Navigation
Data Integration Framework

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March 27, 2013

US Army Corps of Engineers
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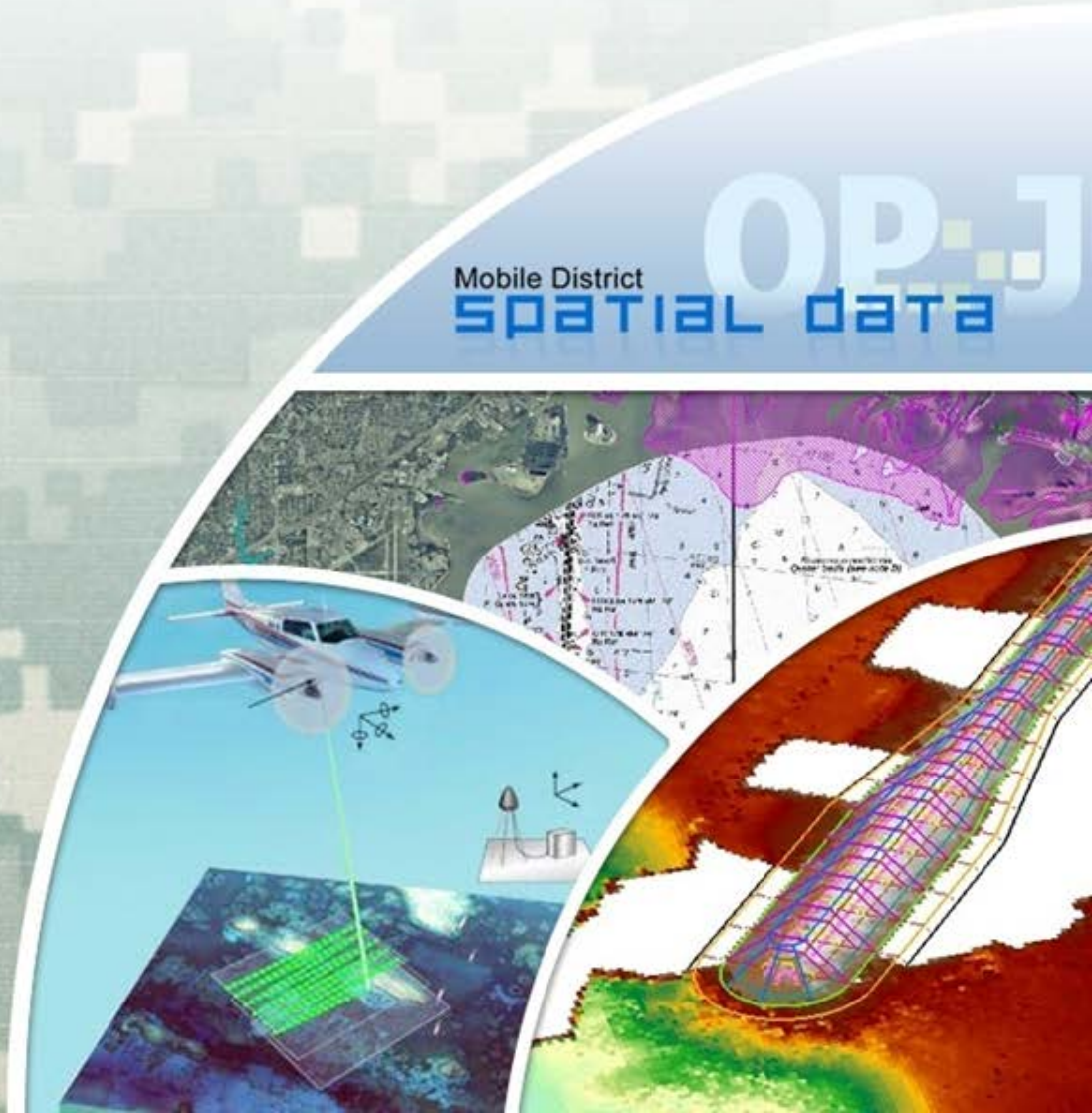
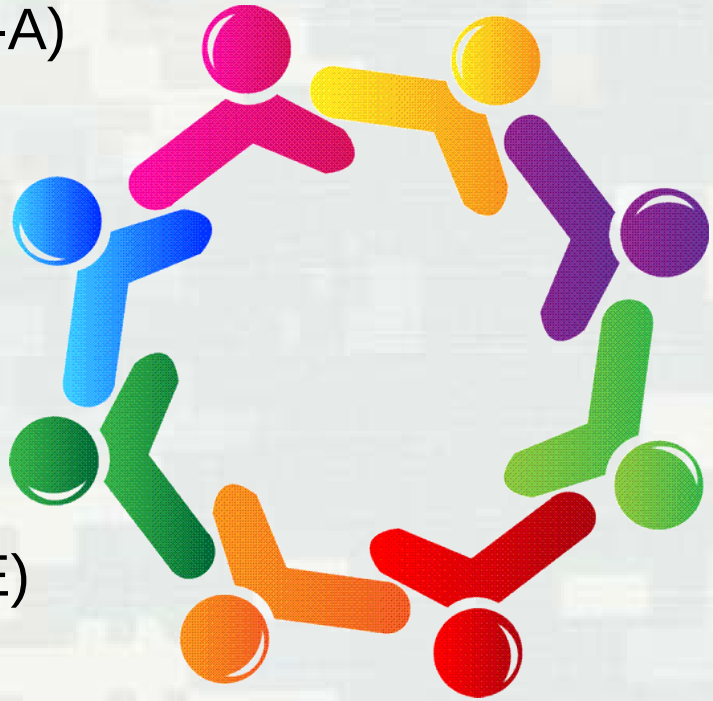


