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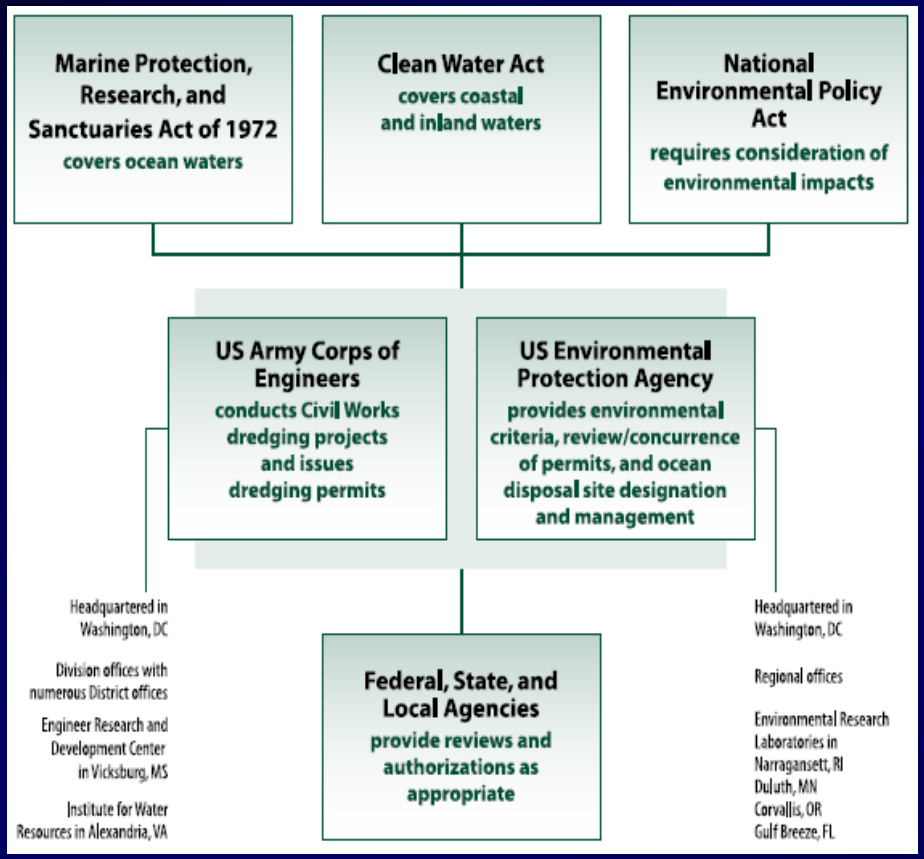
Harvesting Dredged Material as part of RSM Strategy

Outline

- Federal Laws Governing Disposal
- Common Disposal Methods
- Beneficial Use Examples
- Confined Disposal Facilities
- Ways to Increase Beneficial Use
- CDF Harvesting

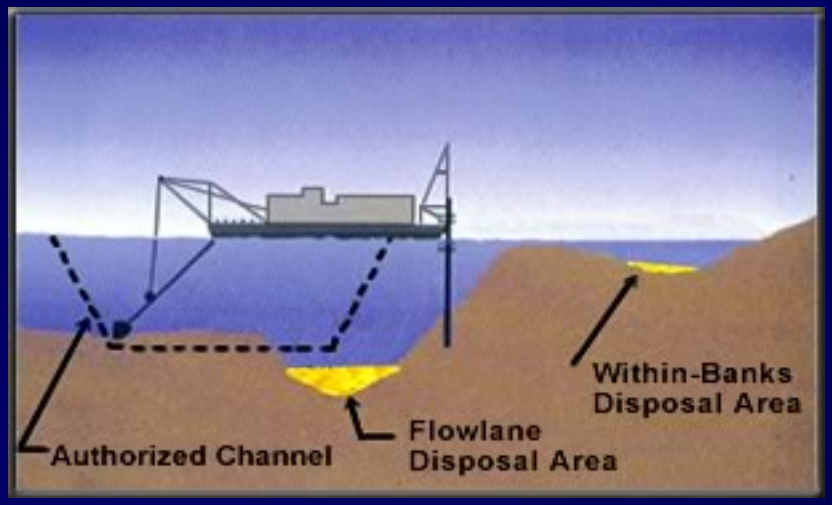
Federal Laws Governing Dredged Material Disposal

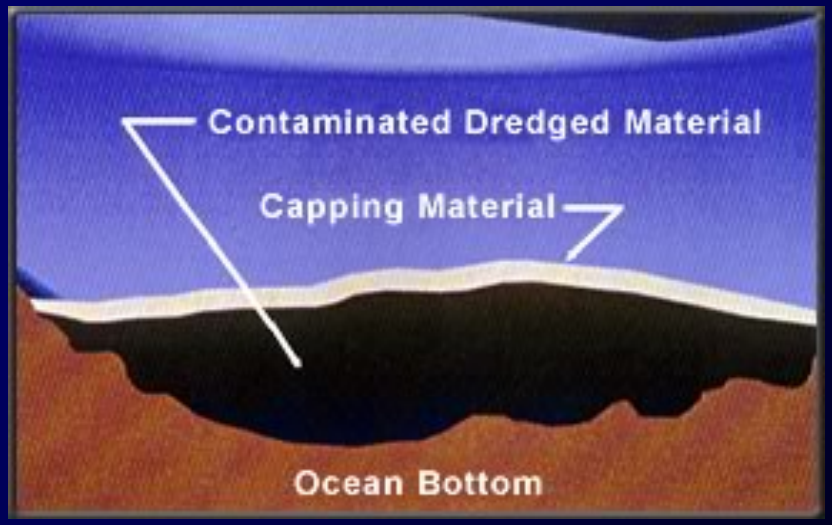


- 300 million cy annually
- $500 million - $1 billion spent between 2005 to 2011
- Marine Protection, Research, and Sanctuaries Act of 1972
- Clean Water Act
- National Environmental Policy Act

