

Appendix D: Example Statistical Resources for Experimental Design and Data Interpretation

Content: This section presents an annotated bibliography of example resources for using statistics for data interpretation and monitoring program experimental design.

D.1 Annotated Bibliography

An annotated bibliography of resources of statistical guidance's and tools are presented in Table D.1. The bibliography is not all-inclusive. Provided is a small sample of publicly-available resources of statistical guidance's and tools specifically designed for environmental sampling or sediment investigations.

Table D.1. Annotated bibliography of sediment- and water-quality specific statistical and experimental design guidances potentially useful for sediment remedial monitoring.

Resource	Description	Reference	URL
Guidances and Compendiums			
Guidance for Environmental Background Analysis	Analytical methods and statistical procedures that can be used to identify background chemicals in sediment (whether from anthropogenic or natural sources), and estimate the chemical concentration ranges that represent site-specific background conditions.	Naval Facilities Engineering Command (NAVFAC). 2003. Guidance for Environmental Background Analysis, Volume II: Sediment.	http://web.ead.anl.gov/ecorisk/related/documents/Final_BG_Sediment_Guidance.pdf
Derivation of Sample Size for Comparison to an Action Level	Statistical method for deriving necessary sample size in a sampling plan to enable comparison to an environmental action level.	USEPA. 2006. Derivation of Sample Size Formula for Testing Mean of Normal Distribution Versus an Action Level. Appendix A of Guidance for the Data Quality Objectives Process. EPA QA/G-4. EPA/240/B-06/001.	http://www.epa.gov/quality1/qs-docs/g4-final.pdf
Derivation of Sample Size	Provides guidance and statistical method for deriving necessary sample sizes for various experimental designs, including designs for comparing sample data to an environmental action level and comparing different locations at a site.	USEPA. 2001. Statistical Considerations in Determining the Appropriate Number of Replicate Samples Needed at Each Sampling Station. Appendix C of Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. EPA-823-B-01-002.	http://www.epa.gov/waterscience/cs/toc.pdf
Experimental Design for Sediment Investigations	Provides general overview of spatial, temporal, and statistical considerations for the experimental design of sediment monitoring programs and investigations.	USEPA. 2001. Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. EPA-823-B-01-002.	http://www.epa.gov/waterscience/cs/toc.pdf