Assessing the Storm Vulnerability of Natural and Cultural Resources in Coastal Parks

2008 WRD AQUATIC PROFESSIONALS MEETING
February 12-14, 2008
Mark Borrelli and Rebecca Beavers

COASTAL GEOLOGY

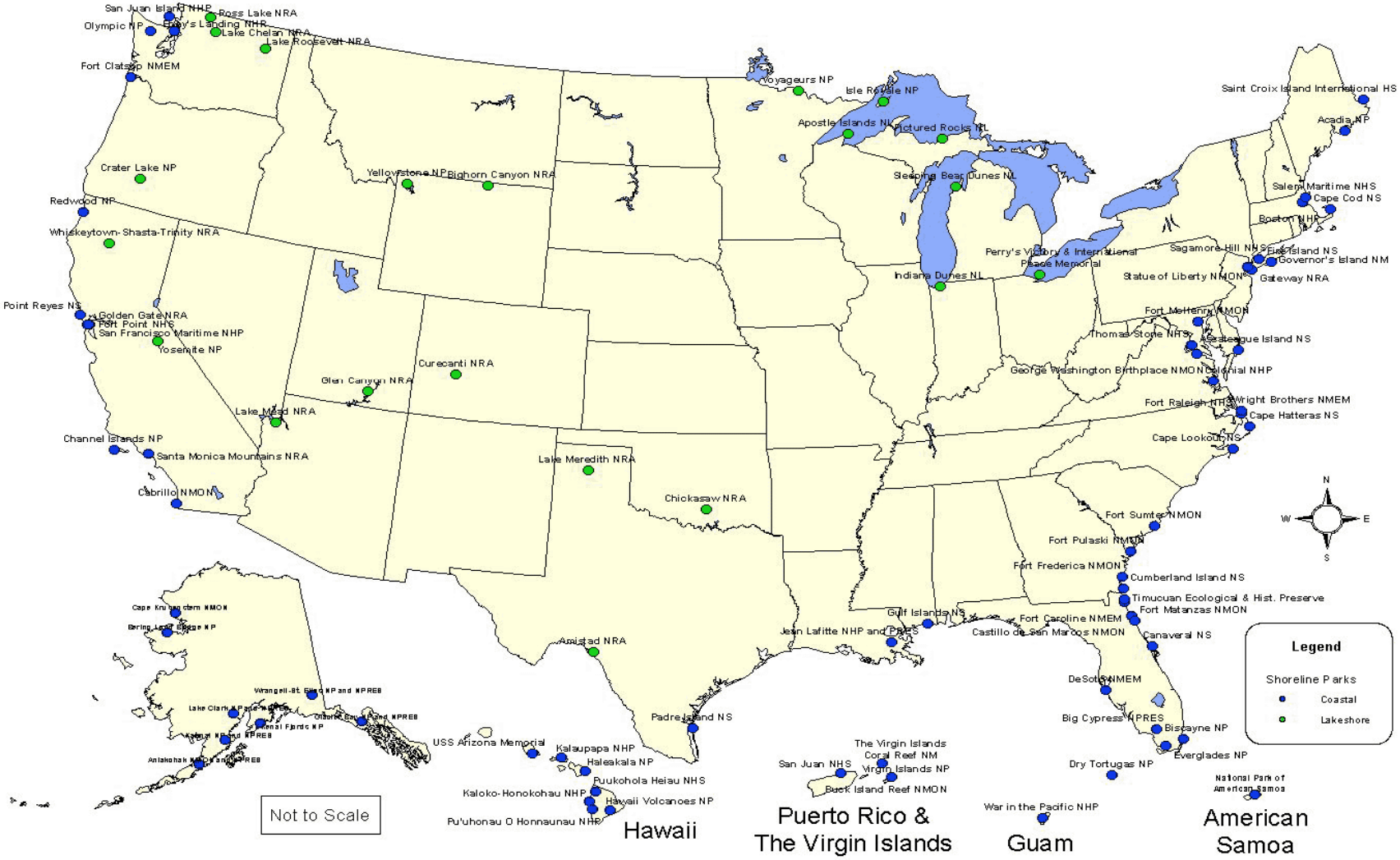
Ocean and Coastal National Park Units

10	Alaska
28	Pacific West
18	Northeast
25	Southeast
9	Intermountain
7	Midwest
97	TOTAL (out of 385 park units)

(76 marine; 21 lakeshore)




Ocean and Coastal Parks



Ocean and Coastal National Park Units

76 marine; 21 lakeshore

- >11,000km (7000 miles) of Marine and Lacustrine shoreline
- >12,000 km^2 (3 Million acres) of submerged resources
- >140,000km^2 (35 Million acres) of coastal habitat

Hurricane Isabel Damage Assessment

1998

19 Sept 2003

Cape Hatteras National Seashore, North of Hatteras Village, NC.

