

Coastal Structures Condition Assessment and Standardized Reporting Application (CoSCA)



Developers:
Mobile District, Spatial Data Branch
US Army Corps of Engineers

Customers:
ERDC Coastal & Hydraulics Lab
Stan Boc & Cheryl Pollock



Application Overview

✿ Description

- ESRI ArcMap Toolbar and backend enterprise database(s)
- Integrates data from various sources to aid inspections and calculate a condition index
- Standardizes coastal structure condition assessments from inspection and survey data
- *Special Function:*
 - 3D wire-frame data model is used as baseline for volume calculations

✿ What will it help us do?

- Assessed condition is no longer subjective. Index is **generated** from calculations



Functions of COSCA



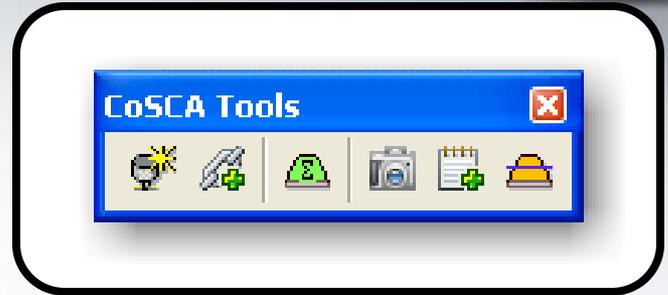
- ❁ Coastal Structures Condition Assessment and Standardized Reporting Application (CoSCA) allows users :
 - To view the operational condition of coastal structures based on bathymetric and topographic data acquired through the NCMP.
 - To submit inspection reports to a centralized database.
 - To create & submit a ‘condition report’ reflecting the state of the structure at a specified time.



Functions of CoSCA



- Connect to District Database
- View Available Structures
- Volume Change Analysis
- Data Snapshot Tool
- Assemble Condition Report
- Generate Cross-Section Profile



Data Model



- ✿ Under USACE guidelines, all spatial datasets produced by the USACE must abide by the DoD Spatial Data Standard.
 - When comparing existing SDS-compliant data model to the data components collected in the design phase of a coastal structure, many components were missing.
 - The released data model was reviewed and modified to reflect the actual features of the coastal structure, as designed by the USACE engineer.

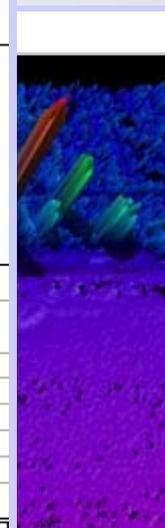
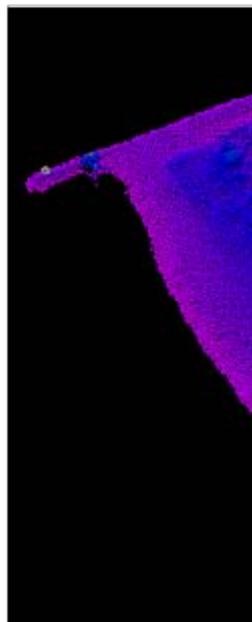


Data Input Requirements



What are the data input requirements?

STRUCTURAL RATING FOR RUBBLE BREAKWATERS AND JETTIES										Page _____ of _____	
PROJECT NAME:								Reach:			
STRUCTURE NAME:								Sta: From _____ To _____			
INSPECTION TEAM: NAME: _____ OFFICE SYMBOL: _____ PHONE: _____						DATE:		TIME: Begin _____ End _____			
WAVE HEIGHT (ft)			WAVE ACTION ON STRUCTURE:			TIDE LEVEL:			WEATHER		
DAY OF INSPECTION:			A. Overtopping B. Non-overtopping			A. High B. Medium C. Low Stage: _____ feet			DAY OF INSPECTION: A. Fair B. Rain C. Fog D. Storming		
TYPE OF INSPECTION: WALKING BOATING OTHER _____ (CIRCLE)											
RATING CATEGORIES: Rate all items (Circle applicable lettered items)		CREST / CAP CR			SEASIDE (or HEAD) SE			CHANNEL / HARBOR SIDE CH			
	Rating 1-6	Damage Length	Comment Numbers	Rating 1-6	Damage Length	Comment Numbers	Rating 1-6	Damage Length	Comment Numbers		
Breach:											
(A) Displaced Cap/Armor											
(B) Settling Cap/Armor											
Core (or Underlayer) Exposure/Loss											
Armor Loss: (A) Displaced (B) Settling (C) Bridging											
Loss of Armor Contact/ Armor Interlock											
Armor Quality Defects:											



ata

3D Wire-f

Inspection Form



Data Output



Structure Details

Active Structure: Perdido Pass Channel (west jetty)

