Dredging 101
Dredging and Disposal Workshop

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U.S. Army Corps of Engineers

Galveston District

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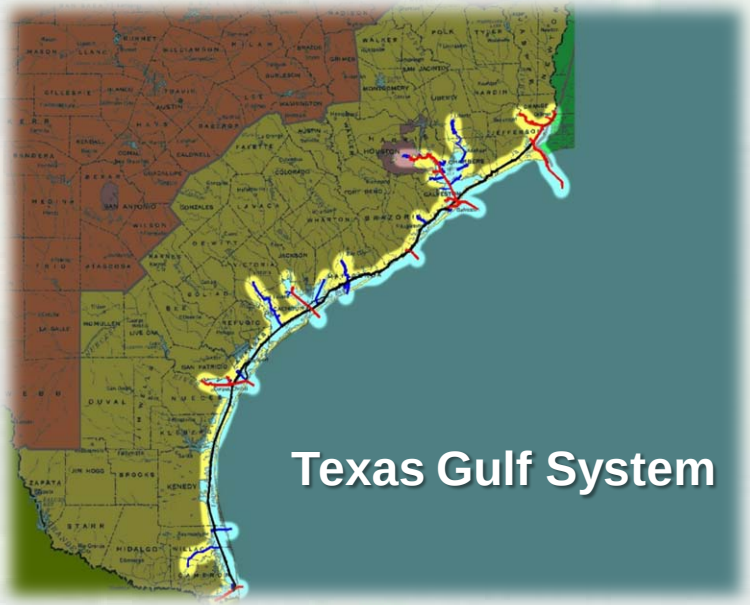
US Army Corps of Engineers

BUILDING STRONG®

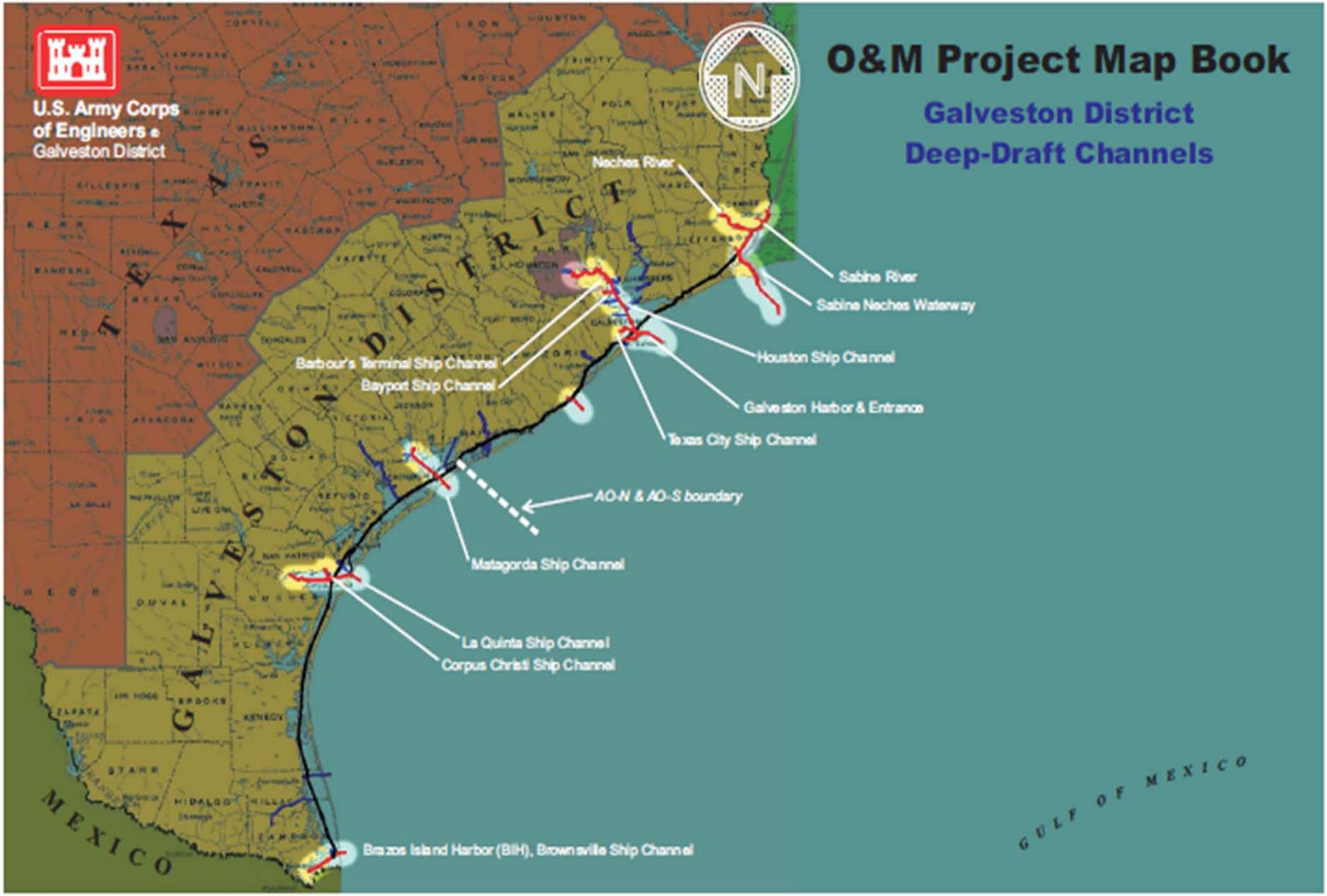
Navigation Mission

Provide safe, reliable, efficient and environmentally sustainable waterborne transportation systems (channels, harbors, and waterways) for movement of commerce, national security needs, and recreation.

Galveston District Facts

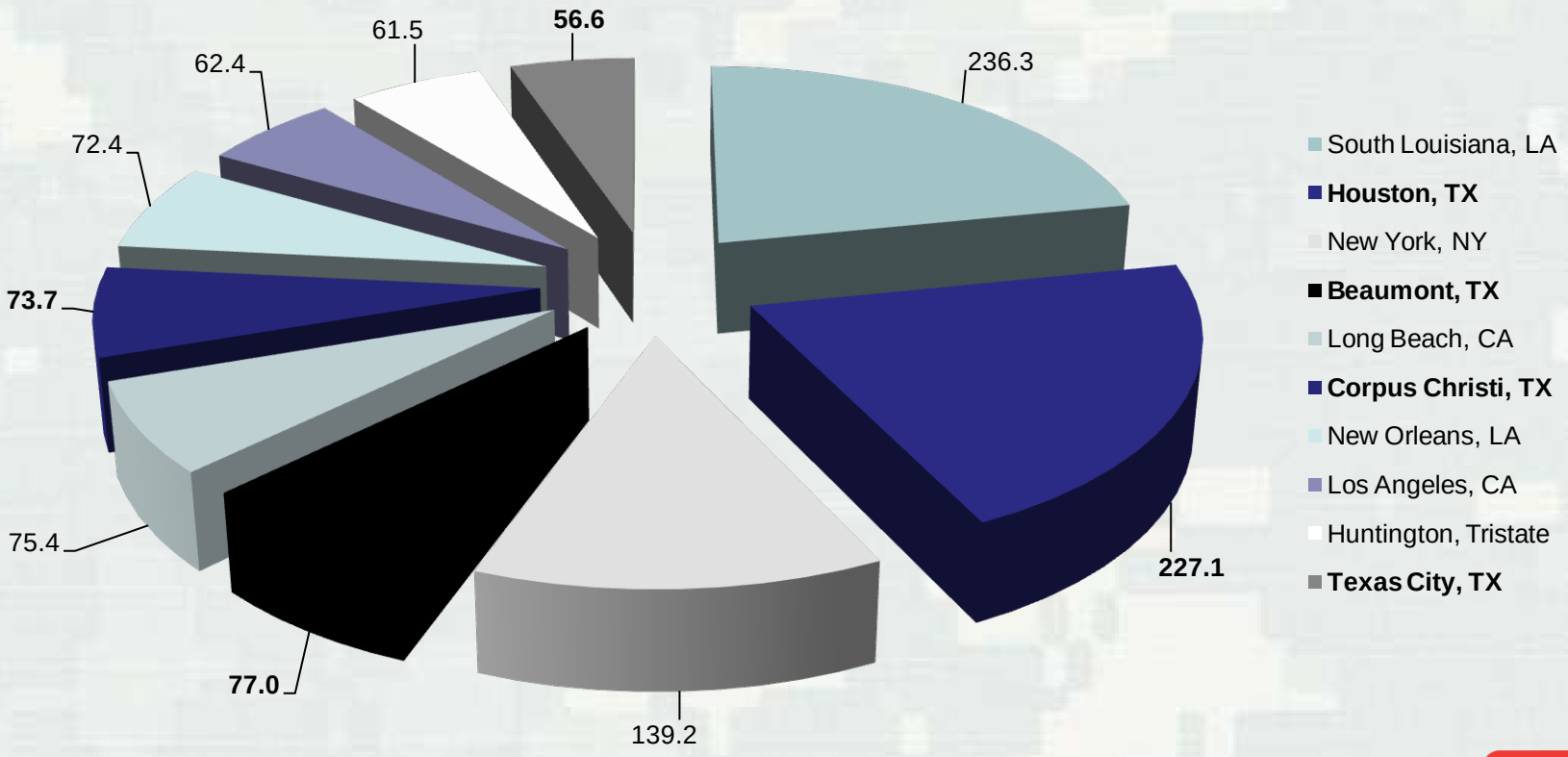


- 50,000 sq-mile district boundary
- 460 miles of coastline
- 48 Texas Counties
- 18 Counties – Coastal Bay Estuaries
- 3 LNG
- 346 full time employees
- 760 miles shallow draft
- 240 miles deep draft
- 13 shallow draft ports
- 15 deep draft ports
- Texas Ports and Waterways moved 575M
- 3 Strategic Ports

