Suspended and Deposited Sediment Effects Database (sdSED) Released Online

ERDC Environmental Laboratory researchers developed a database helpful to dredging operations by enabling sediment managers and natural resource specialists to better understand no effect levels of sediment as opposed to levels that can adversely impact aquatic organisms. This publicly available database compiles data from over 150 studies pertaining to effects of suspended or deposited sediment on aquatic organisms and will support decision making.

Suspended and Deposited Sediment Effects Database (sdSED) is released to the public on the Dredging Operations and Environmental Research (DOER) website (https://doer.el.erdc.dren.mil/sdSED.html). This database compiles data from over 150 studies and 4700 rows of data describing impacts of sediment on aquatic organisms. Specifically, this database focuses on "effect concentrations" for suspended and deposited sediment: concentrations or levels of sediment that can cause a statistically significant effect in the study organisms compared to a control group that was not exposed to sediment. This database should prove a useful resource to better understand effects of sediment on aquatic organisms and identify critical data gaps for future research. Further information detailing how the data was compiled, statistical analysis of sediment effect thresholds, and a narrative of literature review findings will be available in an upcoming technical report. In the current database version, data collection prioritized suspended sediment studies and less sediment deposition studies are available, though further sediment deposition studies will ideally be included future updates.

The database allows users to filter by categories of interest. For example, users can choose to filter data by organism type (fish, crustacean, coral, bivalve), exposure type (suspended sediment, rate of sedimentation, or sediment thickness) species, length of exposure, freshwater or saltwater, toxicity reference value, sediment type, and test endpoint (e.g., survival, growth, reproduction). The database can also be downloaded with the applied filters. An example of filtering the data is shown in Figure 1 below. A screenshot from the website explaining recommendations for filtering data, as well as showing expandable definition fields for the website, is provided in Figure 2.

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► La	ab Su	spended diment	100 mg/L	Fine	SW	Estuarine/Coastal	96	<96	LOEC
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► La	ab Su Se	spended diment	1000 mg/L	Fine (silt)	SW	Estuarine/Coastal	24	<96	LOEC
► La	ab Se	spended	2000 mg/L	Fine (silt)	SW	Estuarine/Coastal	24	<96	LOEC

Figure 1. sdSED database, showing an example of how data can be filtered. The depicted search for lowest observable effect concentrations (LOEC) in exposures less than 96 hours in duration with fish as the test organism yielded 67 results.

LOECs, NOECs, and Filtering Data

This database serves as a tool to identify sediment concentrations or levels that impact aquatic organisms, particularly no observable effect (NOEC) and lowest observable effect (LOEC) concentrations. The NOEC represents the highest sediment concentration or level at which there was not a statistical difference compared to the no-sediment control group while the LOEC represents the lowest sediment concentration to statistically significantly effect the organism. Although the focus of this effort was on NOEC and LOEC data, some other toxicity reference values (TRVs) such as LC50s are reported. To view effects data, filter by **TRV**. Filtering by **Yes** in the **Endpt_LOEC_NOEC_Included** column will filter the data to only include NOEC and LOEC values from suspended sediment studies for relevant endpoints (all coral endpoints included; for other organisms, includes survival, reproduction, growth, development, excretion, hatch, physiology, and tissue damage). Note that the current version of the database focuses primarily on suspended sediment data for organisms other than coral, though future updates may include additional sediment deposition data.

Click headers to toggle information tables.

Abbreviations

Abbreviation	Explanation						
N/I	No information. Upon further review, this data field may be populated.						
N/A	Not applicable. Not relevant for the row of data.						
N/R	Not reported. This data field could not be populated because the information was not reported or was not clear.						
NOEC	No observable effect concentration. NOEC represents the highest non-statistically significant value reported for a treatment. For this literature review, the NOEC was determined as the highest sedimer concentration tested, regardless of whether that treatment group had a statistically significant effect.						
LOEC	Lowest observable effect concentration. Represents the first concentration in a treatment to have a statistically significant effect compared to the control. Note that for the purpose of this literature review, values were only designated as LOECs if the significant difference between the treatment and the control group was consistent with an exposure-response relationship (i.e, data was not categorized as a LOEC if a significant difference was observed at a lower concentration, but not at higher concentrations).						
Org	Organism. Indicates columns providing information about the test organism used.						
Exp	Exposure. Indicates columns providing details about sediment exposure conditions, duration, and location.						
Endpt	Endpoint. Indicates columns providing information regarding the exposure endpoint and statistical significance of measured values.						
Ref	Reference. Indicates columns providing reference information.						
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Figure 2. Screenshot of the sdSED database webpage, explaining key terms and recommendations for filtering data.

The Environmental Laboratory project team consisted of Paige Krupa (literature review and data compilation), Justin Wilkens (data table development, database formatting and refining, review), Audrey Strelzoff (web developer), Alan Kennedy (conceptualization, review) and Andrew McQueen (review).

Link: https://doer.el.erdc.dren.mil/sdSED.html

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