

# WATER FRAMEWORK DIRECTIVE: A reductionist implementation of a systems directive

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Small Water and Wastewater  
Systems

**5<sup>th</sup> IWA**  
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# Evolution of water policy (1)

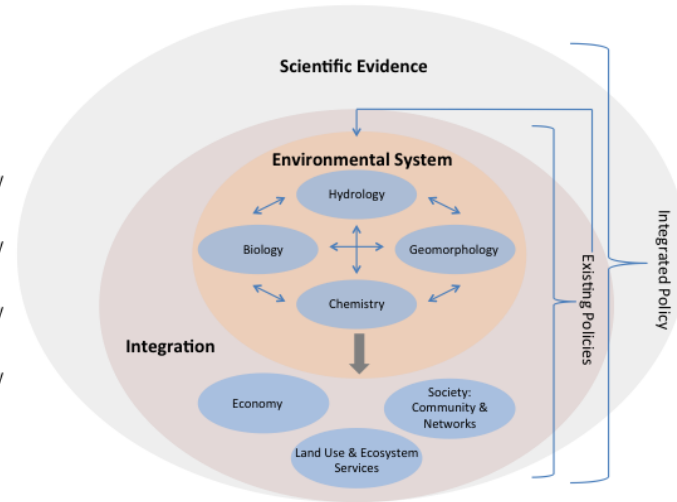
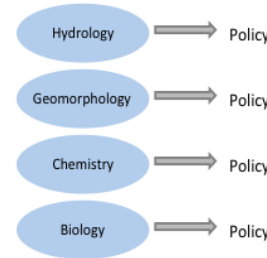
In the 70s the adoption of the **First Environmental Action Programme** laid down the objectives and principles of the EU environmental policies and the implementation of legally binding legislation.

- **1<sup>st</sup> era (1975–1988)** was primarily focusing on **environmental and public health** by setting **Water Quality Standards (WQS)** and the protection of drinking water resources  
i.e. Drinking Water Directive, fish waters, shellfish waters, bathing waters, and ground waters
- **2<sup>nd</sup> era (1991– 1996)** EU water legislation focused on the **pollution** emanating from urban wastewater and agricultural run-off → **Emission Limit Values approach (ELV)**  
i.e. Urban Wastewater Treatment Directive and the Nitrates Directive

A consensus developed that both the WQS and the ELV approaches were needed to tackle water pollution and best to being used to mutually reinforce each other. This 'combined approach' was formalised with the **WFD (Article 10)**, which represents the **latest era of EU water policy**.

# Evolution of water policy (2)

- Under the **command-and-control paradigm**, choice and design of measures was often driven by implementing specific technical solutions.
- Under the assumption that managing individually the non-compliant elements could lead to an overall improvement in ecosystem health, standard water policy was **discipline-specific**.
- This approach was **incoherent**, as well as **fragmented** both in terms of the objectives and of means for action, often taken in isolation without considering the complexity of ecosystems or the interactions and trade-offs at different scales.



## Programmes of Measures (PoMs)

Traditional discipline specific and compliance driven (a) versus integrated ones based on complex systems thinking (b)

Doubts arisen with regard to the functionality of this paradigm, led to European Water Policy restructuring that delivered the WFD , with emphasis on treating the environment as a system, setting the objectives for water protection for the future.

