

Stormwater pollutant-particle dynamics in Ballona Creek

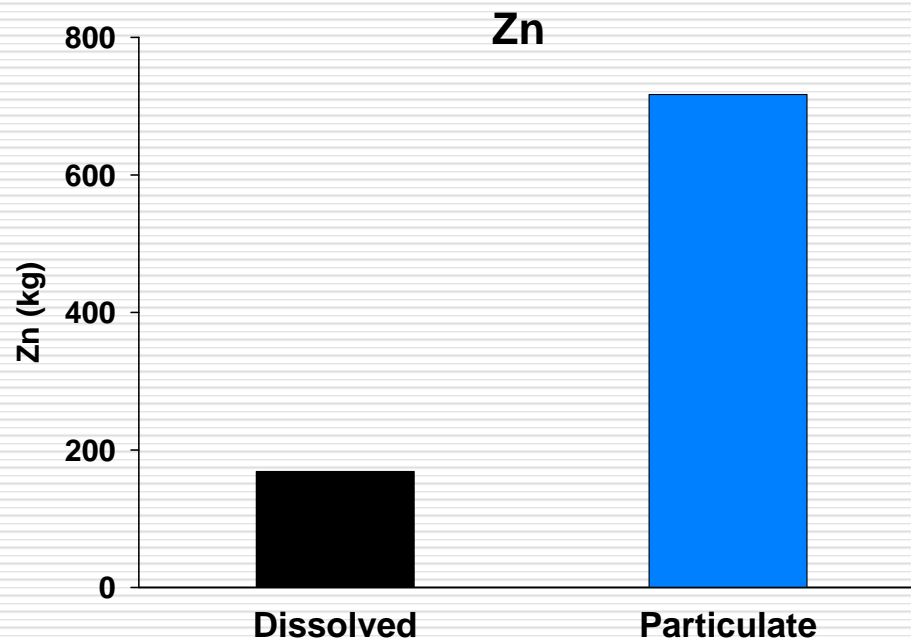


Jeff Brown



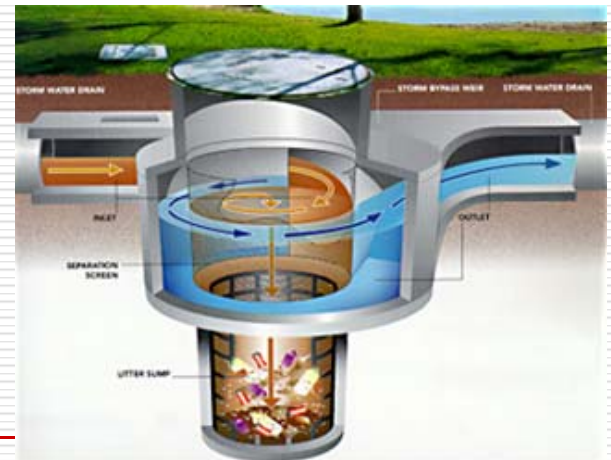
What's the Big Deal About Stormwater Particles?

- ❑ Particle-bound pollutants affect sediment quality
- ❑ Most pollutants in storm water are bound to particles



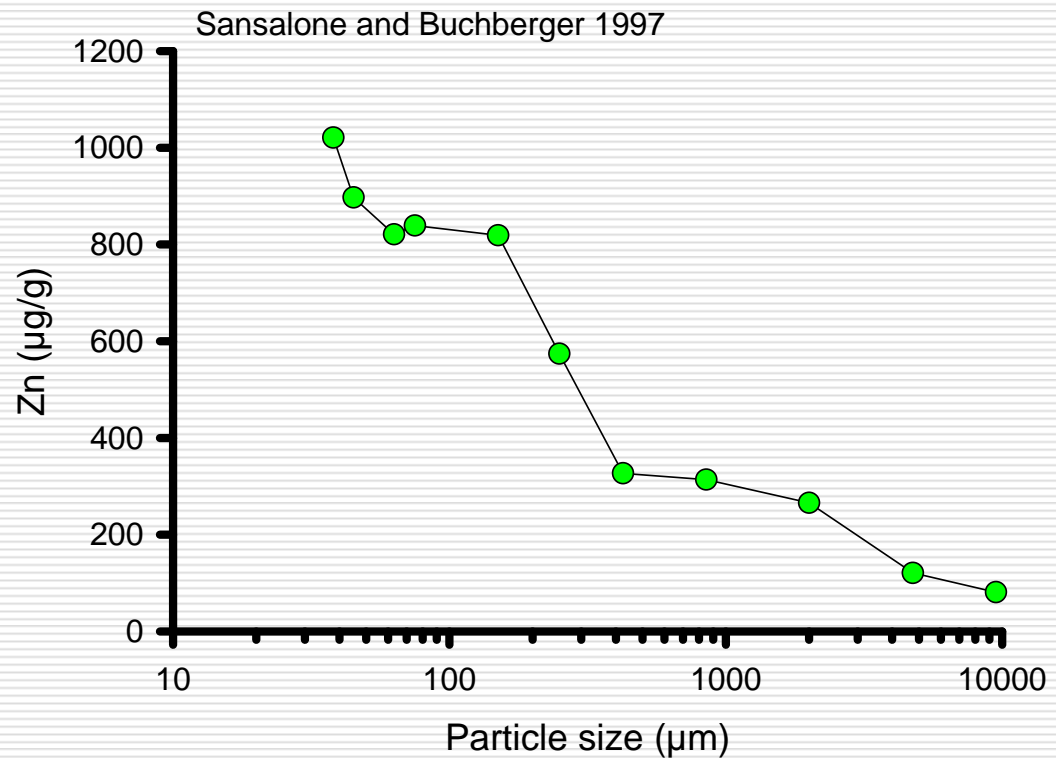
What's the Big Deal About Stormwater Particles?

