

Environmental Tracer Investigation of Ground-Water Flow and TCE Migration Fort Lewis, Washington

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Today's presentation

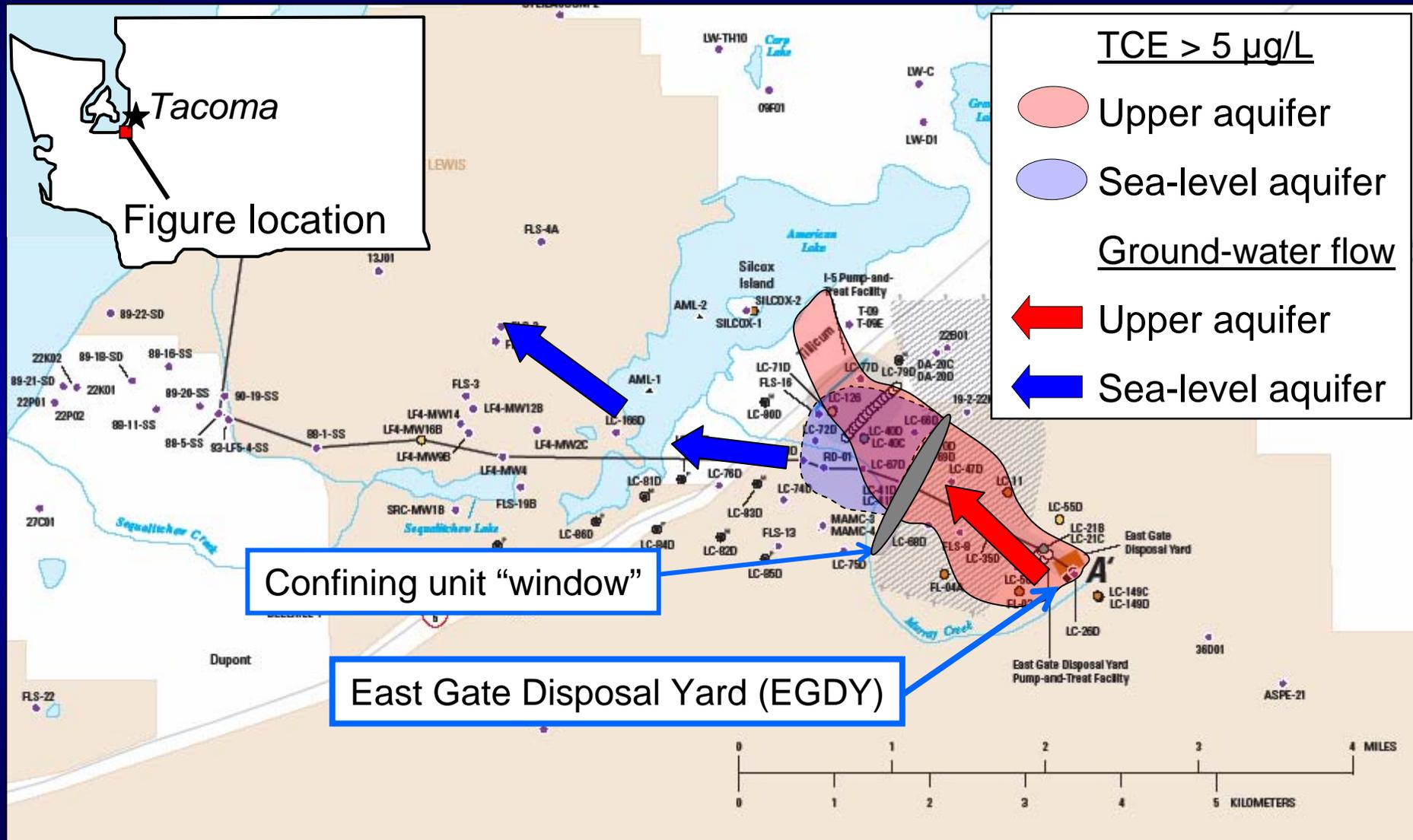
Use of environmental tracers (^{18}O and ^2H) to enhance conceptual model for TCE migration