Keep form on top Auto park form when loading layers

Inspection Records Coastal Structure Project Viewer Condition Reports

Inspection I...	Date	Reach	From Station	To Station	Inspection Team
52	3/17/2008	Reach A	10+20	20+50	CESAM-OPJ
53	3/19/2008	Reach B	00001+10	00004+20	Team A
55	4/28/2008	Lower Channel	00+00	10+00	Red Team

General Ratings Comments and Actions Related Files

Available Files

File Name	Comments
CESAM-OPJGIS Status.JPG	

View File Save File

- Long term management & access
 - Previously produced condition index reports per structure
 - All Inspections



Data Output



Structure Details

- Apalachicola Bay
- Choctawhatchee Bay
- Dog Keys Pass
- East Pass
- East Pass Channel
- East Point
- Horn Island Pass
- Indian Pass
- Mobile Bay
- Panama City Harbor
- Pensacola Bay
 - Perdido Pass Channel
 - Perdido Pass Channel (west jetty)
 - Perdido Pass Channel (east jetty)
- Petit Bois Pass
- Ship Island Pass
- St. Andrews Pass
- St. George Pass
- Two Mile Channel

Active Structure: Perdido Pass Channel (west jetty)

Keep form on top Auto park form when loading layers

Inspection Records Coastal Structure Project Viewer **Condition Reports**

Available Reports

Report <input type="checkbox"/>	Inspection ID	Report Date	Created By	Title
<input checked="" type="checkbox"/>	52	4/28/2008	k5en9mdp	Test
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				



Data Output



Structure Details

- Apalachicola Bay
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- Dog Keys Pass
- East Pass
- East Pass Channel
- East Point
- Horn Island Pass
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- Mobile Bay
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- Perdido Pass Channel
 - Perdido Pass Channel (west jetty)
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Active Structure: Perdido Pass Channel (west jetty)

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Inspection Records Coastal Structure Project Viewer Condition Reports

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53	3/19/2008	Reach B	00001+10	00004+20	Team A
55	4/28/2008	Lower Channel	00+00	10+00	Red Team

General Ratings Comments and Actions Related Files

Available Files

File Name	Comments

View File Save File

Context Menu (highlighted in red):

- Locate
- Locate Previous
- New Inspection Report
- Load Structure Layer
- Export Structure Locally



Add Inspection



Add Inspection Record

General

Project: Inspection Team:

Structure:

Reach:

Station From: To:

Date:

Time Begin: Time End: Wave Height: Wave Action:

Inspection Type: Tide Stage (FT): Tide Level: Weather:

Comments

	Comment number	Suggested Action	Station Location(s)	Comments
▶	1	Watch	005+00	Damage noted.
*	2	Immediate Action	009+25	Armor damaged.
*				



Add Inspection



Add Inspection Record

Ratings

Structural Ratings for Coastal Structures

	Rating 1-6	Damage Length	Comments	
Breach: <input checked="" type="checkbox"/> Settling Cap/Armor <input type="checkbox"/> Displaced Cap/Armor	Insignificant			Crest/Cap
Core (or Underlayer) Exposure/Loss	Insignificant			SeaSide/Hea
Armor Loss: <input checked="" type="checkbox"/> Settling <input type="checkbox"/> Bridging <input type="checkbox"/> Displaced	Insignificant			Channel/Harbor Sid
Loss of Armor Contact/Armor Interlock	Insignificant			
Armor Quality Defects: <input checked="" type="checkbox"/> Rounding <input type="checkbox"/> Cracking <input type="checkbox"/> Spalling <input type="checkbox"/> Fracturing	Insignificant			
Slope Defects: <input checked="" type="checkbox"/> Sliding <input type="checkbox"/> Steepening				

