Threats to Habitats: Shoreline Change and Coastal Geomorphology

USGS Patuxent Wildlife Research Center
Biennial Science Meeting

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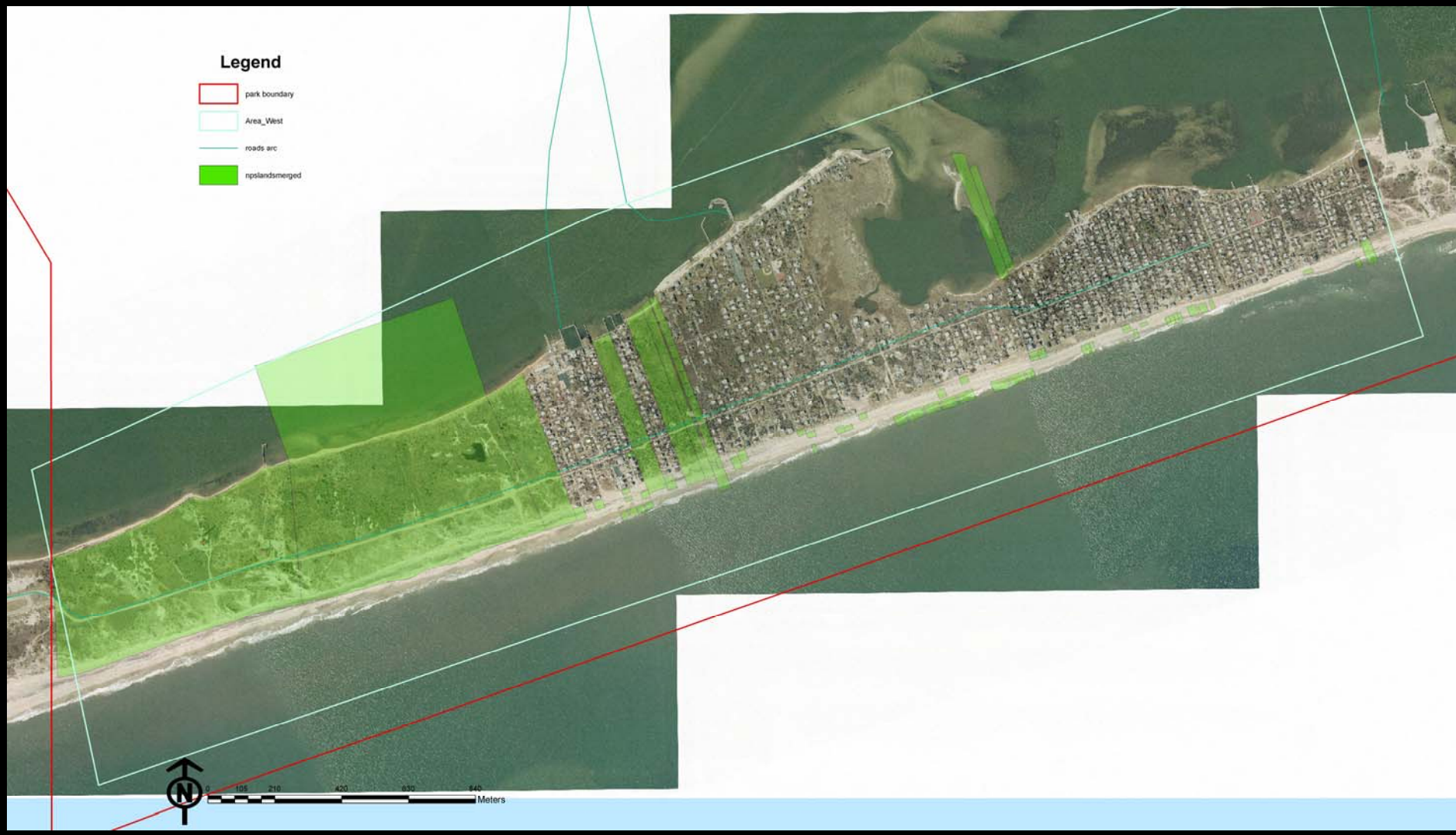
Patuxent Wildlife Research Center
Coastal Field Station
University of Rhode Island

Impacts of Beach Scraping on the Natural Resources of Fire Island National Seashore

USGS

Fire Island National Seashore (FIIS)


Legend
park boundary
Area_West
roads arc
npslandsmerged
N
0
105
210
420
630
840
Meters

Beach scraping

Questions and Study Design

How does beach scraping change the morphology of the beach (long-and short-term)?

How does scraping alter the unscraped beach/dune system?

Does scraping mitigate erosion?

What are the impacts of this practice on park resources (habitats)?

2 study areas, 3-4 km in length:

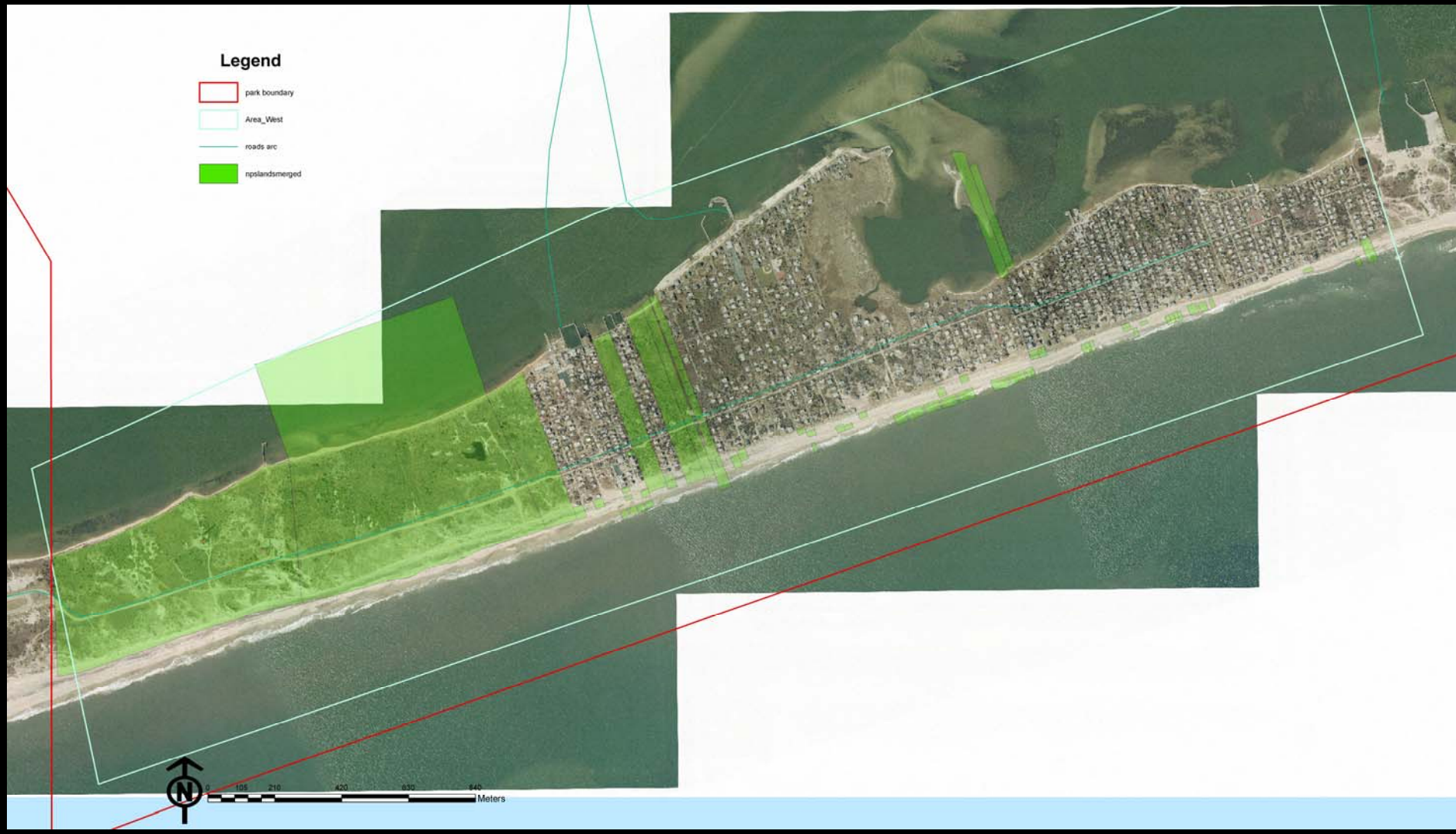
Each area contains scraped and “natural” areas for control

-NRPP funding, begins FY09

- NE NPS funding for FY06

- FY07 and 08???

