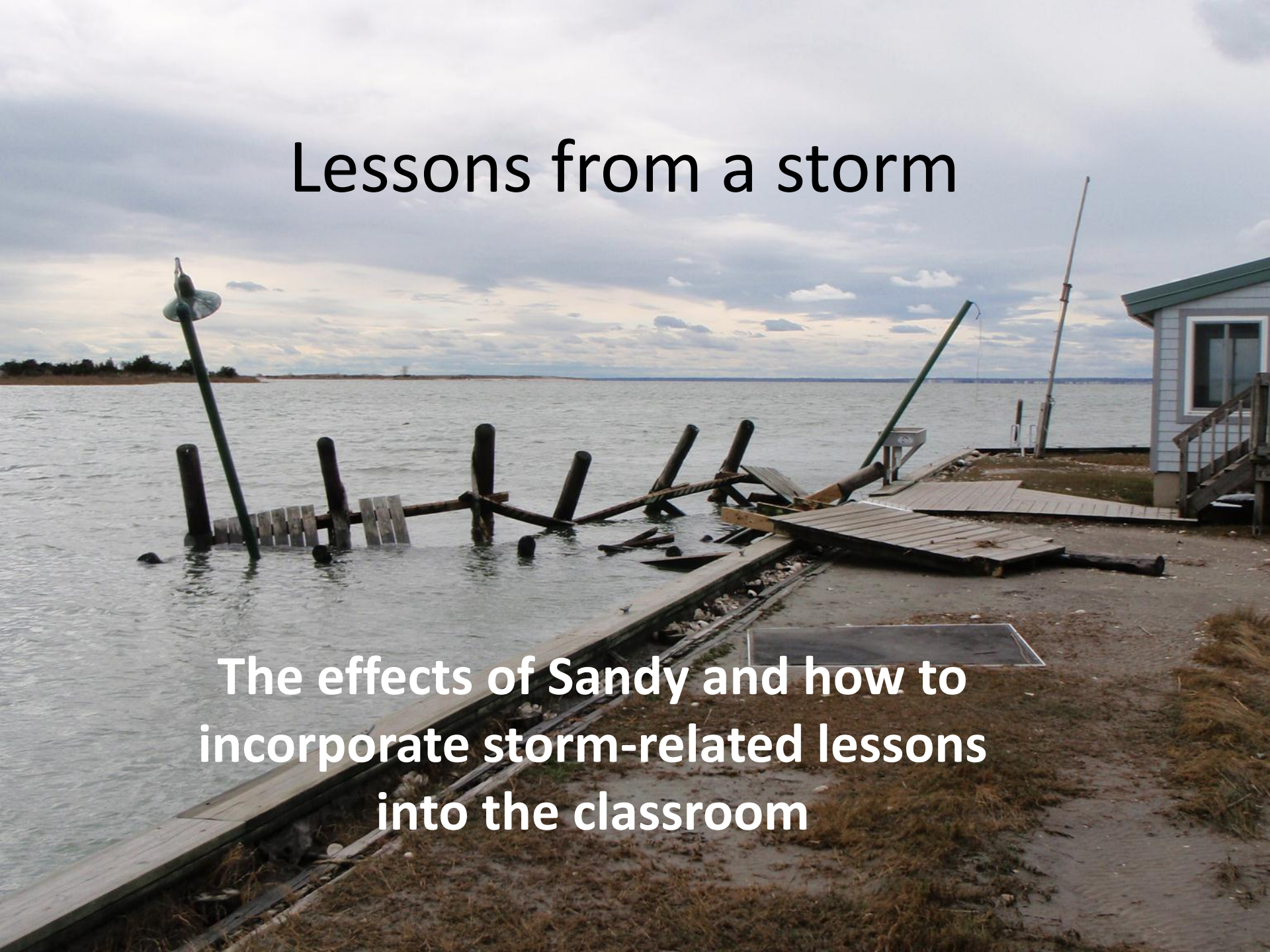
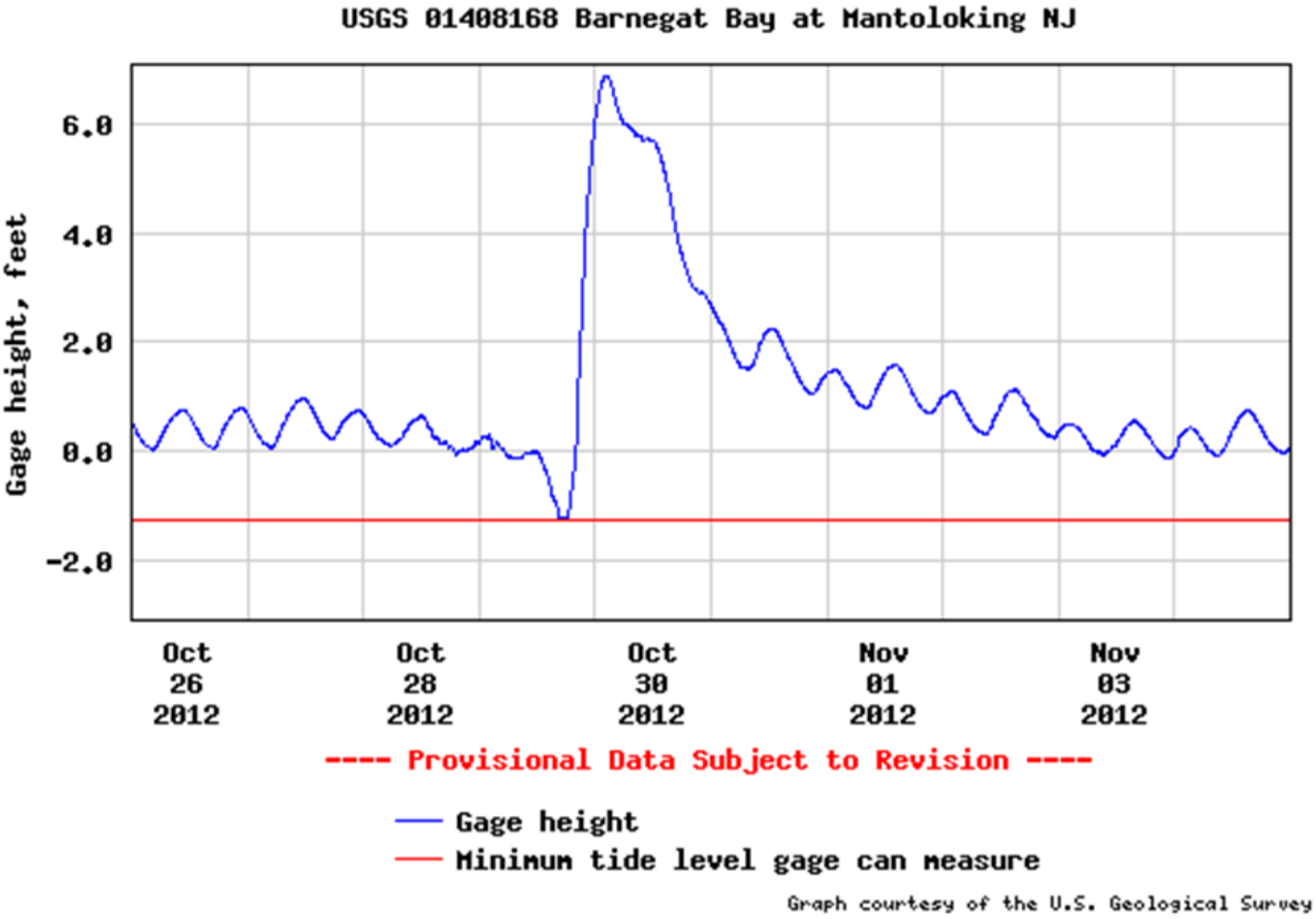
Lessons from a storm



