

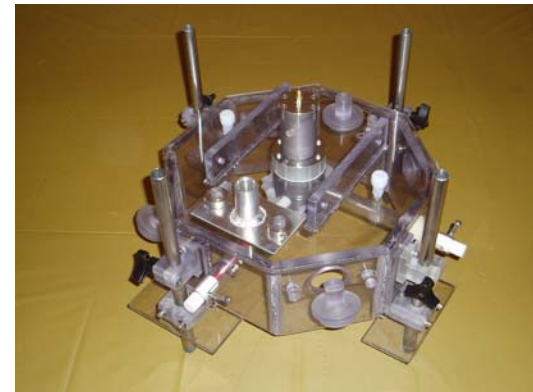
2008 Benthic Flux Chamber Studies



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Benthic Flux Chamber Program History

- Method Development in 2006 and 2007
- Methods developed for flux chamber use in a range of environments:
 - Fine-grained channel margin deposits and other depositional features
 - Periphyton (isolated substrates)
 - In-channel gravel substrates

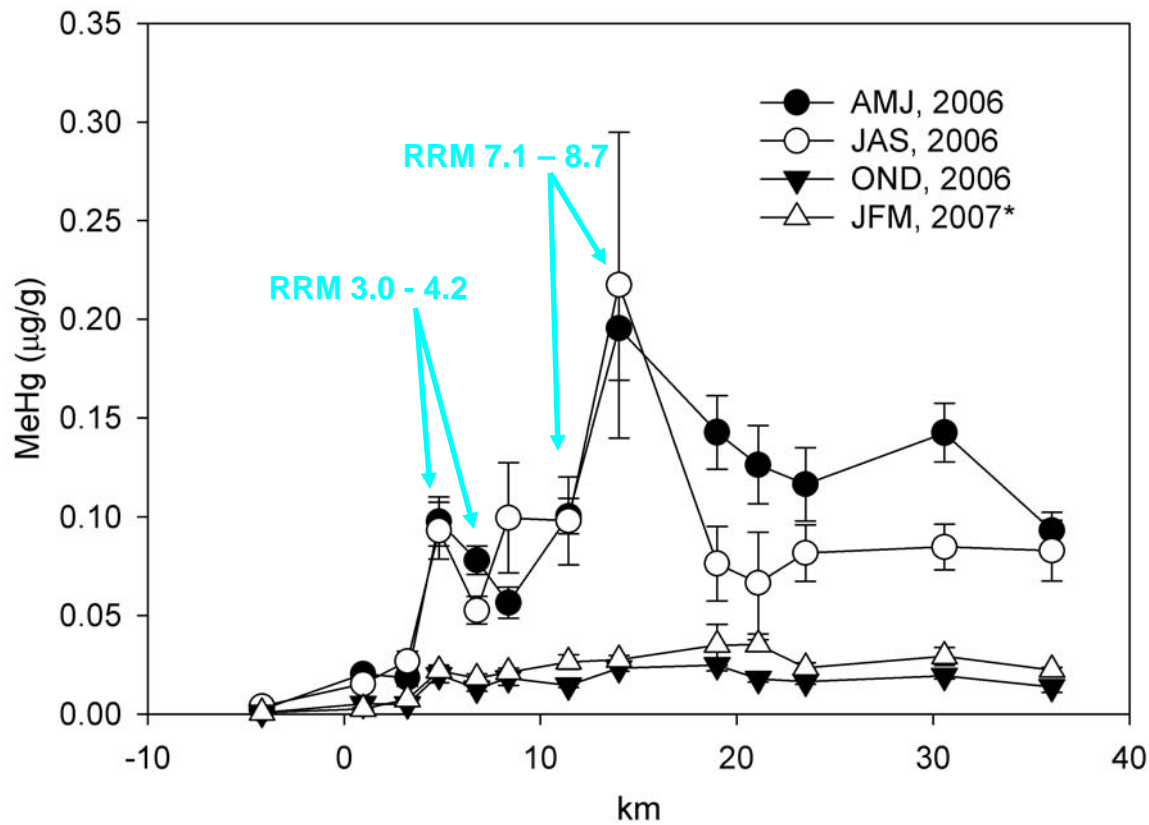


2008 Benthic Flux Chamber Study Components

1. Substrate Comparison: near-synoptic comparisons of habitat types within specific river reaches
 - Measure the major in channel habitat types within a specific reach to provide direct comparisons
 - Two reaches will be evaluated:
 - RRM 3.0 to RRM 4.2
