NATIONAL COASTAL MAPPING NEW PRODUCTS

Jennifer M. Wozencraft

HH&C CoP Annual Coastal Working Group Meeting
09 August 2011, Vicksburg, MS

Outline

- Background
- New data
- Upcoming data collection
- New Products
- Availability

US Army Corps of Engineers
BUILDING STRONG®

Joint Airborne Lidar Bathymetry
Technical Center of Expertise

Joint Airborne Lidar Bathymetry Technical Center of Expertise

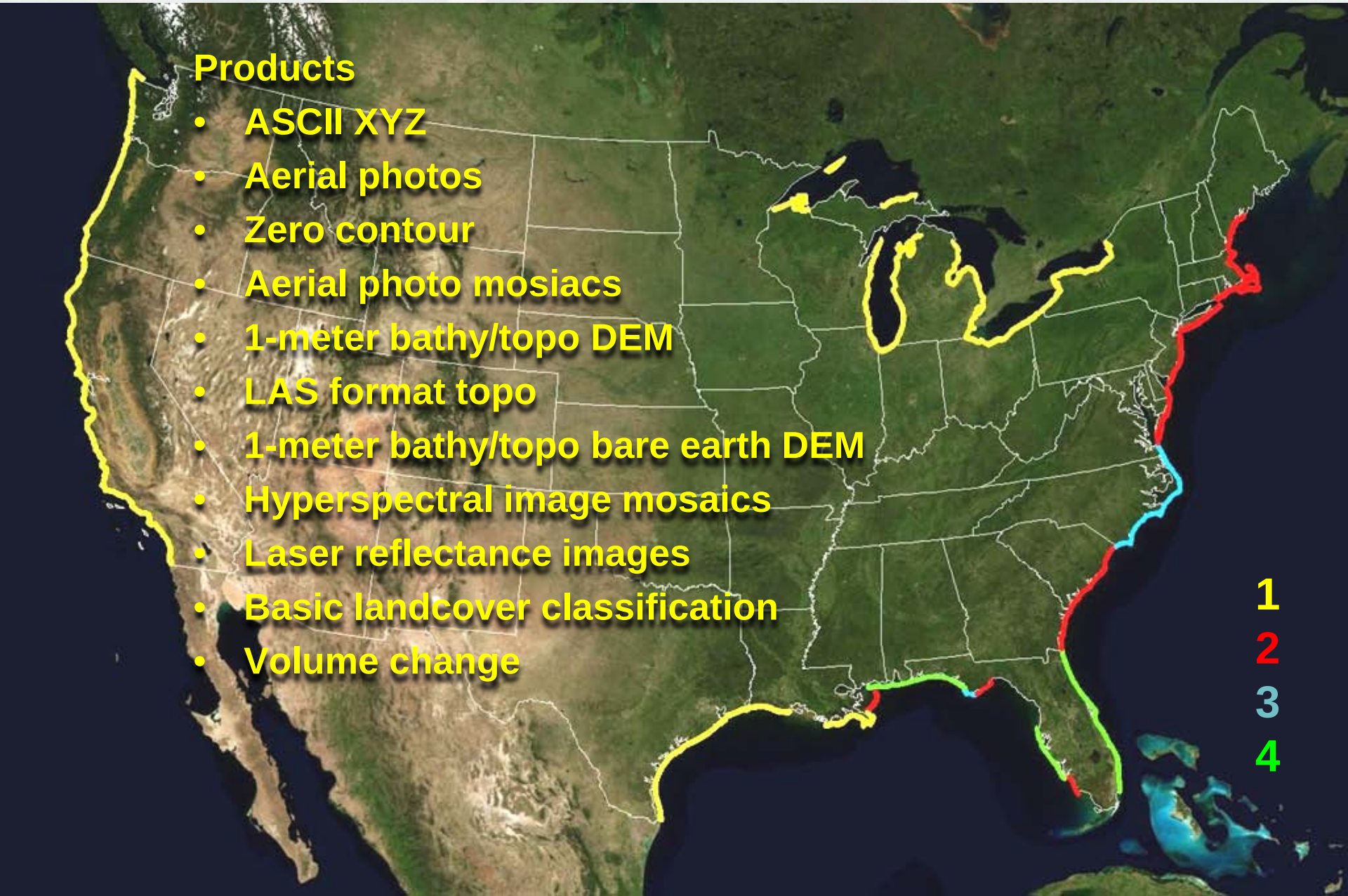
- JALBTCX
  - Operations
    - USACE
    - Navy
  - Technology Evolution
    - Coastal Measurements & Data Usage
    - Sensors & Systems
    - NOAA

