

Mudflat Loss During South San Francisco Bay Salt Pond Restoration –

Regional and Global Perspectives on Initial Post-Restoration Changes

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**U.S. Geological Survey Pacific and Coastal Science Center
Santa Cruz, CA**

South Bay Science Symposium
February 3, 2011



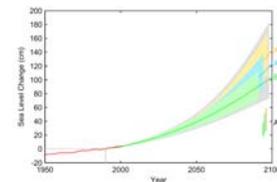
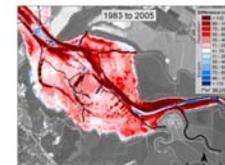
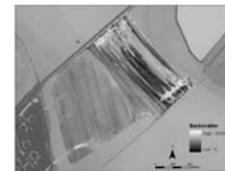
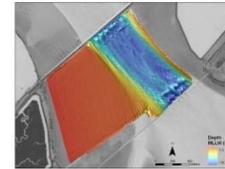
Will Restoration Cause Loss of Mudflats in South San Francisco Bay?

Main Points

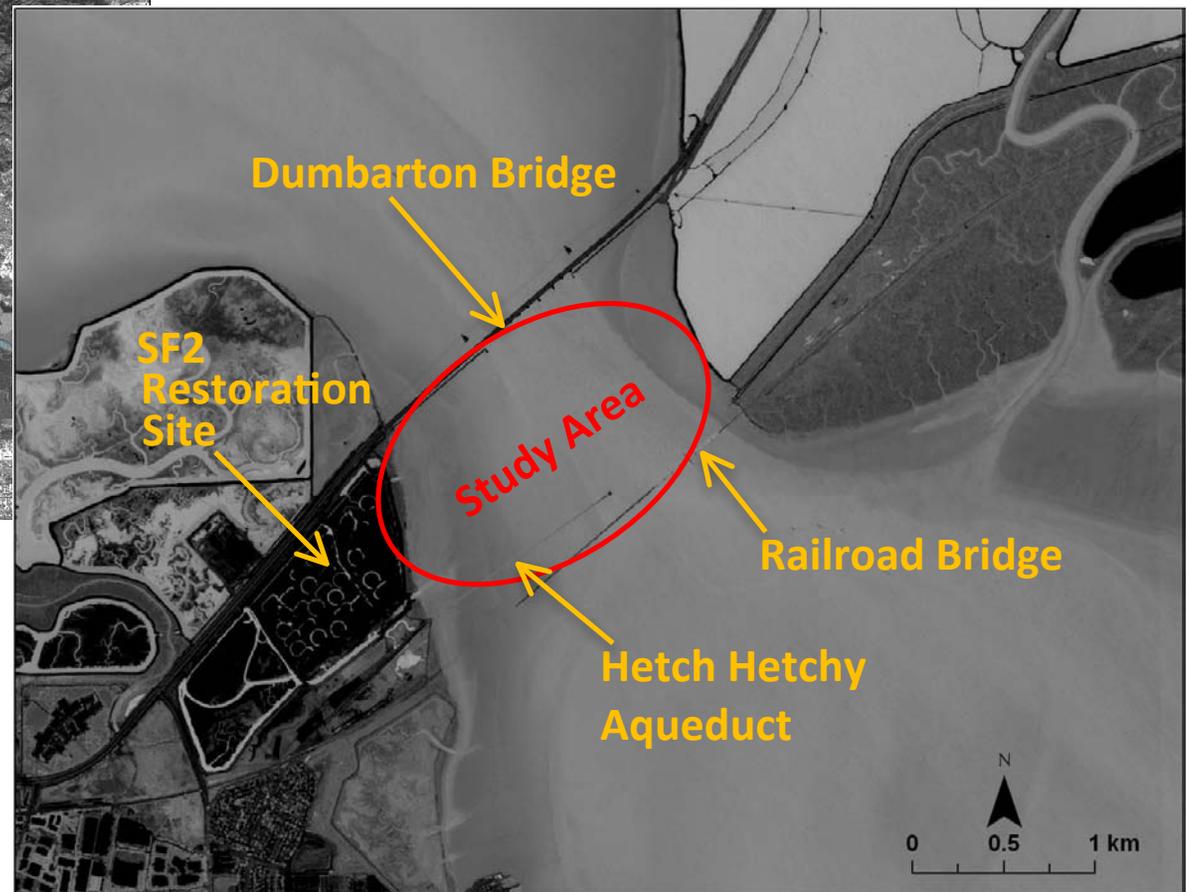
- 1) Restoration at SF2 is creating distributary channels at the pond outlet.
- 2) In the recent past, the far South Bay was a sediment magnet. However, high rates of sea level rise, in combination with restoration, may or may not result in degradation of mudflats. Modeling will aid in increasing certainty
- 3) Optimal restoration requires monitoring, modeling, and adaptive management

Outline

- **Mudflat at SF2 (west side of Bay south of Dumbarton)**
- **Post-restoration change in mudflats at SF2**
- **Historical (known) and future (unknown, sea level rise related) change in far South Bay**
- **Summary and conclusions**



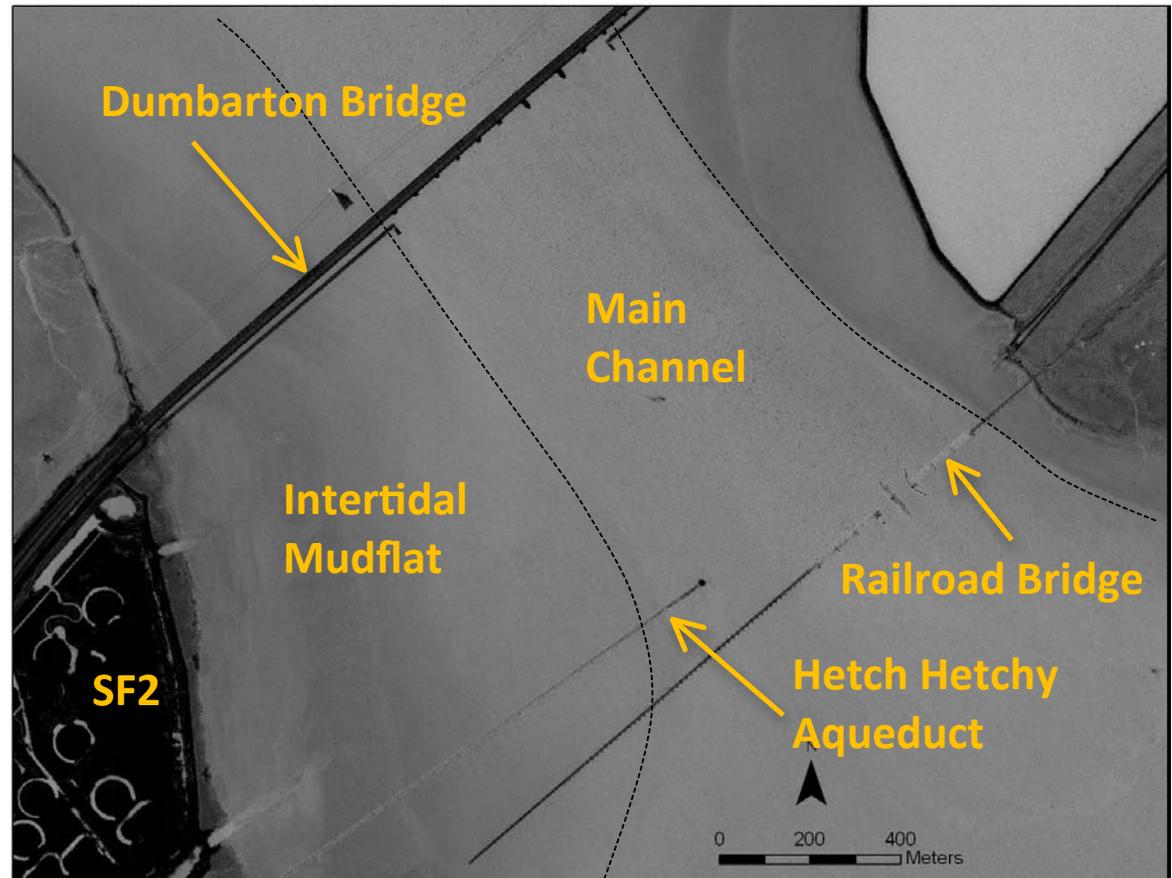
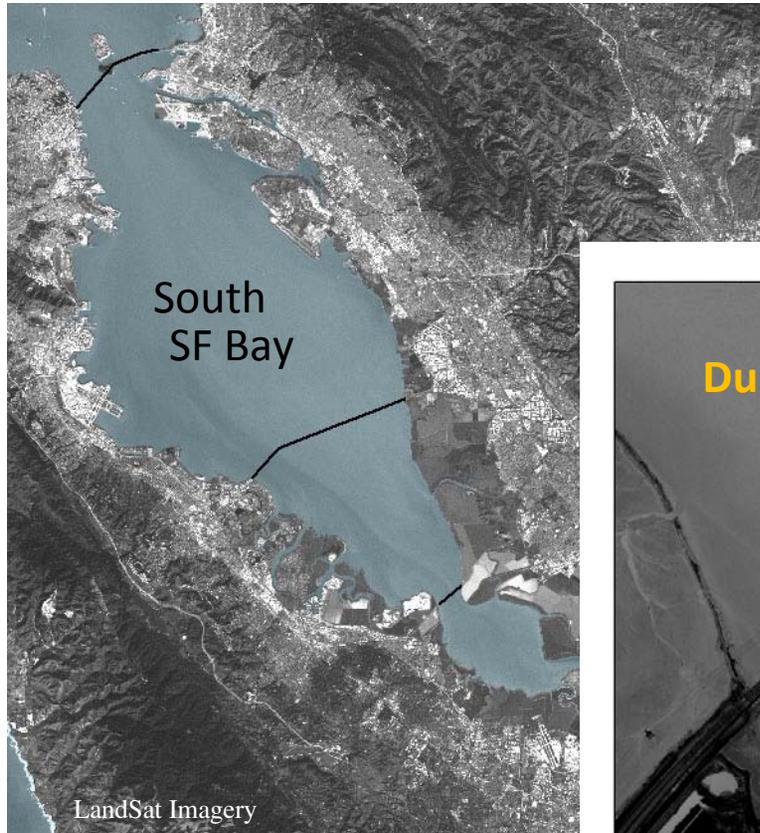
Study Area