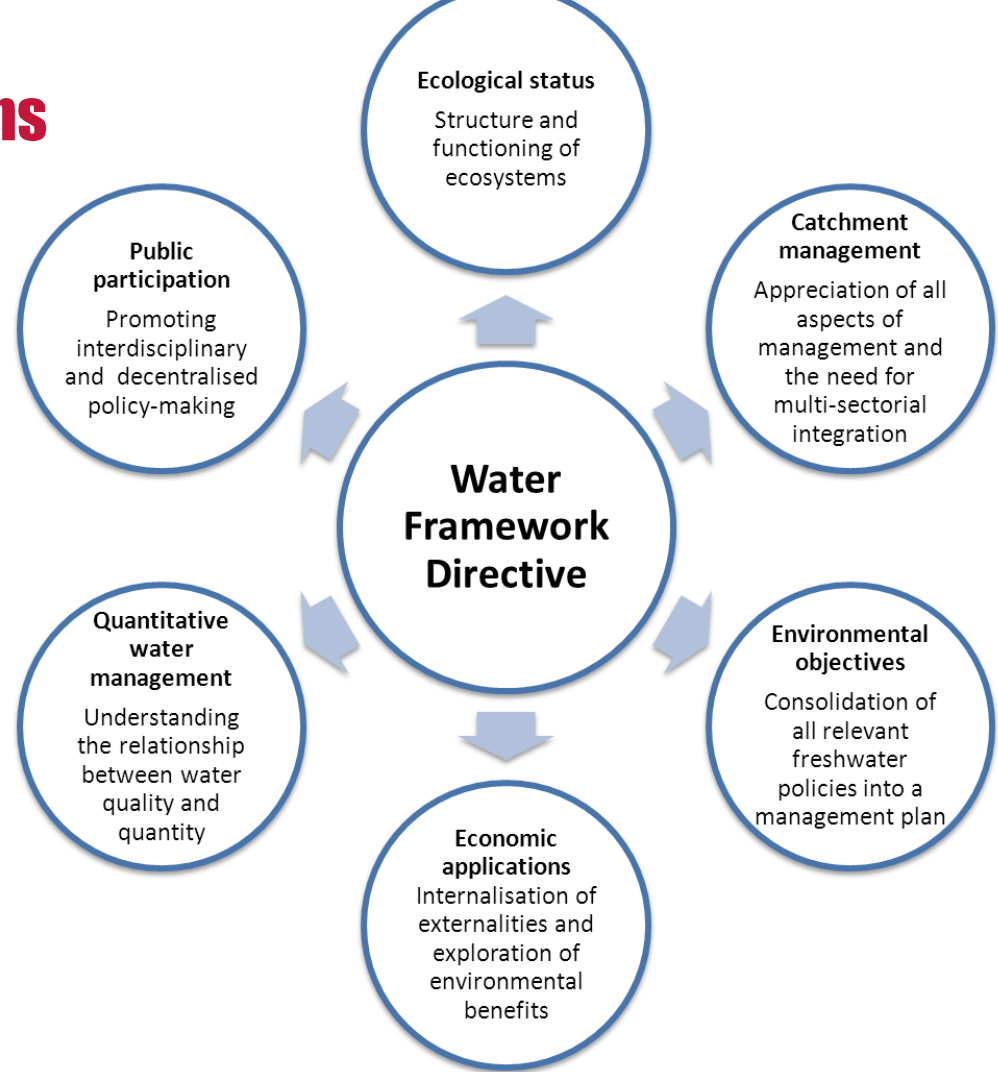
# EU Water Framework Directive 2000/60/EC (WFD)

- **Objectives:**
  - Achieve **good ecological** status by 2015
  - Maintain high status of waters
  - Prevent deterioration in water status
- **New approach to water protection:**
  - Catchment-based
  - Holistic and integrated
  - Public participation
  - Ecological vision
  - River Basin Management Plans (RBMPs) and Programme of Measures (PoMs) in 6 year cycles

*“The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwaters... thereby contributes to the provision of the sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced and equitable water use”* - WFD Article 1

# WFD: Great Expectations

- New generation Directive - **experimentalist approach**: a collaborative framework for achieving common goals and enabling opportunities for continuous policy learning and adjustment.
- The WFD, if enacted as proposed, has the potential to be the **EU's first "sustainable development" directive** (Carter, 2007; Johnson, 2012).
- Its introduction and innovations created **revolutionary prestige** for the Directive, which was considered as a potential template and pilot for future environmental regulations (Josefsson, 2012).



# WFD Implementation Progress

Fifteen years after the WFD was introduced, **achieving its objectives remains a challenge**, with **47% of EU surface waters not reaching the good ecological status in 2015** – a central objective of EU legislation.

- Despite a lot of efforts invested by MS to implement and enforce the WFD and **some good progress**, the outcomes of the 1st WFD planning cycle, which operated from 2009 to 2015, **fell behind expectations** - **the number of surface water bodies in “good” state only increased by 10%**.
- Such delays and slow progress have led to the WFD’s scrutiny with many reviews emphasising **the drawbacks and weaknesses** of the Directive, **questioning** its overall effectiveness as a policy-tool.



Even though, the Directive is still seen as a driver for good environmental change, the perceptions for great expectations, previously attributed to it, have slowly faded away.

# What went wrong?

- Putting aside the daunting technical and organisational challenges of the WFD implementation,

we aimed to **shed light on why the great expectations that came with the Directive have not yet been fully realised.**

- A review of how the Directive has been **interpreted**, focusing on its intentions and how they were applied.
- WFD problems associated with **interpretation**, the “*translation*” of the policy’s legislative intent into operating rules and guidelines, and as a consequence with **application** too.



