

Syed, T.; Choudhury, E. and Islam, S. 2020. An assessment of scale-sensitivity in policy design and implementation of the EU Water Framework Directive within the context of the Danube Basin. *Water Alternatives* 13(3):



---

# **An Assessment of Scale-Sensitivity in Policy Design and Implementation of the EU Water Framework Directive Within the Context of the Danube Basin**

**Tahira Syed**

Tufts University, Medford, Boston, USA; [tahira.syed@tufts.edu](mailto:tahira.syed@tufts.edu)

**Enamul Choudhury**

School of Public and International Affairs, Wright State University, Dayton, Ohio, USA;  
[enamul.choudhur@wright.edu](mailto:enamul.choudhur@wright.edu)

**Shafiqul Islam**

Water Diplomacy Program, Tufts University, Medford, Boston, USA; [shafiqul.islam@tufts.edu](mailto:shafiqul.islam@tufts.edu)

---

**ABSTRACT:** Scales and boundaries are integral components of environmental governance policies. These scales and boundaries – administrative, political or institutional – usually do not align with biophysical scales. For effective environmental governance, a key policy question is which scale to use when. This question, however, is often ignored due to the unavailability of the tools and data necessary for incorporating scale issues into policy design and implementation. In this paper, we introduce the concept of scale–descale–rescale (SDR) as a tool for policy analysis. 'scale' refers to the current scale of a policy; 'descale' refers to levels of scale that are higher and lower than the current scale; 'rescale' refers to the process of bringing all three scales together in order to examine their interactive impact. In this paper, we present an examination of the framing and implementation of the EU Water Framework Directive (WFD) in the Danube River Basin; we find that the current scale of the WFD design is at the river basin level while, at the same time, its implementation is expected to be carried out at the national and sub-river basin levels. To fully understand the efficacy of the WFD as a policy instrument, we first use the SDR tool to descale the design and implementation of the WFD at five scales: multinational, national, subnational, river basin and sub-river basin; we then rescale them in order to observe the overall impact. We find that in the Danube River Basin an interconnected web of scale issues is impacting and often obstructing effective implementation of the WFD.

**KEYWORDS:** Scale, multilevel governance, WFD, complexity, Danube River Basin

---

## **INTRODUCTION**

Environmental governance policies are often scale specific, but they seldom explicitly state or account for this. Scholars have long recognised the need to address the scale disconnects (see, for example, Ostrom, 1999; Young, 2002; Cash et al., 2006). Over the last decades, the discourse on scale issues has expanded. Through interdisciplinary policy debates, a better understanding of the interplay of natural, societal and political processes has evolved. Scholars from the field of natural sciences, for example, may highlight the intricacies of the space and time variations among different variables of processes; sustainability scholars, on the other hand, may highlight the importance of understanding the relationships between local and global issues vis-à-vis decision choices made at the regional, national and

global levels (Wilbanks, 2007; Balvanera et al., 2017; Smith et al., 2018). Similarly, in political geography, scale may refer to the territorial spaces in which social, political and economic relations are contested; these are not considered to be natural processes, but rather are produced through the strategic use of agency in sociopolitical processes (Hameiri and Jones, 2017). Discussion of multiscale interactions by critical geographers often points to the hierarchical spaces where socio-spatial power relations are contested and compromises are negotiated and regulated (Swyngedouw, 1997).

The demarcation of scale into local, subnational, national or regional is considered to be a social construction by social scientists which involves multiple configurations of actors and institutions that affect different social groups at different scales (Smith, 2004). The politics of scale emerging from this territorialism is what some scholars find to be a "common and intrinsic part of political life", even when actors do not think explicitly in terms of scale (Brenner and Elden, 2009). In the literature, there is a repeated underlining of the complexity of the causal forces behind the social construction of scale which lead to politically significant outcomes (Smith, 2004; Brenner, 2001). Within political ecology, scale issues have also become central to addressing environmental governance challenges, especially where the multiplicity of stakeholders has crucial implications for policy design. McCarthy (2005), for instance, not only viewed the production of scale as inseparable from the social production of nature, he also called for greater attention to the increasing role of civil society and non-state actors in the production and contestation of scale.

Despite the ongoing interdisciplinary discourse, it remains difficult to design and implement scale-sensitive policies because of the general unavailability of the conceptual tools and empirical data that are necessary for incorporating scale issues; these tools and data must include variables, processes, actors and institutions from a coupled natural–societal–political system. The epistemic view of scale issues relates more accurately to a biophysical study of the environment. To some extent, this limits our understanding of the deeply connected issues of complex systems, as the approach relies almost entirely on the objective comparison of all the issues (Raška et al., 2019). Given that the environment is more accurately described as being socially constructed (Brenner, 2001), a better or critical explanation of scale emerges in a view that uses a more contextual approach to the issues of spatial fit; this view acknowledges that actions at one scale lead to changes and unexpected outcomes at other scales (Moss and Newig, 2010).

In the context of the European Union's (EU) approach to sustainable development, for example, rather than defining sustainability in terms of the equality principle, it is considered to be a function of individual liberty and equal opportunity, based on the principle of freedom (Telle, 2017). This is what Brenner (2004) termed the 'Rescaled Competition State Regime' which, in the context of the EU, prioritises freedom over equality. Furthermore, the EU-wide policymaking processes have shifted from their post-World War II egalitarian ideals to a more regional-scale 'big picture' policy perspective that emphasises collective growth and development (Cox, 2018). This also means that European integration nurtures the emergence of new modes of governance in order to coordinate interests according to certain agreed-upon rules for the delivery of public goods (Telle, 2017). It is for this reason that, instead of being prescriptive, most EU policies maintain a strong sovereignty principle with regard to institutional arrangements for policy implementation. We shall observe this in the case of the Water Framework Directive (WFD), which was instituted in the year 2000.

This paper examines how scale issues are incorporated into the design and implementation of the European Union's WFD. Using a new analytical framework, we take a closer look at the Danube River Basin's implementation of the WFD. As a major governance policy, the WFD introduced an ambitious set of objectives; these were to be achieved collectively by all EU member states through the adoption of innovative mechanisms for the protection and restoration of aquatic ecosystems for the long-term sustainability of all European waters (EC, 2000). The WFD set in motion a common commitment by all EU member states to achieve a high qualitative and quantitative status for all European water bodies by 2015; this was to include surface and groundwater as well as marine and coastal waters. The river basin

was the agreed-upon impact scale for the successful implementation of the WFD, though it was acknowledged that simultaneous actions would be required at the local and sub-basin scale. Despite this acknowledgment of scale, the WFD, like many other policies, remains organised around administrative boundaries and institutional arrangements. The WFD presumed that collective action at the local and sub-basin scale would generate positive impacts at the basin scale. The scale-acknowledgement of the WFD, however, did not lead to a scale-based analysis of actions and outcomes. While the River Basin Management Plan (RBMP) became the main vehicle for achieving WFD objectives, the lack of scale-based analysis resulted in setting an overly ambitious deadline of 2015 for the achievement of good status. The 2015 deadline severely underestimated the different scales at which actions would need to be taken if WFD objectives were to be achieved (ICPDR, 2018). It is not surprising that setting realistic timelines is problematic; it stands as evidence of the typical neglect of scale issues in environmental governance policies.

In 2015, at the end of first cycle, the WFD scorecard showed that it had achieved less than 50% of its plan; this led to two further cycles of six-year RBMPs and the setting of 2027 as the new deadline for the achievement of the WFD's objectives (EC, 2019). The European Union's Assessment of Status and Pressures shows that 74% of EU groundwater bodies have achieved good chemical status and that 89% of them are at good quantitative status. The situation for surface water remains less encouraging, with 38% having achieved good chemical status and 40% good ecological status (EEA, 2018).

After nearly 20 years, the WFD continues to be an accepted framework. It embodies the principles of integrated river basin management as a legal mandate for EU member states, while at the same time allowing them to maintain their individuality as sovereign nations. A distinction between the scale of action and the scale of impact is relevant here; the success of the WFD rests on the implementation actions of individual EU member states within their administrative boundaries, as well as the achievement of good status at the river basin scale when member states' actions are considered collectively. Against this backdrop, we take a closer look at the WFD implementation through a scale lens. We introduce a new analytical tool, the scale–descale–rescale (SDR) analysis, in order to assess the WFD's design and implementation within the context of the Danube River Basin (DRB). The SDR approach is based on an analysis of the current scale of WFD policy, followed by its descaling to multiple levels; finally, we rescale the WFD policy in order to discover possible cumulative outcomes of adaptive improvements in the policy.

### **THE SCALE–DESCALE–RESCALE ANALYSIS TOOL**

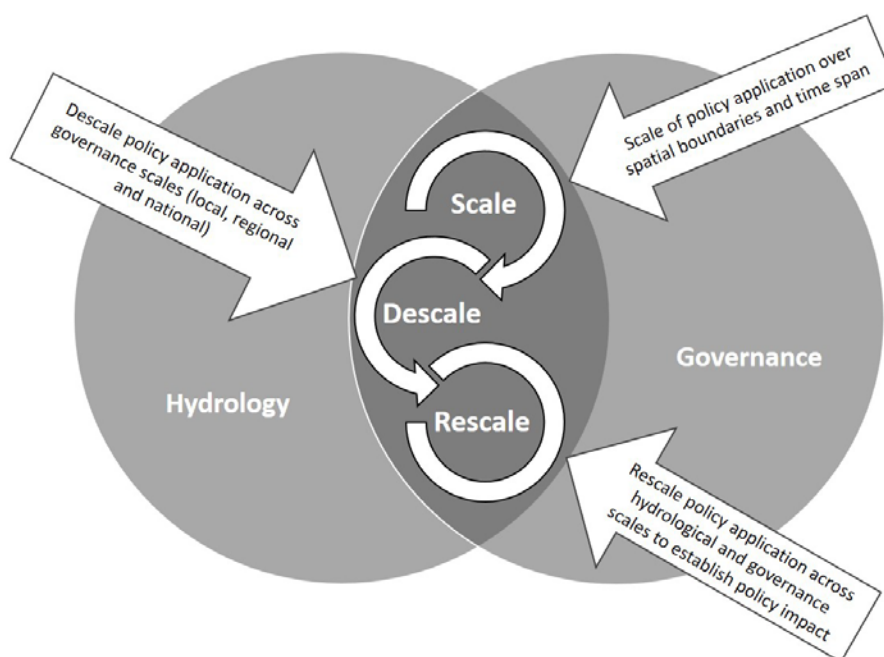
Environmental policies often lay out goals and objectives at larger scales in order to emphasise the importance of resource management and implementation strategies for long-term sustainability and equitable outcomes. Climate change policy arguments, for example, are generally presented at the planetary or global scale; the WFD adheres to this principle as its key premise and incorporates an integrated set of actions aimed at achieving its objectives at the basin scale. In order to enhance the democratic legitimacy of the WFD as a policy instrument, it rescales water management to the river basin scale and demonstrates how the basin-scale impact of good status is beneficial to all stakeholders (Moss, 2004). Democratic legitimacy, in this context, is understood to be the acceptance and justification of a shared rule by a community (Bernstein, 2011).

