

THE DELAWARE BAY BEACHES: SAND NEEDS FOR COASTAL PROTECTION AND RESILIENCY

Jonathan R. Barker P.G., Kimberly K. McKenna P.G. ,
Steven C. Shaw P.E. , and Clay M. Bryant P.E.



Project Location/Overview



Presentation Overview

- Project Location
- Introduction
- Phase 1
- Phase 2
- Phase 3
- Results
- Conclusions
- Acknowledgements



Introduction

- Delaware Bay Shoreline in Kent and Sussex Counties
- Primehook Beach, Slaughter Beach, Kitts Hummock, Pickering Beach
- Comprised of thin sandy estuarine barriers and broad marshes



Introduction



- Delaware Department of Natural Resources and Environmental Control (DNREC) is considering implementation of a major beach renourishment project



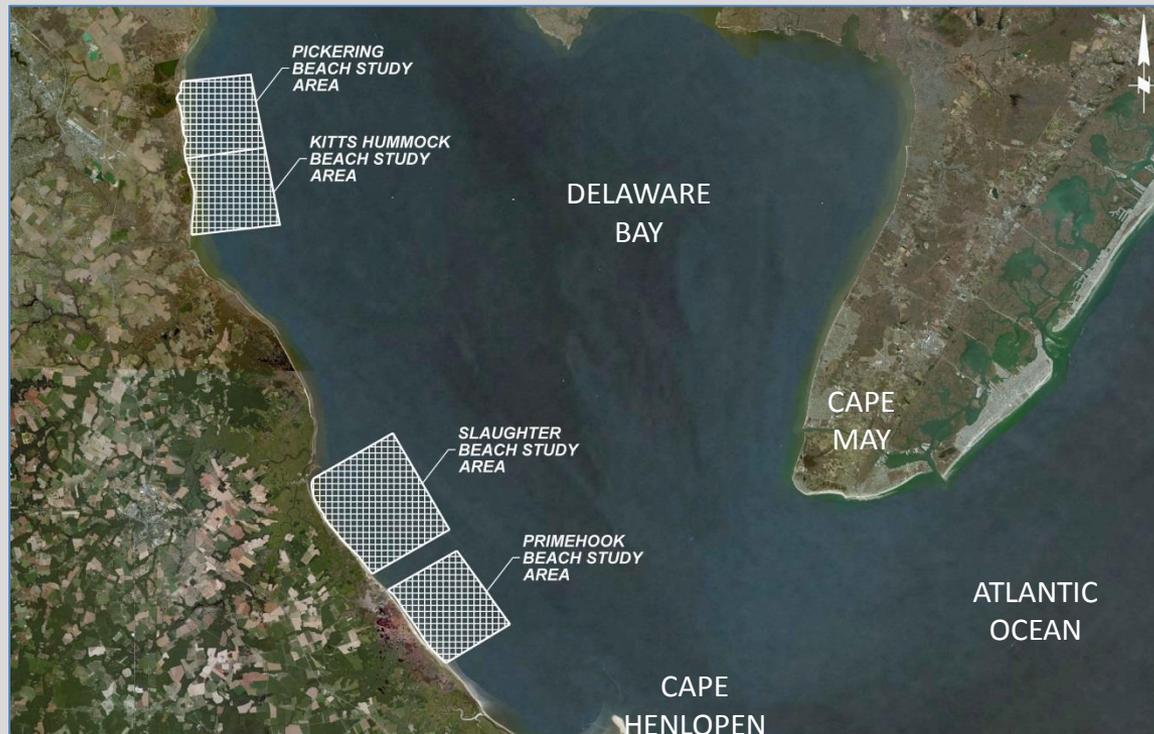
Introduction

- **6 million cubic yards** of sand required to satisfy coastal resiliency projects (PBS&J 2010)



Introduction

- Four Study Areas



Introduction

- Three phase approach
 1. Compilation and review of existing data
 2. Refinement of data and borrow site delineation
 3. Data analysis and final reporting