The effects of Sandy and how to incorporate storm-related lessons into the classroom

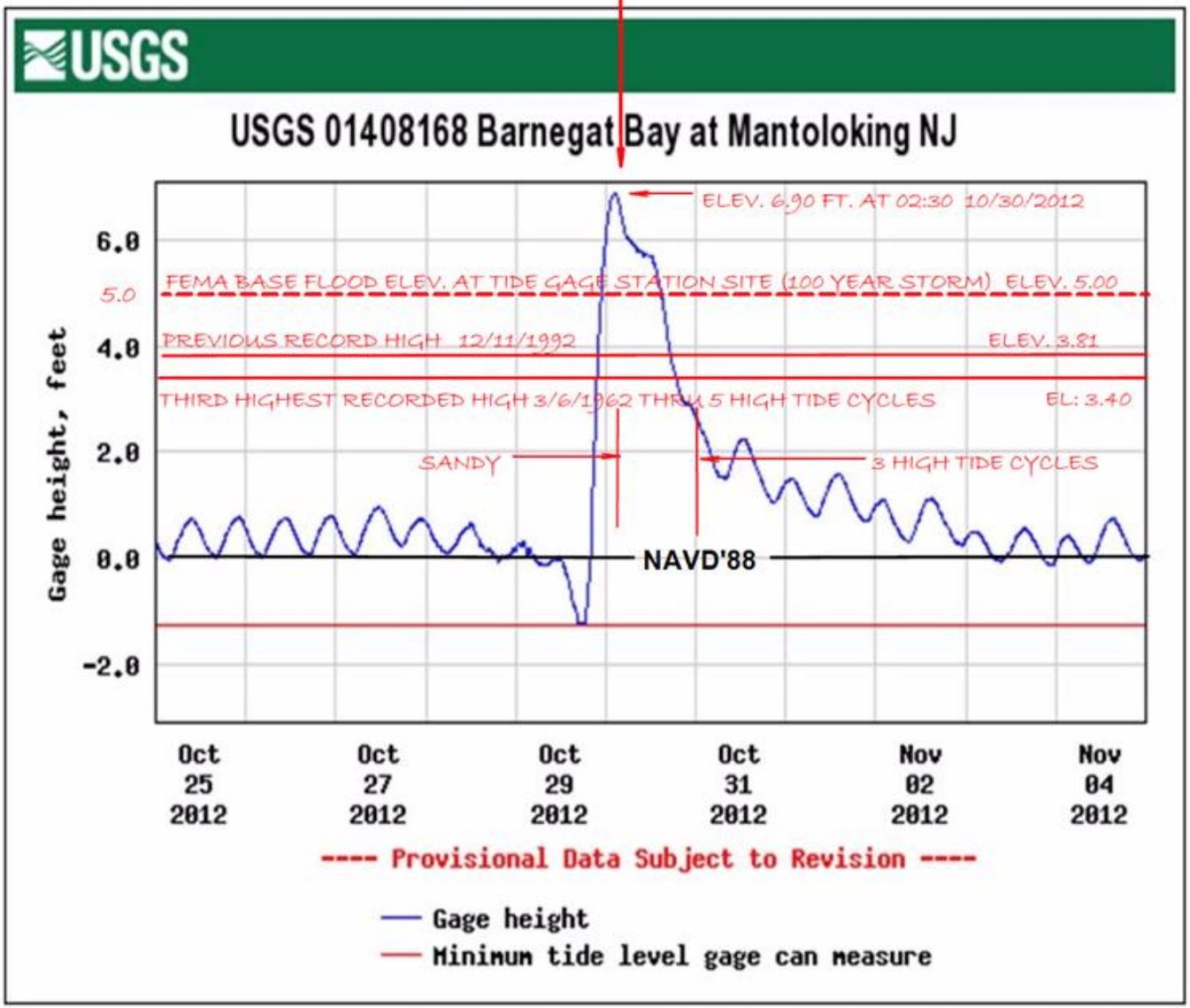

Google
BEFORE
AFTER
Ocean Blvd
W Central Ave
Ocean Ave
35


BEFORE
AFTER
Herbert St

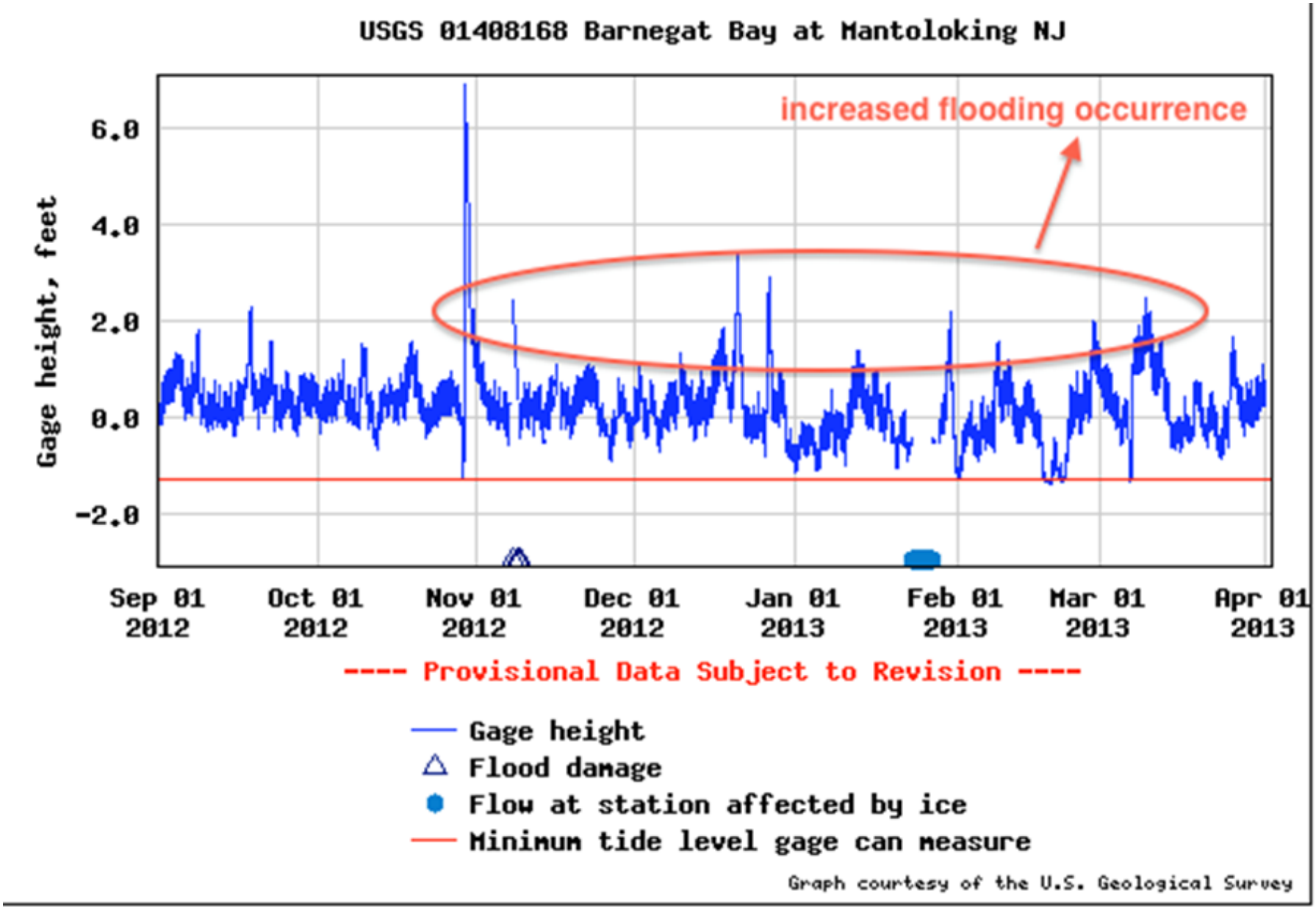


Images courtesy of Allie Jasionowski, Marine Academy of Technology and Environmental Science