GLOBAQUA

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Managing the effects of multiple stressors on aquatic ecosystems under water scarcity. The GLOBAQUA project



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The GLOBAQUA project aims to provide recommendations for improving a better understanding of how current management practices and policies could be improved, taking into account the effects of multiple stressors and to aid in bridging the gap between the science and policy.

# WFD: a “systems” Directive

Because of ecological variability,  
good ecological status cannot be defined  
across Europe using absolute standards

## System: Catchment

Catchments are fundamentally different from each other (both in socio-political and natural conditions)

## System State: Ecosystem Health

An expression of system structure and function

## Ecological Status:

**Performance indicator** that measures the ‘distance’  
between the current environmental state and the desired situation (good ecological status)

**Good ecological status** is defined as the **state of the system** in the **absence of any anthropogenic pressures\***, or a slight **biological deviation from what would be expected under natural/undisturbed** (reference) **conditions**

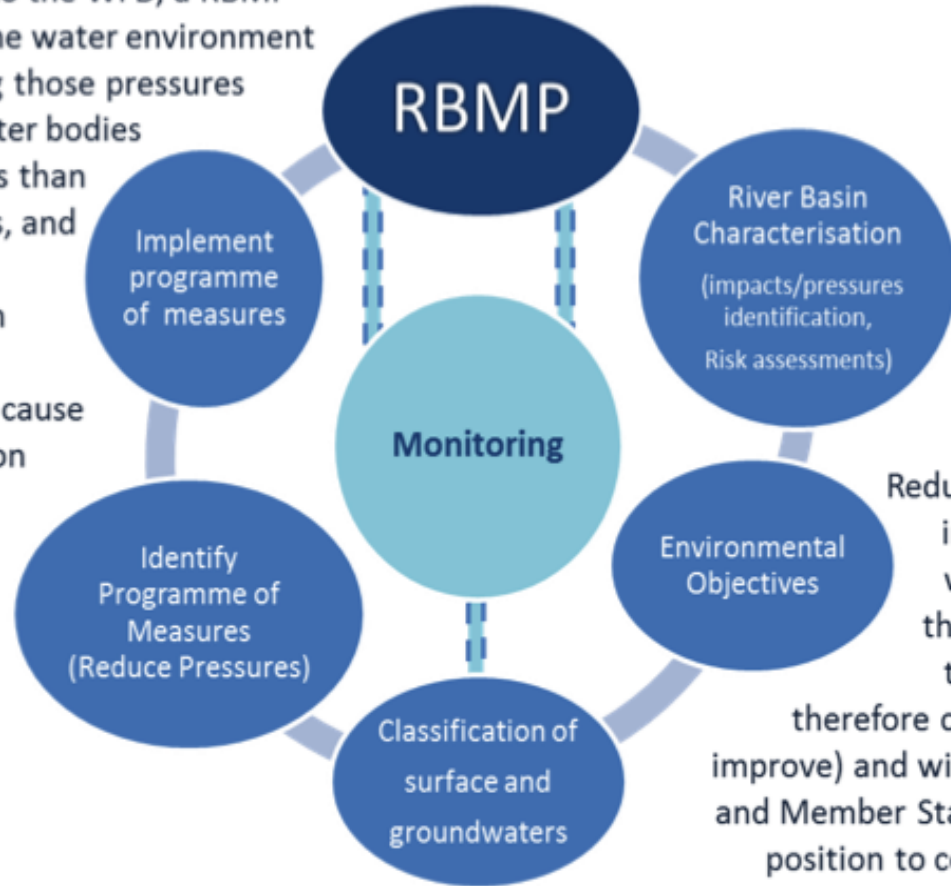
The WFD adopts the Drivers-Pressures-State-Impacts-Responses (DPSIR) framework (European Communities, 2003a), which aims to provide a systemic understanding the cause-effect relationships between the environment and various anthropogenic activities taking into account the essential features of the system of interest.

Programme of Measures (PoMs) are required to manage the anthropogenic pressures causing such deviation from undisturbed/reference conditions.



## RBMP planning process

According to the WFD, a RBMP manages the water environment by reducing those pressures causing water bodies to be at less than good status, and preventing increases in pressures that would cause deterioration of status.



