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## Bright Spots for Local WFD Implementation Through Collaboration with Nature Conservation Authorities?

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**ABSTRACT:** Twenty years after the EU Water Framework Directive (WFD) came into force, much remains to be done by member states in order to achieve the Directive's ambitious aims. In Germany, far fewer measures have been realised or even planned than are needed for the achievement of WFD goals. There are, however, a number of local cases across the country where WFD measures are being realised. A key question can thus be asked as to what are the key characteristics of WFD processes and arrangements in those 'bright spots'? In order to answer this question, we investigated pathways of local WFD implementation in six federal states of Germany; we used data from semi-structured interviews with WFD-related actors at all administrative levels; we also used participatory observation as well as analyses of policy documents and official websites. Our cases are local-level actors realising measures related to hydromorphology and connectivity. Although local actors face common barriers, some have progressed with implementation of WFD measures while others have not. We found that our bright spots of WFD implementation are characterised by the presence of highly dedicated individuals and, often, collaboration between the WFD and nature conservation authorities, although we found the relationship between the two actors was ambivalent. Such collaboration provided those realising WFD measures with access to the instruments of nature conservation law. Although the WFD prescribes sectoral integration, such cooperation did not evolve everywhere; among our cases, collaborating actors showed low independence, meaning no or only few alternative means to cope with implementation barriers, and physical proximity between WFD actors and nature conservation authorities. Finally, we explored the opportunities for, and constraints on, transferring this collaborative approach to other situations where WFD implementation continues to stagnate.

**KEYWORDS:** Water Framework Directive implementation, nature conservation, water governance, cooperation, polycentricity, Germany

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### INTRODUCTION

Twenty years after the EU Water Framework Directive (WFD) came into force, the ambitious aims of good ecological and chemical status in all European waters are far from being achieved (EEA, 2018). The rules of the WFD required transposition into national law by 2003, the characterisation of waters by 2004, and the establishment of water monitoring programmes by 2006. This initial phase was then to be followed by three six-year management cycles ending in 2015, 2021 and 2027, respectively. The EU member states

were also required to designate competent authorities to produce River Basin Management Plans (RBMPs) and to develop Programmes of Measures (PoMs) at the start of each cycle. Measures were to be taken, evaluated, and reported on by the end of each cycle. In all member states, the ultimate goals of good ecological and chemical status were to be achieved by 2027, at the latest.

In Germany, far fewer measures were realised, or even planned, in the first cycle than are believed to be necessary to satisfy WFD aims (LAWA, 2018). By 2015, only 8.2% of Germany's surface waters attained the stated ecological goals and none met the chemical goals (84% met the chemical goals if ubiquitous compounds are not considered) (*ibid*). The LAWA report reveals that the implementation of many measures has not even started. The largest gap between identified, but not yet implemented, measures occurs in relation to hydromorphology and connectivity measures in addition to measures regarding nutrient pollution from agriculture and toxic substances (*ibid*). Local-level actors have been found to be key to decisions on whether action is taken for WFD implementation and on what measures to take (Koontz and Newig, 2014a).

In this paper, we investigated the decision-making processes of local-level actors with regard to the realisation of hydromorphology and connectivity measures. We did this as part of a larger in-depth comparative study of how polycentricity affects WFD implementation in Germany and of which implementation features can be found across federal states and among actor types. We refer here to these local-level actors as 'WFD addressees' and, in our analysis, a WFD addressee constitutes an individual case.

With regard to measures on hydromorphology and connectivity, we found a cascade of barriers to local WFD implementation; these included lack of motivation, lack of human resources and know-how, funding constraints, limited availability of land and lack of agreement over its allocation, institutional interplay, and unsupportive organisational structures (Schröder and Chaudhary, 2020; Reese et al., 2018). These barriers are not uncommon in policy implementation (Mitchell, 2018) and are among the main reasons for the modest realisation of WFD measures.

The barriers are so numerous, however, that we asked – as did Pressman and Wildavsky (1984) in *Implementation: How Great Expectations in Washington Are Dashed in Oakland* – how it is that in some instances measures were actually realised? Despite a generally poor track record, there are a number of local cases across Germany where WFD implementation is progressing well; in those cases, which we call 'bright spots', measures are being identified, planned and realised. A key question for both research and policy concerns how WFD addressees at those bright spots have been able to avoid or overcome implementation barriers.

One feature that is common across our cases is the ambivalent relationship between WFD implementation and nature conservation; this ambivalence creates barriers to WFD implementation but also appears to provide mechanisms for coping with implementation barriers through varying intensities of cooperation. Studies of the relationship between WFD and nature conservation have often stated that synergies outweigh conflicts (Janauer et al., 2015; Mußbach and Evers, 2013; von Andrian-Werburg, 2014), that the latter are singular cases, and that these conflicts are solvable at the planning stage (Rehklau et al., 2017; Kraier, 2014; Drücke, 2014; Peters and Schackers, 2014; Fuchs, 2010); studies, however, have rarely focused on the actual level of measure realisation.

The WFD, furthermore, prescribes cooperation across sectors as a way of solving conflicts and finding synergies, though this prescription is not detailed and allows for discretion regarding how to nurture and organise cooperation. Schröder (2019) found that the kind of attempts at cross-sectoral cooperation vary greatly among local-level WFD implementers and that their attempts at cooperation were rarely driven by WFD requirements.

Building on these findings, this paper examines how the relationship between WFD addressees and nature conservation authorities influences and contributes to successful WFD implementation. Specifically, we ask:

1. What kinds of conflicts arise at the local level and through what mechanisms does cooperation support WFD addressees in coping with implementation barriers?
2. As coordination and collaboration are not omnipresent among our cases, what supports the emergence of such relationships? Specifically, what is the role in those relationships of the independence of WFD addressees and their physical proximity to nature conservation authorities?
3. Are these case-specific characteristics unique or are they transferable as 'solutions' to other situations where WFD addressees have not been able to make the same kind of progress with WFD implementation?

In the next section of this paper, we provide background on the concepts and terms that we use; we then give the rationale for analysing independence and physical proximity as factors in the emergence of collaboration; we follow this with details on the methods used, an overview of our cases, and the barriers to WFD implementation that we found. In the subsequent section, using existing studies of the relationship between WFD and nature conservation, we summarise the known dimensions of conflicts and synergies and the strategies for overcoming/creating them. We present research on cooperation and integration behaviour, because there is a gap here in that there are few studies of local-level cooperation published in English or German. After that, we present and discuss the results pertaining to the three research questions outlined above; we pay attention to what may be learned from these findings and insights, particularly to things that may help improve WFD implementation in the future and especially in the run-up to the 2027 target date for full implementation. We conclude with some broader reflections on what has been learned from the research with regard to interorganisational relationships and their importance to policy implementation.

## **CONCEPTS, METHODS AND CASES**

This section provides an overview of 1) the conceptual background for the study, 2) the methods used, including study design, data collection and data analysis, and 3) the cases, including their multi-level and multi-actor settings, the reasons for which they are identified as bright spots, and their implementation barriers.

### **Conceptual background**

Many of the challenges of implementing the WFD relate to the polycentric nature of water governance itself (Thiel et al., 2019) and relations among water and other spheres of governance, including the governance of nature conservation. According to Ostrom et al. (1961: 831), "'Polycentric' connotes many centres of decision-making which are formally independent of each other", and yet, in practice, they may be highly interdependent.

Polycentricity as a phenomenon is particularly prevalent in Germany's WFD implementation processes and procedures, with various settings of multiple decision makers at multiple levels being responsible for water management. Other settings of multiple decision makers add to water management actors because WFD goals closely interact with other water and land uses and their related interests. Various laws further shape the competition among different interests, such as flood protection, renewable energies, agricultural policy and nature conservation. This effect is called 'institutional interplay', a "phenomenon where one institution intentionally or unintentionally affects another" (Young et al., 2010: 3; Young, 2002). Institutional interplay leads to synergies and contradictions between goals and instruments; it also adds a level of complexity regarding the actors and interests that must be considered and the decision-making arenas that affect good water status. The relations between these multiple actors determine the functioning of the whole system and the measurable environmental outcomes.

Cooperation is one important aspect of the shaping of how systems function and it can take various forms and intensities. We use the term 'cooperation' here to include all forms of coordination and collaboration, with coordination marking a lower intensity than collaboration. Following Koontz (2019), we understand collaboration to involve multiple parties working together to achieve a joint goal and it is taken to mean sharing resources and instruments. We also follow Tetsch's (2015) definition of coordination as being the consideration by actors of the interests and goals of other actors in their decision-making in order to avoid or reduce negative external effects; the achievement of synergies as positive external effects is a subordinated goal of coordination (*ibid*). Coordination may help to reduce the negative effects of institutional interplay, while collaboration offers the potential for using institutional interplay to produce positive effects and impacts which cannot be realised by the parties when acting alone.

Polycentricity – a phenomenon involving multiple decision makers – offers a seemingly infinite number of opportunities for cooperation between different pairs or groups of actors. Insights can potentially emerge from comparisons between cases where cooperation actually did occur and similar cases where such links and relationships did not emerge.

In some of our cases, it was explicitly stated that the collaboration between a WFD addressee and a nature conservation authority emerged due to difficulties experienced by the WFD addressee in unilaterally reaching its goals. Examples include situations where all actors have ideas but only the nature conservation authority has money; in other cases, cooperation works because organisations are physically closer together in an urban setting than they are in rural areas. We therefore decided to analyse our data to specifically look for a correlation between cooperation intensity and the two key factors of 1) 'independence/dependence' and 2) 'physical proximity'.

Previous research supports the hypothesis that strong independence lowers the chances for collaboration in a polycentric system while dependence and physical proximity may raise the chances for collaboration. This hypothesis is supported by research findings regarding the limited capacities of political – administrative systems, transaction costs, incentives, and spontaneity:

(1) According to Jager (2016: 289), every cooperation involves transaction costs, a "fundamental mediating factor" for cooperation, and actors of a political – administrative system are also characterised by limited awareness and information processing capacities (Scharpf, 1973), which leads to limited capacities for cooperation (Schröder, 2019); especially in polycentric governance systems, it also leads to the necessity of selecting cooperation partners in situations where not every thinkable cooperative relationship can be realised (Fischer and Sciarini, 2016). This results in a need for incentives, what Jager (2016: 289) calls an "incentivizing impulse", for cooperating with particular actors. These incentives may be provided by the prospect of improved goal achievement through conflict resolution/prevention, coping with barriers through additional instruments and the improvement of decision-making processes (Schröder, 2019). This prospect may be a stronger incentive if decision-making centres are characterised by a limited capacity for unilateral goal achievement – low independence – and if the cooperation improves the prospects for goal achievement. In contrast, a more independent centre may not perceive options offered through cooperation to be incentives if it feels it can achieve its goals unilaterally; its independence may thus hamper cooperation (Schröder, 2019). (We refrain here from calling actors 'dependent', as a centre may be less independent but not necessarily dependent on a particular other actor.)

