

DREDGING IN SUPPORT OF COASTAL INFRASTRUCTURE

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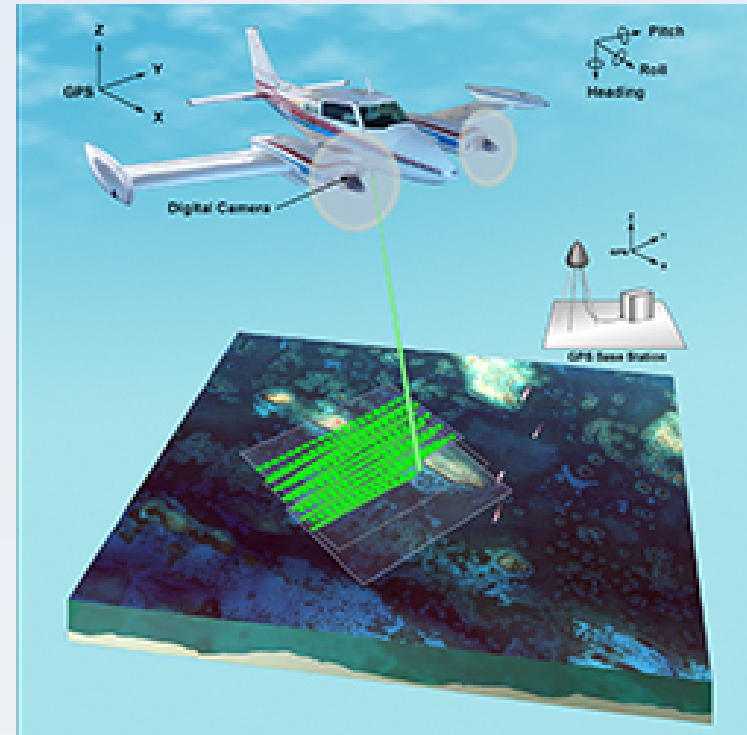
Texas A&M University

OVERVIEW

- Data bank of sand sources, barrier island elevations, beach nourishment and bench marks for action
- Protection of Intracoastal Waterways AIWW & GIWW
- Protection of the Petrochemical/Energy Infrastructure and the public from hurricane
- Coastal community education on the problems and ways for communities to maintain dune protection

COASTLINE RETREAT

- Aerial surveillance or Lidar to monitor coastline changes
- Dredging to maintain coastline using dredged material
- Discharge dredged material into near shore zone.
- Establish and vegetate dunes
- Conduct pilot studies of shoreline protection concepts (e.g. underwater berms, detached breakwaters, reefs, and newly developed concepts)



DREDGING EQUIPMENT FOR NOURISHING BEACHES

- Incentive to build larger US trailing suction hopper dredges for sand hauling
 - Liberty Island (6,500 cy) (US)
 - Glenn Edwards (13,000 cy) (US)
 - Cristal Colon (60,000 cy) (Belgium)
- Investigate underwater vision for dredges to increase efficiency and protect marine life
- Identify sources and volume of beach sand
- Identify storage areas for sand
- Investigate sand separation system for cutter suction dredge to separate beach quality sand from fine grained material
- Incentive to build self propelled cutter suction dredge (CSD)



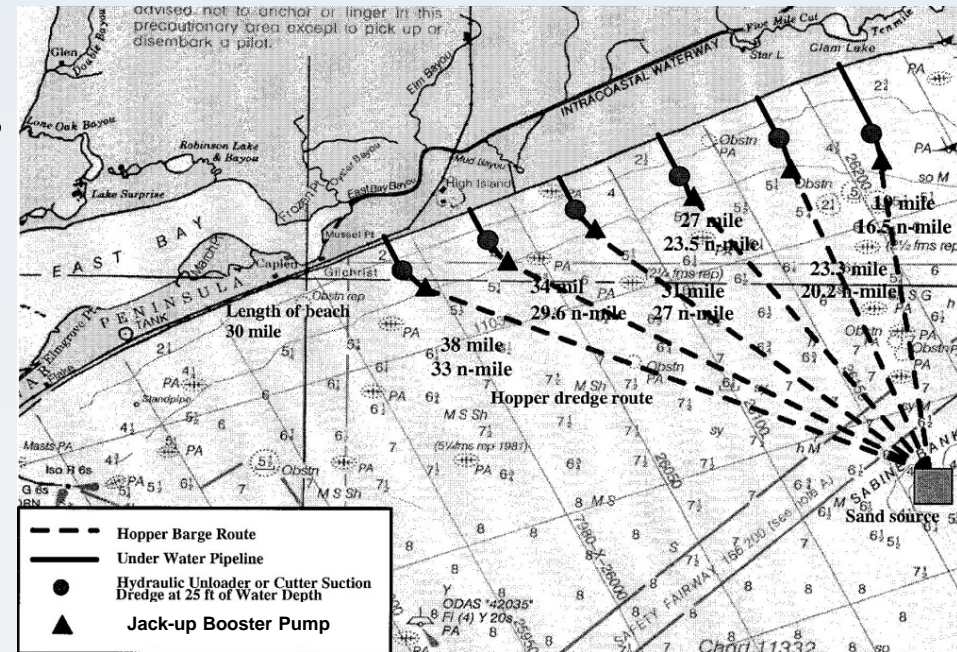
TSHD Colon



Self-propelled CSD

EXAMPLE BEACH NOURISHMENT FOR TEXAS COAST

- 48 km (30 mi) beach from Rollover Pass to Clam Lake.
- Best Alternative – TSHD excavates sand and sails to jack up booster pump location in 10m of water. Slurry pumped through underwater pipeline. Sand pumped 4 km (2.5 mi) to the beach. Six 8 km (5 mi) segments needed. Est. cost ~\$1.25M/km (\$2M/mi), Time 1360 days, Sand quantity – 15 MCM (20MCY).
- More hopper capacity and more TSHDs could reduce time and costs



BUILDING COMMUNITY RESILIENCE

- Develop regulations for public use of dunes and for maintaining dunes
- Maintain dune structures for coastal communities
- Vegetate dunes
- Elevate and vegetate dunes
- Restrict access through dunes



HOUSTON-GALVESTON STORM PROTECTION

- Potential storm barrier and perimeter structures for Galveston Bay
- Continue investigation into feasibility of storm surge barrier at San Luis Pass and Houston/Galveston entrance channel
- Estimated cost - \$6B
- Protect 6.5M population & multibillion dollar Oil and Gas/Petrochemical Industry



INTRACOASTAL WATERWAYS (GIWW & AIWW)



Randall et al (2000) report on Beneficial Use or EWN possibilities

- Thin layer disposal for wetland restoration
- Manufactured soil
- Beach nourishment
- Erosion control along Texas GIWW
- Parks, recreation, port expansion

SARGENT BEACH & MATAGORDA PENINSULA, TX

- Determine minimum width that will protect GIWW.



CONCLUSIONS

- Develop and monitor best techniques for shoreline protection: dunes, underwater berms, sacrificial dredged material islands, detached breakwaters, and reefs.
- Establish bench marks for action to sustain the coastline.
- Houston-Galveston area storm protection dune and barrier gates needs to advance to protect public and infrastructure.
- Protect the Intracoastal Waterways (GIWW & AIWW) from being exposed to the open ocean.
- Research and development should investigate larger and more efficient dredges, underwater vision for dredges, sand separation systems on dredges and continue developing coastal evolution numerical models with validation by field and laboratory measurements.

THANK YOU

