

Technical Report published summarizing suspended sediment effects to aquatic organisms

State and federal stakeholders are concerned with suspended sediment plumes resulting during dredging operations impacting water quality, sensitive and commercially important aquatic species, and recreational activities. USACE is required to acquire 401 water quality certifications from state regulatory authorities; those authorities can place unreasonable (not science-based) expectations on dredging plumes, costing USACE time and money. ERDC Environmental Laboratory researchers published a technical report, literature review, and associated database that will assist dredging program managers in communicating if impacts should be expected based on the latest science. This effort was funded by the Dredging Operations Environmental Research (DOER) Program.

A new technical report entitled *Effects of suspended sediment on aquatic organisms: a literature review and database effort* has been released, providing valuable information to support decision making during dredging operations (Figure 3). This report and its accompanying database (Suspended and Deposited Sediment Effects Database (sdSED), <https://doer.el.erdcl.dren.mil/sdSED.html>) summarize data from over 150 studies concerning effects of sediment suspended into the water column on aquatic organisms. The report describes how suspended sediment can affect organisms, in terms of lethal or sublethal responses due to exposure duration, concentration, and exposure frequency on different aquatic species and life stages. These data are summarized with charts visualizing the range of effects data for different groups of aquatic organisms and figures comparing sensitivity between different species.

This report explains how the risk of suspended sediment to aquatic organisms during dredging scenarios depends on several factors, especially exposure duration (i.e., how long sediment in a certain location remains suspended) and sediment concentration. The effects of suspended sediments vary among different groups of organisms, ranging from mortality to sublethal effects such as reduced growth, decreased reproduction, altered behavior, physiological and morphological changes, and diminished feeding efficiency. Data analysis indicates corals and daphnids (planktonic crustaceans) are particularly sensitive to suspended sediment, while bivalves and marine crustaceans tend to be more tolerant. By providing a framework for visualizing thresholds of sediment effect concentrations associated with potential impacts on aquatic species, this report and accompanying database can be used to support site-specific sediment management decision-making.



Figure 3. Cover image of the technical report, showing ERDC sediment testing, fish in a sediment plume, and a dredging vessel on a sediment plume. See technical report for photo credits.

This literature review effort was prepared under the “NexGen Dredging Water Quality Evaluation, Monitoring and Sensing” (RT-23-07) project funded by the Dredging Operations and Environmental Research (DOER) program. The Environmental Laboratory project team consisted of Paige Krupa, Alan Kennedy, Justin Wilkens, and Andrew McQueen.

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- The accompanying database can be accessed at <https://doer.el.erdcdren.mil/sdSED.html>.

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