

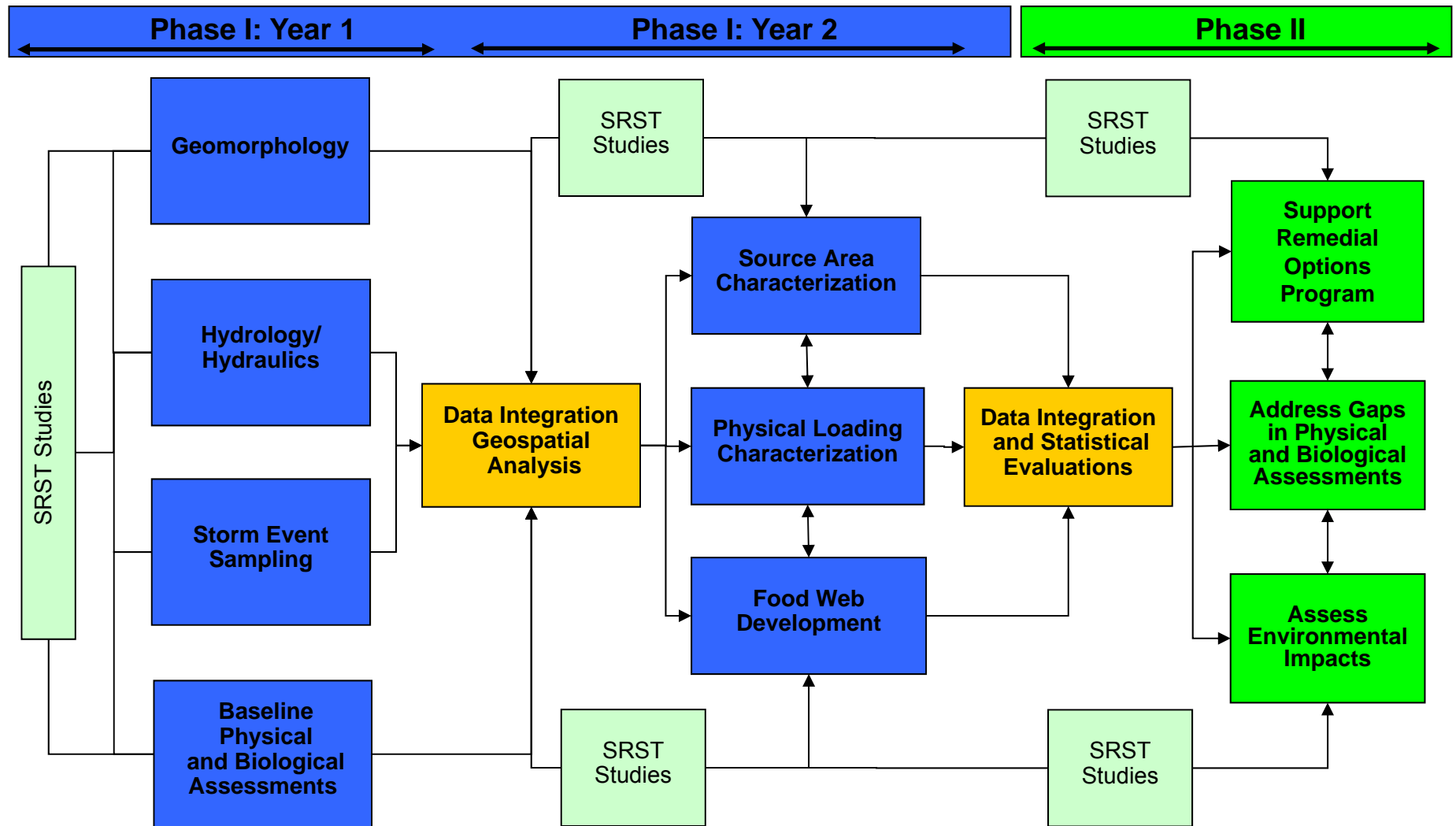


# Ecological Study Phase II Progress

Waynesboro, VA Meeting; July 21, 2009

**URS**

# Overview: Ecological Study



# Phase II Study Plan Elements for 2009

1. Physical and Biological Loading Mechanisms
2. Preparation for Sediment Effects Study (Triad) in 2010
3. Phase II Baseline Monitoring for Surface Water and Tissue

