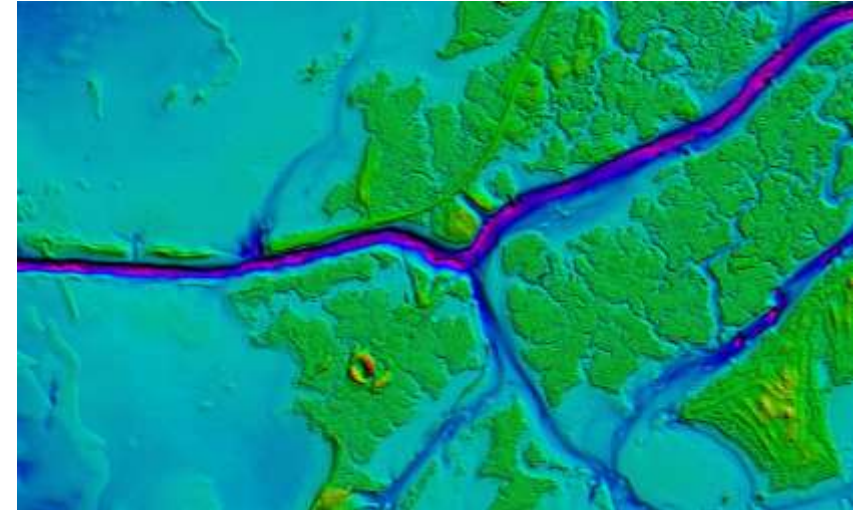




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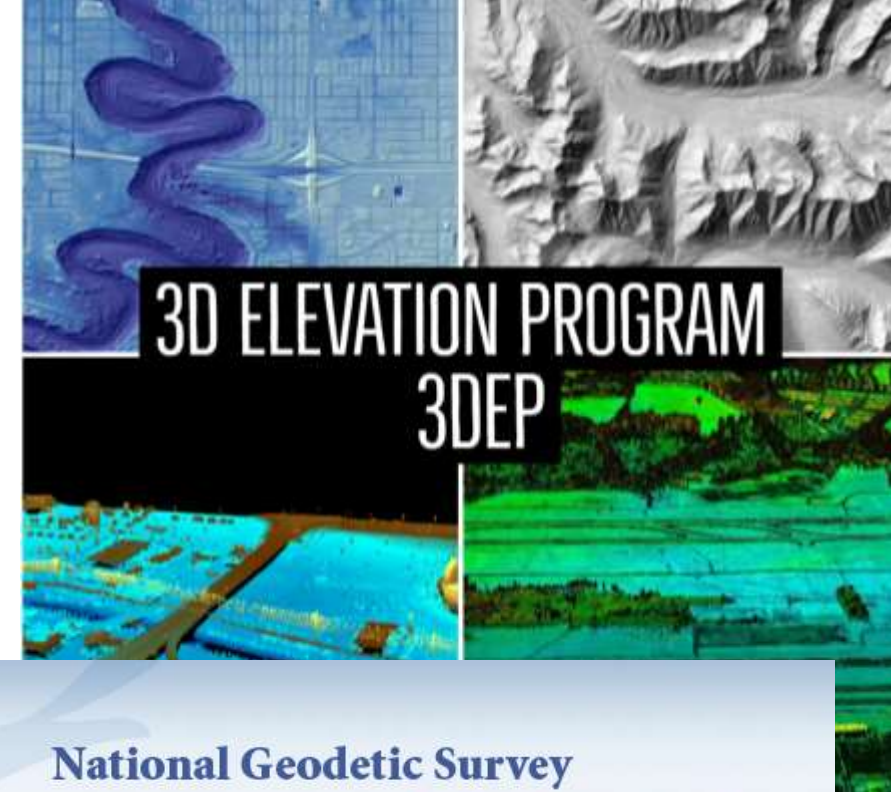
The Case for Topobathymetric Lidar Mapping in a National Mapping Strategy

Amar Nayegandhi, Senior Vice President, Dewberry

Geospatial World Forum, May 15, 2024

US National Elevation Mapping Programs

- US Geological Survey's 3D Elevation Program (3DEP)
- NOAA National Geodetic Survey (NGS) Coastal Mapping Program



NOAA

National Geodetic Survey

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Aeronautical Survey Program
[ASP Home](#)

Coastal Mapping Program
[CMP Home](#)
[Integrated Ocean and Coastal Mapping](#)
[Coast and Shoreline Change Analysis Program](#)
[Shoreline Data](#)