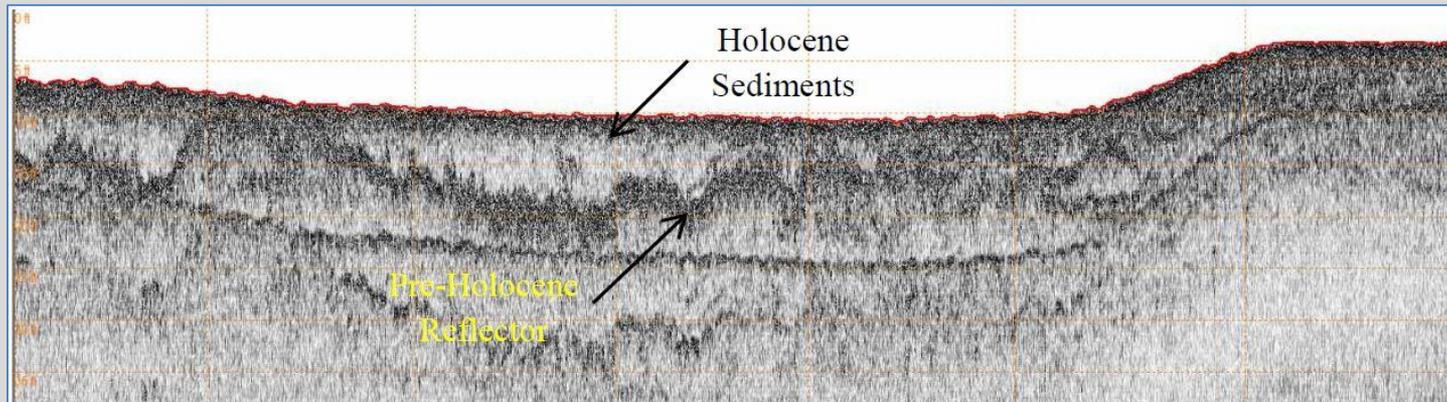
Phase 1

- Large amount of data already existed
 - CHIRP sub-bottom data
 - Roxann seabed classification data
 - Historic vibracore data