(2) In the step that precedes striving towards cooperation, there is some 'spontaneity', as the phenomenon is discussed by Blomquist and Schröder (2019): "[s]cholars have used terms such as 'spontaneity' (...) to try to capture and convey the idea that even though there may be identifiable patterns in a dynamic structure, they do not necessarily reflect or result from an act or a process of design" (*ibid*: 59). The question may be asked, how do WFD addressees get to know other actors who are offering worthwhile incentives for cooperation? Due to the plurality of actors, we need to assume that

WFD addressees possess limited knowledge about other actors, their interests and instruments (Simon, 1959). Schröder (2019) found "knowing each other" and "organisational structure" (institutionalised integration of different sectors) to be drivers for cooperation. Both of these drivers point to opportunity structures (Fischer and Sciarini, 2016). We assume that actors are more likely to develop cooperative relationships with other actors if conditions allow them to 'spontaneously' get in touch and have opportunities to meet without pursuing cooperation and if they can in this way get to know possible partners who can enable their goal achievement through the contribution of additional instruments. This may easily happen if actors are related through organisational structures or their networks (Fischer and Sciarini, 2016), as both of these raise the 'physical proximity' (Schröder, 2018) between potential cooperation partners.

In summary, a system with a multiplicity of centres, on the one hand, increases the possible variances of cooperation but, on the other hand, can make it more difficult to consider cooperation strategically due to the limited capacities of actors. At this point, spontaneity that occurs as a result of physical proximity may drive the initialisation of cooperation and low independence may incentivise cooperation.

## Methods

Data analysed here were collected as part of a larger in-depth comparative study of WFD implementation in the six German federal states of Saxony, Saxony-Anhalt, Hesse, North Rhine-Westphalia, Thuringia and Lower Saxony. The larger study looked at the overall implementation situation and processes, the degree of participation and sectoral integration and river basin management approaches according to polycentricity characteristics; it took a 'bird's-eye view' in identifying cross-cutting features among the selected states.

In order to enhance the manageability and comparability, our analysis focused on actors who were related to the achievement of WFD goals regarding hydromorphology and connectivity. This focus reduced the number and types of actors to be analysed, making the research more manageable; it also allowed for greater comparability among the selected governance settings. Independent from the different governance settings, these types of measures are associated with similar ecological (for example, ecological deficits resulting from existing uses), technical (such as which measures address deficits), and social (in terms of usage interests) challenges, allowing for a reliable comparison of measure realisation processes.

Aiming for diversity within the study, we chose federal states that represent different overarching administration structures in Germany. In order to capture the diversity of independent decision-making, we also tried within each state to interview at least one representative of every type of actor that is actively realising measures on hydromorphology and connectivity. In three states, we did not find interviewees for very small-scale actors<sup>1</sup> such as municipalities (*Gemeinden*) or water and soil associations. Additionally, some actors were interviewed because they had realised WFD measures despite they were not explicitly addressed for WFD implementation by higher administrative levels. Table 1 provides an overview of actor types envisaged as WFD addressees in each state and of the additional actors found to be taking measures; it also indicates which actor types were covered by at least one interview.

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<sup>1</sup> Those actors are generally weak WFD implementers in Germany as they often have no staff capacity for covering WFD implementation to any real degree and sometimes lack the capacity even for water maintenance as a task. This made it more difficult to find individuals who were willing to be interviewed.

Table 1. Types of local WFD addressees for realising hydromorphology and connectivity measures in each selected federal state, and coverage of those with interviews.

Actor type	Federal states					
	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
District governments			◊	◊		
State agencies	◊	◊			◊	◊
Counties				◊		
Free cities	◊		◊	◊	◊	◊
Municipalities			◊		◊	
Maintenance associations		◊				◊
Water and soil associations				◊		
Special-law water associations				◊		
Special purpose associations		◊			◊	◊
Nature conservation associations					◊	
Landscape planning associations	◊				◊	

Note: Dark grey = the state-level administration expects this actor type to realise WFD measures; light grey = actor type generally not expected to realise WFD measures but single actors found to be taking measures; ◊ = at least one representative WFD addressee was interviewed.

This paper is a result of the bird's-eye view analysis; it recognises as a cross-cutting feature of our cases the ambivalent relationships and varied collaborations among WFD addressees and nature conservation authorities (see Appendix A, Table A1 for cooperation characteristics of our interviewed WFD addressees). Not all interviews with WFD addressees generated useful data such as information on cooperation and the specific handling of barriers; we were not able to, for example, interview the actual planner of such a WFD addressee organisation, but could only speak to a person with a different position and who had less knowledge about details. In terms of this analysis, we produced 19 full cases based on one interview per case; however, we used all data for understanding the WFD addressees' overall implementation barriers, independence, interdependencies, and the institutional setting especially for the regulation of nature conservation.

For each state, official websites, policy documents and recorded information from participatory processes were analysed in order to identify relevant decision makers and potential interviewees at higher levels. Interviewees representing small-scale actors were identified using a snowballing approach; higher-level authorities were asked to name active implementers, or active implementers were identified locally during observation of participation processes that took place between 2016 and 2019.

Most of the data were drawn from semi-structured interviews with WFD addressees as well as with lower-, middle- and upper-level authorities that have steering functions with regard to measures on hydromorphology and connectivity. The selection was complemented by interviews with non-state actors who had related responsibilities and aims or who were in a position to give a detailed overview of the implementation situation in the states; the latter particularly included nature conservation associations that take the position of critical observers and environmental advocates in political processes. The 70 conducted interviews lasted about two hours on average (see Appendix B for a complete and numbered list of interviewed actors and observed processes). In the remainder of the paper, we use the interview number '[Ix]' and the process observation number '[Ox]' for referring to

aspects of cooperation and implementation barriers that were mentioned in interviews or, respectively, that were observed in participatory processes.

Interviewees were asked how they plan measures, how they generate ideas for measures, with whom they cooperate or which participation/cooperation processes they use and participate in, or what role they play in WFD implementation. This was complemented by questions on barriers and conflicts and on their relevance, and on possibilities for improvement. The questions were open-ended so as to avoid the risk of prompting interviewees with regard to their reasons for acting in particular ways and in order to allow unexpected or unusual factors to be revealed. Further questions were asked to make sure that all basic aspects were covered, and for clarification of statements especially those addressing aspects which had not come up in earlier interviews. This formula allowed more specific questions to be included in later interviews.

Interviewees provided details, explanations and their own rationales regarding different aspects. In some cases, further questions did not lead to clearer statements because some interviewees were not sure what kinds of things they could share and speak about. We therefore analysed the narratives iteratively in three rounds. In the first round, we looked for direct and explicit statements in which interviewees provided mechanisms and causal links themselves; in the second round, we looked for more indirect and implicit statements and for statements in which interviewees, for example, used only some of the key terms that others did in direct statements about the same issues; the third round was used to review and check the categorisations made in the first and second rounds.

### Cases and implementation barriers

Germany's administration is characterised by a federal (16 states), multi-level (3 to 4 levels per state (Bogumil and Jann, 2009)), multi-actor structure. The ministries at the state level were designated as competent authorities for the WFD. The German states have different types of levels below the ministries; these include 1) government districts such as in Hesse and North Rhine-Westphalia (NRW), 2) a middle authority, as has Saxony-Anhalt and Thuringia, 3) no government districts or middle authority, which is the case in Saxony<sup>2</sup> and Lower Saxony, and 4) city-states, which are not covered here, but are examined in Schröder (2014). Below, we examine the level of counties or free cities (*Kreise* or *Kreisfreie Städte*)<sup>3</sup> and the municipality level. Lower water and nature conservation authorities are located at the county/free city level, and upper authorities are at the level of district governments and middle authorities.

Germany's overall water governance structure reflects these general administrative structures but is more complex. Pertinent to the implementation of hydromorphology and connectivity measures are the many actors who have water maintenance tasks related to the drainage of fields, flood protection and shipping. The main task of these actors is to keep the watercourse free of things like vegetation and river wood in order to maintain and guarantee a riskless runoff; maintenance tasks may also include maintaining constructions such as weirs, dams and shoreline stabilisations within and along watercourses.

The German federal states assigned water maintenance tasks according to the importance of the waters themselves. Waters of national importance such as those used for shipping are managed by a national agency called the *Bundeswasserstraßenverwaltung*. (For reasons of comparability, we did not include this agency in the larger study.) The state laws distinguish two to three orders of waters (Monsees, 2008). Maintenance and management tasks on first-order waters are usually assigned to state

<sup>2</sup> Saxony had government districts only until 2012. In that state, planning of WFD measures does not appear to be done at the district level – in contrast to what occurs in the states of Hesse and North Rhine-Westphalia – but basic organisational structures of former districts still prevail and may induce additional institutional variety within Saxony.

<sup>3</sup> Large cities are not part of a county; rather, they are themselves counties at the same time as being municipalities, which allows them to combine municipal and county administrative tasks.

entities; tasks on higher-order waters are assigned to other types of organisational entities such as associations that have different combinations of water management tasks, and municipalities of varying sizes and capacities. Maintenance and management tasks thus are mainly related to the lowest administrative level (that is, municipalities); non-municipality actors, however, fulfil these tasks often by cutting across administrative boundaries.

Across the general types of administrative structures of the federal states, several WFD addressees have similar organisational characteristics; district governments or state agencies (*Landesbetriebe*), for example, are expected to adopt measures for waters that are of state-wide importance. In five out of the six covered states, municipalities and free cities are expected to pursue WFD measures. In Saxony-Anhalt and Lower Saxony, water maintenance associations which cover the whole state area are mainly envisaged; similarly, different types of maintenance associations<sup>4</sup> can also be found in NRW and Thuringia, where they only cover parts of the state.

The chosen states apply the 'voluntariness principle' (*Freiwilligkeitsprinzip*), calling on local-level actors with water maintenance tasks to voluntarily take measures on hydromorphology and connectivity. The competent authorities address water maintenance actors by using instruments – such as funding programmes – that are intended to set incentives or by installing, for example, 'coordinators' that are intended to support and motivate WFD addressees; they cannot, however, command actors to take WFD measures and we therefore refer to these actors as WFD addressees.

Because independent decision-making regarding measure realisation happens at the local level, it is important to analyse cases at that level – rather than state level – in order to learn about implementation gaps. The voluntariness principle maintains the independence of WFD addressees in their decisions as to whether or not to realise measures in favour of the WFD. WFD addressees are also quite independent from higher levels in terms of what measures to realise, as RBMPs and PoMs are rarely the main basis for decisions in that regard (Koontz and Newig, 2014b; Schröder, 2019); furthermore, the ability of WFD addressees to independently decide with whom, and how, to cooperate is indicated by the variances among WFD addressees in terms of their cooperation with other sectors (Schröder, 2019) and the vagueness of WFD prescriptions on coordination. We therefore treated every WFD addressee as a single case.

Table 2 describes the types of WFD addressees we covered. Some specificities on case delineation should be highlighted. First, in Lower Saxony we included three actors as examples of maintenance associations because they differ in their organisational structures. Second, although we could not interview a water and soil association in North Rhine-Westphalia, we made a case there based on the interview with a representative of the county of Coesfeld; the lower water authority there reported about its collaboration with the nature conservation authority which facilitated the realisation of WFD measures by water and soil associations.