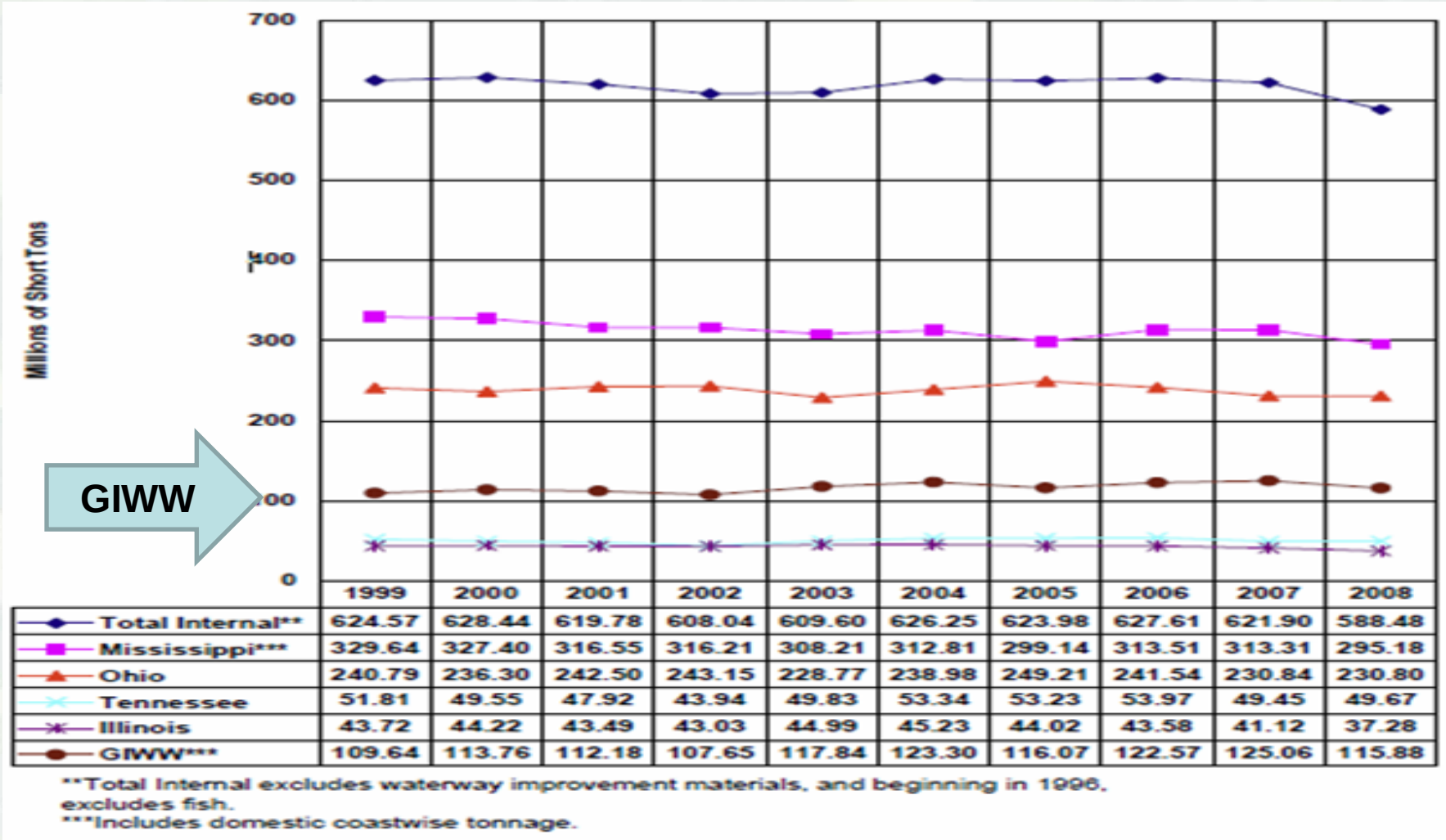

U.S. Army Corps of Engineers
Galveston District
O&M Project Map Book
Galveston District
Deep-Draft Channels
N
TEXAS
GALVESTON DISTRICT
MEXICO
GULF OF MEXICO
Neches River
Sabine River
Sabine Neches Waterway
Houston Ship Channel
Galveston Harbor & Entrance
Texas City Ship Channel
Barbour's Terminal Ship Channel
Bayport Ship Channel
AO-N & AO-S boundary
Matagorda Ship Channel
La Quinta Ship Channel
Corpus Christi Ship Channel
Brazos Island Harbor (BIH), Brownsville Ship Channel

Tonnage for Top Ten U.S. Ports in 2010

(Millions of Tons)



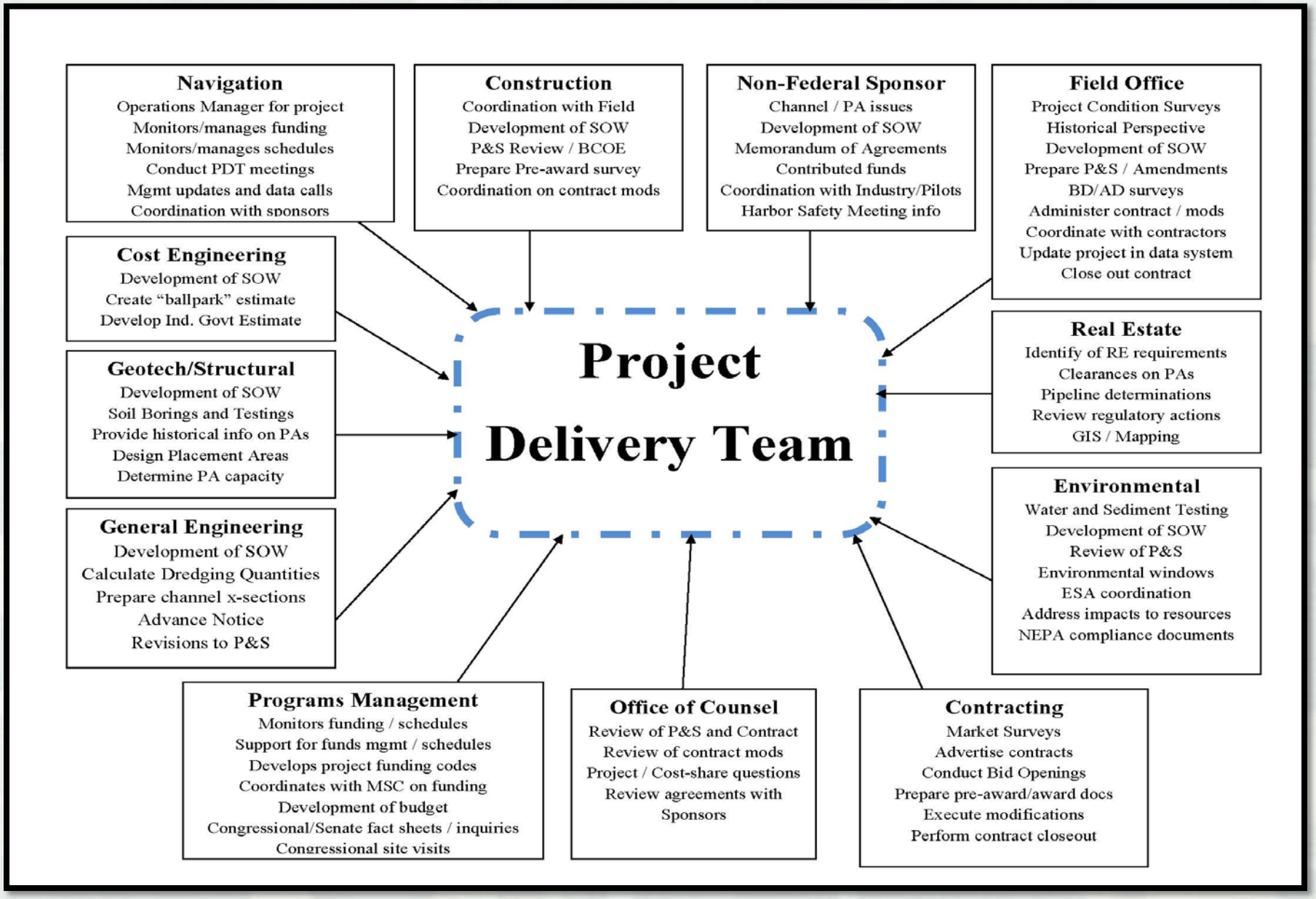
Tonnage of Commerce – U.S. Inland Waterways



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Internal**	624.57	628.44	619.78	608.04	609.60	626.25	623.98	627.61	621.90	588.48
Mississippi***	329.64	327.40	316.55	316.21	308.21	312.81	299.14	313.51	313.31	295.18
Ohio	240.79	236.30	242.50	243.15	228.77	238.98	249.21	241.54	230.84	230.80
Tennessee	51.81	49.55	47.92	43.94	49.83	53.34	53.23	53.97	49.45	49.67
Illinois	43.72	44.22	43.49	43.03	44.99	45.23	44.02	43.58	41.12	37.28
GIWW***	109.64	113.76	112.18	107.65	117.84	123.30	116.07	122.57	125.06	115.88

**Total Internal excludes waterway improvement materials, and beginning in 1996, excludes fish.
***Includes domestic coastwise tonnage.

