



Mystic River/Alewife Brook MWRA Monitoring Update

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MWRA water quality updates for 2011

- MWRA Long Term CSO Control Plan
Status in Alewife and Upper Mystic
- Bacterial indicators
Developments in Alewife vs. Mystic
- Nitrogen and Phosphorus
in Mystic (and Charles)

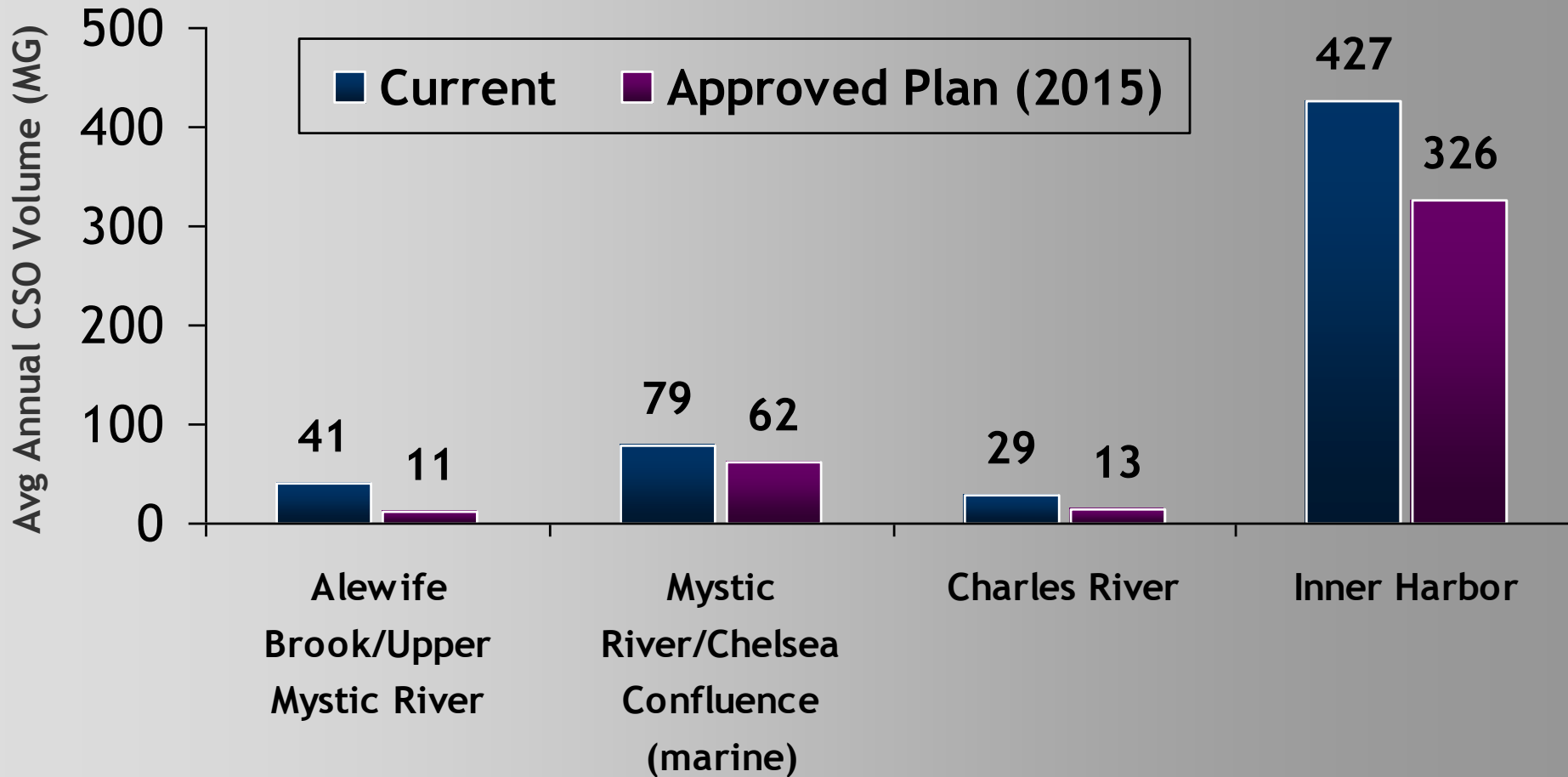


Long Term CSO Plan Alewife/Upper Mystic Update

- Projects in Alewife were delayed by citizens' appeal; now resolved
- Cambridge projects resumed design in 2008. Three of five projects in Alewife Brook Sewer Separation Plan are complete or underway.
- Last of these projects to be complete by Dec 2015



