



United States Department of Agriculture  
Forest Service

# Southeast Alaska Shoreline Mapping Project

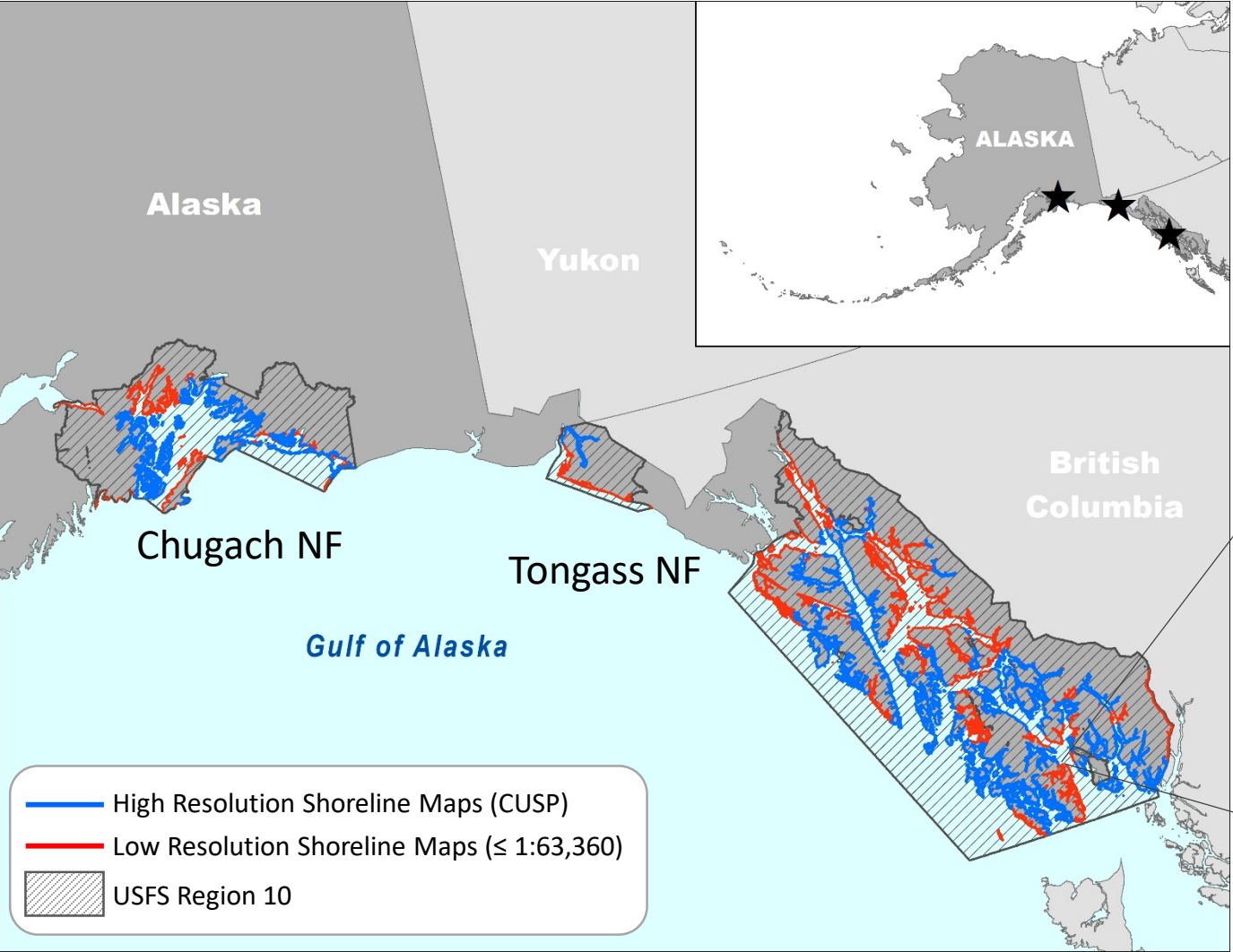
USFS Alaska Region

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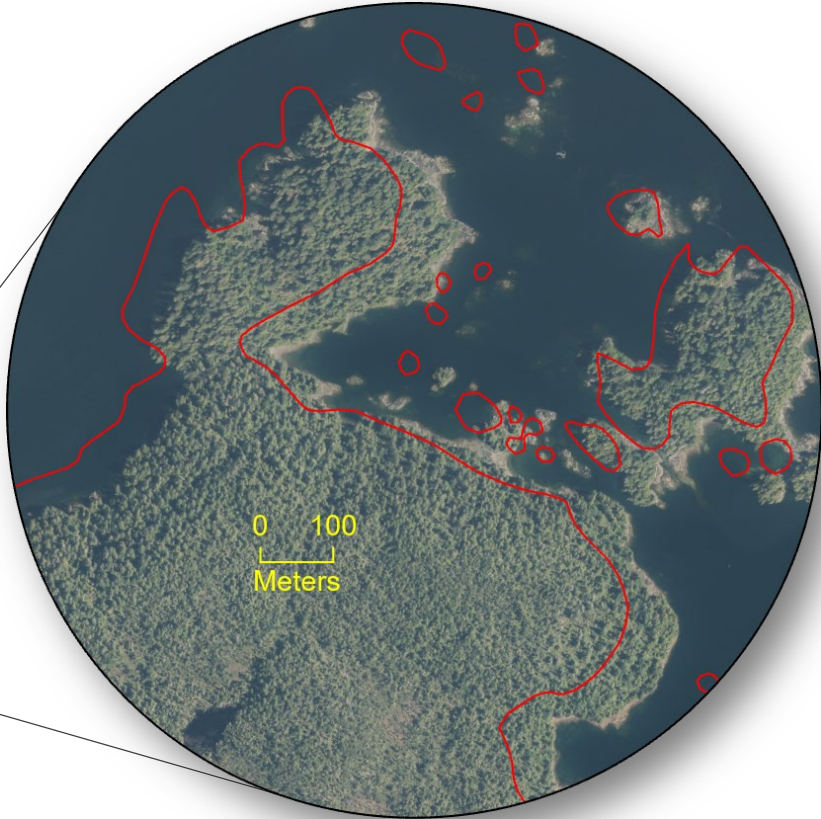
Geospatial Technology and Applications Center | GTAC  
USDA Forest Service

# Project Need



AK National Forest Coastline (approx.)			
Km CNF	Km TNF	Km Total	Km LowRes
6,500	29,500	36,000	11,000

