

Linking Water Framework Directive and Floods Directive

Methodologies and tools to support better
analysis and integration

**The WFD-FD: An Executive Information System
to Support Integrated Planning and
Management in a Web-based, Shared
Environment**



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Rome, October 9th 2014

River Basin Management Plan Updating Process

Updated Drivers, Pressures and Impacts assessment

WBs Updated
Environmental Status

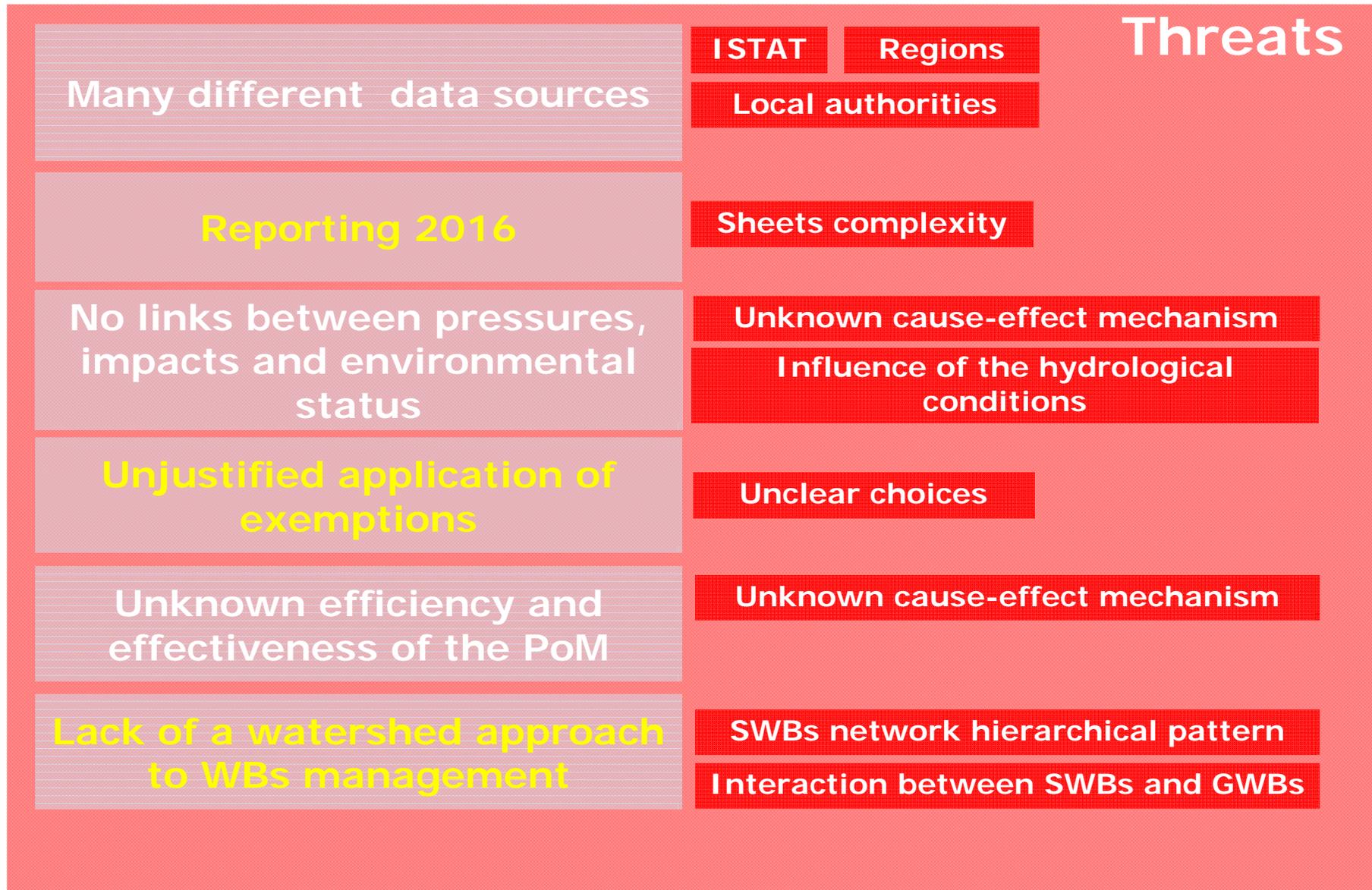
**Revised and updated
Programme of Measures**

Exemptions to Environmental
Objectives

**River Basin
Management
Plan:
how to
update it**



Why an Executive Information System?



