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Setting the threshold: An analysis of different approaches for the definition of exemptions to water quality objectives in the European Union

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Continental water ecosystems and human water uses may be jeopardized by degradation of water quality. To prevent this degradation, the maximum concentration of pollutants for freshwater bodies may need to be set in the legislation. In some cases, the actions needed to achieve those environmental objectives may be technically challenging or financially overburdening. In the case of the European Union (EU), the Water Framework Directive (WFD, Article 4) requires the achievement of the good status of water bodies but allows for the declaration of exemptions due to lack of technical feasibility or disproportionate costs. Twenty years after the WFD approval, the conditions to declare exemptions remain unclear and in practice their declaration is highly discretional.

The extant scientific literature suggests several methods to formulate the justification of exemptions. Although the methodologies are diverse, they all require to select a threshold (e.g. in terms of cost disproportionality) above which a relaxation of the environmental objectives may be accepted. This threshold should be uniform across the EU River Basin Districts in order to guarantee a fair distribution of efforts across Member States. To date, however, there are very few studies that compare the application of exemptions in different regions to assess the uniformity of approaches to the declaration of exceptions.

When defining actions to achieve the good status of water bodies, the quantification of the different pressures, their interactions and the effects on receiving water bodies can be challenging. In the case of physico-chemical pollutants, however, it can be easier to define policy actions as pressures can be quantified (point loads of wastewater treatment plants, diffuse loads emanated by different land uses) and the evolution in receiving waters can be modelled.

In our research, we analyzed over one thousand water bodies in the River Basin Districts of five different Member States of the European Union (Estonia, a transboundary Ireland-United Kingdom basin, Italy, Spain and Portugal), using the available databases on Digital Elevation Models

(Copernicus EU-DEM), land use (CORINE land cover), urban pressures (European Urban Wastewater Treatment Directive dissemination platform and reported data), runoff and gauged flows (Water Information System for Europe, national gauging networks) and WFD exemption databases. Each water body was characterized according to the level of nitrogen and phosphorus pressures deriving from point and diffuse loads, and the declaration of exemptions to the environmental objectives for those nutrients. The exemption threshold is assessed for each River Basin District, allowing for a critical review of the different water policies in this significant aspect of the Water Framework Directive implementation.