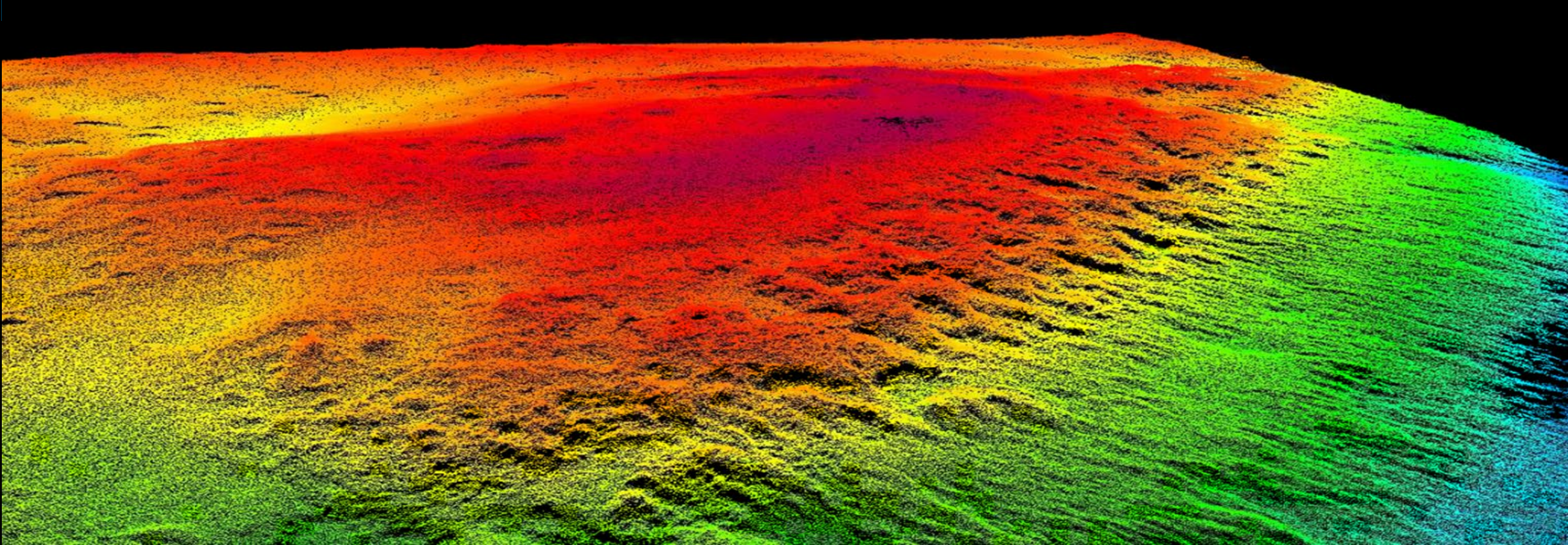


Woolpert's Florida Seafloor Mapping Initiative (FSMI)



WOOLPERT AT A GLANCE



1911

Founded in
Dayton, Ohio



75+

Offices Worldwide



3000+

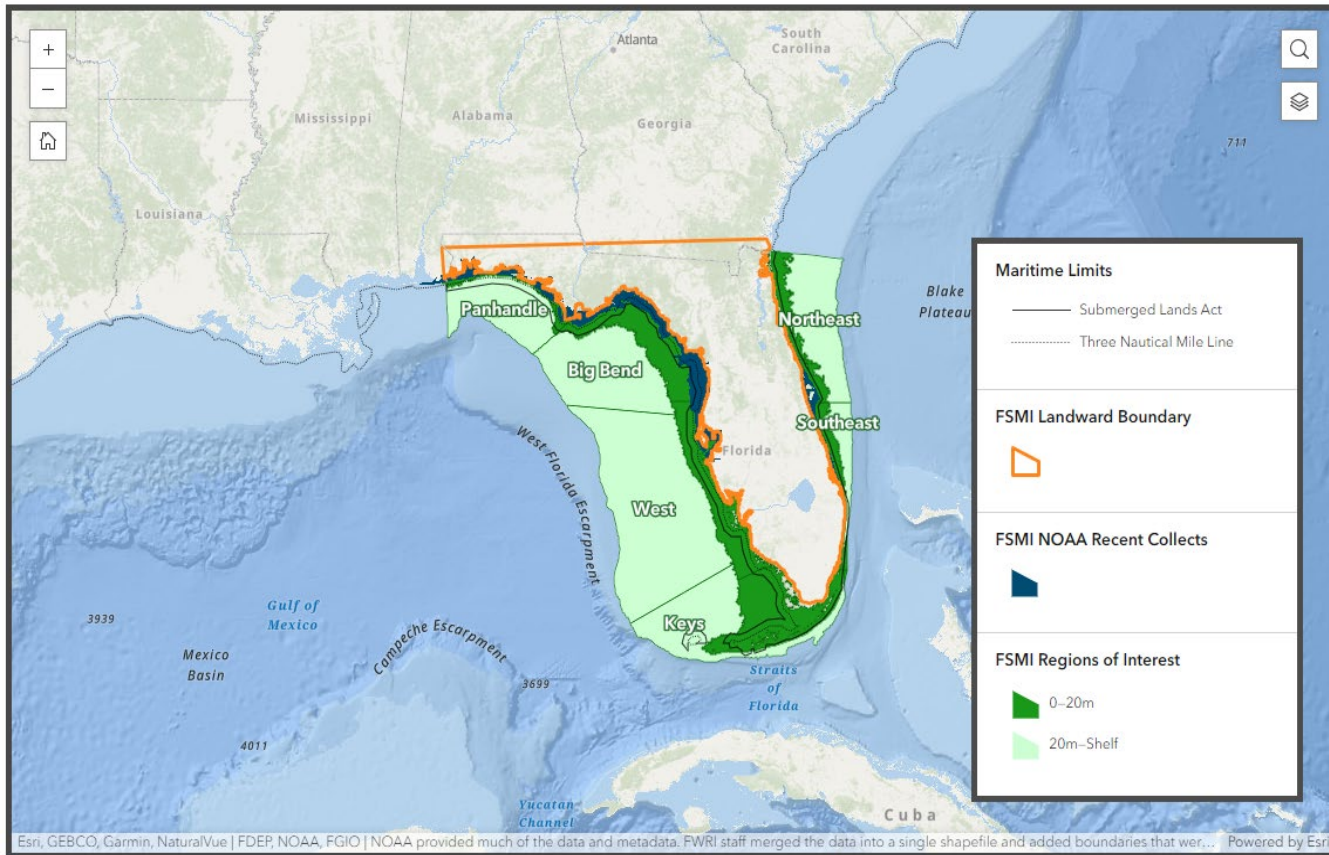
Global
Employees



WOOLPERT GEOSPATIAL CAPABILITIES



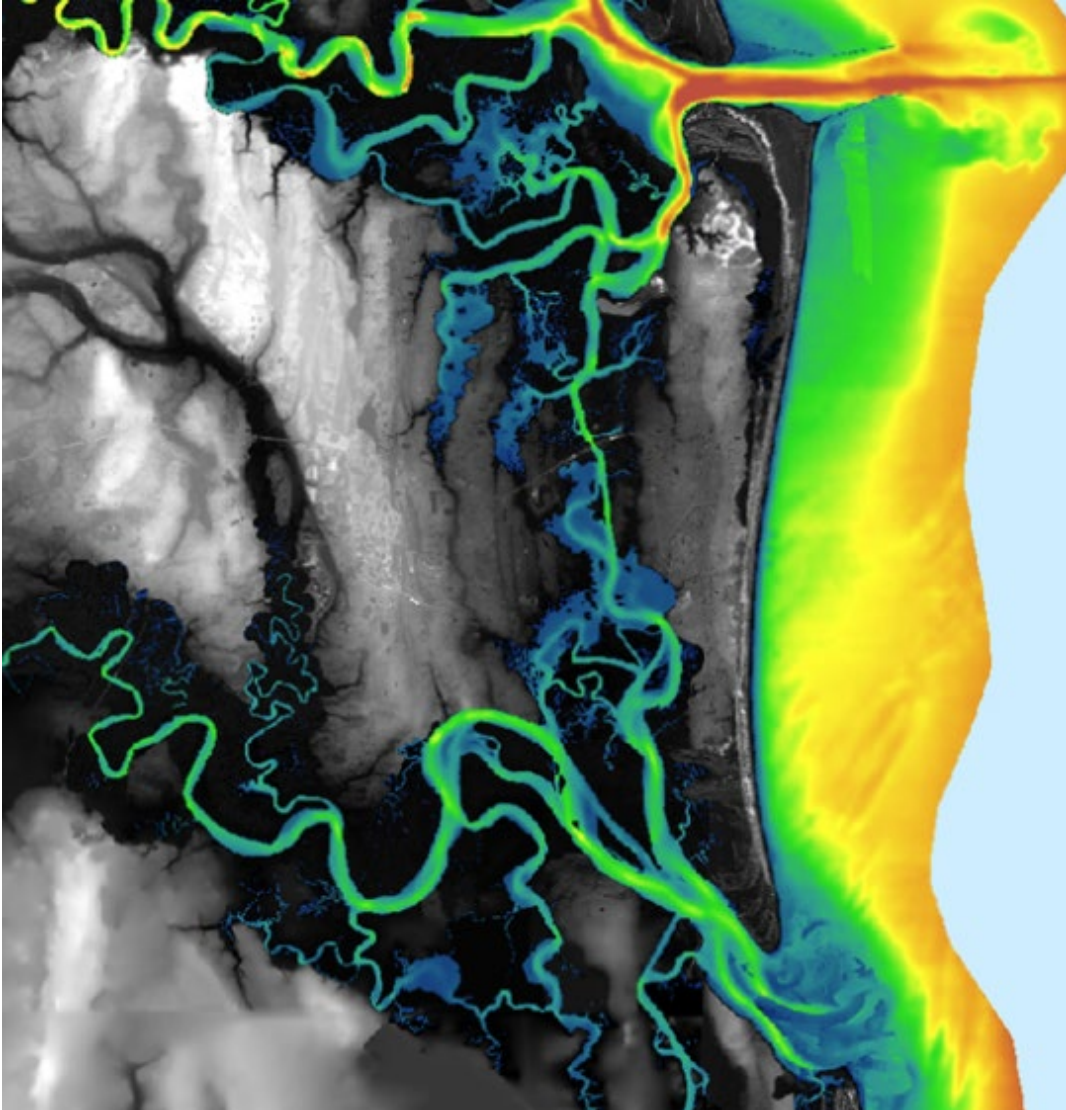
The Florida Seafloor Mapping Initiative



- 100 million dollars of federal funds
- Managed by the Florida Department of Environmental Protection's (FDEP) Office of Resilience and Coastal Protection
- Mapping the Seafloor two ways: Topobathymetric lidar (dark green) with aircraft to a depth of 20 meters and multibeam sonar (light green) with vessels up to 200 meters depth in 6 separate regions
- Once acquired and processed, FDEP will provide the data in a public portal



Why the Florida Seafloor Mapping Initiative (FSMI)?



High-resolution seafloor data are critical for:

Understanding coastal vulnerability and hurricane impacts

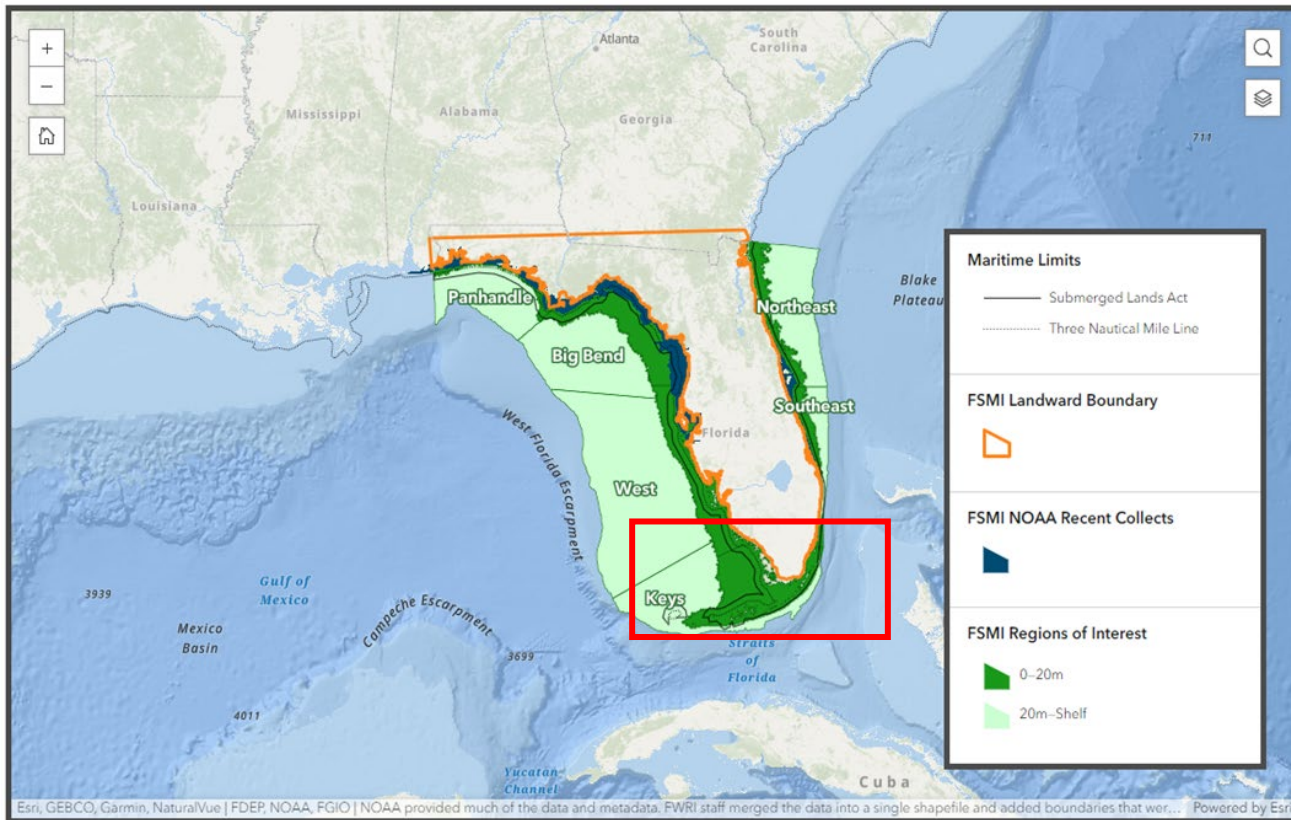
Locating natural resources

Assessing the health of fishery populations

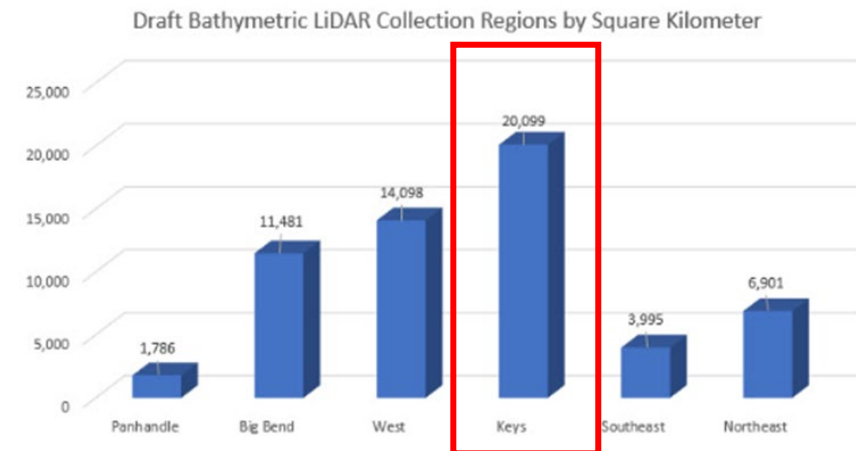
Evaluating performance of restoration projects

Seafloor mapping could also have **substantial economic benefits** for Florida. The predicted return on investment (ROI) is 5.1:1, or **\$28 million** annually. (FGS)

Woolpert Bathymetric Lidar Award



- Woolpert was one of the three firms selected
- Awarded Region 3 (The Florida Keys) by the FDEP in late October 2023
- Original project area over 20,000 square kilometers and over 7,000 square kilometers of potential supplement deep areas




WOOLPERT





Mapping the Seafloor with our Air Force and Navy!