Annual Planning Meeting & Annual Technical Workshop

21-22 June 2011, Baltimore, MD

Progress to-date

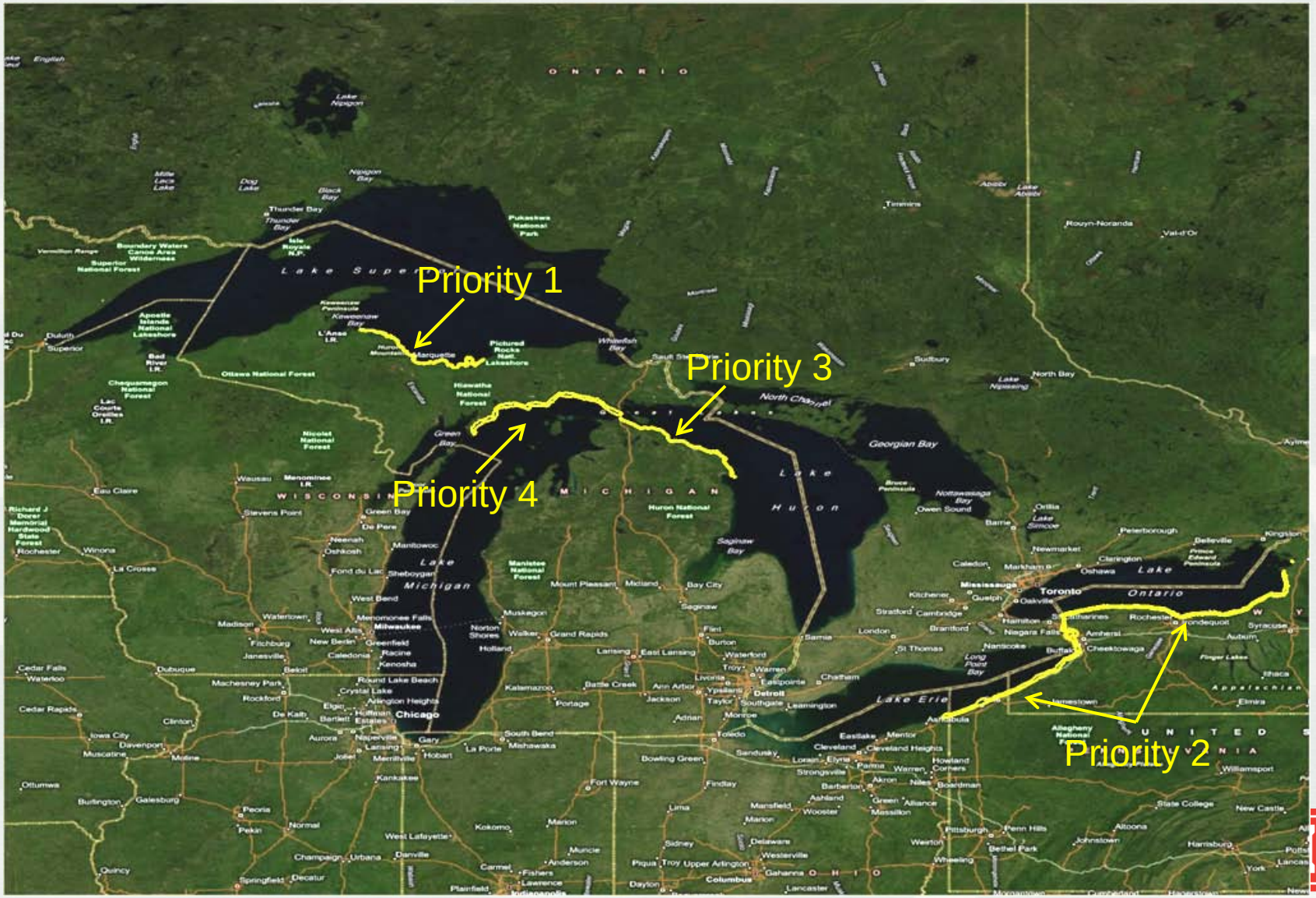
2010



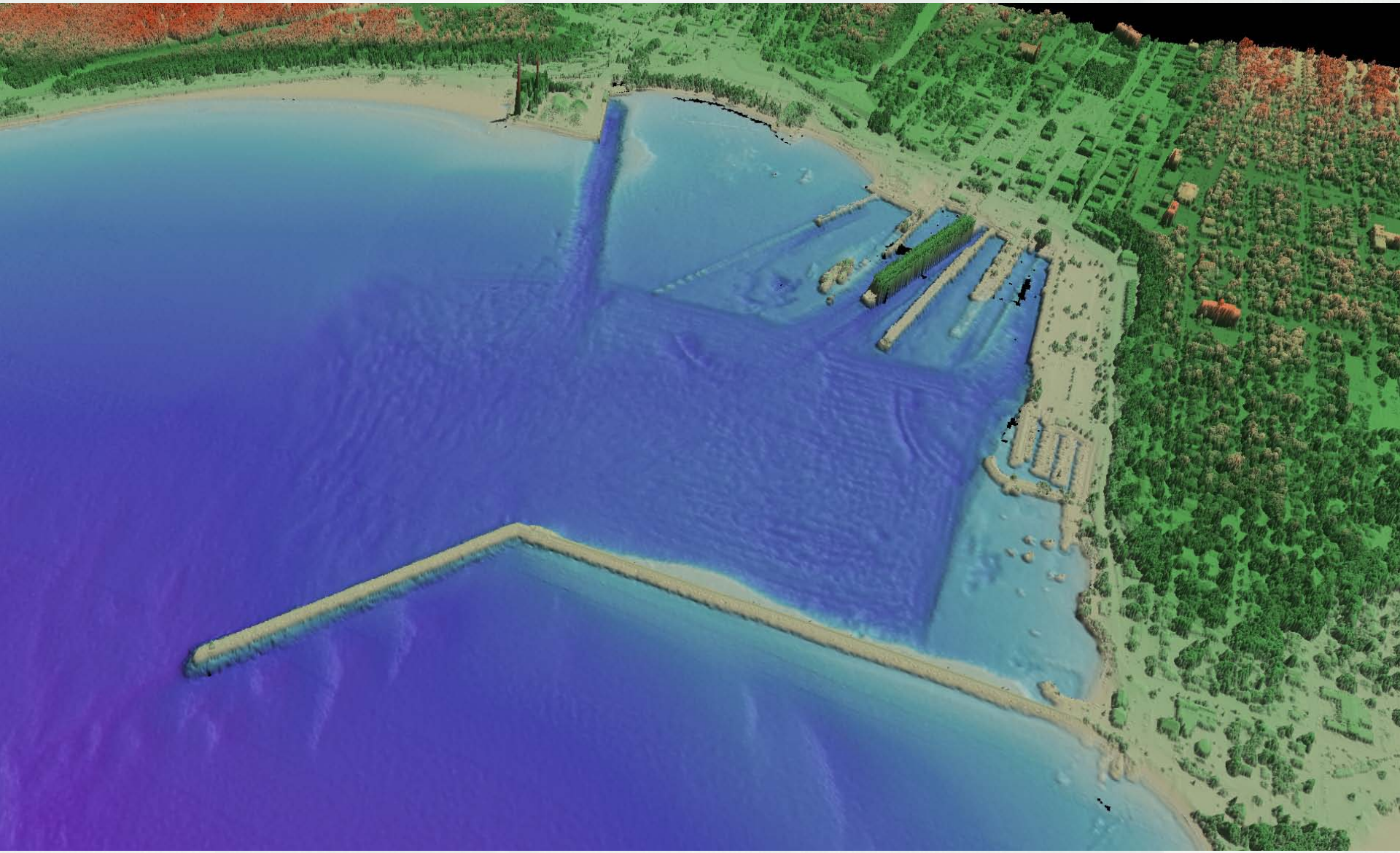
Products

- ASCII XYZ
- Aerial photos
- Zero contour
- Aerial photo mosiacs
- 1-meter bathy/topo DEM
- LAS format topo
- 1-meter bathy/topo bare earth DEM
- Hyperspectral image mosaics
- Laser reflectance images
- Basic landcover classification
- Volume change

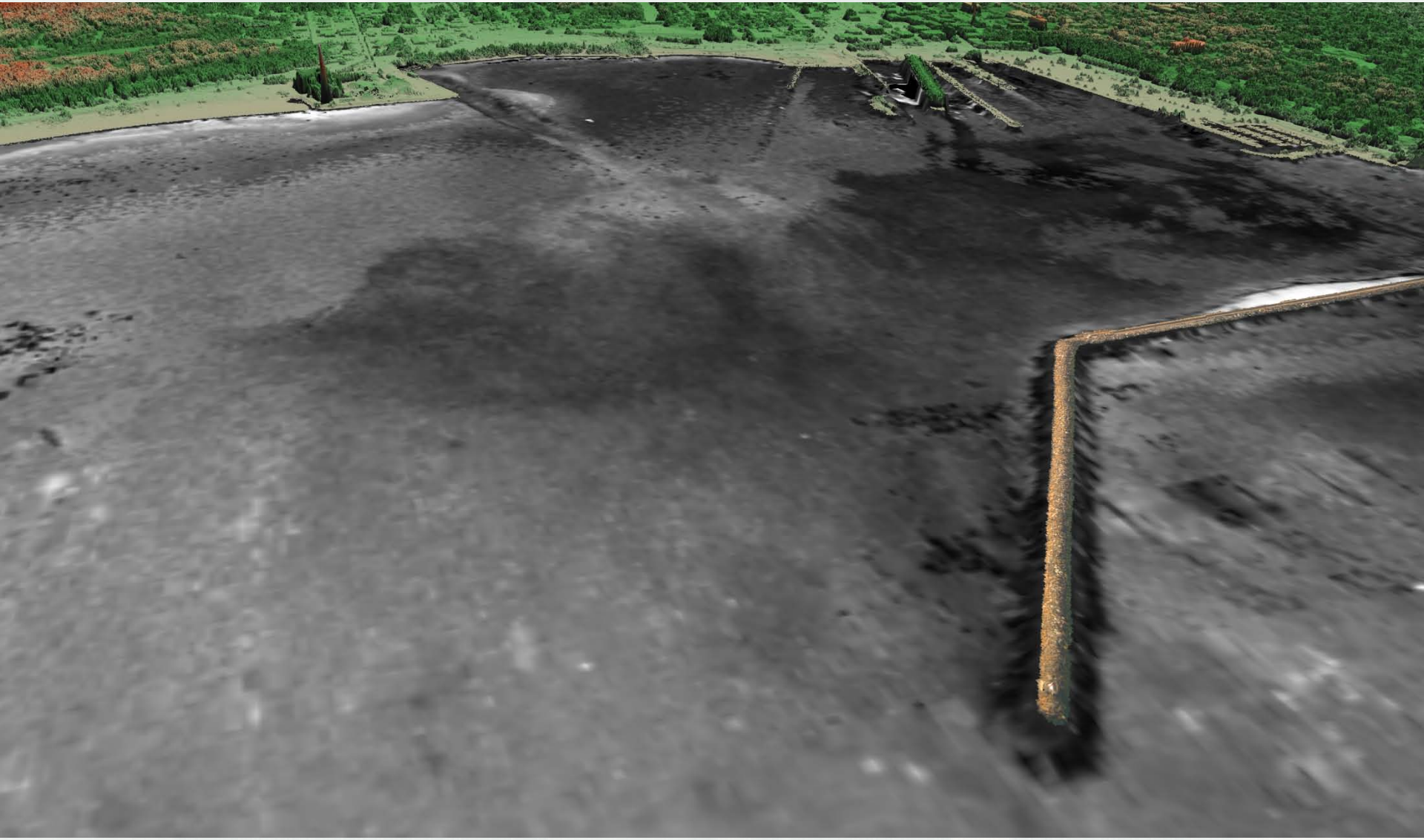
NCMP 2011 planned survey areas


Priority 1
Priority 2
Priority 3
Priority 4
Lake Superior
Lake Michigan
Lake Huron
Lake Ontario
Lake Erie
Georgian Bay
North Channel
ONTARIO
WISCONSIN
MICHIGAN
OHIO
UNITED STATES
Chicago
Toronto
Detroit
Cleveland
Buffalo
Milwaukee
Green Bay
Marquette
Thunder Bay
Sault Ste. Marie
Sudbury
North Bay
Timmins
Rouyn-Noranda
Val-d'Or
Owen Sound
Barrie
Orillia
Peterborough
Kingston
Belleville
Newmarket
Oshawa
Markham
Mississauga
Hamilton
Niagara Falls
Rochester
Syracuse
Ottawa
Kitchener
Guelph
London
Windsor
Sarnia
Saginaw
Bay City
Midland
Mount Pleasant
Muskegon
Grand Rapids
Lansing
East Lansing
Flint
Kalamazoo
Battle Creek
Ann Arbor
Toledo
Sandusky
Lima
Fort Wayne
Dayton
Columbus
Pittsburgh
Erie
Duluth
Superior
Madison
Milwaukee
Minneapolis
Dubuque
Davenport
Peoria
Springfield
Indianapolis
Cleveland
Akron
Youngstown
Williamsport
State College
Harrisburg
Altoona
Johnstown
New Castle
Elmira
Ithaca
Jamestown
Cheektowaga
Niagara Falls
Brantford
Stratford
Cambridge
Chatham
Leamington
Sault Ste. Marie
Thunder Bay
Marquette
Green Bay
Sheboygan
Manitowoc
Oshkosh
Appleton
Wausau
Menominee
Escanaba
Iron Mountain
Ironwood
Hancock
Houghton
Calumet
Ontonagon
Bayfield
Ashland
Superior
Duluth
Grand Marais
Thunder Bay
Sault Ste. Marie
Alpena
Cheboygan
Mackinaw City
Petoskey
Traverse City
Frankfort
Manistee
Ludington
Muskegon
Holland
Saugatuck
Benton Harbor
South Bend
Gary
Chicago
Milwaukee
Racine
Kenosha
Waukegan
Rockford
Dubuque
Davenport
Moline
Peoria
Springfield
Decatur
Champaign
Urbana
Danville
Terre Haute
Evansville
Indianapolis
Muncie
Fort Wayne
Toledo
Sandusky
Cleveland
Akron
Youngstown
Pittsburgh
Erie
Buffalo
Rochester
Syracuse
Ithaca
Elmira
Williamsport
State College
Harrisburg
Altoona
Johnstown
New Castle
Pittsburgh
Wheeling
Morgantown
Charleston
Huntington
Ashland
Portsmouth
Chillicothe
Columbus
Dayton
Springfield
Lima
Toledo
Sandusky
Cleveland
Akron
Youngstown

