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Disproportionate costs in the EU Water Framework Directive—How to justify less stringent environmental objectives

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ABSTRACT

The ambitious objective pursued by the European Water Framework Directive (WFD) is good status for all European waters. However, "less stringent environmental objectives" are permissible if the costs of achieving good status are disproportionately high. This exemption, if abused, carries the risk of watering down the ambitions of the Directive. Currently, no transparent, well-established, universally applicable method for routinely testing disproportionality exists throughout Europe. In this paper, such a method is developed for surface water bodies. The core idea is to determine a water body-specific disproportionality threshold which is then compared to the projected costs of achieving "good status/potential". For the sake of practicability, the benchmark for disproportionality is estimated on the basis of prior expenditure on water quality enhancement. The paper argues that the proposed method combines both possible interpretations of (dis-) proportionality—affordability and cost-benefit considerations. Due to the method's moderate data requirements it can be used readily in most German federal states and is transferable in principle to other EU Member States. The method was tested empirically for a river in the German federal state of Rhineland–Palatinate.

1. Introduction

The ambitious aim of the European Water Framework Directive (WFD) is to ensure that all of Europe's water bodies achieve "good status" by 2015 or, at the latest, by 2027 (Art. 4(1)). As things stand, however, only 18% of German surface waters and less than 50% of European surface waters will achieve that objective by 2015 (BMU, 2012; EEA, 2012). For all water bodies that are expected to not achieve the objective by 2027, the Member States have to define and justify "less stringent environmental objectives" by 2021, in accordance with Article 4(5). The approved justifications according to Article 4 (5) for making the environmental objectives less stringent are (i) technical infeasibility and (ii) disproportionately high costs.[1]

Of these two justifications, the term "disproportionality" in particular requires interpretation. Taken literally, "disproportionate" means that the costs of achieving good status/potential are out of proportion—that is to say, they are too high in comparison to a certain benchmark. There are basically two possible standards of comparison at issue here: the costs may be too high either (i) in relation to the positive effects, i.e. the benefits of the planned measures for improving water status (cost-benefit analysis, CBA), or (ii) in relation to the financial capacity of the public or private subjects that have to bear the costs (affordability) (Klauer et al., 2007).

1.1. Cost-benefit analysis

An obvious operationalization of the first interpretation would be an economic cost-benefit analysis (Martin-Ortega, 2012). Within such analyses, the positive and negative effects of a project or measure(s) are valued in monetary units and are thus rendered comparable. Several attempts have indeed been made to work towards a practical procedure to check for disproportionality on this basis (e.g. Postle et al., 2004; Molinos-Senante et al., 2011; Vinten et al., 2012; Jensen et al., 2013; Hecht et al., 2014). However, a number of major problems are associated with the monetary valuation of the environmental and societal benefits of management measures. Direct methods for measuring the monetary values of benefits that accrue to humanity from ecosystems

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[1] Article 4(5) might also be applied to so-called artificial or heavily modified water bodies (A/HMWB), i.e. water bodies where "hydromorphological characteristics" have been altered on purpose for e.g. "navigation, [. . .]; activities for the purposes of which water is stored such as drinking-water supply, power generation or irrigation; water regulation, flood protection, land drainage or other equally important sustainable human development purposes". Regarding A/HMWB, Article 4(1) defines the environmental objective only as "a good ecological potential and a good surface water chemical status" rather than the "good surface water status" applied to natural surface water bodies (NWB). As the method developed in this paper is applicable to both, in the remainder of the paper we refer, for reasons of simplicity, to "good status/potential".

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(known as ecosystem services) are, like the contingent valuation method or choice experiments, time consuming and costly and have certain methodological shortcomings (e.g. Wegner and Pascual, 2011; Lo and Spash, 2013; Spash and Aslaksen, 2015). Hecht et al. (2014) conducted a cost-benefit analysis for the Lower Wupper River using contingent valuation for the monetization of environmental effects. They concluded that the high costs of the study constitute practical impediments to routinely applying an economic cost-benefit analysis to a large number of water bodies, especially since it would not necessarily bring about clear recommendations.

In order to lower the costs of CBA studies, benefit transfer has been proposed as a method for monetizing water-related ecosystem services (Brouwer and Spaninks, 1999; Bateman et al., 2011). In this approach economic benefits are estimated by transferring results from existing studies to other locations or issues. This method has also been criticized, however, for having serious methodological problems (Spash and Vatn, 2006). As a result, we consider CBA to be an appropriate method for selected cases only. These are cases in which the situation justifies the considerable effort of an in-depth investigation due to specific circumstances (large cities, exceptionally high economic interests at stake, important employment issues etc.) and at the same time the affected environmental goods and services are reasonably accessible to the respective economic valuation and monetization techniques.