NDIF Steering Committee

- Jessica Burton-Evans (CESPN-PM-A)
- Allen Churchill (CEPOA-CO-O)
- Dylan Davis (CESAD-PDO)
- Chris Frabotta (CESWG-OD-N)
- Karen Garmire (CENWP-EC-C)
- Steve Jones (CEMVD-PD-KM)
- Jeff Lillycrop (CEERD-HV-T)
- Rich Lockwood (CELRP/HQUSACE)
- Doug McDonald (CEIWR-NDC)
- Clint Padgett (CESAM-OP-J)
- Teresa Parks (CESAM-OP-J)
- Rich Thorsen (CENAD-PD-OR)



Presentation Outline

1. **NDIF**: What is the need and what is it?

2. **Phases**: What's included?

3. **Benefits**: How will this help you and what impacts will it have?

Coastal Working Group Survey

26 Data Use Questions

Office Symbol	Division	District	1. What types of coastal projects do you have? (i.e. shoreline protection, beach nourishment, shallow draft harbors, deep draft harbors, recreation, environmental restoration. etc.)
LRC, LRB	Great Lakes and Ohio River Division	Buffalo, Chicago	shoreline protection, beach nourishment, shallow draft harbors, deep draft harbors, recreation, environmental restoration, confined disposal facilities, navigation channels dredging projects
LRE		Detroit	Shore protection, Re-hab of Navigation Structures (Shallow and Deep Draft, Sediment Transport Studies, Dredged Sediment Placement Studies, Inner Harbor Wave Analyses, FEMA Flood Elevation Determination, Lawsuit Defense Studies
NAE	North Atlantic Division	New England	Shoreline protection and inundation prevention, coastal structure repair, beach nourishment, shallow draft harbors, deep draft harbors, recreation, environmental restoration, confined disposal facilities, navigation channels dredging projects
NAN		New York	shoreline protection (storm damage reduction), beach nourishment, shallow draft harbors, deep draft harbors, ecosystem restoration, intrscoastal waterways, breakwaters, coastal inlets
NAP		Philadelphia	Hurricane and Storm Damage Reduction projects (including 10 beach nourishment projects), coastal structures (seawalls, jetties, revetments), shallow draft navigation, submerged breakwaters, environmental restoration
NAB		Baltimore	Shoreline Protection; Beach Nourishment; Shallow draft navigation, environmental restoration, Sand bypassing
NAO		Norfolk	Storm damage reduction, ecosystem restoration, beach renourishment, shallow and deep draft navigation projects
SAW	South Atlantic Division	Wilmington	Shoreline protection, beach nourishment, deep draft harbors, shallow draft channels, and environmental restoration.
SAW		Charleston	Shoreline protection, beach nourishment, deep draft harbors, shallow draft channels, and environmental restoration.
SAS		Savannah	Deep Draft Navigation Harbors, Beach Renourishment, Environmental Mitigation/Restoration, Dredged Material Disposal Areas, Shallow Draft Waterways, Flood Damage Reduction
SAJ-EN		Jacksonville	All of the above.
SAJ-PD		Jacksonville	all of the above; mainly shore protection with beach nourishment. hard structures used to a lesser extent. current construction of hard structures is to maintain beach fill in place. Navigation projects include both deep and shallow draft navigation and Intra Coastal Waterway. Navigation: deep draft harbors at 5 major cities and various shallow draft projects as well as the Gulf and Atlantic Intra Coastal Waterways
SAM		Mobile	Shoreline protection, beach nourishment, deep draft navigation harbor, restoration.
MVN	Mississippi Valley Division	New Orleans	Beneficial Use, Marsh restoration and protection, shoreline protection, Freshwater and sediment diversions, deep draft navigation channels, locks, gates, barrier island restoration, hydrologic restoration, sediment trapping, sand mining, sand management
SWG	Southwestern Division	Galveston	Coastal projects in SWG include coastal storm damage reduction, ecosystem restoration, deep-draft and shallow-draft navigation, and flood risk management. The coastal storm damage reduction project also takes into consideration a recreation aspect.
SPL	South Pacific Division	Los Angeles	All of the above including shoreline protection, storm damage reduction, navigation, recreation, ecosystem restoration.
SPN		San Francisco	Shore Protection, Flood Control, Shallow Draft Harbor, Deep Draft Harbors, Environmental Restoration
NWP	Northwestern Division	Portland	Deep draft and shallow draft navigation channels, rubblemound jetty navigation entrances, small boat harbors, riverine and estuary pile dike systems, shoreline erosion and protection, open water dredged material disposal sites, environmental restoration, shoreline/coastal flooding
NWS		Seattle	Shallow draft harbors, deep draft harbors, environmental restoration, beach nourishment
POA	Pacific Ocean Division	Alaska	shore protection, deep draft navigation, shallow draft harbor, flood damage reduction
POH		Hawaii	shoreline protection, beach nourishment, shallow draft harbors, deep draft harbors