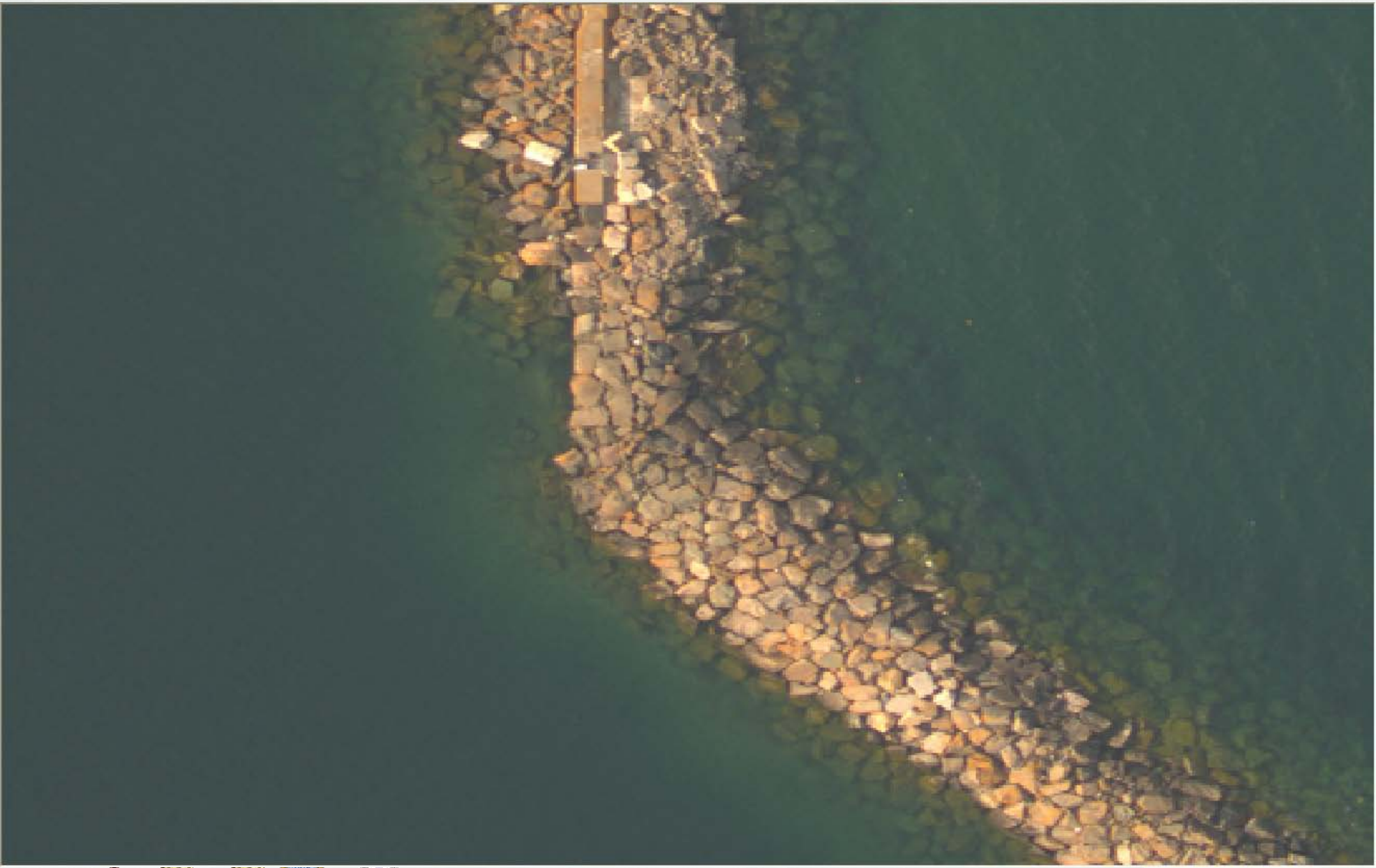
Bathymetry and topography



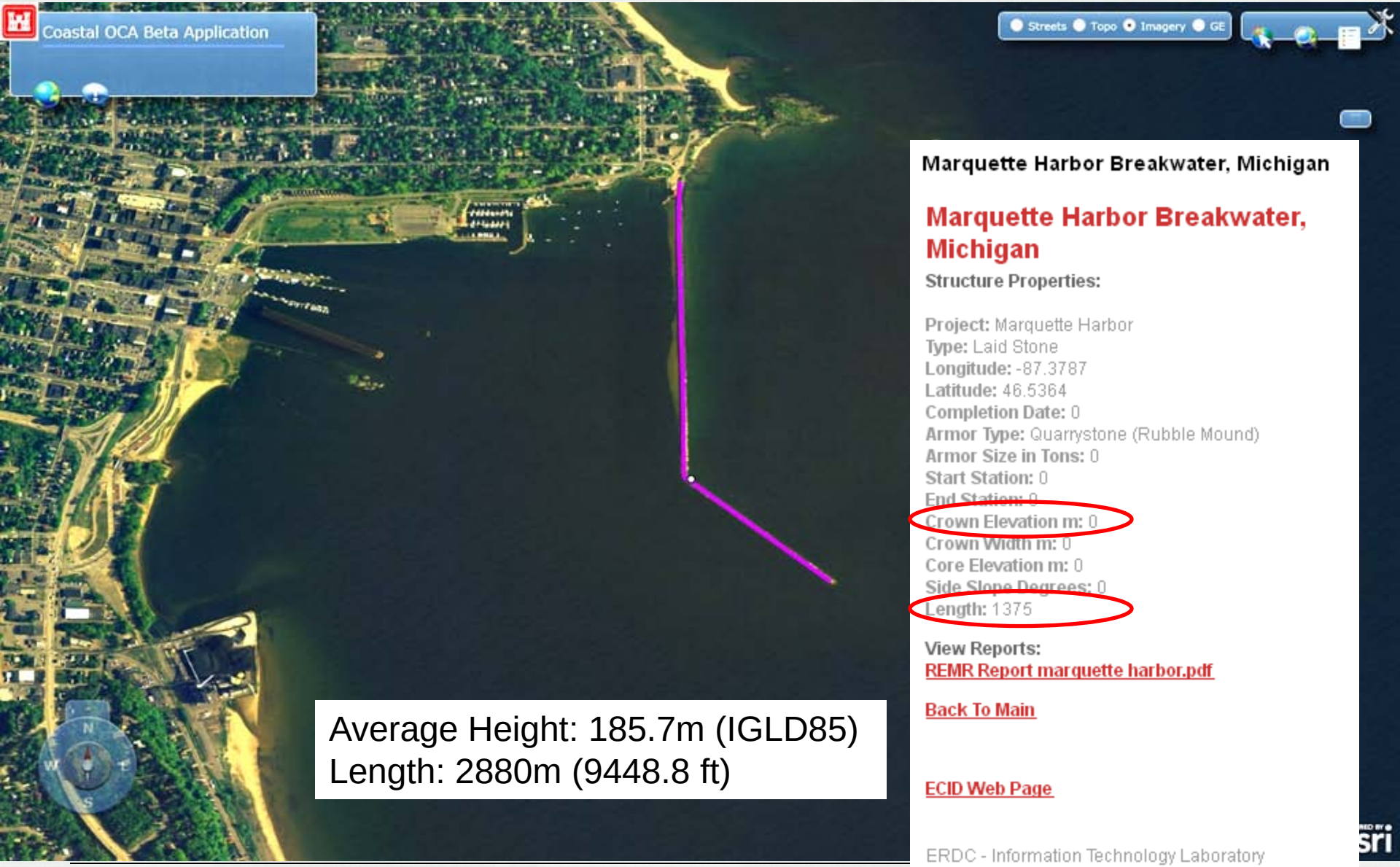
Laser imagery



Aerial photography



Asset management

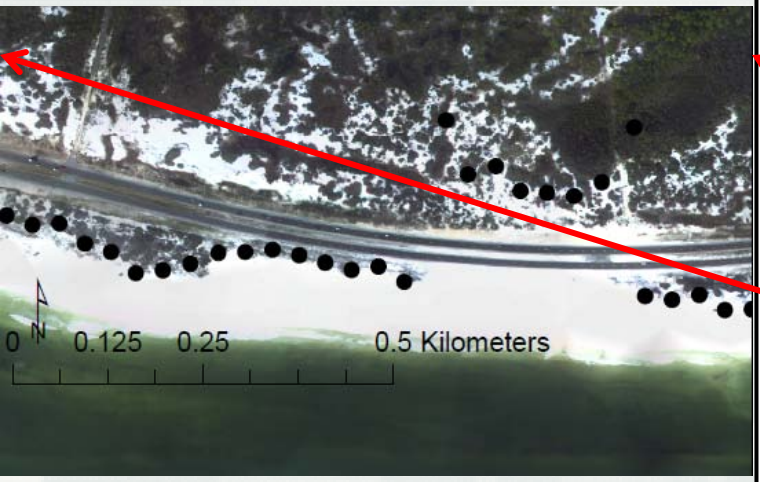


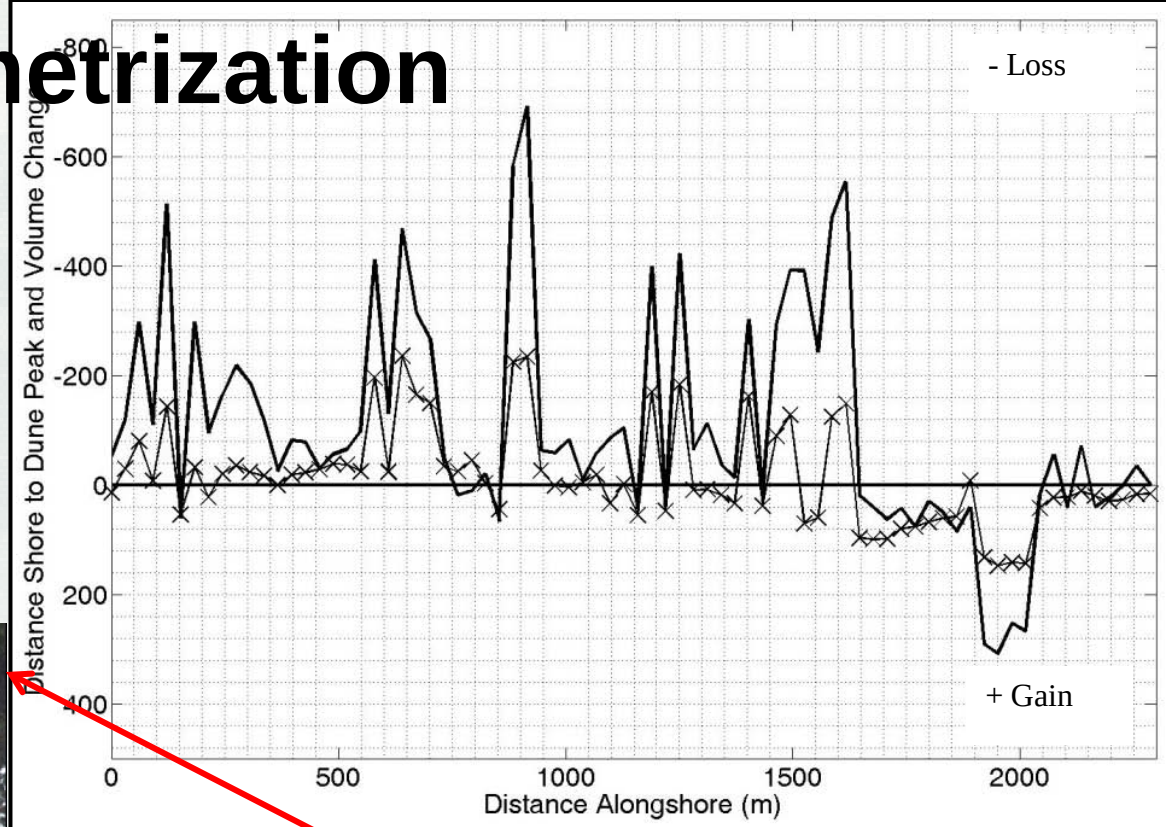
Shoreline parametrization

Change in distance shore to dune peak m (crossed line)