Previous Next Cancel



Add Inspection



Add Inspection Record

Ratings

Structural Ratings for Coastal Structures

	Rating 1-6	Damage Length	Comments
Breach: <input checked="" type="checkbox"/> Settling Cap/Armor <input type="checkbox"/> Displaced Cap/Armor	Moderate	8	
Core			
Armor			
Loss			
Armor <input type="checkbox"/> Rounding <input type="checkbox"/> Cracking <input type="checkbox"/> Spalling <input type="checkbox"/> Fracturing	Insignificant		
Slope Defects: <input type="checkbox"/> Sliding <input type="checkbox"/> Steepening			

Vertical labels on the right: Crest/Cap, SeaSide/Hea, Channel/Harbor Sid

Buttons: Previous, Next, Cancel



Add Inspection



Add Inspection Record

Comments

	Foundation Fault Suspected In	Caused By	Station
1	Item <input type="text" value="Armour Displacement"/>	<input type="text" value="Scour"/>	<input type="text" value="006+50"/>
	Item <input type="text"/>	<input type="text"/>	<input type="text"/>

WARNING SIGNS/GATES

AUXILIARY STRUCTURES (walkways, stairs, navigation lights, etc.)

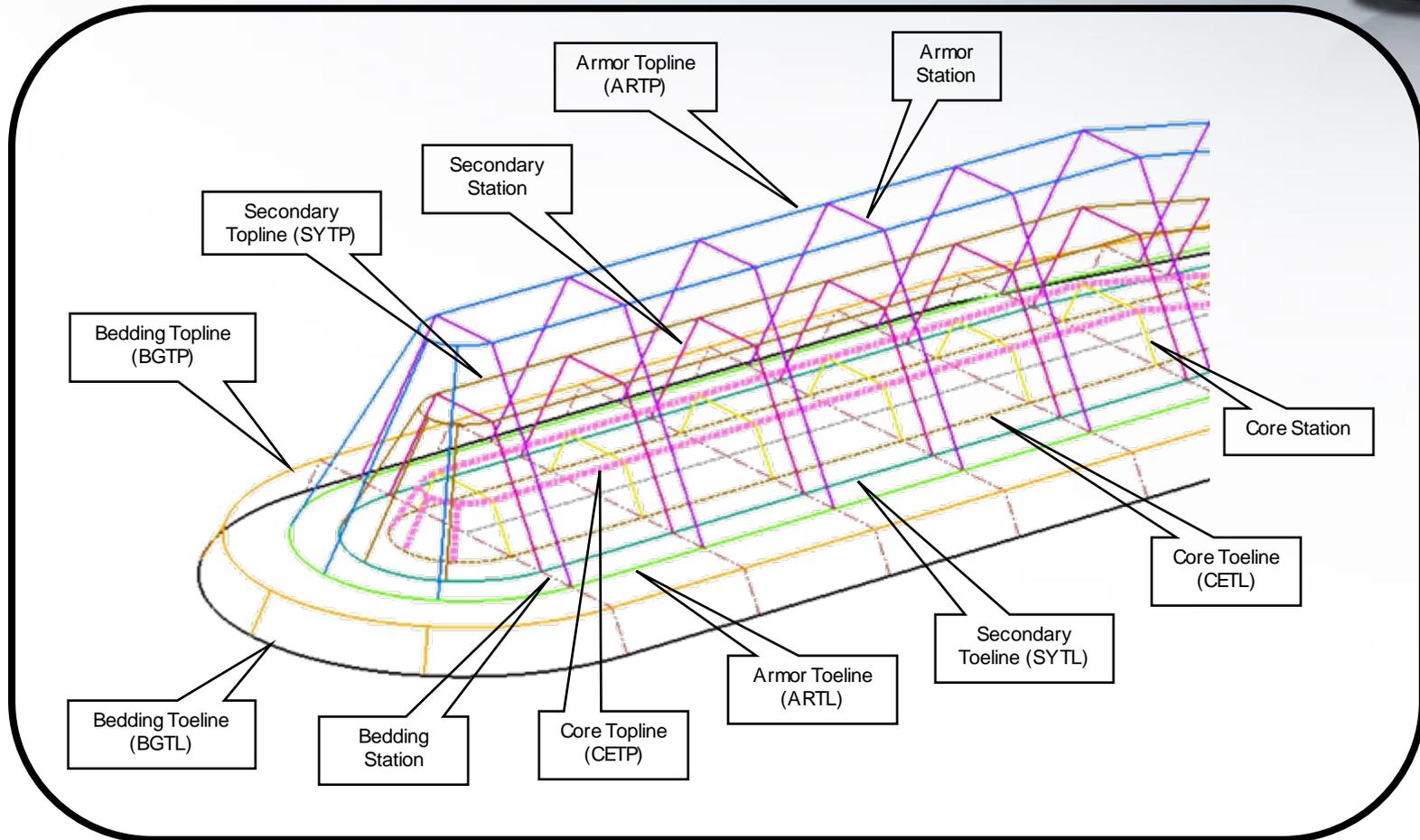
AMOUNT OF DEBRIS IN ARMOR (rubble, trash, logs, etc.)