Coastal Mapping Program

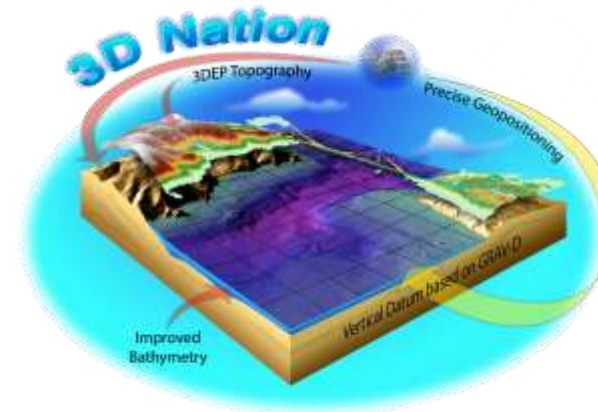
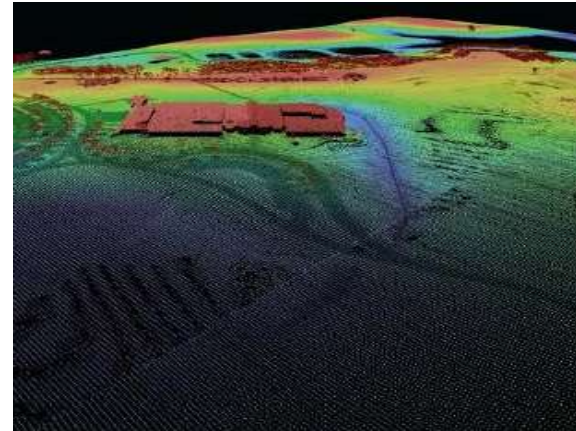
The United States has approximately 95,000 miles of coastline (as compiled from 1:80,000-scale charts). One of the missions of NOAA's National Geodetic Survey (NGS) is to survey these coastal regions and to provide the Nation with accurate, consistent, up-to-date national shoreline.

The national shoreline provides the critical baseline data for demarcating America's marine territorial limits, including its Exclusive Economic Zone, and for the geographic reference needed to manage coastal resources and many other uses. These shoreline data are considered authoritative when determining the official shoreline for the





3D Nation Elevation Requirements and Benefits Study



Study Leads



INTERAGENCY WORKING GROUP ON
Ocean and Coastal Mapping



3D Nation - Builds a modern elevation foundation from the peaks of our mountains to the depths of our waters for stronger, more resilient communities and U.S. economy.

Full report available at:

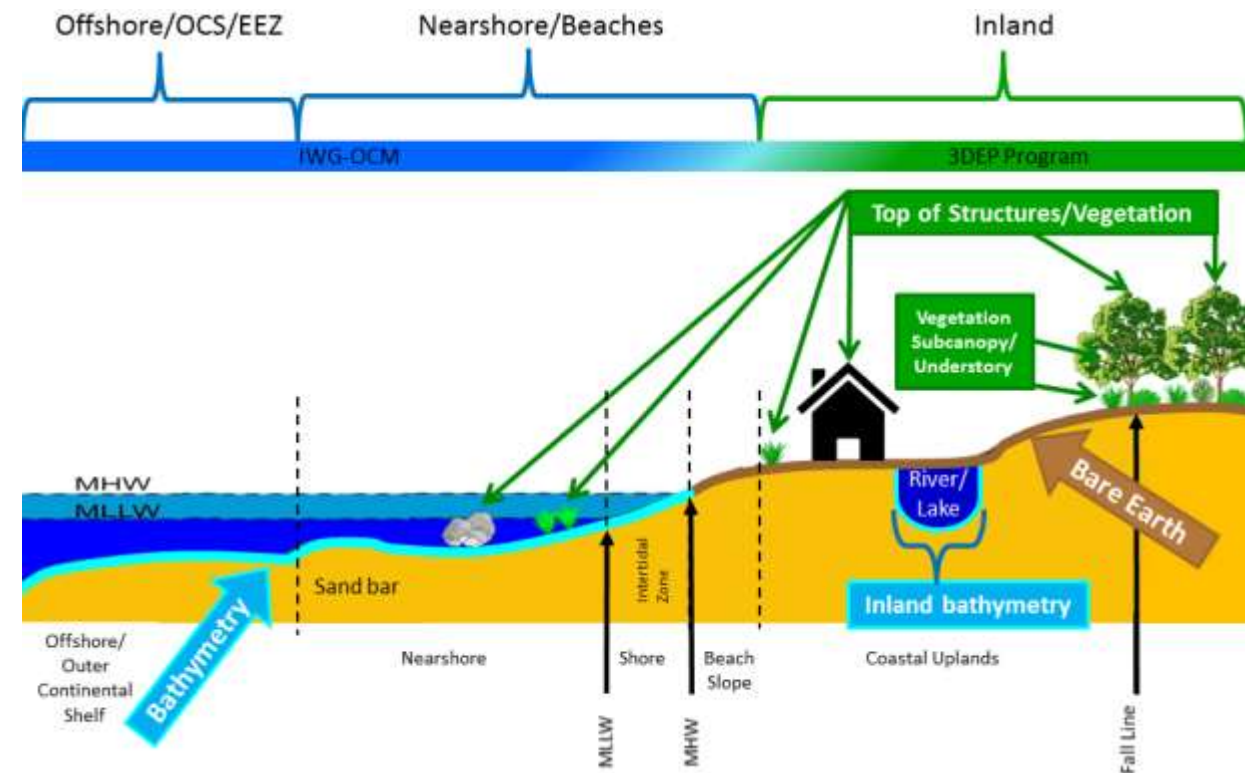
<https://www.dewberry.com/services/geospatial-mapping-and-survey/3d-nation-elevation-requirements-and-benefits-study>



