



U.S. ARMY



# Coastal Flood Risk Management



## Coastal Flood Risk Management

- Field Measurements
- Basic Coastal Processes R&D
- Hazard Quantification

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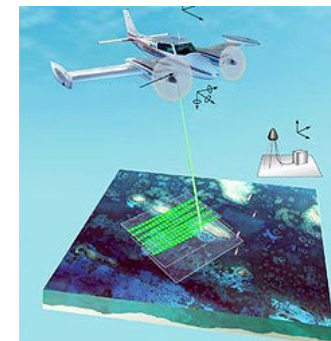
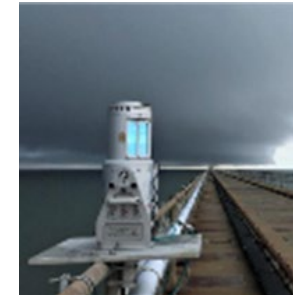
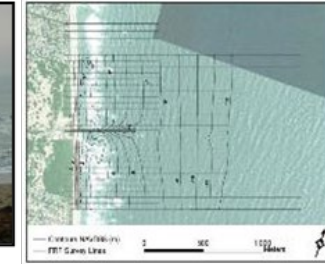
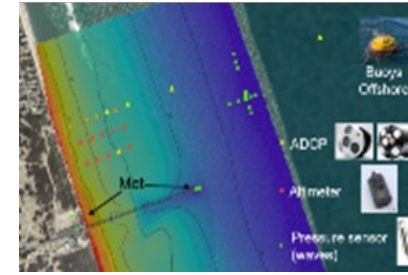
US Army Corps of Engineers

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# Field Data Collection

- Field Research Facility, Duck, NC
  - 40-yr record: wind, waves, currents and topo-bathy
  - Technology development: surveying, remote sensing
  - Collaborative experiments (DUNEX, SandyDuck, DELILAH, SuperDuck)
- Climatological Measurements
  - Waves and Water Levels
  - Airborne LIDAR (JALBTCX) – National Coastal Mapping
- Project/Site-Specific Measurements
  - In-situ: waves, water levels, sediment
  - Remote: video ~ mini Argus, lidar, radar



# Basic Coastal Processes R&D

- Natural and Nature-Based Features
  - Vegetated dune processes
  - Aeolian beach processes
  - Wave dissipation by vegetation
  - Sediment-vegetation interaction
  - Nearshore berms

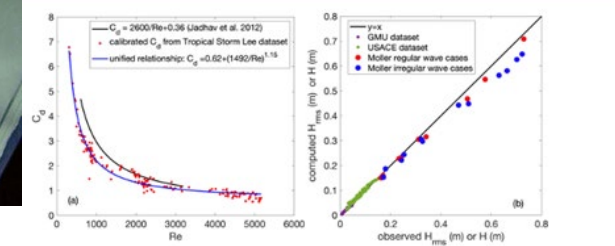
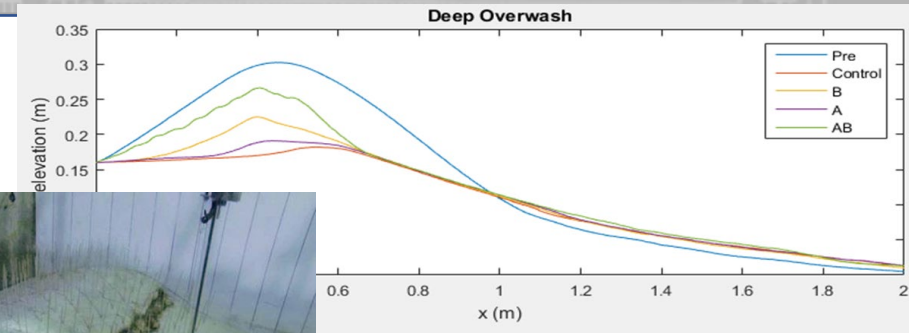
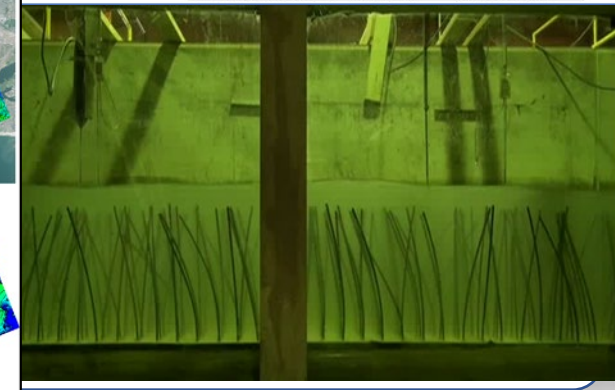
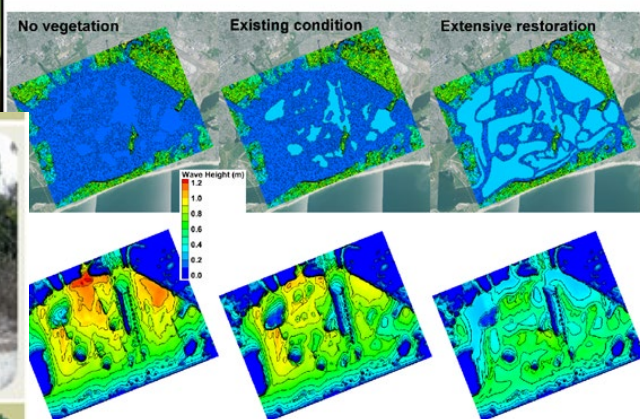
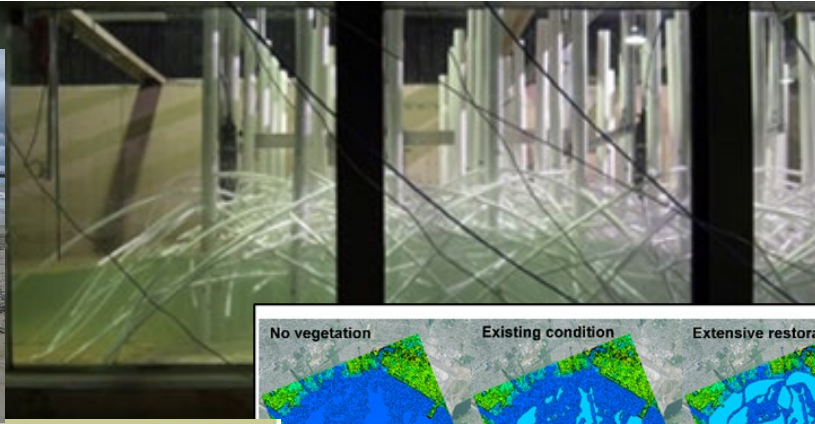


Figure 2. (a) Unified  $C_d$ - $Re$  relationship inferred from Tropical Storm Lee dataset using improved CSHORE with effective vegetation height. (b) Wave height comparison for three independent dataset using  $C_d$  from the unified  $C_d$ - $Re$  relationship.



Dunes and Beaches    Vegetated Features (e.g., Marshes)    Oyster and Coral Reefs    Barrier Islands    Maritime Forests/Shrub Communities

# Hazard Quantification

- High-Fidelity Modeling
  - Coastal Storm Modeling System
  - Compound flooding ~ coupling models and enhanced statistics
  - Testbed for validation
- Coastal Hazards System
  - Climatological storm simulation
  - Coastal storm database
  - Website and tools to support
- Life-Cycle Probabilistic Analysis Methods
  - Including NNBF & community infrastructure

