



Environmental Testing Support for Sediment Management Programs

Sediment management decisions are often made within a complex regulatory arena. No single government agency is completely responsible for addressing the problem of contaminated sediments. More than 10 independent federal laws provide authority to address sediment quality issues to U.S. EPA., U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), and other federal, state and tribal agencies.

Sediment projects also occur in dynamic natural systems with multiple heterogeneous matrices, requiring technical decisions throughout the project. The accuracy of the site and risk assessment is directly related to the representativeness of the samples collected, as well as the precision and accuracy of the chemical, physical and biological environmental testing data generated. In order to execute a successful sediment data collection campaign, the project team must use an experienced, multidisciplinary approach, employing systematic planning and flexible approaches.

Guided by industry leading expertise and unmatched laboratory capacity, TestAmerica generates data that meets project specific data quality objectives, thereby facilitating appropriate sediment management decisions.

Sediment Testing

Sediment is composed of particles including gravel, sand, silt, clay and other natural and anthropogenic substances that have settled to the bottom of a tidal or non-tidal body of water. Sediment also contains pore water, the water between the interstitial spaces in the sediment. Sediment can be a repository and potential reservoir for persistent and bioaccumulative organic and inorganic contaminants. Many of these contaminants can bioaccumulate and biomagnify in the food chain, and may have a significant ecological and human health risk effect.

TestAmerica has more than 20 years of experience providing chemical and physical testing services in support of both marine and fresh water sediment projects nationwide. TestAmerica has developed Sediment Program Standards that serve as our dedicated sediment laboratory's technical framework for the execution of sediment specific procedures, addressing the complexities and challenges associated with the various matrices.

Sediment Testing Programs Supported by TestAmerica:

- Source investigations
- Baseline site assessments
- Site characterizations
- Ecological and/or human health risk assessments
- In situ sediment capping programs
- Monitored natural recovery/natural attenuation
- Long term monitoring
- TMDL, fate and transport programs

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THE LEADER IN ENVIRONMENTAL TESTING

Solutions to Testing Challenges:

Testing Challenges	Potential Project Impact	TestAmerica's Solutions
High moisture content of whole sediment samples	Elevated reporting limits, potentially exceeding project target limits when results are dry weight corrected	Increase sample mass extracted and/or digested
Limited sediment/tissue sample mass	Elevated reporting limits due to limited sample size	Modify analytical approach to compensate for limited mass
Complex matrix interferences, including target and non-target compounds	Elevated reporting limits, potentially exceeding project target limit requirements due to sample dilutions	Project specific sample extract cleanups to reduce both target and non-target interferences
Ultra-low reporting limits required to meet regulatory or risk-based criteria	Data does not meet project targeted reporting limits	Provide a continuum of analytical procedures from routine to ultra-low sensitivity
Non-routine contaminants of concern required to meet project objectives	Incomplete data set or qualitative data provided based on tentative identification of compounds utilizing a library search	Expand compound lists associated with standard analytical methods and approaches
Compressed, logistically challenging sampling campaigns	Sampling schedules and budgets compromised	Unmatched program capacity with six strategic nationwide Sediment/Tissue Laboratories

Specialized Testing Support

Dredged Material Evaluation

Several hundred million cubic yards of sediment are dredged from U.S. ports and waterways annually to maintain navigational waterways for the movement of commerce, national security and recreation. For some projects, dredging is used to remove sediment from a water body for the purposes of remediation. Project objectives for remediation programs are different than maintenance dredging, and include a focus on sediment re-suspension, contaminant release and residual issues related to the potentially contaminated material. Dredged material evaluations often involve more than one environmental matrix, including sediment, surface water, elutriates and/or leachates, and tissues. TestAmerica supports chemical and physical environmental testing to evaluate the potential environmental impacts of all the matrices required for dredged material evaluations.

Elutriate and Leachate Generation

The generation of elutriates from sediment and site water:

- Standard Elutriate Test (SET)
- Modified Elutriate Test (MET)
- Effluent Elutriate Test (EET)
- Dredging Elutriate Test (DRET)

Procedures for the evaluation of dredged material including leachate and settling tests are also available, including:

- Toxicity Characteristic Leachate Procedure (TCLP)
- Synthetic Precipitation Leachate Procedure (SPLP)
- Modified Multiple Extraction Procedure (MMEP)
- Shake Extraction of Solid Waste with Water
- Illinois Supernatant Test
- Simplified Laboratory Runoff Procedure (SLRP)
- Sequential Batch Leachate Test (SBLT)
- Pancake Leachate Test
- Long Tube Column Settling Test (LTCST)

TestAmerica offers project specific sample handling procedures along with any project specified additive requirements.

