SUSTAINABLE SEDIMENT MANAGEMENT AND DREDGING SEMINAR

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GALVESTON, TX

Sampling and Analysis Overview

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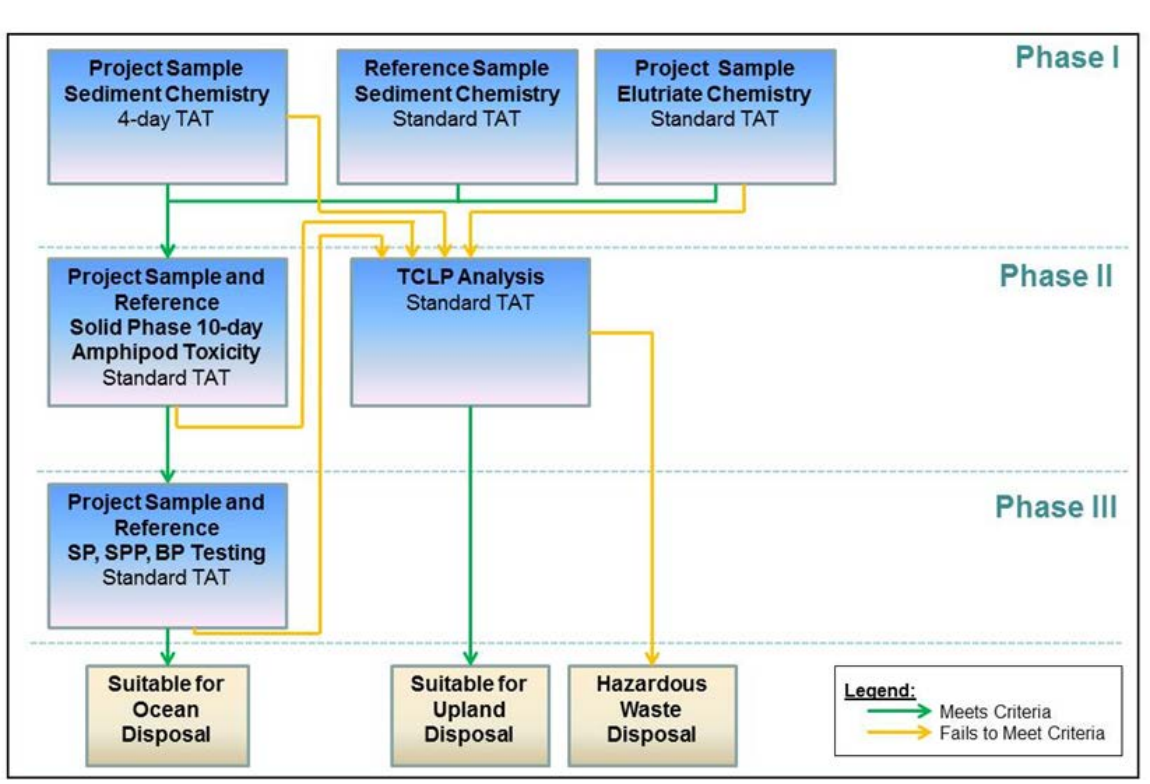
Overview

- The Sampling and Analysis Plan
- Project-Specific Considerations
- Analytical Design
- Sampling Design
- Sample Handling
- QA/QC
- References

The Sampling and Analysis Plan

- Critical to success of project.
- Stipulates how samples will be collected and analyzed.
- Dependent on accurate and recent site information (good bathymetry, etc.).
- Dependent on accurate and complete project information (dredging footprint, project depth, potential obstructions).
- Information collected to enable decisions beyond placement/disposal



The Sampling and Analysis Plan

Serves as an agreement between regulators, permit applicant and contractor performing the work (e.g., compositing strategies, sample locations, etc.).