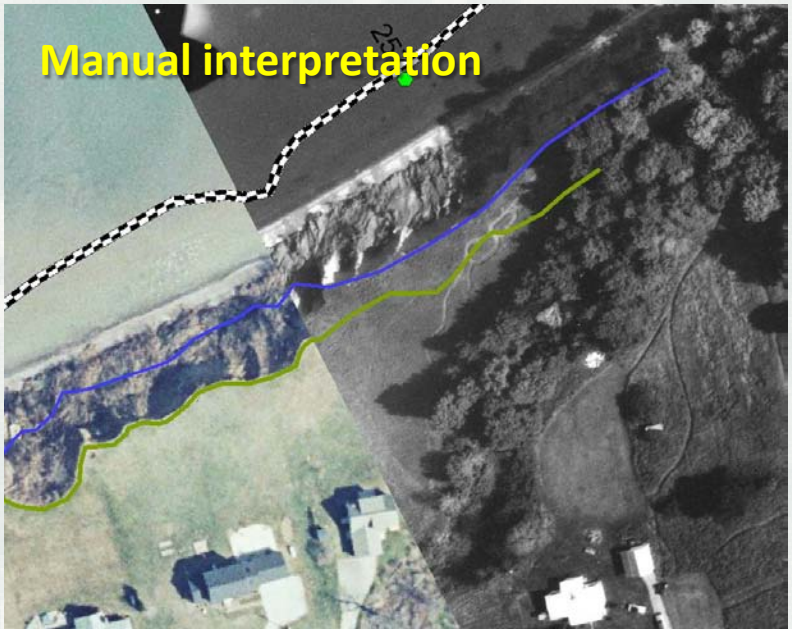
Volume change m^3/m (solid line)

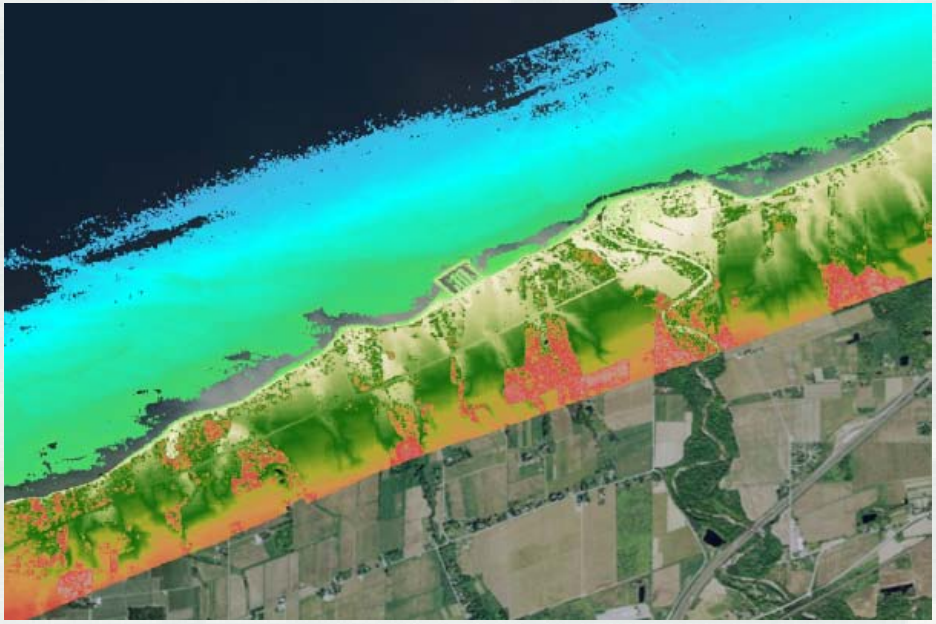
from the 2004 Pre-Ivan NCMP survey and the 2010 NCMP survey

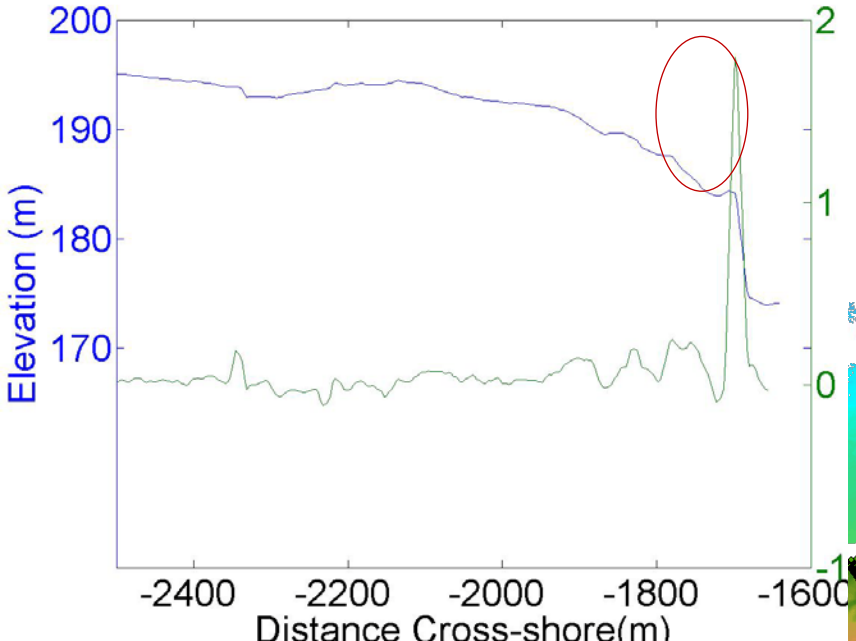


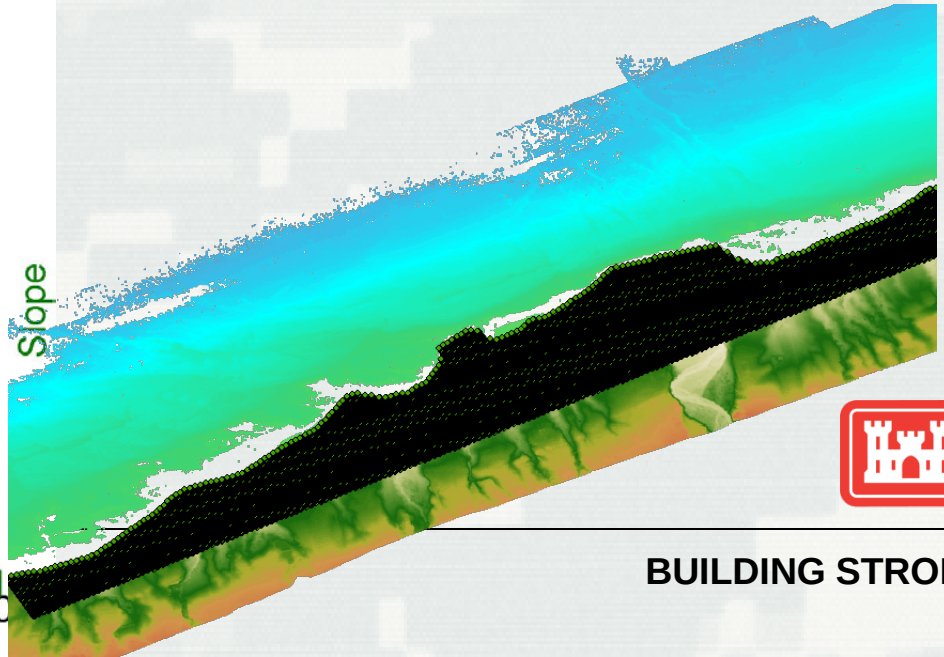


Bluff edge detection









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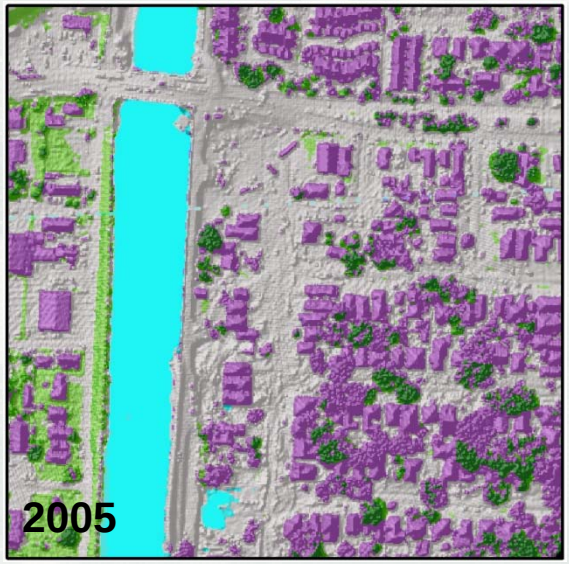
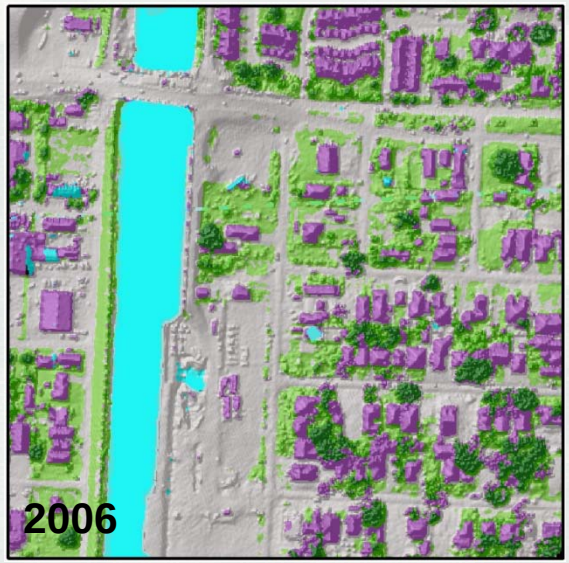
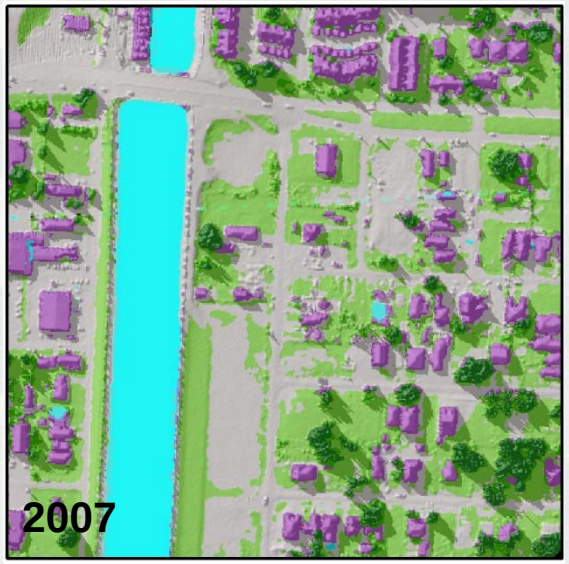
Landscape changes