Source: NHD & CUSP



# Pilot Method

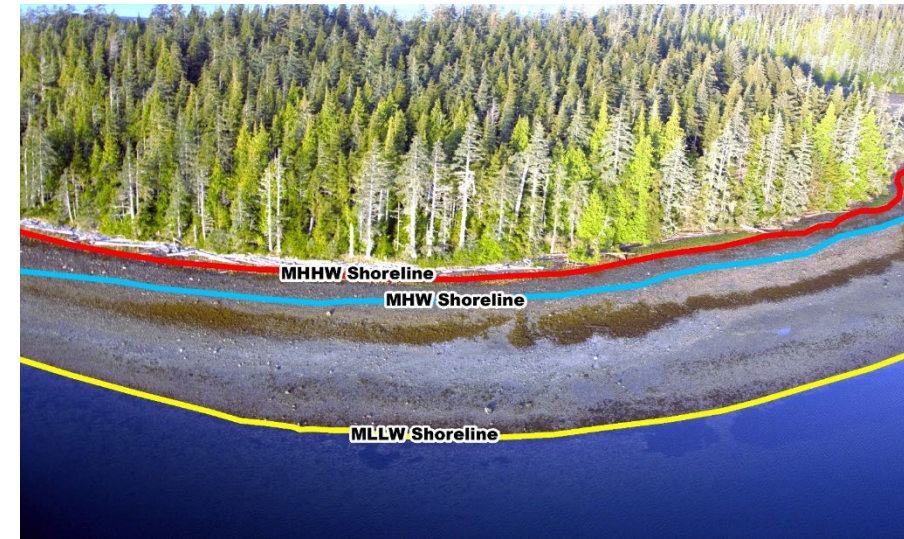
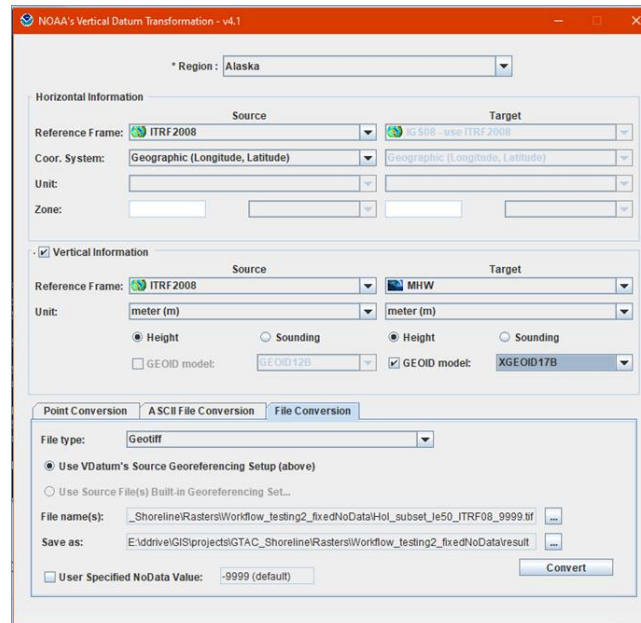
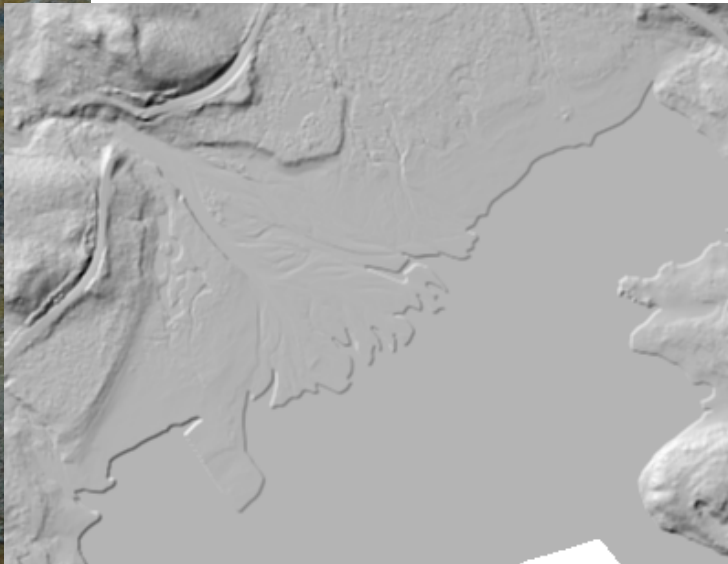
Elevation  
Model  
(geotiff, las, ascii, etc.)



V DATUM



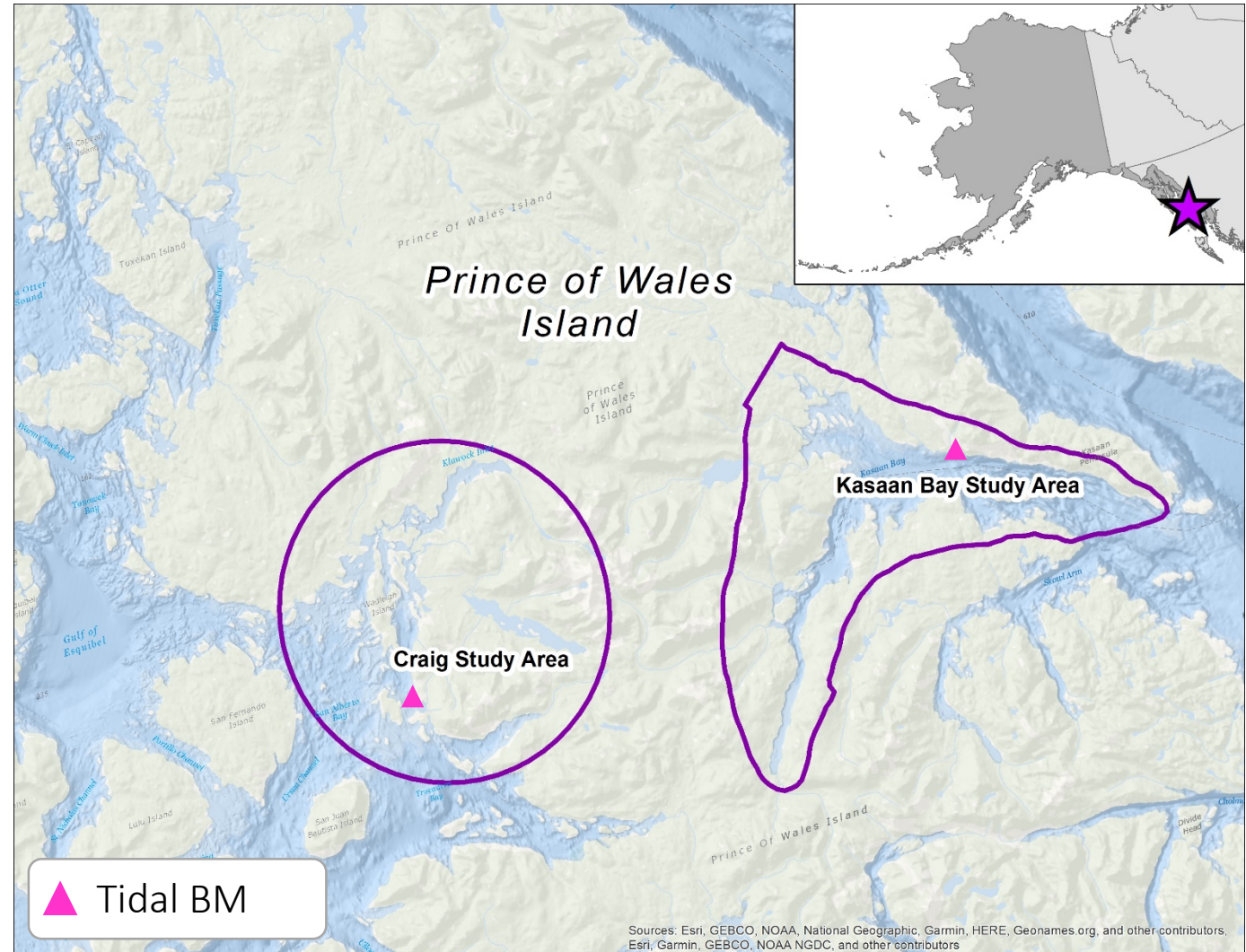
MHW, MHHW, MLLW



- Lidar bare-earth DEM (0.5m)
- IfSAR bare-earth DEM (5.0m)
- SfM DSM from USFS orthophotography (24cm)
- SfM DSM from 2005-06 Shorezone photography & video stills
- SfM DSM from 2019 contracted Shorezone photos & video stills
- NOAA Bathymetric DEM (20m)