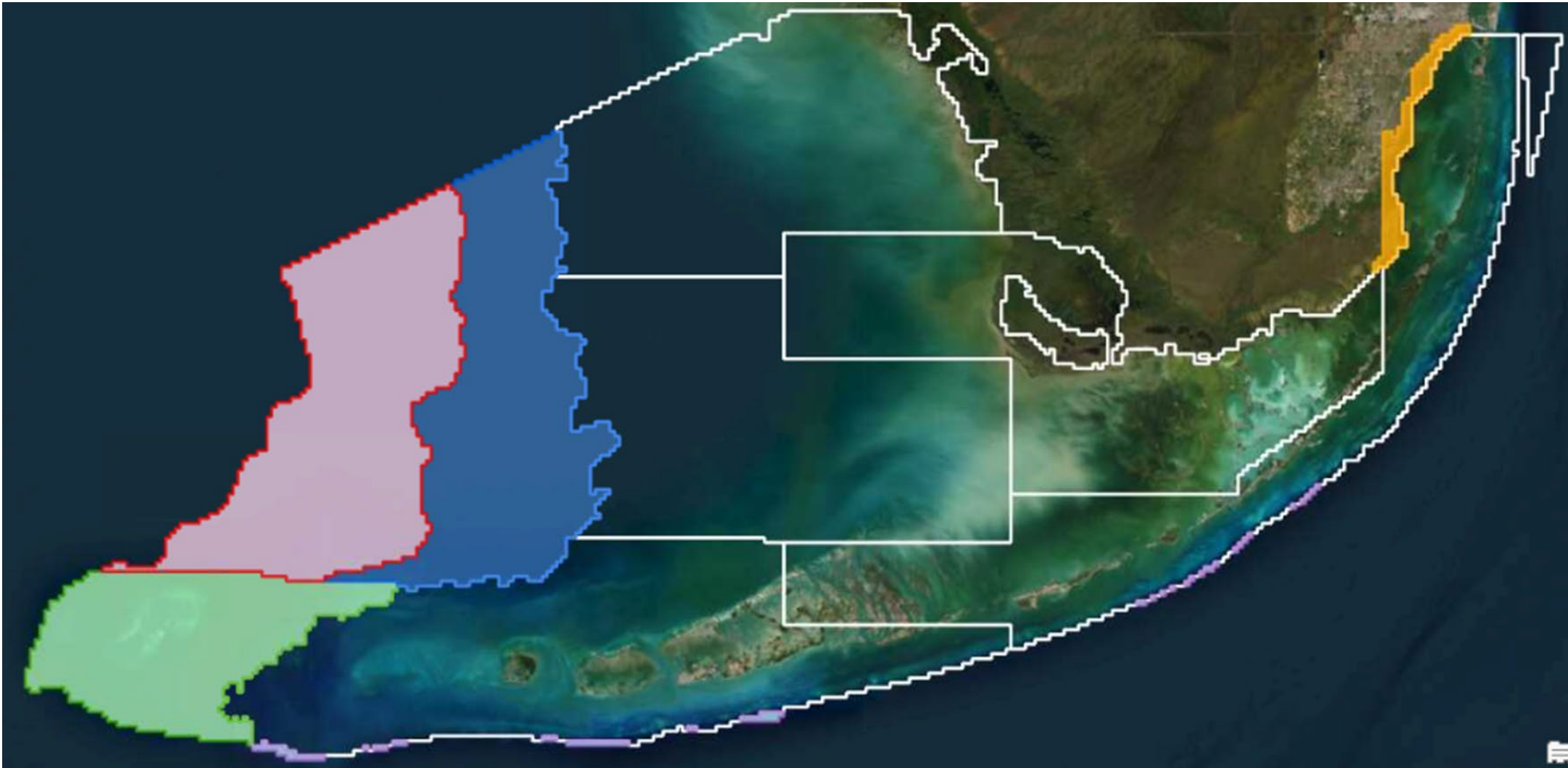

WOOLPERT

N|V|5 GEOSPATIAL
powered by QUANTUM SPATIAL

- Expansive Fleet of Vessels and Aircraft
- Large Inventory of Required Sensors
- High-Capacity Team of Mapping Professionals



Region 3 AOI and Supplemental Areas



How do you map the Seafloor from an aircraft?

Topobathy Lidar!

Light Detection and Ranging (Lidar)

- Emits thousands of pulses of light and measures return time of the pulse
- Near Infrared (NIR) @1064nm measures land elevations
- Green @ 532 nm measures water depth
- Creates a highly accurate 3D map of land and subsurface features

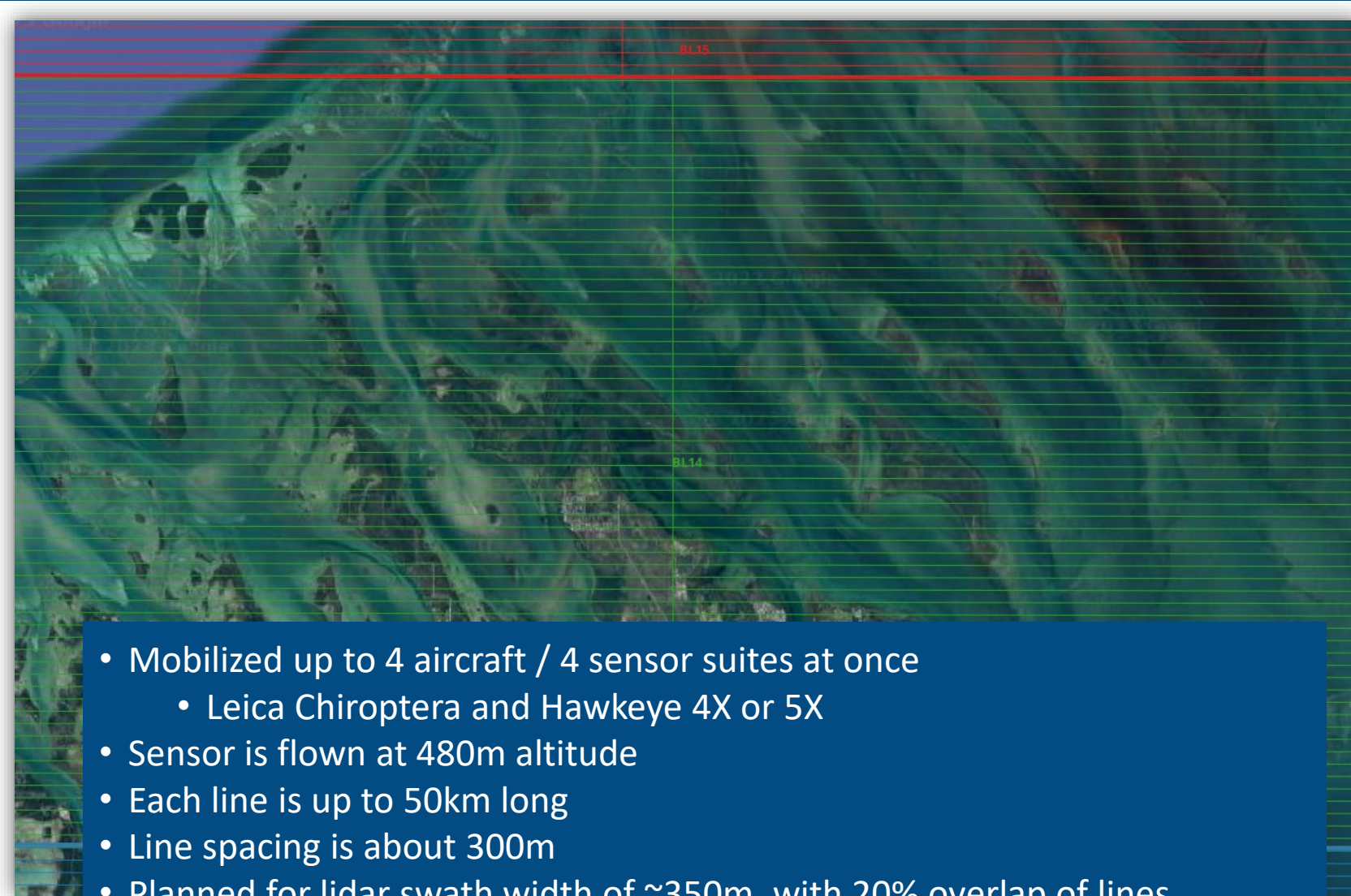


Topobathy Lidar Aerial Assets

- Team operates a total of 5 aircraft and 5 sensors
- Leica Chiroptera and HawkEye models 4x & 5x topographic and bathymetric Lidar sensors



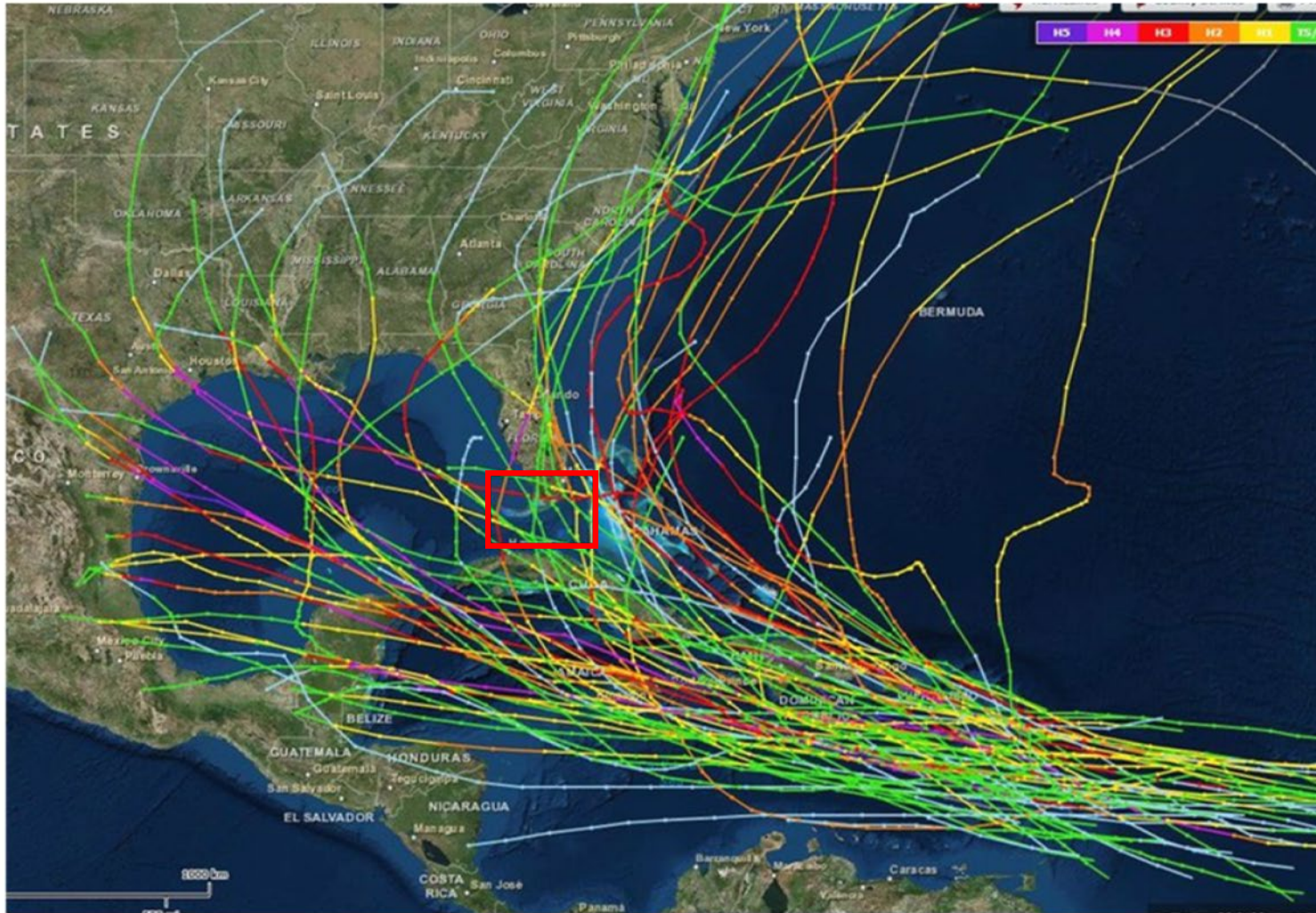
Topo-bathy Lidar Acquisition



- Mobilized up to 4 aircraft / 4 sensor suites at once
 - Leica Chiroptera and Hawkeye 4X or 5X
- Sensor is flown at 480m altitude
- Each line is up to 50km long
- Line spacing is about 300m
- Planned for lidar swath width of ~350m, with 20% overlap of lines
- Can reach water depths of up to 50m (clear water)



Project Obstacles

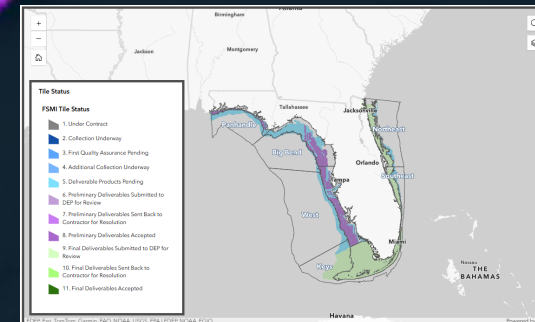
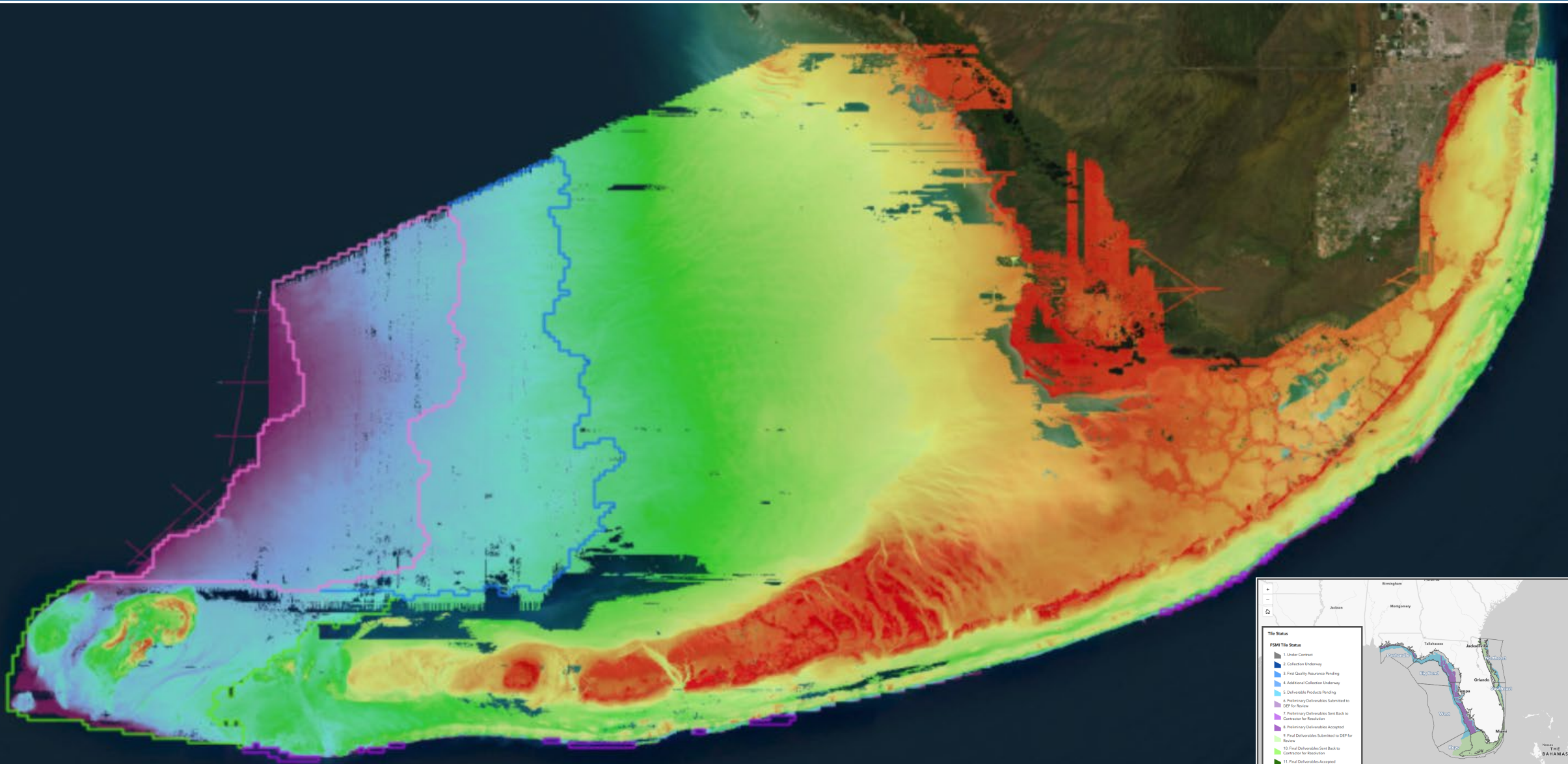


- Weather
- Environmental Conditions
- Mechanical Issues
- Processing Petabytes of data
- Tight Schedule
- Natural events