Assess Storm Vulnerability to Improve Public Safety and Resource Protection in Coastal Parks

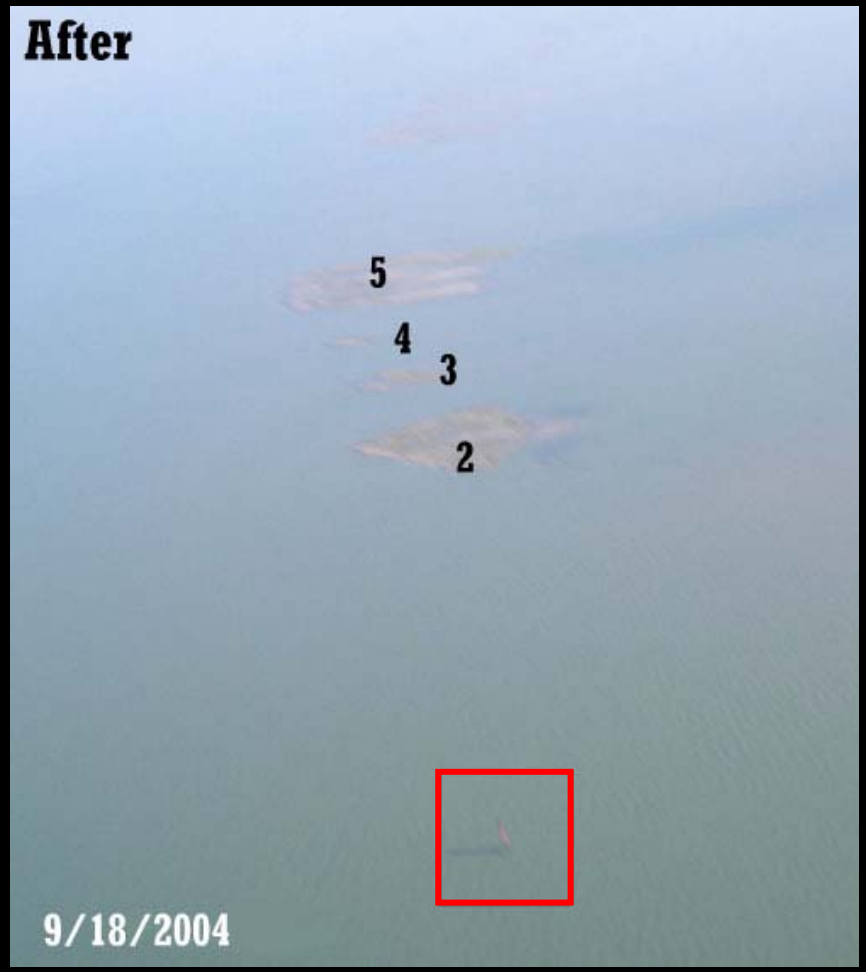
NPS PMIS 46 (Recreation Fee Program)

1. Maps of pre-storm resource conditions
2. Park-specific storm recovery plan
3. Coordinate post-storm response
4. Provide extended support post-storm to NPS areas
5. Prepare coastal engineering inventory

COASTAL GEOLOGY




HURRICANE IVAN:
Pre- and Post-storm: Chandeleur Islands, LA



http://www.nwrc.usgs.gov/hurricane/postivanphotos.htm

Assess Storm Vulnerability to Improve Public Safety and Resource Protection in Coastal Parks

NPS PMIS 46 (Recreation Fee Program)

1. Maps of pre-storm resource conditions
2. Park-specific storm recovery plan
3. Coordinate post-storm response
4. Provide extended support post-storm to NPS areas
5. Prepare coastal engineering inventory

COASTAL GEOLOGY




Hurricane Katrina

Assess Storm Vulnerability to Improve Public Safety and Resource Protection in Coastal Parks

NPS PMIS 107946 (Recreation Fee Program)

1. Maps of pre-storm resource conditions
2. Park-specific storm recovery plan
3. Coordinate post-storm response
4. Provide extended support post-storm to NPS areas
5. Prepare coastal engineering inventories




Assess Storm Vulnerability to Improve Public Safety and Resource Protection at Coastal Parks

NPS PMIS 50946 (Recreation Fee Program)

1. Maps of pre-storm resource conditions
2. Park-specific storm recovery plan
3. Coordinate post-storm response
4. Provide extended support post-storm to NPS areas
5. Prepare coastal engineering inventories

