DREDGING TECHNIQUES FOR ENGINEERING WITH NATURE

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2 ENGINEERING WITH NATURE

- ***"Is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes" Suedel, B. USACE ERDC.***

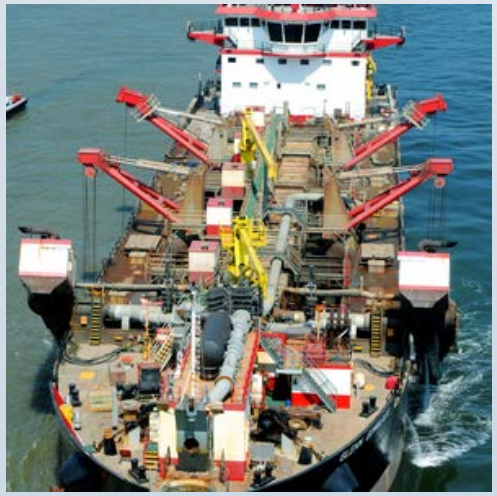
- ***Engineering w Nature = Working w Nature = Building w Nature***

3 DREDGING TECHNIQUES

- **Large Hopper Dredge (>1000 cy, 765 cm)**
- **Small Hopper Dredge (< 1000 cy, 765 cm)**
- **Large Cutter Suction Dredge (>12 in discharge, 305 mm)**
- **Small Cutter Suction Dredge (<12 in discharge, 305 mm)**
- **Sediment Separation Systems (dewatering systems)**
- **Long Distance Pumping Systems (>1mi, 1.6 km)**
- **Dredges for Thin Layer Placement**

4 SELECTED US HOPPER DREDGES AVAILABLE FOR EWN PROJECTS

Weeks Magdalen (8500 cy)



Manson Glenn Edwards(13,000 cy)

GLDD Liberty Island(6000 cy)

GLDD Ellis Island (15,000 cy)

5 CUTTER SUCTION DREDGE, SIDECASTING DREDGE, AUGER DREDGE, REMOTE AUGER DREDGE, SPRAY DREDGE, DUSTPAN DREDGE, SWINGING LADDER DREDGE