+ Mapping a 3D Nation: Study Goals

Understand 3D Elevation Data Requirements

- Understand inland, nearshore, and offshore elevation data requirements and benefits
- Understand how requirements and benefits dovetail in the coastal zone
- Improve understanding of needs to guide planning for NOAA and the next generation of 3DEP for USGS after completion of nationwide coverage
- Gather technology-agnostic user information to assess new technologies against requirements and tradeoffs between different approaches



US Federal and State Partnerships

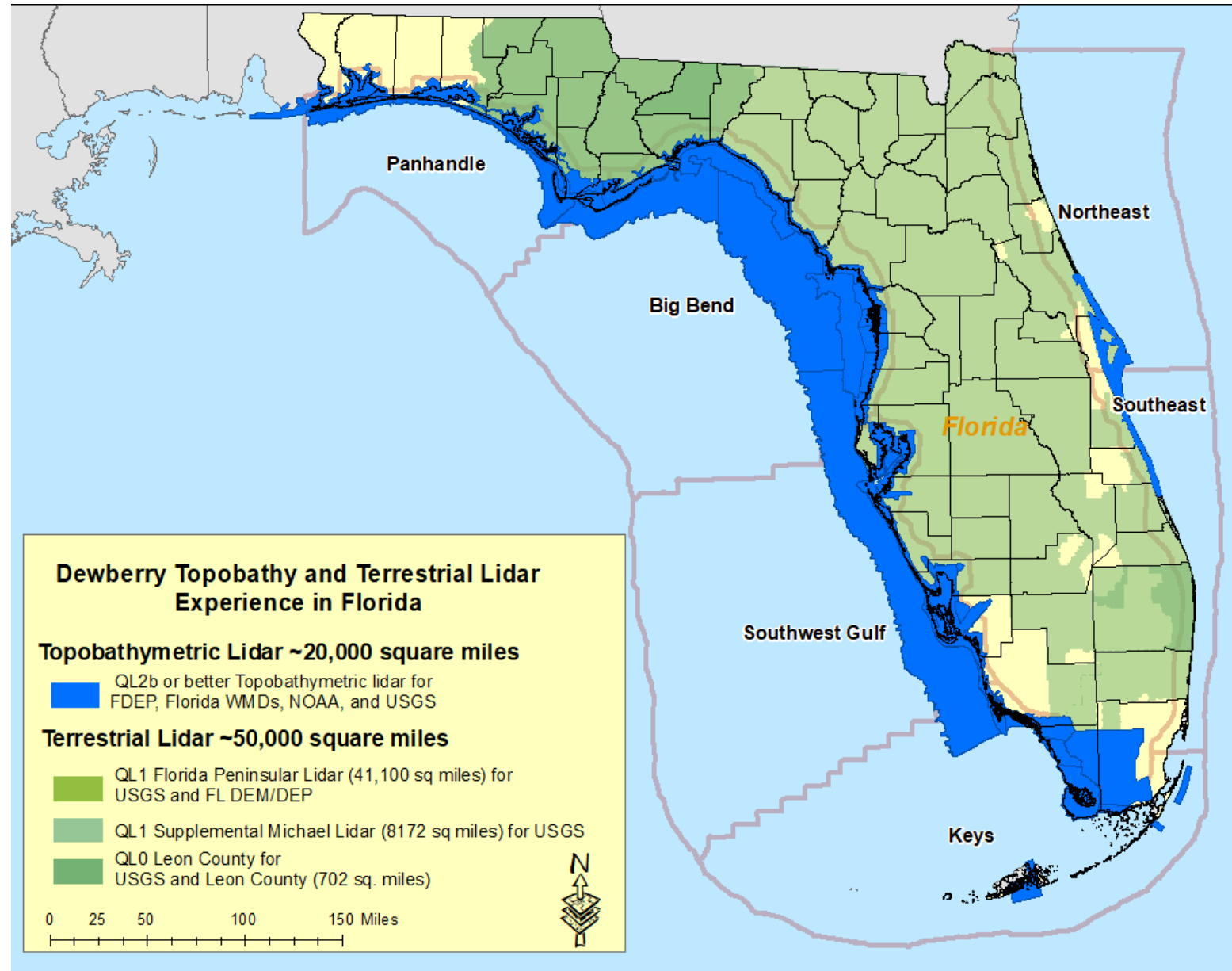
- Working together to build a national elevation dataset
- Private sector involvement
- Example from Florida



Mapping in Florida

Dewberry has collected and processed...