SANDY

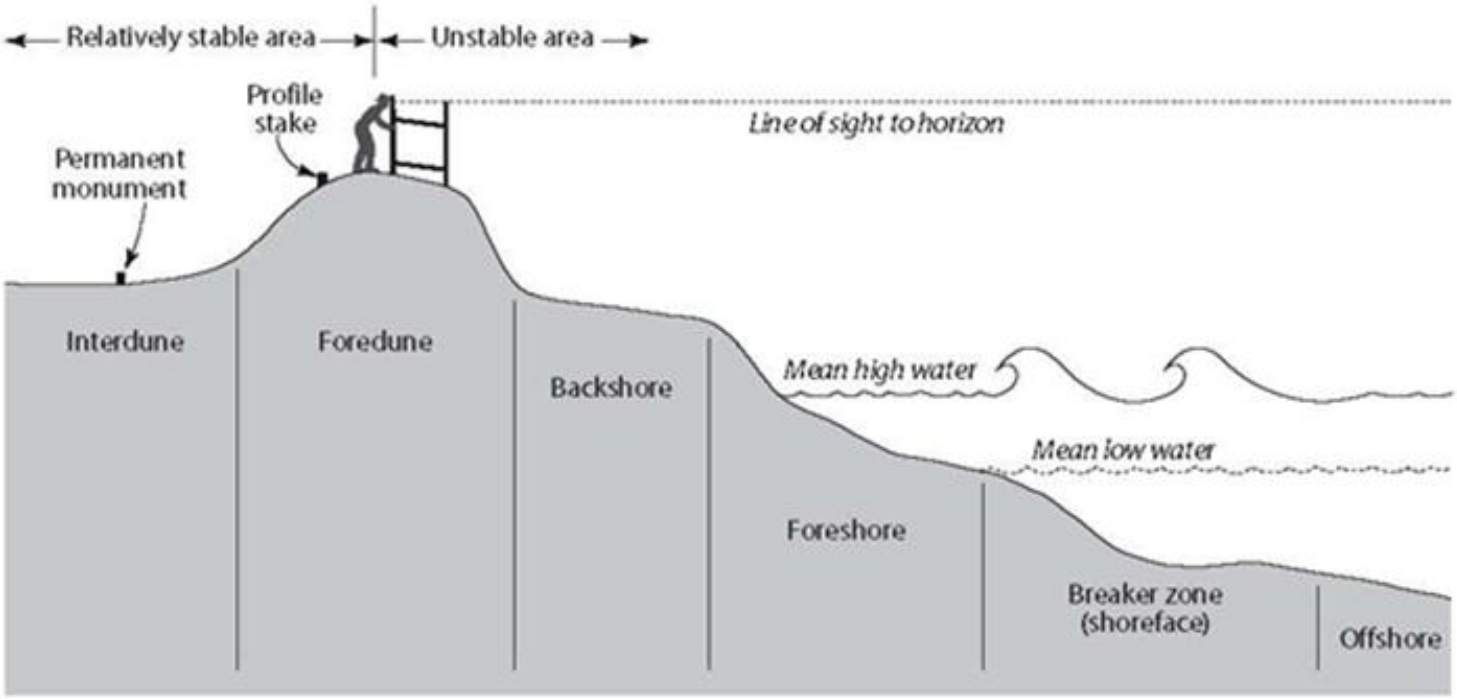


HAND WRITTEN ANNOTATIONS IN RED BY B. McGRATH, PLS


USGS 01408168 Barnegat Bay at Mantoloking NJ
increased flooding occurrence
Gage height, feet
6.0
4.0
2.0
0.0
-2.0
Sep 01 2012
Oct 01 2012
Nov 01 2012
Dec 01 2012
Jan 01 2013
Feb 01 2013
Mar 01 2013
Apr 01 2013
---- Provisional Data Subject to Revision ----
Gage height
Flood damage
Flow at station affected by ice
Minimum tide level gage can measure
Graph courtesy of the U.S. Geological Survey

What can a storm tell us?

- Composition of the sand at different locations on the beach…



WHOI.edu


New Jersey Beach Profile Network Locations,
Northern Ocean County
&
Beach-Dune Susceptibility Results:
100-year Storm
Note: Assessment results are based on year-2000 LiDAR data
N
156
155
154
153
152
151
150
149
248
148
347
247
246
146