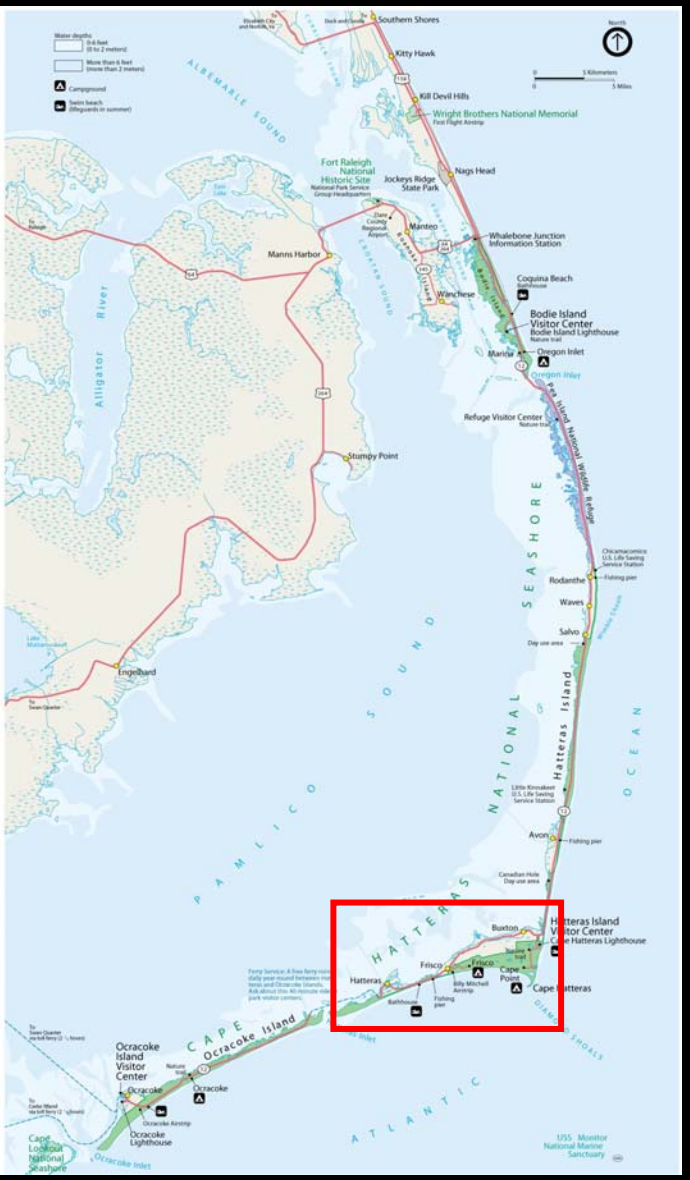



Data Products

1. Storm Vulnerability Assessments
   - 1st: CALO, CUIS, FIIS, 2nd: GEWA, PUHE, KAHO
2. Coastal Engineering Inventory
   - 10-15 parks
3. Storm Recovery Plan
   - CALO
4. Public Education of Storm Dynamics

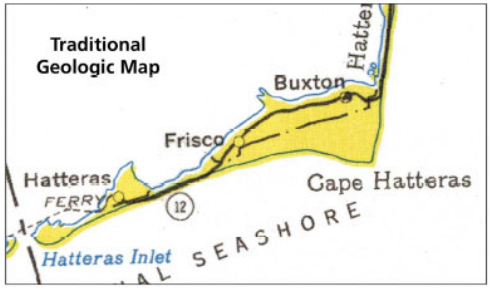



Existing data



Cape Hatteras
National Seashore

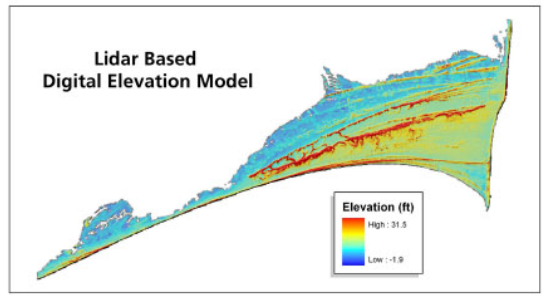
Preliminary Geomorphic Map of the Buxton Area



N

Map Units

- Beach
- Dune Saddle
- Dune Ridge
- Intradune Swale
- Overwash Zone
- Undifferentiated Upland
- Interior Dune
- Spit Ridge
- Spit Complex
- Sand Flat
- Relict Beach Ridge
- Fresh Water Marsh
- Salt/Brackish Marsh
- Airport/Landing Strip
- Dredge Spoil
- Commercial/Industrial Facility
- Filled/Reclaimed
- Water Body