Scholars have argued that participation in the different phases of a system (input, throughput and output) can play an important role in achieving different forms of legitimacy (Newig et al., 2016). In the context of the WFD, the policy design reflects legitimacy through the process of participation; it is recognised that democratic legitimacy is better achieved at the local level because, at that level, relevant actors are provided with the opportunity to participate (Moss and Newig, 2010). In addition, the WFD also prescribes other processes that contribute towards input legitimacy; these include a common understanding of the timelines for achieving key milestones (for example RBMPs) and the frequency of

carrying out monitoring and preparing reports. While these are desirable traits of effective environmental governance, their implementation is often fraught with challenges because of problems that emerge from scale mismatches between the spatial jurisdiction of policies and resource boundaries.

The complexities of designing institutions and vertical and horizontal flows of information across multiple scales pose several problems. One key problem relates to the lack of a systematic way to think about the challenges of integrating multiple scales within policy designs and implementation. This problem has given rise to an emerging discourse where there is little agreement on how to study scale-based effects of policies that govern shared waters (Newig and Fritsch, 2009; Norman et al., 2012; Padt et al., 2014; Norman et al., 2015). In the absence of an analytical approach that can operationalise a scale-sensitive assessment of environmental governance policies, scholars argue that a reframing of scale issues is needed in order to better assess policies (Cash et al., 2006; Moss and Newig, 2010; Norman et al., 2012; Padt et al., 2014). Incorporating scale issues into environmental policy design and implementation thus provides an operational mechanism for studying the scale-based impacts of various policies. With this aim, we propose the SDR analysis tool and show its utility by assessing the performance of the WFD. The SDR analysis starts by establishing the current scale at which a given policy applies; it goes on to descale the policy to multiple levels and then to reconstruct it in order to identify the possible cumulative outcomes from a rescaled policy perspective (Figure 1).

Figure 1. The scale–descale–rescale framework in the context of water management.



Source: Authors.

The SDR framework covers both physical (sub-basin and basin) and governance (local, national, and multi-country) scales for water management. It is important to differentiate the descaling process from that of rescaling to the basin scale. Descaling to multiple levels means that we examine policy from a multiscale point of view, that is, the scale at which policy is designed to impact and the scale at which implementation is expected to take place. In this way, we are examining how policy design and implementation may occur at multiple scales. As we will see in the case of the Danube, the initial policy design scale is at the river basin level, but implementation is expected to occur at local, national or multi-

country levels. Our descaling analysis focuses on various implementation scales; the rescaling process then brings all the scales together in order to examine the cumulative impact of WFD policy.

The process of descaling and rescaling helps to examine and understand the impact of the interplay and interactions between different levels of governance (Young, 2002). This addresses the issues of multilevel governance whereby a wide range of stakeholders operates at different jurisdictional levels (Moss and Newig, 2010). Solutions to policy harmonisation are seldom available at one scale; they often involve a process of matching multiple levels of one scale with multiple levels of another in order to find the spatial matches (Termeer and Dewulf, 2014). In the case of the Danube, this comprises not only the river basin level, but also local, national and multi-country levels. The SDR, by exploring possible policy impacts at multiple scales, provides the means for recognising scale mismatch.

### **THE WATER FRAMEWORK DIRECTIVE – AN EMERGENT POLICY INSTRUMENT**

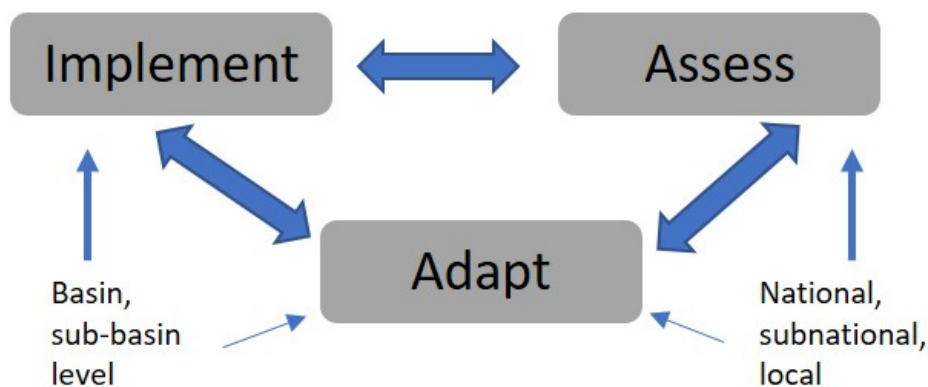
The WFD is intended as a coherent transboundary policy framework that accounts for the entire course of the river as well as all water uses and users. Issues such as transboundary water pollution transcend national interests and the capacities of individual countries; some form of supranational structure is thus required for its sustainable management. Compared to issues at the national or subnational levels – which can be better managed through localised structures – transboundary issues require handling by a multilevel governance process (Turnhout et al., 2015). The WFD is an example of such a transboundary policy process; it is designed to integrate basin waters in a multilevel governance process that includes the European Union as a whole (Benson and Jordan, 2014; Moss and Newig, 2010). The challenge to policymaking lies in devising functioning water management systems that can operate at multiple levels of governance, in a situation where particular functions find their best fit at particular governance levels (Benson and Jordan, 2014). Governance scales consist of the EU, national, sub-national and municipality levels, while the hydrological scales consist of the sub-river basin and basin levels. The WFD addressed the question of the multilevel governance of water by reconfiguring water regulation around river basins rather than by replacing one scale with another. This reconfiguration of scales has initiated a process of renegotiating the forms and means of institutionalising river basin management, thus altering established power dynamics within the EU (Moss and Newig, 2010). Whether the goal is the reconfiguration or the matching of governance scales, as a policy process, the WFD has led to the emergence of a complex and remarkable mechanism of transboundary water governance within Europe. As policy, the inherent complexity of the WFD rests on its encouragement of thinking about transboundary waters along the river basin scale while acting along national borders; it thereby generates the interaction of several scale issues, and the fitness of these scales forms a key criterion of the WFD's implementation success. Not only are the different scales of hydrodynamics involved; also important is the conscious attention paid to the different scales of water management and their interactions across the hydrological and governance scales. Despite the complexity of multilevel governance, the entire approach of the WFD rests on recognising and realising a central environmental value – the sustainability of water resources.

The innovative ideas introduced in the WFD range from (a) the adoption of a holistic view of water resources management at the river basin level as the main hydrological scale, (b) the concerted promotion of the participation and involvement of non-state actors in planning decisions, (c) the incorporation of economic principles, and, above all, (d) the development of a comprehensive common strategy to support EU member states in their implementation of the Water Framework Directive. When adopted in 2000, the WFD was considered to be ahead of its time in its promotion of sustainable water use as a strategy for protecting the long-term availability of water resources (Moss and Newig, 2010). The principle of long-term sustainability is manifested in policy that progressively reduces the discharge of hazardous substances into ground and surface water bodies and mitigates the effects of floods and droughts; this principle is echoed in the key mechanism by which the WFD achieves its targets: an integrated river basin management (IRBM) approach (Moss and Newig, 2010).

IRBM has been commended as a uniquely innovative approach; it enables WFD policy to be oriented towards both its hydrologic and its political boundaries (Moss, 2012; Green et al., 2013). The WFD's IRBM approach is envisioned as affecting a shift away from multiple and fragmented policies that address limited areas, and towards a transboundary notion of combining economic and social considerations in its approach to all aspects of the river basin. Because the WFD rests on a decentralised implementation arrangement, it is also considered to be a democratically legitimate framework; as it allows individual member states to have flexibility in using existing processes and structures within their national boundaries in the process of planning and implementing the EU-wide WFD. Both member and non-member countries have since taken on WFD implementation in a variety of ways, with some countries developing scale-specific spatial plans and an adaptive governance approach. However, some difficulties arise from the variations in adaptive capacity among member states and other implementing partners that are due to differences in technical and scientific expertise. We found greater representation within the Expert Groups of the ICPDR by some DRB countries, which may be an indication of the different levels of capacity among these countries.

Having robust capacity requires a threefold approach involving assessment, adaptation and implementation. This threefold approach (Figure 2) shows that WFD implementation at the river basin scale is informed by a consistent flow of information across different scales – national, subnational, multi-country, sub-river basin and river basin. The importance of information flow from the subnational to the national and – in the case of shared basins – the multi-country level is essential to an assessment of the impacts of actions taken at each level, including at the level of the entire river basin. This also enables national-level decisions to be informed by actions taken at the local and subnational levels, which can result in an iterative cycle of improved decision-making and implementation.

Figure 2. The implement–assess–adapt approach of the Water Framework Directive.



Source: Authors.

The WFD remains an emerging policy instrument; its effectiveness is still contingent on how EU member and non-member countries in shared basins carry out various actions to achieve WFD goals. We hold that the scale fitness of WFD implementation can only be determined through a descaled analysis; we have therefore used the SDR frame to show how different instruments are, or are not, resulting in an overall realisation of the WFD. At the time of WFD adoption, there was a lack of the deeper understanding of scale which addresses what was absent and what was ignored in many of the prescribed actions of the WFD. It was assumed that all member states could and would internalise the institutional arrangements with equal enthusiasm. This deeper analysis thus provides the added value of the SDR framework.

### **WFD is a pioneer but not a panacea**

Through the years of its implementation, the WFD has been subjected to extensive discussions and evaluative studies of the design features and innovative principles that set it apart from the various previous attempts at a Europe-wide policy (Hering et al., 2010; Nielsen et al., 2013). The WFD also has its fair share of criticism for setting an ambitious agenda with a time-bound target for reaching 'good status' for all European water resources; the definition of what comprises good status also remains contested. Several studies highlighted the problem of terminology and common units of measurement for biological and chemical element classification, as well as how to monitor them. The WFD outlines the biological, hydro-morphological and physicochemical quality elements that are to be used in the classification of the good ecological status of the river basin in the absence of any anthropogenic pressures (Voulvoulis et al., 2017). This listing, however, does not align the environmental quality standards for specific pollutants among the member states; a concern which, in the European Commission's latest report, has been highlighted as an area requiring improvement (EC, 2019).

Criticism of the WFD has been in several areas; these include its overly ambitious timelines (Hering et al., 2010; Liefferink et al., 2011; Voulvoulis et al., 2017), the challenges of coordinating assessment methods and monitoring arrangements (Hering et al., 2010; Nielsen et al., 2013; Chapman et al., 2016), the effectiveness of public participation and stakeholder involvement (Jager et al., 2016; Koontz and Newig, 2014), and its accounting of the complexities of cross-sectoral integration (Pahl-Wostl et al., 2012; Green et al., 2013; Jager et al., 2016).

The theoretical underpinning of the WFD in terms of its aspiration to create an IRBM approach has also come under scrutiny; Voulvoulis et al. (2017), for instance, point out that the shift to systems thinking is yet to be fully recognised. A shift to systems thinking would require all implementing entities to acquire an improved understanding of the technical information (such as the classification of hazardous substances and other pollutants) that must be monitored effectively in order to implement the Programme of Measures (PoM) for the Danube River Basin. Such an understanding is currently absent.