West Area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Approach:

Assess behavior of the beach/dune system in scraped versus unscraped areas over a variety of time scales

- storms, seasons, historical (50-100 yrs)

Storm and Seasonal - RTK (GPS) surveys, lidar data, existing shorelines and beach profiles

Historical - digital terrain models from aerial photography

Model topographic change prior to onset of scraping practices (in early 1990s), going back as far as 1940s

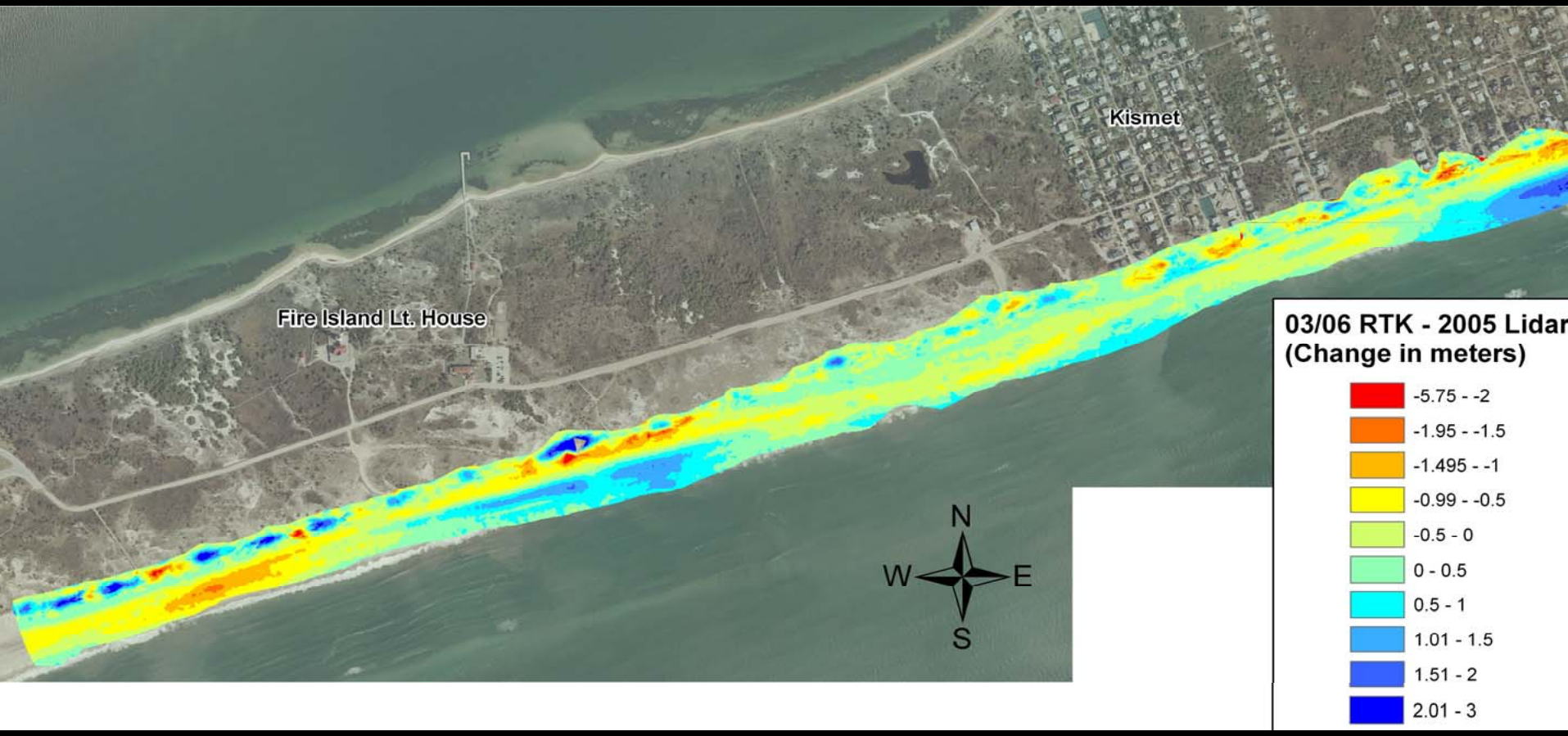
1st RTK survey: March 2006

Repeat survey: Sept. 2006

Plan post-storm surveys and repeat March survey

March 2006 survey track and gridded topography – West area

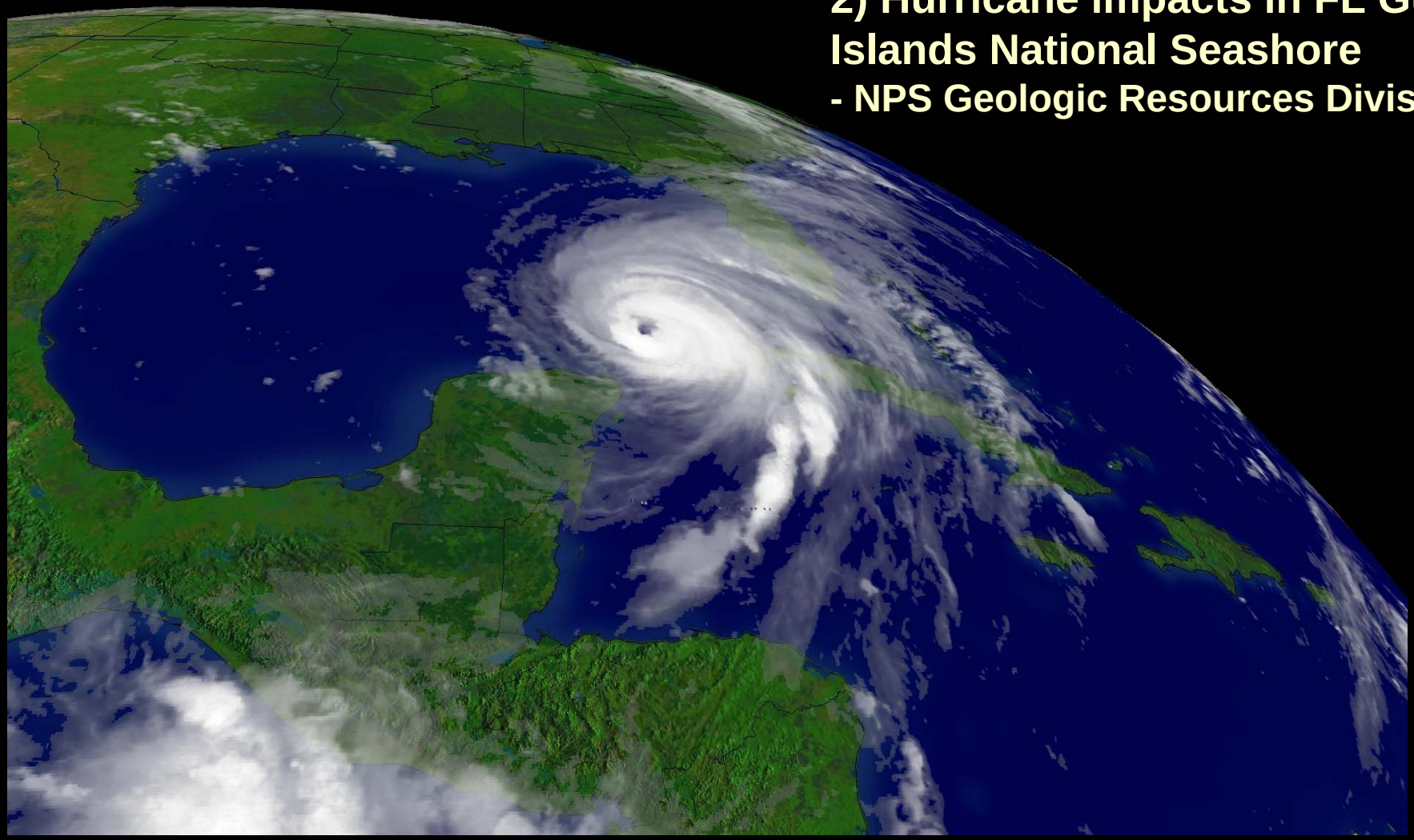
Elevation change April 2005 to March 2006 – West area



