



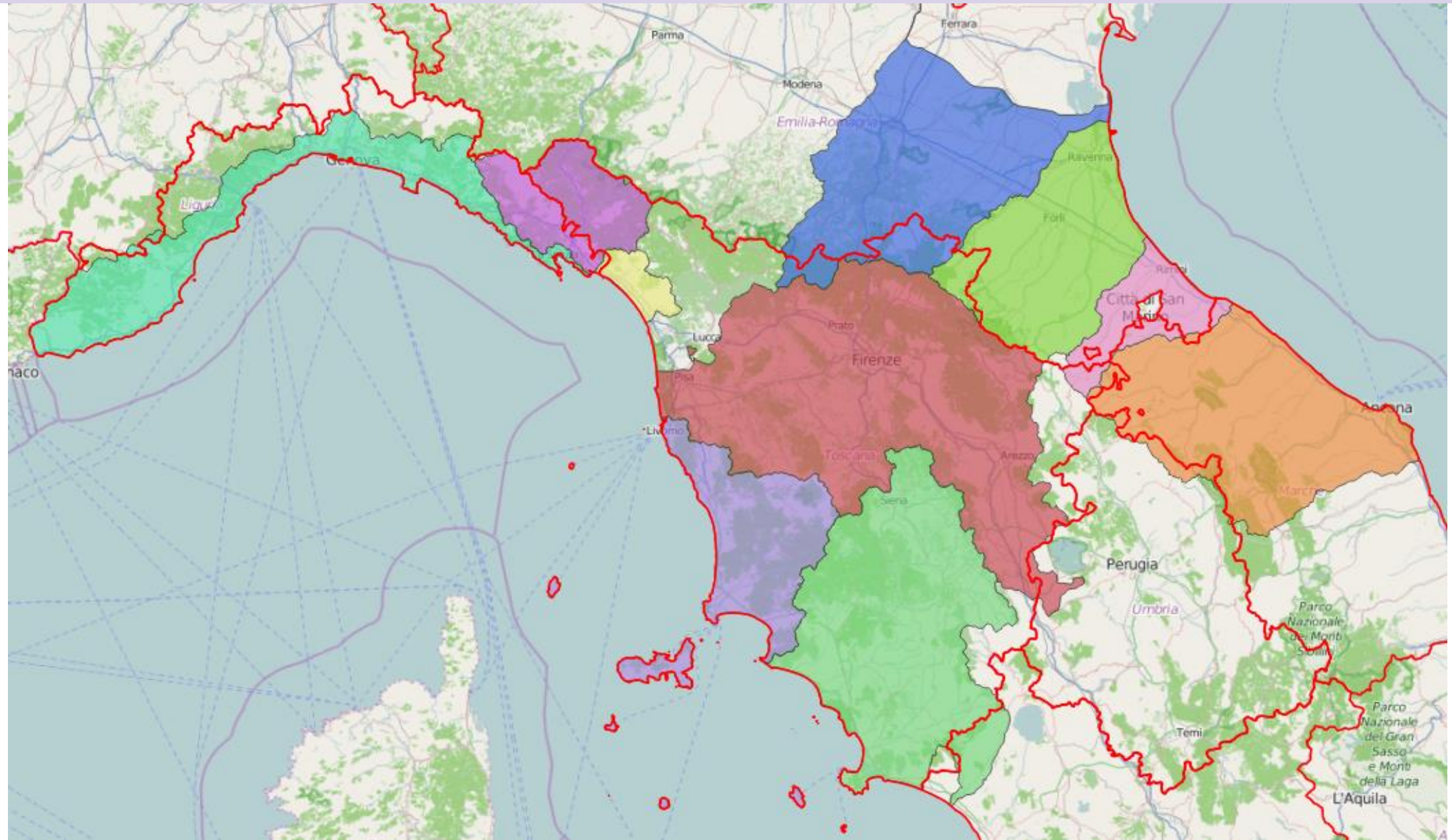
# **Il Piano di Gestione delle Acque del Distretto Idrografico dell'Appennino Settentrionale**

## **Il Bilancio Idrico e il Progetto PAWA (Pilot Arno Water Accounts)**

**WORKSHOP NAZIONALE SULL'IDROLOGIA  
OPERATIVA – BILANCIO IDROLOGICO E  
IDRICO**

**Bernardo Mazzanti**  
*Roma, 09/12/2015*

# Il Distretto dell'Appennino Settentrionale



## Objectives and Exemptions

- IT to follow up on a **clear justification of exemptions** based on the updated Article 5 analysis and a comprehensive assessment of the measures needed to achieve good status

## Programme of measures

- For the next RBMP a **better link between pressures and measures** should be made not only for agriculture but for all other sectors too

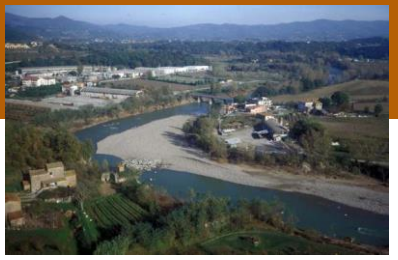
# La scheda del corpo idrico

## Scheda Corpo idrico

<b>Informazioni generali</b>	Codice	CI_N002AR623fi2
	Codice WISE	IT09CI_N002AR623fi2
	Nome	TORRENTE PESA VALLE
<b>Localizzazione</b>	Subunità	ARNO
	Regione	TOSCANA
	Bacino	Arno
	Sottobacino	Pesa
<b>Caratteristiche</b>	Categoria	Fiumi
	Tipo	11SS3N
	Natura	Naturale
	Area bacino [kmq]	333.6
	Area dir. afferente [kmq]	55.3
	Aree protette	ASE018 (ASENS) CI_N002AR623fi2 (P)



**Caratterizzazione corpo idrico**



**Determinanti Pressioni Impatti**



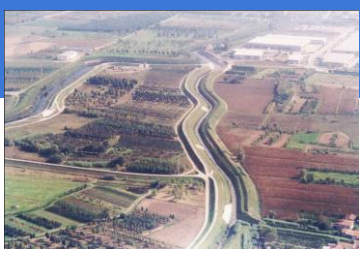
**Stato ambientale**

**Bilancio Idrico**



**Programma delle misure**

**Relazione misure PGRA**



# L'analisi

## Scheda Corpo idrico

<b>Informazioni generali</b>	Codice	CI_N002AR623fi2
	Codice WISE	IT09CI_N002AR623fi2
	Nome	TORRENTE PESA VALLE
<b>Localizzazione</b>	Subunità	ARNO
	Regione	TOSCANA
	Bacino	Arno
	Sottobacino	Pesa
<b>Caratteristiche</b>	Categoria	Fiumi
	Tipo	11SS3N
	Natura	Naturale
	Area bacino [kmq]	333.6
	Area dir. afferente [kmq]	55.3
<b>Connessioni</b>	Aree protette	ASE018 (ASENS) CI_N002AR623fi2 (P)
	Corpi idrici a monte	[IT09CI_N002AR750fi], [IT09CI_N002AR779fi], [IT09CI_N002AR778fi], [IT09CI_N002AR721fi], [IT09ci_N002AR623fi1], [IT09CI_N002AR731fi], [IT09CI_N002AR011fi], [IT09CI_N002AR154fi], [IT09N002AR020IN]
	Corpi idrici a valle	[IT09CI_N002AR081fi4]

## Analisi II PdG

### Passaggi fondamentali

Stima del gap

Stima della potenzialità  
delle misure

Stato ambientale

Misure in atto

Misure aggiuntive

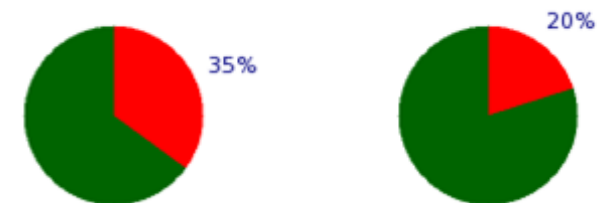
Giustificazioni

Obiettivi / Esenzioni

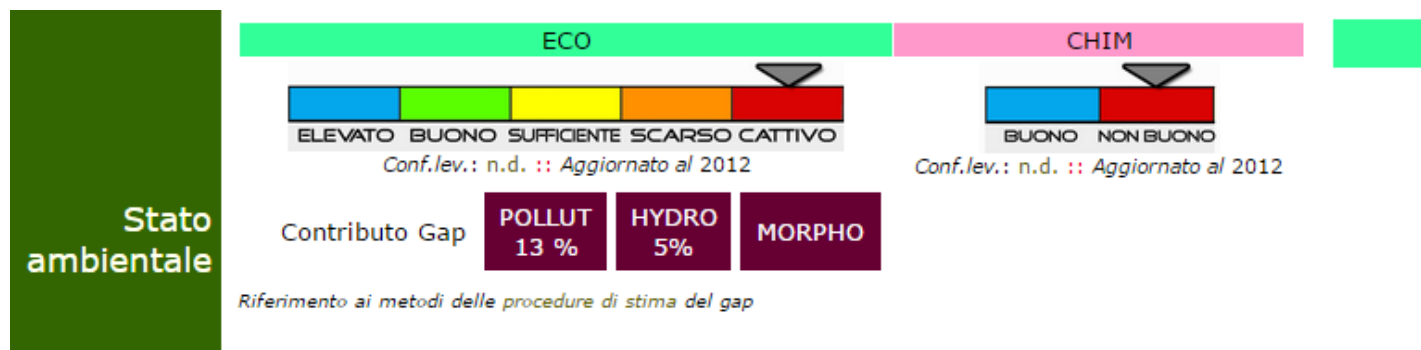
# Valutazione del gap

## Scheda Corpo idrico

Informazioni generali	Codice	CI_N002AR623fi2
	Codice WISE	IT09CI_N002AR623fi2
	Nome	TORRENTE PESA VALLE
Localizzazione	Subunità	ARNO
	Regione	TOSCANA
	Bacino	Arno
	Sottobacino	Pesa
Caratteristiche	Categoria	Fiumi
	Tipo	11SS3N
	Natura	Naturale
	Area bacino [kmq]	333.6
	Area dir. afferente [kmq]	55.3
	Conessioni	Aree protette
	Corpi idrici a monte	[IT09CI_N002AR750fi], [IT09CI_N002AR779fi], [IT09CI_N002AR778fi], [IT09CI_N002AR721fi], [IT09ci_N002AR623fi1], [IT09CI_N002AR731fi], [IT09CI_N002AR011fi], [IT09CI_N002AR154fi], [IT09N002AR020IN]
	Corpi idrici a valle	[IT09CI_N002AR081fi4]