 - RRM 7.1 to RRM 8.7
2. Variability Study: Multiple deployments per area to address potential variance in flux
3. Eco Study Support: Monitoring flux from South River aquatic habitat types from RRM 1.6 to 12.8
 - Six locations will be selected from the 10 stations included in bimonthly monitoring of MeHg in sediment

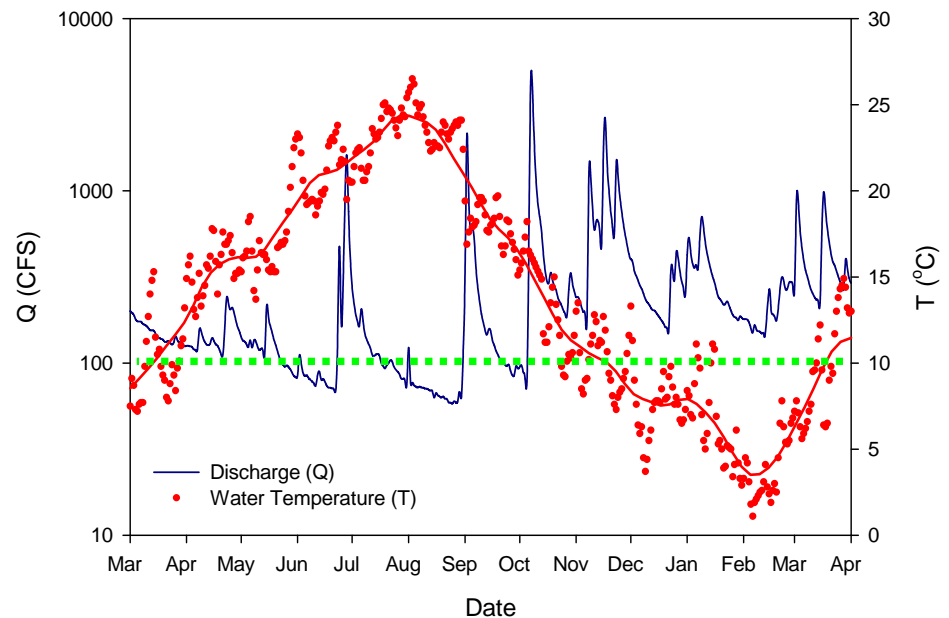
Reaches for Substrate Comparison

Sediment Monitoring Station Results 2006 to 2007



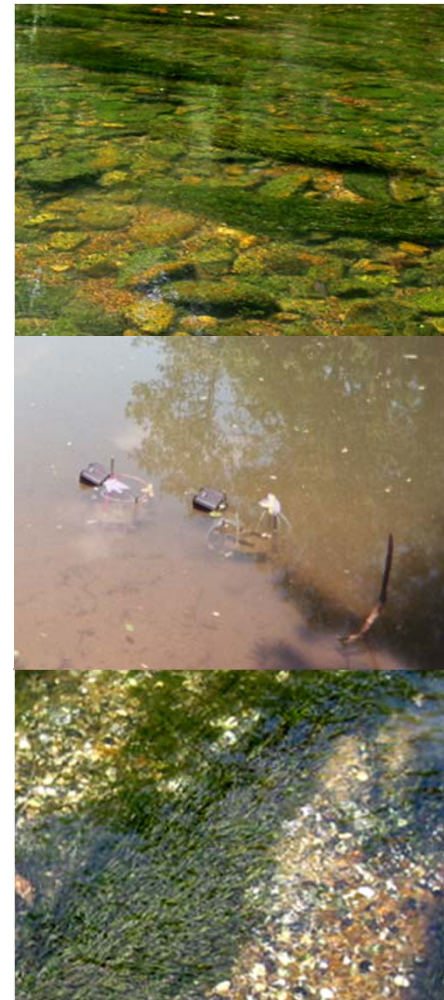
Study Timing

- Five field events planned in 2008
 - Two Eco Study events (this week, Sept.)
 - Three substrate comparisons (April, May, August)
 - One Variability Study (June)
- Eco study BFC deployment will be conducted adjacent to bimonthly monitoring events for integration



