

# NWD RSM Program Review

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USACE Northwest Division

August 10, 2011

National RSM Program Review,  
Vicksburg, MS



®

US Army Corps of Engineers  
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# Overview

- Benson Beach Summary
- Kansas City District

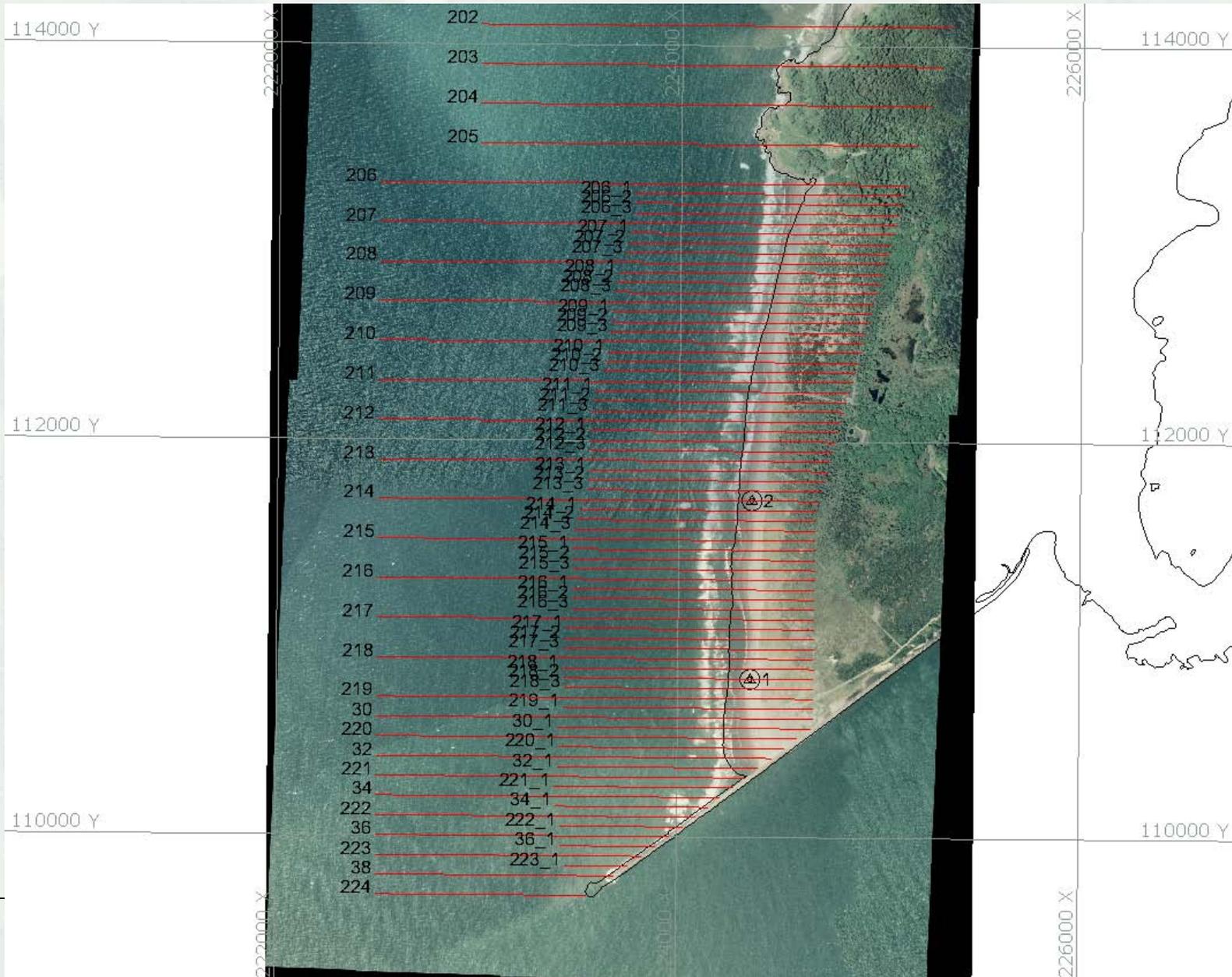


# SW WA LDR Monitoring

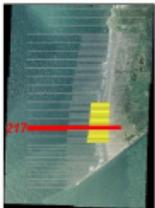
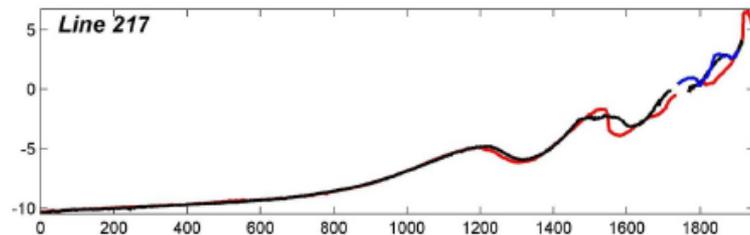
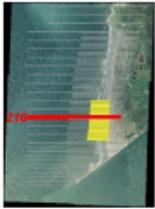
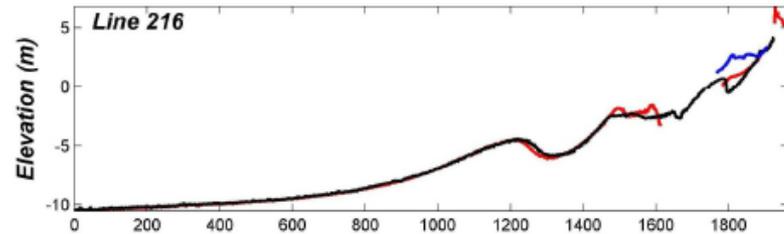
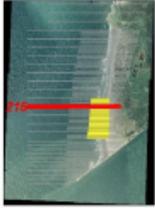
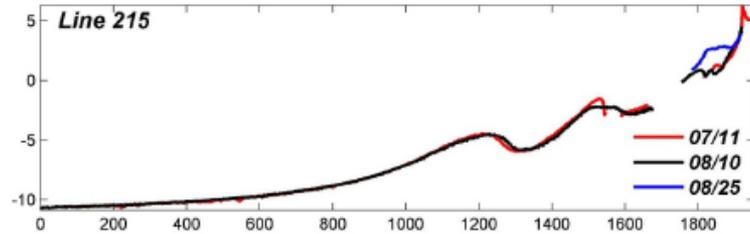
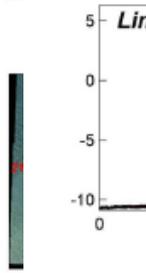
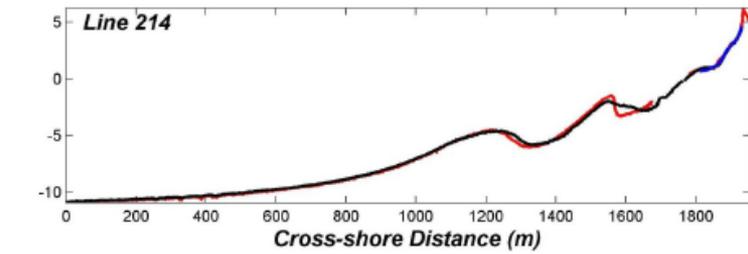
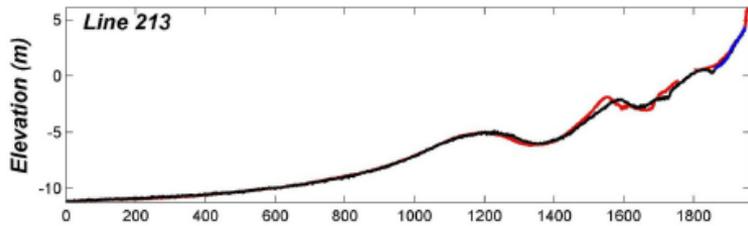
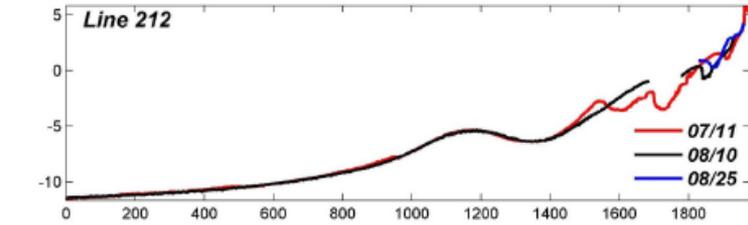
- Topographic and bathymetric surveys: (WDOE, OSU, USGS)
- Remote observation of foreshore dynamics – ABMS at North Head: (NWRA/NWP)
- Nearshore wave and current data collection: (WDOE)
- Hydrodynamic, sediment transport, and morphological modeling: (USGS)
- Sediment tracer study: (SAIC/EHI)
- Aerial photography: (NWP)