- Statewide, QL1 topographic lidar
- Bays and estuaries (Tampa Bay, Indian River Lagoon)
- Parts of FL Keys for coral reef studies
- Everglades National Park for habitat studies
- Offshore bathymetry in the Gulf of Mexico
- Florida west coast nearshore bathymetry following Hurricane's Michael & Ian
- Rivers and Springs systems (Lower Withlacoochee River, Gum Slough, Rainbow River)
- From 2020 – Active Current Projects: 18,000 mi² of Topobathy lidar



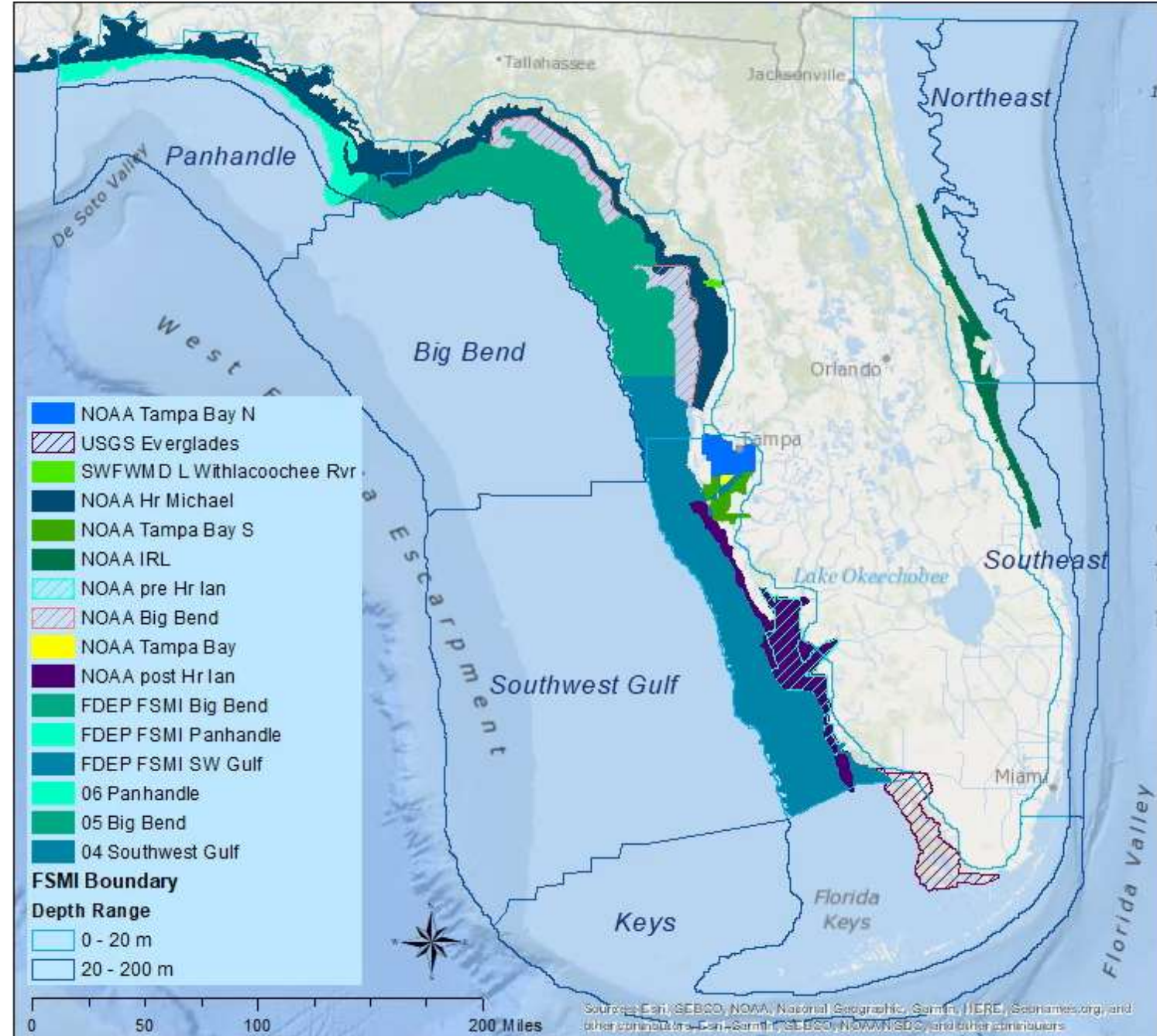


Project Examples

Florida Seafloor Mapping Initiative
Withlacoochee River Watershed

Florida Seafloor Mapping Initiative (FSMI)

- 6 Regions – Dewberry awarded 3 regions (West Florida)
- Aligns well with recent FL Topobathy projects
- 46,620 km² or 18,000 mi² of Topobathy Lidar
- Project is ongoing – lidar scheduled to be completed Dec 2024.
- 20 – 200 m to be completed with boat-based sonar



CZMIL SuperNova (x3)