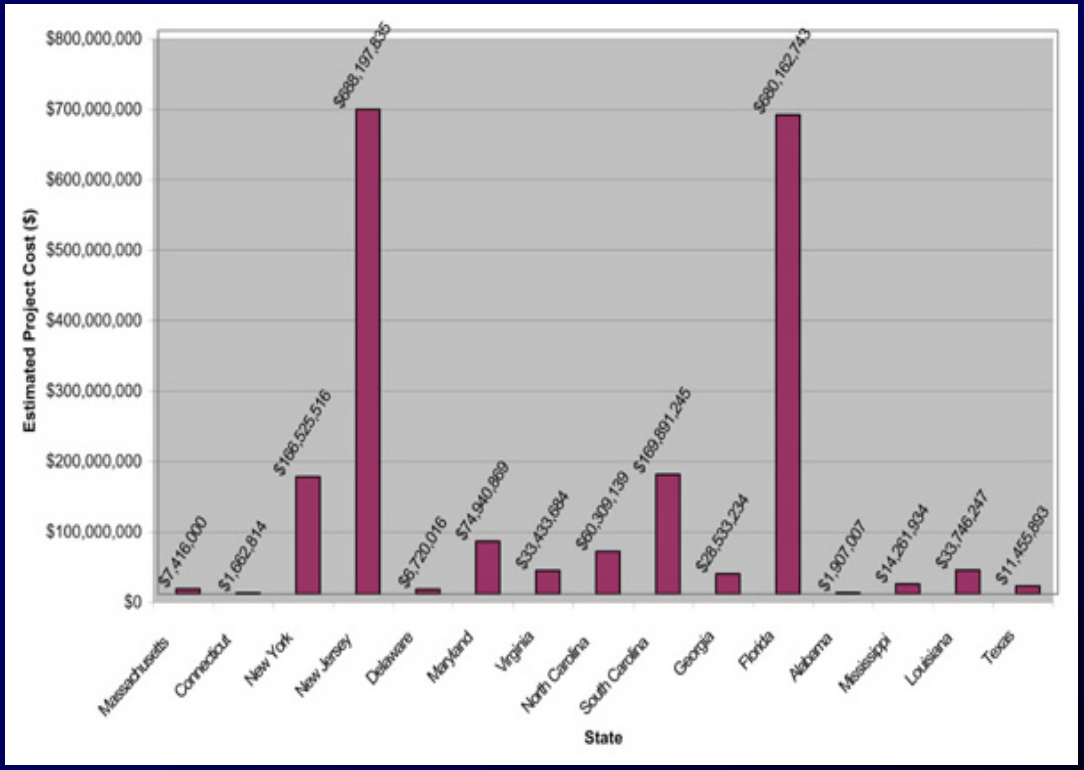
Common Dredged Material Disposal Methods

- Ocean Disposal
- In-river Disposal
  - In-stream
  - Capped
- CDFs
  - Approx 80%
- Beneficial Use
  - Approx 15%





Beach Nourishment



Confined Disposal Sites

- Engineered diked impoundments to provide containment and control dredging operation produced water
- Three types of CDFs: *Upland*, *Shoreline*, and *Island*.
- Managed over time to gain added capacity through DMMP
- Eventually run out of capacity
- ERDC 2010 Study
  - *Sustainable Confined Disposal Facilities for Long-term Management of Dredged Material* (ERDC TN-DOER-D10)

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CDF Construction

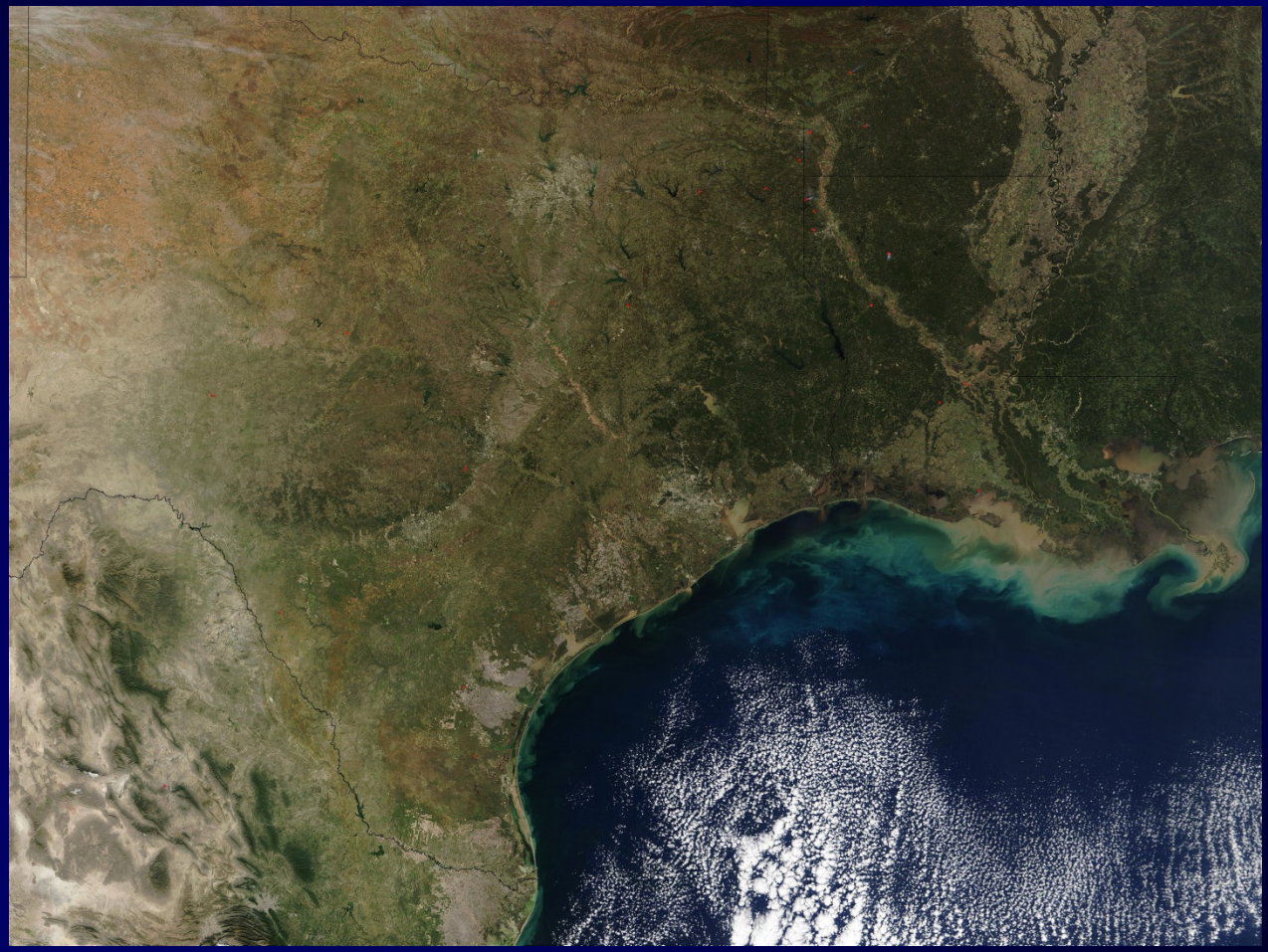
Louisiana Example

- Calcasieu Ship Channel Project does not have adequate dredged material disposal capacity, gross dredging to be 97 million cy, current CDF capacity is 5 million cy,