6 SELECTED MECHANICAL DREDGES FOR EWN PROJECTS

clamshell

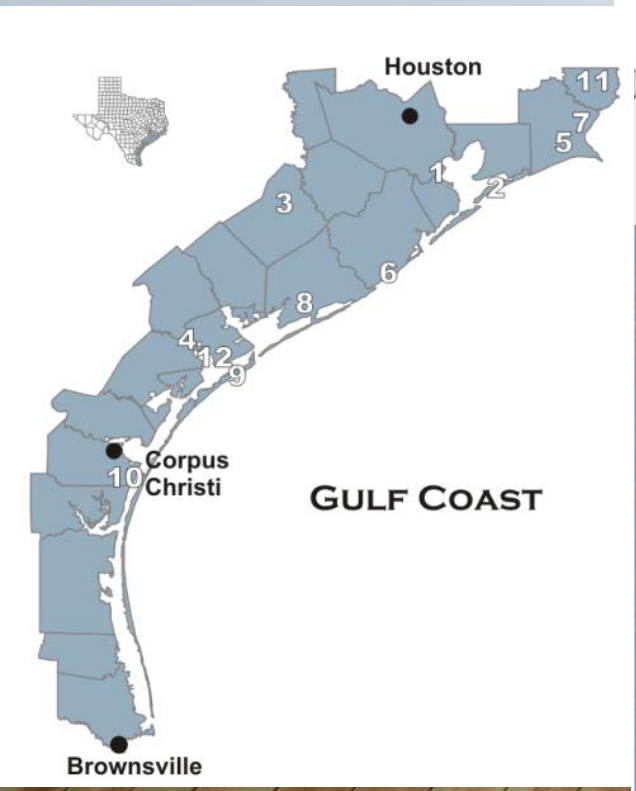
backhoe

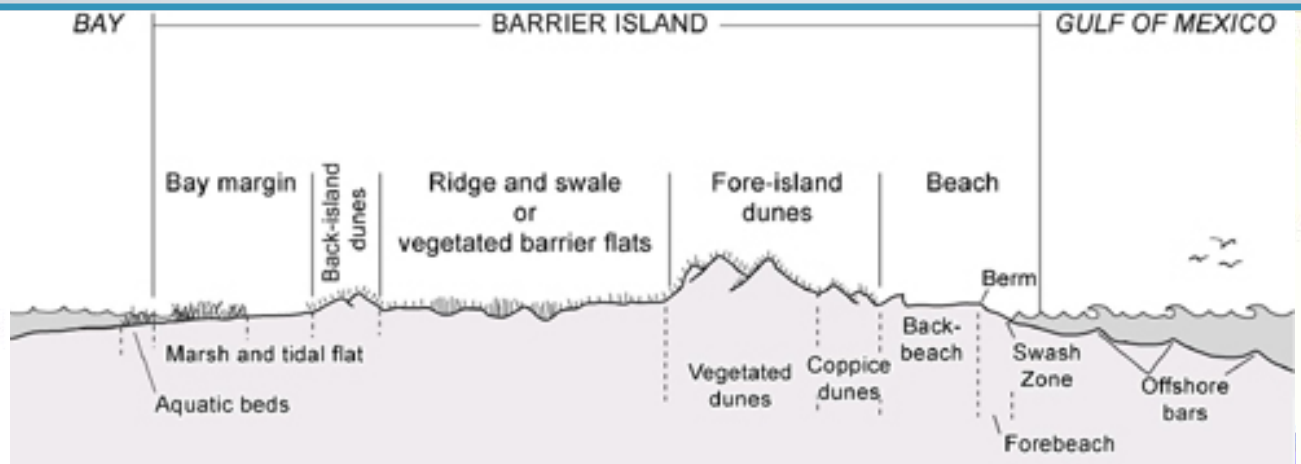
dipper

environmental clamshell

7

MAINTAINING AND INCREASING THE ELEVATION OF BARRIER ISLANDS

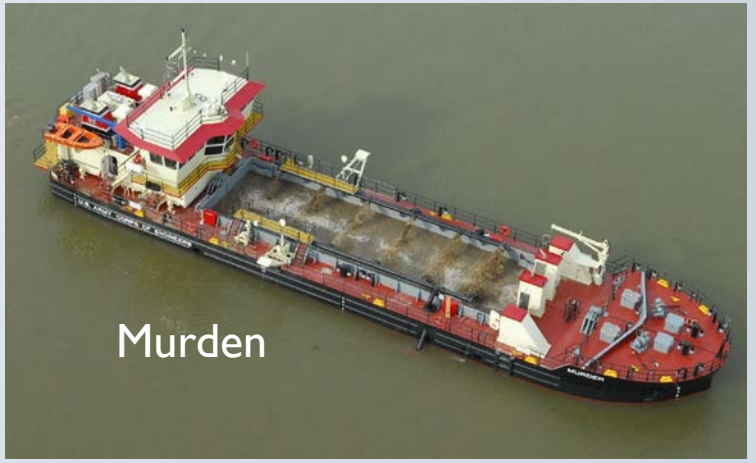




8 FEASIBILITY OF USING DREDGED SAND FOR UNDERWATER NEARSHORE BERMS

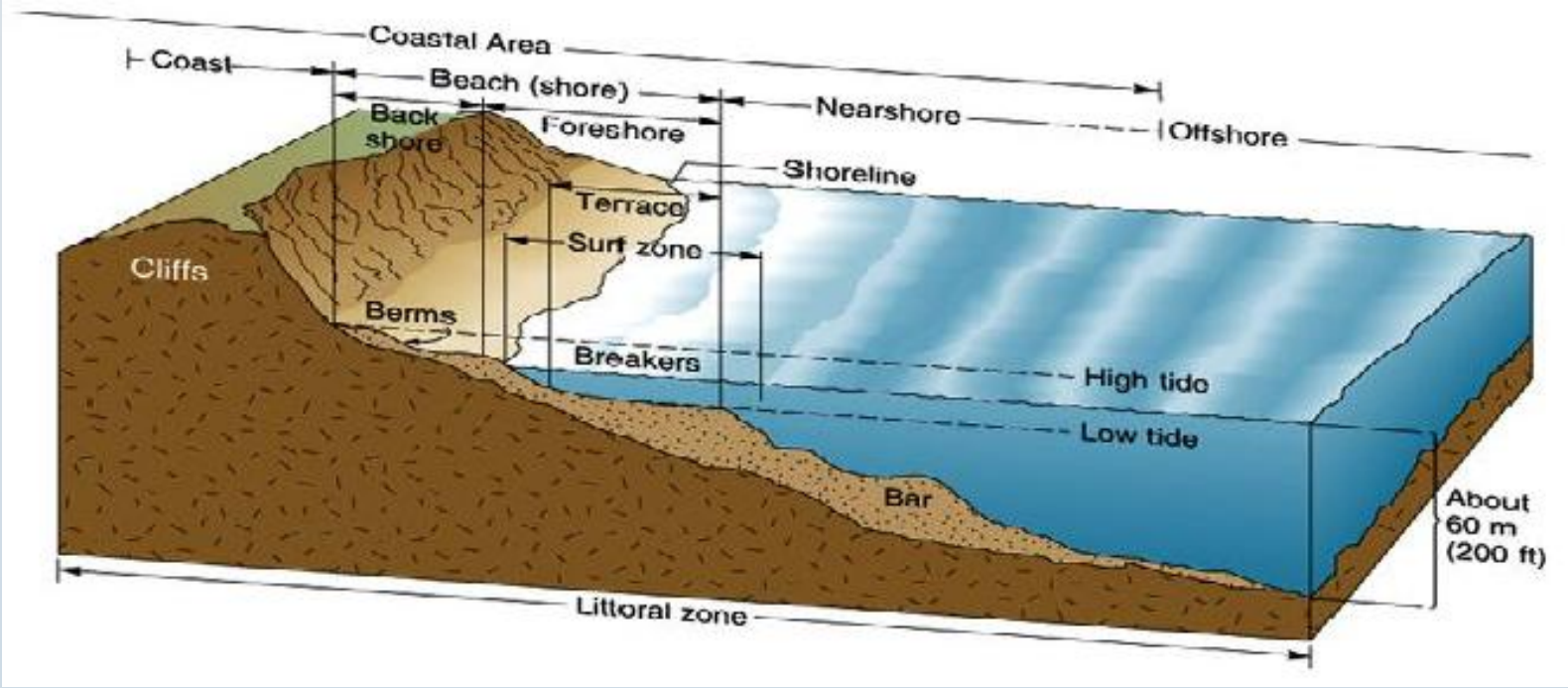
- Berms classified as sacrificial (feeder berms), protection, and containment. Feeds shoreline, breaks waves, acts as a bar.
- Existing berms: South Padre Island (4000 ft long in 20 ft water depth), Mobile Bay, Alabama

- Shallow draft hopper dredge Murden (Length Overall: 156', Hull Breadth: 35', Hull Depth: 10'-9", Draft: Bow 3'-10", Stern 4'-7, Max Hopper Load: 512 cu yds
- Shallow draft hopper dredge Currituck (Length, Overall 150', Beam, Molded 30'-7", Draft, Light 3'-4", Draft, Loaded 7'-6", Cap. 315 cy