File Name	Comment

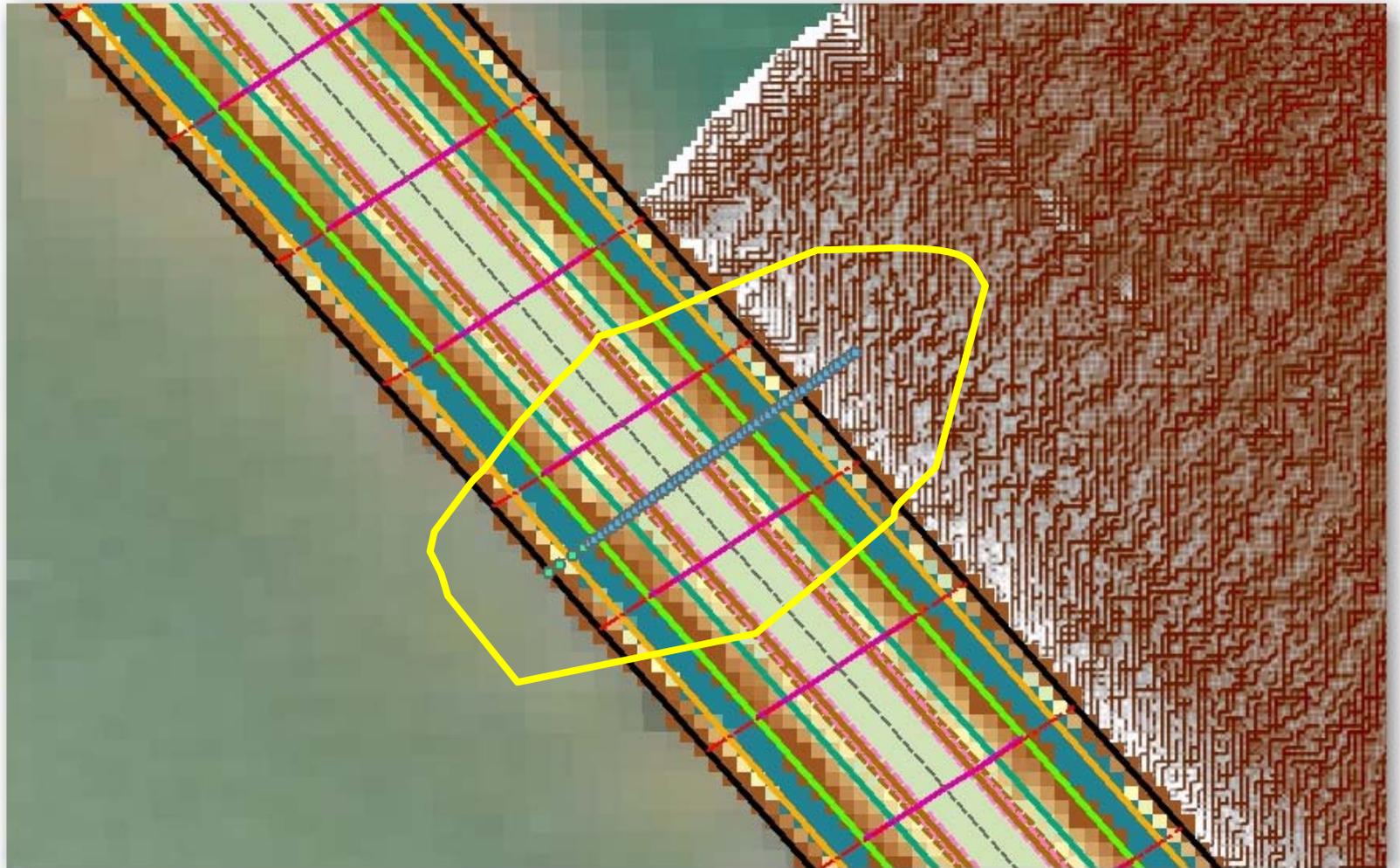
Comment on File



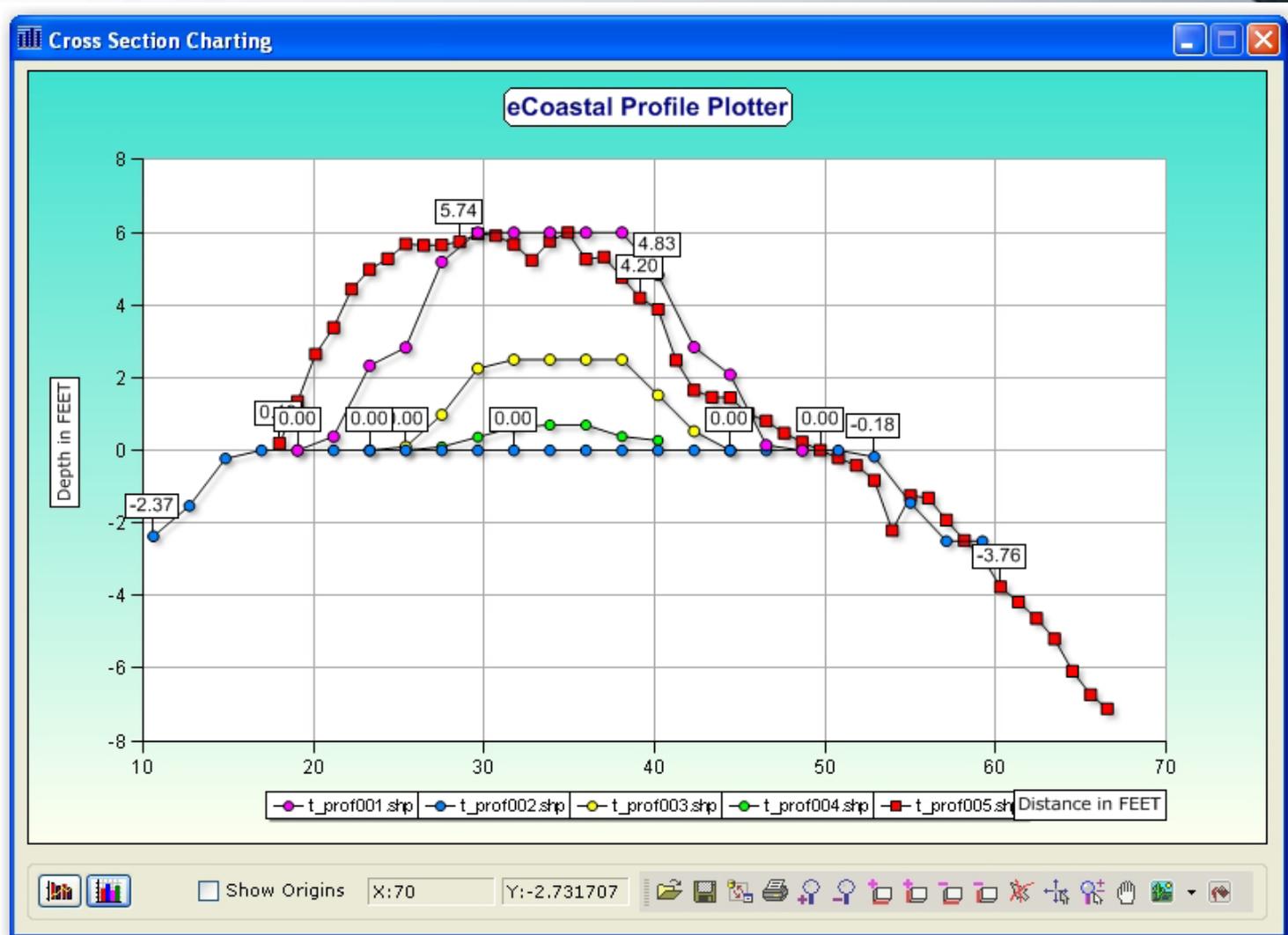
Jetty Data Model



Data Analysis



Data Analysis



Data Analysis



Volume Change Analysis

- Apalachicola Bay
- Choctawhatchee Bay
- Dog Keys Pass
- East Pass
 - East Pass Channel
 - East Pass Channel (west jetty)
 - East Pass Channel (west sand dike)
 - East Pass Channel (east jetty)
 - East Pass Channel (east sand dike)
 - East Point
 - Horn Island Pass
 - Indian Pass
 - Mobile Bay
 - Panama City Harbor
 - Pensacola Bay
 - Perdido Pass Channel
 - Petit Bois Pass
 - Ship Island Pass
 - St. Andrews Pass
 - St. George Pass
 - Two Mile Channel