Tissues

The chemical analysis of tissue from biota is often necessary to understand the potential impacts of sediment on biological resources. This can include benthic organisms that live in, or feed on, the sediment, as well as fish or other organisms that represent higher trophic organisms where constituents of concern can bioaccumulate and bioamplify.

TestAmerica supports the sample preparation, homogenization and ultimate chemical analysis of the tissues from fresh water, estuarine or marine biota including native biota, as well as biota from in situ and ex situ bioaccumulation tests. Tissue matrices supported include whole body benthic organisms, clams, worms, shellfish, crustaceans, turtles, amphibians, fish, birds, mammals, vegetation and other biota.

TestAmerica's tissue support includes:

- Project specific instructions for sample preparation (shucking, resection, fileting, composting, dissecting)
- Tissue homogenization
- Use of specific organic extract cleanup strategies to address complex tissue matrix interferences, including target and non-target compounds
- Moisture determination
- Lipid analysis including Bligh-Dyer and other gravimetric methods
- Utilization of reduced tissue sample mass, while providing ultra-low reporting limits

Pore Water

Pore water is the water between the interstitial spaces in sediment. The bioavailability of chemicals of concern in sediment is often estimated using sediment pore water. Pore water can be obtained ex situ by the centrifugation of sediment, or in situ using direct pore water collection methods.



TestAmerica offers project support for both in situ and ex situ pore water generation. In situ generation support includes providing the appropriate dialysis water for the sampling device prior to field deployment. Ex situ pore water generation is supported through high-speed centrifugation of sediment samples. When bioavailability is a concern, a large quantity of sediment may be required for pore water generation. Preserving redox conditions is critical, and requires field personnel and the laboratory to maintain the integrity of the sample by minimizing exposures to atmospheric oxygen. This can be executed in the lab through sediment core processing in a glove box under nitrogen conditions. The analytical methods used for pore water allow for the use of reduced sample volume, while still providing low reporting limits. TestAmerica's pore water support includes the following:

- Provide appropriate lab grade water (oxygenated/deoxygenated) for peeper deployment
- Analysis of pore water resulting from peeper/dialysis sampler & centrifugation
- Sample or sediment core processing handled under anaerobic or aerobic conditions
- High Speed Centrifugation - chilled or ambient
- Variety of centrifuge containers – polypropylene, stainless steel & Teflon™

Passive Samplers

Passive Samplers measure freely dissolved chemicals of concern in pore water or surface water. The freely dissolved phase represents the fraction of the bioavailable phase which is readily available for uptake by benthic or pelagic organisms, as well as higher trophic organisms like fish. TestAmerica supports Polyethylene (PE), Polyoxymethylene (POM) and Polydimethylsiloxane (PDMS) samplers and analyzes passive samplers with or without Performance Reference Compounds [PRCs].

The hydrophobic organic constituents of concern that TestAmerica supports on passive samplers include:

- PCBs (Aroclors, homologs & congeners)
- PAHs (parent and alkylated homologs)
- Organochlorine Pesticides
- Dioxins & Furans
- Diesel Range & Oil Range Organics (DRO/ORO)

Value Added Services - TestAmericas offers systematic laboratory procedures that address the complexities and challenges associated with sediment projects. These standards provide the technical framework for our sediment laboratories to deliver the highest levels of scientific and service performance in the environmental testing industry.

Certifications

- NELAP – National Environmental Laboratory Accreditation Program
- USDA Soil Import Permit
- USFW Tissue Import Permit
- Comprehensive state certifications

Leadership

- Interstate Technology & Regulatory Council (ITRC) Contaminated Sediment Technical Team Member
- SERDP/ESTCP Technical Reviewer for Laboratory, Field, and Analytical Procedures for Using Passive Sampling in the Evaluation of Contaminated Sediment: User's Manual; EPA/600/R-16/357
- ASTM Sediment WK51760 Analytical Standard Guide Team Member

Reports and Electronic Deliverables That Are Easy to Use

- TestAmerica's laboratory information management system creates one single report and electronic deliverable, regardless of analysis location, saving time and reducing costs
- PDF reports are searchable, color coded and tabbed for easy navigation, reducing review time and validation efforts
- Electronic deliverables mitigate the risk of errors associated with manual data entry