Long Term CSO Plan Alewife/Upper Mystic Update





Long Term CSO Plan

Alewife/Upper Mystic Update

Region	2009 Total Volume	Outfall	2009 Activations
Alewife Brook	12.3 MG	CAM001	0
		CAM002	6
		MWR003	0
		CAM004	7
		CAM400	6
		CAM401A	0
		SOM001A	18
		CAM401B	6
Upper Mystic	0.9 MG	SOM007A/MWR 205A	4
Downstream of dam	74.2 MG	MWR205	23



Long Term CSO Plan

Alewife/Upper Mystic Update

- Purpose is to greatly reduce discharges and impacts of CSOs to Alewife Brook, particularly activation frequency.
- Stormwater separation efforts will mean fewer backups in larger storms, and create capacity for additional sanitary flows from communities

Bacterial indicators in Alewife vs. Mystic



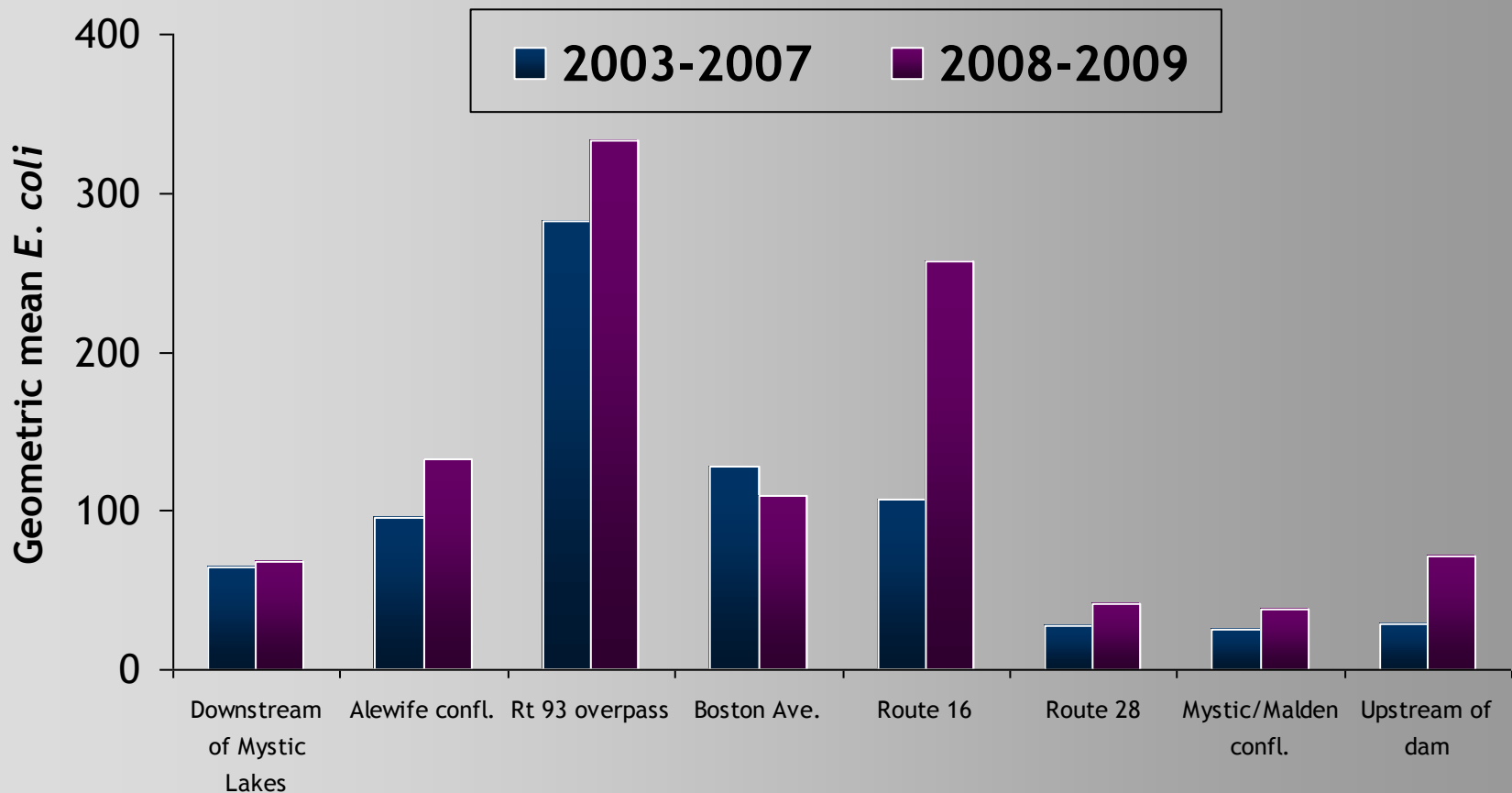
Bacterial indicators in Alewife vs. Mystic