9 PLACEMENT OF DREDGED SEDIMENTS IN LITTORAL CURRENT TO MAINTAIN COAST LINES

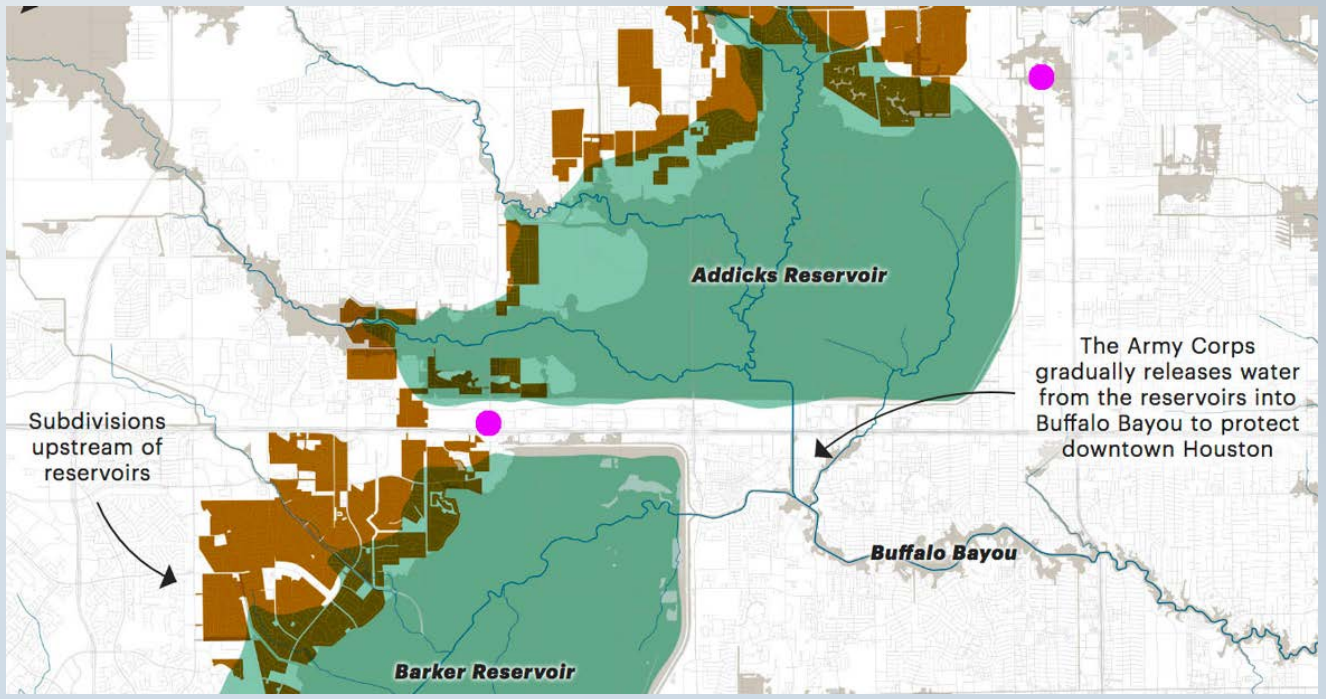
- Locate Open Water Dredged Material Disposal Sites (ODMDS) in littoral zone
- Regulate height of dredged material above original seafloor
- Locate disposal area where the dredged material can be mobilized (dispersed)