# Biological Studies: Asian Clams

## Objective

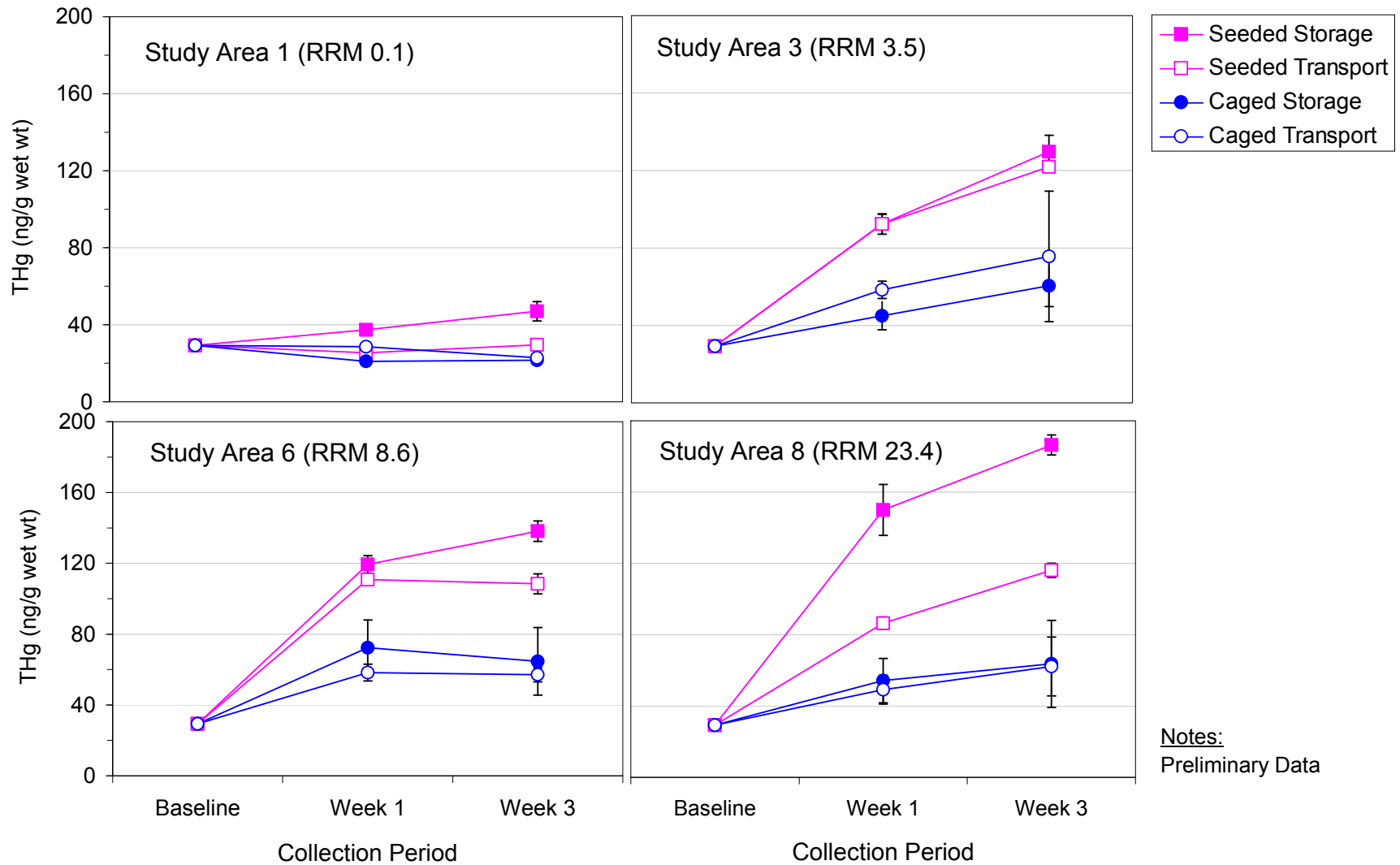
- Evaluate caged and seeded clams to determine uptake rates for two feeding guilds (filter feeding and filter / pedal feeding):