Post-hurricane work in NGOM:

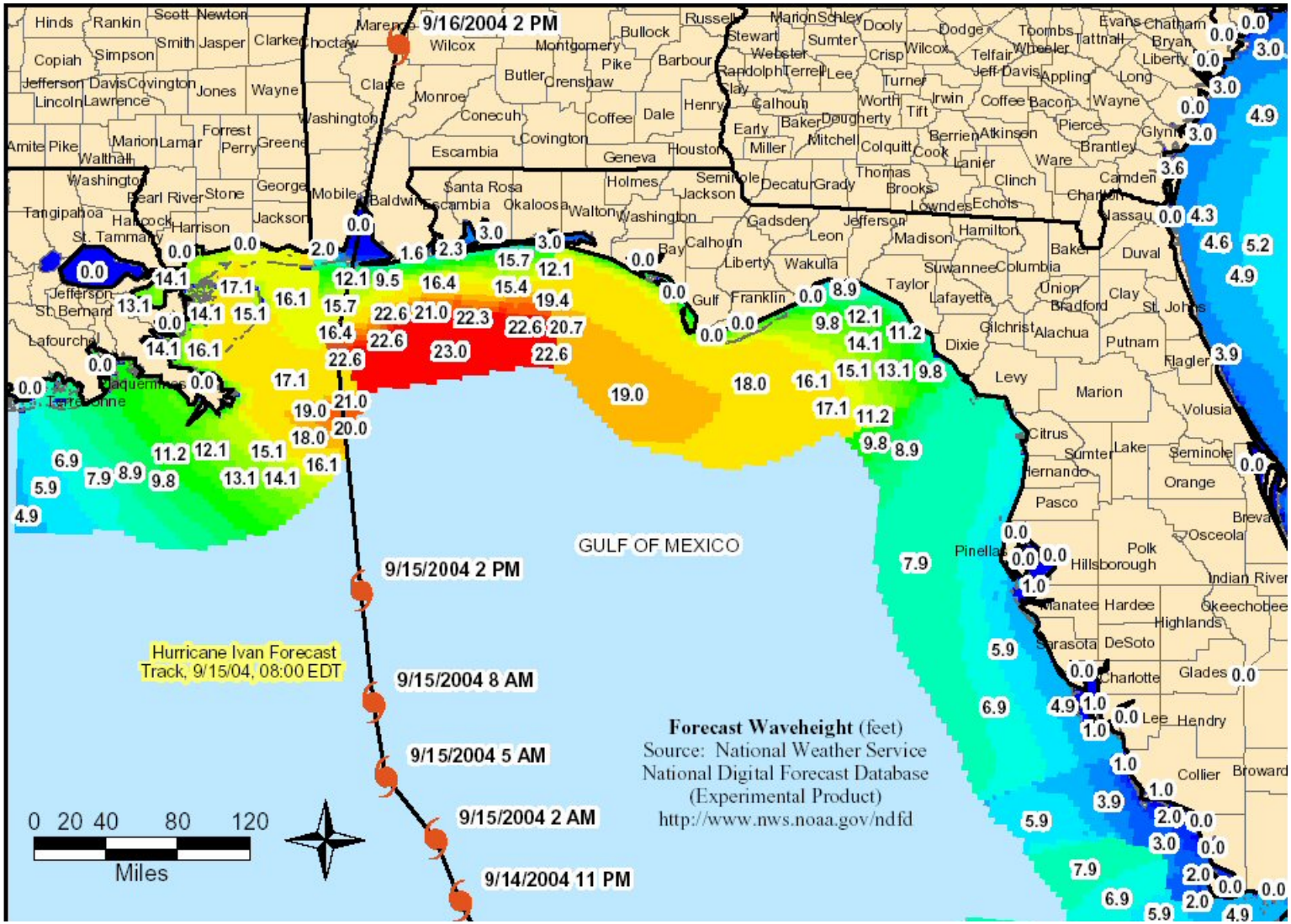
1) Post-Katrina sediment sampling in coastal marshes
(with Cahoon, Guntenspergen, Perez)

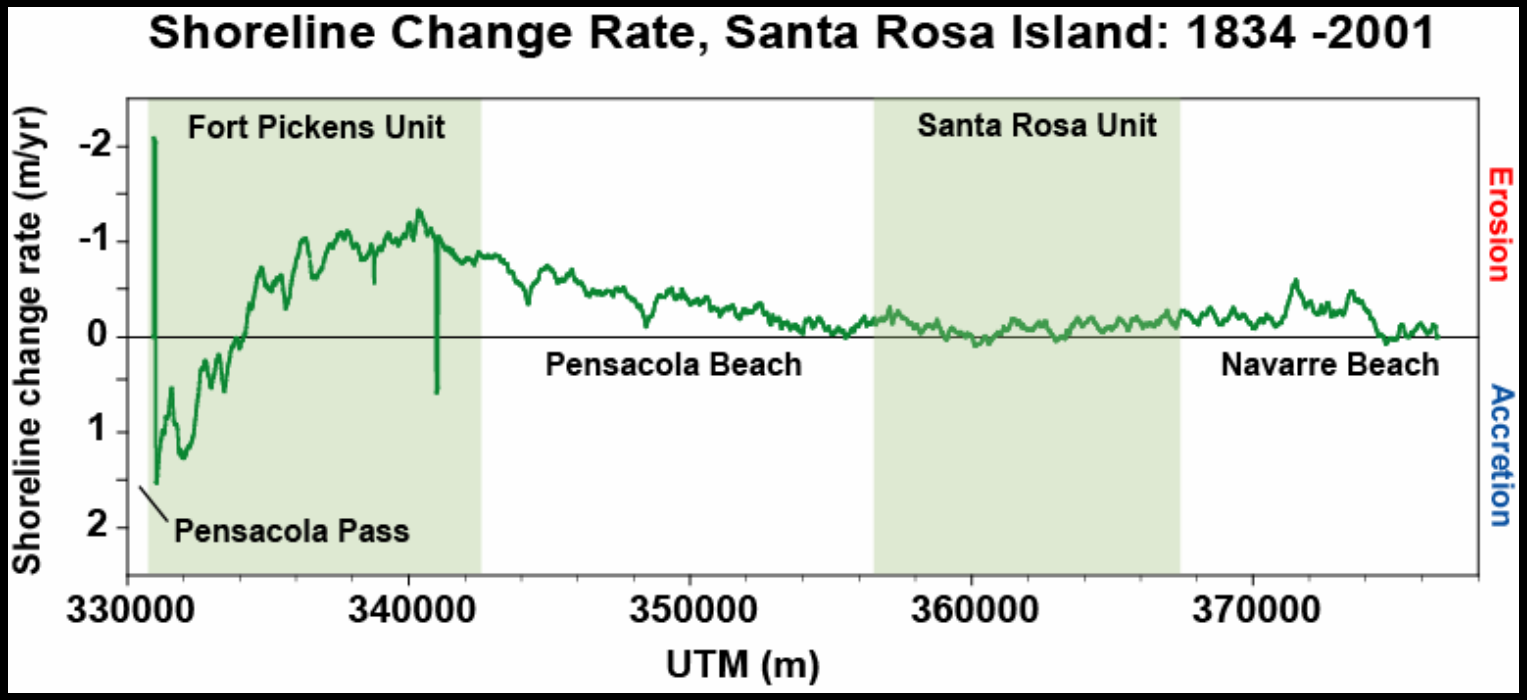
2) Hurricane impacts in FL Gulf Islands National Seashore
- NPS Geologic Resources Division