- **Includes discussion of how results are to be interpreted and what will be included in final report.**
- **Should proactively identify potential problems anticipated in the field or issues that may arise during testing and provide for contingencies (refusal/obstructions at designated sampling locations, low water content clays, hard packed sands, mudstone).**

The Sampling and Analysis Plan

Content:

- Background (Location and description of the project, site history, previous studies)
- Objectives: purpose of the sampling and analysis to be performed
- Sampling & Analysis Design
  - Overview of sampling design and rationale (including description of nature and type of samples to be collected)
  - Overview of analysis to be performed and rationale

The Sampling and Analysis Plan

Content (cont.):

- Material and Methods
  - Sample Collection & Handling
  - Physical, Chemical , and Biological Analysis
  - Documentation
  - Quality Assurance and Quality Control
- Reporting
- Schedule
- References

Objectives

- Representative – samples must be collected such that they reflect material to be assessed (dredging site and placement site)
- Adequate – Sufficient material should be collected for the required analysis (including contingencies) and handled in a manner that ensures integrity to the point of analysis.
- Reliable – appropriate collection, handling and analytical procedures using approved methods

Project Specific Considerations

- Project Objectives
- Review of Dredging Plan (area, depth, volume, method, etc.)
- Local/Regional Requirements
- Review of Historical Data
- Site characteristics
- Health & Safety Concerns (UXO, utilities, etc.)

Sampling Design

- Division of project area into Dredged Material Management Units (DMMUs)
- Number & Location of samples within DMMUs
- Sample Depth
- Stratification
- Contingencies (refusal, stratification, obvious signs of contamination, etc.)
- Compositing
- Sample Handling

Sampling Design- Subdivision of Dredging Area

Dredging area can be divided into segments based on:

- Historical data
- Sediment characteristics
- Geographical configuration
- Anticipated method of dredging
- Known contaminated areas
- Number of DMMUs should be sufficient to adequately represent the area to be dredged and generally reflective of how the material is likely to be dredged and managed

Sampling Design - Number of Samples

The number of sample locations within a DMMU are generally based on:

- The size of the area represented by the DMMU
- Potential for contamination within a DMMU (to facilitate hotspot isolation)
- Time/funding constraints

The numbers of samples per location within a DMMU should be based on:

- Volume for the required analysis plus contingencies.
- Time / funding constraints