2 Summary Spreadsheets Compiling Input from 21 Coastal Districts

Office Symbol	Division	District	Beach Profiles: Sources of Data	Beach Profiles: Problems Encountered	Beach Profiles: Related Data Needs
LRC, LRB	Great Lakes and Ohio River Division	Buffalo, Chicago	SHOALS in-house surveys contract	SHOALS - inconsistent coverage due to turbidity and breaking waves	
LRE		Detroit	Contractors. D&M	Inconsistent datum	Denser coverage around harbor
NAE	North Atlantic Division	New England	SHOALS/CHARTS in-house surveys contract	SHOALS/Charts - inconsistent coverage due to turbidity and breaking waves	
NAN		New York	In house (survey Branch) Contract Engineering Staff Local University	timeliness of data collection increasing costs difficulty in getting immediate post-storm profiles (for model calibration)	LIDAR vs. short profiles
NAP		Philadelphia	Contractor, in-house non-Federal sponsor (DE) University (Stockton)	environmental windows (not completing profiles) accuracy in surf zone	technologies that develop accuracy surveying the surf zone
NAB		Baltimore	A-E	Control issues on occasion	
NAO		Norfolk	Local sponsor, Local Universities		
SAW	South Atlantic Division	Wilmington	Annual monitoring 2 projects.		
SAW		Charleston	University State of South Carolina contractor	incorrect equipment setup	
SAS		Savannah	Construction Contractor Surveys In-House Survey Crews	Reliability due to potential conflict of interest Due to the large tidal range, it is difficult to get both hydrographic and topographic surveys during a reasonable time frame.	
SAJ-EN		Jacksonville	AE's, In-house	none	
SAJ-PD		Jacksonville			
SAM		Mobile	Lidar, In-house Bathymetric Survey, State databases	Inconsistent vertical datums. Issues with post processing.	
MVN	Mississippi Valley Division	New Orleans			
SWG	Southwestern Division	Galveston			
SPL	South Pacific Division	Los Angeles	hydrographic and nearshore surveys Old Corps and BEB records Old County records BEACON/SANDAG Organization of Local Gov't	datum conversions, accuracy not geo-referenced ambiguous alignment and zero location inconsistent datums (vertical) and local datums	Data to Produce Accurate Beach Profiles, long-term records that are geo-referenced need frequent enough capture seasonal and long-term trend Comparing historic beach profiles with current profiles and LIDAR
SPN		San Francisco	Survey Contractors NOAA Coast & Geodetic Survey USGS Surveys In-house staff	Datums Variability in survey techniques or assumptions Poor understanding of the true accuracy of various survey techniques	Datums; transect reference point Risk and Uncertainty Lidar capable software and computer power
NWP	Northwestern Division	Portland	in-house crew, contractor State governments, local agencies photogrammetric methods, lidar	some datum and control issues ground control setup expensive	more regional coverage needed after storms
NWS		Seattle	District WA Dept. Ecology	Data is unavailable without requesting	Post-storm monitoring surveys of erosional hotspots
POA	Pacific Ocean Division	Alaska	Contract surveyor	survey control. vertical datum changed relative to survey due glacial rebound/and or sea level rise	new monuments and tide gaging to update old monuments
POH		Hawaii	A/E Contracts	Cost is extremely high in remote locations. Datum issues.	In-house resources and tools would be beneficial.

Summary of Needs

- Data is required to execute our missions

- We have requirements for a wide range of data types – temporal, spatial, financial, real-time, legacy, biological, chemical, physical, environmental, economic…

