

Passive Sampling in Contaminated Sediment Assessment: Building Consensus to Improve Decision-Making

Thomas F. Parkerton¹, Keith A. Maruya²

¹*ExxonMobil Biomedical Sciences Inc., Houston, TX, USA*

²*Southern California Coastal Water Research Project Authority, Costa Mesa, CA, USA*

ABSTRACT

Contaminated sediments pose an on-going, pervasive, global challenge to environmental managers as sediments can reflect a legacy of pollution that can impair the beneficial uses of water bodies. A formidable challenge in assessing the risks of contaminated sediments has been elucidation and measurement of contaminant bioavailability, expressed as the freely dissolved concentration (C_{free}) in interstitial water which serves as a surrogate measure of the substances' chemical activity. Recent advances in passive sampling methods (PSMs) enable C_{free} of sediment-associated contaminants to be quantified at trace levels thereby overcoming current limitations of predictive models. As a result, PSMs afford the opportunity for a paradigm shift from traditional practice that can effectively reduce uncertainty in risk assessment and bolster confidence in the science used to support management of contaminated sediments. This paper provides a brief overview of the five subsequent papers in this series that: review literature on PSM use in sediments for both organic and metal(loid) contaminants; outline the technical rationale for using PSMs as a preferred basis for risk assessment over conventional chemical analyses; describe practical considerations for and uncertainties associated with laboratory and field deployment of PSMs; discuss management application of PSMs including illustrative case studies where PSMs have been used in decision-making; and, highlight future research and communication needs.

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