Teledyne Coastal Zone Mapping and Imaging Lidar (CZMIL) SuperNova

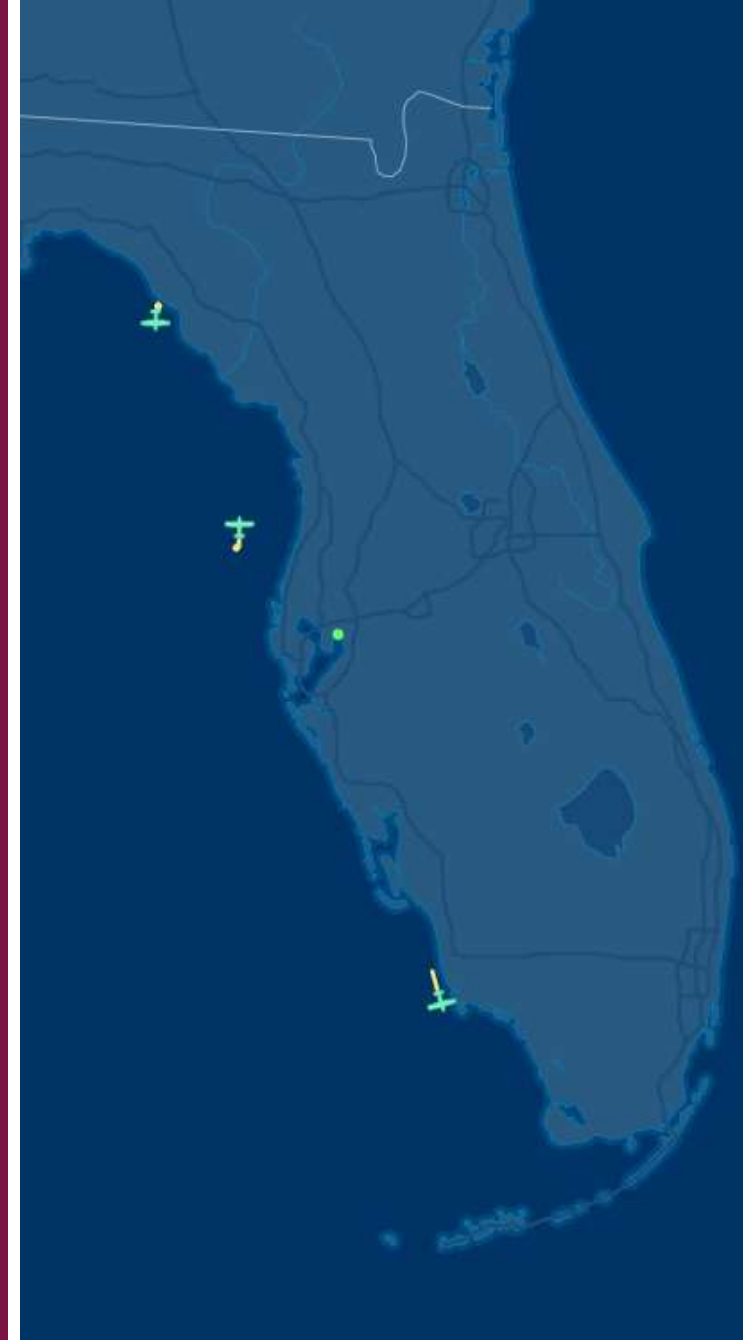
Unique green-wavelength lidar with QL1 topography, bathymetry from 7 shallow channels and 1 deep channel