Project Delivery Team

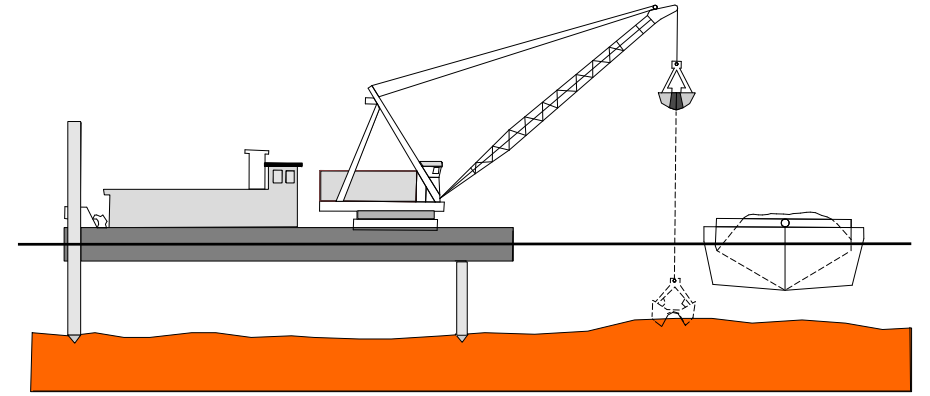


DREDGING METHODS

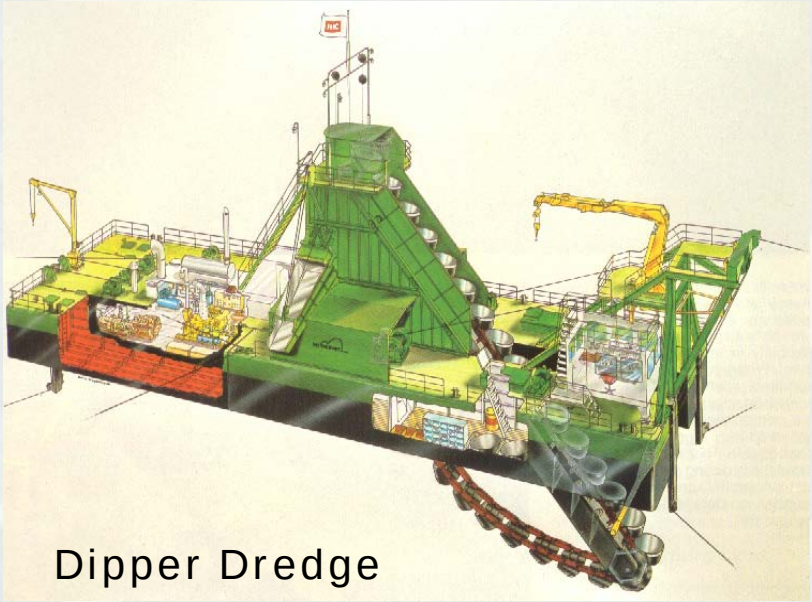
TYPES OF DREDGES

- **Mechanical Dredges**
  - Clamshell
  - Backhoe
  - Dipper
  - Dragline
- **Pipeline Dredges**
  - Cutterhead
  - Dustpan
- **Trailing Suction Hopper Dredge**

Mechanical Dredges



Clamshell Dredge with Scow



Dipper Dredge

Source: IHC Holland

Backhoe Dredge

Clamshell Dredges

Source: The Dutra Group

Source: Great Lakes Dredge & Dock

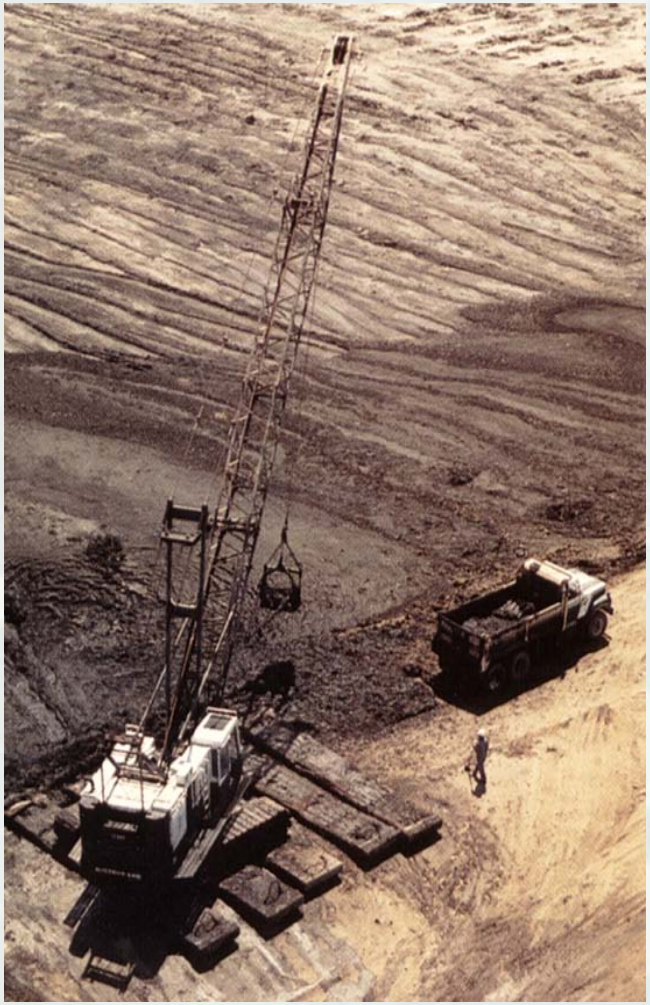
Clamshell Dredge

Source: Manson Construction and Engineering Co.

Backhoe Dredge

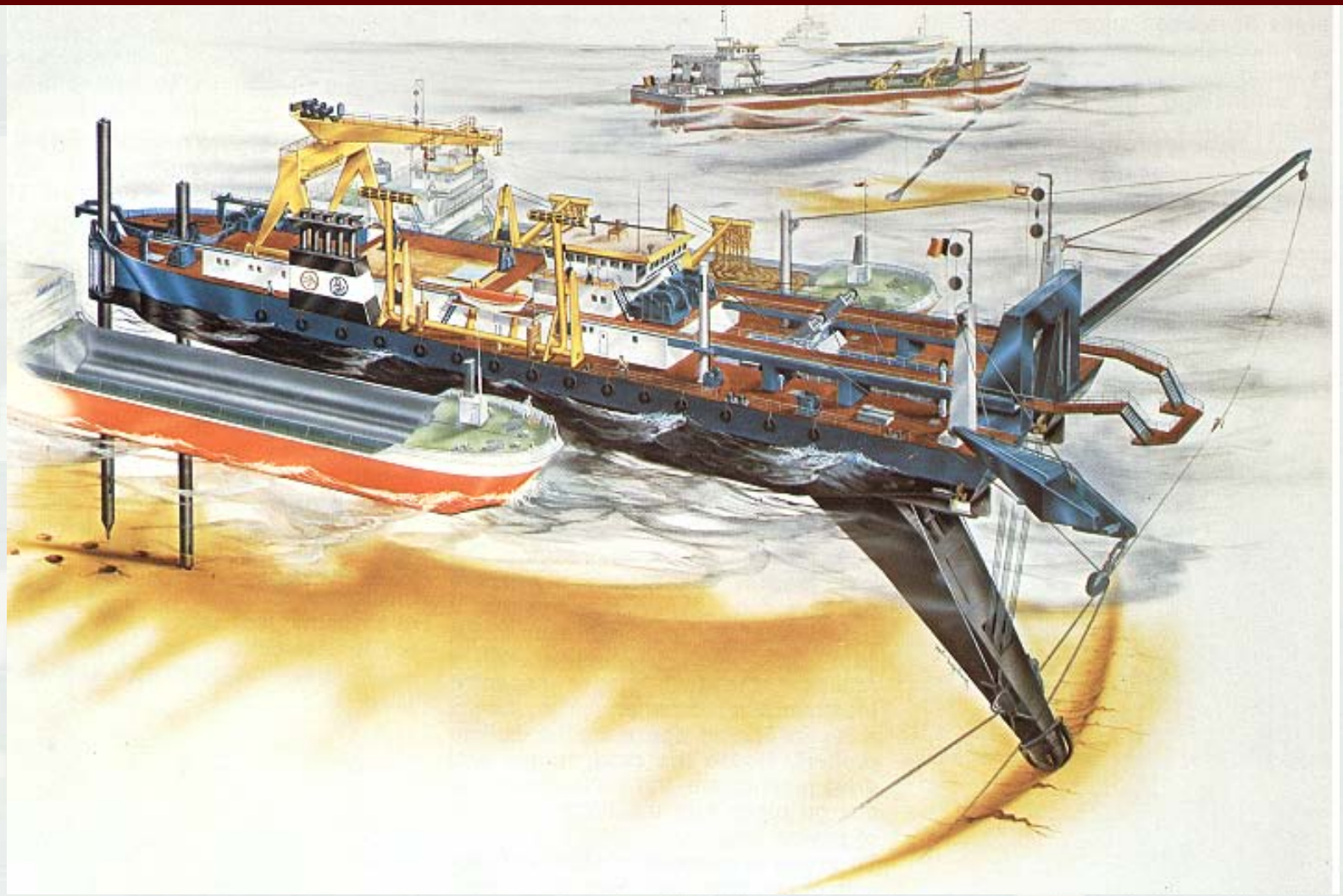
Source: The Dutra Group

Dragline Dredging



Source: The Dutra Group

Hydraulic Pipeline Dredge (Cutterhead Dredge)



Cutterhead Suction Dredges

Cutterhead Dredge in Operation

Types of Cutterheads

Cutterhead with Rock Teeth

Source: Great Lakes Dredge and Dock Co.