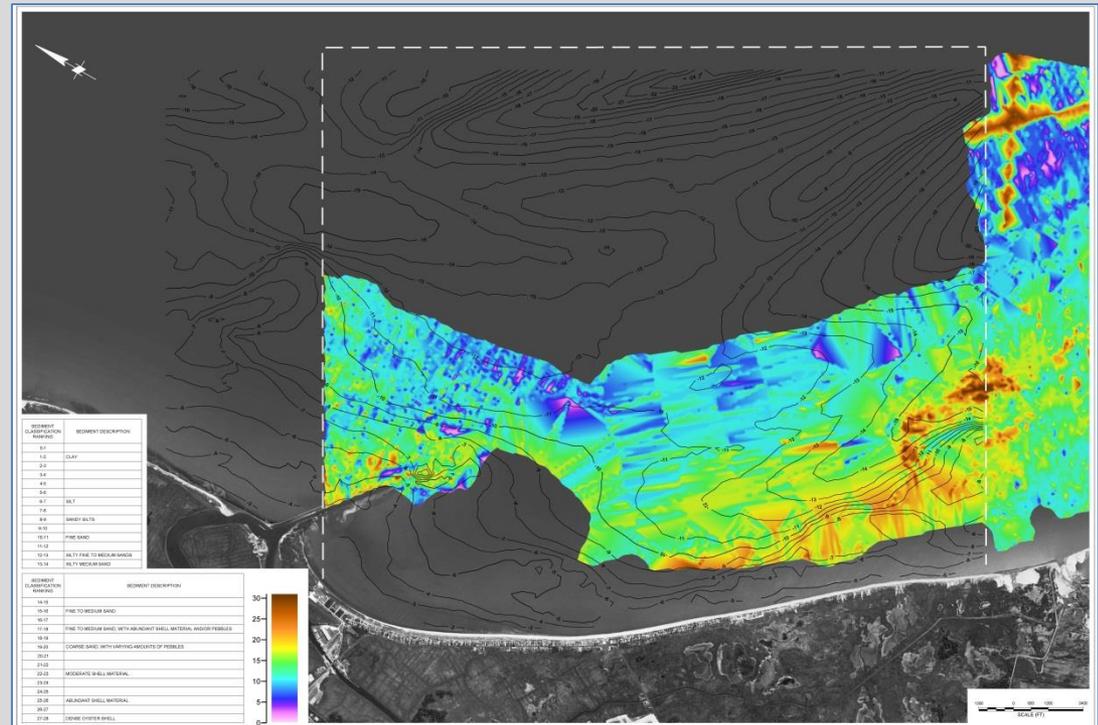
Phase 1

- CHIRP sub bottom Data
 - Collected from 2003-2008
 - University of Delaware, DNREC Delaware Coastal Programs
 - Outcrops of pre-holocene reflectors



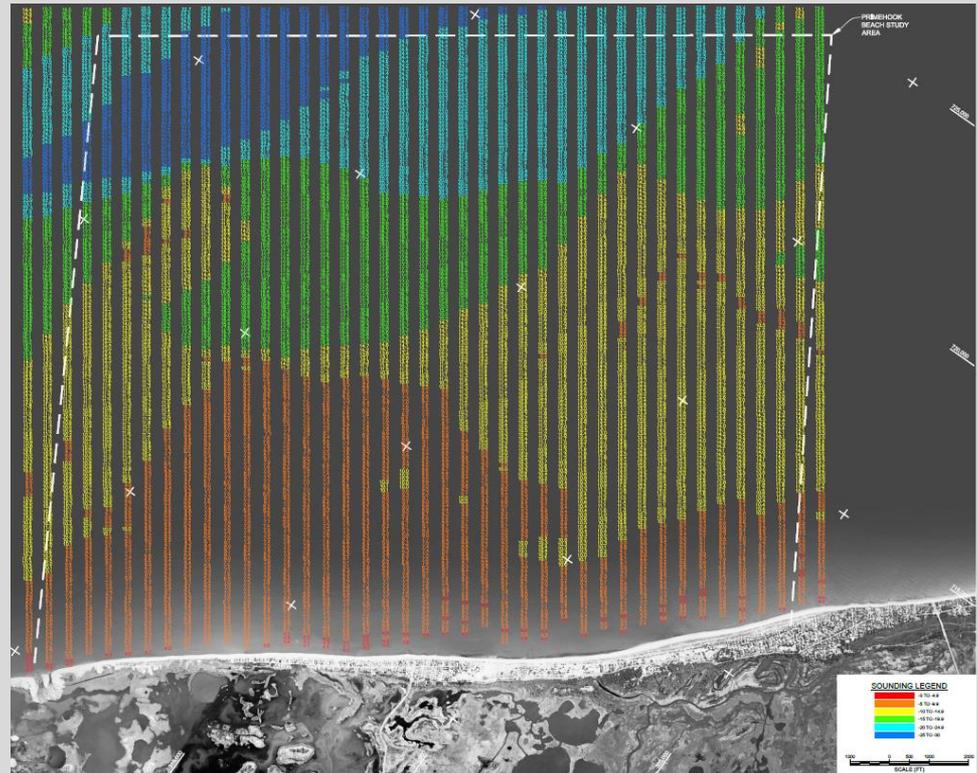
Phase 1

- Roxann Seabed Classification Data
- University of Delaware, DNREC Delaware Coastal Programs
- First two returns from an echo sounder are analyzed
- Characterizes the roughness and hardness of the seafloor
- Calibrated and “ground truthed” with grab samples



