Remote Sensing of Hazardous Shoals

PROBLEM

- The repeated formation of shoals following dredging operations are costly (> $1B) and hazardous to inlet navigation and operations.

- Existing data sources are insufficient to monitor and predict shoal formation and channel migration within the appropriate time scales (weeks, months).
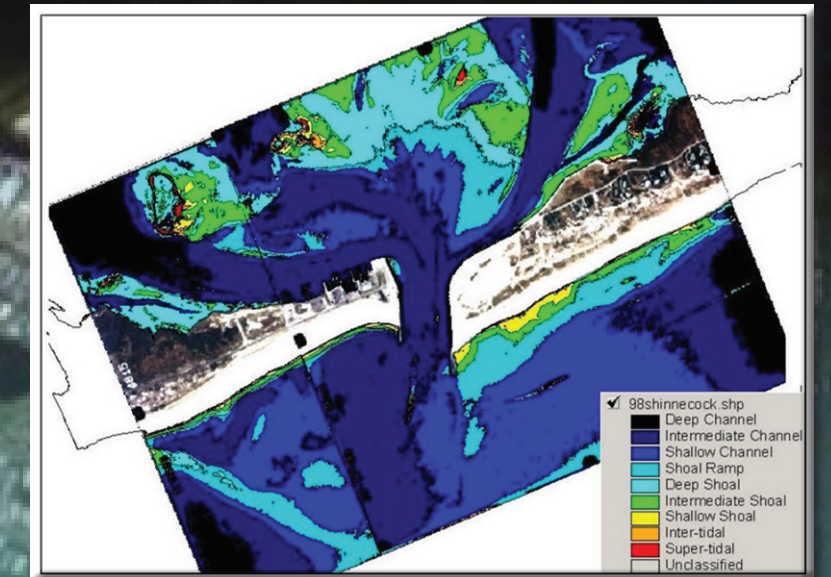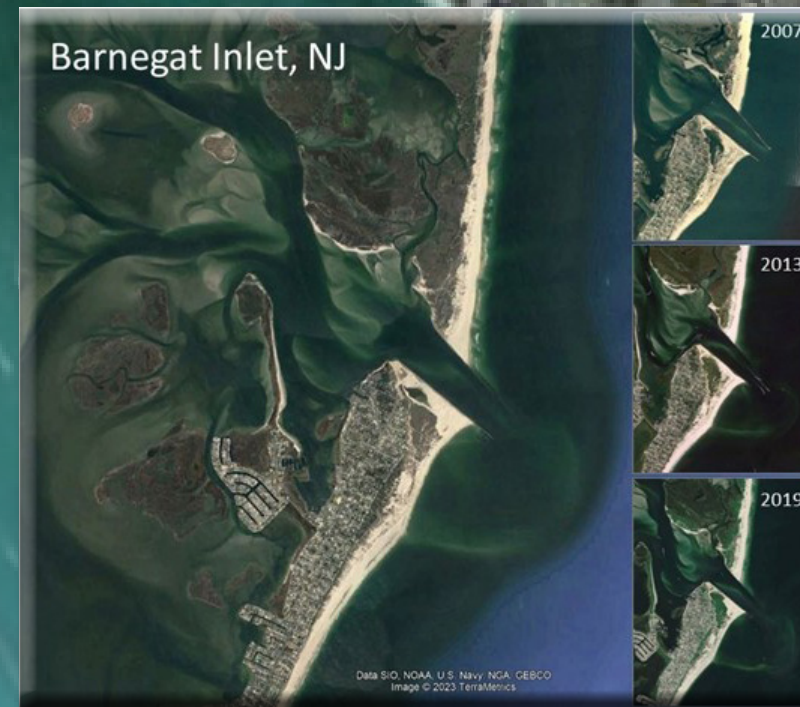
SOLUTION

- Utilize aerial and satellite imagery to fill spatial and temporal data gaps in navigation inlet channels.

- Tailor image classification methods for inlet shoal and bar detection and tracking through time.

IMPACT

- Improved sediment budget and inlet management practices, reducing overall operation and maintenance costs.

- Increased confidence in channel marking and mariner safety for commercial and recreational vessels navigating inlet channels.

