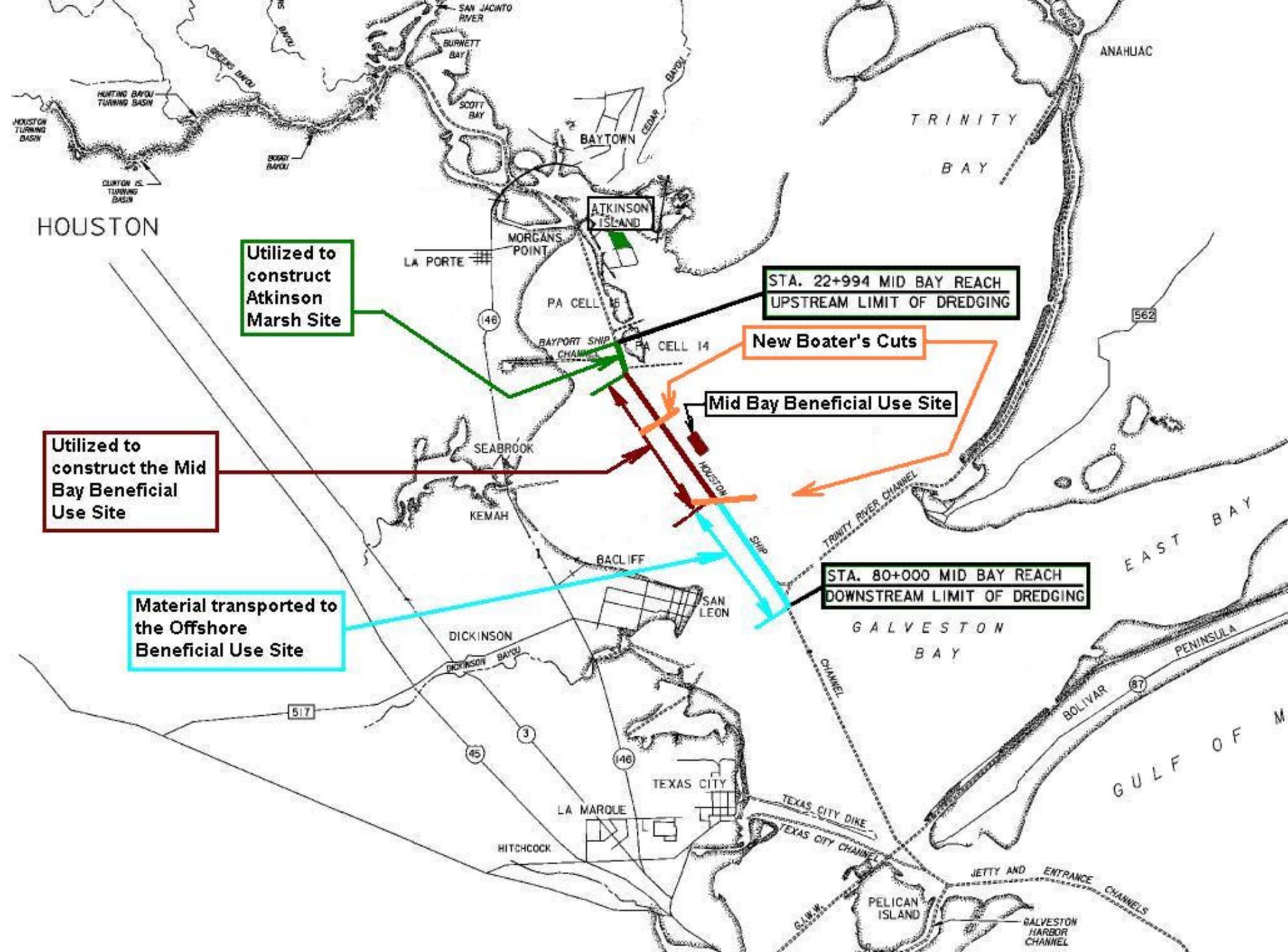


HGNC - 45' Project

Dredging Mid Bay



Utilized to construct Atkinson Marsh Site

Utilized to construct the Mid Bay Beneficial Use Site

Material transported to the Offshore Beneficial Use Site

STA. 22+994 MID BAY REACH
UPSTREAM LIMIT OF DREDGING

New Boater's Cuts

Mid Bay Beneficial Use Site

STA. 80+000 MID BAY REACH
DOWNSTREAM LIMIT OF DREDGING

Dredging Mid Bay – Major Goals

- ⇒ Deepen the Houston Ship Channel to – 45'
- ⇒ Widen the Houston Ship Channel from 400' to 530' wide
- ⇒ Create “barge lanes” adjacent to the Ship Channel
- ⇒ Create upland placement areas for future dredging
- ⇒ Create upland habitats
- ⇒ Create marsh habitats

