Delta Bathymetry Update: The New Release

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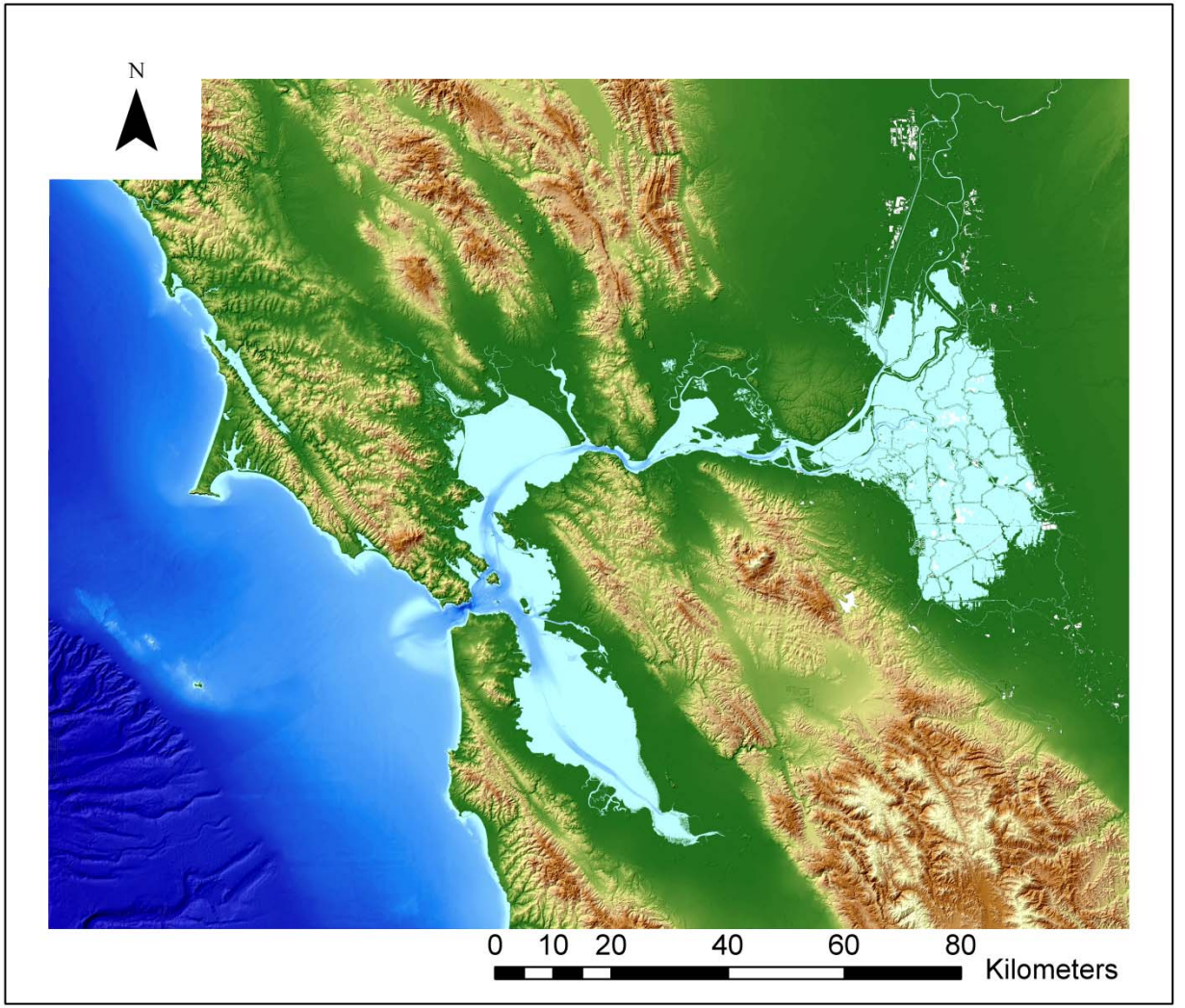
Acknowledgments

- Tom Heinzer and Diane Williams:
  - original 10m DEM techniques
- Shawn Mayr:
  - most original data collection



