



LARGE SCALE COASTAL MAPPING: OPERATIONAL CONSIDERATIONS

Alaska Coastal Mapping Summit



OUTLINE

Introduction

Coastal Mapping Experience

Alaska Operations

Technology

Operational Considerations

Data Products



Quantum Spatial GEOGRAPHICAL FOOTPRINT

Our production offices stretch from St Petersburg, FL to Anchorage, AK. We also have global offices in Vancouver, BC and Bangalore, India.

Acquisition assets are located in Wisconsin, Kentucky, Oregon, and Alaska. But these teams are highly mobile and follow weather patterns and project locations.

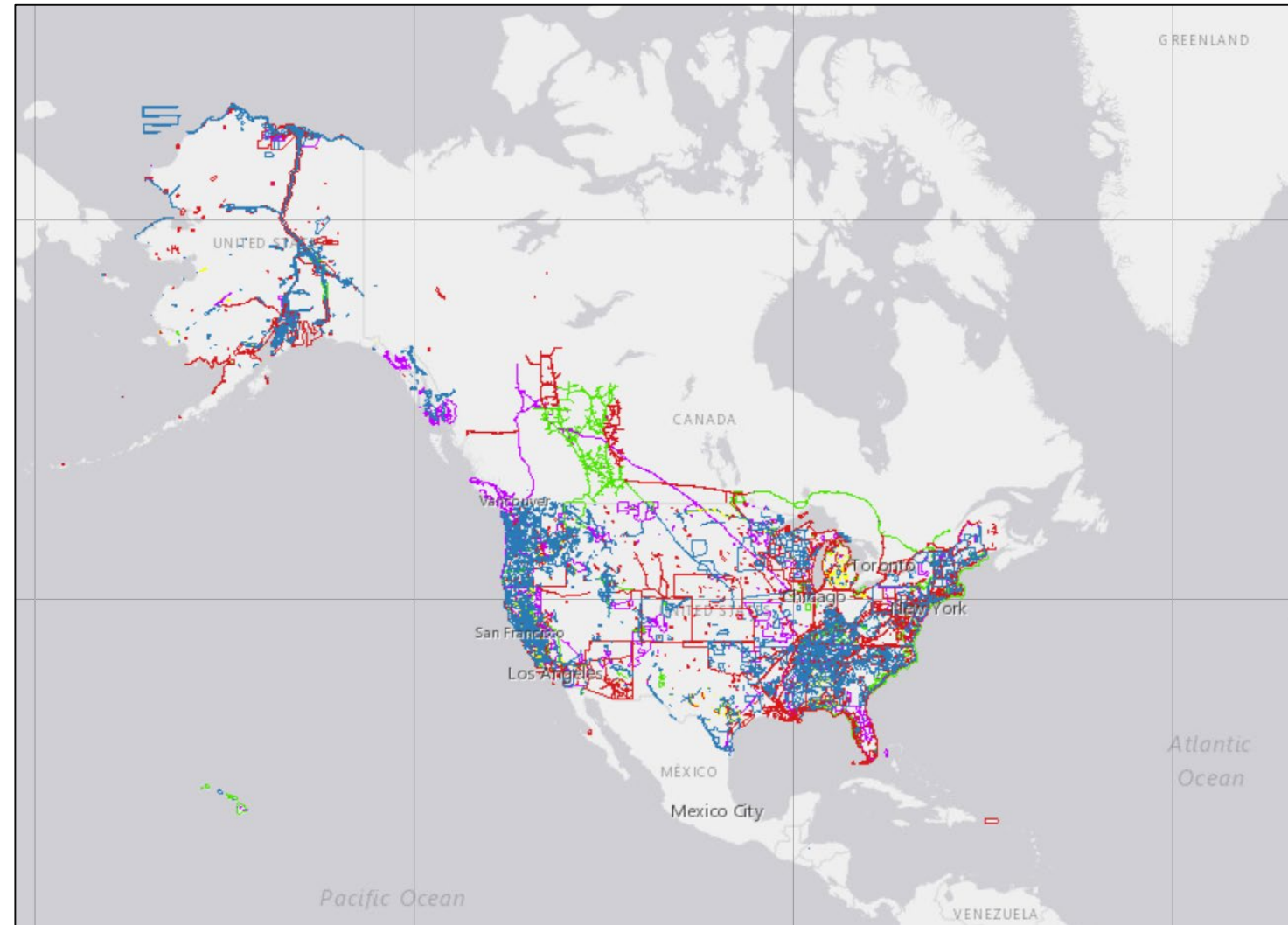
PROJECT EXPERIENCE



Quantum Spatial has executed projects over much of North America including:

- All 50 US States from Alaska to Florida and Hawaii to Maine
- 7 Canadian Provinces
- 2 Canadian Territories
- Mexico
- Puerto Rico & Caribbean

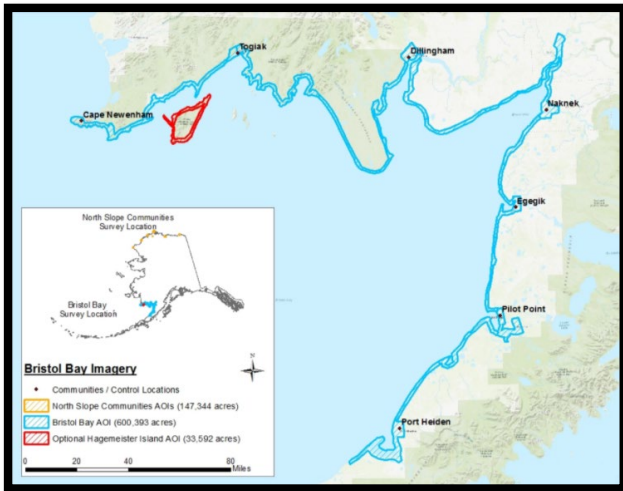
Our acquisition assets can mobilize almost anywhere and our pilots and sensor operators have experience acquiring data in nearly any environment.



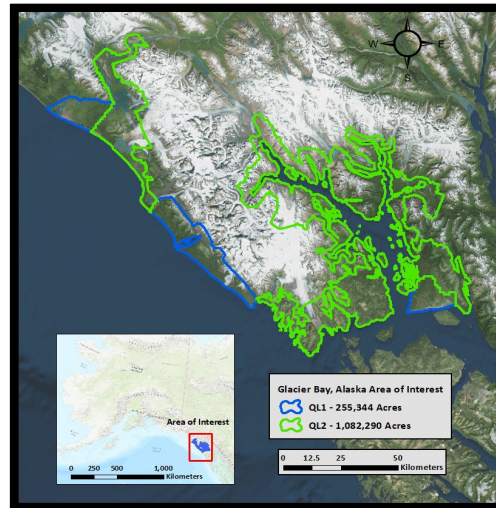
COASTAL MAPPING EXPERIENCE



- USACE St Mary's River, MI (963 shoreline miles)
- NOAA Post Super Storm Sandy (~5,000 Shoreline Miles)
- NOAA Chesapeake Bay (2,761 Shoreline Miles)
- NOAA Post Hurricane Florence (6,511 Shoreline Miles)
- NOAA South Carolina (1,372 Shoreline Miles)
- NOAA Post Hurricane Michael (5,215 Shoreline Miles)
- NOAA Florida Keys (1,872 Shoreline Miles)