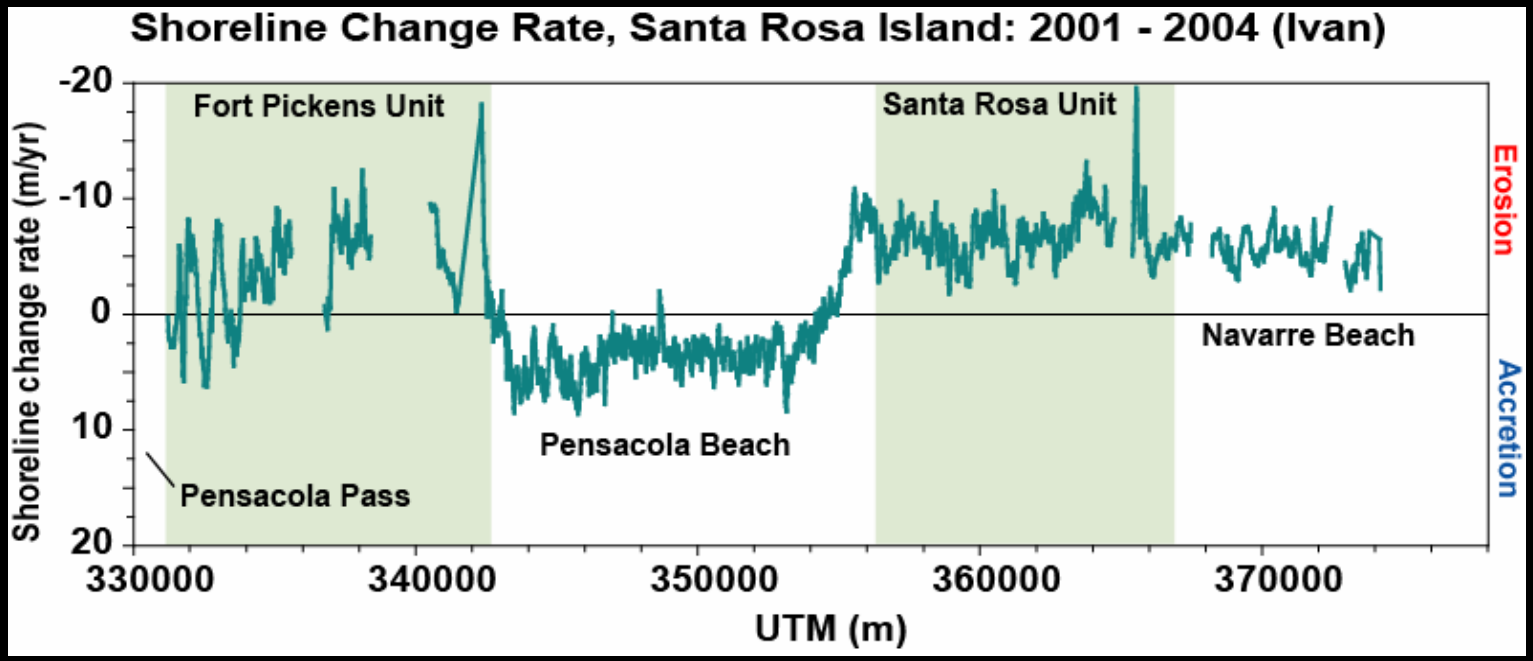
DHS/FEMA DFO
Orlando, FL
9/15/04 -- 11:30 EDT

Hurricane Ivan: Forecast Waveheight (feet)
Valid 09/16/04 08EDT

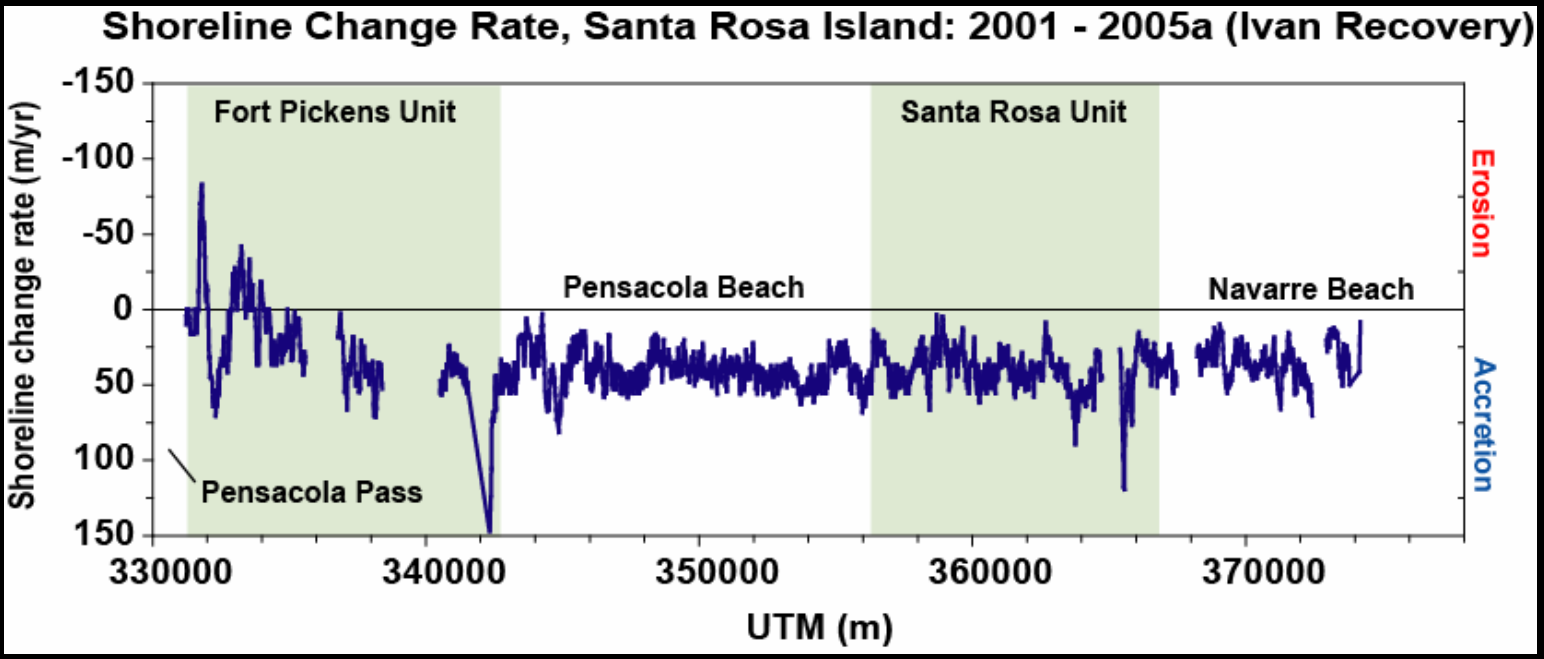




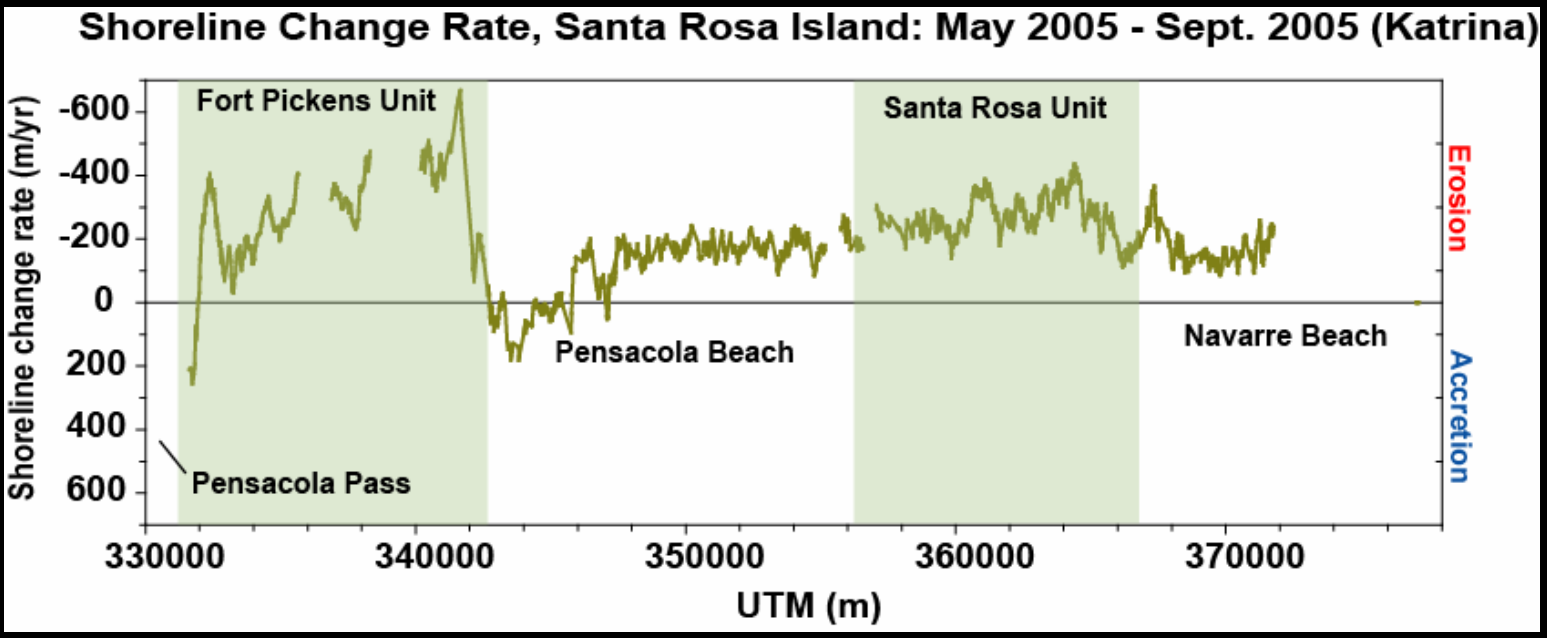
Av. = -0.3 m/yr
(SD = 0.4)