Courtesy of Wikipedia

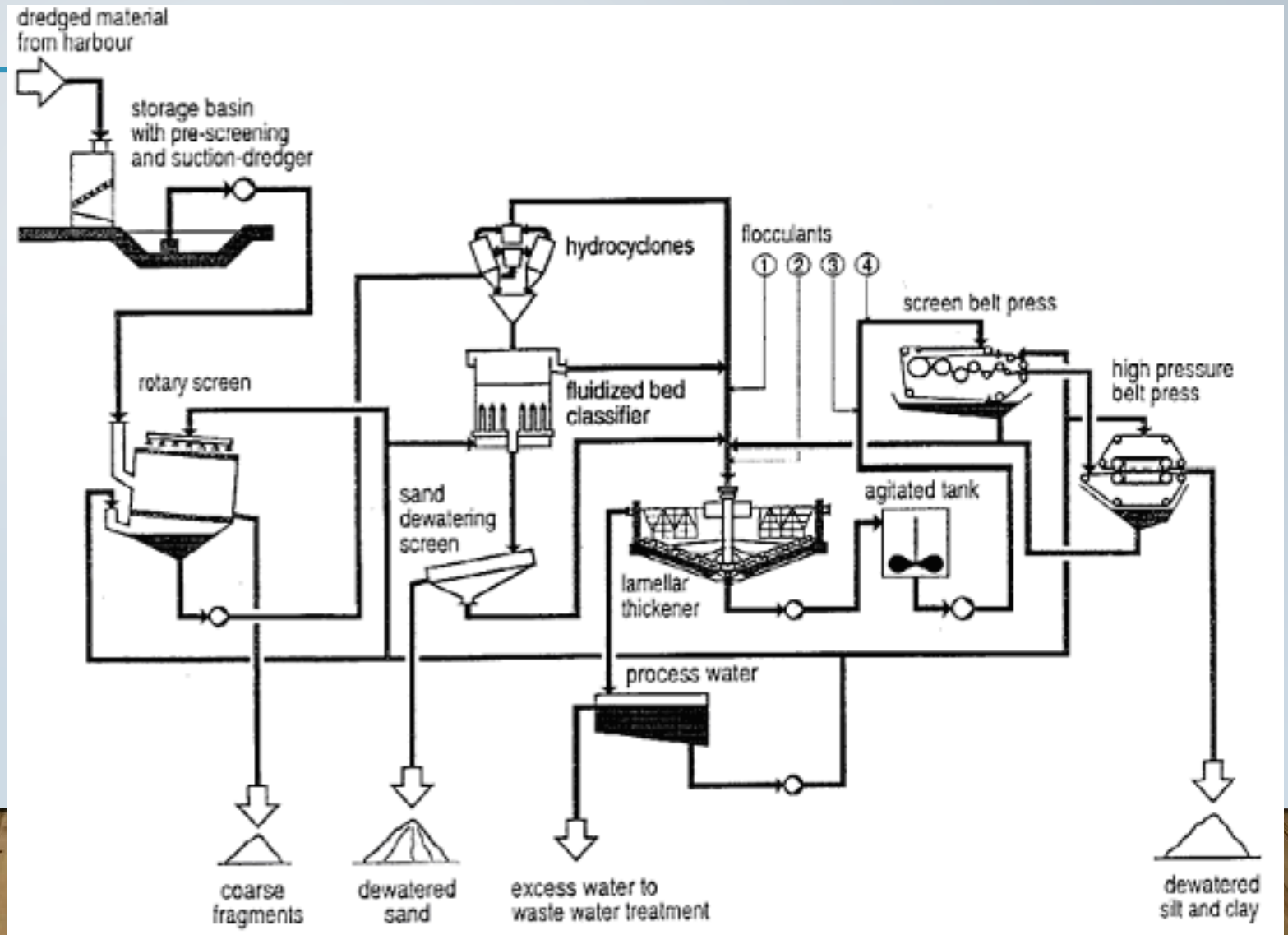
FEASIBILITY AND ECONOMICS OF DREDGING RESERVOIRS AND PLACEMENT AREAS (CDF) FOR EWN MATERIALS

Filled Placement Area (CDF)



Sediment Removal from Flood Protection Reservoirs

SAND WATER SEPARATION, BOOSTER PUMP, DEWATERING SYSTEM



12 SUMMARY

- **Dredging equipment is an essential part of engineering with nature.**
- **Dredging companies are great collaborators for project scientists/engineers in the development of project goals.**
- **Scientists (biologist, ecologists, geologists, etc) need to collaborate with engineers to insure construction satisfies the needs of nature (wildlife, people, plants, etc) in a sustainable, economic, and resilient approach.**
- **Dredging companies are a great source of engineering innovation to successfully complete engineering with nature projects.**

THANK YOU