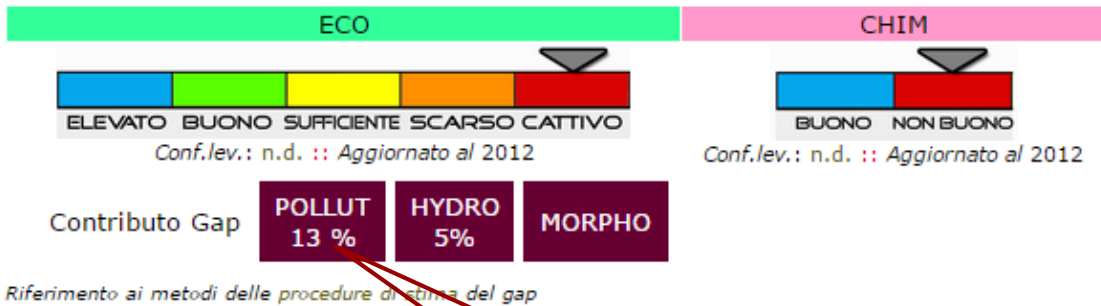


Gap da stato e pressioni

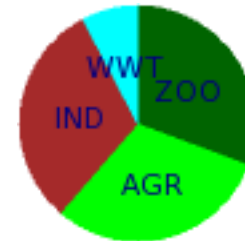
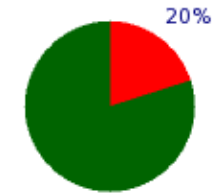
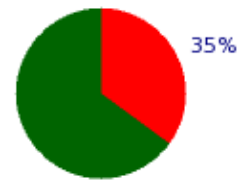


# Valutazione del gap

Stato ambientale



## Procedura di stima



unità di misura comune (p.e. ab eq. depurati, Ml mc di volume d'acqua)

stime sulla base di riferimenti di letteratura (p.e. CNR IRSA), con una valutazione dell'incertezza

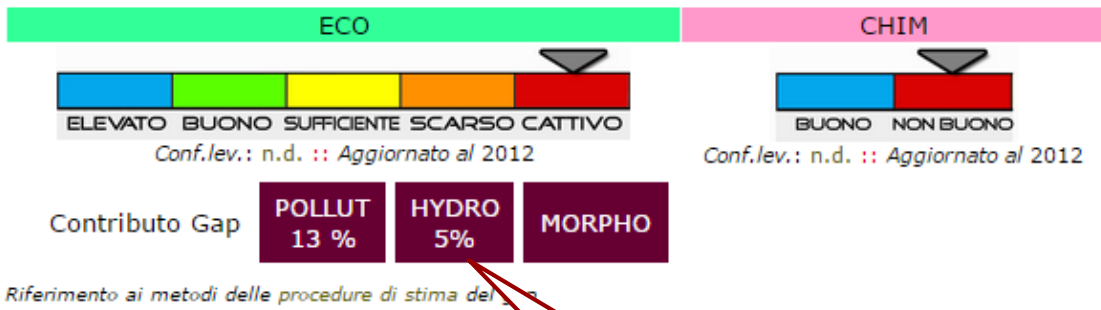
Stima carichi inquinanti da nutrienti	
Carico diretto	9.55 [Ml mc/anno]
Carico inquinante complessivo	16.38 [Ml mc/anno]
Volume totale medio	130.95 [Ml mc/anno]
Portata media annua	4.15 [mc/s]
Valore limite stato "buono"	10.04 [Ml mc/anno]
Risorsa correlata al DMV	4.98 [Ml mc/anno]



**1** Carico inquinanti grey water

# Valutazione del gap

Stato ambientale



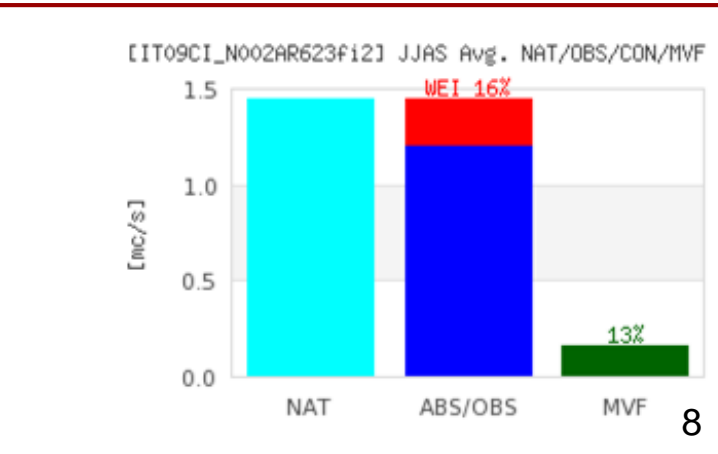
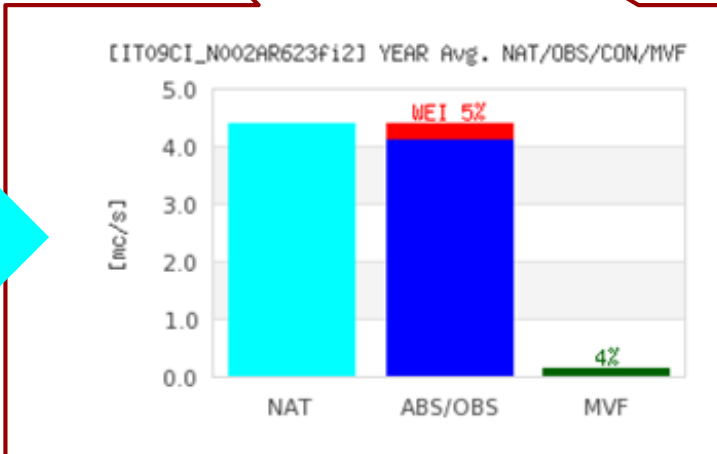
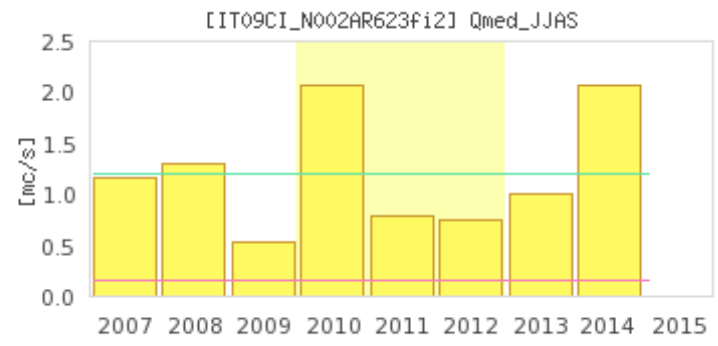
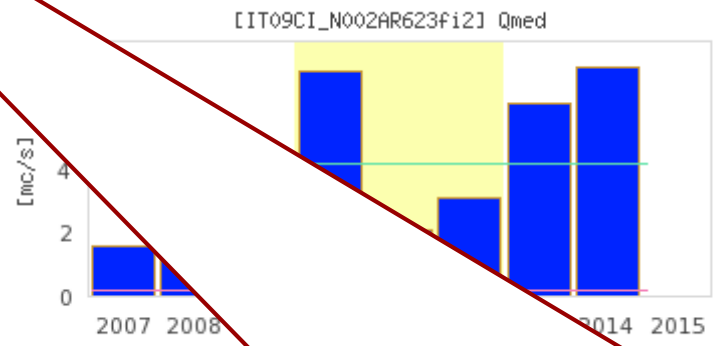
## Procedura di stima



2

## Sfruttamento della risorsa idrica

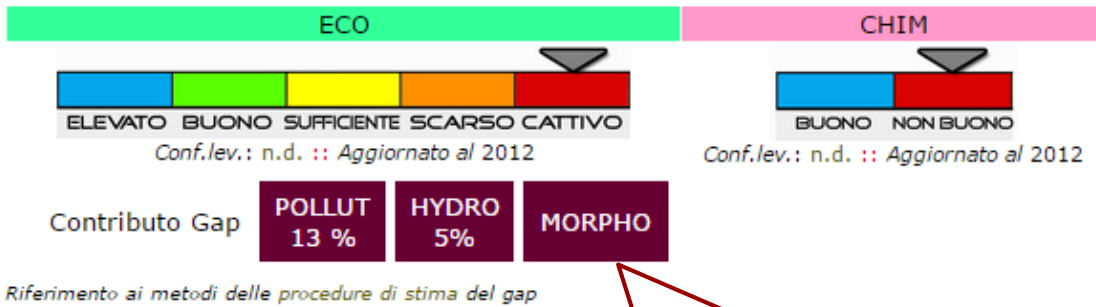
Indice **WEI+** (mod. Water Exploitation Index)





# Valutazione del gap

Stato ambientale



## Procedura di stima



### 3 Alterazione morfologica



Indici (IQM) o **valutazione empirica**, supportata da indicazioni del monitoraggio