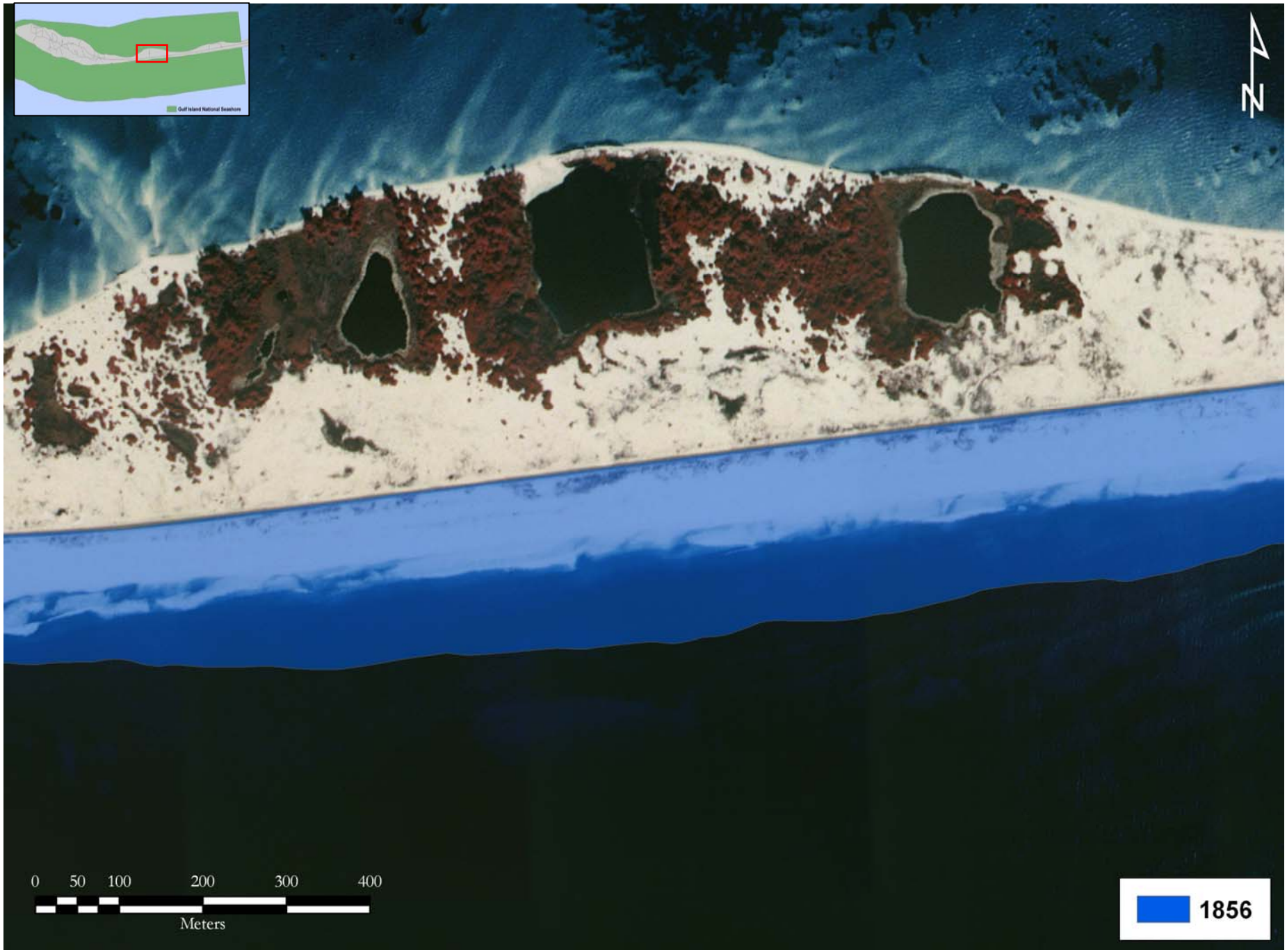
Av. = -2.5 m/yr
(SD = 5.0)