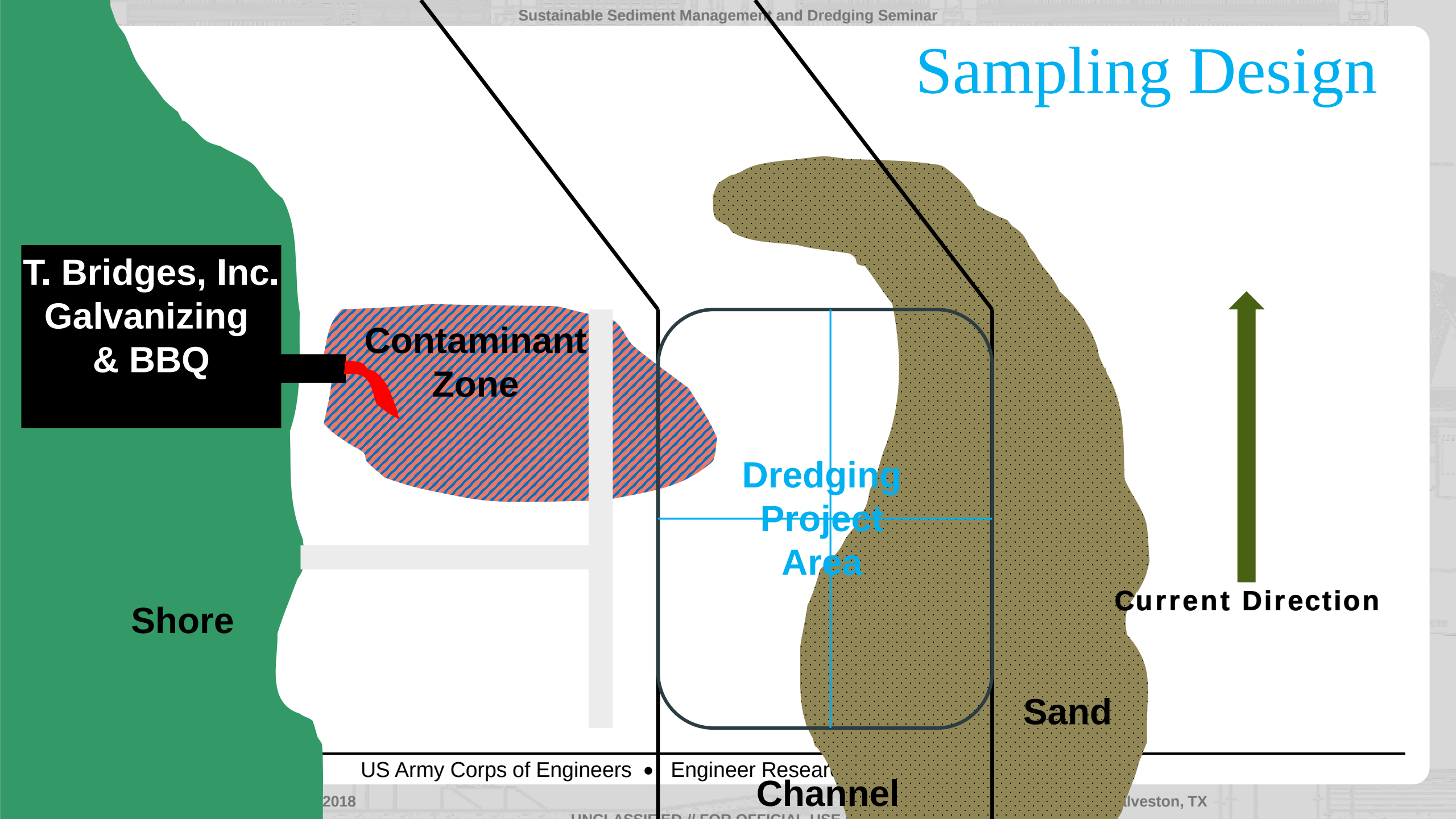
Sampling Design - Sample Location

- Areas above proposed design depth (shoals) and within the footprint
- Areas downstream from point sources
- Areas free of known impediments/hazards (rip rap, debris, utilities, UXO)
- Areas where fine grained material may be deposited (side channels and bends)
- Distribute sample locations throughout project/segment area