Elementi sensibili

MacroBenthos

MacroFite

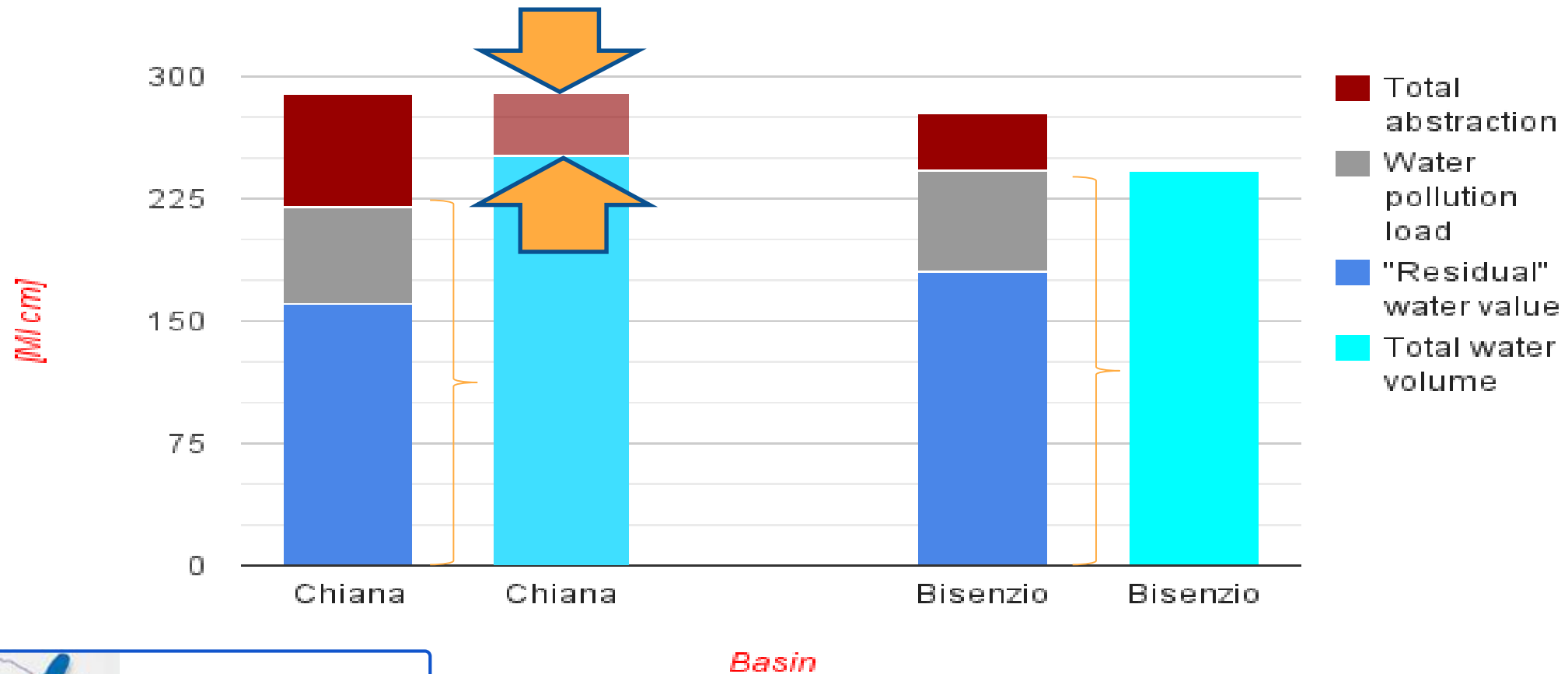
Fauna ittica



# Valutazione del gap dopo le misure "on going"

## Selezione delle misure

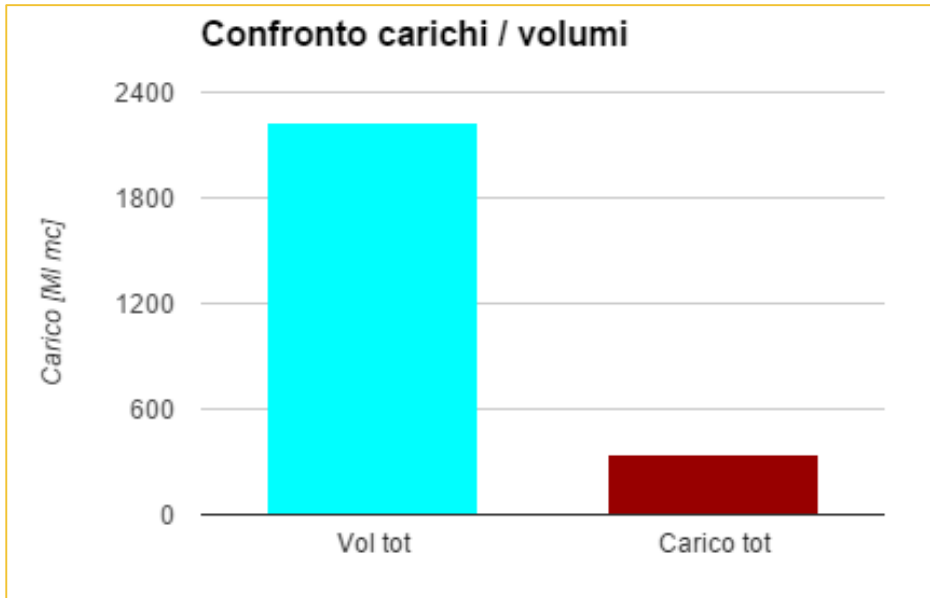
## Valutazione dell'efficacia delle azioni



Grant Agreement No.  
07.0329/2013/671279/S  
UB/ENV.C.1

# Valutazione del gap dopo le misure "on going"

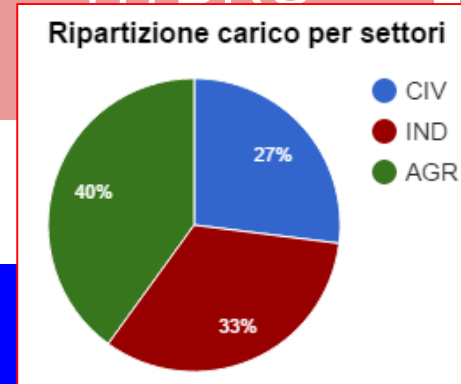
Come agiscono le misure?



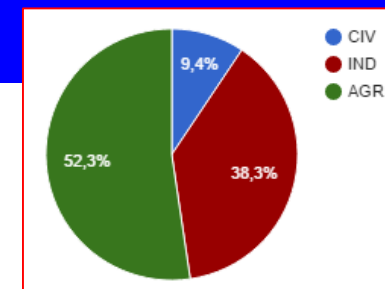
POLLUT  
20%

HYDRO

MORPHO



**Misure on going**



POLLUT  
5%

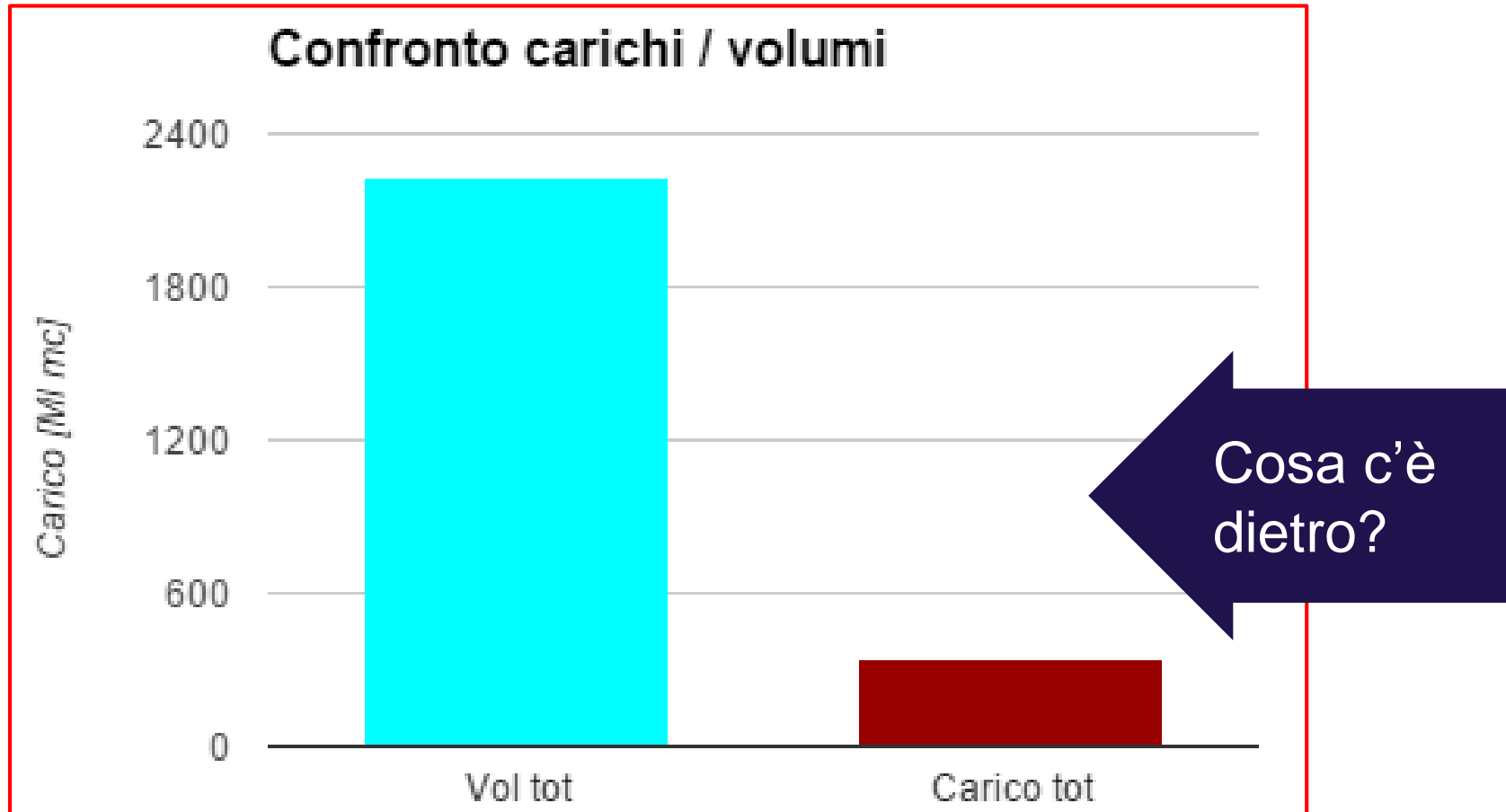
HYDRO  
2%

MORPHO



# Valutazione del gap dopo le misure “on going”

grafico “semplice”, elaborazioni complesse



**Analisi delle pressioni (Art. 5)**

**1**

**Connessioni monte/valle, SW/GW**

**2**

**Bilancio Idrico aggiornato**

**3**

# Valutazione del gap dopo le misure “on going”

Come colmare il gap? Come scegliere le misure? Come giustificare le esenzioni?