0 1.5 3 6 Kilometers

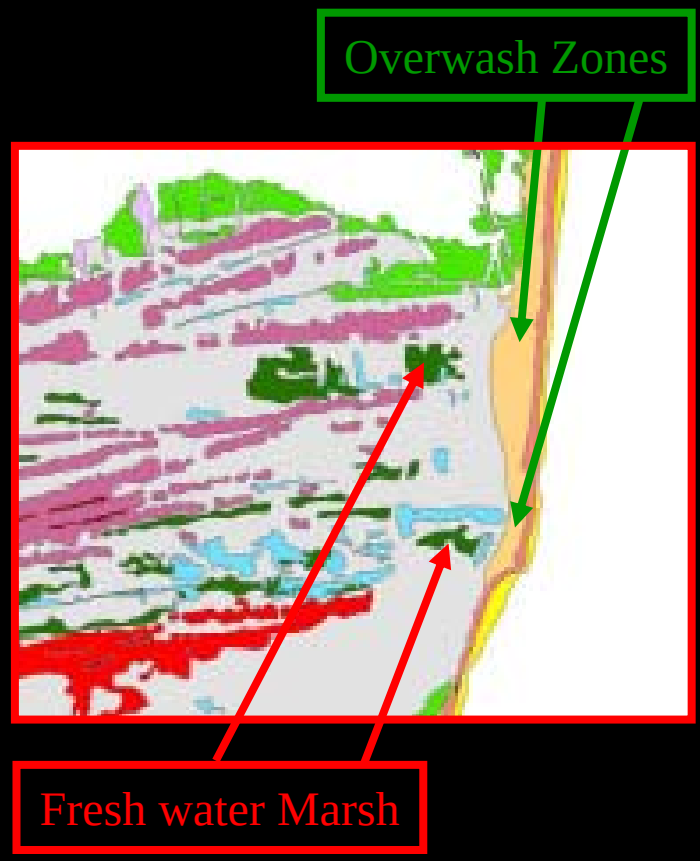
0 1 2 4 Miles

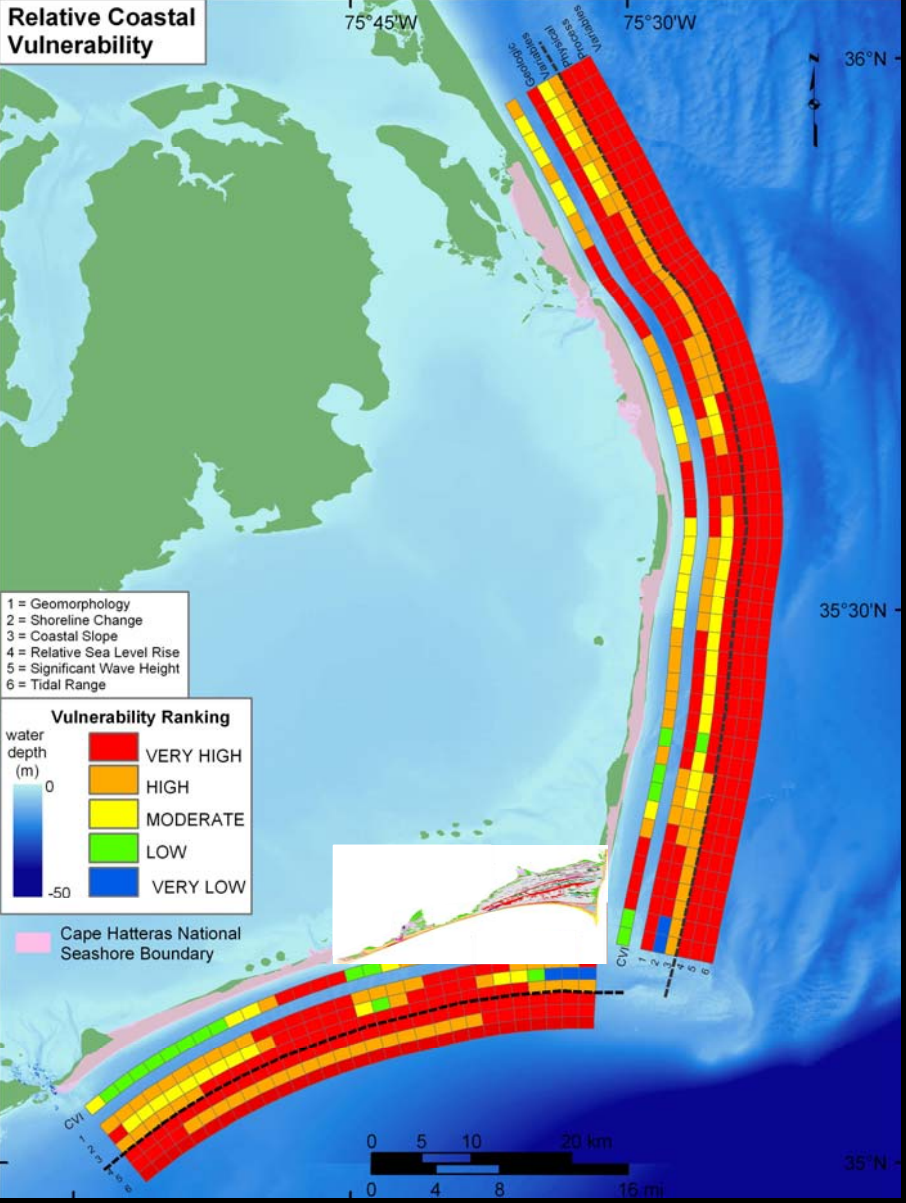
Produced by: The North Carolina Geological Survey; Charles W. Hoffman and William J. Shroyer

