

LISST-SL Experience and Testing Results in Illinois

FISP Technical Committee Meeting

November 8, 2011

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Marian Domanski, and a many others.



Typical Boat Setup



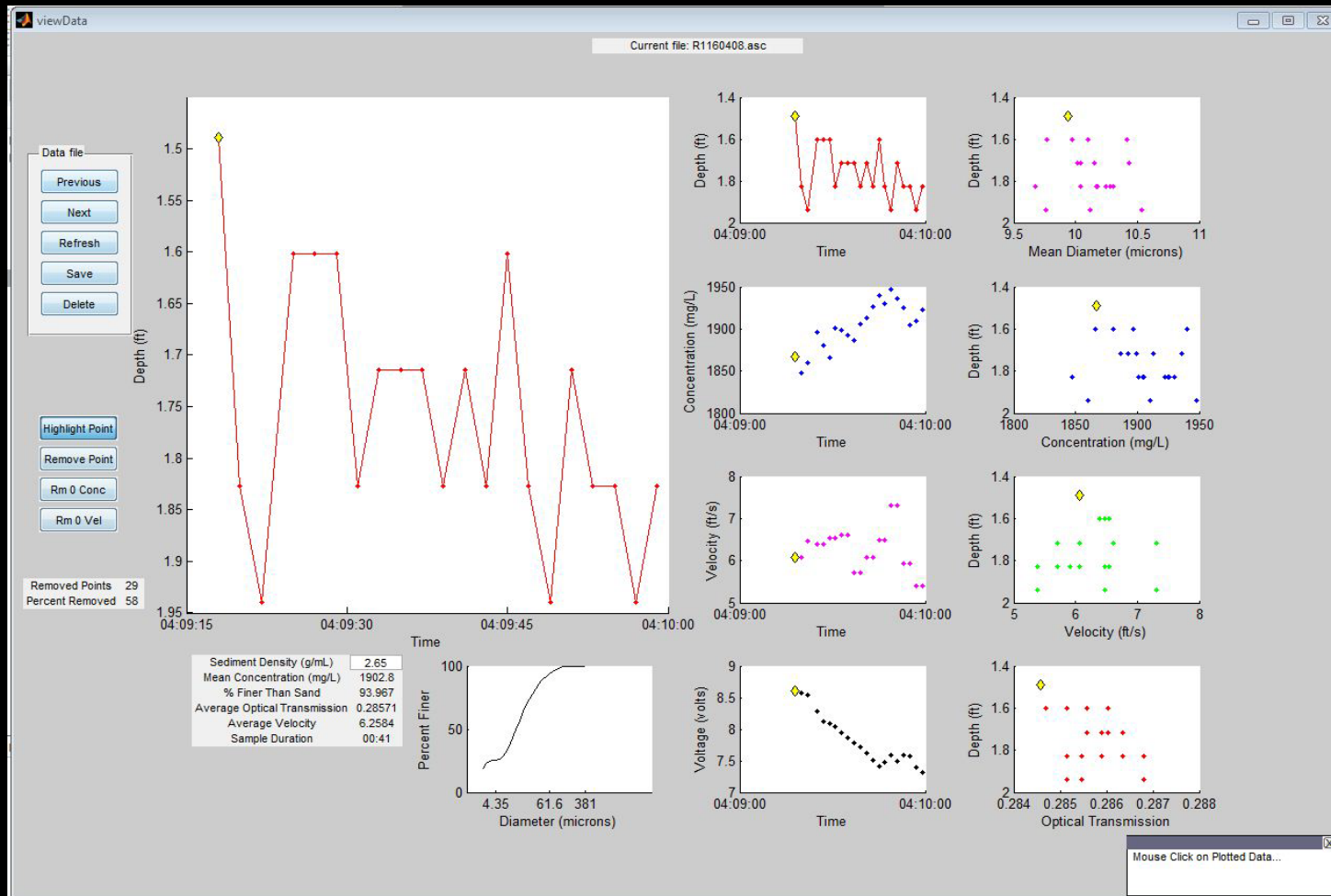
Typical Bridge Setup



Experience Summary

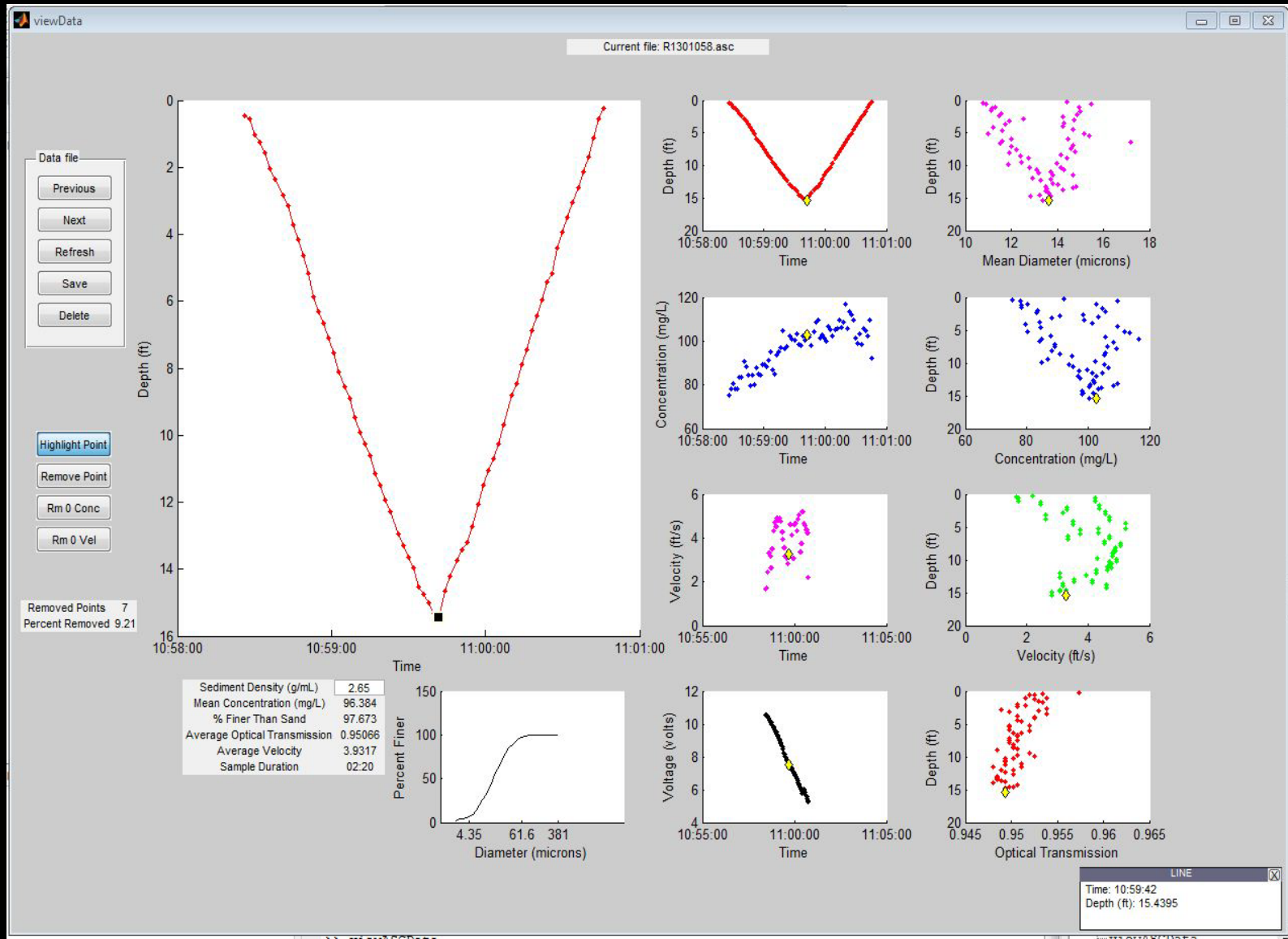
- 1,194 Files on LISST-SL Topside Controller Box
-Solution: MATLAB programs to view and process