0 0.5 1 2 3 4
Miles
Legend
New Jersey Beach Profile Network Sites
Northern Ocean County Dune Assessment
100-Year Susceptibility, Average
Surge at Structure
> 90% Foredune Removed
75% - 90% Foredune Removed
50% - 75% Foredune Removed
25% - 50% Foredune Removed
10% - 25% Foredune Removed
0% - 10% Foredune Removed
Surge not at Structure

Sites	Volume Change (cubic yards)
Point Pleasant Beach	540,610.46
Point Pleasant Beach	222,144.64
Bay Head	677,333.97
Mantoloking	1,184,691.26
Brick Twp	228,527.02
Dover Twp	508,394.46
Lavalette	667,654.81
Ortley Beach	386,586.18
Seaside Heights	376,798.01
Seaside Park	212,859.05
	Total Volume Loss= **5,005,599.86**

Source: Richard Stockton College of New Jersey: Coastal Studies Program Report 2012

How many gallons?

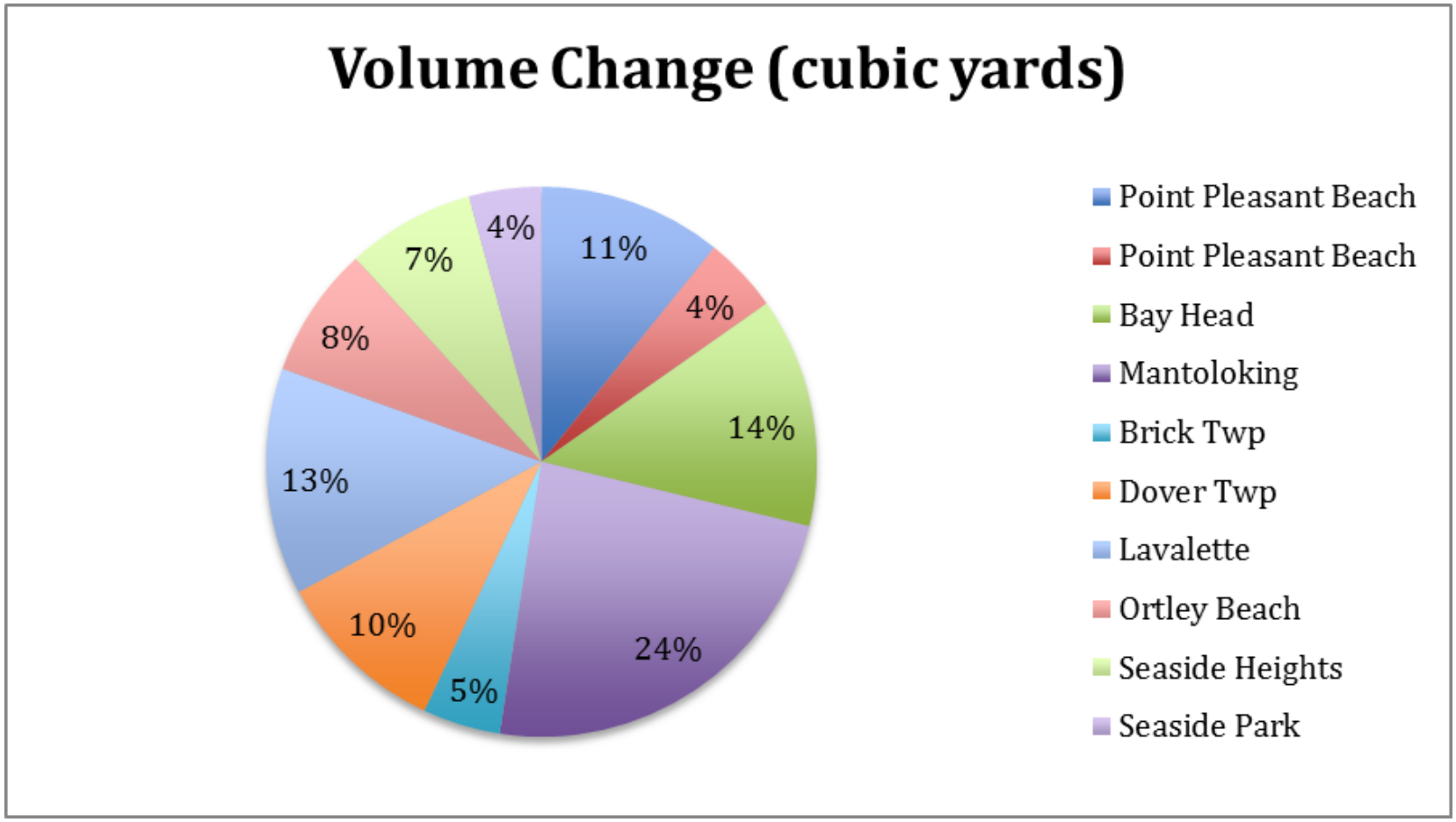
5,005,600 cubic yards in gallons?

