

Assessing Sediment Chemical Status in Europe: Frameworks, Standards and Approaches, Now and Into the Future

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Introduction: It is nearly two decades after passing the Water Framework Directive, which mandated catchment-wide approaches to managing waterways, and over a decade since the European Sediment Research Network (SedNet) published a series of books addressing the role of sediments in achieving this goal. In 2008, the European Commission published a directive on environmental quality standards in the field of water quality, but declined to specify or require sediment quality guidelines except under special circumstances, although it still required that Member States monitor sediment and biota for priority substances that accumulate in them. Subsequently, a significant body of work has addressed contaminant trends, drivers of toxicity and contaminants of emerging concern in European waters. While European approaches to sediment assessment and monitoring were reviewed by SedNet [1], many national approaches have evolved since that time, or are under review. The time is ripe for a new review and synthesis of approaches, and the path forward.

Methods: Documents on national frameworks, regulations and approaches to freshwater and marine sediment assessment were reviewed, and national experts were contacted, for a range of European countries. Where no guidance or regulations were available, case studies and current practices were evaluated to identify a possible approach.

An additional focus was on evaluating both national approaches to emerging contaminants not currently identified as priority pollutants, and how future attention on these might change sediment assessment frameworks in the near term. As far as was possible, national approaches were summarized in a common context.

Results: Europe remains quite diverse in its approach to sediment standards and assessment. Approaches range from a complete absence of standards and guidelines to highly detailed frameworks; applications can be broad or narrow. The assumptions behind frameworks and policies are critical to their application; not all countries clearly distinguish between screening and action levels.

Discussion: Where specified, lists of potential contaminants to be monitored range from a handful to dozens, and differ for freshwater and marine systems. While it is impossible to monitor the millions of chemicals which can potentially be found in sediments, the main assumptions behind a limited chemical action list are 1) priority lists capture the main indicators of anthropogenic activity, and 2) as they tend to associate with specific sediment components, priority chemicals act as “sentinels” for the presence of a broader list of contaminants, and thus, for potential toxicity. As data for broader lists of chemicals tend to be more limited, these assumptions have been difficult to challenge, but some data are emerging to help frame a path forward.

This paper will review and compare approaches to sediment chemical assessment in a range of European countries (a full review of all European countries is still ongoing). Using a large database of co-located sediment chemical and toxicity data, it will explore differences in potential outcomes for some differing approaches. To the extent possible, it will evaluate future strategies (and challenges) for addressing both priority pollutants and emerging contaminants in sediments.

References: [1] Heise (2007) *Sustainable Management of Sediment Resources. Sediment Risk Management and Communication*. Elsevier, Amsterdam, 278p.