2010 IKONOS satellite image courtesy of the City of San Jose

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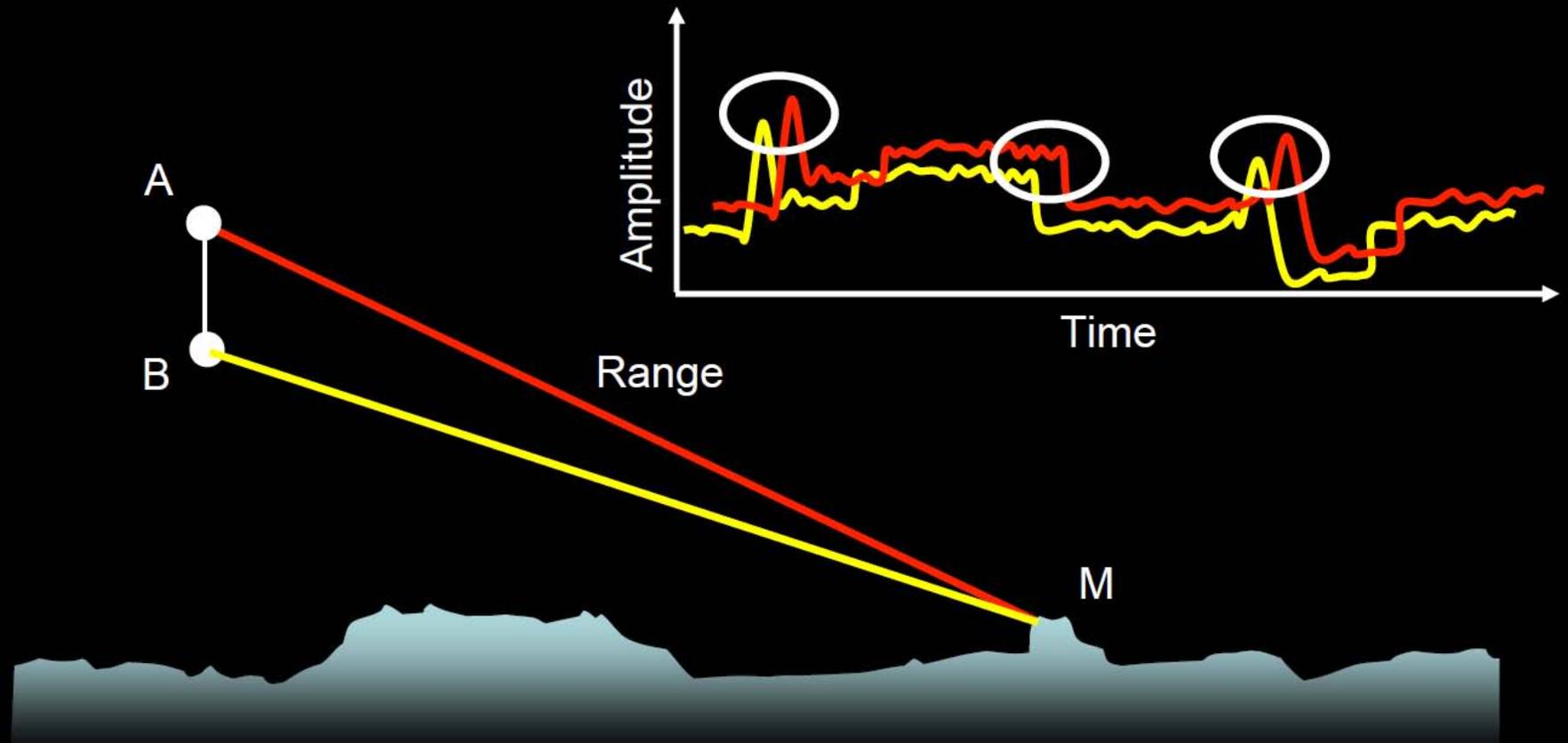
Measuring seasonal changes in bathymetry

Transducers for interferometric sidescan sonar swath bathy system



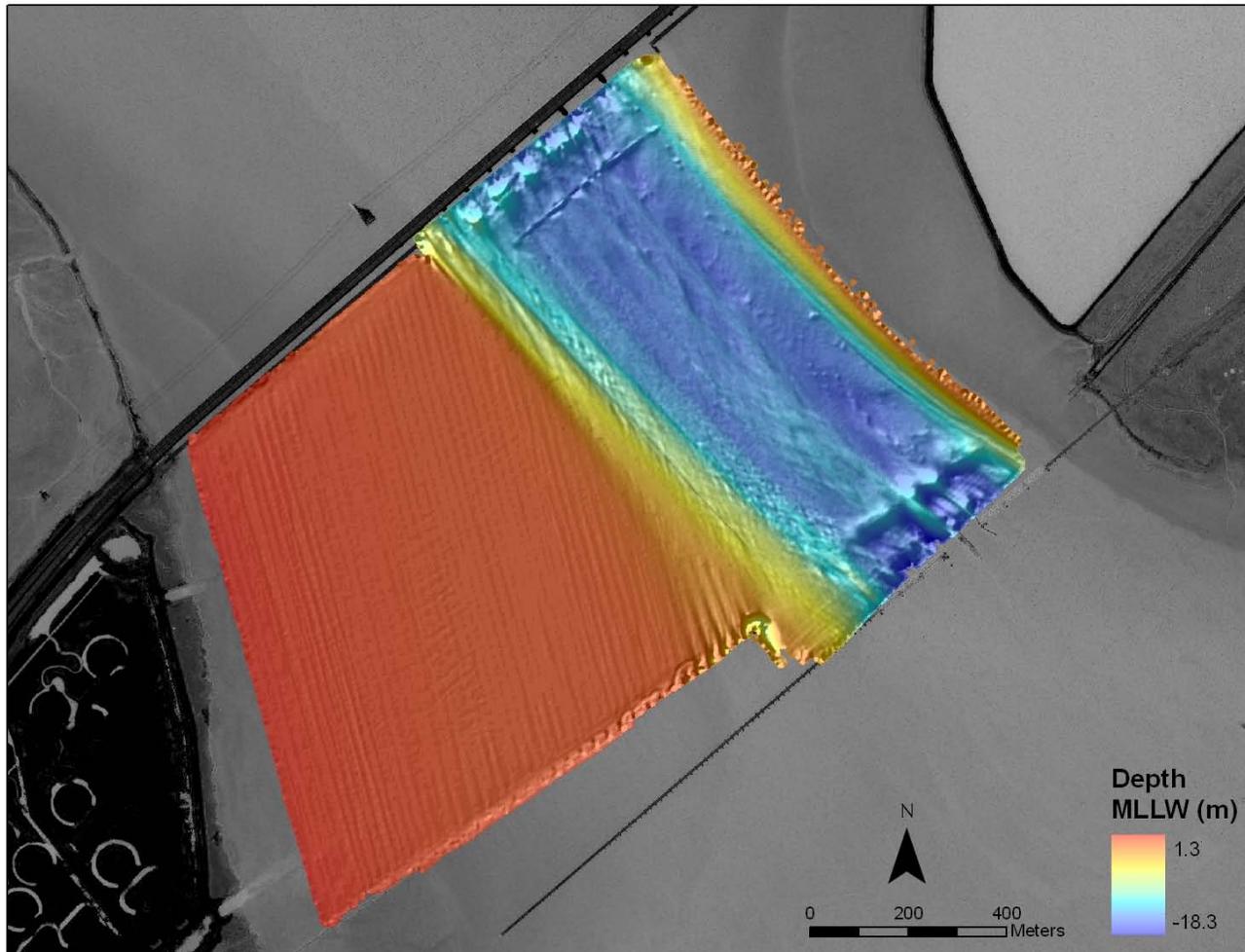
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Measuring Bathymetry with Sidescan