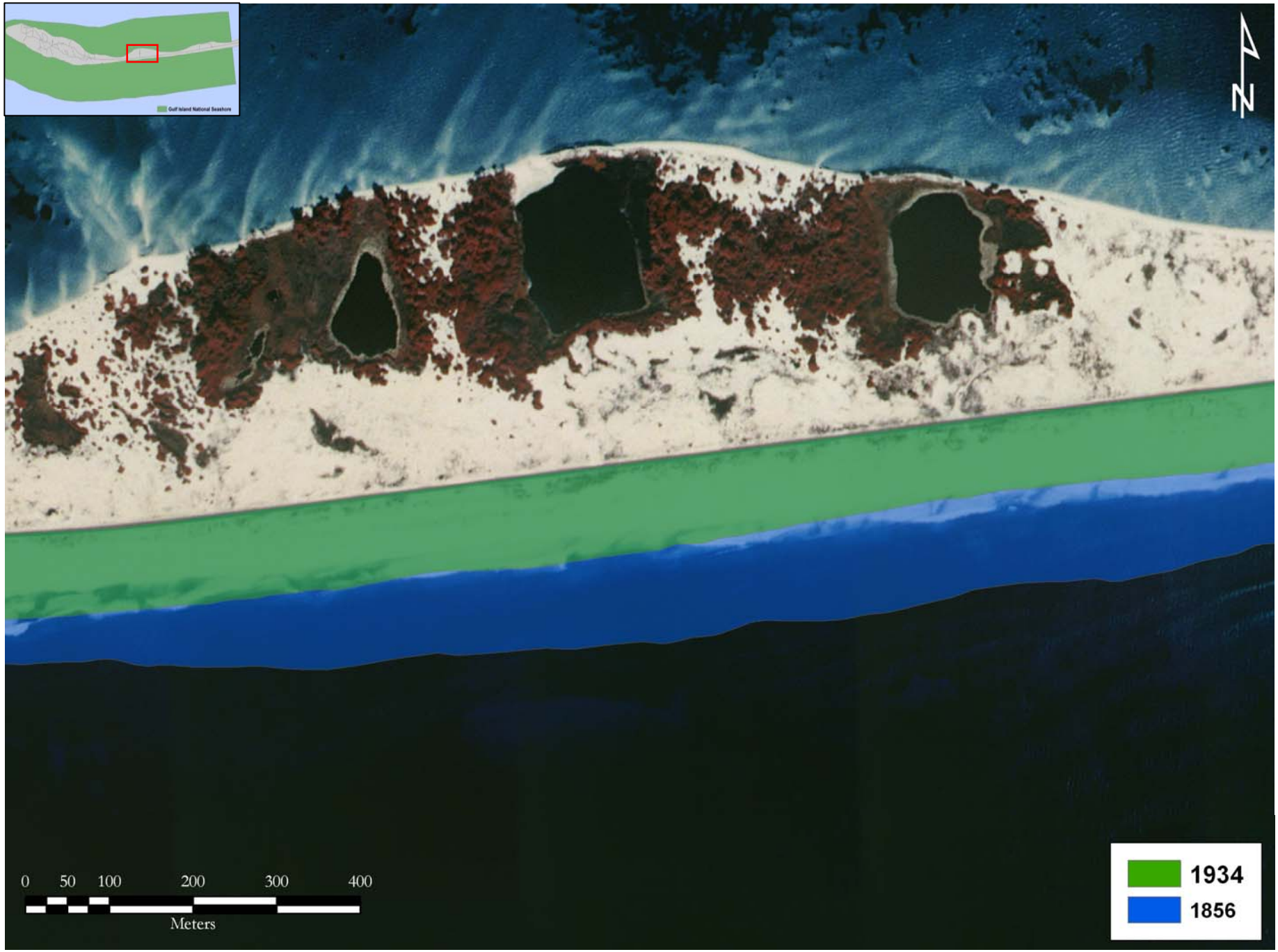


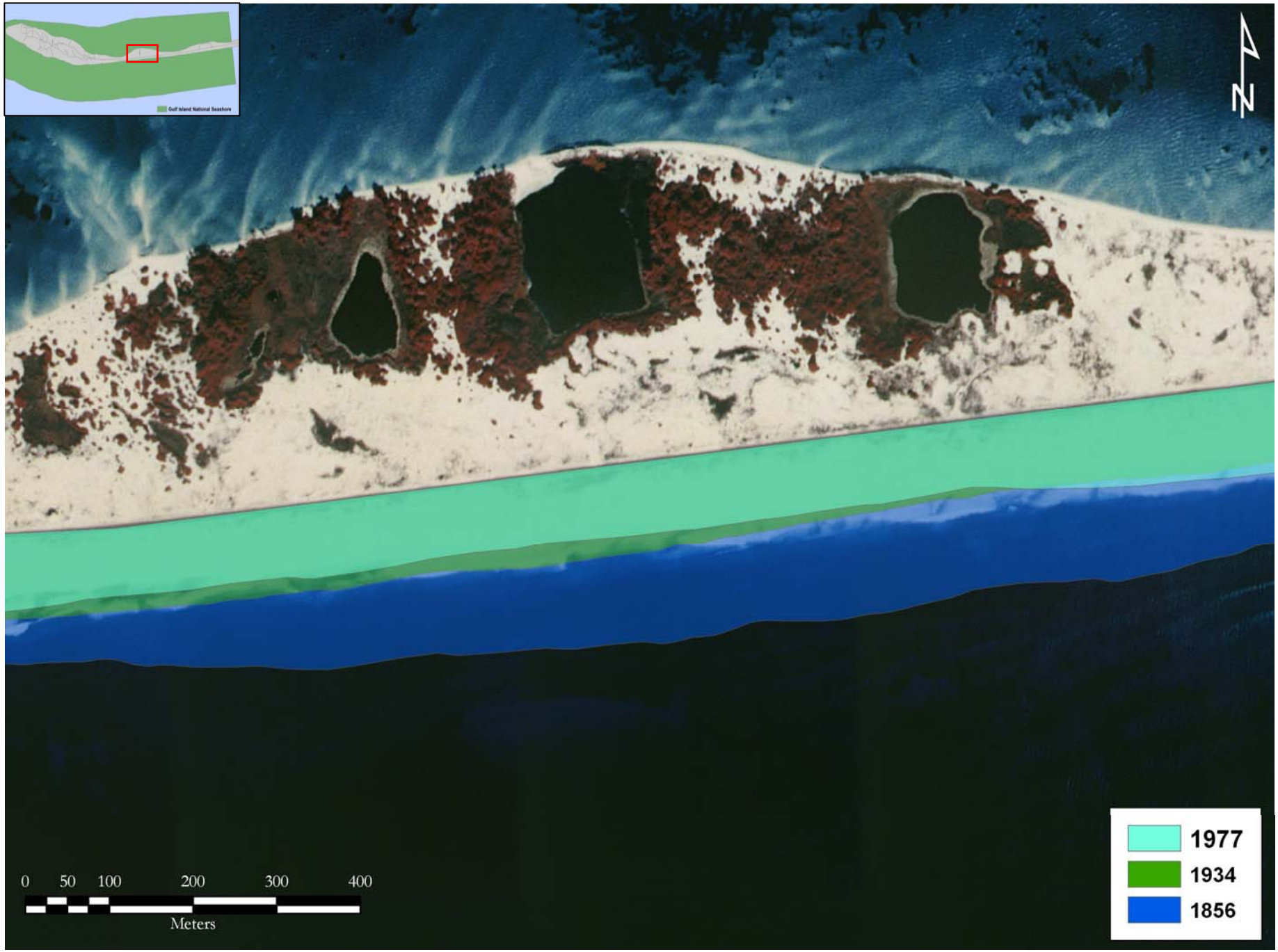
Av. = 36.3 m/yr
(SD = 19.0)