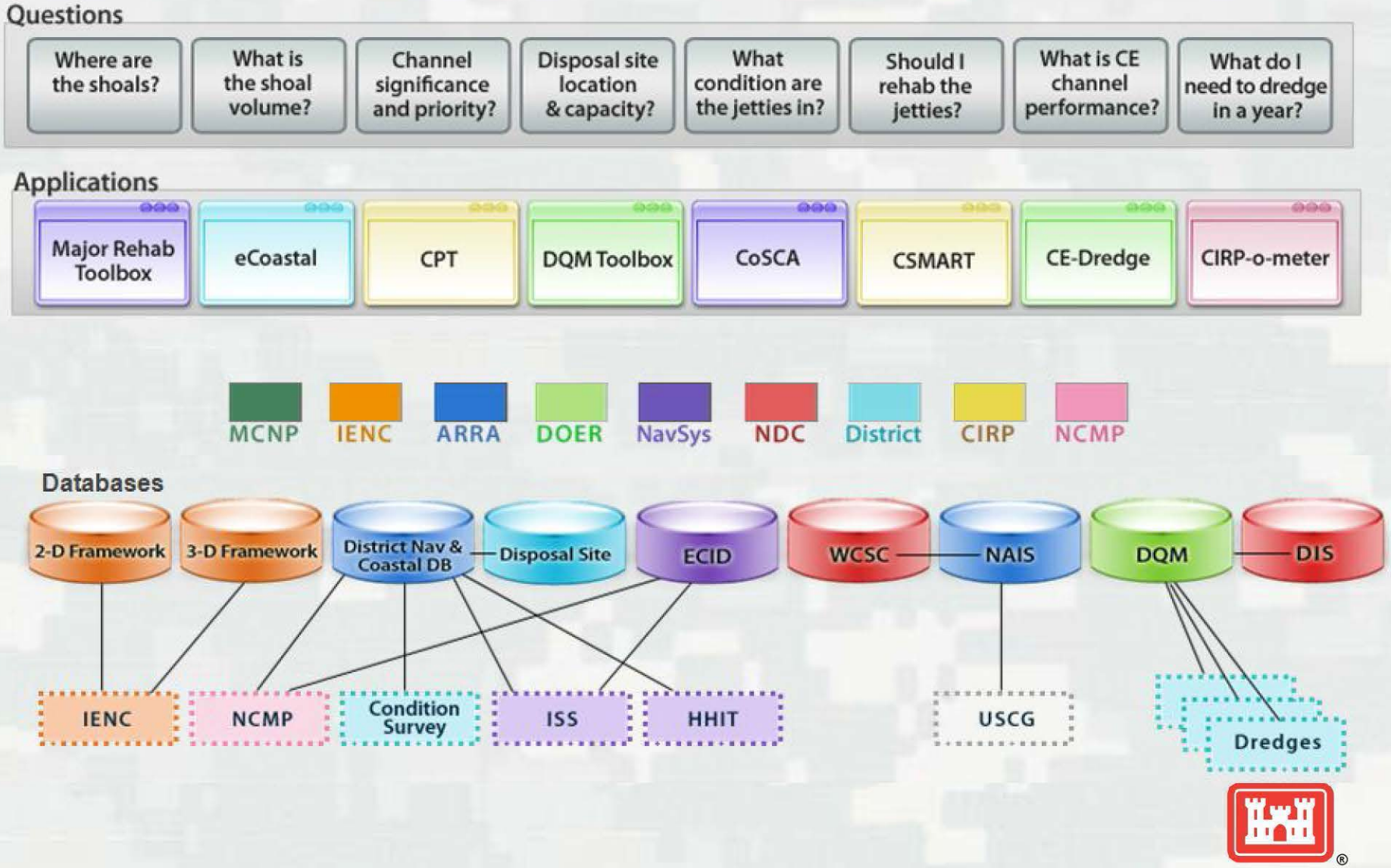
- Corps collects / produces a lot of data that is indispensable to us, our stakeholders, and the public

- Corps relies on other agencies for much data: other Fed (USGS, NOAA, others), coastal States (TX, LA, MS, AL, FL, CA, OR, WA, all), NGO's, and Universities

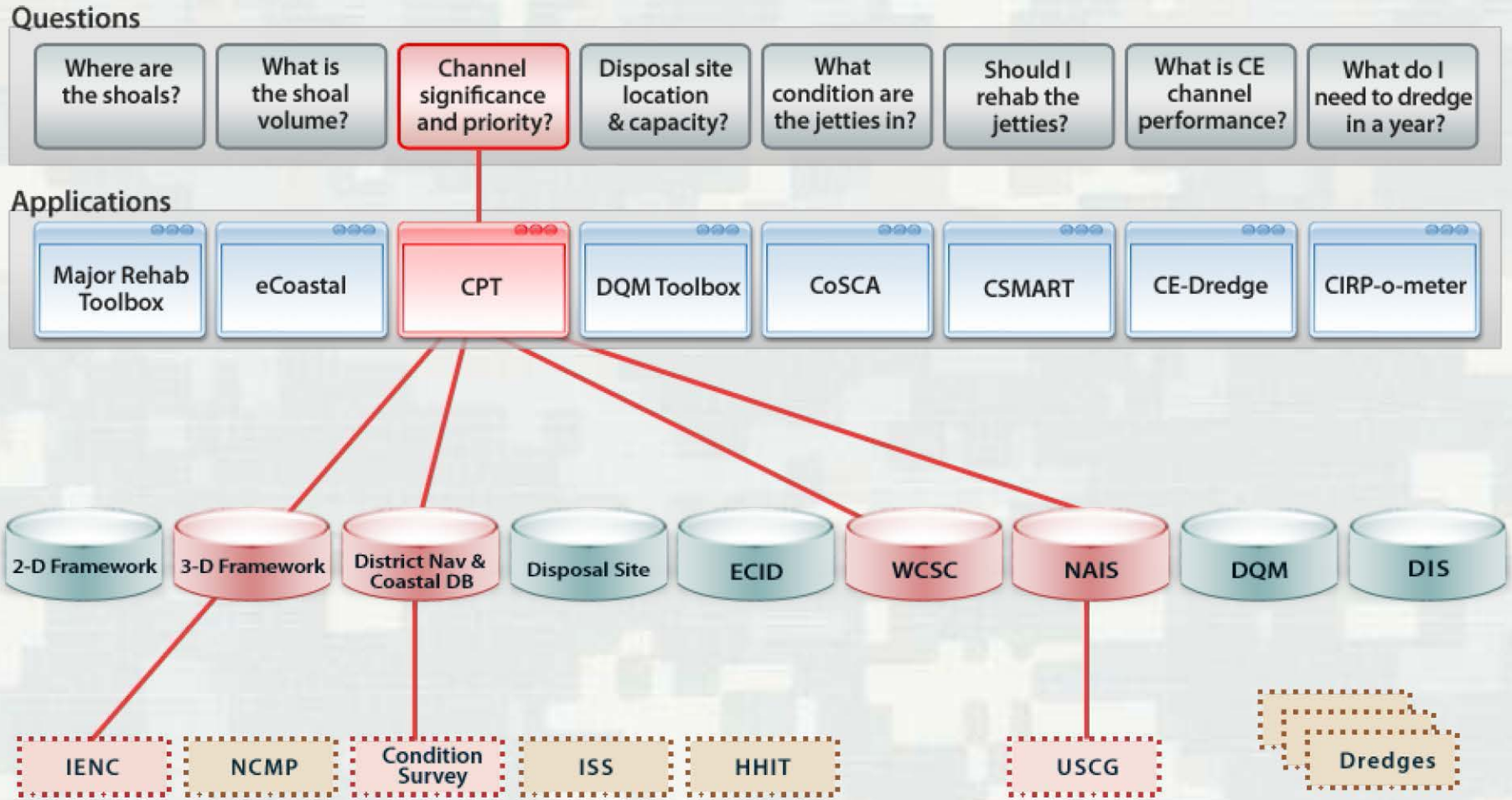
- There are national & regional issues that require data partnerships to adequately address