http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/modelingdata/DEM.cfm

The Product

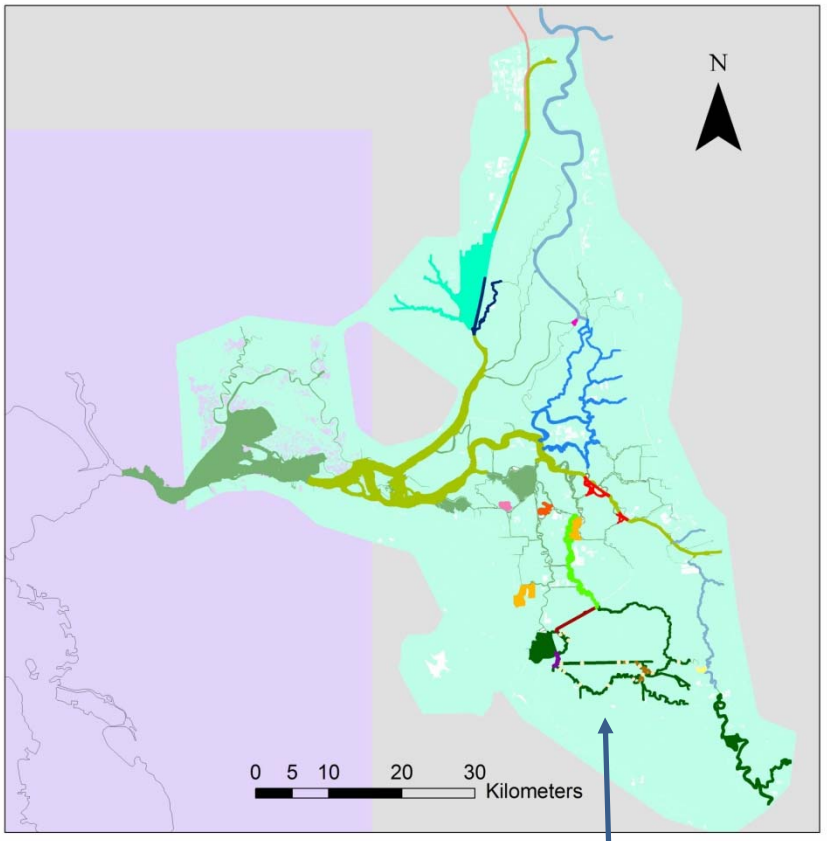
- 4 tiled 10m DEMs
- 11 2m DEMs
- Seamless at shore
- Some NA on islands

Data Sources

Data Sources

- Miner Slough (multi/single beam, DWR, 2012)
- Columbia and Turner Cuts (multibeam, DWR, 2012)
- Georgiana Slough (multibeam, DWR, 2011)
- North Delta (multibeam, GRS, 2008 & DWR, 2012)
- Old River at Head (multibeam, DWR, 2011)
- South Delta (multibeam, Fugro West, 2010 & DWR, 2011)
- Urban Levee Surveys (multibeam, DWR, 2008)
- Victoria Canal (multibeam, DWR, 2011)
- West Canal (multibeam, DWR, 2012)
- Liberty Island (single beam, cbec/EDS, 2006, 2009, 2010)
- South Delta Scour Survey (single beam, DWR 2010)
- Grant Line Canal 5 Points Area (DWR, 2009)
- Delta Coves (grading plan, 2005)
- CSDP Bathymetry Data
- Deep Water Ship Channel, COE (2004, 2008)
- Manually Digitized Data - P.E. Smith
- USGS Topo Map
- DWR LiDAR (1m, 2007)
- Foxgrover, Smith, and Jaffe, USGS (10m DEM, 2005)
- NOAA San Francisco Bay DEM (1/3 arc-second) (2010)
- USGS National Elevation Dataset (1/3 arc-sec)

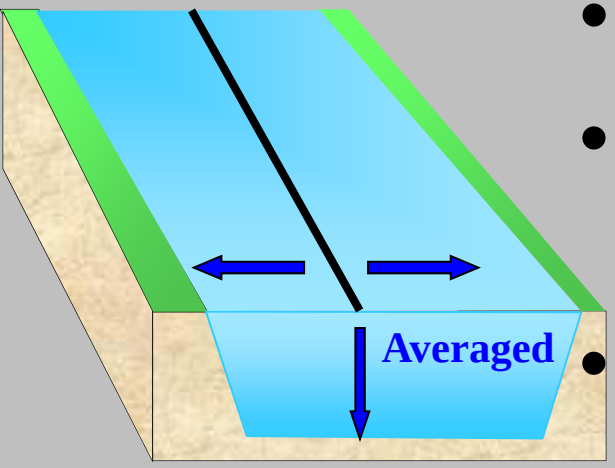
Data for the area west of the Carquinez Strait comes from NOAA's San Francisco Bay DEM