Keep form on top

Analysis Density

Densify Station Lines Point Distance: 1.0

Distance Quantity Project output to WGS84

Analysis Tools

Structure Component: Armor

Start Station: 0036+00 End Station: 0040+00 Z Unit: Foot

Survey Layer: East Pass Hydro-L Design Layer: S0215 Armor Grid

Volume Change Report Information

Report Title: East Pass Created By: k5en9mdp

Active Structure: East Pass Channel (west jetty)

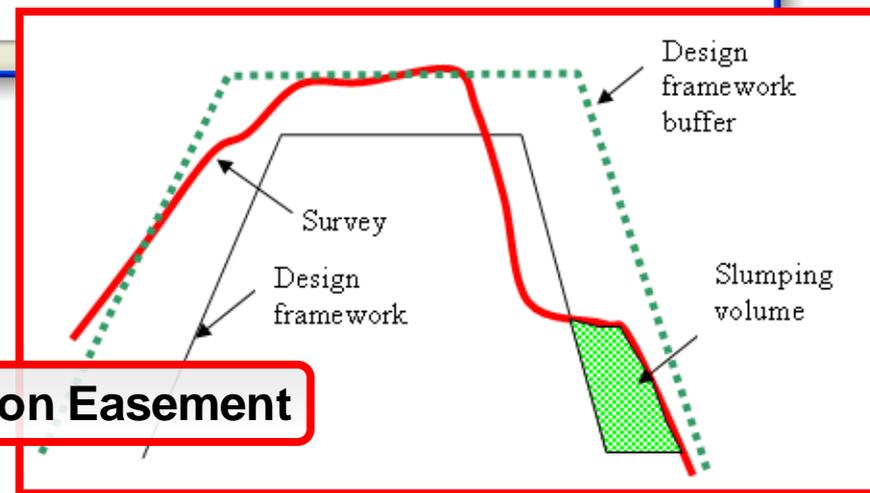
Working Projection: GCS_WGS_1984

Repair Costs

Material (\$/CY): 2.50 Construction Easement: 0 (FT)

Remarks: 1-15 stones

Material: rock rubble Auto park form when loading layers



Construction Easement

Data Analysis



Volume Change Analysis

- [-] Apalachicola Bay
- [-] Choctawhatchee Bay
- [-] Dog Keys Pass
- [-] East Pass
- [-] East Pass Channel
 - [-] East Pass Channel (west jetty)
 - [-] East Pass Channel (west sand dike)
 - [-] East Pass Channel (east jetty)
 - [-] East Pass Channel (east sand dike)
- [-] East Point
- [-] Horn Island Pass
- [-] Indian Pass
- [-] Mobile Bay
- [-] Panama City Harbor
- [-] Pensacola Bay
- [-] Perdido Pass Channel
- [-] Petit Bois Pass
- [-] Ship Island Pass
- [-] St. Andrews Pass
- [-] St. George Pass
- [-] Two Mile Channel

Keep form on top

Analysis Density

 Densify Station Lines Point Distance:

Distance Quantity Project output to WGS84

Analysis Tools

Structure Component:

Start Station: End Station: Z Unit:

Survey Layer: Design Layer:

Volume Change Report Information

Report Title: Created By:

Active Structure:

Working Projection:

Repair Costs

Material (\$/CY): Construction Easement: (FT)