Many different data sources

Reporting 2016

No links between pressures, impacts and environmental status

Unjustified application of exemptions

Unknown efficiency and effectiveness of the PoM

Lack of a watershed approach to WBs management

ISTAT

Regions

Local authorities

Sheets complexity

Unknown cause-effect mechanism

Influence of the hydrological conditions

Unclear choices

Unknown cause-effect mechanism

SWBs network hierarchical pattern

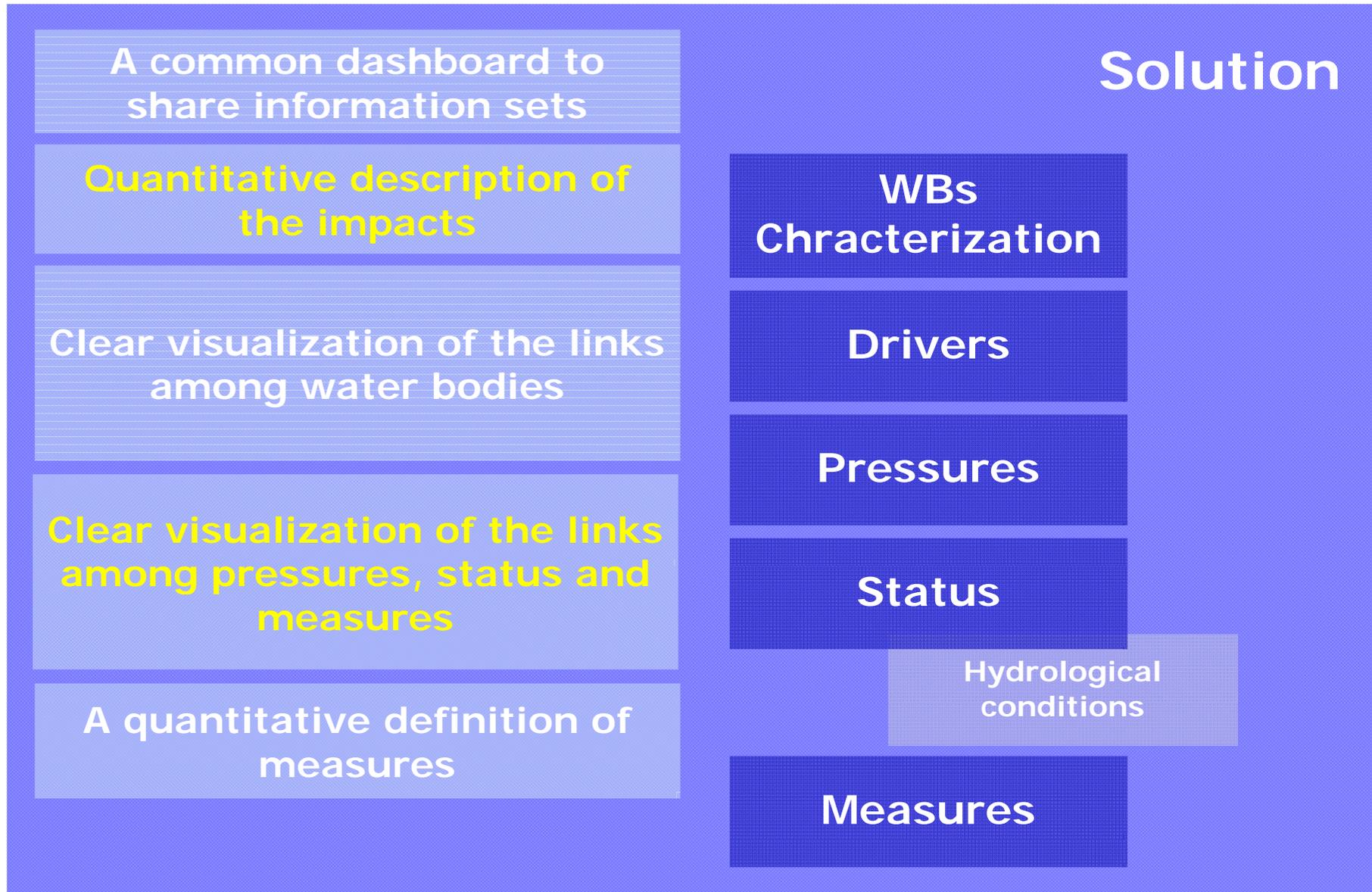
Interaction between SWBs and GWBs

Threats

Why an Executive Information System?

Many different data sources	A common, shared Geo-dataBase	Needs
Reporting 2016		
No links between pressures, impacts and environmental status	Data-driven analysis of cause-effect mechanisms	
Unjustified application of exemptions		
Unknown efficiency and effectiveness of the PoM		
Lack of a watershed approach to WBs management	An holistic vision	

Why an Executive Information System?



Why an Executive Information System?

Open source tools	PGsql/PostGIS geoDB	Technical choices
	Web-based interface	
Standard Tables and Layers	WISE & reporting 2016	