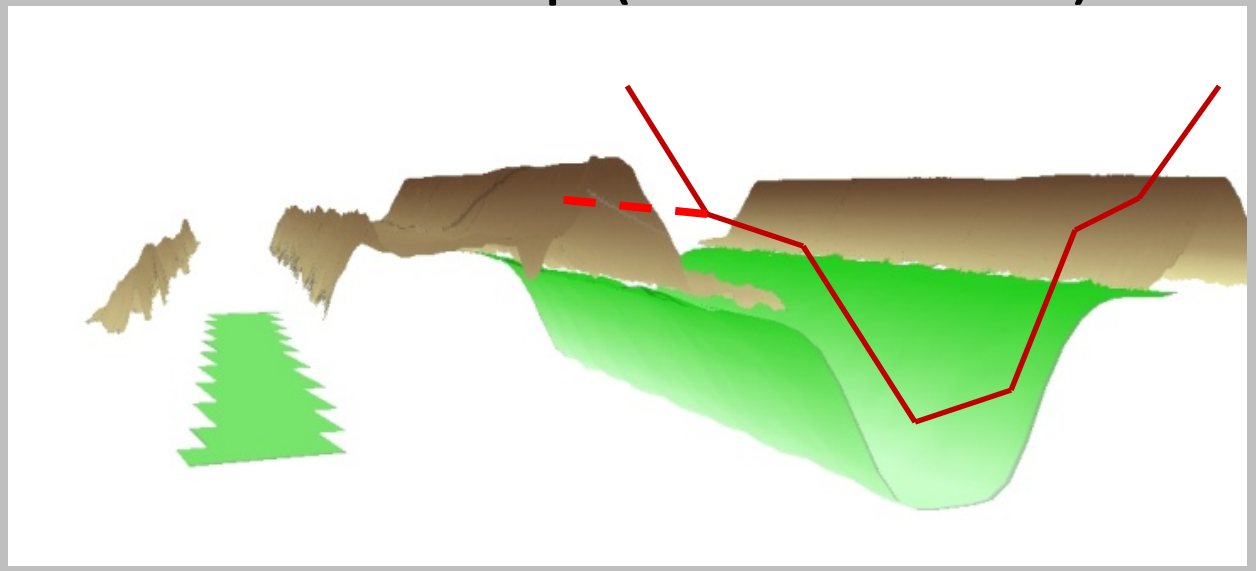
Interpolation

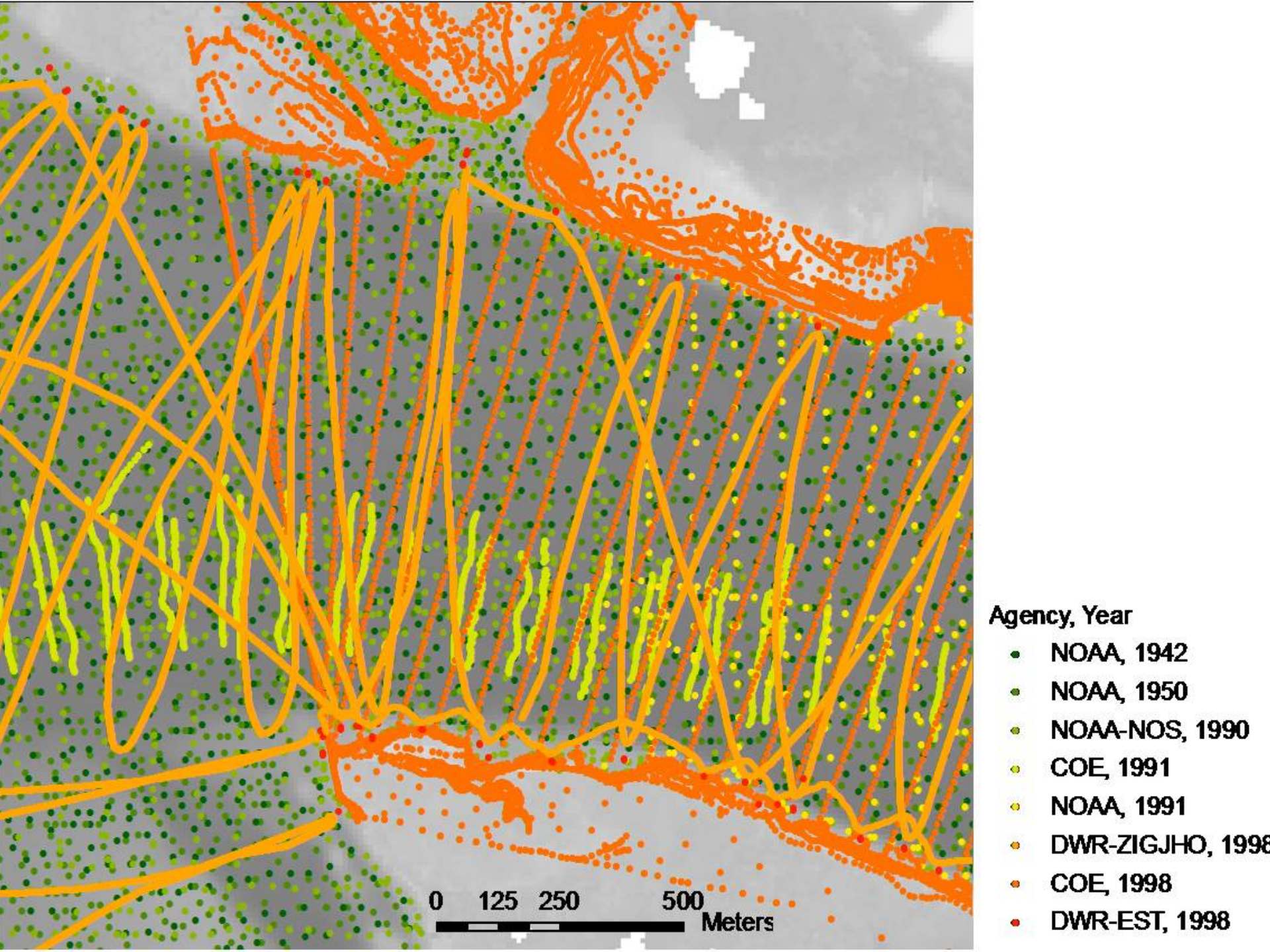
Motives and Background

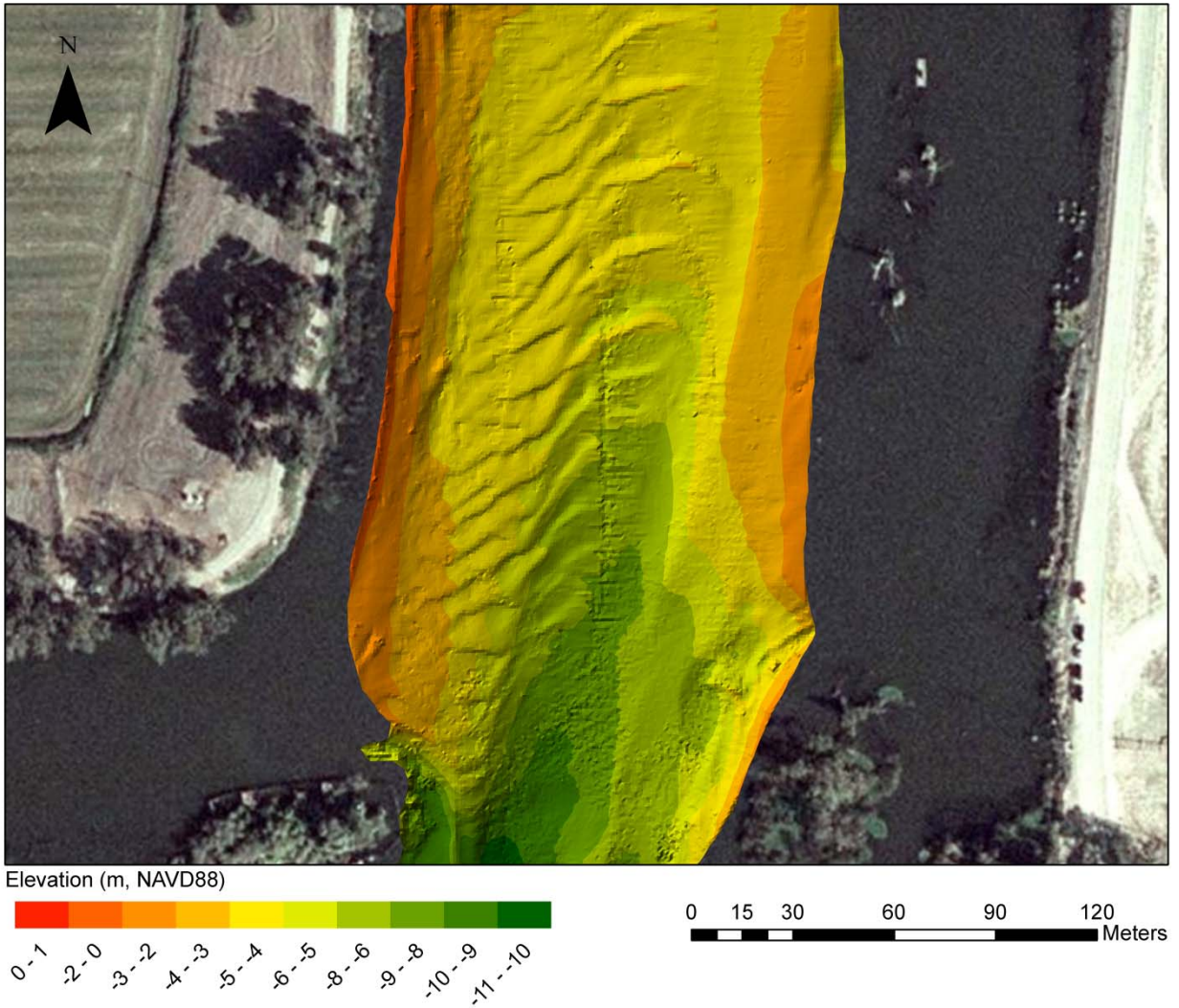
DSM2 geometry

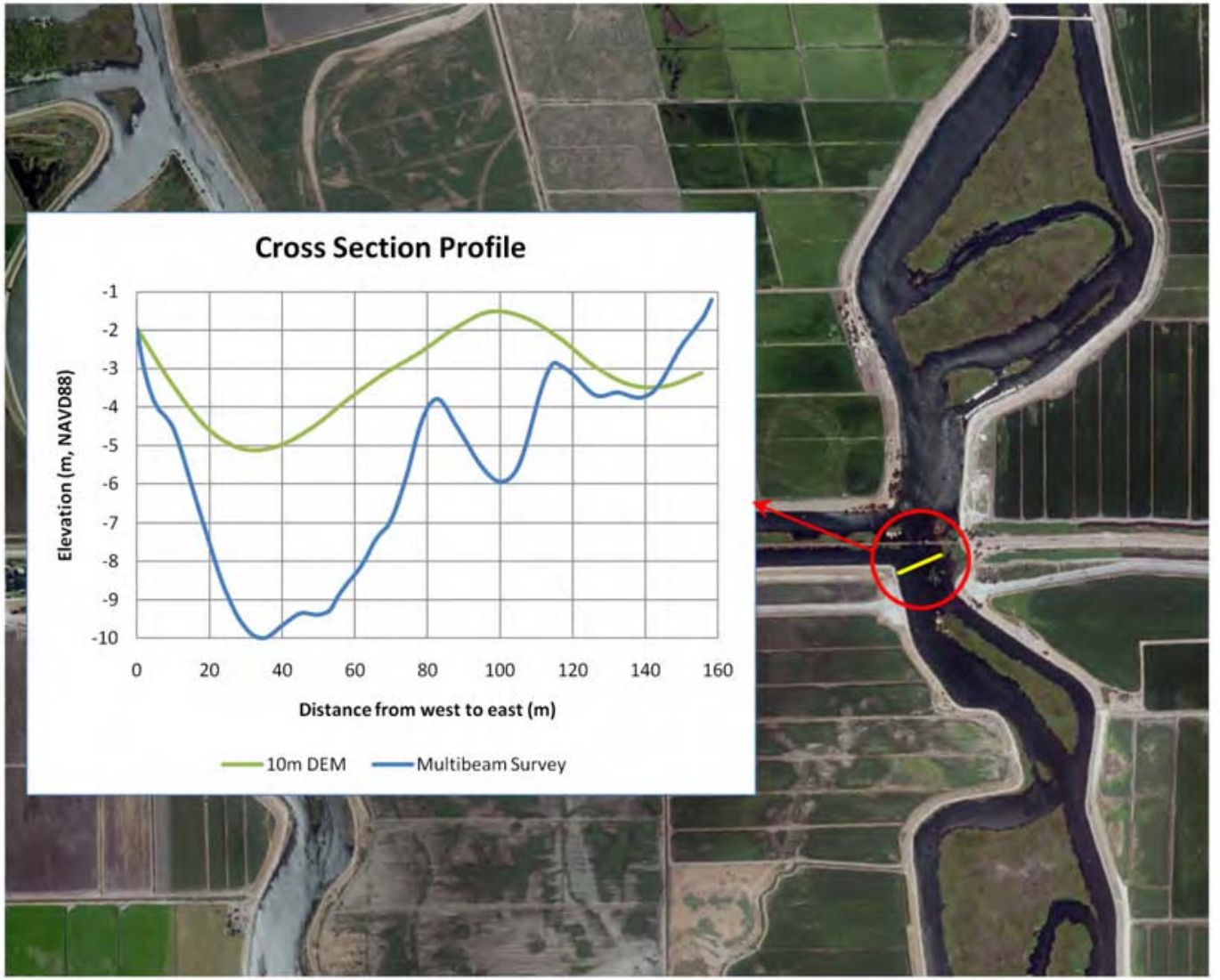


- Cross-sections: piecewise linear
- Large dx, many features are subgrid