Capable of modeling ~3.5 x Secchi depth

Field-programmable for maximum performance in wide range of environments

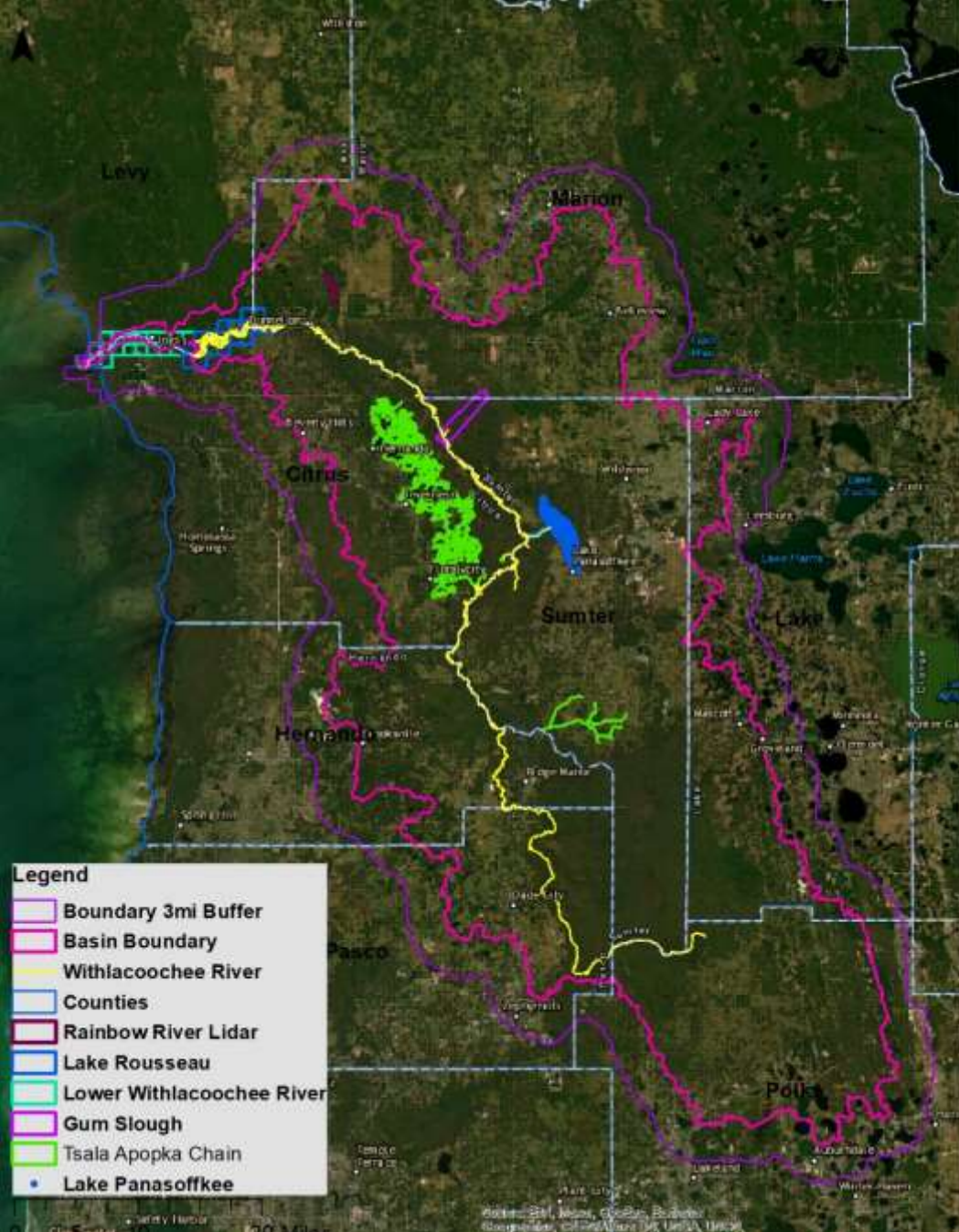
CARIS BASE Editor for processing data using AI/ML techniques

