A.1 Technology Name

Multiple

A.1.1 Source

Grundy, James S., Matthew K. Lambert, and Robert M. Burgess. (2023) Passive Sampling-Based versus Conventional-Based Metrics for Evaluating Remediation Efficacy at Contaminated Sediment Sites: A Review. Environmental Science & Technology, June 26, 2023. https://doi.org/10.1021/acs.est.3c00232.

A.1.2 Summary

Media:	Sediment porewater, surface water, flux
Study Type:	Review Article
Technology:	LDPE, PDMS, POM, DGT, SPMD, peepers and Other (e.g., Tenax, XAD)
Peer Reviewed:	Yes
Publication Date:	June 2023

A.1.3 Site Description

- Provides a comprehensive overview of the application of passive samplers (PSD) in assessing the effectiveness of remedy at 102 contaminated sediment sites with a range of constituents of concern (COCs), such as PAHs, PCBs, DDx, organochlorine pesticides (OCPs), PCDD/F, PBDEs, and various metals.
- Compares the post-remediation reductions in COC concentrations, as determined by PSD-based metrics (e.g., C_{free}), against those derived from conventional metrics, including bioaccumulation, toxicity, bulk sediments, porewater grab samples and water column grab samples.
- Quantitative metrics used for the comparison include Pearson correlation coefficient, Lin's concordance correlation coefficient (Lin's CCC), arithmetic mean of the ratios between paired observations, and percentage of paired observations falling within a factor of 2 of each other.

A.1.4 Remedial Phase

The study compared pre- and post-remediation concentrations to evaluate the effectiveness of remedies, such as capping, in-situ amendment, dredging, and monitored natural recovery (MNR). Data sources included lab-based feasibility studies, field pilot studies and field full-scale studies. Most studies examined sediment amendments in labs during the feasibility study phase, with only nine using PSD in full-scale field remediation. PSDs were more commonly used for evaluating capping and in-situ amendment remedies, less so for dredging and MNR.

A.1.5 Outcome

PSD-based metrics agreed with conventional metrics in more than 60% of remedy assessments. Recommends adding PSDs to the toolkit for long-term monitoring of remediated sediment sites.

A.1.6 References

Grundy, James S., Matthew K. Lambert, and Robert M. Burgess. (2023) Passive Sampling-Based versus Conventional-Based Metrics for Evaluating Remediation Efficacy at Contaminated Sediment Sites: A Review. Environmental Science & Technology, June 26, 2023. https://doi.org/10.1021/acs.est.3c00232.