maps (Scale 1:250,000).
Stile: IGM, IGM Data & Maps and IGM Data & Maps (Scale 1:250,000), Data: IGM Data & Maps and IGM Data & Maps (Scale 1:250,000).

Vers. ottobre 2011



The Flood Risk Management Plan

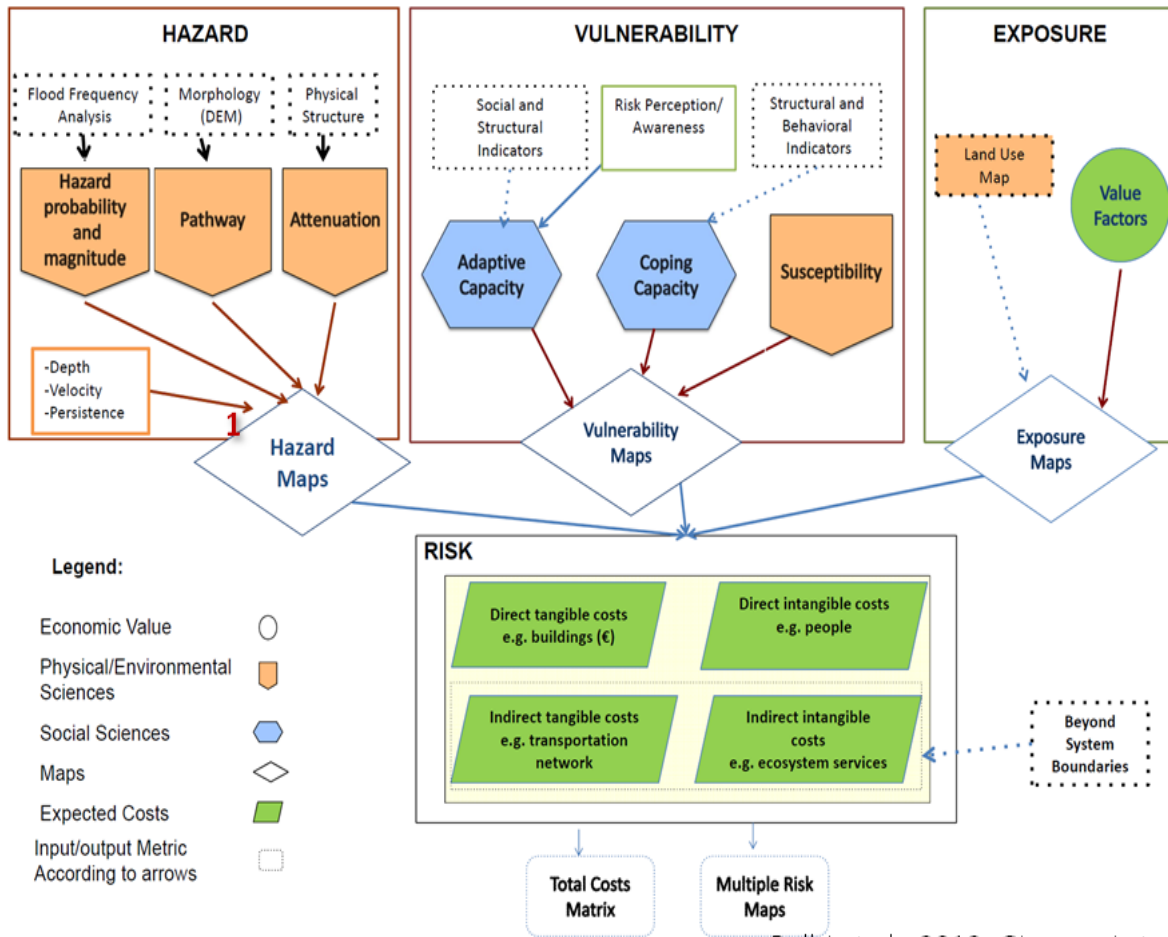
(FRMP) highlights the hazards and risks of flooding from rivers, the sea, surface water, groundwater and reservoirs, and set out how Risk Management Authorities (RMAs) work together with communities to manage flood risk

The Hydrographic District of Eastern Alps approved the plan in March 2016

the Flood Risk Management Plan includes:

- **flood hazard and risk maps**
- objectives for the purpose of managing the flood risk
- proposed **measures** for achieving those objectives





According to the EC Flood Directive, flood risk results as “the combination of the probability of a flood event and of the potential adverse consequences”. Such general statement often finds its operational implementation for producing flood risk maps both in the literature and in national regulations and guidelines as the product of hazard, vulnerability and exposure.