Roads/ Bare Ground

Structures

Low Vegetation

Medium Vegetation

Tall Vegetation

System-Wide Water SWWRP Resources Program

17th Street Canal
New Orleans, LA

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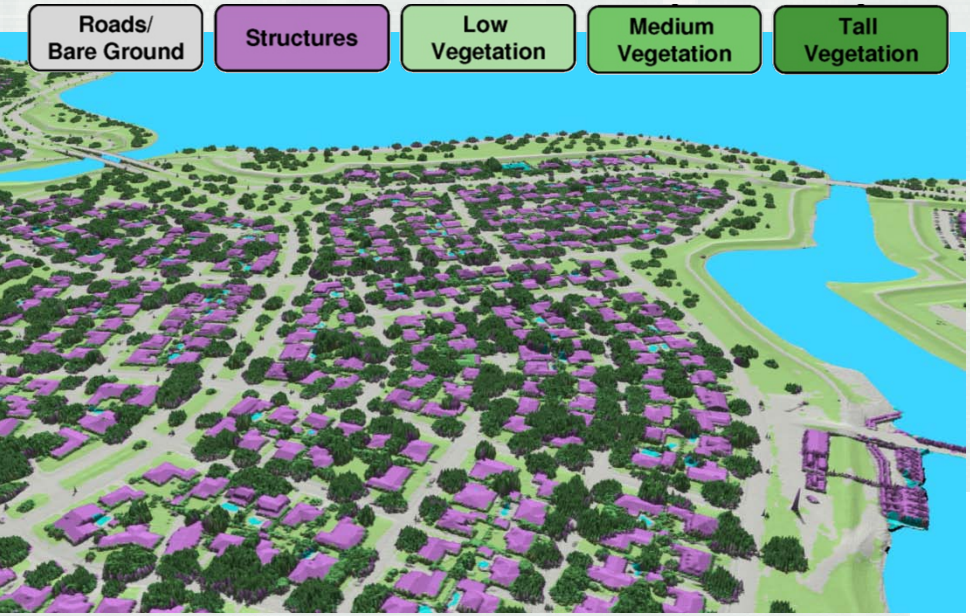
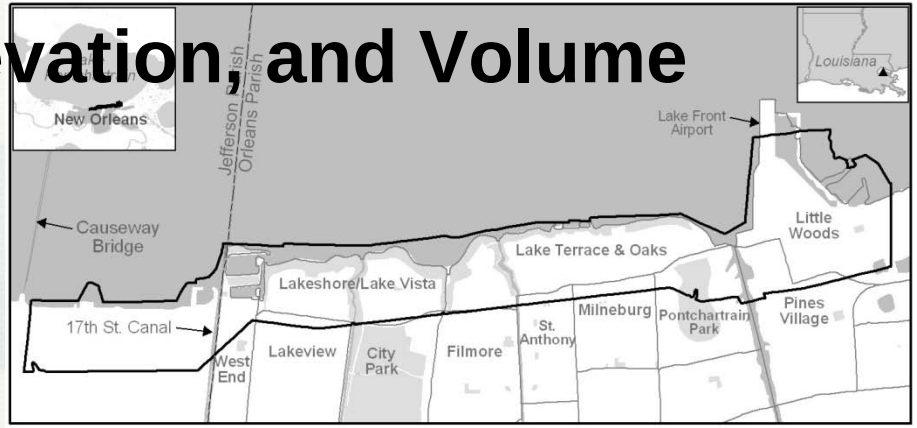
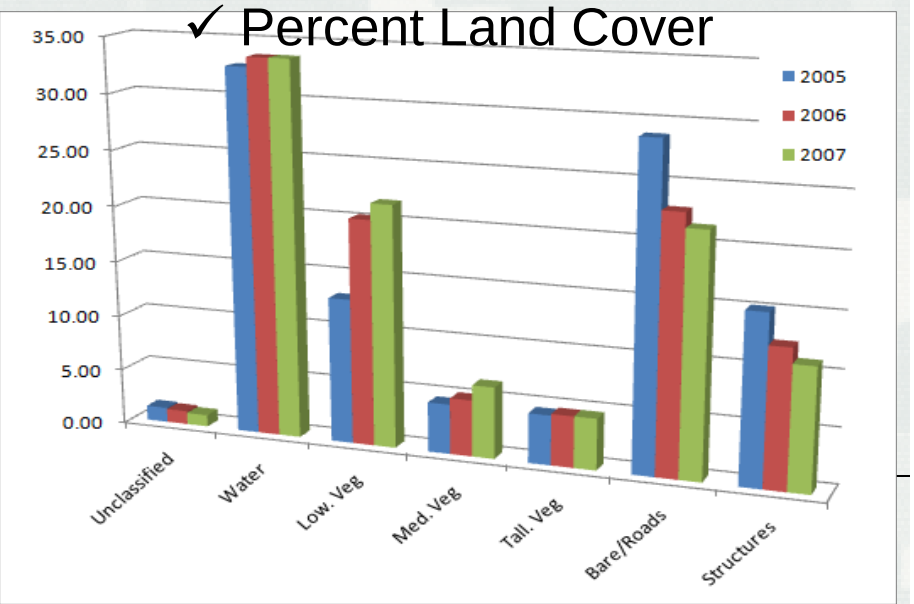
Post-Storm Land Cover, Elevation, and Volume Change Assessment

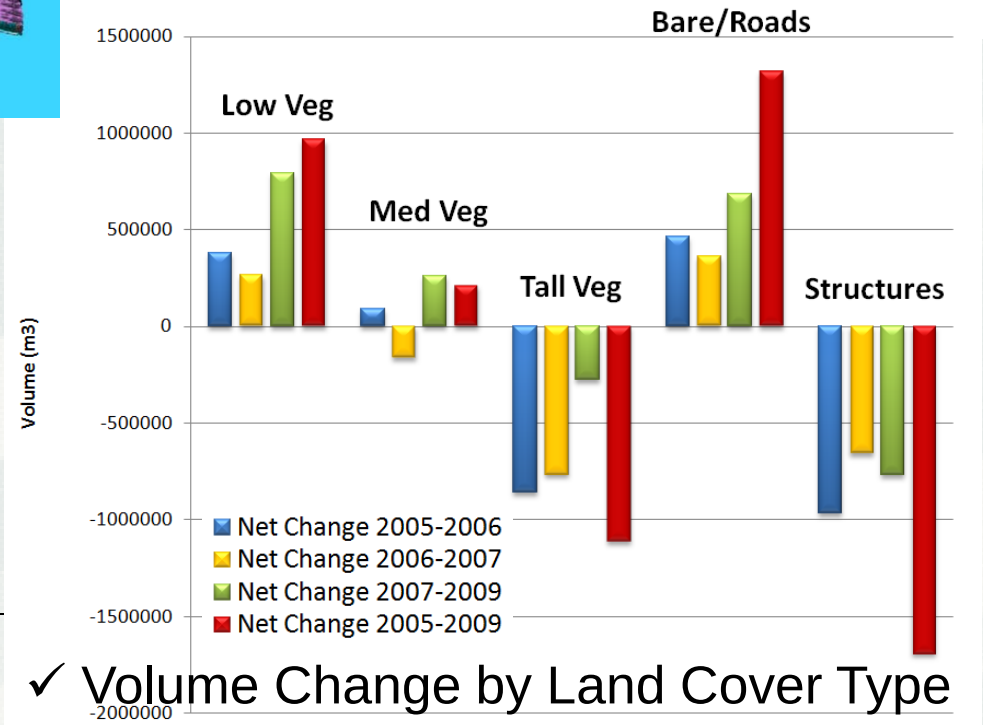




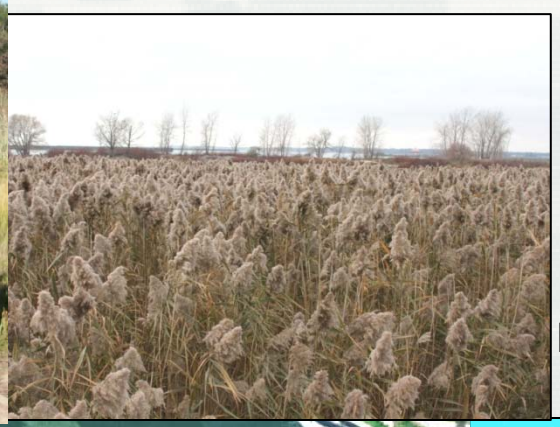
✓ Elevation Change

	2005-2006 Loss	2005-2006 Gain	Net Change
Elevation (km²)	-2.21	+2.17	-0.04
% Elevation	-6.55	+6.43	-0.12
Volume (m³)	-8.1×10^6	$+6.5 \times 10^6$	-1.6×10^6
% Volume	-25.97	+20.75	-5.22