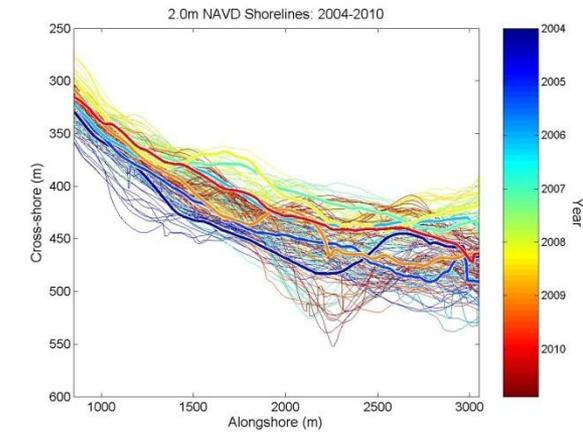
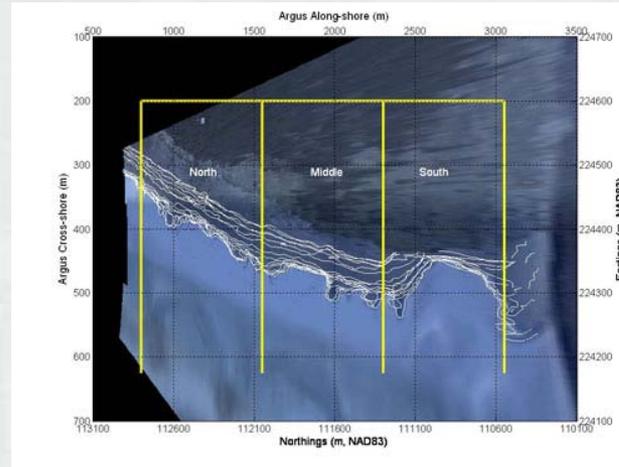
# Topographic and Bathymetric Surveys



# Cross-Shore Profiles



# The North Head Argus Camera



# Argus Camera Analysis

Courtesy Northwest Research Associates



2010 Man-made salient



2006 Natural salient

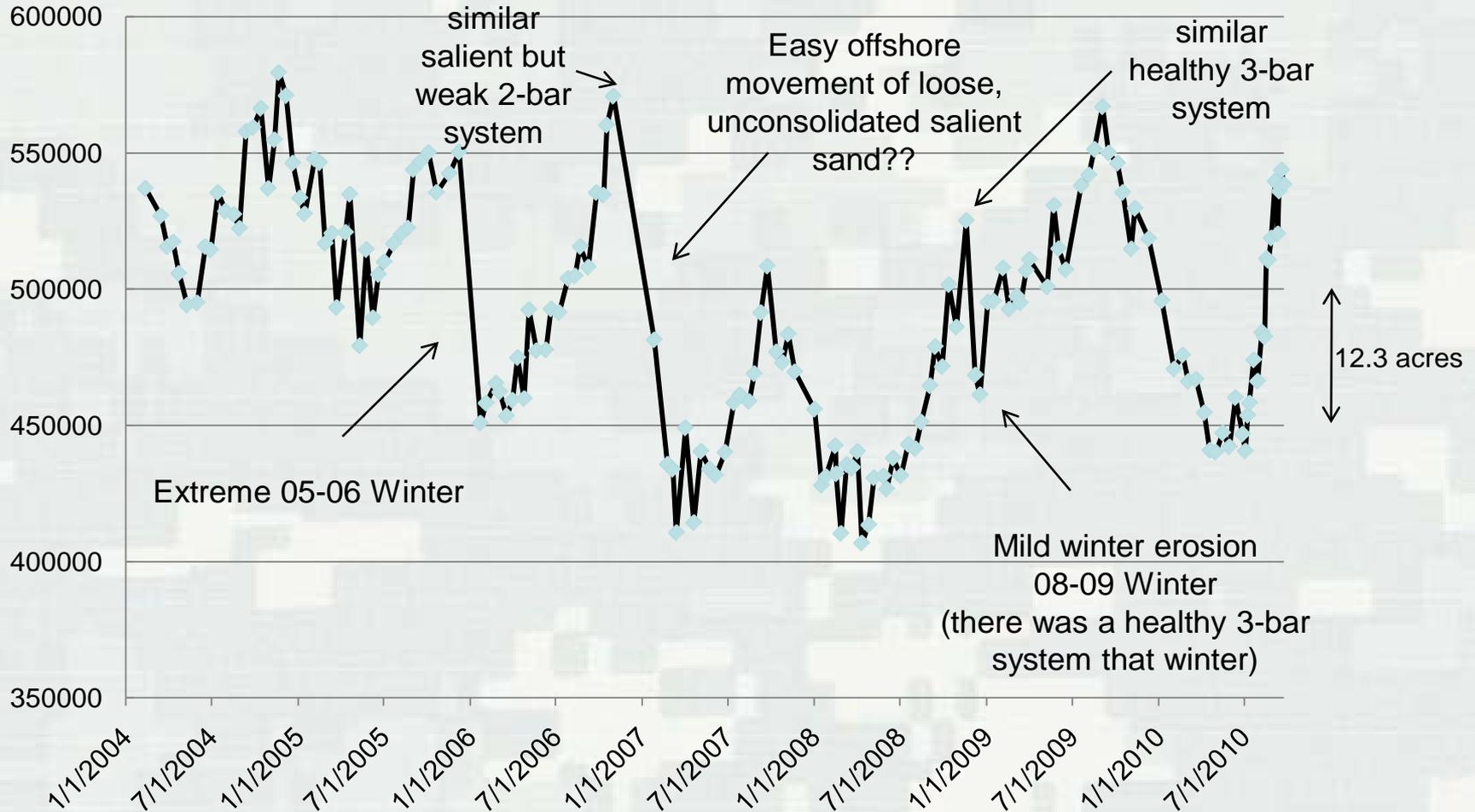
images, acquired from Camera 6, on 15 Sept 2010 (upper) and 24 August 2006 (lower). The left image shows the growing salient fed by the pump-ashore project. The right image shows the natural salient after the extreme storms of Winter 2005/2006.



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# Total Dry-Beach Acreage (m\*\*2)