- Corps spends $200M/yr - Need a sustainable framework to discover, access, and use data

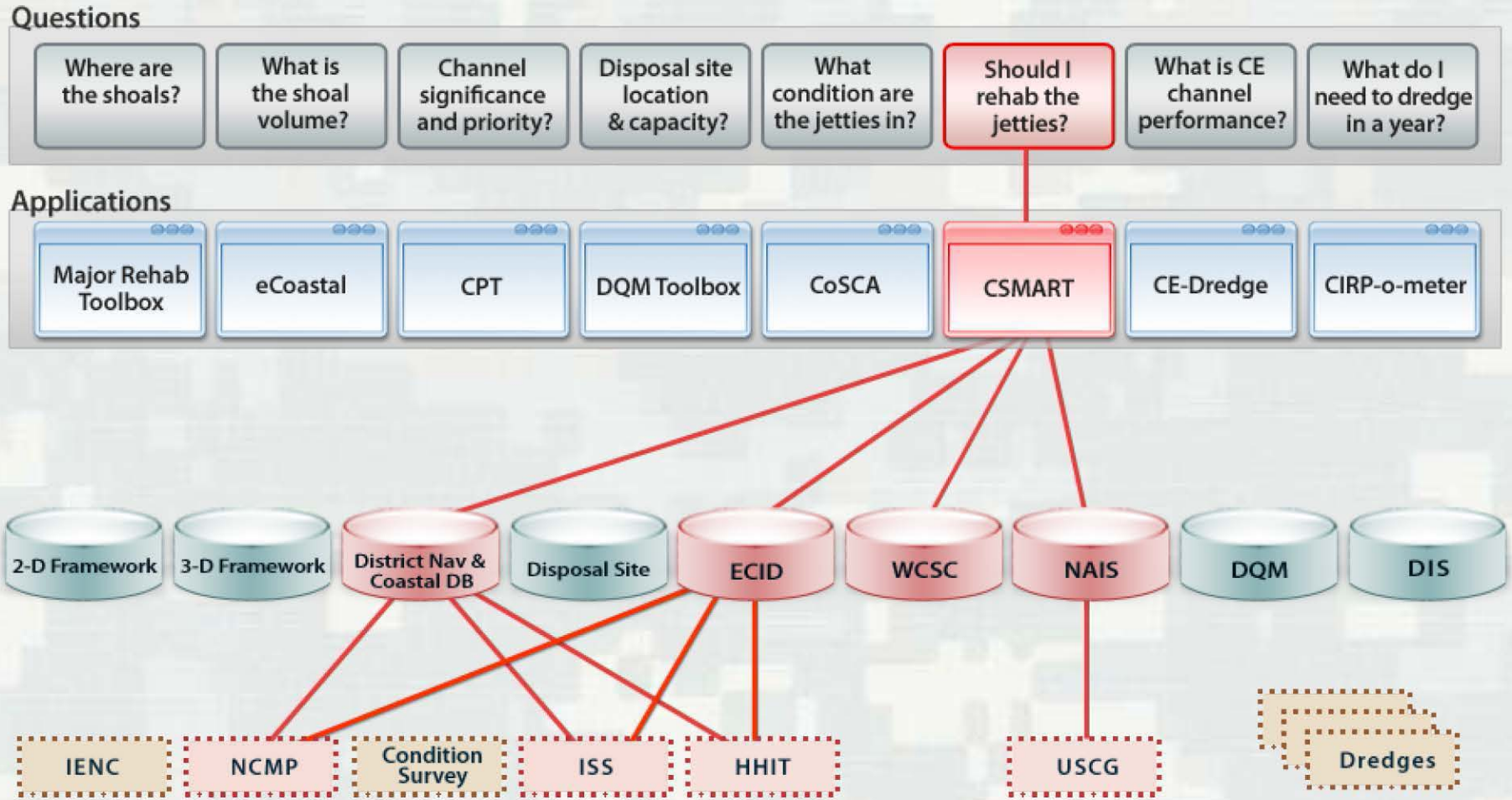
Integrated Coastal Navigation Programs



Integrated Coastal Navigation Programs



Integrated Coastal Navigation Programs



Challenges

- Multiple, disconnected navigation databases
- Data format
- Data inconsistency
- User time and effort
- User participation
- Data availability
- Data timeliness