March 2004

Science-based Resource Management

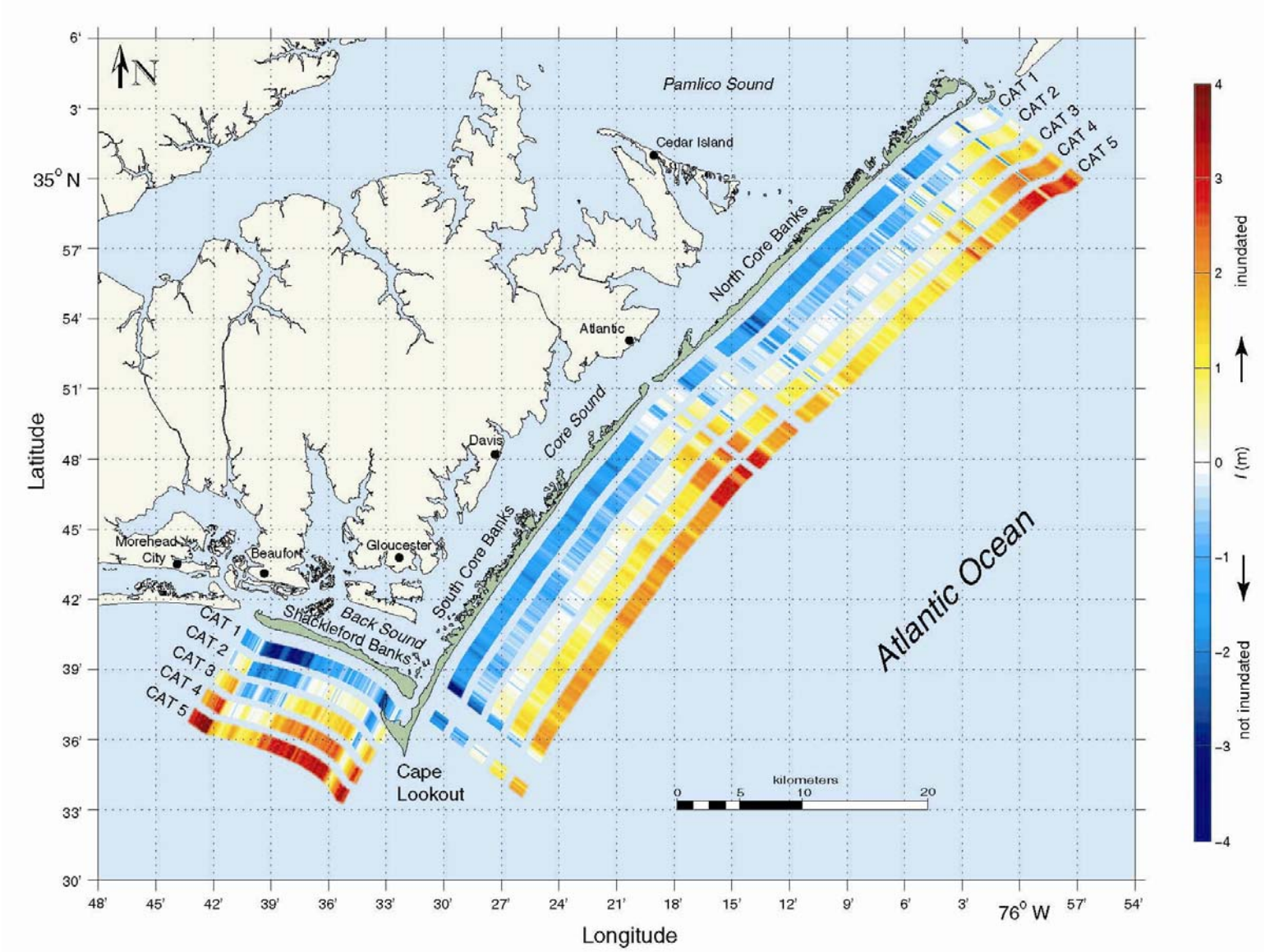
- Extent overwash event?
- T&E species in the marsh?
- T&E habitat in the marsh?