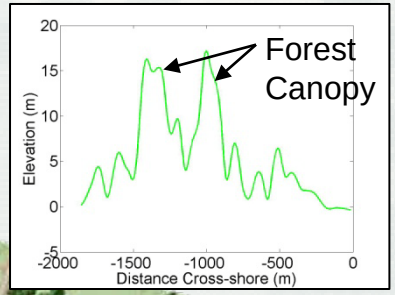
Invasive species detection



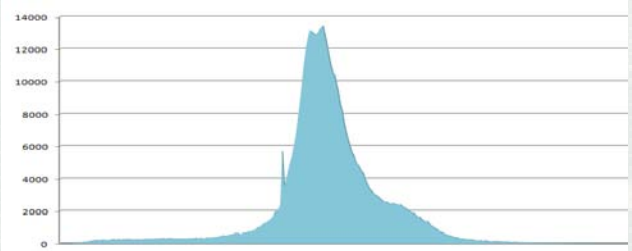
Times Beach, Buffalo NY, 2007

Emergent marsh dominated by *phragmites*

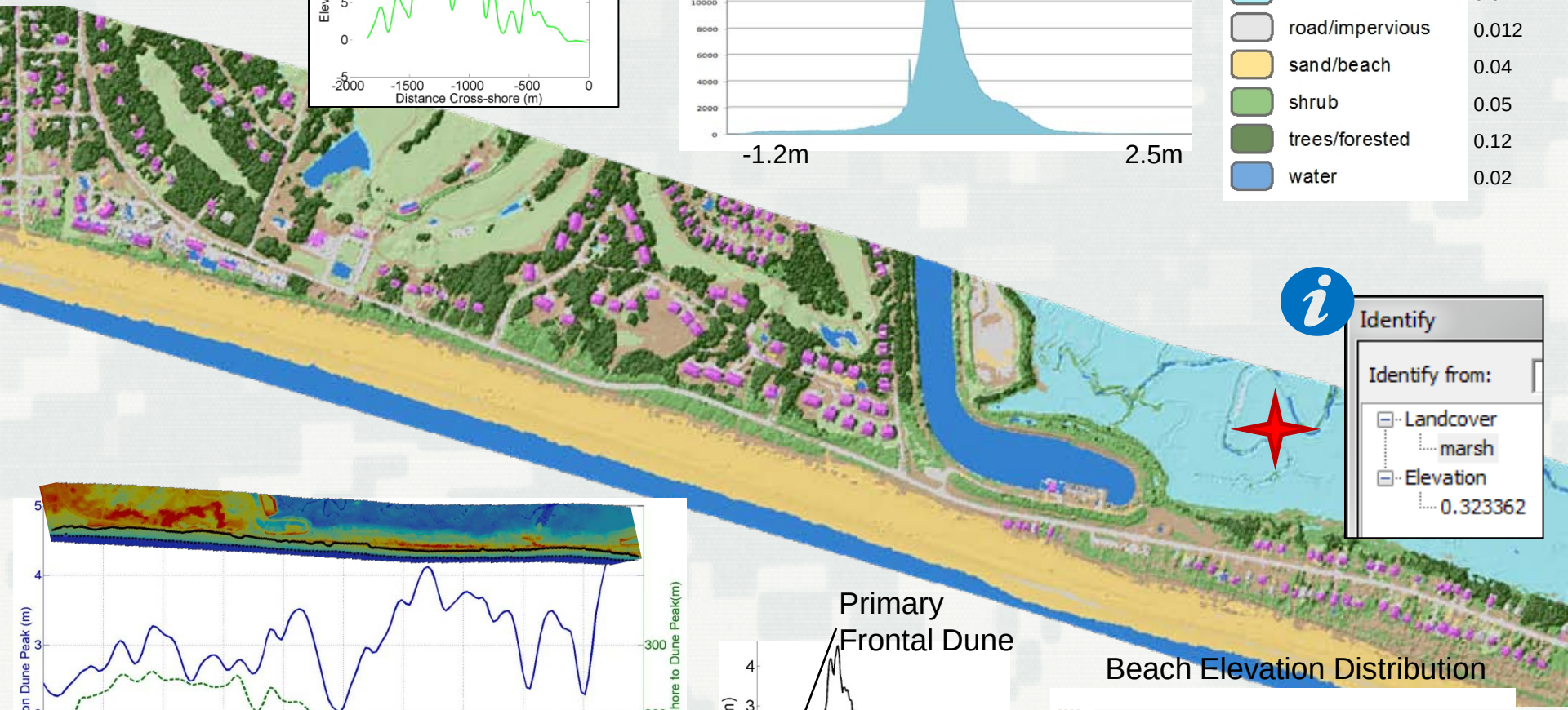
Coastal land cover classification

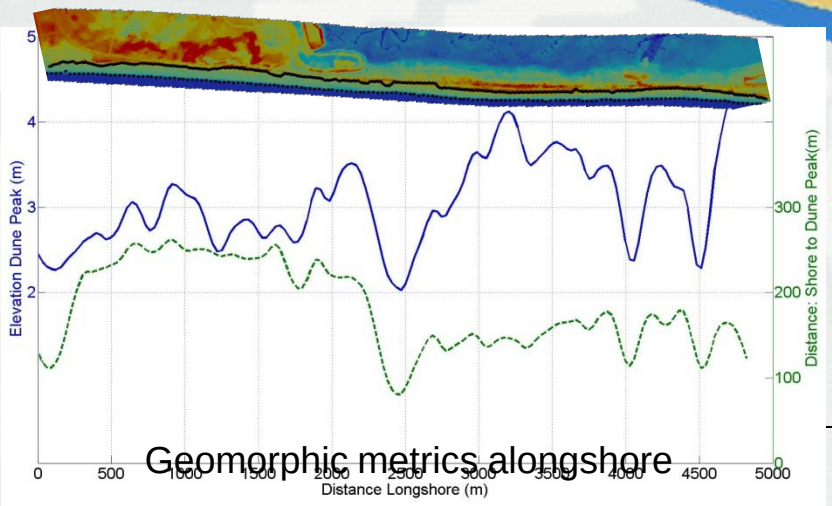


Marsh Elevation Distribution



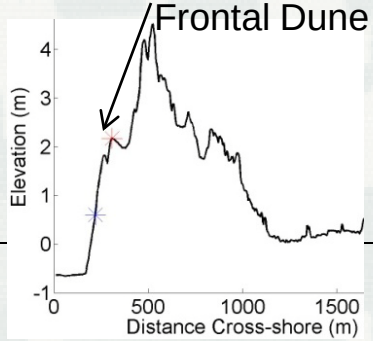
Landcover type	Manning n Value
bare/open	0.04
buildings/structures	0.07
grass/lawn	0.034
marsh	0.04
road/impervious	0.012
sand/beach	0.04
shrub	0.05
trees/forested	0.12
water	0.02



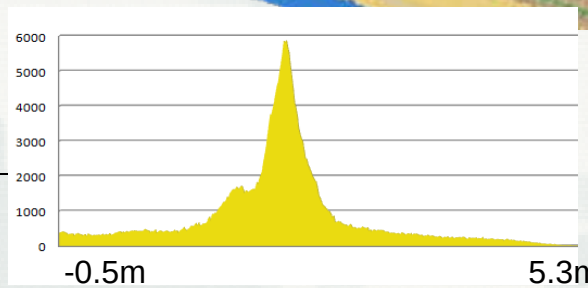


Geomorphic metrics alongshore

Primary
Frontal Dune



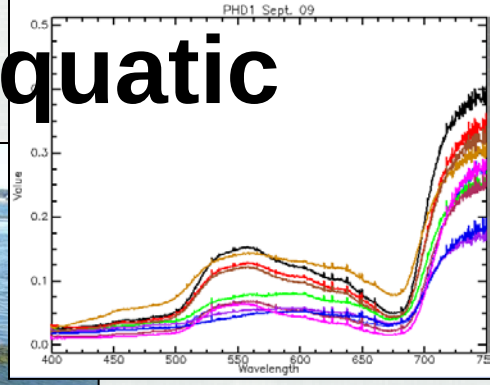
Beach Elevation Distribution



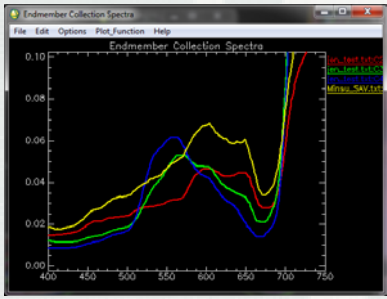
Discrimination of submerged aquatic vegetation species

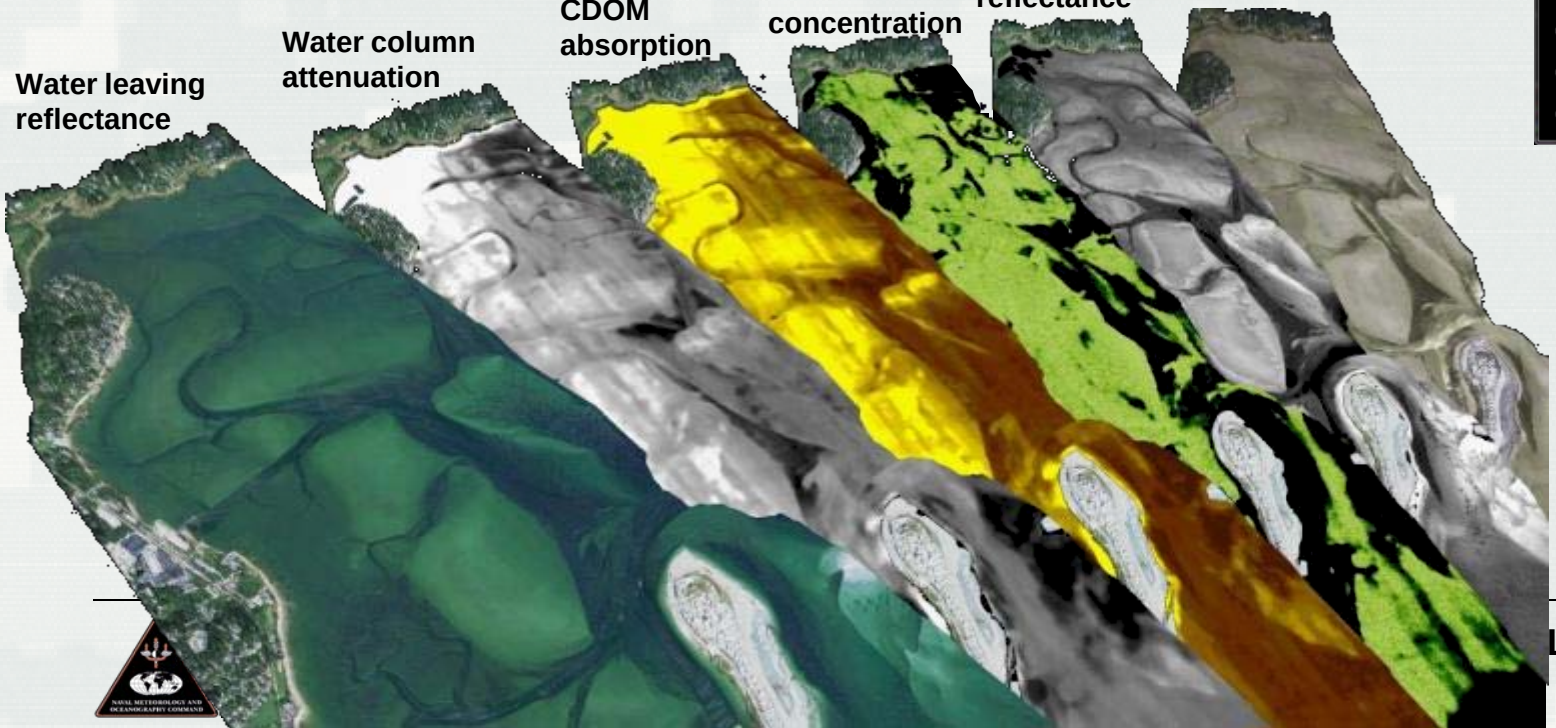
Background: Dredging impacts to SAV vary by species; CWA lists SAV as a Special Aquatic Site
Mapping species is important for:

- Planning dredging operations
- Mitigating ecological damage
- Monitoring SAV



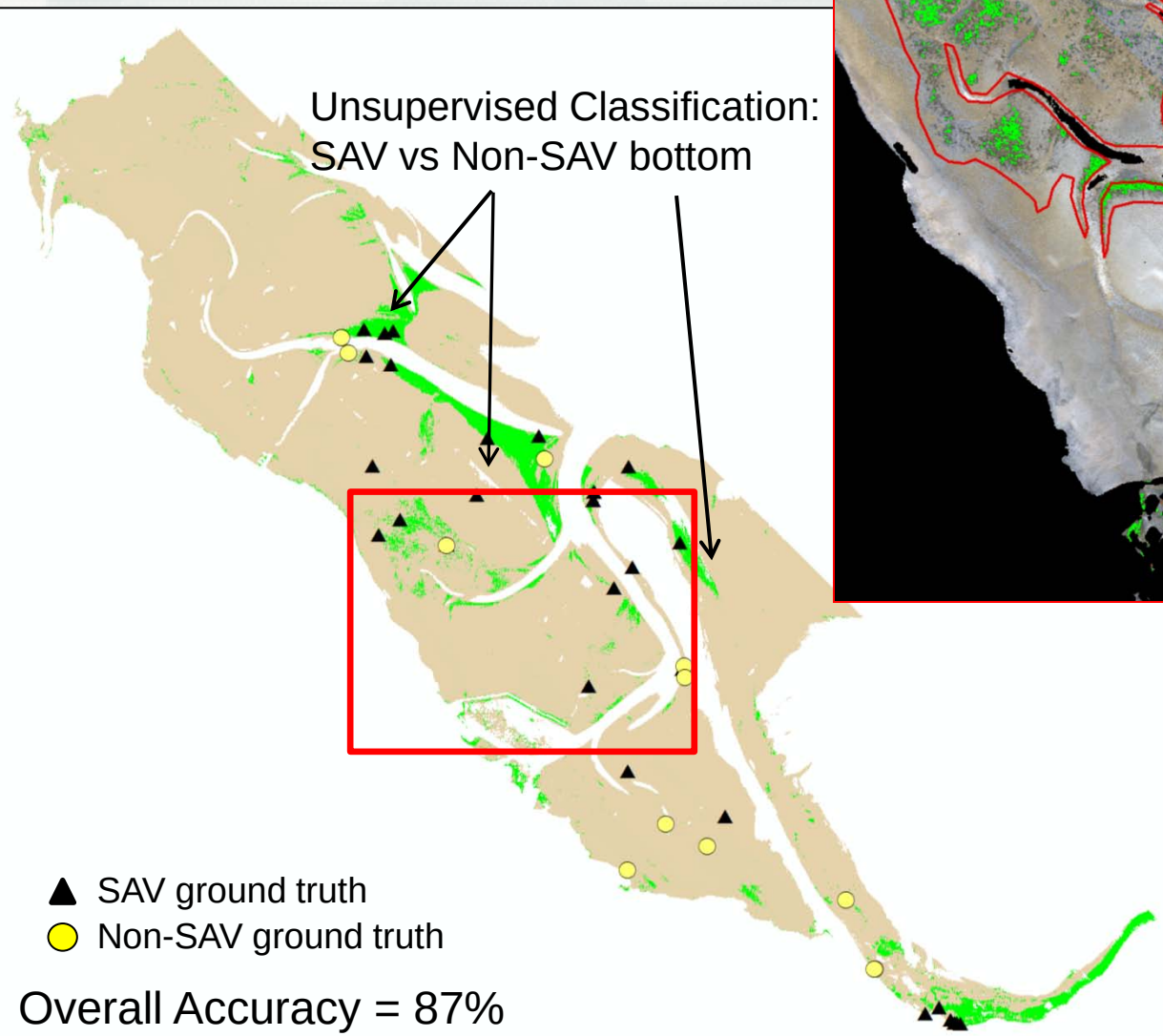
Submersed Eelgrass spectra, Plymouth Harbor, MA





Seagrass

Discrimination of submerged aquatic vegetation species



Overall Accuracy = 87%

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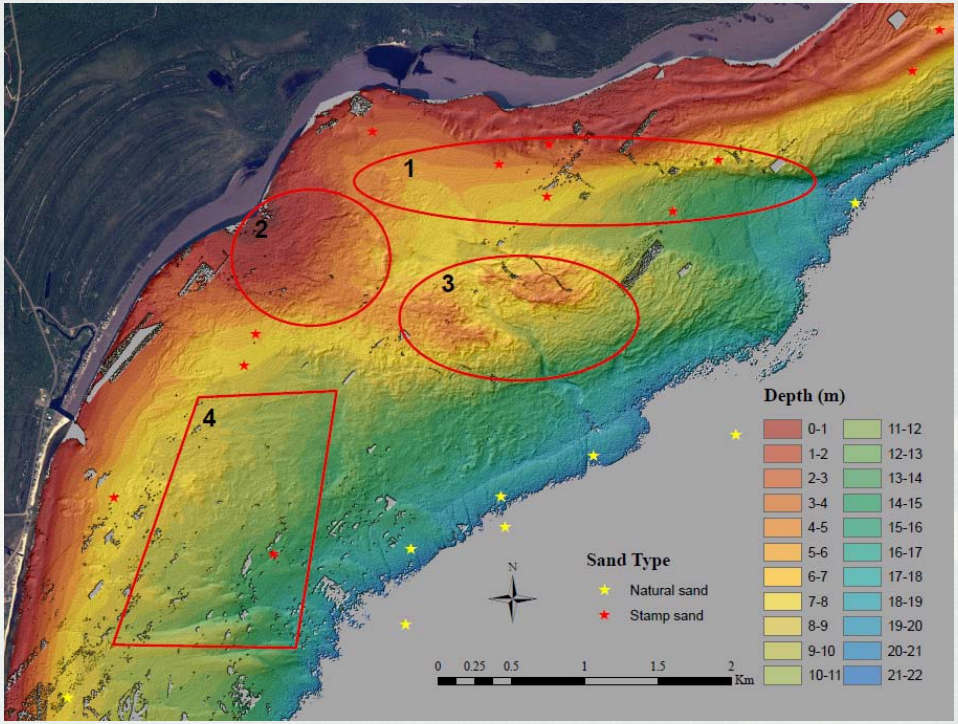
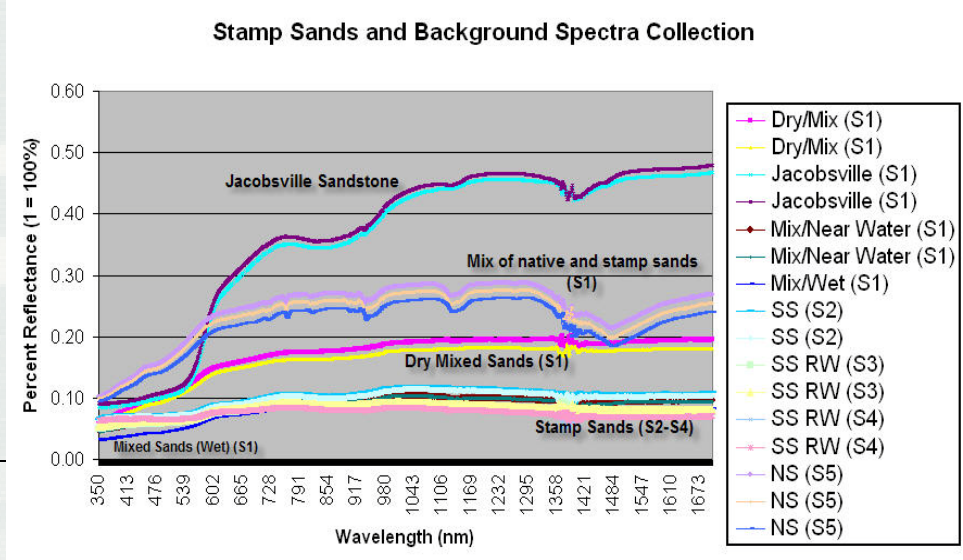
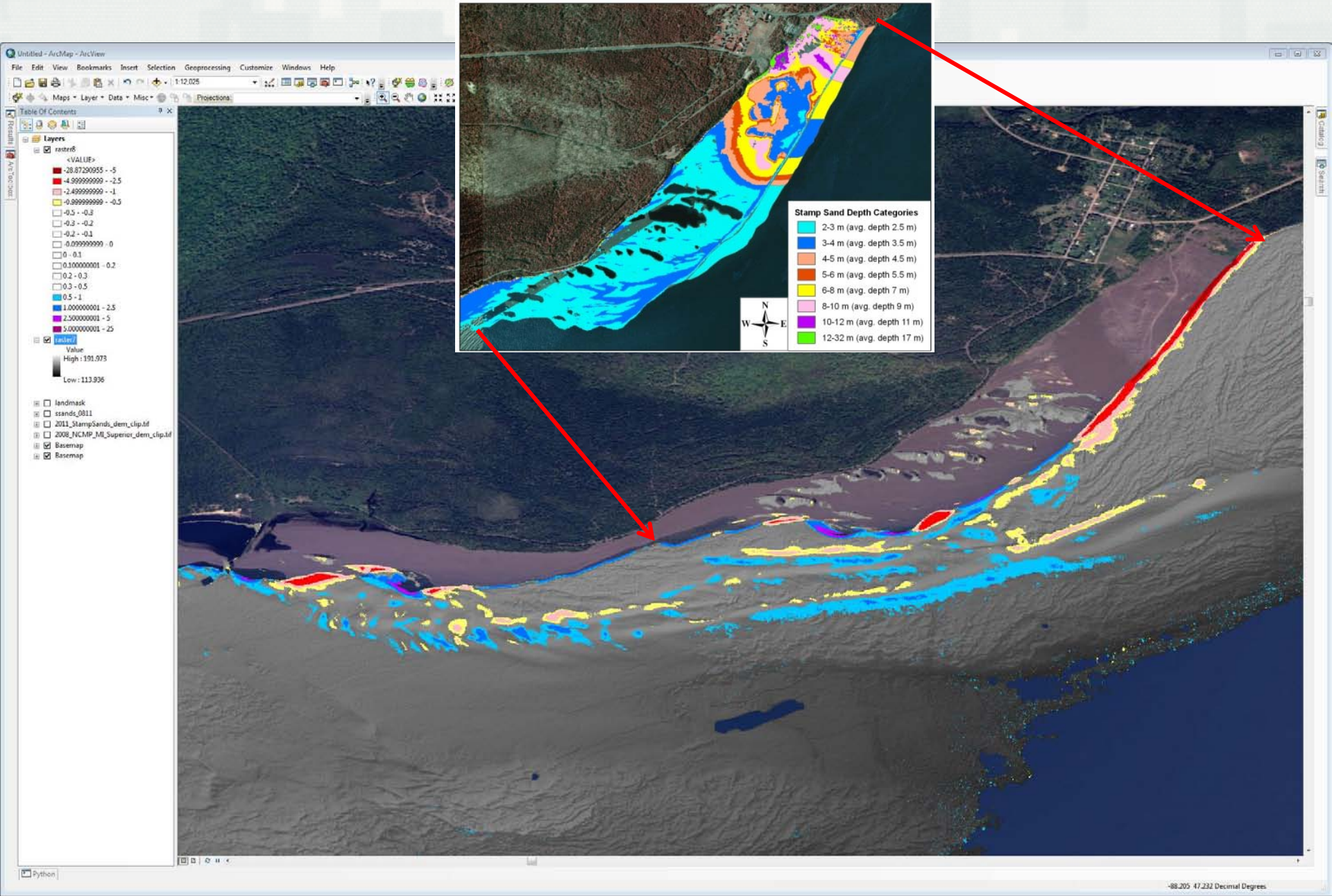
Heavy-metal stamp sands migration in Lake Superior

