Microcystin and Taste and Odor Compound Occurrence, Fate and Transport in central Indiana Surface Waters

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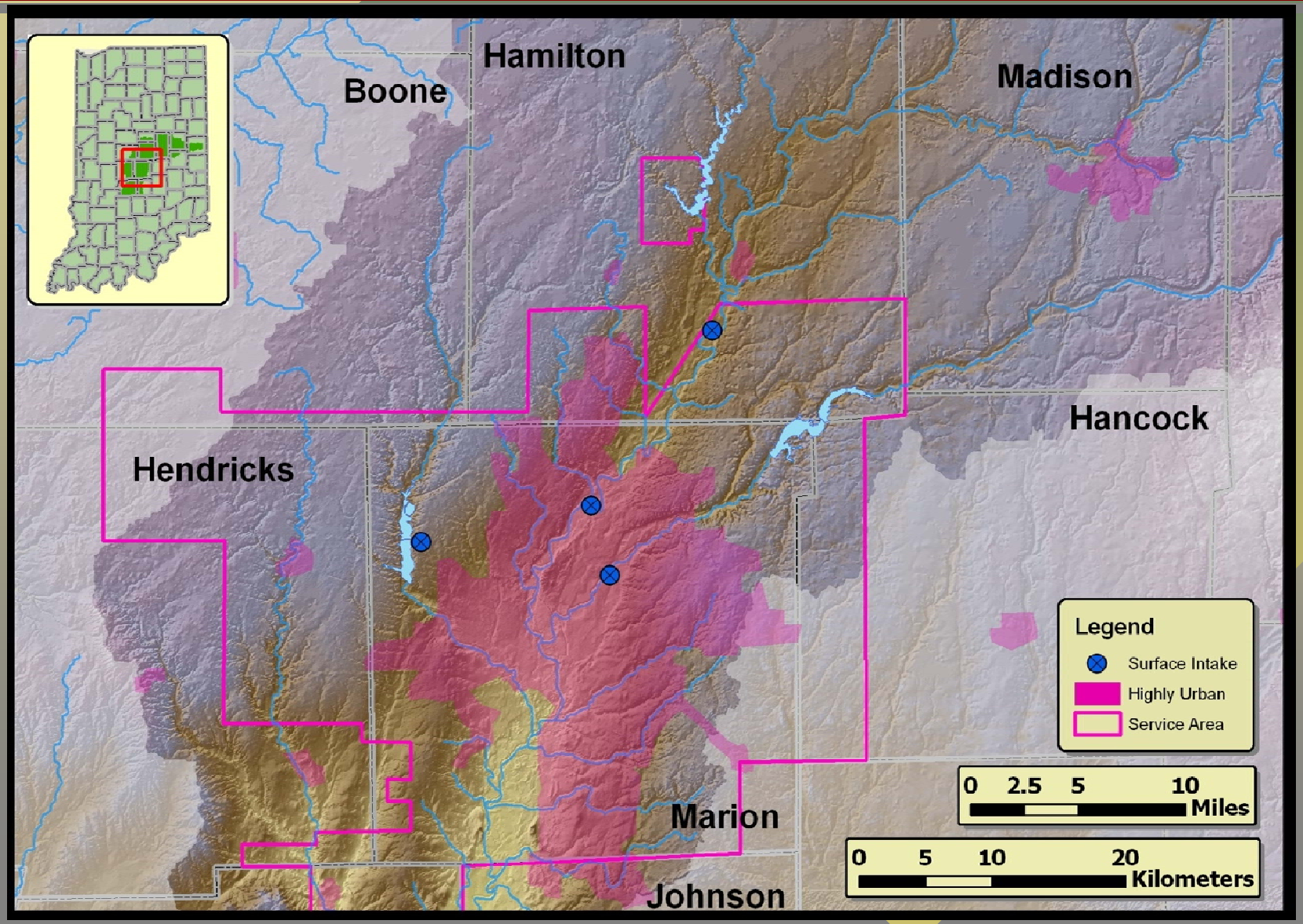

2008-2009 MIB and Geosmin: Central Indiana Reservoirs

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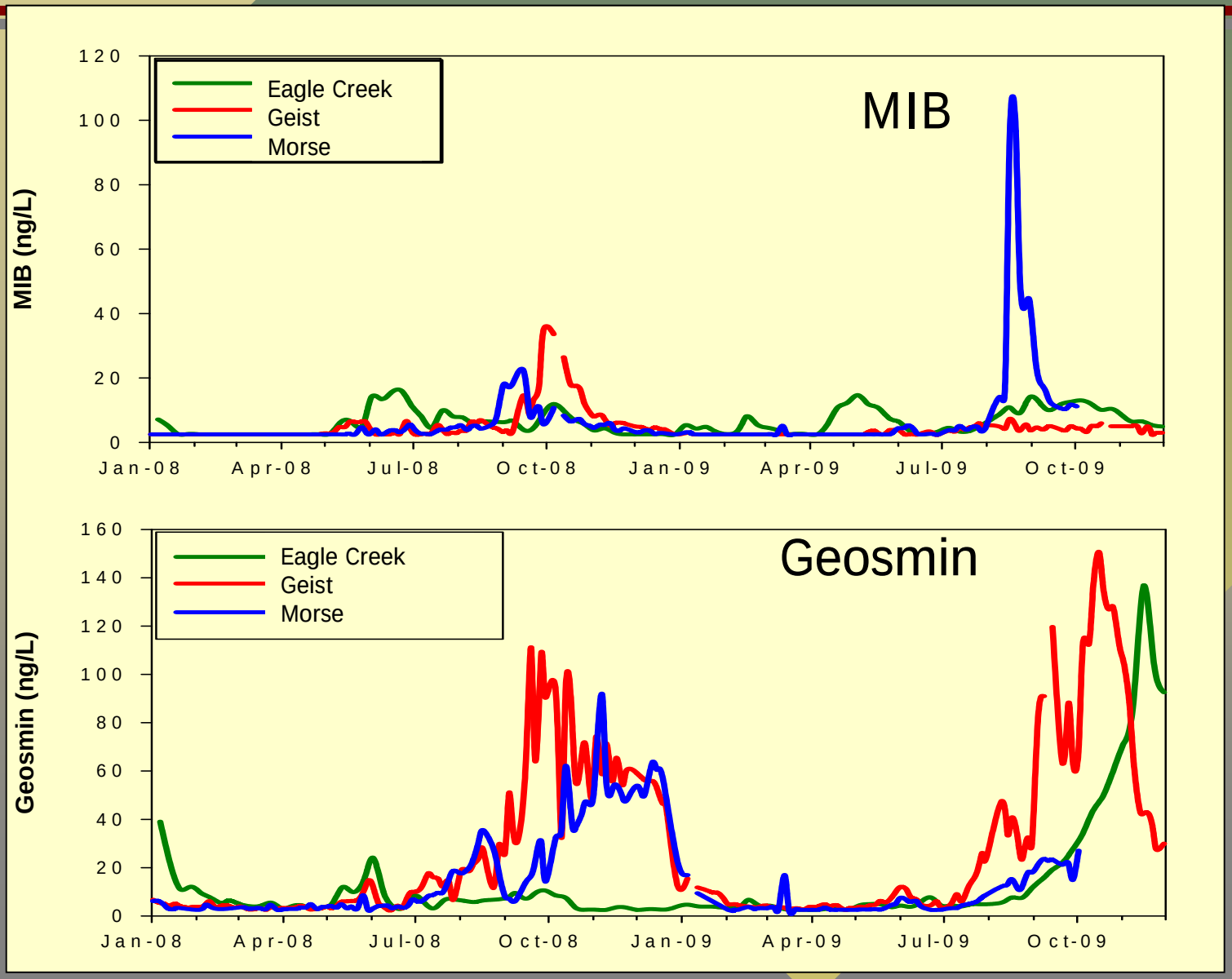