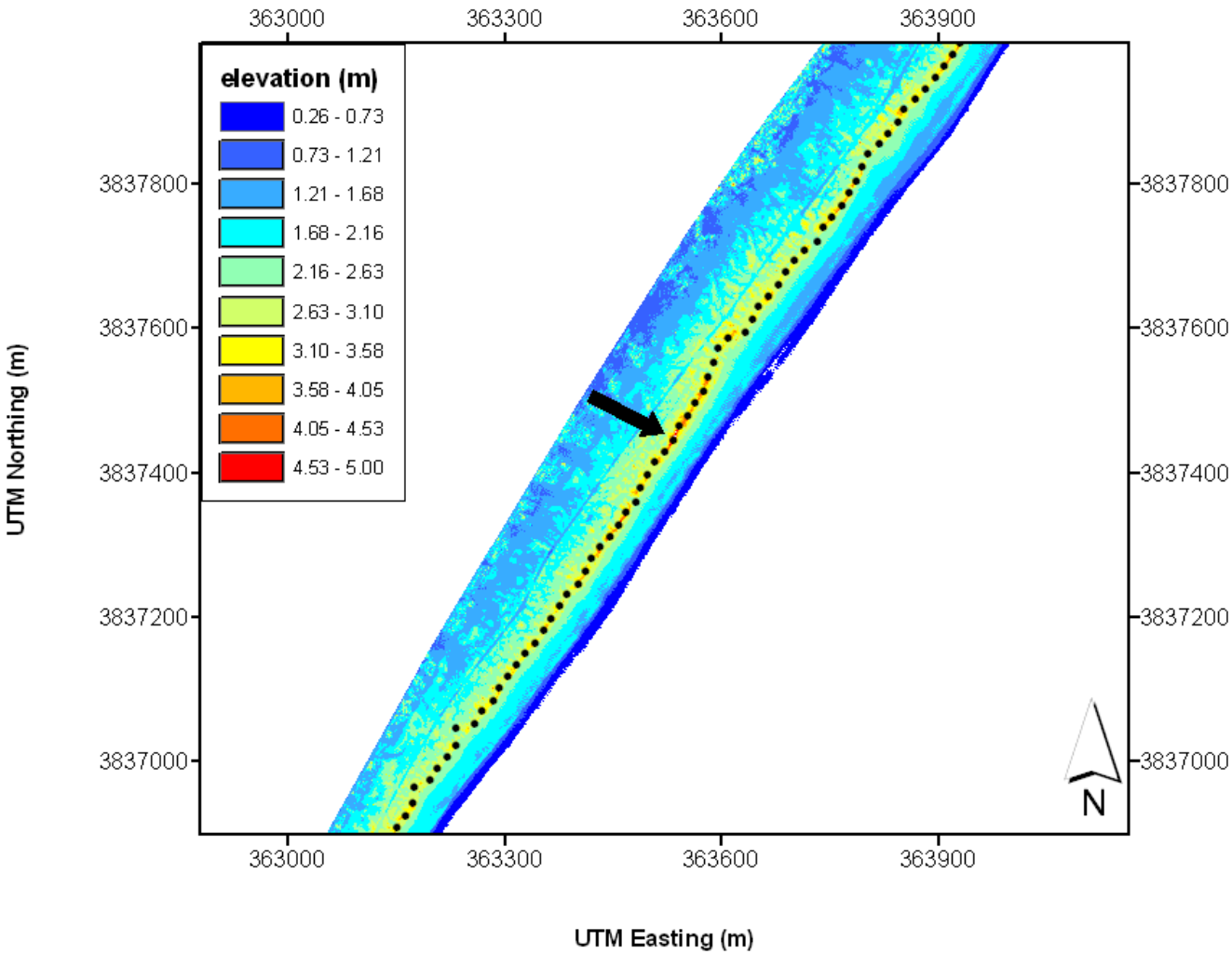


Coastal Vulnerability Index To Sea Level Rise

Example of Storm Vulnerability Assessments



Dune Crest Taken From Lidar Data



After Stockdon and Thompson, 2007

Hurricane Isabel, 2003

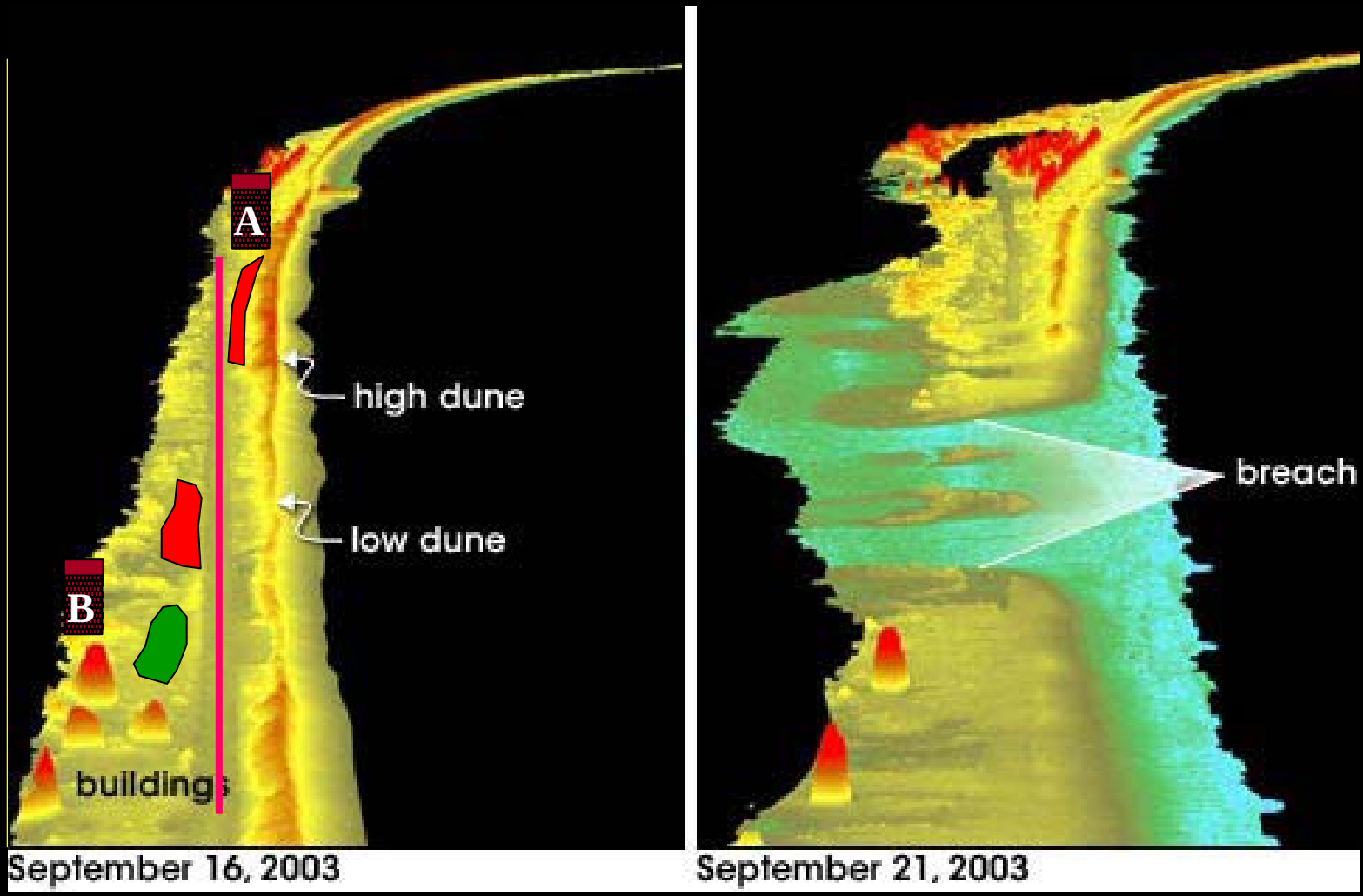


Image taken from USGS website and modified

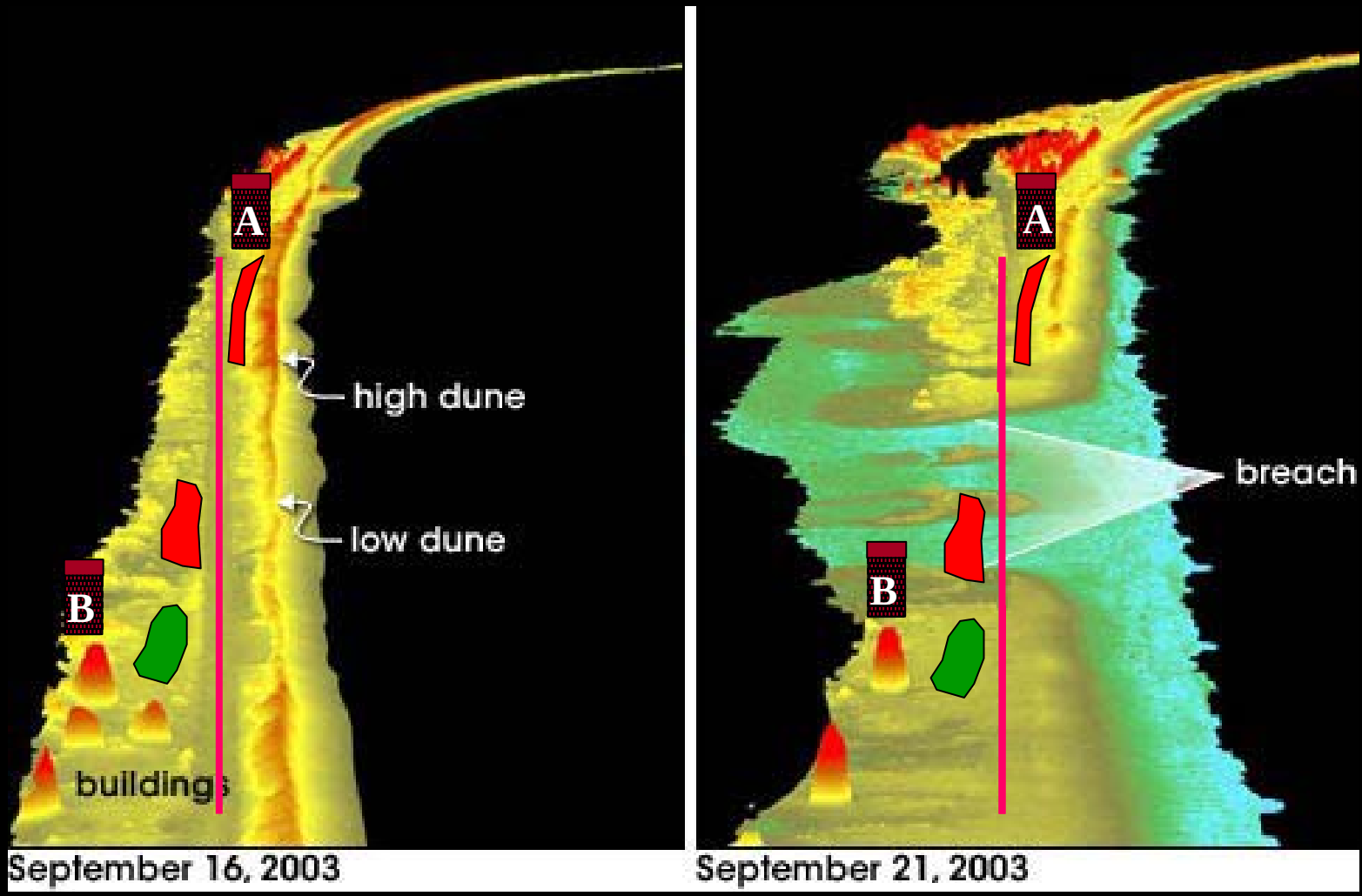


Image taken from USGS website and modified

Coastal Engineering Inventory

Deliverables:

1. Searchable, web-database of coastal engineering projects
   - by park, by project type, by cost, etc.
2. GIS-based inventory of projects
3. Written listing of project, by park unit
   - Project descriptions, costs, images, and discussion of impacts (where available and appropriate)
4. Report of cumulative impacts from Coastal Engineering activities in coastal NPS units.