We refer to our cases here as 'bright spots' because they represent situations where the actors have actively realised WFD measures. We consciously decided to not use the term 'best practice' because we do not evaluate whether those measures are locally sufficient or whether they can lead effectively to the expected ecological outcomes; this is due to three main reasons: The first reason is that outcomes can only be achieved if other actors, which are not analysed here, also take measures concerning other pressures such as pollution; second, it would need a much longer time horizon to wait for the natural response and we lack the data to evaluate bright spots based purely on ecological outcomes; the third reason is that interviewees mentioned that they themselves are sometimes not sure if the measures they have taken are effective, or they recognised that, due to constraints, they could not implement better or more measures. A further factor for not using the term best practice is that in this paper we do not compare the possible advantages for WFD implementation of cooperation between WFD addressees and

<sup>4</sup> The specific governance structure and names of associations may vary among and within states, compare with Monsees (2008).

nature conservation with the possible advantages of cooperation between other types of actors or cooperation at other levels.

Table 2. Cases and the degree of their collaboration with nature conservation authorities on local WFD implementation which was described as necessary.

Actor type	Federal states					
	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
District governments			—	BR Arnsberg		
State agencies	—	—		Thüringer Landesellschaft		—
Counties					Soest	
Free cities	Dresden		Wiesbaden	Hamm	Erfurt	Braunschweig
Municipalities	—		City Taunusstein	—	City Blankenhain	—
Maintenance associations	UHV Ehle-Ihle			Aller-Ohe-Verband UHV Oker		
Water and soil associations				County Coesfeld with WuB	SE BS	
Special-law water associations	—					
Special purpose associations	Abwasser-verband Main-Taunus			GUV Harzvorland	Wasserverband Mittlere Oker	
Nature conservation associations	—					
Landscape planning associations	—				LPV Thüringer Grabfeld	

Note: Full actor names and translations or descriptions can be found in Appendix B; dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities; — = not a case, due to insufficient data (for example, the interviewee is not a WFD planner in the respective organisation but the interview data supports the analysis of barriers and rules-in-use; alternatively, no representative WFD addressee has been interviewed).

Our bright spots are identified as such because the WFD addressees were motivated to implement WFD measures and found the means to overcome implementation barriers. Our WFD addressees were often highly dedicated individuals; due to the voluntariness principle, however, many WFD addressees did not understand WFD implementation as being their primary task and felt themselves only responsible for maintenance and various other tasks such as drinking water provision and wastewater treatment. Actors

from our cases found themselves to be motivated by synergies with flood protection, recreation, and nature conservation (especially of particular species like salmon) (Schröder and Chaudhary, 2020; Schröder, 2019, see Table 3: Measure implementation incentive). While motivation is not our main focus, it is a precondition for realising WFD measures; motivation can, however, be reduced by barriers that hamper the realisation of WFD measures.

Table 3 describes the barriers to WFD implementation which we used for the subsequent analysis of coping mechanisms, cooperation intensity and the degree of independence.

Table 3. Barriers for WFD implementation found across federal states.

Barrier	Description
Human resources and motivation	Actors may lack personnel in overall numbers; for example, some maintenance associations are led by one volunteer who would need to invest time in WFD measures on top of that already being spent in completing the primary tasks of the organisation. Actors may also lack know-how, with training and experience varying with the actor's previous tasks as well as with the size of the organisational unit. Some units are highly specialised and hold a good command of different water management practices, while others are general purpose units where a decision maker needs (theoretically) to attend to water-related – among many other – tasks.
Main or full financing	State entities are fully financed by the states. Other WFD addressees may apply for funding from WFD funding programmes set up by the states to incentivise WFD measure realisation, but only Saxony-Anhalt offers a 100% funding programme. Financial barriers in the cases analysed here were less an issue regarding the overall size of funds. Difficulties in using these programmes rather resulted from eligibility criteria. Certain measure types and areas were excluded because they were not defined as targeted, and certain actor types were excluded as applicants. Difficulties also arose from the requirements for co-payments and from the organisation of application and processing procedures.
Co-payments in funding programmes	Most WFD funding programmes require co-payments by WFD addressees and sometimes regulations allow them to cover these by their own work. Often, however, WFD addressees have difficulty covering these co-payments because, for instance, their organisational regulations do not allow them to use their own money or because they can simply not afford the co-payments. Regulations sometimes restrict the sources of co-payments, making it even more difficult to obtain external funding to cover these costs.
Application procedures for funding programmes	The application and approval procedures for receiving WFD funds require, for instance, a lot of effort, an initial plan with a degree of detail which cannot be provided by WFD addressees (because they lack know-how or man-power), or pre-financing (which especially prevents small actors from realising measures); WFD funding bodies may also impose high sanctions for contracting mistakes. Furthermore, funding decision-making processes may allow the influence of other actors on local decisions, something which is seen as problematic in some cases. (Schröder and Chaudhary, 2020)
Land acquisition	The acquisition of necessary land along rivers for larger measures, such as renaturation, is difficult due to very high market prices and the low willingness to sell land, especially agricultural land. Buying, leasing, transforming, or swapping land, even if possible, takes long. (Schröder and Chaudhary, 2020)
Institutional interplay	Institutional interplay may arise either through goal conflicts or through contradicting instruments for reaching those goals. Apart from agricultural policy, the most frequently mentioned institutional interplay here concerned nature conservation law (Natura 2000/Flora Fauna Habitat Directive). (Schröder and Chaudhary, 2020)
Political will	WFD addressees may lack political support to realise measures (Schröder and Chaudhary, 2020) from, for example, mayors or members of their organisations; this can affect the financing of measures, the provision of public land, and the approval by public veto players.

Institutional interplay deserves further attention here as a barrier because it is especially relevant to cooperation intensity. Even before the WFD was put in place, Germany prescribed plan approval procedures in order to ensure the integration of stakeholders' interests; the selection of stakeholders, however, depends on the size of the measure or plan. The requirement for plan approvals itself depends on the categorisation of a planned measure as a construction; this categorisation is itself, to a certain extent, a matter of discretion in that WFD addressees with maintenance tasks have some discretion to define WFD measures as a 'construction' or as 'maintenance' in order to avoid such procedures. This discretion is used more extensively in trustful relationships with authorities. Plan approval procedures are conducted by water authorities here and involve others such as nature conservation authorities; this gives the latter the opportunity to assess a planned measure in terms of its own goals and then signal agreement or disagreement. The conducting authority weighs up the various actors' interests, which potentially results in a requirement to adjust or stop a plan. Due to this procedural prescription, several WFD addressees engage in advanced coordination (Schröder, 2019), when plans are still more easily adjustable or when not so much money and time has already been invested in planning.

In the larger study, we analysed our cases regarding the necessity of cooperation for the realisation of measures; we noted whether interviewees described cooperation with a particular actor as 1) necessary, 2) a precondition to implementing their measures, or 3) addressing implementation barriers. This analysis led us to recognise the cross-case and cross-state importance of collaboration with nature conservation authorities and to analyse it in greater depth in this paper.

Table 2 summarises the results of this analysis of cooperation; it shows the local collaboration with nature conservation authorities, coding the necessity for regular collaboration in dark green and sporadic collaboration in light green. The only other pathway where a particular cooperation was found necessary for WFD measure realisation was the cooperation with flood protection: In the case of the city of Blankenhain, the water authority, with its steering and control function, used approval procedures to impose WFD measures on the primary flood protection actor. WFD measures were, furthermore, attractive because of their flood protection effects, but also because intended measures were not eligible for flood protection funding programmes, and thus the funding made available by the WFD was appreciated. The GUV Harzvorland also focuses on flood protection; its WFD measures are a by-product, and prompted by the nature conservation authority in approval procedures.

In this section, we laid out the basis for analysing our cases with regard to mechanisms for coping with barriers, cooperation intensity, independence and physical proximity. The next section summarises what is already known and published on the relationship between the WFD and nature conservation.

## RELATIONSHIPS BETWEEN WFD AND NATURE CONSERVATION

This section provides an overview and summary of key papers examining relationships between the WFD and nature conservation actors; it includes descriptions of their conflicts, institutional interplay, integration, cooperation, and the practical implementation of their goals. The studies are from the fields of ecology, engineering, land use planning, water management, environmental policy, law sciences and environmental practice.

Laws for nature conservation include goals which exist in parallel to the Water Framework Directive, with neither WFD nor nature conservation goals having priority. The Conservation of Nature and of Landscapes Act (*Bundesnaturschutzgesetz*), to which we refer as national nature conservation law, transposes various directives into national law; this includes, among others, the EU Birds and Habitats Directives (BHDs). The national nature conservation law was enacted in 1976 and then substantially amended in 2010 [146]. This law aims to protect species and their habitats and, applying the principle of 'no deterioration', regulates the compensation of interventions in nature and landscape. The implementation of nature conservation law is the responsibility of the federal states, which regulate details and may allow deviations from national law. Nature conservation authorities are tasked with

implementation at the level of counties and free cities (Sachverständigenrat für Umweltfragen, 2020: 214; compare with actor types in Table 2).

This section examines: 1) five different dimensions of synergies and conflicts between the WFD and nature conservation; 2) instruments and strategies for cooperation and integration which were suggested by the studies; and 3) how actual cooperation and integration has been researched.

(1) Studies have described primarily three different dimensions of contact between the WFD and nature conservation: ecological, legal and practical. In terms of ecological relations, evidence points to both<sup>5</sup> synergies and conflicts, with conflicts appearing to be primarily a result of differences in guiding principles; specifically, the WFD has a process orientation, whereas nature conservation is more concerned with the conservational protection of cultural landscapes (Fuchs, 2010; Kraier, 2014; Janauer et al., 2015). Conflicts between WFD and nature conservation therefore tend to arise in relation to, for example, former river beds such as oxbows which host rare species due to their disconnection from flowing water; in situations such as this, the WFD requires connectivity while nature conservation aims to conserve such sites (EC DG Environment, 2011; Janauer et al., 2015).

The legal perspective shows that neither the WFD nor the BHDs have overall priority in terms of objectives (Fuchs, 2010; Janauer et al., 2015). There are, however, legal instruments to solve conflicts that may arise; these include compensation – under nature conservation law – for WFD measures that are assessed to negatively impact nature, and exemptions or less stringent environmental objectives according to the WFD (EC DG Environment, 2011; von Andrian-Werburg, 2014; Janauer et al., 2015; Connor, 2016). Such instruments do not, however, address the difficulties that local actors may experience when searching for consensus in such situations (Jessel, 2014; Galler, 2015).

From a practical point of view, potential synergies include: 1) the efficient use of land through multifunctional measures and different measure options (Galler, 2015); 2) increased support for measures (Peters and Schackers, 2014); 3) finding different funding sources (Galler, 2015); and 4) time savings in the form of, for example, early conflict resolution (Rehklau et al., 2017). Conflicts may practically be solved by 1) limiting construction times, 2) regulating the execution of construction works, 3) imposing compensation measures prior to WFD-related construction projects, 4) transferring species to new habitats (von Andrian-Werburg, 2014) or 5) by improving strategic approaches through, for example, the consideration of sufficiently sized areas, the separation of sites to avoid conflicting aims, and the formulation of focal points for particular goals (Kraier, 2014).