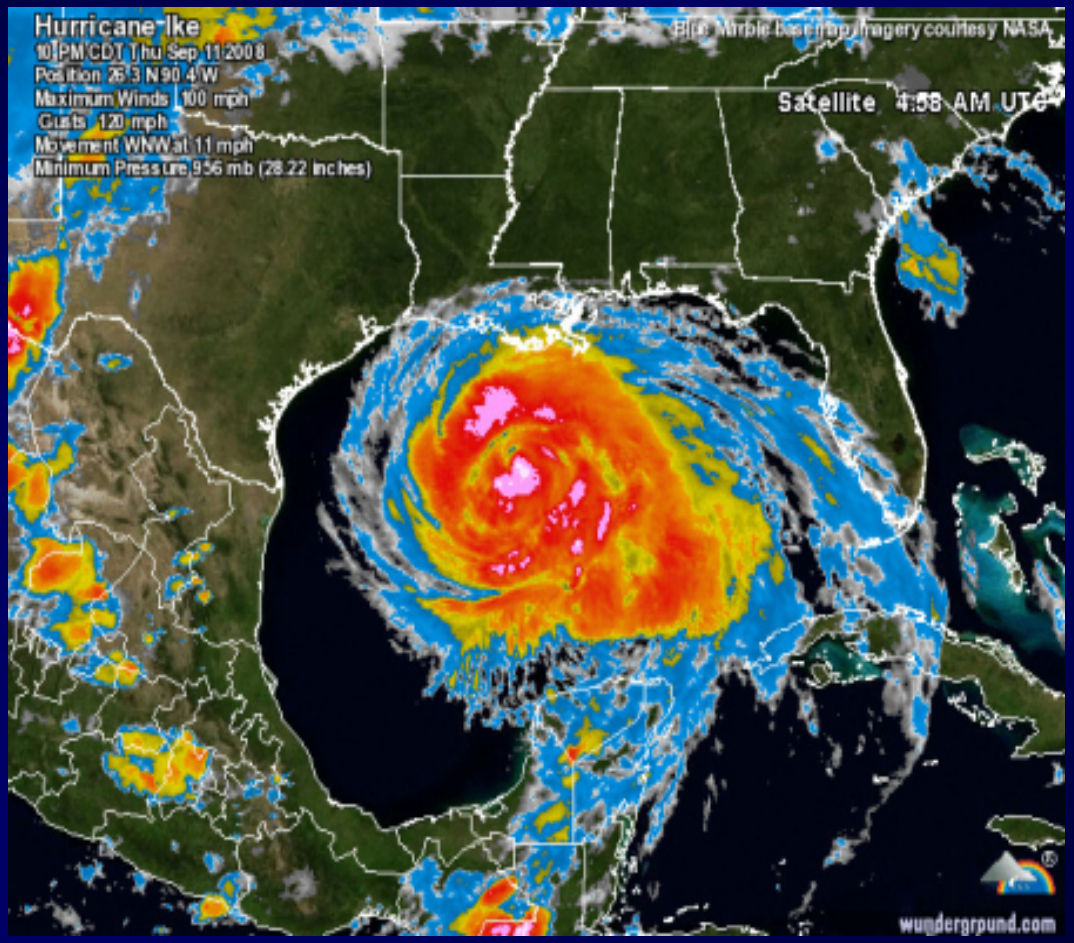
  DMMP looked at 4 alternatives:
  - A. no action
  - B. create 6,306 ac marsh and expand CDF
  - C. create 10,030 ac marsh and expand CDF
  - D. ocean dredged material disposal

- Alternative B was preferred with cost estimate of $865,863,000
- Seeing dredged material as a resource was not considered
- Loss of sediment from the ecological system was not considered as a cost