The ambitious timelines for achieving good status and other environmental objectives have also been criticised by several scholars and commentators (Hering et al., 2010; Green et al., 2013; Voulvoulis et al., 2017); these criticisms are well-placed and their validity has become increasingly evident over time. The first timeline of WFD was set for 2015, with a caveat that limitations in technical feasibility and the disproportionate costs caused by natural conditions might result in some EU member states not reaching good status for all waters by that deadline. This caveat included a provision that member states could engage in two additional six-year cycles of planning and implementation. To date, nearly all the member states and coordinating entities have taken advantage of this provision, engaging in subsequent cycles of river basin management plans (RBMPs) (EC, 2019). Given the history of performance by member and non-member countries, valid concerns remain regarding the ability to achieve the objective of good status or higher in all EU waters even by 2027 (Carvalho et al., 2019).

While the list of criticisms of the WFD may be long, we argue that it has broken barriers in environmental governance policy planning and management. Its success rests on having been able to raise policy above the level of administrative and political jurisdictions, which it has done through firmly establishing the primacy of the river basin scale as the basis for all actions. In the process, the WFD has launched a concerted effort to address scale issues in environmental governance within the EU. In this paper, we explore how the WFD has theoretically and practically dealt with scale issues in the DRB.

### **Key scale issues in the WFD**

Articles 3 and 13 of the EU Water Framework Directive are particularly of interest in terms of how the WFD addresses scale issues. Article 3 states that member states must identify river basins and assign them to individual river basin districts (RBDs). This provision directly addresses the jurisdictional barriers and administrative arrangements that are needed for integrated river basin management, particularly as

they relate to transboundary river basins. The WFD emphasises coordination across borders through horizontal and vertical information flow (Green et al., 2013). Article 13 of the WFD states that in the case of transboundary river basin districts that extend beyond the borders of a single country, member states shall endeavour to produce a single river basin management plan. This provision of the WFD requires both cooperation and close coordination in order to produce joint RBMPs (ICPDR, 2012). These articles clearly point to the scale at which action must be taken; they recognise that successful implementation of the WFD requires a consideration of the entire river basin as a socio-ecological system.

The WFD incorporates spatial connectedness and overlapping administrative and jurisdictional boundaries, two key areas which various scholars have alluded to (Young et al., 2006; Pahl-Wostl et al., 2012). The WFD mandates implementation through cross-scale collaboration, while recognising that decisions will still be made and implemented at national levels by individual member states. In establishing this protocol, the WFD incorporates a new scale of governance at the river basin management level, which is operational along with the multiple scales of local, national and multi-country levels. The WFD demands meaningful participation through consultation; for decision-making and for monitoring of the results and targets, and it encourages the active involvement of stakeholders in cross-scale communication and information exchanges (Newig et al., 2016). Meaningful participation aimed at improved decision-making and legitimacy is another key WFD guideline provided to the member states. WFD Article 14 states that all member countries are obliged to inform and consult the public when defining goals, making plans, and adopting measures; it includes guidelines for information disclosure requirements (EC, 2003).

The WFD also generates overall scale effects through deliberate governance interventions and expansion of democratic legitimacy (Newig et al., 2016); for instance, it establishes input legitimacy (defined as public support for its policy goals) by specifying arrangements for soliciting public inputs, but it does not specify how the processing of these inputs should be organised (Young, 2002; van Buuren et al., 2020; Scharpf, 2019; Vringer and Carabain, 2020). In the process of incorporating democratic legitimacy, the WFD addresses accountability by clearly organising its environmental objectives and output requirements (Behagel and Arts, 2014); in reference to the broader objective of good status. For example, participatory requirements are set by member states through adherence to specific milestones along given timelines, with monitoring procedures set within Programmes of Measures (PoMs) and RBMPs. In setting these milestones, the WFD requires member states to exercise various types of democratic legitimacy in order to participate as active stakeholders who are represented and included in decision-making at multiple scales (Newig et al., 2016). At the national scale, for example, the WFD requires all member states to organise participatory processes that enhance input legitimacy. As an example of throughput legitimacy, it clearly lays out the frequency of and procedures for soliciting feedback from various stakeholder groups. The WFD, however, does not require member states to exercise output legitimacy, which they would otherwise do by reporting on the extent to which stakeholder contributions are traceable in final decisions and the degree to which they are reflected in national RBMPs and other technical reports.

In establishing its participation requirements, the WFD has thus initiated a process of negotiation over the form and means of institutionalising river basin management that alters the established power geometries, thus creating winners and losers (Moss and Newig, 2010). The principal beneficiaries are those who can act across the post-WFD scales of water management, increasing their scope of influence through novel multi-scalar strategies. This scaled-governance approach enables vertical and horizontal information flow, builds local capacity, and delegates control at multiple relevant scales (Green et al., 2013). Integrated management at the river basin scale, coordination and joint deliverables of river management plans, and cross-scale communication and information flow jointly make WFD a scale-sensitive policy instrument. However, for effective implementation, alignment of institutional arrangements operating at multiple levels of governance must also be recognised – an alignment that is currently lagging behind its goal (Moss and Newig, 2010).



## APPLICATION OF SDR – A CASE STUDY OF THE DANUBE RIVER BASIN

### The Danube River Basin

The Danube, at 2850 kilometers, is the second-longest international river in continental Europe; its drainage basin covers 211,600 square kilometers, which is 10% of the continent's area. The Danube River Basin comprises 12 European Union (EU) member states, 3 EU-candidate countries, and 3 non-EU countries; as such, the joint use of the Danube's water has historically been tumultuous and eventful (ICPDR, 2018), especially as it is a strategic resource with regard to navigational, agricultural and urban use. With the launching of the WFD, addressing the governance of the DRB for sustainable water resource development was a natural part of the transition to achieving good status. The good condition of the river is considered not only to be essential to the Danube's riparian states; it also constitutes a key indicator of successful WFD implementation. This is not a simple endeavour, however, and its success depends on effective cooperation among all Danube countries and stakeholders.

Riparian interactions on the Danube have an extensive history, one that shaped both the cooperation and the conflict that led up to World War II. Key agreements and treaties on the Danube River date back to the mid-1800s (Syed, 2018). Instruments like the 1991 Environmental Programme for the Danube River Basin, the 1994 Danube River Protection Convention and the Strategic Action Plan, are all evidence of early measures at the national and international levels that were aimed at the sustainable development and environmental protection of the Danube. Unlike other river basins, the DRB is unique in ways that call for collective action from riparian countries. Its distinct features include its location among several of the world's socially and economically most developed and diverse countries, its function in the provision of navigational and trade exchanges between Eastern and Western Europe, and the shared concerns of water quality versus water quantity. There are observable socio-economic disparities among the Danube riparian states. The GDP per capita of Austria, for example, is nearly 14 times higher than that of Moldova, the poorest country in the Danube Basin. Water use by the agricultural sector is also starkly different among the Danube countries. While 9.8% of Ukrainian, 12.4% of Romanian and 21.8% of Moldovan GDP is generated from agriculture, only 1.7% of Austrian, 2.4% of German and 2.6% of Czech Republic GDP is derived from this sector (ICPDR, 2015).

### WFD implementation in the Danube Basin

Some scholars argue that the way in which riparian interests shape negotiations is based on their actual needs, values, desired outcomes, fears and uncertainties (Rogers and Hall, 2003; Hirsch et al., 2006; Mirumachi, 2013; Pahl-Wostl, 2015; Norman et al., 2015). Other scholars assert that transboundary water governance structures often emerge through a negotiated process that broadly reflects the concerns, hopes, perceptions and positions of different actors (Chellaney, 2013; Davidson and de L oe, 2014; Islam and Susskind, 2012; Islam and Choudhury, 2018).

In the DRB, the WFD does not limit itself to issues of quality and environmental conservation; it accounts, rather, for all aspects of water and land management in the basin, including navigation, flood and drought prevention, water transfers and hydropower production (ICPDR, 2018). The relevant scale of WFD implementation is at the basin level and it concerns management practices of all types of shared waters including rivers, lakes, groundwater and coastal waters. The ICPDR was established to represent the collective interests of riparian countries; its existence predates the WFD. Since the ICPDR was already promoting transboundary cooperation in the DRB through a negotiated process, it was well-positioned to implement the WFD in the DRB; it was not exclusively designed to implement the WFD, but its presence made it a natural vehicle of coordination. In this capacity, some of the scale issues embedded in the WFD were transferred to the ICPDR for coordination among EU member and non-member countries; these included the standardisation of the monitoring and reporting requirements stipulated by the WFD. The

ICPDR, however, only acts as a post office for transferring and collating information, while implementation responsibilities still rest with individual countries.

The SDR analysis tool shows how key provisions under different WFD articles are implemented in the DRB at different scales. Table 1 provides a summary of specific WFD implementation mechanisms and the scale of their application within the DRB in terms of (a) planning processes, and (b) participatory processes. We show how these processes are addressed at the current scale, then how they can be descaled to national and subnational as well as multi-country and sub-river basin levels, and finally rescaled to account for the overall impacts on the DRB in terms of the stated goals. The sections after Table 1 provide more detailed discussions of the SDR analysis of WFD implementation in the DRB.

### **The current scale of WFD implementation in the Danube Basin**

As the key water governance legislation for the EU, the responsibility for the WFD's implementation remains with member states within their national boundaries. In the case of the DRB, few anomalies exist between what the WFD provisions mandate and how member and non-member countries act on these provisions for the implementation of Articles 3, 13, 14 and 15 of the WFD.

Article 3 (1), for instance, mandates that member states identify a competent authority for implementing the WFD in the RBDs located in their territories. Although, all member states in the DRB, except for Italy, have nominated competent authorities, there has been no single competent basin-level authority identified for the DRB. EU member states have been entrusted by the ICPDR to coordinate and facilitate the technical and joint deliverables; the ICPDR, however, is not a formal competent authority and its mandate is limited to providing a coordination role upon the instruction of the Danube Contracting Parties, which includes both member and non-member countries. The absence of a DRB-level competent authority is an important point; it directly contradicts the institutional mechanisms of WFD implementation. The scale issues among the DRB countries, for instance, are not fully accounted for, particularly in situations where bilateral and multilateral negotiations are needed for decisions. This not only weakens the efficacy of the WFD as an integrative policy instrument, but also disregards the ongoing politics of scale among the DRB countries when it comes to, for example, aligning sectoral policies.

WFD Articles 3 and 13 similarly prescribe river basin cooperation among member states. They do so through assigning international river basin districts (iRBDs) and producing a single river basin management plan for international rivers. What is less explicit here is the mechanism for fulfilling the necessary legal requirements for member states to carry out joint planning and reporting (Macrory and Turner, 2002). The WFD requires member states to rearrange their own legislative structures if this is necessary for WFD application and enforcement. While this provision empowers the member states to decide on legislative arrangements, it also results in WFD implementation being largely dependent on national legislative structures, thereby making the attainment of the WFD goals contingent on legislative action at the national level (Green et al., 2013).