Dredging Mid Bay – Major Challenges

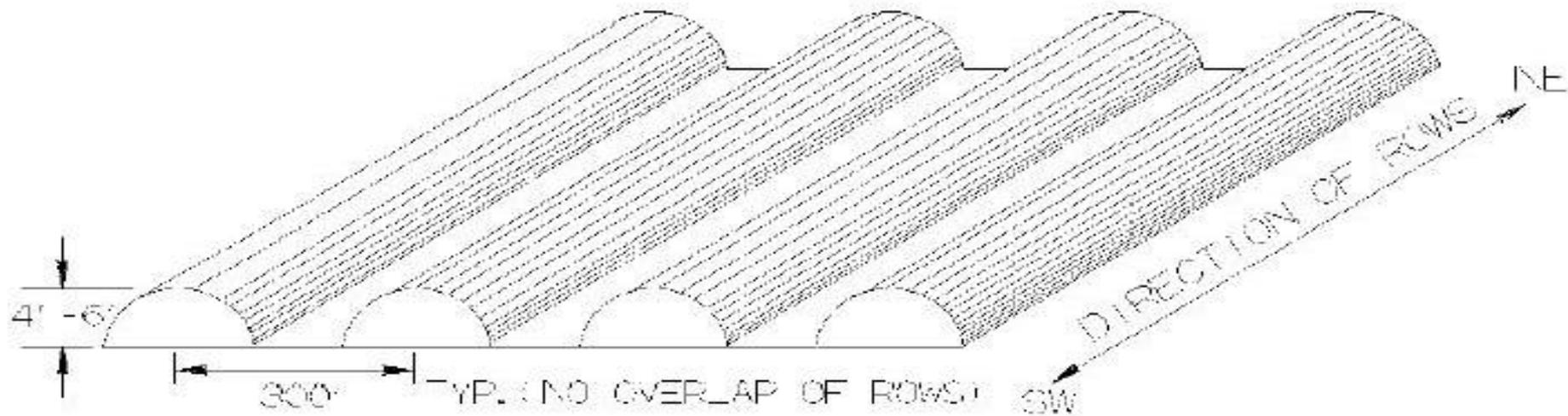
- ➔ Coordination with HSC users to facilitate safe passage of vessels during dredge operations
- ➔ Optimize the use of suitable materials removed from the HSC in construction of upland sites & marshes – beneficial use of material
- ➔ Construct the 565 Acre Mid Bay Beneficial Use Site atop existing soft materials in Galveston Bay
- ➔ Complete the removal of 22.5 MCY of dredged material in the time allotted for the project

Dredging Mid Bay – Major Challenges

- ➔ Coordinate the placement of 160,000 tons of rock shore protection on the newly constructed Mid Bay Beneficial Use Site

Dredging Mid Bay – Offshore Phase

- ➔ Remove approximately 5 MCY of soft material (unsuitable for upland construction) and transport to the Offshore Beneficial Use Site



DREDGED MATERIAL
ROW PLACEMENT

NOT TO SCALE

Bucket Dredge 506 working in the HSC



Tug Alexandra towing 6,000 CY scow out to Offshore Beneficial Use Site



Hopper Dredge B.E. Lindholm heading to Offshore Beneficial Use Site



Dredging Mid Bay – Marsh Creation Phase

- ➔ Remove approximately 1.5 MCY of material by hydraulic / cutter head dredge and transport to the Atkinson Marsh Site for use in marsh creation

