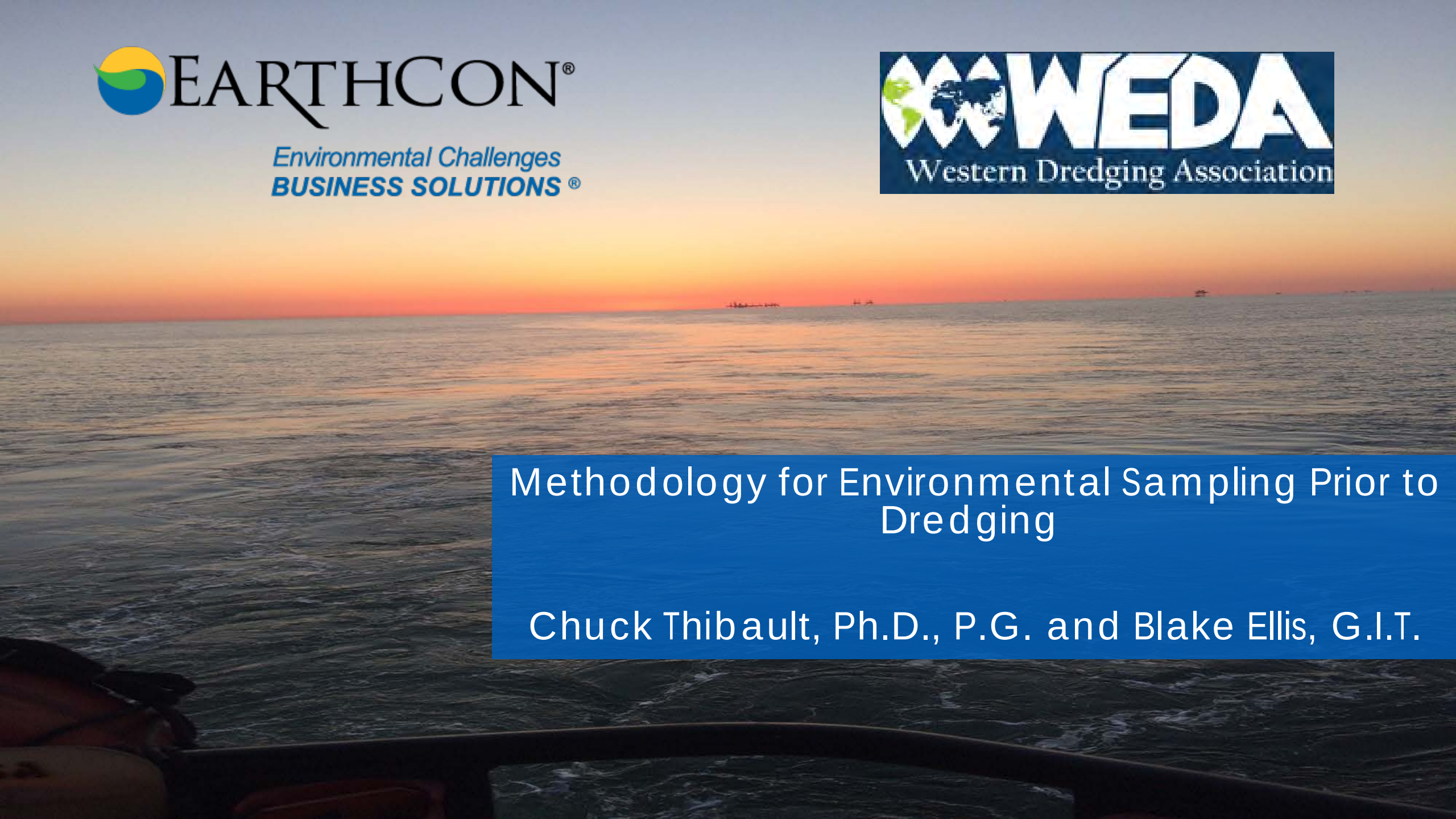

Methodology for Environmental Sampling Prior to Dredging

Chuck Thibault, Ph.D., P.G. and Blake Ellis, G.I.T.

THE SAMPLING AND ANALYSIS PLAN

- a) Collect water and sediment samples which adequately characterize the project dredged materials;
- b) Analyze the dredged material samples chemically and physically to provide information to determine if the sediments are contaminated;
- c) Document the field sampling and results of physical and chemical analyses of water and sediments, and quality control measures; and
- d) Determine whether unacceptable adverse impacts could result from dredging and dredged material upland placement operations.