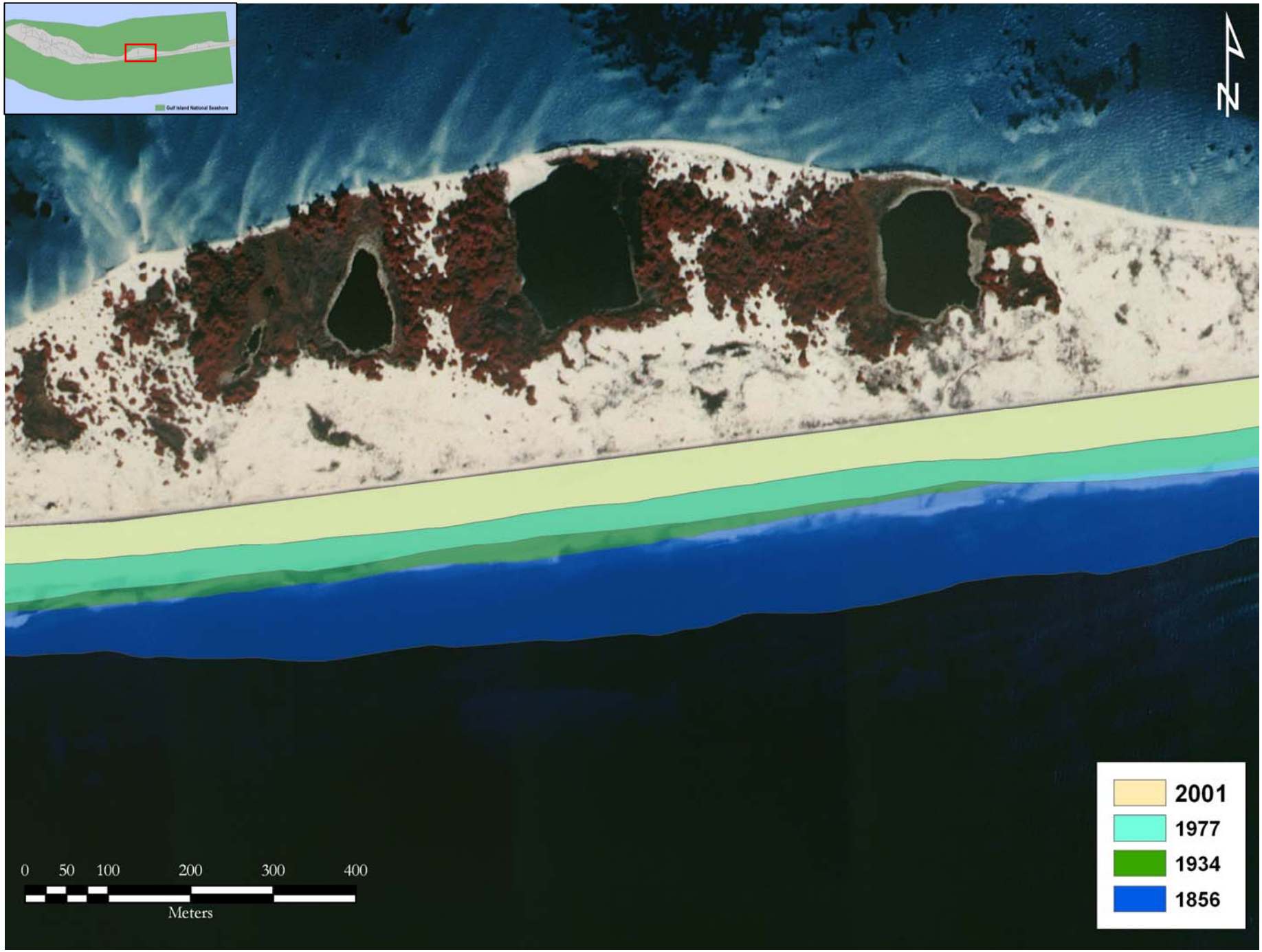


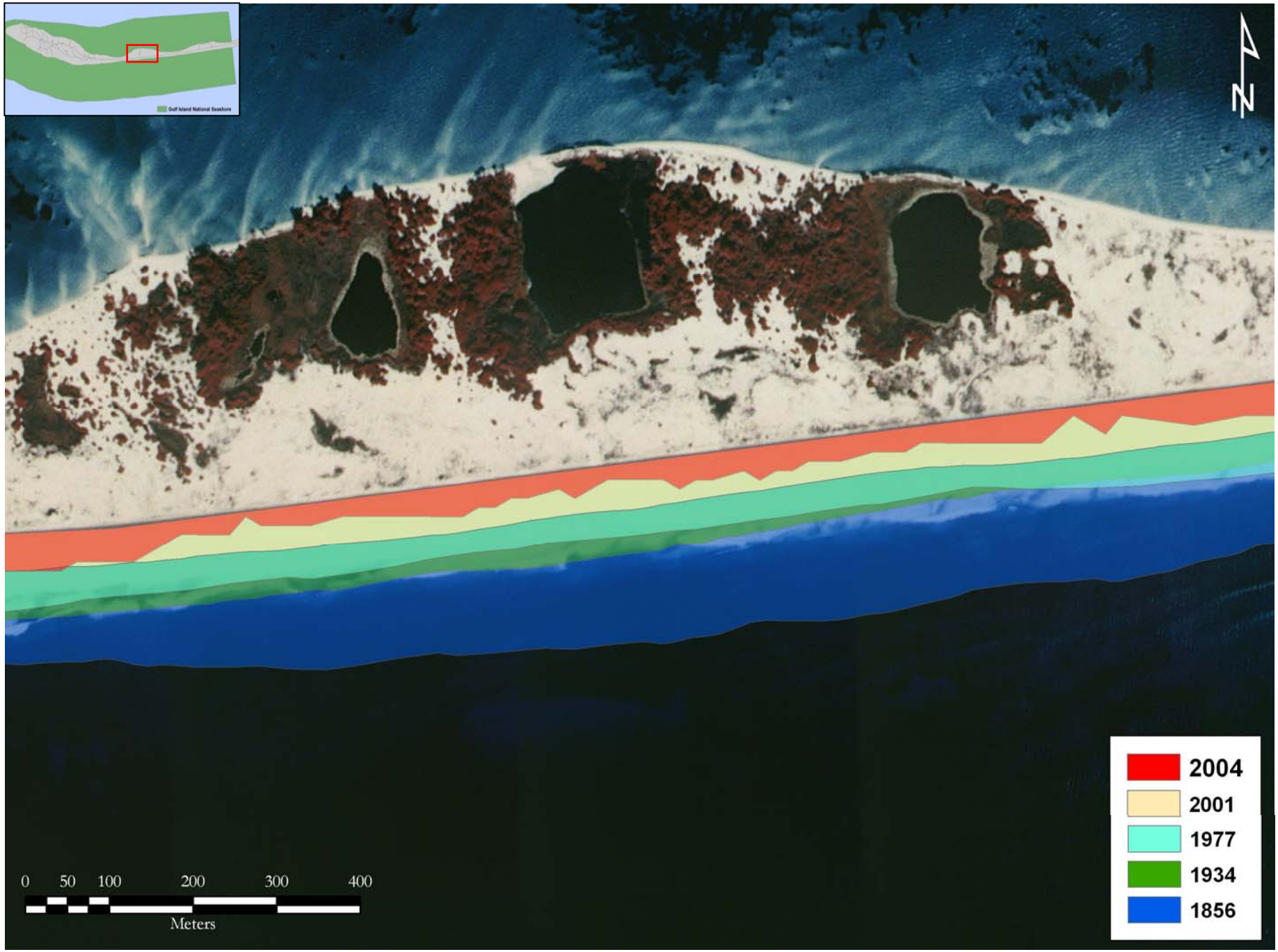
Av. = -182.0
m/yr
(SD = 133.7)