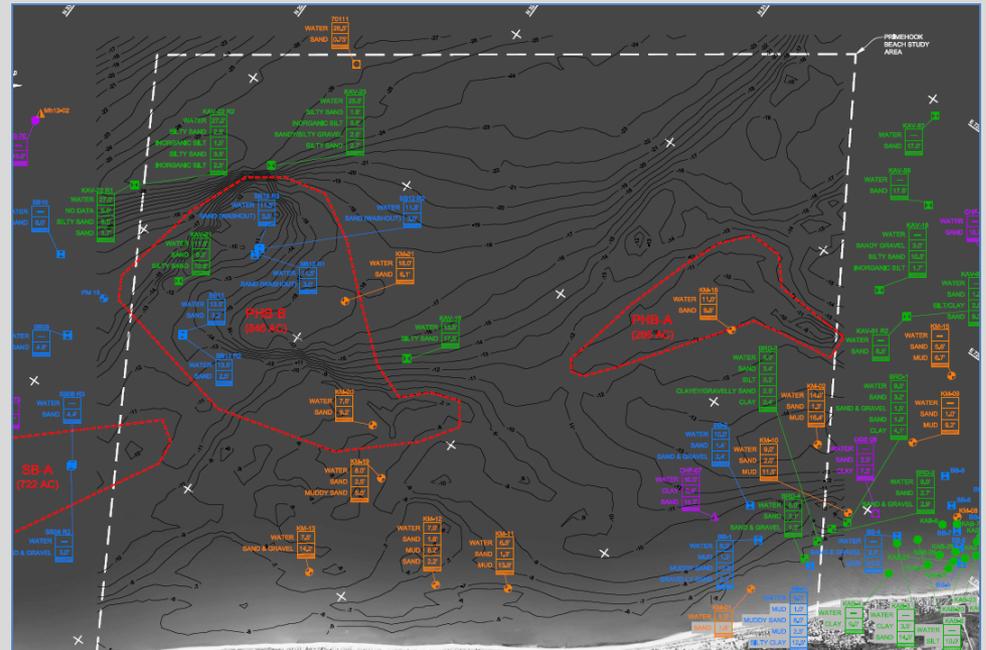
Phase 1

- New Bathymetric Data
 - GBA performed a single beam hydrographic survey
 - 500 foot line spacing
 - Lines extended 3 miles offshore



Phase 1

- Data Correlation
 - Primary and secondary areas of interest were developed
 - Primary areas had more than one dataset indicating potential sand
 - Secondary areas had only one dataset indicating potential sand



