

## DATA RICH, INFORMATION POOR? 10 YEARS OF THE EU WATER FRAMEWORK DIRECTIVE IN EUROPE.

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The Water Framework Directive (WFD) provides the legal basis for water management in the European Union (EU). Twelve years after it was passed, all but five out of 27 EU Member States now have phytobenthos assessment methods for rivers, whilst only nine have methods for lakes. Most of these methods are based on diatoms, although a few are supplemented by evaluations of non-diatom algae and some states include macroalgae as part of their macrophytes assessment methods. Norway is the exception, having a phytobenthos assessment system based on non-diatom algae alone. Over half of all states have methods based wholly or partly on weighted average metrics developed before the onset of the WFD, with nine states choosing the Indice de Polluosensibilité Spécifique. These metrics generally have high correlations with the predominant nutrient/organic pollution gradient found across Europe and, as such, represent pragmatic solutions to ecological status assessment. However, their widespread use also raises questions about what, exactly, “ecological status” means. Diatom-based metrics are often strongly correlated with chemical pressure gradients yet this may be a mixed blessing, particularly when we move from describing spatial patterns of ecological status to prescribing solutions for water bodies that fail to achieve good ecological status. Such pressure gradients are often composed of several intercorrelated variables, making it difficult to disentangle “correlation” and “causation” in the absence of ecophysiological studies of individual diatom species. Moreover, the focus on strong relationships with chemical gradients means that most phytobenthos metrics describe the scale of hazard at a site rather than the risk that the hazard poses to other trophic levels, and to ecosystem services. This first generation of phytobenthos assessment tools are, at best, “fit for purpose” but may be inadequate when catchment managers need detailed guidance on remediation steps needed for particular water bodies. A second generation of assessment tools, focused on the fitness of the phytobenthos as part of aquatic ecosystems, rather than just as indicators of chemical conditions, is needed if the goal of good ecological status around Europe is to be achieved.