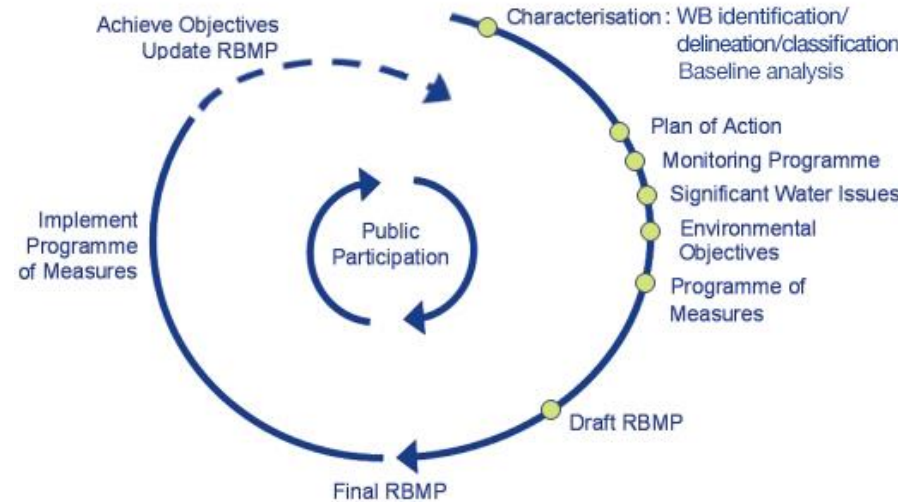
Reducing pressures in a sustainable way will enable the environment to recover (and therefore classification to improve) and will place Europe and Member States in a better position to cope with other pressures such as climate change and invasive species impacts.

**Ecological status** is a reflection of multiple, diverse and distributed (scalar) causes: - multiple pressures that affect both structure and function of aquatic ecosystems.

# Implementation problems (1)

- The **characterisation of river basins** (including analysis of pressures, impacts and economic analysis) proved to be a **real challenge** for many Member States.
- The number of operational monitoring sites was higher than the **number of surveillance monitoring sites** in 17 out of 25 reported EU Member States, with **significant gaps in the pressures and impacts analysis** also reported in many Member States (European Commission, 2015).
- This is evident in the **limited links between pressures and PoMs**, in the **inadequacy of monitoring to capture the interactions between stressors** and how best to manage them (European Commission, 2012b).

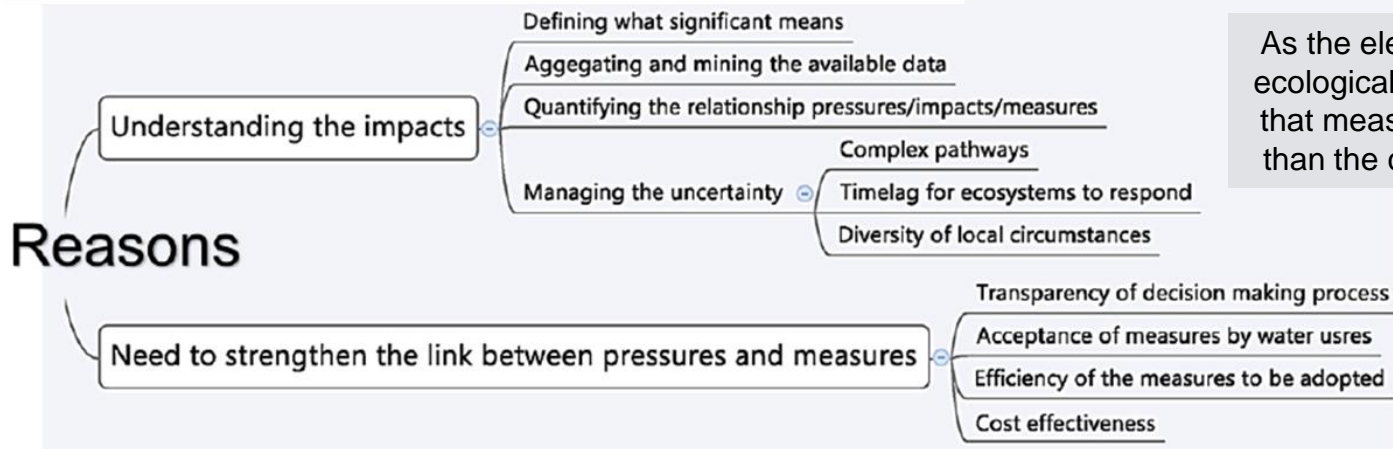
## WFD planning sequence



The **pressure-impact analysis** validated by **surveillance monitoring** (collecting data for all quality elements) is key to the success of the RBMPs (EC, 2003).