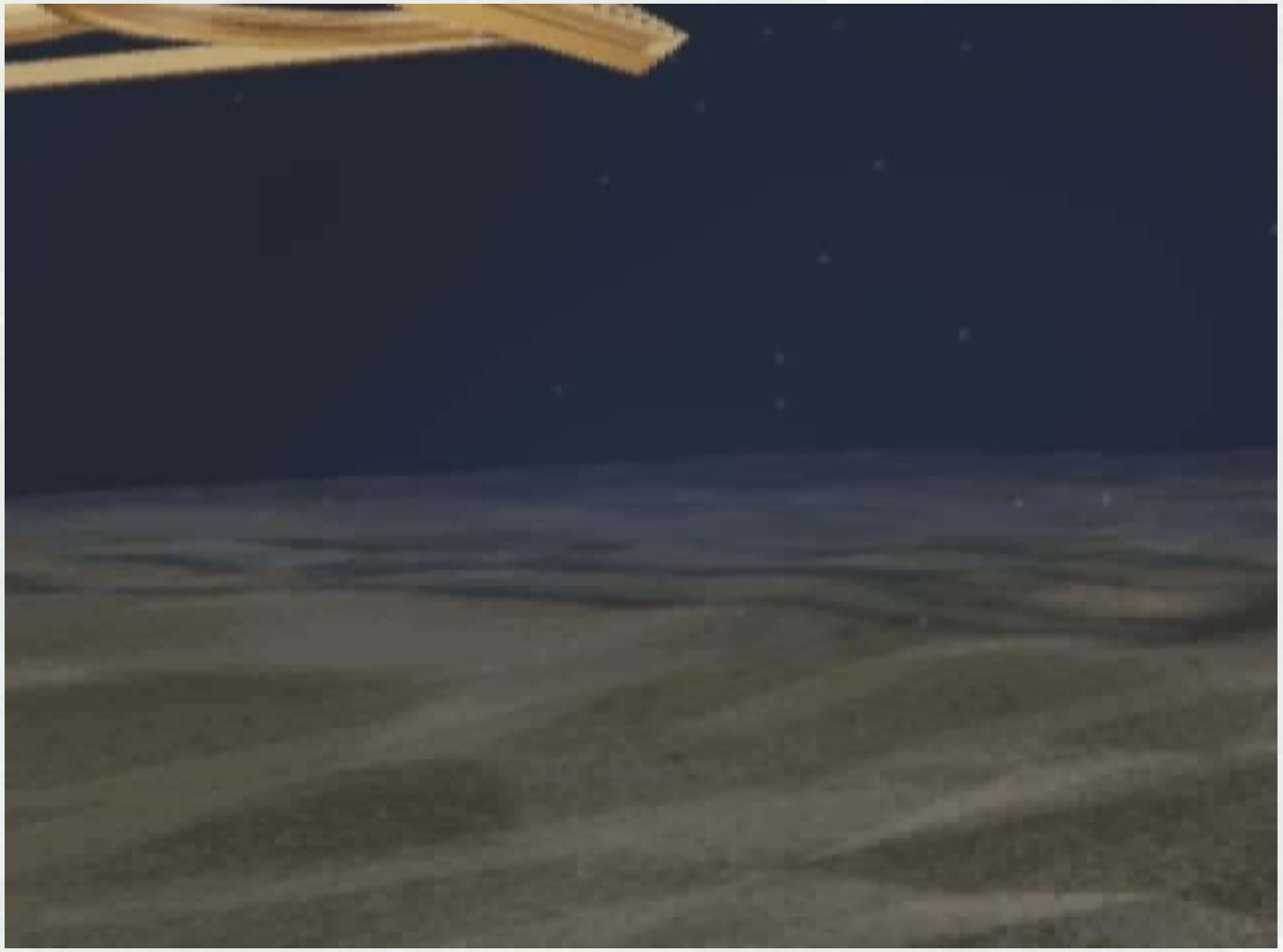
Cutterhead Dredge

DREDGE TEXAS

The Texas performs rock dredging on the Wilmington Harbor Deepening Project.

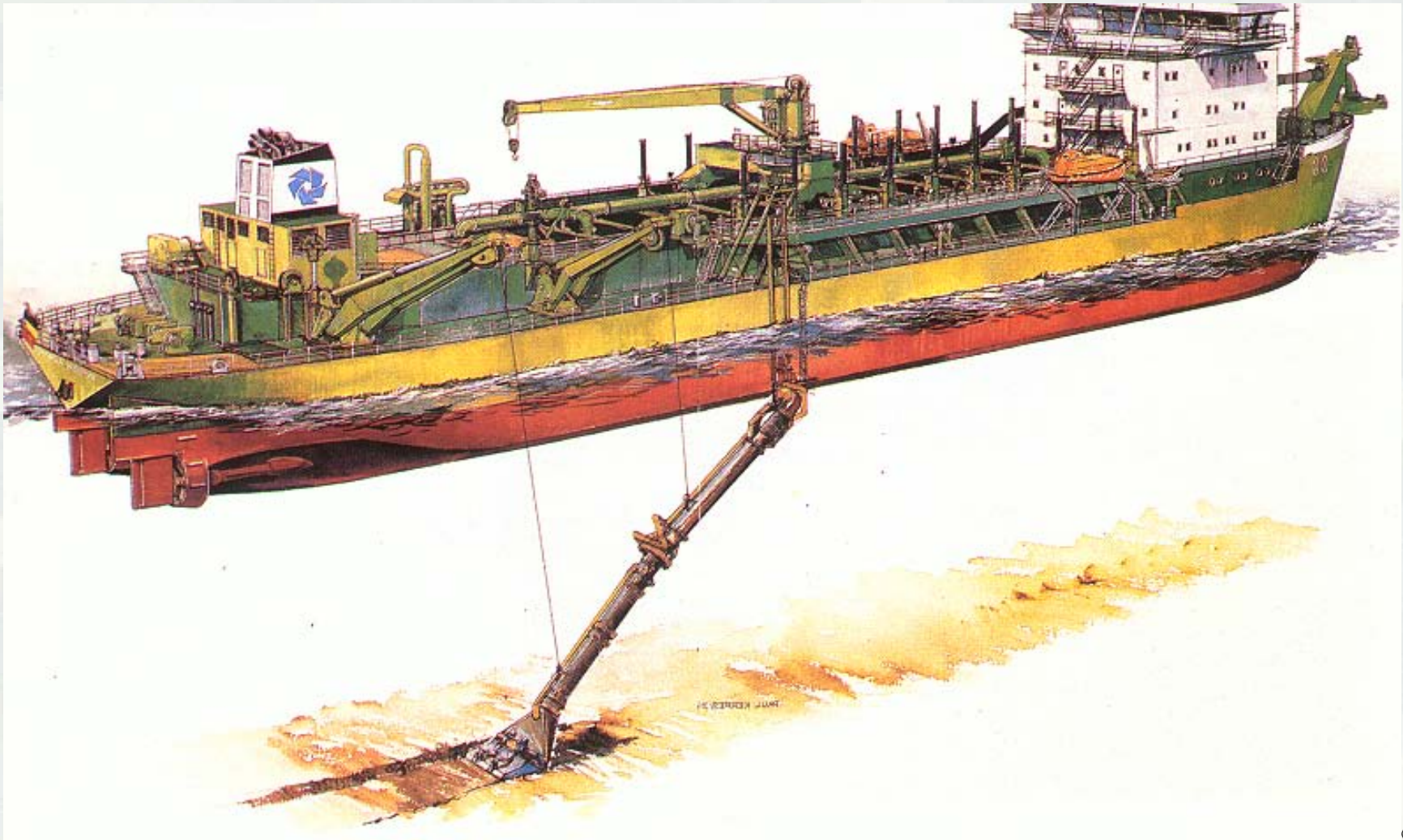
Hydraulic Pipeline Dredge (Dustpan Dredge)

Dustpan Dredge in Operation



Trailing Suction Hopper Dredge

(Hopper Dredge)