Taste and Odor and Cyanobacteria: Eagle Creek Reservoir 2009

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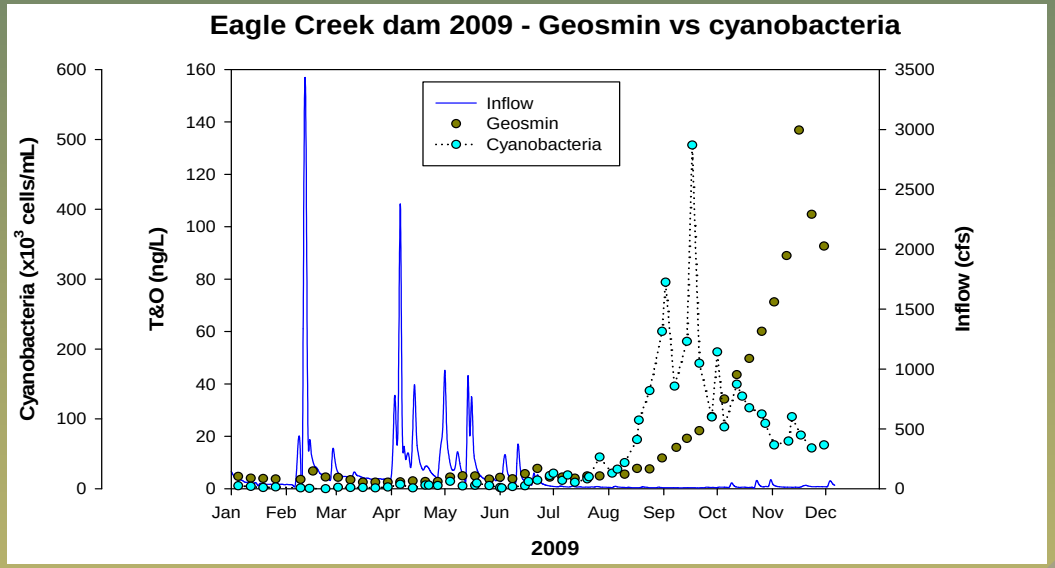
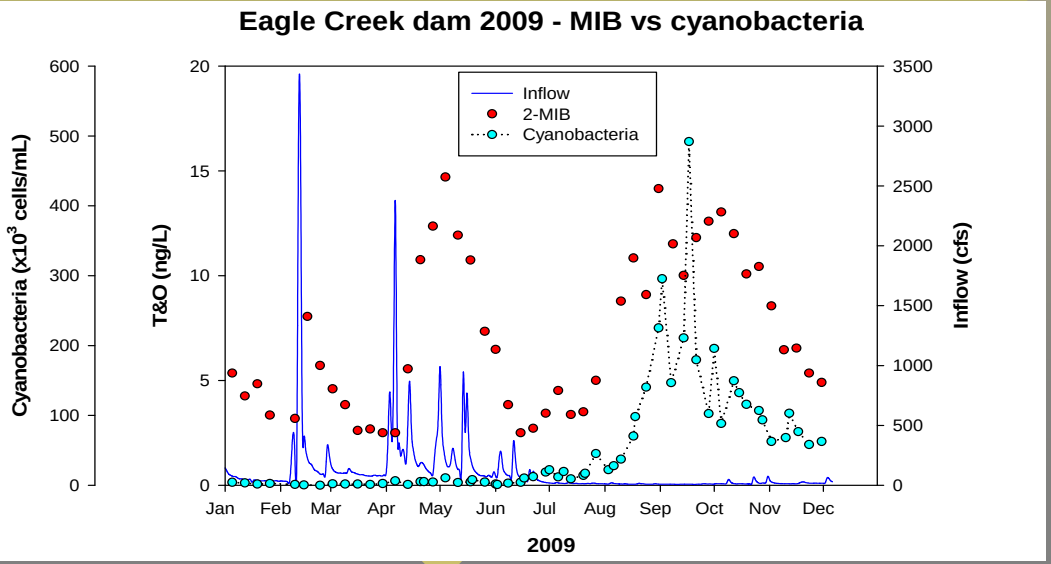
- **Geosmin (GE)**
  - Cyanobacteria peak Sept, 17th (491,880 cells/mL)
  - Geosmin peak Nov, 16th (136.8 ng/L)
  - No correlation due to lag time (R^2 = 0.1284) in biosynthesis and release of geosmin
- **2-MIB:**
  - Two seasonal peaks of 2-MIB
  - In early spring during high flow period, with no/few cyanobacteria
  - In late summer/fall when cyanobacteria are present
  - Whole year (R^2 = 0.3403)
  - Growing period of cyanobacteria (R^2 = 0.6512) , no/low reservoir inflows, from June, 1st





2008-2010 Microcystin and T&O Source and Transport Tracking in central Indiana

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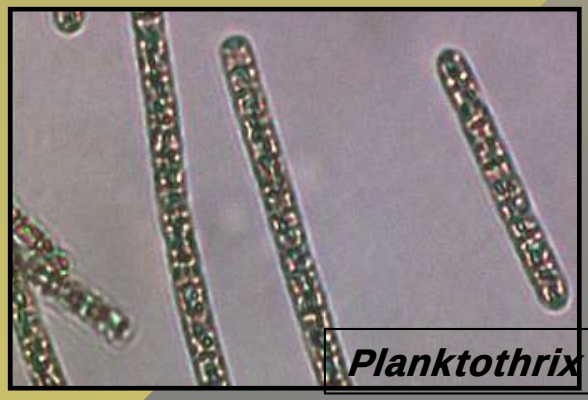
- *Goals*
  - *Document MC and T&O sources outside of drinking water supply reservoirs*
  - *Understand transport and dilution of transported metabolites and their impact to drinking water supplies*
  - *Isolate reservoir production on MC and T&O from foreign sources*
- *Poor correlations between cyanobacterial blooms and taste and odor episodes led to questions of sources.*



2008-2010 Microcystin and T&O Source and Transport Tracking in central Indiana

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- *Approach*
  - *High-frequency storm sampling of streams upstream of drinking water assets*
  - *Small lake and stormwater basin reconnaissance sampling*
  - *Stormflow monitoring of outflows to drinking water source streams*
  - *Downstream sampling of reservoir outflows*
- *Funded by Veolia Water Indianapolis through CIWRP*

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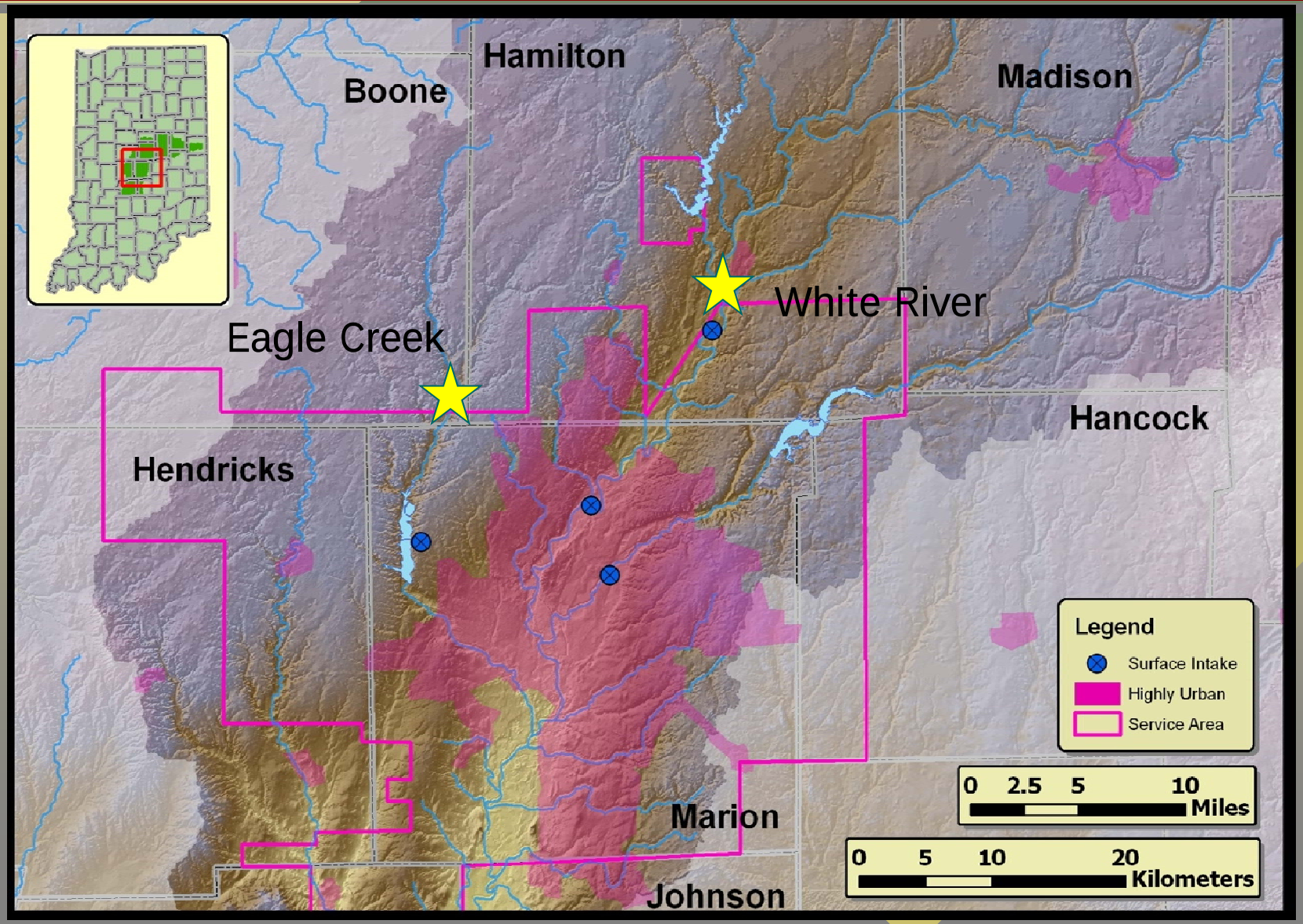

MIB & Geosmin: High-frequency Sampling through Spring Storms

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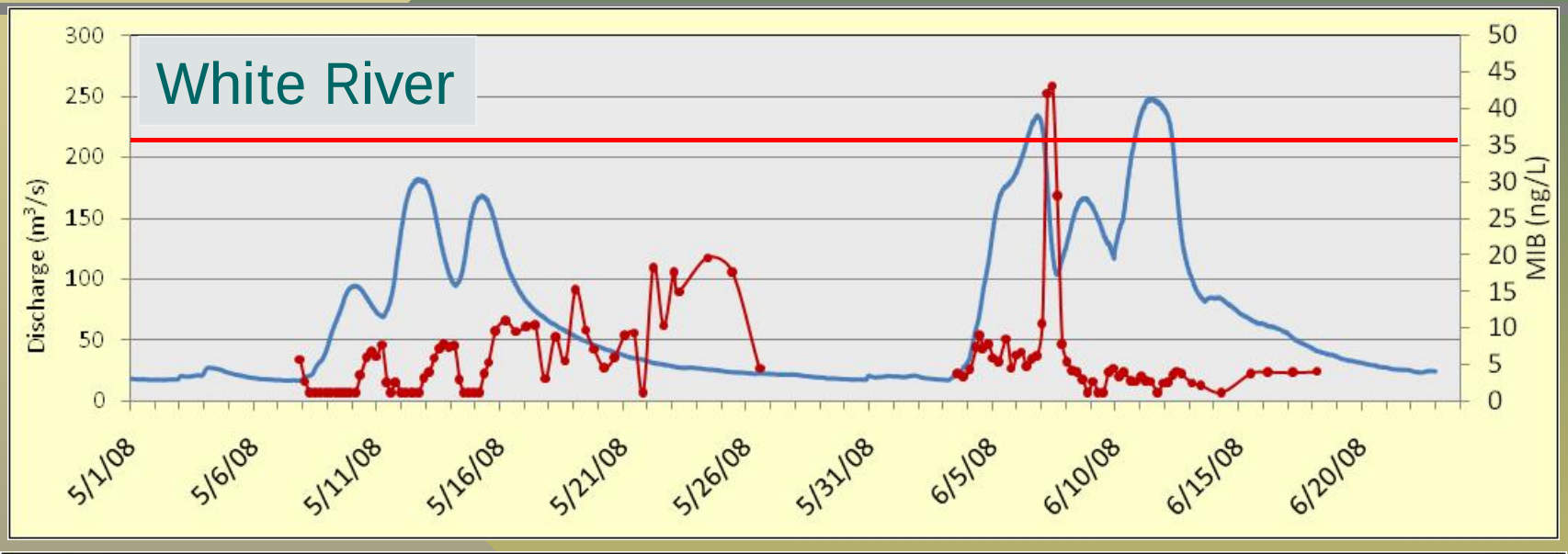