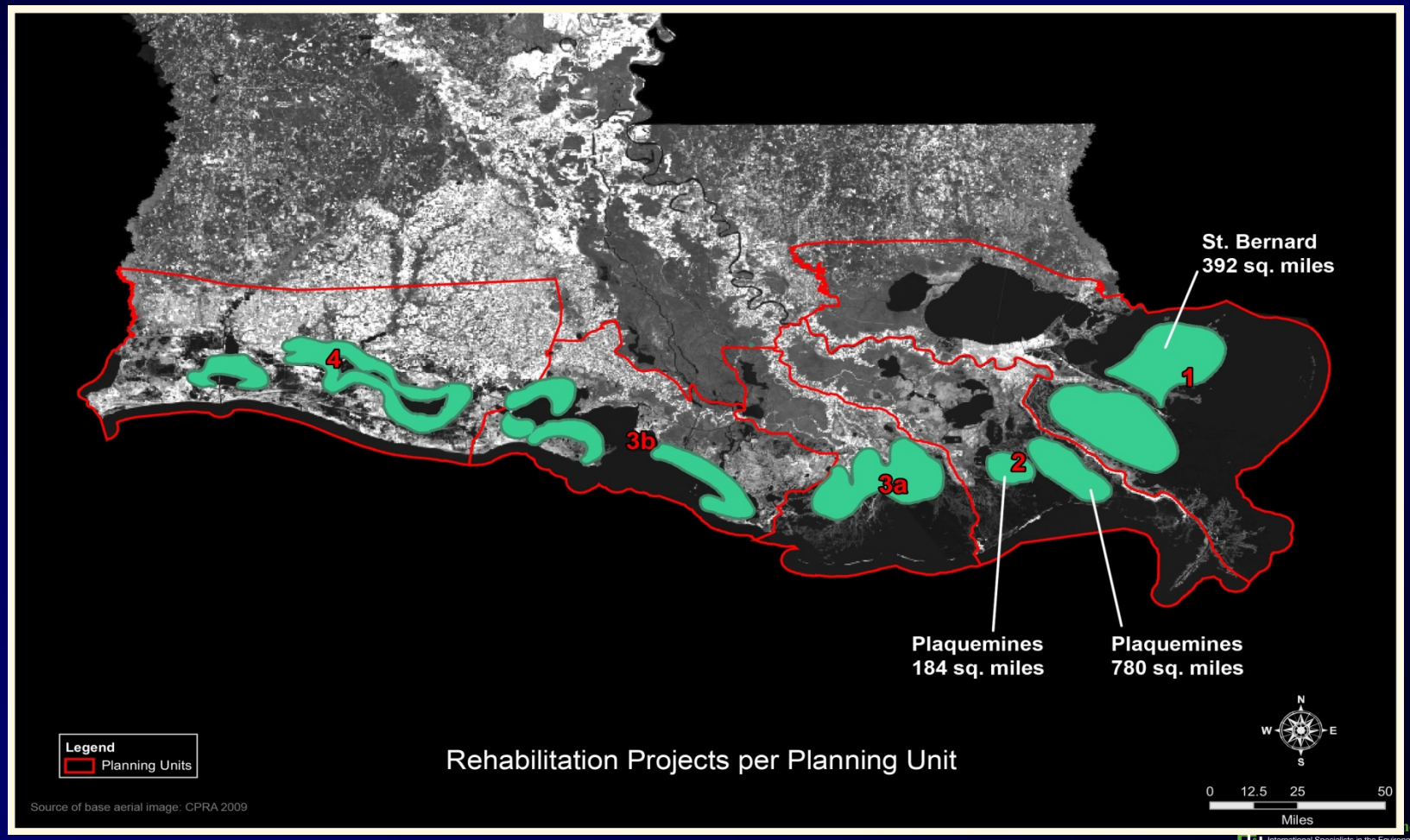
Sediments are a resource



Hurricane Ike



Targeted Marsh Restoration Areas




Slidell
55
10
New Orleans
Houma
Empire
Venice

Planning Unit 1:
St. Bernard Parish

The total marsh restoration area shown in Figure 5-17a is 392 sq. miles (28 miles by 14 miles). Yellow arrows in the figure show that pumping distance to the fill site from potential open water excavation sites (red dots) is feasible, since a 20-inch dredge can be pumped up to 19 miles.

Open water areas protected during filling include: False Mouth Bay, Bay Boudreau, Drum Bay, Shell Island Lake, Lake Eugene, and Long Lagoon, adjacent to the GIWW.

Figure 5-17a. Feasible pumping distances, St. Bernard Parish

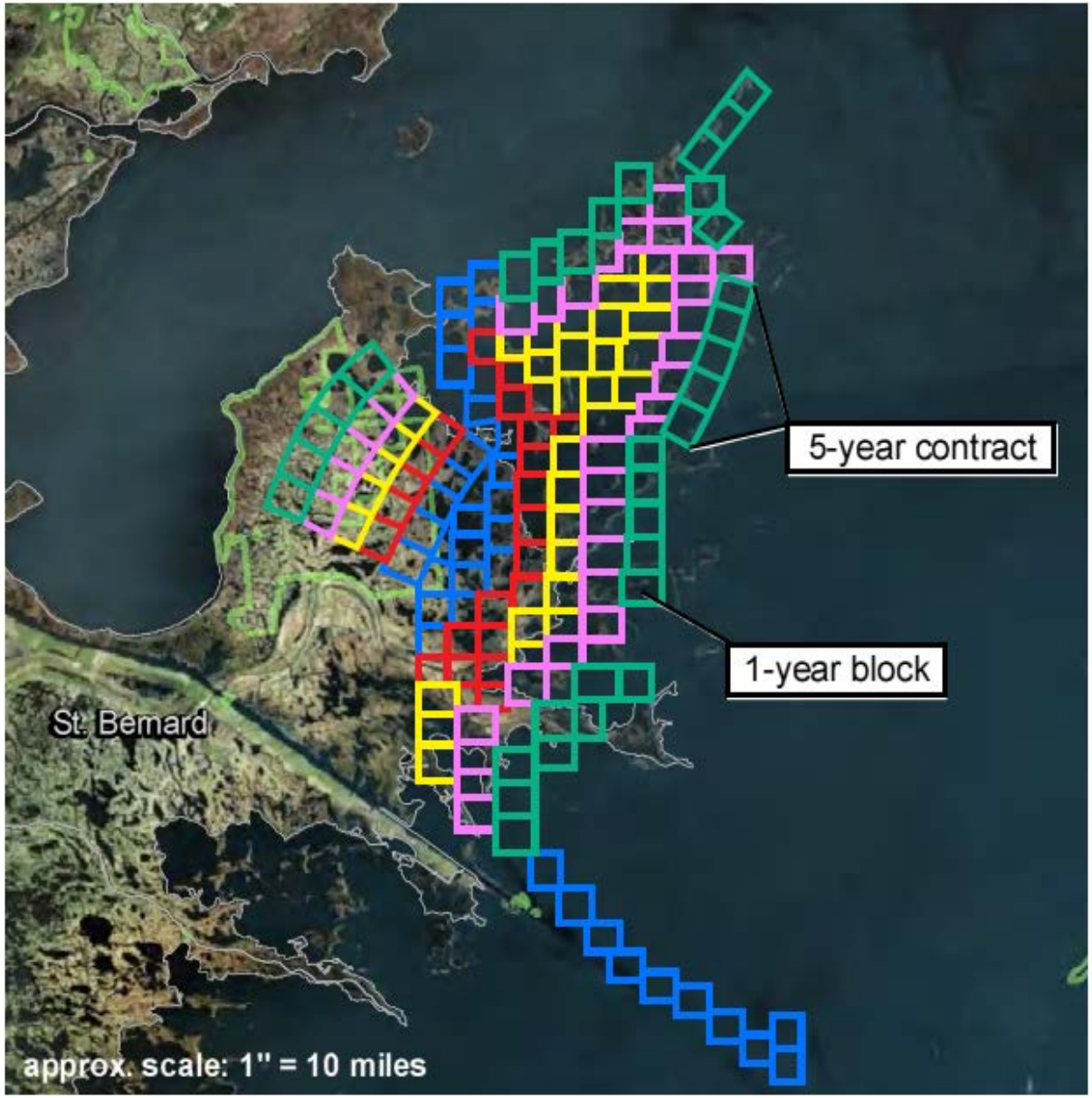
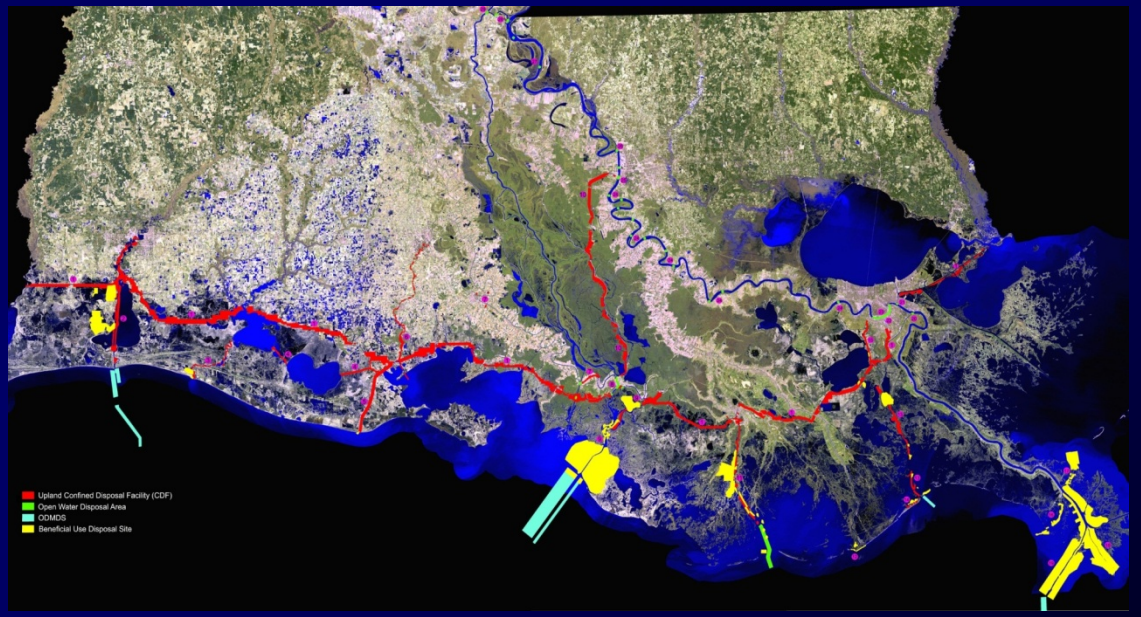