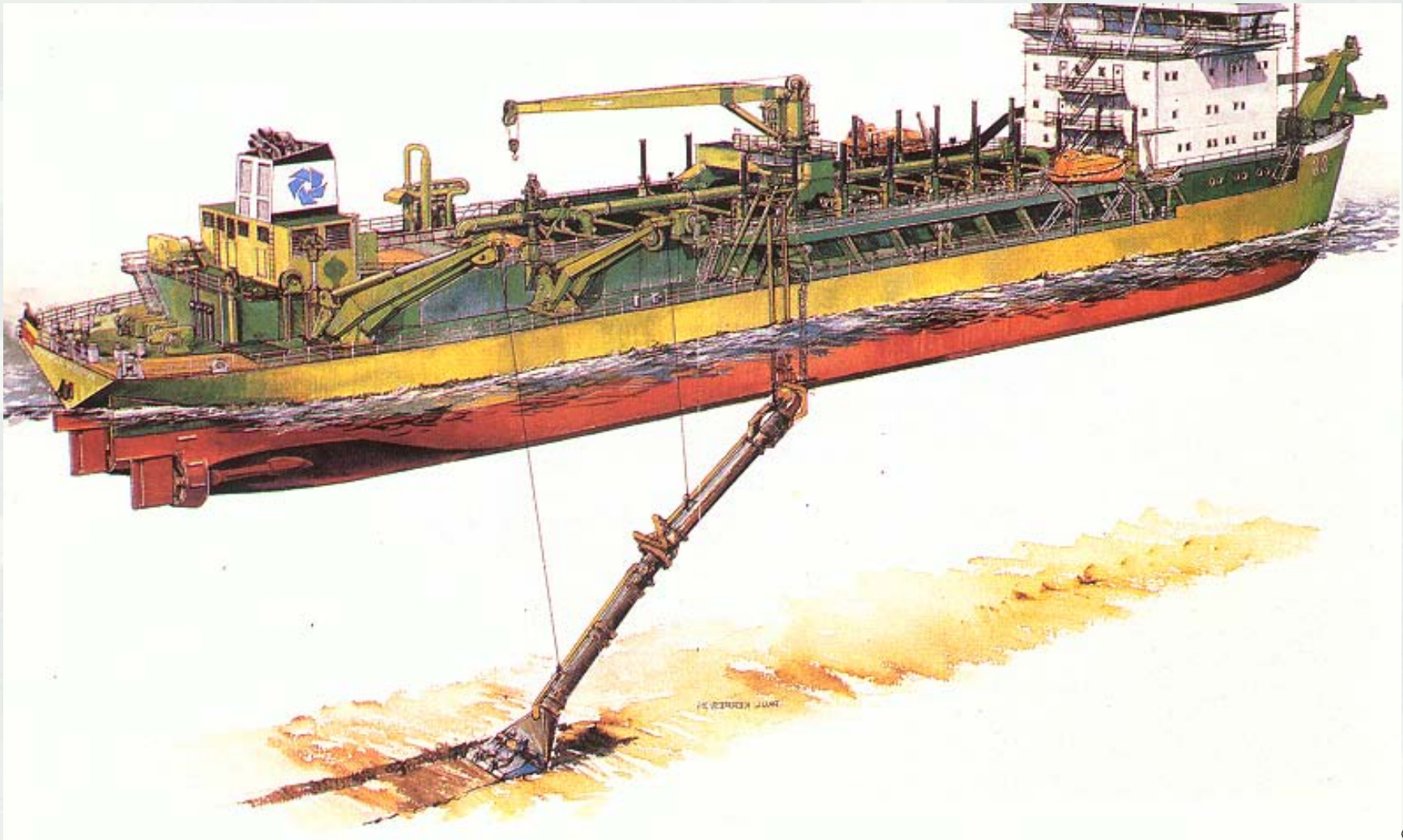


U.S. Hopper Fleet

1.	Glenn Edwards	13,800 CY	2006
2.	Stuyvesant	11,140 CY	1982
3.	Wheeler	8,000 CY	1981
4.	Liberty Island	6,540 CY	2001
5.	Terrapin Island	6,400 CY	1981
6.	Essayons	6,000 CY	1983
7.	Bayport	5,000 CY	1999
8.	Columbia	4,425 CY	1944
9.	Newport	4,000 CY	1982
10.	BE Lindholm	4,000 CY	1985
11.	RN Weeks	4,000 CY	1987
12.	Padre Island	3,600 CY	1981
13.	Dodge Island	3,600 CY	1980
14.	McFarland	3,140 CY	1967
15.	Westport	1,500 CY	1980
16.	Atchafalaya	1,300 CY	1980

Trailing Suction Hopper Dredge

(Hopper Dredge)



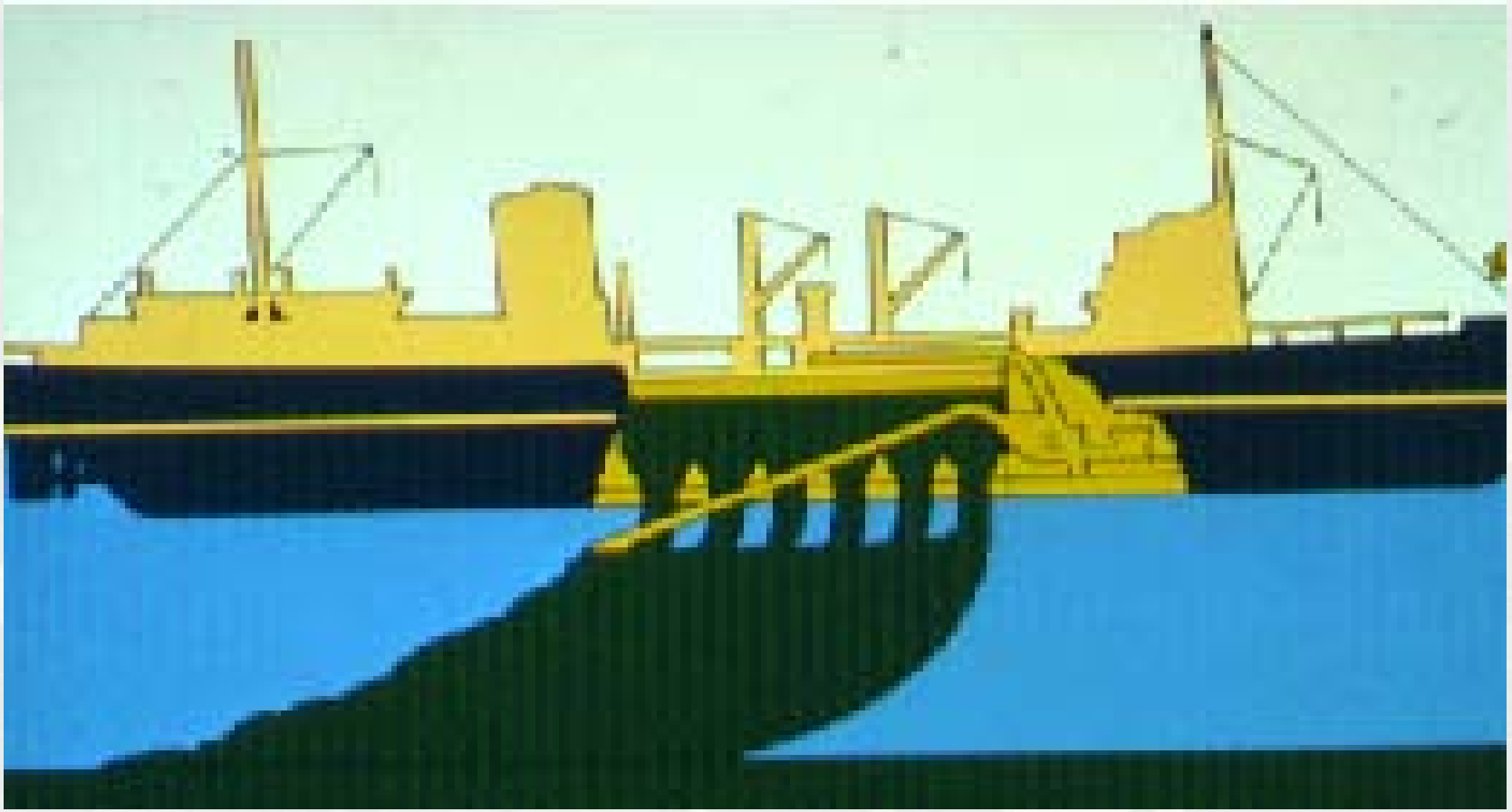
Hopper Dredge in Operation

Source: Great Lakes Dredge and Dock Co.

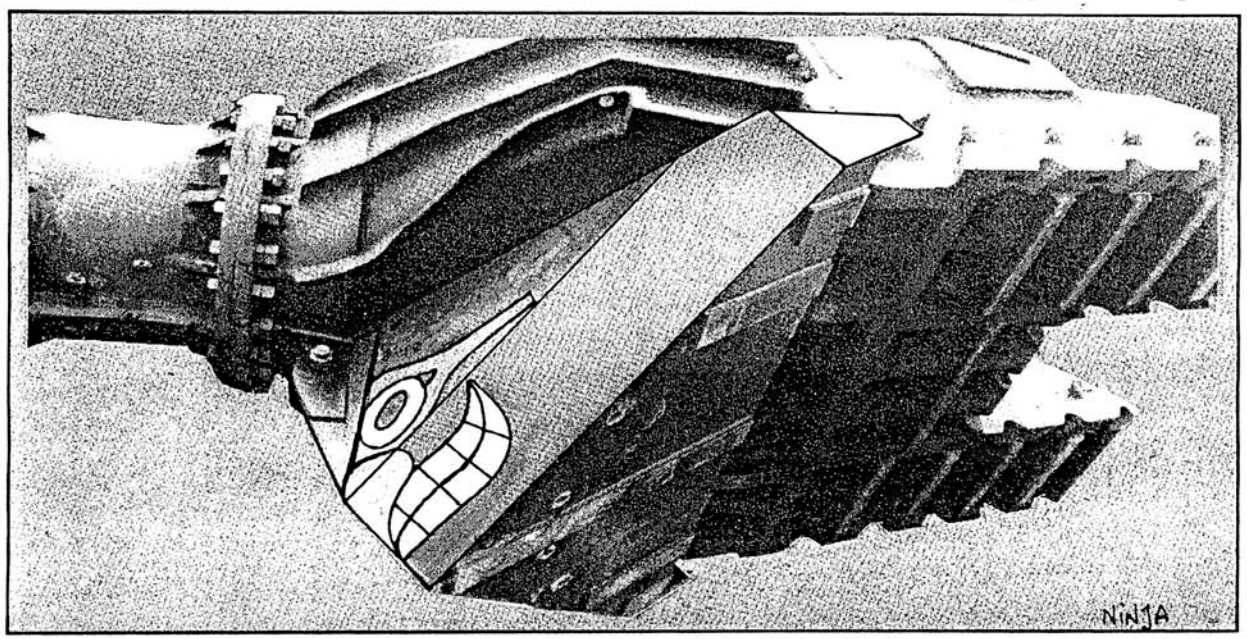
Split-Hull Hopper Dredge

Source: Bean-Stuyvesant Dredging

Hopper Dredge with Hydraulic Disposal Doors



Turtle Exclusion Device



A stylized turtle's face adorns the draghead deflector designed by MDC. The deflector is positioned on the front of the draghead, so as the dredge moves forward, the deflector pushes turtles out of the way, keeping them from being sucked into the draghead. (Photo courtesy of Jacksonville District Public Affairs Office.)