Close collaboration with Teledyne and JALBTCX through CZMIL SuperNova User group

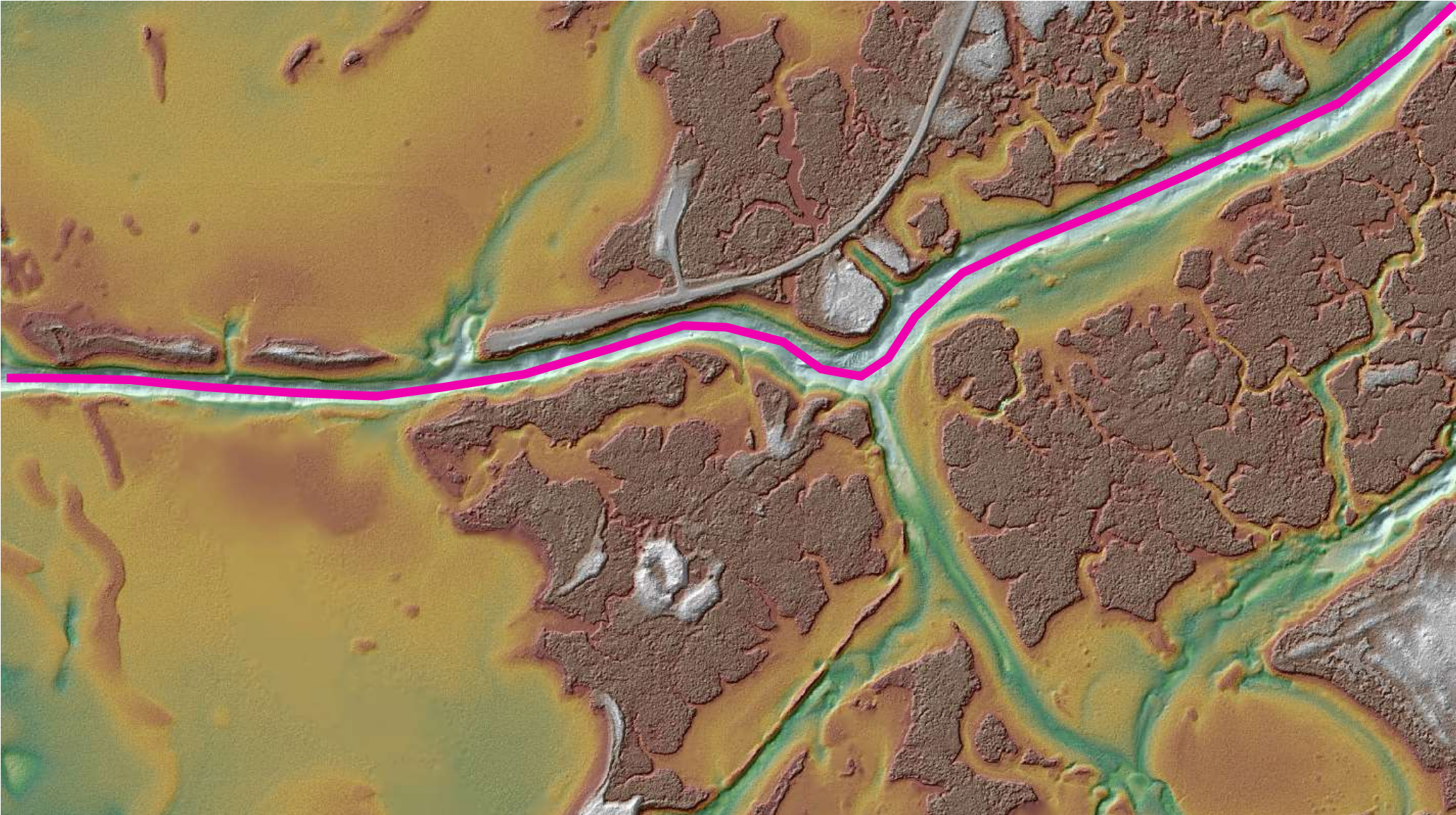


Withlacoochee River Watershed DEM Update

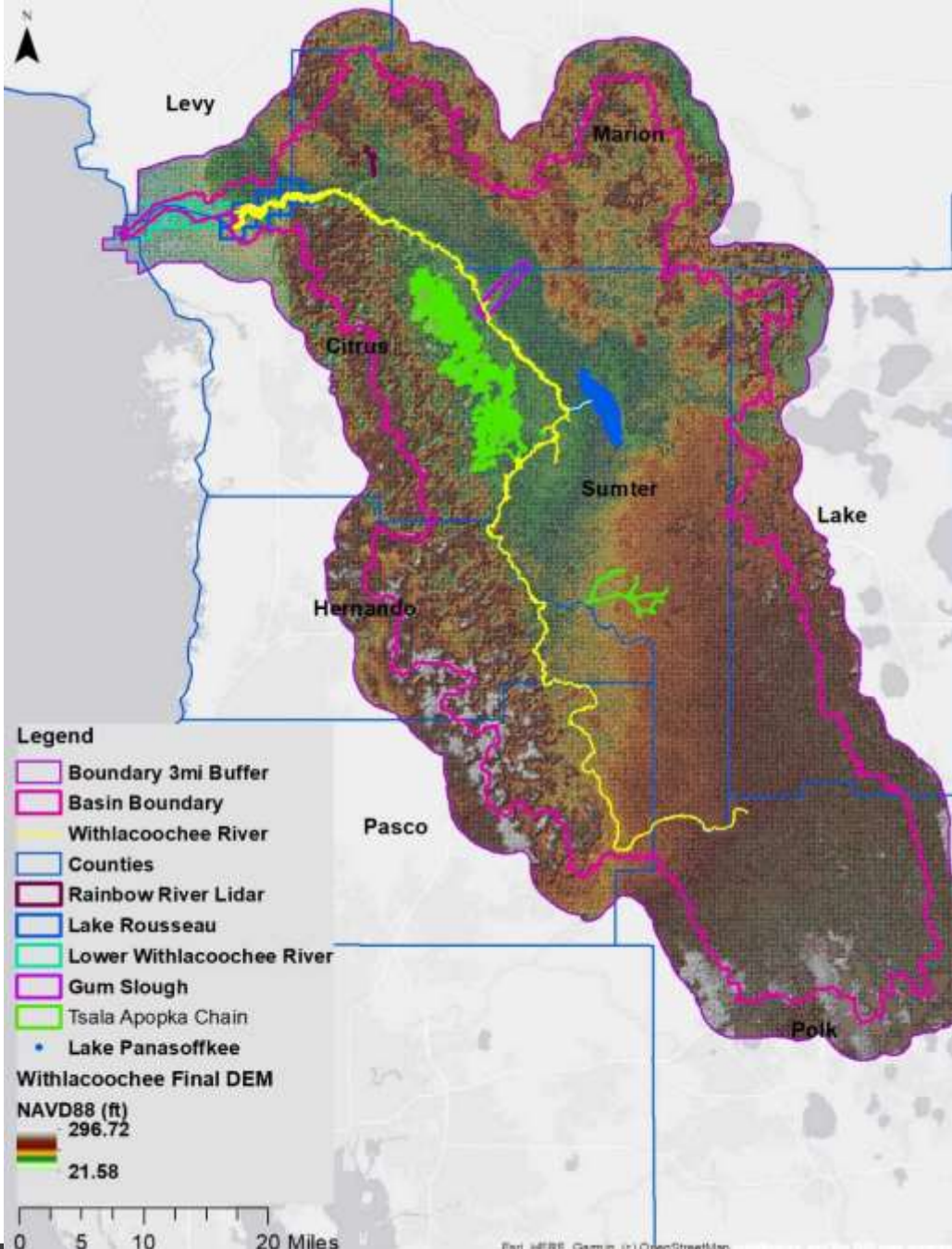
- Update 2018 Watershed DEM with new FL QL1 topo data
- Incorporate topobathymetric lidar and acoustic data from:
 - Rainbow River
 - Gum Slough
 - Lake Rousseau
 - Lower Withlacoochee River
- Southwest Florida WMD (SWFWMD) to use for modeling of the Withlacoochee River Basin to support the minimum flows and levels (MFLs) establishment scheduled for completion in 2024



