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CE-Dredge Decision Support Tool
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The Challenge

- USACE is responsible for maintaining and improving coastal channels, inland and intracoastal waterways and committed to dredging and managing dredged sediments in an economically and environmentally sound manner.

- Corps completes annual Preliminary Assessments (PAs) or more extensive Dredge Material Management Plans (DMMPs)
  - Identifies and assesses plans for future placement of dredged material (beneficial use opportunities)
  - Can be static, quickly outdated, time consuming and costly
  - Corps of Engineers Galveston District requested ERDC and Mobile District to modernize the PA/DMMP technical process for more efficiency and effectiveness
Increase integration of information through a connected data network

- Consistent access to authoritative data
- Simplified & expedited dredging analyses
- Multi-objective systems optimization
- Dynamic visualization
- Enhances communications
  - Within the district
  - With the vertical team
  - With non federal sponsors
  - With environmental agencies

Improved Communication, Shared Visioning, and Alignment of Mutual Objectives
Dredging Cycle Questions

Where and when do I need to dredge? What volume? What are the priorities?

When, Where, How much was historically dredged/placed? What are placement area remaining capacities? How have I managed the Placement Areas?

Where are the navigation channels? Where are the placement areas?

What are the sediment characteristics in Channels and Placement Areas?

What are the sediment sources? Where do I need sediment? What are natural transport pathways?

What are impacts to ecological habitat in dredge/place areas?

Where and when do I need to dredge? What volume? What are the priorities?

Are there potential new beneficial use opportunities in the region?

Closeout: Final volumes, payment, reports, etc.

What are the dredging and placement options? What tools/models are available to evaluate the options?

Is the construction going as planned?

What are my stakeholders priorities?

What are the optimal dredging and placement options for our goals?

What are placement area remaining capacities? How have I managed the Placement Areas?

When, Where, How much was historically dredged/placed? What are placement area remaining capacities? How have I managed the Placement Areas?
CE-Dredge Decision Support Tool

Decision Support Tool

1. About the DST

The CE-Dredge Decision Support Tool (DST) is a web-based dashboard providing an integrated, comprehensive approach for strategic dredged material management. The DST integrates selected Corps enterprise data, knowledge, tool results, and limited external data to allow more efficient and effective real-time and long-term planning, communication (internal and external), and collaborative decision making regarding activities to improve the management and beneficial use of dredged materials. The goal is to streamline preliminary or DMRP assessments by utilizing the USACE Navigation Data Integration Framework (NDIF) to develop a “living” DMRP capability.

2. Understand the Region

3. Sediment Analysis

4. Identify Environmental Concerns

5. Placement Area Capacity Summaries
What is the CE-Dredge DST Mapping Tool?

- The CE-Dredge Decision Support Tool (DST) is a web-based dashboard providing an integrated, comprehensive approach for strategic dredged material management.

- The DST integrates selected Corps enterprise data, knowledge, tool results, and limited external data to allow more efficient and effective real time and long-term planning, communication (internal and external), and collaborative decision-making regarding activities to improve the management and beneficial use of dredged material.

- The goal is to streamline preliminary or DMMP assessments by utilizing the USACE Navigation Data Integration Framework (NDIF) to develop a “living” DMMP capability.
CE-Dredge Decision Support Tool

Where and when do I need to dredge? What volume? What are the priorities?

When, Where, How much was historically dredged/placed? What are placement area remaining capacities? How have I managed the Placement Areas?

Where are the navigation channels? Where are the placement areas? Is there capacity? When, Where, How much was historically dredged/placed? What are placement area remaining capacities? How have I managed the Placement Areas?

What are my stakeholders priorities? Is the construction going as planned?

Closeout: Final volumes, payment, reports, etc.

What are the optimal dredging and placement options for our goals?

What are the sediment characteristics in Channels and Placement Areas? What are impacts to ecological habitat in dredge/place areas? Are there potential new beneficial use opportunities in the region?