Common Hydrological Parameters	WEI + E-flows WG results	
Classification of the Magnitude of Pressures	Pressures' Number Pressures' Intensity	
Classification of the Magnitude of Measures	Measures' number Measures' impacts appraisal Measures' costs	

A common Reference Unit for WFD-FD – EIS Dashboard

Water Body sheet

River Basin Management Plan

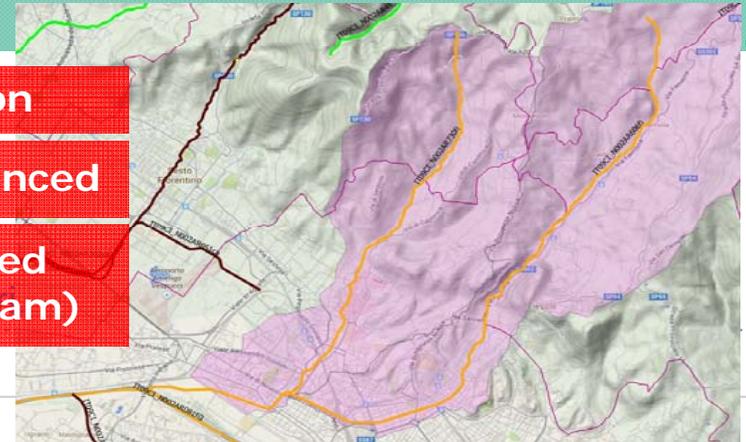
Adoption of a single and shared Water Body Sheet in compliance with the WFD and FD

WB Characterization

Each WB is geo-referenced

Each WB is connected (upstream/downstream)

Waterbody sheet



Drainage area of each WB

General Information	Code	CI_N002AR083fi1
	WISE code	IT09CI_N002AR083fi1
	WB Name	FIUME BIENZIO MONTE
Location	Subunit	ARNO
	Region	TOSCANA
	Basin	Arno
	Sub-basin	Bisenzio
Characteristics	Category	Fiumi
	Type	10SR3N
	Typology	Naturale
	Basin area [sq.km]	104.6
	Directly drained area [sq. km]	83.5
	Links	Protected areas
Upstream WB	[CI_N002AR488fi], [CI_N002AR450fi]	
Downstream WB	[CI_N002AR083fi2]	
Connected GW	[99MM931] Corpo idrico delle Arenarie di avanfossa della Toscana nord-orientale - zona dorsale appenninica	