Figure 5-17d. Multiple 1- to 5-year contract blocks, St. Bernard Parish

Figure 5-17d illustrates both a short-term (one-year) and long-term (20-year) filling strategy using multiple 1-year and 5-year contracts. An individual block represents one year of dredging for one dredge, and block size is based on the anticipated annual fill production rate for one 20-inch dredge. The colored blocks (blue, pink, red, yellow, and green) represent different contractors working/dredging in designated areas under multiple five-year contracts.

Current CDF Harvesting Plan for Coastal Louisiana

- CDFs at or reaching capacity
- Severe sediment deficit for marsh restoration



Estimated Dredged Material Volumes

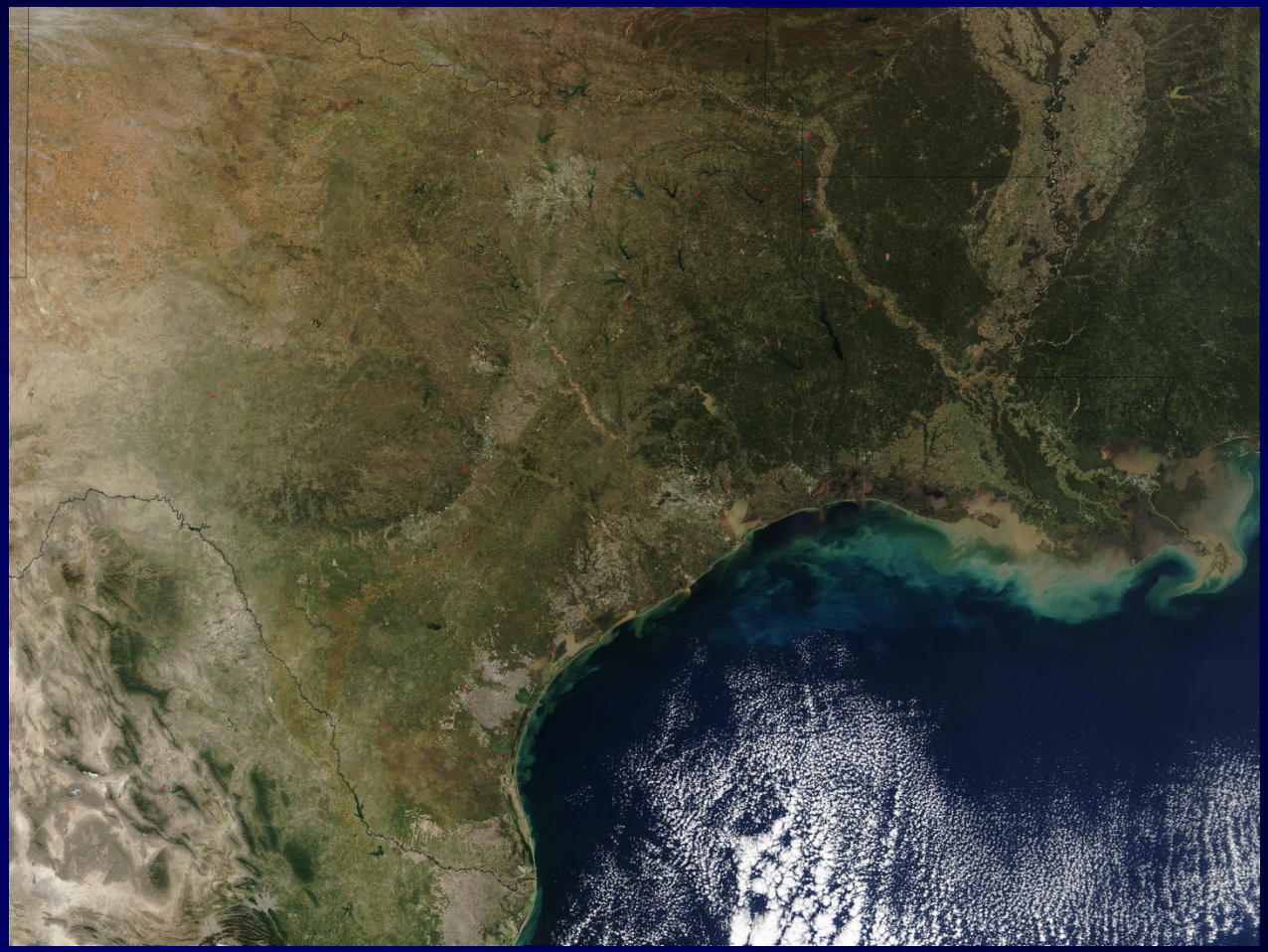
- 49.5 -100 million cy needed annually for marsh restoration
- Annual maintenance dredging
  - NO District 91 million cy
  - Mobile 27 million cy
  - Galveston 25.9 million cy
- 650 million cy in CDFs in Louisiana