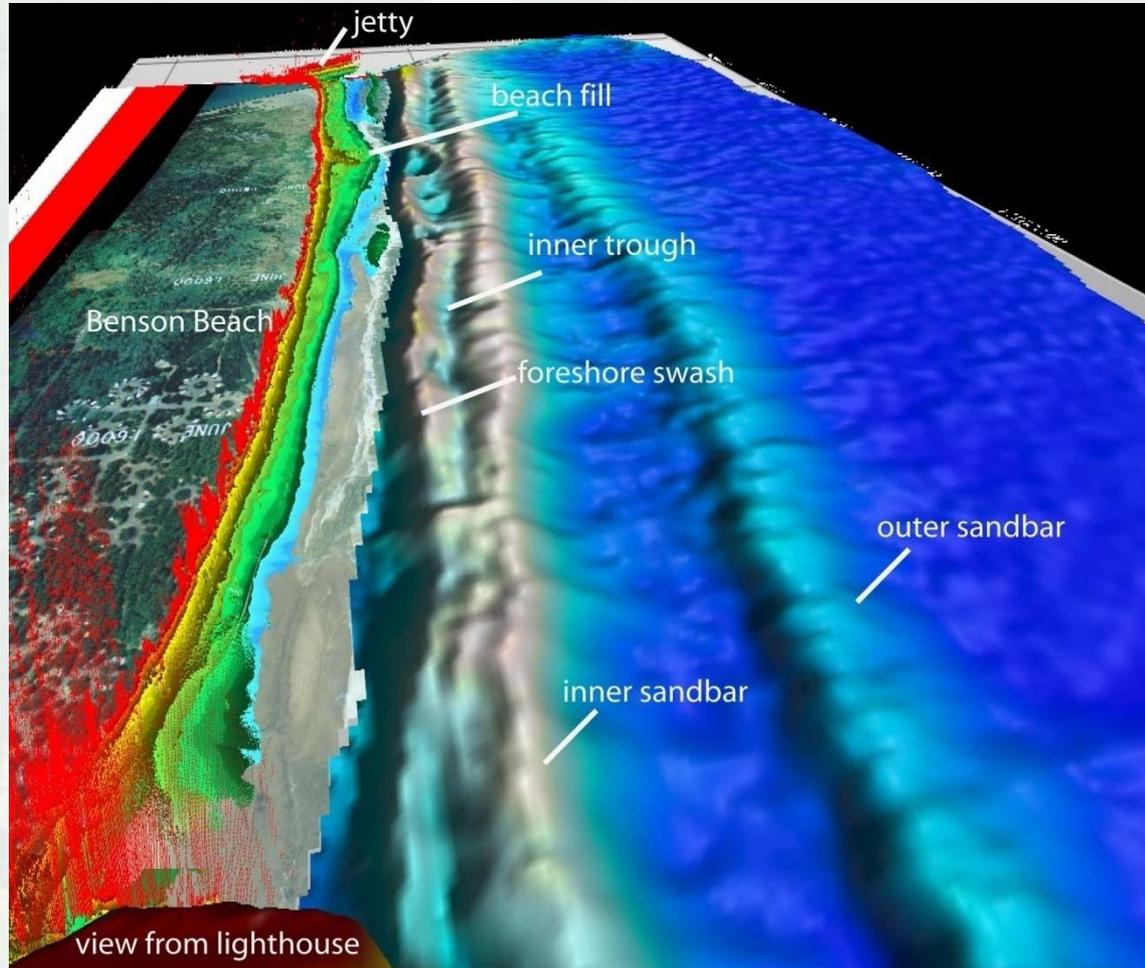
Courtesy Northwest Research Associates



# Seamless topography and depths during storms

Courtesy Jesse McNinch, ERDC

View of beach and nearshore sand bars from the lighthouse looking south



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# Nearshore and Inter-tidal Measurements

- Inshore wave, current, water level, and suspended sediment concentration (SSC) data collection: Beach Pod installations for measuring 3-dimensional wave, current and suspended sediment monitoring in the inter-tidal zone.
- Offshore wave, current, and water level data collection: measurement of nearshore waves, current, water level, and suspended sediment on the western slope of the ebb tidal delta using a bottom-mounted instrumentation platform.





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# Nearshore and Inter-tidal Measurements

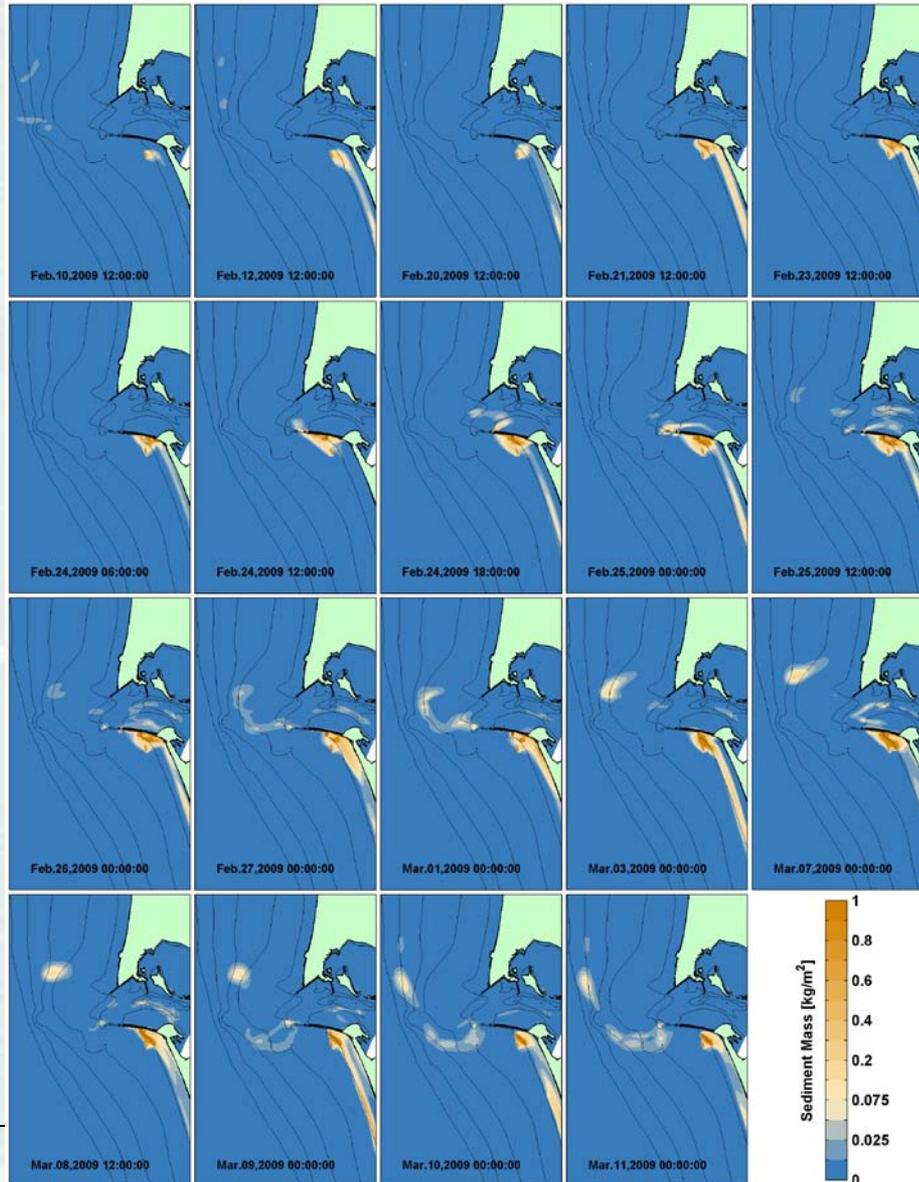


Courtesy of Golder Associates



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# MCR Delft3D Model



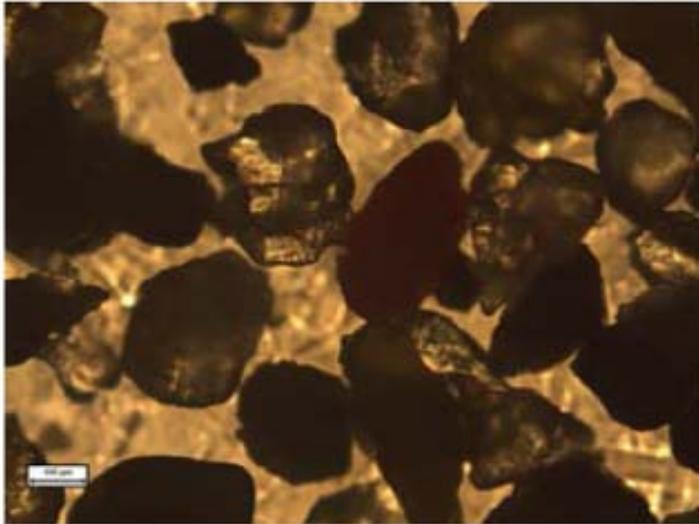
Courtesy of USGS



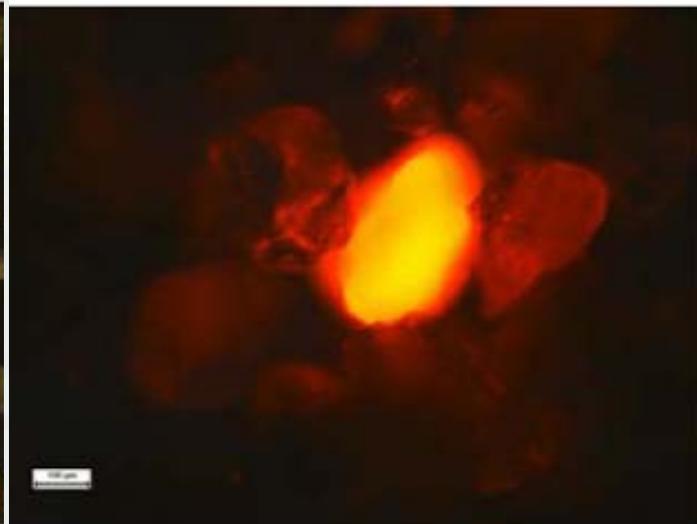
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# Tracer Particle Detection