Diminuzione carico

Ripristino morfologico

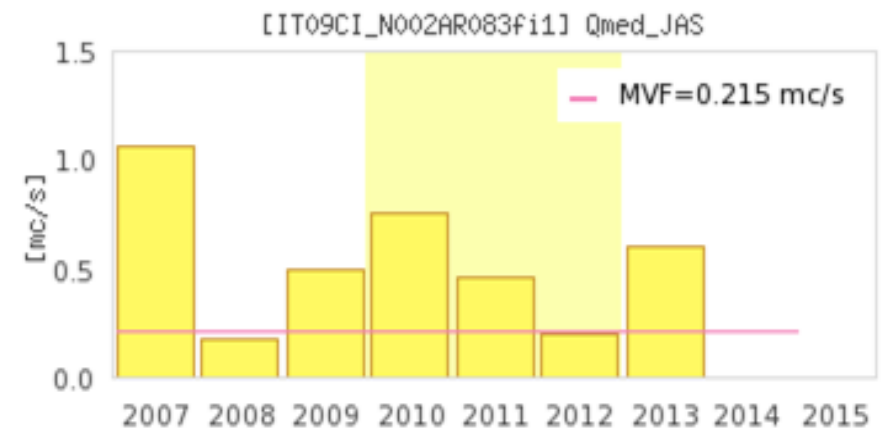
Incremento Q

Indicatori quantitativi e soglie

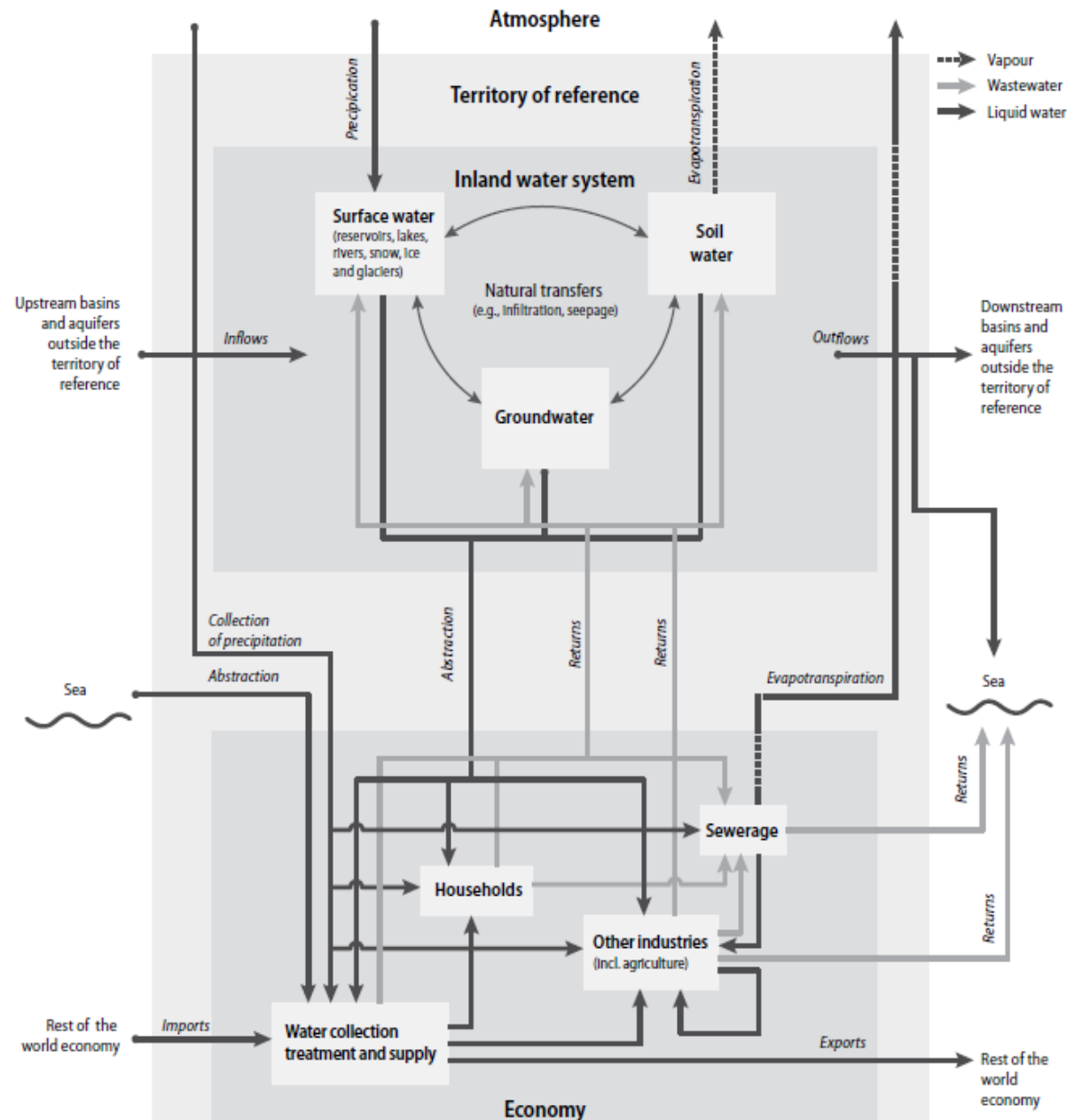
controllo dei prelievi



Grant Agreement No.  
07.0329/2013/671279/SUB/  
ENV.C.1



# SEEA-Water Methodology



Integrates water cycle with economic activities in a standard way

Standard codes:

Economic activities (ISIC Rev. 4)

Data items (water flows)

Standard SEEA-Water tables

(1) Physical Supply and Use Accounts

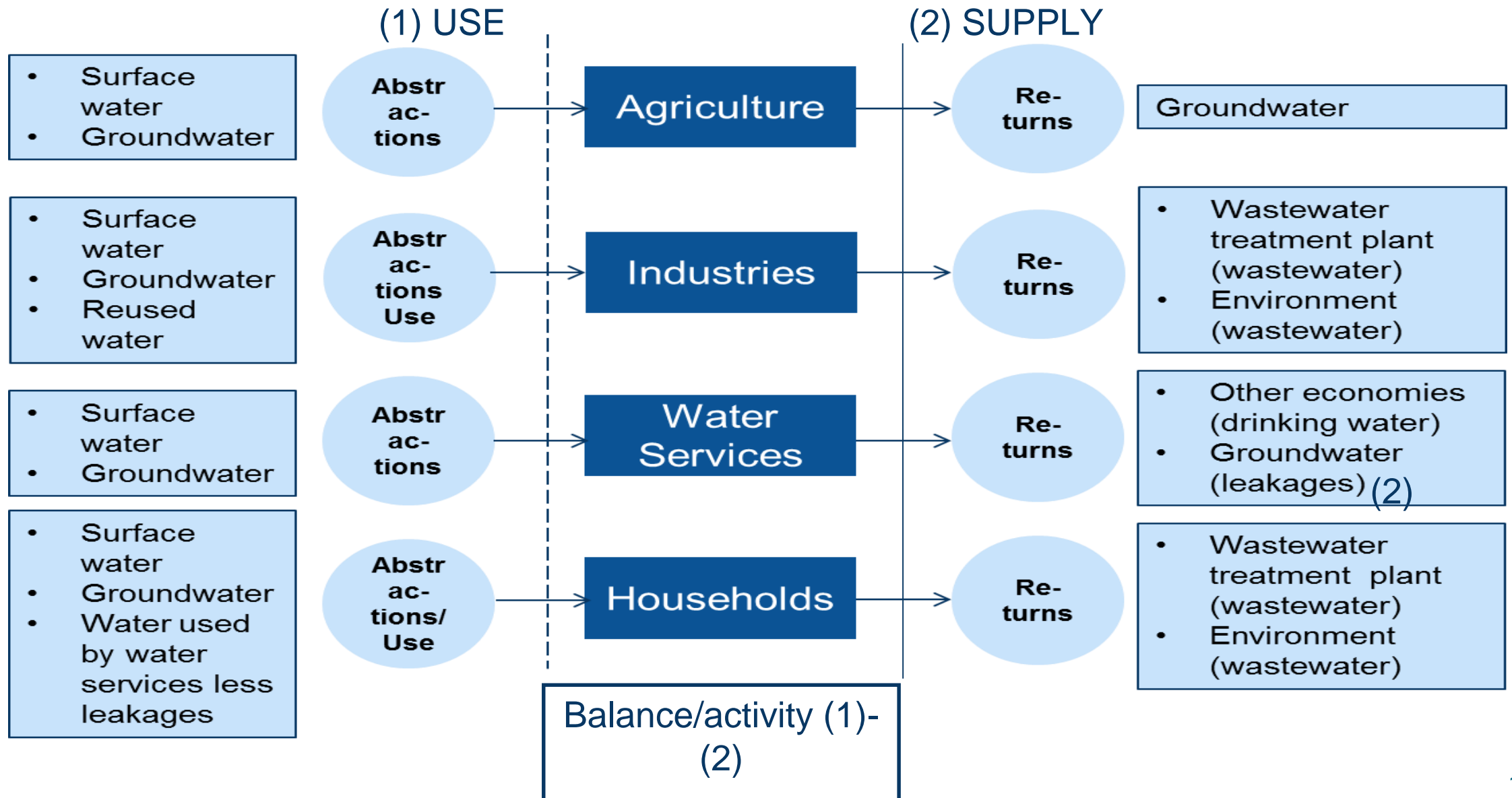
(2) Emission Accounts

(3) Hybrid and Economic Accounts

(4) Water Asset Accounts

- (1) Water supply and use in the production process and by households
- (1) Re-used water within the economy
- (2) Pressures exerted by the economy on the environment.
- (3) Costs, financing of costs, investments and water permits payment
- (4) Stocks and flows of water within the environment.