• Bristol Bay Phodar



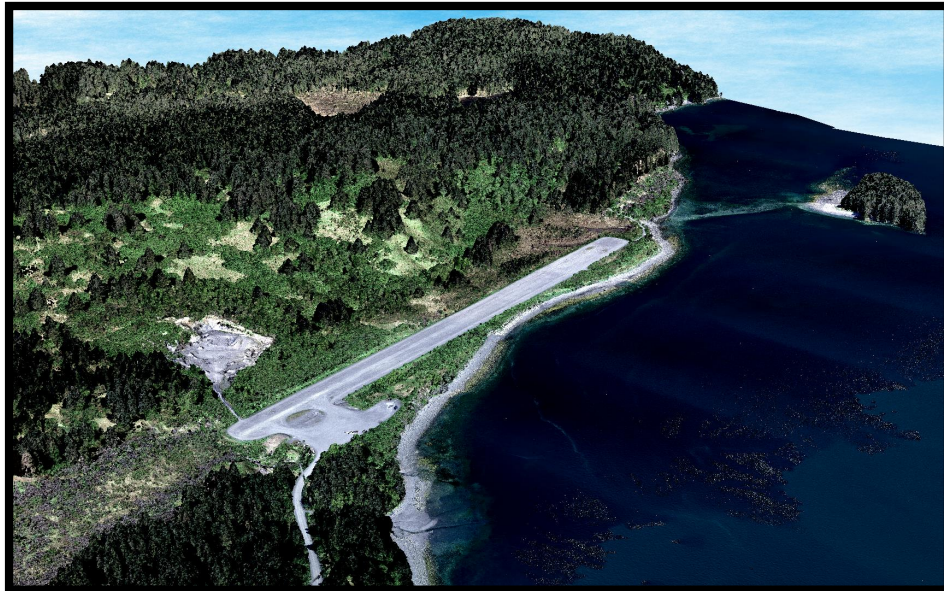
• Glacier Bay Lidar



ALASKA OPERATIONS



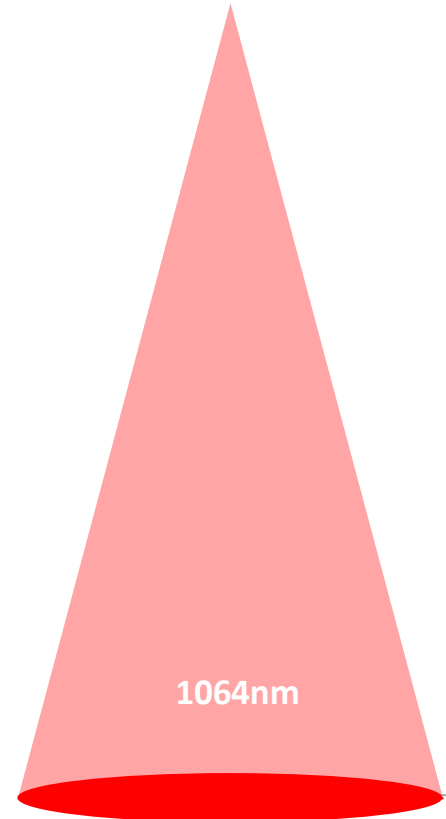
- Production & Flight Operation base at Merrill Field
- 3-4 aircraft in AK during flying season
 - Imagery, lidar, and topobathymetric lidar
 - Helicopter operations
- Large Partner Network
 - Survey firms
 - Maintenance/aviation services