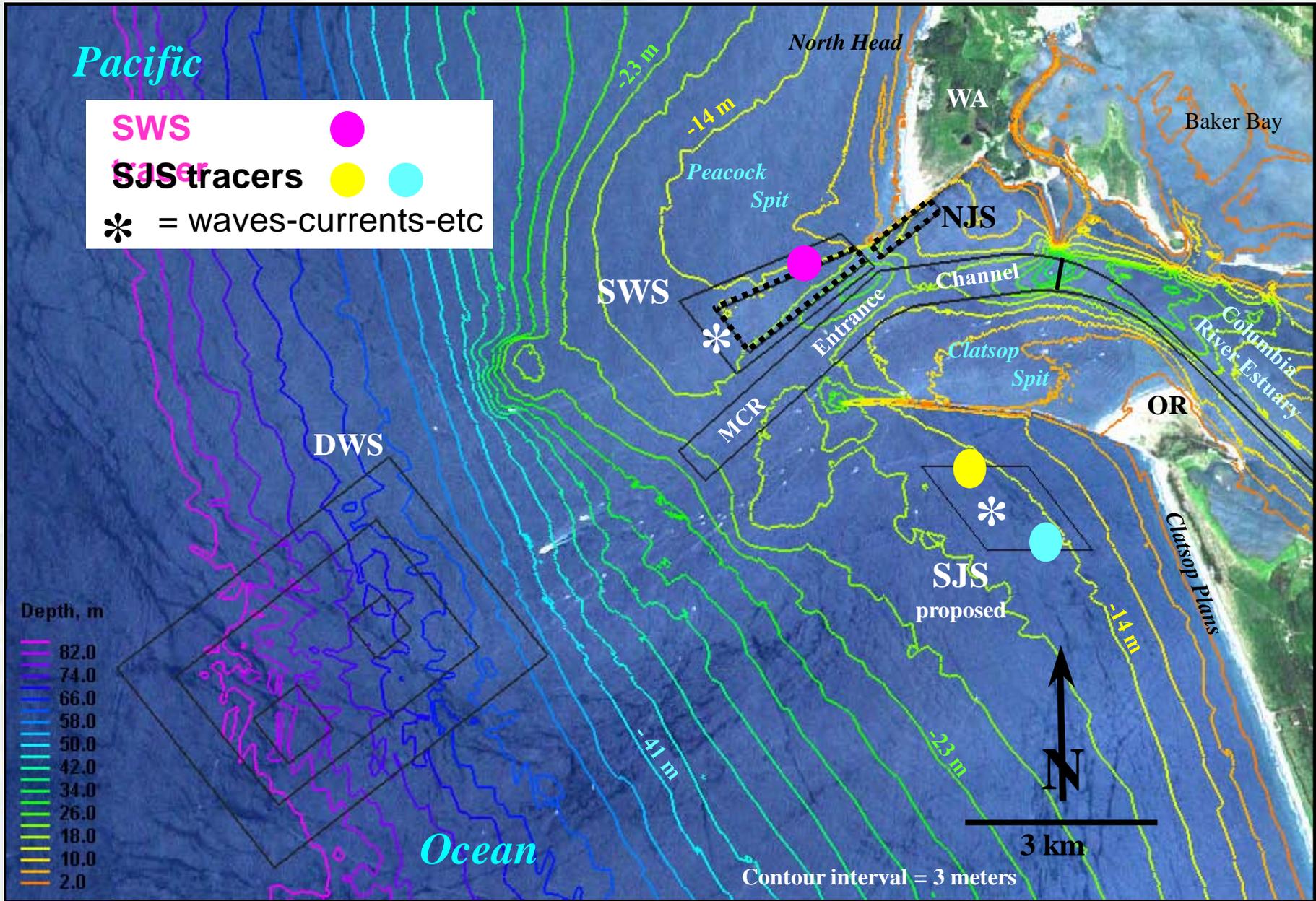
(Limit detection: 1 grain /kilo dry weight)



Tracer particle in native sand  
white light only, no  
fluorescence illumination.



Tracer particle in native sand  
No white light, fluorescence  
illumination only.



# Month 6: Round 3 Sampling, Apr/May 2007

**Seaview**

Round 3 Tracer Analysis  
Counts per 100 g dry weight

- 2.0 to 5.0 (2)
- 1.0 to 2.0 (22)
- 0.5 to 1.0 (49)
- 0.2 to 0.5 (39)
- 0.0 to 0.2 (34)
- Zero (81)

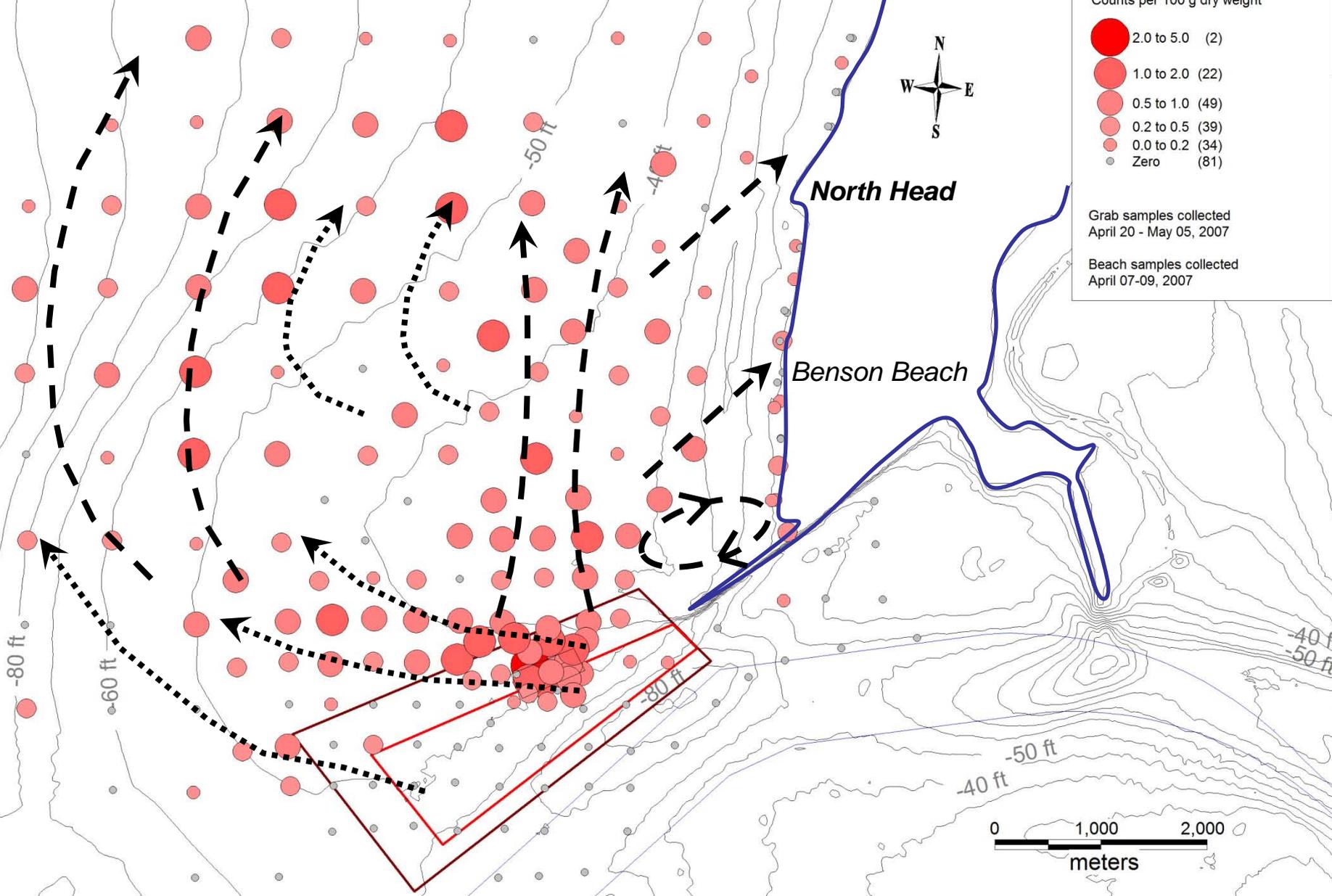
Grab samples collected  
April 20 - May 05, 2007