- ❑ Particle-bound pollutants affect sediment quality
- ❑ Most pollutants in storm water are bound to particles
- ❑ Watershed models are based on behavior of particulate matter
- ❑ BMP effectiveness is also based on removal of particles



Importance of particle size

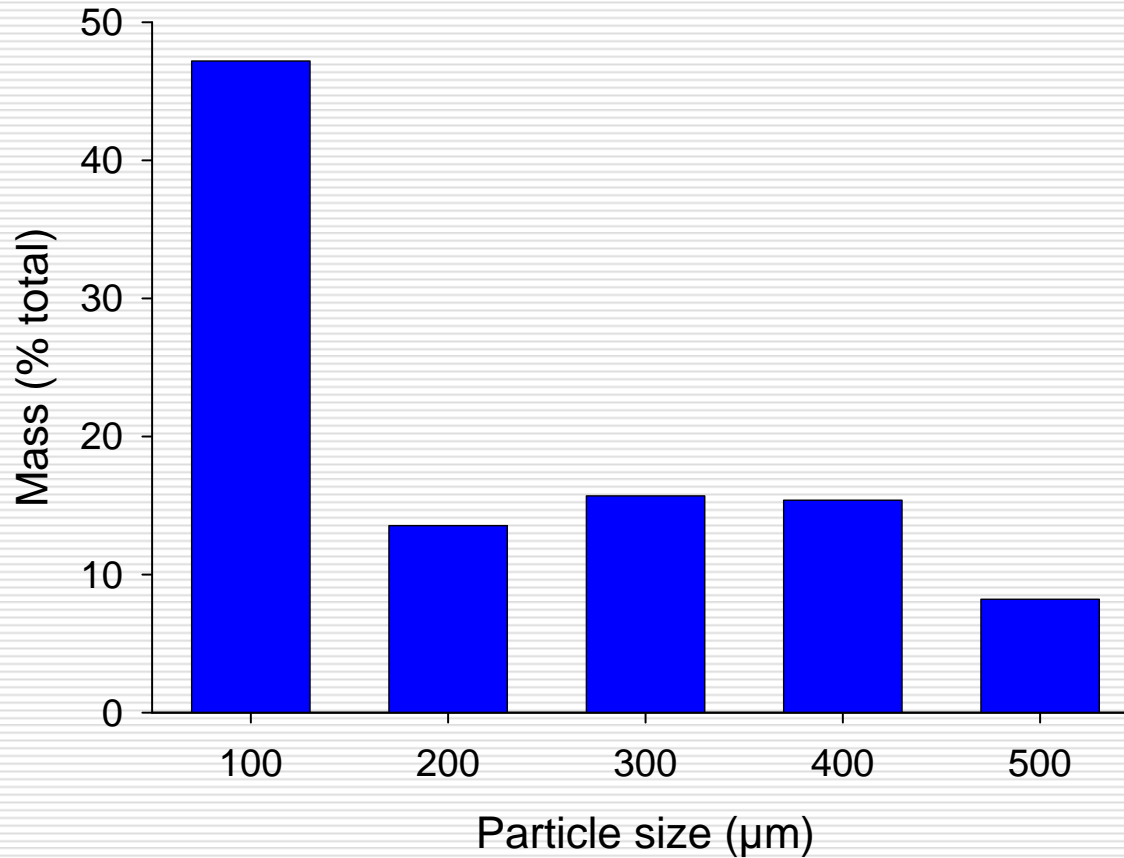
- Evidence suggests pollutants are associated with smaller particles



Questions

- What is the pollutant-particle association in storm water for southern California?
 - Does the association change over the course of a storm?
 - Does the association change among storms?
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Particle size distribution in Ballona Creek