- Ground-water flow directions
- Contaminant migration pathways
- TCE attenuation through mixing

Acknowledgments

- Fort Lewis Public Works
 - Rich Wilson, Troy Bussey
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- PNNL
 - Ron Smith, Jim Bush, Mike Truex
- USGS Tacoma
 - Steve Cox, Raegan Huffman, Greg Justin, CG Laird

1998 TCE plumes and GW flow

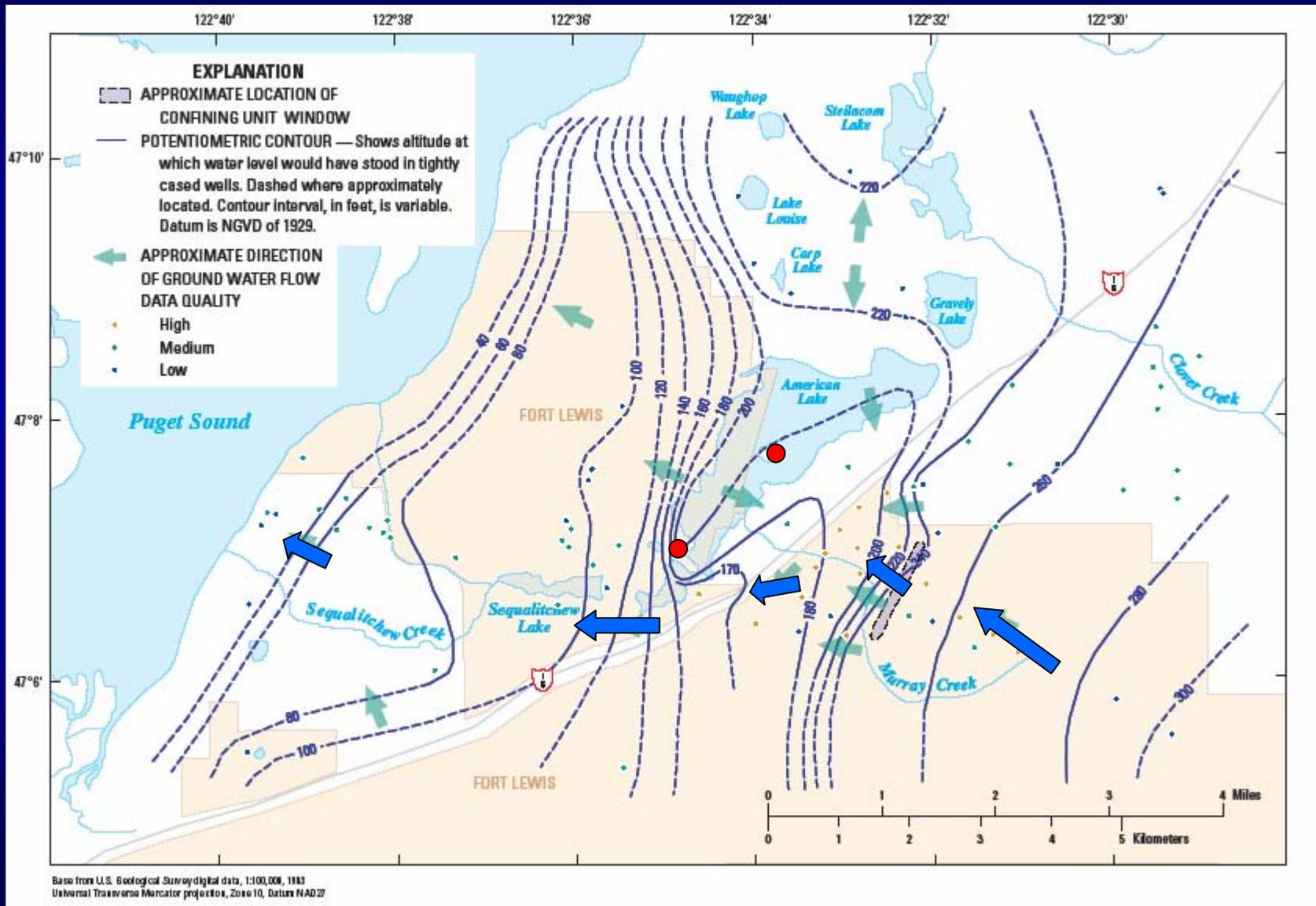


Study objectives

Information needed to determine appropriate remediation in sea-level aquifer

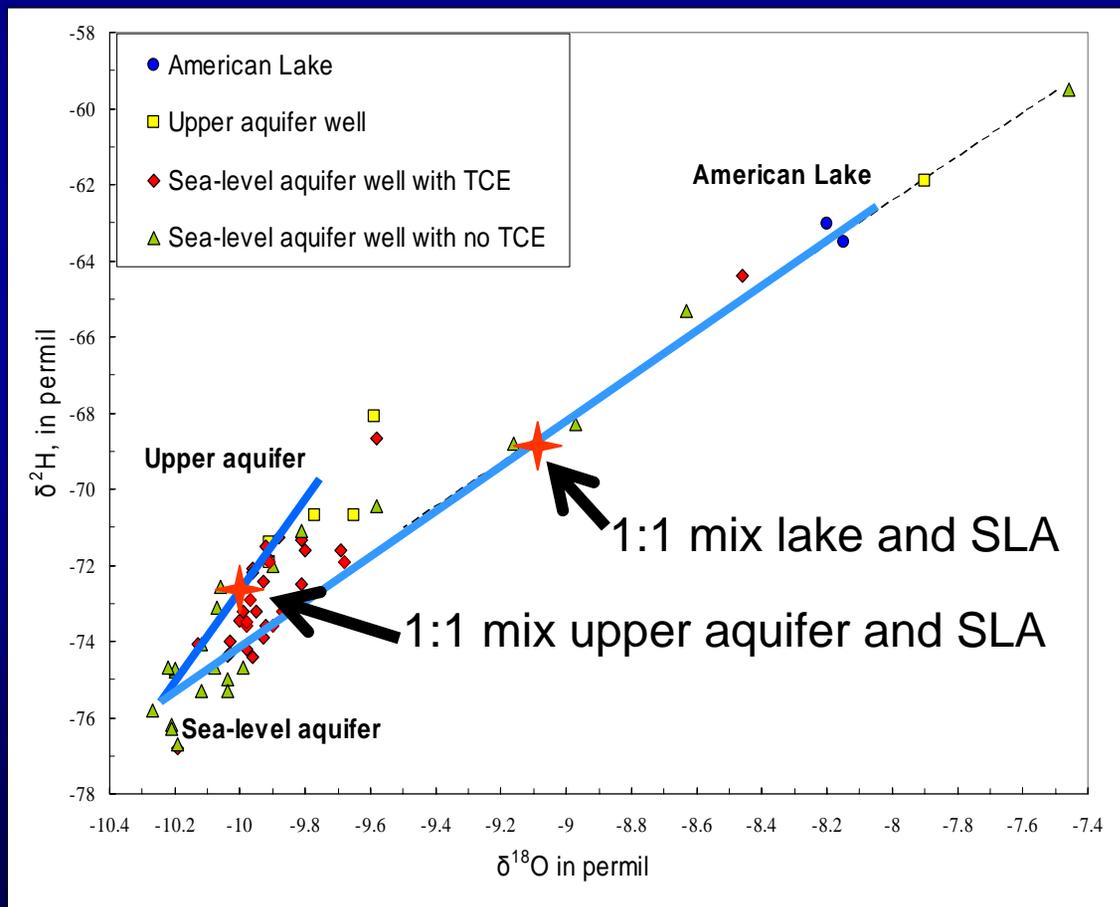
- Ground-water flow directions
- Extent of current TCE plume
- TCE attenuation through mixing
- Potential down-gradient receptors