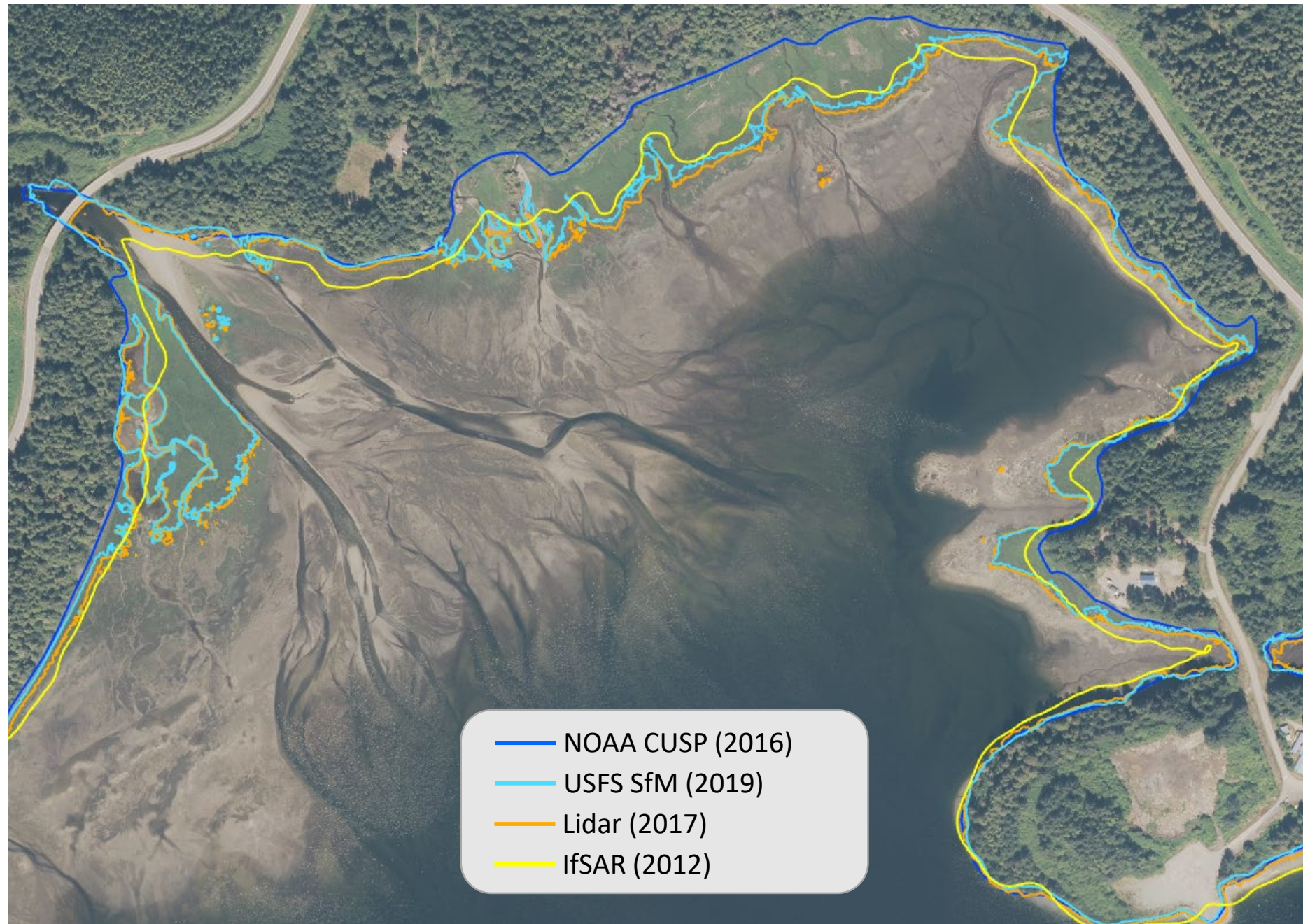
# Pilot Study Areas

- Both study sites on Prince of Wales Island
- Diverse coastline with varying topographic relief and characteristics common throughout SE Alaska
- Extensive, recent Lidar acquisition
- CUSP present for relative comparison
- Tidal bench mark in each AOI with NAVD88 elevation for more objective evaluation



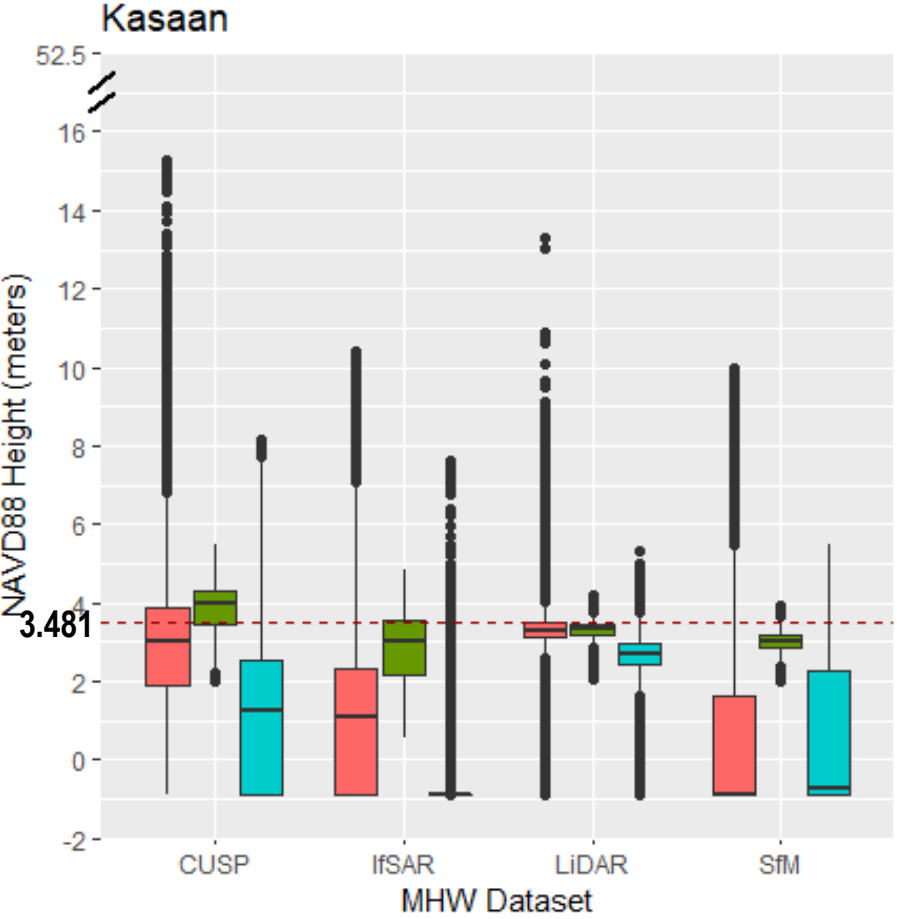
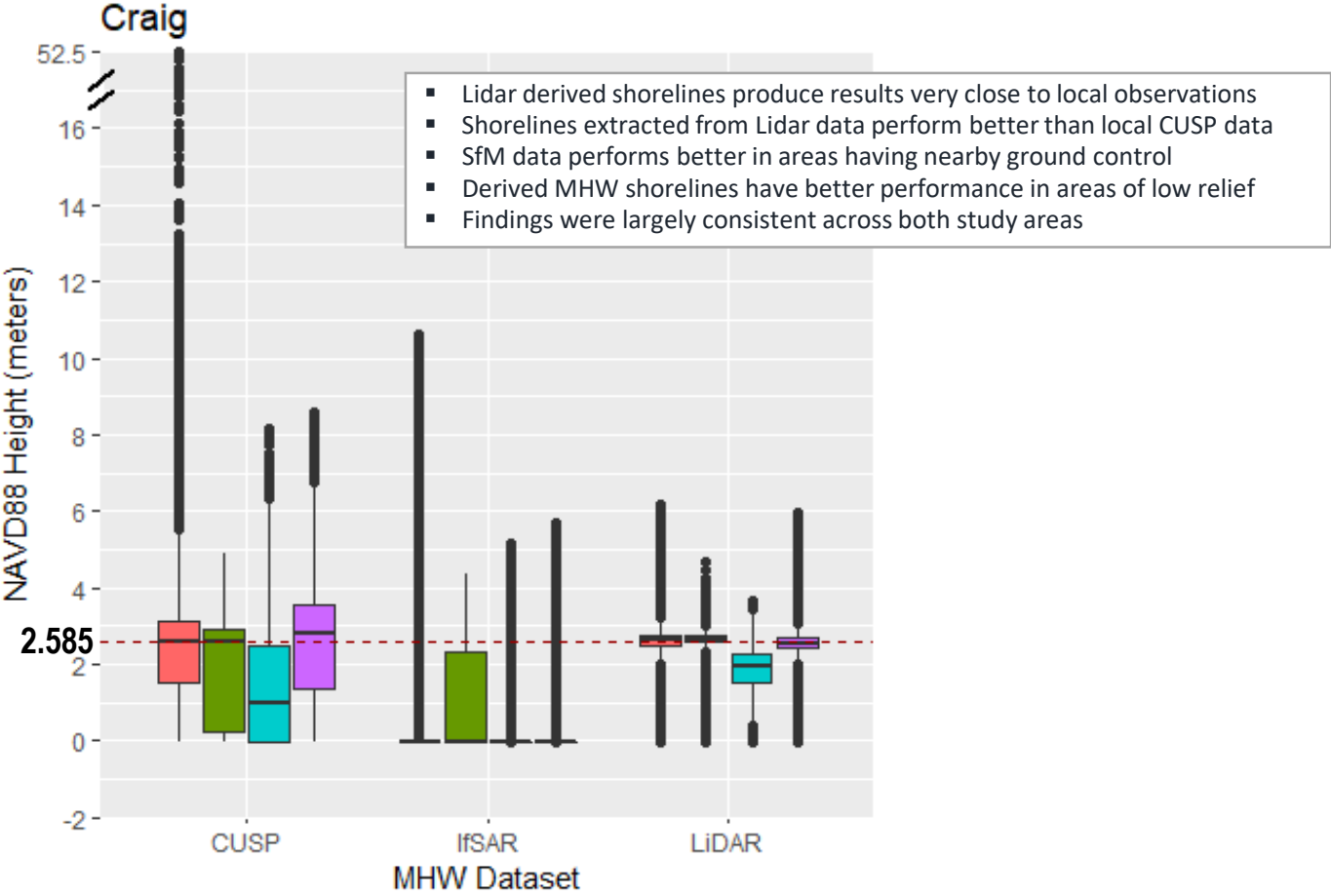
# Pilot Results