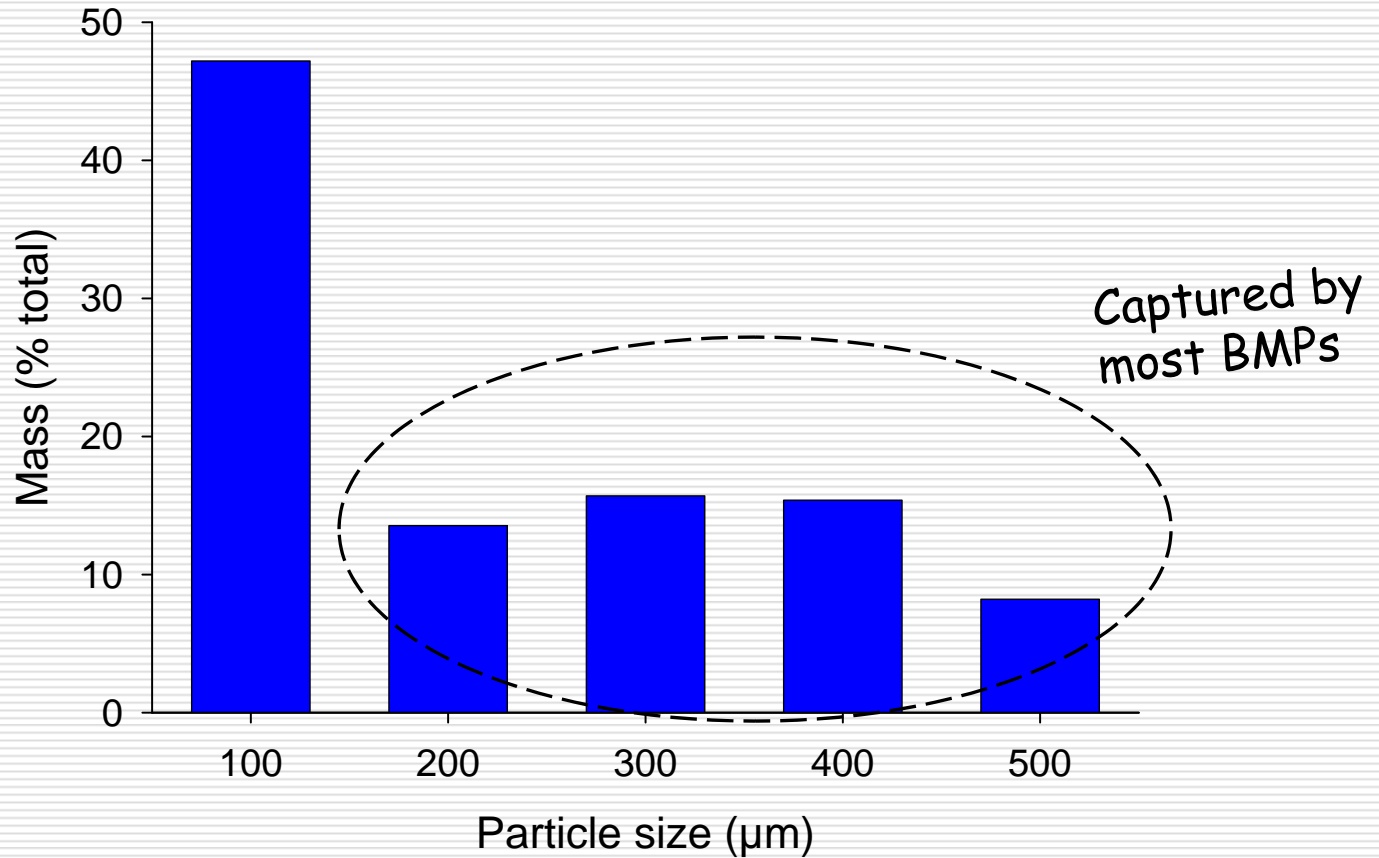


*Silt/
Clay*

*Very fine/
fine sand*

Medium sand

Particle size distribution in Ballona Creek



*Silt/
Clay*

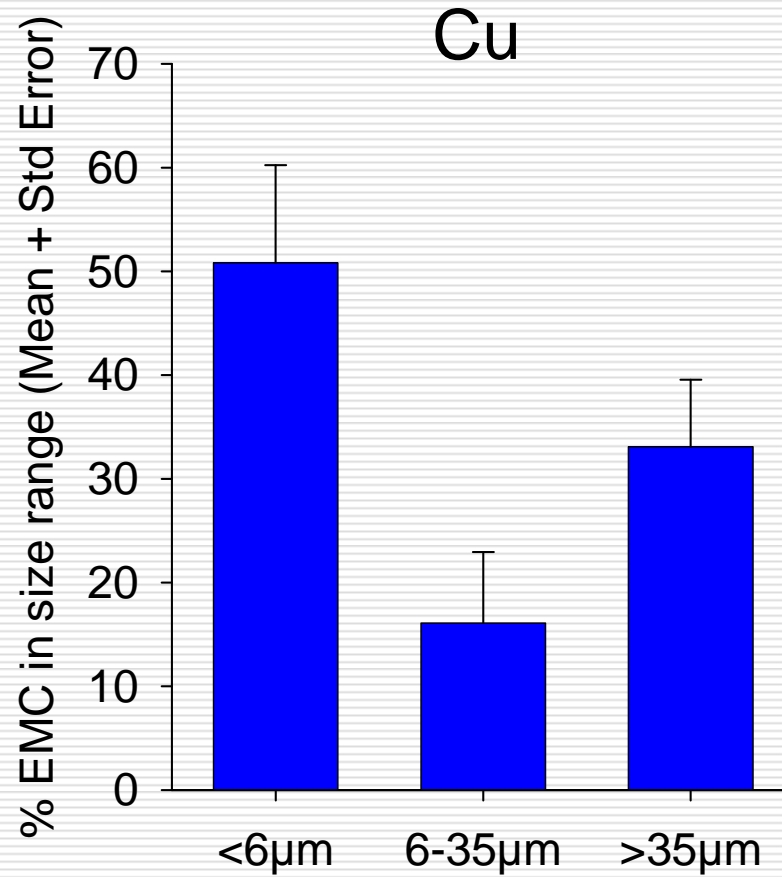
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Medium sand