Geographical localization
RBMP web GIS cartography



**Updated
detection of
drivers,
pressures and
impacts**

**Population Density
Trend**

**Pollutants (hazardous
substances)**

**Assets at Risk
(Infrastructures)**

**Hydromorphological
changes**



Drivers and Pressures: links between WFD / FD – EIS Dashboard

Our choice: appraisal of the relevance of drivers and pressures

Drivers											
Direct	Agriculture	Climate change	Energy – hydropow	Energy – non-hydr	Fisheries and aqu	Flood protection	MIN MAX				
	Forestry	Industry	Tourism & recreat	Transport	Urban development	Unknown/Other					
Upstream	Agriculture	Climate change	Energy – hydropow	Energy – non-hydr	Fisheries and aqu	Flood protection	MIN MAX				
	Forestry	Industry	Tourism & recreat	Transport	Urban development	Unknown/Other					

Pressures	Direct										Upstream										
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Direct pressures							7				[1.1] Point – Urban waste water										
Total pressures						6	7				[1.5] Point - Contaminated Sites/Abandoned industrial sites										
Environmental status 2009											[1.9] Point – Other										
Environmental status 2012											[2.1] Diffuse - Urban run off										
											[2.2] Diffuse – Agricultural										
											[3] Abstraction/Flow Diversion										
											[4.1] Physical alteration of channel/bed/riparian area/shore										



Hazardous substances

- [RT0019] IDL SAN GIUSTO cadmio e composti
- [RT0019] IDL SAN GIUSTO piombo e composti
- [RT0019] IDL SAN GIUSTO cromo totale
- [RT0019] IDL SAN GIUSTO nichel e composti

Environmental Status: EIS Dashboard

**Our choice:
update of
ecological and
chemical status
and monitoring
results**

- Global Status trend
- Ecological status trend
- Chemical status trend
- Diffuse pollutants
Hazardous substances

Monitoring
yearly
values

WISE

	Hazardous substances	[RT0750] IDL CANTAGALLO tricloroetilene [RT0750] IDL CANTAGALLO tetracloroetilene		
Environmental status	Status	2009	2012	2015
		moderate	poor	
Monitoring	Corpo idrico	ECO poor CHEM not good		
	MAS-125/IT09S1287	2010	2011	2012
		ECO		
		CHEM		
	Diffuse pollutants:	4- nonilfenolo; arsenico; arsenico; benzo(1,2,3-cd)pyrene; benzo(k)fluoranthene; cromo totale; difenilietere bromato (sommatoria congeneri 28, 47, 99, 100, 153 e 154); mercurio e composti; nichel e composti; piombo e composti; tetracloroetilene; tributilstagno composti (Tributilstagno catione); triclorometano		
	GES objective by	2015	2021	2027

Objective Setting: EIS Dashboard

**Our choice:
inclusion of
shared
hydrological
parameters**

WEI + | E-flows | Avg. discharge

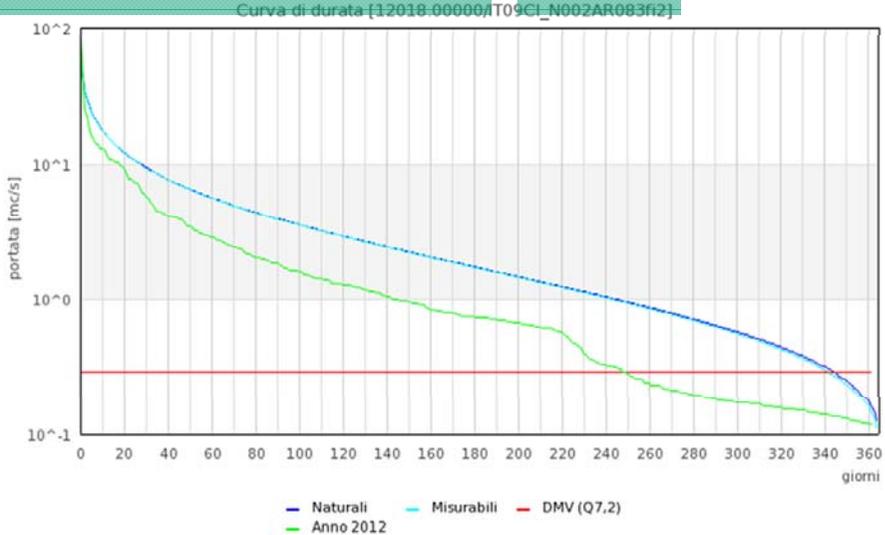
Avg. discharge / Summer | ...