# Water Flow Diagrams for Water Supply and Use Accounts



# Water accounts: La scelta degli strumenti

## Sviluppo di strumenti dedicati

Fonti diverse dei dati, formati diversi

Dati eterogenei, per scala spaziale e temporale

Necessità di procedure standard per la predisposizione delle tabelle SEAA-W

Aggiornamento continuo delle tabelle sulla base dell'aggiornamento dei dati

Requisiti di sistema:

- open
- condiviso
- documentato
- Facile da verificare
- Facile da aggiornare

**QUINDI**

- Sul web
- SQL standard
- in formato non-proprietary (free)
- usando URI/URL per identificare le tabelle
- Correlabile a risorse esterne

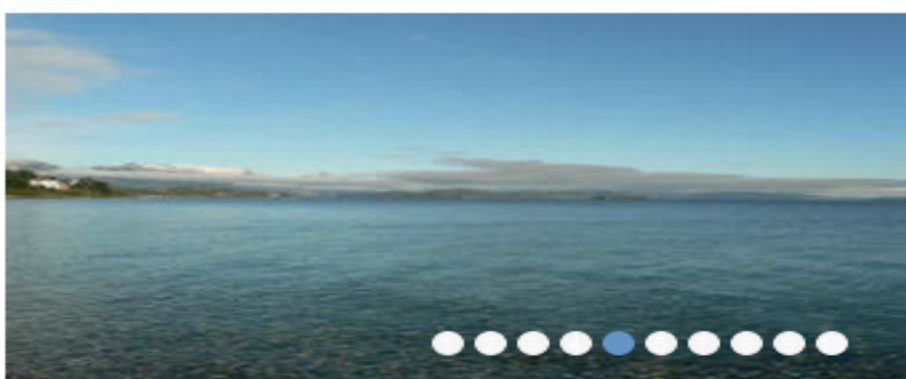




# Water Accounts: scelta degli strumenti

Prelievi





## The Water Information System for Europe

– or more commonly known as WISE – is your gateway to information on European water issues. It comprises a wide range of data and information collected by EU institutions to serve several stakeholders

About WISE

Links

Policy

Data and topics

Modelling

Projects and research

WISE is a partnership between the European Commission (DG Environment, Joint Research Centre and Eurostat) and the European Environment Agency, known as “the Group of Four” (Go4). The main roles and responsibilities of the partners are:

- **DG Environment**, leads the policy and strategic aspect of WISE. It liaises with Member States, especially on official reporting requirements of EU water legislation.

For more information: <http://ec.europa.eu/environment/water/index.html>

- The **European Environment Agency** hosts the Water Data Centre and the thematic WISE webpages.

For more information: <http://www.eea.europa.eu/themes/water/dc>

<http://www.eea.europa.eu/themes/water>

- The **Joint Research Centre** conducts environmental monitoring and water resources modelling including nowcasting and forecasting services.

For more information: <http://ies.jrc.ec.europa.eu/the-institute/units/rural-water-and-ecosystem-resources-unit.html>

<http://floods.jrc.ec.europa.eu>

<http://desert.jrc.ec.europa.eu>

<http://fate.jrc.ec.europa.eu>

- **Eurostat** is collecting and disseminating water statistics, also as a part of WISE data and themes, and provides significant input in the development of the GIS part of WISE and in particular ensuring the link to INSPIRE.

### News

- DG ENV, 19/03/2015: Shipping oil pollution: new hazard mapping method developed
- DG ENV, 19/03/2015: Environmental Scenario Planning: what if marine conservation hotspots in NE Atlantic increase under climate change?
- DG ENV, 19/03/2015: Air pollution modelling could help predict algal blooms
- EEA, 29/10/2014: River Mur recognised for effective river basin management
- EEA, 24/10/2014: River basin management relies on effective public participation
- EEA, 14/10/2014: Extreme weather driving countries to adapt to climate change
- EEA, 06/08/2014: Europe’s climate continues to change
- EEA, 27/05/2014: Water quality excellent at most of Europe’s bathing sites

# Water Accounts: scelta degli strumenti



Indipendenza dalla piattaforma

Data access: SQL standard

Compatibile con ampia scelta di strumenti GIS

Uso di GeoNetwork per la gestione dei metadati

GeoNetwork  
OpenSource  
Geographic data sharing for everyone

Home | Contact us | Links | About | Help | English

Username Password Login

WHAT?  
WHERE?

- Any -

Search

Reset Advanced Options

Applications  
Audio/Video  
Case studies, best practices  
Conference proceedings  
Datasets  
Directories  
Interactive resources  
Maps & graphics  
Other information resources  
Photo

Show map

FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS

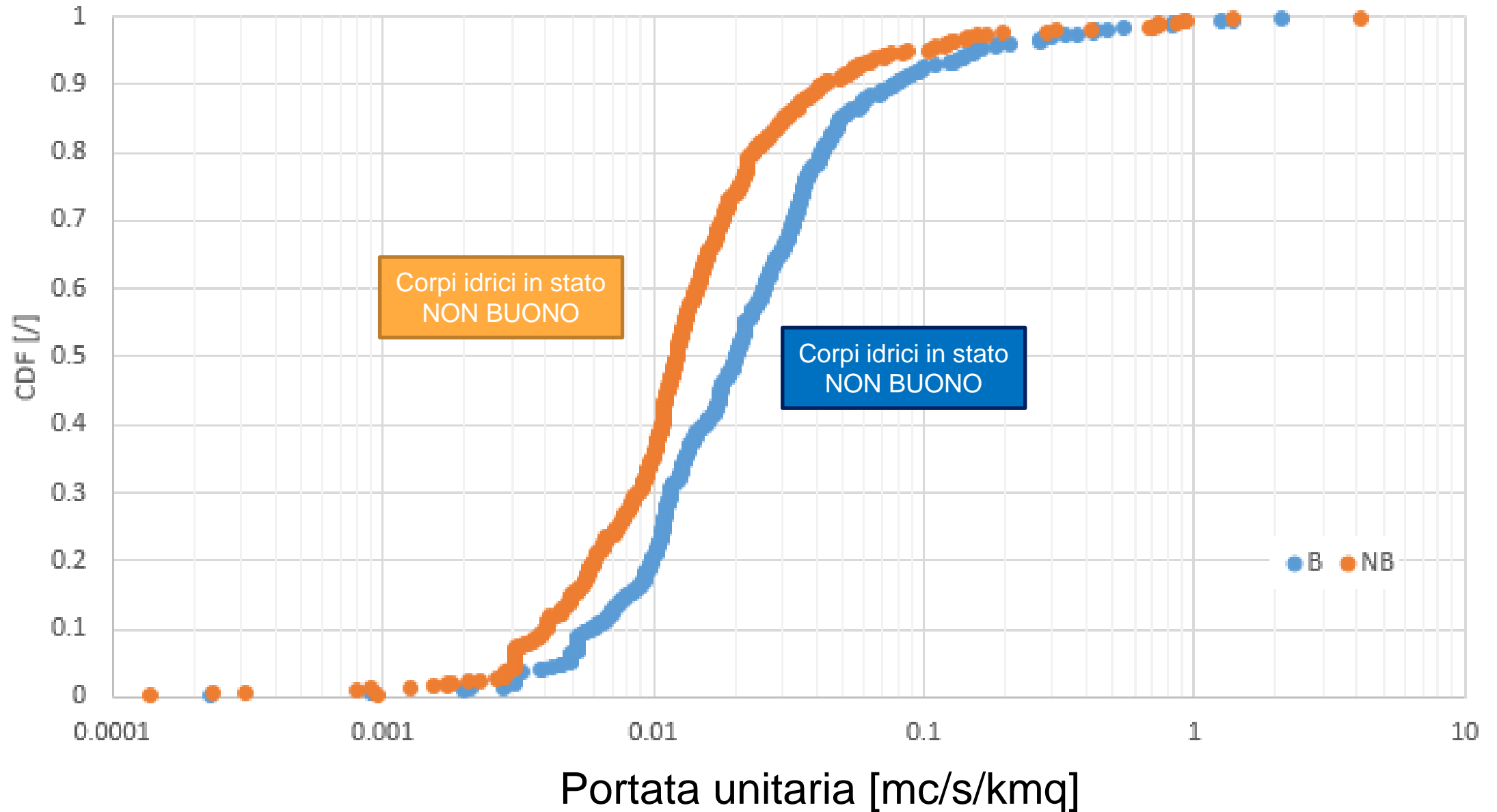
GEONETWORK'S PURPOSE IS:

- To improve access to and integrated use of spatial data and information
- To support decision making
- To promote multidisciplinary approaches to sustainable development
- To enhance understanding of the benefits of geographic information