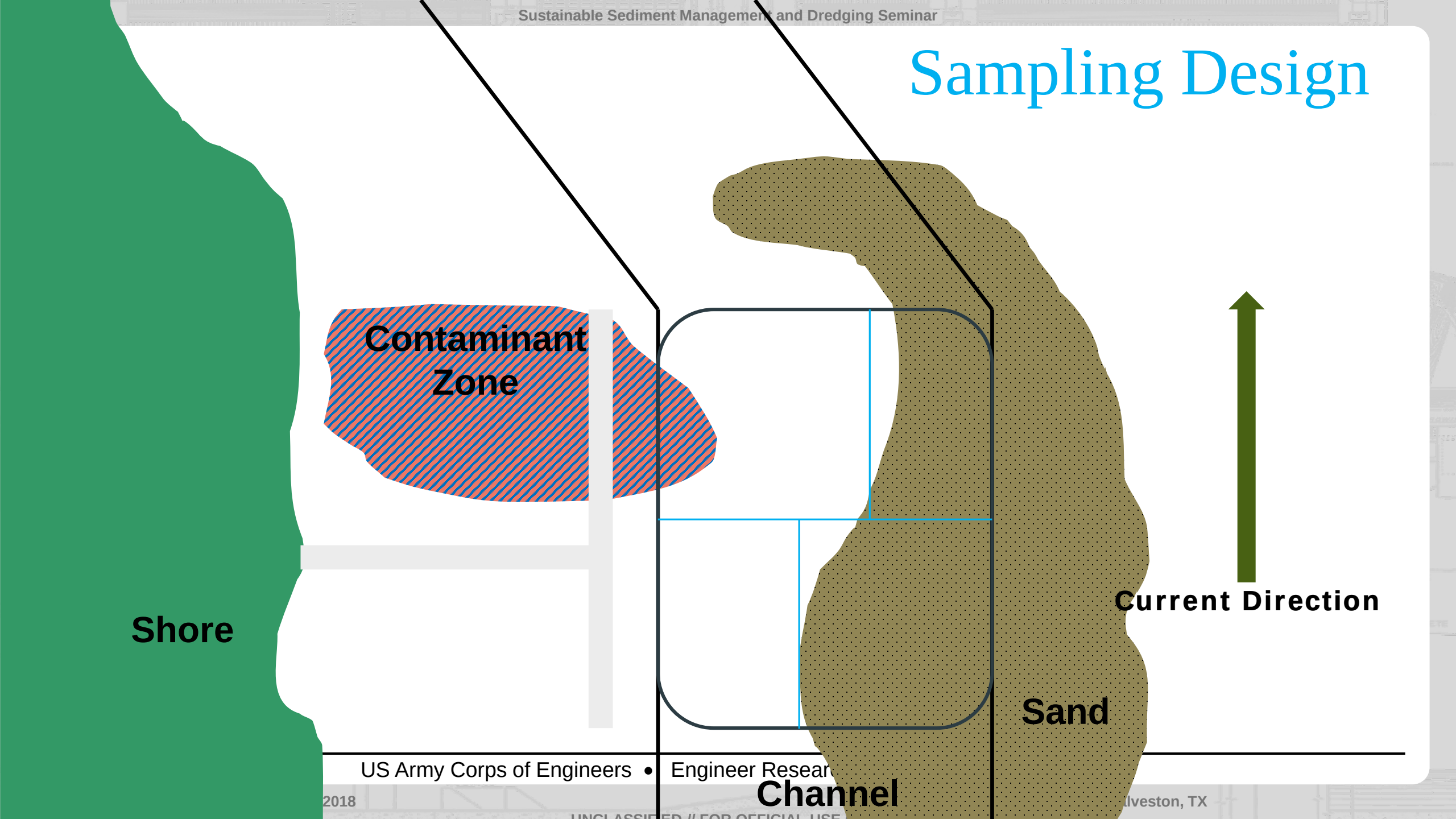
Sampling Design-Compositing

- DMMUs are typically represented via a composite of the samples collected within the DMMU to reflect how the material will be managed.
- Compositing represents an average of the sites sampled within the DMMU.
- Compositing results in decreased description of variability within project area (hence its important to maintain archives of individual cores).
- Compositing is not intended as a means to dilute a highly contaminated area