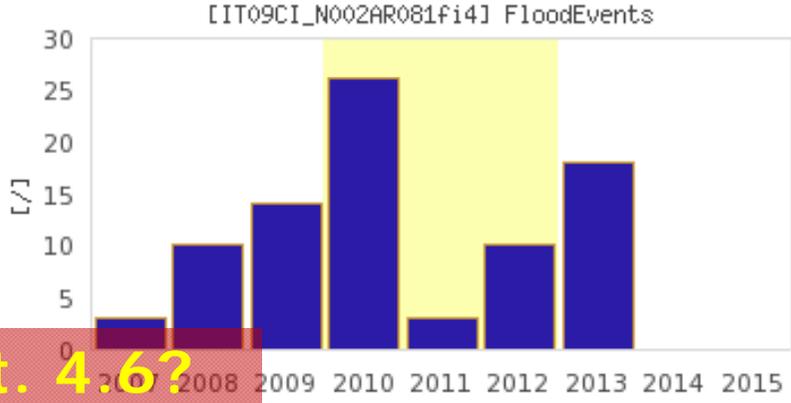
**Drought
Conditions**



**Flood
Conditions**



**Number of yearly
floods**



Justification for applying Art. 4.6?

Programme of Measure: EIS Dashboard

Our choice: list of activated measures

Costs estimation for each measure

Measures identified as BM (Art. 11.3a) / OM (Art. 11.3b-I) / SM (art. 11.4-5)

Impacted drivers

Links to WBs / Hierarchy

Programme of Measures

Direct	Agriculture	Climate change	Energy – hydropow	Energy – non-hydr	Fisheries and aqu	Flood protection	MIN MAX
	Forestry	Industry	Tourism & recreat	Transport	Urban development	Unknown/Other	
Upstream	Agriculture	Climate change	Energy – hydropow	Energy – non-hydr	Fisheries and aqu	Flood protection	MIN MAX
	Forestry	Industry	Tourism & recreat	Transport	Urban development	Unknown/Other	

Direct measures [1] Definizione dei bilancio idrico e del DMV per ogni bacino del Distretto: 1 intervento, costo non definito (SM)
 [3] Gestione del sistema di prelievi e rilasci, anche attraverso riduzione dei volumi concessi, finalizz ...: 1 intervento, costo non definito (OM)
 [12] Attuazione di interventi di difesa degli abitati e delle strutture esistenti che tengono conto del m ...: 20 interventi, € 29.500.000 (OM)
 [29] Completamento e manutenzione delle reti fognarie: 14 interventi, € 178.000 (SM)

Extended list of measures

Upstream measures [1] Definizione dei bilancio idrico e del DMV per ogni bacino del Distretto: 2 interventi (SM)
 [3] Gestione del sistema di prelievi e rilasci, anche attraverso riduzione dei volumi concessi, finalizz ...: 2 interventi (OM)
 [19] Applicazione della disciplina degli scarichi delle acque reflue (trattamento di tipo secondario o tr ...: 1 intervento, € 1.350.000 (BM)
 [29] Completamento e manutenzione delle reti fognarie: 6 interventi (SM)

Extended list of measures

**Our choice:
NWRM
Bioengineering**



Recognition and data collection



Efficiency and effectiveness appraisal as regards to WB quality

Efficiency and effectiveness appraisal as regards to flood protection

Sustainability



Programme of Measure - Links between WFD / FD

FRMP Reference Unit

FRMP Knowledge base

FRMP PoM



RBMP Reference Unit

RBMP Knowledge base

RBMP PoM

“Win-Win” Measures



Sewerage systems completion



Polluted sites reclamation



Mini Hydro



Urban stream control works



<http://www.appenninosettentrionale.it>

Thank you!