MHW



# Pilot Results

## Box Plots

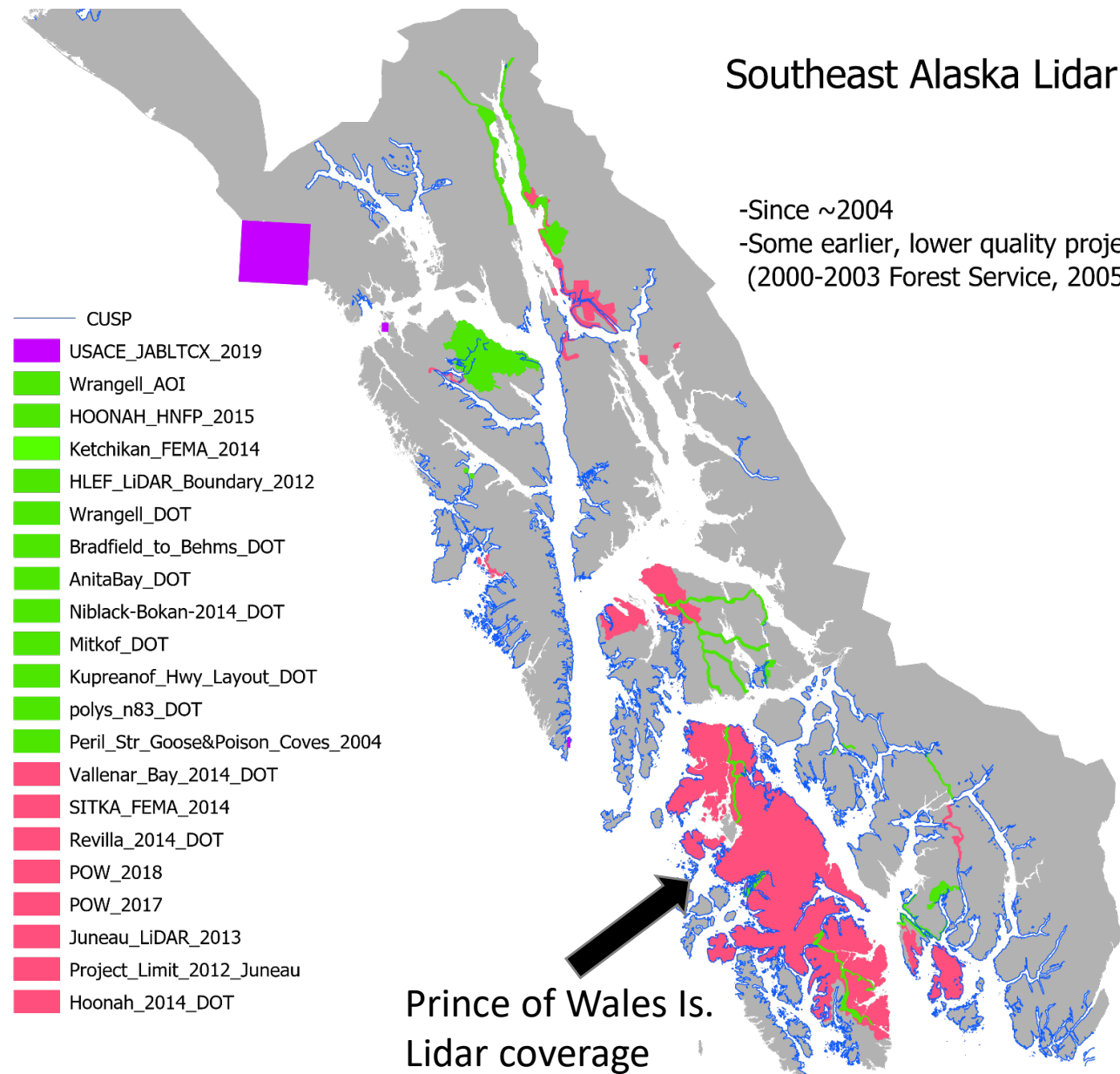


# Next Steps

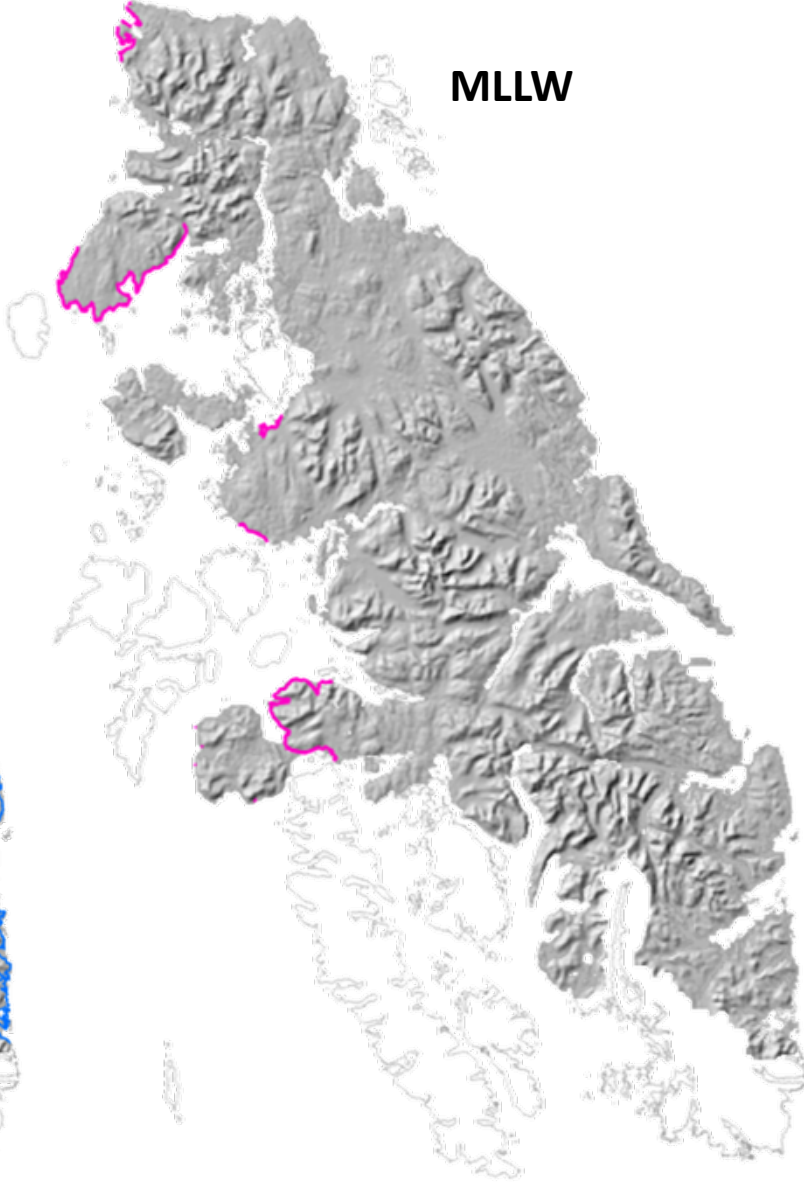
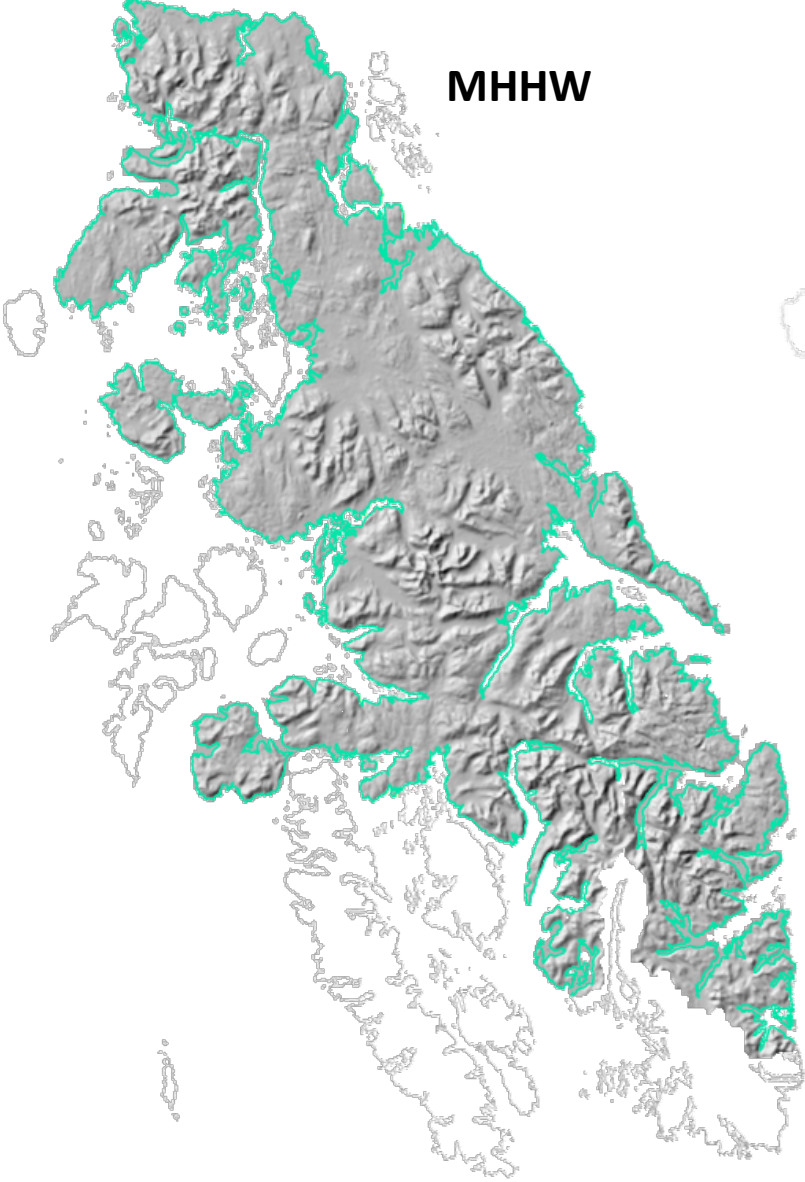
- Production of MHW, MHHW, and MLLW for Prince of Wales Island
- Edit and QC
- Submit to CUSP, NHD, AKHydro