# Implementation problems (2)

- Instead of following the WFD process and designing **appropriate and cost-effective measures** to reduce the **impacts of anthropogenic pressures** to achieve good status, many MSs continued with traditional water management practices focusing on **regulating individual monitored pollutants**.
- Often PoMs based on the improvement of individual **element classifications**, assuming linear causality, which does not adequately account for the **complex conditions operating within the system**.



As the elements serve as indicators of ecological status, this approach implies that measures target symptoms rather than the causes of water degradation.

Compliance focus implementation targeted on improving classification rather than meeting environmental objectives, often fails to deliver benefits.

To assess compliance with the WFD objective of preventing deterioration, 2015 classifications results (based on data up to the end of 2014) using the standards and classification tools used in 2009, were compared with the 2009 classification baseline.

Water bodies that have deteriorated (at >75% confidence)



Update to the river basin management plans in England

National Evidence and Data Report

Updated December 2015

Water bodies	Number	Percentage
Surface water ecological status	143	2%
Surface water chemical status	9	<1%
Groundwater quantitative status	0	0%
Groundwater chemical status	0	0%

Between 2009 and 2015, out of 34,320 monitored surface water elements:

- 1,658 (4.8%) elements have a lower status
- 27,481 (80.1%) elements maintained their status
- 4,142 (12.1%) elements improved their status
- 1,039 (3%) elements moved from High to Good status

Comparison of 2009 baseline with 2015 predicted and actual results (using the water body network, standards and classification tools used in 2009)

They represent a 7.24% net improvement (2.06% net improvement at >75% certainty) in the status of surface water body elements but a 4% reduction of water bodies at good or better status.

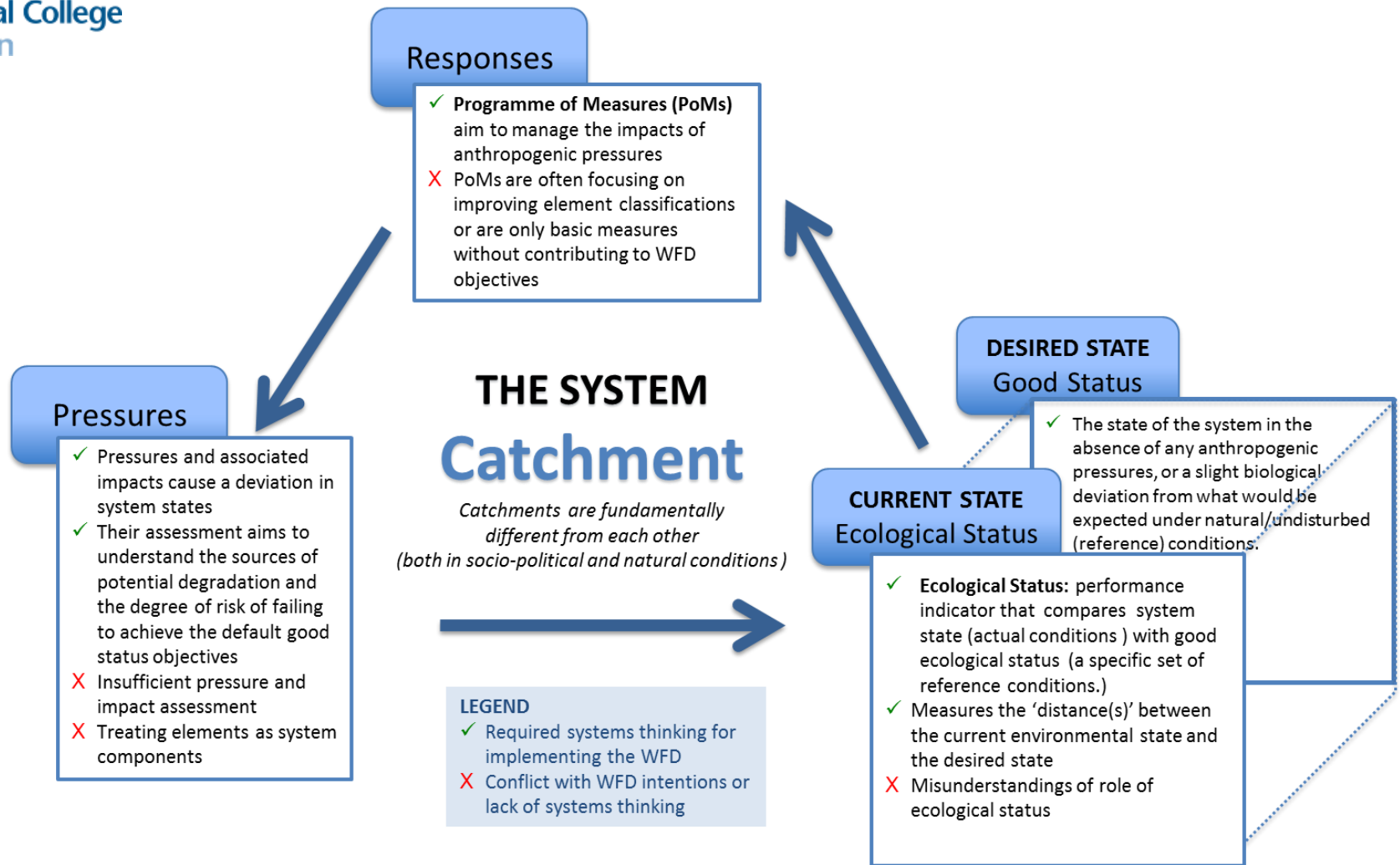
Water bodies	Percentage of water bodies at good or better status		
	2009	2015 predicted	2015 actual
Surface water ecological status	26%	30%	21%
Surface water chemical status	8%	9%	14%
Groundwater quantitative status	61%	61%	72%
Groundwater chemical status	58%	59%	53%
Overall status	26%	30%	22%