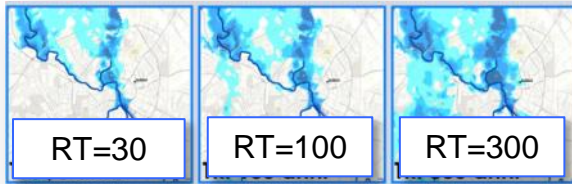
Balbi et al., 2012; Giupponi et al., 2012

$$R = H \times V \times E = H \times D$$





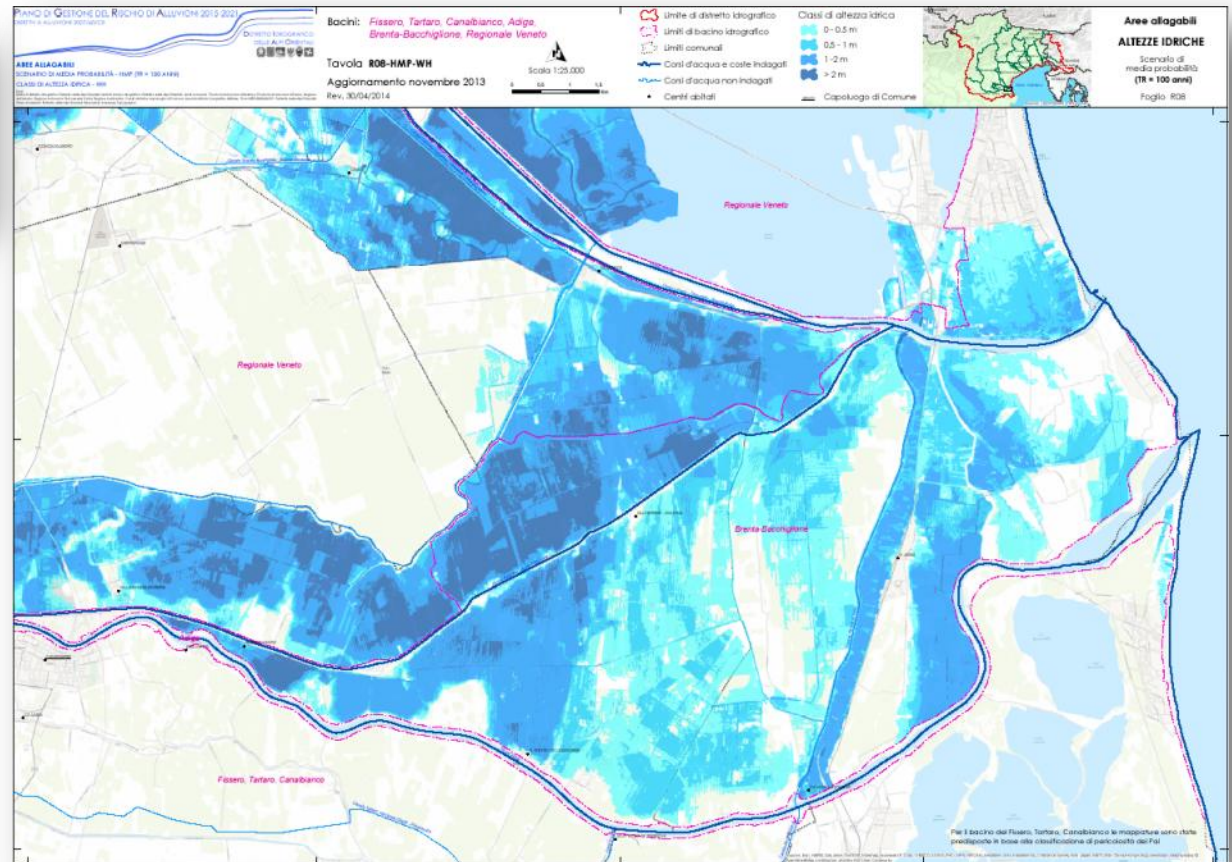
The Hydrographic District of Eastern Alps Implementation of the Flood Directive: The Flood Risk Management Plan