## Southeast Alaska Lidar Projects

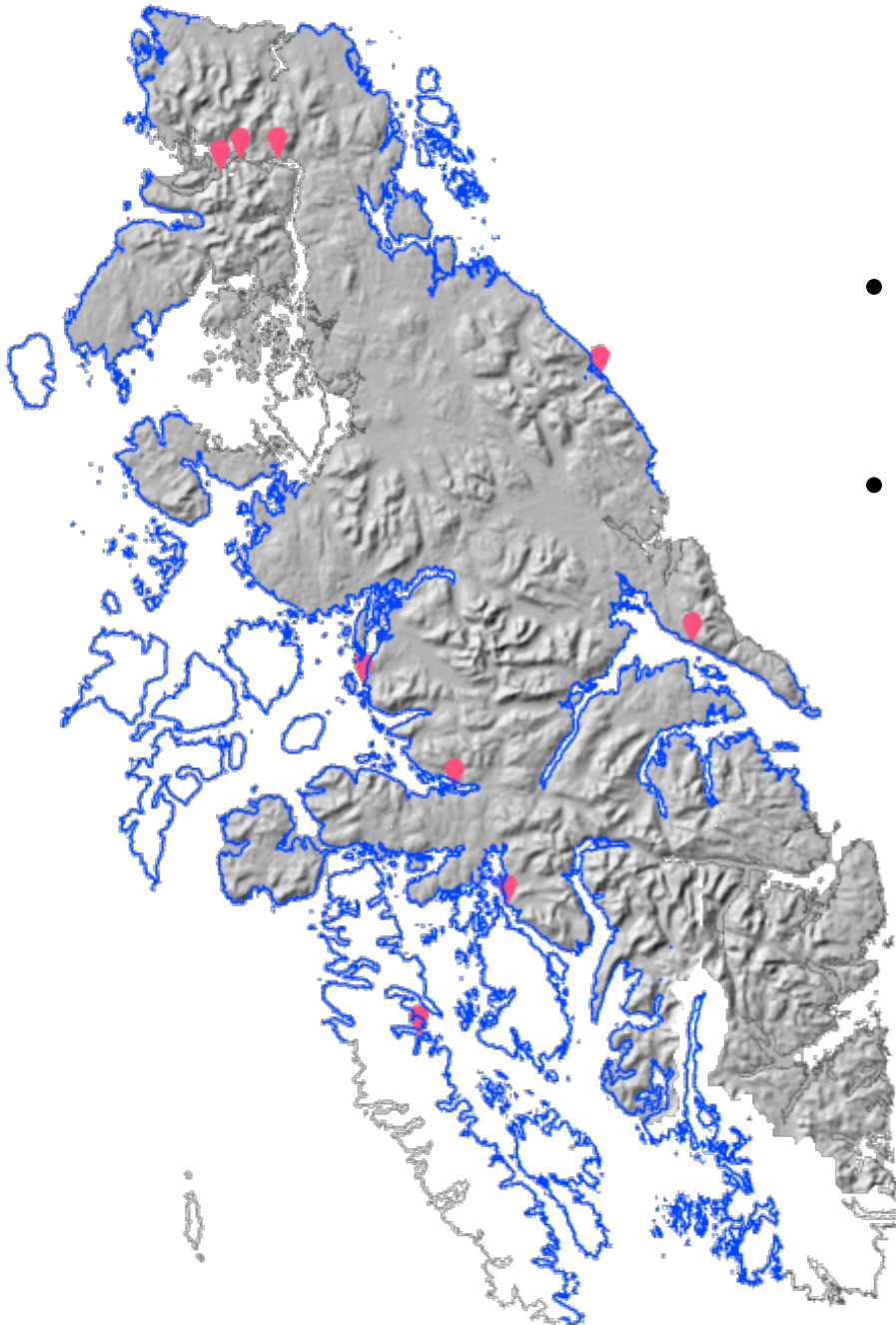
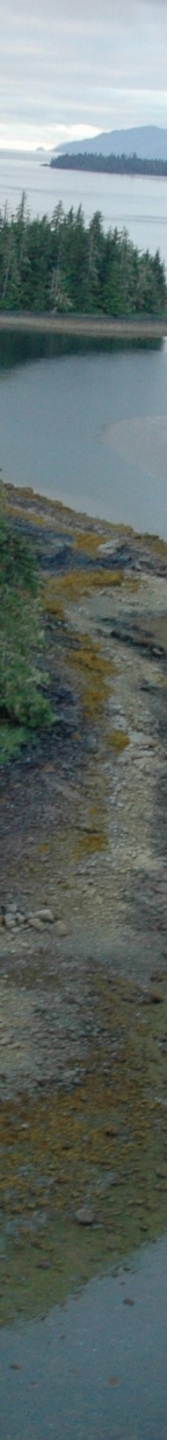
- Since ~2004
- Some earlier, lower quality projects