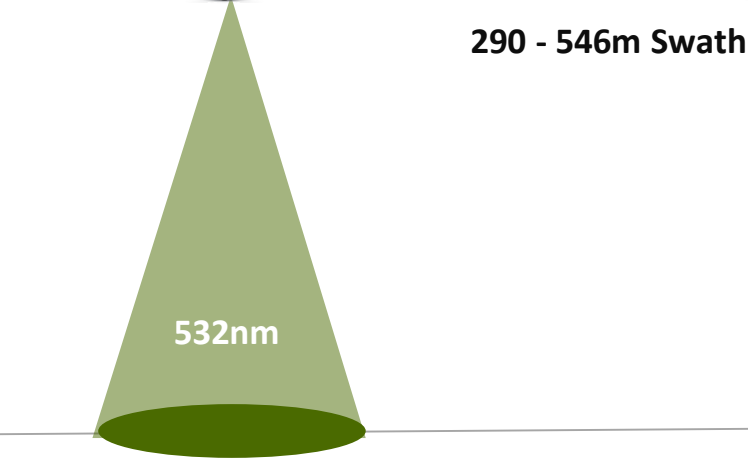
TECHNOLOGY



Topographic LiDAR



Topographic-Bathymetric LiDAR



1,000 – 2,500m AGL

1,121 – 2,800m Swath

400 - 750m AGL

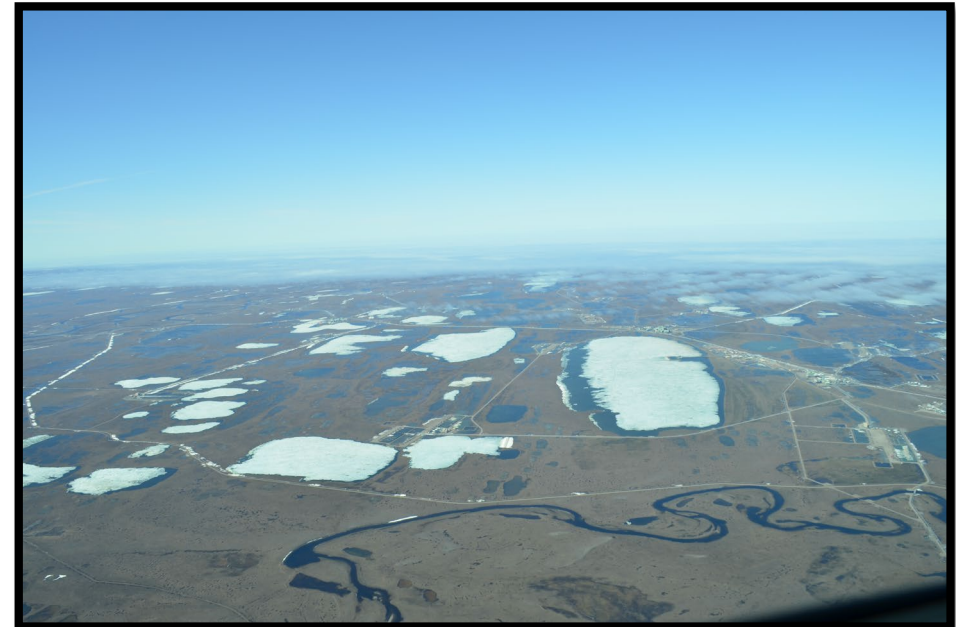
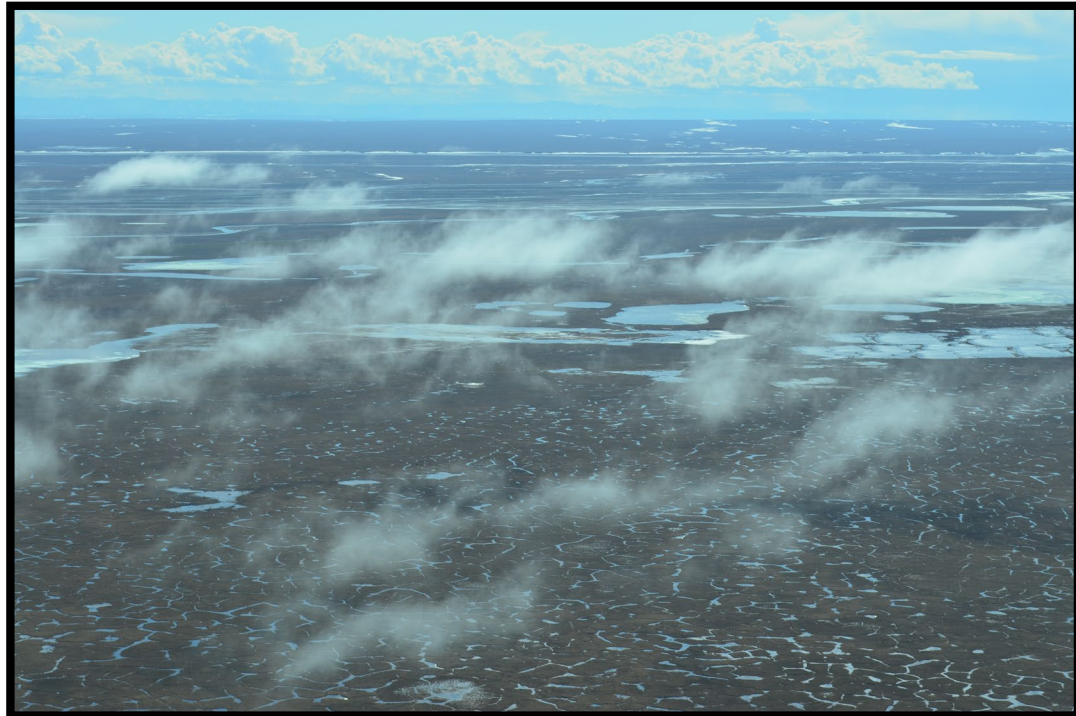
290 - 546m Swath

OPERATIONAL CONSIDERATIONS

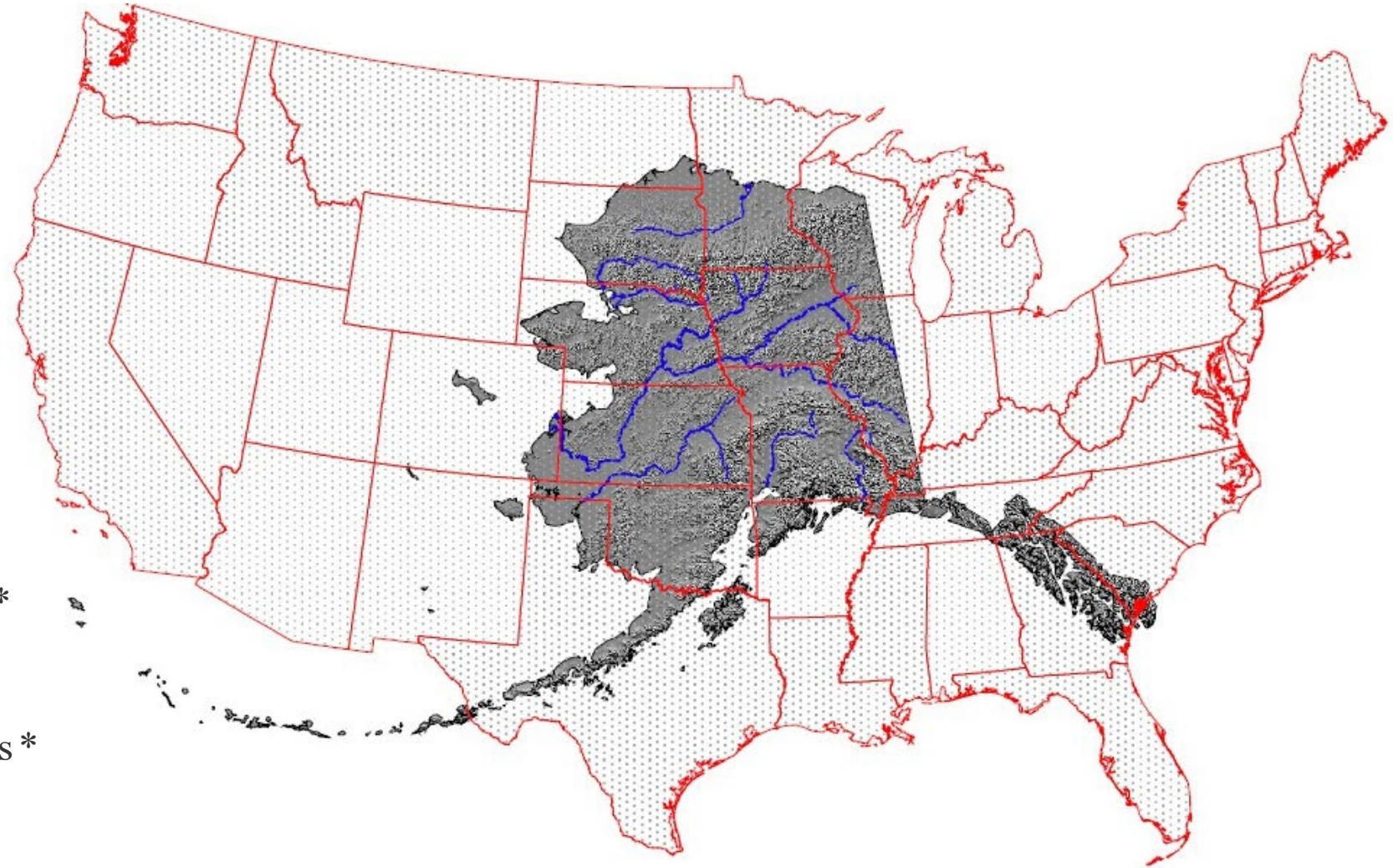


WEATHER

- Short flying season
- Late snow pack
- Ice break up
- Coastal fog/marine layers
- Rain



SCALE



- AK-
33,904 Shoreline Miles*
- CONUS-
~59,000 Shoreline Miles*
- Project size & location

*Source: NOAA Shoreline Website at [shoreline.noaa.gov/faqs.html?faq=2](https://www.shoreline.noaa.gov/faqs.html?faq=2).