Point Sample Example



Experience Summary

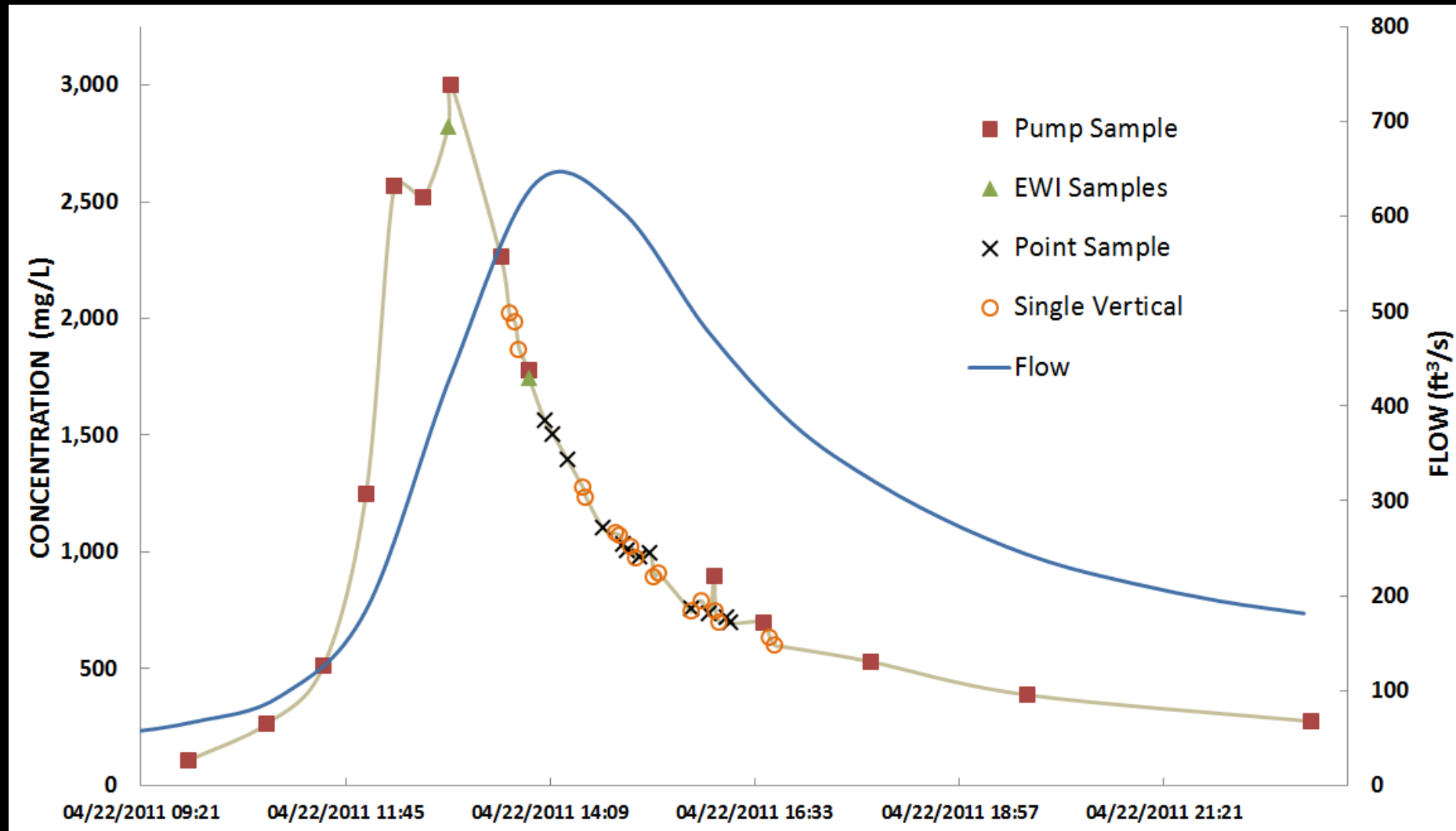
Single Vertical Sample Example



Experience Summary Cont.