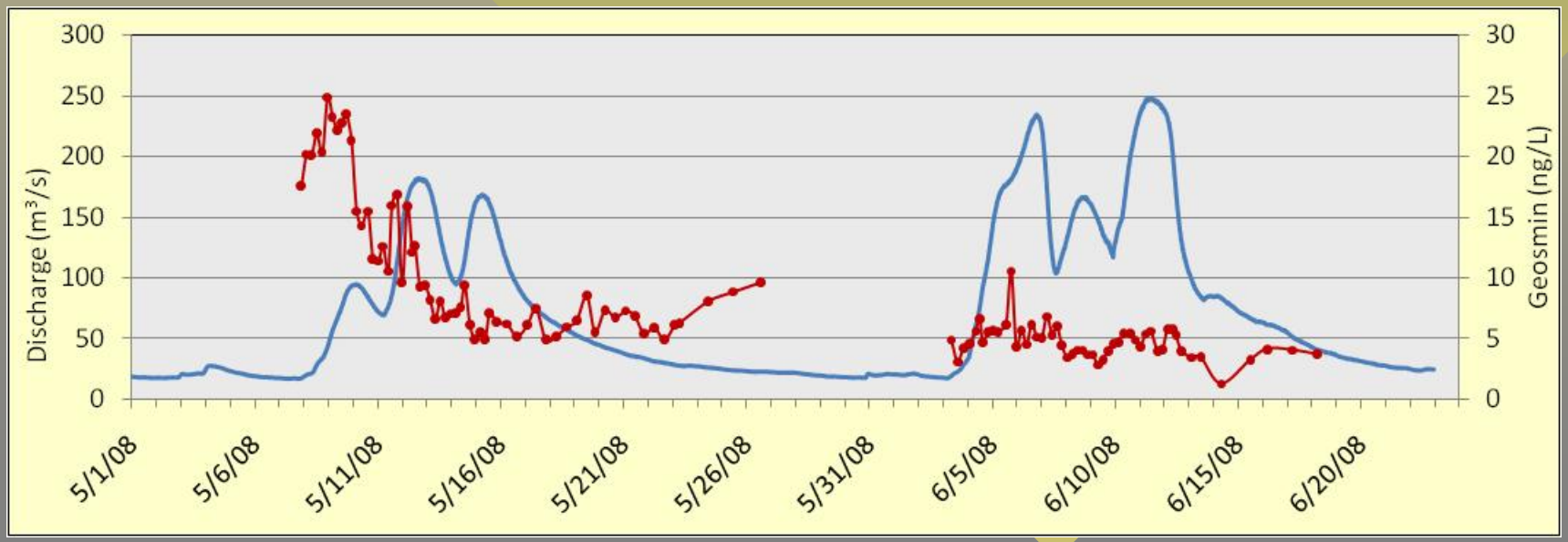

Eagle Creek Watershed: Taste and Odor

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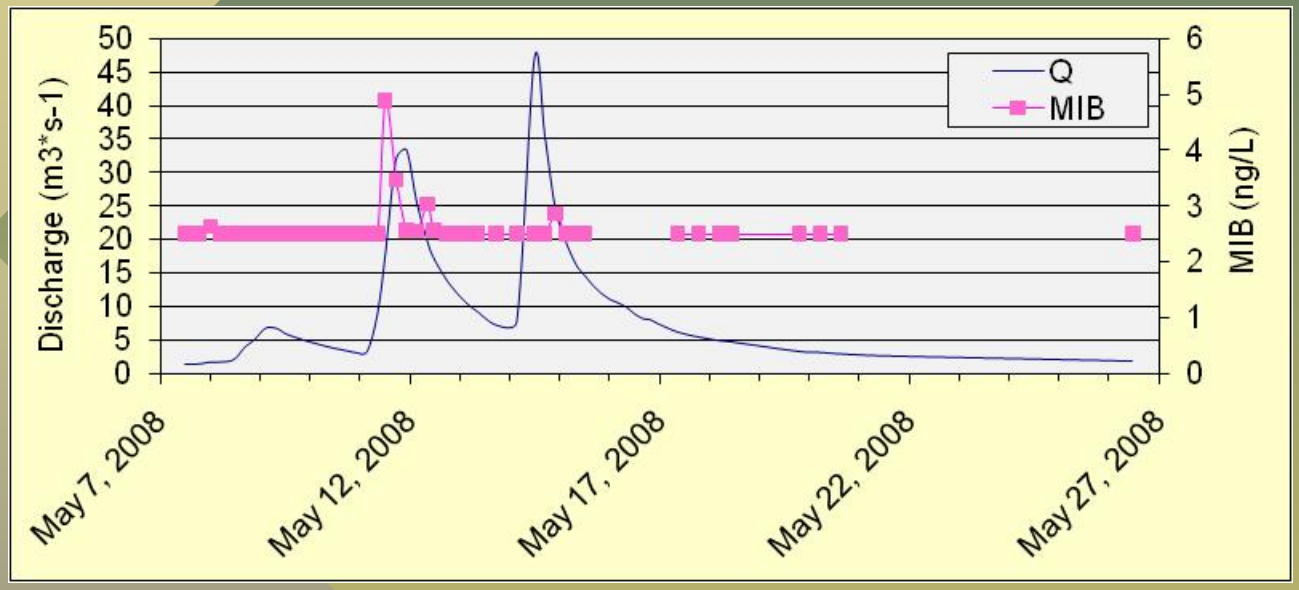
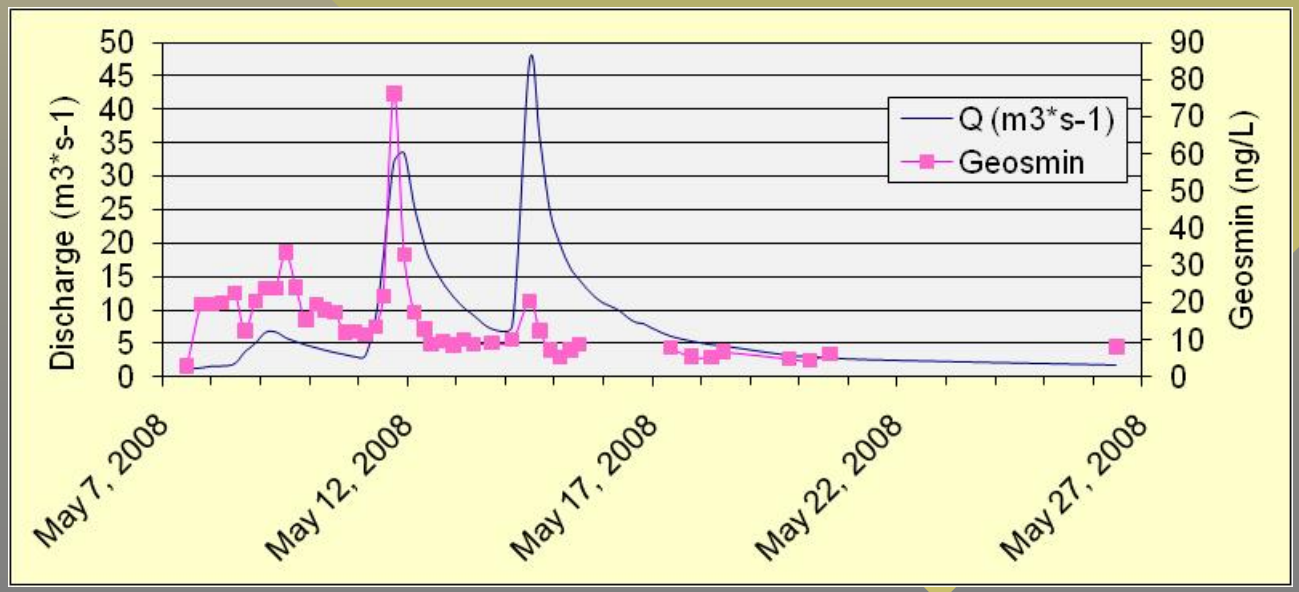
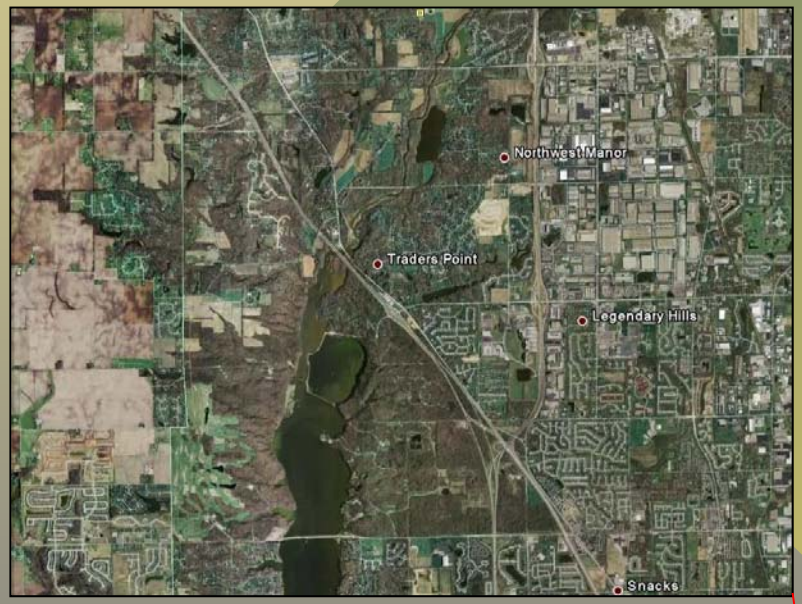
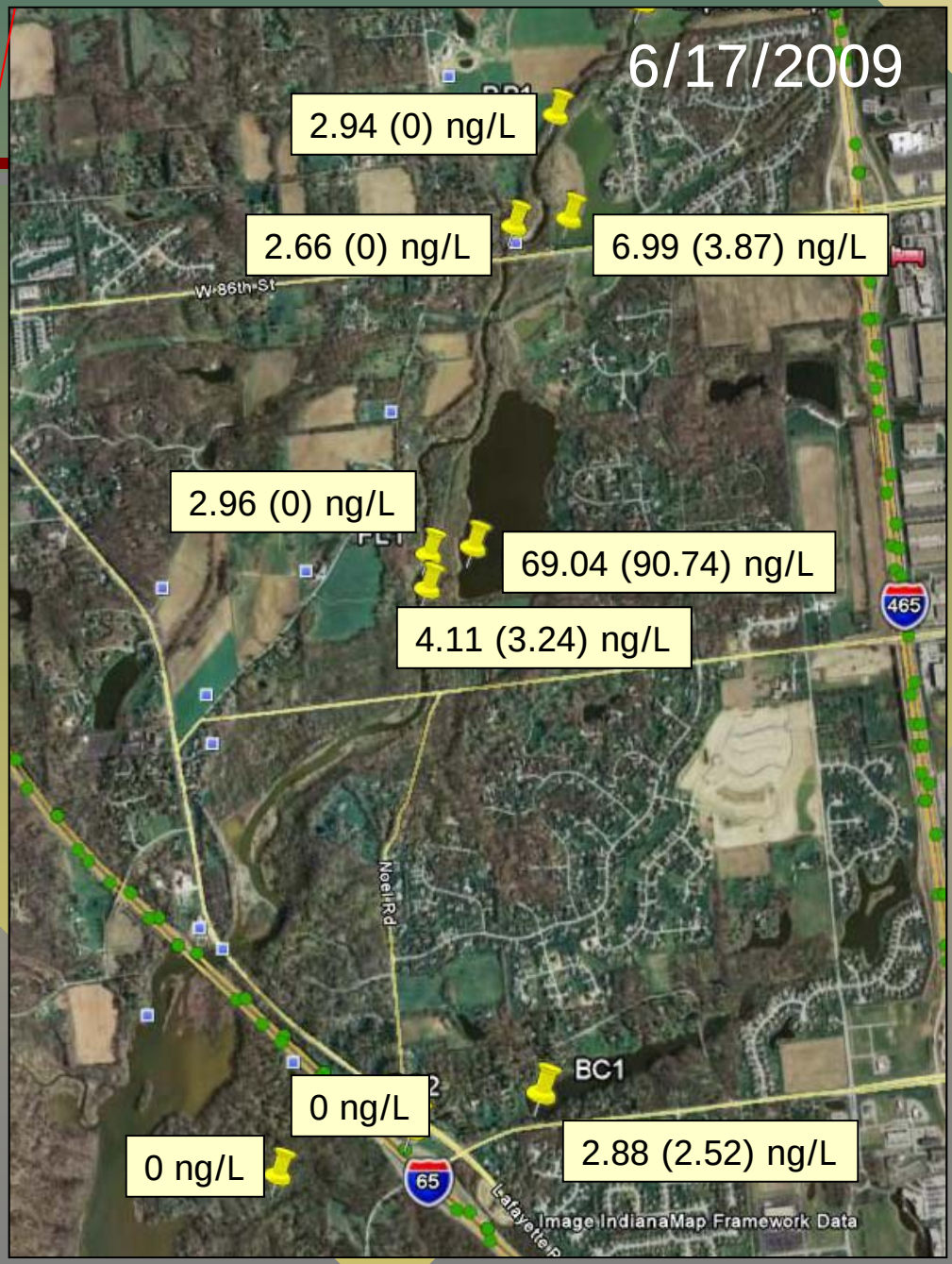