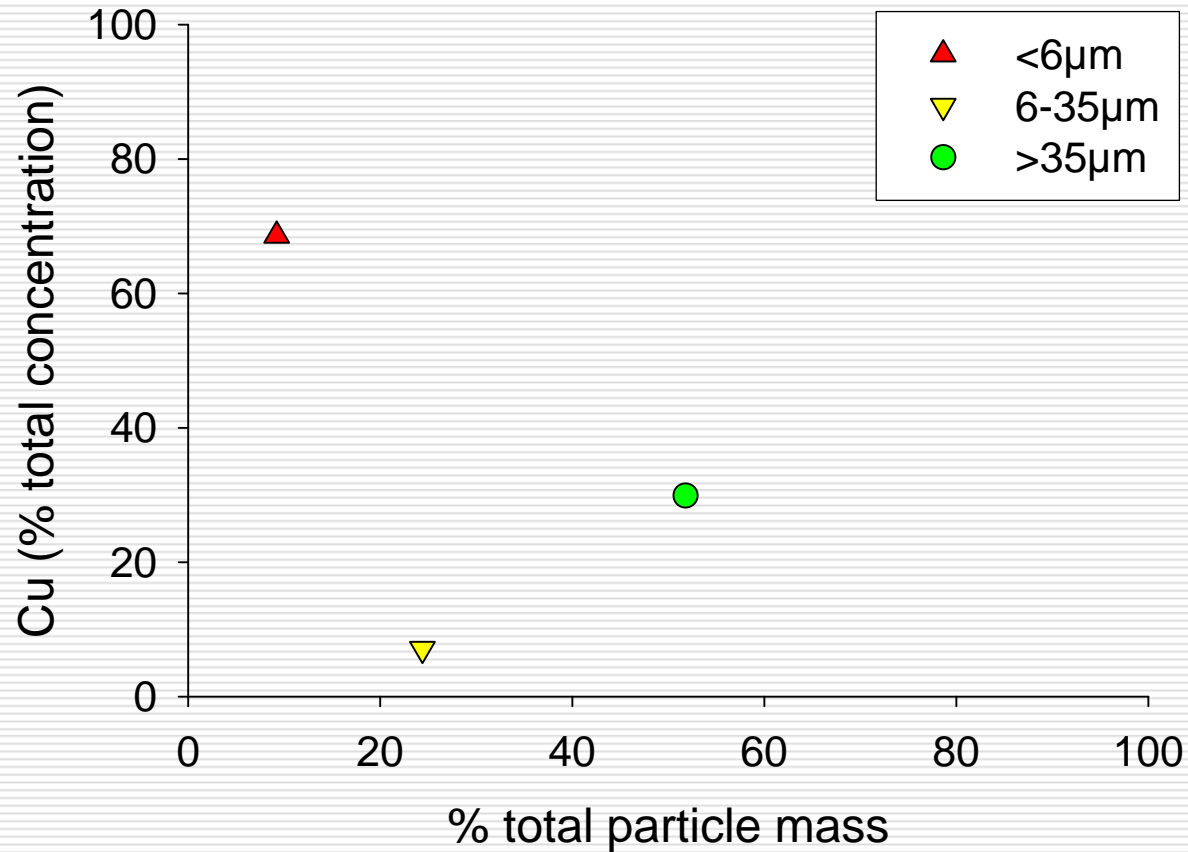
Storm water sampling

- 8 storms sampled at Ballona Creek
 - Representative watershed for southern California
 - Particle size distribution
 - Laser In-Situ Scattering Transmissometry (LISST)
 - Coulter Counter
 - Filtered grab samples ($<6\mu\text{m}$, $6-35\mu\text{m}$, $>35\mu\text{m}$)
 - Contaminants
 - Metals (Cu, Pb, Ni, Zn)
 - Bacteria (Enterococcus, *E. coli*)
-