In addition to these three dimensions of contact, Kraier pointed towards cost and emotion as two further dimensions (*ibid*). The cost dimension refers to the defence of funding the extensive use and the maintenance of habitats by farmers – an important source of their income – and also of departmental budgets. The emotional dimension includes actors' preferences for certain species, as well as traditions, misunderstandings, the exercise of power, and the lack of shared priorities (*ibid*). According to Kraier (*ibid*), the relevance of emotional aspects should not be underestimated with regard to other factors such as common or contradicting guiding principles. This observation fits with Connor's (2016: 334) statement that, in the Irish context, it is likely that, "the perceived conflicts in objectives between the WFD and the Nature Directives have been overstated".

(2) With regard to creating synergies and avoiding conflicts between the WFD and nature conservation, studies have also suggested various cooperation and integration strategies. These include:

- The use of planning instruments: These exist at the regional level (landscape framework plans and regional planning) and the municipal level (open space plans, landscape conservation plans which

<sup>5</sup> Hübner (2007), among others (Janauer et al., 2015; Mußbach and Evers, 2013; von Andrian-Werburg, 2014), states that synergies outweigh conflicts; although he found, that for the state of North Rhine-Westphalia, more than one-third of species and habitat types related goals are conflicting with WFD goals compared to less than half which are conforming and the rest being only partially conforming with WFD goals.

accompany construction plans, land pools for compensation, plans to connect biotope systems), and also include management or development plans specific to protected areas such as Natura 2000 sites (Peters and Schackers, 2014); other instruments include basin-level plans (RBMPs and PoMs) (EC DG Environment, 2011; Galler, 2015; Janauer et al., 2015);

- Cooperation at all levels: The willingness to cooperate is necessary on both sides (Fuchs, 2010; Drüke, 2014); communication structures are needed to establish relations on the interpersonal level (Fuchs, 2010), providing a basis for trust and for understanding of each actor's practical constraints (Kraier, 2014);
- Coordination of tasks: These tasks include environmental information (Galler, 2015), standards for monitoring (Hübner, 2007; Frederiksen et al., 2008), and spatial distribution of measures through plans or funding programmes (Frederiksen et al., 2008; Galler, 2015);
- Nature conservation actors may also realise WFD measures: The water sector may motivate and incentivise others in, for example, the use of WFD funding programmes (Drüke, 2014; Peters and Schackers, 2014);
- Joint use of sector-wide instruments: Both sectors should plan jointly in favour of shared objectives by using instruments such as the intervention regulation under nature conservation law (Jessel, 2007; Kraier, 2014; Peters and Schackers, 2014; Schröder, 2014; Galler, 2015), market-based instruments such as funding programmes from, for example, agricultural policy and contract-based nature conservation), regulatory instruments such as the designation of nature conservation or water protection areas, and usage fees according to water law (Galler, 2015).

The studies mentioned above, however, also identified factors that hamper the use of these strategies. Through the WFD, the water management planning system became incompatible with existing landscape planning methods (*ibid*); this led to mismatching time schedules, different spatial references and scales, varied degrees of detail (Fuchs, 2010), and fragmentation among the planning and coordination levels of the German federal states (Harms and Dister, 2018). Similarly, differentiated environmental data were produced from various monitoring programmes; this data tends to be spread across numerous authorities and entities and administrative borders, to be sectoral and spatial as well as vertical (Galler, 2015) and, according to van Apeldoorn (2007), may also be outdated, all of which can lead to isolated planning decisions which lack synergies (Galler, 2015). Additionally, local nature conservation authorities in Germany lack funding and personnel for writing their own management plans (van Apeldoorn, 2007).

(3) Few studies examine actual integration and local-level cooperation between the WFD and nature conservation sectors. Some studies looked at the objectives level; an example of this, in the Baltic Sea region, is Frederiksen and Maenpaa's (2007) study of how other directives were integrated in the transposition of the WFD into national law; another study considered the level at which ecological goals related to the Birds and Habitats Directives were formulated (which, in the Netherlands, is at the national level and in France and Germany is at the site level) (van Apeldoorn, 2007); still other studies analysed cooperation around RBMPs (van Apeldoorn, 2007; Janauer et al., 2015; Stratmann and Albrecht, 2015). Strong variances between the plans on the one hand and the actual cooperation on the other hand are a commonplace (van Apeldoorn, 2007; Janauer et al., 2015). Janauer et al. (2015: 24) identified a clear knowledge gap on "whether possible conflicts between Natura 2000 and WFD were already solved during the preparation of the programmes of measures or whether they are rather passed on to the subsequent planning levels". Galler (2015) found for Germany, that coordination between the sectors in the implementation of measures does currently not happen; existing coordination mechanisms are only partially effective, integrating landscape planning is not used, and specific measures are regularly realised without coordination. Beunen et al. (2009), similarly, found that for the Netherlands the implementation processes of both directives are "largely autonomous and independent" due to the organisational separation of water management and nature conservation.

Studies from practitioners have nevertheless mentioned examples of cooperation, for example that by Jessel (2014) in Lower Saxony. In North Rhine-Westphalia, various types of nature conservation actors were observed to participate in round tables and in the creation of implementation roadmaps, although rarely in the development of projects. On occasion, they did realise WFD measures themselves and a few small water and soil associations realised WFD measures in collaboration with nature conservation authorities, including the refinancing of co-payments required by WFD funding programmes through compensation measures (Drücke, 2014). It has been argued that WFD aims are in some cases not achievable without using compensation measures (Jessel, 2007). In Bavaria, the higher nature conservation authority, together with the water management authority, elaborated ecological development concepts in an effort to integrate Natura 2000 management plans and WFD implementation concepts; this was called the '*Landshuter Modell*' (Rehklau et al., 2017).

Summarising the key findings, we can expect to find synergies between WFD and nature conservation actors but relations are also unlikely to be free of tension. Synergies will not necessarily be created as win-win situations and can require political decisions as to what goals to prioritise locally. Furthermore, cooperation between WFD addressees and nature conservation actors at the local level seems to lack systematic analysis in the scientific literature. This leaves unanswered questions with regard to how joint approaches and instruments are used strategically, and by whom and for which purposes (Galler, 2015). This paper offers a way to fill this gap in knowledge and understanding.

## RESULTS

The results presented here contribute to knowledge regarding local-level cooperation between WFD addressees and nature conservation authorities. In our cases, we first illustrate the actual relations between WFD addressees and nature conservation authorities by highlighting the conflicts which hamper WFD implementation and by analysing the mechanisms available through cooperation which support WFD implementation. Second, we analyse the patterns of (in)dependence and physical proximity as potentially critical factors driving the emergence of collaboration. Third, we consider opportunities and constraints in transferring the collaboration solutions to other WFD addressees.

### **Institutional interplay between the WFD and nature conservation in local-level implementation: Causing and reducing barriers**

In this section, we illustrate the practical, positive, and negative effects of the institutional interplay with nature conservation law on WFD implementation. Negative effects and tensions are caused by policy incoherencies regarding the protection of particular species and habitats. Positive effects result from the cooperation between WFD addressees and nature conservation authorities, which make mechanisms available that help to cope with implementation barriers.

Both types of effects are caused by the intervention regulation (*Eingriffsregelung*) of nature conservation law and related instruments. This regulation allows nature conservation authorities to assess plans regarding their effects on nature, protected habitats and species, and to make prescriptions regarding whether and how to realise those planned measures. The prescriptions are intended to help avoid, or at least minimise, negative effects on nature (which are referred to as 'interventions'). Unavoidable interventions must be compensated for (Peters and Schacke, 2014) and details regarding the assessment of compensation can be regulated by the federal states. A national directive on such assessments failed to be passed due to opposition from the federal states [O2]; as a result, regulations on assessment vary across the states [I33].

State-level compensation decrees may regulate where the nature needs to be compensated (for example, how close to the intervention), who conducts compensation measures, what qualifies as compensation, how to assess that a compensation measure is appropriate to the intervention, and who decides all of this. In order to allow a spatial and especially temporal separation between intervention

and compensation measures, states may regulate whether and how intervention and compensation measures can be quantified, using what formulas; some of these formulas offset the possible positive and negative effects of plans [I33], and often the size of the claimed land is decisive for calculations (Galler, 2015). Planned measures with positive effects may be credited with 'eco-points' which can be then saved to compensate for future intervening measures or which may be pooled from various projects (Peters and Schackers, 2014). Compensation requirements may also be monetised; 'compensation money' is paid by the intervener into a fund that can be used for other nature conservation projects.

The perception of conflicts with nature conservation varies strongly among the cases examined. In some cases, nature conservation is perceived as an increasing barrier for WFD implementation because of blocking particular measures [I50]. Conflicts arise on the typical species inventory [I27], for example, the beaver needs to be weighed up against the common river mussel [I50]. Nature conservation authorities assess WFD measures as interventions and require compensation measures (for an example from Hamburg, see Schröder, 2014) [I49]; an example of this are unfavourable calculation formulas that give higher negative values for cutting trees and removing soil than the positive values given for habitat improvements through river renaturation which involves cutting and removing trees (Schröder, 2014) [I33]. Nature conservation authorities also restrict construction times in order to protect species [I36, I51]; the time limitations constituted by breeding and spawning seasons of various species can add up [I27] and, in combination with funding schedules, may leave only two months a year for the construction of WFD measures [I67]. As some WFD addressees (depending on the actual time of construction) also faced reduced availability of engineering consultants [I51], construction companies, and financial resources [I56, I67], some interviewees perceived the restriction of construction times as a strong barrier to WFD implementation [I27]; others, however, perceived this as a minor problem [I33, I49].

Except for three of our cases, all have drawn attention to the need for coordination of planning with lower nature conservation authorities in order to prevent or solve goal conflicts. Such coordination happens at various planning stages during, or prior to, the prescribed plan approval procedures (see Schröder, 2019). In the three exceptional cases, interviewees explained that they carry out the WFD measures that can mostly be considered maintenance measures and therefore do not require plan approval procedures or coordination. Cooperation intensity, however, has more variations than we can illustrate here. In practice, the absence of coordination within plan approval procedures does not necessarily mean that there is no coordination at all; for instance, those responsible for maintenance plans may coordinate with, and seek agreement from, nature conservation authorities [I70].

Although the papers on the relations between the WFD and nature conservation suggest various other possibilities for cooperation between the two sectors, we found that the instruments related to the intervention regulation were the main basis for collaboration. In contrast to the assessment of WFD measures as 'constructions', in collaboration with nature conservation authorities WFD measures may also be deemed 'compensation' measures, a designation which allows a different assessment (Schröder, 2014). Overall, barriers to WFD implementation can be addressed by different mechanisms, with the understanding that not all mechanisms can be applied everywhere. The various mechanisms are summarised below.