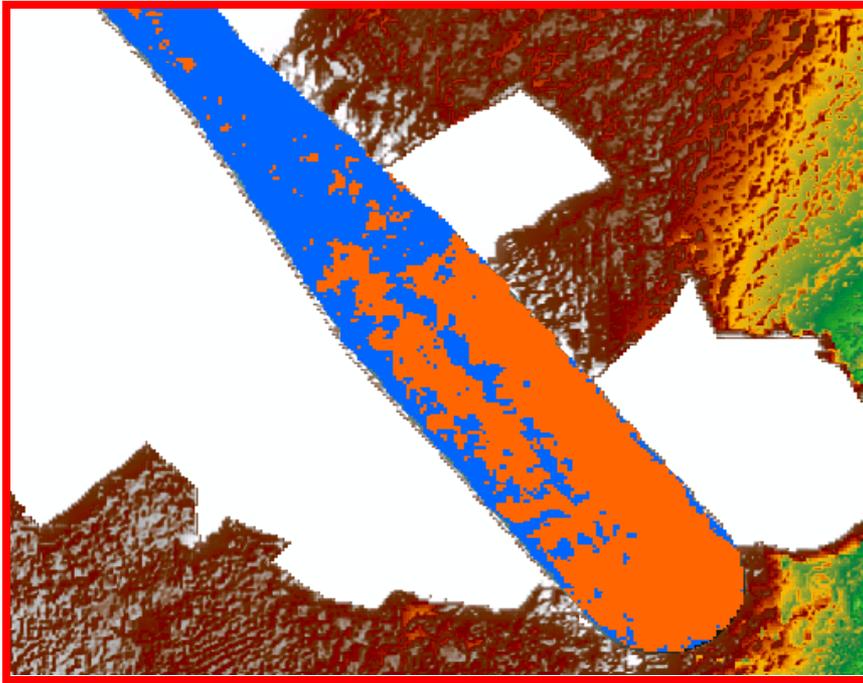
Remarks:

Material: Auto park form when loading layers

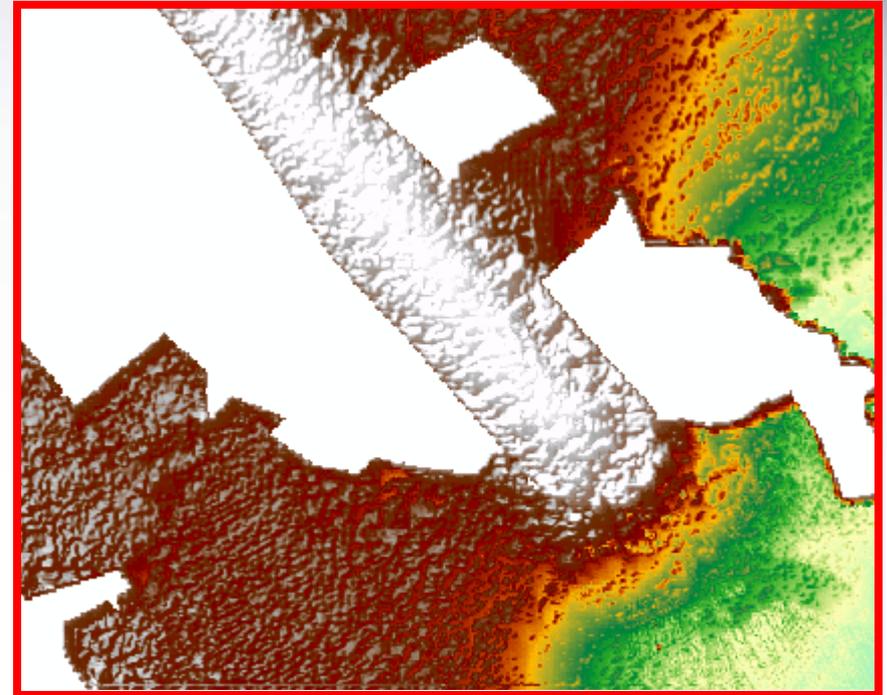
Component	Start Station	End Station	Cost (\$/CY)	Total Cost	Erosion (CY)	Accretion (CY)
East Pass Channel (west jetty)						
Component : Armor - 1 item(s)						
Armor	0036+00	0040+00	\$2.50	\$146.79	73	253
Material: rock rubble Remarks: 1-15 stones						
Component : Secondary - 1 item(s)						
Secondary	0036+00	0040+00	\$2.50	\$157.74	79	93
Material: rock rubble Remarks: 1-15 stones						
2 rows						