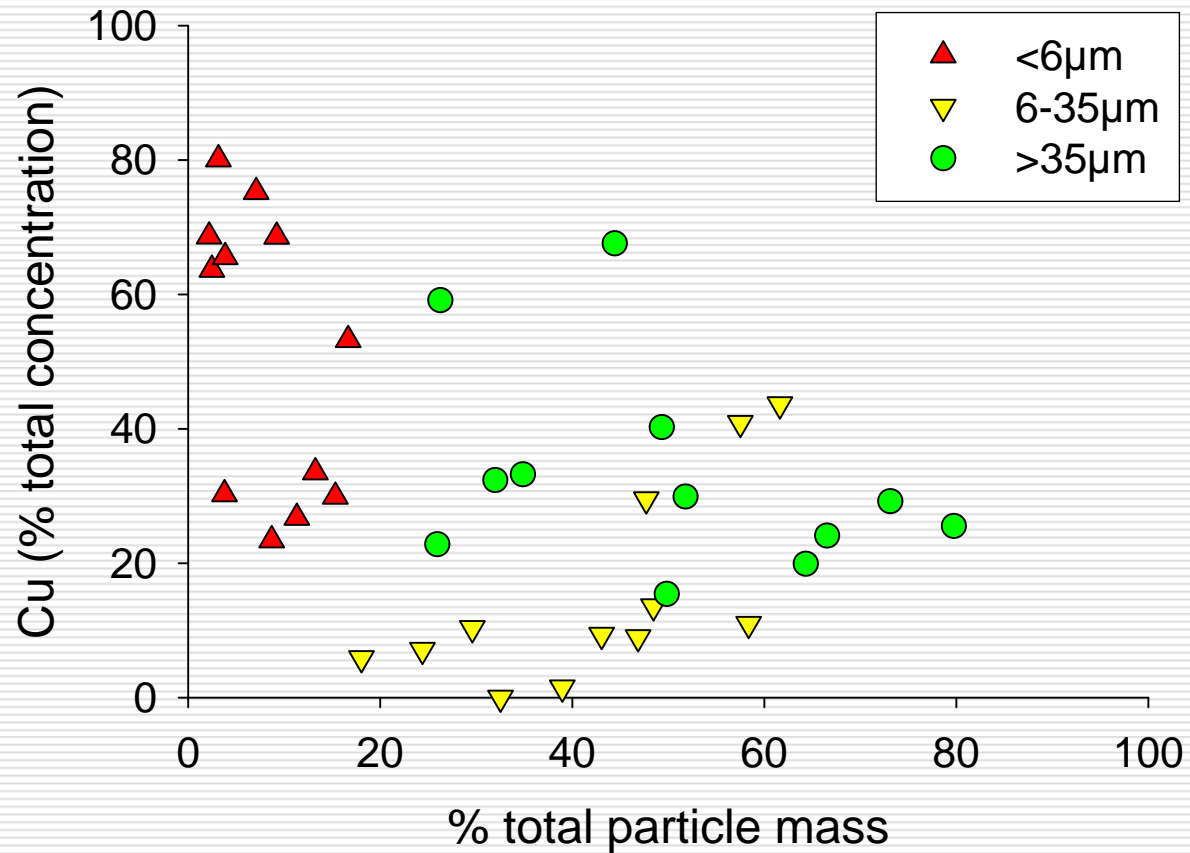
Association of metal concentrations with particle size



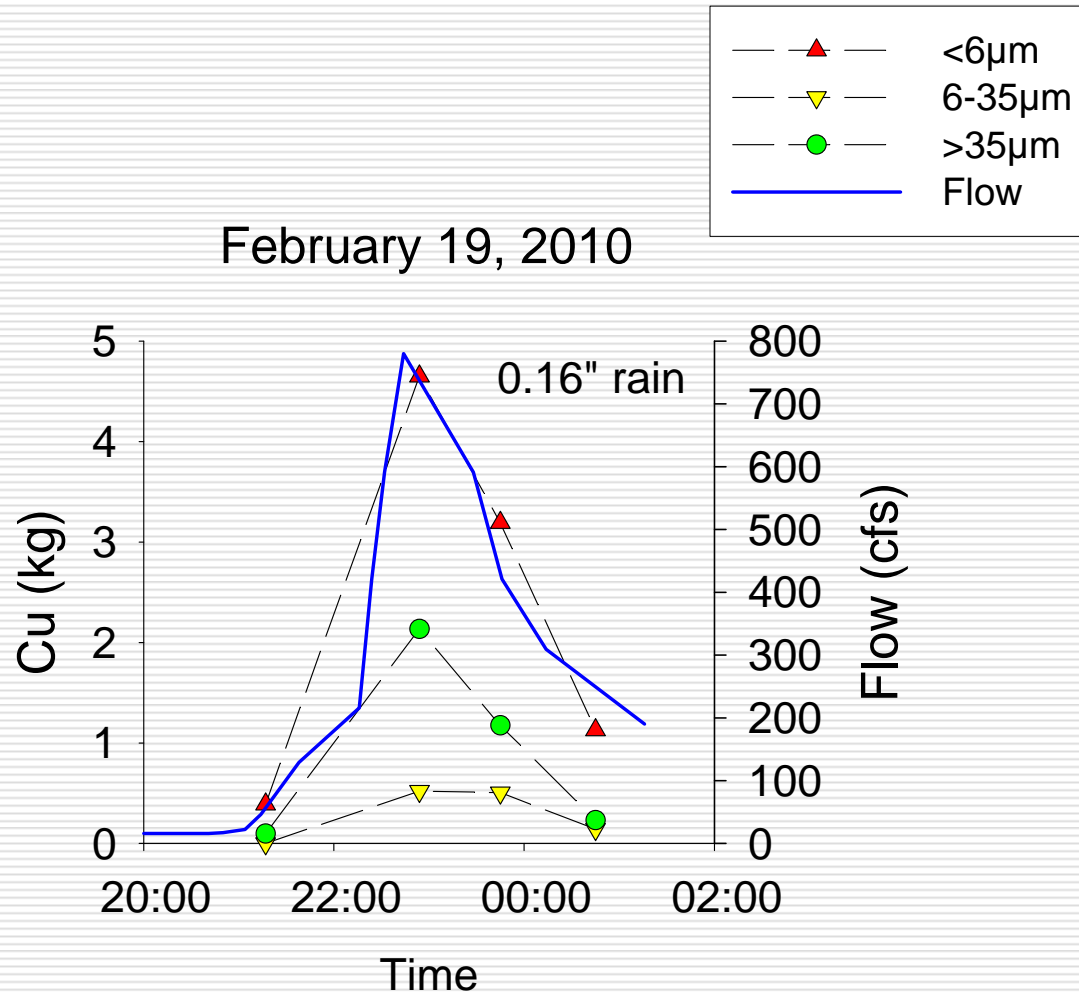
Association of metal concentration with particle size & Distribution of particles