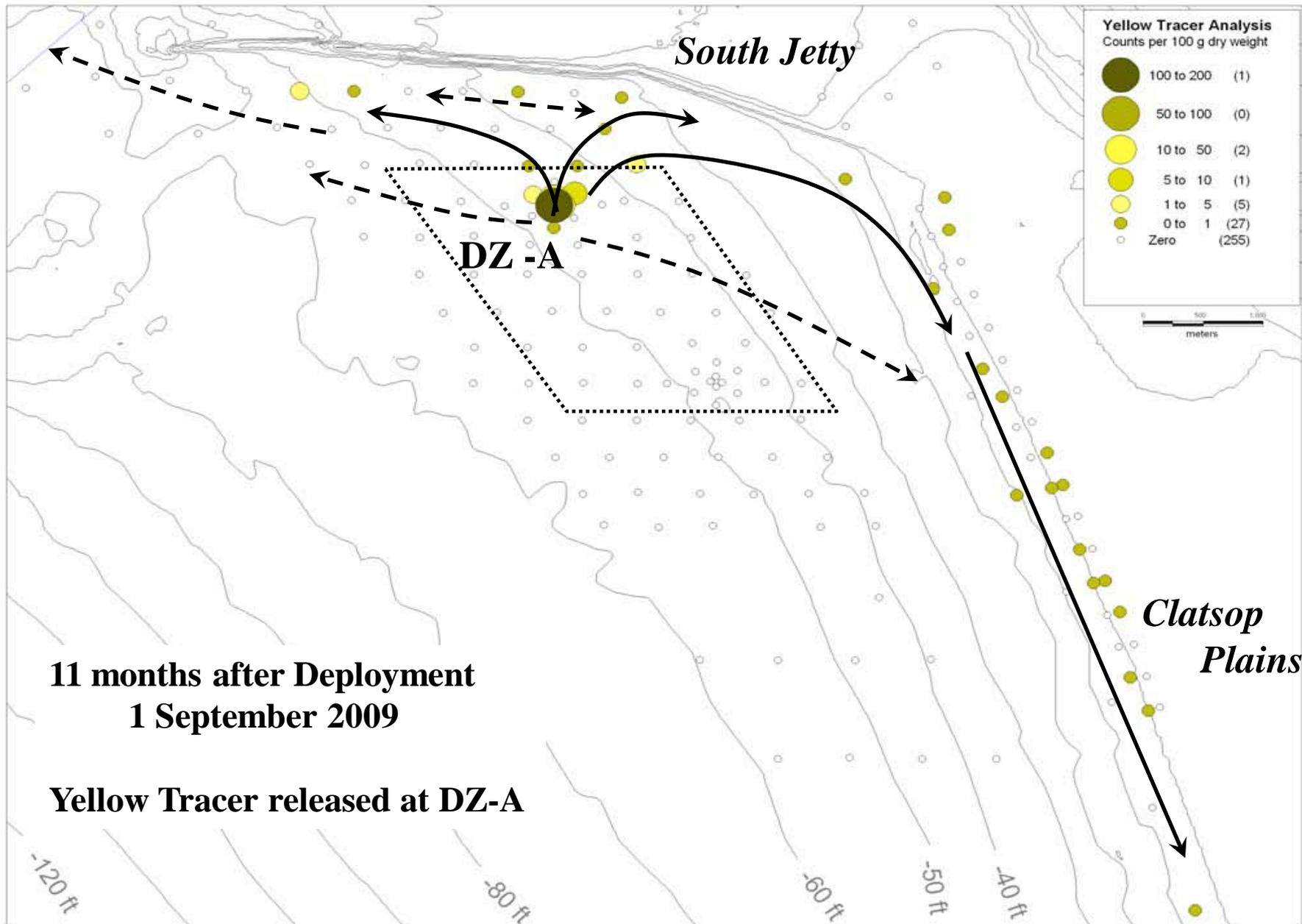
Beach samples collected  
April 07-09, 2007



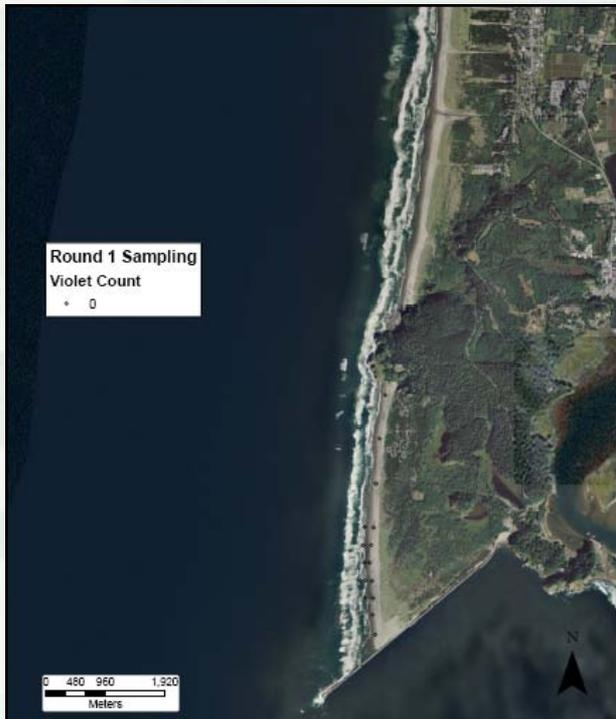
**North Head**

**Benson Beach**

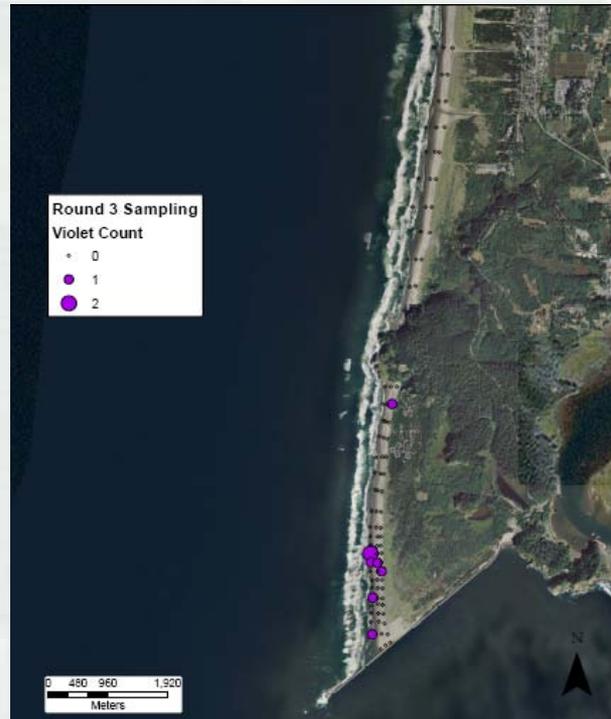




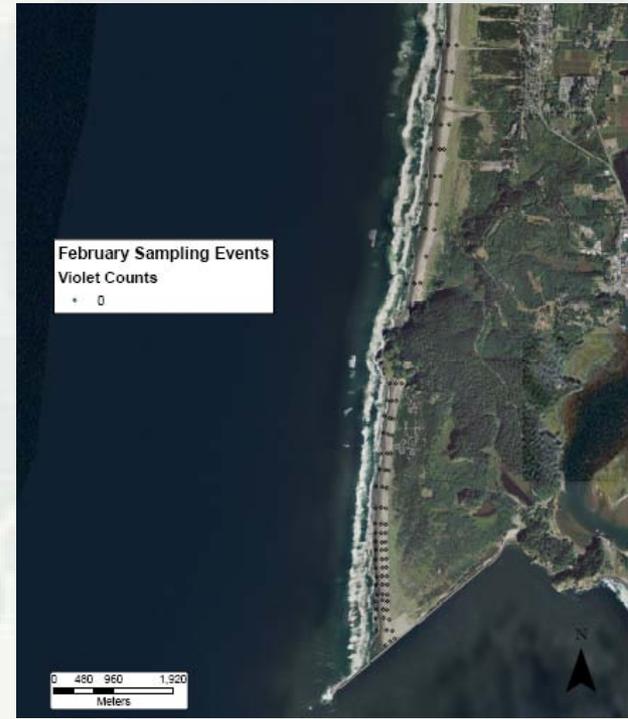
# Benson Beach Sampling Results to Date: SW WA LDRP