Source USDA NRCS
https://www.nrcs.usda.gov/wps/portal/nrcs/ak/technical/dma/nrcs142p2_035899/

TERRAIN

Kenai Peninsula, SE AK, Aleutian Islands

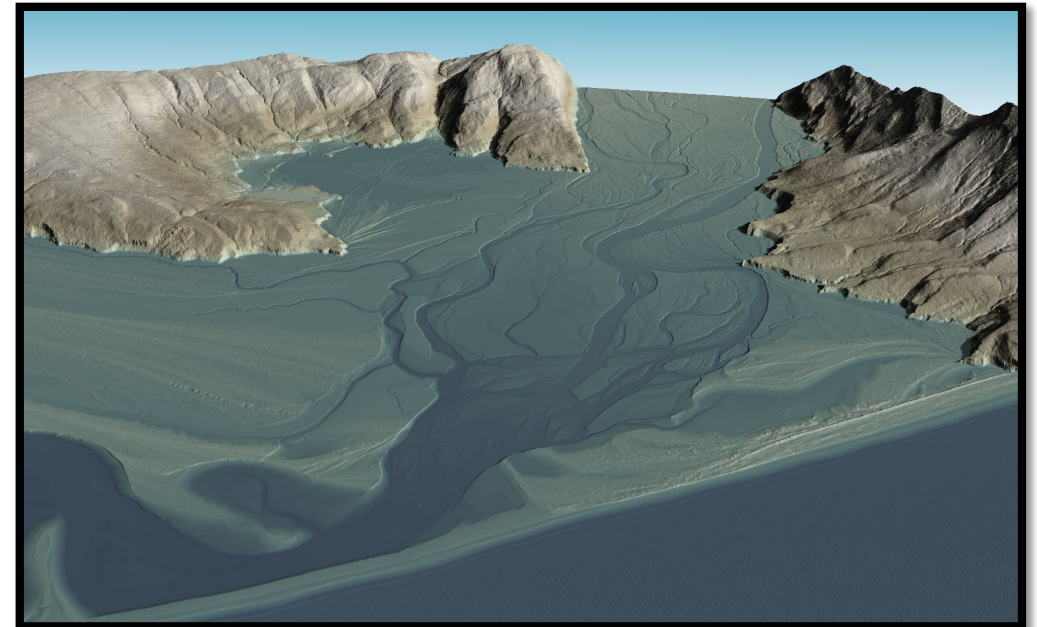
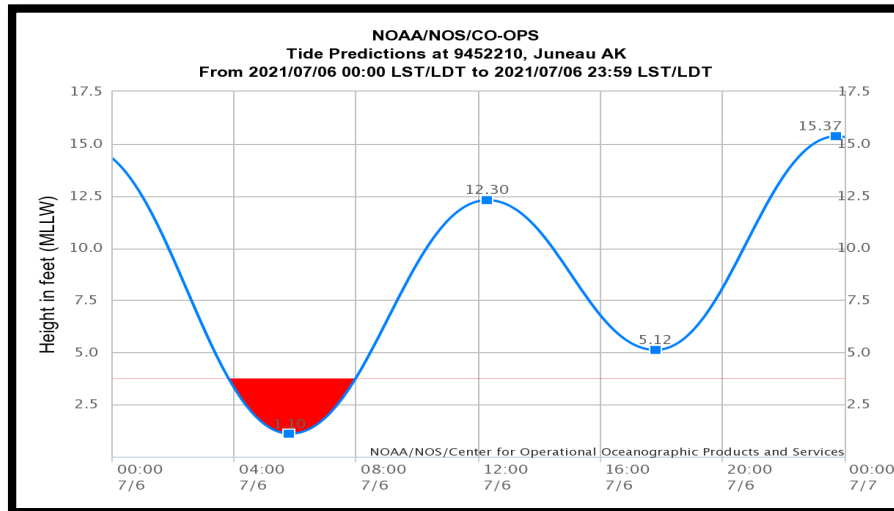
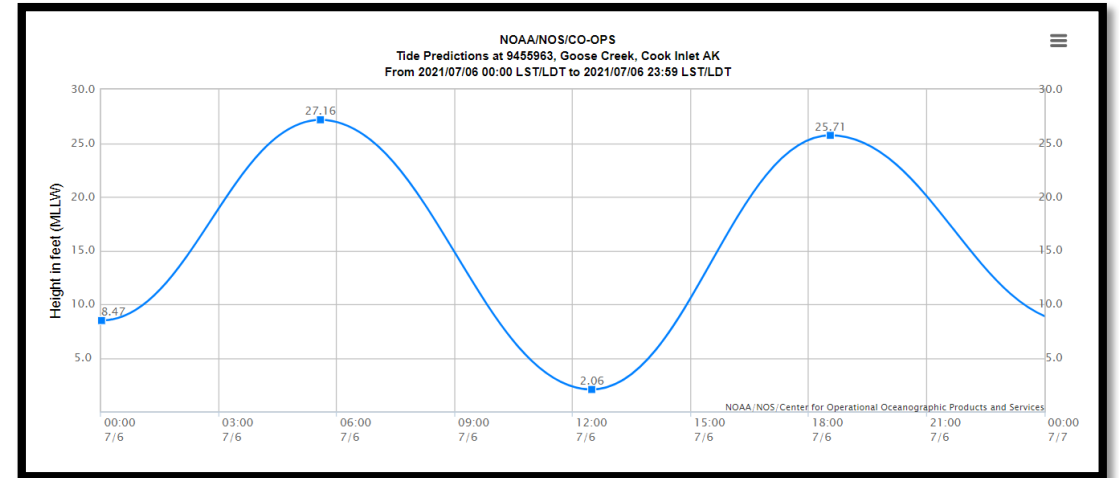
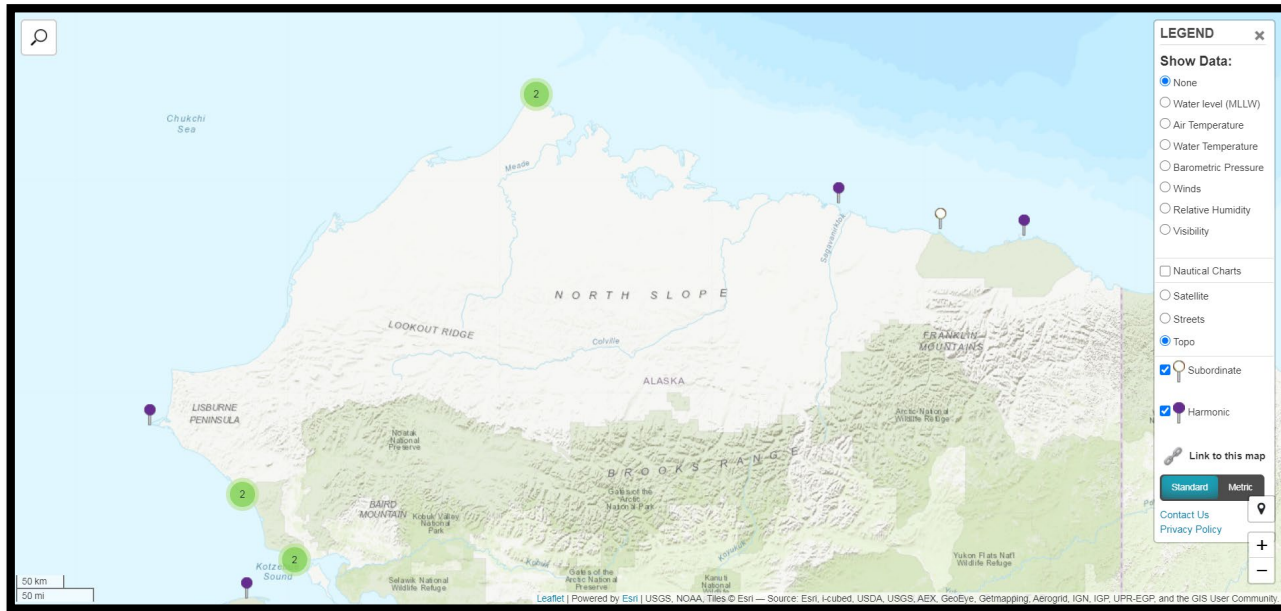
Mountainous terrain, Fjords, Box canyons

