

Tissue Support for Biological Testing

Sediment bioassay laboratories perform biological studies to evaluate the potential uptake of organic and inorganic contaminants of concern in tissues. TestAmerica provides organic and inorganic chemical testing of compounds of concern from these tissues generated from these biological tests which can include benthic bioaccumulation studies as well as plant and animal bioassays.

TestAmerica utilizes analytical methods that reduce the tissue sample mass while providing ultra-low reporting limits for organics and inorganic parameters. In addition to chemical testing, TestAmerica also provides sample preparation and homogenization, sample extract cleanup procedures, and lipid analysis including Bligh-Dyer, micro-scale techniques and other gravimetric methods.

Chemical and Physical Testing for Beneficial Use Evaluations of Dredged Material

Dredged material can be a valuable resource and can be tested for physical and chemical suitability for beneficial use evaluations.

Testing to assess the physical suitability of dredged material can include grain size distribution as well as permeability, plasticity and organic content. The physical testing should specifically evaluate the sediment for its intended beneficial use. The chemical suitability testing program can include the compounds of concern as well as other characterization tests. This data can be compared to the project specific standards identified for each of the proposed beneficial uses. There are no specified testing methods or standards for beneficial use evaluations and the default is often the state and/or federal screening criteria to determine if contaminant of concern poses a risk based on the proposed use of the site and potential receptors. TestAmerica can support the testing for both the physical and chemical suitability of sediments for potential beneficial use.

TestAmerica also offers sediment characterization techniques to evaluate the bioavailability of contaminants of concern. The tests that evaluate the bioavailability of toxic metals in aquatic systems, include Acid Volatile Sulfides/Simultaneously Extracted Metals (AVS/SEM), Sequential Extraction Procedures (SEP), and associated dissolved organic carbon (DOC), anions, hardness and alkalinity. TestAmerica also supports pore water generation and subsequent chemical testing for other potential contaminants of concern as well as ex situ and in situ Solid Phase Microextraction (SPME) for Polynuclear Aromatic Hydrocarbons (PAHs).

Environmental Dredging Support

Environmental dredging is the removal of sediments from a water body for the purposes of sediment remediation. It is one of the considerations for remediation of contaminated sediments as well as monitored natural attenuation and in situ capping. Environmental dredging project objectives are different than maintenance dredging and include a focus on sediment resuspension, contaminant release and residuals issues related to the potentially contaminated material.

TestAmerica has extensive successful experience in providing the chemistry testing support for the constituents of concern during all phases of environmental dredging projects supporting the chemical testing in the near-real time project turnaround time for decision making. This includes baseline chemical and physical sediment testing, water quality monitoring program inclusive of background, near field, far field water monitoring during the dredging operation as well as sediment samples for confirmation or residuals evaluation.

Dredged Material Evaluation Testing Programs Supported by TestAmerica:

National USACE/EPA Dredged Material Evaluation Programs:

- Inland Testing Manual – EPA 823-B-98-004 February 1998
- Ocean Testing Manual – EPA 503/8-91/001 February 1991
- QA/QC Guidance for the Sampling and Analysis of Sediments, Waters and Tissues for Dredged Material Evaluations – EPA 823-B-95-001 April 1995

National USACE Resource Document Providing Technical Guidance:

- Upland Testing Manual - Technical Report ERDC/EI TR-03-1 2003

USACE/EPA Regional Implementation Manuals (RIMs)

- USACE/EPA, Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters - April 2004
- USACE/EPA, Guidance for Performing Tests on Dredged Material Proposed for Ocean Disposal - Dec 1992 with 1994 updates
- USACE/EPA, Mid-Atlantic Regional Implementation Manual [MARIM] Dredged Material Evaluation for Norfolk and Dam Neck Ocean Disposal Sites
- USACE/EPA, Requirements and Procedures for the Evaluation of the Ocean Disposal of Dredged Material in Southeastern U.S. Atlantic and Gulf Coast Waters - August 2008
- USACE/EPA/GLNPO, Great Lakes Dredged Material and Testing Manual Main Text, App C, D, E and F - Sept 1998
- USACE/EPA, Ocean Dredged Material Disposal Program Regional Implementation Agreement for Testing and Reporting for Ocean Disposal of Dredged Material off Louisiana and Texas Coasts - Jul 2003
- USACE/EPA, Guidelines for the Implementation of the Inland Testing Manual in the San Francisco Bay Region- Sept 2001.
- USACE/EPA, Northwest Regional Sediment Evaluation Framework Interim Final 2006.
- USACE/EPA, Dredged Material Evaluations and Disposal Procedures (Users' Manual) July 2008 Rev. Nov 2009