- Method switch from membrane filtration to Colilert and Enterolert in mid-2007
- EPA-approved method, reduces processing time and human error
- Method comparisons showed slight differences from membrane filtration method for each indicator



Mystic *E. coli*

counts are slightly higher with Colilert method

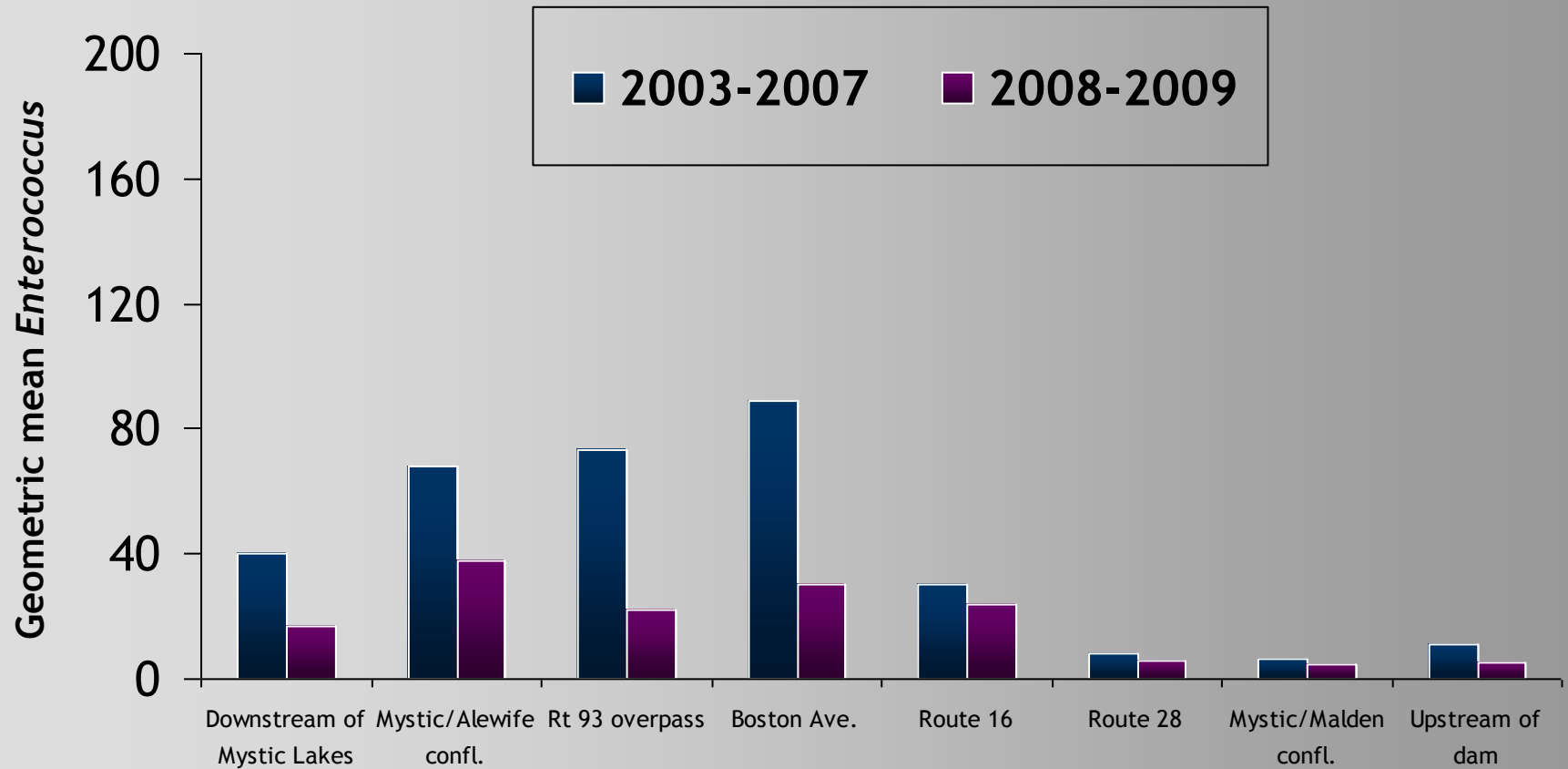


Upstream  Downstream



Mystic *Enterococcus*

counts are lower with Enterolert method

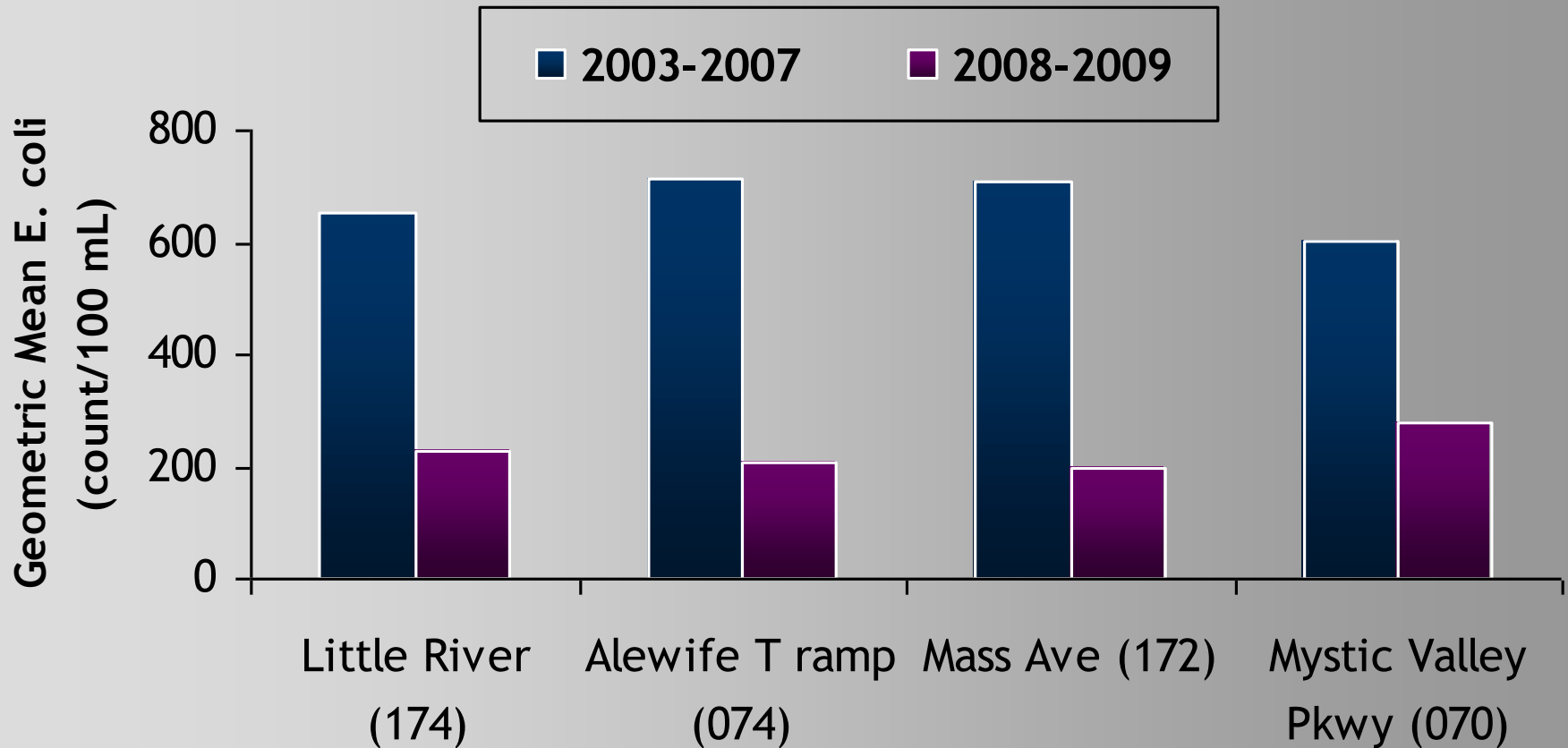


Upstream —————> Downstream



Alewife *E. coli*

counts are dramatically lower after 2007