Disposal Methods

- **Mechanical Dredges**
  - Scow to Offshore Dredged Material Disposal Site (ODMDS)
  - Mechanically hauled
- **Pipeline Dredges**
  - Upland Confined Placement Area (CPA)
  - Semi-Confined (Control-of-Effluent Placement)
  - Beach Placement
  - Scow-to-ODMDS
- **Trailing Suction Hopper Dredge**
  - ODMDS
  - Near-Shore Feeder Berm
  - Pump-out
    - Beach Placement
    - CPA
    - Semi-Confined, etc.

Mechanical Dredging with Scow Disposal to ODMDS

Disposal Methods

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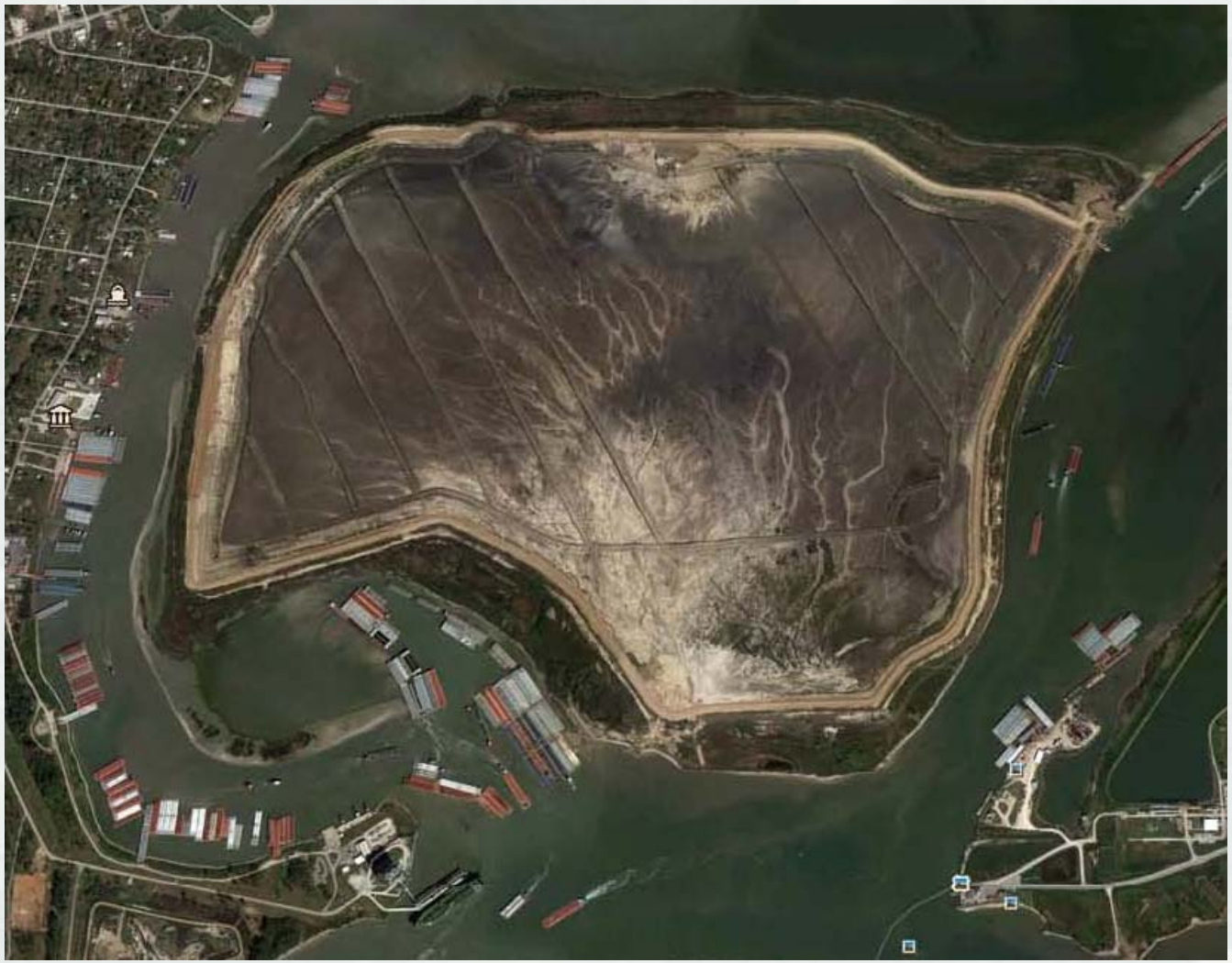
Aerial of Confined Placement Area

(Houston Ship Channel - Lost Lake Placement Area)

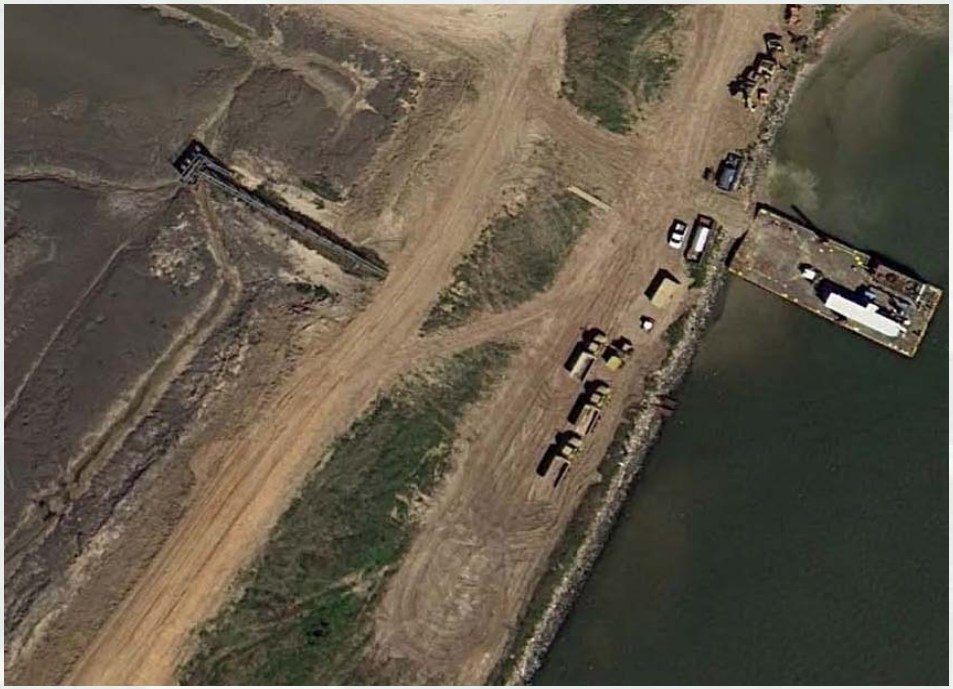


Aerial of Confined Placement Area

(Houston Ship Channel - Lost Lake Placement Area)

Aerials of Spillway Structures

(Houston Ship Channel - Lost Lake Placement Area)



Interior of Confined Placement Area

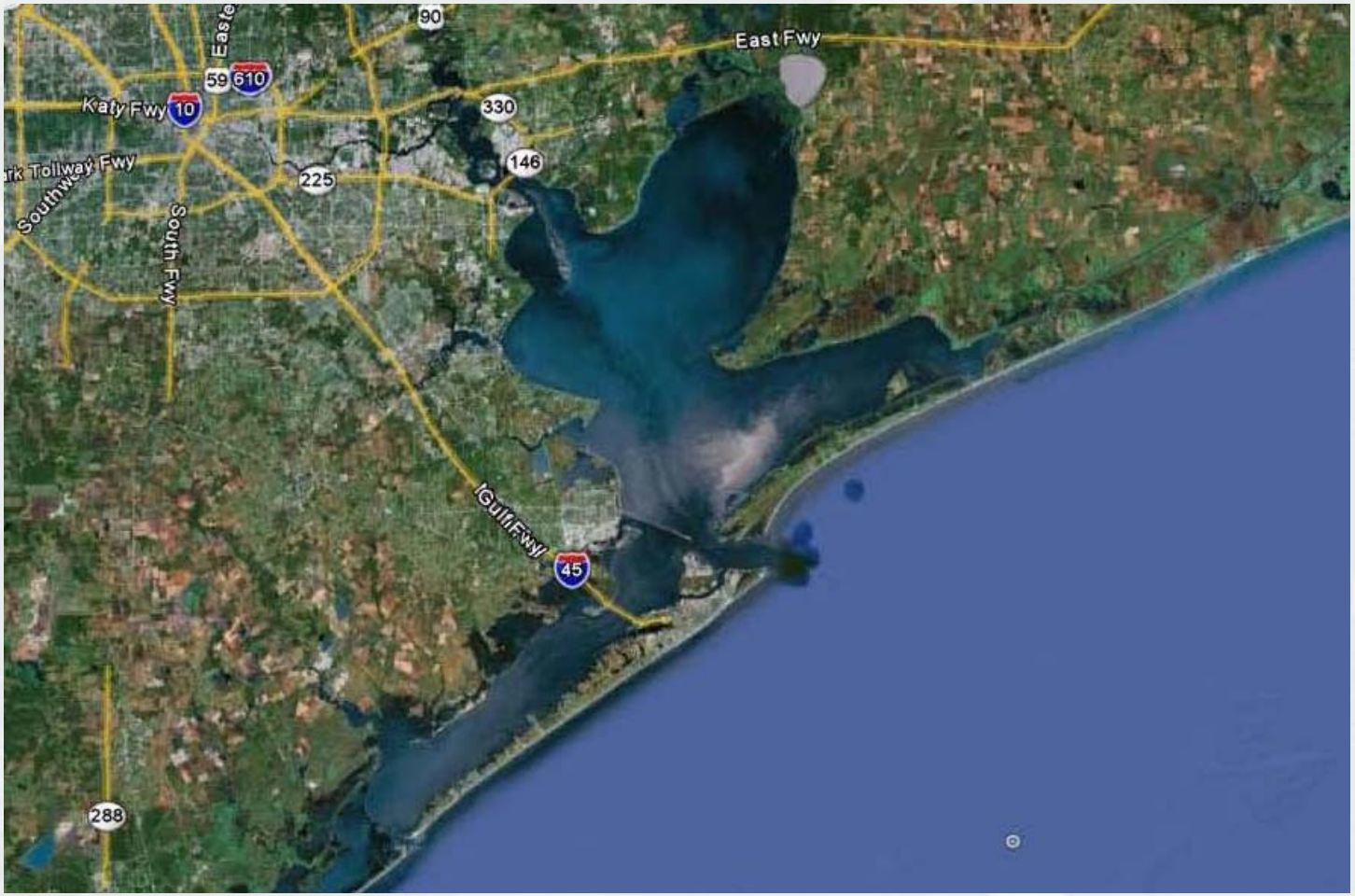
(Levees & Spillway Structure)