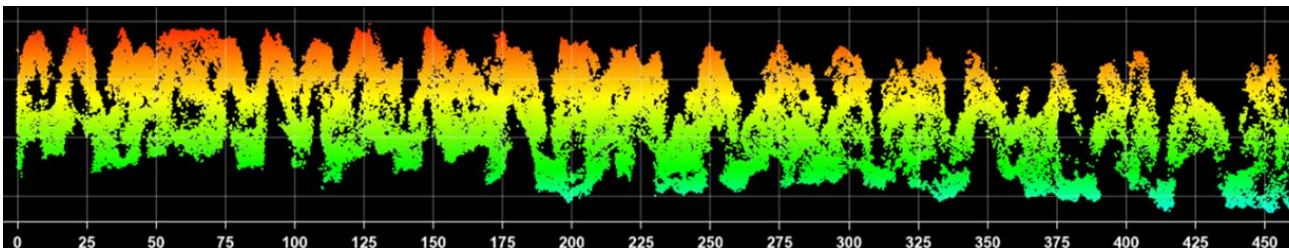
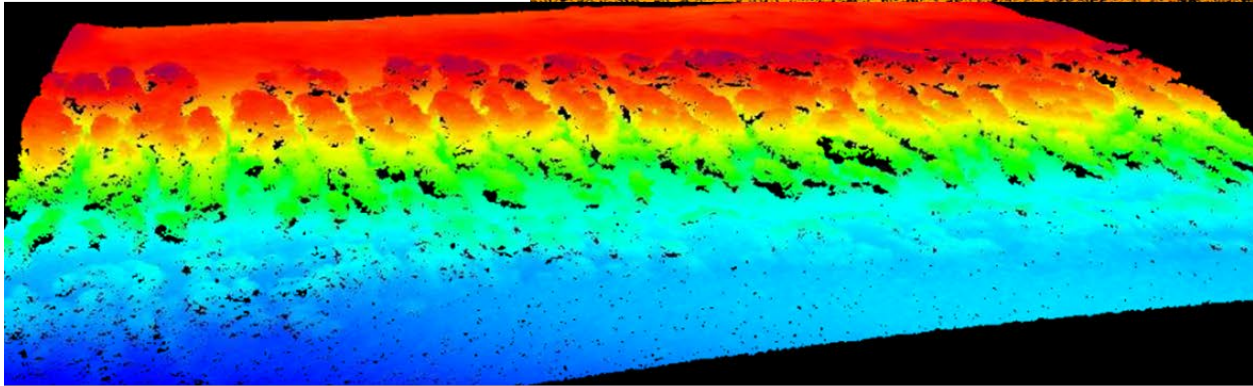
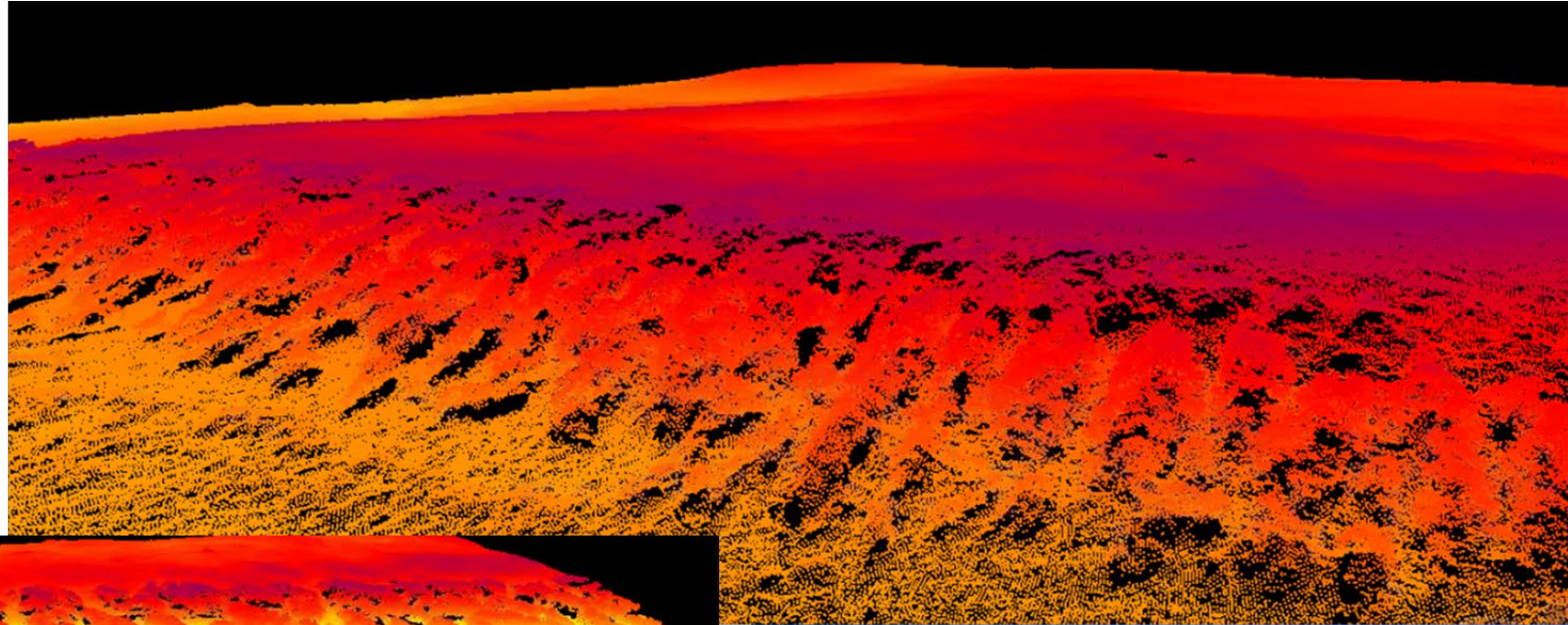
Region 3 Topobathy Completed!

Including Supplemental Areas as of Sept 30th 2025

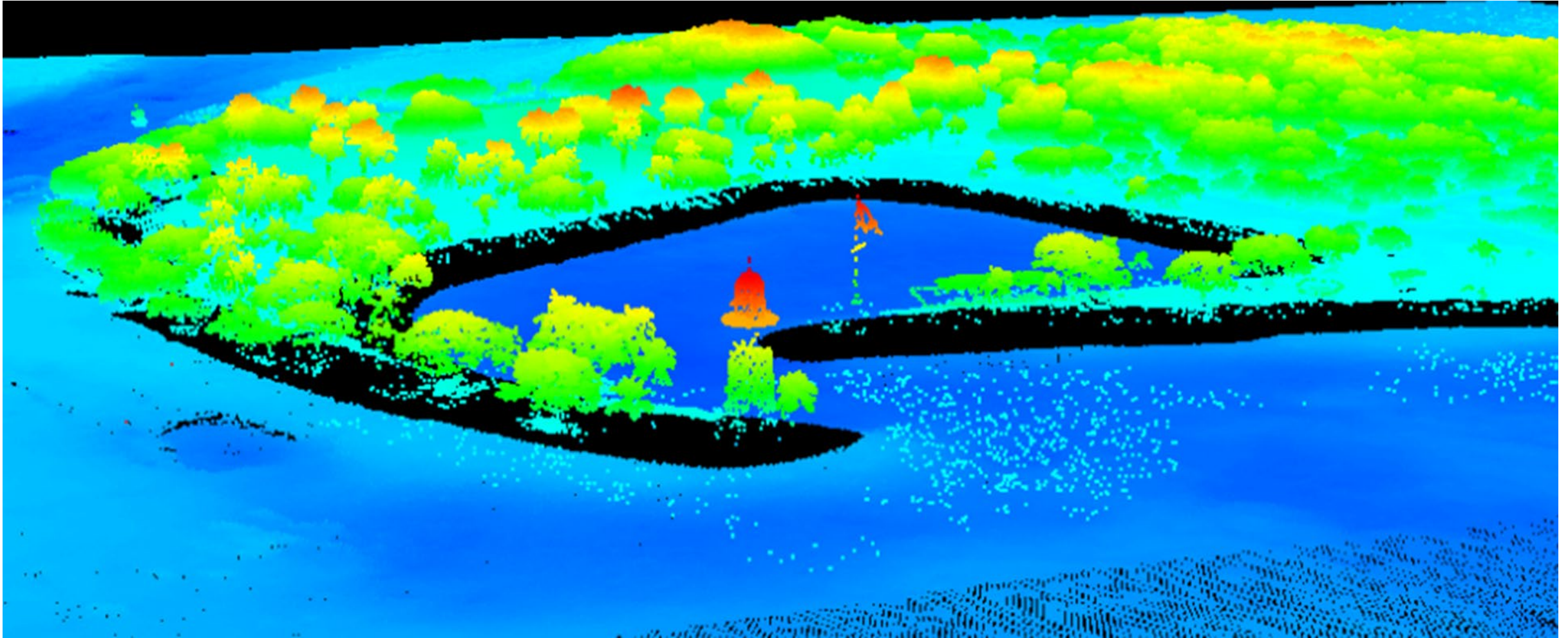


Spur and Groove Coral Near Looe Key

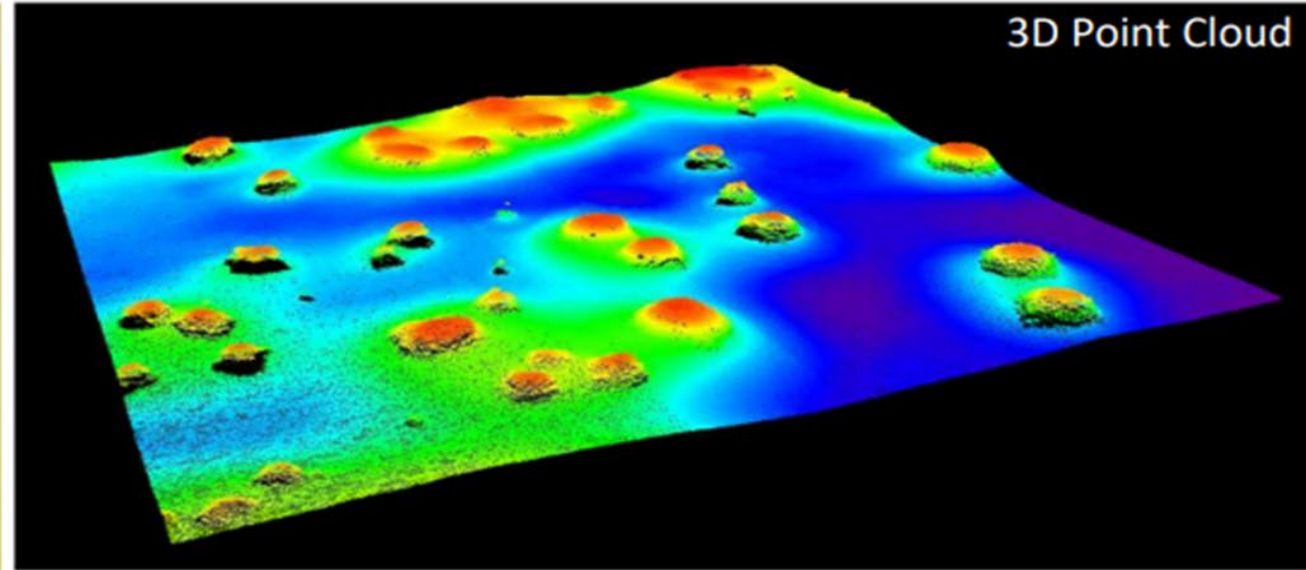
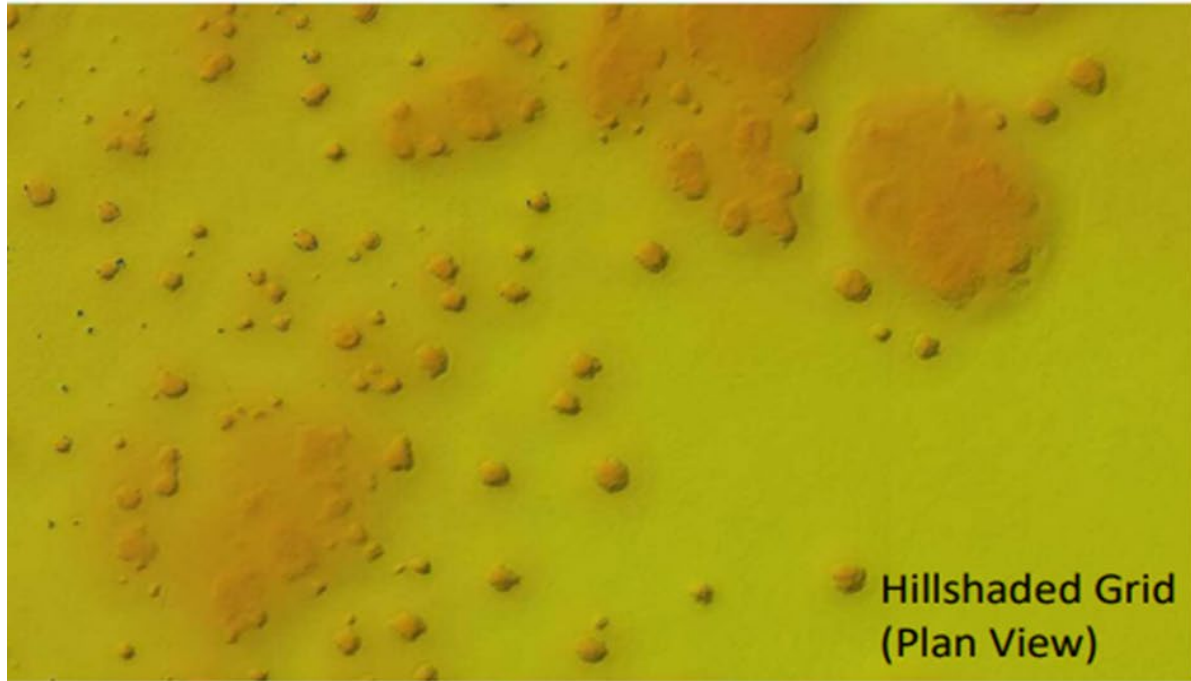
Spur and groove coral
fingers, 4-6m tall



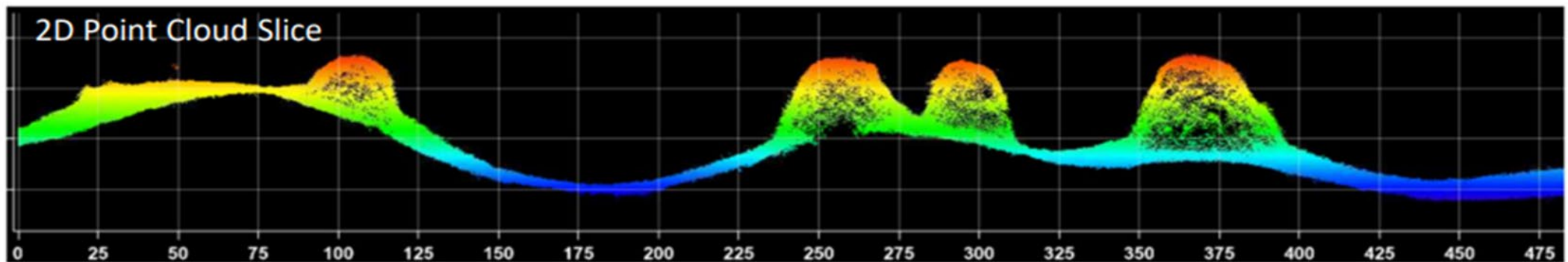
Boca Chita Lighthouse Biscayne National Park



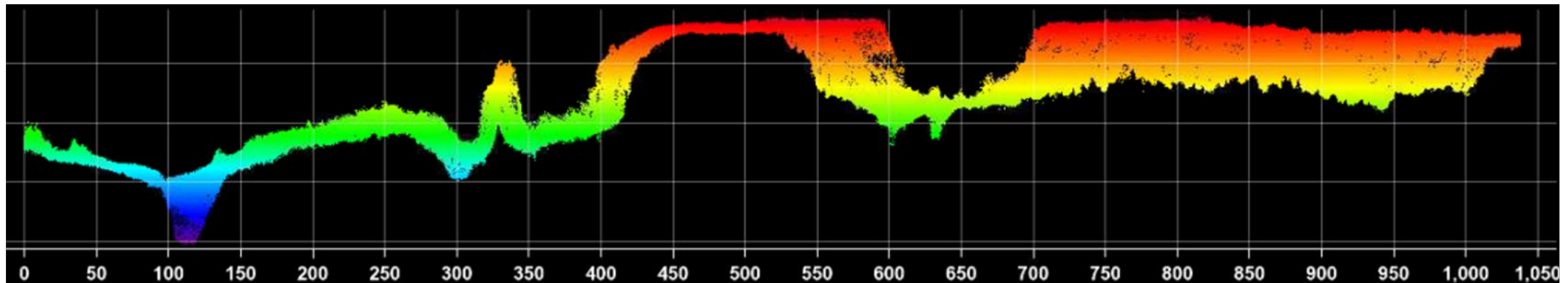
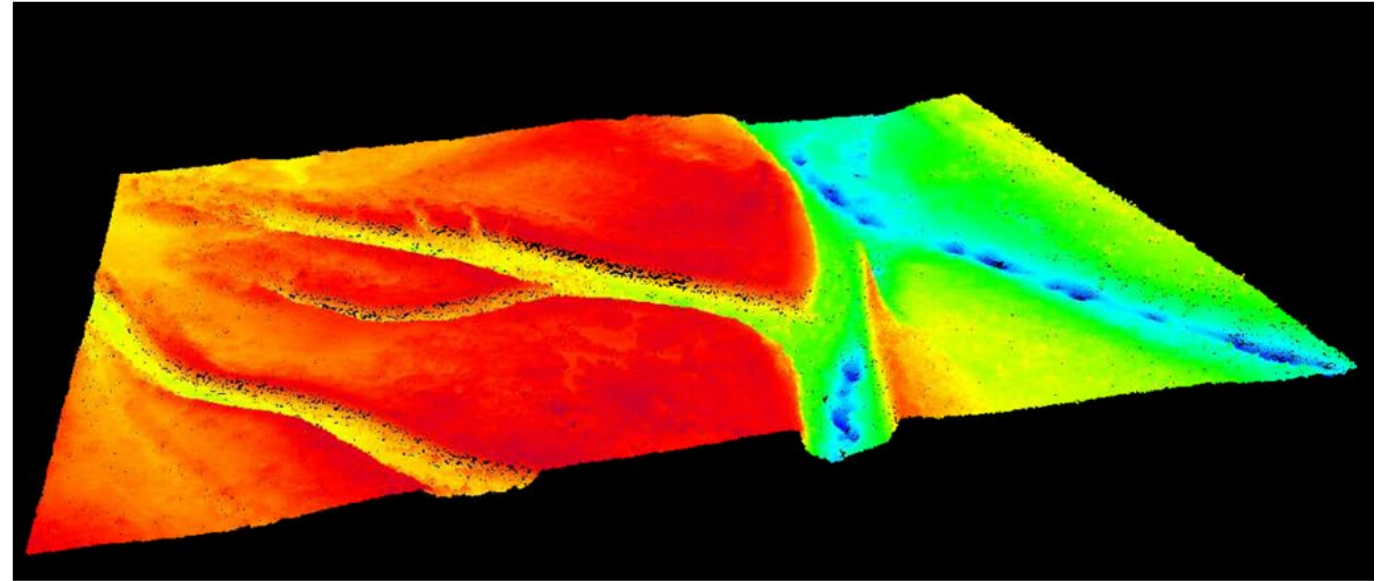
Coral Reef and Rocks East of Elliot Key