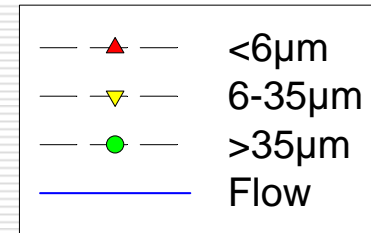
Association of metal concentration with particle size & Distribution of particles



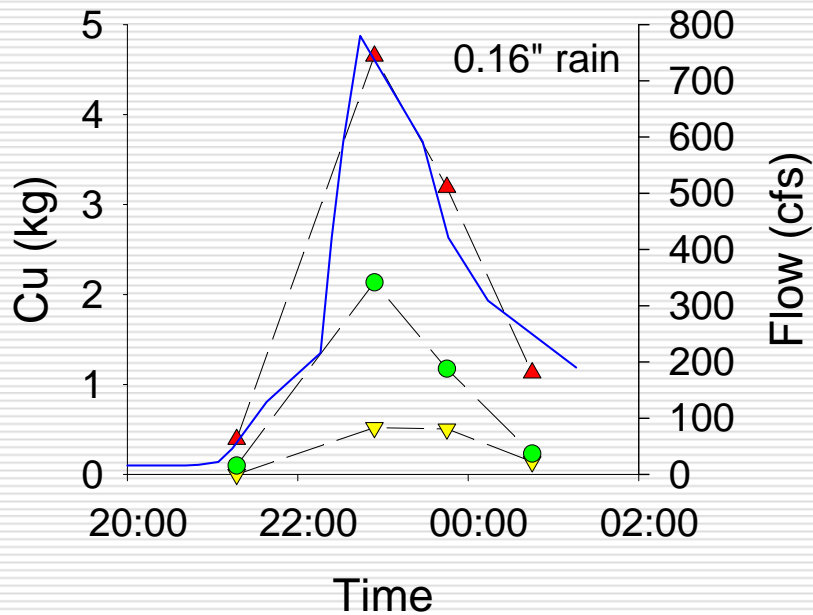
Association of metals with particle size over the course of a storm



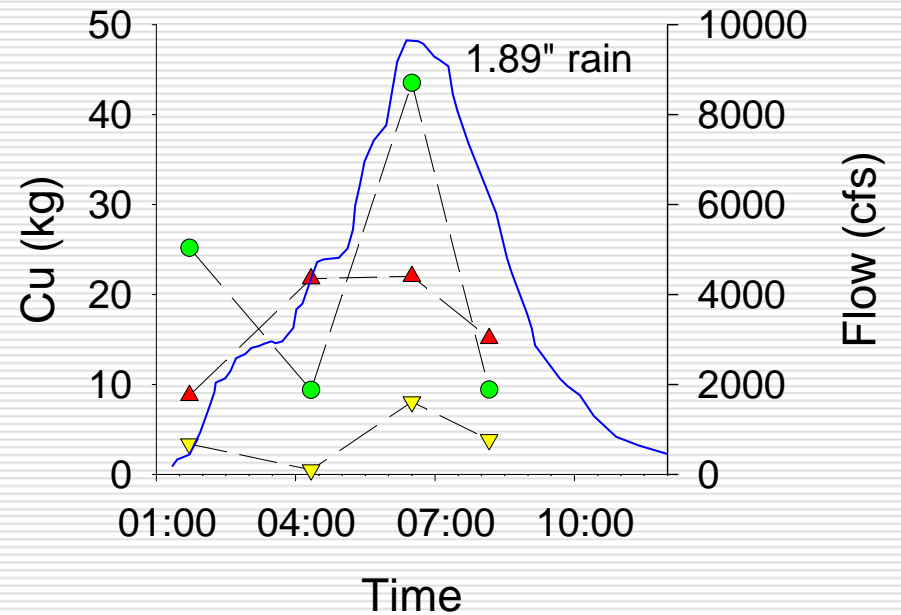
Association of metals with particle size over the course of a storm