Regarding the financing of measures:

1. Compensation measures are directed from private or public interventions to the water bodies [I17, I33, I48, I50, I56, I66] if, for example, flood protection measures require compensation; measures need to be financed by the intervener;
2. Compensation money is used to fund WFD measures fully or partially, as, for example, the co-payments required from WFD addressees in several funding programmes for WFD implementation [I39, I43, I67];

3. WFD measures are fully or partially credited with eco-points; these are saved on an eco-point account to spend on later compensation requirements or may be sold in order to refund measures fully or partially [I51, I56, I50, I32].

Other mechanisms address the (perceived) pitfalls of WFD funding programmes:

4. Compensation instruments allow the realisation of measures of a specific type [I50] or at specific water bodies [I17] which are not targeted by existing funding programmes because, for example, these programmes intend to set (other) priorities;
5. The realisation of measures by designating them as compensation avoids time-consuming applications to WFD funding programmes [I33];
6. The realisation of measures as 'compensation' precludes the influence of other actors on measure design and realisation such as the upper water authority that needed to be involved in funding approval procedures for WFD implementation [I39].

Additional mechanisms address land resources and political will:

7. A compensation requirement may be used to oblige a private investor to buy the costly land around a water body that is necessary for a WFD measure. If public actors buy land, they are restricted by rules regarding the prices they are allowed to pay; often these payment limitations are low compared to the actual market prices for a piece of land. Private actors, on the other hand, are not restricted in the prices they pay for land and may be willing to pay the higher market price in order to realise their main project [I66]. Additionally, measures can be combined into land pools in order to allow larger-scale measures (Jessel, 2007; Peters and Schackers, 2014);
8. Compensation requirements can add pressure for the realisation of WFD measures and can in this way help to overcome unwillingness. Requirements that have been put in place for construction plans constitute a good argument for political support; the funding of WFD measures needs to be planned and argued together with the construction itself. Construction is not allowed to start without fulfilling the schedule for compensation [I17].

It is plausible that collaboration might be pursued in order to also address barriers such as lack of human resources and motivation. Nature conservation authorities may, for example, become active in taking over motivational activities, as well as idea generation and planning or organising tasks; this partially occurred in one of our cases [I62, I65, I69]. We have not, however, found such a mechanism to be at play across our cases.

Table 4 summarises the WFD implementation barriers that are addressed through cooperation with nature conservation authorities; this, along with the associated mechanisms, led to our classification of the cooperation intensity. We classified cases as showing 'medium' cooperation intensity<sup>6</sup> if WFD addressees at least coordinated regarding institutional interplay, and 'low' if they cooperated less than this; a 'high' cooperation intensity indicates situations where WFD addressees collaborated with nature conservation authorities. We did not consider it to be collaboration when it consisted solely of crediting eco-points to measures; therefore, two cases which used eco-points to refinance co-payments were not classified as having high cooperation intensity. We also distinguished between 'regular' implementation behaviour and 'sporadic' behaviour for single measures and recorded it in two lines. We maintained the distinction between regular and sporadic behaviour for the further analysis of our cases.

<sup>6</sup> The Stadtentwässerung Braunschweig (SE BS) is a special case because it only realises WFD measures that are considered to be maintenance and has not clearly stated coordinating mechanisms with regard to institutional interplay [I70]. We classified it, however, as having medium cooperation intensity because it cooperates with the local water and nature conservation authority on annual funds for small measures provided by the SE BS [I70].

Table 4. Cooperation intensity of WFD addressees operationalised as implementation barriers that are addressed through cooperation.

State	WFD addressee	Cases						Implementation barriers	Cooperation intensity
		Main or full financing	Co-payment in funding programmes	Application procedures for funding programmes	Land acquisition	Political will	Institutional interplay		
Saxony-Anhalt	UHV Ehle-Ihle							✓	M
Saxony	Free city Dresden	✓	✓	✓	✓	✓	✓	H	
Thuringia	Thüringer Landgesellschaft							✓	M
					(✓)		✓	(H)	
	Free city Erfurt						✓	M	
		(✓)					✓	(H)	
	City Blankenhain						✓	M	
	GUV Harzvorland						✓	M	
					(✓)	✓	✓	(H)	
	LPV Thüringer Grabfeld		✓				✓	M	
		(✓)					✓	(H)	
Hesse	Free city Wiesbaden							L	
	City Taunusstein	✓		✓	✓	✓	✓	H	
	Abwasserverband Main-Taunus		✓					L	
							(✓)	(M)	
North Rhine-Westphalia	BR Arnsberg							✓	M
	County Soest							✓	M
	Free city Hamm	✓	✓	✓			✓	H	
	Water and soil associations with County Coesfeld		✓				✓	H	
	Free city Braunschweig				✓		✓	H	
	Wasserverband Mittlere Oker				✓		✓	H	
	SE BS							M	
	UHV Oker		✓				✓	H	
	Aller-Ohre-Verband						✓	M	

Note: ✓ = barrier is regularly addressed; (✓) = barrier is sporadically addressed; H = high cooperation (collaboration); M = some cooperation (coordination); L = low cooperation; ( ) = deviation from regular planning behaviour; dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities.

Our findings illustrate the practical effects of institutional interplay between nature conservation and WFD implementation. We found eight mechanisms in total that supported WFD addressees in dealing with implementation barriers when collaborating with nature conservation authorities. However, WFD addressees also stated that collaborating partners needed to step back from their highest aims. Policy incoherencies precluded win-win situations. In our cases where there was collaboration, solutions were found, but any species needed to suffer, the space for developing a river was restricted [I50] or nature conservation goals receded behind WFD goals [I51]. Finding mutually acceptable compromises may very much depend on the individuals involved on both sides [I51, I69]. This underlying tension between the two types of actors illustrates that collaboration might not always be in the interest of either of them; furthermore, the variation in collaboration among our cases implies that collaboration, despite its potential benefits, does not automatically emerge or endure. In the following section, therefore, we analyse (in)dependence and physical proximity as potential factors leading to the emergence of collaboration among our cases.

### **Cooperation intensity driven by (in)dependence and physical proximity?**

We have illustrated and explained above how collaboration aided with particular mechanisms in coping with barriers to WFD implementation. In the following, we analyse potential factors that may have driven the emergence of collaboration; we ask whether the independence of decision makers and the physical proximity between WFD addressees and nature conservation authorities is related to the degree of cooperation intensity between them.

Table 5 shows the independence of decision makers from nature conservation authorities; this is based on the availability of coping mechanisms other than those identified in the previous section. Columns relate to barriers where cooperation might have provided useful coping mechanisms; blank cells indicate barriers for which no alternative coping mechanisms were reported by interviewees. We classified WFD addressees as 'highly independent' if implementation barriers mainly do not apply or are not perceived as barriers, or if there are regular alternative coping mechanisms. We placed cases in the 'medium independence' category if regular alternative coping mechanisms exist but not for solving institutional interplay. The category of 'low independence' applies to cases where there was only sporadic use of alternative coping mechanisms, especially for financing measures.

Alternative coping mechanisms as well as barrier characteristics were found to be very diverse. Barriers were considered to be only sporadically addressed if, for example, WFD funding programmes, or alternatives such as flood protection funding programmes, were reported as being not applicable to every planned measure [I49], or if interviewees named numerous different funding sources which they had found for single measures [I17, I66]. Financial alternatives included funding for flood protection [I12, I18, I27, I44 I50, I51, I56] and maintenance [I12, I17, I32, I70] as well as support by foundations [I11, I52, I66], and, for co-payments, municipal budget funds [I17, I27, I48, I50]. Land acquisition was often avoided by, for example, planning only in-stream measures which do not require additional land [I3, I32, I44, I48, I49, I50, I51, I67, I68]; this was done if there was no option of buying land [I17, I44] or of land consolidation [I36, I39, I51, I63] – in a few cases specialised actors buy land strategically [I32, I33, I70]. Political will was mostly generated through promises of increased flood protection [I17, I27, I44, I50, I51, I70] or reduced future costs of water maintenance [I51, I68, I70] and improved recreation areas [I17, I44]. A specific way, what we identified, to realise WFD measures was that they served as compensation for flood protection measures [I56]. No alternatives to approval procedures were identified, apart from avoiding those procedures altogether by planning very small-scale measures.

Table 5. Independence of WFD addressees operationalised as the availability of alternative mechanisms to cope with implementation barriers.

State	WFD addressee	Cases		Implementation barriers					Independence
		Main or full financing	Co-payment in funding programmes	Application procedures for funding programmes	Land acquisition	Political will	Institutional interplay		
Saxony-Anhalt	UHV Ehle-Ihle	–	–		↗				M
Saxony	Free city Dresden	(–)	(✓)		(✓)	✓			L
Thuringia	Thüringer Landgesellschaft	–	–	–	↗ ✓	✓			M (M)
	Free city Erfurt	–	✓		✓ ↗	✓			M (L)
	City Blankenhain	✓ –	(✓)	–	↗	✓			M
	GUV Harzvorland	✓		–	✓	✓			M
	LPV Thüringer Grabfeld	– (✓) (–)	✓ (✓)	✓ –	↗ ✓ (✓)	✓ ↗			(M) M (L)
Hesse	Free city Wiesbaden	✓ –	✓			✓	↗		H
	City Taunusstein	(–)			(✓)		↗		L
	Abwasserverband Main-Taunus	–			(✓) ↗		↗		H
		–							(M)
North Rhine-Westphalia	BR Arnsberg	–	–	–	✓ ↗	✓			M
	County Soest	–	✓		✓				M
	Free city Hamm	(–)			✓	✓			L
	Water and soil associations with County Coesfeld	(–)							L
Lower Saxony	Free city Braunschweig	(✓) (–)	(✓)		(✓) ↗		–		L
	Wasserverband Mittlere Oker	(–)	✓						L
	SE BS	–	–	–	↗	✓	↗		H
	UHV Oker	(–)	(✓)		✓ ↗				L
	Aller-Ohre-Verband	–	(✓)		(✓) ↗	✓			M

Note: ✓ = barrier is regularly addressed; – = barrier does not apply for this case or is not perceived as a barrier by the interviewee; (✓/–) = barrier is sporadically addressed or sporadically does not apply; ↗ = avoiding land requirements or plannings which require approvals to address institutional interplay; H = high independence; M = some independence, for example, preliminary reconciliation prior to approval procedures is still necessary; L = low independence, for example, actors cannot realise WFD measures without additional strategies to cope with barriers; ( ) = deviation from regular planning behaviour; dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities.

In three of the four cases that showed sporadic collaboration behaviour, interviewees stated that certain, single measures could not have been realised without using the coping mechanisms provided by this collaboration; these cases were, additionally to their regular behaviour, classified in 'low independence'. The planner in the fourth case recognised implementation of the WFD measure as being a compensation measure beneficial to reduce the overall amount of land that was taken from actors such as farmers, but not as something for coping with a barrier [I51]. We therefore classified this sporadic behaviour in the same way as the regular behaviour.