Another example, as per WFD Article 15 (1), is the requirement of submission to the European Commission (EC) of reports on the RBMPs and of the subsequent updates by member states. For the DRB, the ICPDR does not take on any formal legal responsibility for reporting to the EC. The Danube River Basin Management Plan (DRBMP) is essentially a compilation of national RBMPs, and the ICPDR prepares a Roof Report to fulfil the requirements of WFD Article 5, Annex II and Annex III regarding the characterisation and analysis of the Danube iRBD (ICPDR, 2004). EU member states send their national RBMPs, together with the ICPDR's Roof Report, to the Commission. The ICPDR informally sends the Commission copies of the national reports of non-member countries (Bosnia-Herzegovina, Bulgaria, Croatia, Moldova, Romania, Serbia and Montenegro, and Ukraine) (ICPDR, 2016). This arrangement is used for reporting the information that is required under Article (8) and Annex I of the WFD. Since the Roof Report is not a legally binding document, however, it remains questionable whether it fully adheres to the Article 13 (3) requirement of a single RBMP and to Article 15 (1) updates on iRBMPs (ICPDR, 2016).

Table 1. Water Framework Directive implementation mechanisms and their scales of application in the Danube River Basin.

|                         | Current scale   | Descale   |   | Rescale  |
|-------------------------|---|---|---|--|
|                         |   | National and subnational  | Multi-country and sub-river basin   |  |
| Planning Processes      | Article 3; all countries have identified competent authorities although in different ways   | No country formed new structures since the WFD does not mandate member states to alter national structures; some countries listed a single competent authority, for example the Czech Republic; others listed large numbers of competent authorities – Germany, for example, listed 16 competent authorities at the state level   | The ICPDR provides coordination for Danube’s four sub-river basins (Sava, Tisza, Prut and Danube Delta); the ICPDR’s Expert Group on River Basin Management (RBM EG) is responsible for reporting and consolidating information among all DRB countries; the ICPDR monitors bilateral and multilateral agreements and participates in negotiations, in order to ensure necessary coordination | No single river basin organisation exists for the DRB; the ICPDR is the key structure for coordination but is not legally recognised as an RBO for the DRB   |
|                         | Article 13; Danube International River Basin Management Plan, based on national RBMPs       | Some DRB countries (for example the Czech Republic and Germany) prepare multiple plans to complement their national RBMP; some DRB countries (for example, Slovakia) prepare river basin specific RBMPs   | For each sub-river basin, the ICPDR develops frameworks of collaboration for the countries sharing these sub-river basins; for example, joint reports and RBMPs were prepared for Sava and Tisza; joint action plans were developed for the Tisza to address pollution discharges   | Cross-cutting issues (for example, water scarcity, drought and climate change) were debated at the EU level, with the ICPDR coordinating for the DRB; to date, no formal mechanism exists for the DRB  |
|                         | Article 15; all member states prepare national RBMPs and the ICPDR prepares the Roof Report | National RBMP preparations differ among DRB countries; Bulgaria, for example, prepares one national RBMP for its four river basin districts, while the Czech Republic prepares three: (a) international plans for the Danube, Elbe and Oder RBDs, (b) national plans for the national Danube, Elbe and Oder RBDs, and (c) 10 sub-basin plans. Austria prepares one national RBMP for its three RBDs (Danube, Rhine and Elbe)                                | National RBMPs from member states and national reports from the non-member countries are disseminated by the ICPDR to all DRB countries through its Roof Report; sub-river basin reports are prepared as inputs to both national RBMPs and the Danube iRBMP   | The Roof Report is prepared but is not legally binding for submission to the EU; Danube GIS (Danube River Basin Geographic Information System) provides inputs to Water Information of Europe (WISE) and serves as the management information system for the DRB’s implementation of the WFD |
| Participation Processes | Article 14; DRB Strategy for Public Participation agreed to by all countries.               | All countries list key groups of stakeholders for development of RBMPs; there are differences among countries, for example: Austria includes cities, municipalities and chambers of commerce as additional stakeholder groups, Bulgaria includes consumer groups and energy/hydropower in the Danube and Aegean RBDs, Germany reports extensive levels of consultations and the formation of special advisory groups and alliances, holds local exhibitions | Reports and sub-river basin RBMPs are disseminated through the ICPDR; special reports are prepared and made accessible to the public, for example, the Tisza pollution status report, the Danube Delta Conference and its follow-up   | Coordinated information and awareness campaigns by the ICPDR, for example, the annual Danube Day, Joint Danube Survey, Danube Basin Analysis, and the Transnational Monitoring Network (TNMN)  |

The Roof Report nevertheless serves as a single consolidated document for providing information to multiple audiences, including (i) the countries sharing the Danube (both member and non-member states); (ii) the European Commission; and (iii) all other interested parties and the general public (ICPDR, 2004).

For Article 14 (1), on public information and consultation, member states are required to encourage the active involvement of all interested parties in the production, review and updating of the RBMPs. The WFD mandates EU member states to publish the RBMPs and to make them available for at least six months to receive written comments. In the DRB, while all member states adhere to this provision, conducting consultations and providing access to information through national and subnational fora, compliance among non-member countries varies significantly. The ICPDR was tasked to develop the DRB Strategy for Public Participation, which emphasised that public participation must start immediately (in 2003) so that future management plans could be based on commonly supported initiatives. The Strategy covers both member and non-member states in order to align consultation and information sharing at different levels: (i) international, for all riparian countries including member and non-member states and candidate countries; (ii) national, for preparation of country-level RBMPs, background reports, implementation strategies and management plans; (iii) sub-river basin, for carrying out specific programmes and pilot projects within different parts of the DRB; and (iv) local, through country-based structures and stakeholders.

At the current scale of WFD implementation in the DRB, the mechanisms adopted by DRB countries significantly vary in terms of policy design and implementation at operational levels. While the WFD as a policy is designed to operate at a river basin scale, its implementation is significantly limited by the need for action to be taken at national and subnational levels. Within the context of the DRB, there are also examples of joint actions at multi-country and sub-river basin levels, as shown below in our descaled analysis.

### **Descaling WFD implementation in the Danube River Basin**

While there is a visible convergence among the Danube countries (including both member and non-member states) towards adopting European standards for water management, there are still political and cultural differences that influence the implementation of the WFD in the DRB. We are using poverty data here as a proxy measure of the differences. This is based on the assumption that the differences among DRB countries reflect their socio-economic contexts. GDP per capita, although showing a slight decrease in measured poverty since 2015, is still showing significant differences across the countries, with nearly 2.5 million people living on less than US\$2.50 a day (World Bank, 2019).

The broader implementation of various WFD articles by the Danube countries also differs from country to country. This is due not only to their placement in the DRB, but also to the different political, administrative and legal structures on which they are based. Translating WFD provisions and implementing them through country-based institutional arrangements requires studying these arrangements in more detail. Descaling WFD implementation thus provides a better understanding of how WFD implementation mechanisms are being applied at the national, subnational, multi-country and sub-river basin levels of governance.

#### *Descalate to national and subnational levels*

As shown in Table 1, there are similarities and differences among DRB countries in terms of how they implement key provisions of the WFD. Since countries self-report to the Commission on the status of their compliance, we studied country reports and the information available in the Water Information for Europe (WISE) database. Key documents included country reports on the second RBMP implementation, the ICPDR Roof Reports and Annual Reports, and several research articles. We looked for similarities and differences among the DRB countries in terms of planning and participation interventions.

For planning interventions (Table 1), we find that there is variation among DRB countries in the assignment of RBDs and in the national and subnational/local processes adopted for planning and preparation of RBMPs. Some DRB countries have chosen to prepare multiple plans that complement the national RBMP. The Czech Republic, for example, prepared international, national and local/sub-basin level plans and Germany prepared international, national and federal state level plans. A few countries prepared RBD-specific RBMPs. Slovakia, for example, is located within two international RBDs; in the second cycle, upon the recommendation of the Commission, it prepared two RBMPs. National and local structures within DRB countries also vary. Some countries practice centralised planning processes by listing a single competent authority, as in, for example, the Czech Republic, while others enlist a large number of competent authorities. Germany listed 16 competent authorities for its 10 RBDs, with one competent authority for each of the country's federal states.

The variation among stakeholders can be partly attributed to the geography and location of a riparian state within the basin; although, it can also be attributed to the national-level planning process. The WFD does not mandate member states to alter national structures as long as relevant organisations are identified as competent and responsible authorities for preparing RBMPs. Among the DRB countries, there are also differences in the way that local and sub-basin level planning are conducted. For example, Bulgaria reported on four RBDs (Danube, Black Sea, East Aegean and West Aegean), all of which are part of international RBDs. Furthermore, while Bulgaria prepared a single national RBMP and no sub-plans, in contrast, the Czech Republic is situated within three iRBDs and prepared its plan for the three different levels: (i) international plans for the Danube, Elbe and Oder RBDs which are coordinated by their respective International River Basin Commissions; (ii) national plans for the national Danube, Elbe and Oder RBDs, which are coordinated by the Ministry of Agriculture and the Ministry of the Environment; and (iii) 10 sub-basin plans coordinated by river boards, state enterprises and regional authorities.

Bulgaria has nominated many competent authorities, the major one being the River Basin Directorate. The Ministry of Environment and Water was also nominated, as were various ministries which were assigned specific roles. These include the Ministries of Energy, of Economy, and of Regional Development and Public Works, as well as the Ministry of Transport, Information Technology and Communications, and the Ministry of Agriculture, Food and Forestry. Bulgaria also identified some national agencies, including the Executive Agency for Exploration and Maintenance of the Danube River, the Institute of Oceanology, the Executive Environment Agency, the National Institute of Meteorology and Hydrology, and the National Statistical Institute. It also identified the municipalities to be involved in implementation at the local level (ICPDR, 2013). In the case of the Czech Republic, the Ministries of Agriculture and of the Environment are responsible for status assessments and monitoring, for preparation of the Programme of Measures (PoM) and of RBMPs, for environmental pressure and impact analysis, for public participation, and for reporting to the European Commission. Instead of a large number of national ministries and institutions, the Czech Republic has nominated some 14 local authorities to be responsible for the implementation of measures and the RBMP (ICPDR, 2013).

Austria forms part of three RBDs, the Danube, Rhine and Elbe, with the Danube River Basin covering more than 96% of country's territory. Austria chose not to prepare sub-plans for its RBMP; instead it prepared a single national RBMP for all three RBDs and then faced internal delays in the adoption and publishing of the RBMP which prevented it from complying with the timetable provided by the WFD. For its competent authorities, Austria assigned to the Federal Ministry for Sustainability and Tourism the main responsibility for a variety of roles. These included, the monitoring and assessment of groundwater and surface water, enforcement of regulations, environmental pressure and impact analysis, economic analysis, preparation of the RBMP and PoM, public participation, implementation of measures and coordination of implementation, as well as reporting to the European Commission. The governors of each of the country's nine regions were assigned the same roles, except for coordination of WFD implementation and reporting to the European Commission. For preparation of the RBMPs and implementation of PoMs, Austria assigned responsibility to three federal ministries: the Ministry of

Health, the Ministry of Transport, Innovation and Technology, and the Ministry of Science, Research and Economy; the Ministry of Science, Research and Economy, however, has a role only in the implementation of measures (ICPDR, 2013).