- Land-water interface determines tidal prism
- Levees are steep (1:3 assumed)




0 125 250 500
Meters
Agency, Year
NOAA, 1942
NOAA, 1950
NOAA-NOS, 1990
COE, 1991
NOAA, 1991
DWR-ZIGJHO, 1998
COE, 1998
DWR-EST, 1998


N
Elevation (m, NAVD88)
0 - 1
-2 - 0
-3 - -2
-4 - -3
-5 - -4
-6 - -5
-8 - -6
-9 - -8
-10 - -9
-11 - -10
0 15 30 60 90 120
Meters

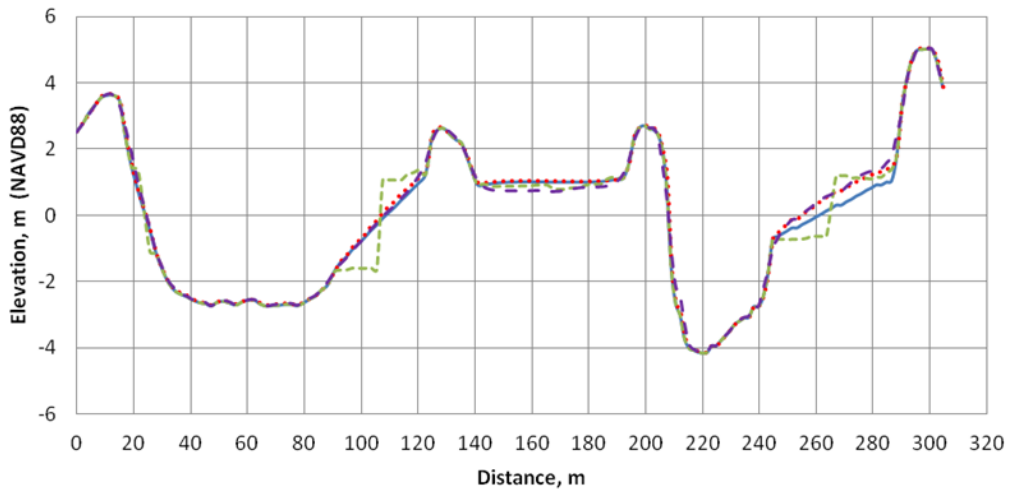

Cross Section Profile
Elevation (m, NAVD88)
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
0
20
40
60
80
100
120
140
160
Distance from west to east (m)
10m DEM
Multibeam Survey