State Programs

- NJ Tidal Waters Technical Manual NJDEP, October 1997. The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters
- NY DEC, Technical & Operational Guidance Series 5.1.9 In Water and Riparian Management of Sediment and Dredged Material Nov 2004
- Oregon Joint Source Control Strategy (JSCS) - OR DEQ, EPA 2005
- Oregon Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, OR DEQ 2007
- WA Dredged Material Management Program (DMMP) – USACE June 2007
- WA Sediment Management Standards (SMS) – Chapter 173-204 WAC 1995
- WI DNR Sediment Sampling and Analysis, Monitoring Protocol, and Disposal Criteria for Dredging Projects WAC Chapter NR 347

Dredged Material Evaluation Tissue testing programs supported includes:

- Dredged material evaluation programs – benthic bioaccumulation tissue measurements
- Upland Testing - plant and animal bioassay tissue measurements
- Environmental Dredging - restoration monitoring – pre- and post-tissue measurement

TestAmerica's certifications include:

- NELAP – National Environmental Laboratory Accreditation Program
- USDA Soil Import Permit
- U.S. Fish and Wildlife Tissue Import Permit
- Comprehensive State certifications

TestAmerica leadership:

- Interstate Technology & Regulatory Council (ITRC) Contaminated Sediments Technical Team Member
- Participation in National Institute of Standards (NIST) Sediment Performance Evaluation Studies for Sediments and Tissues

TestAmerica's Dredged Material Evaluation Laboratories are committed to provide outstanding client service, the lowest detection limits, the highest integrity and the fastest turnaround times with accuracy and precision at a competitive price.

TestAmerica offers e-solutions for information management through TotalAccess (our online data access portal), data on CD-ROM and an extensive library of project specific Electronic Data Deliverable formats.

For more information, please contact Patricia McIsaac, Sediment and Tissue Product Manager at 703.758.8381 or patricia.mcisaac@testamericainc.com

DREDGED MATERIAL EVALUATIONS

CHEMICAL AND PHYSICAL TESTING OF SEDIMENT, SITE WATER, ELUTRIATES, LEACHATES, COLUMN SETTLING AND TISSUES



Dredged Material Management

Several hundred million cubic yards of sediments are dredged from U.S. ports and waterways annually to maintain navigational waterways for the movement of commerce, national security and recreation.

The regulations for dredged material disposal within the waters of the U.S. and ocean waters are a complex regulatory arena and are the shared responsibility of the U.S. Army Corps of Engineers (USACE) and EPA. The USACE, EPA and some states have developed dredged material evaluation guidance documents to support the decision making associated with the applicable federal and state statues regulating dredged material management.

To support this decision making process, TestAmerica supports the chemical and physical environmental testing for the evaluation of the potential environmental impacts of the dredged material discharges. Potential dredging sites vary in their size and complexity. Dredged material evaluations often involve more than one environmental matrix, which can included sediment, surface water, elutriates and / or leachates, and tissues. Our experience has consistently demonstrated that the critical success factor for each project is our dedication to pre-project planning. This includes Quality Assurance Project Plan review, with the detailed review and evaluation of targeted detection limits of compounds of concern. TestAmerica has the experience, resources and desire to continue to support each project team's goal of successfully executing dredged material evaluation testing projects.

TestAmerica's Dredged Material Evaluation Support

TestAmerica has extensive experience providing chemical and physical testing services in support of dredged material evaluations projects nationwide. These projects have been executed within various EPA Regions, USACE Districts, as well as under various state agencies. Guided by industry leading expertise and unmatched laboratory capacity, TestAmerica's goal is to generate chemical and physical testing data to meet project specific objectives, thereby facilitating appropriate dredged material evaluation decisions.

Chemical Testing

Chemical testing provides detailed information on the contaminants of concern in the dredged material. If these compounds of concern are biologically available it could cause toxicity and or be bioaccumulated. TestAmerica follows U.S. EPA methods and USACE procedures in support of dredged material projects. Matrices supported include sediments, site water, elutriates, leachates, settling tests and tissues.

Physical Testing

Physical testing or geotechnical testing is performed as a fundamental part of the dredged material evaluation to support the characterization of the sediments. TestAmerica offers comprehensive sediment geotechnical services supporting sediment and dredged material evaluations utilizing ASTM Standards.

TestAmerica utilizes a [Sediment & Tissues Program](#) which is our systematic laboratory procedures to address the complexities and challenges associated with sediment and tissue matrices. These standards provide the technical framework for our dredged material evaluation laboratories to deliver the highest levels of scientific and service performance in the environmental testing industry.

Dredged material may contain a wide variety of chemicals. On a project by project basis, TestAmerica scientists collaborate with the client to determine a targeted list of contaminants of concern to be selected for analysis based on dredged material guidance documents and the historical review information of the dredged site. The selection of the appropriate contaminants of concern for each dredged material evaluation is critical to the success of the testing program.