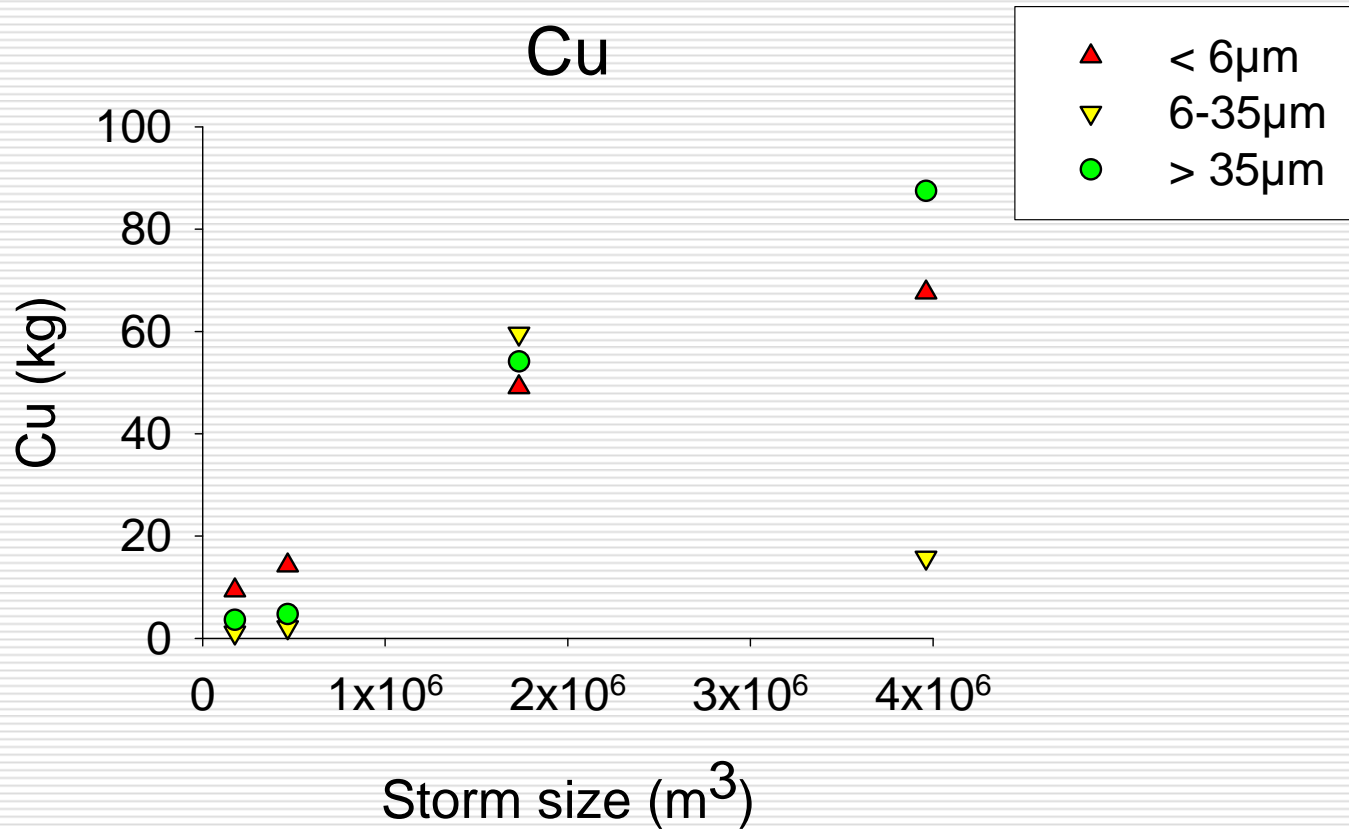
February 19, 2010



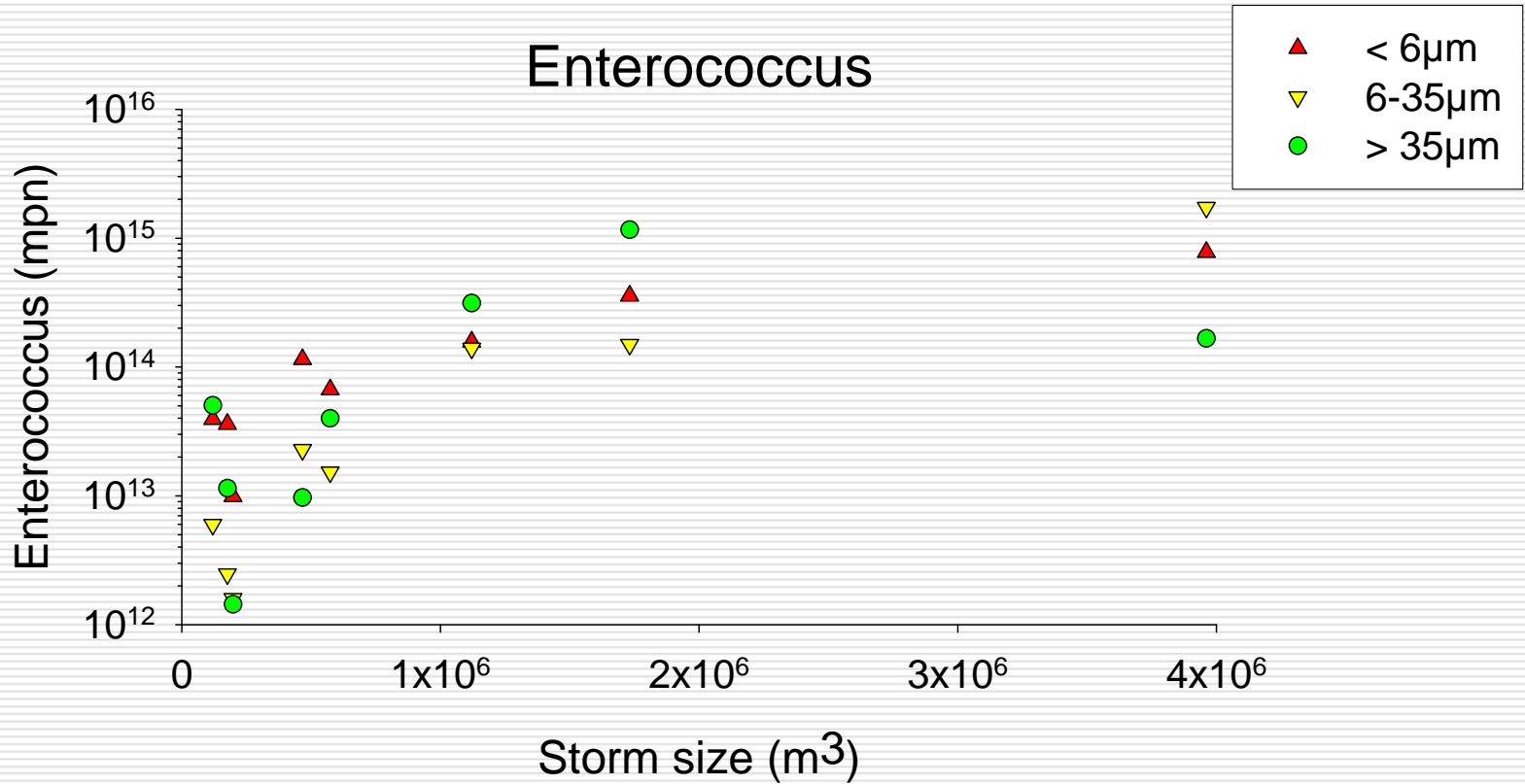
December 15, 2008



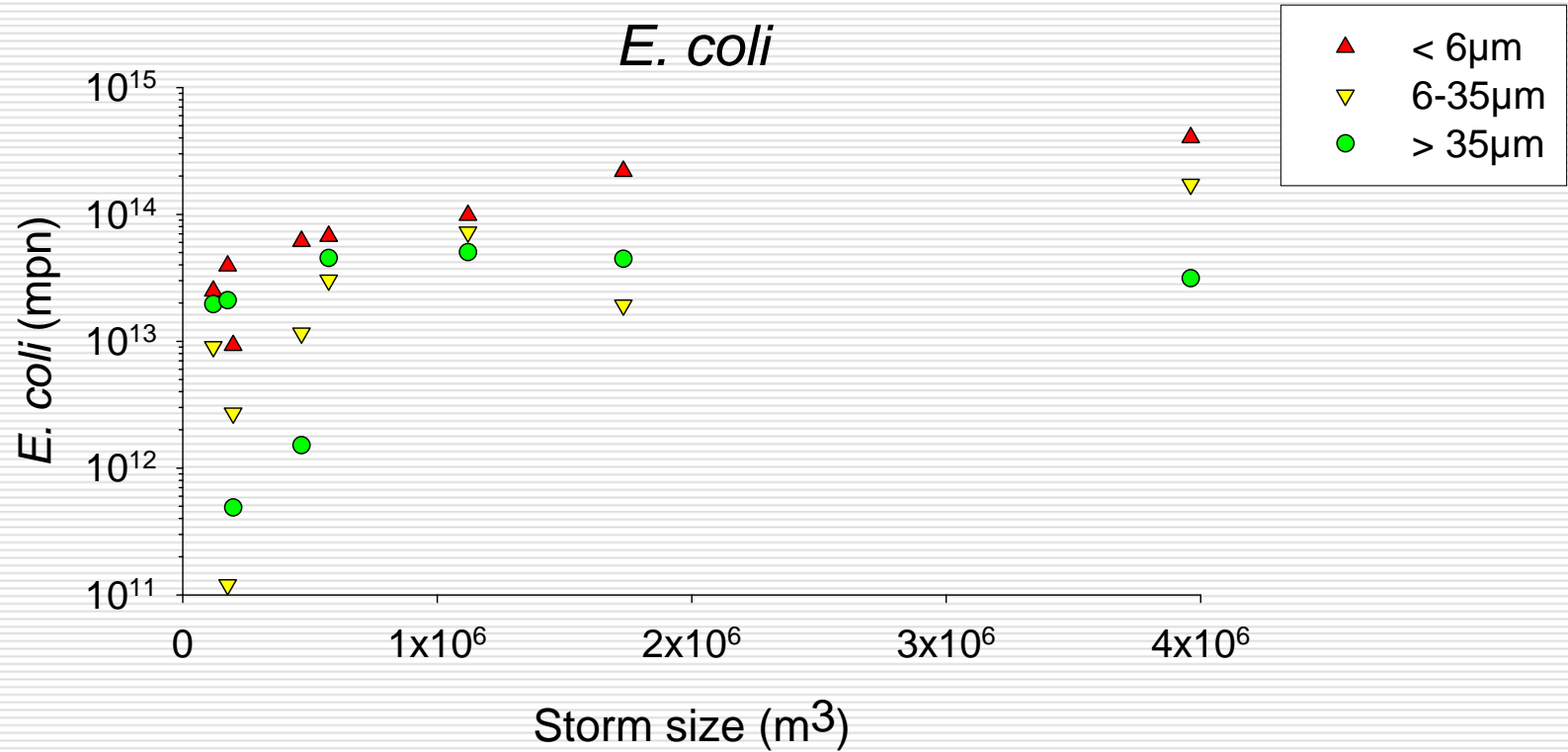
Association of metals changes to larger particles with larger storms



Association of bacteria with storm size



Association of bacteria with storm size



Implications of results

- Focus on large storms
 - Greater mass discharge
 - Focus on larger particles during larger storms
 - Focus on small particles during small storms
 - Most BMPs would not capture the small particles
 - Alternative BMPs
 - Media filters
 - Low Impact Development
 - Source control
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Questions?

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