

SAP MEETING 2012

KC Filippino & Margie Mulholland
Richmond, VA November 2, 2012

Subtasks addressed

- ▣ Subtask 1.2 – Chl *a*, diagnostic pigments and the occurrence of harmful algae in Lower James River: “Diagnostic pigments as a means of tracking the distribution of algal functional groups within the James River”
- ▣ Subtasks 1.1 & 1.3 – Expand monitoring network, Determine environmental factors favoring algal blooms in Lower James River: “Environmental factors promoting algal blooms in the Lower James River estuary”
 - Establishing Chl:C relationships for the James river
- ▣ Subtask 1.2 – Determine environmental factors favoring algal blooms for entire James River: “Nutrient uptake and regeneration as a means of initiating and sustaining algal blooms in the James River estuary”

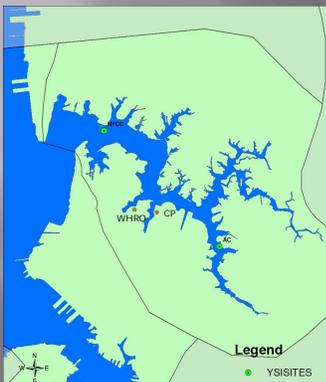
Progress to date: Diagnostic pigments as a means of tracking the distribution of algal functional groups within the James River

- ▣ 116 samples run out of 585 from 2011 sampling
- ▣ Issues resolved with HPLC and data analysis, sample processing has resumed
 - Running now nearly continuously
- ▣ 800 pigment samples collected in 2012
- ▣ 390 samples for PC/PN to establish Chl:C relationship

Progress to date: Environmental factors promoting algal blooms in the Lower James River estuary

- ▣ Weekly mapping and monitoring for Chl *a* occurring from Feb. 15 – Oct. 15 (HRSD-DATAFLOW), PN/PC collected for chl:C comparisons (390 samples)
- ▣ Grab samples taken at specific locations before, during, and after bloom
 - Analysis of nutrients, ¹⁵N uptake experiments, primary productivity rates, PN/PC, chl *a*, DIC underway
- ▣ Nutrients and stratification measured before and after major storm events (> 0.5 in)

Monitoring sites in the Lafayette



- **Continuous monitoring (COMMON), Lafayette River:**
 - 2 YSI sites – Ashland Circle (AC) and Norfolk Yacht and Country Club (NYCC)
 - YSI monitors temperature, salinity, and depth (3/12 – 10/12)
- **Storm monitoring, Lafayette River:**
 - 4 storm sites –
 - 2 ISCO samplers at AC and NYCC - in river water during rain events, and
 - 2 ISCO samplers at Colonial Place (CP) WHRO/ODU (WHRO) collecting stormwater run-off (summer 2012)

Monitoring sites in the Lafayette



Monitoring sites – samples collected and run to date

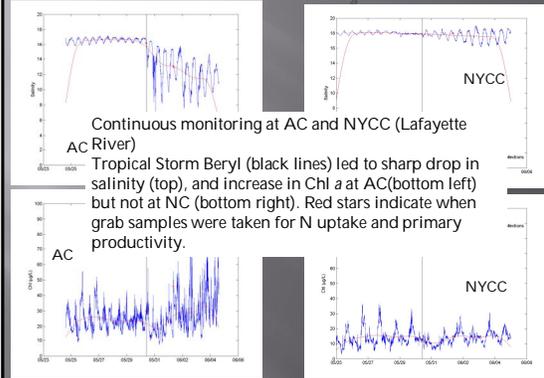
Nutrients run to date

	AC	NYCC	CP	WHRO
Total	129	123	7	9
NH ₄ ⁺ run	21	17	1	1
NO ₃ ⁻ +NO ₂ ⁻ run	51	49	3	3
PO ₄ ³⁻ run	51	49	3	3
TDN run	17	16	2	1

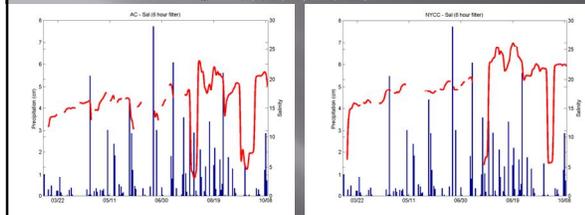
* First storm event collected for season showed high N and P concentrations from storm drains

		NH ₄ ⁺ (µM)		NO ₃ ⁻ +NO ₂ ⁻ (µM)		PO ₄ ³⁻ (µM)	
		Ave.	SD	Ave.	SD	Ave.	SD
CP	7/9/2012	63.485	0.643	70.553	0.284	15.401	0.028
WHRO	7/9/2012	45.807	0.001	40.023	0.260	2.768	0.006