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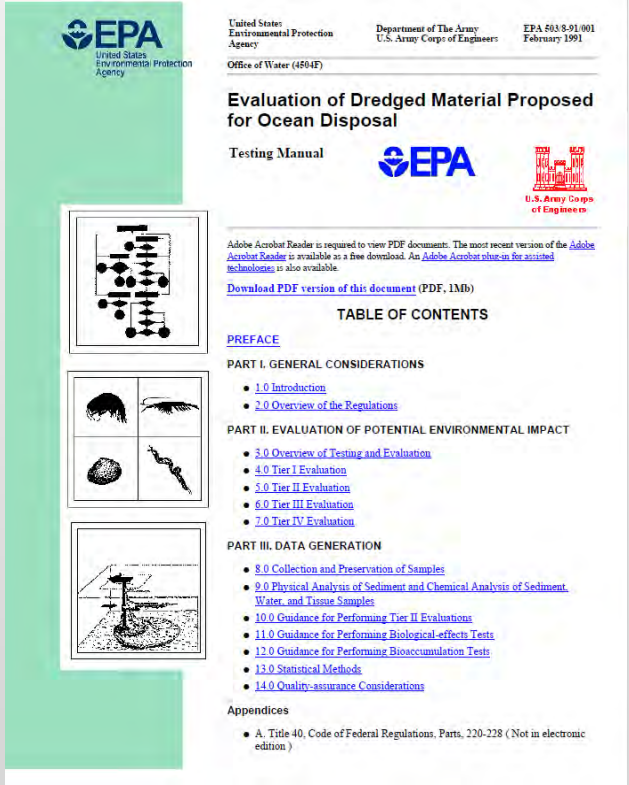
GUIDANCE



United States Environmental Protection Agency | Department of The Army U.S. Army Corps of Engineers | EPA 503/8-91/001 February 1991

Office of Water (4504F)

Evaluation of Dredged Material Proposed for Ocean Disposal

Testing Manual

U.S. Army Corps of Engineers

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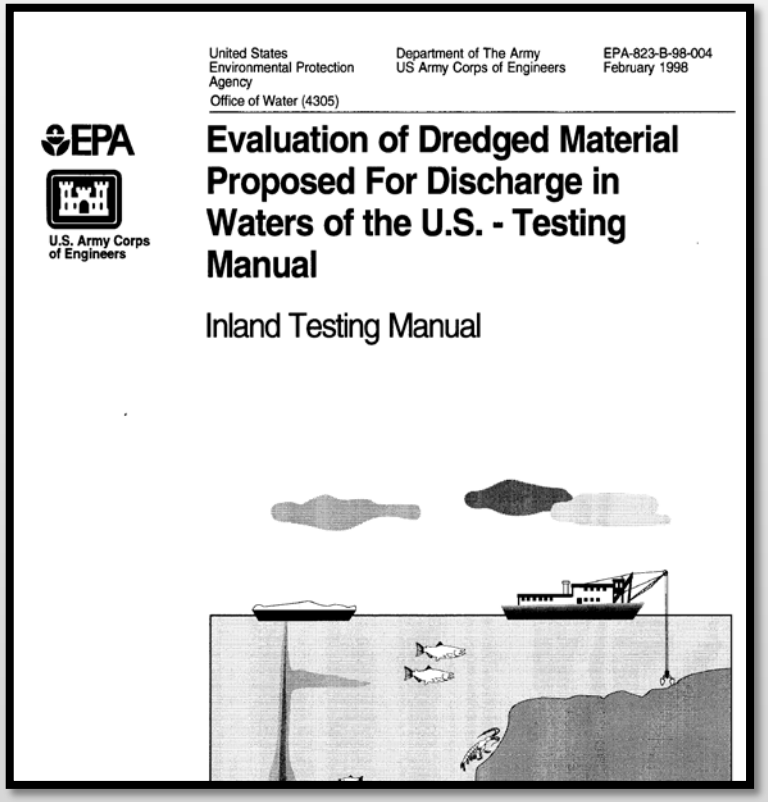


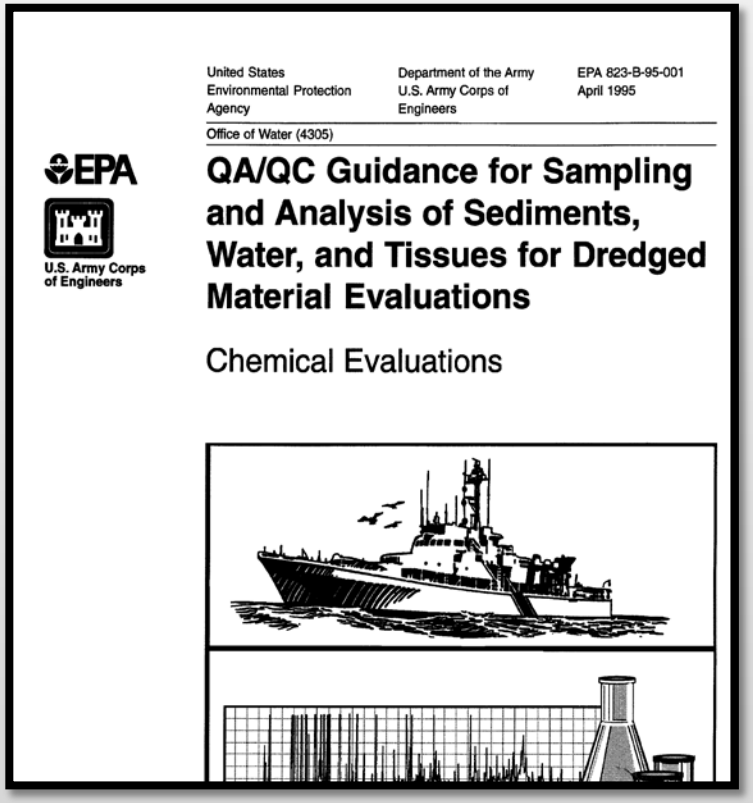
United States Environmental Protection Agency | Department of The Army US Army Corps of Engineers | EPA-823-B-98-004 February 1998