not shown (2000-2003 Forest Service, 2005 Yakutat NASA)



# POW Shoreline Mapping



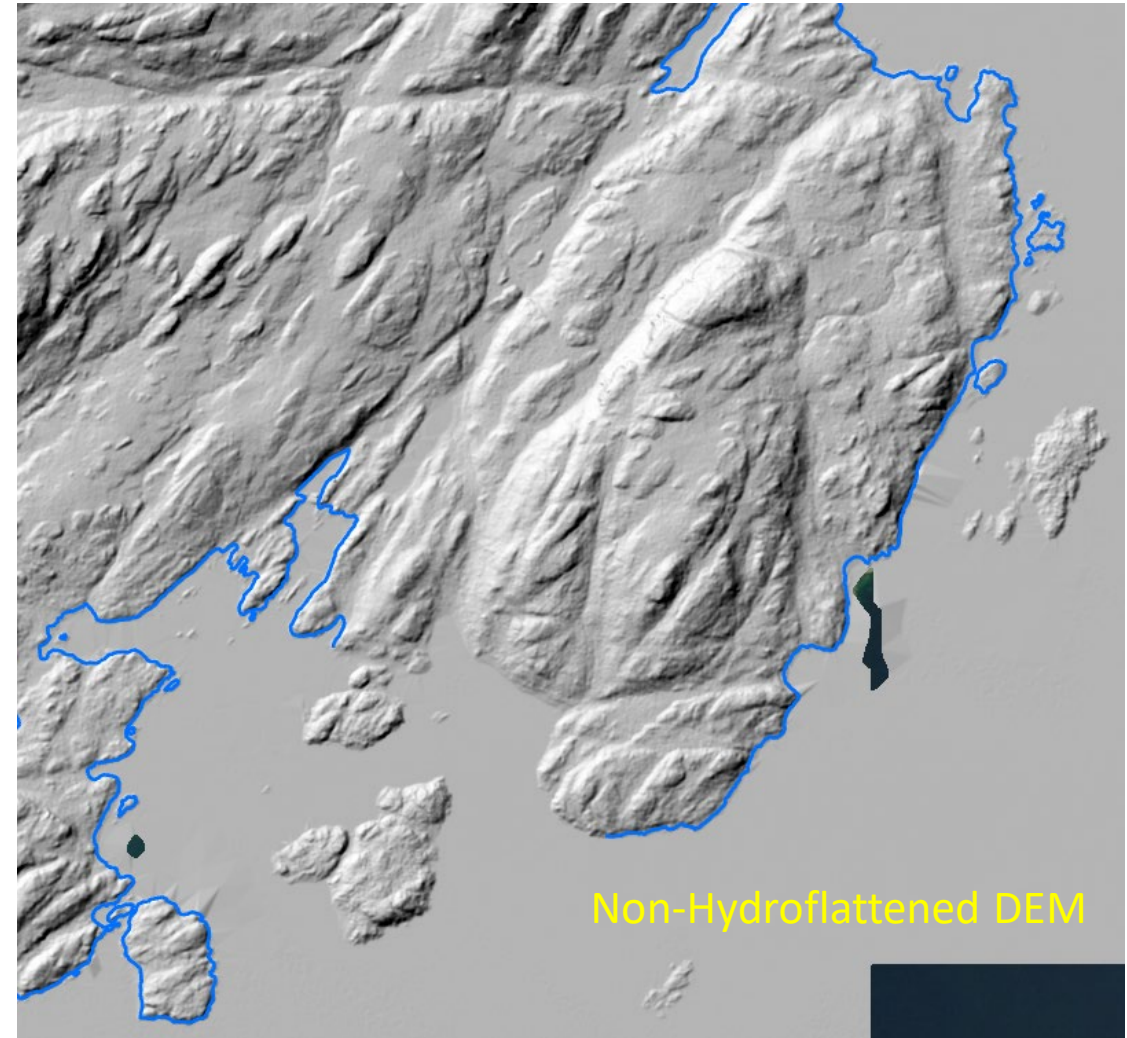
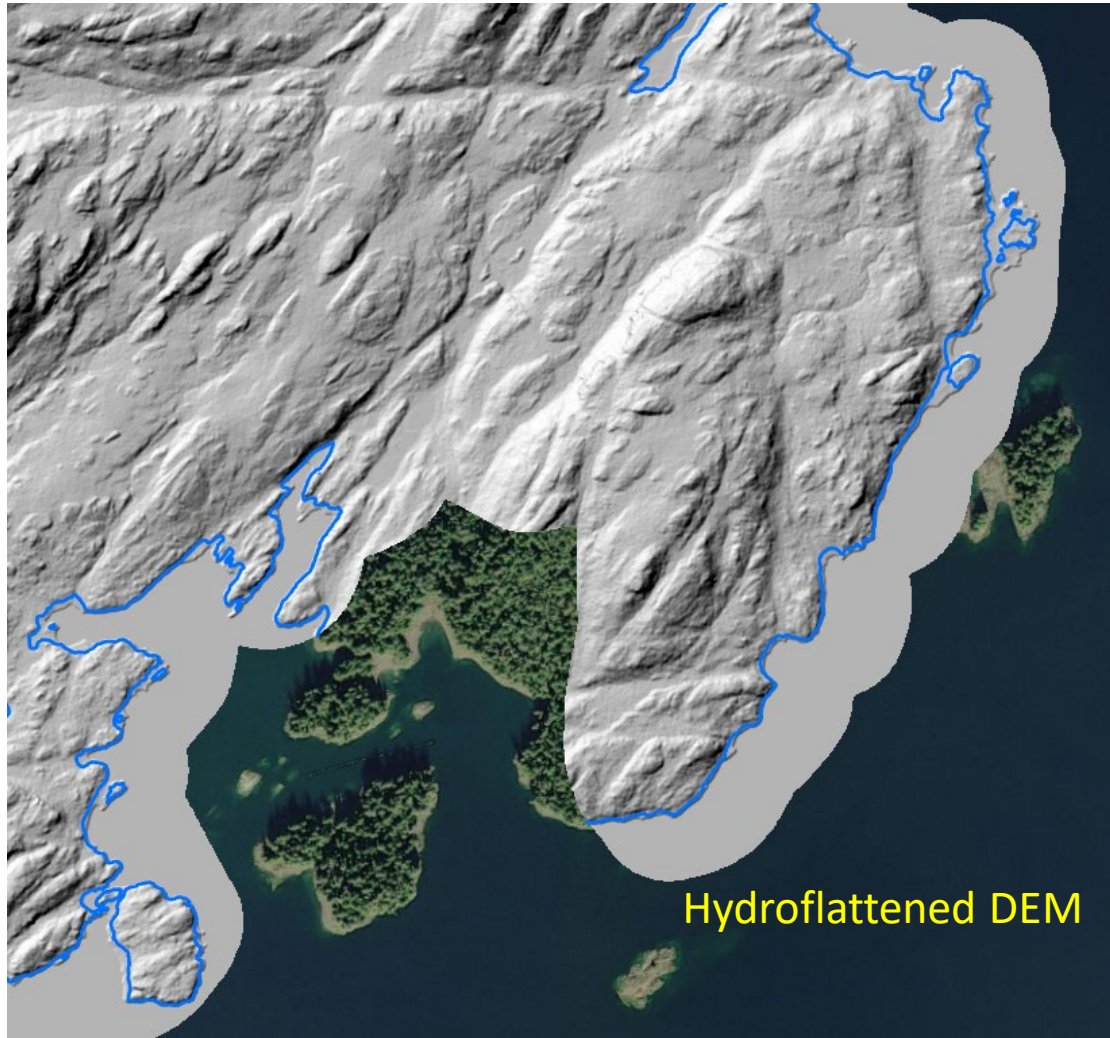