We also classified our cases regarding the physical proximity of decision makers to nature conservation authorities. Seven cases show high physical proximity through working in the same building [I16, I17, I12, I36, I39, I43, I63, I66], regular meetings independent from WFD measures [I48], or a single person who is not a nature conservation authority but who is responsible for water management and nature protection [I33]. Five cases show medium physical proximity through alternative close connections to nature conservation; these include a close collaboration during former employment at the forestry authority [I67], close ties due to the constant initiative of the nature conservation authority [I70], and through tasks related to nature conservation handled by the same organisation [I51, I50]. We classified seven cases as showing low physical proximity because interviewees<sup>7</sup> did not mention any of the types of ties described for medium and high proximity.

We then grouped the cases according to independence, physical proximity and cooperation intensity; the results are shown in Table 6 (Appendix A, Table A2 indicates case names for each group).

Although many of our cases made use of compensation instruments, the specific mechanisms applied and the barriers which were being addressed varied considerably; in an aggregated form, nevertheless, patterns of independence became visible. More independent WFD addressees (medium and high), facing fewer barriers or having alternative means to cope with barriers, showed only a low or medium cooperation intensity with nature conservation authorities; they coordinated only as much as was necessary to gain agreement for their measures. Low independence, on the other hand, tended to be associated with high cooperation intensity. Collaboration allowed barriers to be addressed and supported goal achievement by WFD addressees.

Physical proximity and cooperation intensity showed a less clear relation; cases characterised by collaboration did, however, show mainly either high or medium physical proximity. Five cases where we found high or medium proximity did not display regular collaboration, but rather coordination. Three of these were cases with only sporadic collaboration; they were sporadically, but not regularly, characterised by low independence, what incentivised collaboration. One exceptional case, which implemented only measures under the heading of 'maintenance tasks', was highly independent but still demonstrated a medium cooperation intensity that coincided with medium proximity [I63, I66, I70]. Overall, for those interviewees who experienced it, physical proximity was described as very conducive to, and supportive of, collaboration.

<sup>7</sup> While other interviewees reported physical proximity without being explicitly asked about it and their reports match with organisational charts, the website of Wiesbaden indicates that WFD planners occupy the same (very large) building as the responsible nature conservation authority. However, the interviewee mentioned conflicts with nature conservation goals but did not mention forming closer ties, despite a direct question.

Table 6. Cases' cooperation intensity in relation to independence and physical proximity.

Cooperation intensity	Degree of independence	Physical proximity	Number of cases
Medium	Low	High	2
		Low	6*
	Medium	Medium	2
		High	2
	High	Medium	1
	High	High	6*
		Medium	3*
		Medium	1*
High	Medium	Low	1*

Note: Cooperation intensity/degree of independence: High = high independence/cooperation; Medium = some independence/cooperation (such as preliminary reconciliation prior to approval procedures); Low = low independence/cooperation. Physical proximity: High = actors are related to each other through organisational structures; Medium = actors are related through a network to nature conservation; Low = actors have no, or only formal, relations to nature conservation authorities. \* = includes one case with sporadic planning behaviour because five cases were sorted into two lines each with regard to their independence and cooperation intensity.

These findings indicate that high physical proximity can be an important supporting factor for the emergence of collaborative relations but that it does not necessarily lead to collaboration if actors are highly independent from possible collaboration partners. The findings further indicate that low independence is a driver for the emergence of collaboration. The implementation deficit and the overarching barriers to WFD implementation that we found in our study suggest that many WFD addressees are rarely entirely independent in the achievement of WFD goals. The question remains, however, as to whether collaboration with nature conservation serves as a transferable solution for overcoming implementation deficits elsewhere. In the following section, we elaborate on this issue based on our data.

#### **Exceptional cases of, or transferable solutions for, WFD implementation?**

We now analyse the possibilities for, and restrictions on, making use of the identified mechanisms beyond our cases. We ask whether we have found some very exceptional, or possibly unique, cases of bright spots, or whether these solutions are in fact transferable and thus can help improve overall WFD implementation in Germany. In order to answer this question, we analyse the distribution of our bright spot cases across the selected federal states and across actor types. We then compile the details of practical constraints and summarise the regulatory constraints for collaboration.

First, is it likely that the coping mechanisms can be used across 1) federal states and/or 2) actor types?

(1) Table 2 shows collaborating WFD addressees in five of the six examined states. This incidence indicates that state-level regulations of the five states generally allow, or at least do not restrict, the use of the identified mechanisms.

(2) Table 2 also shows a predominance of collaborating WFD addressees on the municipality/free city level and on the county level in the selected federal states. This points to the shared independence and physical proximity characteristics of this group of actors compared to other actor types. First of all, district governments and state agencies are fully financed by the states while all other actors, if not obtaining alternative financial resources or using their own money (independence characteristics), need to use WFD funding programmes that require applications and co-payments and which cause those implementation barriers which can be addressed by the identified mechanisms. As the exceptional cases

above indicate, high independence neither precludes nor fosters collaboration. In county administrations and administrations of free cities, furthermore, water authorities and/or WFD addressees and nature conservation authorities often act under one roof, which increases the physical proximity of these actors; other collaborators are characterised by more personal (non-transferable) ties.

We therefore argue that this collaboration solution is transferable to federal states other than the selected ones; however, it is more likely to be used by WFD addressees if they face similar barriers to those found in this study and thus show similar (in)dependence characteristics and incentives. Use of the identified mechanisms must also not be hampered by practical or regulatory constraints and getting the potential collaborators to be in contact with each other may need external support.

Second, for transferability to be possible, the practical settings need to allow the use of compensation instruments. There can, however, be constraints or conditions:

1. The described instruments can only be used in areas where constructions require compensation measures (so mainly in growth regions) [I49];
2. A temporal misfit may prevent the use of compensation instruments especially if compensation measures are not a daily occurrence; compensation requirements come up on an ad hoc basis whereas the regular funding approvals need to be done one year in advance of a measure [I50];
3. Spontaneity and/or chance may determine whether WFD addressees get to know early enough that there is a compensation measure that could be planned, especially if non-municipal actors put the compensation requirements on the agenda [I50].

Third, compensation decrees vary from state to state [I33]; these regulations may constrain the use of compensation instruments to different degrees. For Thuringia [I46] and Hesse [I23], interviewees mentioned that the use of compensation instruments was difficult before regulations were adjusted to support WFD implementation, the reason being that calculation formulas based on the size of the area were disadvantageous [I23, I54]; an example is that connectivity measures are expensive but get a low number of eco-points because these measures require less land than the intervening construction project claims. Additionally, WFD measures were not accepted as compensation because WFD implementation is a mandatory task [I46]. Thuringia completely revised its assessment directive; it developed a guidance document to assess compensation measures for flowing water bodies and, since 2014, municipalities can more easily cover their co-payments through compensators [I46]. The state of Hesse acknowledged that river renaturation is desirable in itself [I23] and thus proclaimed that renaturation measures should not be classified as interventions, not like it also often happened in Thuringia before the assessment revision [I46]).

We grouped the following regulatory constraints according to the mechanisms for financing measures that were described above. It should be noted that these issues are highly interrelated as, for example, compensation measures directed to water bodies may also be assessed for qualifying as equivalent compensating interventions:

#### 1) Directing compensation measures:

- Qualification as compensation measure: Despite Hesse's 'desirable in itself' decision, according to the state's compensation decree a renaturation project is still not worthwhile when assessed through an eco-points calculation. However, this calculation is not mandatory and if the assessment does not need to hold up in court, the decision maker can argue verbally [I33];
- Transfer of compensation duties: In Thuringia, an actor may generate many eco-points from the measures adopted, but the actor is not allowed to sell them to other actors (such as the wind industry) who would prefer to make such a payment rather than conducting and maintaining a compensation measure themselves [I51]. In 2011, Saxony-Anhalt addressed this issue through a decree on transferring compensation duties, which followed a decree on the acknowledgement

of compensation measures realised prior to intervention (eco-points account) in 2005. Interestingly, the Land Society Saxony-Anhalt is now organising so-called 'eco-pool projects' in which measures are directed to water bodies and compensation duties are transferred to the Land Society [O2].

### 2) Co-payments:

- Unreachable compensation money: A municipality may contract with an actor who is producing compensation requirements but, as soon as the compensation is monetised, the money needs to be transferred to a nature conservation fund which will then decide on its use. The money therefore becomes unreachable for the WFD implementers [I47];
- Decrees on the county level may regulate the use of compensation money for specific purposes [I43] (not necessarily in favour of WFD measures).

### 3) Eco-points:

- A weak guidance document for calculating eco-points is a constraint [I54];
- The use of eco-point accounts may not be allowed if the project requiring compensation is itself a public asset [I47];
- Responsibilities are unclear in some cases regarding who should record the eco-points account [I50];
- There are time limits regarding how long eco-points can be saved in an eco-points account [I50].

The compensation regulations show shortcomings and are criticised for not offering sufficient incentives for compensation measures at water bodies. The existence of compensation regulations is nevertheless looked upon favourably compared to the situation for federal states that are without such regulations, such as Lower Saxony and Brandenburg [O2].

## DISCUSSION AND CONCLUSION

This paper contributes to the understanding of what water governance actually *is* – in terms of everyday practices – rather than what it should be (Zwarteveld et al., 2017). In this section, we first summarise and discuss the implications the found practices have for WFD implementation in Germany and then offer what can be learned for policy implementation in general.

Germany is unlikely to achieve the WFD goals by 2027 because a cascade of governance-related barriers hampers the initiation of measures, including the institutional interplay with nature conservation law. Nevertheless, we found cases – which we call 'bright spots' – where WFD implementation has progressed because the local WFD addressees have found individual solutions for coping with the governance-related barriers and have therefore been able to realise WFD measures. One solution pathway that we found to be relevant across the selected federal states and across different actor types is the collaboration with nature conservation authorities.

Overall, we found the relationship with nature conservation to be ambivalent, being both conflictive as well as cooperative. Nilsson et al. (2012) distinguish three levels on which policy incoherencies may arise, specifically the levels of policy objectives, policy instruments and implementation practices. Although these are analysed in different studies and from various disciplinary perspectives, the studies on the relationship between WFD and nature conservation reflect this distinction in what we identified as the ecological, legal and practical dimensions. While focusing on implementation practices, we found incoherencies at all three levels; furthermore, we found institutional interplay which showed positive effects, constituting the basis for collaboration. Restricting our examination to 'policy incoherence' would have led us to miss these positive effects. Mirumachi and Allan (2007: 1) stated it was misleading to

assume that, "transboundary water relations exist on a single axis from undesirable conflict to desirable cooperation"; similarly, our cases cannot, and should not, be described as being either conflictive or cooperative. Less cooperative cases, however, tended to perceive constraints on WFD implementation that were set by nature conservation regulations as being more conflictive.

We found that collaboration provided eight different mechanisms which supported WFD addressees in coping with implementation barriers, especially regarding the financing of measures, the pitfalls of funding programmes for WFD implementation, the provision of land, and the generation of political will. Despite the plurality of suggested cooperation strategies, collaboration in our cases was moulded by instruments related to the intervention regulation. On the one hand, we can trace this back to its practical implications for incentive generation. On the other hand, it may be owing to our study design which looks from the perspective of WFD addressees. The actors on which we focused, for example, are simply not responsible for the planning instruments and monitoring standards which are suggested for cooperation. This holds potential for research on the actual use of further cooperation and integration strategies and the interaction between cooperation attempts at different levels.