Office of Water (4305)

U.S. Army Corps of Engineers

Evaluation of Dredged Material Proposed For Discharge in Waters of the U.S. - Testing Manual

Inland Testing Manual



United States Environmental Protection Agency | Department of the Army U.S. Army Corps of Engineers | EPA 823-B-95-001 April 1995

Office of Water (4305)

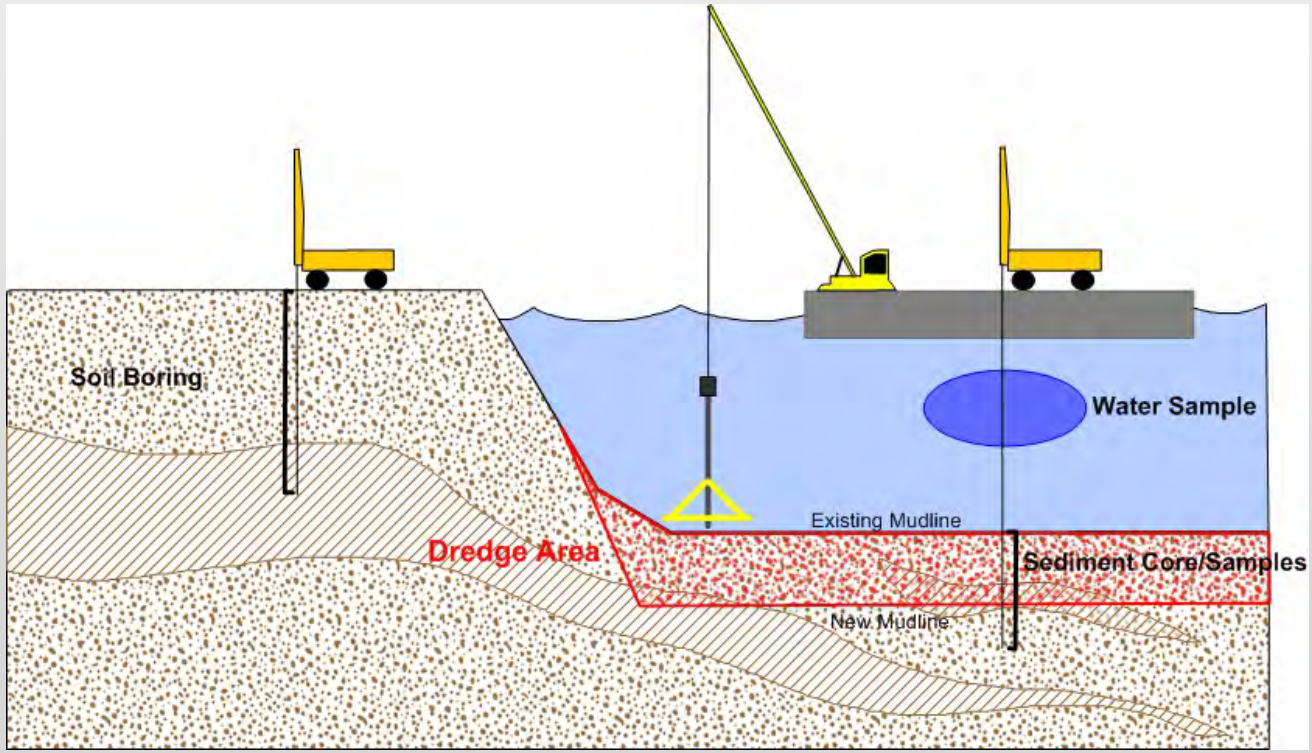
U.S. Army Corps of Engineers

QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations

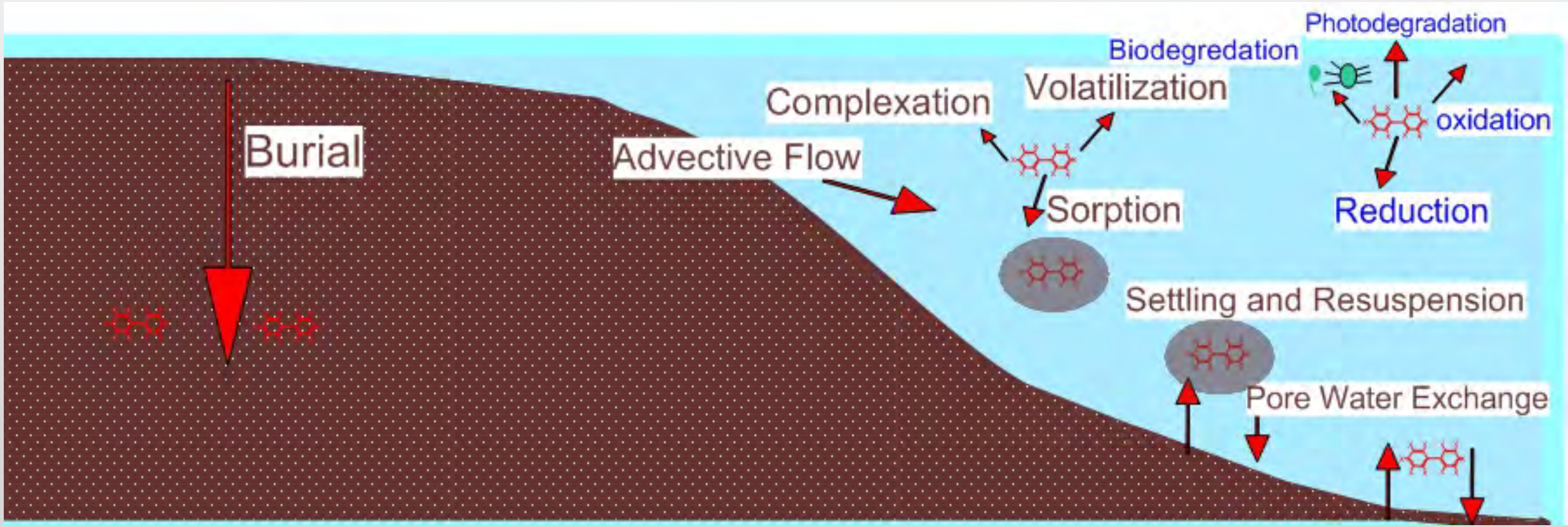
Chemical Evaluations

KEY TERMS

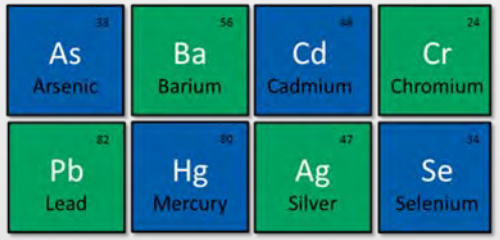
- Water sample-Sample taken at half way point of water column above material to be dredged.
- Sediment sample- Sample collected from material to be dredged.
- Elutriate -Mix of sediment and water from the site
- Soil sample-Sample collected from on-shore location
- Sorption-a physical and chemical process by which one substance becomes attached to another.
- VOCs -Volatile Organic Compounds
- SVOCs-Semi-Volatile Organic Compounds
- PCBs-Polychlorinated biphenyls
- Advection-Process that transports compounds by water motion