- 13 IL-WSC datasets
 - Over 160 samples at 11 sites
- Concentration
 - 18 – 2,170 mg/L (from physical samples analyzed at lab)
- Velocity
 - 1.1 – 7.6 ft/s
- Depth
 - 2 – 30 ft

Example Data at Kickapoo Bloomington



Physical Sample and Laboratory Analysis Inventory

LISST-SL Testing:

- ~170 samples
- ~100 Sand/Fine Split
- ~60 Full Particle Size
- 17 Pycnometer
- 5 Loss of Ignition

Labs Used:

Kentucky Lab (Pipette/VA)

CVO Lab (SediGraph/Sieve, Pycnometer, Digital Imaging)



Pycnometer Testing

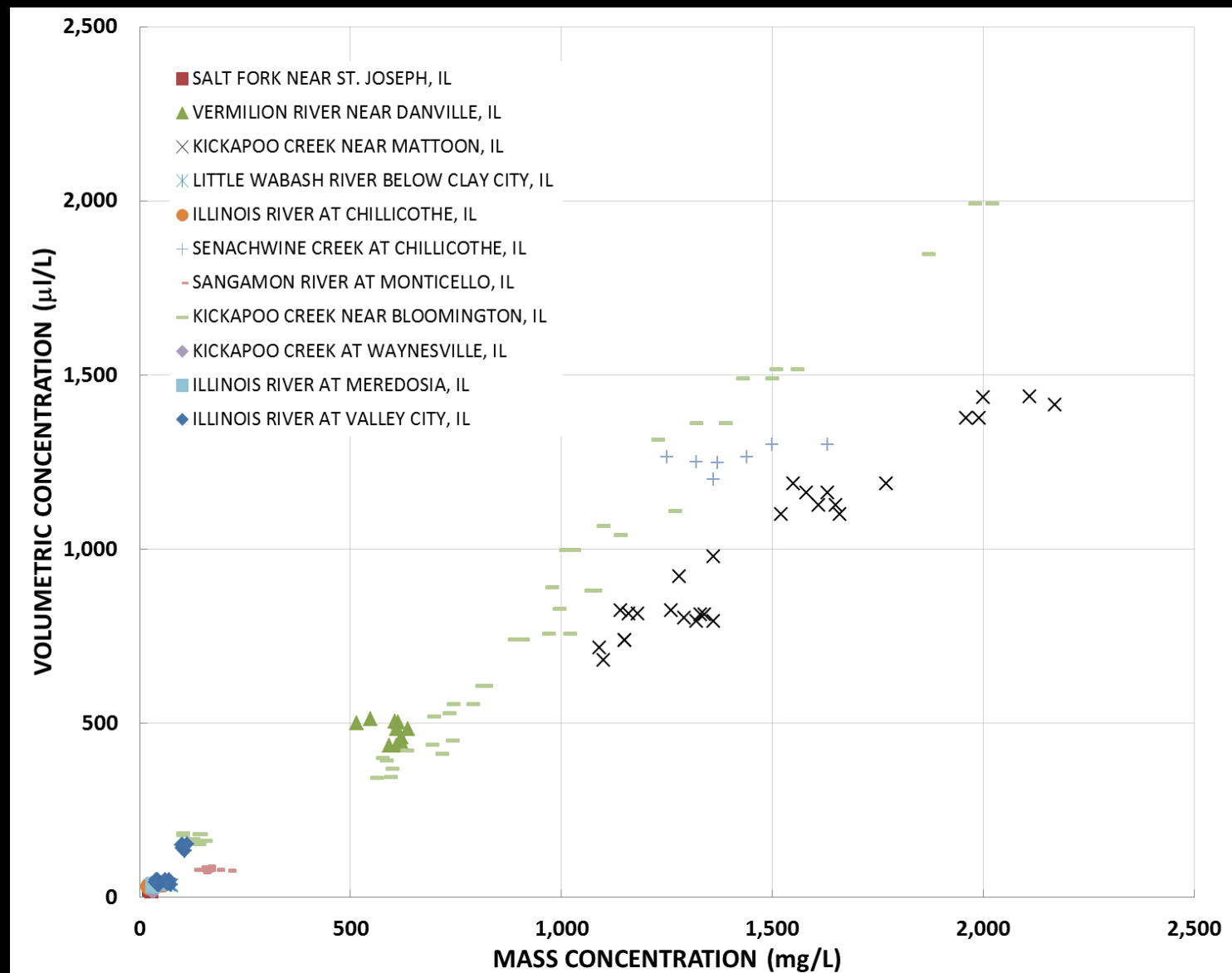
Statistic	Density (g/ml)
Minimum	2.56
Maximum	2.72
Average	2.64
Samples Used	17