Marsh fill at Atkinson Island Site



08/27/2002

Marsh fill at Atkinson Island Site



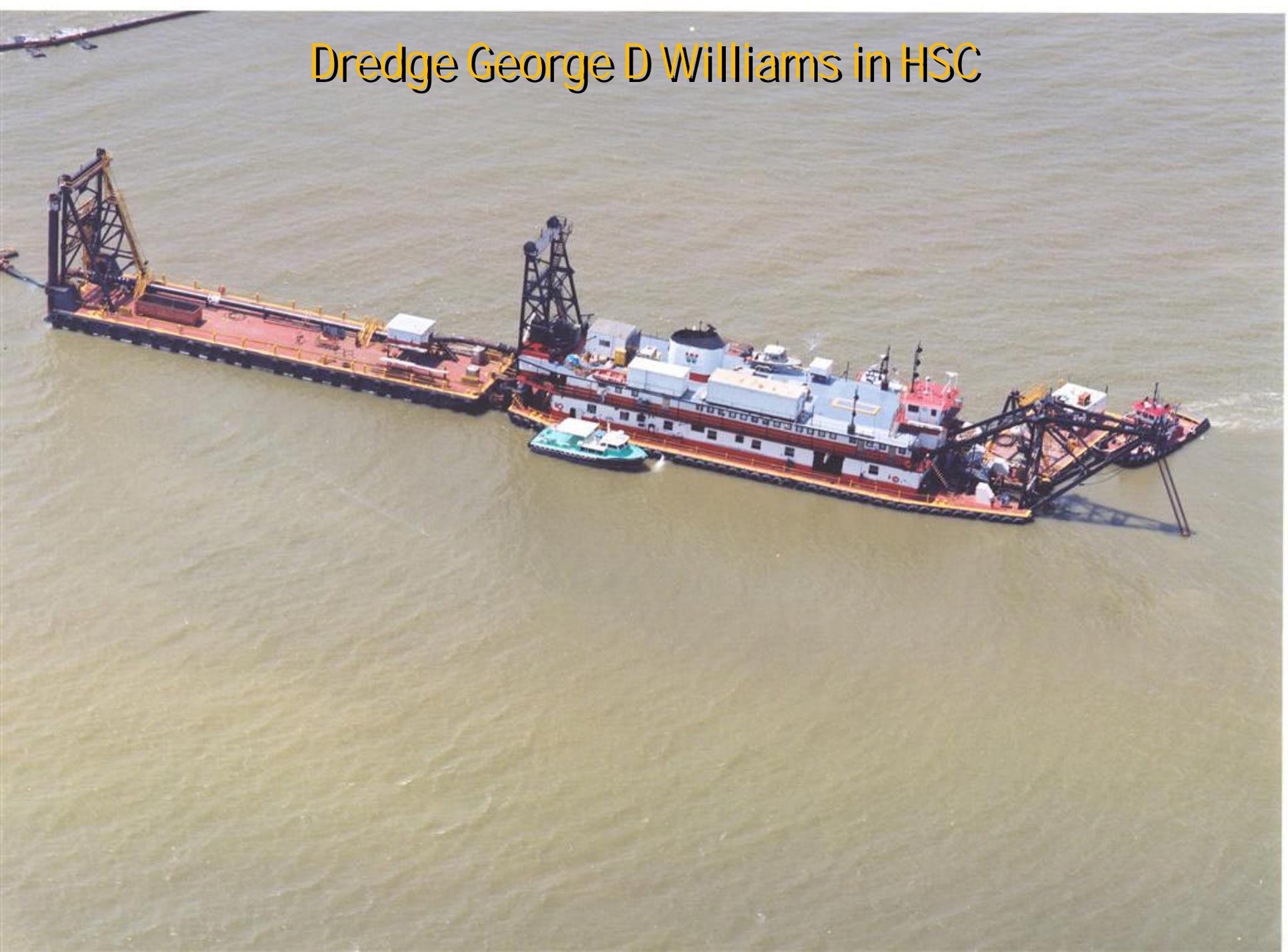
Dredging Mid Bay – Mid Bay Beneficial Use Site (MBUS) Phase

- ➔ Remove approximately 8.5 MCY of medium to stiff clays and sands from the Houston Ship Channel and utilize this material to construct the Mid Bay Beneficial Use Site.

Dredge Tom James in HSC



Dredge George D Williams in HSC



MBUS Construction – Spill Barge

- ⇒ MBUS “levee design is based on hydraulically constructed fill utilizing the foundation displacement technique.”



MBUS Construction – Spill Barge



MBUS Construction – Marsh Excavators



MBUS Construction - Habitat

- ⇒ Marsh excavators were required to work the fill in this area (the South Upland Habitat).



MBUS Construction – Displacement

- ⇒ Displacement of softer, bay bottom materials with the heavier materials (clays & sands) dredged from the ship channel resulted in a mud being pushed up around the fill areas.



Dredging Mid Bay – Erosion Protection

- ⇒ Place approximately 160,000 Tons of rock shore protection along 21,200 linear feet of exterior levee constructed at the Mid Bay Site
- ⇒ Going in, a major concern was erosion of the hydraulically placed levee exposed to the open waters of Galveston Bay by wind generated waves and vessel generated wakes
- ⇒ Placing stone shore protection quickly was key to mitigating the effects of erosion

Stone Shore Protection Placement



- ⇒ Pumped levee is prepared by excavator equipment, fabric is then placed on the slope followed by rock ranging in size from 55 to 1,500 pounds