1 cubic yard = 202 gallons

Therefore, **1,011,131,200 gallons**

Approximately 101,000 tanker trucks

Quick Math Lesson

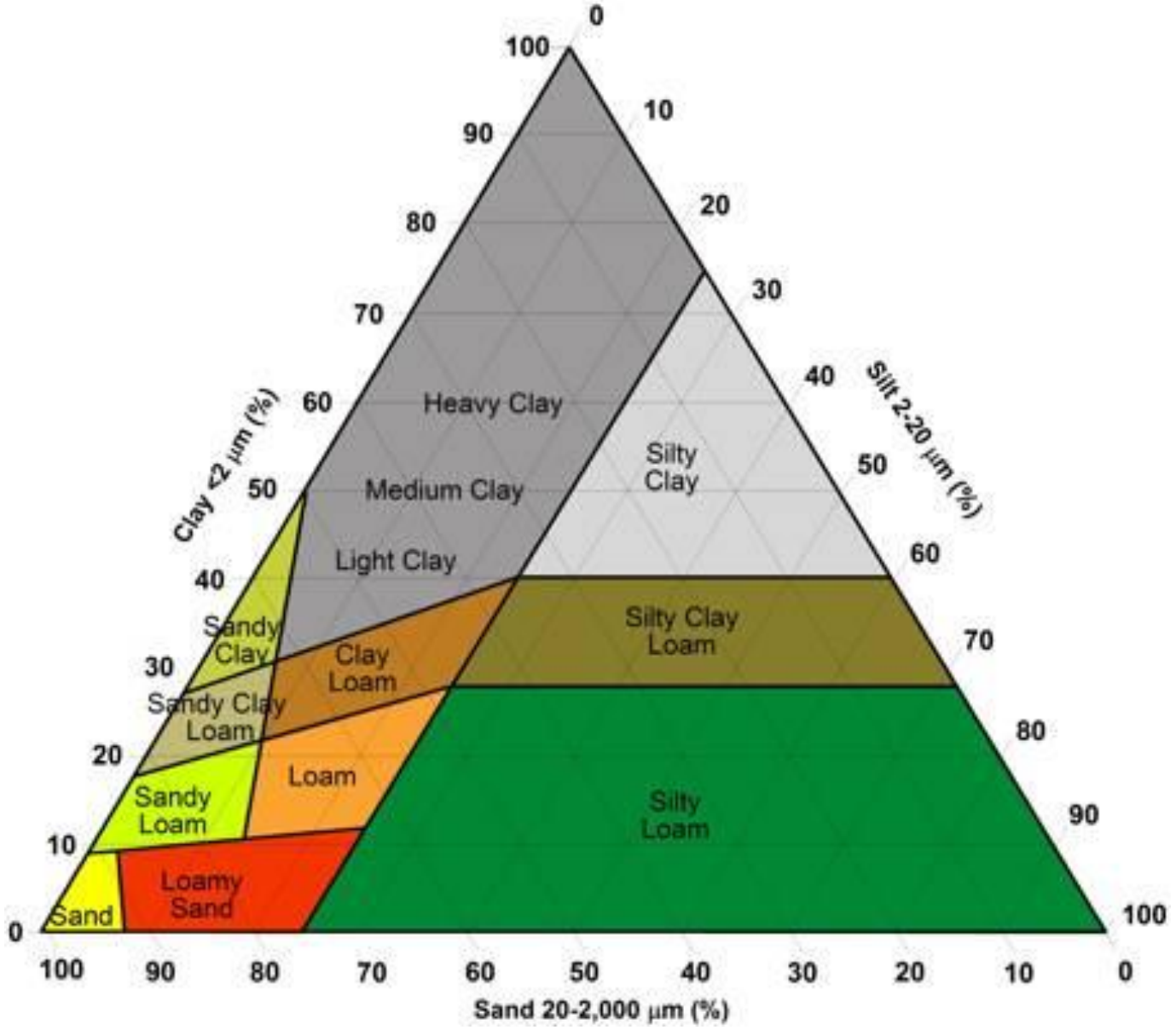
- 

Type of sand?