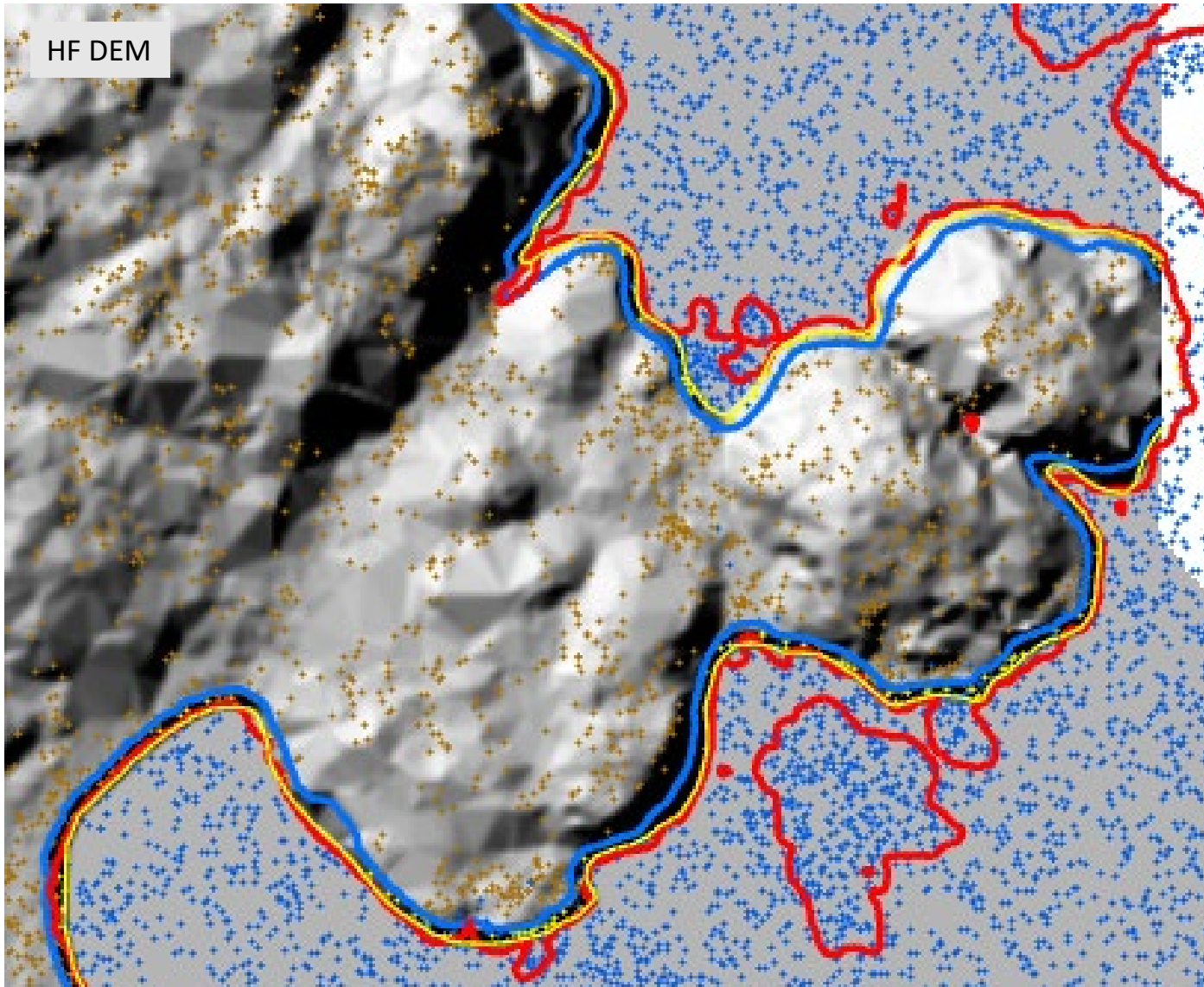
# Evaluation

- Tidal Bench Marks with known NAVD88 elevations (pink pins)
- CUSP (blue line)

