Assessing Sediment Status in Europe: Frameworks, Standards and Approaches, an Expanded Review

Sabine E Apitz[1]

[1]SEA Environmental Decisions Ltd. 1 South Cottages, The Ford, Little Hadham, Herts, SG11 2AT, UK

Phone: +44-(0)-1279-771890
E-mail: drsea@cvrl.org

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 the 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 [2]. 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.

Following on from the 2017 review, the scope of this study has been expanded, seeking inputs from many more European countries (35 to date), and more explicitly examining the role of other, non-chemical assessments, in decision-making.

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, nor between soils and sediments. Still, some sort of standard or guidance was found for many counties; these have been compiled and synthesized, in collaboration with SedNet efforts to evaluate bioassessment approaches.

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 substantially update the 2017 review, considering a much broader range of European countries and regions and compare approaches to sediment chemical assessment in these countries. To the extent possible, the paper will evaluate future strategies (and challenges) for addressing both priority pollutants and emerging contaminants in sediments, and their relationship to other assessments, such as toxicity.

References: [1] S Heise (2007) Sustainable Management of Sediment Resources. Sediment Risk Management and Communication. Elsevier, Amsterdam, 278p.; [2] S E Apitz and S Merchandani (2017) EuroSed: Review of National Approaches to the Screening of Potentially Contaminated Sediments. Prepared by SEA Environmental Decisions, Ltd. and AECOM. October 2017, Little Hadham, UK.