## Methods

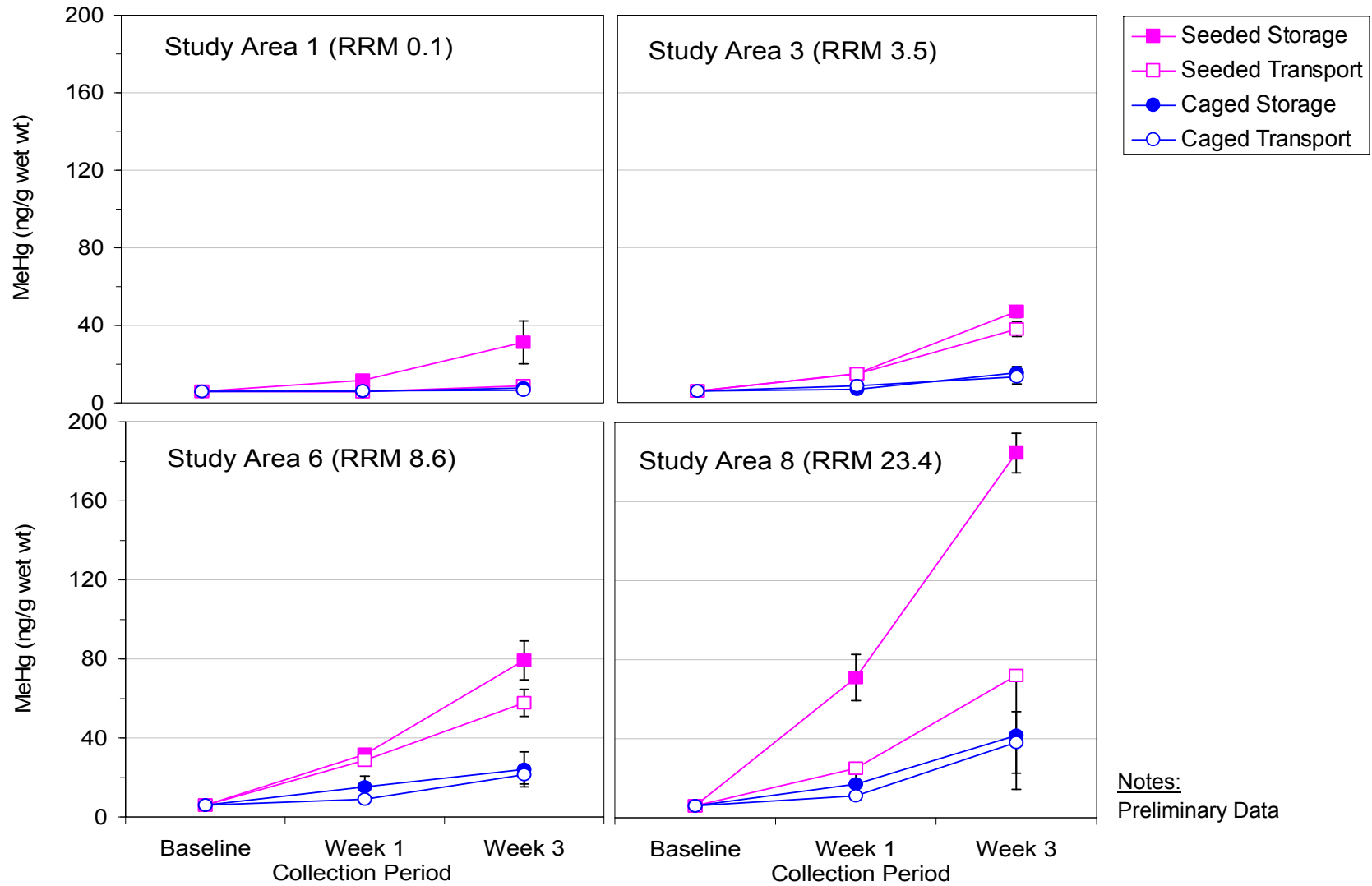
- Co-locate caged and seeded clams at 6 sampling stations within each Phase II study area; 3 stations in hydraulic storage zones and 3 stations in hydraulic transport zones
- Harvest 3 replicate composite samples at 1, 3, and 5 weeks following transplant for THg and MeHg analyses