# Misunderstanding the WFD's systemic intent

Some of the key challenges that have been identified include:

- **Misunderstandings with the definition and the role of ecological status in the WFD**
- **Better characterisation of river basins (including analysis of pressures, impacts and economic analysis) and inadequacy of monitoring to capture the interactions between stressors**
- **Developing measures to improve element classifications without fully understanding the system as a whole**
- **Implementing measures that do not readily address significant pressures**
- **Advocating centralised decision-making process that may hinder the shift towards participatory catchment management.**

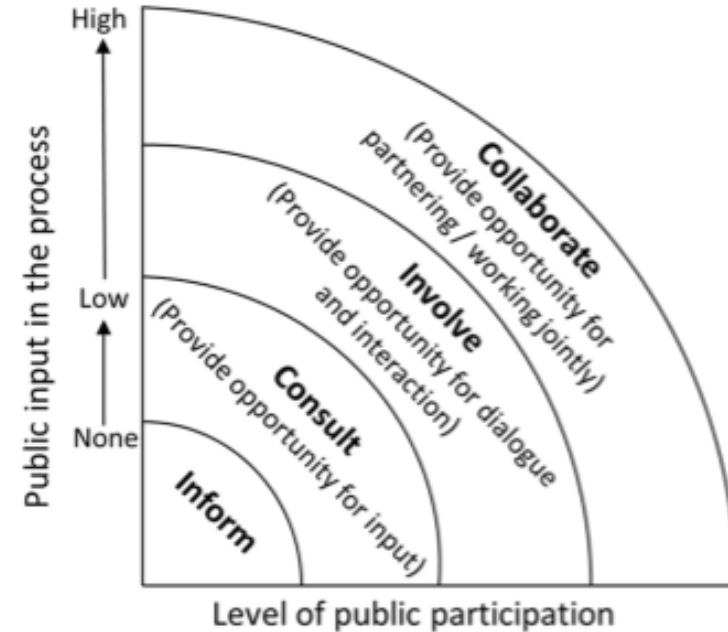
Such challenges are all symptoms of the same cause, the **lack of a systemic thinking in** the WFD implementation



# The way forward

Implementing the WFD like any other directive is not going to work. Need to review implementation efforts to allow the WFD to deliver its systemic intent to reach its full potential.

- The WFD requires **in depth catchment understanding** - treat the catchment as a system composed of human-nature interdependencies
- The role of ecological status should be to reflect the **system's overall performance**, with monitored elements selected to be indicative of pressures
- Establish clear **links between pressures and measures** through the information created by those interdependencies
- Promote **interdisciplinary research and knowledge integration** – collaborative participatory approaches



# Acknowledgements