Sampling Design



Sampling Design



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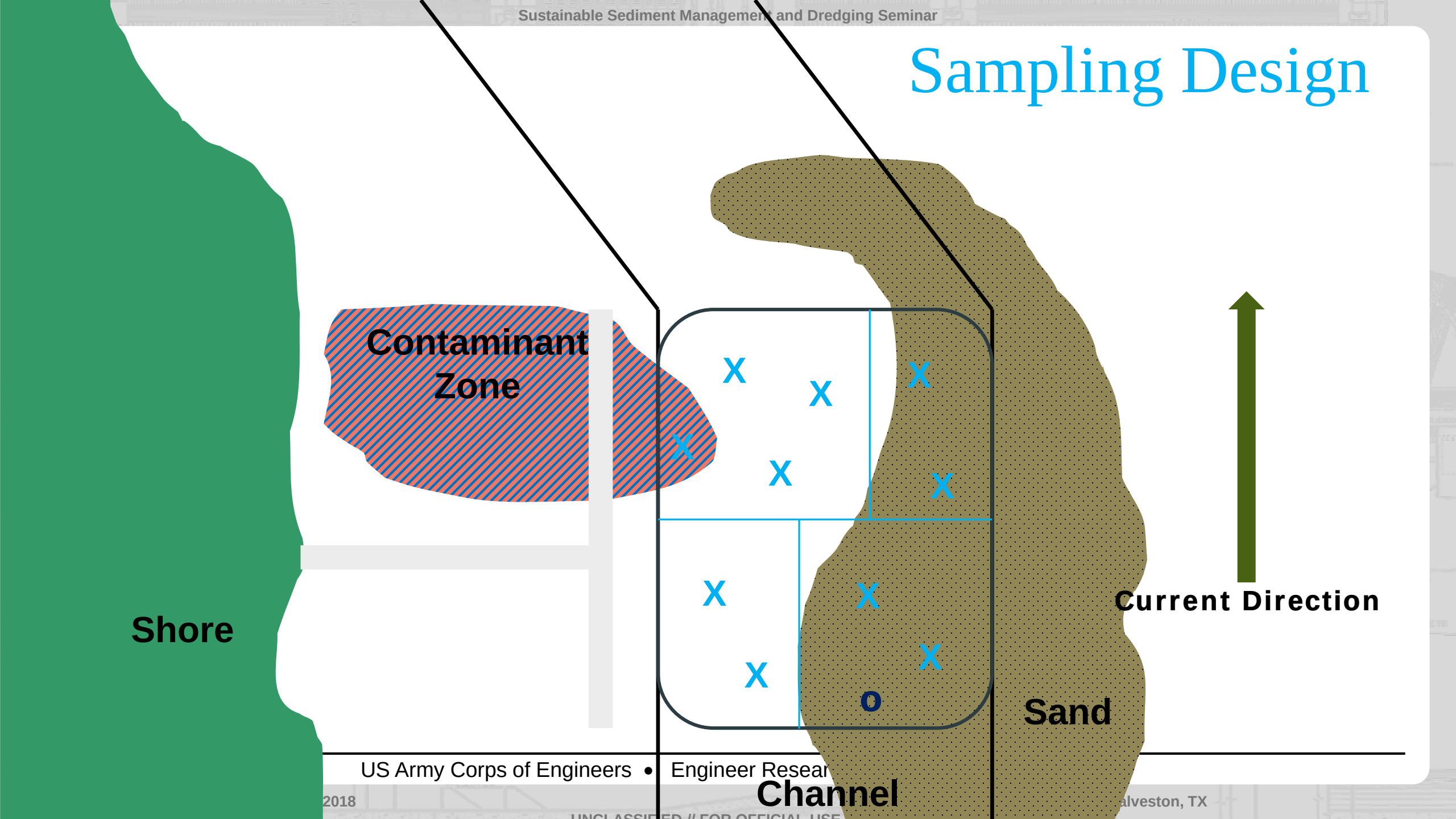
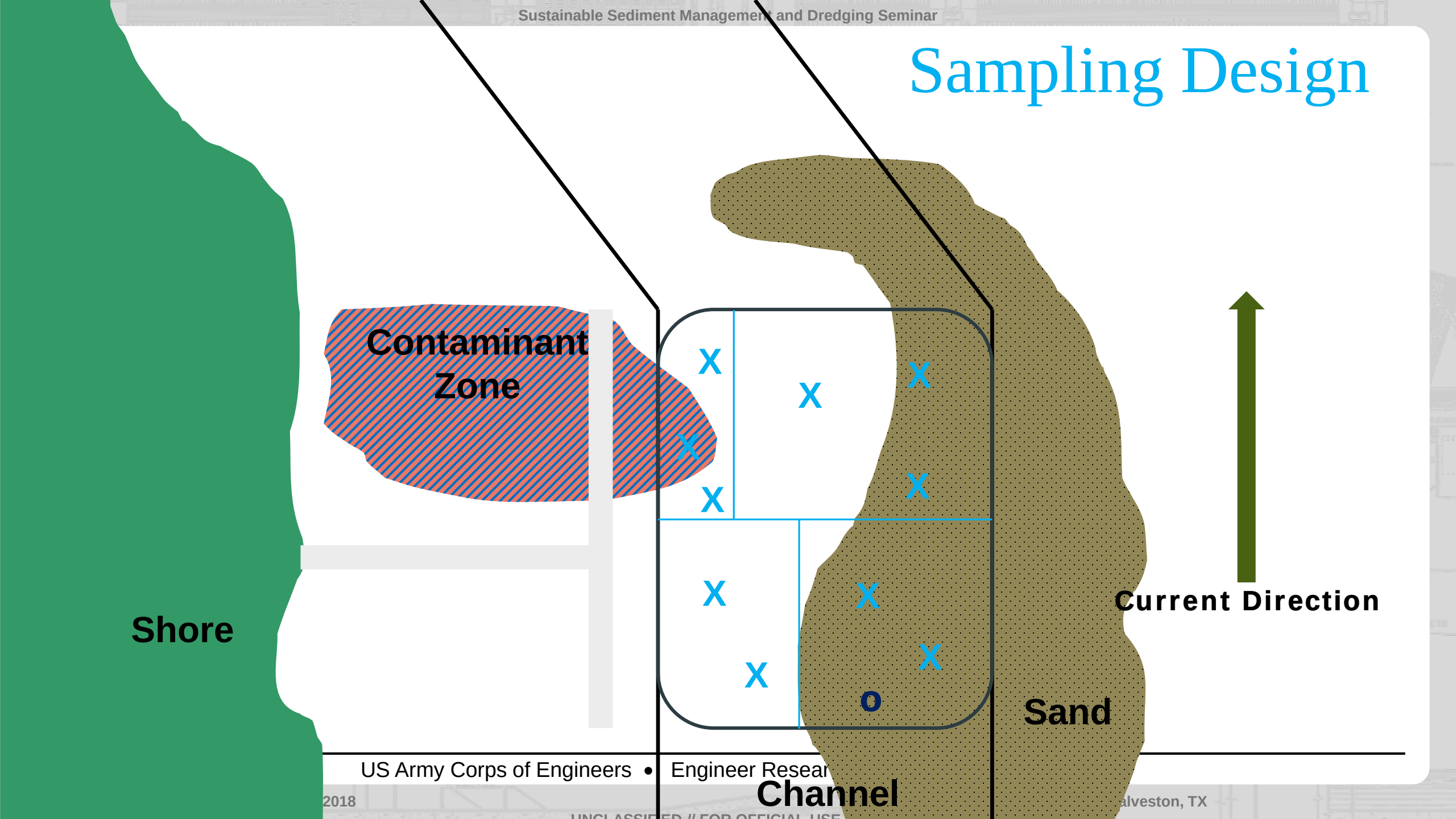