Eagle Creek Watershed MIB (Geosmin) Source Tracking





Fox Lake: Cyanobacteria and Taste and Odor Production

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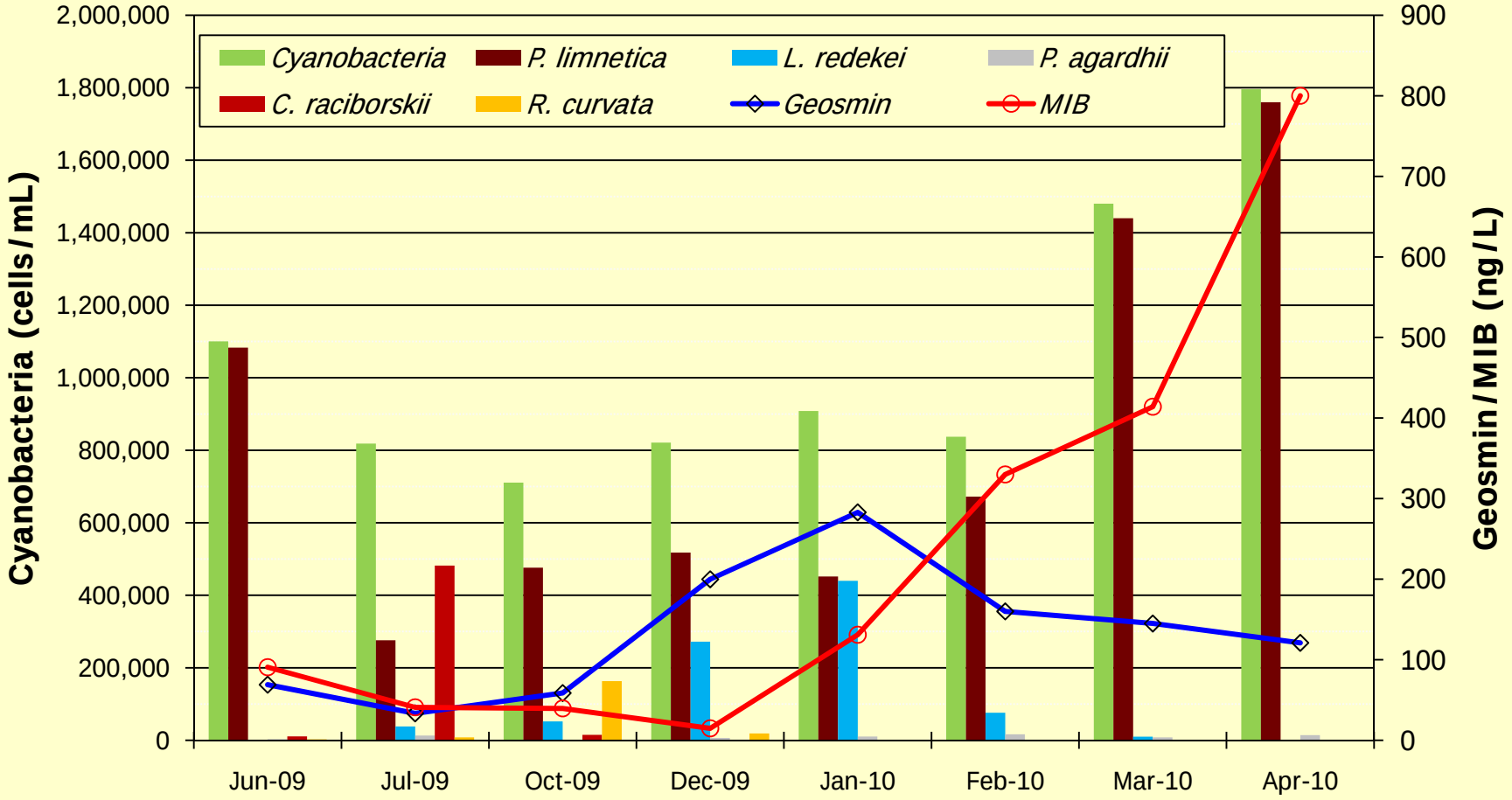
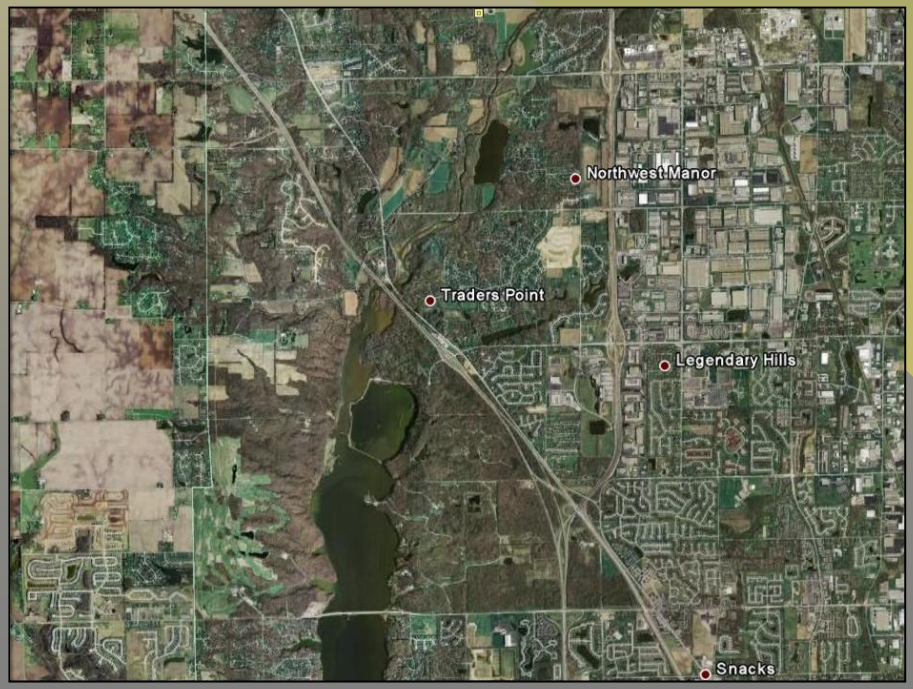
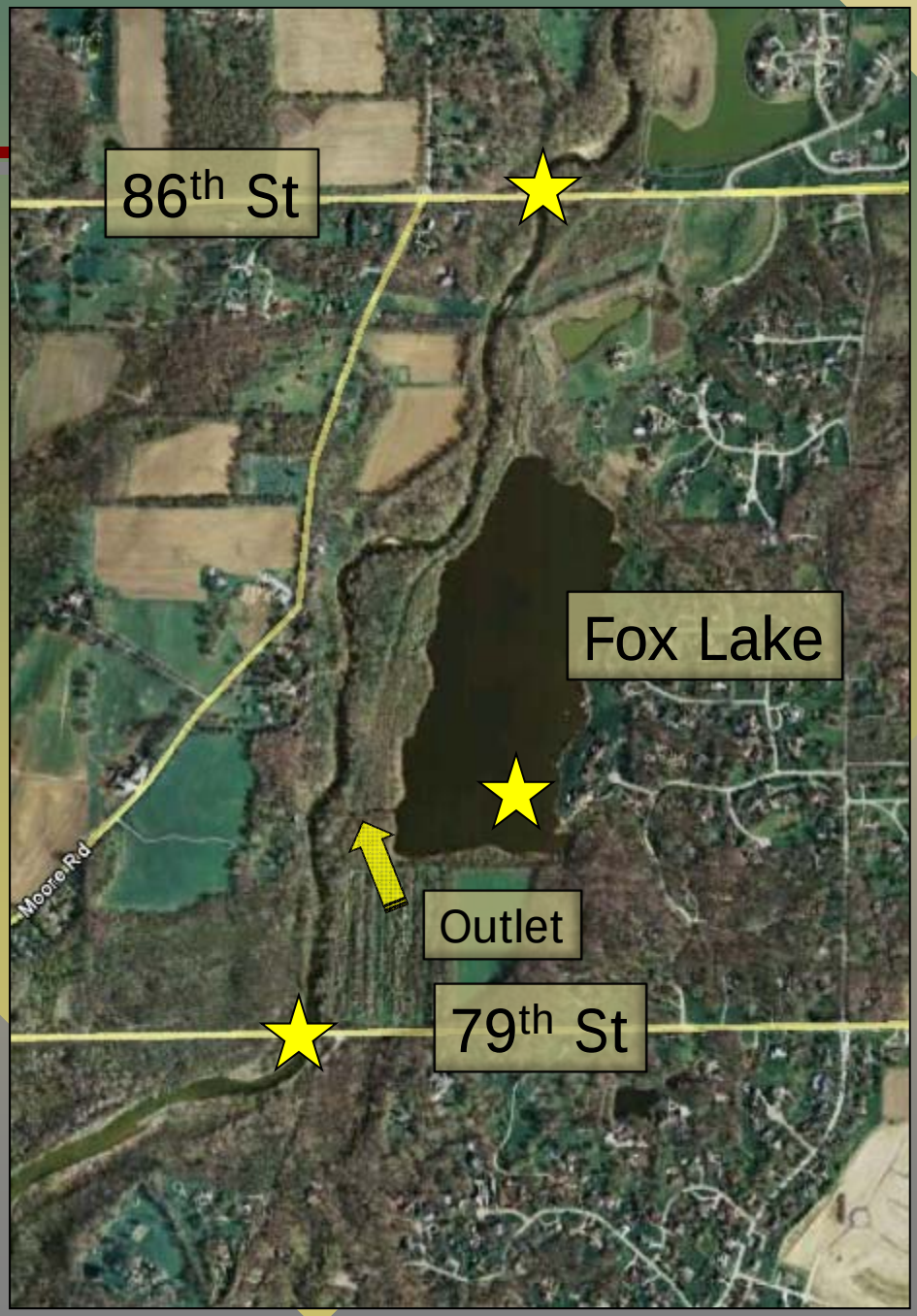


Fox Lake and Downstream Transport

		86th St	79th St	Fox Lake
3/29/2010	Tcyano	2,429	6,972	1,293,000