Challenges

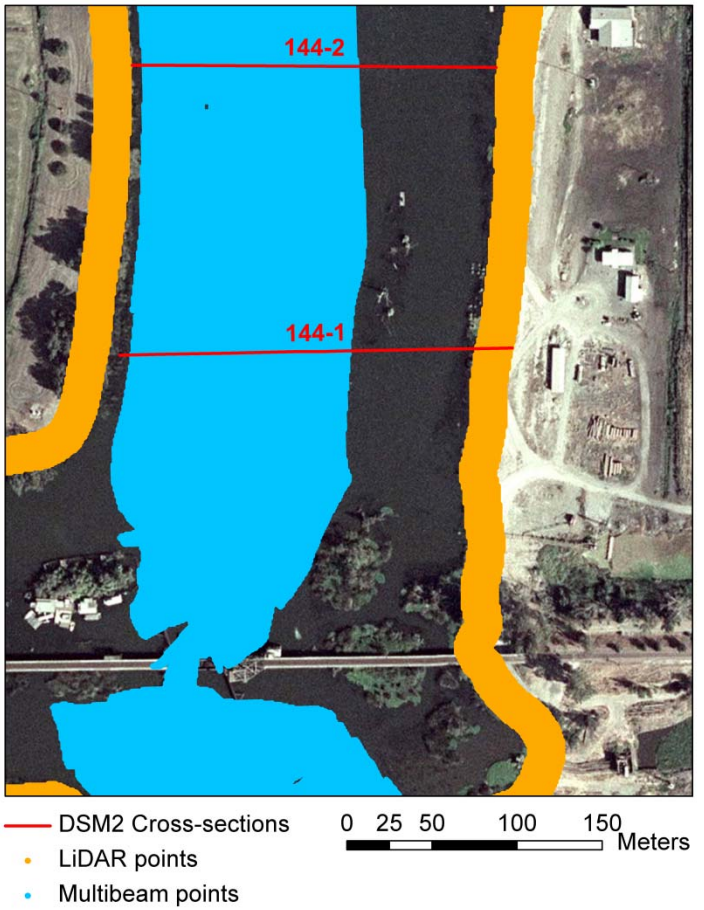
Gaps

- Multibeam
- LiDAR
- Guessed shoreline
- Cross-section

0 30 60 120 Meters

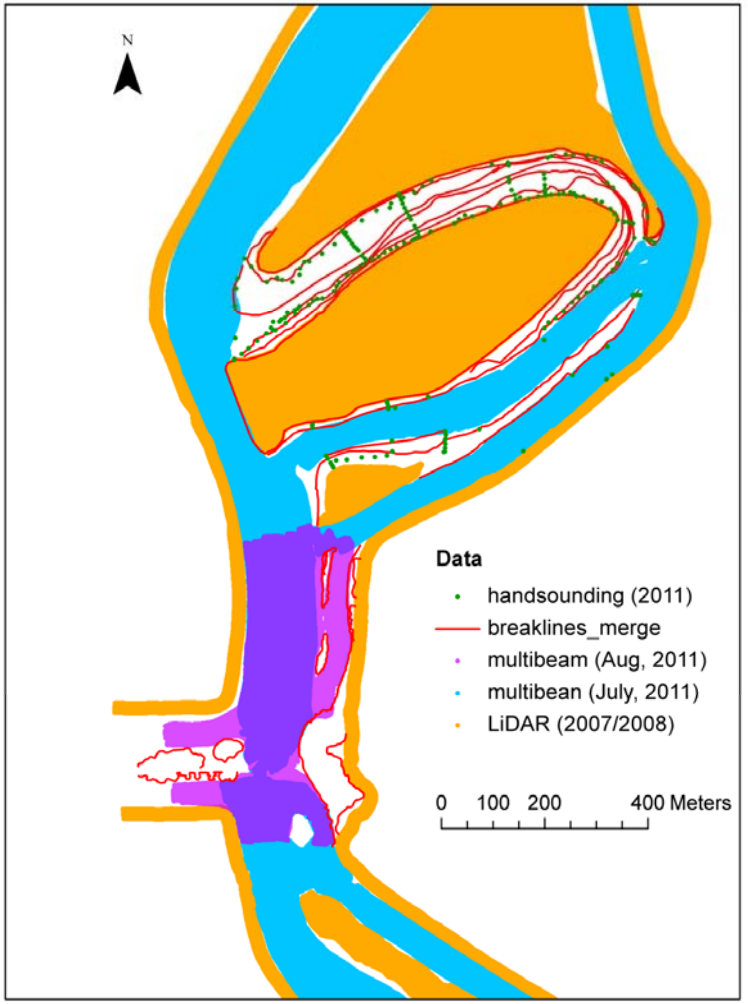


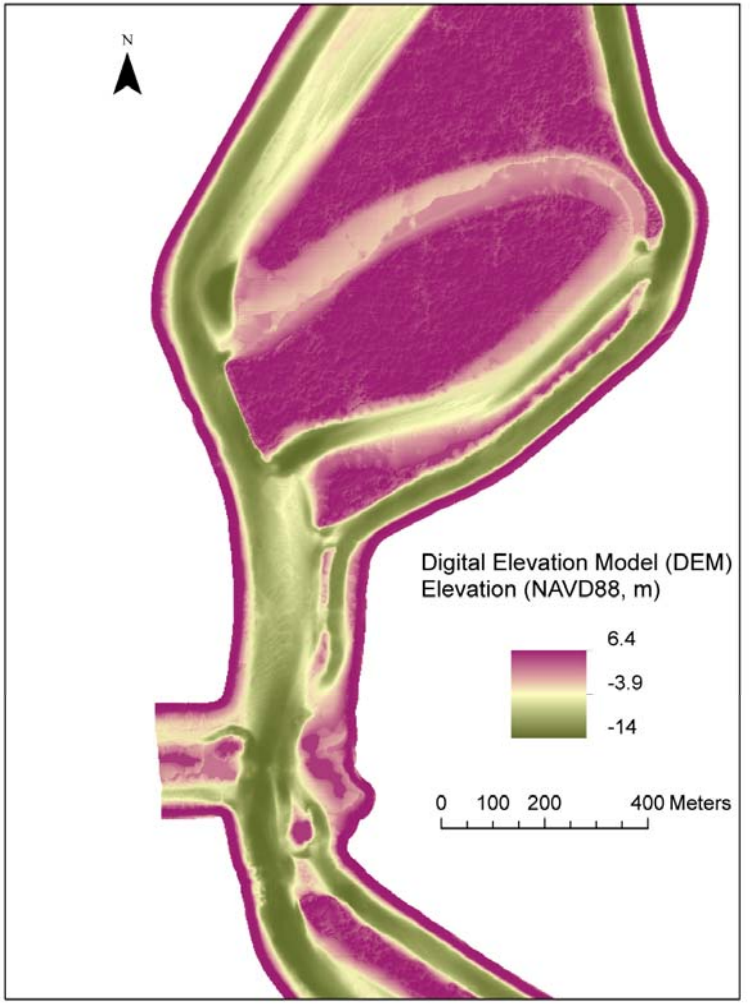
Data Gaps


144-2
144-1
DSM2 Cross-sections
LiDAR points
Multibeam points
0 25 50 100 150
Meters

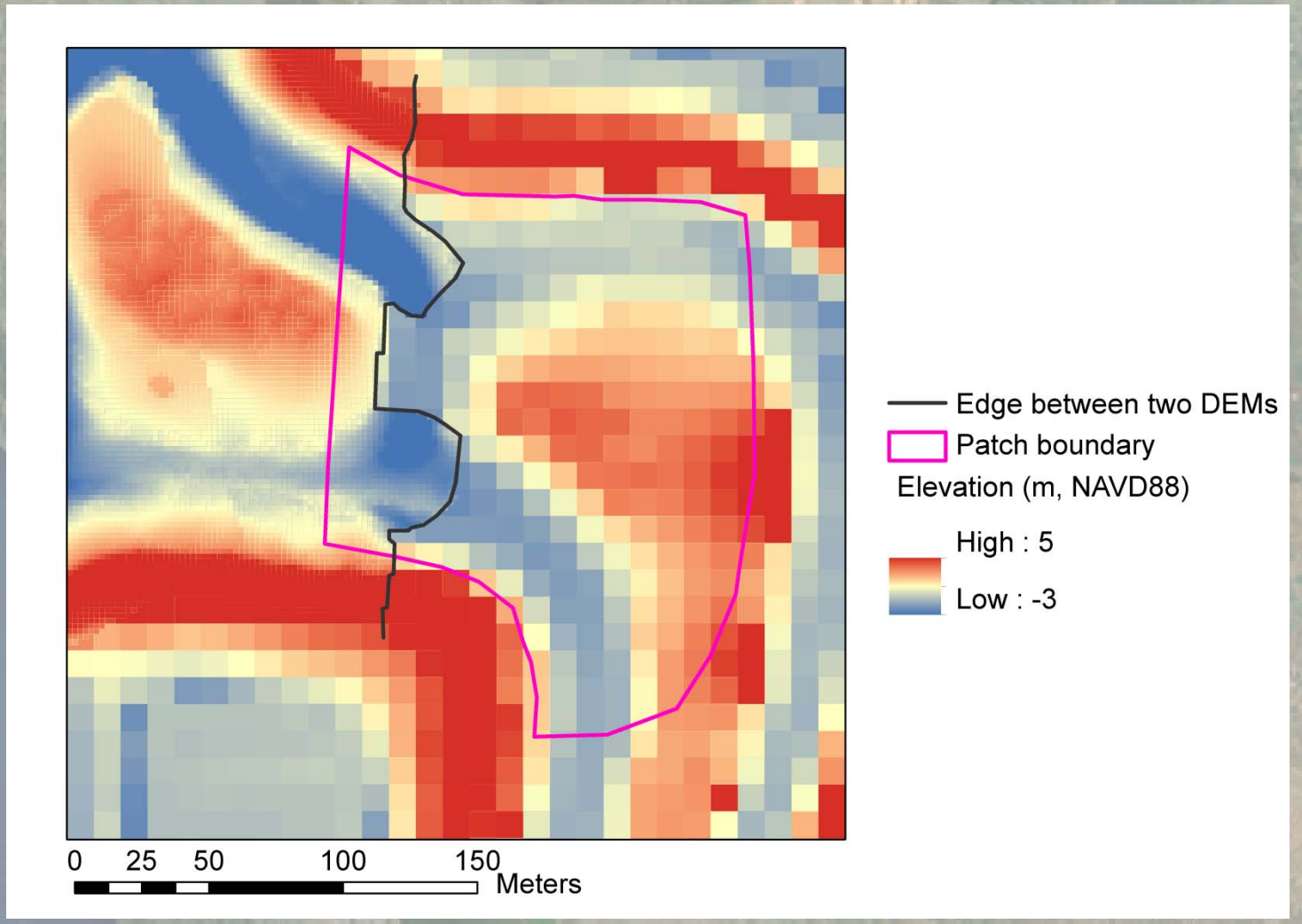
Cross-section 141-1
Elevation (m, NAVD88)
6
4
2
0
-2
-4
-6
-8
-50
0
50
100
150
200
250
300
Distance from west to east (m)
DSM2 cross-section points
Multibeam points
LiDAR points
Multibeam/LiDAR

Cross-section 141-2
Elevation (m, NAVD88)
6
4
2
0
-2
-4
-6
-8
-10
-50
0
50
100
150
200
250
300
Distance from west to east (m)
DSM2 cross-section points
Multibeam
Multibeam
Multibeam/LiDAR