Safety of flight

Topobathymetric lidar flying altitude ~400-600m

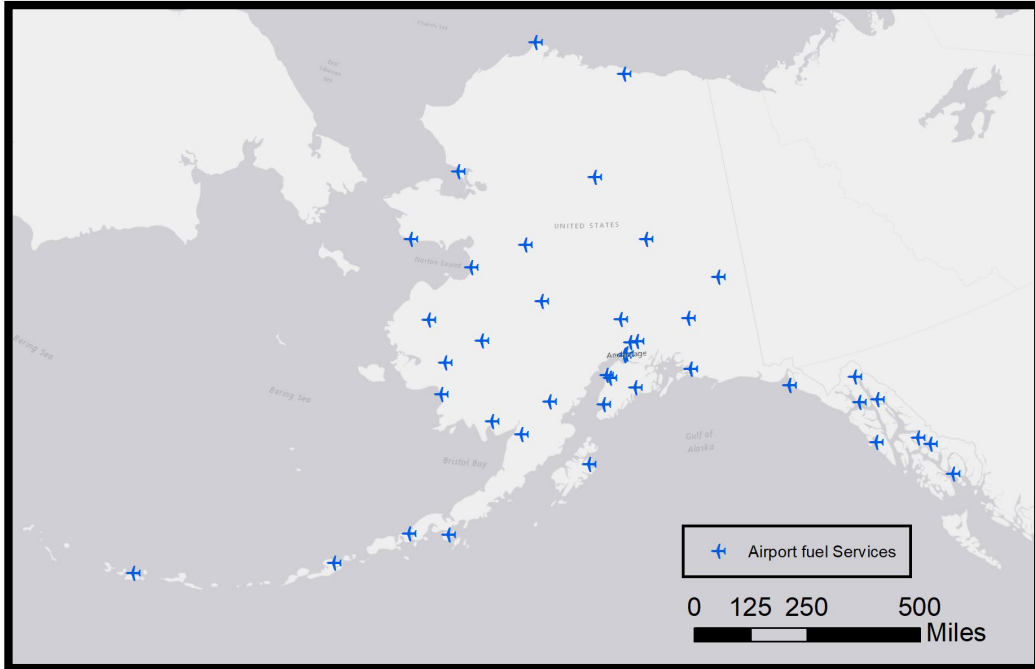


TIDES



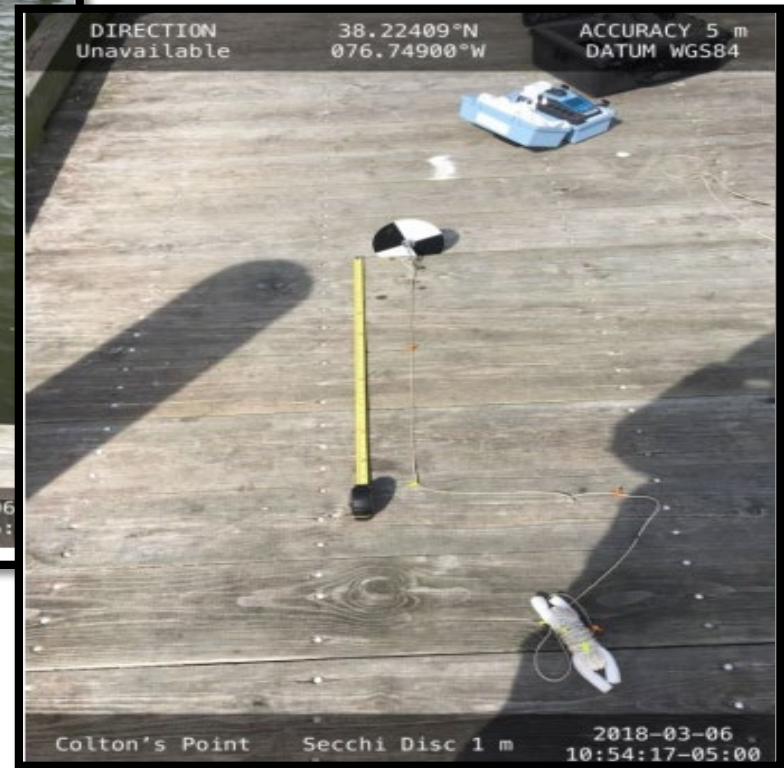
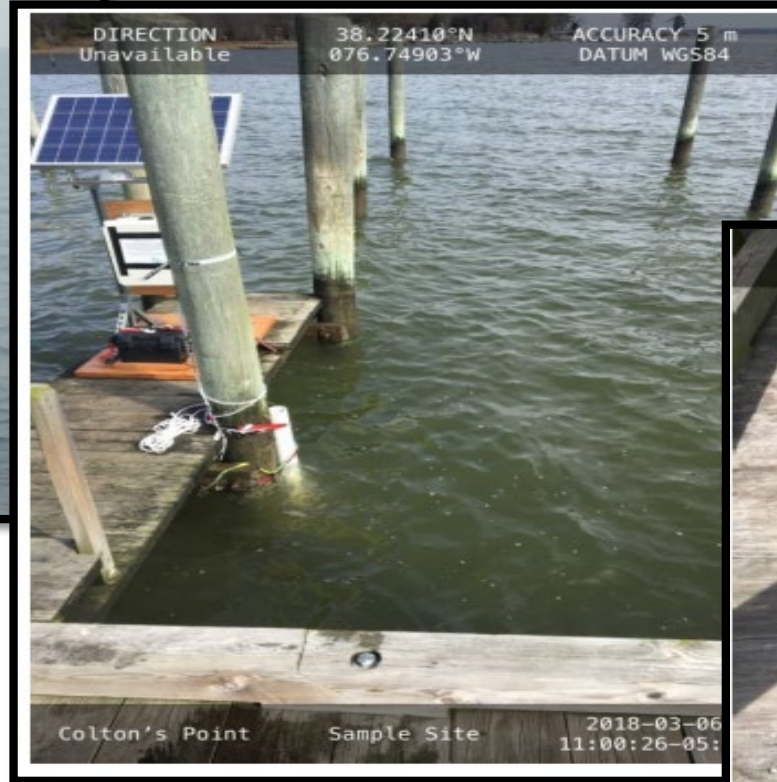
REMOTENESS