Interior of Confined Placement Area

(Levees & Spillway Structure)

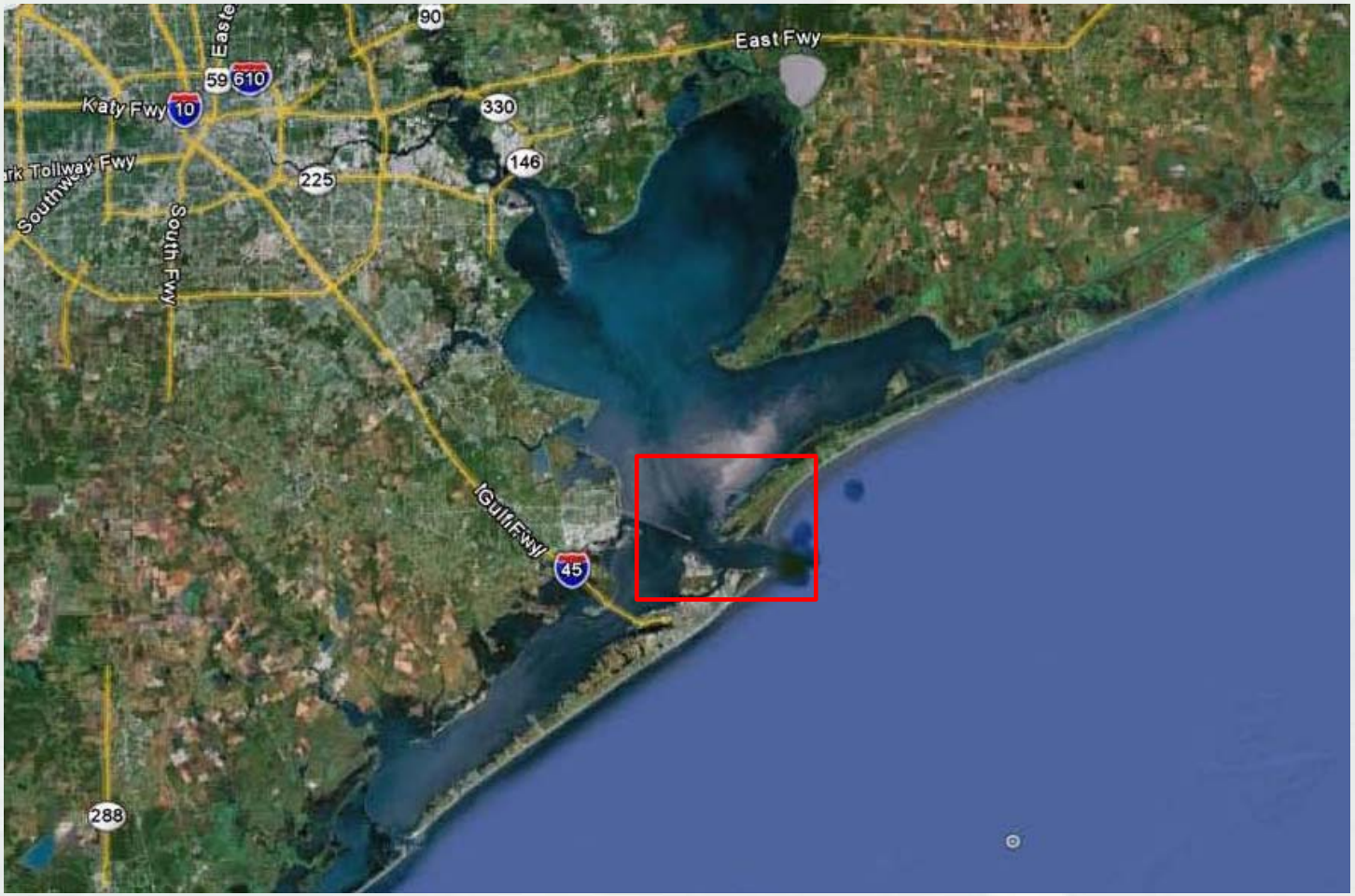
Semi-Confined Placement Area

(Bolivar Marsh Creation – Beneficial Use of Dredged Material)



Semi-Confined Placement Area

(Bolivar Marsh Creation – Beneficial Use of Dredged Material)



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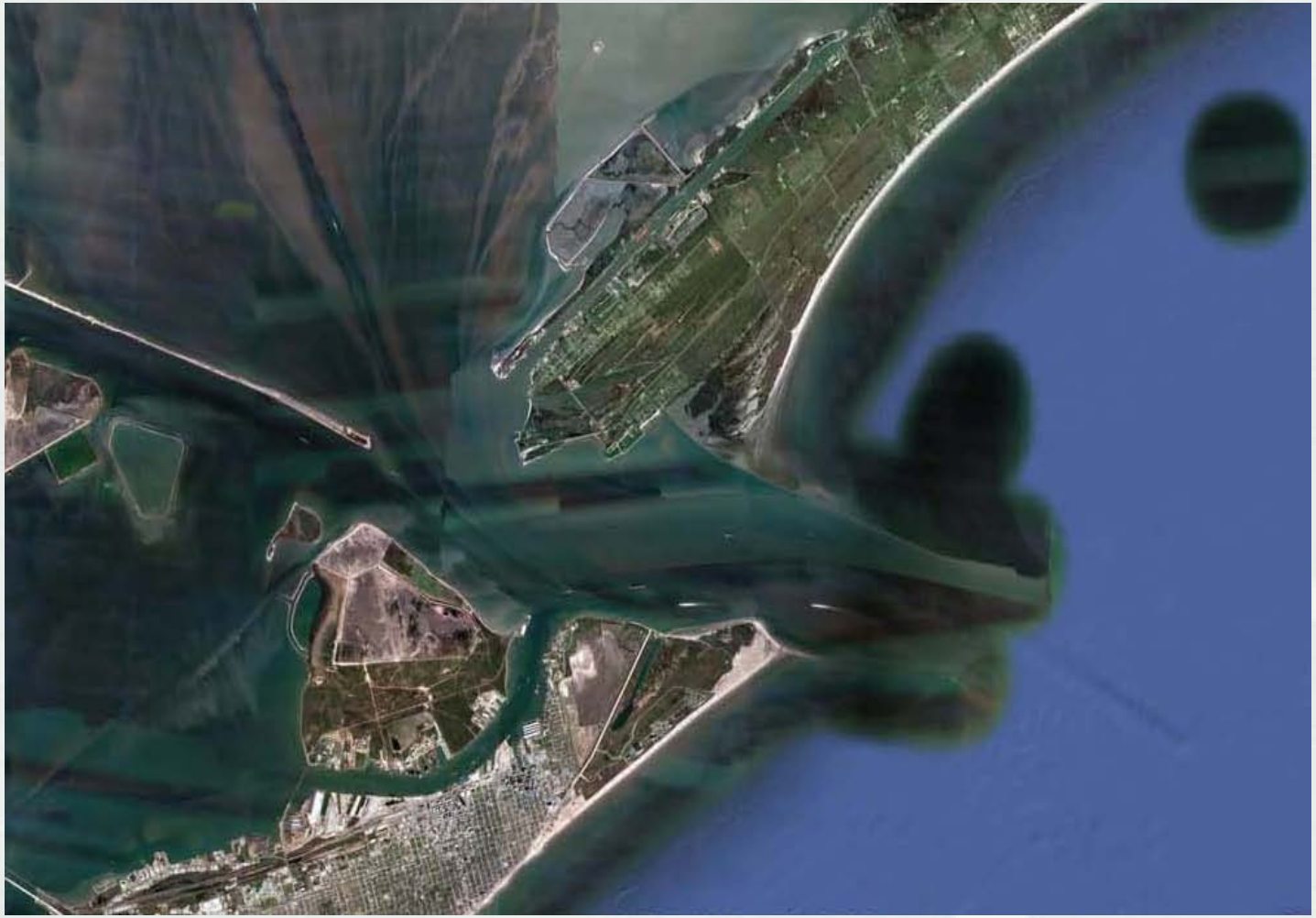
Semi-Confined Placement Area

(Bolivar Marsh Creation – Beneficial Use of Dredged Material)