# Average Total Mercury (THg) Uptake in Asian Clams - Weeks 1 and 3

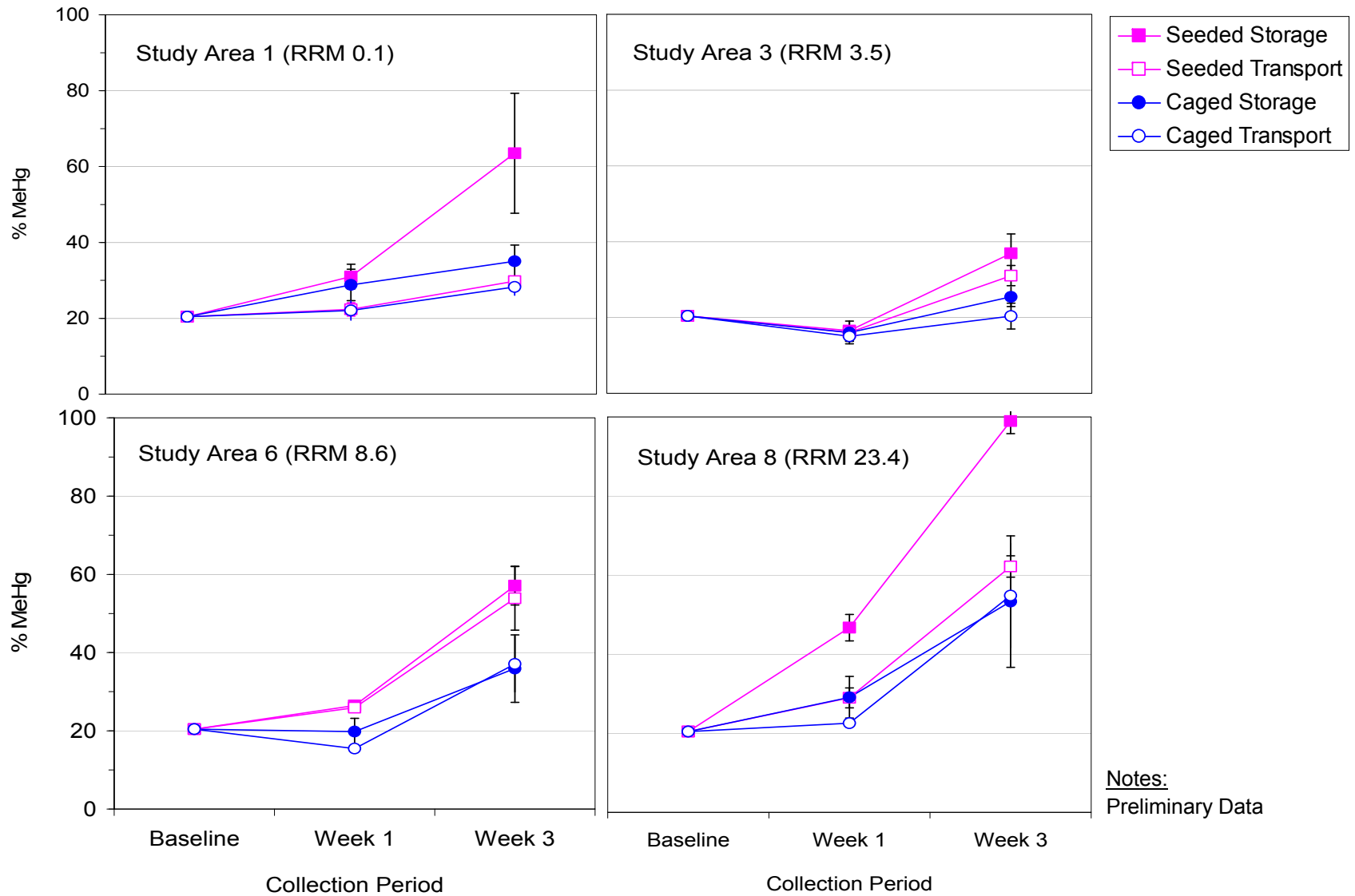


# Average Methylmercury (MeHg) Uptake in Asian Clams - Weeks 1 and 3

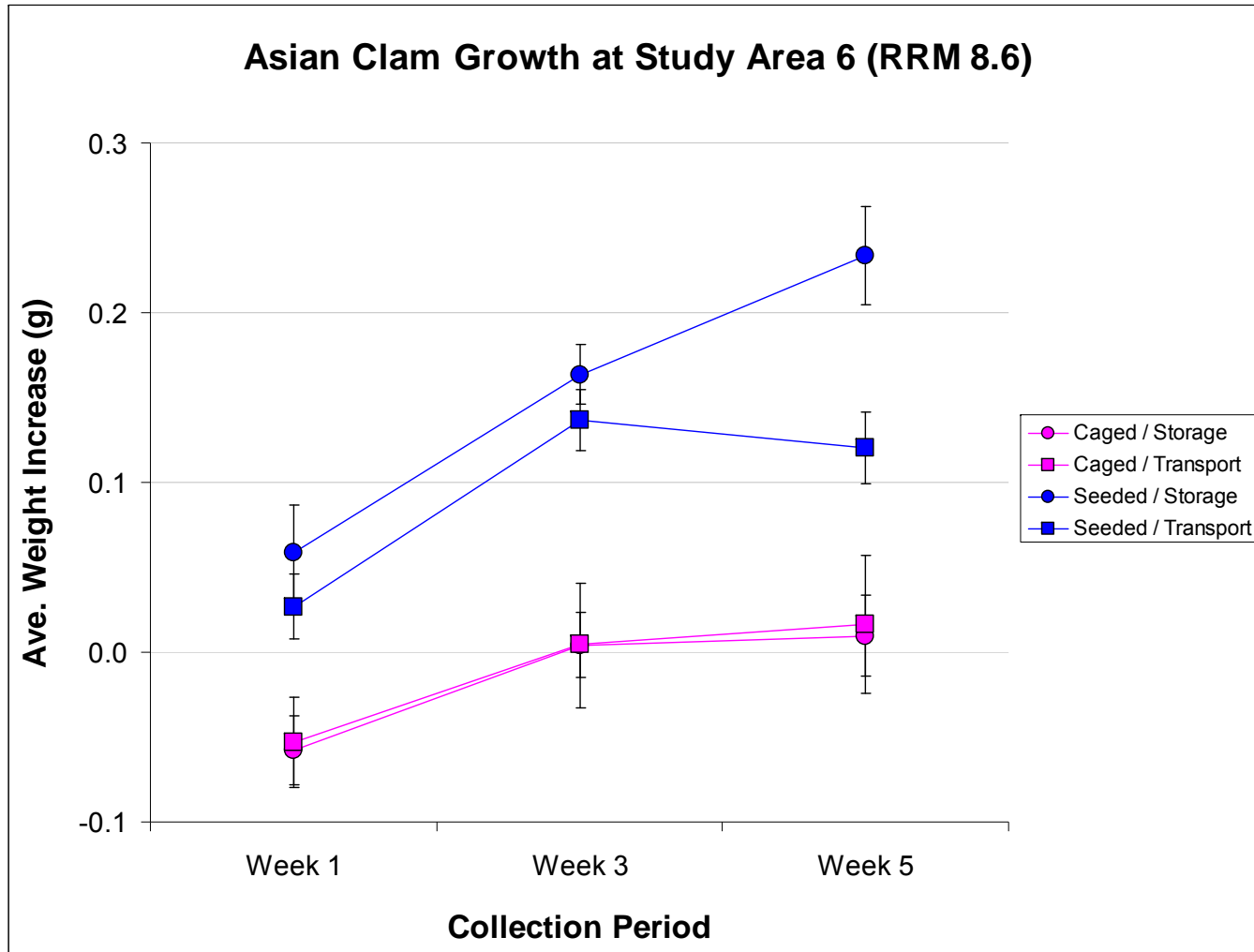


Notes:  
Preliminary Data

# Average % MeHg in Asian Clams - Weeks 1 and 3



# Differences Between Caged and Seeded Clams





# Summary and Next Steps

- Through Week 3, clams show localized differences in MeHg concentrations between feeding groupings, within stations and between stations along the river
- Seeded clams appear to grow better and accumulate more Hg in sediments
- Clams have higher % MeHg in tissue with increasing distance downriver
- Second study underway
  - additional data for caged clams at a reference area (evaluate growth)
  - moved seeded and caged clams in transport area at Study Area 6

# Biological Studies: Aquatic Insects

## Objective

- Evaluate THg, MeHg, and stable isotopes in larvae and adult aquatic insects important in aquatic and terrestrial food webs of the South River

## Target Insect Taxa

- Caddisfly (Hydropsychidae)
- Mayfly (Baetidae, Ephemerellidae, or Leptohyphidae)
- Midge (Chironomidae)

## Methods

- Collect using passive (e.g., Malaise trap) and active gear
- Sample Study Areas 3 (RRM 3.5) and 6 (RRM 8.6)
- VIMS to sample near Study Area 8 (RRM 23.4) and Augusta Forestry Center (RRM 11.8)
- Collect 3 composite samples per taxa and life stage