	MIB	2.8	9.1	414.0
	Pseudanabaena	0	0	1,248,000
	STORM EVENT			
4/8/2010	Tcyano	5,800	65,600	1,795,700
	MIB	2.3	29.0	800.0
	Pseudanabaena	2,857	46,400	1,760,000





Downstream Transport of MIB (ng/L) (4-16-2010)

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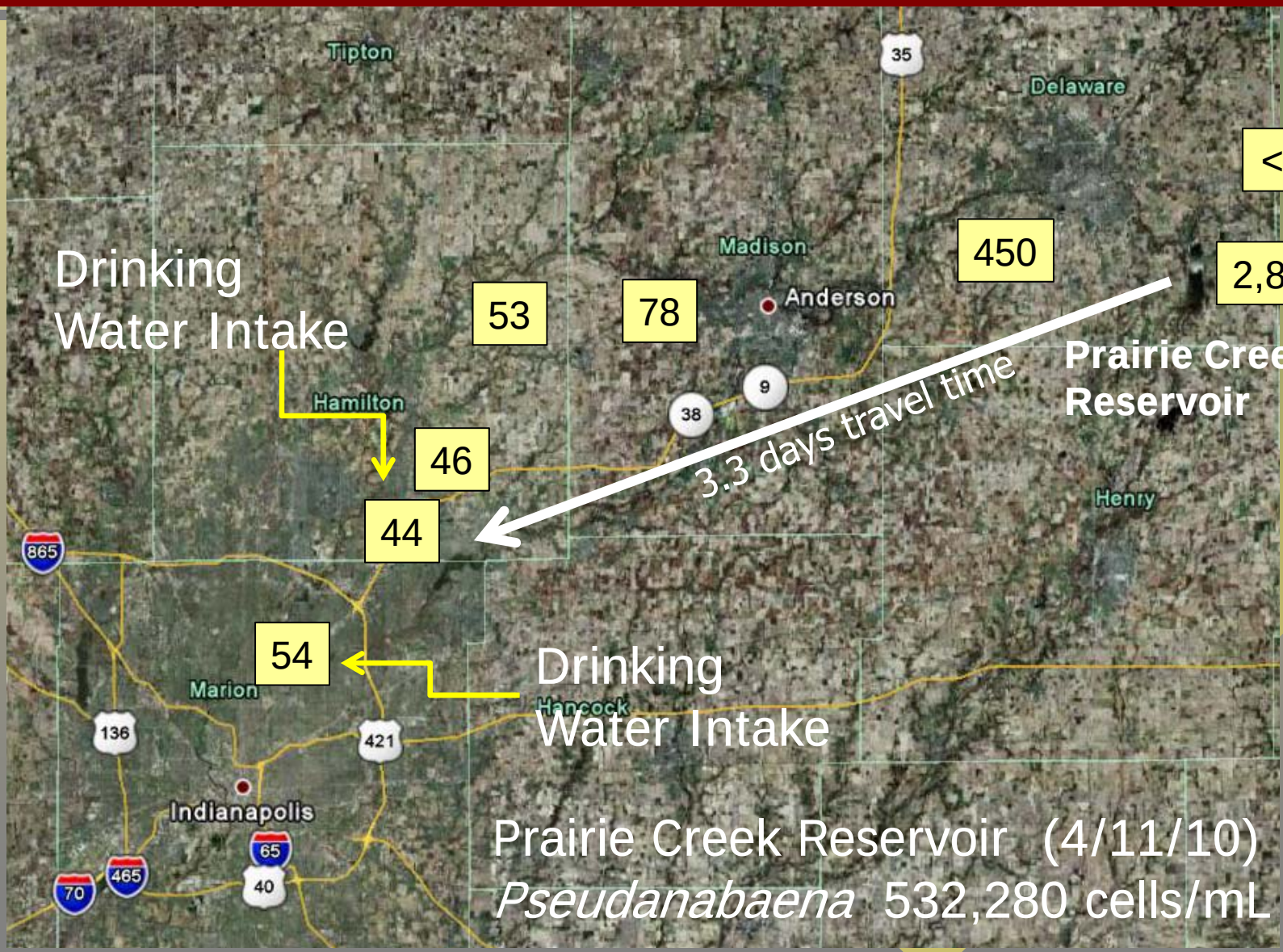

Downstream Transport of MIB (ng/L) (4-22-2010)