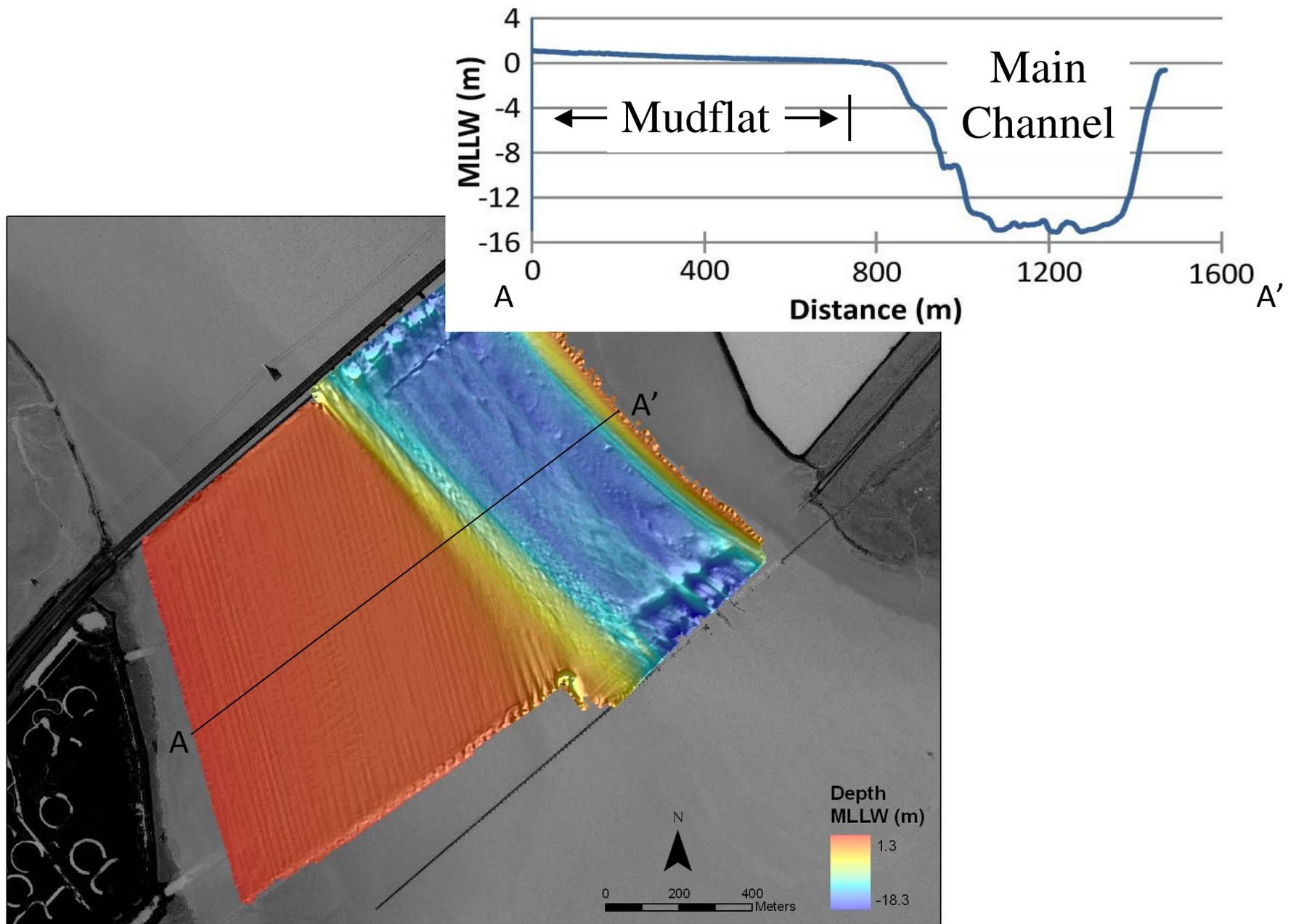


(Lurton, 2002)

Bathymetry in 2010



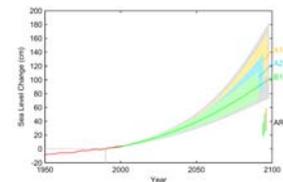
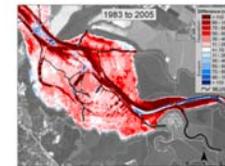
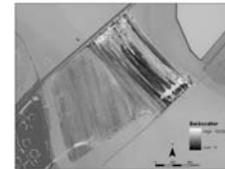
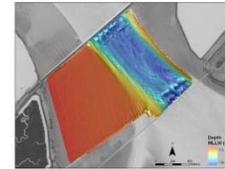
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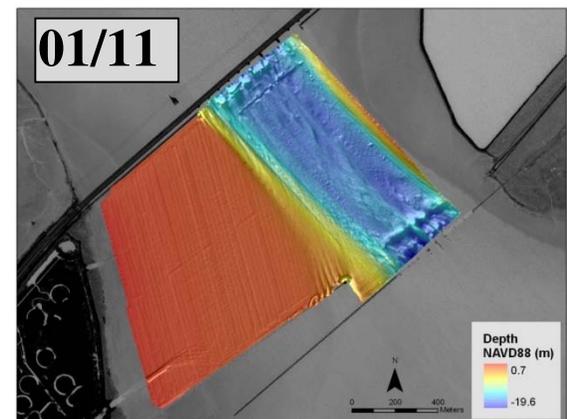
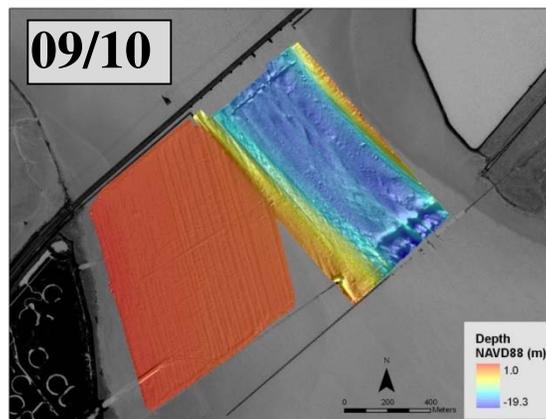
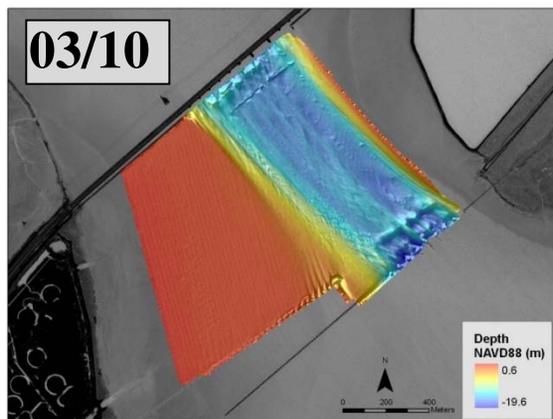
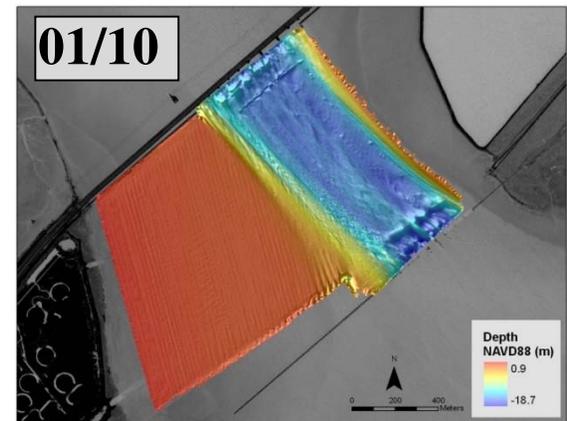
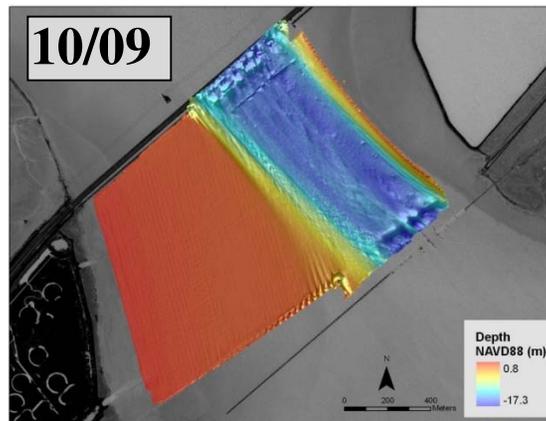
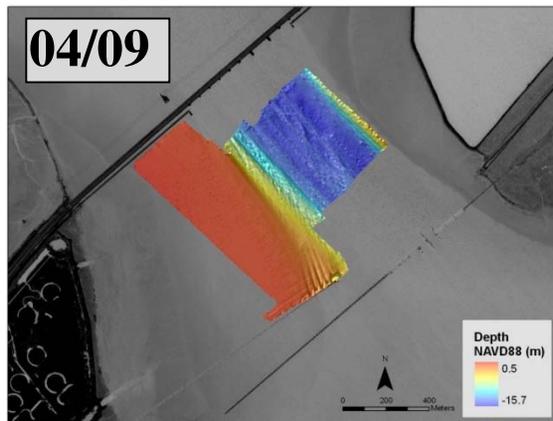
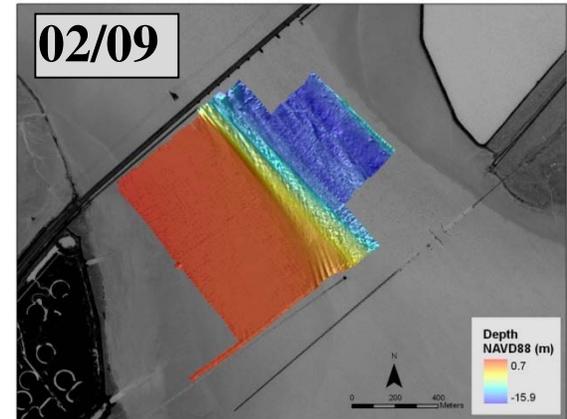
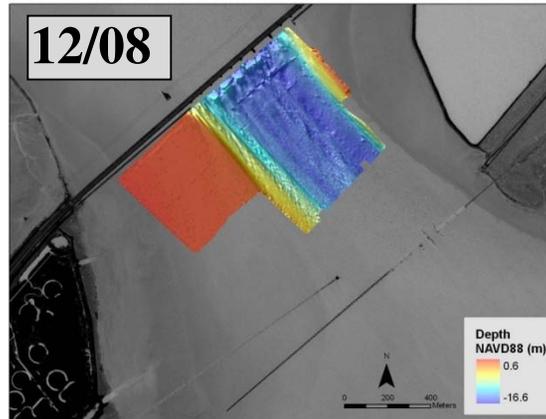
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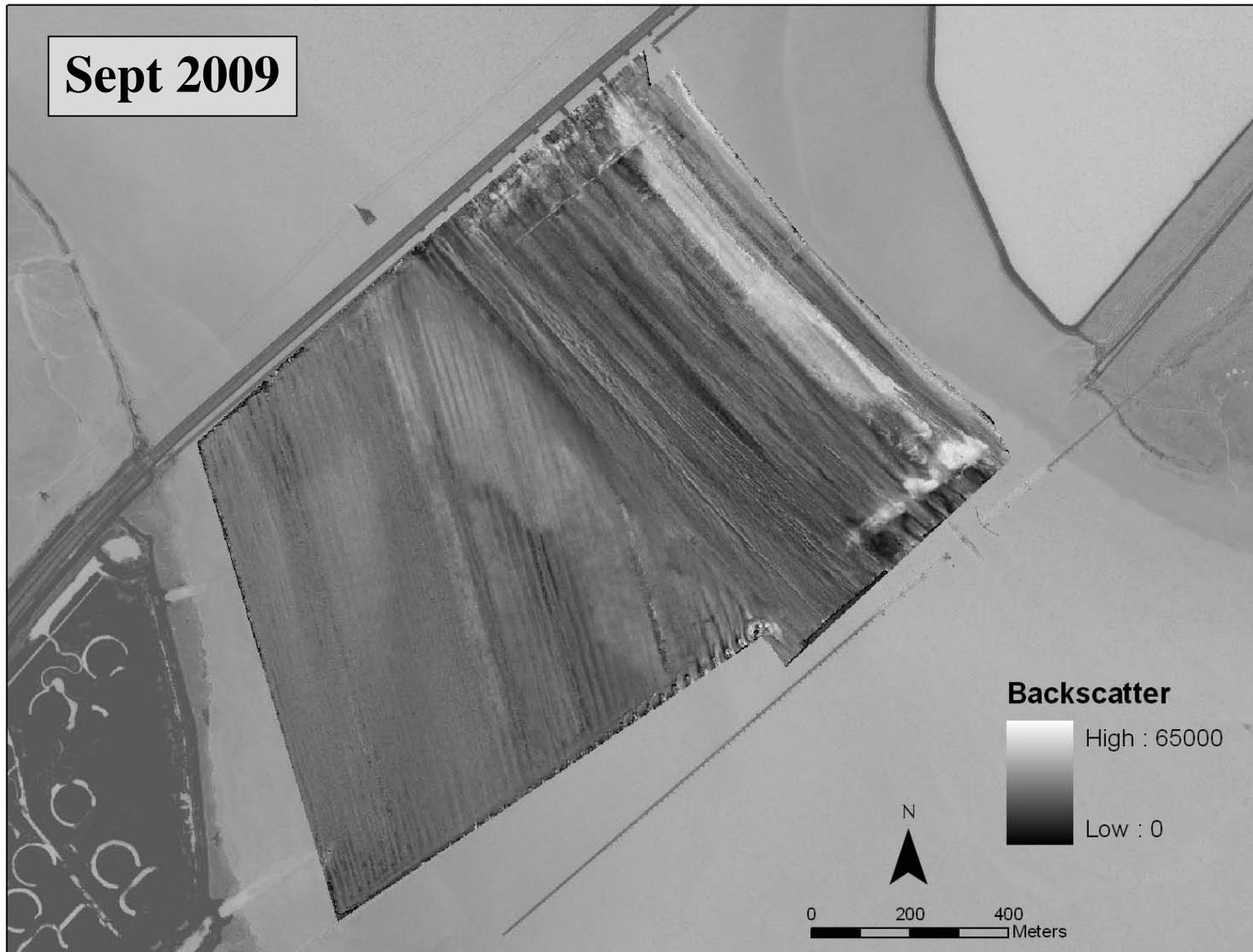