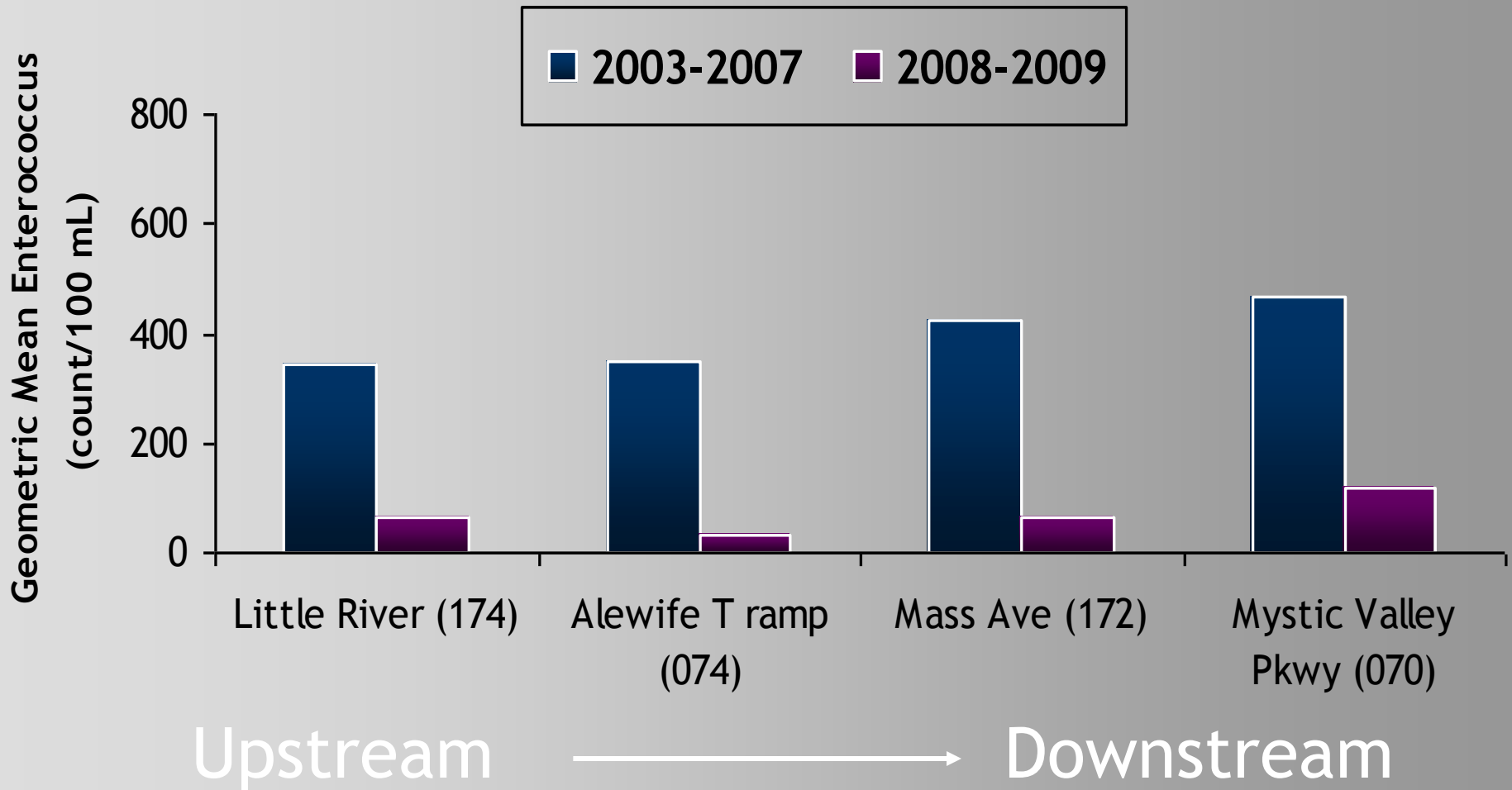


Upstream —————> Downstream



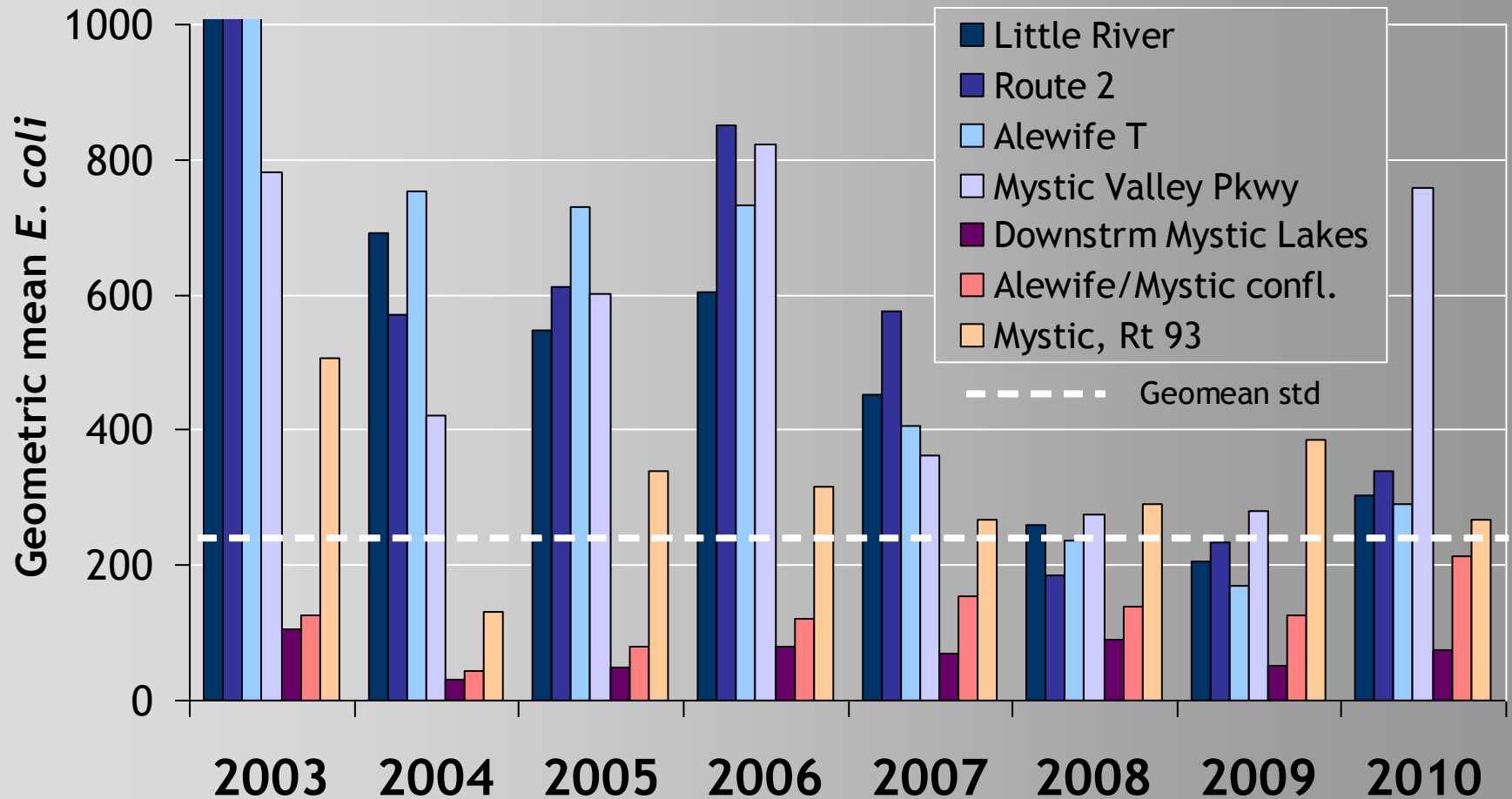
Alewife *Enterococcus*

counts are dramatically lower after 2007





Annual Geometric Mean *E. coli* in Alewife and Mystic





Bacterial indicators in Alewife and Mystic

- Unclear if change in the Alewife water quality is due to method switch, since other regions have not shown a corresponding change
- There may be an issue with analysis of extremely high bacteria concentrations with either method. MWRA has resumed comparison testing using old membrane filtration methods in late 2010 and 2011