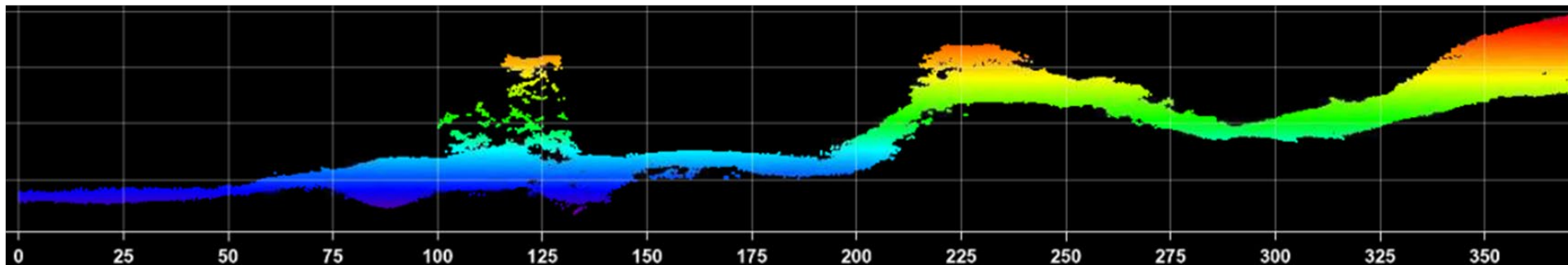
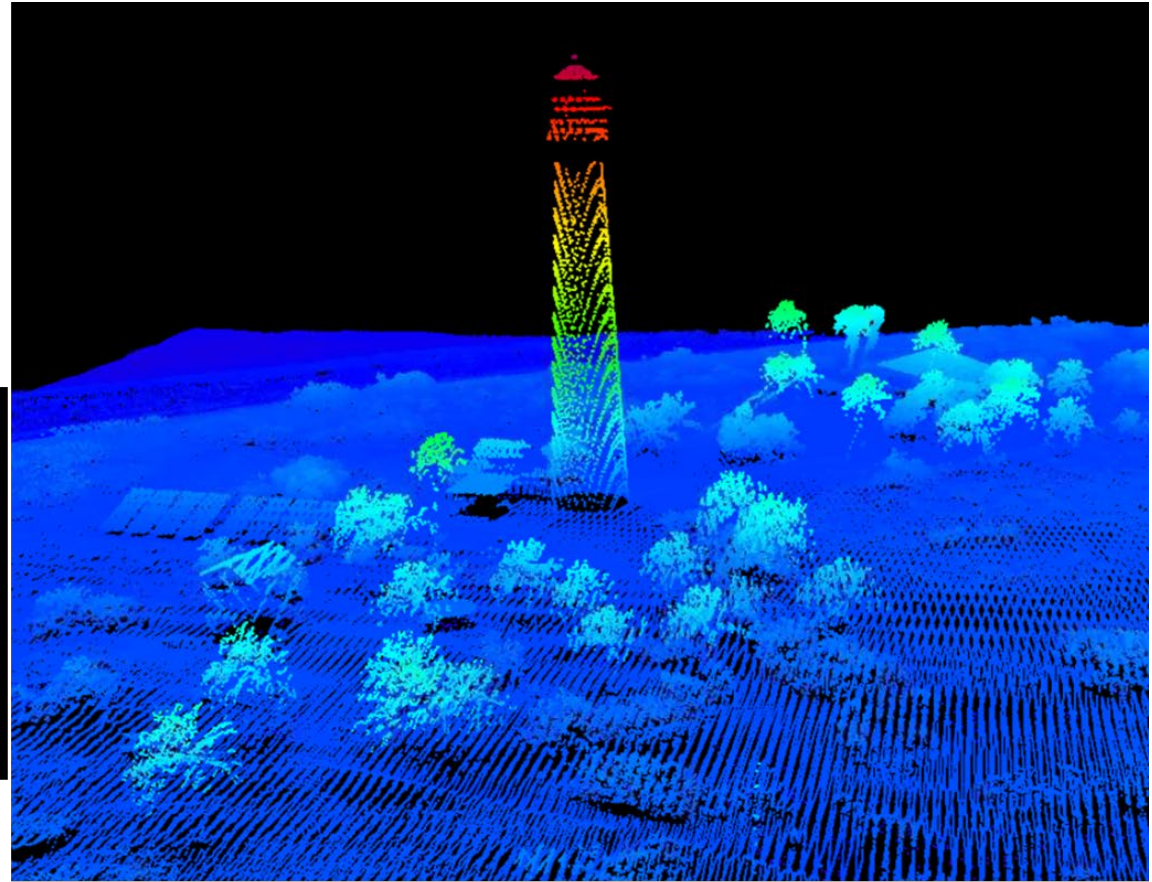
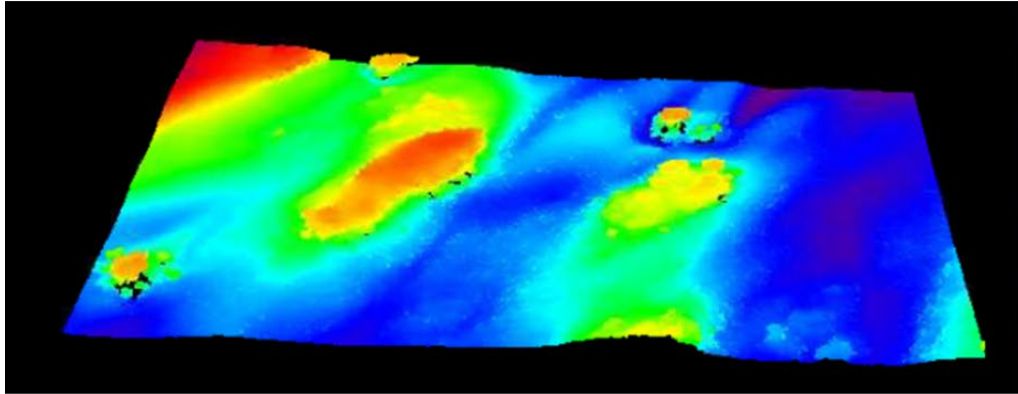
Coral rises 1-5 meters off seafloor



Underwater Channels North of Big Pine Key



Loggerhead Key – Dry Tortugas



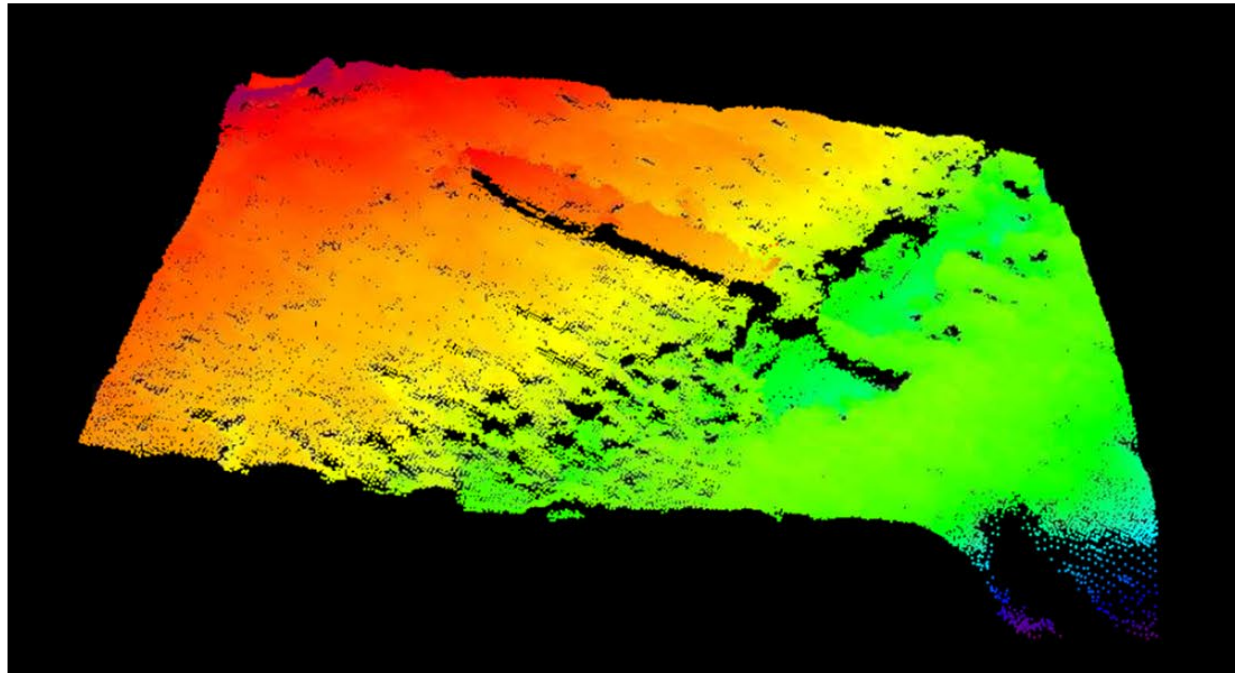
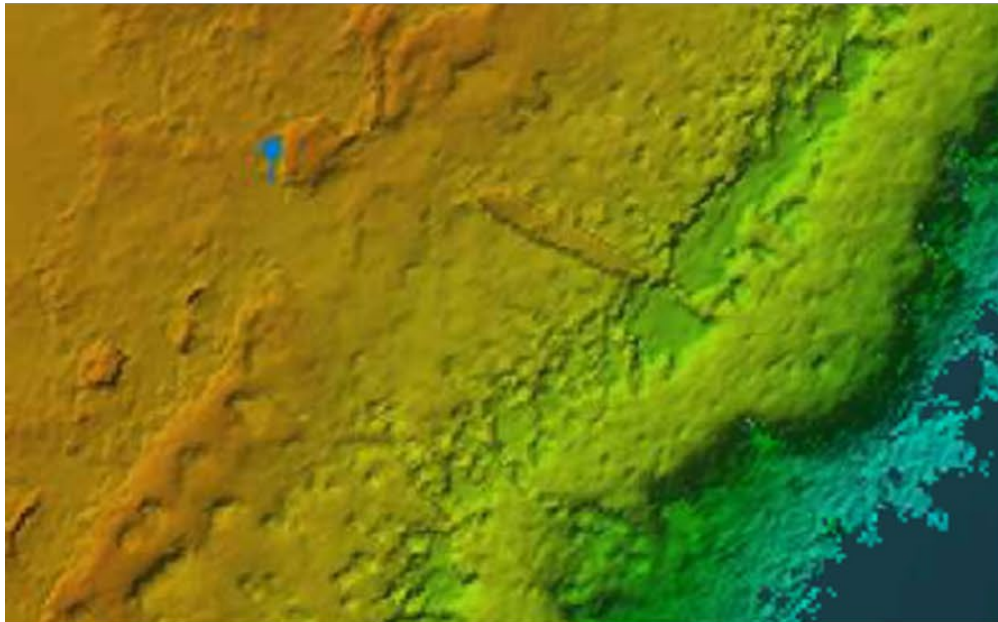
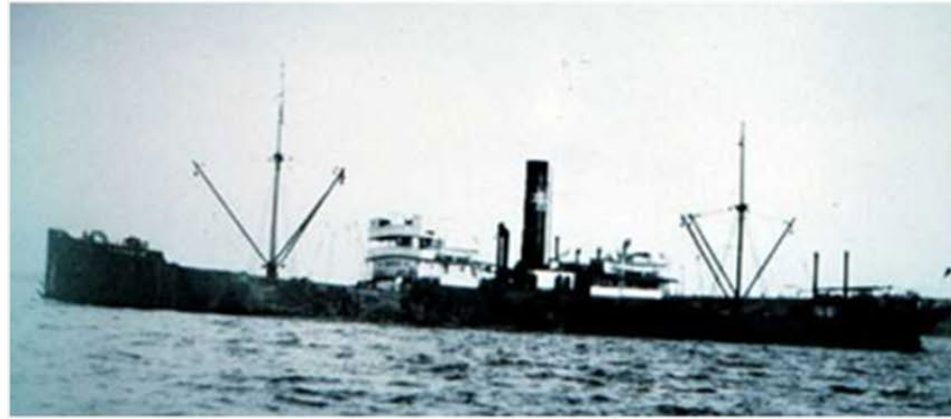
Bentwood Wreck – Southeast of Key Largo

Benwood, Merchant Marine Freighter

Built in England, 1910

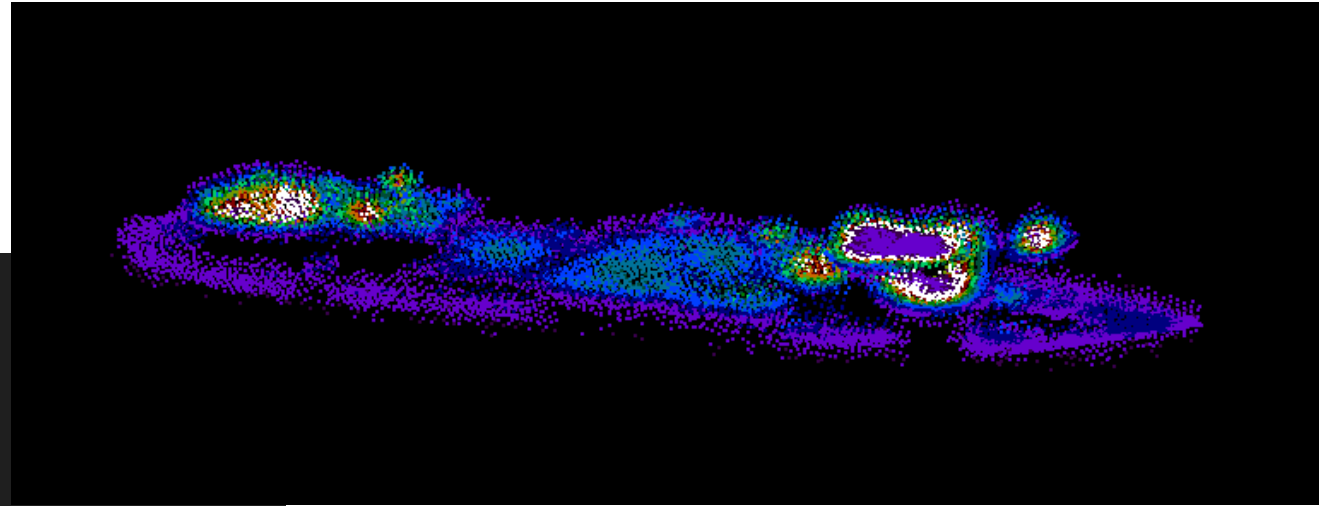
360 ft long, 51 ft beam

Sunk in 1942 after collision

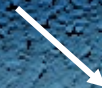


USNS General Hoyt S. Vandenberg, South of Key West

- ~50 meters max depth achieved
- USNS General Hoyt S. Vandenberg at ~45m
- Second largest artificial reef in the world



Bonus: "Joe's Tug"