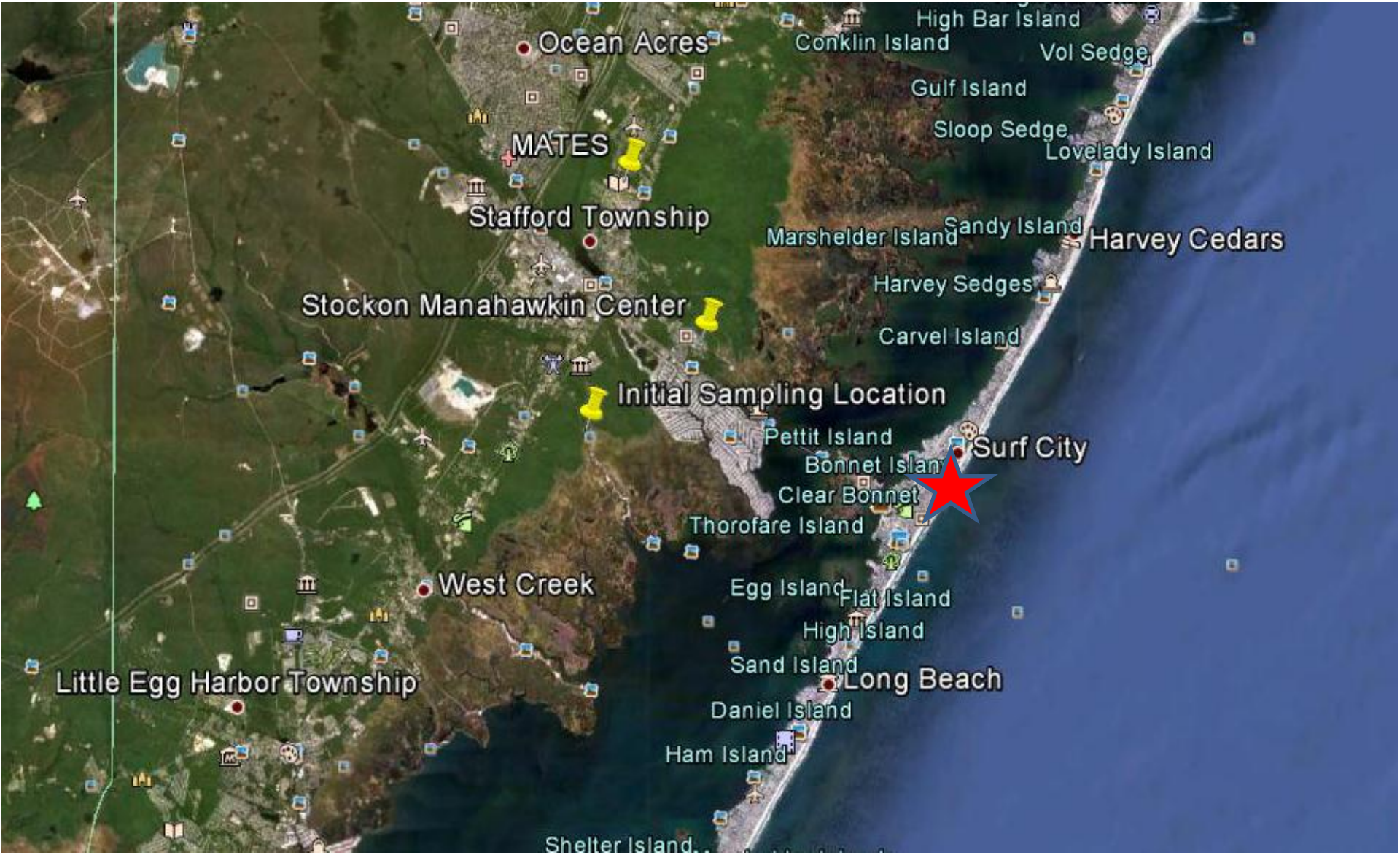
- There are many categories of sand determined by particle sizes