Semi-Confined Placement Area

(Bolivar Marsh Creation – Beneficial Use of Dredged Material)

Pipeline Dredge with Beach Placement

Pipeline Dredge with Beach Placement

Pipeline-to-Scow-to-ODMDS

Disposal Methods

- **Mechanical Dredges**
  - Scow to Offshore Dredged Material Disposal Site (ODMDS)
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- **Pipeline Dredges**
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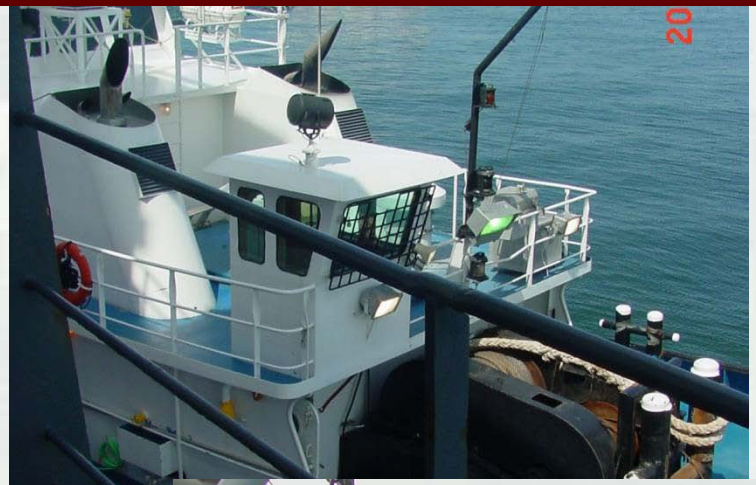
- **Trailing Suction Hopper Dredge**
  - ODMDS
  - Near-Shore Feeder Berm
  - Pump-out
    - Beach Placement
    - CPA
    - Semi-Confined, etc.

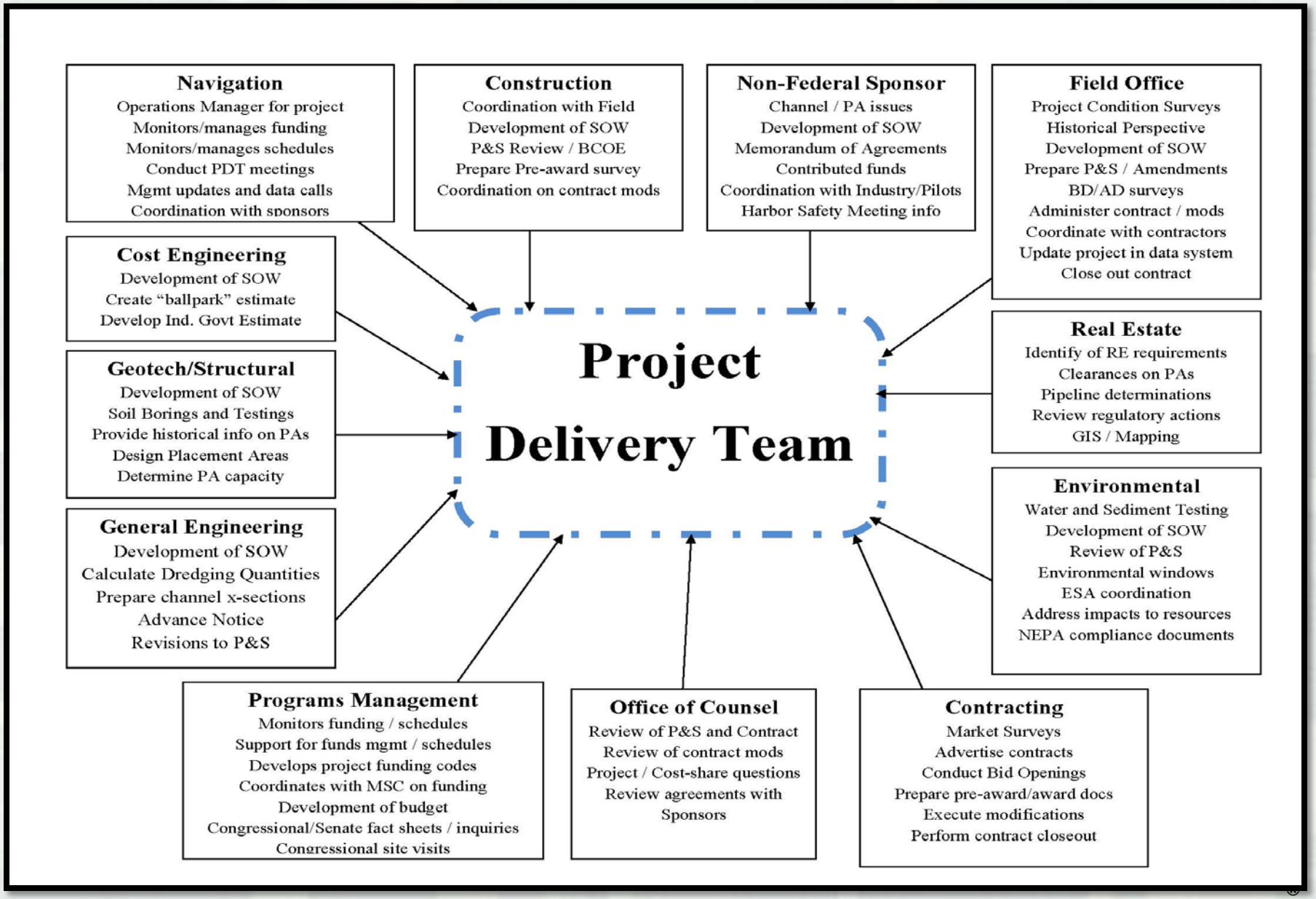
Hopper Dredge with Pump out to Beach

Hopper Dredge with Pump out

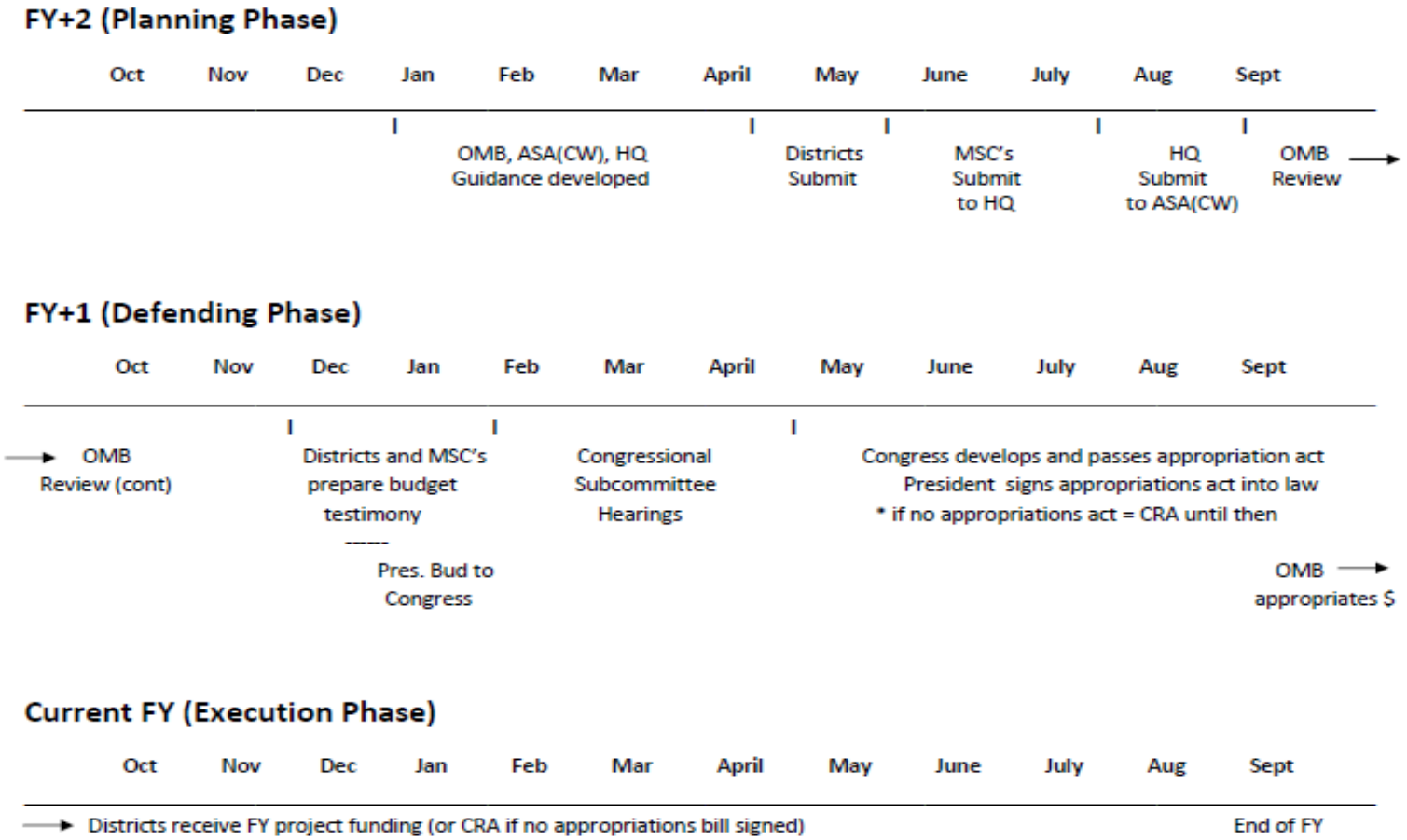


Beach Placement Pipeline or Hopper Pump out

Project Delivery Team



Budget Cycle Timeline



Questions

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