Federal Navigation Channel CDF Volu

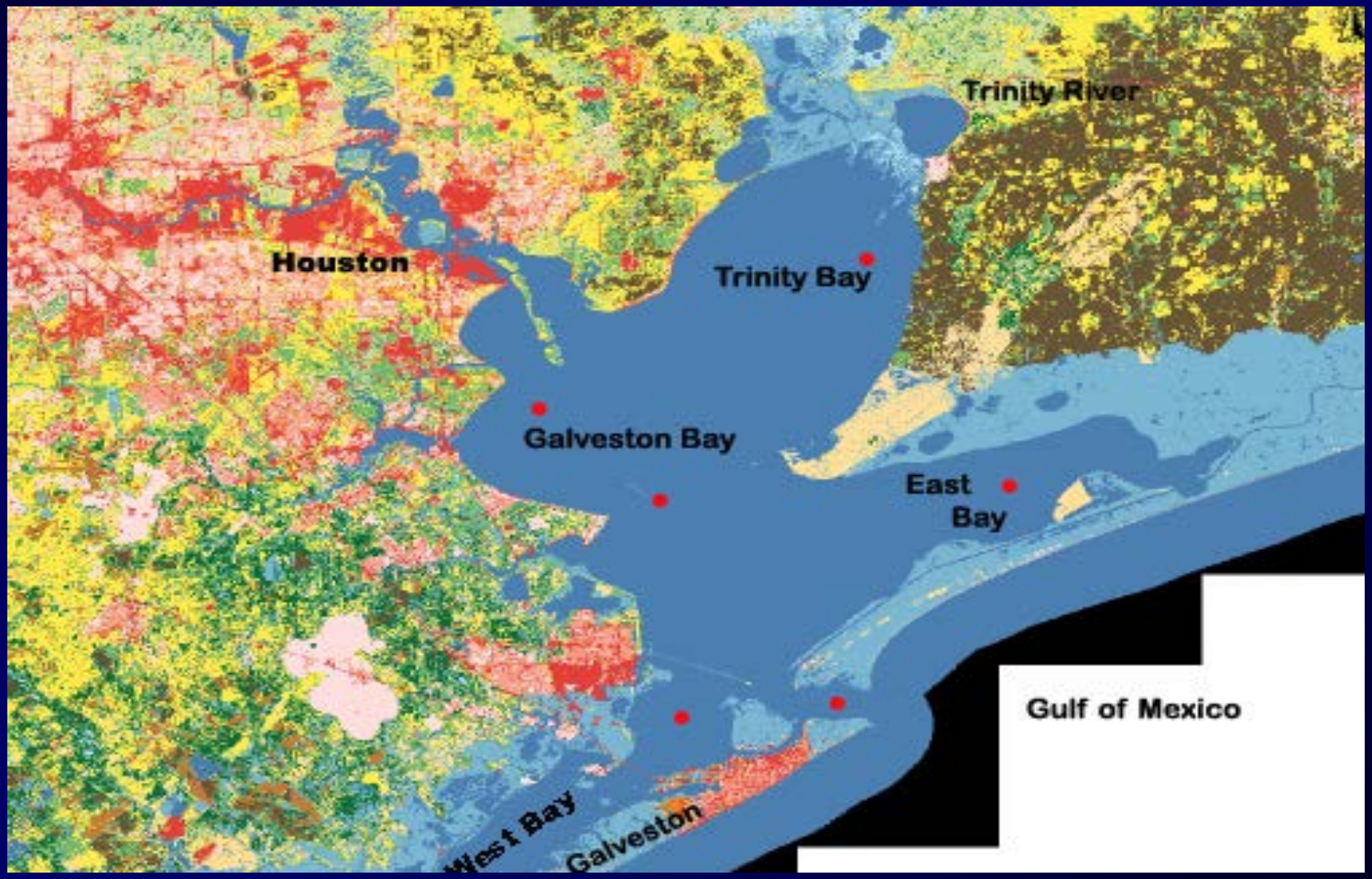
Federal Navigation Channel	CDF volume (cy)
New Orleans District Widewide*[1]	
1. Gulf Intracoastal Waterway	25 million
2. Calcasieu River and Pass	330 million*[3]
3. Mermentau River	20 million
4. Inland Waterway	10 million
5. Freshwater Bayou	5 million
6. Vermilion River	20 million
7. Bayou Teche 8. Berwick Bay Harbor	5 million
9. Atchafalaya River and Bayous Chene, Boeuf, and Black	100 million
10. GIWW Alternate Route	10 million
11. Houma Navigation Channel	10 million
12. Port Fourchon (Bayou Lafourche)	10 million
13. Barataria Bay Waterway	5 million
14. Bayou Rigaud	5 million
15. Bayou Segnette Waterway	10 million
16. Tiger Pass	10 million
17. Baptiste Collette Bayou	10 million
18. South Pass	5 million
19. Southwest Pass	5 million
20. GIWW-Algiers Lock Forebay	5 million
21. GIWW-IHNC Lock Forebay	5 million
22. GIWW-Harvey Lock Forebay	5 million
23. New Orleans Harbor	5 million
24. Mississippi River- Deep Draft	10 million
25. GIWW-Port Allen Lock Forebay	5 million
26. Baton Rouge Harbor (Devil's Swamp)	5 million
27. Mississippi River- Shallow Draft	5 million
28. Old River Lock- Forebay and Tailbay	5 million
29. Three Rivers	5 million
Estimated total	650 million*[4]