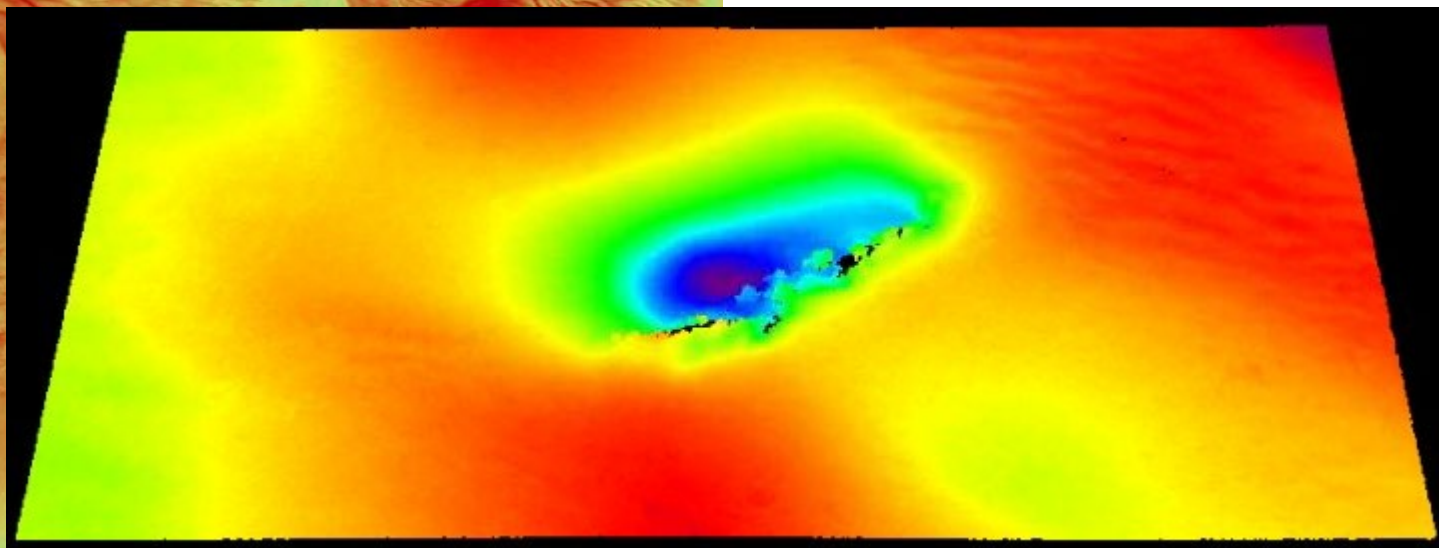
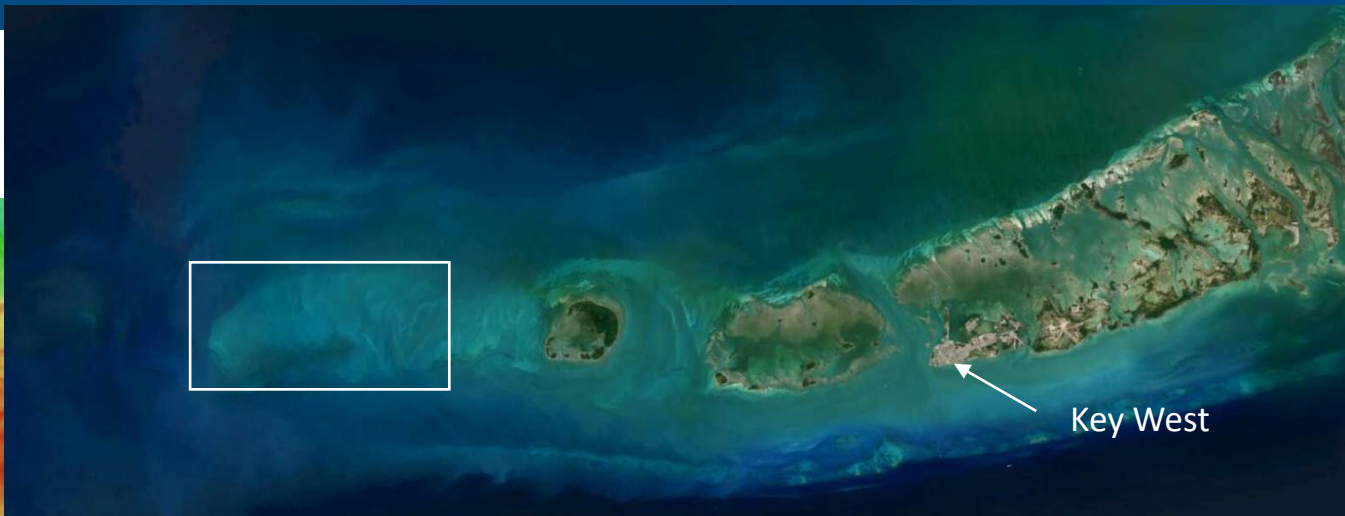
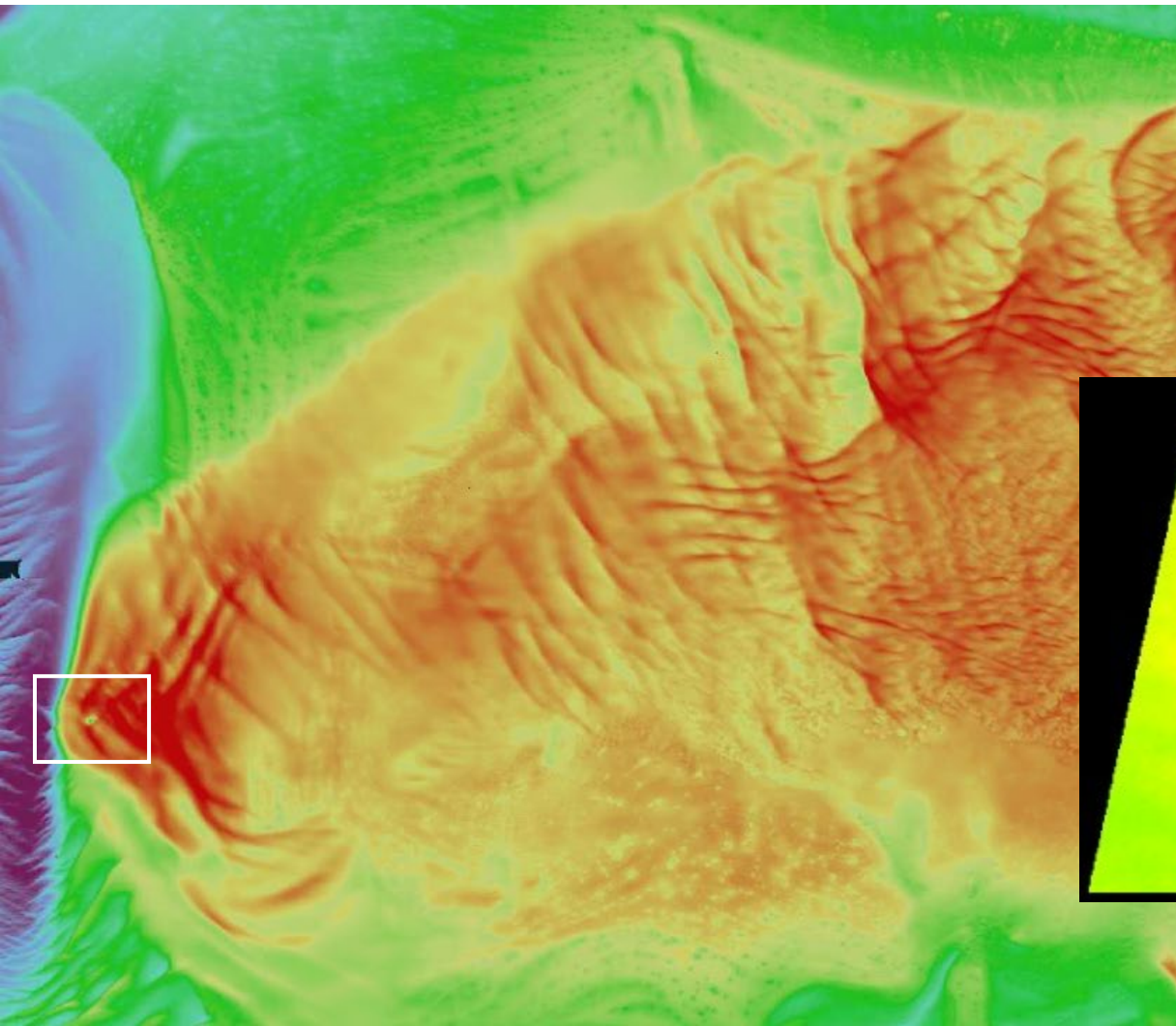


The Quicksands

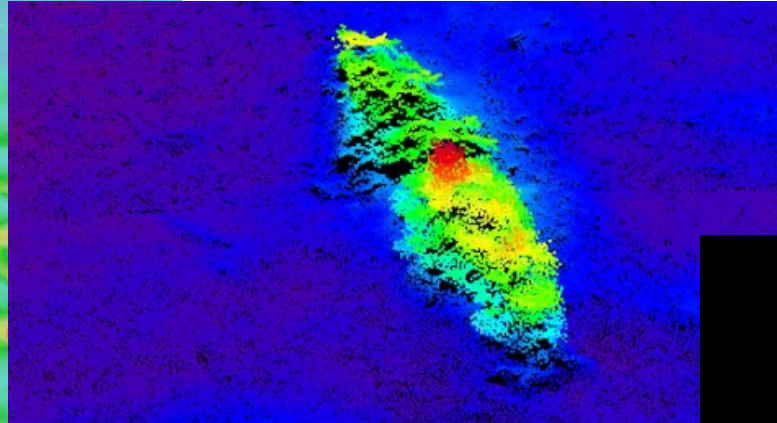
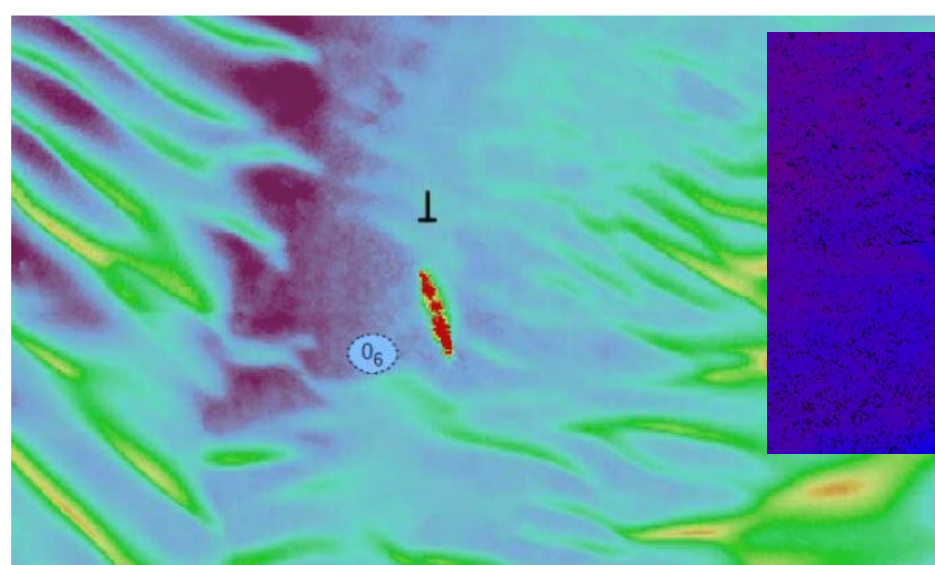


The Quicksands

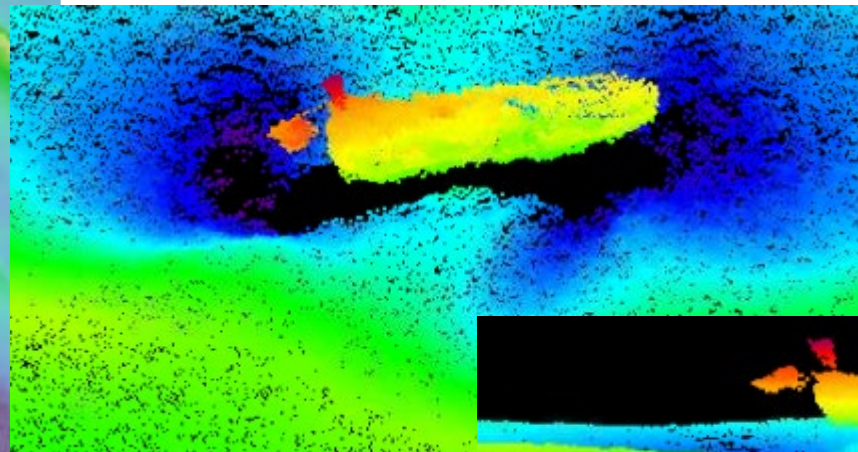
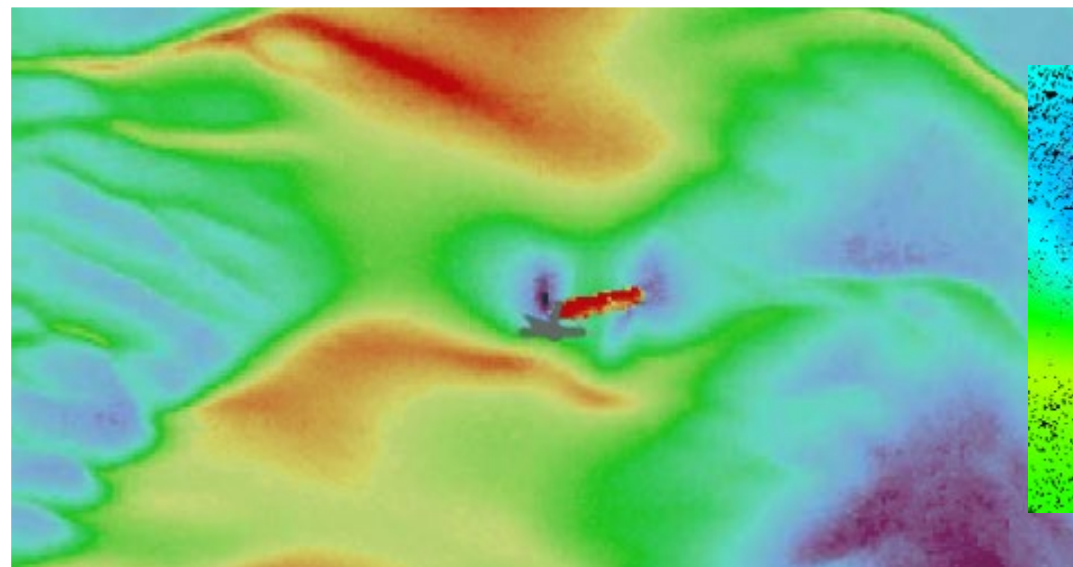
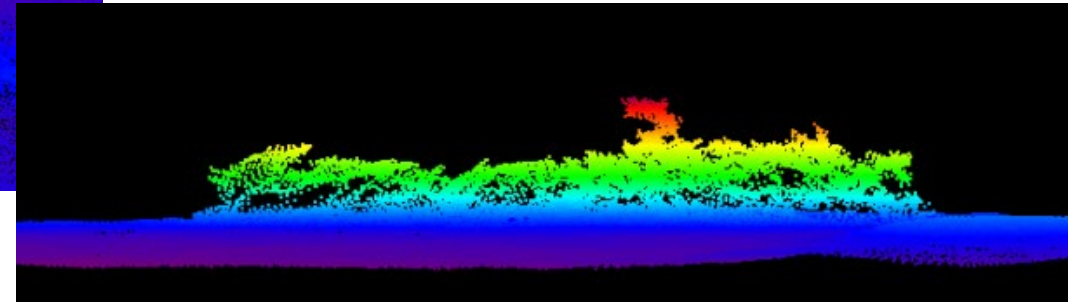
- Between Marquesas Keys (East) and Dry Tortugas (West)
- Dangerous area, strong currents, shoals, many wrecks



