



## The EU Water Framework Directive: From great expectations to problems with implementation

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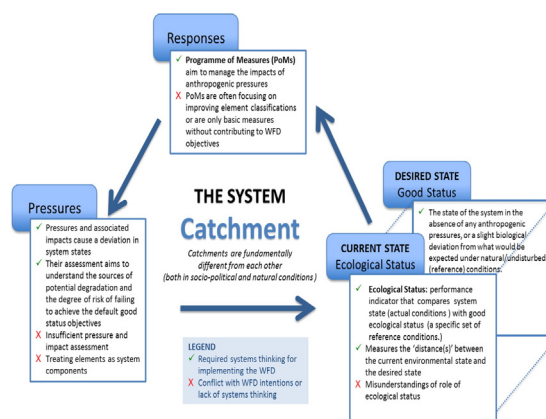
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### HIGHLIGHTS

- Systems thinking is a pre-requisite to effective WFD implementation.
- Departure of implementation efforts from the WFD's intention identified.
- Misunderstandings even of WFD core principles highlighted
- Implementing the WFD like any other directive will not work.
- Acknowledging the WFD's systemic intent is required to deliver its full potential.

### GRAPHICAL ABSTRACT



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### ABSTRACT

The Water Framework Directive 2000/60/EC (WFD) is widely accepted as the most substantial and ambitious piece of European environmental legislation to date. It has been referred to as a once in a generation opportunity to restore Europe's waters and a potential template for future environmental regulations. However, fifteen years since it was adopted, and with many problems and delays in its implementation, the WFD has not delivered its main objectives of non-deterioration of water status and the achievement of good status for all EU waters. Putting aside the daunting technical and organisational challenges of its implementation, this paper aims to shed light on why the great expectations that came with the WFD have not yet been fully realised. It reviews how the Directive has been interpreted, focusing on its intentions and how they were applied. The findings reveal the absence of the paradigm shift towards the systems (integrated) thinking that the WFD was grounded on, as a fundamental problem with its implementation. This is also evident in cases where the Directive has been criticised as a policy tool or when implementation efforts were reviewed, indicating misunderstandings even of its core principles. This inherent departure from the Directive's systemic intention and methodological approach needs further investigation, as it could be the reason behind many of its problems and delays. Unless current implementation efforts are reviewed or revised in light of this, enabling the paradigm shift required to ensure a more sustainable and holistic approach to water management, the fading aspirations of the initial great expectations that came with the Directive could disappear for good.

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## 1. Introduction

The introduction of the EU Water Framework Directive 2000/60/EC (WFD) aimed to bring in a new era for European water management, focusing on understanding and integrating all aspects of the water environment to be effective and sustainable (Teodosiu et al., 2003). The purpose of the Directive was to establish a framework for the protection of European waters in order for Member States to reach “good status” objectives for water bodies throughout the EU. These efforts are based on a six-year cycle, whereby the WFD environmental objectives were to be met by 2015, provided that no deadline extension or exception was invoked. Member States that avail themselves of an extension beyond 2015 are required to achieve all WFD environmental objectives by the end of the second and third management cycles, which extend from 2015 to 2021 and 2021 to 2027 respectively (European Commission, 2012a).

The Directive was adopted to succeed and replace traditional management practices predicated upon the command and control paradigm, which looked at pressures in isolation and reduced environmental systems to their constituent elements when setting specific water objectives (European Commission, 2012a). Under this approach, specific parameters were monitored at the point of discharge to control the emissions of individual pollutants beyond specified limits (Petersen et al., 2009; Porto and Lobato, 2004). Under the assumption that managing individually the non-compliant elements could lead to an overall improvement in ecosystem health (Glasbergen and Driessen, 2002), this policy approach was discipline-specific, focusing on compliance of isolated components of an environmental system, in an attempt to increase their predictability and stability (Holling and Meffe, 1996). Although this paradigm had been effective for a long time and enabled developed industrial societies to address the most serious health-threatening environmental impacts, it failed to consider the complexity of ecosystems or the interactions and trade-offs at different scales (Müller-Grabherr et al., 2014).