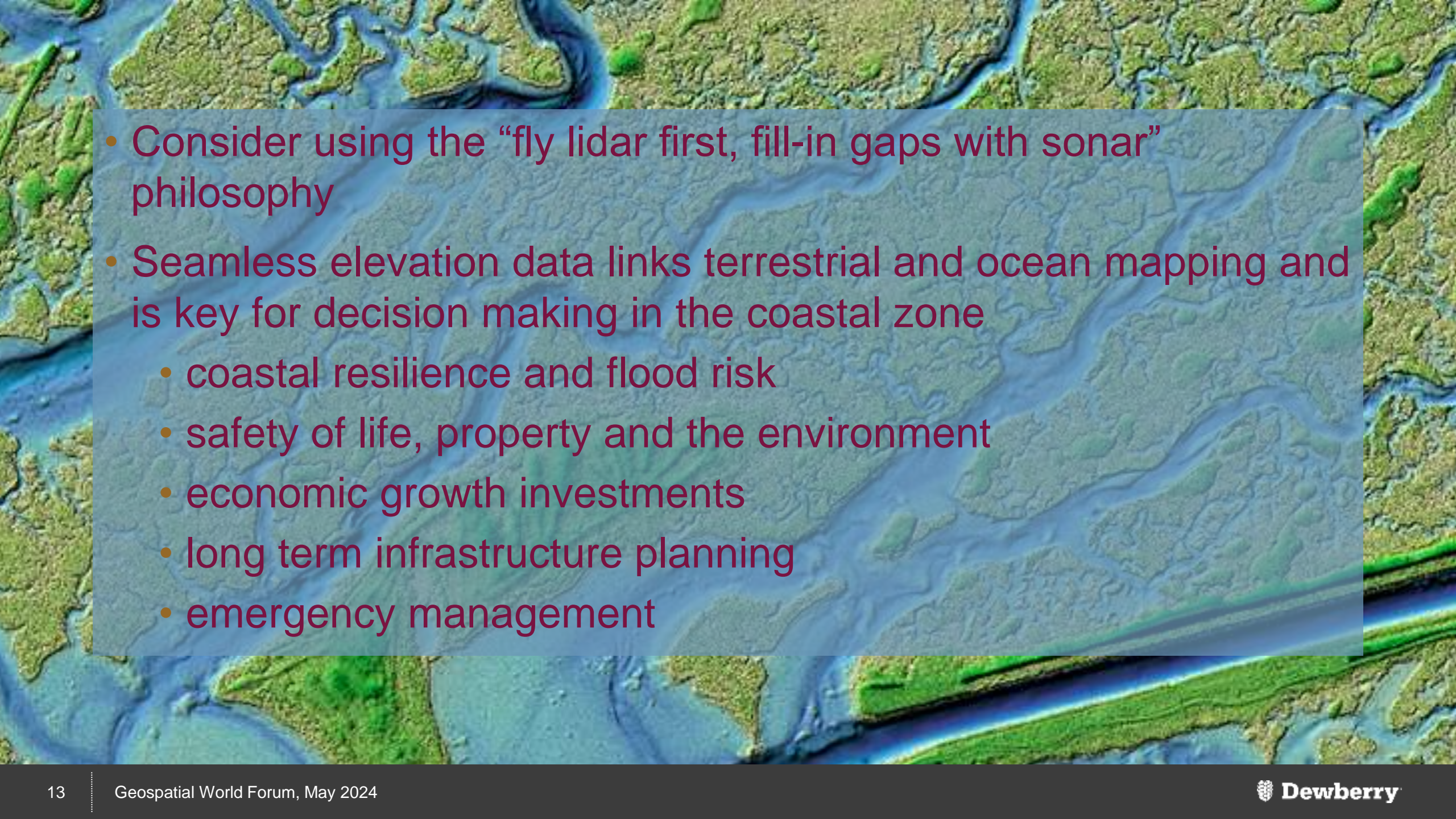
SWFWMD – Lower Withlacoochee River Watershed



Withlacoochee River Watershed



AOI	Topo Lidar	Topobathy Lidar	MBES	SBES	Pole Soundings
FL Peninsula QL1	X				
Withlacoochee River Main				X	X
Lower Withlacoochee	X	X	X	X	X
Lake Rousseau	X		X	X	X
Rainbow River		X			
Gum Slough		X			
Tsala Apopka Lake Chain				X	X
Lake Panasoffkee				X	

- 
- Consider using the “fly lidar first, fill-in gaps with sonar” philosophy
 - Seamless elevation data links terrestrial and ocean mapping and is key for decision making in the coastal zone
 - coastal resilience and flood risk
 - safety of life, property and the environment
 - economic growth investments
 - long term infrastructure planning
 - emergency management

Thank you!



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