- Ground Truthing
- Advanced Logistics



TURBIDITY

- Wind speed and direction
- Water surface conditions and wave height



KEY TAKEAWAYS

 Clear Goals & Expectations

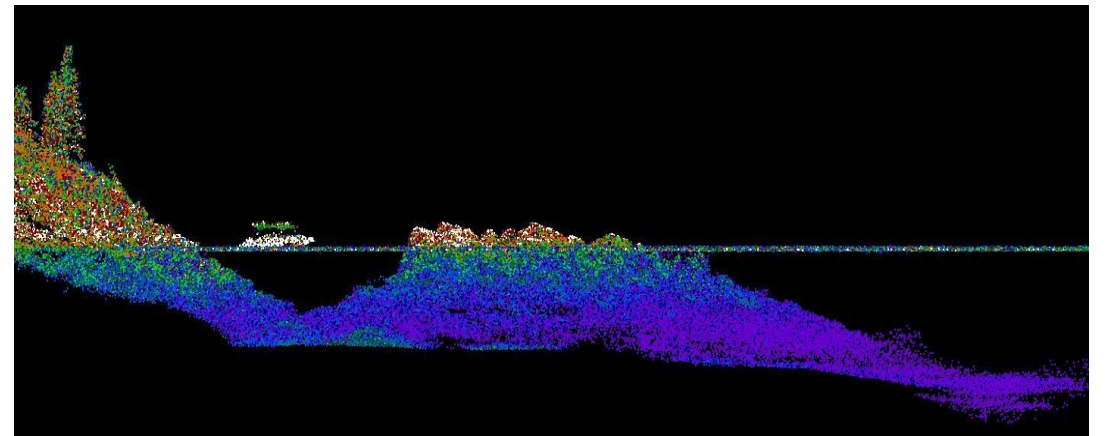
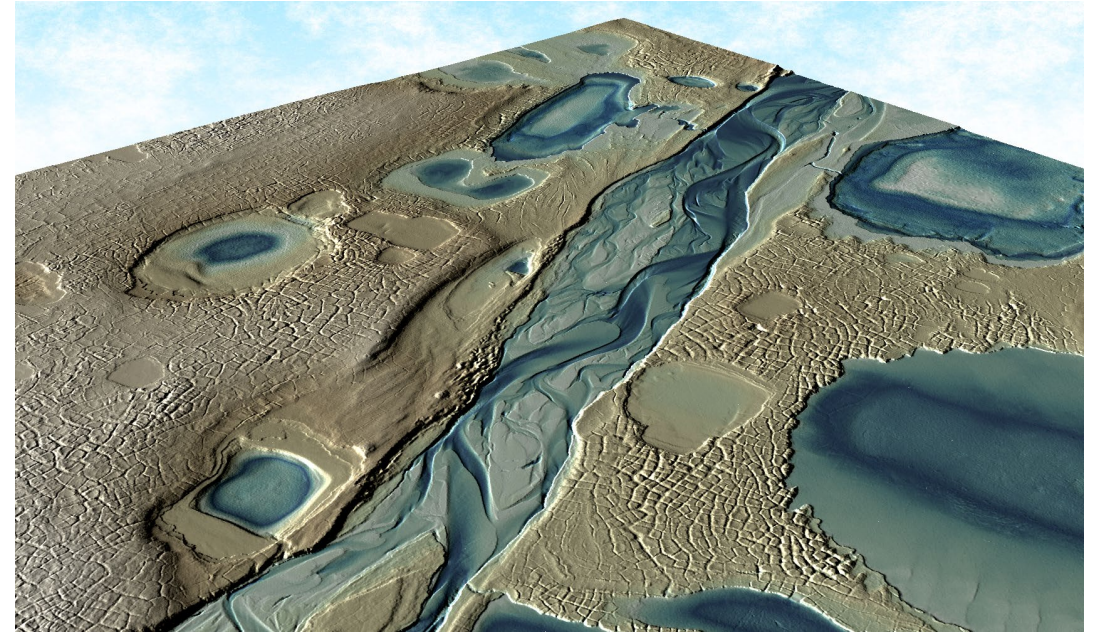