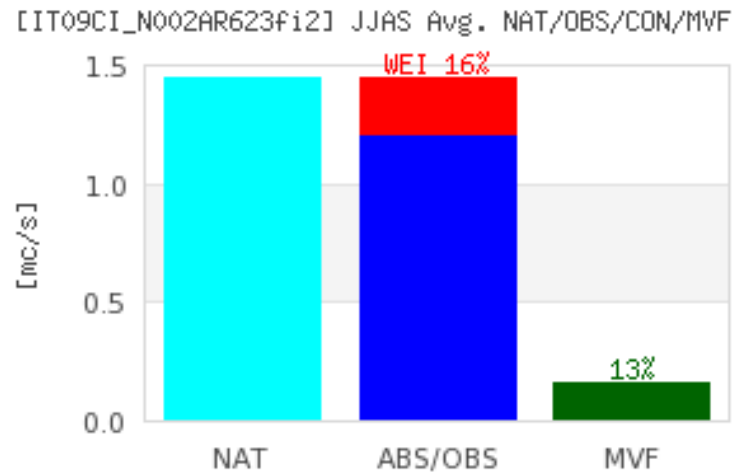
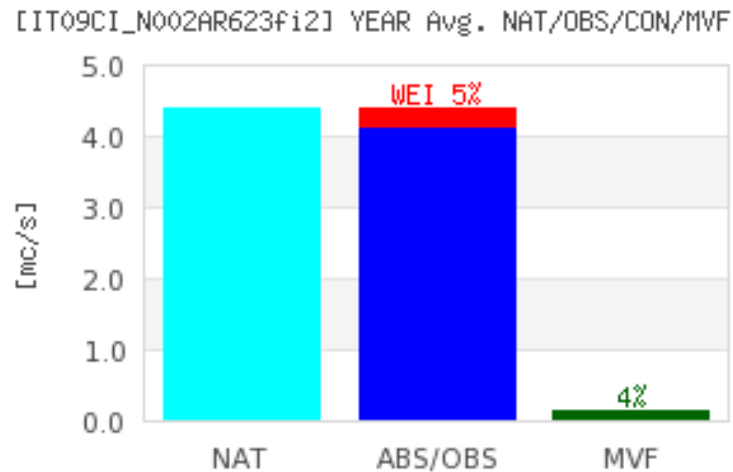
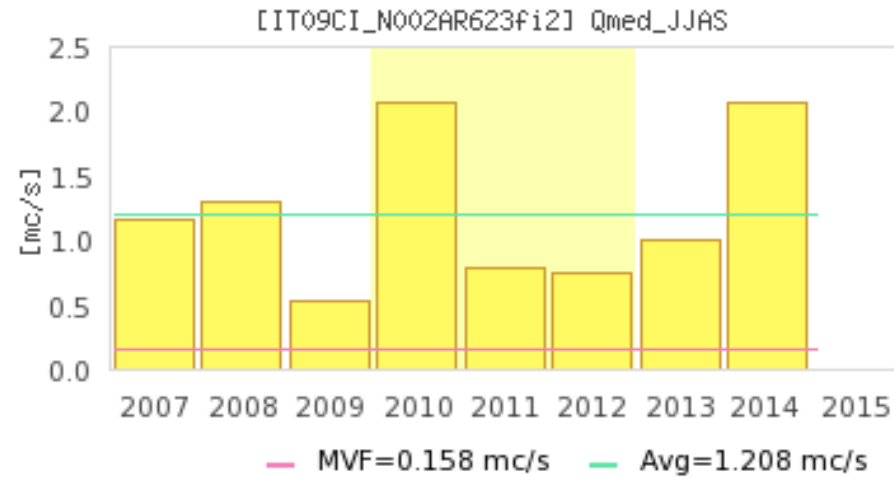
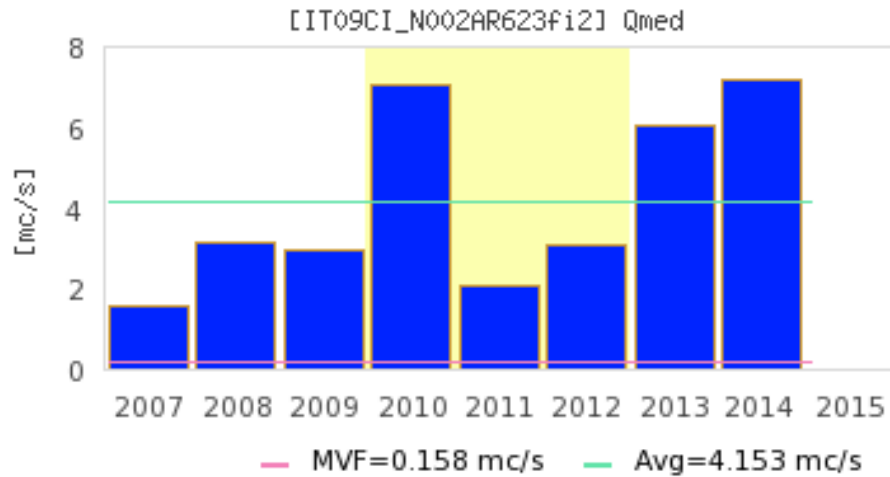
GeoNetwork opensource allows to easily share geographically referenced thematic information between different organizations. For more information please contact



# Il Piano di Gestione e il Bilancio Idrico



# Il Piano di Gestione e il Bilancio Idrico



Portata  
“naturale”  
media annua  
stimata su  
1148 corpi  
idrici (su  
1206)

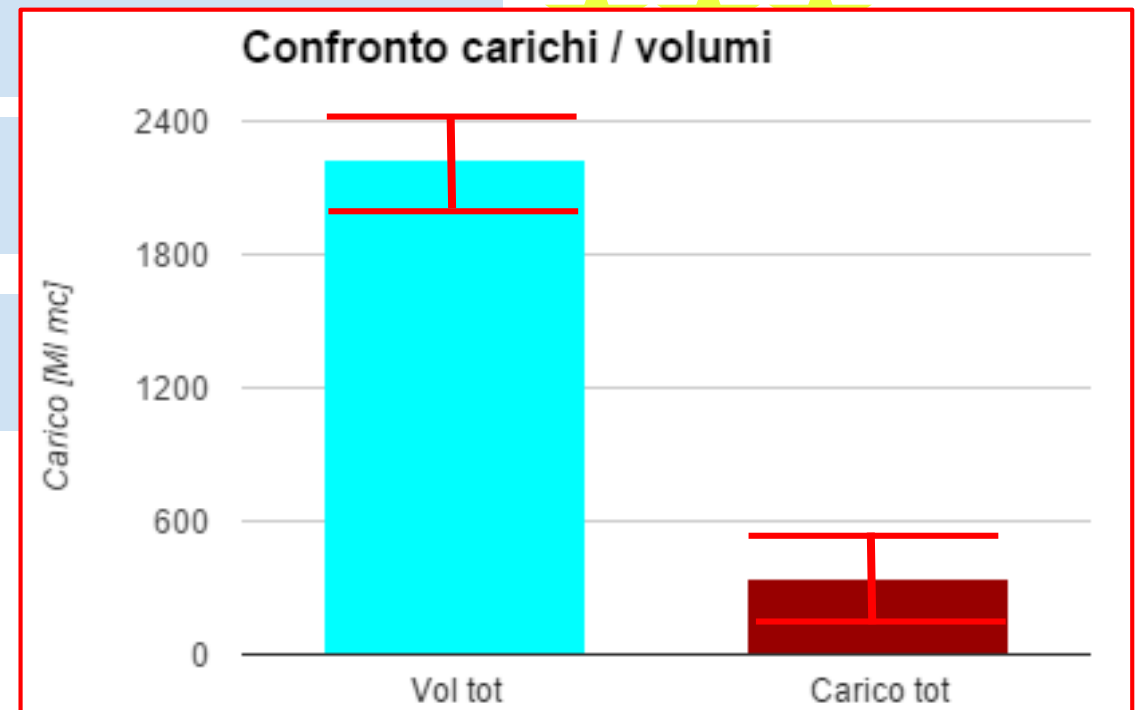
# Il Piano di Gestione e il Bilancio Idrico: requisiti

DAT	Bilancio derivato da misurazioni dirette e attività di monitoraggio	★★★★★
MOD.STO	Modellistica di bilancio idrologico su base stocastica	★★★★
MOD.DET	Modellistica di bilancio idrologico su base deterministica	★★★
RIC	Assimilazioni ed elaborazioni (aggregazione, estrapolazione, ...) da dati statistici a differenti scale	★★
REG	Modelli empirici e/o approssimazioni	★

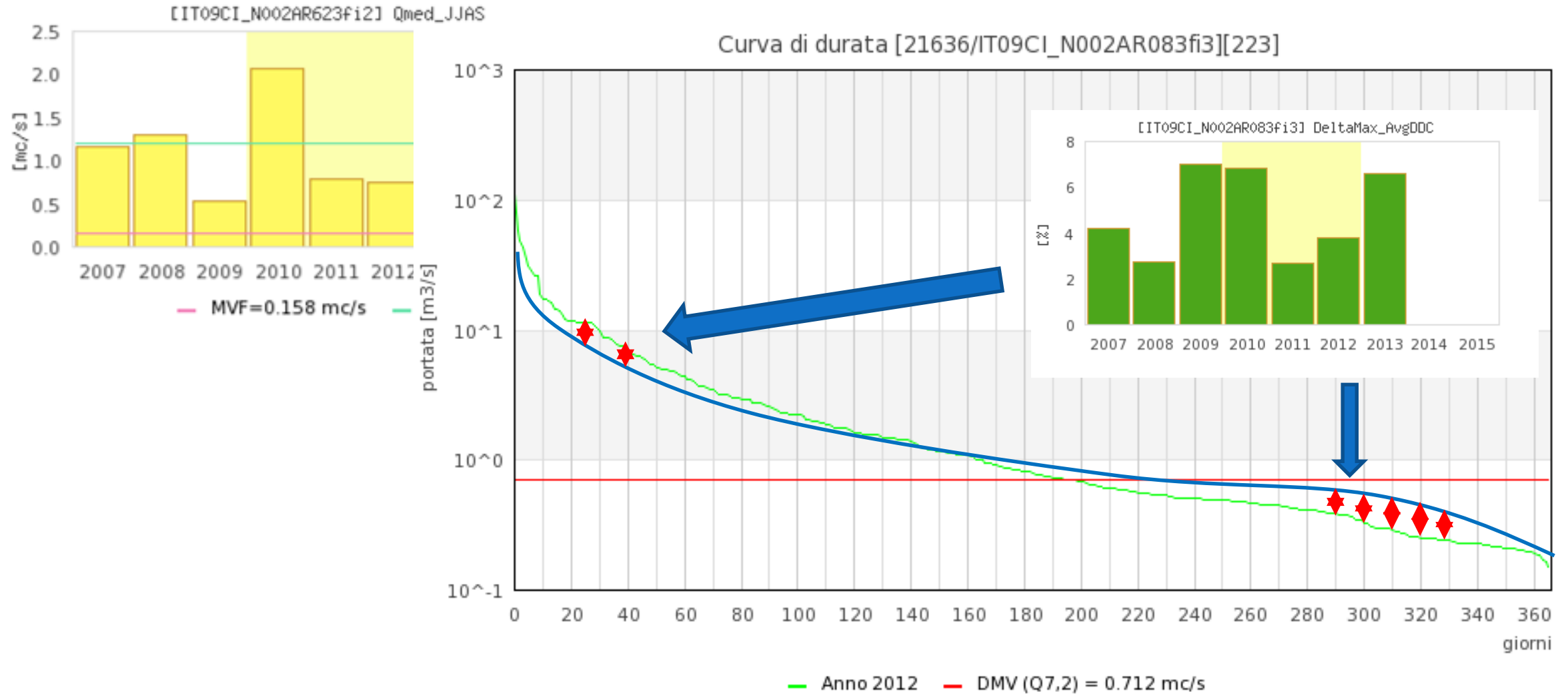
RIFERIMENTO: “WFD Reporting Guidance 2016” [1], Annex “8o

# Stima dell'incertezza

DAT	$\pm 5\%$	★ ★ ★ ★ ★
MOD.STO	$\pm 10\%$	★ ★ ★ ★
MOD.DET	$\pm 15\%$	★ ★ ★
RIC	$\pm 20\%$	
REG	$\pm 30\%$	