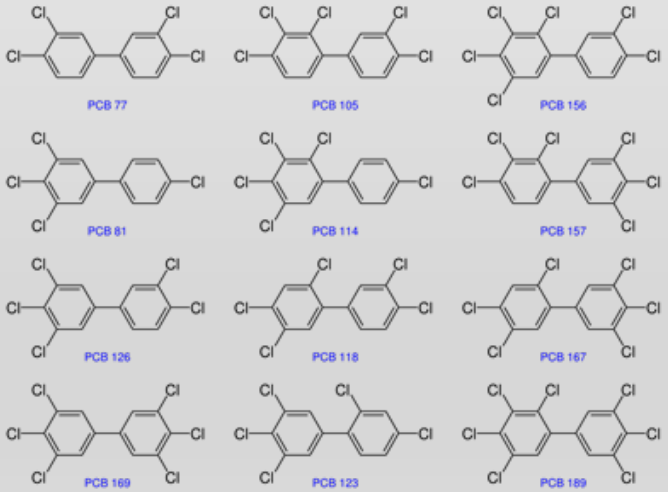


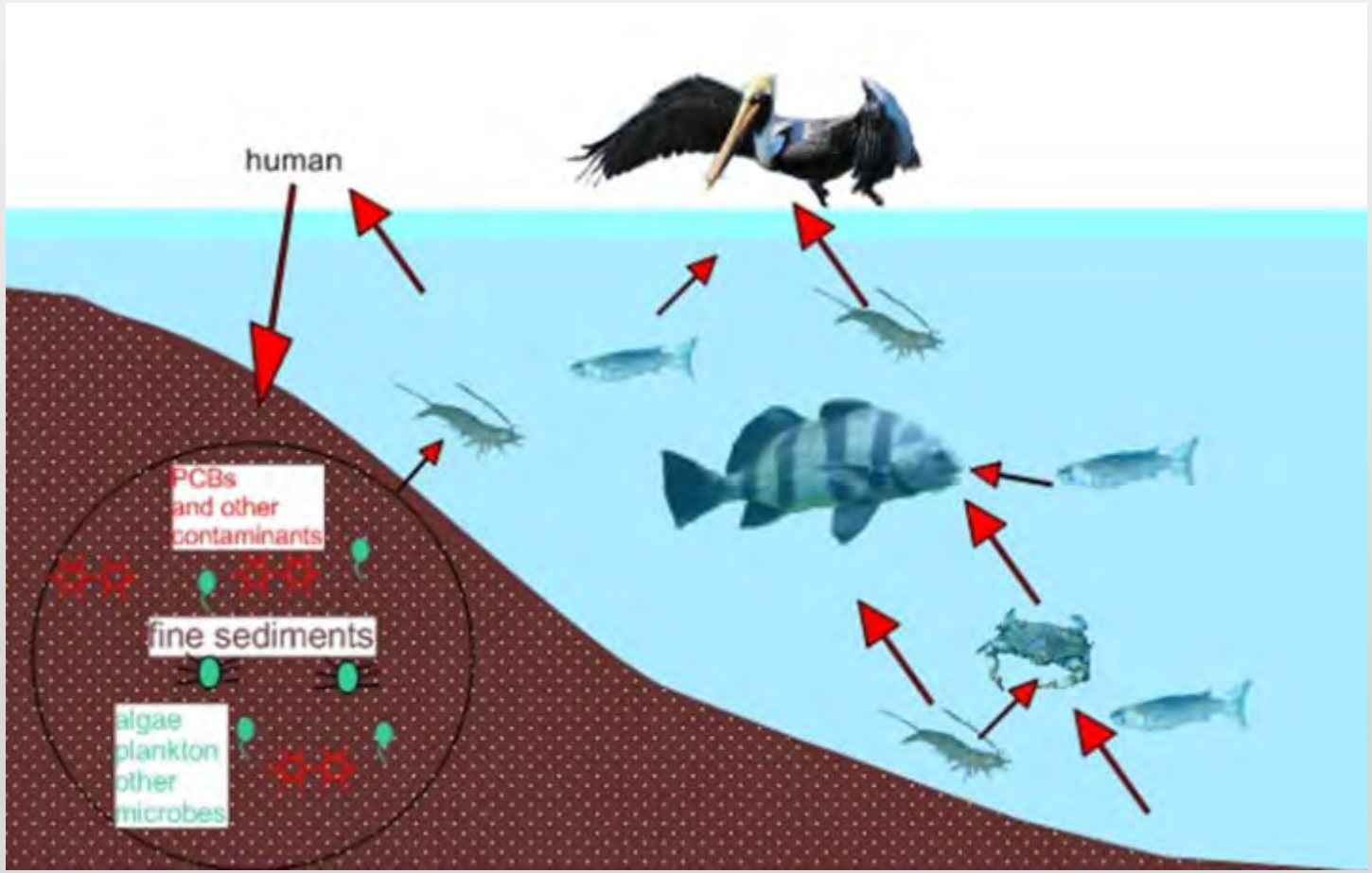
CHEMICAL PROCESSES AND SEDIMENT MOBILITY



BIOACCUMULATION AND MAGNIFICATION







ENVIRONMENTAL SAMPLING AND ANALYSES

- Target detection level (TDLs), Method detection limit (MDLs) and Reporting Limits (RLs)
- Designated Screening Benchmarks
- Analyses
  - VOCs, SVOCs
  - Pesticides
  - PCBs
  - Metals
  - Organotins
  - Ammonia, TOC, TPH