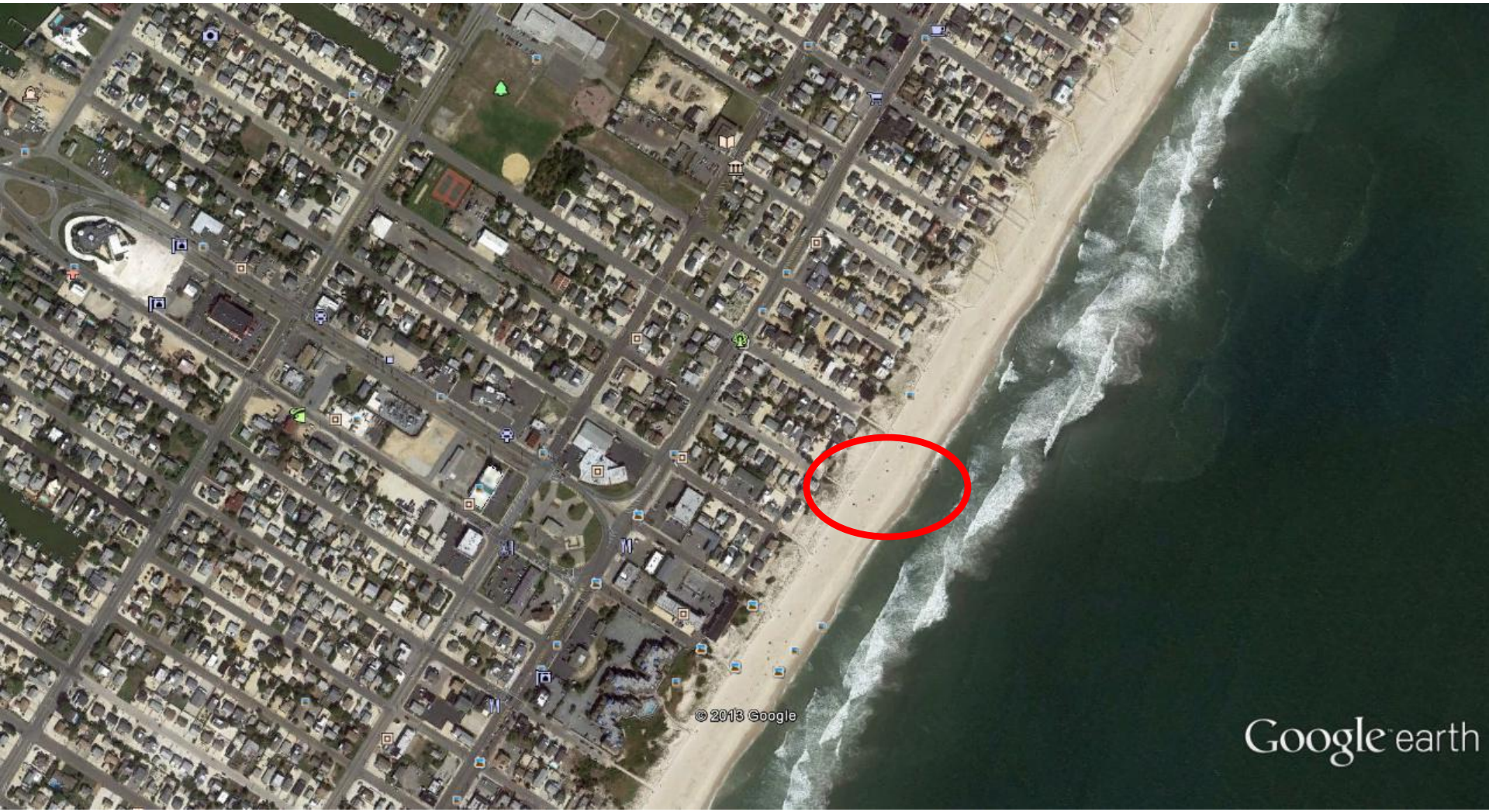
  - Course Sand
  - Medium Sand
  - Fine Sand
  - Very Fine Sand

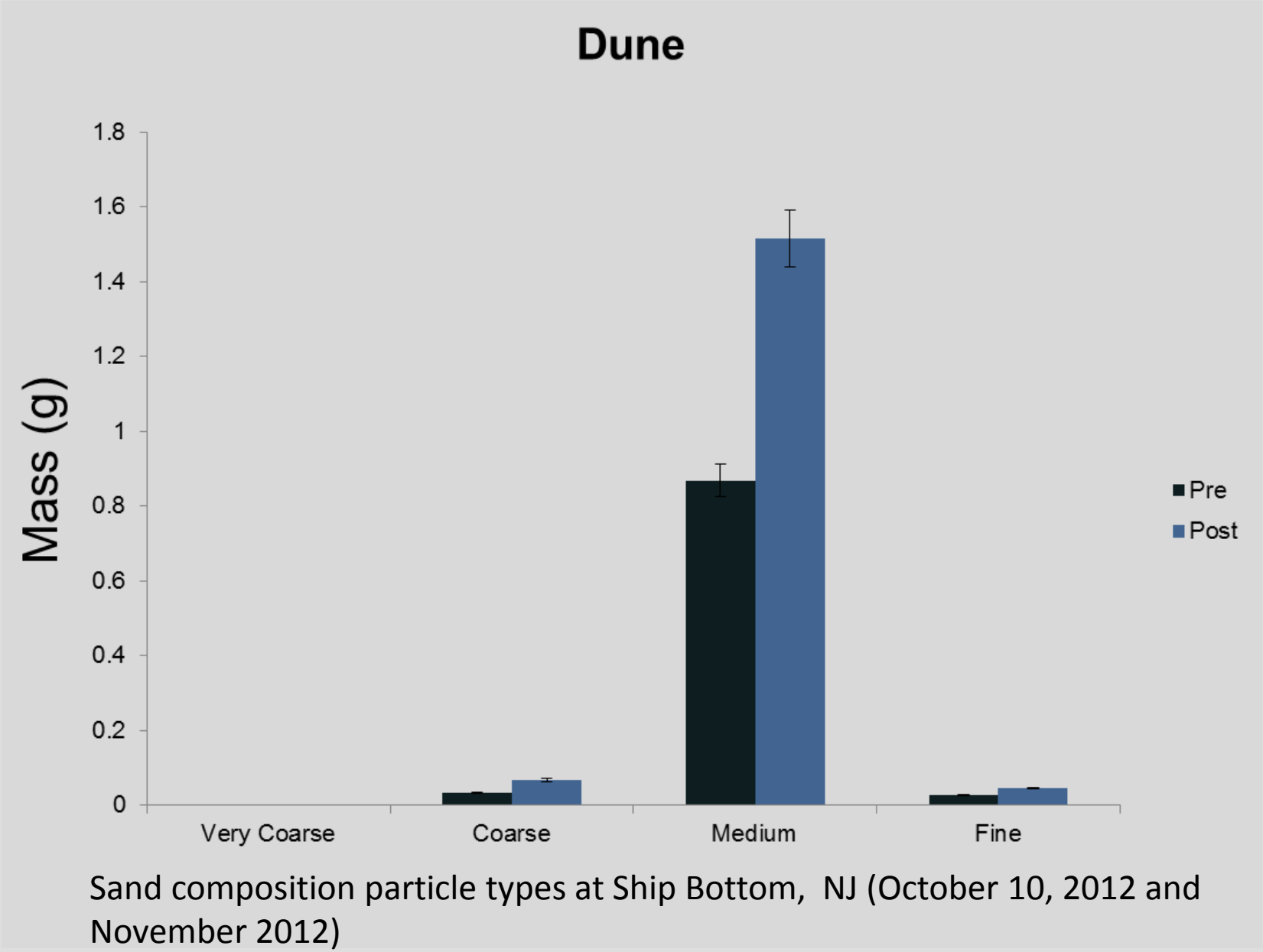
These could change position on the beach as a result of storm surge, wind, etc…