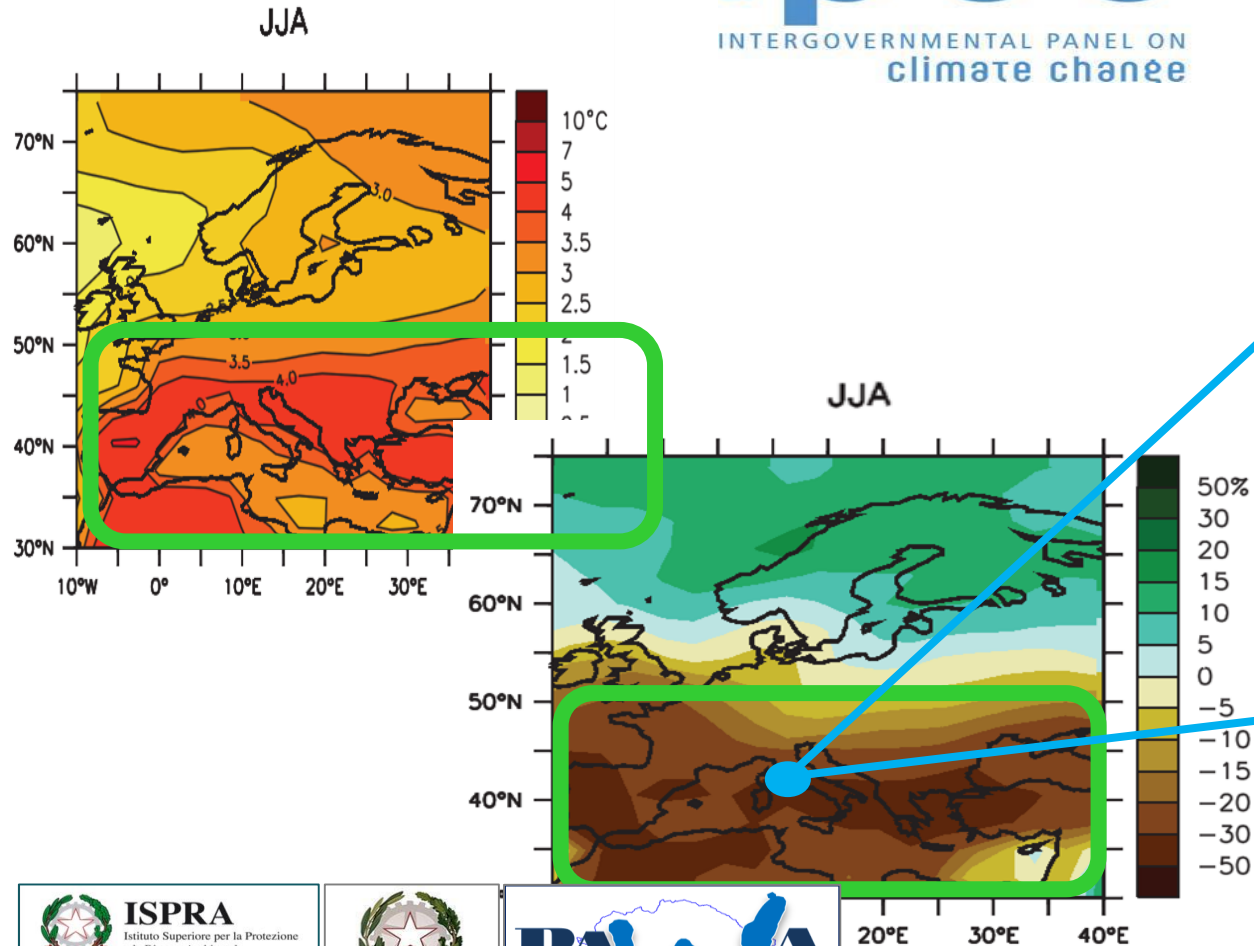
# Verso il deflusso ecologico





# Water Accounts: Climate Change Impact Assessment

**ipcc**  
INTERGOVERNMENTAL PANEL ON  
climate change






**MOBIDIC**  
Hydrologic Model

Fully distributed, physically-based  
parameters

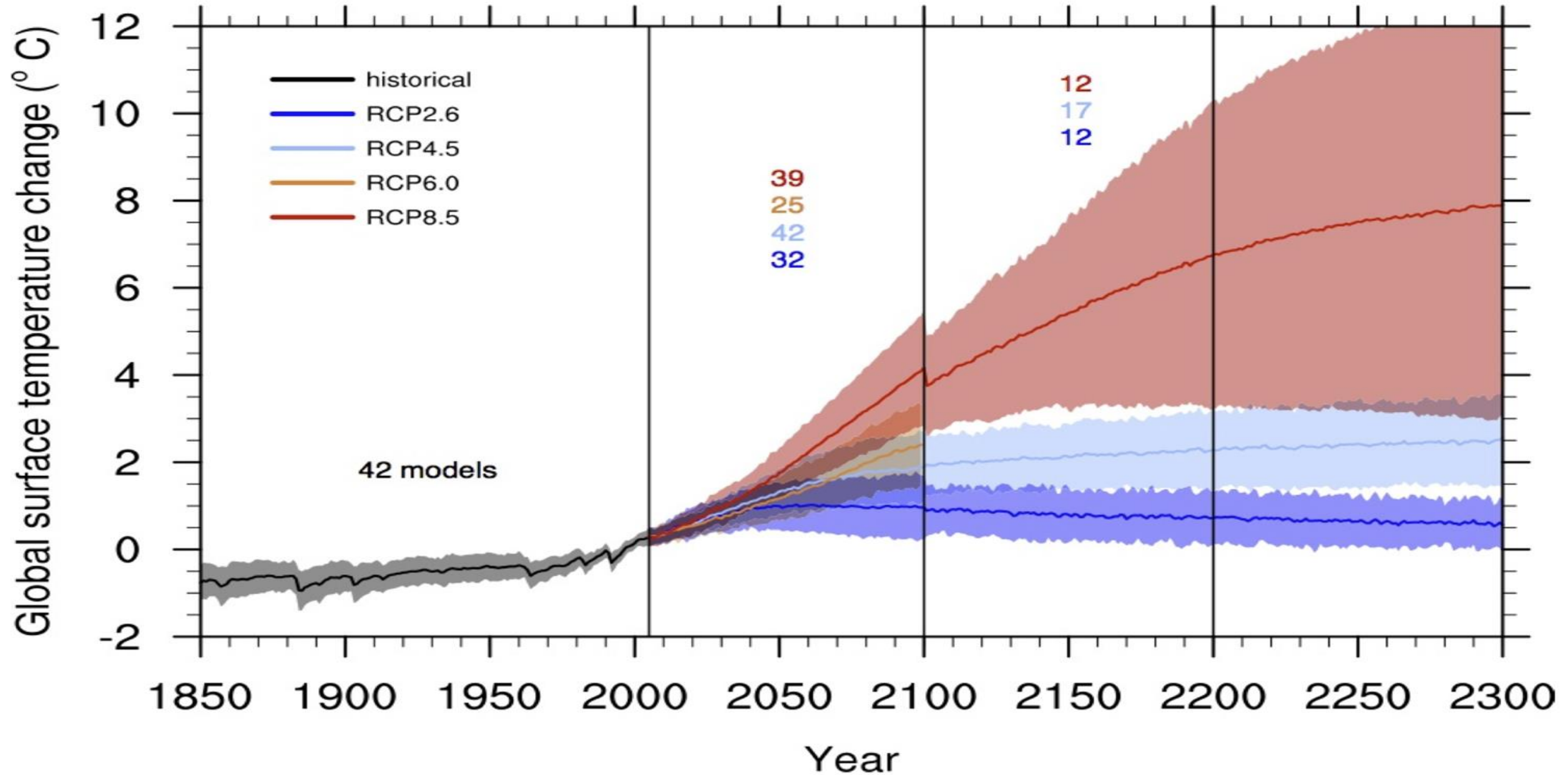


# Water Accounts: Climate Change Impact Assessment

## Climate Change Scenarios

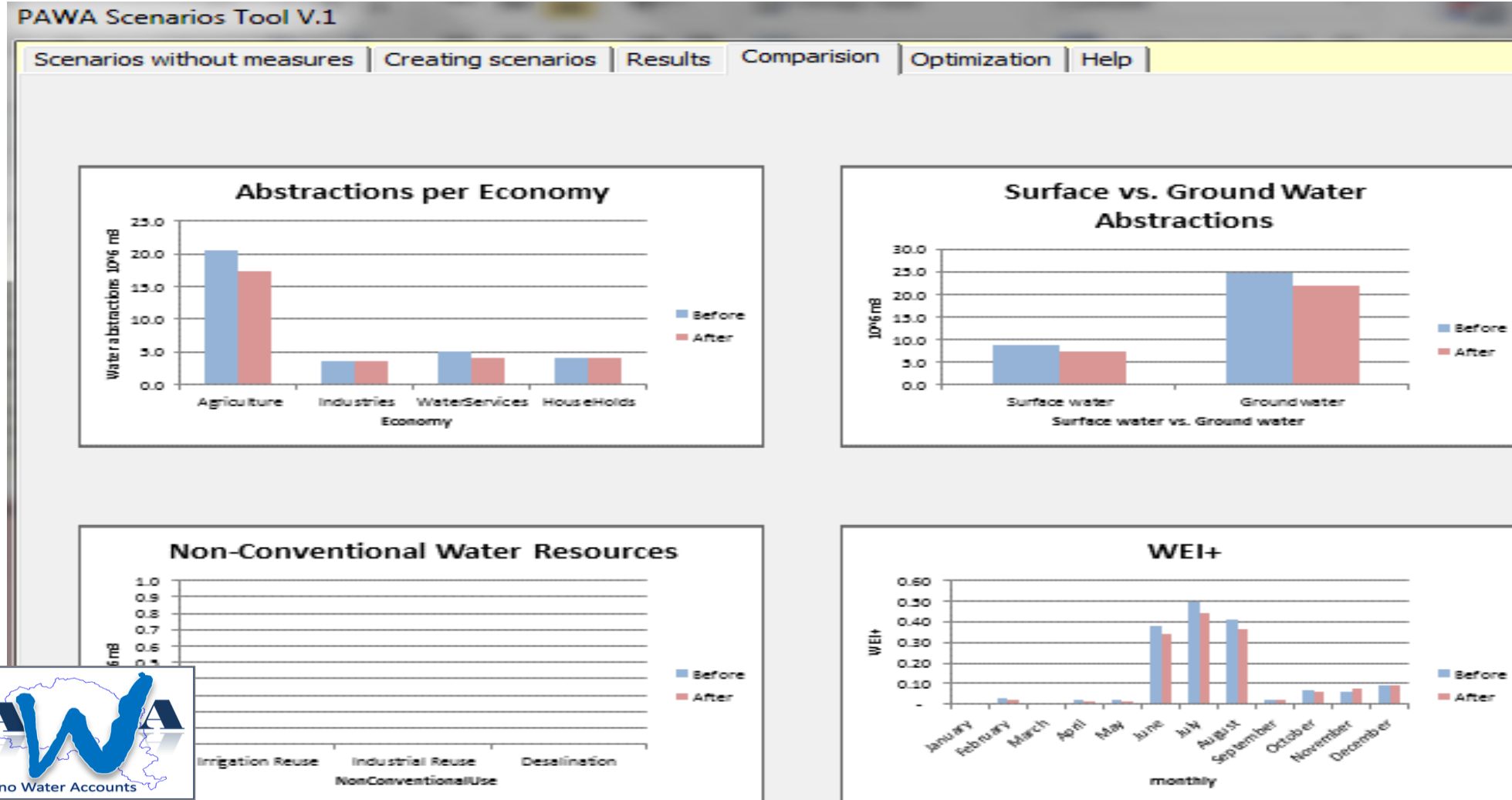
Id	Scenario	Description
1	Real	Based on measured hydrological data, 1993-2013
2	CNRM_RCP45	Synthetic hydrological data derived from 1993-2012 measured data, biased in order to copy with global circulation model output for a long-medium term temporal horizon (2070-2090)  CNRM - CM5 global circ. Météo France <a href="http://www.cnrm-game.fr/spip.php?article126&amp;lang=fr">http://www.cnrm-game.fr/spip.php?article126&amp;lang=fr</a>
3	CNRM_RCP85 	
4	MOHC_RCP45	Synthetic hydrological data derived from 1993-2012 measured data, biased in order to copy with global circulation model output for a long-medium term temporal horizon (2070-2090)  Met Office Hadle Center <a href="http://www.metoffice.gov.uk/">http://www.metoffice.gov.uk/</a>
5	MOHC_RCP85 	
6	IPSL_RCP45	Synthetic hydrological data derived from 1993-2012 measured data, biased in order to copy with global circulation model output for a long-medium term temporal horizon (2070-2090)  Institut Pierre Simon Laplace des Sciences de l'Environnement Global (IPSL) <a href="http://igcmg.ipsl.jussieu.fr/">http://igcmg.ipsl.jussieu.fr/</a>
7	IPSL_RCP85 	