Purpose: Classify submersed lake bottom surfaces using hyperspectral and lidar bottom reflectance. Map stamp sands distribution and estimate movement and loss of stamp sands to lake.

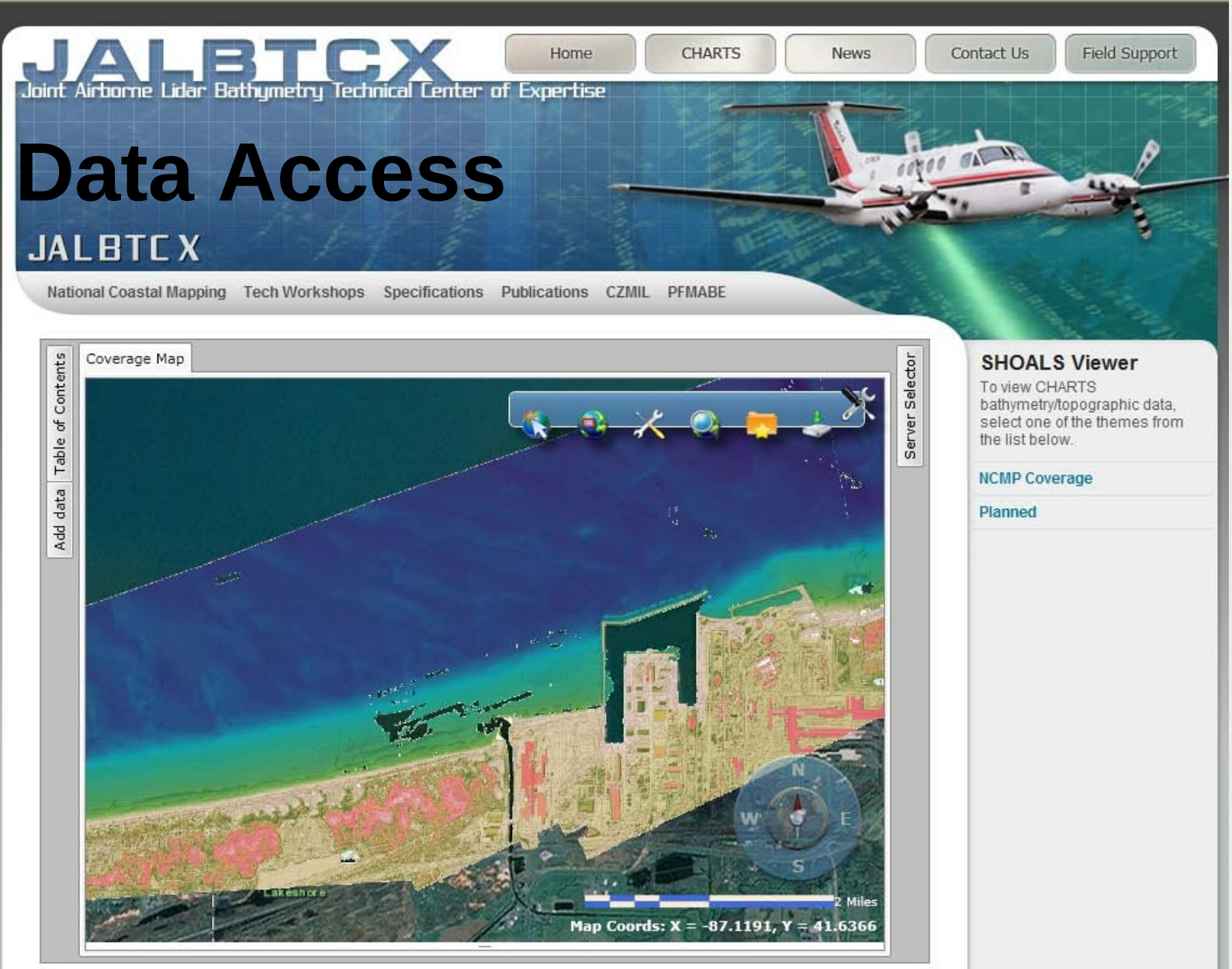




Heavy metal stamp sands migration



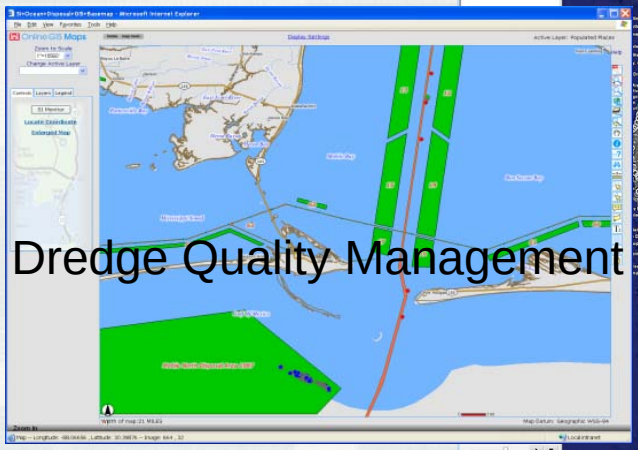
Data Access



DING STRONG®

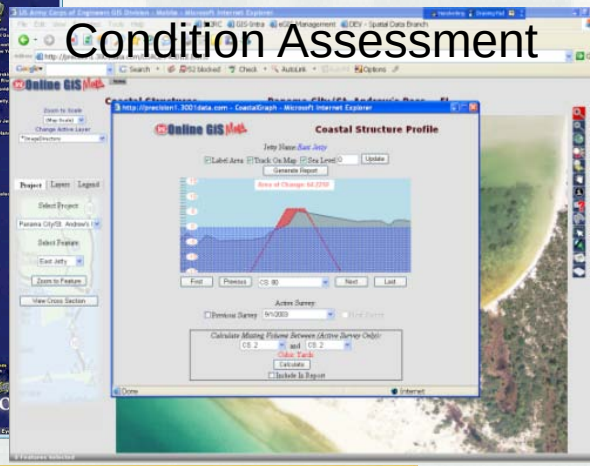
Technology integration: eCoastal GIS and Navigation and Coastal Data Bank

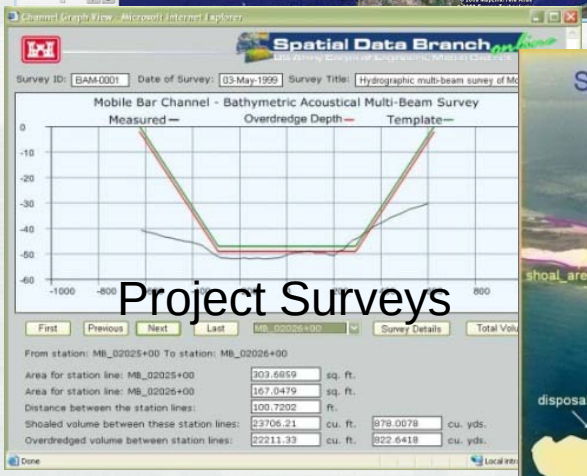
Enterprise Coastal Inventory



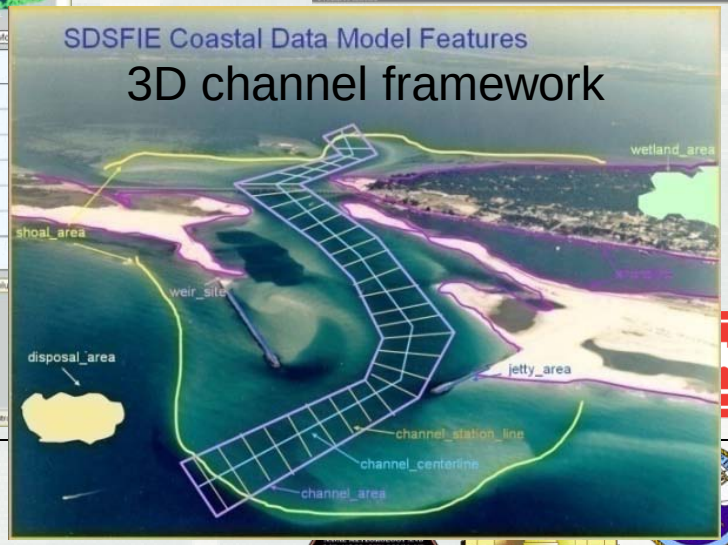
Dredge Quality Management

Coastal Structure Condition Assessment





Project Surveys



- USGS St. Petersburg
- USGS EROS Data Center
- NOAA NGDC
- NOAA CSC
- By Request

Questions?

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