The coping mechanisms depend on specific regulatory settings, including the compensation regulation of nature conservation law and its local interpretation. Despite the practical constraints, these mechanisms may be used to address similar implementation barriers at other places in Germany if the regulatory settings for WFD and nature conservation actors offer similar options. Identifying these mechanisms, we show options and do not sell best practices in the sense of Molle (2008), who argues that, "sanctioned concepts allow the diffusion of general principles and the identification of common problems and solutions at a generic level; (...) they sometimes encourage dialogues between segments of the administration or ministries that share responsibilities on water issues but fail to coordinate their actions" (*ibid*: 148), but that the best practices approach "tends to 'freeze' the range of arrangements and site-specific mixes of municipalities, state and private management" which "must be defined endogenously" (*ibid*: 149). Constructed solutions would "mask the associated 'politics', but politics are integral to such interventions and their uneven outcomes" (Wilson et al., 2019: 8).

We have not studied the regulatory settings explicitly; they do appear, however, to be very specific to Germany. Therefore, we expect no direct transfer from Germany to other regulatory contexts of our insights on how coping mechanisms can arise out of collaboration between WFD actors and nature conservation. Comparisons across member states are nevertheless still promising at higher levels, such as the integration at the objectives level, and across levels for learning with regard to alternative integration options and in terms of another common ground for collaboration – besides the intervention regulation – between WFD and nature conservation actors.

Furthermore, due to our study design we have not explicitly studied the perspective of nature conservation actors; they also need to be willing to engage in political negotiations on prioritising contradictory goals locally, in cases where WFD addressees are interested in collaboration. Indirect assessment through the statements of interviewees indicates that nature conservation authorities have had their own incentives for collaboration, particularly in cases where their landscape plans are implemented through WFD measure realisation [I36] or in situations where they were dissatisfied with common compensation measures<sup>8</sup> and where WFD measures offered alternatives [I33, I54, O2]. In other situations, nature conservation authorities may have no incentive, such as when they have other, or their own, plans on how to spend the available money [I68]. Prior studies on WFD and nature conservation show that these actors are often still alien to each other (Drücke, 2014) and that they need to get closer for integration and coordination (Galler, 2015). Moreover, from an overall environmental perspective,

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<sup>8</sup> The – often used – creation of traditional, mixed orchard meadows has been described as unproductive as they were not maintained adequately, used up a lot of land [I33], and were probably not typical at the chosen location [I54]. A study from the 1990s found that many small compensation measures were not identifiable later because of a lack of responsible persons maintaining them [O2].

we may ask whether we want the sectors working in parallel, assuming that there is thus more space dedicated to an ecological environment, or whether we want collaborative settings, assuming that then existing uses will be less restricted.

What does this mean for the environment at large? Realistically, it can be questioned whether parallel implementation by the two sectors would lead to an added value for the environment because both sectors face implementation barriers. The local WFD addressees in our cases were mainly inspired by the spirit of the WFD. Mismatches between motivated actors and the priorities of funding programmes, however, suggest that the pursuit of steering instruments without collaboration may even reduce the adoption of WFD measures. Ignar and Grygoruk (2015) did not anticipate a bright future for WFD implementation without an appropriate funding background. The observed collaboration promises to at least partially brighten up the future of WFD implementation because it enables to cope with financial implementation barriers as long as the German states do not introduce improved funding options.

Even the collaboration found here is not able to address all barriers, making additional coping strategies necessary; particularly, the lack of human resources and motivation in German WFD implementation cannot be solved by this collaboration. We could observe in our cases what Mitchell (2018) put in a nutshell, namely that, "highly committed and enthusiastic resource and environmental managers are often capable of implementing even poorly crafted or designed policies (...). In contrast, unmotivated or incompetent people may be unable to implement the most sophisticated and carefully designed policy" (*ibid*: 274). The capacities of WFD addressees vary widely across and within actor types, from specialised personnel to situations where there is no personnel at all dedicated to WFD tasks (Schröder, 2019). Collaboration probably aligns with the willingness and capacity to implement WFD measures. Nature conservation authorities might drive the collaboration by taking over tasks, but they also lack human resources [I69]. This explains in addition to their incentive structures and the emotional dimension (Kraier, 2014), why we rarely found them playing a more active role in WFD implementation.

Beyond the implications for WFD implementation in Germany, our findings are also relevant for policy implementation in general. As our findings suggest, collaboration is a positive phenomenon or attribute that can improve the effectiveness of policy implementation (Fischer and Sciarini, 2016). The multiplicity of studies on positive effects of collaboration (Ansell and Gash, 2007) boost the call for integrated water resources management (IWRM) as *THE* solution to implementation gaps (Schröder, 2019). IWRM is an approach which has also found its way into the WFD (Junier and Mostert, 2012; Richter et al., 2013; Theesfeld and Schleyer, 2013). However, as Molle tellingly described it, "nirvana concepts, such as IWRM, are 'photographic negatives' of prevailing chaotic situations and embodiments of a consensual reconciliation of antagonistic worldviews and interests" (Molle, 2008: 150).

Although the WFD prescribes sector integration, cooperation has not evolved into a general phenomenon. Due to limited capacities and highly complex systems, actors from the water sector (or any other sector) cannot be expected to be familiar with the interests and institutions of (all) other sectors, or to stay current on all their changes such that they are able to coordinate or to strategically use them (Fischer and Sciarini, 2016); this left it to chance between which actors cooperation evolves. We contribute to the knowledge on drivers of collaboration across sectors (*ibid*) and at the policy implementation level by analysing two factors, independence and physical proximity, that reduce spontaneity in the emergence of cooperation. Low independence was found to foster collaboration by setting incentives. Physical proximity supported the collaborators in getting to know the potential synergistic effects of each other's goals and interests but did not necessarily lead to collaboration when there were no incentives.

Steering authorities may expect synergies or may see the need for solving conflicts at lower levels; they may want to instigate cooperation between particular sets of actors and for that influence both factors. This sounds simple, but in practice it is not. Both factors may only support the establishment of collaboration if actors are characterised by low independence and are thus not able to achieve their goals

unilaterally. Independence may differ from goal to goal and low independence does not necessarily mean a dependence on a specific other actor. Further research is also deserved on the overall explanatory power of both factors in relation to possible other drivers for collaboration such as beliefs, norms, traditions (Watson et al., 2019), and opportunity structures (Fischer and Sciarini, 2016). Research that includes more cases and that examines both progressing and non-progressing implementation cases will be particularly useful.

Physical proximity may be created by the three types of opportunity structures (relational, social, institutional); these were analysed by Fischer and Sciarini (2016) as being drivers of collaboration. Physical proximity in our cases mainly stems from organisational structures or from the personal background such as a former employment. The personal background cannot be steered at all, however, it is also not necessarily beneficial to change organisational structures, as every organisational distribution of tasks has its advantages and disadvantages (Schröder, 2014). Proximity might therefore be strategically generated by forums or seminars – referred to by Fischer and Sciarini (2016) as "institutional opportunity structures" – which promise incentives for participation to both groups of actors. Meetings may foster the establishment of networks. Potential distrust needs to be reduced. Fischer and Sciarini (*ibid*) found that social and institutional opportunity structures did not always lead to collaboration, similarly, the participatory processes we observed, which were established to fulfil WFD prescriptions, rarely seemed to instigate collaboration. This was probably because participants were gathered e.g. for being provided with information on implementation progress or for discussing their positions on suggested measures. Participants as well as organisers were more prone to defending their positions than seeking common interests, even though the latter is deemed necessary by Mitchell (2018: 286):

By working to find the common interest of all stakeholders, you will establish a strong foundation for an effective plan. One way to do this is to get past opposing positions by asking why stakeholders have taken a particular position. (...) It usually takes seven layers of 'whys' to uncover the interest that is common to other stakeholders.

Steering authorities may set incentives which tackle implementation barriers; in cases of collaboration, funding programmes, for example, might offer additional advantages for both collaborating parties. Incentives need to be real, but identifying what is really incentivising<sup>9</sup> is not a trivial task, especially because this is a matter of perception. What is perceived as a barrier varies among actors; one person may perceive the influence of other actors as a barrier, while another person may regard the bureaucratic effort as crucial. What is perceived as a viable alternative also varies, for example, in answering the question of whether the bureaucratic effort required by WFD funding programmes is lower or higher than the effort to implement measures as compensation measures. The response depends on what actors are used to, on individual preferences, and on their knowledge of alternatives.

While collaborating during practical implementation, actors need to find consensus and synergies on both objectives and policy mechanisms. As no order of priority is defined by the policy maker, decisions on prioritisations at the local level inevitably become political in nature (Molle, 2009) and some goals need to take a back seat if no win-win solution can otherwise be found. Water goals are not necessarily prioritised and the lack of initiated WFD measures in Germany indicates that actually barriers still outweigh the priority given to WFD goals.

Considered at the level of individual policies, moving political decisions to the local level will inevitably lead to implementation gaps. A policy is in the understanding of administrative rationalism (Dryzek, 2013), a clearly defined public interest which needs to be fulfilled locally. With that in mind, it is questionable whether it is in the overall public interest if local actors avoid funding approval procedures

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<sup>9</sup> WFD funding programmes are thought to be incentives for WFD addressees to realise WFD measures, but the required co-payments are not incentivising.

which are intended to steer the quality of measures or the measure realisation at priority water bodies or by envisaged actors.

In contrast, in line with democratic pragmatism (*ibid*), street-level bureaucrats need to negotiate local policy compliance, because "policies made centrally are rarely sensitive to the local circumstances in which street-level bureaucrats operate" (*ibid*: 96). Policy, by this understanding, is facilitated but not controlled by higher levels (*ibid*). This leaves discretion to negotiate, here with nature conservation authorities, the objectives to be prioritised. On the one hand, this contradicts the considerable EU requirements for WFD reporting. On the other, in general the German WFD addressees cannot be regarded as street-level bureaucrats or simply WFD advocates who negotiate compliance; they must, rather, be regarded as actors with whom compliance needs to be negotiated. This leads us to the two fundamental questions of where contradicting policy goals should be addressed and resolved politically, and how environmental and local priorities should be set and recognised outside the local and environmental realms. It also leaves a further question of how we should decide who should make decisions regarding compliance with policies.

Fundamentally, political decisions at the local level may be simultaneously boon and bane. Negotiating compliance locally allows for adjustments to measures to reflect local necessities but it also makes decision-making susceptible to local power imbalances. We found that strategic collaboration may offer individual solutions to varied local implementation barriers but also that this collaboration cannot be programmed. We nevertheless found factors conducive to the emergence of collaboration, factors which may to some extent help instigate collaboration between specific actors.

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**APPENDIX A**

Table A1. Interviewed WFD addressees and the cooperation necessary for their WFD implementation to progress.