### Hydropsychidae



### Baetidae



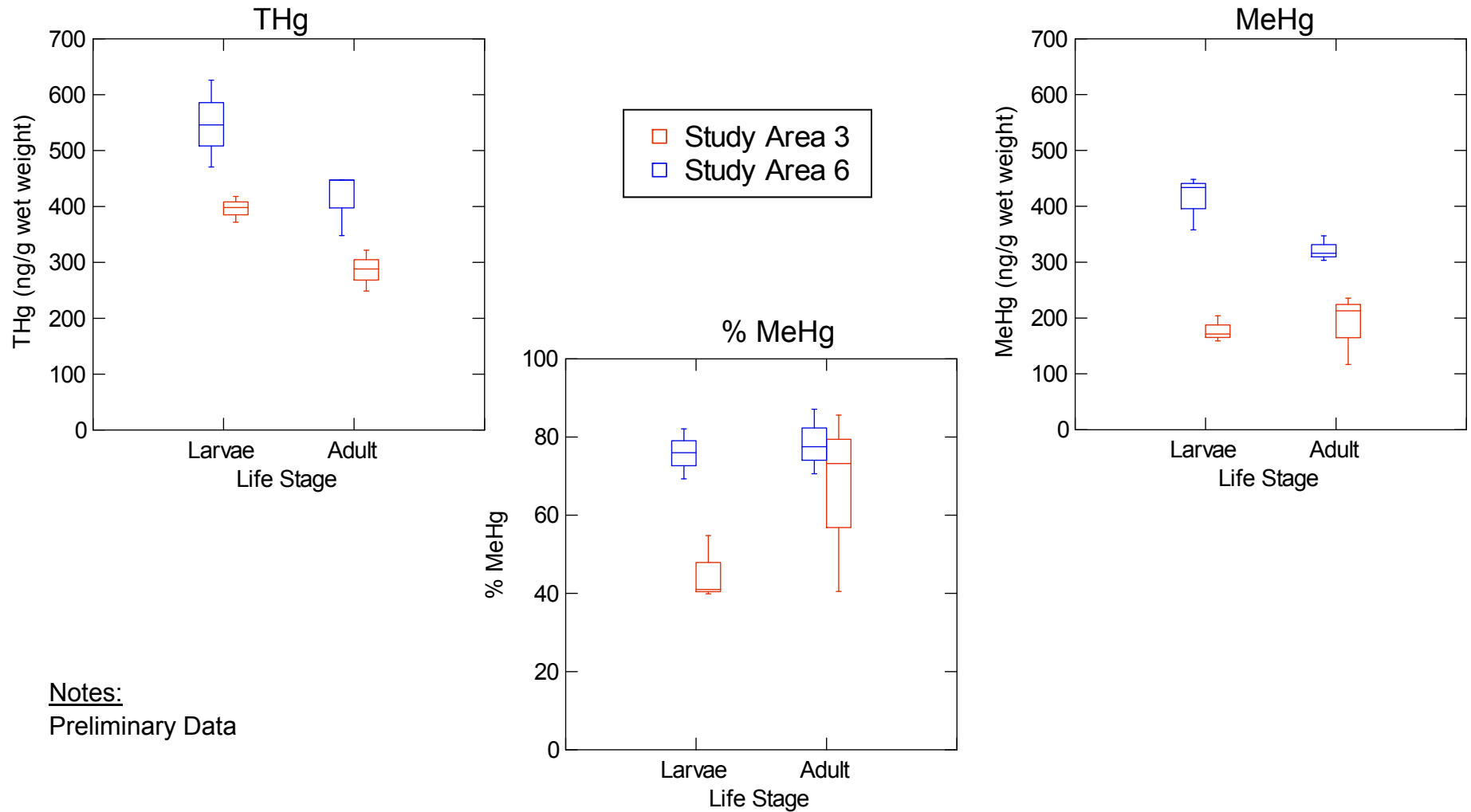
### Chironomidae



# Malaise Trap Deployments

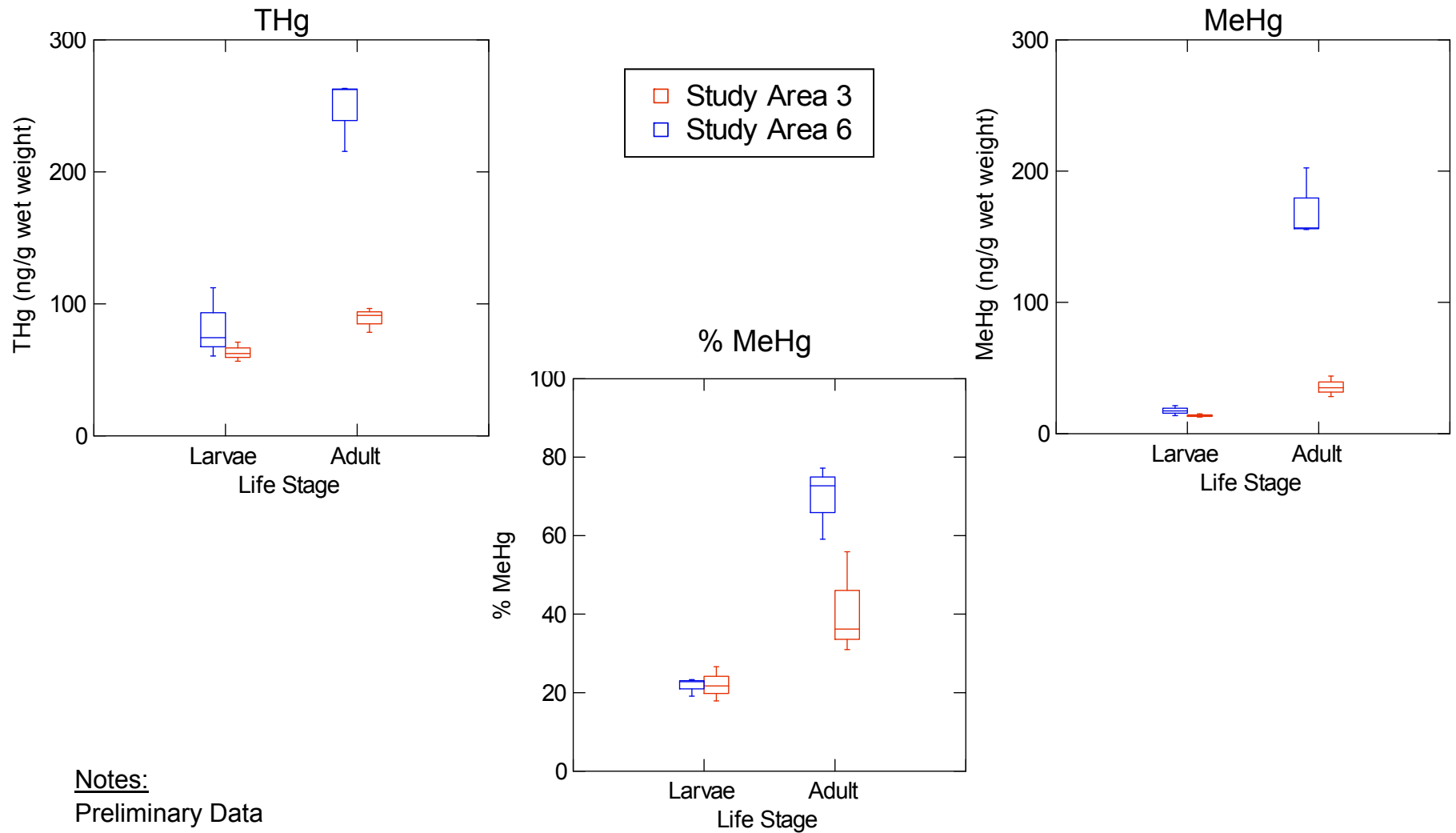


# Mercury Concentrations in Caddisfly (Hydropsychidae) Larvae and Adults



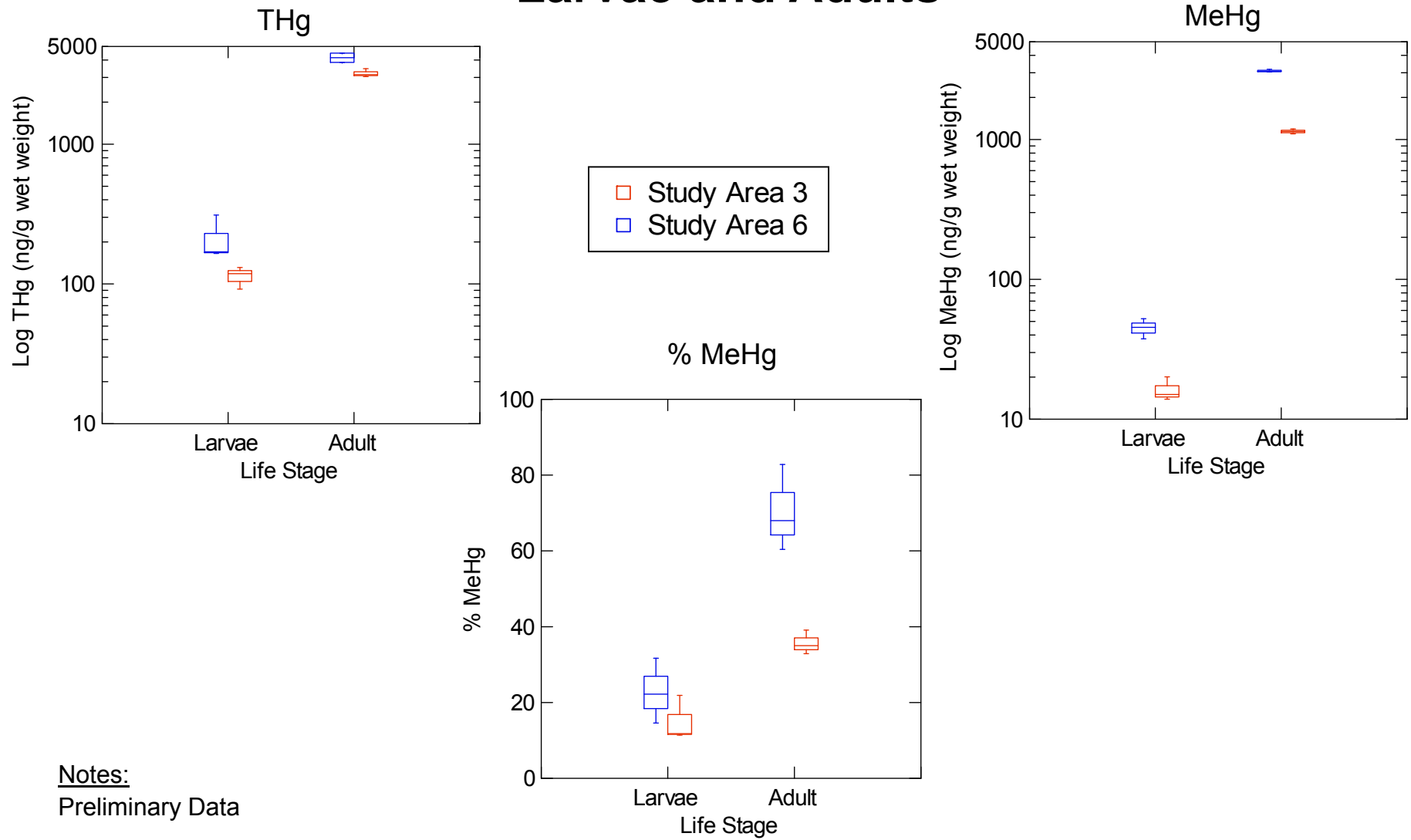
Notes:  
Preliminary Data

# Mercury Concentrations in Mayfly (*Baetis sp.*) Larvae and Adults



Notes:  
Preliminary Data

# Mercury Concentrations in Midge (Chironomidae) Larvae and Adults



# Summary and Next Steps for Insects

- Data show differences in MeHg body burdens for larvae and adult insects
- Coordinating with VIMS to evaluate data at two additional stations and collect second set of data along the river in August

# Biological Monitoring of THg in Bass Tissue

## Objective

Track and evaluate seasonal, inter-annual, and size / age related changes in THg concentrations in the muscle tissue of smallmouth and largemouth bass