MBUS Construction – Oct. 2003



MBUS Construction – Mar. 2004



MBUS Construction – May 2004



MBUS Construction – Jun. 2004



MBUS Construction – Jul. 2004



MBUS Construction – Aug. 2004

South Habitat

Southwest Marsh

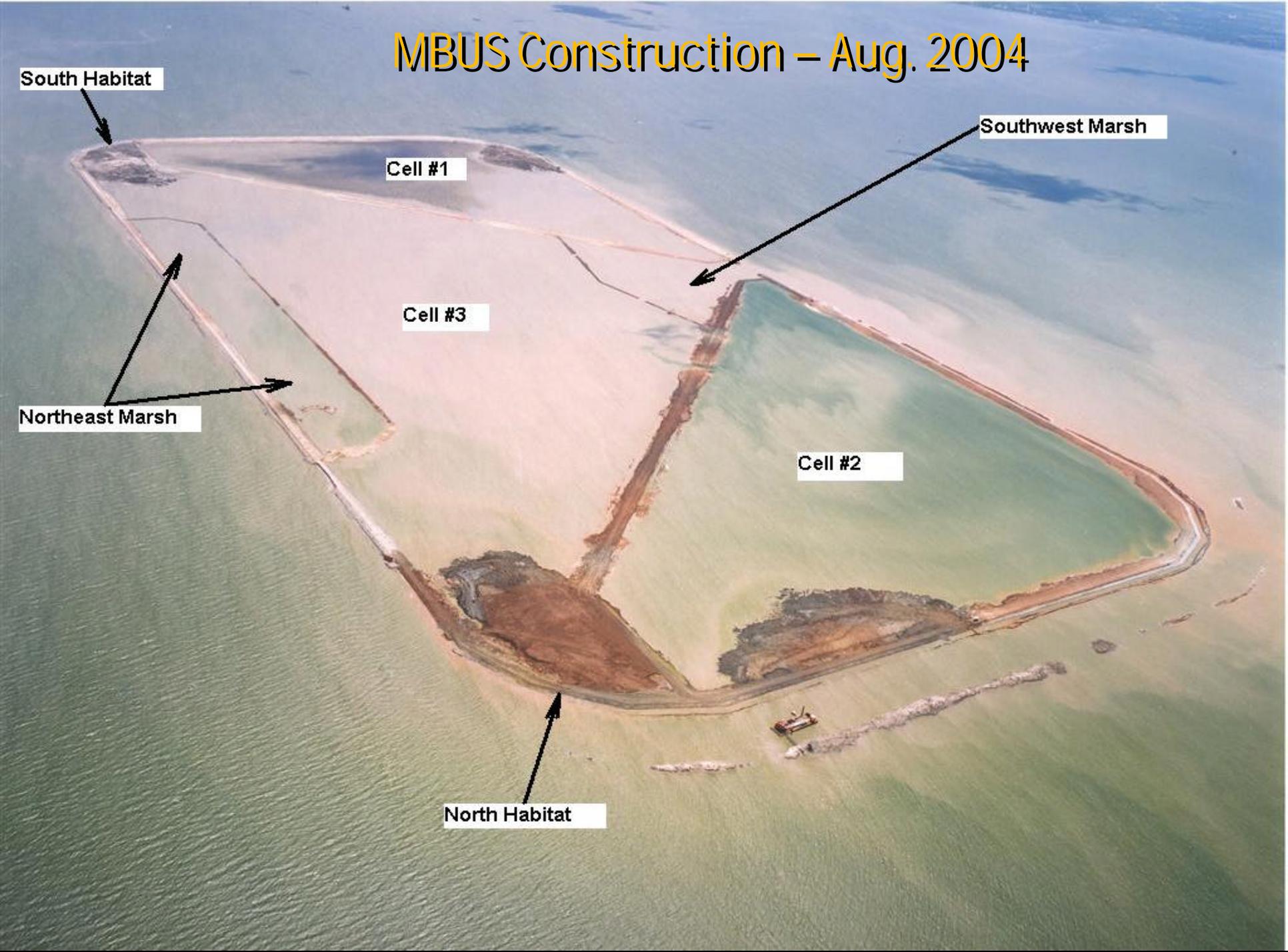
Cell #1

Cell #3

Cell #2

Northeast Marsh

North Habitat



HSC Mid Bay - Summary

- ⇒ Project start: October, 2001
- ⇒ Project completion: October, 2004
- ⇒ Total Quantity Dredged at Completion: 22,500,000 Cubic Yards (approximately 33.4 Million Tons)
- ⇒ Overall size of newly constructed Mid Bay Beneficial Use Site (MBUS): 565 Acres (24,500,000 square feet)
- ⇒ Height of exterior levees at MBUS: + 10' MLT
- ⇒ Capacity of MBUS if filled level full: 15.4 Million CY
- ⇒ Estimated Contract Value at Completion: \$104M

HSC Mid Bay – Other Facts

- ⇒ Approximate total number of ships transiting by the dredges during the project = 43,450
- ⇒ Approximate total number of tows transiting the work area during the project = 228,125
- ⇒ Approximate number of times Dredges Tom James & Geo D Williams (combined) swung from the toe of the channel to the middle of the channel = 307,200
- ⇒ Approximate total number of individual meals served on board dredges during this project = 78,500
- ⇒ Approximate total number of times someone stated “I don’t like what they’re serving today” = unknown