TotalAccess® On-line Data Delivery

- All project data is available online via TotalAccess®, allowing clients to track all aspects of projects with 24/7 secure access from any Internet enabled device
- Access current and historical projects in the entire TestAmerica network from one on-line portal
- Easily search by jobs, project, documents, invoices, analytes and more
- Compare regulatory limits

TestAmerica Offers Comprehensive Testing Support For:

- sediment
- water
- elutriates
- tissue
- pore water
- passive samplers

ORGANICS including Specialty Organics:

- Volatiles (VOA)
- Semivolatiles (SVOA)
- Polycyclic Aromatic Hydrocarbons (PAHs) including alkylated homologs
- Organochlorine Pesticides (OCP)
- Organophosphorus Pesticides (OPP)
- Polychlorinated Biphenyls (PCBs) Aroclors
- PCB Homologs
- PCB Congeners
- Herbicides
- Polychlorinated Dioxins/Furans (PCDD/PDFs)
- Explosives
- PFAS including PFOA & PFOS

CLEANUP PROCEDURES FOR ORGANICS:

- Gel Permeation Cleanup (GPC)
- Silica Gel
- Alumina
- Florisil®
- Carbon
- Sulfuric Acid/Permanganate
- Acid Base Partitioning
- Mercury, Activated Copper
- Tert-butyl Ammonium Sulfite

CLASSICAL WET CHEMISTRY:

- Black Carbon (BC)
- Dissolved Organic Carbon (DOC)
- Particulate Organic Carbon (POC)
- Total Organic Carbon (TOC) by Lloyd Kahn
- PSEP TOC
- TOC by SW 846 9060
- Fractional Organic Carbon (FOC)
- Total Suspended Solids (TSS)
- Total Sulfides
- Total Phosphorus
- Nitrogen series (TKN, Ammonia, NO2 & NO3)
- Total Cyanide
- Free Cyanide
- BOD
- COD
- Chloride
- Salinity
- pH
- Specific Conductivity
- Total Solids by SM 2540G / EPA Method 160.3
- Cation Exchange Capacity

PETROLEUM RELATED ORGANICS:

- Gasoline Range Organics [GRO]
- Diesel Range Organics [DRO]
- Oil Range Organics [ORO]
- State Specific Hydrocarbon Methods
- Hexane Extractable Material [HEM]
- Oil and Grease
- Saturated Hydrocarbons [C6-C40]
- PAHs including alkylated homologs Biomarkers

Elutriates:

- Standard Elutriate
- Effluent Elutriate
- Modified Elutriate
- Dredging Elutriate Test

Leaching Testing:

- Supernatant Test [Illinois EPA]
- Sequential Batch Leachate Test
- Simplified Laboratory Runoff Procedure
- Pancake Column Leachate Test
- Monofilled Waste Extraction Procedure
- Toxicity Characteristic Leachate Procedure
- Synthetic Precipitation Leachate Procedure
- Modified Multiple Extraction Procedure
- Waste Extraction Test

Geotechnical:

- ASTM D422 – Particle Size Analysis; PSEP Grain Size, Plumb 1981 –Sediment Classification System
- ASTM D854 – Specific Gravity of Soils
- ASTM D1140 – Particulate in Soils Finer than No. 200 Sieve (75 um)
- ASTM D2216 – Determination of Water (Moisture) Content in Soil and Rock
- ASTM D2487 – Classification of Soil for Engineering Purposes
- ASTM D2937 – In-Place Density or Bulk Density
- ASTM D4318 – “Atterberg Limits” Standard Test Method for Liquid Limit, Plastic Limits and Plasticity Index of Soils
- ASTM D 2487- Organic Content / Organic Matter

METALS:

- Total Metals/ Dissolved Metals
- Total Mercury
- Low Level Mercury
- Hexavalent Chromium (Cr6)
- Organotin / Butyltins
- Methyl Mercury
- Acid Volatile Sulfides / Simultaneous Extracted Metals (AVS / SEM)
- Sequential Extraction Procedure for Metals (SEP)

TestAmerica’s Sediment

Laboratories are committed to providing outstanding client service, the lowest detection limits, the fastest turnaround times, with accuracy and precision, at a competitive price.

TestAmerica’s strategically located facilities provide nationwide testing and logistical support for sediment projects.



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