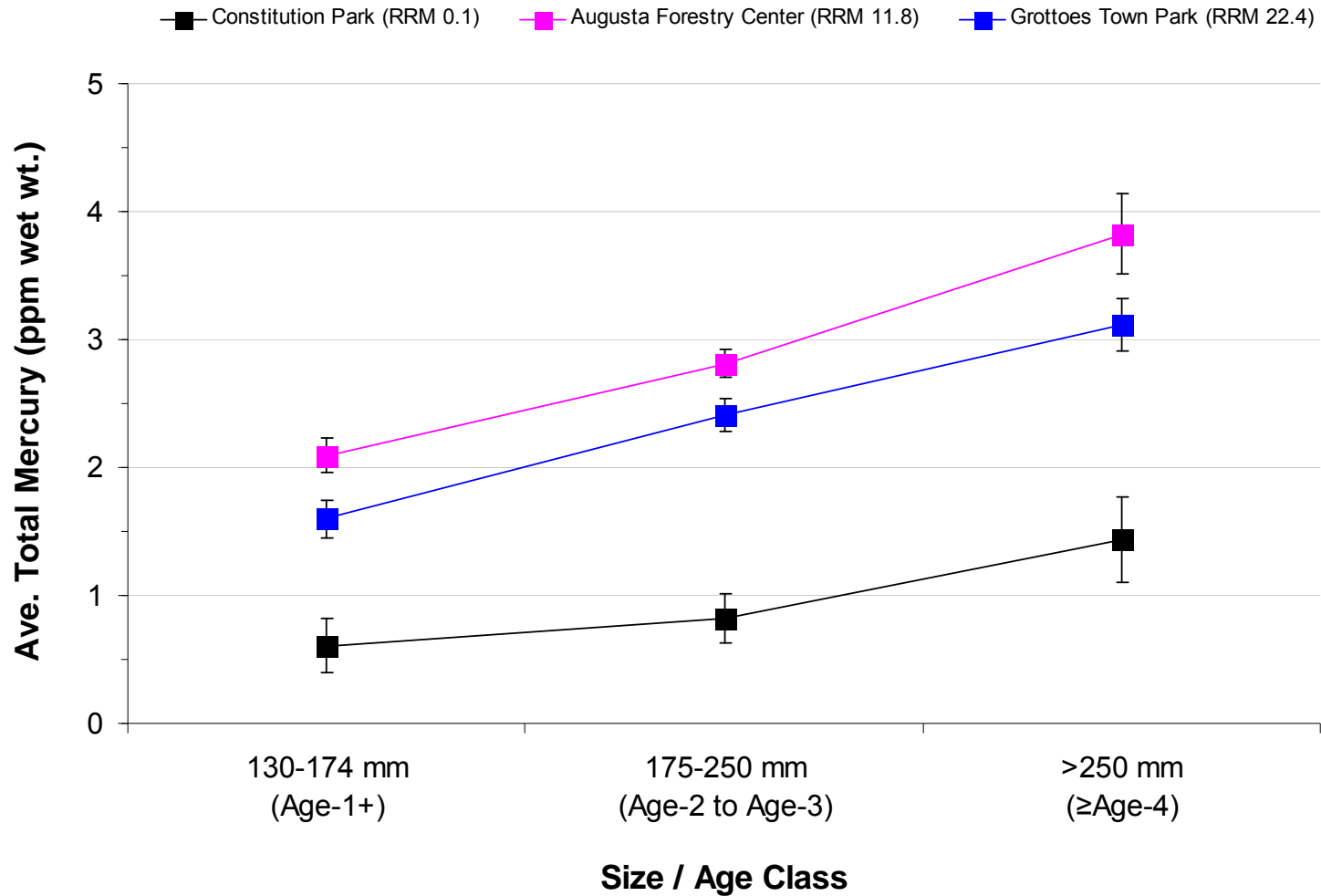
## Progress

- Biopsy punch field test successful
- 146 bass sampled in May:
  - 36 at Constitution Park (RRM 0.1), 32 at Augusta Forestry Center (RRM 11.8), and 78 at Grottoes Town Park (RRM 19.5)
- Fish were measured, weighed and PIT tagged; scales were collected for aging
- Mid-dorsal biopsy punch collected from each individual and submitted for THg analysis





## Total Mercury (THg) Concentrations in Bass Muscle Tissue - May 2009



Notes:

Ages presented are estimates

# Timeline of 2009 Field Work

Item	2009												2010		
	1 <sup>st</sup> Quarter			2 <sup>nd</sup> Quarter			3 <sup>rd</sup> Quarter			4 <sup>th</sup> Quarter			1 <sup>st</sup> Quarter		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Workplan Development	█	█													
Study Preparations															
Preliminary Study Site Selection		█													
Field Habitat Survey		█													
Soil and Sediment Characterization		█													
Final Phase II Study Area Selection			█	█											
Physical and Biological Loading Study					█	█	█	█	█	█	█				
Data Evaluation										█	█	█			
Baseline Monitoring															
Surface Water		█			█			█			█			█	
Bass Tissue					█					█					
Triad Study Planning											█	█			

# Ecological Study Path Forward

- Continue with 2009 field work
- Meeting with NRDC on Wednesday and Thursday to discuss 2009 progress
- Next meeting in December 2009 in FL