Oct. 6, 2010



Dec. 2-4, 2010



Feb. 1-2, 2011



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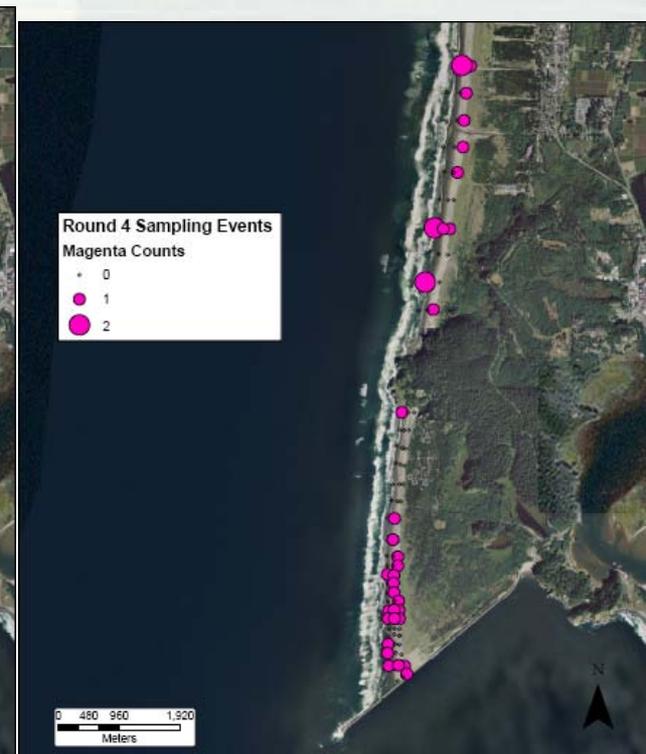
# Benson Beach Sampling Results to Date: 2006 SWS



Oct. 6, 2010



Dec. 2-4, 2010



Feb. 1-2, 2011



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# Conclusion

- A variety of monitoring methods allowed for a comprehensive approach
- A demonstration project
  - ▶ Stakeholder involvement
  - ▶ Logistically feasible
  - ▶ Nearshore vs. On-shore effectiveness of littoral augmentation

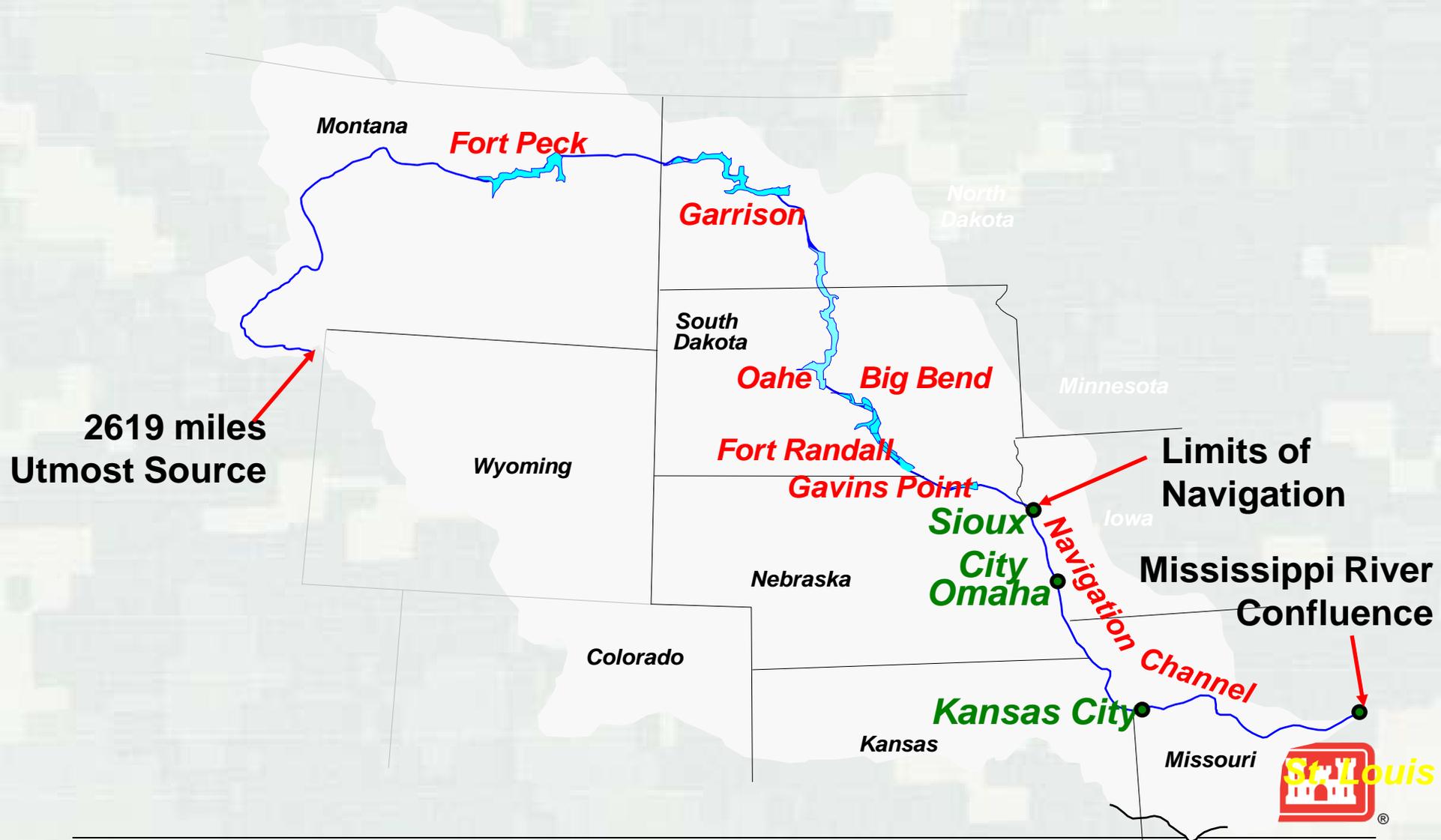




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# Missouri River Basin



2619 miles  
Utmost Source

Limits of  
Navigation

Mississippi River  
Confluence



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# RSM Funding Sources

- Planning Assistance to States (PAS)
  - ▶ Cost shared (50/50) with state
- WRDA Section 204 (WRDA 2037)
  - ▶ Sediment Management
  - ▶ 100% Federal Funding
- American Reinvestment and Recovery Act
- Operations and Maintenance
- Various Other Programs



# Kansas Water Authority

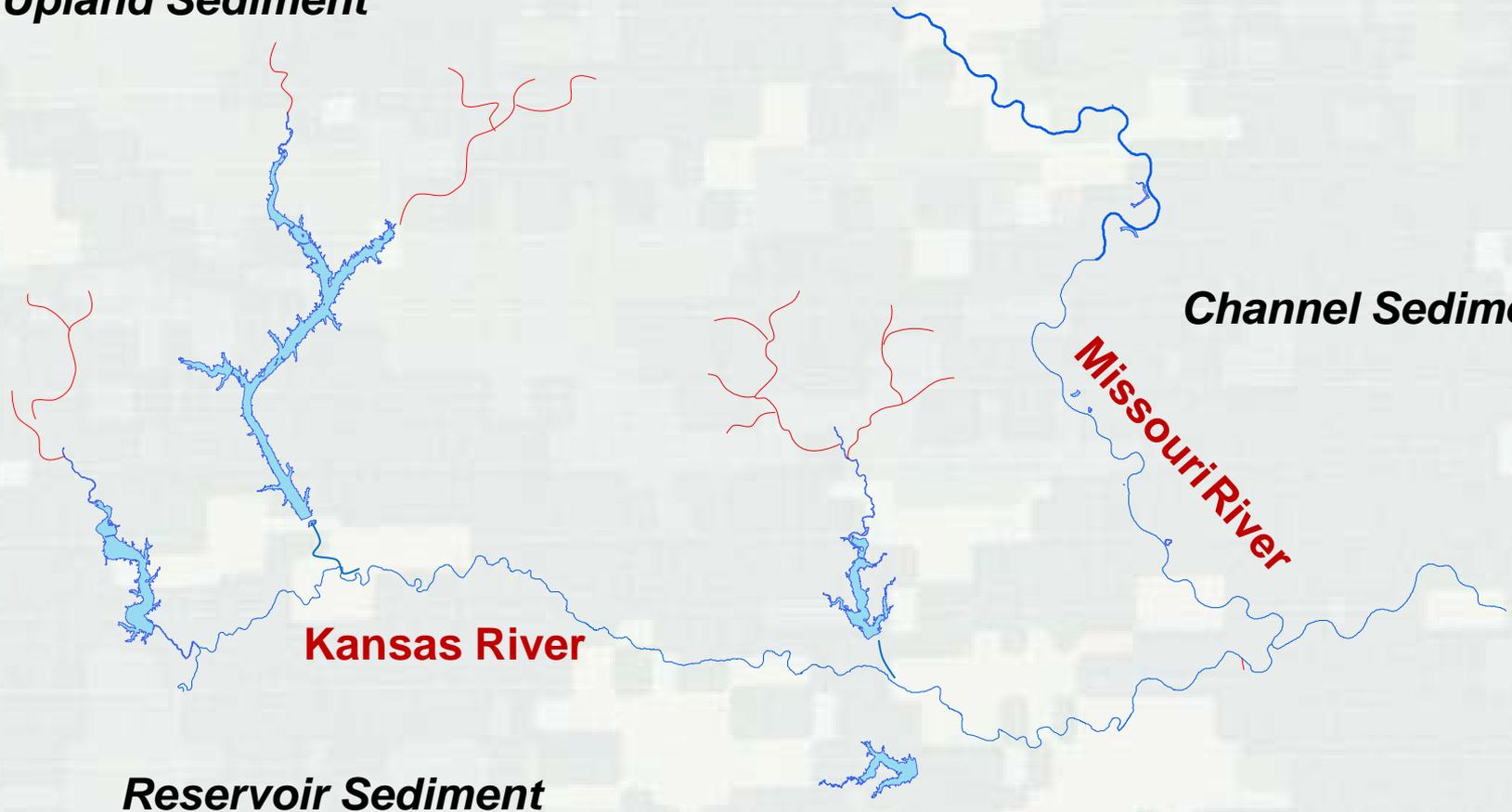
- State of Kansas owns storage in thirteen federal reservoirs operated by USACE
- Federal Reservoirs provide water in some manner to roughly **two-thirds** of Kansas' citizens
- Kansas Water Plan
  - ▶ Reservoir Sustainability Initiative