Matrix Sampling Method

Sediment

- Boring (SPT/Shelby Tube, Direct Push)
- Ponar
- Vibracoring

Water

- Submersible Pump

Elutriate

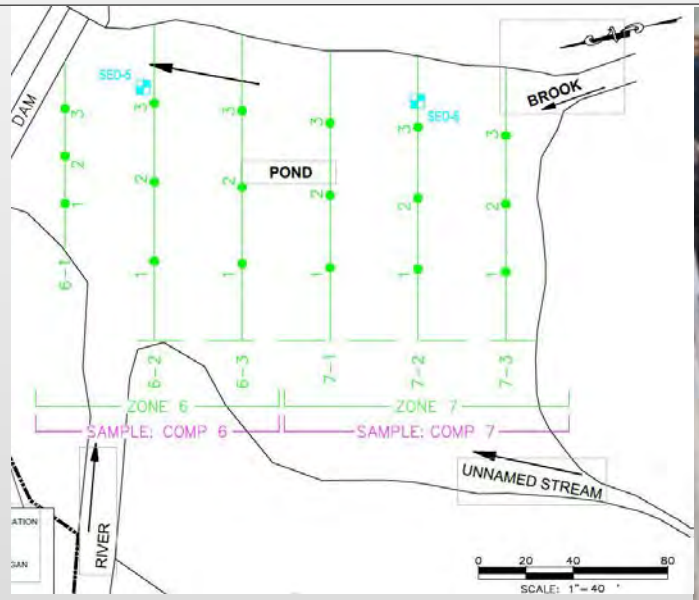
- Submersible pump

PROJECT PLANNING PER USACE AND EPA GUIDANCE

- USACE Approval
- Project Approach
- Project Description and Summary
- Sample Number and Location Selection
- Sample Types (Water, Sediment, & Elutriate)
- Physical and Chemical Parameters
- Quality Control (QA/QC)
- Deliverables

SAMPLE COLLECTION AND REPORTING

- Health and Safety Plans
- Pre-planning Meetings coordinating access requirements, notifications, security, and other details
- Experienced Field, Drilling and Laboratory Teams
- Proper vessels, work barges needed
- Drilling contractors experienced in land and water-based sampling
- NELAP certified Laboratory with demonstrated analytical acceptance
- Project Reporting according to USACE Guidance