Seasonal Bathymetry Surveys



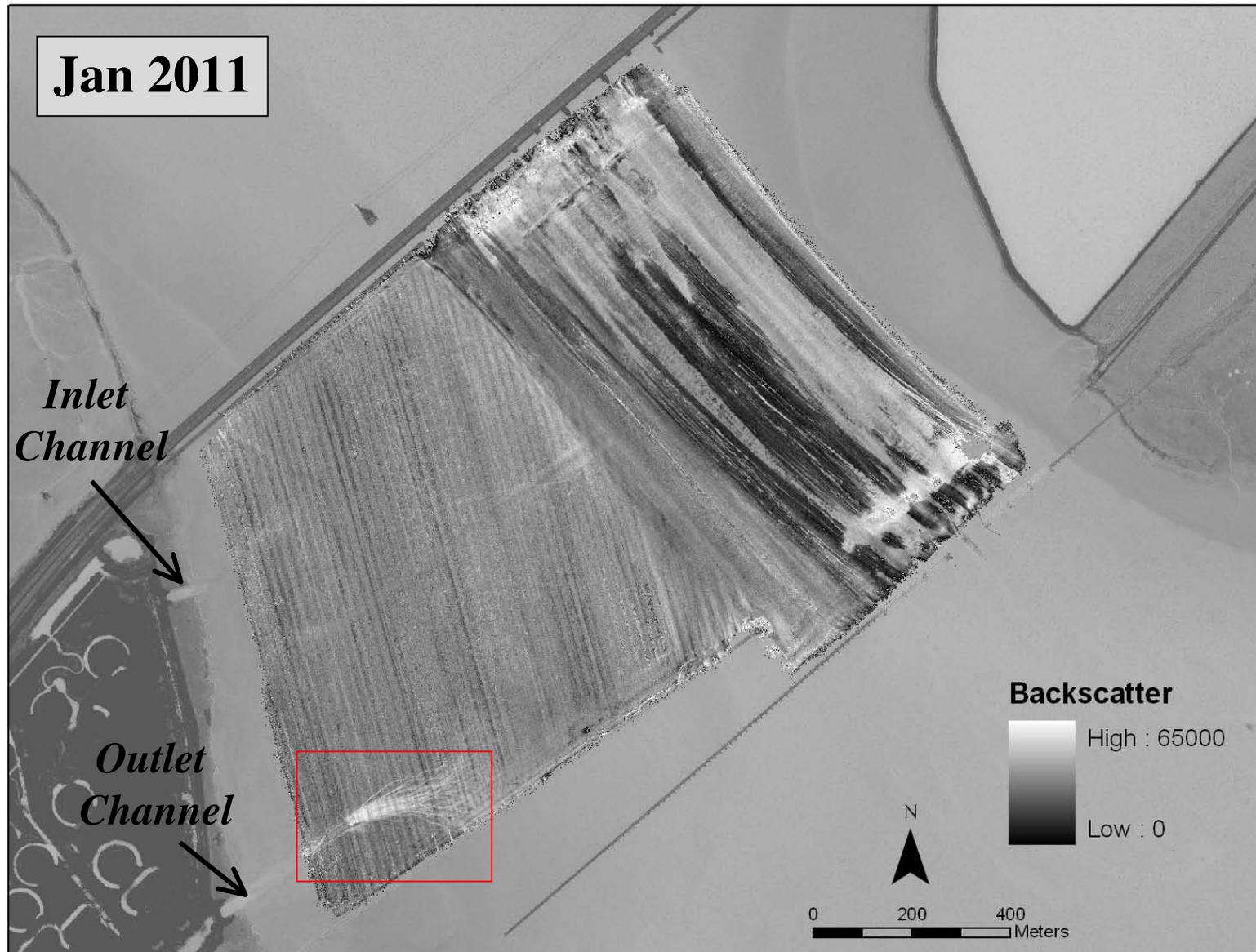
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Pre-Restoration Backscatter