# Kansas River Basin

***Upland Sediment***

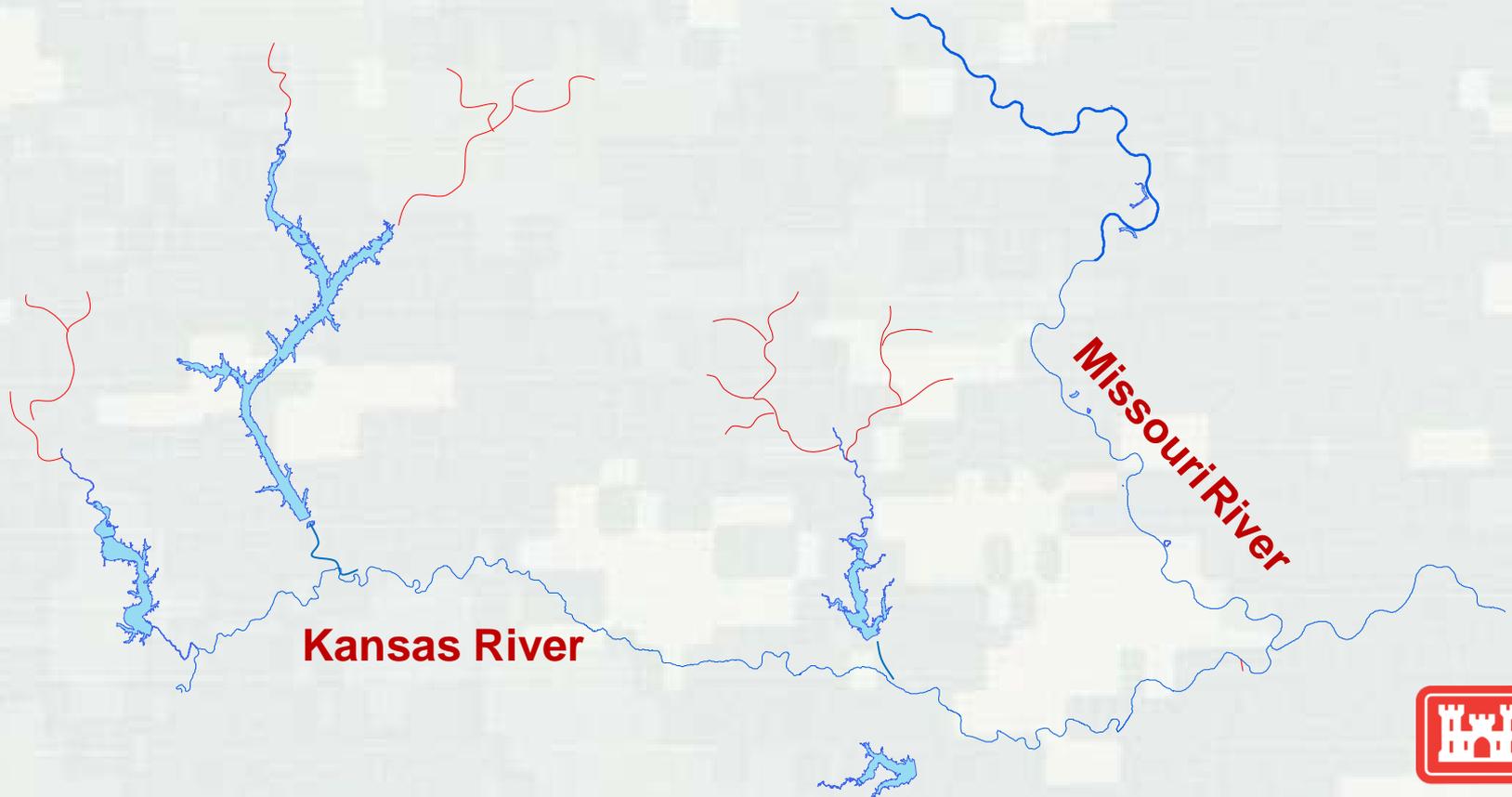
***Channel Sediment***



# Kansas River Basin

## ***Upland Sediment***

- Bank Stabilization BMP Report
- Bank Stabilization Geodatabase
- USDA – BSTEM and HEC–RAS
- Mobile Bed Workshop