Concentration Results

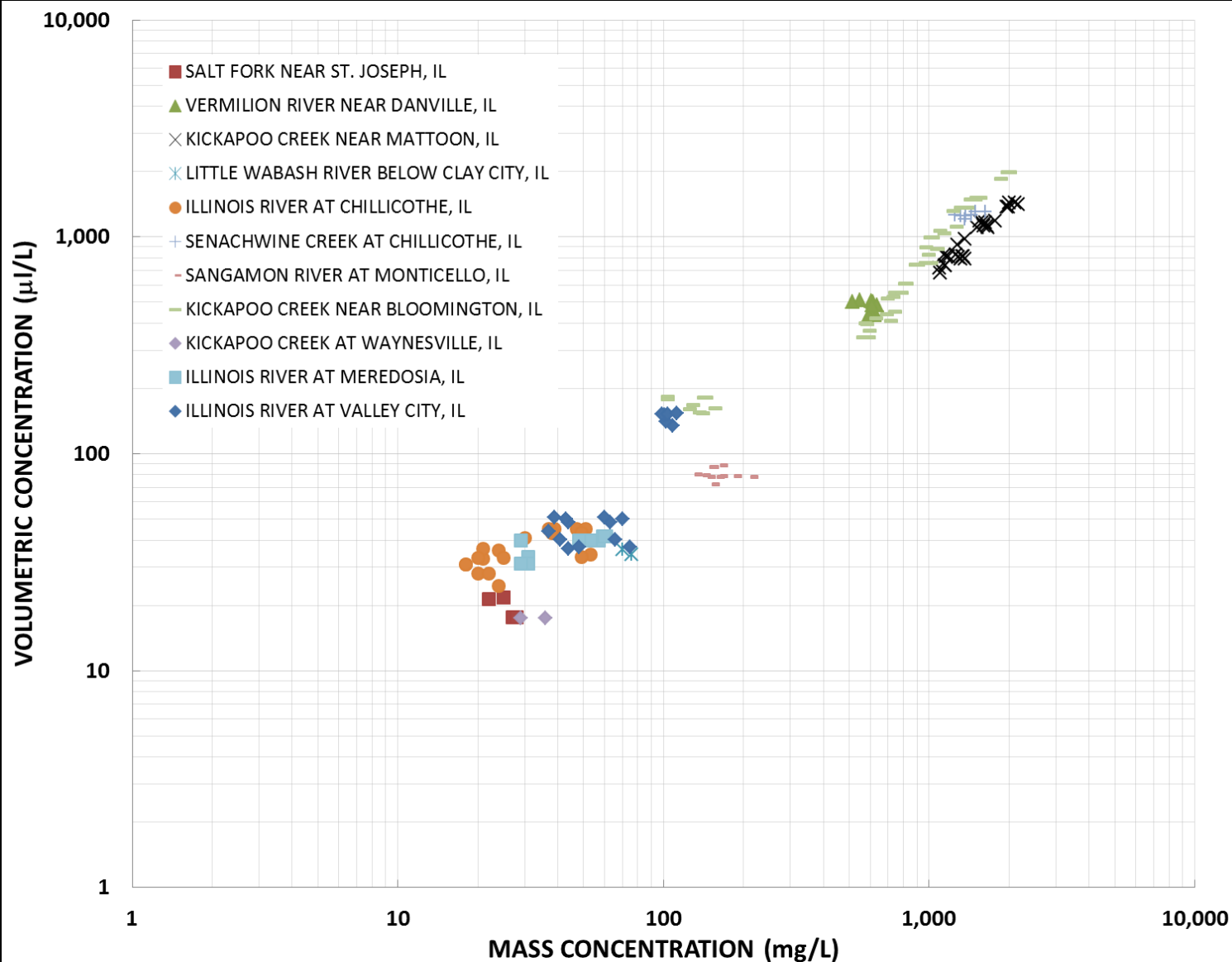
Statistic	Laboratory (Mass)		LISST-SL (Volumetric) ¹	
	Concentration (Mass Conc) (mg/L)	Percent finer than 0.0625 mm	Concentration (Vol Conc) (μl/L)	Percent finer than 0.0625 mm
Minimum	18	68	17	48
Maximum	2170	100	1994	100
Average	557	92	448	90
Samples Used	163	102	163	163