Sampling Design



Equipment

Sediment Cores

- Diver cores
- Box cores
- Gravity Cores
- Push Cores
- Piston Cores
- Vibracores (electric or hydraulic)
- Barge mounted hollow stem auger
- Vibratory hammer cores

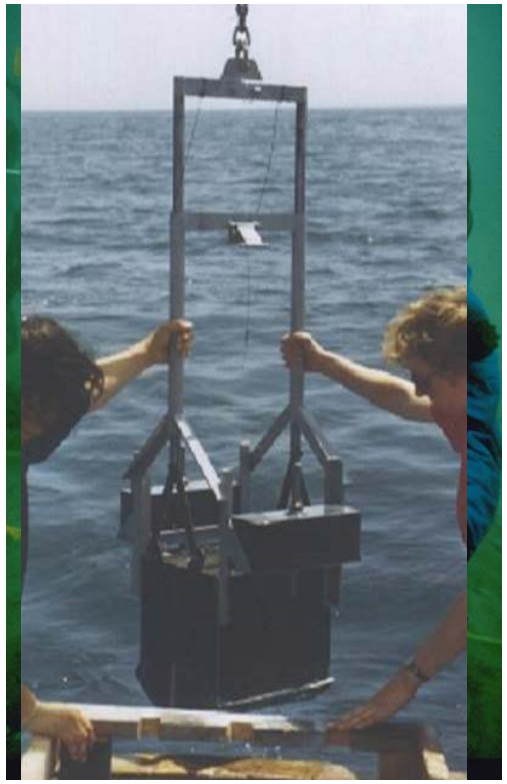
Sediment Grabs

- Van Veen
- Ponar
- Bucket dredge

Water

- Van Dorn/Kimmler grab sampler
- Bucket
- Pumps

Equipment- Sediment Cores



Diver Core
Box Corer

Piston Core
Mod. Box Corer

Vibratory
Gravity Core
Hammercore

Vibracore
Rotary Drill Rig

Equipment – Sediment Grabs

Van Veen

Eckman

Shipek

Equipment Water - Grabs

Nisken Sampler

Rossette Sampler

Sample Handling

Handle sample according to published SOP

- **Container type**
- **Preservative**
- **Sample storage**

Handle sample to minimize changes in composition

- **chemical**
- **biological**
- **avoid contamination**

Quality Assurance & Quality Control

- Ensure sample integrity from point of collection to point of analysis (CoC)
- QA assures the quality of the data
- QC assures that procedures are followed to obtain quality data

References

USEPA/USACE, 1998. Inland Testing Manual

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USACE, 2003. Upland Testing Manual

USEPA, 2001. Methods for Collection, Storage, Manipulation of Sediments

USEPA, 1995. QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations. EPA-823-B-95-001.

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