flooded area extension =
1200 km²

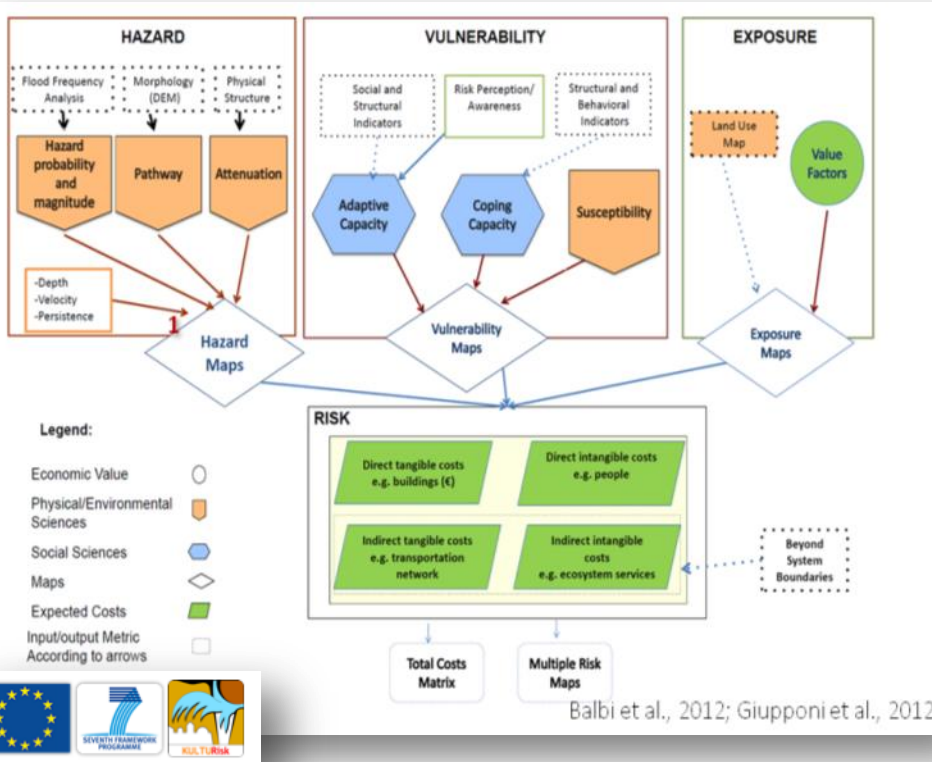
flooded area extension =
2200 km²

flooded area extension =
3900 km²



The Hydrographic District of Eastern Alps Implementation of the Flood Directive: The Flood Risk Management Plan

Exposed and Vulnerability assets



Population

Economic goods

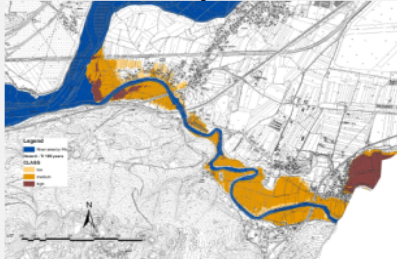
Environmental and cultural heritage



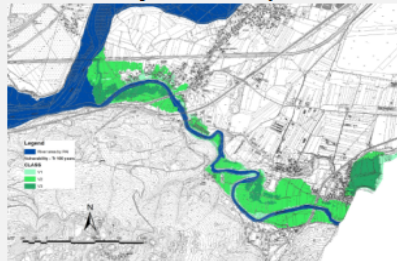
$$R = H \times V \times E$$

(H, V, E)

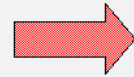
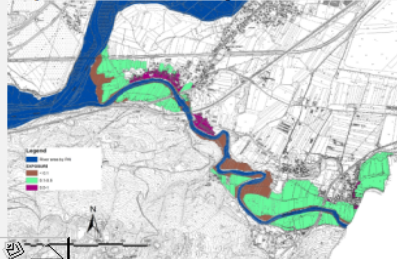
Hazard – Tr 100 years



Vulnerability – Tr 100 years



Exposure – Tr 100 years



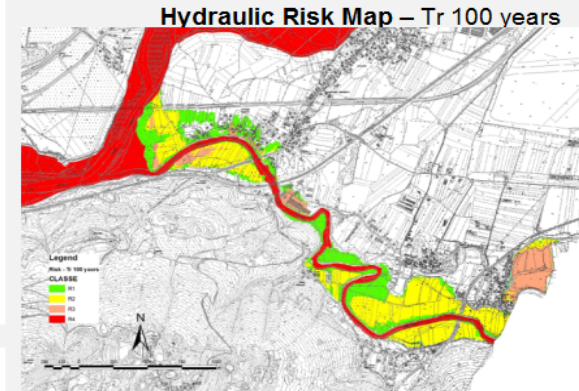
$R_{\text{RECEPTORS}}(H; V, E)$



$R(H, V, E)$

$$R = H \cdot V \cdot E = H \cdot D$$

RISK CLASSES		HAZARD CLASSES				
		P3	P2	P1		
DAMAGE CLASSES	D4	R4	R4	R3	R2	
	D3	R4	R3	R3	R2	R1
	D2	R3	R2	R2	R1	
	D1	R1		R1	R1	

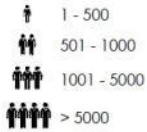


R INTERVALS	DESCRIPTION	Risk category
$0.1 < R \leq 0.2$	Moderate Risk for which relative social economic and environmental damages are negligible or nulls.	R1
$0.2 < R \leq 0.5$	Medium Risk for which are possible minor damage to buildings, infrastructures and environmental heritage that do not compromise people safety, buildings use and economic activities functionality.	R2
$0.5 < R \leq 9$	High Risk for which are possible problems for people safety, functional damages to buildings and infrastructures, interruption of socio economic activities and damages to environmental heritage.	R3
$0.9 < R \leq 1$	Very High Risk for which there are possible loss of human lives and serious injuries to people, serious damages to buildings, infrastructures and environmental heritage and the destruction of socio economic activities.	R4