Data Integration Framework (DIF)

- A combination of processes, standards, people, and tools used to transform disconnected enterprise data into useful, easily accessible information for strategic analysis and reporting
- A blueprint identifying how all of its pieces interact and establishing a set of standards and best business practices
- Turns data scattered among different databases and locations into data that is consistent across databases, that can be easily discovered, accessed, and used

NDIF Architecture

- Source Databases (data)
- Data Hub (catalog)
- Web Service Layer (access)
- Tools (analysis)
- Portal (discovery)

US Army Corps of Engineers

Data Integration Framework
Dredging Portal

Data Explorer | Data Map Viewer | **Resource Discovery** | Workflow Questions

Resource Discovery

Filter Settings (click to include):

Dredging Phase: Planning Contracting **Operations/QA** Closeout Analysis All

Resource Type: **Tool** Map Graph/Report Export Map Svc Web Svc All

Dredge Type: **Hopper** Pipeline Mechanical Scow All

Resources matching filter settings **Operations/QA + Tool + Hopper**:

DQM Online Data Viewer v.2.5.5

http://sam-db01mob.sam.ds.usace.army.mil/applications/opj/A067_DQM/viewer/

View dredge tracks by contractor-reported load numbers or calculated cycle numbers; export raw track data; create and export disposal plots

Tags: Operations/QA, Tool, Map, Graph/Report, Export, Hopper, Scow

DQM Multi-Load Export and Disposal Plot

http://sam-db01mob.sam.ds.usace.army.mil/applications/opj/A067_DQM/multiLoad/Main.aspx

Request exports and disposal plots of multiple loads at once; export Excel spreadsheets, shape files, or PDF

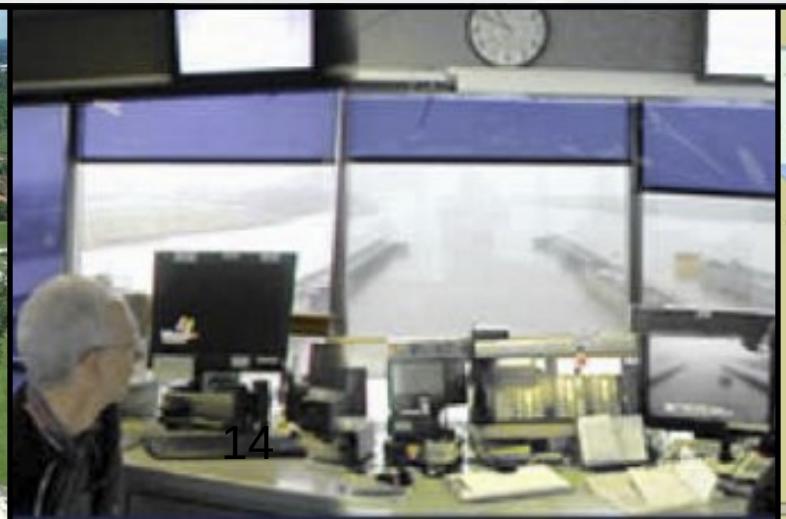
Tags: Operations/QA, Tool, Export, Hopper, Scow

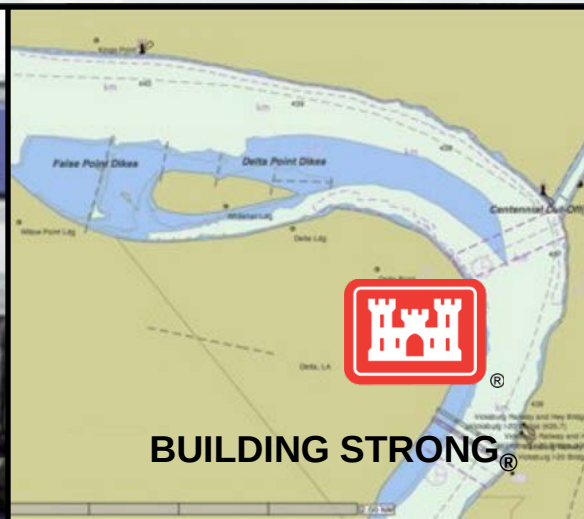
NDIF Phases

1. Dredging
   - Development of a Dredging Portal “front end” to the dredging databases—DM, DIS, DQM, and RMS–their connection to the each other, and the portal’s connection to the District’s Navigation and Coastal Data Banks
2. River Information Services (RIS)
3. Surveying and Mapping
4. Navigation Infrastructure
5. Engineering with Nature
6. Marine Transportation

River Information Services (RIS)