2004 ground-water flow

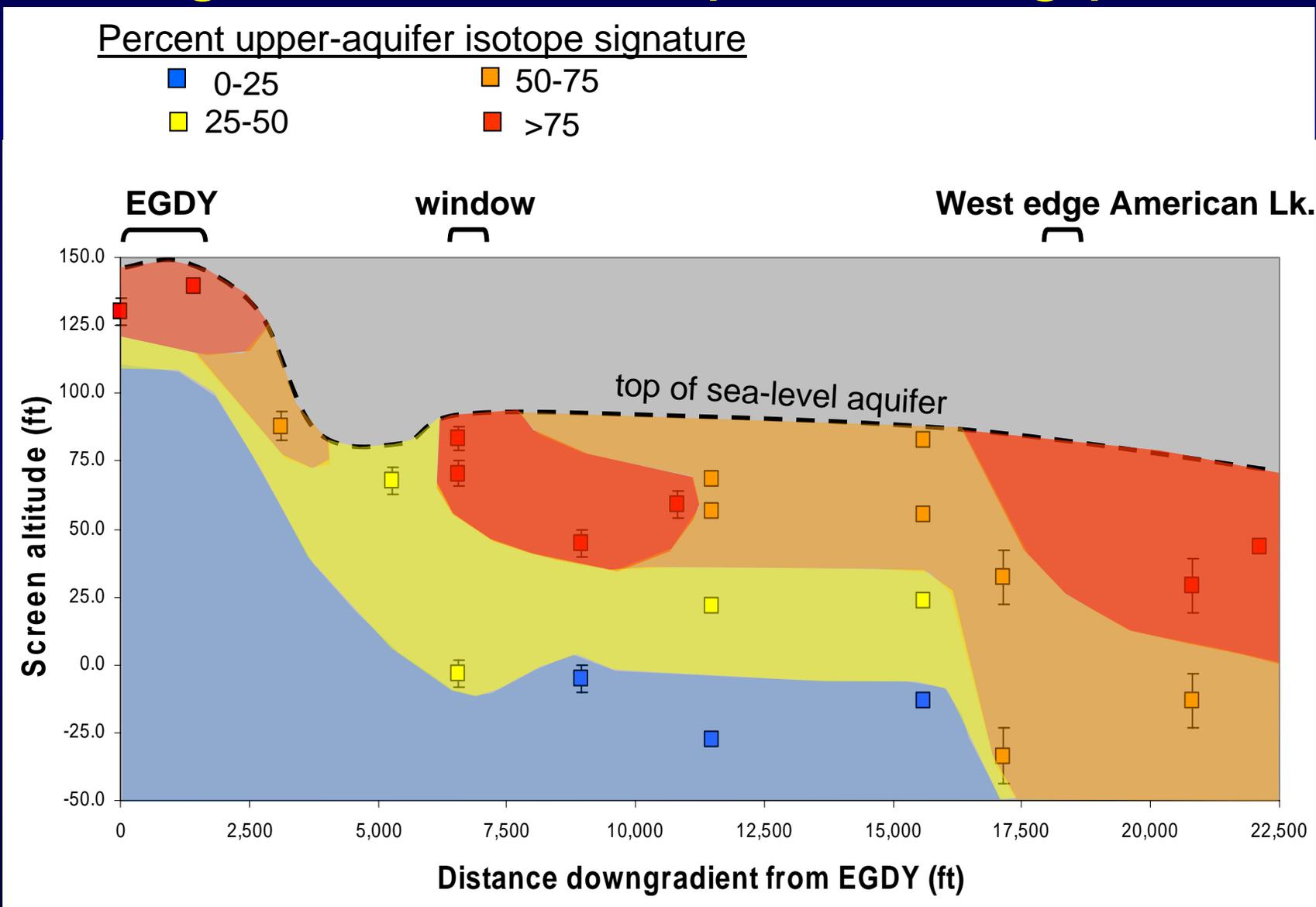


TCE attenuation through mixing

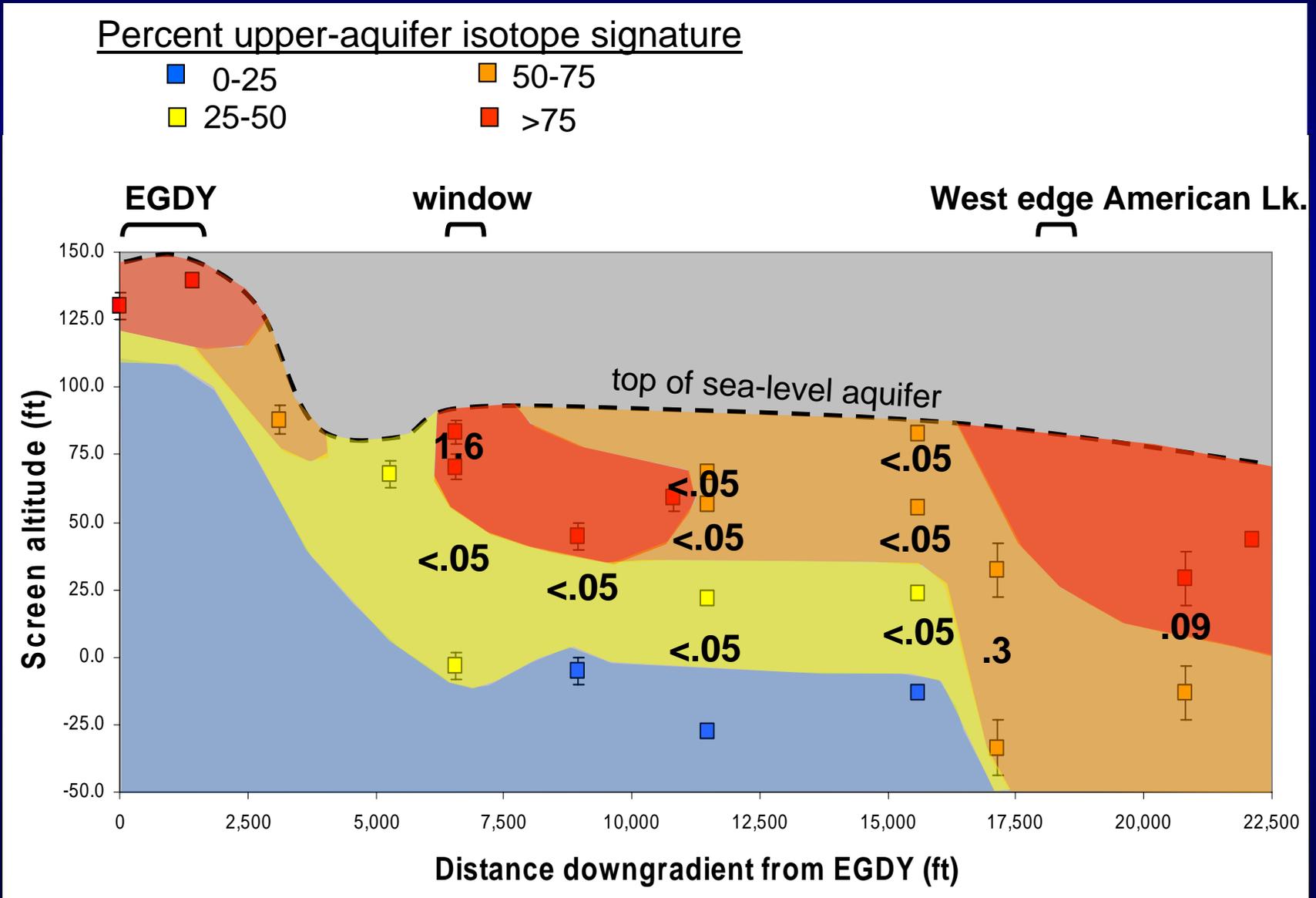
- TCE biodegradation minimal in sea-level aquifer
- Stable isotopes and end-member mixing model



Mixing in sea-level aquifer along plume



$\Delta h/\Delta y$ in sea-level aquifer along plume



Conclusions

- Stable isotopes provided unique information
 - Lake-aquifer interaction
 - Mixing and dilution along plume flowpath
- Isotope data will improve numerical flow and transport model
 - Downgradient mixing can be bounded
 - Lake-aquifer interaction can be simulated without process-level understanding

Thank you

Dinicola, R.S., 2005, Hydrogeology and trichloroethene contamination in the sea-level aquifer beneath the Logistics Center, Fort Lewis, Washington: U.S. Geological Survey Scientific Investigations Report 2005-5035, 50 p.

<http://pubs.water.usgs.gov/sir2005-5035/>