ELEMENTI ESPOSTI

Abitanti



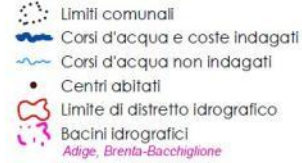
Aree protette



Patrimonio culturale



Attività economiche



fonti:
 Limite di distretto idrografico: Istituto delle Api Orientali; Limite di bacino idrografico: Istituto delle Api Orientali; Limiti comunali: Provincia Autonoma di Bolzano, Provincia Autonoma di Trento, Regione del Veneto, Regione Autonoma Friuli Venezia Giulia, Regione Lombardia; Centri abitati e capoluoghi di Comune: Istituti Istituti Geografici Militari; Piani IPR 2000/00/02; Centro delle Api Orientali; Elementi esposti e icari di rischio: Istituto delle Api Orientali; Base raster: basemap Topographic.

Novembre 2013
 Rev. 30/11/2015



CLASSI DI RISCHIO

- Moderato (R1): i danni sociali, economici ed al patrimonio ambientale sono trascurabili o nulli
- Medio (R2): sono possibili danni minori agli edifici, alle infrastrutture e al patrimonio ambientale che non pregiudicano l'incolumità delle persone, l'agibilità degli edifici e la funzionalità delle attività economiche
- Elevato (R3): sono possibili problemi per l'incolumità delle persone, danni funzionali agli edifici e alle infrastrutture con conseguente inagibilità degli stessi, l'interruzione di funzionalità delle attività socio-economiche e danni relativi al patrimonio ambientale
- Molto elevato (R4): sono possibili perdita di vite umane e lesioni gravi alle persone, danni gravi agli edifici, alle infrastrutture ed al patrimonio ambientale, la distruzione di attività socio-economiche