It is not unexpected that there are differences in the institutional approaches and mechanisms adopted by DRB countries for organising to implement the WFD. The WFD is a product of negotiations that spanned several years. The flexibility built into WFD Article 3(6) regarding the identification of competent authorities from existing local, national and international bodies (EC, 2000) is taken advantage of by the member states in fitting WFD requirements within their administrative structures. Article (1), regarding the identification of RBDs states that, where appropriate, smaller river basins may be combined with larger river basins or may be joined with neighbouring small basins in order to form a single RBD (EC, 2000). This provision which is similar to Article 3(6), is taken up by member countries in ways that allow them to more conveniently organise their RBMPs and reporting arrangements. For DRB countries such as Austria, Romania and Slovakia, all of which have more than 90% of their territories in the DRB, and Hungary which has 100% of its territory in the DRB, the level of planning is less cumbersome than it is in countries with a smaller share of their territory in the DRB and which also share waters with other transboundary rivers. Furthermore, those DRB countries that are not EU member states and which have a relatively smaller share of their land area (less than 2000 km<sup>2</sup>) in the DRB – namely Albania, Macedonia and Switzerland – neither have assigned RBDs nor are they covered in the Danube iRBMP (EC, 2019).

The arrangements for participatory decision-making across the DRB countries also differ because, while WFD provisions have a set timetable for information sharing and consultations, they do not define how active involvement might take place (De Stefano, 2010). There is a general trend towards greater formal provision for public and stakeholder participation; in practice, however, this has not happened due to the varied political-cultural contexts of the countries involved (Jager et al., 2016). As shown in Table 1, we find similar trends in the DRB countries. In terms of the groups of stakeholders that were actively involved in developing the RBMPs, all countries listed agriculture/farmers, energy/hydropower, fisheries/aquaculture, industry, local/regional authorities, navigation/ports, NGOs/nature protection and water supply and sanitation (ICPDR, 2014). However, there were differences from one country to another in the list of which specific stakeholder groups were involved. In Austria, for example, additional groups that were consulted included the Austrian Association of Cities and Towns, Association of Municipalities, Chamber of Commerce and Chamber of Labour; Bulgaria held consultations with consumer groups and energy/hydropower in the Danube and Aegean RBDs; and Germany reported having actively involved stakeholders in all 10 RBDs for drafting sub-plans, establishing special advisory groups in seven RBDs, forming alliances in five RBDs, and regular exhibitions in four RBDs (EC, 2015).

In some instances, the European Commission has taken it upon itself to make recommendations for improving participatory processes. In the first cycle of RBMP planning in the Czech Republic, for example, the Commission recommended good coordination between public administration and other stakeholders in order to improve planning and implementation of the PoMs within the RBMPs (EC, 2015). During the second cycle of RBMPs, the Commission's evaluation showed that stakeholders were more actively engaged via advisory groups and in the drafting of the RBMPs. Similarly, the Commission, in its assessment of the RBMPs and PoMs for Slovakia, called for more information in the second-cycle RBMPs on the country's plan to involve interested parties and hold consultations. This recommendation arose from a lack of clarity in the first-cycle RBMP as to which stakeholders were involved and what impact consultations had on the content of the RBMP (EC, 2015).

Consultation is an important mechanism of descaling; nearly all DRB countries that are EU member states, reported carrying out consultations in compliance with WFD requirements and provided information on the participation of a broad range of stakeholder and other groups. While it is difficult to gauge the quality of consultative efforts, we use a proxy indicator that is based on the reported impacts of consultations on the RBMP. In looking at seven DRB countries, we found that there were differences in what actions resulted after consultations (Table 2).

Table 2. Outcomes of public consultations.

|                                   | Austria | Bulgaria | Czech Republic | Germany | Hungary | Romania | Slovakia |
|-----------------------------------|---------|----------|----------------|---------|---------|---------|----------|
| Addition of new information       | ✓       | ✓        | ✓              | ✓       | ✓       | ✓       | ✓        |
| Adjustment to specific measures   | ✓       |          | ✓              | ✓       | ✓       | ✓       | ✓        |
| Changes to selection of measures  | ✓       | ✓        | ✓              | ✓       | ✓       | ✓       |          |
| Changes to methodology used       | ✓       |          |                |         | ✓       |         |          |
| Commitment to action in next RBMP | ✓       | ✓        |                | ✓       | ✓       |         |          |
| Commitment to further research    | ✓       | ✓        |                | ✓       | ✓       | ✓       |          |
| Other changes not specified       |         |          | ✓              |         |         |         |          |

Among the countries that did not report any outcomes resulting from the consultation process, it is difficult to assess whether they had sufficiently met the quality of participation. In the case of the Czech Republic, for example, the country's legislation does not distinguish between the general public and key stakeholders; as a result, public participation often only means providing the information to the public and then receiving their feedback (Slavíková and Jílková, 2011). In other instances, as was seen in Germany, stakeholder acceptance seems to be more related to processes than to outputs (Kochskämper et al., 2016). In some instances, the more frequent calls for meetings and discussion platforms was seen by stakeholders as limiting the voices of the smaller groups; these smaller groups were prevented from being present at meetings in the various geographical locations by their limited time, money or personnel (van der Heijden et al., 2014). Studies also point to the challenges presented by the conflicting interests among stakeholders that could not be reconciled to reach consensus (Slavíková and Jílková, 2011), and by situations where most participation was process- rather than output-oriented (Kochskämper et al., 2016; Fritsch, 2019).

Given the inter-country differences in participatory processes, in the case of non-compliance by a specific entity, a descaled analysis is needed in order to reveal the reasons for the failure to comply. Also necessary for critical analysis, but not clear from this assessment, is the input from stakeholders on their level of satisfaction with the degree to which their concerns were covered in the RBMP. It is unclear how the linkage is established between participatory processes conducted at the sub-district level and decision-making processes at the river basin level (Pellegrini et al., 2019). A more in-depth assessment is necessary in order to match stakeholders' self-reported expectations with assessments reported by the Commission. In most DRB countries, the history of governing structures with responsibility for carrying out participatory processes predates the WFD. Indeed, it can be argued that even before the WFD required them to do so, the broader process of change in the EU member states – from government to governance – had already enabled the increased involvement of the stakeholders (Jager et al., 2016).

#### *Descaling to multi-country and sub-river basin level*

The Convention on Cooperation for the Protection and Sustainable Use of the Danube River (the Danube River Protection Convention, or DRPC) remains the key international multilateral agreement on the DRB. After the formulation of the WFD in 2000, the Danube countries declared it to be the highest priority for all DRB countries and the ICPDR. The DRB countries agreed to produce a coordinated international River Basin Management Plan (iRBMP) for the Danube, and the ICPDR took the lead on coordinating the technical studies and information gathering for preparation of the Danube iRBMP (or the DRBMP). To implement the WFD, the ICPDR also established expert groups and task groups to address specific areas of water management issues that were to be monitored in the Danube.

For planning interventions (Table 1), there are several bilateral and multilateral agreements among different DRB countries. Coordinating and keeping track of various actions and information-sharing provisions is by no means a simple task; however, transboundary issues not covered by the ICPDR – especially some bilateral agreements – are dealt with separately at appropriate levels. This includes bilateral negotiations and the general coordination that takes place at the lowest level possible (bilateral or multilateral) without the ICPDR's participation. Bilateral agreements are in place between almost all states in the DRB. It is important to note that these agreements were not established in order to ensure coordination, as stated in WFD Annex I (6); instead, these are older treaties regarding specific issues of transboundary cooperation (ICPDR, 2016). While it can be appreciated that DRB countries are adhering to legal and institutional structures in order to resolve conflicts, it is difficult to assess how these agreements are contributing to WFD implementation; where the success of the WFD rests on the efficacy of cooperation across scales.

In the second RBMP cycle, the Commission made recommendations for some DRB countries to align their bilateral and multilateral agreements with neighbours in order to improve the coordination for the third cycle of the national RBMP, especially for the four Danube sub-river basins (EC, 2019). The Commission's country report for Bulgaria, for example, recommends that international cooperation and coordination mechanisms must be established with Macedonia, Serbia, Greece and Turkey, and that the river basins shared with Turkey need to be correctly designated as iRBDs. More recently, increased efforts at cooperation to implement the WFD have been undertaken through joint programmes. For example, in response to the industrial accidents in the Baia Mare and Baia Borsa regions of the Tisza sub-river basin in 2000, the five Tisza countries (Hungary, Romania, Slovakia, Serbia and Ukraine) agreed to develop a joint programme of action to address pollution discharges. A joint assessment of the extent of damages and remedial actions was conducted, and a combined analysis of water quality was prepared in order to monitor pollution levels (ICPDR, 2015).

In order to support participatory governance (Table 1), the ICPDR facilitates public dissemination of sub-river basin special reports. For example, the Tisza pollution status report, as well as the Danube Delta Conference and its follow-up report are available to the public on ICPDR websites and special consultations are organised by the ICPDR. In the ICPDR's role as coordinator for the sub-rivers of Sava, Tisza, Prut and Danube Delta, it functions as a primary network for information sharing and conducts consultations on behalf of any number of DRB countries. To do this effectively, it adopted operational mechanisms for sub-river basins and multi-country coordination. Special initiatives, for example, were launched at the sub-river basin level for preparing the Danube iRBMP. The ICPDR helps countries along each sub-river basin to develop a framework for collaboration; it also helps in the preparation of joint reports and RBMPs for the Sava and Tisza sub-river basins (ICPDR, 2016). Similarly, it signed a memorandum of understanding with the Black Sea Commission (BSC). This established a framework for cooperation through a joint technical working group which developed and monitored impact indicators of activities in the DRB on the Black Sea. The BSC is represented within ICPDR structures as one of the 23 organisations with observer status. The sharing with the BSC of the 2015 data on the Danube loads marked a key milestone in improved information sharing between the two commissions (ICPDR, 2018).

### **Rescaling to the Danube River Basin level**

The WFD is at times put forward as an example of a top-down approach to environmental governance, given that its objectives and instruments are mostly set by bureaucracies through formal legislative and regulatory processes and are thus steered at higher levels of governmental organisations (Rouillard and Spray, 2017). The WFD prescribes the implementation actions to be taken by member states through their respective national structures, while maintaining the view that all actions at subnational and national levels contribute to creating impacts at the river basin scale. In doing so, the WFD is rescaling water governance. As a result, the national, subnational, multi-country and sub-river basin reports (including the national RBMPs, sub-river basin RBMPs, Danube iRBMP and other sectoral and



supplementary reports) are prepared with a view to their basin-scale impact (Table 1). To address the analysis of rescaling, we elaborate on some of the key planning processes; which include institutional arrangements and cross-sectoral integration of the WFD as well as participatory processes of basin-wide information sharing and harmonised monitoring and reporting.

### *Institutional arrangements*

In 2000, the ICPDR was unanimously nominated by the Danube Contracting Parties as the platform for the implementation of all transboundary aspects of the WFD. In 2007, the ICPDR also took responsibility for coordinating the implementation of the EU Floods Directive in the DRB. The ICPDR, as tasked by the Danube Contracting Parties, performs cross-sectoral coordination for not only water management and the protection of the Danube from excess nutrients and toxic chemicals, but also for maintaining a healthy and sustainable river system and damage-free floods (ICPDR, 2014). Since 2002, the ICPDR has continued to function as a robust institution and it has been fully accepted by DRB countries as a coordinator of joint studies and monitoring reports. As shown in Table 1, we find that the implementation of the WFD did not include rescaling of institutional arrangements, and almost all actions must still be carried out exclusively by member and non-member states.