# Technical Issues

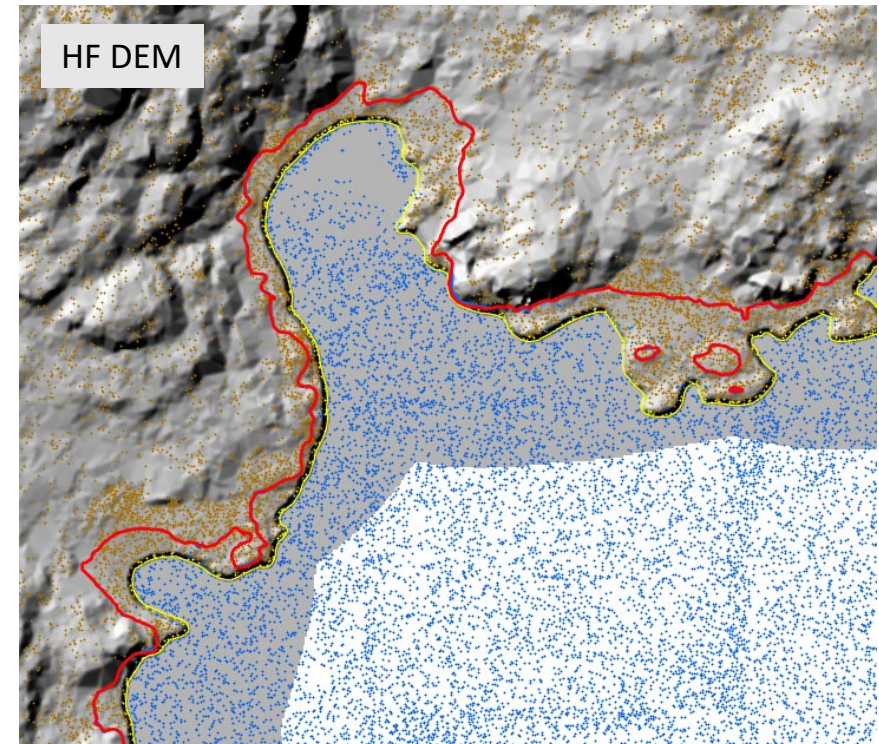


# Technical Issues

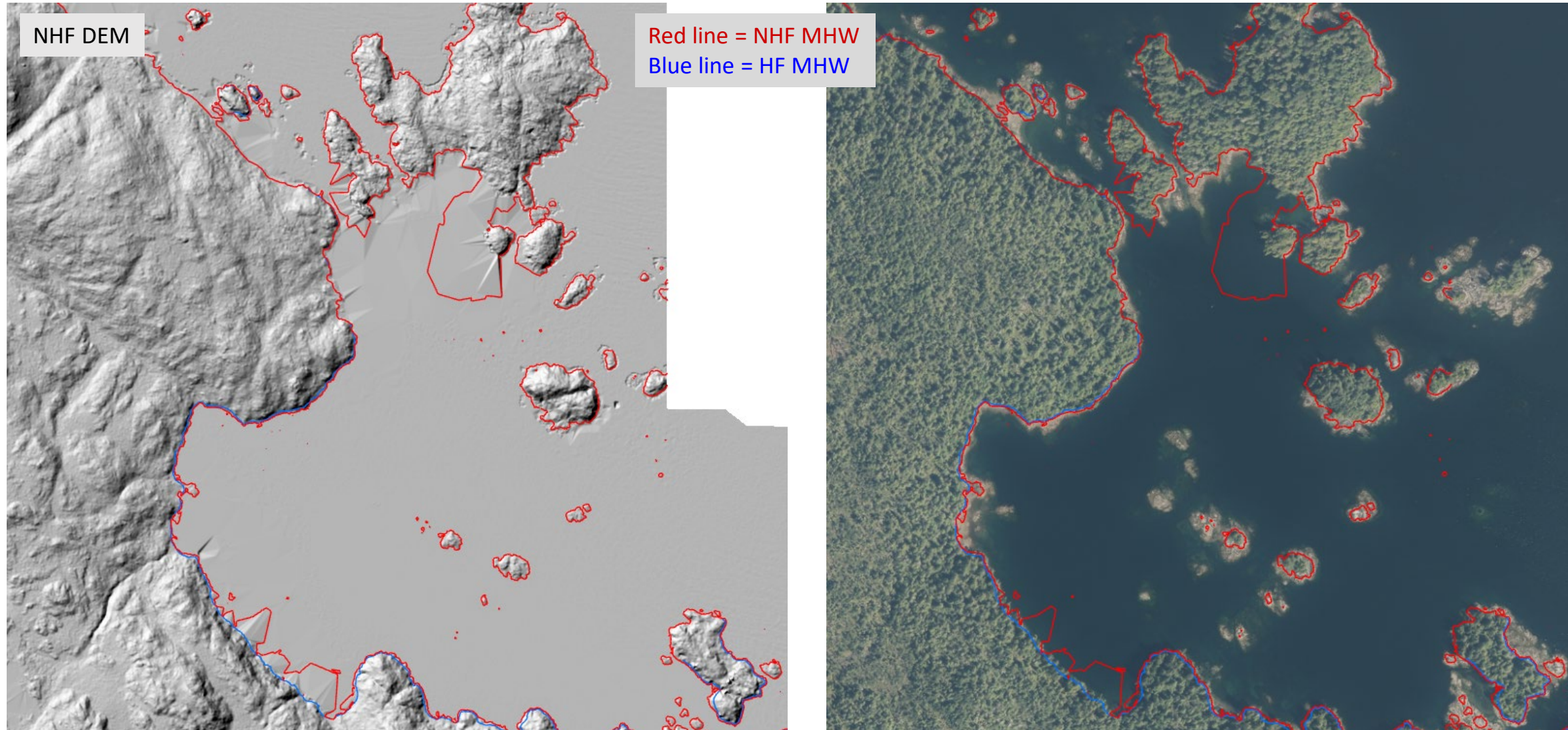


Red line = NHF MHW  
Blue line = HF MHW  
Yellow line = Shoreline breakline

Brown dots = lidar ground class  
Yellow dots = lidar ignored ground class  
Blue dots = lidar water class



# Technical Issues



# V DATUM

...A few tips (ver. 4.1)

1 Make your life easier. Start in ITRF08. Magnitudes faster!

2 Make your life easier. Start in ITRF08. Magnitudes faster!  
Caution: Vertical datum transformations for rasters in ArcGIS bug. Use ArcGIS Pro and file geodbs rasters.

NOAA's Vertical Datum Transformation - v4.1

\* Region : Alaska

Horizontal Information

Source Target

Reference Frame: ITRF2008 IGS08 - use ITRF 2008

Coord. System: Geographic (Longitude, Latitude) Geographic (Longitude, Latitude)

Unit: [ ] [ ]

Zone: [ ] [ ]

Vertical Information

Source Target

Reference Frame: ITRF2008 MHW

Unit: meter (m) meter (m)

Height  Sounding  Height  Sounding

GEOID model: GEOID12B  GEOID model: XGEOID17B

Point Conversion ASCII File Conversion File Conversion

File type: Geotiff

Use VDatum's Source Georeferencing Setup (above)

Use Source File(s) Built-in Georeferencing Set...

File name(s): E:\drive\GIS\projects\GTAC\_Shoreline\Rasters\Biles\_NHF\_test\stepow\_2\_9\_20\_BAL.tif

Save as: E:\drive\GIS\projects\GTAC\_Shoreline\Rasters\Biles\_NHF\_test\result

User Specified NoData Value: -9999 (default)

Convert

3 It says ITRF08, but no horizontal conversion is applied. Output horizontal will match input horizontal.

4 Choosing correctly here is critical. Currently use xGeoid17B

5 Check log file.

6 'Define Projection' in ArcGIS

*AK model: Tidal datum conversions based on ITRF08 and xGeoid17B gravity data*

*Lower48: Tidal datum conversion based on GRS80 and NAVD88 orthometric datum*



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