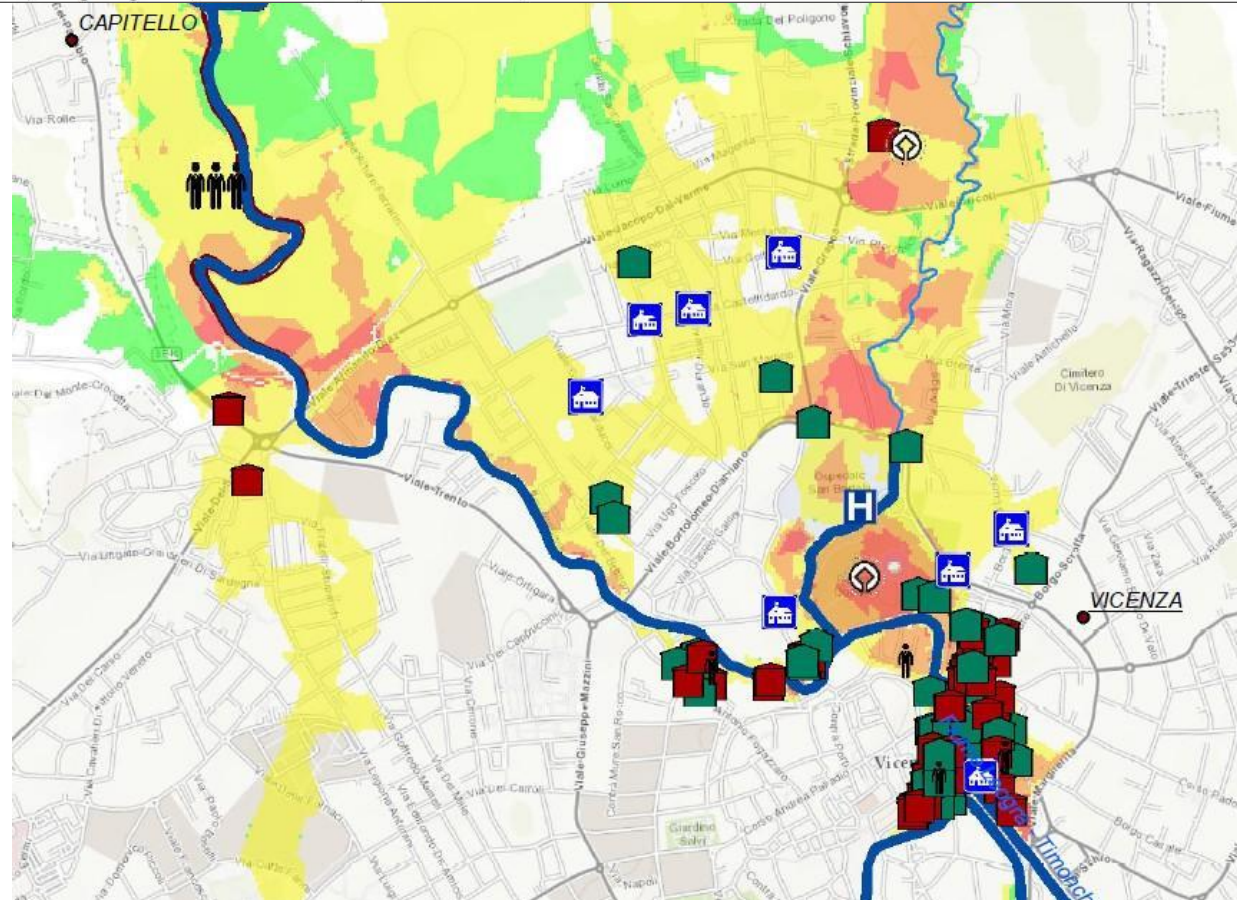
The flood risk maps

Number of inhabitants

Protected areas

Cultural heritage

Economic activities





The Hydrographic District of Eastern Alps Implementation of the Flood Directive: The Flood Risk Management Plan

Risk Assessment

VULNERABILITY



Risk perception
Awareness

Behaviors

Adaptive capacity
Coping capacity
Resilience





The Hydrographic District of Eastern Alps Implementation of the Flood Directive: The Flood Risk Management Plan

Risk Assessment



EXPOSURE

Evacuation

Assets
handling/
transfer

presence of people, livelihoods, environmental resources, or economic, social, or cultural assets in places that could be adversely affected



It's all about the people



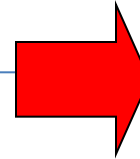
The Hydrographic District of Eastern Alps

Implementation of the Flood Directive: The Flood Risk Management Plan

The Floods Directive (2007/60/CE), as the Water Framework Directive (2000/60/EC), attributes to European citizens a key role in the implementation of the Flood Management Plan;

Information

Consultation



Participation

People provided official observations regarding the implementation of the Flood Management Plan

highest priority in the non-structural measures of prevention and preparedness





The Hydrographic District of Eastern Alps Implementation of the Flood Directive: The Flood Risk Management Plan

In the Eastern Alps Hydrographic District, **the citizen observatory** is promoted as a non structural mitigation measure for flood risk in the implementation of the European Flood Directive 2007/60/EC (preparedness **measure M43_1**)



According to the European Commission the project **WeSenseIT- Citizen Water Observatories**

is one of the three examples of EU-funded projects that have developed unique forecasting and alert systems to warn communities of impending floods





The Hydrographic District of Eastern Alps Citizen Observatory

Citizens' observatories are emerging as a means to establish interaction and co-participation between citizens and authorities both during emergencies but also during the day-to-day management

Authorities and citizens cooperate in:

- sharing information about events and places
- supporting a shared situation awareness, not only to improve response and recovery, but also to improve prevention, protection and preparedness for future emergency situations
- implementing new approaches to participation in planning, decision making and governance





The Hydrographic District of Eastern Alps Citizen Observatory

It's a virtual place of the two-way communication between citizens and decision-making authorities



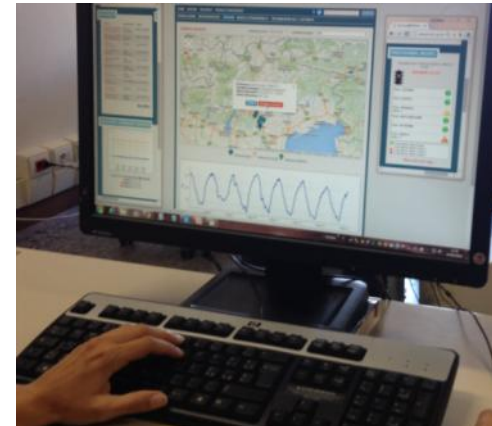
Observatories allow citizens and communities to take on a new role in the information chain

It's the decision support at all stages of the floods management process: preparedness, emergency, recovery



The Hydrographic District of Eastern Alps Citizen Observatory

Citizens become active stakeholders in information capturing, evaluation and communication