The ICPDR is primarily recognised as a coordinating entity and not as a formal competent authority that is designated as a river basin organisation (RBO) for the DRB. This is the case even though in many ways it operates as an RBO; for instance, national RBMPs are communicated directly from member states to the Commission and other member states, while the flow of information to non-member countries is fulfilled through the ICPDR. Similarly, the ICPDR's Expert Group on River Basin Management (RBM EG) not only coordinates joint reporting from all contracting parties to the DRPC; it also plays an important role in enabling high quality information to be received on time from countries that are not party to the convention or members of the EU (ICPDR, 2018). In addition, the ICPDR has proactively sought cooperation from DRB countries which were not party to the DRPC, persuading them to commit to the Danube iRBMP; this led to cooperation from Poland, Switzerland, Macedonia and Albania (ICPDR, 2015). This operational mechanism has proved useful in ensuring that information from all DRB countries is included in reports that are submitted to the Commission, while also adhering to the obligation of member states to ensure necessary coordination with their neighbours who are either non-member states or not DRPC contracting parties.

### *Cross-sectoral integration of the WFD*

The national-level data collection for the WFD, the Flood Directive and the new Nitrate Directive require that DRB countries integrate national policies and programmes in order to monitor the DRB's progress towards these directives (ICPDR, 2017). Other sectoral issues still need a better planning approach for integration into WFD implementation; for example, pressures from different human activities – and how these activities translate into basin-scale impacts – pose a challenge for collecting, collating and reporting information for basin-wide implications in sectors such as industrial use of water, power generation, agriculture, forestry, fish farming, mining, navigation, and dredging (EC, 2019). Issues that are more cross-cutting in nature – such as water scarcity, drought and climate change – are being increasingly debated at the EU level (EC, 2019). In the DRB, the reluctance to actively align national-level policies is partly due to the relevance of these issues, which also differ significantly among the countries. Recently, the ICPDR has been tasked with maintaining information exchanges on climate change adaptation best practices; it is also required to update the 2012 Danube Climate Change Adaptation Strategy to include information on WFD implementation. A rescaling analysis shows little evidence that WFD implementation is leading to actual changes in national-level sectoral policies.

### *Basin-wide information sharing mechanisms*

Coordinated information sharing and awareness campaigns among the DRB countries have begun to emerge, some of which are aimed at reaching out to the general public and a broad range of stakeholders, while others are for the purpose of collecting scientific information. *Danube Watch*, for example, is a monthly magazine that provides information on current issues affecting the Danube Basin and on the various creative ways these challenges are being met. Available on ICPDR's website, *Danube Watch* is an important channel for informing people, using in-depth stories, art and photographs. The annual Danube Day is another example; which since 2004, remains the event most visited by the general public. A popular offshoot of Danube Day is the Danube Art Master, a competition which invites schools to organise a field trip to the Danube or one of its tributaries and create works of art to promote awareness of the importance of the Danube (ICPDR, 2014). The Joint Danube Survey (JDS) is an example of a scientific forum that was carried out in 2001, 2007 and 2013; the fourth JDS started in 2019 and is yet to be fully concluded (ICPDR, 2018). The JDS aligns data collection methodologies and identifies information gaps that indicate where specific DRB countries can be supported. The Danube Basin Analysis (DBA) report is another example of a cooperative effort on technical information sharing; it addresses topics relating to the whole basin as well as to the various specific portions within the DRB. The most recent DBA report was prepared in 2014 and an update is due in 2020 (ICPDR, 2018).

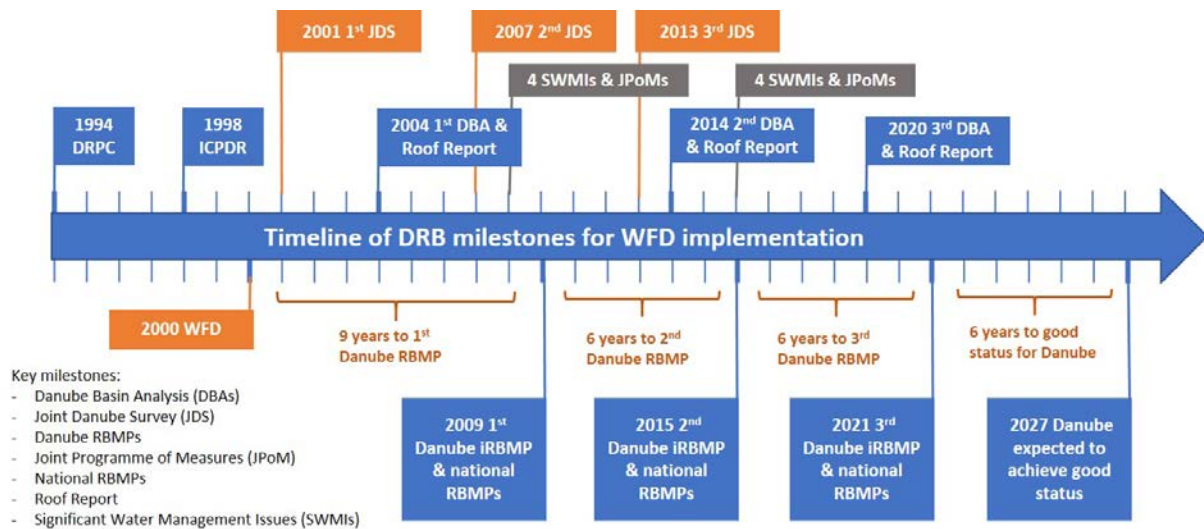
### *Harmonised monitoring and reporting*

A key challenge of rescaled coordination is the accuracy of data, especially datasets that are accumulated for basin-wide analyses. Another challenge is the organisation of data collection and availability from the national to the basin scale. DRB countries have made significant efforts to align their reporting structures in order to meet WFD reporting requirements. The Transnational Monitoring Network (TNMN), for example, was established in 1996 and revised in 2006; its aim was to ensure full compliance with the provisions of WFD Article 8 and instituting common methodologies for providing information on the basin-wide assessment of water status (ICPDR, 2015). Further, improving the alignment of environmental quality standards for specific pollutants is needed; only 15 pollutants share coordinated standards, and they are shared only between Romania and Germany (EC, 2019). The national reporting structures among DRB countries have been gradually aligned to provide information through the EU-wide information portal -- the Water Information of Europe (WISE). WISE serves as the key management information system (MIS) for all member countries for reporting to the Commission. All national data, however, is still organised along administrative units which often do not coincide with sub-river basins or DRB boundaries. This leads to a mix of reporting outputs from DRB countries; some countries, for instance, have provided reports for the year 2008, some for 2009, 2010 and 2011. Data submitted to the ICPDR may or may not relate to the whole country, and some countries provide yearly reports while others provide average values for a three-year period. However, the alignment of timelines for delivering various reports and outputs for WFD implementation has consistently improved over the years since the first cycle of RBMPs (Figure 3).

## **DISCUSSION AND KEY TAKEAWAYS**

At the time of the WFD's enactment, while the aspirational goal of achieving 'good ecological status' was widely accepted among EU member states, the challenges to its operationalisation were not fully appreciated. One key reason for the difficulty – as we have argued in this paper – was the absence of cross-scale cooperation. Implicit and explicit issues related to biophysical and governance scales were inherent in several of these challenges. Using the scale–descale–rescale (SDR) analysis, we have examined the efficacy of WFD implementation at multiple scales in the DRB. Our analysis provides evidence of scale interactions and the related challenges in implementing the WFD for the DRB. The main takeaway is that, after nearly 20 years of experience of implementing the WFD, mismatch of scale is still

Figure 3. Alignment of Danube River Basin outputs for the implementation of the Water Framework Directive.



Source: Authors.

far from being resolved in the Danube. The impact of how the WFD is understood conceptually, internalised legislatively and institutionally, and implemented practically varies from country to country. The SDR analysis has unpacked several areas where scale differences are hindering WFD achievements. While we need to recognise the policy shift that the WFD initiated through a process of adaptive learning among Danube countries, the pace of changing and realigning internal processes remain a challenge and is a key reason for collective slippages of WFD timelines. We highlight the following key areas of scale-sensitive challenges within the Danube Basin:

*Internalisation of hybrid territoriality:* The WFD created a hybrid form of territoriality that is changing the political geography of the European Union and redrawing political-administrative scales along physical geographical scales; consequently, a politics of scale in water governance is emerging in DRB countries. The SDR framework explains these outcomes as the product of both an intra- and an inter-scale politics of contestation. The outcomes of the EU-wide WFD are intrinsically shaped by sociopolitical dynamics within individual countries. In the context of the DRB, this is apparent in how member and non-member states interact through the ICPDR. Due to the lack of a formal institutional arrangement in the form of a river basin organisation, however, the ICPDR can only go so far in ensuring a comprehensive internationalisation of the WFD's hybrid territoriality among DRB countries.

*Actors, power and political landscape:* The case of WFD implementation in the Danube manifests that the actions of member and non-member states must be a scale-based arrangement of politically aligned decisions. Actions at different scales involve different configurations of actors, power, resources and institutional structures. Shifting scales through rescaling can change the configurations and can potentially alter the outcomes expected from WFD implementation. At the time of WFD formulation, it was not known how the hybrid territoriality of implementation around the basin scale would evolve. Now, nearly 20 years later, we can speak from evidence as to how countries have dealt with the inherent mismatch of multilevel governance systems. Germany and Austria, for example, remain under a federal structure of decision-making, with consolidated multilevel governance systems for the sharing of power between the federal state, regions, districts and municipalities, while other member states, such as the Czech Republic and Slovakia, maintain very different governing structures. Through the WFD and other Euro-regional policy frameworks (for example the 2007 Flood Directive and the 2008 Air Quality

Directive), the flexible non-binding characteristic of policy implementation requirements have enabled local-level stakeholders to engage with each other across borders despite a mismatch of governing levels. In other words, the WFD has to some extent acted as an agent for the bridging of incompatibilities in political-administrative structures across countries. What is still not clear, however, is whether or not the issue of uneven economic and social development among DRB countries (member and non-member states) was addressed in the process of shifting internal policies to better align with EU-wide frameworks; this could be a focus of future investigations. There is still a long way to go before evidence of such misalignment can be fully studied.

*Quality of the information generated and information shared:* In the context of the DRB, there is clear evidence of continuous information sharing. The ICPDR has played a pivotal role in assisting DRB countries to generate technical information and then find ways to share it effectively among different groups of stakeholders and the general public. The extent to which WFD policy design has contributed to this information exchange, however, is debatable. With the WFD implementation completing its second decade, SDR analysis points out that the evidence of fit-to-scale information sharing and coordination remains anecdotal at this stage. Much of the credit for regular information exchange can be given to the institutional maturation of the ICPDR rather than to any direct contribution of the WFD design. There exists a persistent lack of harmonisation of the gathering and sharing of technical knowledge, a situation which arises partly because the DRB continues to lag in the full alignment of ecological quality standards with the measurements of element classifications of hazardous substances and other pollutants. Analysis shows that effective harmonisation will require a common understanding and improvement of data collection systems by DRB countries at different scales. Given the complexity of diagnosing the main causes of degradation that are impacted by multiple stressors at different scales, the water managers are still trying to establish a practical 'stressor hierarchy' to help decide which stressors to tackle first and/or when to tackle multiple stressors (Carvalho et al., 2019).