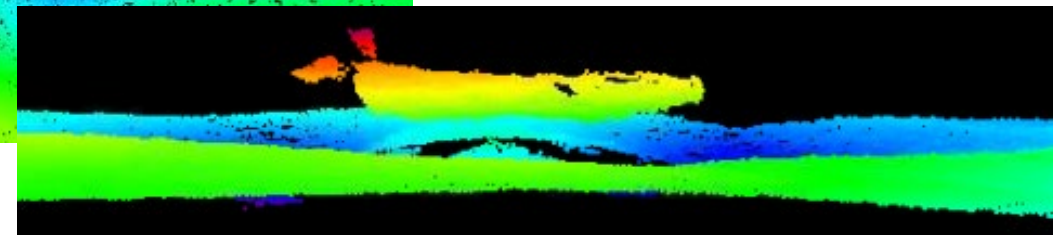
The Quicksand's Wrecks



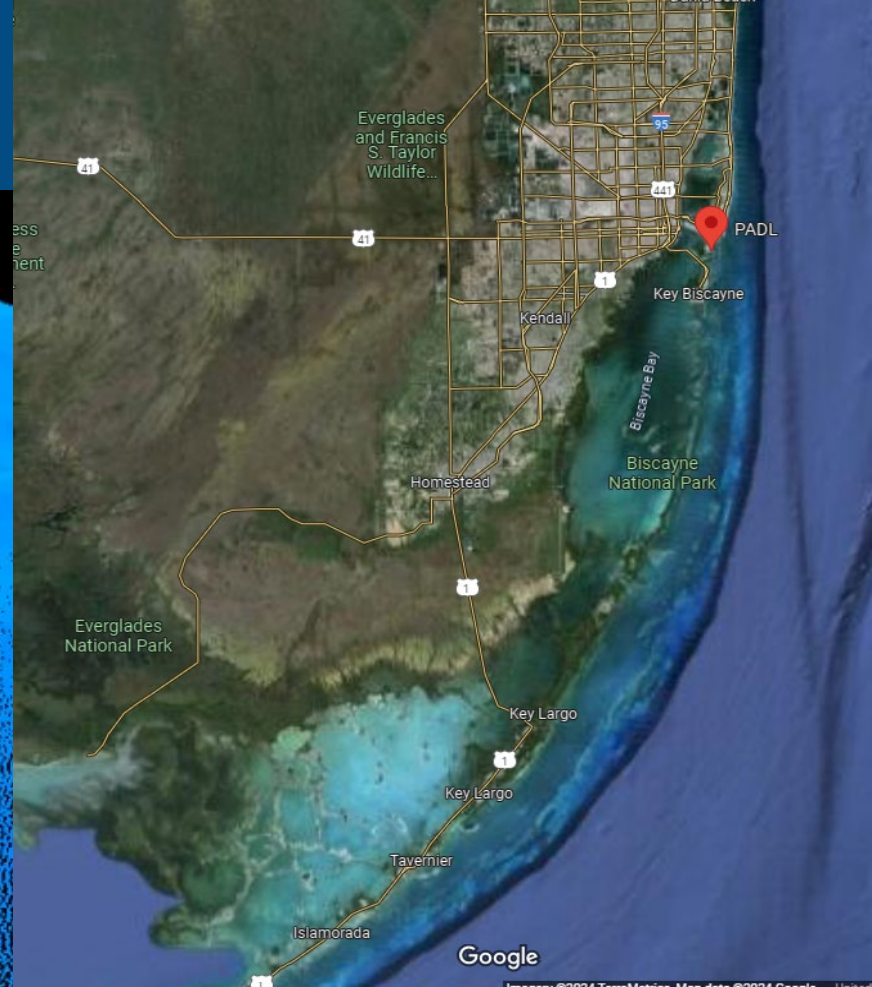
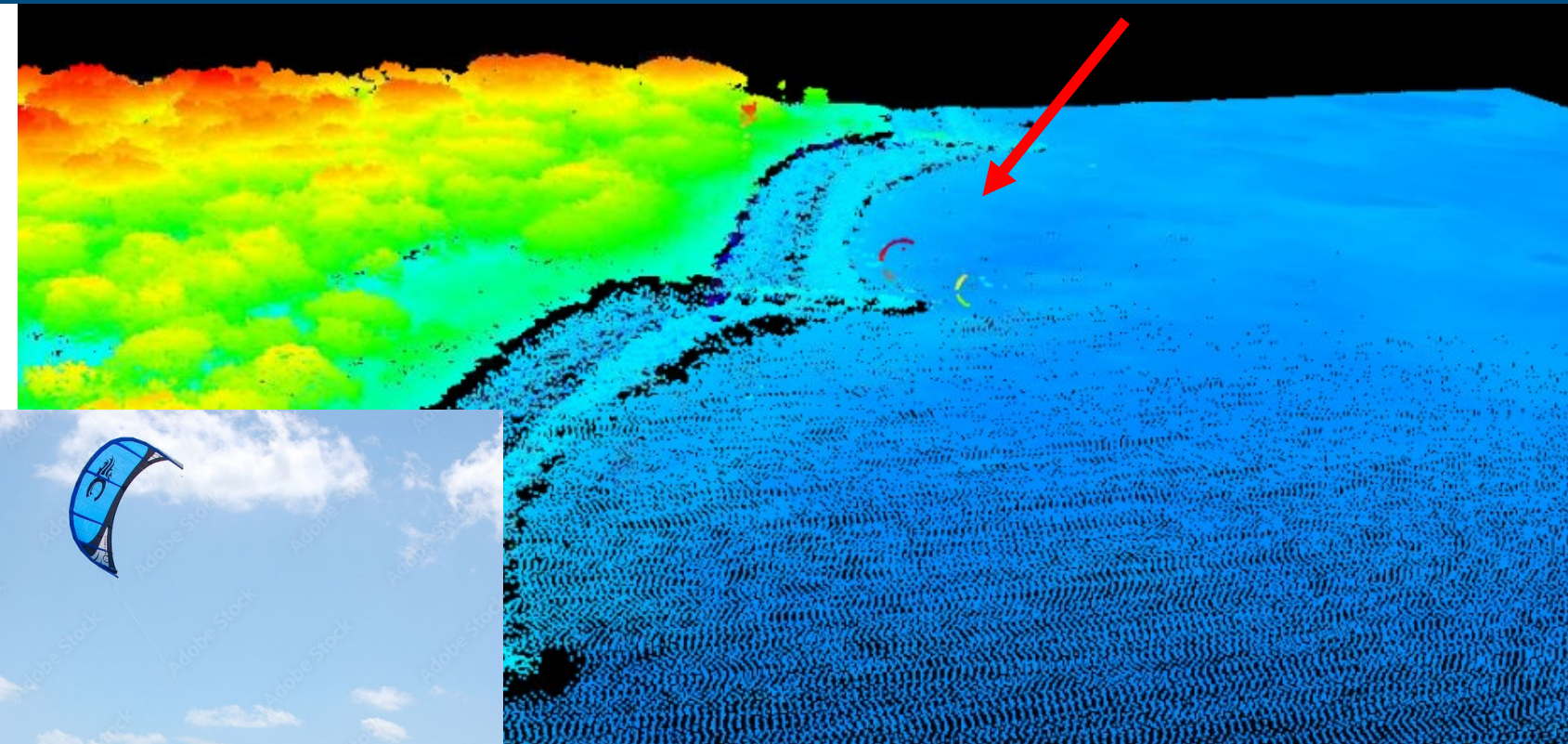
Wreck is 75-80m in length and submerged only 0.6m (MLLW)



Wreck is 55-60m in length and partially submerged (MLLW)

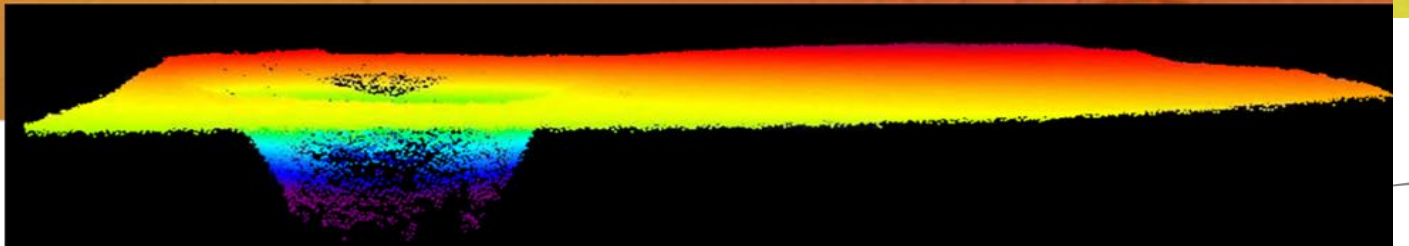
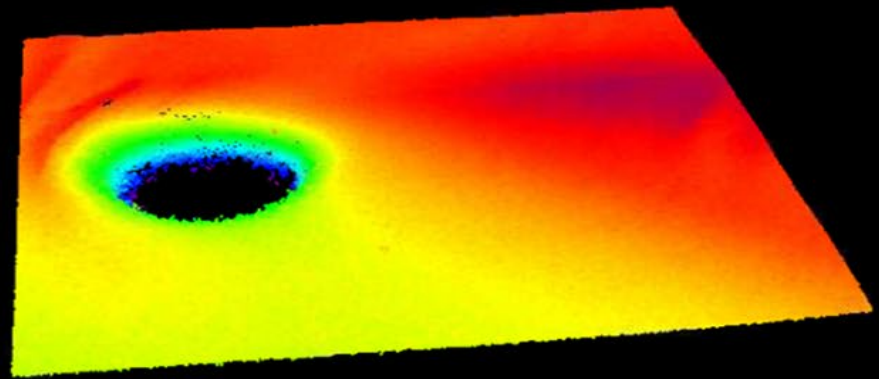
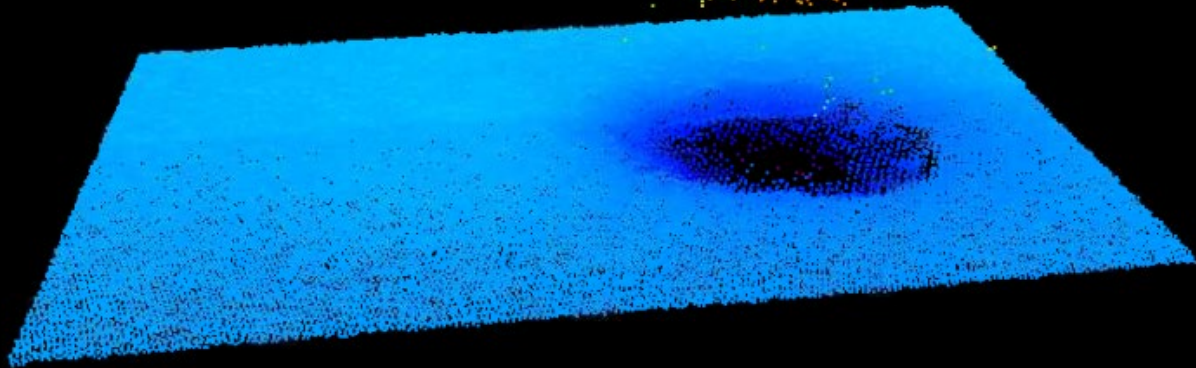


UFOs?



Mysterious Blue Holes

3D Point Cloud



Fort Jefferson, Dry Tortugas



Water Conditions – “Turbidity”

Lunch buddy – photo by Dan Cassell



Speed: 237 ± 11 km/h
Bearing: $234 \pm 1^\circ$ (SW)
Azimuth: 330° (NW)
Time: 10-05-2024 13:43
Manatees stirring up sediment