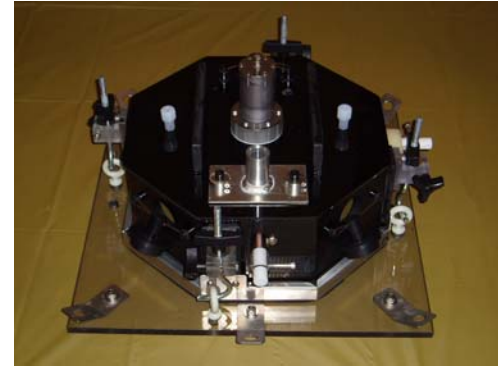
Substrate Comparison

- Two reaches will be studied:
 - RRM 3.0 to RRM 4.2
 - RRM 7.1 to RRM 8.7
- Six total locations within a reach - two locations within each major substrate type
 - Mud (FGCM deposits, submerged banks, backwaters/wetlands)
 - Gravel/cobble
 - Clean substrate
 - Embedded
 - Periphyton (rock plates)
- Three sampling events in 2008



Variability Study

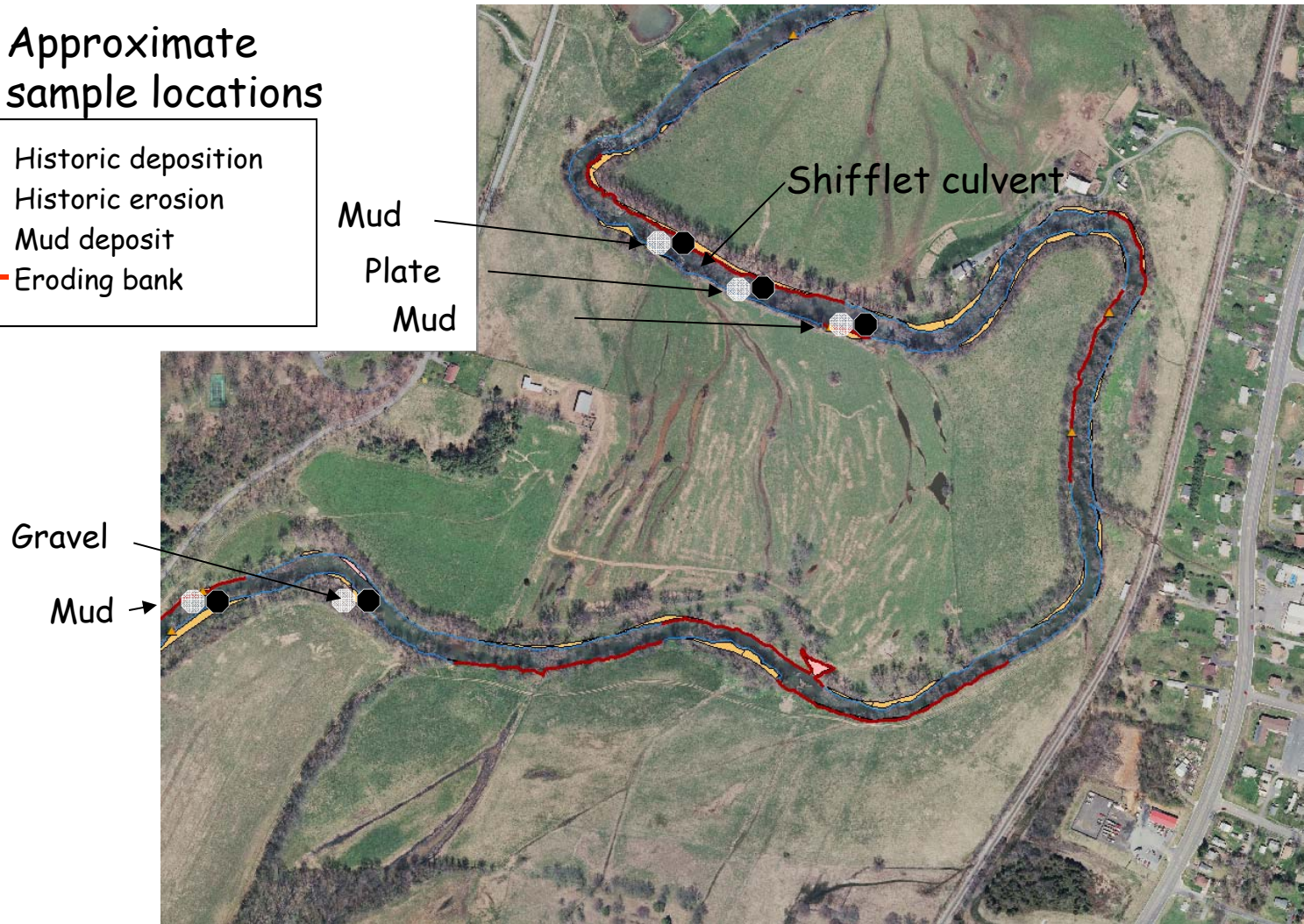
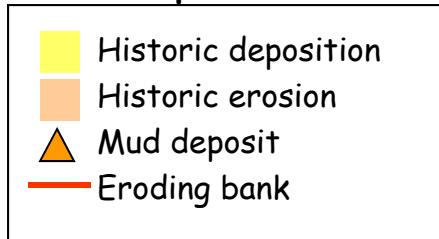
- Four chambers deployed on:
 - Mud deposits
 - Clean gravel
 - Embedded gravel