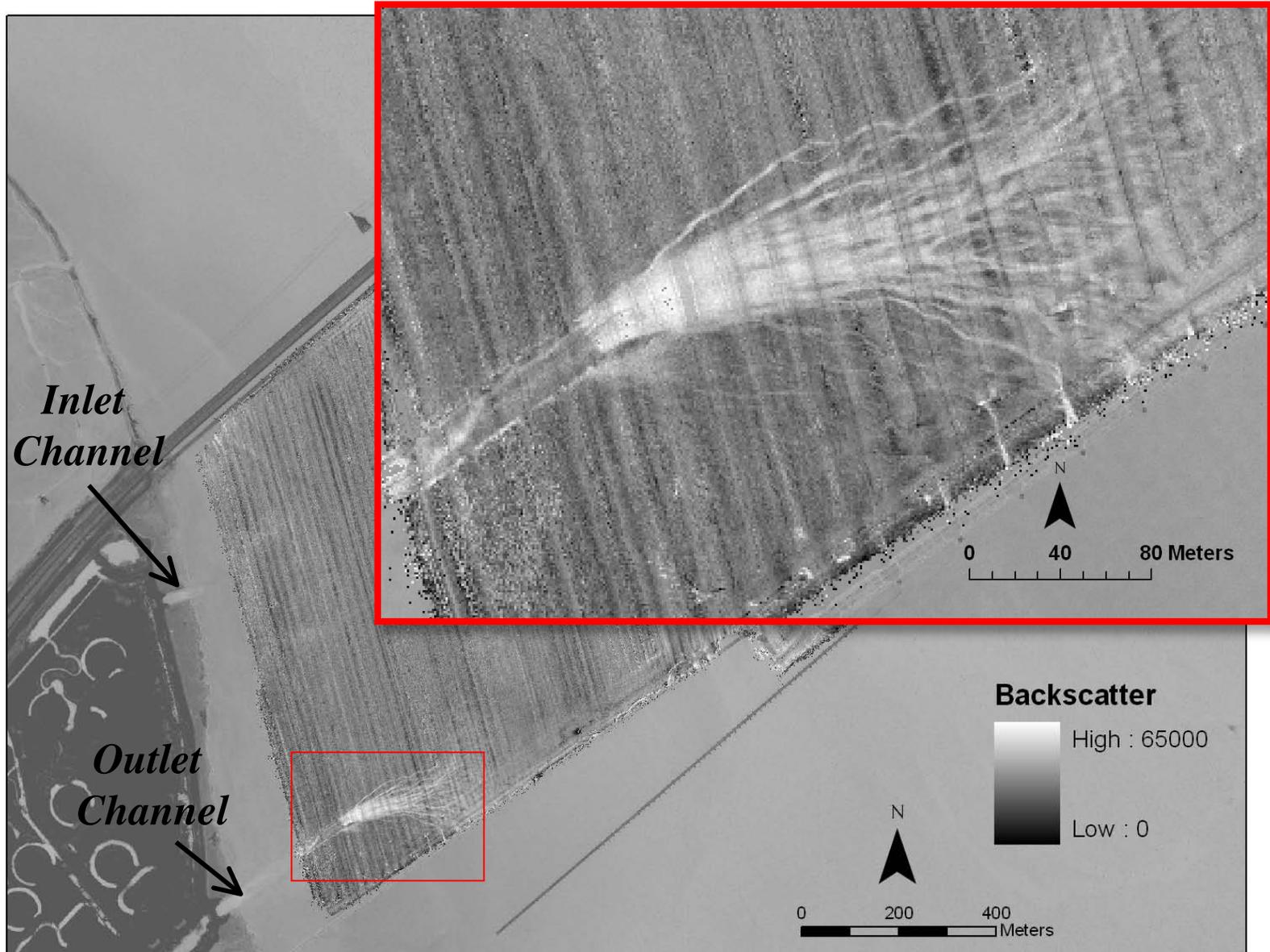
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Restoration-induced mudflat change