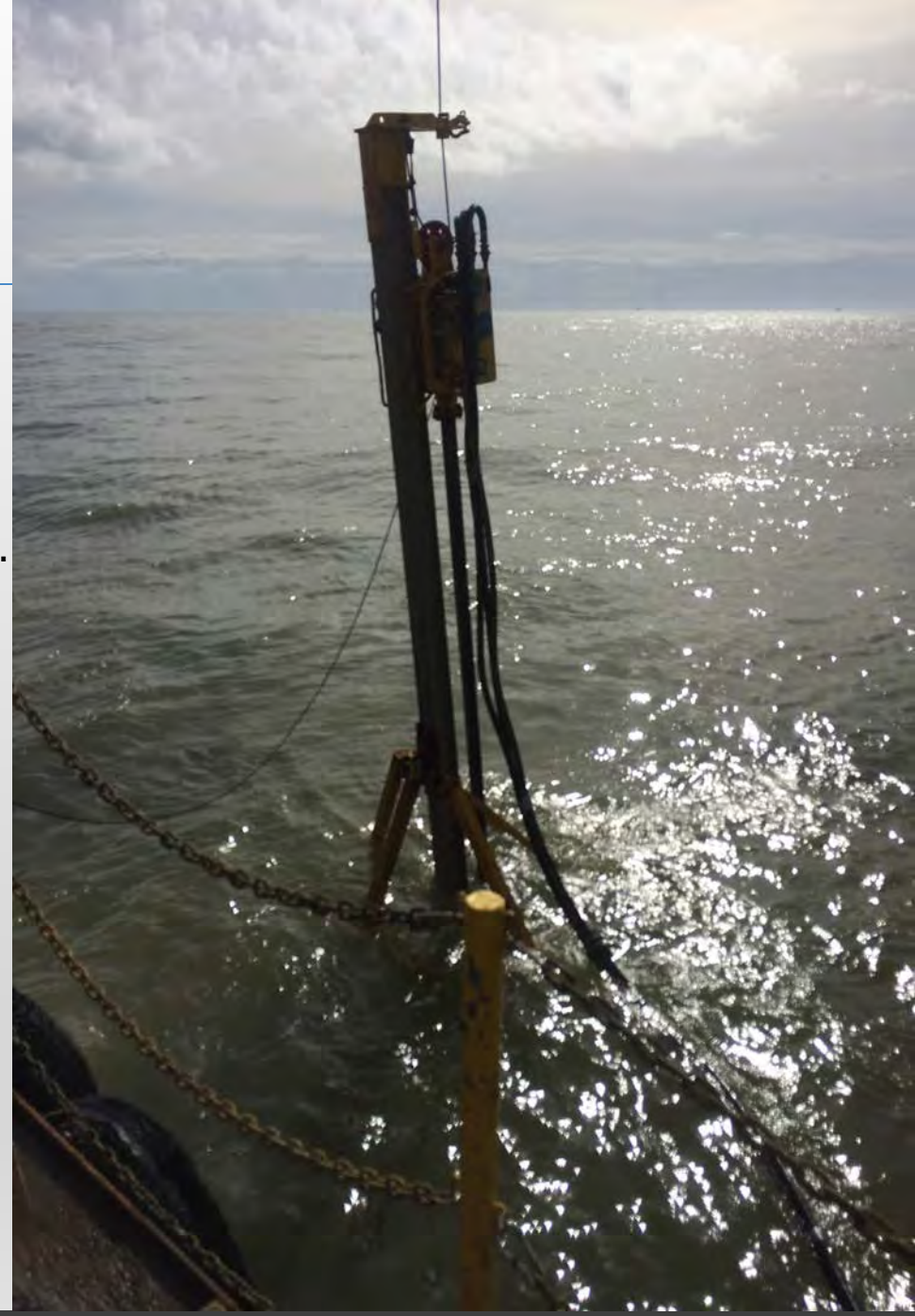
PHYSICAL SAMPLING AND ANALYSIS

- Why are physical properties needed?