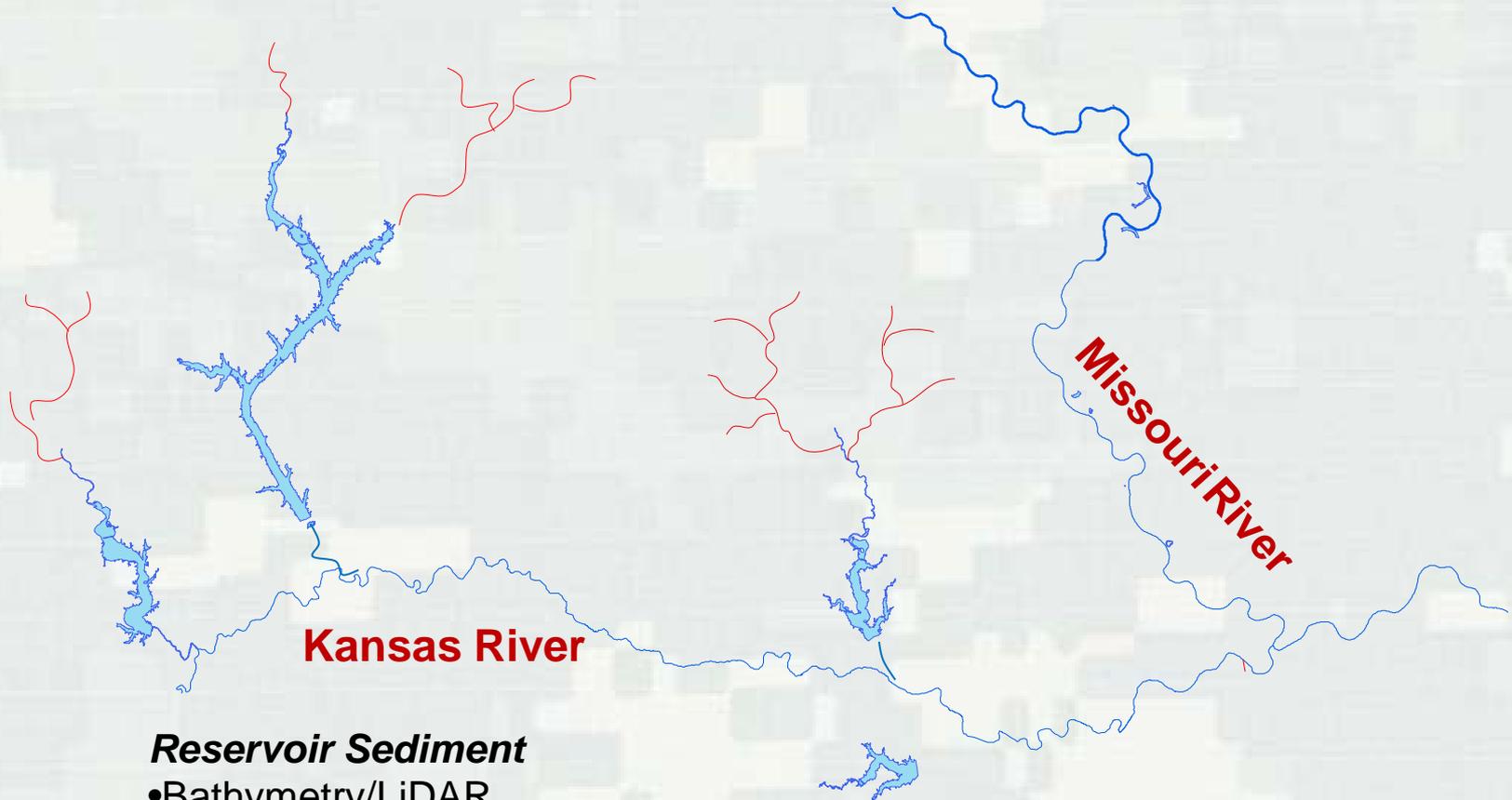


# Sediment Workshop

- **USDA – Agricultural Research Service**
  - ▶ Bank Stabilization and Erodibility Model
  - ▶ HEC – RAS Mobile Bed Modeling
  - ▶ SIAM
- **Speakers**
  - ▶ HEC – Stanford Gibson
  - ▶ USDA – Andrew Simon
  - ▶ ERDC – Charlie Little
- **22 Attendees**
  - ▶ Kansas Water Office
  - ▶ Kansas Department of Health and Environment
  - ▶ Kansas Department of Agriculture
  - ▶ Vermont Department of Environmental Conservation
  - ▶ Kansas City/Tulsa/Omaha Districts



# Kansas River Basin

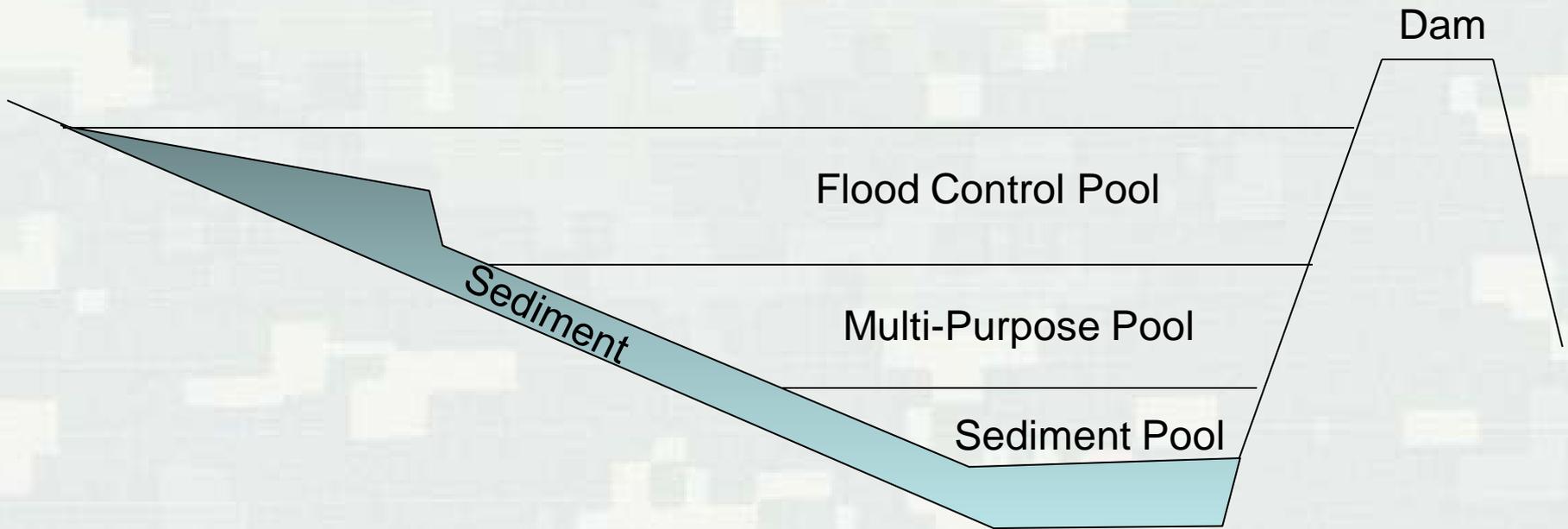


## ***Reservoir Sediment***

- Bathymetry/LiDAR
- Area-Elevation-Capacity Tables
- Sediment Coring
- Sediment Distribution



# Reservoir Schematic



# Kansas River Basin

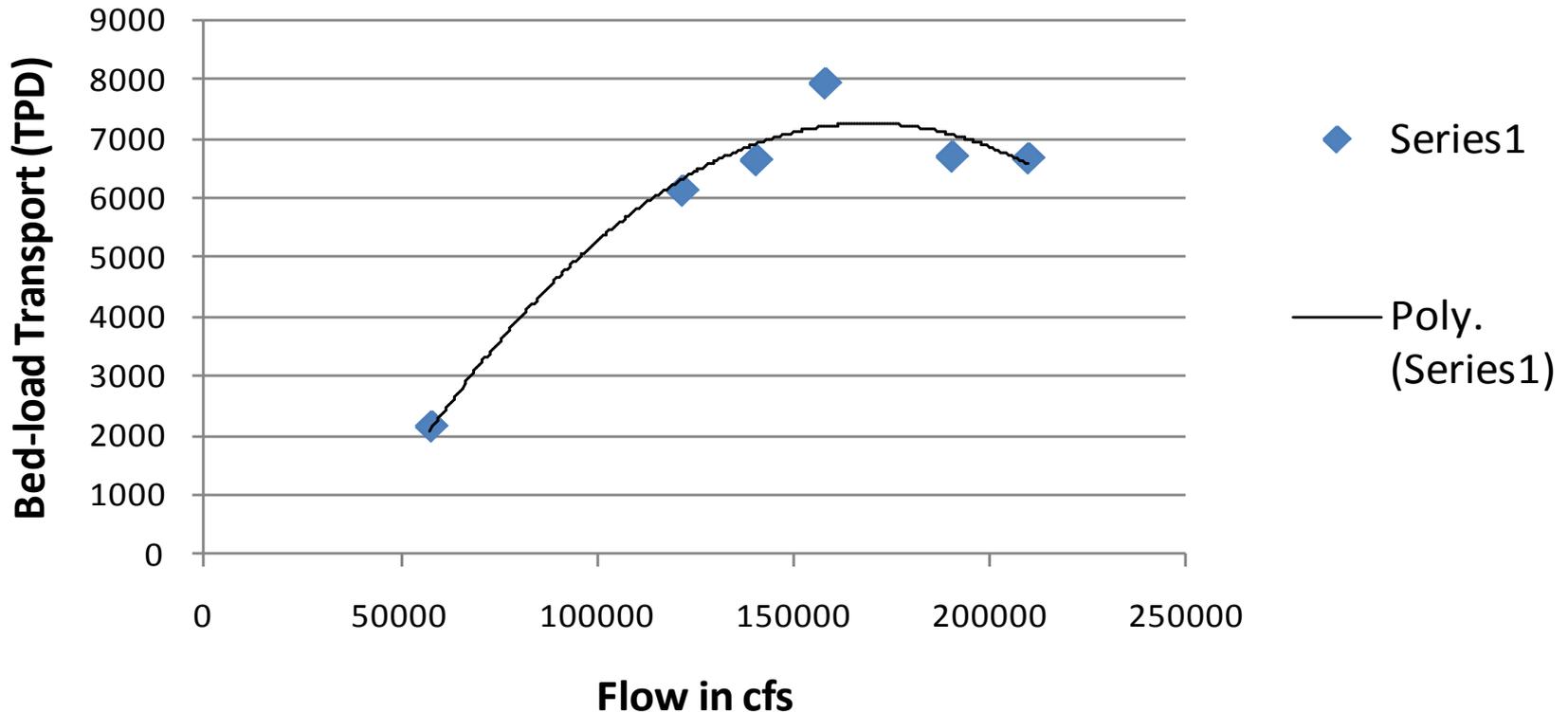
## ***Channel Sediment***

- ERDC – Sediment Rating Curve
- Missouri River Recovery Monitoring
- Degradation Study
- Geomorphic Assessment
- Commercial Dredging



# Sediment Rating Curve

Missouri River at Washington: Bed-Load Transport as a Function of Flow



# What's Next?

- Reservoir Sediment Life
  - ▶ What will the reservoir look like in 2050?
- Sediment Bypass Demonstration Project
  - ▶ Hydro-suction
  - ▶ Sluicing
- Incorporate BSTEM into HEC-RAS