Nitrogen and Phosphorus Mystic (and Charles)



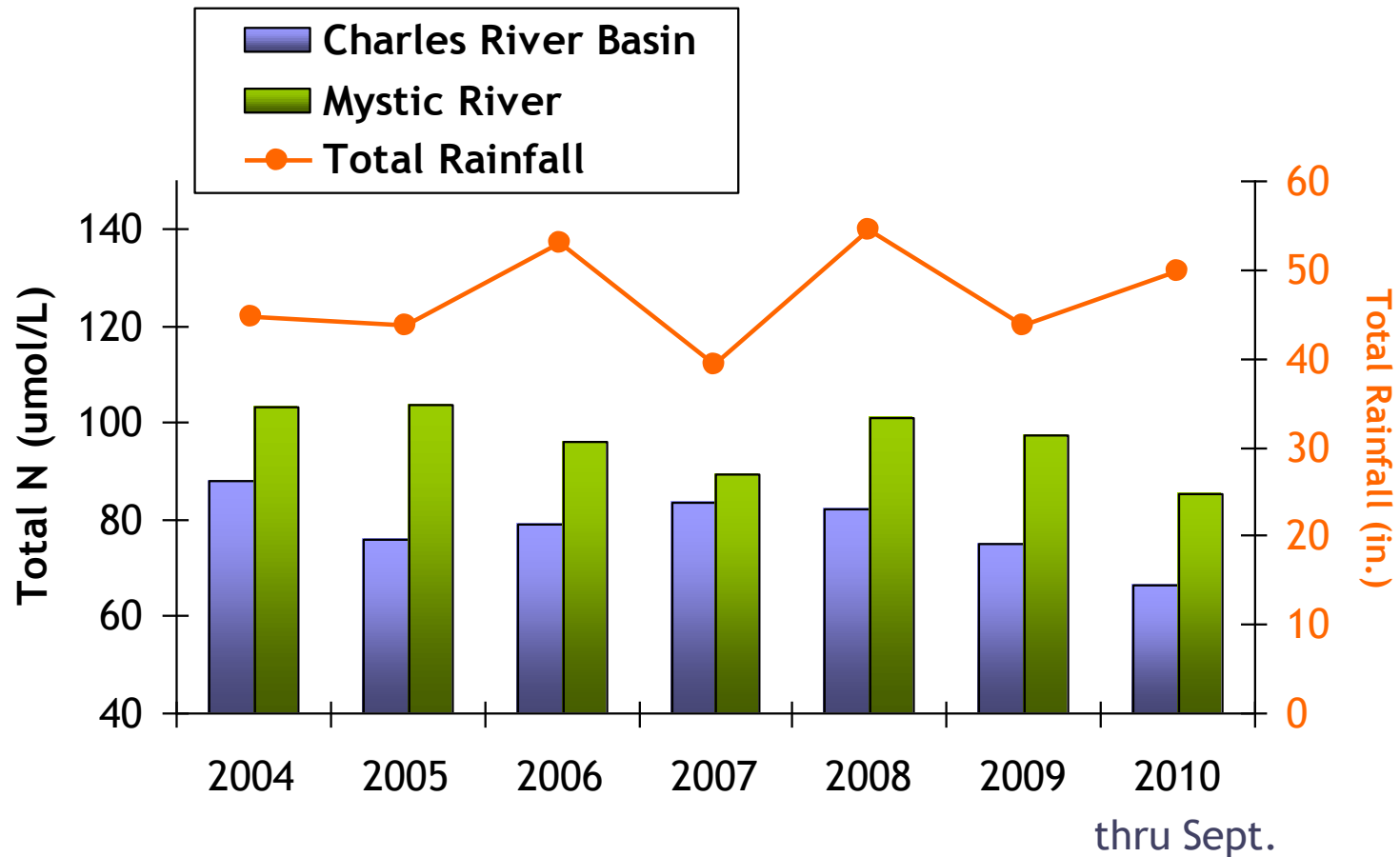
Nutrient Monitoring Mystic and Charles

- MWRA eutrophication monitoring ongoing since 1993.
- Samples collected at upstream and downstream regions every two weeks, year-round.
- Purpose of project to estimate nutrient loadings to harbor.