 Comprehensive Project Design 



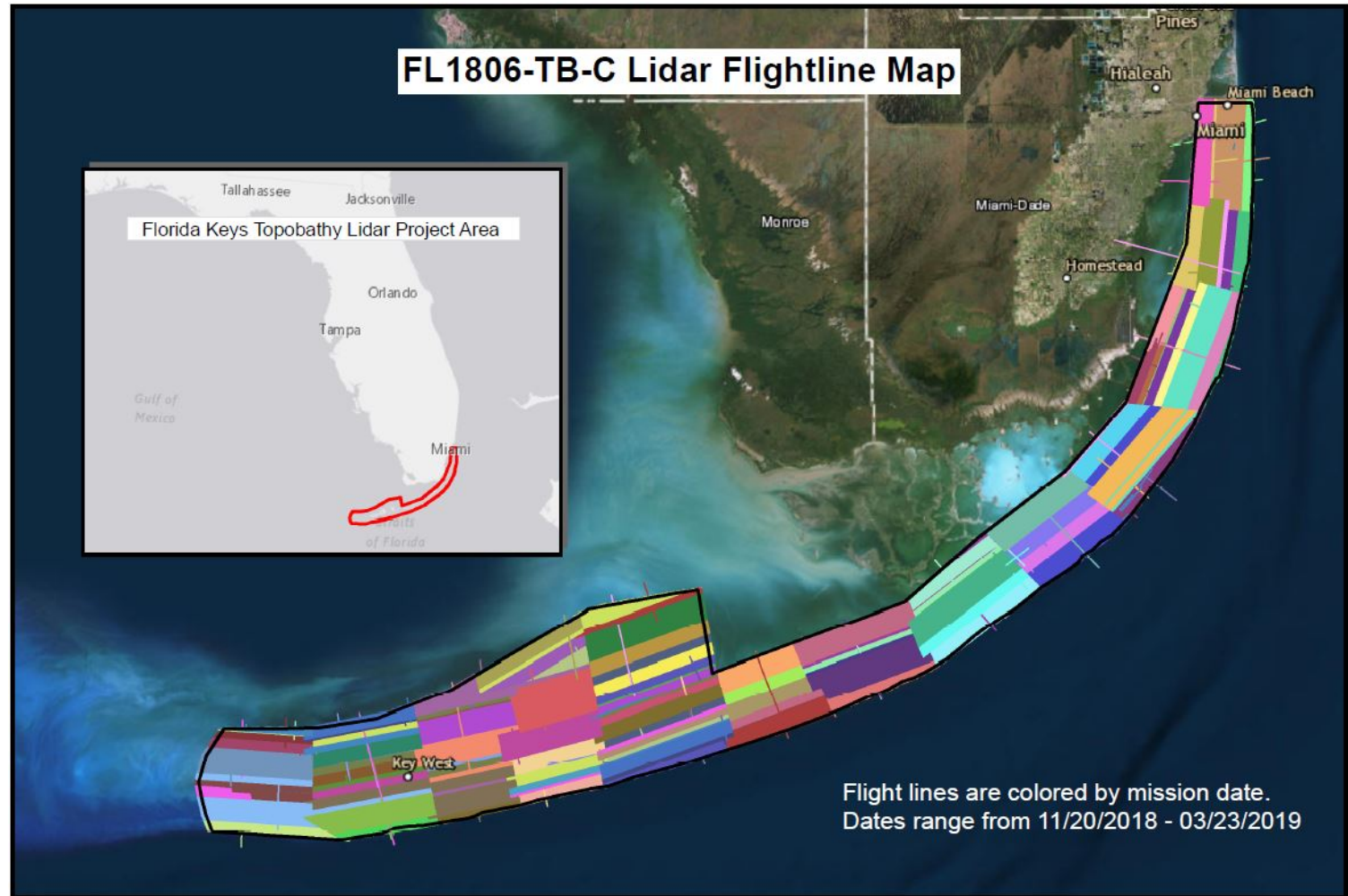
 Communication & Collaboration

Success!



PROCESSING CONSIDERATIONS

- Temporal Differences
- Project Calibration
 - Boresight
 - Line to line
 - Absolute Accuracy
- Refraction
 - One size does not fit all
- Scheduling and Delivery
 - Chase good conditions, but...
- Multiple Sensor Integration
 - Intensity normalization
 - Fundamental Differences

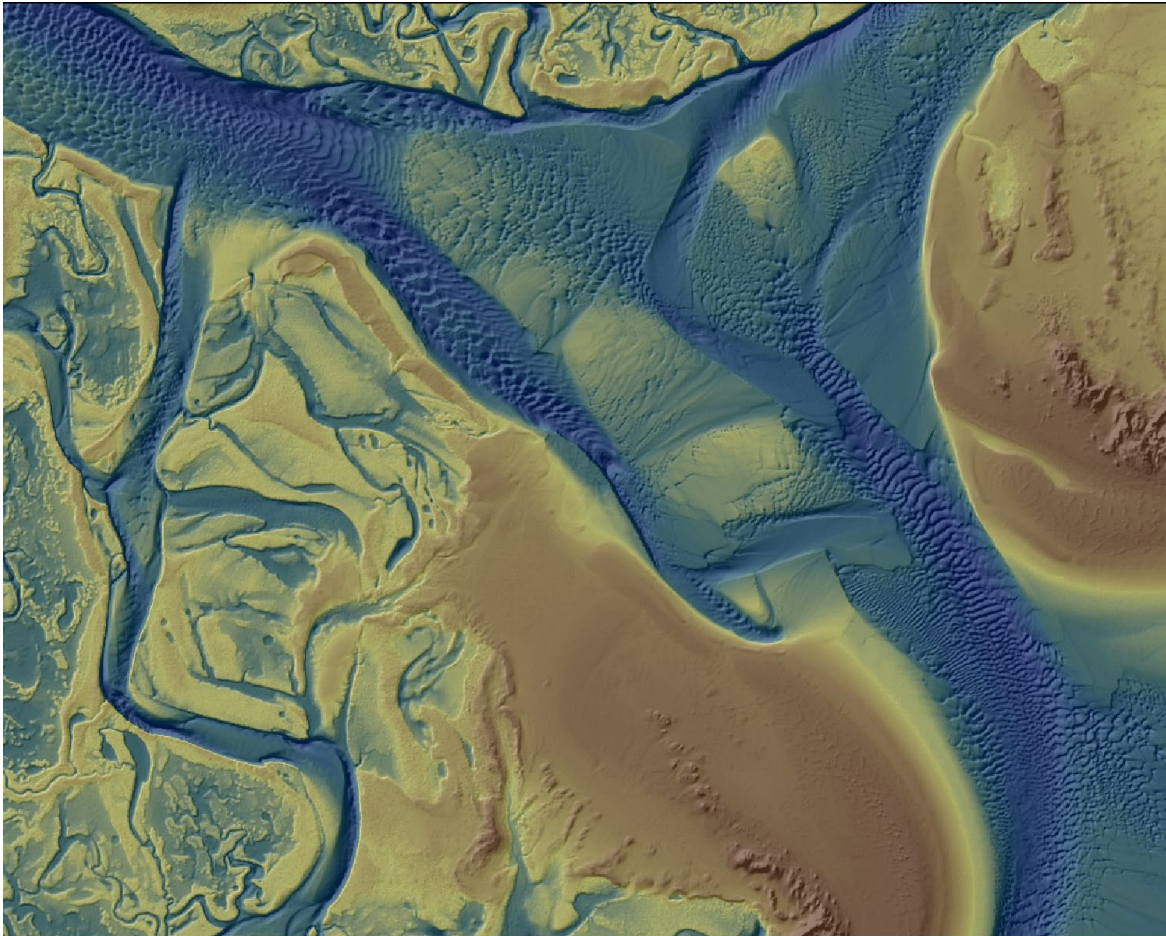


Florida Keys Topobathymetric Lidar
NOAA NGS RSD CMP
FL 1806-TB-C
EA-133C-14-CQ-0007