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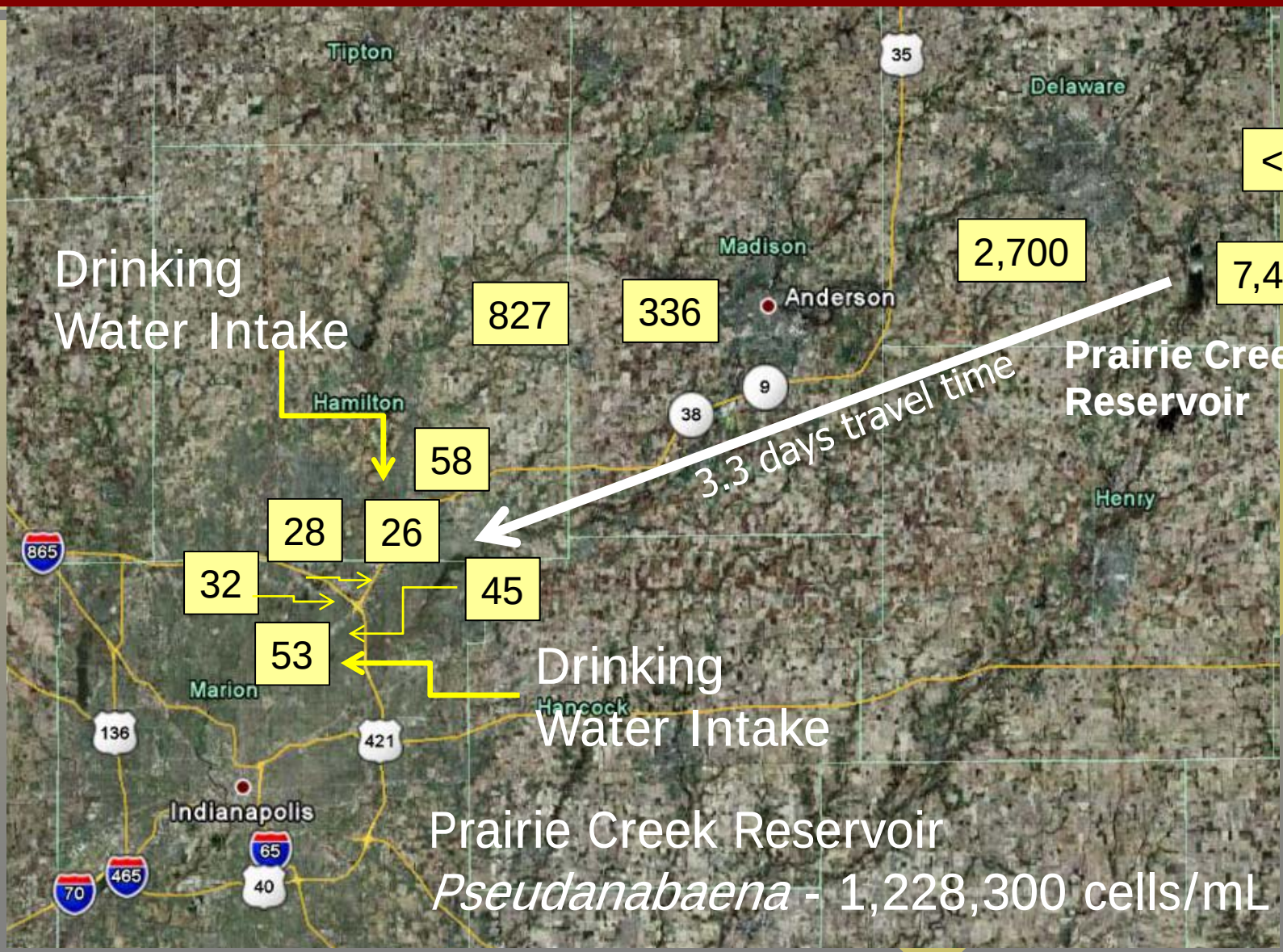

MIB Source and Downstream Transport

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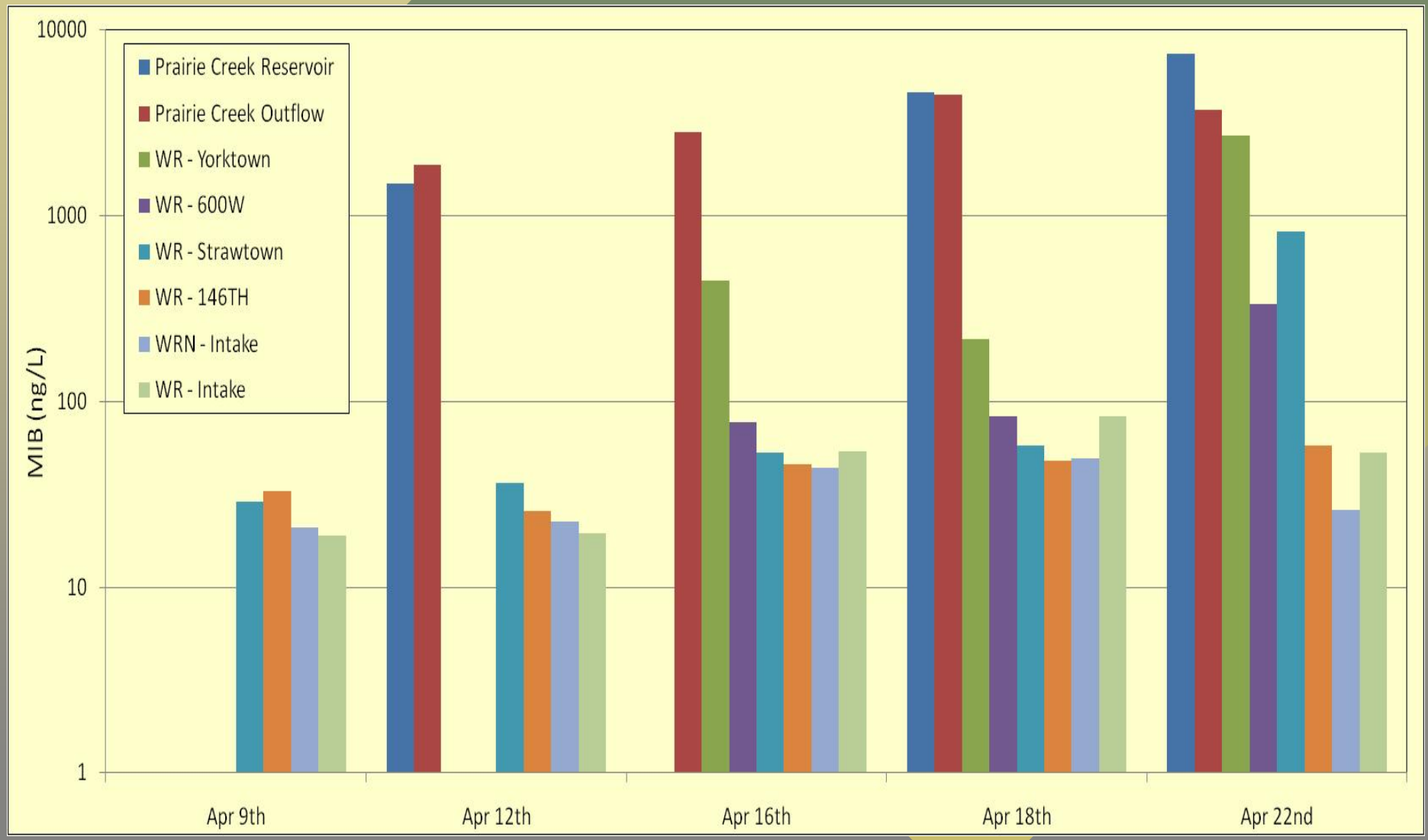

Distribution of Cyanobacteria and Diatoms vs MIB: White River (4/22/10)

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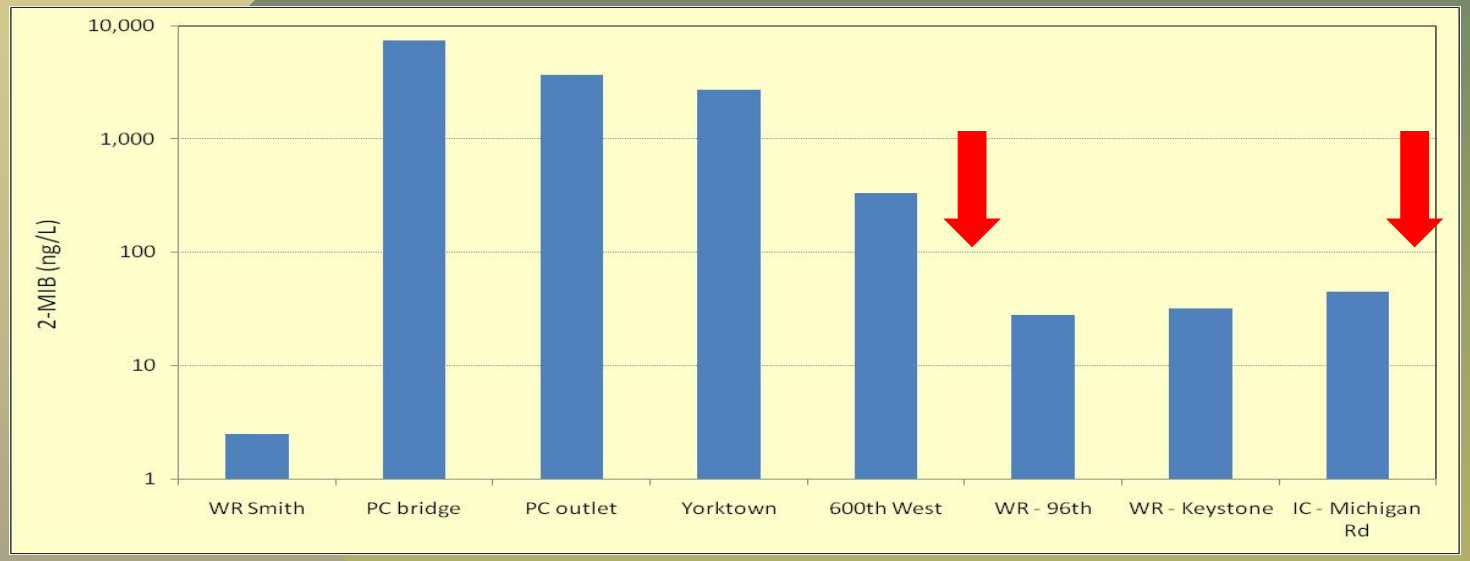

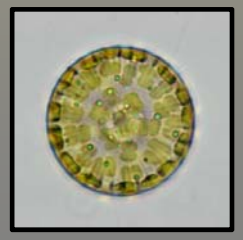

Stephanodiscus spp.