Destin

Barnegat Inlet, NJ
2007
2013
2019
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2023 TerraMetrics

98shinnecock.shp
Deep Channel
Intermediate Channel
Shallow Channel
Shoal Ramp
Deep Shoal
Intermediate Shoal
Shallow Shoal
Inter-tidal
Super-tidal
Unclassified

May 2024

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APPLICATIONS

- Effective and reliable monitoring of the 150 federally authorized and maintained coastal inlet navigation channels by the USACE.

- Monitoring of inlet sediment transport following beach renourishment and dredging activities in and around navigable channels

STATUS

- New start (Year 1 of 3)

BENEFITS

- Overall reduction in maintenance dredging costs across all USACE-managed coastal inlets.

- Sediment budget improvements support USACE goal of 70% beneficial use of dredged material by 2030.

WHAT'S NEXT?

- Technical documentation of various workflows and methods for extracting shoals using image classification.

- USACE-wide deployment of new ArcGIS Toolbox for inlet shoal morphodynamics analysis.

POC:
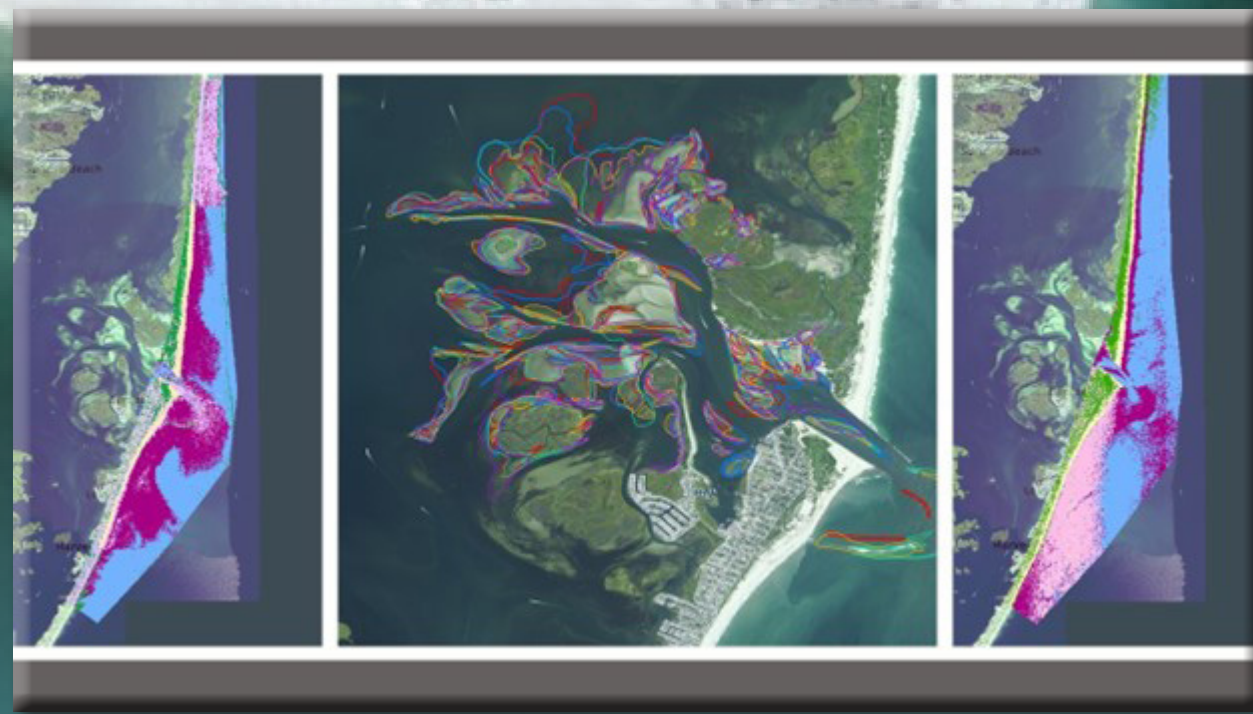
Justin Shawler
USACE ERDC CHL
Justin.L.Shawler@usace.army.mil

Aleksandra Ostojic
USACE ERDC CHL
Aleksandra.Ostojic@usace.army.mil

May 2024