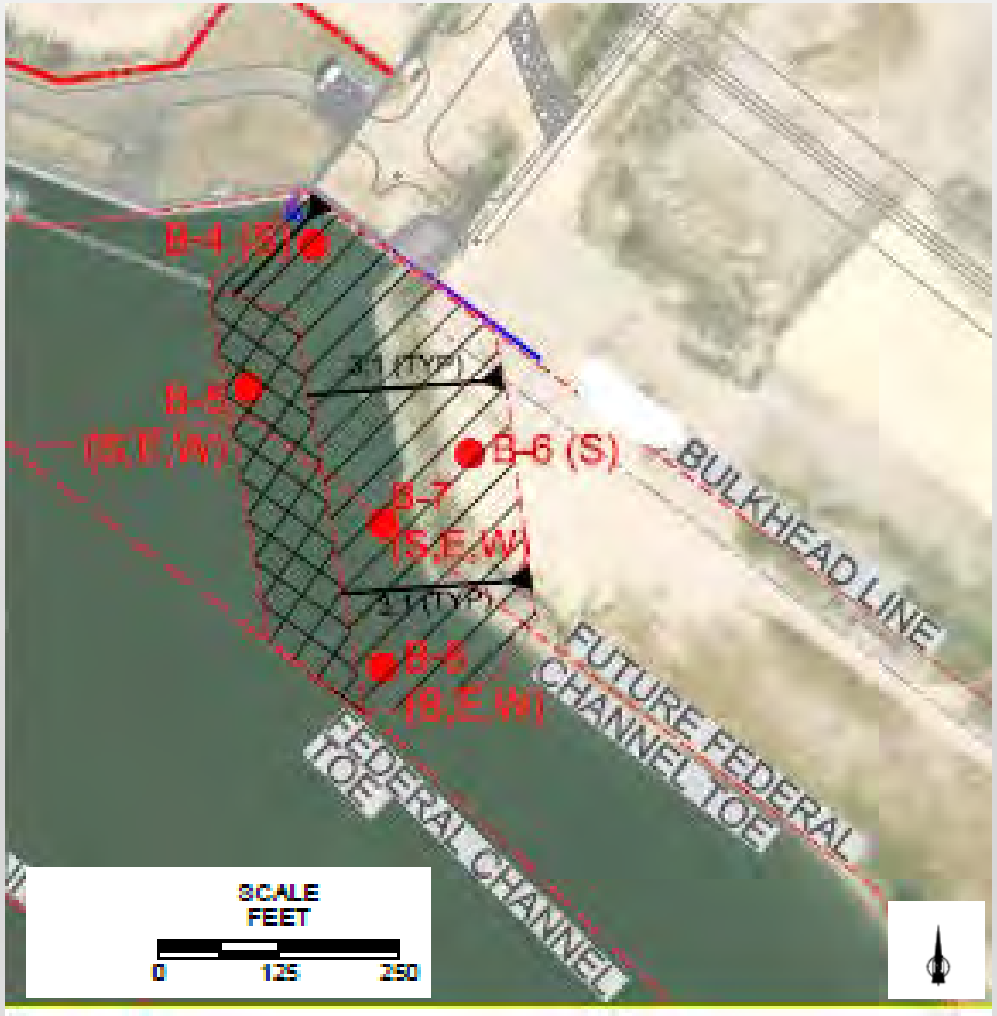
- Classification of Dredge Material
  - Sand, Sand with silt, Silty Sand, Sandy Clay, Clayey Sand, etc.