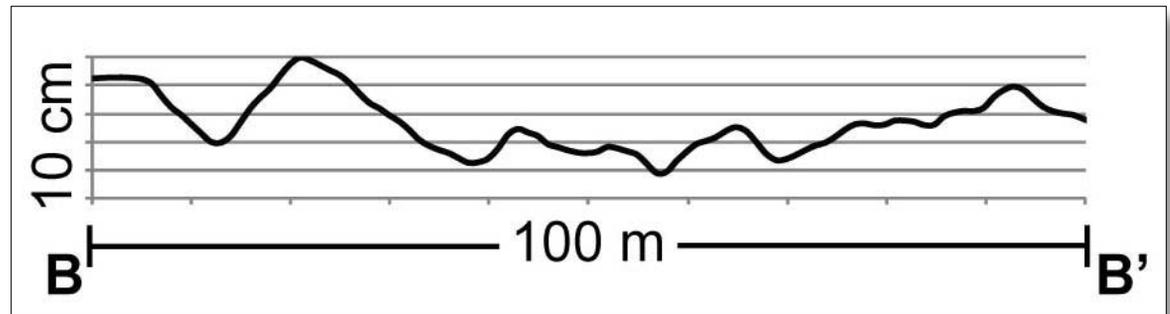
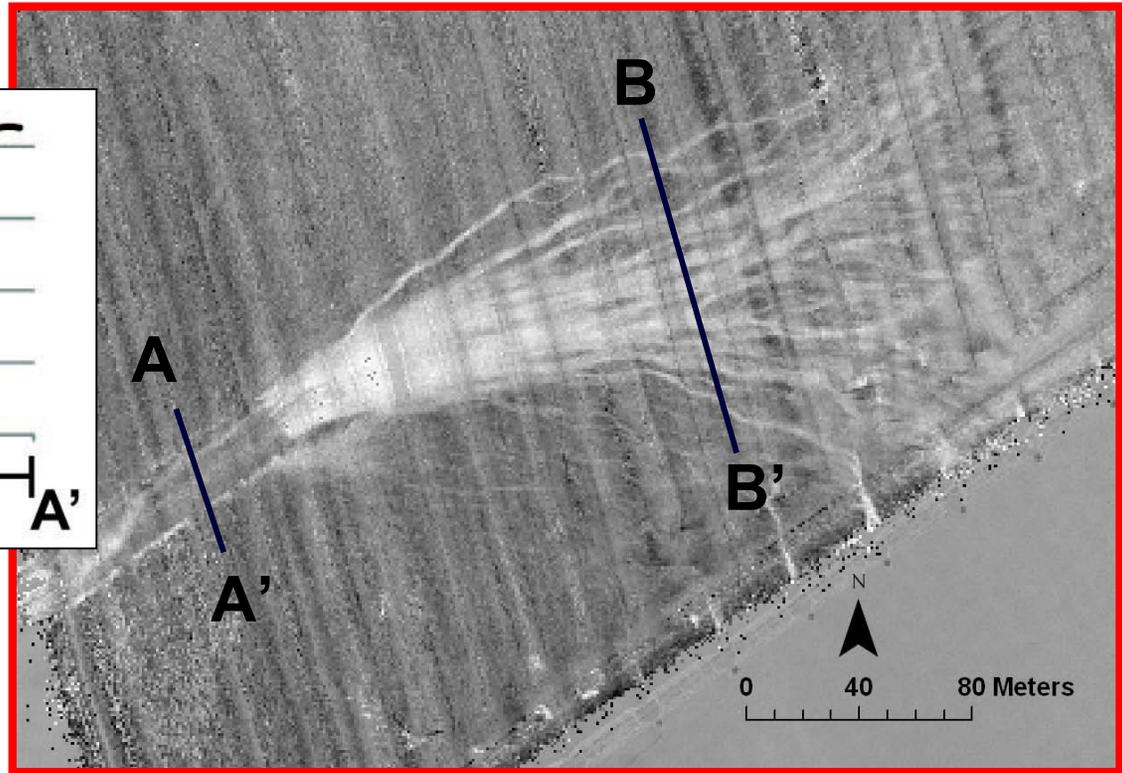
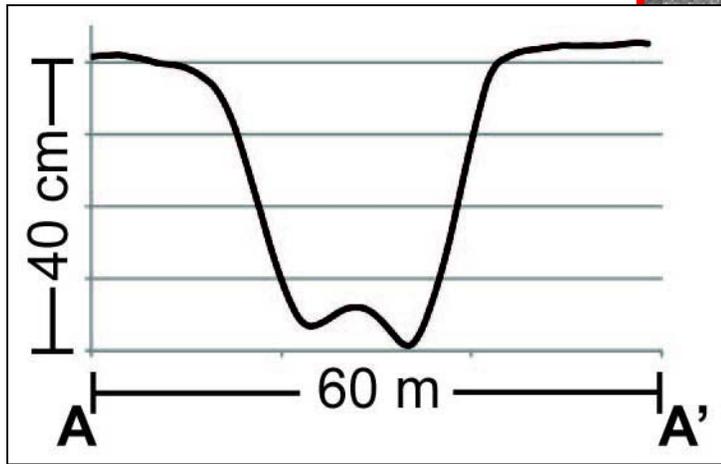
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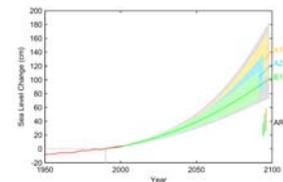
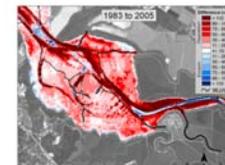
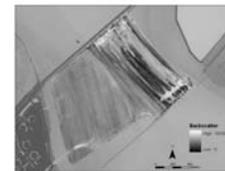
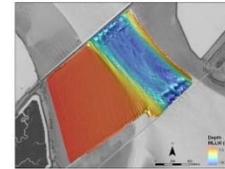
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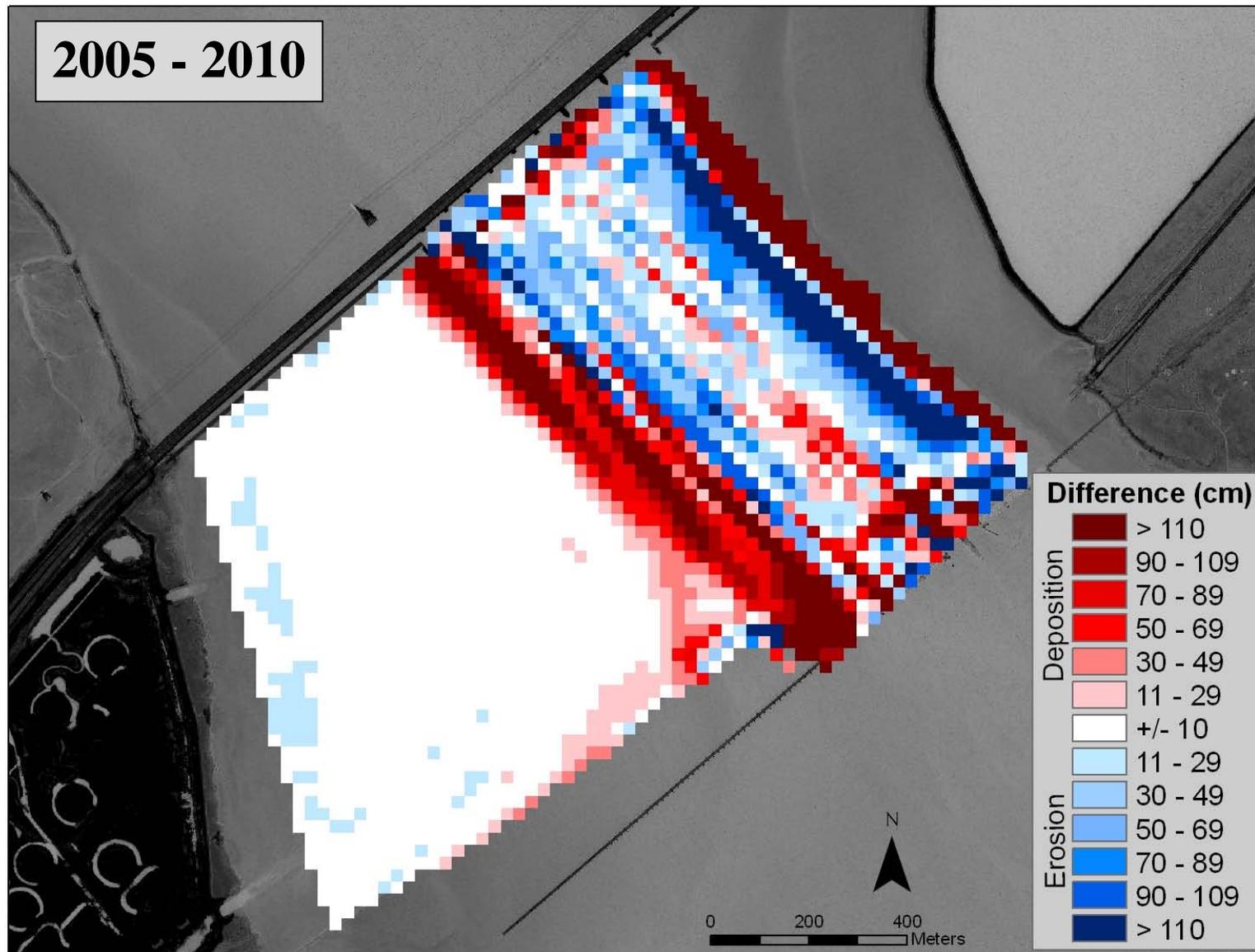
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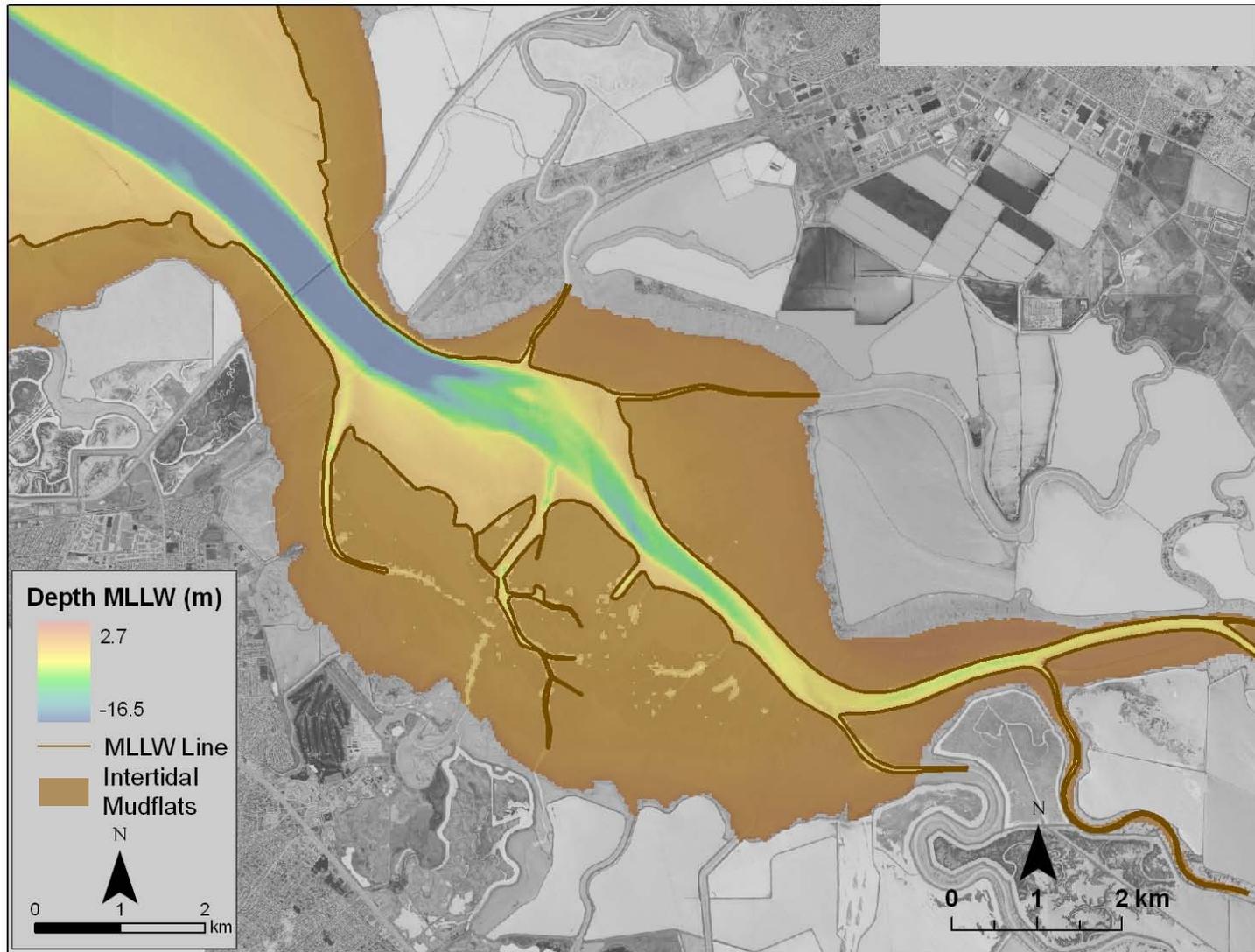