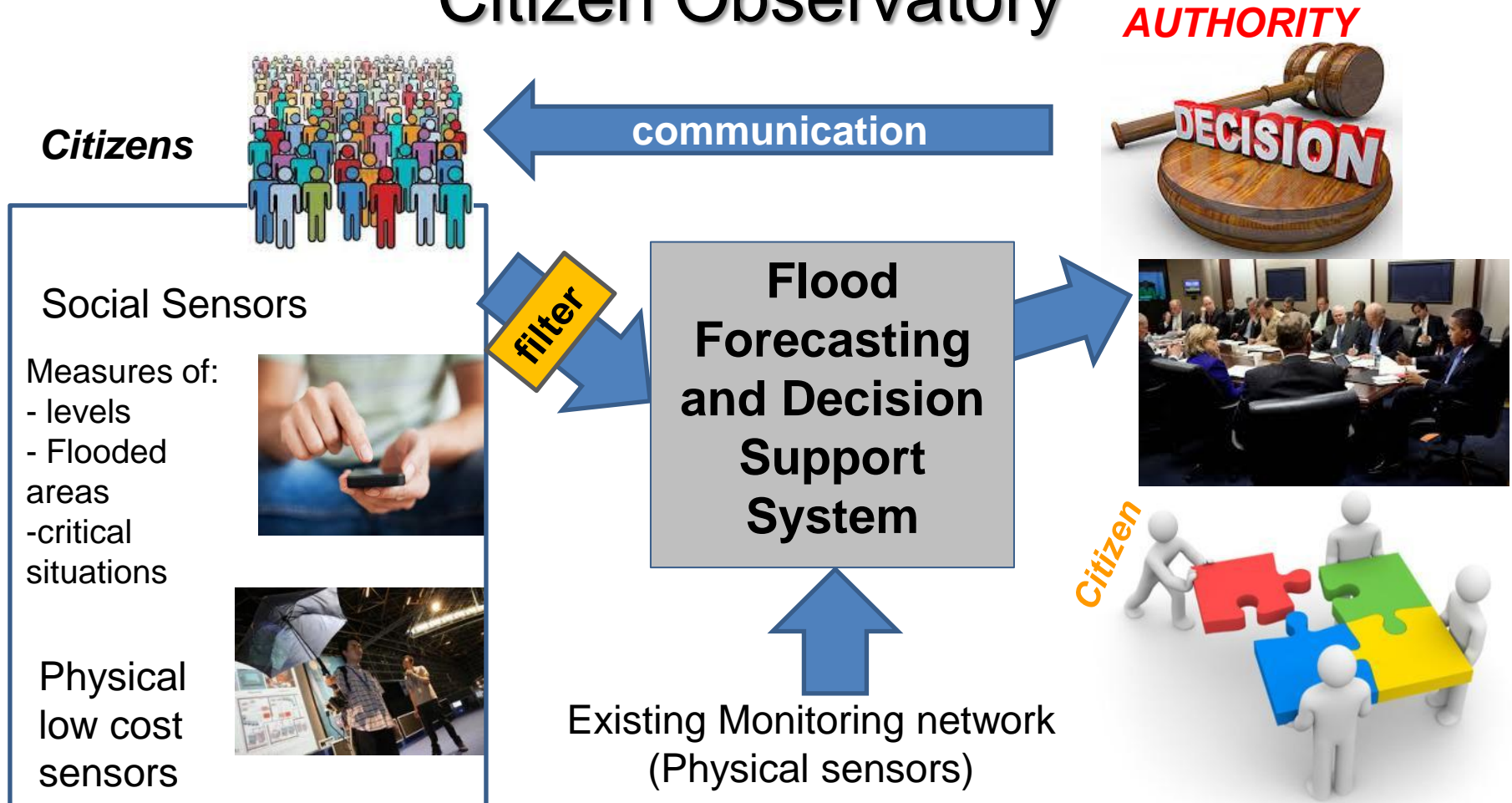


Environmental structured data collection via optimized networks of sensors as well as information provided directly by citizens (measurements, images, messages) and via mining of social media portals

