Editorial

The previous issue of *Archives of Environmental Contamination and Toxicology* (vol. 35, no. 2, pp 181–217) presented a noteworthy series of four articles describing the results of an assessment of sediment quality in the upper Mississippi River (UMR) from researchers at the Environmental Contaminant and Patuxent Wildlife Research Centers, U.S. Geological Survey (USGS). The UMR extends northward from the confluence with the Ohio River, and consists of 26 navigational pools created by the locks and dam system between Minneapolis, MN and St. Louis, MO. The four articles address three important aspects of sediment assessment: toxicity testing, benthic community surveys, and bioaccumulation studies. Kemble and coworkers report on the results of 28-day sediment toxicity testing using *Hyaella azteca*. Winger and Lasier report the results of similar testing in the lower reaches of the Mississippi River. Canfield and coworkers report on the results of a benthic invertebrate community evaluation and sediment quality triad approach. Brunson and coworkers report on the results of bioaccumulation studies of contaminants from UMR sediments using field-collected and laboratory-exposed oligochaetes. Together, the results of these studies provide convincing evidence to indicate that the majority of sediments in the UMR are not severely contaminated as compared to other waterways in the United States.

The UMR studies may serve as a useful model for future sediment assessments, particularly in view of the considerable ongoing debate regarding the proper framework for investigation, assessment, and remediation of contaminated sediments. The great temporal and spatial variability of sediments and lack of quantitative ecotoxicological data required to apply important assessment parameters hamper our efforts to determine the incidence and severity of sediment contamination and its effects on aquatic resources. At present, much of our understanding of the ecological implications of contaminated sediments is limited. Laboratory testing and field studies typically involve characterization of persistent organic chemicals and metals; however, studies that match sediment chemistry with toxicity testing, biological tissue residue data and biological community surveys are typically lacking in the available literature.

The importance of field studies such as the UMR assessment program cannot be understated. In its first comprehensive analysis of sediment quality (USEPA 1997), the U.S. Environmental Protection Agency (USEPA) estimates that approximately 10%, or 1.2 billion cubic yards, of the sediment underlying U.S. waterways is sufficiently contaminated with

toxic pollutants to pose a potential hazard to fish and to humans and wildlife who eat fish. Of the 300 million cubic yards of sediment dredged *annually* from harbors and shipping channels to maintain commerce, 3 to 12 million cubic yards are sufficiently contaminated to require special handling and disposal.

The USEPA's report to the U.S. Congress offers several recommendations for future assessments of the nation's watersheds, including coordination of private and public efforts through individual watershed management programs; incorporation of a weight-of-evidence approach for interpretation of available scientific information; improved access to sediment quality data; and, funding for state-of-the-science monitoring and assessment tools (USEPA 1997).

Similar recommendations calling for improvements to current sediment assessment techniques emerged from a February, 1998 workshop sponsored by the U.S. Army Corps of Engineers (USACE). The USACE has renewed its focus on defining how sediment testing and ecological risk assessment techniques should fit within the national dredge maintenance program (USACE 1998).

This series of articles in *Archives of Environmental Contamination and Toxicology* highlights the contributions of the USGS scientists to this field. The results of the UMR study can serve as a useful guide to the scientific and regulatory communities who conduct comprehensive sediment assessments of other waterways in the United States and elsewhere. While acknowledging that additional study of the UMR is needed to understand water quality and temporal and spatial variability of contaminants within different navigational pools, the USGS scientists provided valuable information for management of the UMR.

Richard J. Wenning
Editorial Board

References

- US Army Corps of Engineers (USACE) (1997) Workshop on Ecological Risk Assessment of Contaminated Sediments, San Diego, CA (February 17–20)
- US Environmental Protection Agency (USEPA) (1997) The incidence and severity of sediment contamination in surface waters of the United States, volumes 1–3. EPA823-R-97-006. Office of Science and Technology, Washington, DC