Pseudanabaena limnetica vs MIB: White River

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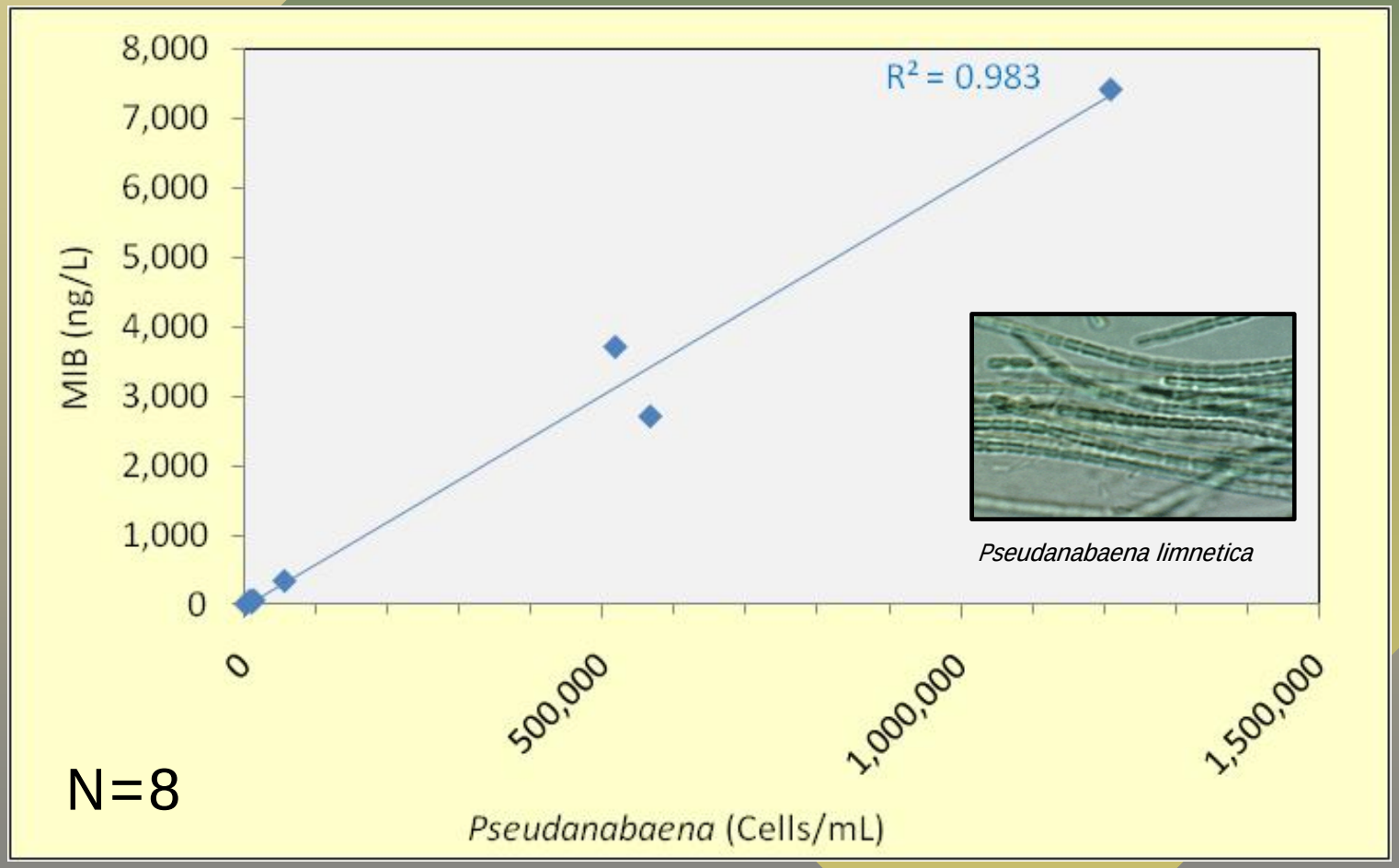

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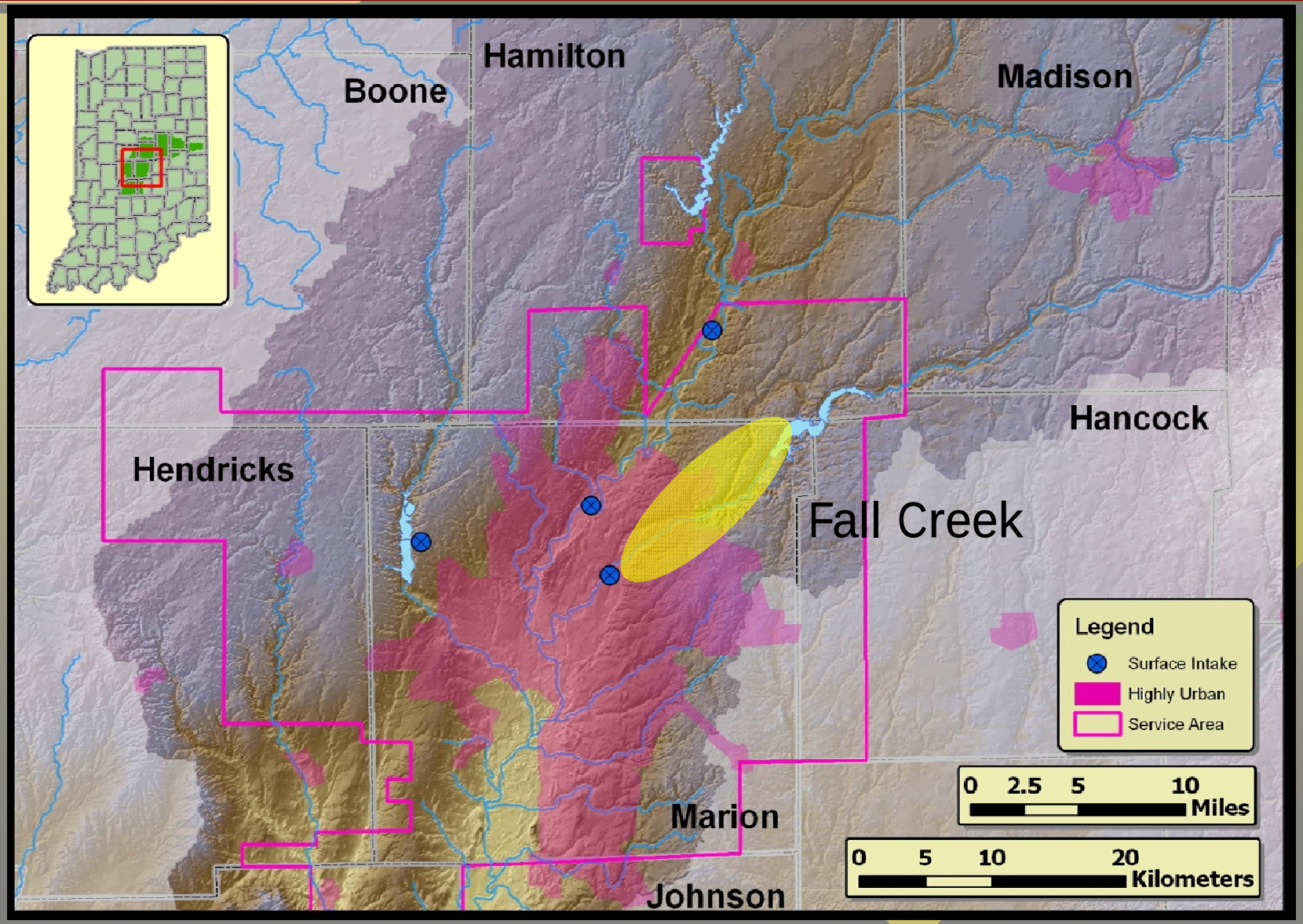

Downstream Transport from Reservoir: Fall Creek System

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Downstream Trends: Cyanobacteria and Microcystin