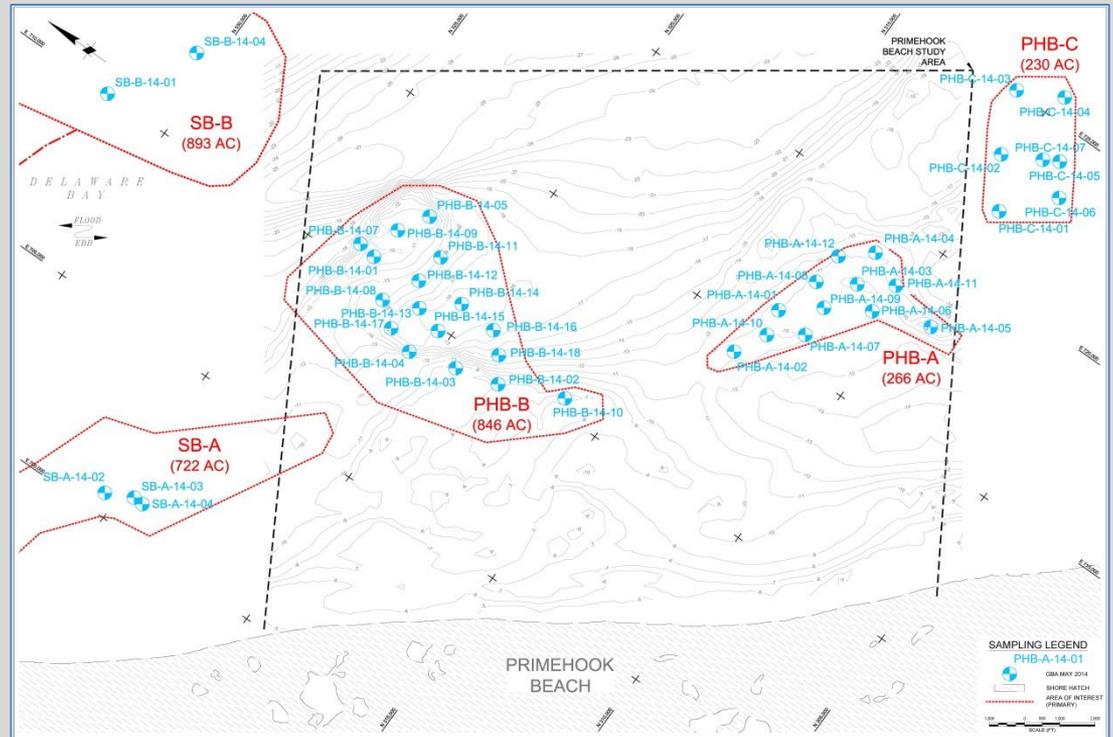
Phase 2

- Vibracores
 - Coring plan developed from, areas of interest
 - 50 cores collected over 4 days, (Athena Technologies)
 - Some core locations adjusted “on the fly”



Phase 3

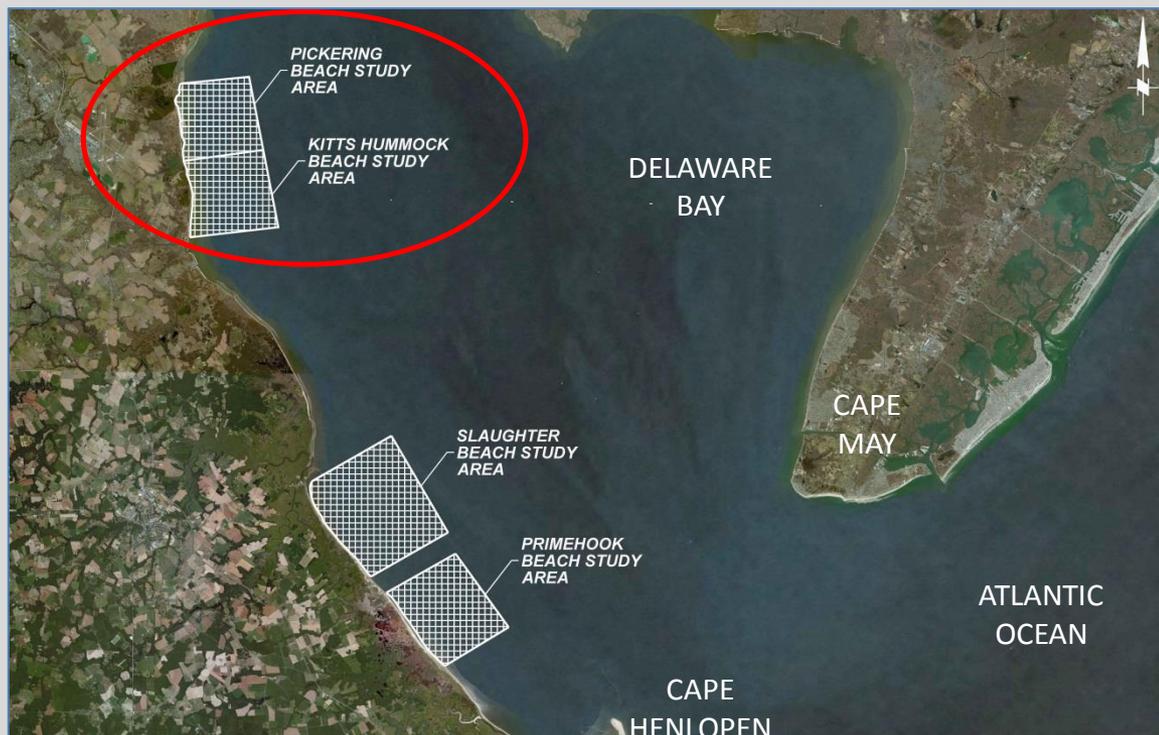
- Data Analysis
 - Borrow areas were delineated
 - Volumes calculated for potential borrow areas