TestAmerica's Elutriate, Leachate Generation and Column Settling Tests

TestAmerica supports all the elutriate and leachate generation procedures as well as column settling tests required under the Ocean Testing Manual, Inland Testing Manual, Upland Testing Manual, Regional Implementation Manuals and other state guidance documents.

Testing	Designed to:
Standard Elutriate [SET]	Predict the release of contaminants at the point of open water disposal.
Effluent Elutriate [EET]	Predict the release of contaminants from confined disposal facilities (CDF).
Modified Elutriate [MET]	Predict the release of contaminants from confined disposal facilities (CDF).
Dredging Elutriate Test [DRET]	Predict the release of contaminants from dredged materials at the point of dredging.
Long Tube Column Settling Test [LTCST]	Define the settling behavior of sediment and provide information regarding newly placed dredged material.
Supernatant/Elutriate Test [Illinois EPA]	Fulfill requirement for issuance of Illinois section 401 Water Quality Certification.
Sequential Batch Leachate Test [SBLT]	Evaluate potential leachate quality in freshwater and estuarine dredged material. Anaerobic dredged material is exposed to successive aliquots of sitewater.
Simplified Laboratory Runoff Procedure [SLRP]	Simulate the water quality of precipitation runoff from dredged material. Determines runoff quality from wet, anoxic and dry, oxidized conditions.
Pancake Column Leachate Test [PCLT]	Evaluate potential leachate quality in fresh water and estuarine dredged material. Laboratory-scale physical model of contaminant elution from dredged material.
Monofilled Waste Extraction Procedure [MWEP]	Estimate the quantity of potentially leachable constituents in a solid waste.
Toxicity Characteristic Leachate Procedure [TCLP] - SW 846 Method 1311	Determine the mobility of both organics and inorganics analytes in wastes which are destined for disposal in municipal landfills.
Synthetic Precipitation Leachate Procedure [SPLP] - SW 846 Method 1312	Determine the mobility of both organics and inorganics analytes
Modified Multiple Extraction Procedure [MMEP] - SW 846 Method 1320M	Simulate the leaching which a waste will undergo from repetitive precipitation of acid rain on an improperly designed sanitary landfill.
Waste Extraction Test [WET]	Determine the mobility of both organics [not VOA] and inorganic [extended list] analytes in the State of California.

TestAmerica offers comprehensive testing support for sediment, water, elutriate, tissue and pore water to include:

Elutriates:

Standard Elutriate [SET]
Effluent Elutriate [EET]
Modified Elutriate [MET]
Dredging Elutriate Test [DRET]

Leachate Testing:

Supernatant Test [Illinois EPA]
Sequential Batch Leachate Test [SBLT]
Simplified Laboratory Runoff Procedure [SLRP]
Pancake Column Leachate Test [PCLT]
Monofilled Waste Extraction Procedure [MWEP]
Toxicity Characteristic Leachate Procedure [TCLP]
Synthetic Precipitation Leachate Procedure [SPLP]
Modified Multiple Extraction Procedure [MMEP]
Waste Extraction Test [WET]

Settling Tests:

Long Tube Column Settling Test

Metals:

Total Metals
Low Level Mercury
Hexavalent Chromium
Diethylene Triamine Pentaacetic Acid [DTPA] Metals

Specialty Organics:

Volatiles
Semivolatiles
Polycyclic Aromatic Hydrocarbons [PAHs]
Organochlorine Pesticides [OCP]
Organophosphorous Pesticides [OPP]
Herbicides
PCBs- Aroclors and Congeners
Polychlorinated Dioxins/ Polychlorinated Furans [PCDD/PCDFs]
Gasoline Range Organics [GRO]
Diesel Range Organics [DRO]
Oil Range Organics [ORO]
Organotins/Butyl Tins

Classical Wet Chemistry:

Total Petroleum Hydrocarbon [TPH] procedures by State required methods
Dissolved Organic Carbon
Total Organic Carbon [TOC] by Lloyd Kahn, EPA Method 9060, or PSEP
Total Suspended Solids [TSS]
Total Sulfides
Total Phosphorus, Orthophosphorous
Nitrogen series [TKN, Ammonia, NO2/NO3]
Total Cyanide
BOD
COD
Salinity
pH
Specific Conductivity
Cation Exchange Capacity
Chloride
% Moisture

Clean Up Procedures for Organics:

Gel Permeation Cleanup [GPC]
Silica Gel Cleanup
Alumina
Florisil™
Sulfuric Acid/Permanganate
Acid Base Partitioning
Mercury, Activated Carbon
Tert-butyl Ammonium Sulfite

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 D2488 – Description and Identification of Soils
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