* Notes:
1. NO District 2010 dredging budget $203.64 million

Regional Sediment Management



Galveston Bay Human System



Galveston Bay Ecological System

Integration of Coastal Protection and Restoration with Regional Sediment Management

- Through CDF harvesting as a tool in the tool box

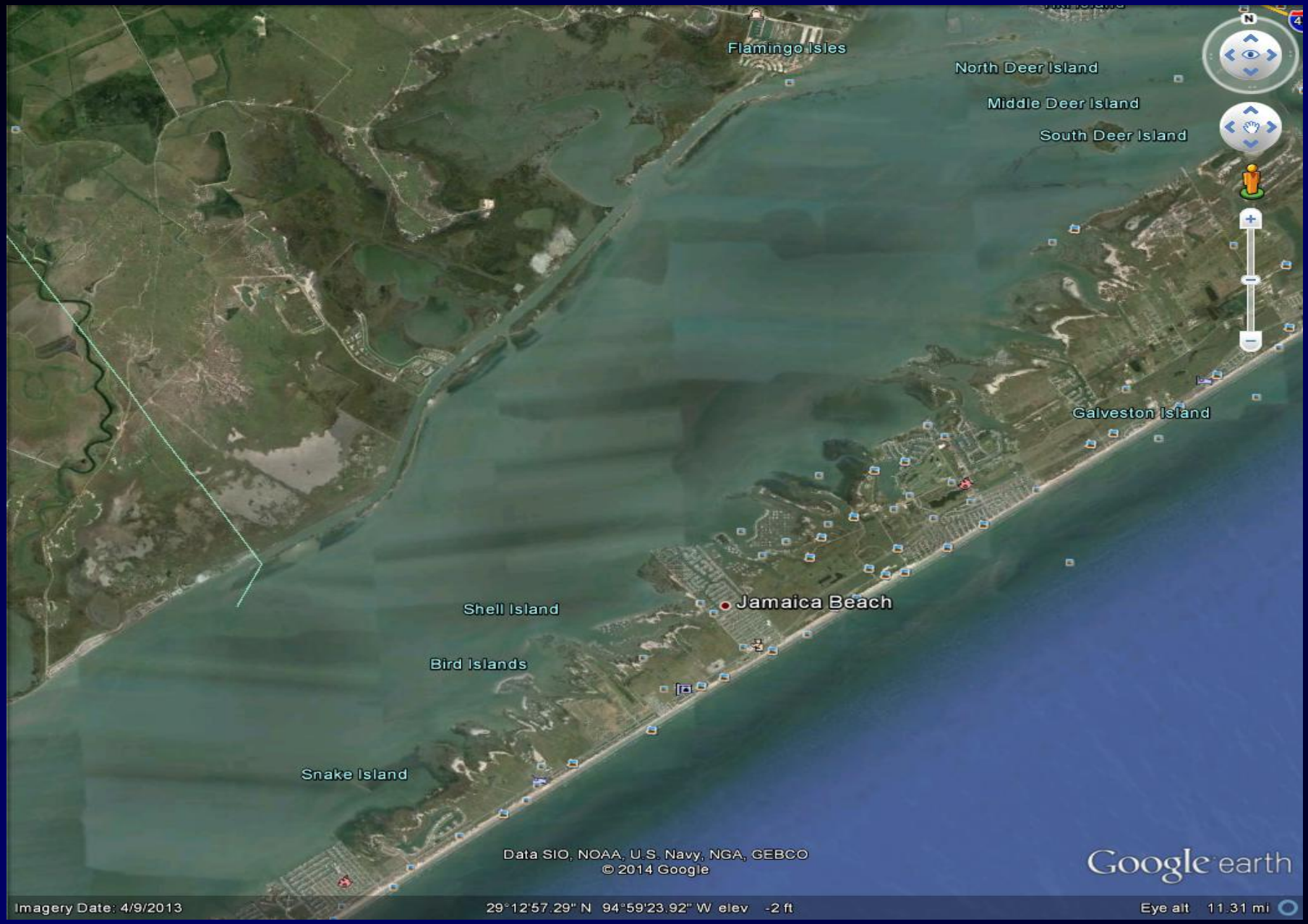


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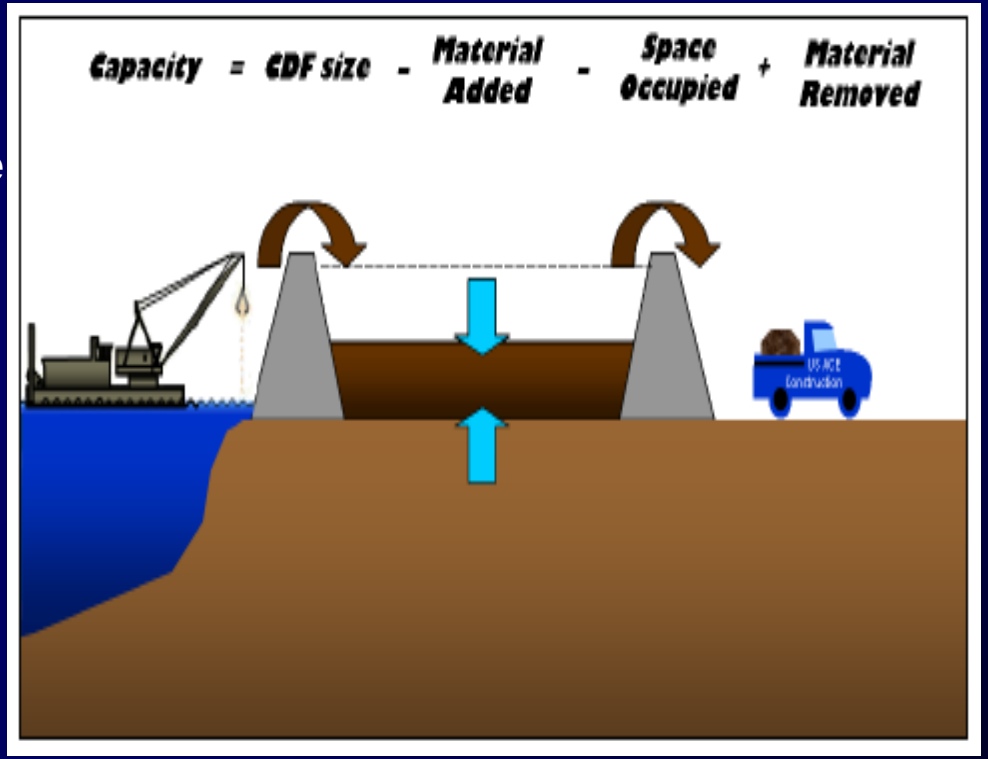
Image Houston-Galveston Area Council
©2007 Google™
Pointer 29°14'03.47" N 94°54'57.83" W
Streaming 100%
Eye alt 34260 ft