¹ Volumetric concentration in this table is not adjusted for unmeasured fraction (percent of physical sample mass less than 2 microns and greater than 381 microns). The unmeasured fraction ranged from 32 to 65 percent for 25 samples analyzed.

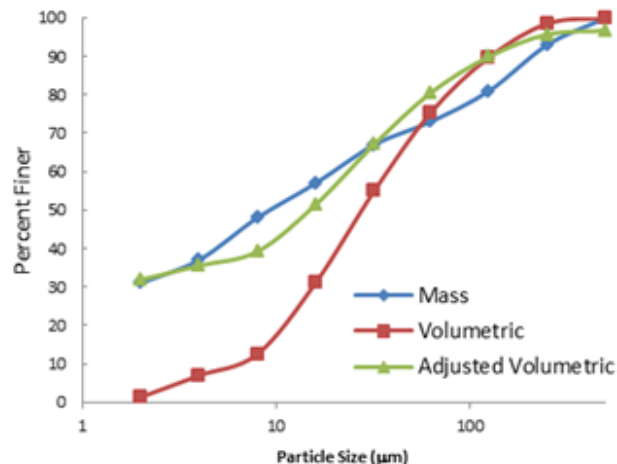
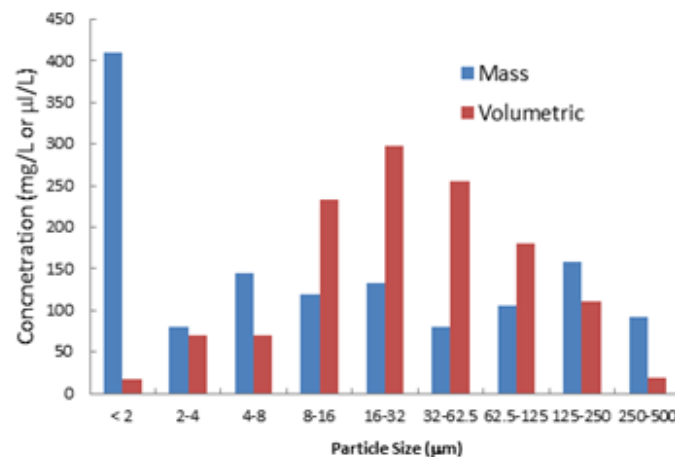
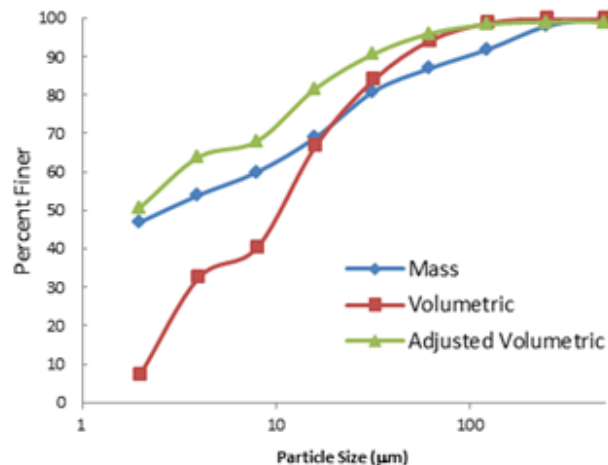
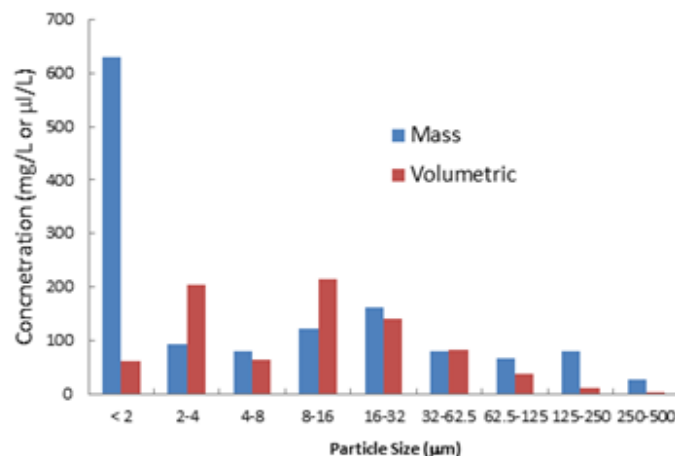
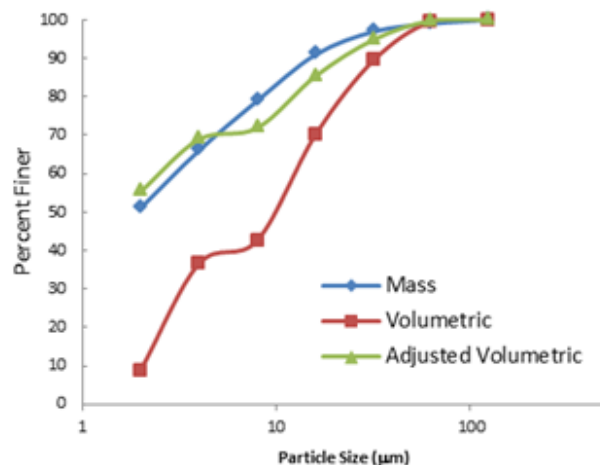
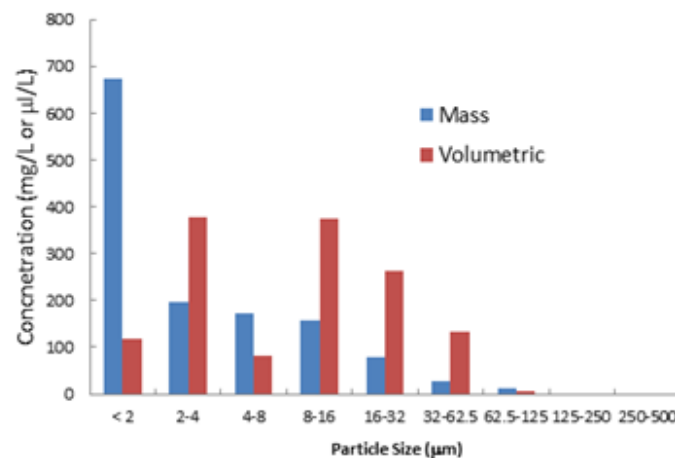
Concentration Results



Concentration Results



Comparison of particle-size distributions for three sites with a broad range of percent finer than 0.0625 mm and unmeasured LISST-SL fraction.



Deployment Experiences

- Pitot Tube
- Tail Fin Configuration



Summary

- Good range of testing
- Volumetric Concentration Issues
 - Software Revisions?
 - Percent finer than 2 microns?
- Overall good LISST-SL performance

LISST-SL Testing Guidelines

Laser In-Situ Scattering and Transmissometry (LISST) Stream Lined (SL)

- **Background/Clean Water Checks**
 - Before and after testing at a site
 - Instrument should be left in the water for 35 minutes prior to background checks and testing
- **Single Vertical Samples**
 - “a”, “b”, and optional “c” samples
 - Transit rate of the LISST-SL < 1 ft per 5 seconds
- **Point Samples**
 - “a”, “b”, and optional “c” samples
 - At least at 0.6 depth, and 0.2, 0.4, and/or 0.8 as conditions allow