# Water Accounts: Climate Change Impact Assessment

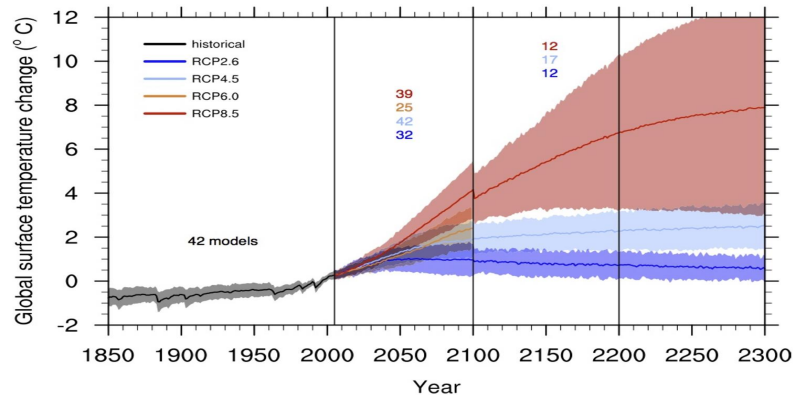
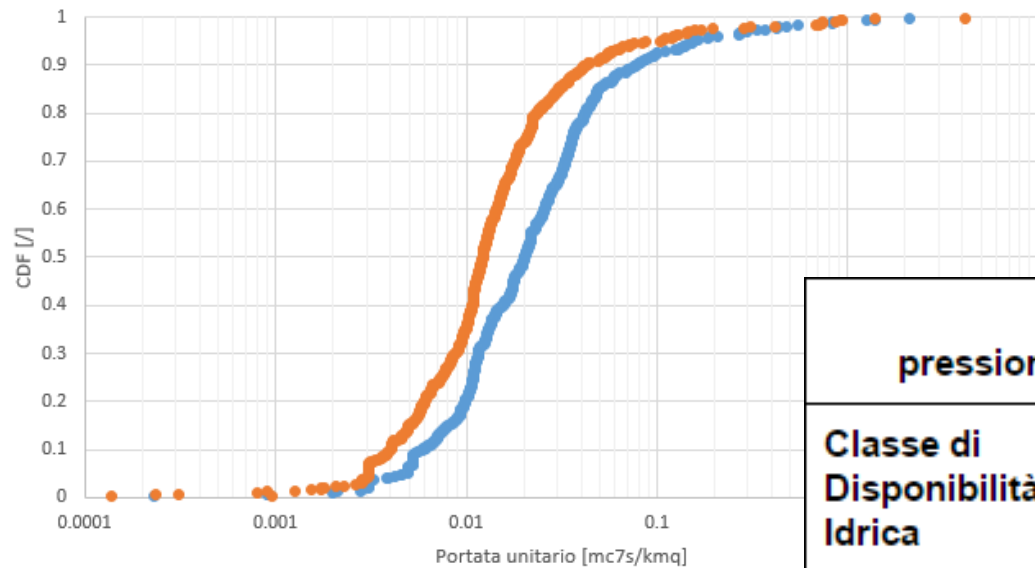


# Water Accounts: Climate Change Impact Assessment

Testing Measures' effects in a climate change scenario



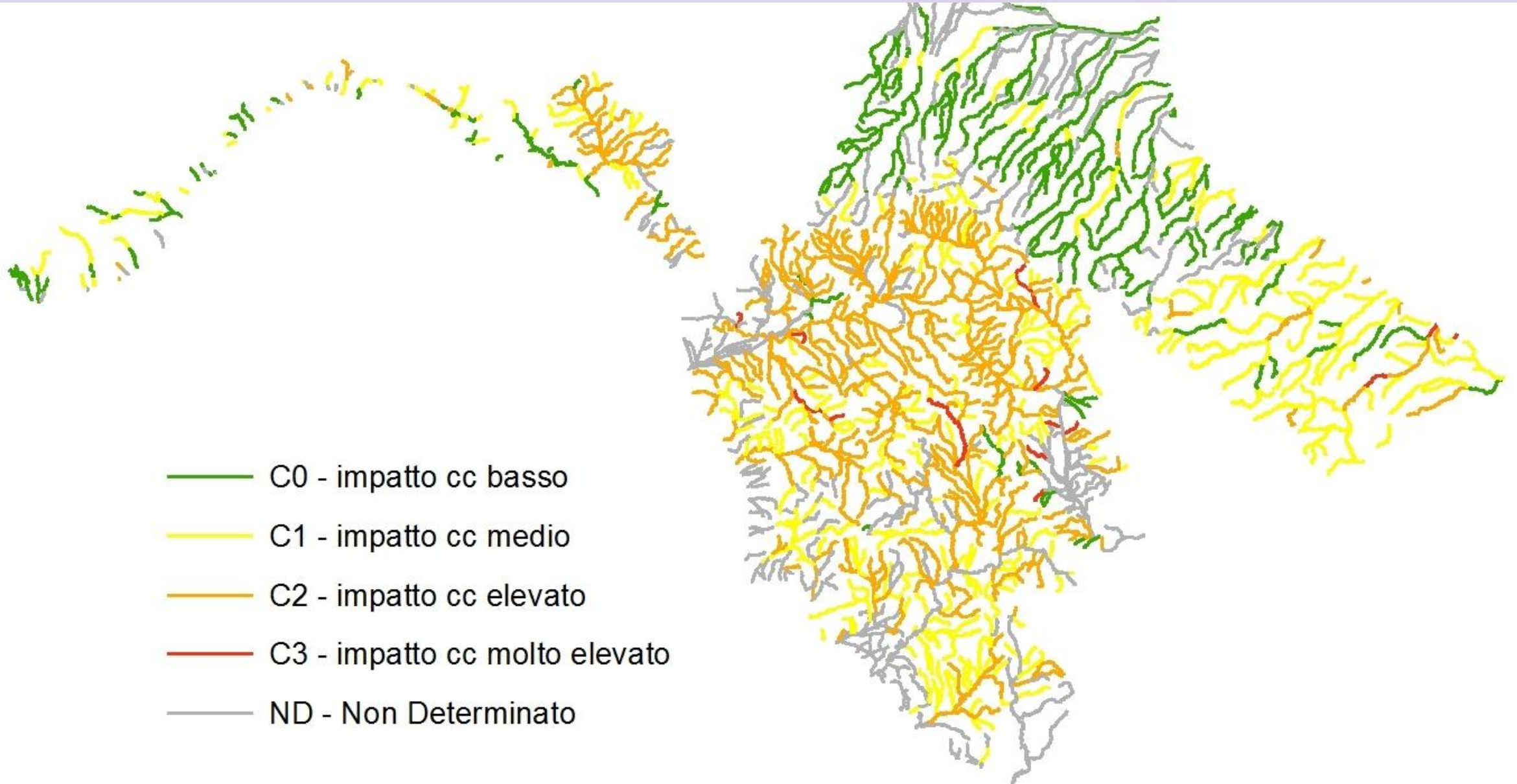
# PdG: valutazione impatto del cambiamento climatico



pressioni clima-sensibili		A0	A1	A2	A3
Classe di Disponibilità Idrica	B0	C0	C0	C1	C2
	B1	C0	C1	C1	C2
	B2	C1	C1	C2	C3
	B3	C2	C2	C3	C3

Classe	Descrizione
C0	Potenziale impatto del cambiamento climatico basso
C1	Potenziale impatto del cambiamento climatico medio
C2	Potenziale impatto del cambiamento climatico elevato
C3	Potenziale impatto del cambiamento climatico molto elevato

# PdG: valutazione impatto del cambiamento climatico



Grazie dell'attenzione

[www.adbarno.it](http://www.adbarno.it)

[www.appenninosettentrionale.it](http://www.appenninosettentrionale.it)

[pawa.emwis.net](http://pawa.emwis.net)



*Autorità di Bacino  
del Fiume Arno*



Grant Agreement No.  
07.0329/2013/671279/SUB/ENV  
.C.1