0 5 10 20 30 40 Miles



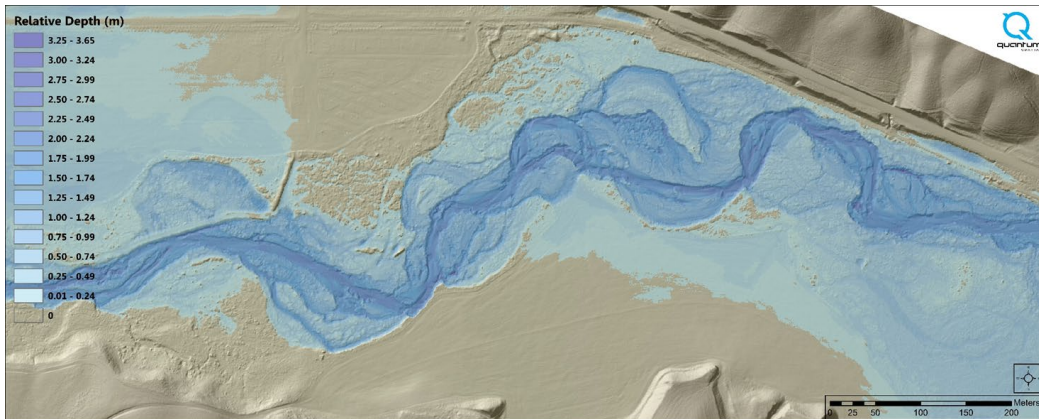
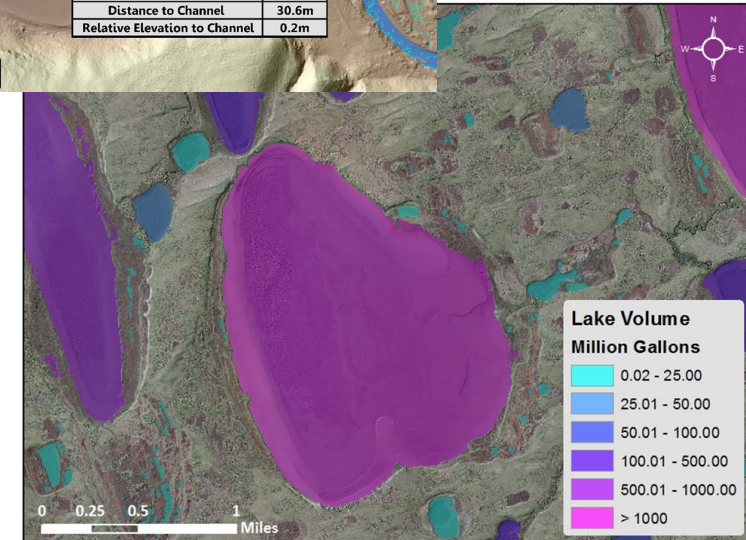
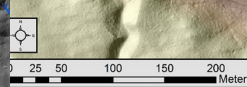
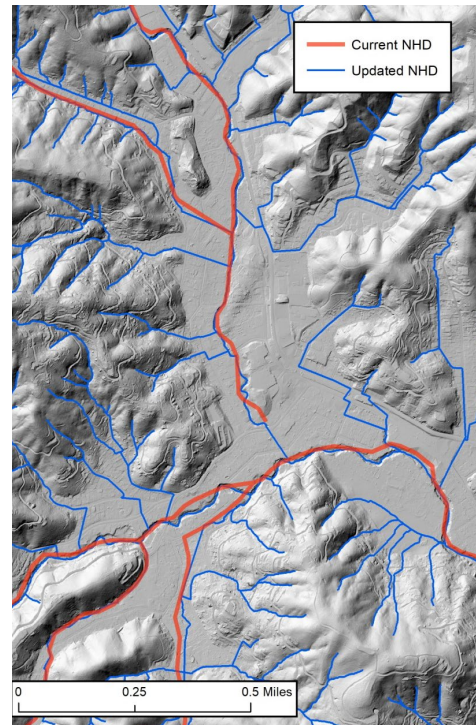
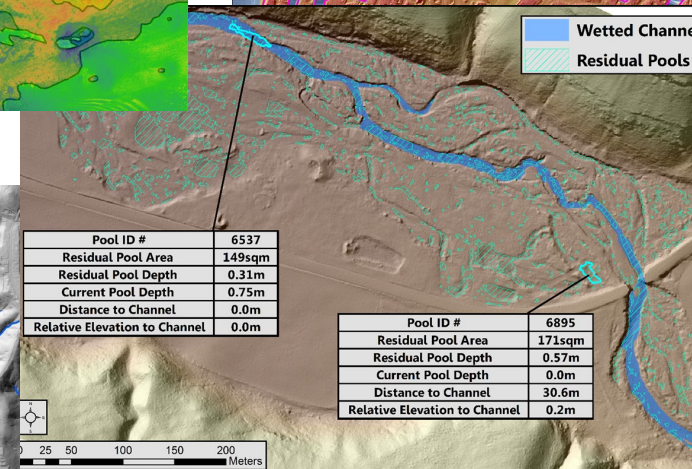
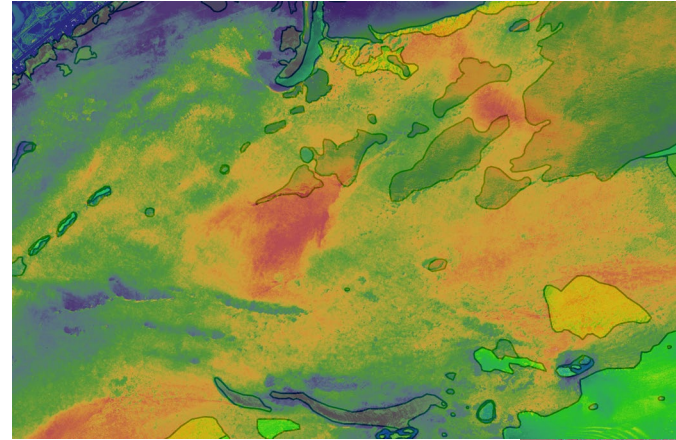
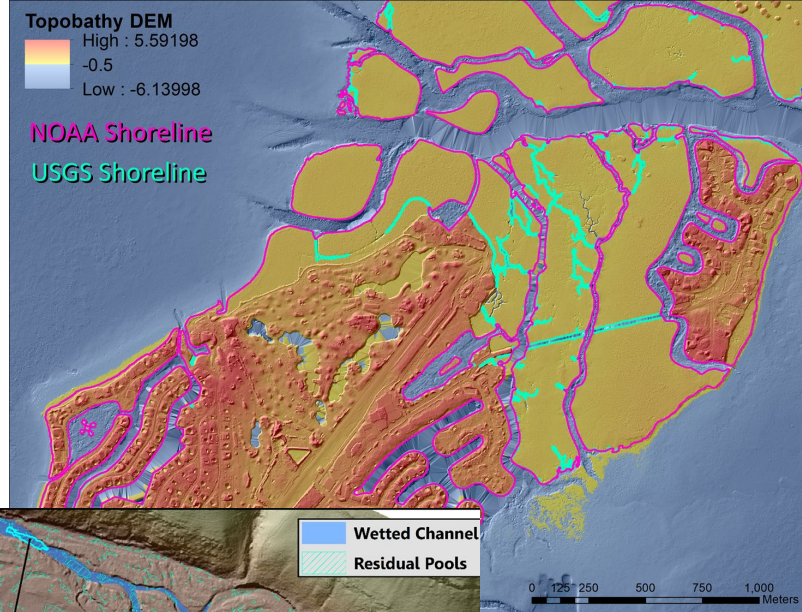
LIDAR PRODUCTS



Points	<ul style="list-style-type: none">• Classified Point Cloud LAS• Full waveform availability
Raster Models	<ul style="list-style-type: none">• Topobathymetric Bare Earth Model• Intensity images (Normalized for depth attenuation)• Surface models• Total Propagated Uncertainty
Vectors	<ul style="list-style-type: none">• Water's Edge Delineation• Void Areas• Contours

DOWNSTREAM ANALYTICS

- Update existing tools with topobathy elevation data
- Shoreline mapping
- Benthic habitat mapping
- River Restoration
- Floodplain modeling
- National Hydrography Dataset



THANK YOU