CDF Harvesting

- ERDC three factors:
  - 1. Minimize dredging volume placed into the CDF.
  - 2. Manage the CDF to maximize capacity.
  - 3. Maximize recovery/removal of material.
- Material readily available
- Avoids comparison with Federal Standard
- Disconnects BU from traditional navigation dredging project

- Issues to Resolve



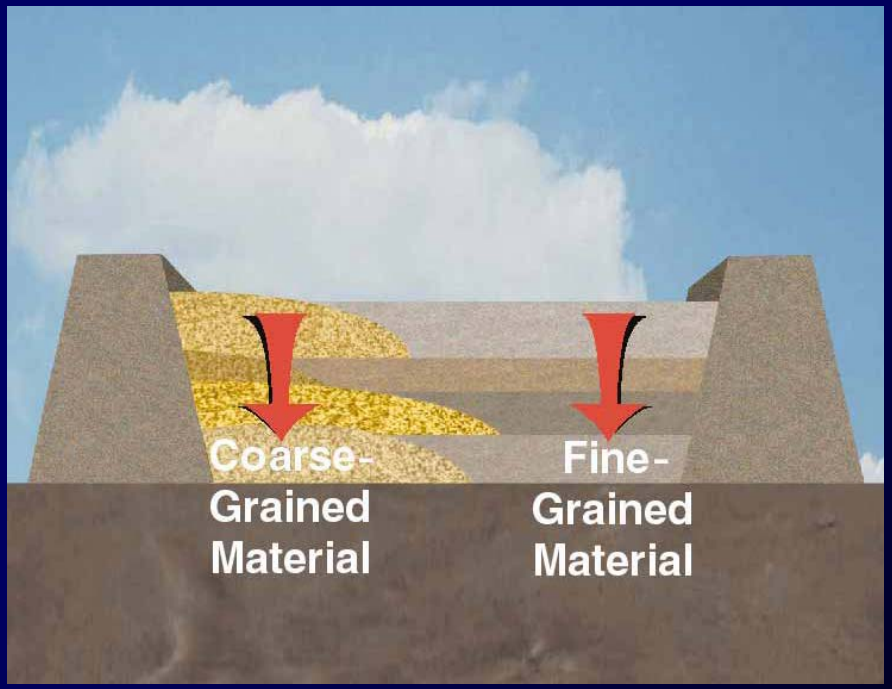
In-CDF Initial Evaluations

Table 1. Appropriate characterization tests for determining physical and engineering properties of dredged material to evaluation its suitability for beneficial uses.

Physical Analysis	Source
1. Grain Size	
Standard Sieve Test	ASTM D422-63; COE V; DOD 2-III, 2-V, 2-VI; CSSS 47.4
Hydrometer Test	ASTM D422-63; CSSS 47.3; COE V
Pipette Test	CSSS 47.2
2. Particle Shape/Texture	ASTM D2488, D4791-95, and D3398-93
3. Water Content/% Moisture	ASTM D2216-92; COE I-1; DOD 2-VII
4. Permeability	ASA: 41-3 and 41-4; ASTM D2434-68
5. Atterberg Limits (Plasticity)	ASTM D4318-9 5; COE III; DOD 2-VIII
6. Organic Content/Organic Matter	ASTM D2487-93
Engineering Properties	**Source**
7. Compaction Tests	
Proctors	COE VI
Standard Compaction Test	ASTM D698-91
Modified Compaction Test	ASTM D1557-91
15 Blow Compaction Test	ASTM D5080-93
California Bearing Ratio	DOD 2-IX
8. Consolidation Tests	COE VIII; ASTM D2435-90
9. Shear Strength	
UU (unconsolidated, undrained)	COE X-18
CU (consolidated, undrained)	COE X-29
CD (consolidated, drained)	COE IX-38

Notes:
ASTM = American Society for Testing and Materials (ASTM 1996).
ASA = American Society of Agronomy/Soil Science Society of America. Method of Soil Analysis, Part-1, 1965.
COE = EM 1110-2-1906 (Headquarters, U.S. Army Corps of Engineers 1986).
CSSS = Canadian Society of Soil Science (Carter 1993).
DOD = U.S. Department of the Army, Navy, and Air Force 1987.

Source: Winfield and Lee (1999).



Issues to Resolve

- Volume and suitability
- Access
- Federal Easement
- Ownership
- Liability
- Costs and Who Pays
- Other

- Case Studies
  - Philadelphia District
  - NY District
  - Mobile District
  - Great Lakes Commission

Background

- Consider
  - Since 1969, Philadelphia District excavates from CDFs to provide more capacity
  - New York District is investigating feasibility of centralized public dredged material processing facility where material is brought, processed, and distributed
  - Seattle District tests material for BU and supports interagency forum for re-use
  - Mobile District has a full time PM dedicated to finding BU opportunities since they are out of capacity
  - Galveston District constructing CDFs 20 years ahead of schedule due to excess sediments

Implementation Strategy

- **Step 2-Feasibility Study**
  - **Engineering**
    - Identify feasibility of CDF dredged material for BU
    - Identify dredged material volume and character in the CDFs
    - Obtain map of CDFs within each District and along the GIWW
    - Determine access routes
  - **Environmental**
    - Site selection criteria
    - Oyster leases
    - Reduce storm impacts
    - Proximity to Barataria Basin and other high priority areas
  - **Economics**
    - Evaluate establishing a state wide mitigation bank for various hurricane protection projects
    - Maximize existing collected data
    - Analyze costs

Thank you

Demonstration Project

Applicable Regulations

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