What are the sediment sources? Where do I need sediment? What are natural transport pathways?

What are the optimal dredging and placement options for our goals? What are the stakeholders priorities? Is the construction going as planned?

Closeout: Final volumes, payment, reports, etc.

What are the optimal dredging and placement options for our goals?

What are the sediment characteristics in Channels and Placement Areas? What are impacts to ecological habitat in dredge/place areas? Are there potential new beneficial use opportunities in the region?

What are the sediment sources? Where do I need sediment? What are natural transport pathways?
Using the CE-Dredge DST Tool

- Each tab holds a category of data layers organized in a map.
- Maps are designed with data layers from a selection of different agencies, focused on data applicable to the tab category.
- All maps have legends and some maps are designed for full user interaction depending on complexity.
- Sediment, Placement Area Capacity and Hydrographic Surveys tabs are designed as interactive dashboards. These mapping applications summarize data in onscreen reports to assist in discovering complex map content.
- Sediment, Hydrographic Surveys, and Volume Change tabs provide integrated tools to download or perform geoprocessing tasks.
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Description

The CE-Dredge Decision Support Tool (DST) is a web-based dashboard providing an integrated, comprehensive approach for strategic dredged material management. The DST integrates selected Corps enterprise data, knowledge, tool results, and limited external data to allow more efficient and effective real-time and long-term planning, communication (internal and external), and collaborative decision-making regarding activities to improve the management and beneficial use of dredged material. The goal is to streamline preliminary or DMMP assessments by utilizing the USACE Navigation Data Integration Framework (NDF) to develop a “living” DMMP capability.

Example Studies

The CE-Dredge DST was developed through collaboration with SWG, SAM and ERDC for the Gulf Intracoastal Waterway from High Island to Brazos River, Houston Ship Channel, and Galveston Bay. The CE-Dredge National Infrastructure Opportunities Tool (NIOXT) was developed through the Center for Infrastructure Security and Technology (CIST) and builds on the NDF and CE-Dredge DST to incorporate public data to identify and evaluate collaborative opportunities for beneficial use.

Products


Benefits

CE-Dredge DST provides improved data access, visualization, and decision support for Corps dredging operations managers, engineers, planners, HQ, and R&D. The modernization and streamlining of preliminary or DMMP assessments through the USACE NDF to develop a “living” DMMP capability increases DMMP quality, usability, and adaptability while reducing required steps, costs, and timeframes.

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US Navy Corps of Engineers
Building Strong
Engineer Research and Development Center
This is a map showing the location of oyster reefs and environmental sensitivity. It includes areas designated as Special Land, Threatened and Endangered Species, and Sub-Aquatic Vegetation. Zoom into your area of interest.
5 Placement Area Capacity Summaries

Discover the status of U.S.ACE's Placement Areas. Zoom into the map to uncover details about the area of interest. As you zoom within changes, the dashboard will automatically refresh to provide you with a summary of values.

Want to discover more? Click on the wedges in the Placement Location and General Purpose to learn. The map and dashboard content will automatically filter based on your selection. Click again on the wedge to clear the filter.

Placement Areas in View

181

75,676,695 cu yds Remaining Capacity
Concluding Thoughts

- Traditionally, PAs and DMMPs have been costly and time-consuming to complete. Drivers are the time and cost required to locate, analyze, and review all of the required data which is labor-intensive.

- USACE Galveston District, ERDC and Mobile District have developed an extensible framework that uses available Corps enterprise databases and integrates data collection and analysis tools.

- Provides capability to gather and analyze the data required for PAs and DMMPs in a more efficient, timely, and cost-effective manner.

- Most importantly, the database capabilities, tools, and methods developed for this project are easily extendable to other projects, and to other USACE Districts.

- Currently expanding to additional districts, and in the process of developing map based analytic tools to aid in identifying placement and BU sites.