Nevertheless, several EU Member States (e.g. the UK and Denmark) consider CBA to be the backbone of disproportionality assessments in the context of practical water management and make wide use of benefit transfers. Upon closer inspection, however, the arguments put forward for doing so turn out to be quite superficial and eclectic (Klauer et al., 2015). In Germany in particular there are deep-seated reservations among administrators regarding any routine application of economic cost-benefit analyses (and particularly benefit transfers) to assess disproportionality. Attempts have therefore been made to develop alternative methods and, in particular, to consider non-monetary cost-benefit assessments (Ammermüller et al., 2011). This paper constitutes one such attempt.

1.2. Affordability

The second interpretation of disproportionality refers to the concept of affordability. This interpretation is mentioned in European as well as the German guidance documents (EC, 2003, 2009; LAWA, 2009, 2012). CIS Guidance Document No. 1 (WATECO document, EC, 2003) refers to certain sectors' ability to pay (households, agriculture, industry) as a possible benchmark for justifying exemptions according to Article 4(4) (extension of deadlines) as well as Article 4(5), but requires clear and transparent criteria. A point of controversy between several Member States and the European Commission remains whether or not the financial burden on Member States themselves and their limited national budgets can be a valid argument for disproportionality in the context of Article 4(5) (EC, 2009, p. 14). In informal debate, the representatives of the Commission argue that, as signatories of the WFD, the Member States are obligated to ensure that the necessary financial resources are provided. At the same time, several Member States argue for a broad interpretation of affordability, including state budgetary constraints. However, neither the EU nor the German guidance documents offer a concrete recommendation for operationalizing affordability. Several Member States, including France, Bulgaria and Lithuania, plan to use the issue of affordability to substantiate their arguments regarding disproportionality (Klauer et al., 2015). There is a danger, however, that the (disproportionality) argument of overstrained public budgets may be misused to mask insufficient political will to achieve the ambitious environmental objectives of the WFD (Klauer et al., 2007).

1.3. Aim of the paper

The debate about how to make progress on justifying less stringent environmental objectives by claiming disproportionate costs has not yet reached any conclusions. A review of existing studies, documentation and publications on methods for assessing disproportionality in the context of Article 4(5) reveals that currently no well-established, applicable method exists for routinely testing disproportionality (Klauer et al., 2015; Sigel et al., 2015). On the basis of a review of applications of the WFD's disproportionality principle in Europe, Martin-Ortega et al. (2014) propose a general procedure for the assessment of disproportionality. While a cost-benefit argument is in its centre, it also calls for consideration of distributional effects. It is not, however, a fully elaborated methodology for assessing disproportionality.

In this paper, which builds on the so-called "Leipzig approach" by Ammermüller et al. (2011), we propose a method for assessing disproportionality. The core idea of the original Leipzig approach was to rank the water bodies of a federal state according to the estimated costs involved in achieving good status/potential in the future (measured by € per km^2 of catchment area); this is done in order to obtain a reference figure for defining a cost threshold for disproportionality. The routine application of the Leipzig approach ran into difficulties, however, because the necessary cost data were not available in none of the German federal states. In contrast to the original Leipzig approach, the new approach proposed in this paper takes average past public expenditure on water protection in Germany (measured by the annual costs in € per km^2 of river basin) as a starting point for determining a cost threshold. In order to calculate a water body-specific threshold, the expected positive effects of achieving good status/potential and additional benefits are taken into consideration. This proposed "new Leipzig approach" is applicable to surface water bodies and, within this, to both natural and artificial/heavily modified water bodies.

Practical applicability was a key requirement in developing the "new Leipzig approach". Hence, the method was first designed and tested in relation to a concrete case study. The general characteristics of the river involved are described briefly in Section 2. Section 3 describes the new method for assessing the disproportionality of costs. Each of the steps is developed, explained and illustrated in relation to the case study. The main features of the proposed method as well as its limitations are discussed in Section 4, while Section 5 concludes with a consideration of the prospects for routinely applying the method in Germany and elsewhere as well as of the possibilities for extending it to groundwater bodies.

2. General description of the case study

The river in the case study is located in a hilly area in the German federal state of Rhineland–Palatinate.[2] The river basin covers an area of 375 km^2. The basin consists of seven surface water bodies, one of them natural (NWB) and the other six heavily modified (A/HMWB) due to urbanization. It was chosen as an ordinary case that is representative of a large number of watercourses in Germany.

[2] The cost figures as well as the expert judgments in the case study are provisional, non-official data provided by the Environment Ministry of Rhineland–Palatinate for the sole purpose of testing the method and on condition that the river should not be named.