terraGIS.com

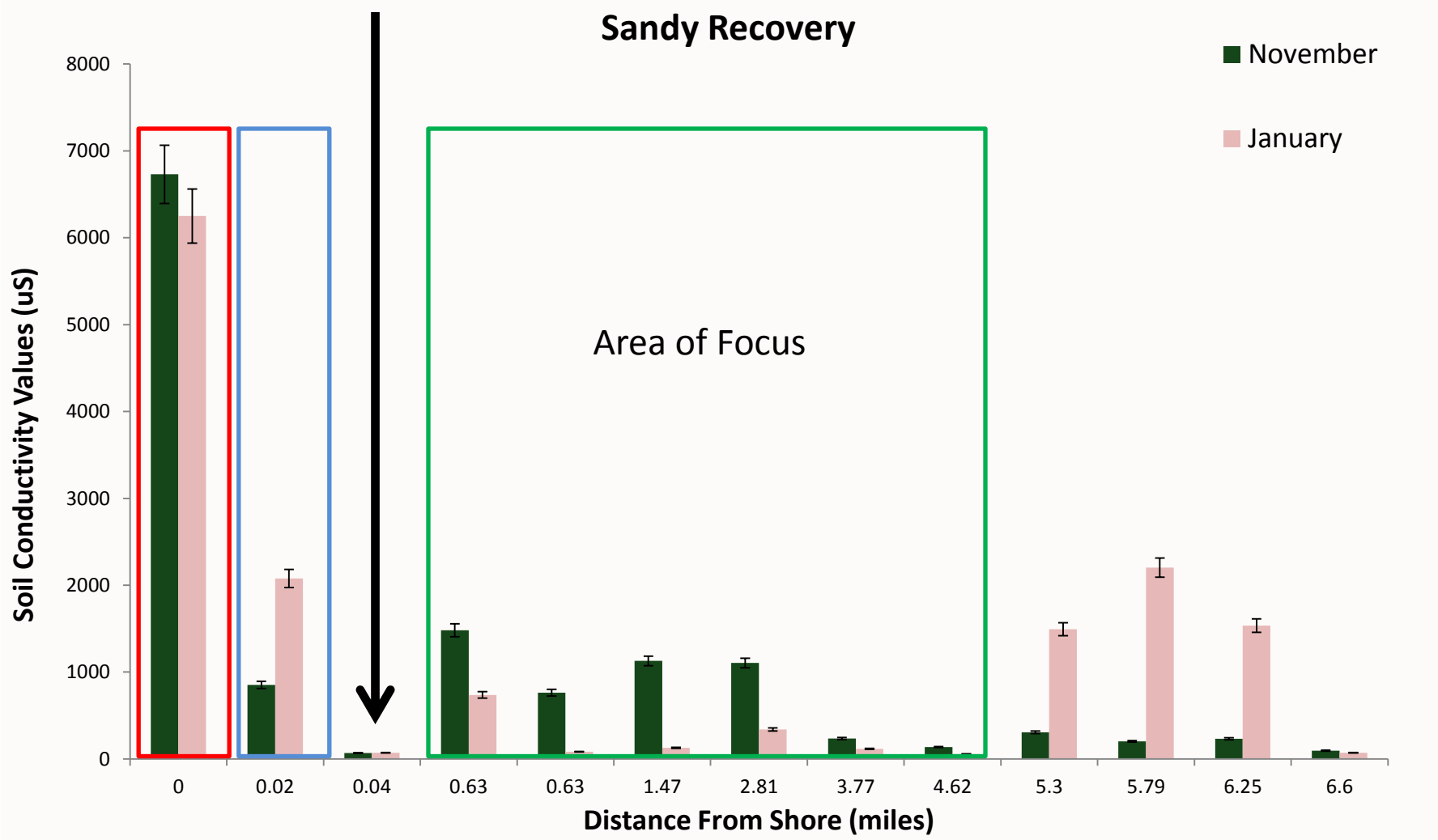

High Bar Island
Ocean Acres
Conklin Island
Vol Sedge
Gulf Island
Sloop Sedge
MATES
Lovelady Island
Stafford Township
Sandy Island
Marshelder Island
Harvey Cedars
Harvey Sedges
Stockon Manahawkin Center
Carvel Island
Initial Sampling Location
Pettit Island
Surf City
Bonnet Islan
Clear Bonnet
Thorofare Island
West Creek
Egg Island
Flat Island
High Island
Sand Island
Long Beach
Little Egg Harbor Township
Daniel Island
Ham Island
Shelter Island


© 2013 Google
Google earth



Sand composition particle types at Ship Bottom, NJ (October 10, 2012 and November 2012)

Ornstein, 2013, Marine Academy of Technology and Environmental Science



Ornstein, 2013, Marine Academy of Technology and Environmental Science

Measuring Sand Conductivity

Using a conductivity meter, is an easy way to determine ion concentrations in sand (soil)

Take a sample of sand (volume) and add double that volume of distilled water to the sand

Pour off the water and use the meter to determine specific conductance

Lessons for the classroom

- Seasonal beach composition would be easy to do in the classroom. By analyzing sand from beach zones and determining changes over seasons (ask permission from municipality with stipulation that you would bring the sand back)

- Conductivity studies after a Nor'easter would be good, and then, a few weeks after a storm

But who will help?

- MATES has dedicated an aspect of student-based research to studying the effects of Storm Sandy

- Our students would be willing to help with a lesson, and/or lend you basic equipment to use with your students