Data Visualization



Cut/Fill between Survey Data & Jetty Design



TIN of Jetty Design



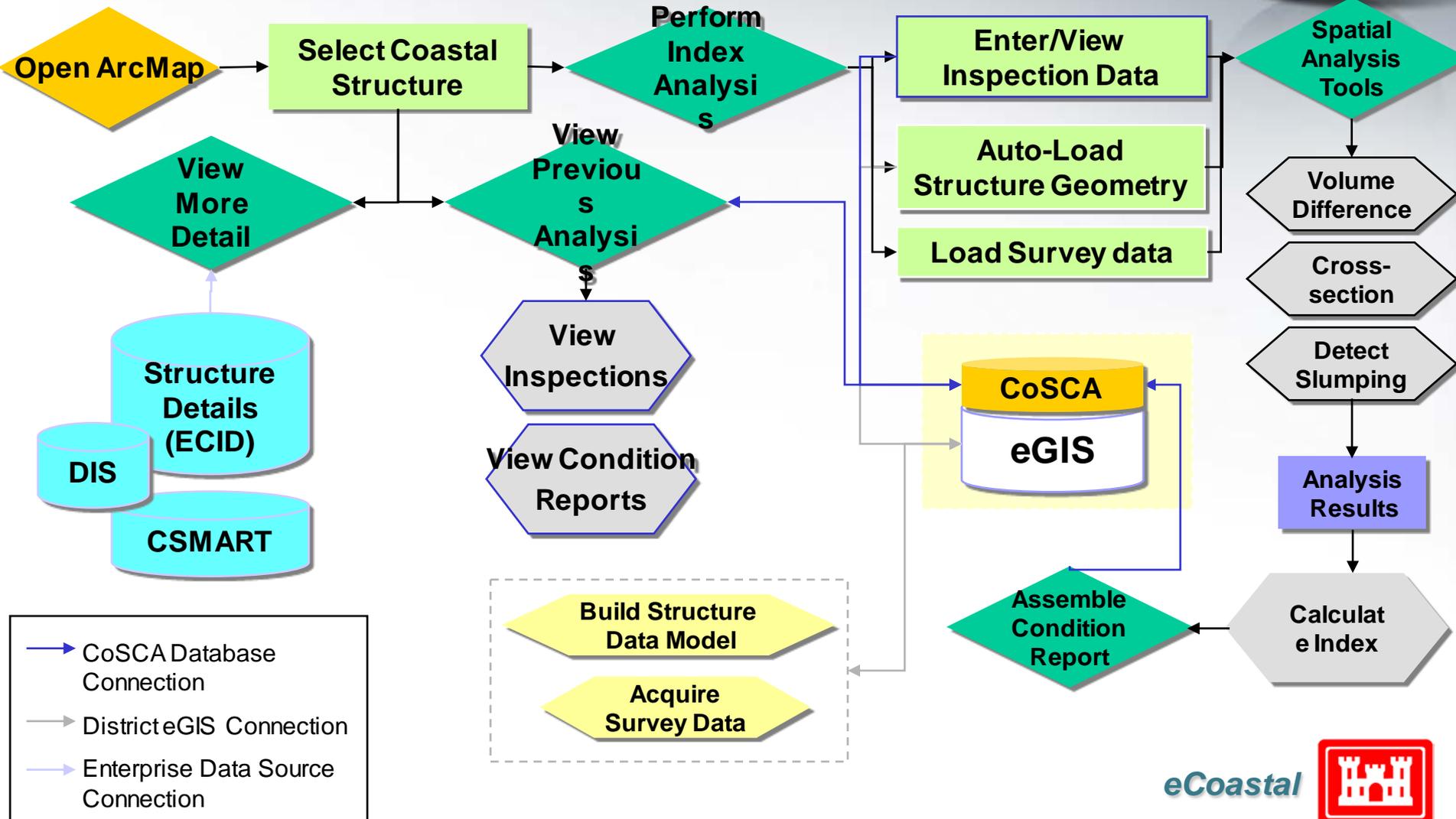
Application User



- Who are the application users? How might they use the tool?
 - Where are they in the organization Division/branch?
 - Operations Division/Navigation Branch/Area Office (inspections)
 - Engineering Division/Structures Branch (analysis)
 - What level are they (Tech, Eng, Mgr)?
 - Technicians can provide the data entry for inspections (HHIT-Hand Held Inspection Tools)
 - Engineers can work through the data analysis to determine damage
 - Managers can view calculated results in posted condition reports and use information for budgeting



Work Flow



Questions



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Bowhead / Mobile District USACE / 251-680-4047
rose.dopsovic@usace.army.mil