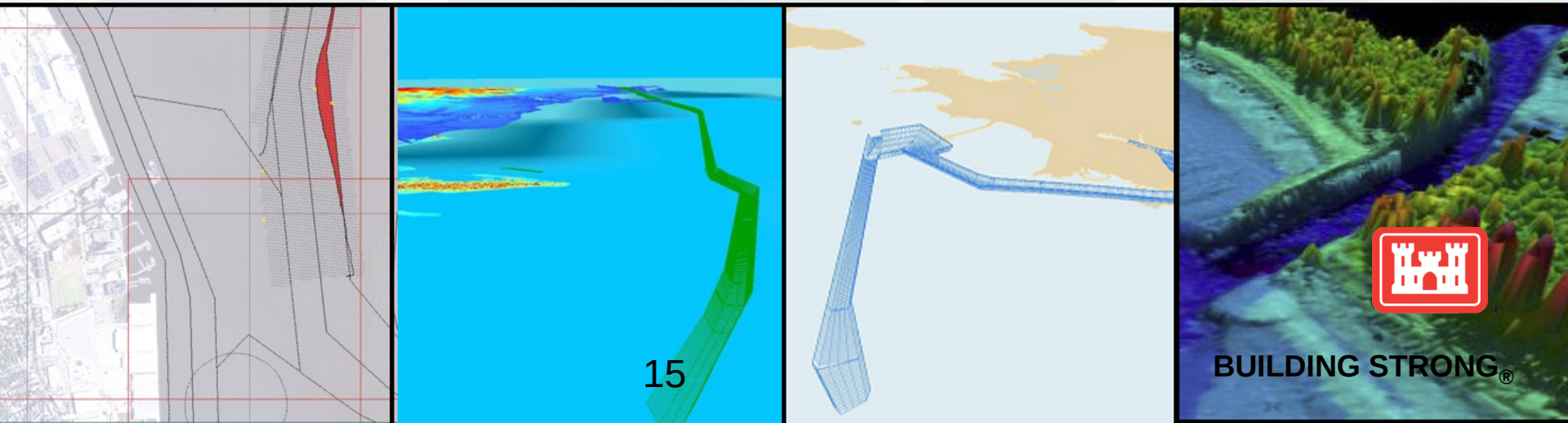
- Consolidated US Coast Guard (USCG) Web Service
- Inland Electronic Navigation Charts (IENC)
- Lock Operations Management Application (LOMA)
- Lock Performance Monitoring System (LPMS)
- Master Docks Plus (MDP)
- Nationwide Automatic Identification System (NAIS)





Surveying and Mapping

- eHydro Hydrographic Survey
- National Channel Framework (NCF)
- National Coastal Mapping Program (NCMP)/ Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX)
- Navigation and Coastal Data Bank (NCDB)

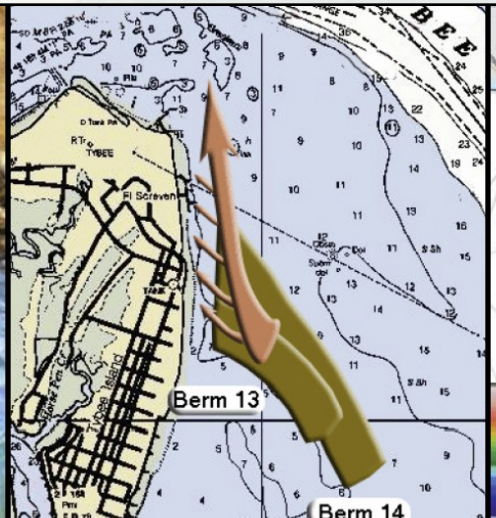


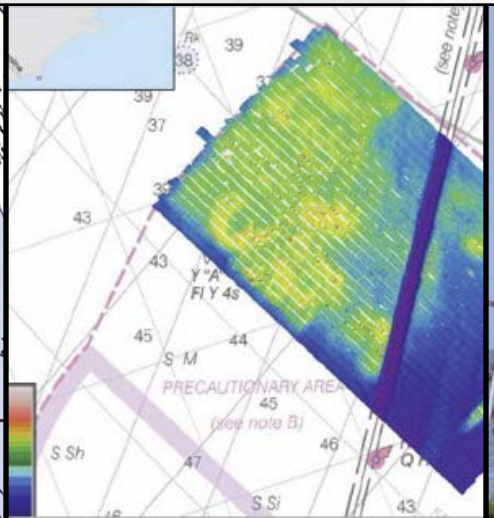
Navigation Infrastructure

- **Channel Portfolio Tool (CPT)**
- **Coastal Structures Management, Analysis, and Ranking Tool (CSMART)**
- **Enterprise Coastal Inventory Database (ECID)**
- **Lock Characteristics**
- **Master Docks Plus (MDP)**
- **National Coastal Mapping Program (NCMP)/ Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX)**
- **Navigation and Coastal Data Bank (NCDB)**
- **Port and Waterways Facilities**

Engineering with Nature

- Engineering With Nature (EWN)
- Ecosystem Restoration Database
- Civil Works Project Mitigation Database (CWPMD)