Historical mudflat change



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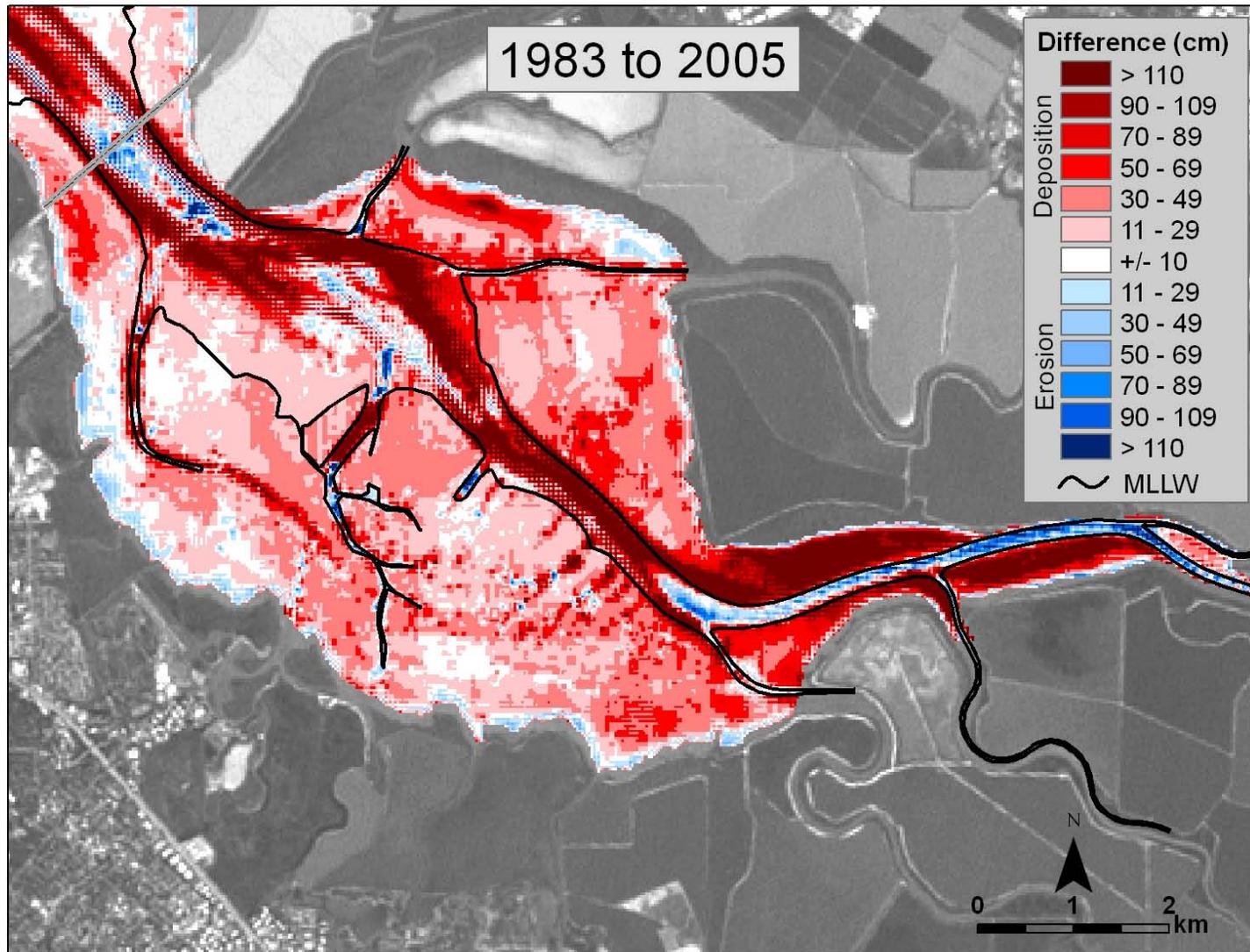
South SF Bay Bathymetry



2004 and 2005 data

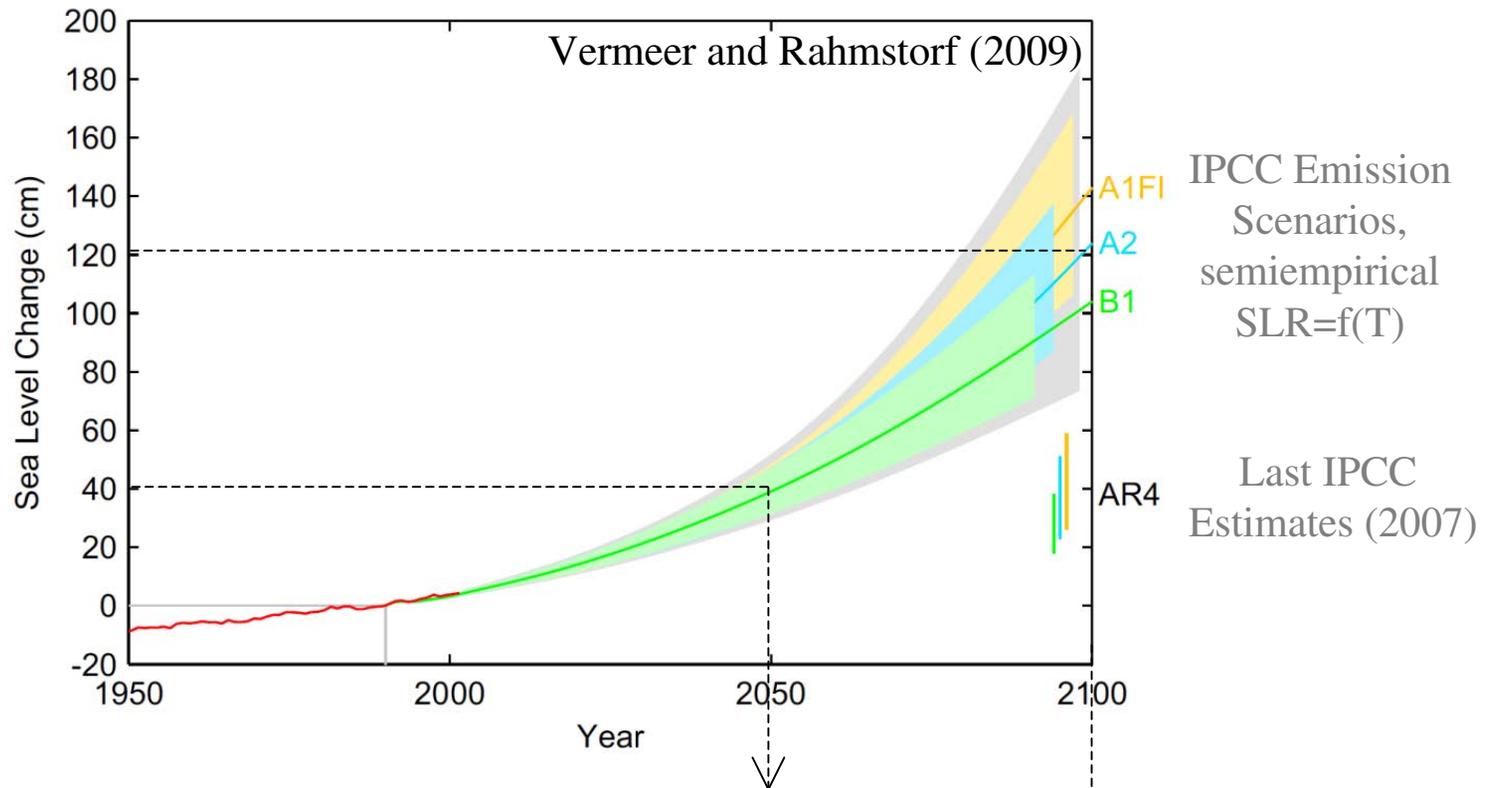
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Historical Sedimentation in Far S. Bay



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Sea Level Rise (SLR) Scenarios



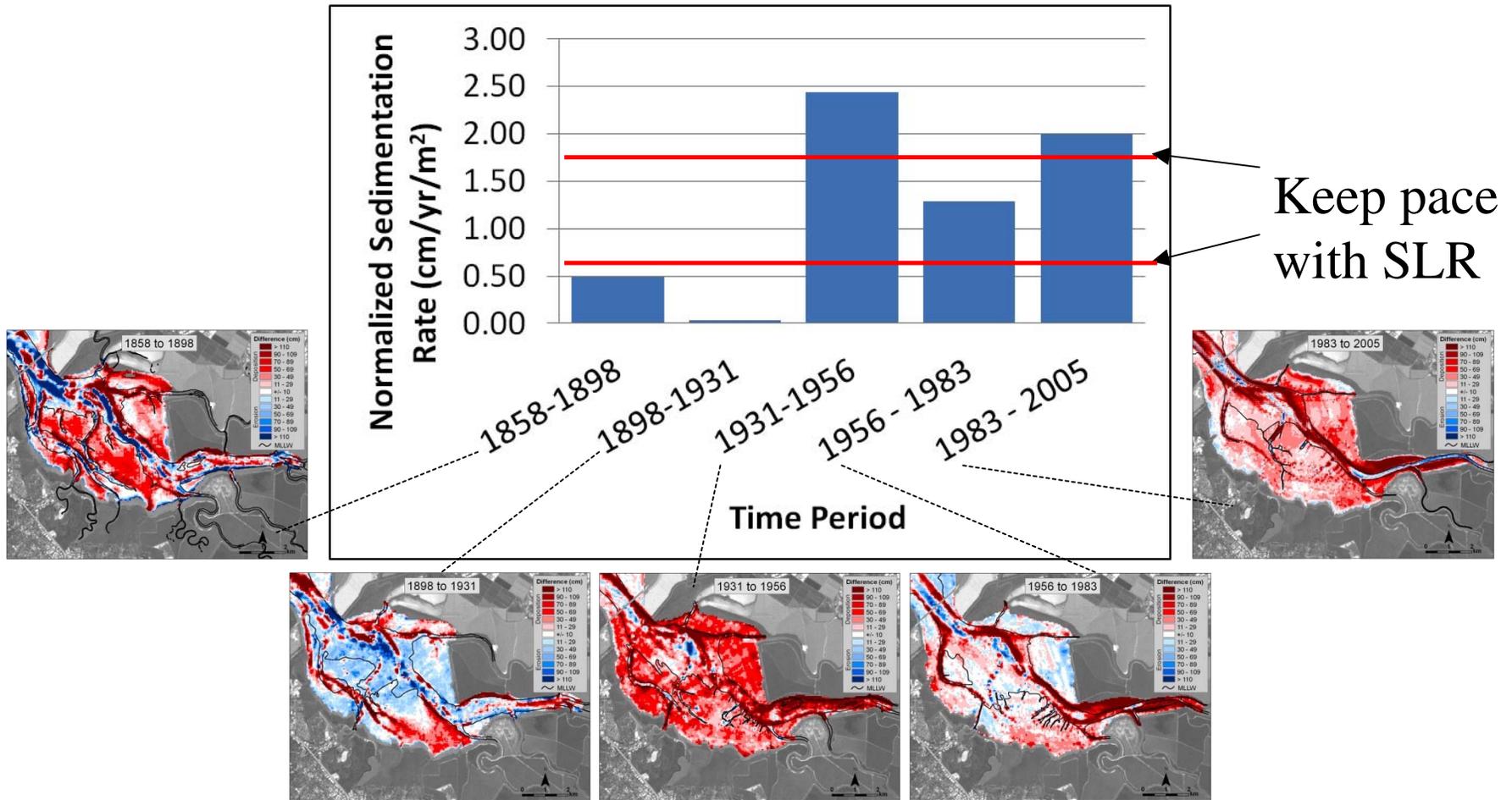
36 cm¹ SLR over 40 yrs = 0.7 cm/yr

121 cm¹ SLR over 100 yrs = 1.2 cm/yr

¹ estimates from State of CA Sea-Level Rise Interim Guidance Document (2010)