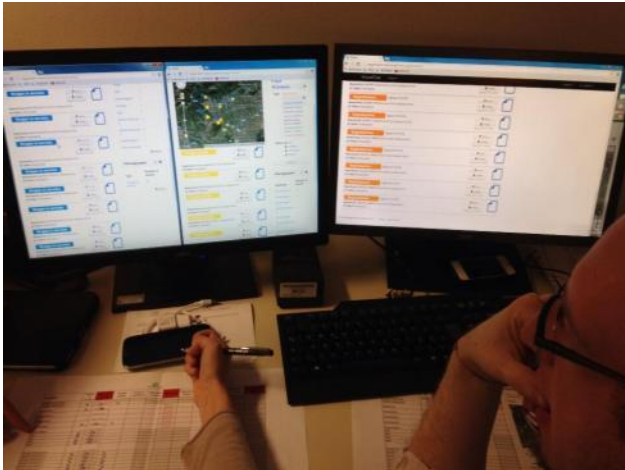




Citizen Observatory

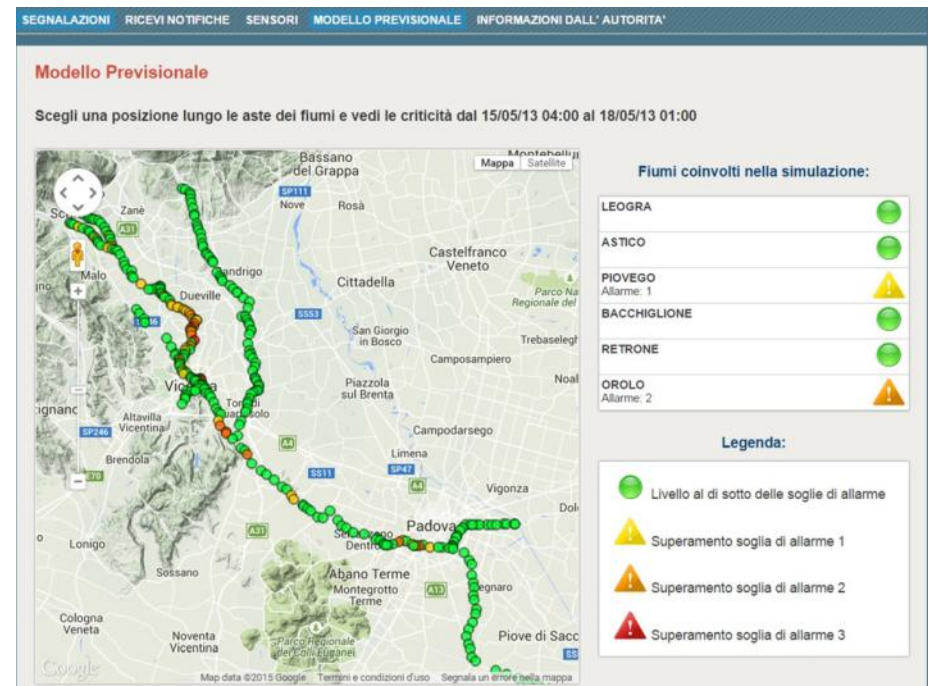


The Hydrographic District of Eastern Alps Citizen Observatory



Development of predictive models and decision-making tools that will be able to optimally assimilate both social and physical data

Early Warning System



Some examples: VICENZA (April, 25th 2014)

evacuation of the city due to the dismantle of a II World War Bomb

REAL TIME MONITORING
of the activities in
GATHERING POINTS and
SHELTERS



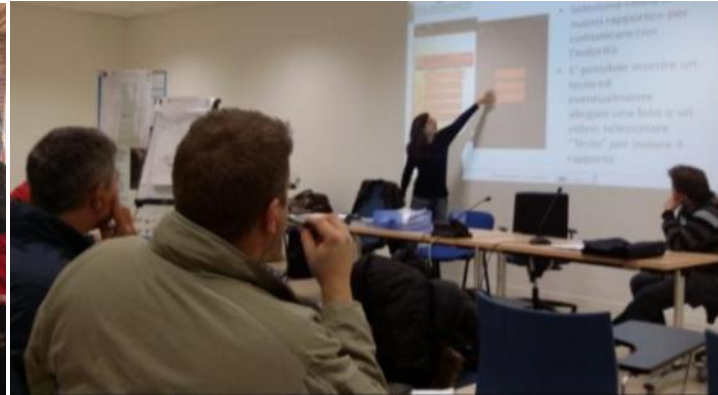
Explaining the
operation to
the head of
National Civil
Protection
Department



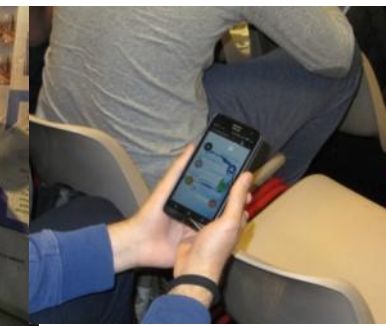
Control room
activities

The Hydrographic District of Eastern Alps Citizen Observatory

TRAINING activities with Civil Protection volunteers and professionals



EDUCATION campaigns with school teachers and students



The citizens are the hearth of the alert system: they are involved in data collection and are made aware of the risk that characterizes the place in which they live

Citizen Observatory's potential:

- to create “resilient” models, harnessing the power of the people to withstand a disaster
- to effectively help people and the authorities involved during an emergency



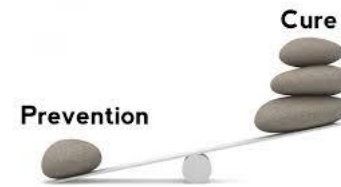
The Citizen Observatory can generate social but also ECONOMICAL value!!!!