TD Beryl

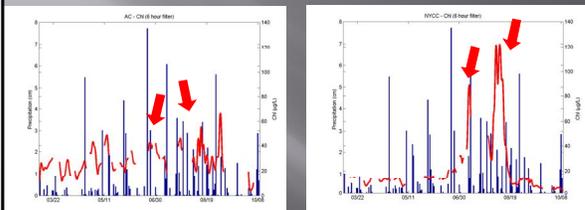


YSI data series



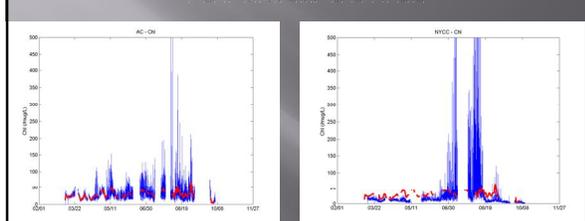
- Salinity drops correspond to precipitation events in Lafayette River
- Similar drops observed at AC (up river) and NYCC (mouth)

YSI data series

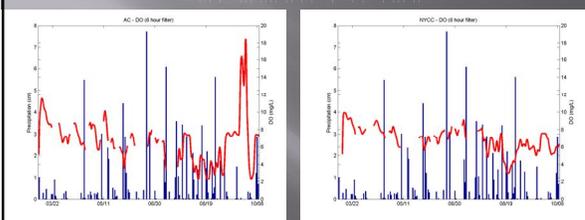


- *Cochlodinium* bloom first noticed in Lafayette at the end of June, preceded by rain event
- Bloom later observed at NYCC in July, persisting through August

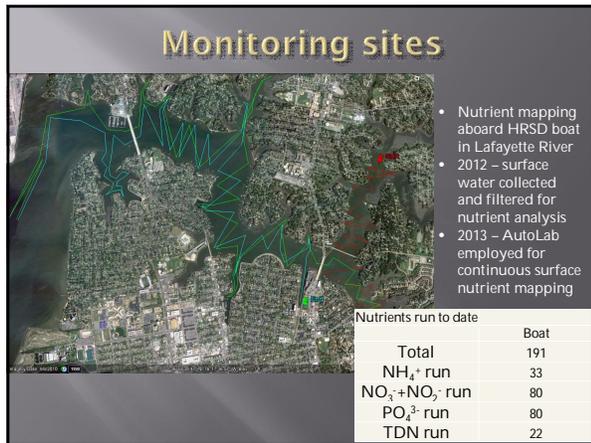
YSI data series



YSI data series

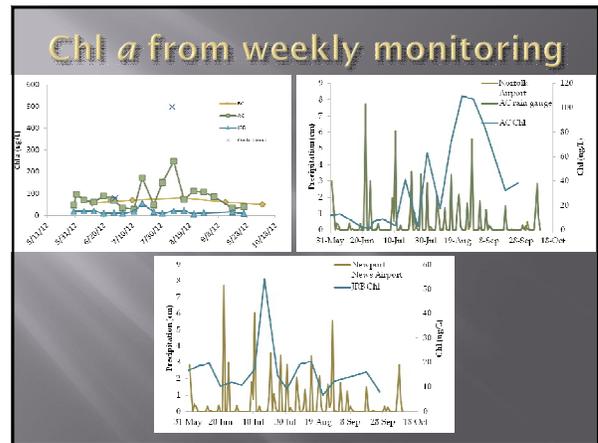
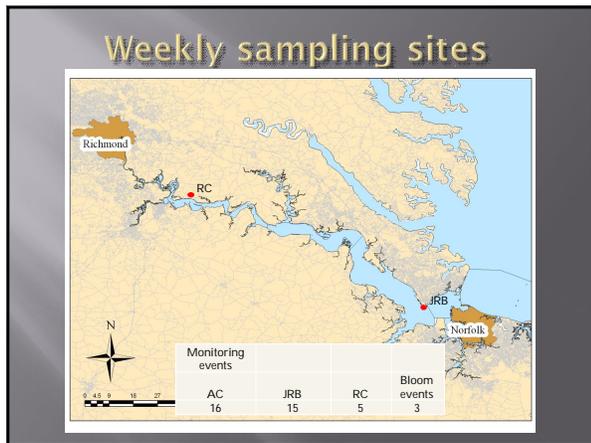


- DO fluctuates most at AC, lowest DO observed during *Cochlodinium* bloom



Progress to date: Nutrient regeneration as a means of initiating and sustaining algal blooms in the James River estuary

- Monthly sampling at Rice Center and weekly sampling off James River Pier and AC from May through October
 - ¹⁵N uptake experiments also measuring NH₄⁺ and urea regeneration
 - Analysis still ongoing



Summary

- Sample analysis still ongoing – nutrients, PN/PC, pigments, stable isotope experiments
- Observed relationships between precipitation, increased nutrients from storm water, increased Chl a, and drop in DO
- Constraining and mapping values will prove valuable for modelers
- 2013 field season will be modified accordingly