The introduction of the WFD aimed to facilitate a shift from these fragmented policies to a holistic approach integrating all parts of the wider environmental system (Howarth, 2006). With the emergence of integrated watershed management in several countries throughout the world, the growing recognition of the multiple—often competing—uses of water, and the increased awareness of the interrelationships of water systems with other physical and socio-economic systems (Margerum, 1995) shaped the WFD's systemic intent. As articulated in its Preamble and Article 1, the Directive offers an integrated and coordinated approach to water management in Europe based on the concept of river basin planning (European Commission, 2000). Acknowledging that catchments differ from each other in terms of both socio-political and natural conditions (Hooper, 2003), it signified a shift towards catchment management and systems thinking. In line with systems theory putting emphasis on the interactions and interdependencies within a system that form a functioning whole (Arnold and Wade, 2015), it required understanding the relationship between land and water under different socio-economic drivers in the management of water resources (Vlachopoulou et al., 2014).

Furthermore, the Directive's requirements for public participation in its planning process address the inherent complexity of water resources management, and create the impetus for the integration of multiple perspectives and skills for decentralised policy-making in freshwater governance (Steyaert and Ollivier, 2007). Through the WFD Common Implementation Strategy (CIS), a recursive process of provisional goal-setting and revision based on learning (Sabel and Zeitlin, 2012), the WFD introduced an experimentalist approach to water governance, offering much more flexibility than previous directives, and opportunities for continuous policy learning and adjustment (Behagel and Arts, 2014; Von Homeyer, 2010), leaving many choices open to the Member States (Liefverink et al., 2011). Unlike any other environmental directive that prescribes specific targets, the WFD is manifestly not a target-based

piece of legislation, the only notable exception being the WFD's explicit obligation that no water bodies are to experience deterioration in status from one class to another (Howarth, 2009; Donauhanse, 2013). Instead, it sets specific operational and technical implementation obligations for member states that could be referred to the EU Court of Justice if these were not followed correctly (European Commission, 2012b, 2012c). Overall, the WFD was seen as the first European Directive that focused on environmental sustainability (Johnson, 2012; Carter, 2007), and partly because of this, 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).

However, 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 water legislation (European Commission, 2012a). During the first WFD cycle, which operated from 2009 to 2015, the number of surface water bodies in “good” state only increased by 10% (van Rijswijk and Backes, 2015). This has led to the Directive's effectiveness as a policy tool being questioned; with many reviews further highlighting drawbacks and weaknesses (Josefsson, 2012; Moss, 2008; Rettman, 2007; Boscheck, 2006).

This paper reviews the WFD implementation efforts, focusing on the interpretation of its key principles in the process, in order to shed light on why the great expectations that came with the Directive have not yet been fully realised. Putting aside the daunting technical and organisational challenges of the Directive, it investigates the extent to which implementation practices might not be aligned to the Directive's initial aspirations and systems approach. Also, it reviews some of the main criticisms of the WFD, and the extent to which these may be attributed to a lack of appreciation or understanding of the Directive's integrated and systemic nature.

## 2. A “systems” approach to water management

The WFD prompted a shift from traditional end-of-pipe solutions insufficient in achieving its ambitious goals, towards sustainable catchment management (Tippett, 2005). It requires in depth understanding of catchments and management that is aligning human-nature interdependencies with the goal of improving the system as a whole, under an ecological vision that considers human activities as a source of disturbance and water quality degradation (Kelly, 2013). In support of this, the WFD adopted the Drivers-Pressures-State-Impacts-Responses (DPSIR) framework (Oliveira et al., 2005; European Communities, 2003a), which aims to provide a systemic understanding of the relationship between environmental effects, their causes and measures taken (Nöges, 2002), in an approach that requires Programme of Measures (PoMs) taken to manage anthropogenic pressures in order to improve ecosystem health (European Commission, 2000). The WFD calls for a ‘catchment-based approach’ and ‘integrated river basin management’, terms both used to refer to the management of land and water as a system, thus requiring a paradigm shift in management, towards systems thinking, which adopts an interdisciplinary, integrated, and holistic approach (Voulvoulis, 2012).

The WFD required competent authorities and all relevant parties to define their *system of interest* (catchment) and have a more tailored understanding of its conditions. This was a pre-requisite for river basin management, away from the standardised instructions of traditional water policies, often not relating to the catchments (Sabatier et al., 2005). As systems are identified by their *structure* and their *function*, and their state (health) is an expression of both (Arnold and Wade, 2015), ecological status or potential, according to the WFD, is an “expression of the quality of the *structure* and *functioning* of surface water ecosystems” (European Commission, 2000) and is therefore expressing the system state—the ecosystem's health (Fig. 1). As the main objective of the WFD is for all waters to reach good or high ecological status,

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