Implementation of the Flood Directive: The Flood Risk Management Plan

PLANNED RESOURCES per Unit Of Management



Prevention (M2)
10 million euro



Protection (M3)
1000 million euro

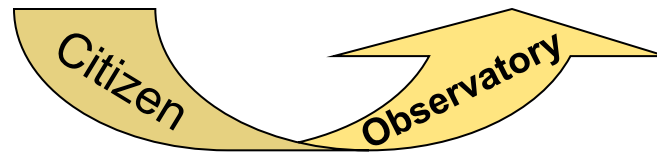
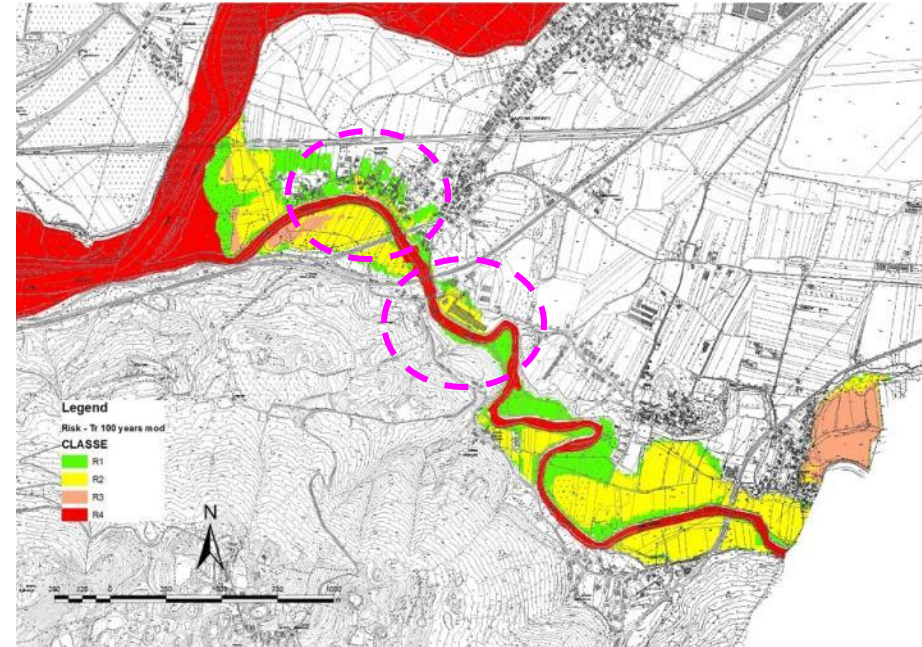
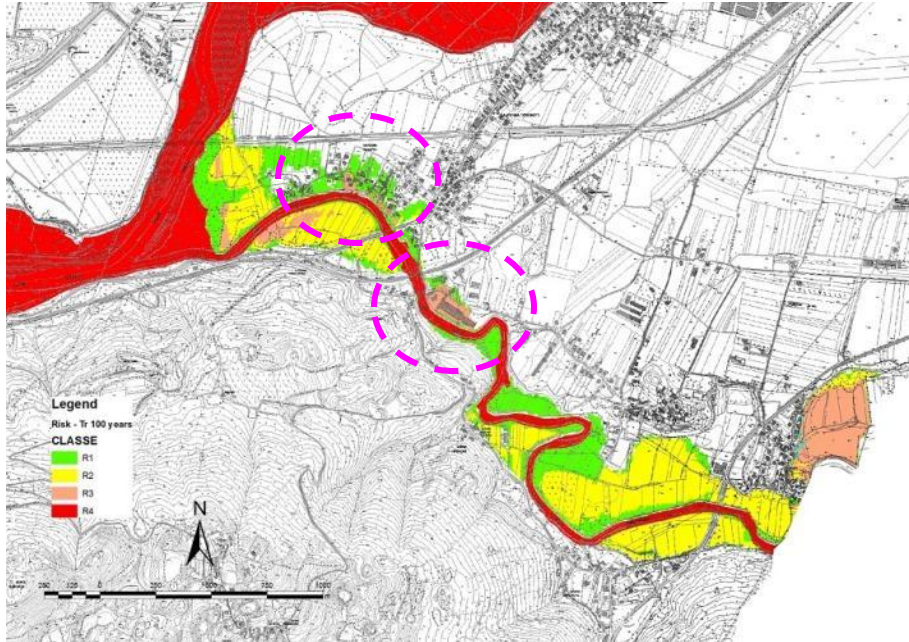


Preparedness (M4)
10 million euro





THE CITIZEN OBSERVATORY AS FLOOD RISK MITIGATION MEASURE



by: “*SERRA application to flood risk in the Vipacco Basin*”, iEMSs, San Diego 2014





INTERNATIONAL CONFERENCE

CQWM

Citizen Observatories for Natural
Hazards and Water Management

**27 - 30 November 2018,
VENICE**

Info on: **www.cowm.eu**



-Palazzo Labia





GRAZIE

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