*What the future holds for the WFD in the DRB:* As the current deadline of achieving good status by 2027 approaches, there is some discussion of a further extension of the achievement deadline beyond 2027 based on technical feasibility (Carvalho et al., 2019). In the context of the DRB, however, reviewing the 1994 Danube River Protection Convention in order to update key agreements among DRB countries could improve the quality of the Danube iRBMP and of other technical studies. If the ICPDR is given legal recognition as a river basin organisation, it could potentially empower an institutional arrangement within its current structure of Expert Groups and Task Groups to improve scale-specific areas of water management in the implementation of the WFD. Across a complex system such as the DRB, such an arrangement would better reflect the reality of the structured response needed to implement a basin-scale system of measures that are acceptable to the multiple stakeholders with their differing interests. Additionally, the intersectoral integration of the WFD across sectors like water, food and energy could be better achieved among the DRB countries. In reviewing the rationality of using 2027 as the target deadline for achieving good status, it is clear that incorporating a sustained process of improving the water quality of the DRB would still be necessary. This is unlikely to happen without renewing the DRPC, which has proven to be an effective mechanism for ensuring that information from all DRB countries is represented in the reports that are submitted to the Commission, and that, the obligations of the member states to coordinate with their non-member neighbours are met.

## CONCLUSIONS

As a policy for environmental governance, the WFD has rescaled itself by introducing a new hybrid scale along hydrological resource boundaries. It has mandated EU member states to involve non-member countries without specifying any mechanism for political integration. In the process, the WFD has formed a hybrid territory within continental Europe which has not included any fundamental change in political scales, and which treads carefully on the national sovereignty of the member states. As a result, there is

no change in administrative units and structures, and most countries – at least within their national and subnational borders – are continuing to use the existing arrangements. Therefore, a significant mismatch of scales persists, although, to a lesser extent than before the enactment of the WFD. As seen in the case of the Danube, it is uncertain whether the WFD could ever fully succeed in aligning political boundaries with resource-planning boundaries. This is because such an outcome would require a greater political willingness to weaken or even dismantle national structures and reassemble them at the basin and sub-basin scales.

The SDR analysis shows the WFD to have had some success in the rescaling effort. While the WFD accords flexibility to the member states in terms of using existing structures instead of creating new ones, the main drawback of this flexibility is that the cross-sectoral integration of the WFD into other sectoral policies within the countries does not occur. As we saw in the SDR analysis of the DRB, almost all countries maintained their existing administrative structures; they designated information and reporting responsibilities without creating new formal institutions that would operate on spatial scales defined by hydrological boundaries.

Scholars and practitioners have warned against the unresolved scale misfits arising from the vertical and horizontal interplay between newly established institutions at the basin scale and those organised at traditional administrative boundaries; such problems of spatial planning impede the implementation of integrated management approaches (Moss, 2004; Newig et al., 2016). The SDR analysis highlights the challenges and difficulties in WFD implementation that arise from such mismatch of scales. To effectively implement the WFD for the DRB, a cross-spatial and cross-sectoral shift is needed in order to integrate the RBM approach of the WFD within sectoral planning and implementation structures. While desirable, this shift will also increase the complexity of planning and management in the DRB.

There is a growing recognition among EU member states that basin management and transboundary cooperation cannot be achieved by any single member alone. Findings from this SDR analysis highlight that attempts to implement the Water Framework Directive in the DRB may remain limited due to the mismatch of scales. Cooperation among DRB countries predates the WFD and several other directives; nevertheless, the existence of the Danube River Protection Convention and its implementation arrangements, including the presence of the International Commission for the Protection of the Danube River, have enabled DRB countries to effectively incorporate some aspects of WFD implementation into their plans. While all DRB countries are increasingly working towards achieving WFD objectives, their efforts differ at different levels of governance due to their location and to their perception of the Danube's importance. At each governance level – national, subnational, multi-country and sub-river basin – SDR analysis can provide insights into the details of what is working well and what remains to be addressed, in order to achieve effective transboundary implementation of the WFD in the Danube River Basin.

## ACKNOWLEDGEMENTS

This research was partially supported by a grant from the US National Science Foundation (Water Diplomacy IGERT NSF 0966093).

## REFERENCES

- Behagel, J.H. and Arts, B.A.S. 2014. Democratic governance and political rationalities in the implementation of the Water Framework Directive in the Netherlands. *Public Administration* 92(2): 291-306.
- Benson, D. and Jordan, A. 2014. Subsidiarity as a 'scaling device' in environmental governance: The case of the European Union. In Weibust, I. and Meadowcroft, J. (Eds), *Multilevel environmental governance: Managing water and climate change in Europe and North America*, pp. 39-57. Edward Elgar Publishing.

- Balvanera, P.; Calderón-Contreras, R.; Castro, A.J.; Felipe-Lucia, M.R.; Geijzendorffer, I.R.; Jacobs, S.; Martin-Lopez, B.; Arbieu, U.; Speranza, C.I.; Locatelli, B. and Harguindeguy, N.P. 2017. Interconnected place-based social-ecological research can inform global sustainability. *Current Opinion in Environmental Sustainability* 29: 1-7.
- Brenner, N. 2001. The limits to scale? Methodological reflections on scalar structuration. *Progress in Human Geography* 25(4): 591-614.
- Brenner, N. 2009. Urban governance and the production of new state spaces in Western Europe, 1960–2000. *Review of International Political Economy* 11(3): 447-488.
- Brenner, N. and Elden, S. 2009. Henri Lefebvre on state, space, territory. *International Political Sociology* 3(4): 353-377.
- Bernstein, S. 2011. Legitimacy in intergovernmental and non-state global governance. *Review of international political economy* 18(1): 17-51.
- Cash, D.; Adger, W.N.; Berkes, F.; Garden, P.; Lebel, L.; Olsson, P.; Pritchard, L. and Young, O. 2006. Scale and cross-scale dynamics: Governance and information in a multilevel world. *Ecology and Society* 11(2): 8, <http://www.ecologyandsociety.org/vol11/iss2/art8/>
- Carvalho, L.; Mackay, E.B.; Cardoso, A.C.; Baattrup-Pedersen, A.; Birk, S.; Blackstock, K.L.; Borics, G.; Borja, A.; Feld, C.K.; Ferreira, M.T. and Globevnik, L. 2019. Protecting and restoring Europe's waters: An analysis of the future development needs of the Water Framework Directive. *Science of the Total Environment* 658(2019): 1228-1238.
- Chapman, D.V.; Bradley, C.; Gettel, G.M.; Hatvani, I.G.; Hein, T.; Kovács, J.; Liska, I.; Oliver, D.M.; Tanos, P.; Trásy, B. and Várbbíró, G. 2016. Developments in water quality monitoring and management in large river catchments using the Danube River as an example. *Environmental Science & Policy* 64: 141-154.
- Chellaney, B. 2013. *Water, peace, and war: Confronting the global water crisis*. Rowman and Littlefield.
- Cox, K.R. 2018. Globalization and the question of scale. In Kloosterman, R.C.; Mamadouh, V. and Terhorst, P. (Eds), *Research handbook on the geographies of globalisation*, pp. 43-61. Cheltenham, UK: Edward Elgar.
- Davidson, S.L. and de Loë, C.; 2014. Watershed governance: Transcending boundaries. *Water Alternatives* 7(2): 367-387.
- De Stefano, L. 2010. Facing the Water Framework Directive challenges: A baseline of stakeholder participation in the European Union. *Journal of environmental management* 91(6): 1332-1340.
- EEA (European Environmental Agency), 2018. European Waters Assessment of Status and Pressures. Report No. 7/2018, [www.eea.europa.eu/publications/state-of-water](http://www.eea.europa.eu/publications/state-of-water) (accessed on 25 October 2019)
- EC (European Commission), 2000. Directive 2000/60/EC of the European Parliament and of the council of 23rd October 2000 establishing a framework for community action in the field of water policy. *Official Journal of the European Communities*, L327/1. Brussels, European Commission.
- EC (European Commission), 2003. Common implementation strategy for the Water Framework Directive. 2000/60/EC. Guidance document no. 8 public participation in relation to Water Framework Directive. Produced by World Group 2.9 – public participation. *Office for Official Publications for the European Communities*, 2003. Luxemburg
- EC (European Commission), 2015. Report on the progress in implementation of the Water Framework Directive Programmes of Measures [https://ec.europa.eu/info/sites/info/files/com\\_report\\_wfd\\_fd\\_2019\\_en\\_1.pdf](https://ec.europa.eu/info/sites/info/files/com_report_wfd_fd_2019_en_1.pdf) (accessed on 24, 25, 27, 30 October 2019)
- EC (European Commission), 2019. Overview of the implementation of Water Framework Directive 2000/60/EC and the Floods Directive 2007/60/EC Second River Basin Management Plans and First Flood Risk Management Plans, [https://ec.europa.eu/info/sites/info/files/com\\_report\\_wfd\\_fd\\_2019\\_en\\_1.pdf](https://ec.europa.eu/info/sites/info/files/com_report_wfd_fd_2019_en_1.pdf) (accessed on 23 October 2019)
- Fritsch, O. 2019. Participatory water governance and organisational change: Implementing the Water Framework Directive in England and Wales. *Water* 11(5): 996.
- Green, O.; Garmestani, A.; van Rijswick, H. and Keessen, A. 2013. EU water governance: Striking the right balance between regulatory flexibility and enforcement? *Ecology and Society* 18(2): 8, <http://www.ecologyandsociety.org/vol11/iss2/art8/>.
- Hameiri, S. and Jones, L. 2017. Beyond hybridity to the politics of scale: International intervention and 'local' politics. *Development and Change* 48(1): 54-77.