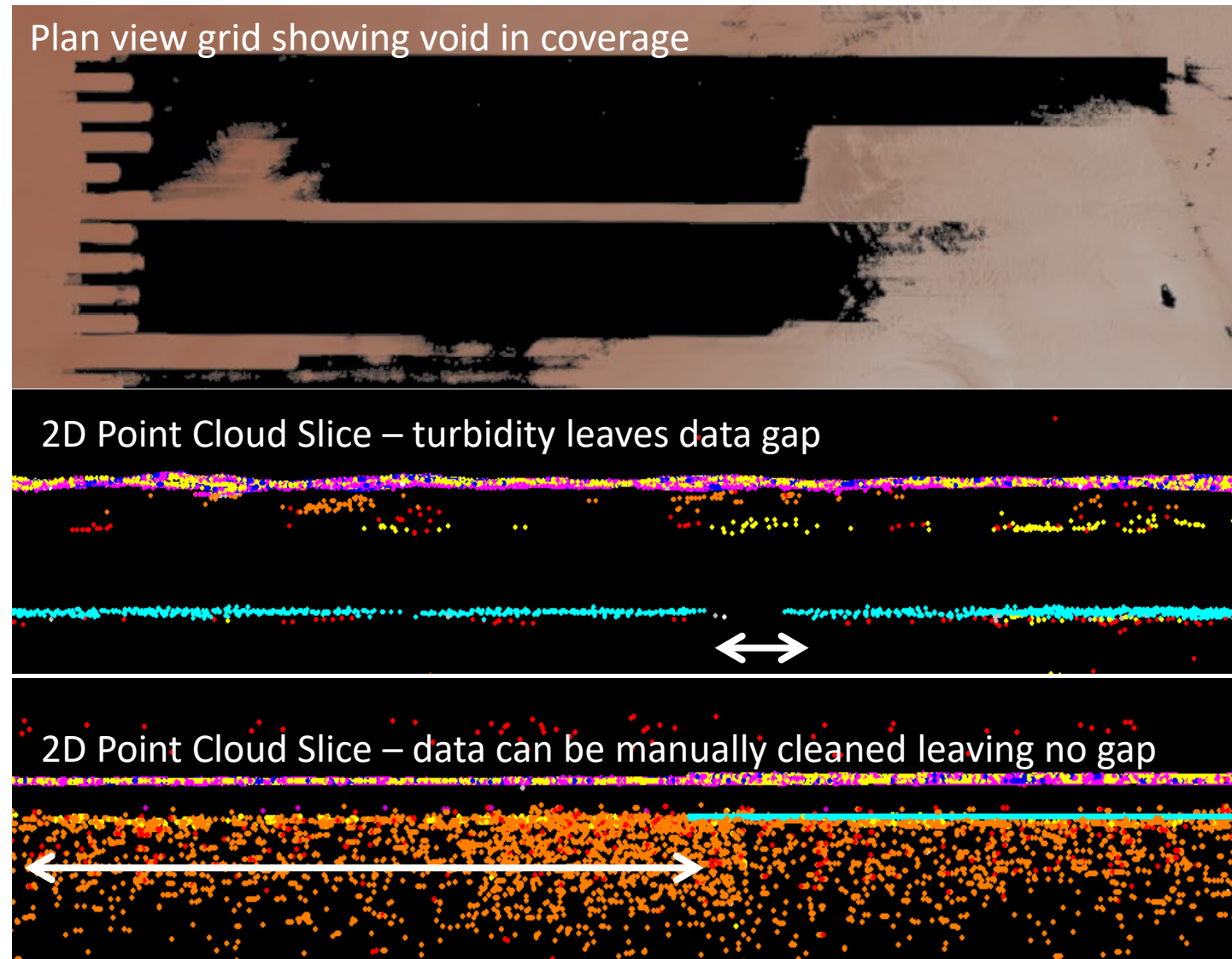


Water Conditions - Sargassum

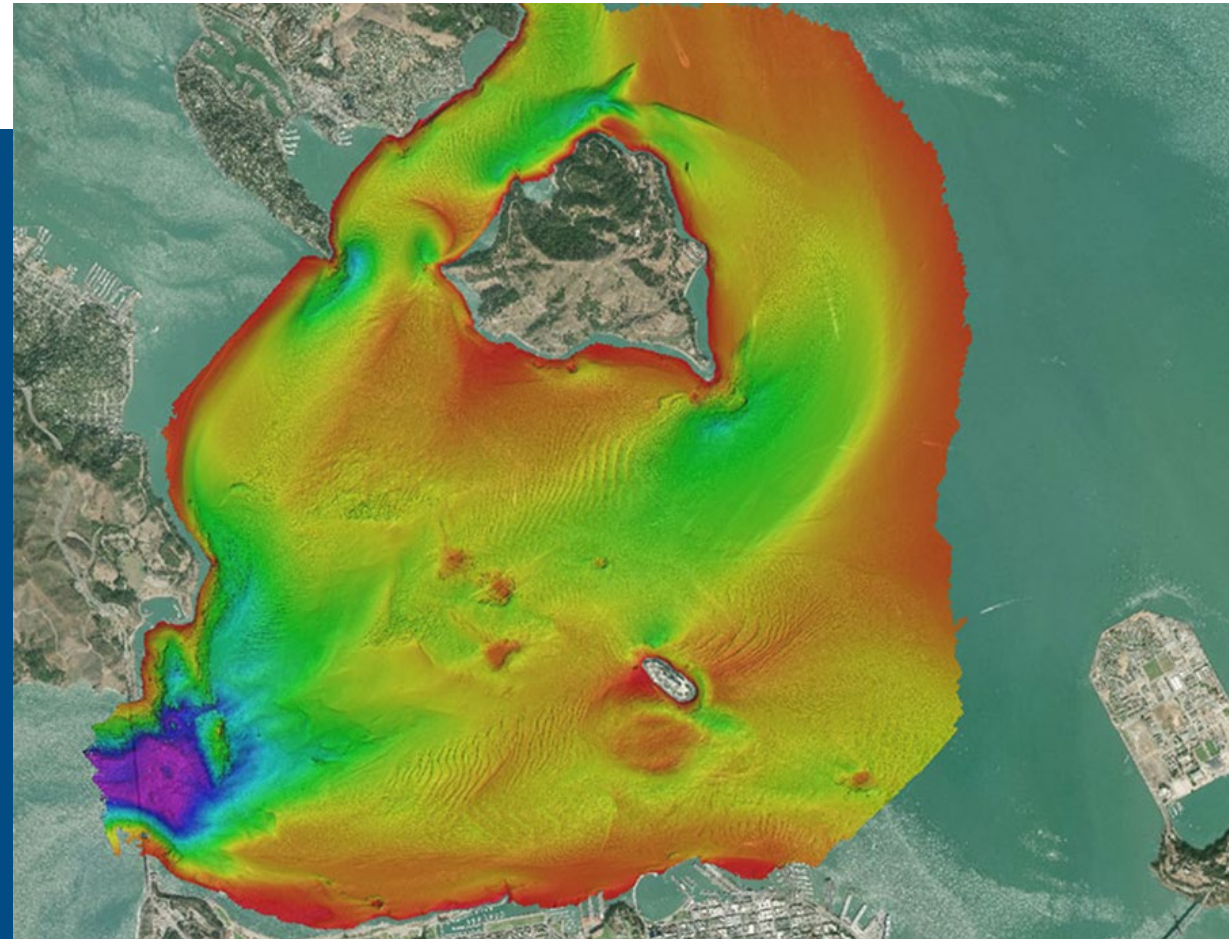


Topo-bathy Lidar Data Processing Workflow

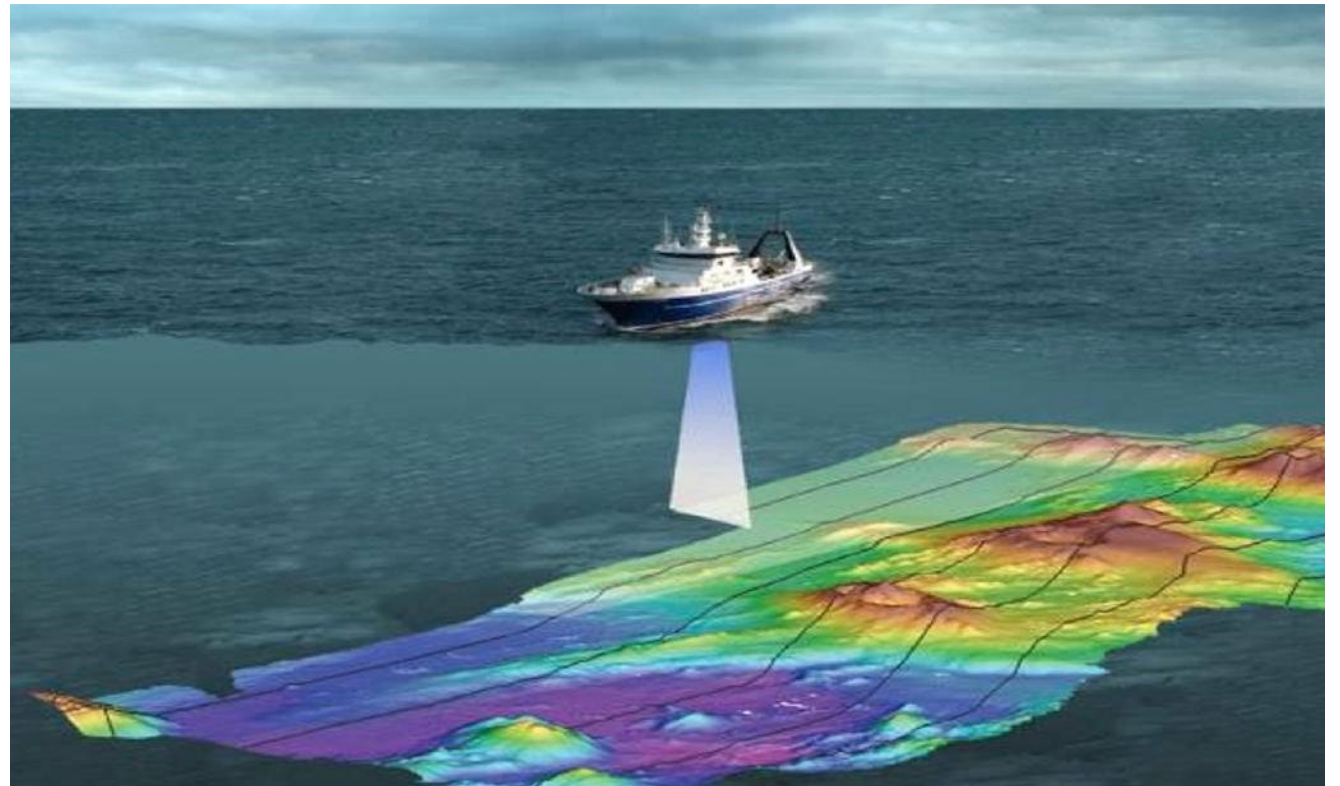
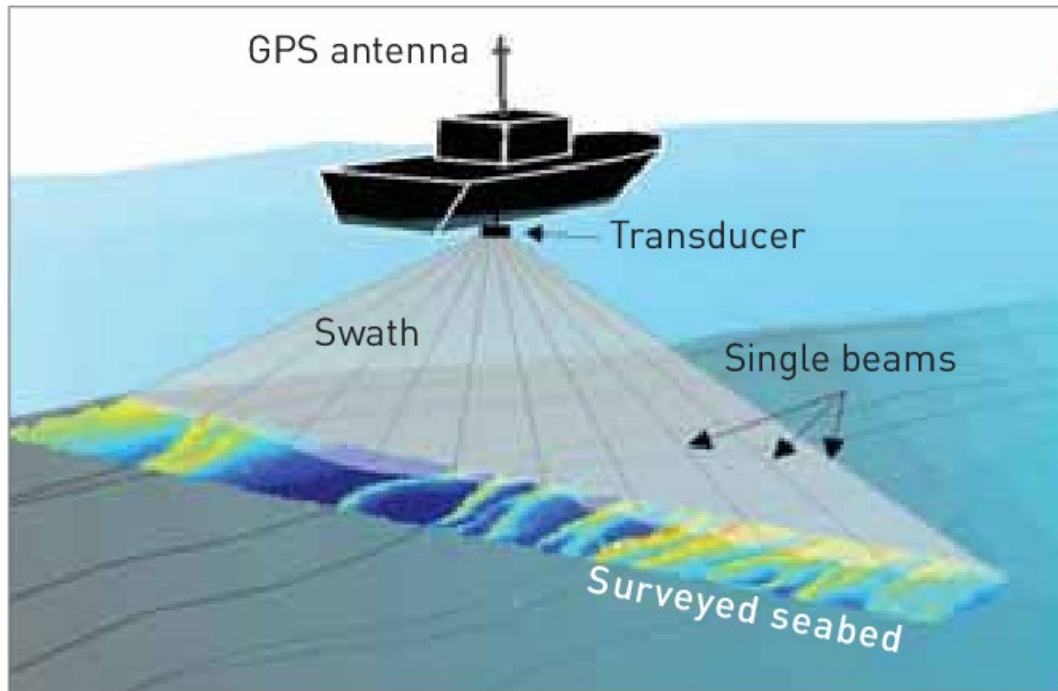
- Waveforms converted to point cloud via Leica Lidar Survey Studio and trajectories processed
- Coverage grid created and checked for holidays, reflights determined
 - Environmental conditions may limit data collection
 - Must fly voids 2x if conditions allow
- Automated cleaning processes (Terrascan)
- Line-to-line calibration (Terramatch)
- Manual classification (Terrascan)
- Product creation (Esri ArcGIS, FME, and others)



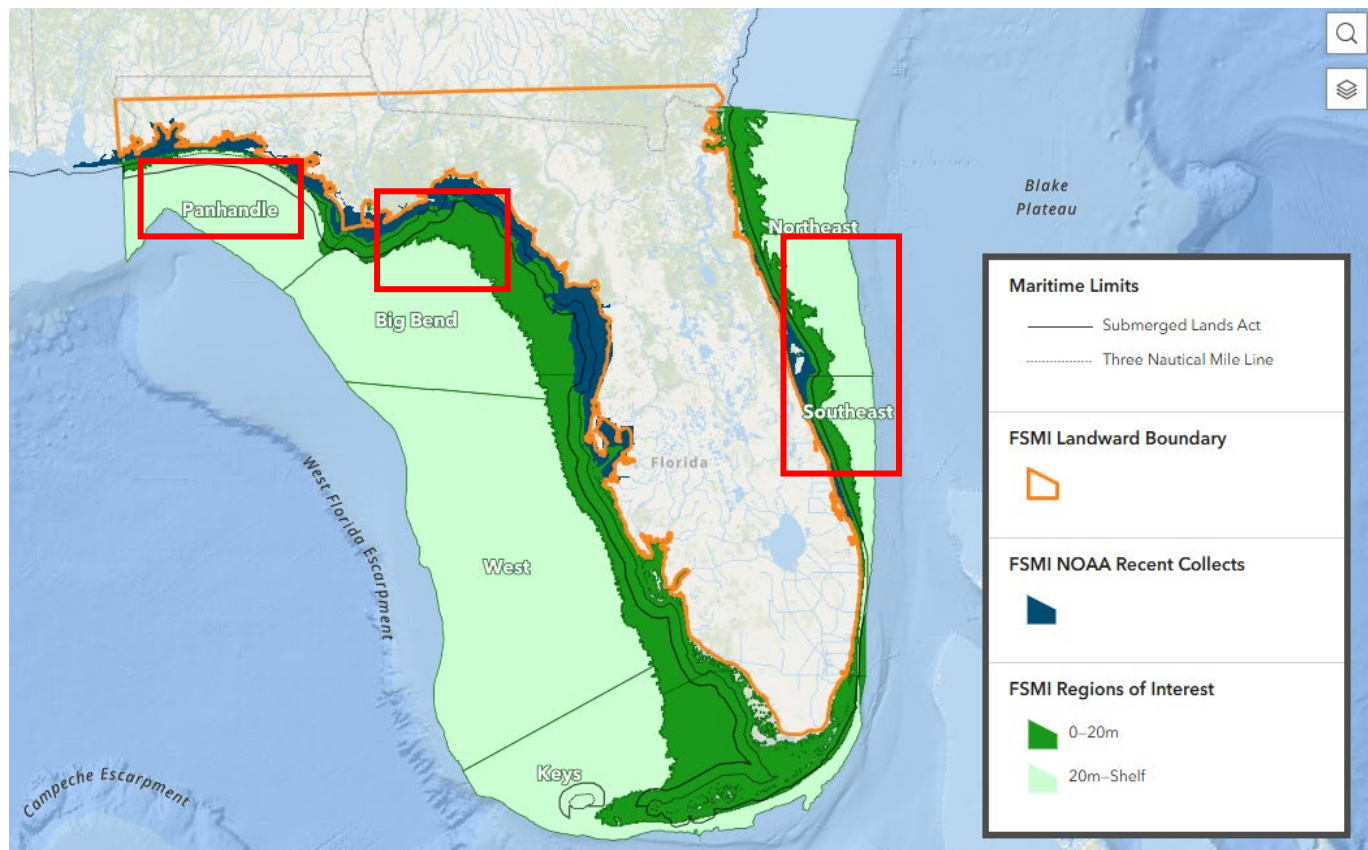
FSMI Vessel Based Phase: Woolpert Multibeam Sonar Mapping



How Sonar Works



Woolpert's Sonar Award



- Awarded 3 regions, Big Bend, Panhandle and Northeast
- Partnering with NV5
- Total project area over 17,600 square kilometers
- 6+ Vessels Mobilized

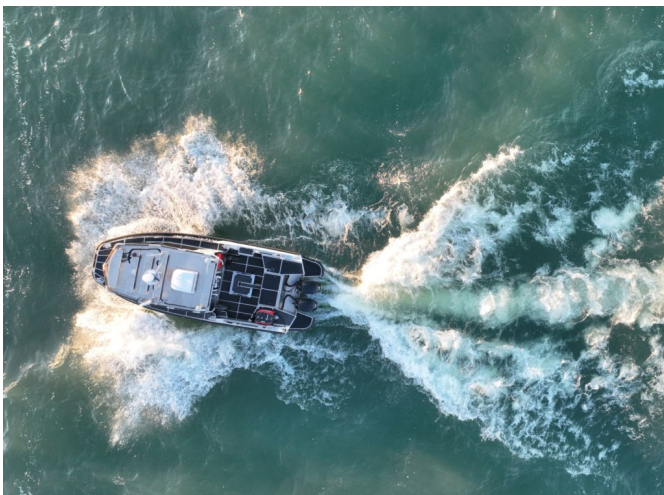



WOOLPERT

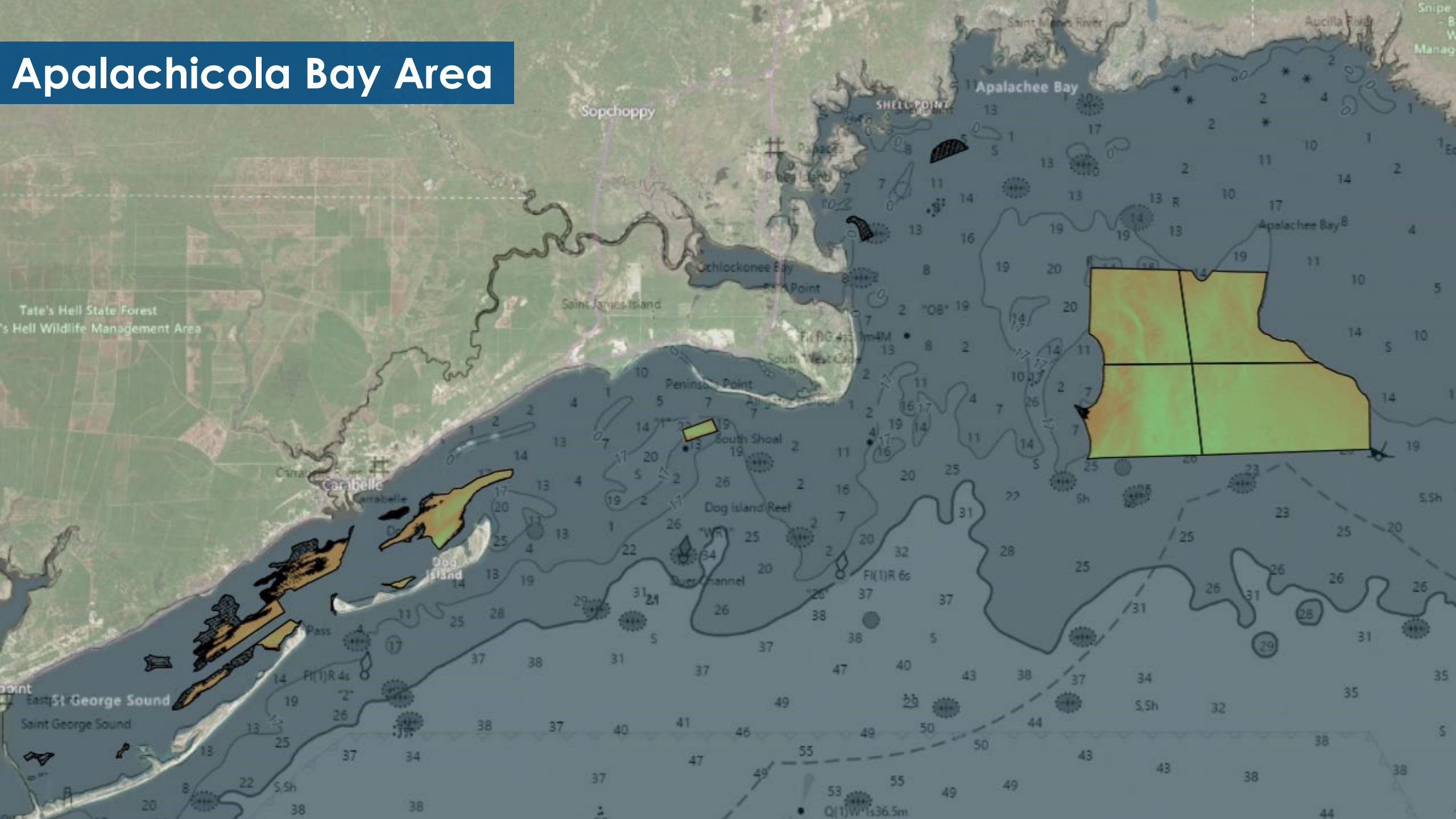
N|V|5 GEOSPATIAL
powered by QUANTUM SPATIAL