Marine Transportation

- **Commodity Code Cross Reference File**
- **Flag Master File**
- **Foreign Cargo (Inbound/Outbound)**
- **Foreign Traffic Vessel Entrances and Clearances**
- **Hazardous Commodity Code Cross Reference File**
- **International Classification of Ships by Type (ICST)**
- **Master Docks Plus**
- **Principal Ports of the United States**
- **Schedule K Classification of Foreign Ports**
- **Waterborne Commerce of the United States (WCUS)**

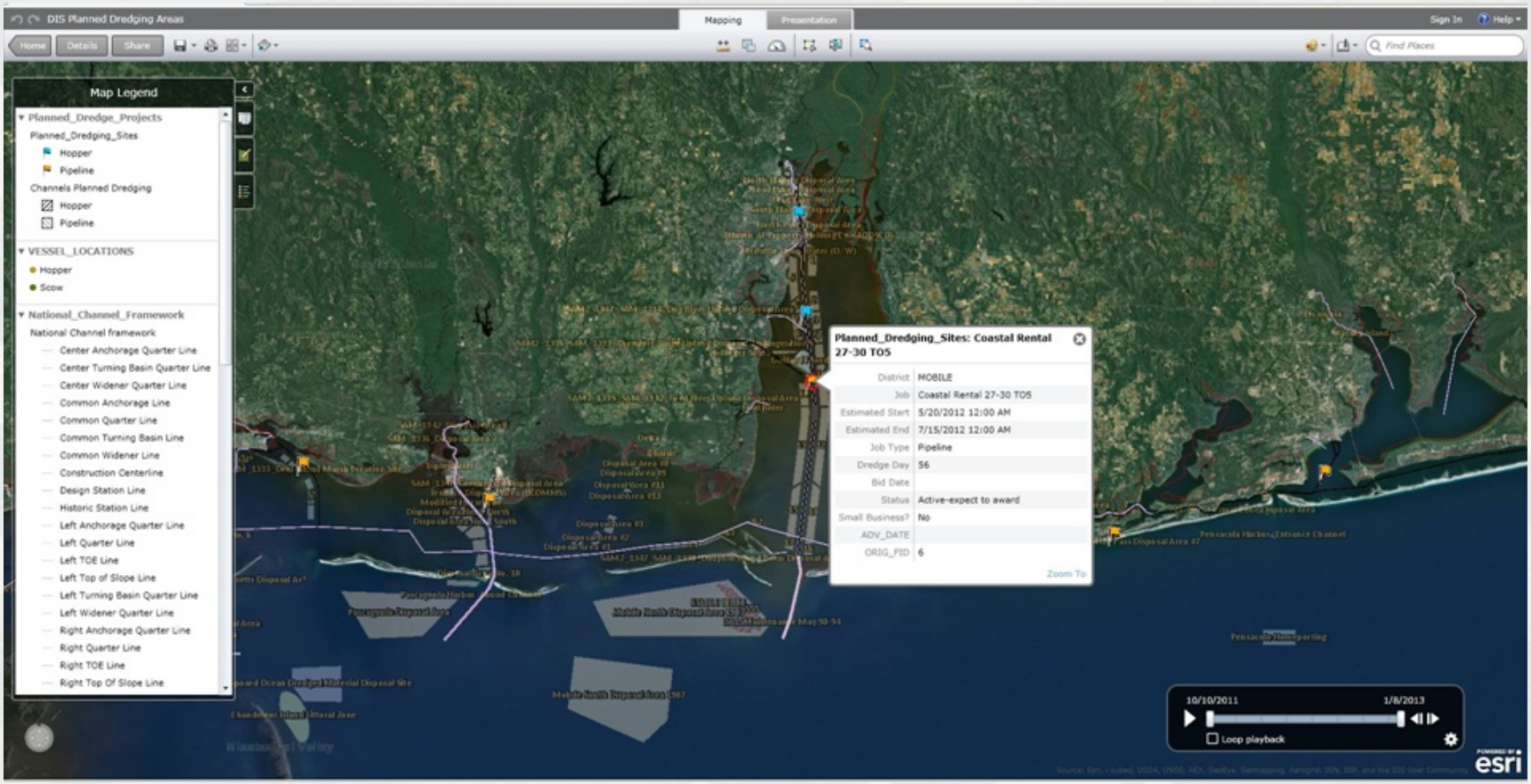
NDIF Impact on USACE Navigation Staff

- Designed to assist those who collect, enter, distribute, *and* use navigation data
- Removes data insularity
- Helps users find answers more easily
- Reduces data entry, time, and effort
- Enhances staff participation, data consistency, and data timeliness
- Standardizes data format
- Provides geospatial data

NDIF Integration into USACE's Enterprise Geospatial Program

- Promotes geospatial data sharing across the USACE Navigation Business Line
- Exposes and makes discoverable decentralized data through a centralized Portal
- In the process of linking disparate databases, provides a geospatial component to those that previously had none

DIS Planned Dredging Areas



Impact on USACE as a Whole

- The ultimate goal of the NDIF is to develop an integrated data system across the Navigation Business Line, which will serve as a model of what ultimately might be accomplished across the entire USACE

Question/Comments?

- Upcoming Milestones
  - Dredging Portal Prototype (May 2013)
  - Paper - NDIF: The Concept and the Vision (June 2013)

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