Results

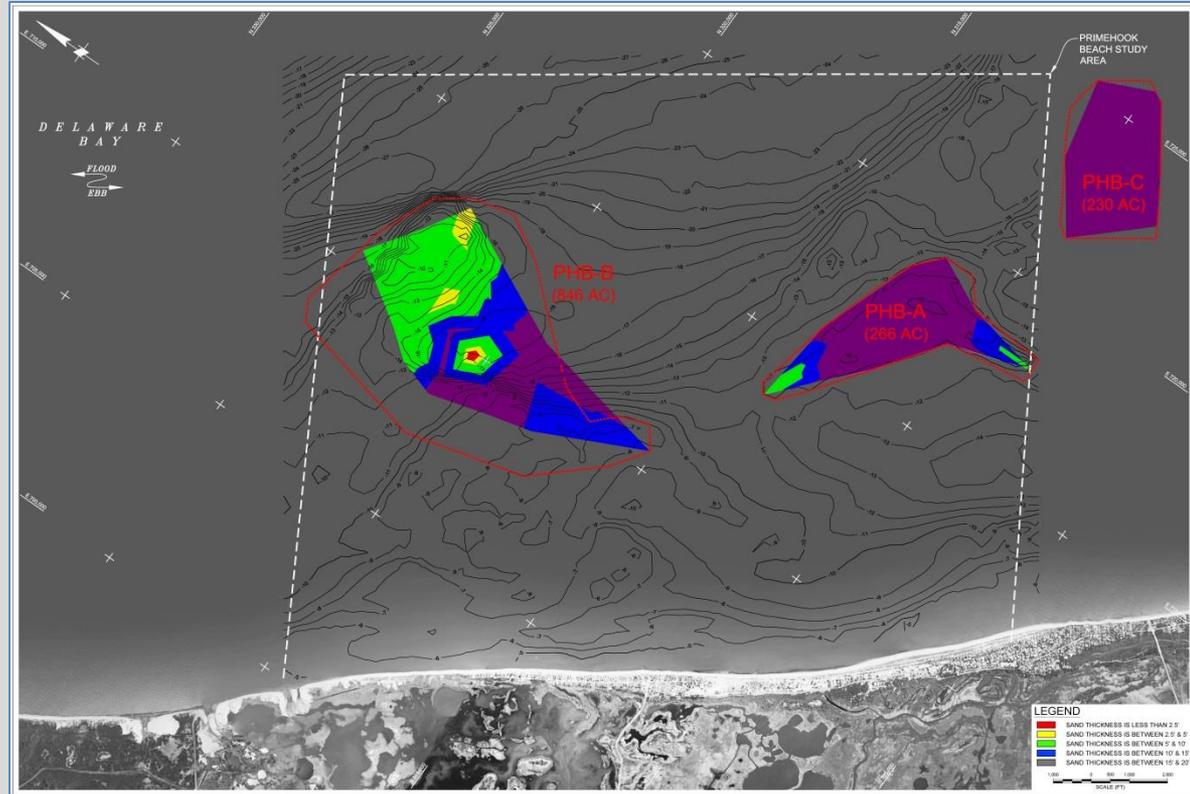
- Pickering Beach and Kitts Hummock

- Seven cores collected
- No viable source of beach sand within either of the study areas



Results

- Primehook Beach
 - 20.9 m.c.y. of sand in 3 borrow areas
 - PHB-A
 - PHB-B
 - PHB-C



Conclusions

- Plenty of sand for Slaughter and Primehook beaches
- No sand within 15-20 miles of Kitts Hummock and Pickering Beach



Going Forward

- Prime Hook Beach Restoration in Primehook National Wildlife Refuge is currently out to bid
- Project will utilize borrow area PHB-B
- Total time from investigation start to construction = 2 years



Acknowledgements

- Dr. John Madsen (University of Delaware) for providing CHIRP sub-bottom data
- Bartholomew Wilson (Delaware Center for Inland Bays) for providing the Roxann Seabed Classification Data
- Dr. Kelvin Ramsey (Delaware Geological Survey) for providing historic vibracore log data
- Athena Technologies provided vibracore services



Questions?