Actor type	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
District governments			RP Darmstadt	BR Arnsberg NC		
State agencies	LTV	LHW			Thüringer Landesellschaft NC	NLWKN
Counties				Soest NC		
Free cities	Dresden NC		Wiesbaden	Hamm NC	Erfurt, Gera NC	Braunschweig NC/ F
Municipalities	—		City Taunusstein NC	—	City Blankenhain F	—
Maintenance associations	UHV Ehle-Ihle NC				Aller-Ohe-Verband	UHV Oker NC
						SE BS NC/ F
Water and soil associations			County Coesfeld with WuB NC			—
Special-law water associations			Lippeverband			
Special purpose associations		Abwasser-verband Main-Taunus		GUV Harzvorland F/ NC	Wasserverband Mittlere Oker NC/ F	
Nature conservation associations				Natura 2000-Station NC		
Landscape planning associations	LPV Osterz-gebirge NC			LPV Thüringer Grabfeld NC		

Note: Dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities; blue = necessity for cooperation between WFD and flood protection; grey = not a case due to insufficient data (for example, interviewee is not a WFD planner in the respective organisation), but data supports the analysis of barriers and rules-in-use; no colour code = cooperation does not go beyond solving institutional interplay; F = early cooperation with flood protection; NC = early cooperation with nature conservation; — = actor type is WFD addressee but no organisation was interviewed.

Table A2. Cases' cooperation intensity in relation to independence and physical proximity.

Cooperation intensity	Degree of independence	Physical proximity	Number of cases	WFD addressee	Interviews
L	H	L	2	Free city Wiesbaden, Abwasserverband Main-Taunus	[I27], [I32]
M	M	L	6	UHV Ehle-Ihle, BR Arnsberg, City Blankenhain, GUV Harzvorland, Aller-Ohre-Verband, (Abwasserverband Main-Taunus)	[I3], [I42], [I44], [I49], [I56], [I68], [I32]
		M	2	Thüringer Landgesellschaft, LPV Thüringer Grabfeld	[I51], [I50]
		H	2	County Soest, Free city Erfurt	[I36], [I48]
		H	1	SE BS	[I70]
H	L	H	6	Free city Dresden, City Taunusstein, Free city Hamm, Water and soil associations with County Coesfeld, Free city Braunschweig, (Free city Erfurt)	[I16], [I17], [I33], [I39], [I43], [I63], [I66], [I48]
		M	2	Wasserverband Mittlere Oker, UHV Oker, (LPV Thüringer Grabfeld)	[I70], [I67], [I50]
		M	1	(Thüringer Landgesellschaft)	[I51]
		L	1	(GUV Harzvorland)	[I56]

Note: Cooperation intensity/Degree of independence: H = high independence/cooperation; M = some independence/cooperation (such as preliminary reconciliation prior to approval procedures); L = low independence/cooperation. Physical proximity: H = high (actors are related to each other through organisational structures); M = medium (actors are related through a network to nature conservation); L = low (actors have no, or only formal, relations to nature conservation authorities). ( ) = a case with sporadic planning behaviour indicating the five cases which were sorted into two lines each with regard to their independence and cooperation intensity.

## APPENDIX B

### *Actor acronyms and translations*

Acronym/name	Full name	Translation/description
Abwasserverband Main-Taunus		Wastewater association at Main-Taunus
Aller-Ohre-Verband (Gewässerallianz)		Water maintenance association having smaller associations as members with a transfer of tasks for the Aller and Ohre Rivers; part of the Lower Saxon water alliances project
BR Arnsberg	Bezirksregierung	District Government of Arnsberg
GUV Harzvorland	Gewässerunterhaltungsverband	Water maintenance association at Harzvorland
LHW	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft	State agency for flood protection and water management
Lippeverband		Special purpose association for the Lippe River

LPV Thüringer Grabfeld/ Sächsische Schweiz- Osterzgebirge	Landschaftspflegeverband	Landscape conservation association at Thüringer Grabfeld/ Sächsische Schweiz- Osterzgebirge
LTV	Landestalsperrenverwaltung	State dam administration
Natura 2000-Station	Natura 2000-Station Auen, Moore, Feuchtgebiete	Task to protect and develop water- related habitats by initiating projects
NLWKN	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz	Lower Saxon state agency for water management, coast and nature conservation
RP Darmstadt	Regierungspräsidium	Government District of Darmstadt
SE BS	Stadtentwässerung Braunschweig	Company for wastewater treatment of the free city Braunschweig
Thüringer Landgesellschaft	Unterhaltungsverband	Thuringia Land Society
UHV Ehle-Ihle/ Oker		Water maintenance association for the Ehle and Ihle/Oker Rivers
Wasserverband Mittlere Oker		Special purpose association for constructions for the middle part of the Oker River
WuB	Wasser- und Bodenverband	Water and soil association

The following tables show the actors interviewed and the processes observed for the case study analysis for each German federal state. They are numbered for referencing in the text. The time frame for interviews is indicated.

*Interviews:*

Saxony-Anhalt: January 2017, March-June/August 2018

No.	Actor
I1	Landesverwaltungsamt: water
I2	Free city Magdeburg: lower water authority
I3	Unterhaltungsverband Ehle-Ihle a
I4	Unterhaltungsverband Ehle-Ihle b
I5	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology a
I6	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology b
I7	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology c
I8	Wasserstraßen- und Schifffahrtsamt Magdeburg, Burg
I9	BUND Saxony-Anhalt (Friends of the Earth Germany)
I10	Ministry for Environment, Agriculture and Energy of the state of Saxony-Anhalt: wastewater treatment, facilities for handling water-polluting substances, water provision, water protection, Water Framework Directive
I11	NABU Saxony-Anhalt (Nature and Biodiversity Conservation Union) + County Börde: lower nature conservation authority

Saxony: January/April/May 2017, December 2018, January 2019

No.	Organisation
I12	Free city Dresden: environment
I13	Landesdirektion Sachsen, Dresden a
I14	Landesdirektion Sachsen, Dresden b
I15	Wasser- und Schifffahrtsverwaltung des Bundes, WSA Dresden
I16	Free city Dresden: lower water authority
I17	Municipality Dresden: water and soil maintenance
I18	Landestalsperrenverwaltung: EU directives, nature conservation

I19	Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie (technical authority): surface waters, Water Framework Directive
I20	Landschaftspflegerverband Sächsische Schweiz-Osterzgebirge e.V.: landscape development, flood protection, WFD public relations project
I21	County Meißen: lower water authority

Hesse: September, November 2018

No.	Organisation
I22	Hessisches Landesamt für Naturschutz, Umwelt und Geologie (HLNUG): water ecology
I23	Regierungspräsidium Darmstadt, Wiesbaden: surface waters
I24	Hesse Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection: surface water protection/ water ecology
I25	Hesse Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection: questions of principle, state-crossing and international cooperation, coordination of Water Framework Directive, public relations a
I26	Hesse Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection: questions of principle, state-crossing and international cooperation, coordination of Water Framework Directive, public relations b
I27	Free city Wiesbaden: protection and management of waters, water maintenance/lower water authority for non-WFD issues
I28	Rheingau-Taunus-County: lower water authority
I29	Main-Taunus-County: lower water authority
I30	Gemeinnützige Fortbildungsgesellschaft für Wasserwirtschaft und Landschaftsentwicklung GmbH (organises water neighborhoods for the exchange of experiences)
I31	NABU Hesse (Nature and Biodiversity Conservation Union)
I32	Abwasserverband Main-Taunus: water maintenance
I33	City Taunusstein: city development, technical environmental protection, nature conservation, water protection

North Rhine-Westphalia (NRW): October–December 2018, February 2019

No.	Organisation
I34	Water Network NRW (by nature conservation associations)
I35	Bezirksregierung Arnsberg: water management including facility-related environmental protection, water advisor
I36	County Soest: water maintenance
I37	Kommunalagentur NRW (municipality agency): water advisor
I38	Lippeverband: river area development, central department EU directives, nature conservation
I39	Free city Hamm: lower water authority
I40	Arbeitsgemeinschaft der Wasserwirtschaftsverbände in Nordrhein-Westfalen (AGW): umbrella organisation of special water law associations
I41	Ministry of the Environment, Agriculture, Nature and Consumer Protection of the state of North Rhine-Westphalia: river area management, water ecology, flood protection
I42	Bezirksregierung Arnsberg: funding approvals, conceptual work
I43	County Coesfeld: lower water authority
I44	Bezirksregierung Arnsberg: building authority, water maintenance

Thuringia: January – March 2019

No.	Organisation
I45	Free city Erfurt: lower water authority, surface waters
I46	Thüringer Landesamt für Umwelt, Bergbau und Naturschutz: river area management

I47	Thüringer Aufbaubank: agricultural advancement, infrastructure, environment, regional water advisor
I48	Municipality Erfurt: garden and graveyard authority, water maintenance
I49	City Blankenhain: building authority
I50	Landschaftspflegerverband "Thüringer Grabfeld" e.V.: landscape development, water maintenance
I51	Thüringer Landesgesellschaft: water construction
I52	Natura2000-Station
I53	Free city Gera: lower water authority, water maintenance
I54	Flussbüro Erfurt (engineering office): representative of nature conservation associations in the Thuringian Water Advisory Council
I55	Thuringian Ministry of the Environment, Energy and Nature conservation: water protection, flood protection
I56	GUV "Harzvorland": water maintenance
I57	Thüringer Gemeinde und Städtebund: rural area, nature protection, agriculture, forestry and water law

Lower Saxony: January, June, July 2017, September 2019

No.	Organisation
I58	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Verden: river basin management
I59	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Braunschweig: river basin management and biological monitoring
I60	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Lüneburg
I61	River Basin Commission Weser
I62	Lower Saxon Ministry for Environment, Energy, Construction and Climate Protection: surface and coastal waters, marine protection
I63	Free city Braunschweig: lower water authority
I64	Kommunale Umwelt-Aktion UAN (Municipal Environmental Campaign)
I65	BUND Lower Saxony (Friends of the Earth Germany)
I66	Free city Braunschweig: lower nature conservation authority
I67	Unterhaltungsverband Oker
I68	Aller-Ohe-Verband: water alliance coordinator
I69	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Hannover: nature conservation
I70	Wasserverband Mittlere Oker + Stadtentwässerung Braunschweig: water maintenance

*Participatory observation:*

No.	Time	Process
<b>Saxony-Anhalt</b>		
O1	June 2018	Second project accompanying working group for the water development concept of the Aller River
O2	October 2018	Water Advisory Council
O3	November 2019	Water Forum North (Elbe-Havel-Weser)
<b>Saxony</b>		
O4	April 2017	Regional working group for the Elbe River
O5	May 2019	Water forum
<b>Hesse</b>		
O6	September 2018	Water Advisory Council
O7	November 2018	Water forum
<b>NRW</b>		
O8	September 2018	WFD symposium

O9	December 2018	Informing WFD addressees which have maintenance and construction duties of measure overviews to be compiled
Thuringia		
O10	February 2019	Discussion forum for WFD addressees to establish water maintenance associations at the entire area of Thuringia by 2020
O11	March 2019	Water workshop to determine measures for the water body Middle of Unstrut
Lower Saxony		
O12	June 2017	Area Cooperation for the Oker River

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