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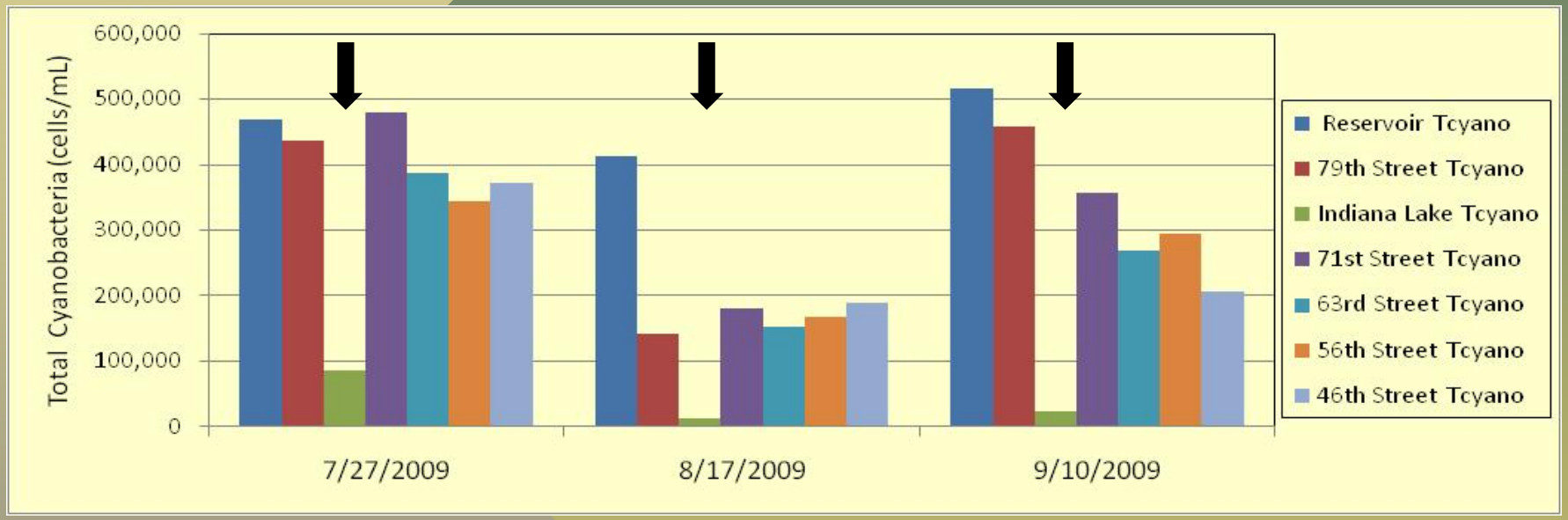

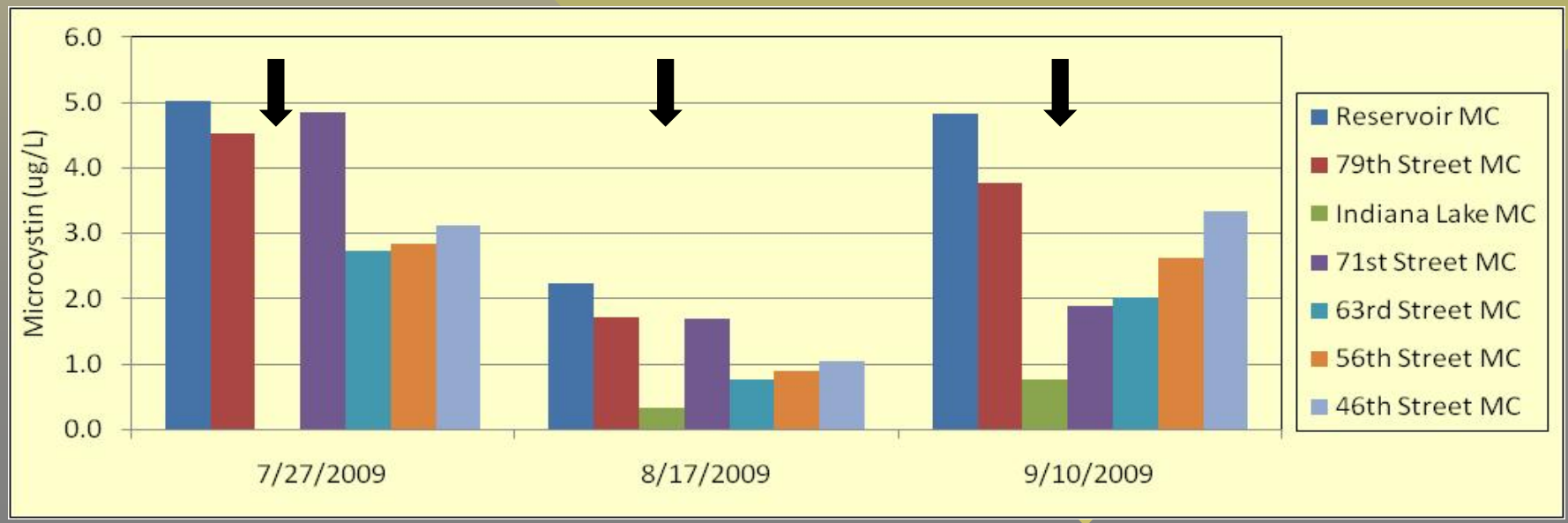

Downstream Trends: MIB and Geosmin

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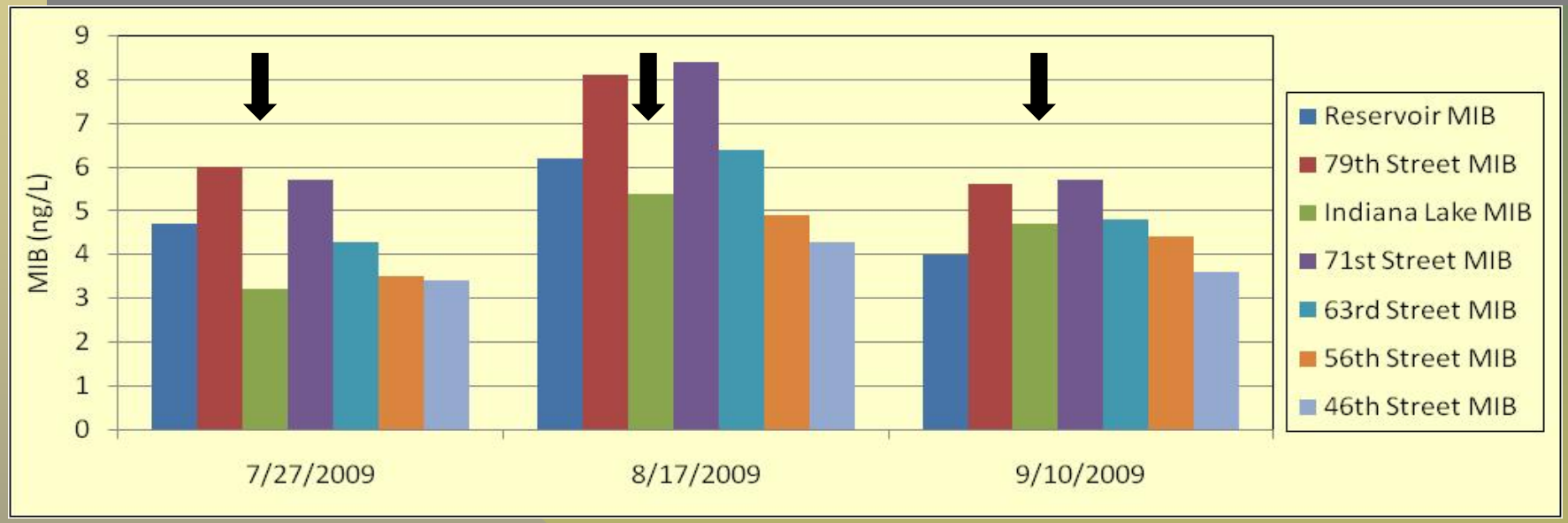

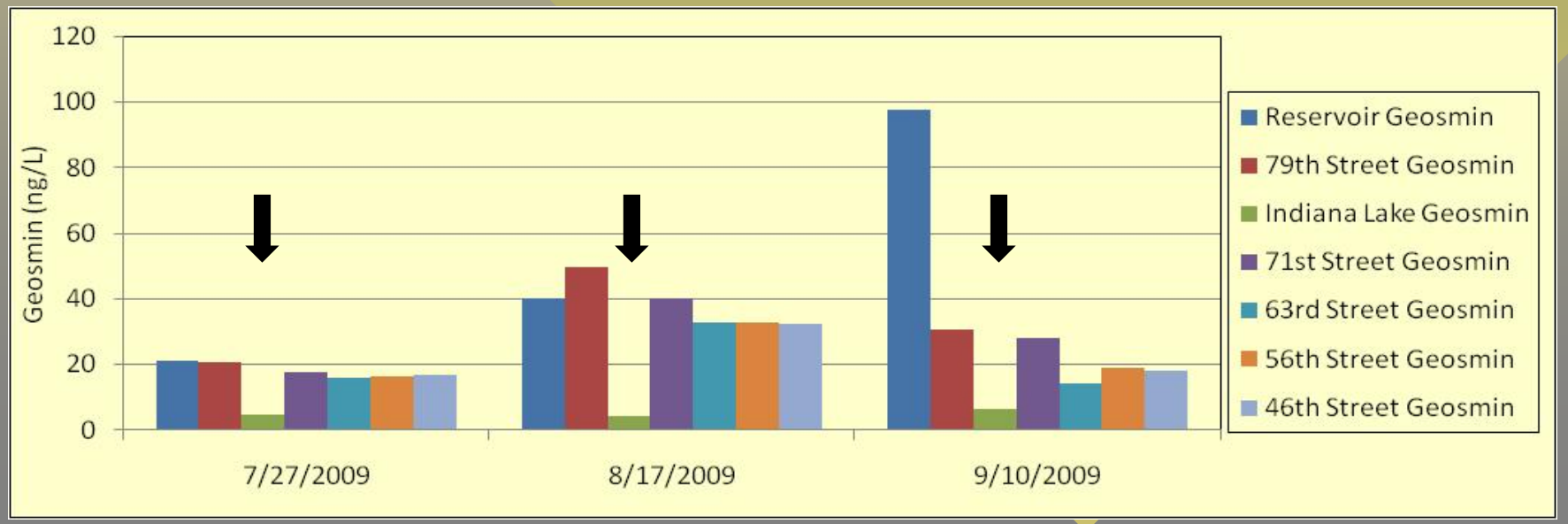

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