- Laboratory Analyses
  - Grain size
  - Plasticity
  - Total Solids
  - Specific Gravity
  - Compressive Strength (rock and clay)

- Engineering Properties of Dredge Material
  - Density and strength of soils needed to be dredged



SITE LOCATION AND BORING LOCATION MAPS



The SAP includes at least two or three figures with the following elements:

Site Location Map
- Overall geographic location of site and adjacent properties

Boring Location Map
- Approximate area to be dredged and the slope(s)
- Location and type of samples (Water (W), Sediment (S), and Elutriate (E)
- Adjacent properties and potential sources of contamination like stormwater outfalls labelled

Optional Cross Section Map
- Cross Section of the planned dredging
- Estimated thickness of sediment

TIMETABLE

TIMETABLE

SAMPLING AND ANALYSIS PLAN DEVELOPMENT AND IMPLEMENTATION

3/8/2019

			Months							
ID	Task Name	Duration (days)	1	2	3	4	5	6	7	8
1	Meet with Stakeholders	1								
2	SAP Preparation and Approval	45								
3	SAP Implementation*	60								
4	Report Preparation**	30								
5	Report Review and Approval by Regulatory Agency	90								

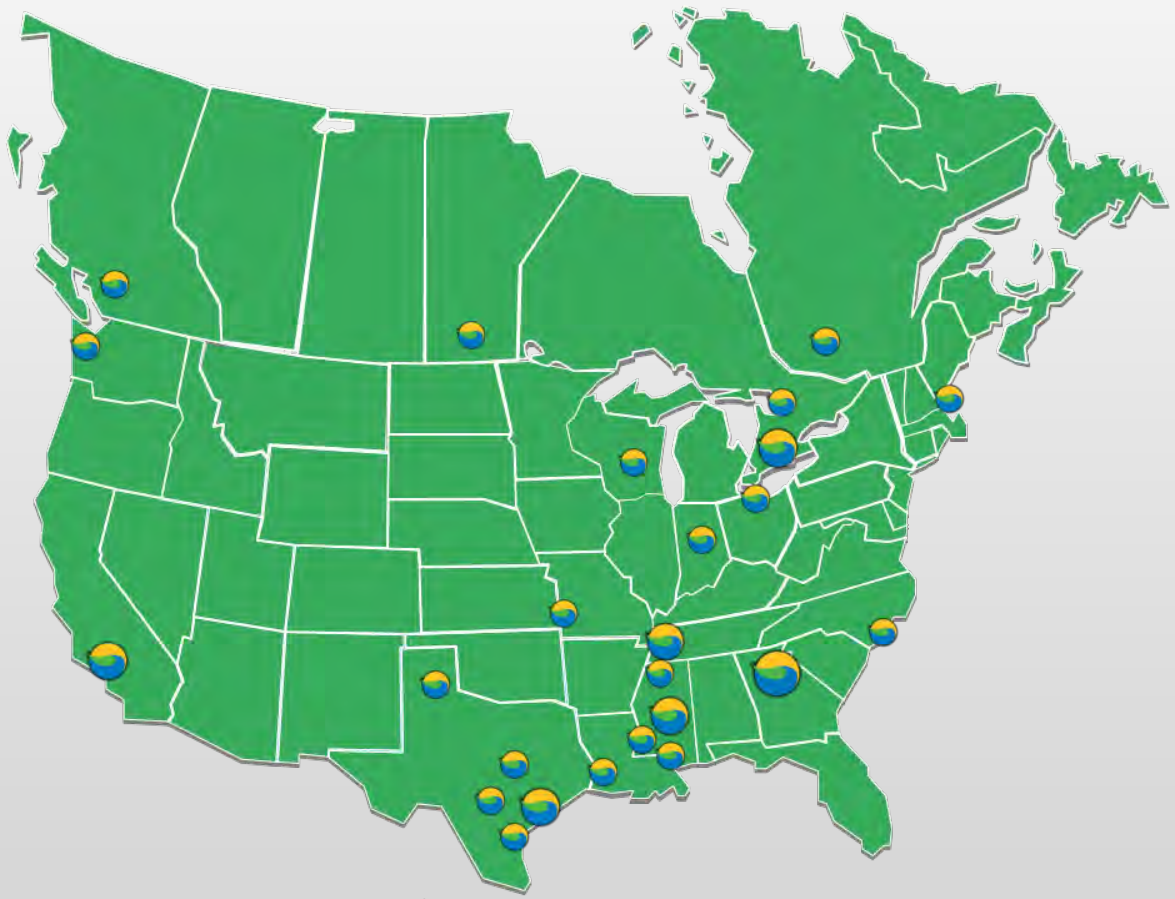
Notes:

*Exact dates contingent upon approval

**60 days following completion of all site work and the receipt of final validated laboratory analytical data.

CONCLUSIONS

- Do
  - Meet with stakeholders, regulatory agencies, etc. and get buy in prior to plan implementation.
  - Allow for ample time for plan implementation.
  - Ensure safety of sampling crew.
  - Sample for the proper constituents.
  - Ensure all subcontractors have proper certifications.
- DO Not
  - Rush SAP
  - Assume
  - Sacrifice safety for speed/cost.
  - Under/over sample.



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- 180+ Engineers, Scientists, Project Managers and Technicians
- Locations

QUESTIONS? CONTACT US

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