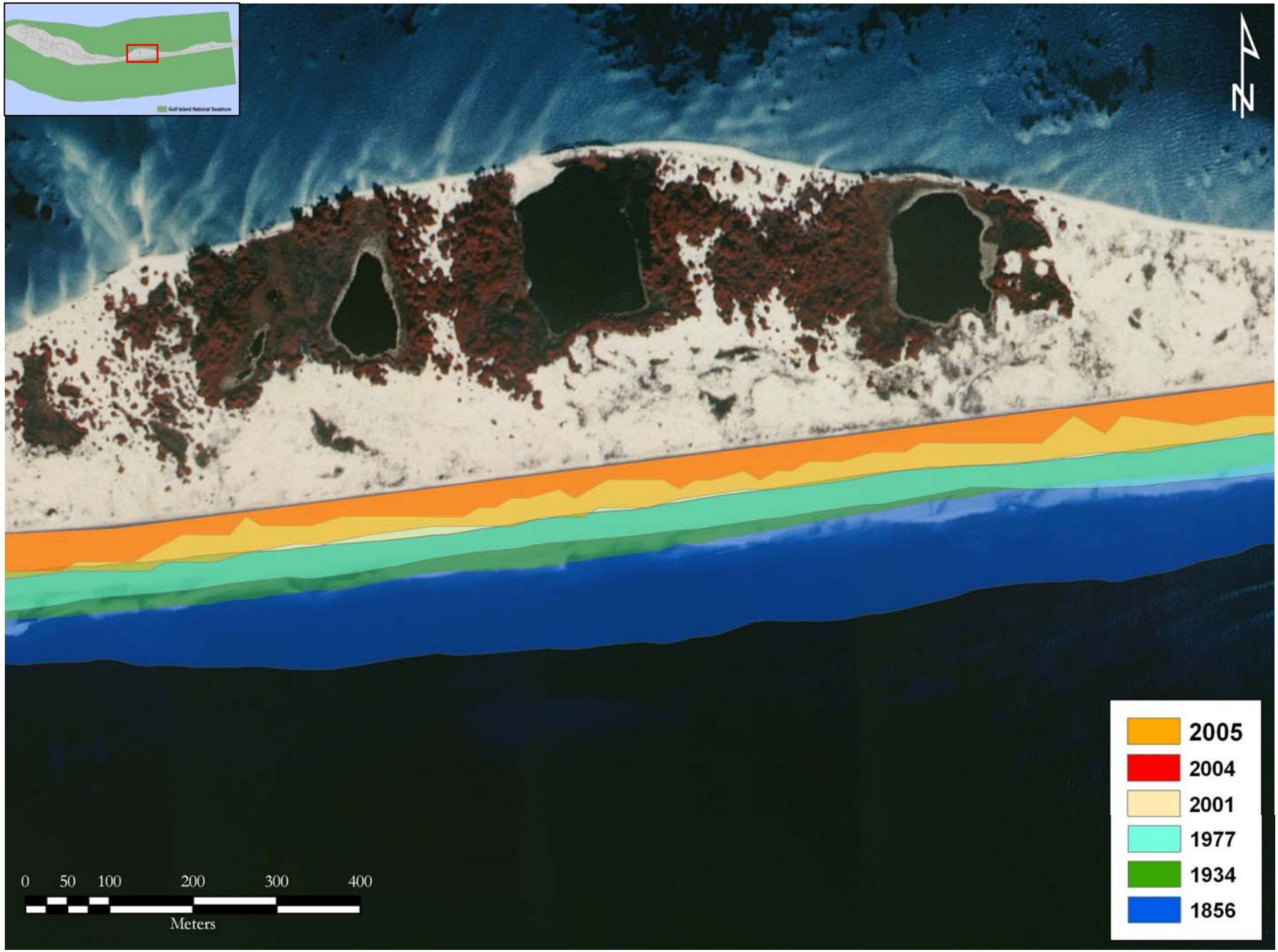

Gulf Island National Seashore
N
0 50 100 200 300 400
Meters
1856

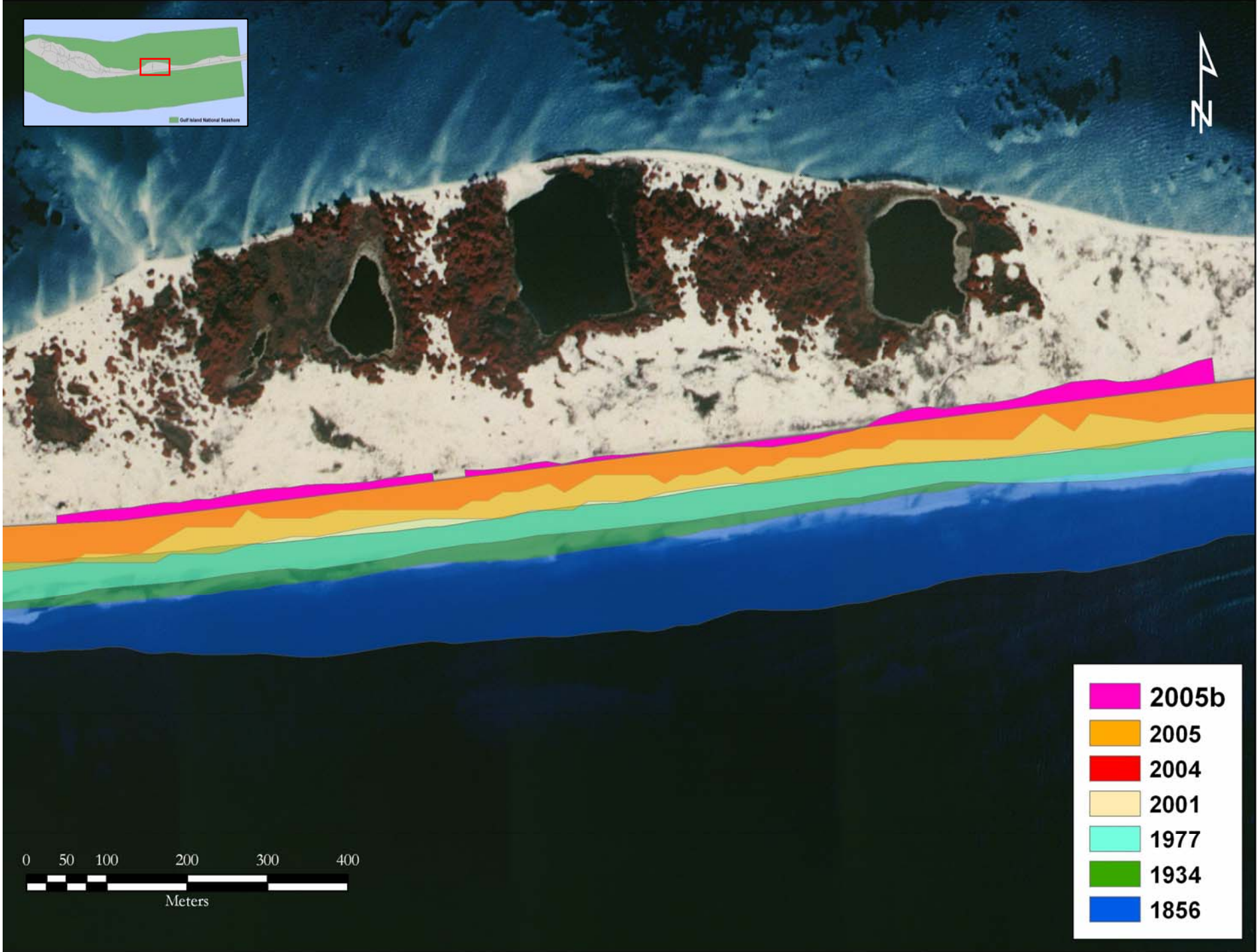

Gulf Island National Seashore
N
0 50 100 200 300 400
Meters
1934
1856

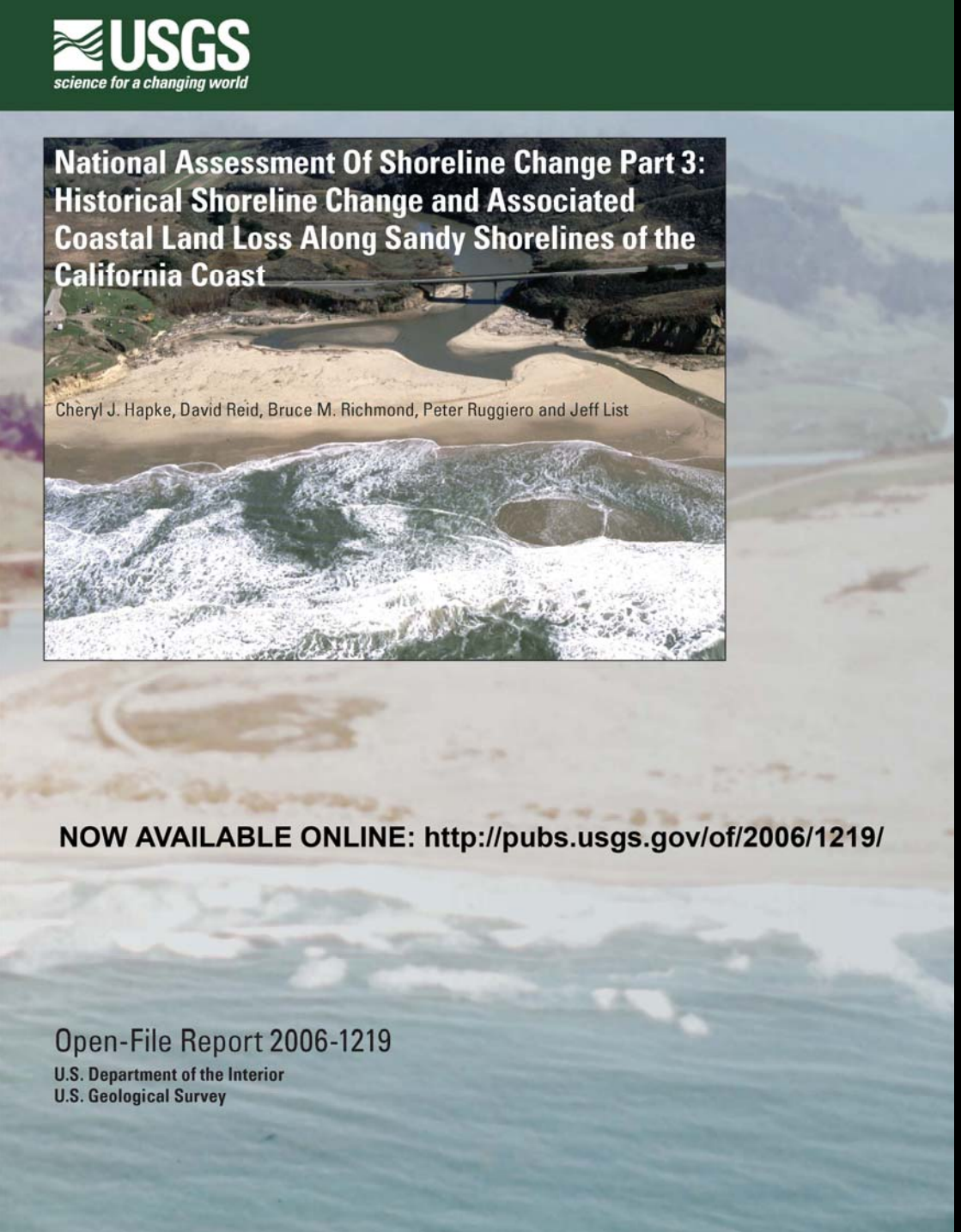

Gulf Island National Seashore
N
0 50 100 200 300 400
Meters
1977
1934
1856


Gulf Island National Seashore
N
2001
1977
1934
1856
0 50 100 200 300 400
Meters


Gulf Island National Seashore
N
2004
2001
1977
1934
1856
0 50 100 200 300 400
Meters


Gulf Island National Seashore
N
2005
2004
2001
1977
1934
1856
0 50 100 200 300 400
Meters


Gulf Island National Seashore
N
2005b
2005
2004
2001
1977
1934
1856
0 50 100 200 300 400
Meters



Work to begin on Northeast in FY07

- Maine to Virginia

- Long-term (~120-years) and short-term (25-year) shoreline change rates based on historical maps and lidar data

- Reports already exist for Gulf of Mexico, SE U.S., California