CHANCE
MARITIME TECHNOLOGIES

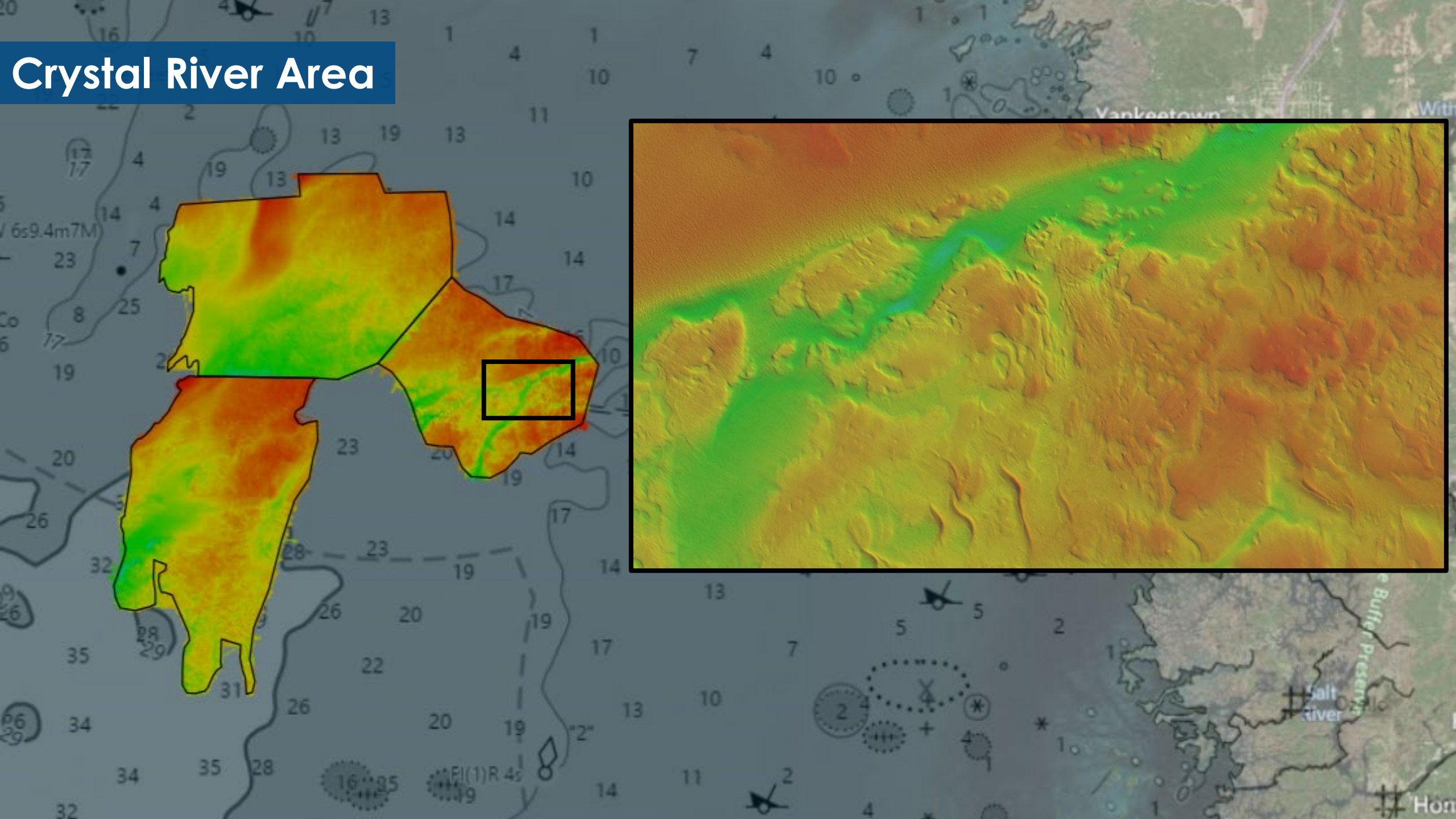
 Mythos AI



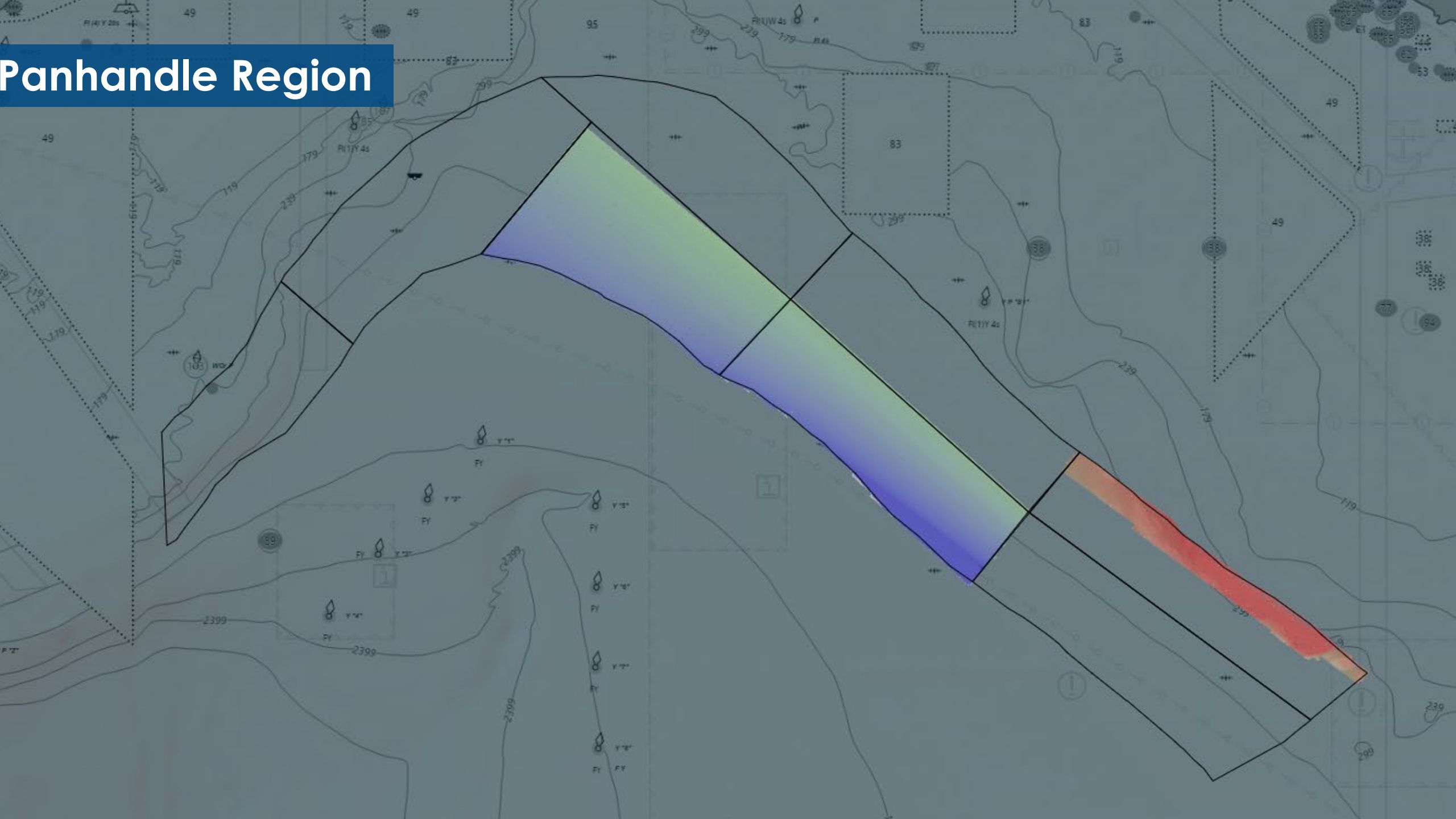
Apalachicola Bay Area



Crystal River Area



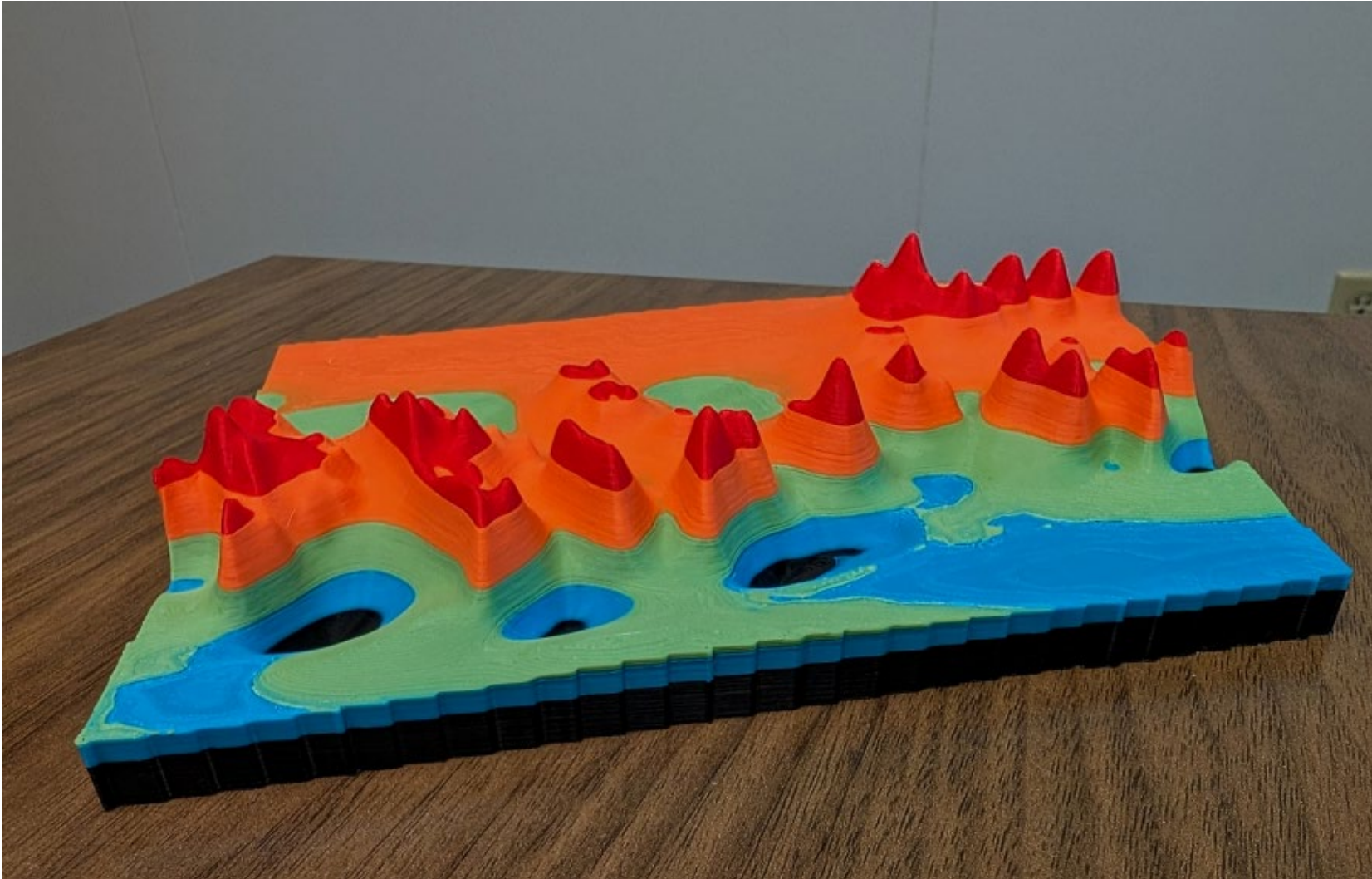
Panhandle Region



Northeast Region

The image displays a map of the Northeast Region of Florida, showing the coastline and surrounding waters. The map includes labels for various locations such as Jacksonville, St. Augustine, Palm Beach, and Orlando. Two insets provide a detailed view of the bathymetry (seafloor topography) in the highlighted area. The top inset shows a cross-section of the seafloor with a color scale ranging from -40 to -249 meters. The bottom inset shows a similar cross-section with a color scale ranging from -10 to -40 meters. The map also includes labels for various islands and reefs, such as Cumberland Island, Amelia Island, and the Ocala National Forest.

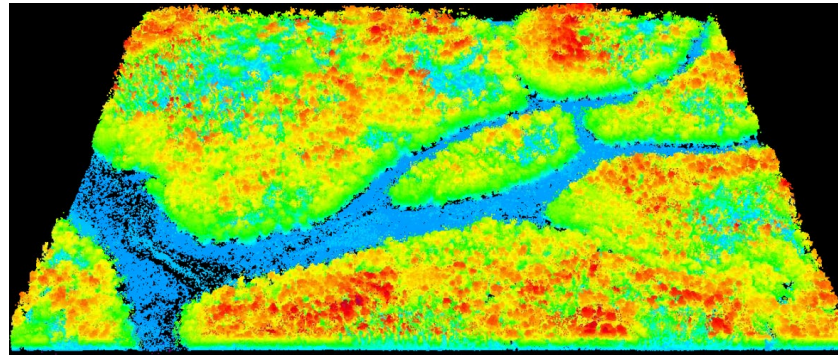
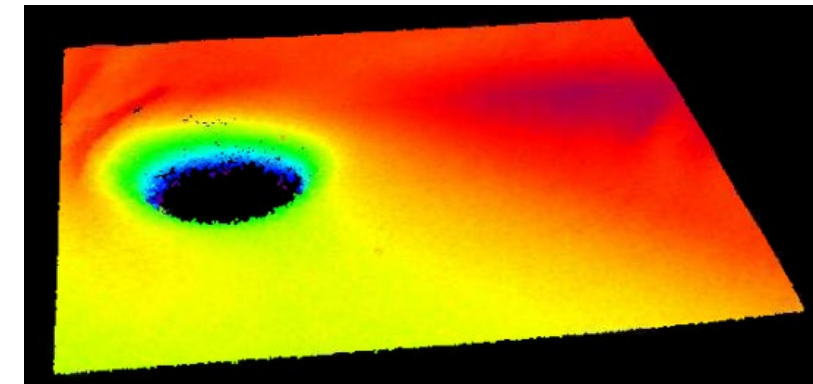
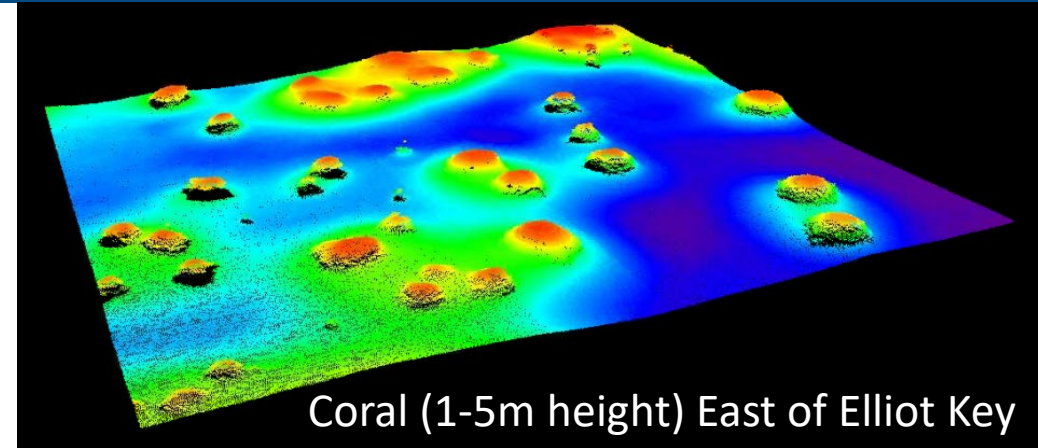
3D Printer Representation of Northeast by Neal Kolonay - FDEP



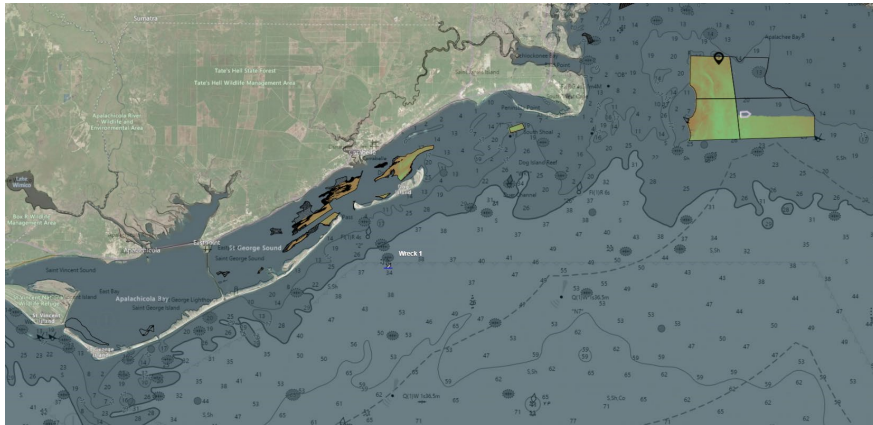
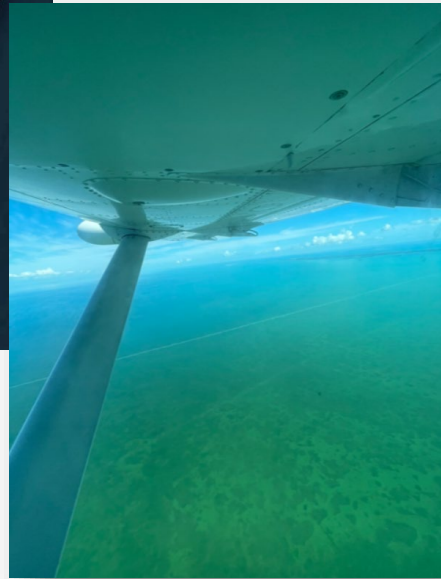
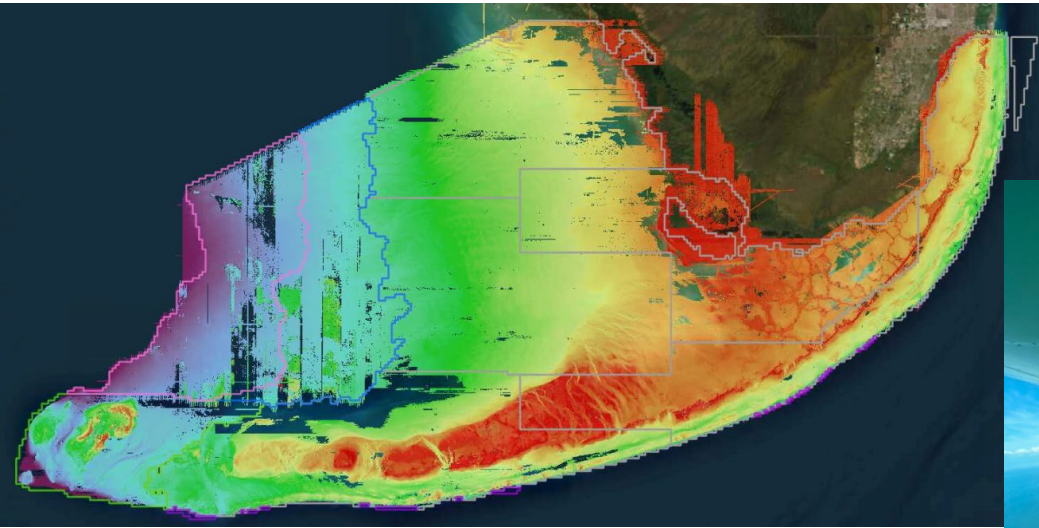
Why is FSMI Data Important?

Significance to the Blue Economy

- Habitat mapping
 - Evaluate coral health
 - Reefs protect large metropolitan areas
- Change analysis
 - Pre-storm data (some data collected prior to 2024 Hurricanes Helene and Milton)
 - Beach replenishment
 - Inundation Modeling
- Site preservation
 - Underwater archaeological sites (wrecks, popular dive sites)
 - Historical sites (forts, landmarks)
 - Good data stewardship
- Navigation



FSMI Summary and What's Next



- Topobathy lidar:
 - Initial acquisition for Region 3 AOI Bathy complete
 - Completion of supplemental areas and void reflights through April
 - Met the FDEP's September 30th 2025 Deadline
- Sonar:
 - Acquisition completed
 - All Sonar data has also been delivered
- USGS to take on task of edge matching contractor datasets
- FSMI data is valuable to many stakeholders and has many uses



Questions?