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Historical versus future sediment “demand” (bay only)

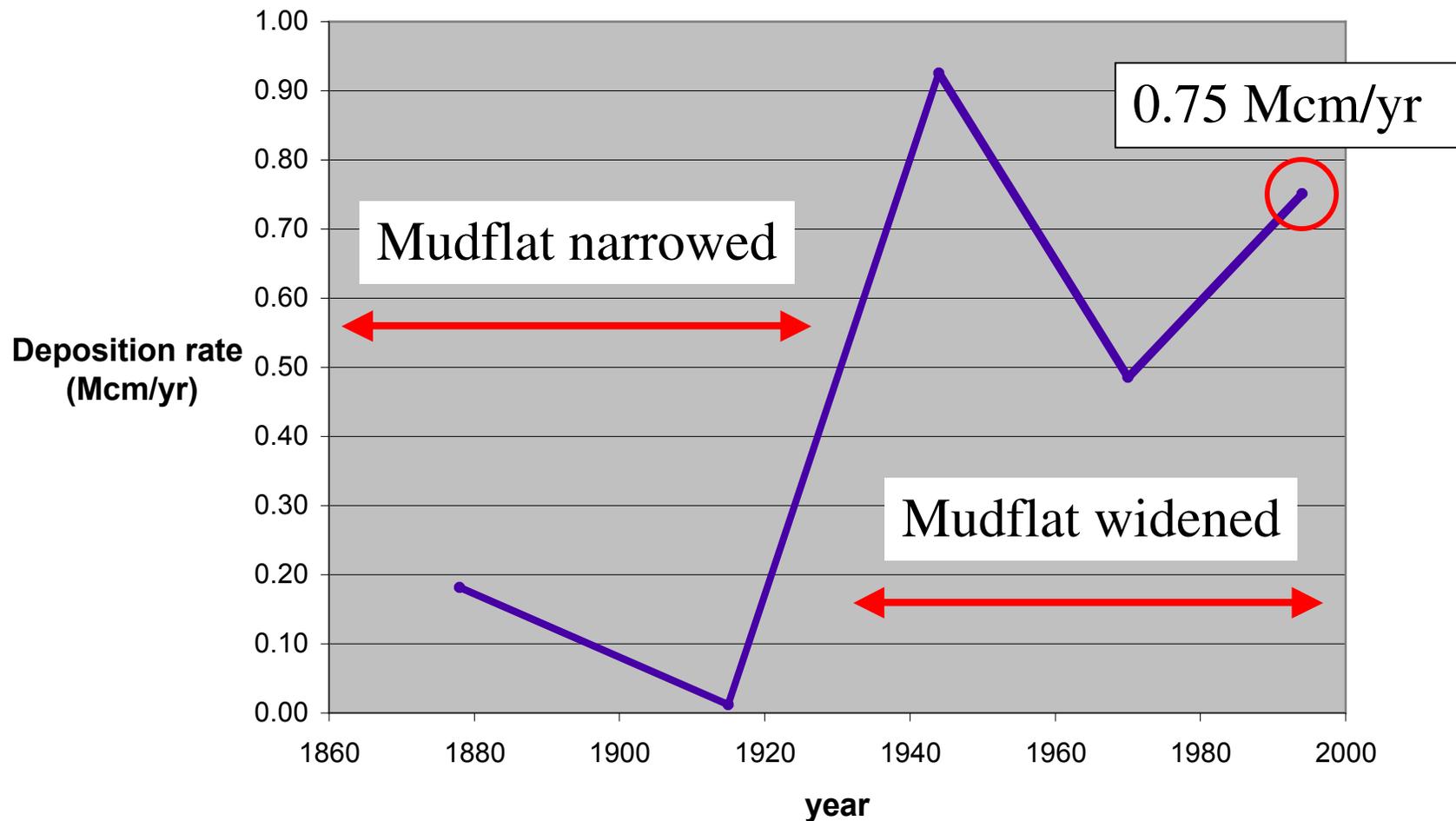


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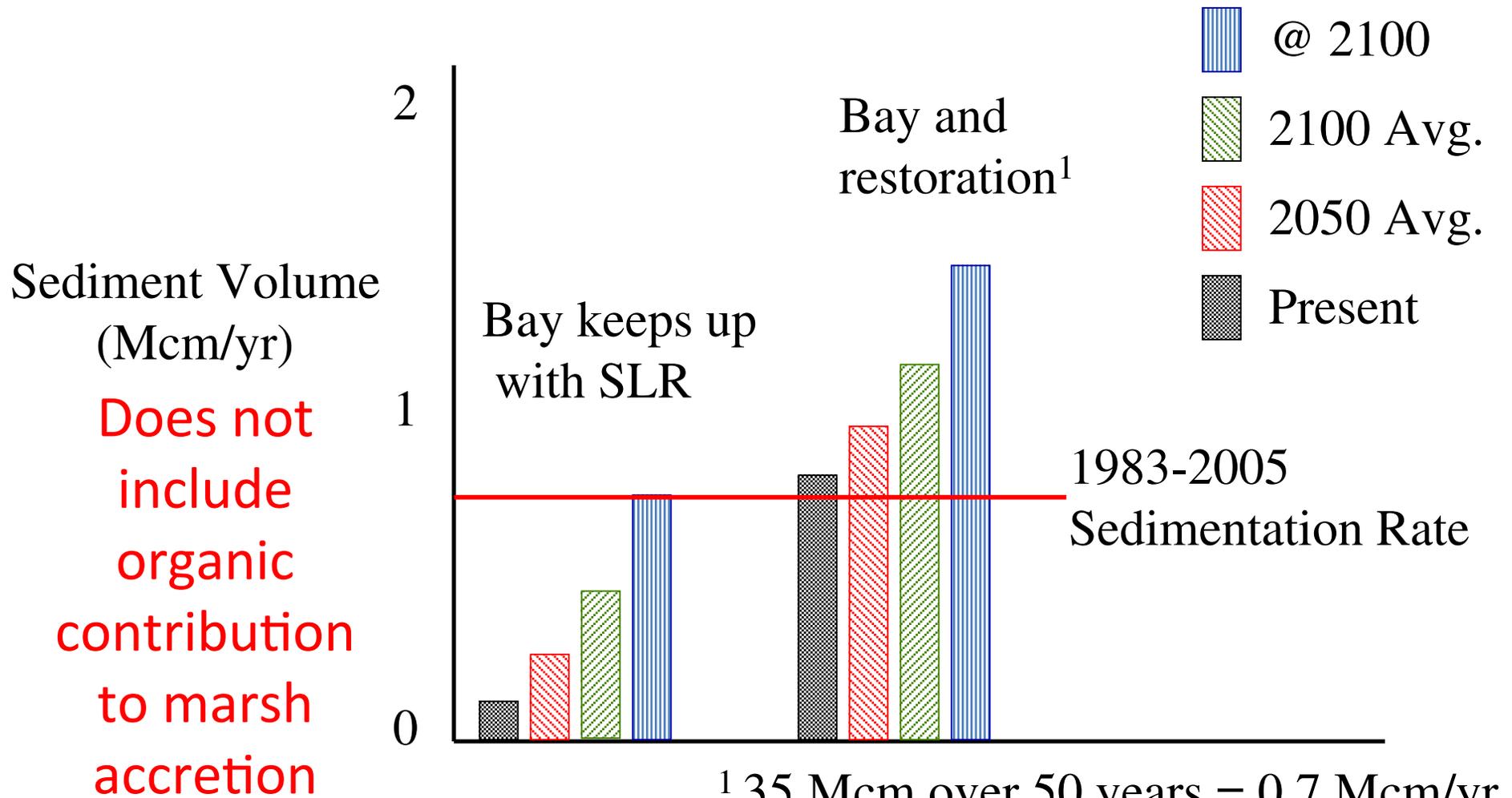
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Mudflat width at SF2 related to deposition in far South Bay



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Bay and restoration sediment “demand” from SLR (food for thought)



¹ 35 Mcm over 50 years = 0.7 Mcm/yr from Schoellhamer et al. (2006)

Summary and Conclusions

- **Mudflat disrupted by distributary channels radiating from outlet at SF2**
- **Mudflat widening at SF2 in recent past**
- **Recent sedimentation in far South Bay > SLR for rates < ~2 cm/yr**
- **Restoration sediment demand, in combination with very high SLR rates, will stress system and may result in loss of mudflats. Optimal restoration requires **monitoring, modeling** and **adaptive management**.**