Parks: (10+5)

- APIS, BOHA, CALO, CHIS, FIIS, FOPU, INDU, JELA, LEWI, TIMU

Storm Recovery Plan

- Integrate agency and park resource concerns
- Prioritize park resources
- Assess post-storm situation
- Triage status of park resources
- Perform resource assessments and develop appropriate guidance
- Provide necessary follow-up analysis of above steps.

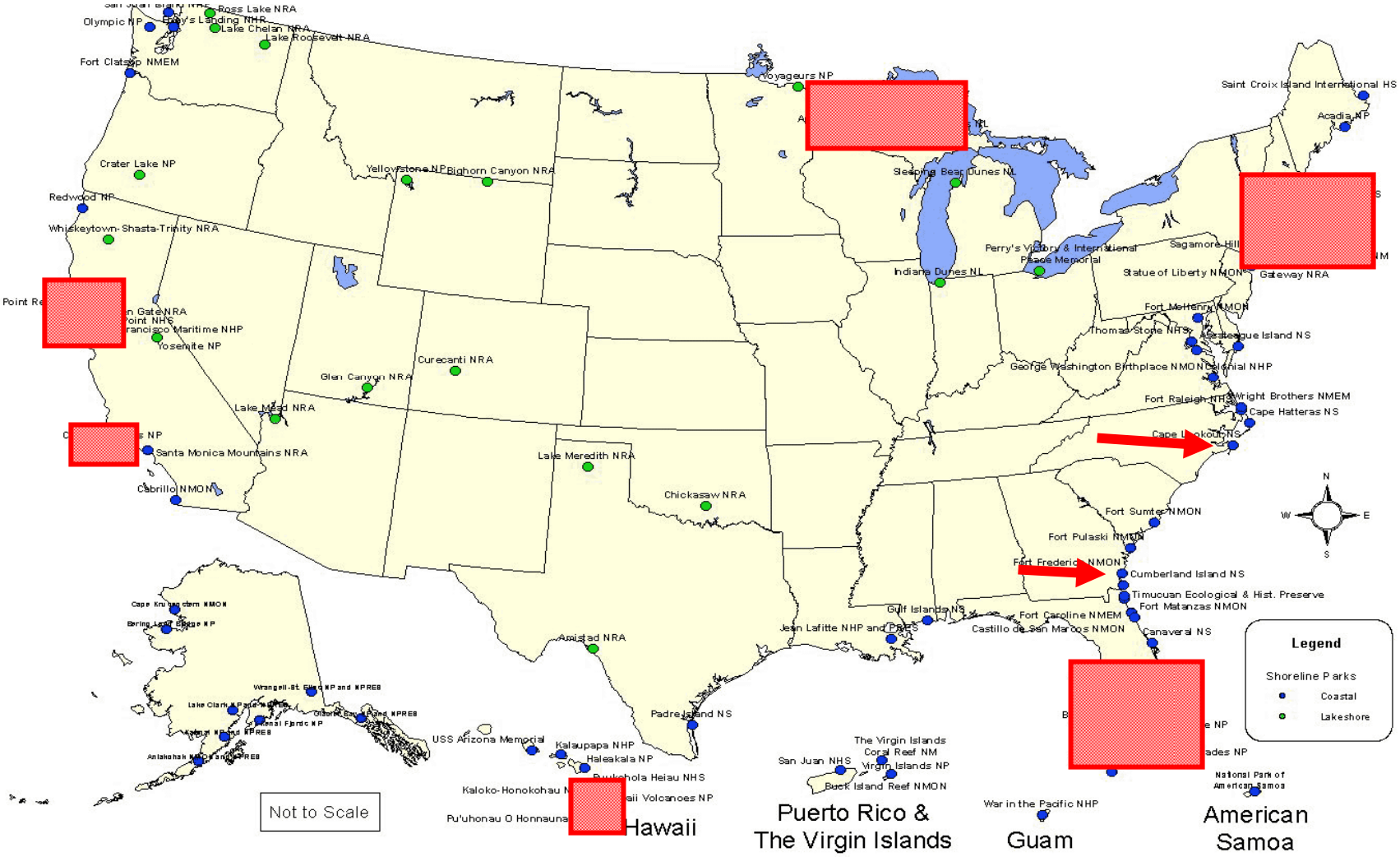



Storm Education and Outreach

- Project Webpage and Brochure
- ‘Views of the National Parks’
  - Video: Storm Processes
  - Audio: Historic Accounts
- Press Release Templates
- Trips to Parks for Visitor Presentations




Storm Education and Outreach



Post-Storm Analysis

1. Strengths, weaknesses, usefulness of project components

2. Storm Impact on Park Visitation
   a. Regional impacts vs. Individual Park Units
   b. Socio-economic implications and impacts

How do we help parks manage resources pre- and post-storm?

Gulf Islands National Seashore