- Utilize opaque chambers to control for sunlight/shade effects on flux
- Sediment samples collected as explanatory variable

Reach Comparison I: RRM 3.0 to RRM 4.2

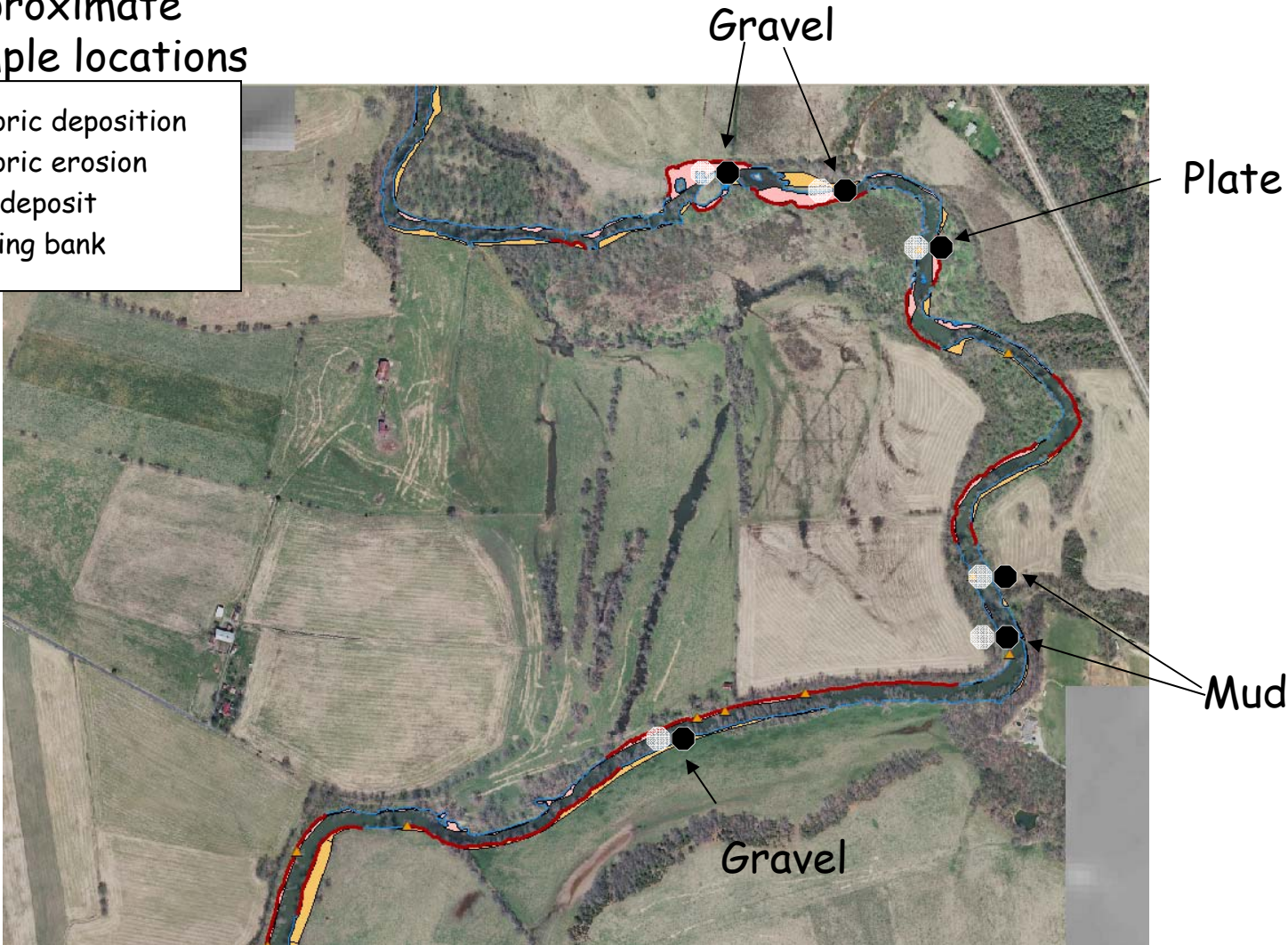
○● Approximate sample locations



Reach Comparison II: RRM 7.1 to RRM 8.7

○● Approximate sample locations

- Historic deposition
- Historic erosion
- Mud deposit
- Eroding bank



BFC Eco Study Locations

Habitat/Environment	Approx. Station RRM	Substrate Type
Baseline monitoring stations in toe of river pool	3	Cobble/Gravel
	8.7	Cobble/Gravel
River pool with embedded substrates	4.6	Cobble/Gravel
	7.4	Cobble/Gravel
Fine grained sediment deposit along river pool edge	6.2	Mud
	12.8	Mud
Island or mill race side channel pool	5.2	Mud
	9.9	Mud
Floodplain wetland	1.6	Mud/Wetland
	8.6	Mud/Wetland

- Six locations sampled during one week
- Locations are coincident with surface sediment MeHg monitoring locations
- Sampling will be conducted in weeks with bimonthly surface water and sediment sampling
- Two events in 2008



= Proposed BFC Location

BFC Sampling Program

- Deploy paired clear and opaque chambers to investigate the potential for diurnal effects
- Measure filter-passing THg, MeHg, Fe and Mn flux at 0, 1, 2 and 3 hours
- Measure DOC, SUVA (Measures DOC aromaticity)
- Measure dissolved oxygen (DO) inside chambers
 - Compare DO results to 24 hour DO cycle in ambient surface water
- Measure light intensity to control for shade effects on clear chambers



Supporting Surface Water and Sediment Collections

- Filtered SW samples upstream and downstream of BFC sampling location once during sampling week (for substrate comparison and variability study)
 - Samples collected in duplicate before and after BFC deployment
 - Surface water samples will be analyzed for THg and MeHg, TSS, DOC, SUVA, Fe, Mn
 - Collect samples at bridges or Eco Study locations (e.g., RRM 3.0 and RRM 4.2)
- Surficial sediment sample from study location after BFC deployment
 - Sediment samples will be analyzed for THg, MeHg, LOI