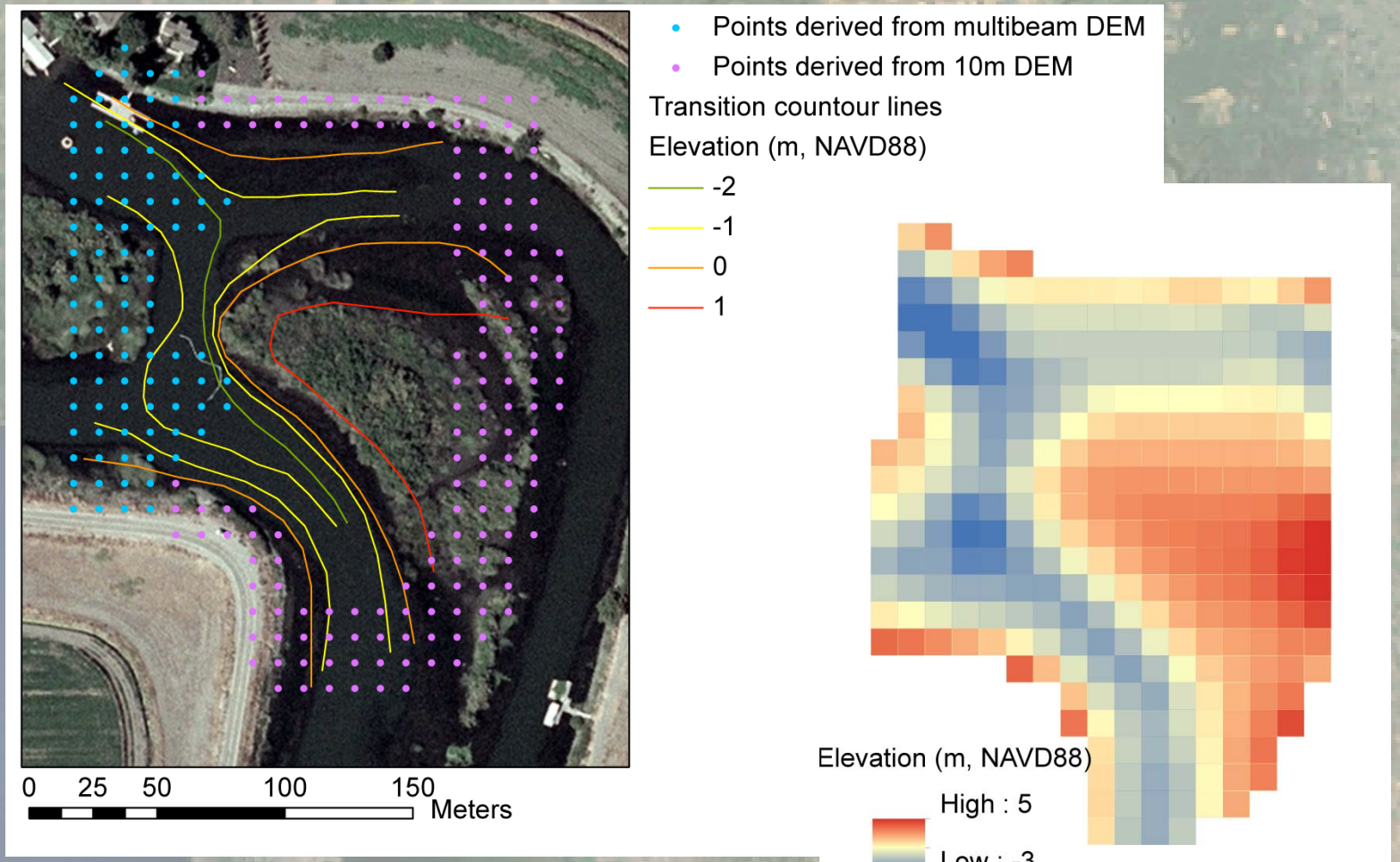

N
Data
handsounding (2011)
breaklines_merge
multibeam (Aug, 2011)
multibean (July, 2011)
LiDAR (2007/2008)
0 100 200 400 Meters


N
Digital Elevation Model (DEM)
Elevation (NAVD88, m)
6.4
-3.9
-14
0 100 200 400 Meters

DEM Integration – Edge Matching



DEM Integration – Patch



Other Integrated Bay-Delta DEMs

- NOAA 1/3 arc second Bay map (Tsunami)
  - Coast and bay
  - Probably superseded by …
- USGS 2m DEM in Bay
  - Combines high resolution data and interpolation
  - Probably not out yet
- DWR Delta LiDAR
  - Both DWR and CSTARS (UCD) are filling the terrestrial part in land
  - We are still figuring out whether to include this at 10m

Update Accomplishments

- Integrated 10m DEM for the Bay-Delta
- Consistent 2m DEM for numerous channels
- Continuous in water bodies
- Smooth dataset transitions at shore
- Organization of original data and patches, reproducible techniques

References

- Download link:

  http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/modelingdata/DEM.cfm

- Methodology: *"A Continuous Surface Elevation Map for Modeling," Chapter 6, 33rd Annual Report*

  http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/AR2012/Chapter%206_2012_Web.pdf

For more information

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