- Hering, D.; Borja, A.; Carstensen, J.; Carvalho, L.; Elliott, M.; Feld, C.K.; Heiskanen, A.S.; Johnson, R.K.; Moe, J.; Pont, D. and Solheim, A.L. 2010. The European Water Framework Directive at the age of 10: A critical review of the achievements with recommendations for the future. *Science of the total Environment* 408(19): 4007-4019.
- Hirsch, P.; Jensen, K.M.; Boer, B.; Carrard, N.; FitzGerald, S. and Lyster, R. 2006. *National interests and transboundary water governance in the Mekong*. Australian Mekong Resource Centre, in collaboration with Danish International Development Assistance.
- ICPDR (International Commission for the Protection of the Danube River). 2004. Danube Basin Analysis (WFD Roof Report 2004), [www.icpdr.org/main/resources/danube-basin-analysis-wfd-roof-report-2004](http://www.icpdr.org/main/resources/danube-basin-analysis-wfd-roof-report-2004) (accessed on 17 October 2019)
- ICPDR (International Commission for the Protection of the Danube River), 2012. 2012 Interim Report on Implementation of Joint Programme of Measures in the DRBD, [www.icpdr.org/main/2012-interim-report-implementation-joint-program-measures](http://www.icpdr.org/main/2012-interim-report-implementation-joint-program-measures) (accessed on 13 October 2019)
- ICPDR (International Commission for the Protection of the Danube River), 2013. Shared waters joint responsibilities. ICPDR Annual Report 2013, [www.icpdr.org/main/publications/annual-reports](http://www.icpdr.org/main/publications/annual-reports) (accessed on 17 October 2019)
- ICPDR (International Commission for the Protection of the Danube River), 2014. Shared waters joint responsibilities. ICPDR Annual Report 2014, [www.icpdr.org/main/publications/annual-reports](http://www.icpdr.org/main/publications/annual-reports) (accessed on 17 October 2019)
- ICPDR (International Commission for the Protection of the Danube River), 2015. Danube River Basin Management Plan 2015-2021, [www.icpdr.org/main/activities-projects/river-basin-management-plan-update-2015](http://www.icpdr.org/main/activities-projects/river-basin-management-plan-update-2015) (accessed on 15 October 2019)
- ICPDR (International Commission for the Protection of the Danube River), 2016. Shared waters joint responsibilities. ICPDR Annual Report 2016, [www.icpdr.org/main/publications/annual-reports](http://www.icpdr.org/main/publications/annual-reports) (accessed on 17 October 2019)
- ICPDR (International Commission for the Protection of the Danube River), 2017. Shared waters joint responsibilities. ICPDR Annual Report 2017, [www.icpdr.org/main/publications/annual-reports](http://www.icpdr.org/main/publications/annual-reports) (accessed on 17 October 2019)
- ICPDR (International Commission for the Protection of the Danube River), 2018. Interim Report on the Implementation of Joint Programme of Measures in the Danube River Basin, [www.icpdr.org/main/2018-interim-report-implementation-joint-programme-measures-danube-river-basin](http://www.icpdr.org/main/2018-interim-report-implementation-joint-programme-measures-danube-river-basin) (accessed on 13 October 2019)
- Islam, S. and Choudhury, E. 2018. Complexity and contingency: Understanding transboundary water issues. In Choudhury, E. and Islam, S. (Eds), *Complexity of transboundary water conflicts: Enabling conditions for negotiating contingent resolutions*, pp. 3-25. New York: Anthem.
- Islam, S. and Susskind, L.E. 2012. *Water diplomacy: A negotiated approach to managing complex water networks*. New York: Routledge.
- Jager, N.; Challies, E.; Kochskämper, E.; Newig, J.; Benson, D.; Blackstock, K.; Collins, K.; Ernst, A.; Evers, M.; Feichtinger, J.; Fritsch, O. et al. 2016. Transforming European water governance? Participation and river basin management under the EU Water Framework Directive in 13 member states. *Water* 8(4): 156.
- Kochskämper, E.; Newig, J.; Challies, E. and Jager, N.W. 2016. Participation for effective environmental governance? A comparative study of European water policy implementation in Germany, Spain and the United Kingdom. *Journal of Environmental Management* 181: 737-48.
- Koontz, T.M. and Newig, J. 2014. Cross-level information and influence in mandated participatory planning: Alternative pathways to sustainable water management in Germany's implementation of the EU Water Framework Directive. *Land Use Policy* 38: 594-604.
- Liefferink, D.; Wiering, M. and Uitenboogaart, Y. 2011. The EU Water Framework Directive: A multi-dimensional analysis of implementation and domestic impact. *Land Use Policy* 28(4): 712-722.
- Macrory, R. and Turner, S. 2002. Cross-border environmental governance: The EC law dimensions. *Regional & Federal Studies* 12(4): 59-87.
- McCarthy, J. 2005. Scale, sovereignty, and strategy in environmental governance. *Antipode* 37(4): 731-753.
- Moss, T. 2004. The governance of land use in river basins: Prospects for overcoming problems of institutional interplay with the EU Water Framework Directive. *Land use policy* 21(1): 85-94.
- Moss, T. 2012. Spatial fit, from panacea to practice: Implementing the EU Water Framework Directive. *Ecology and Society* 17(3): 2, <http://dx.doi.org/10.5751/ES-04821-170302>.

- Moss, T. and Newig, J. 2010. Multilevel water governance and problems of scale: Setting the stage for a broader debate. *Environmental Management* 46(1): 1-6.
- Mirumachi, N. 2013. Securitising shared waters: An analysis of the hydro-political context of the Tanakpur Barrage project between Nepal and India. *The Geographical Journal* 179(4): 309-319.
- Newig, J. and Fritsch, O. 2009. Environmental governance: Participatory, multi-level—and effective? *Environmental policy and governance* 19(3): 197-214.
- Newig, J.; Schulz, D. and Jager, N.W. 2016. Disentangling puzzles of spatial scales and participation in environmental governance – The case of governance re-scaling through the European Water Framework Directive. *Environmental management* 58(6): 998-1014.
- Nielsen, H.Ø.; Frederiksen, P.; Saarikoski, H.; Rytönen, A.M. and Pedersen, A.B. 2013. How different institutional arrangements promote integrated river basin management: Evidence from the Baltic Sea Region. *Land Use Policy* 30(1): 437-445.
- Norman, E.S.; Bakker, K. and Cook, C. 2012. Introduction to the themed section: Water governance and the politics of scale. *Water Alternatives* 5(1): 52-61.
- Norman, E.S.; Cook, C. and Cohen, A. (Eds). 2015. *Negotiating water governance: Why the politics of scale matter*. London, UK: Ashgate.
- Ostrom, E. 1999. Coping with tragedies of the commons. *Annual review of political science* 2(1): 493-535.
- Padt, F.; Opdam, P.; Polman, N. and Termeer, C. (Eds). 2014. *Scale-sensitive governance of the environment*. Chichester: Wiley Blackwell.
- Pahl-Wostl, C. 2015. *Water governance in the face of global change: From understanding to transformation*. London, UK: Springer.
- Pahl-Wostl, C.; Lebel, L.; Knieper, C. and Nikitina, E. 2012. From applying panaceas to mastering complexity: Toward adaptive water governance in river basins. *Environmental Science & Policy* 23: 24-34.
- Pellegrini, E.; Bortolini, L. and Defrancesco, E. 2019. Coordination and participation boards under the European Water Framework Directive: Different approaches used in some EU countries. *Water* 11(4): 833.
- Raška, P.; Slavíková, L. and Sheehan, J.; 2019. Scale in nature-based solutions for flood risk management. In Hartmann, T.; Slavíková, L. and McCarthy, S. (Eds), *Nature-based flood risk management on private land*, pp. 9-20. Springer: Cham.
- Rogers, P. and Hall, A.W. 2003. *Effective water governance*. TEC Background Papers No. 7. Stockholm: Global Water Partnership.
- Rouillard, J.J. and Spray, C.J. 2017. Working across scales in integrated catchment management: Lessons learned for adaptive water governance from regional experiences. *Regional Environmental Change* 17(7): 1869-1880.
- Scharpf, F.W. 2019. Multilevel democracy: A comparative perspective. In Behnke, N.; Broschek, J. and Sonnicksen, J. (Eds), *Configurations, dynamics and mechanisms of multilevel governance*. *Comparative territorial politics*, pp. 249-271. Palgrave Macmillan: Cham.
- Slavíková, L. and Jílková, J. 2011. Implementing the public participation principle into water management in the Czech Republic: A critical analysis. *Regional Studies* 45(4): 545-557.
- Smith, N. 2004. Scale bending and the fate of the national. In Sheppard, E. and McMaster, R.B. (Eds), *Scale and geographic inquiry: Nature, society, and method*, pp. 192-212. Malden, MA: Blackwell.
- Smith, M.S.; Cook, C.; Sokona, Y.; Elmqvist, T.; Fukushi, K.; Broadgate, W. and Jarzebski, M.P. 2018. Advancing sustainability science for the SDGs. *Sustainability Science* 13(6): 1483-1487.
- Swyngedouw, E. 1997. Neither global nor local: 'Glocalization' and the politics of scale. In Cox, K.R. (Ed), *Spaces of globalization: Reasserting the power of the local*, pp. 137-166. New York, London: The Guilford Press.
- Syed, T. 2018. The resolve to cooperate on Danube: Enabling conditions for transboundary water cooperation. In Choudhury, E. and Islam, S. (Eds), *Complexity of transboundary water conflicts: Enabling conditions for negotiating contingent resolutions*, pp. 77-98. New York: Anthem.
- Telle, S. 2017. Euroregions as soft spaces: Between consolidation and transformation. *European Spatial Research and Policy* 24(2): 93-110.



- Termeer, C.J.A.M. and Dewulf, A.R.P.J. 2014. Scale-sensitivity as a governance capability: Observing, acting and enabling. In Padt, F.; Opdam, P.; Polman, N. and Termeer, C. (Eds), *Scale-sensitive governance of the environment*, pp. 66-80. Chichester: Wiley Blackwell.
- Turnhout, E.; Behagel, J.; Ferranti, F. and Beunen, R. 2015. The construction of legitimacy in European nature policy: Expertise and participation in the service of cost-effectiveness. *Environmental Politics* 24(3): 461-480.
- van Buuren, A.; Lewis, J.; Guy Peters, B. and Voorberg, W. 2020. Improving public policy and administration: Exploring the potential of design. *Policy & Politics* 48(1): 3-19.
- van der Heijden, J.; ten Heuvelhof, E.; Broekmans, B.; van der Arend, S.; van Bueren, E.; Hartevelt, C. and van Ruijven, T. 2014. Contrasting stories on overcoming governance challenges: The implementation of the EU Water Framework Directive in the Netherlands. *Local Environment* 19(3): 318-333.
- Vringer, K. and Carabain, C.L. 2020. Measuring the legitimacy of energy transition policy in the Netherlands. *Energy Policy* 138(2020): 111229.
- Voulvoulis, N.; Arpon, K.D. and Giakoumis, T. 2017. The EU Water Framework Directive: From great expectations to problems with implementation. *Science of the Total Environment* 575(2017): 358-366.
- Wilbanks, T.J. 2007. Scale and sustainability. *Climate Policy* 7(4): 278-287.
- World Bank. 2019. *Water and wastewater services in the Danube region: A state of the sector 2018 update*. Washington, DC: The World Bank.
- Young, I.M. 2002. *Inclusion and democracy*. Oxford: Oxford University Press.
- Young, O.; Lambin, E.; Alcock, F.; Haberl, H.; Karlsson, S.; McConnell, W.; Myint, T.; Pahl-Wostl, C.; Polsky, C.; Ramakrishnan, P.S. and Schroeder, H. 2006. A portfolio approach to analyzing complex human-environment interactions: institutions and land change. *Ecology and Society* 11(2): 31, <http://www.ecologyandsociety.org/vol11/iss2/art31/>

THIS ARTICLE IS DISTRIBUTED UNDER THE TERMS OF THE CREATIVE COMMONS *ATTRIBUTION-NONCOMMERCIAL-SHAREALIKE* LICENSE WHICH PERMITS ANY NON COMMERCIAL USE, DISTRIBUTION, AND REPRODUCTION IN ANY MEDIUM, PROVIDED THE ORIGINAL AUTHOR(S) AND SOURCE ARE CREDITED. SEE [HTTPS://CREATIVECOMMONS.ORG/LICENSES/BY-NC-SA/3.0/FR/DEED.EN](https://creativecommons.org/licenses/by-nc-sa/3.0/fr/deed.en)