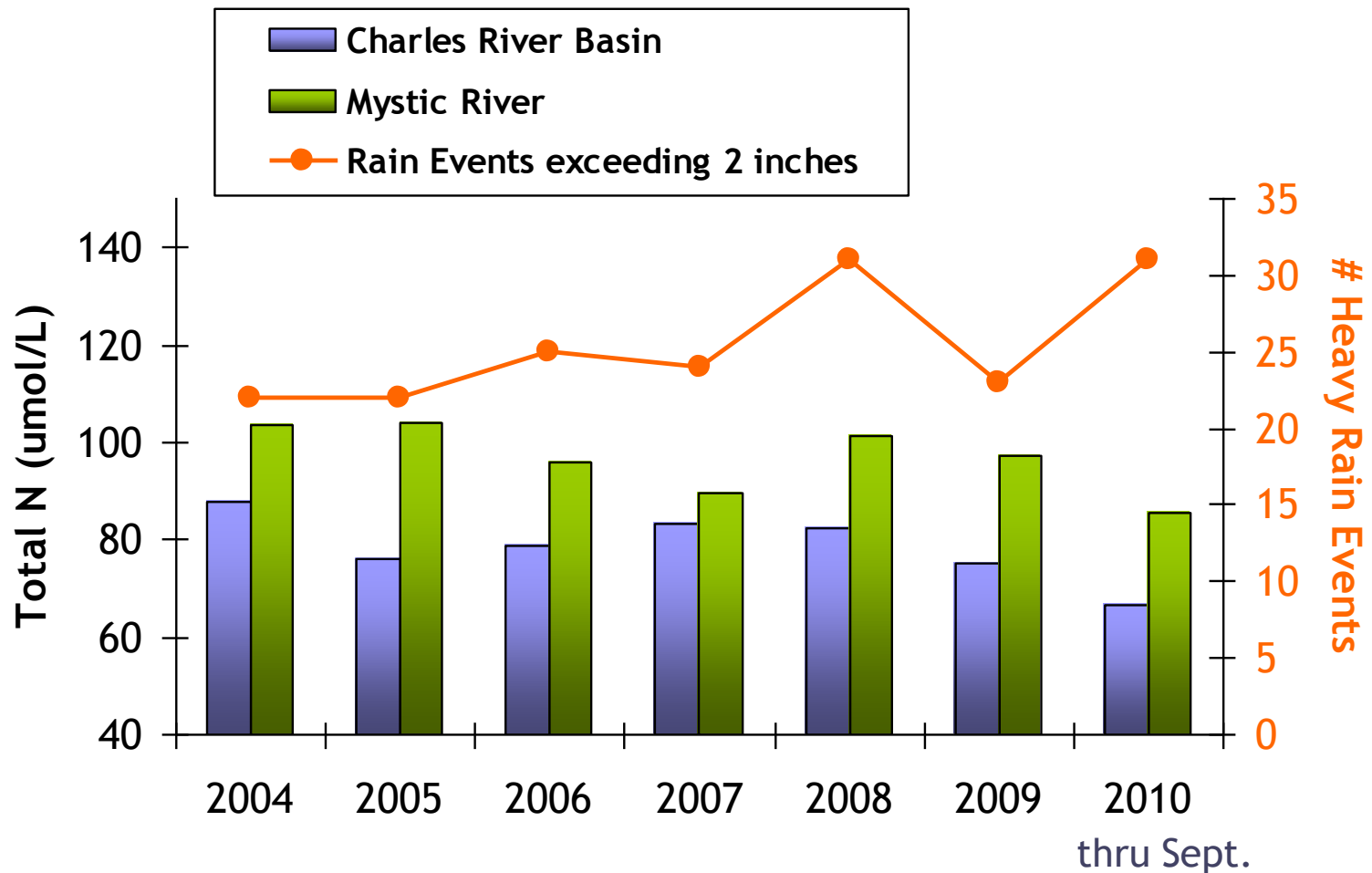


Total Nitrogen Mystic and Charles



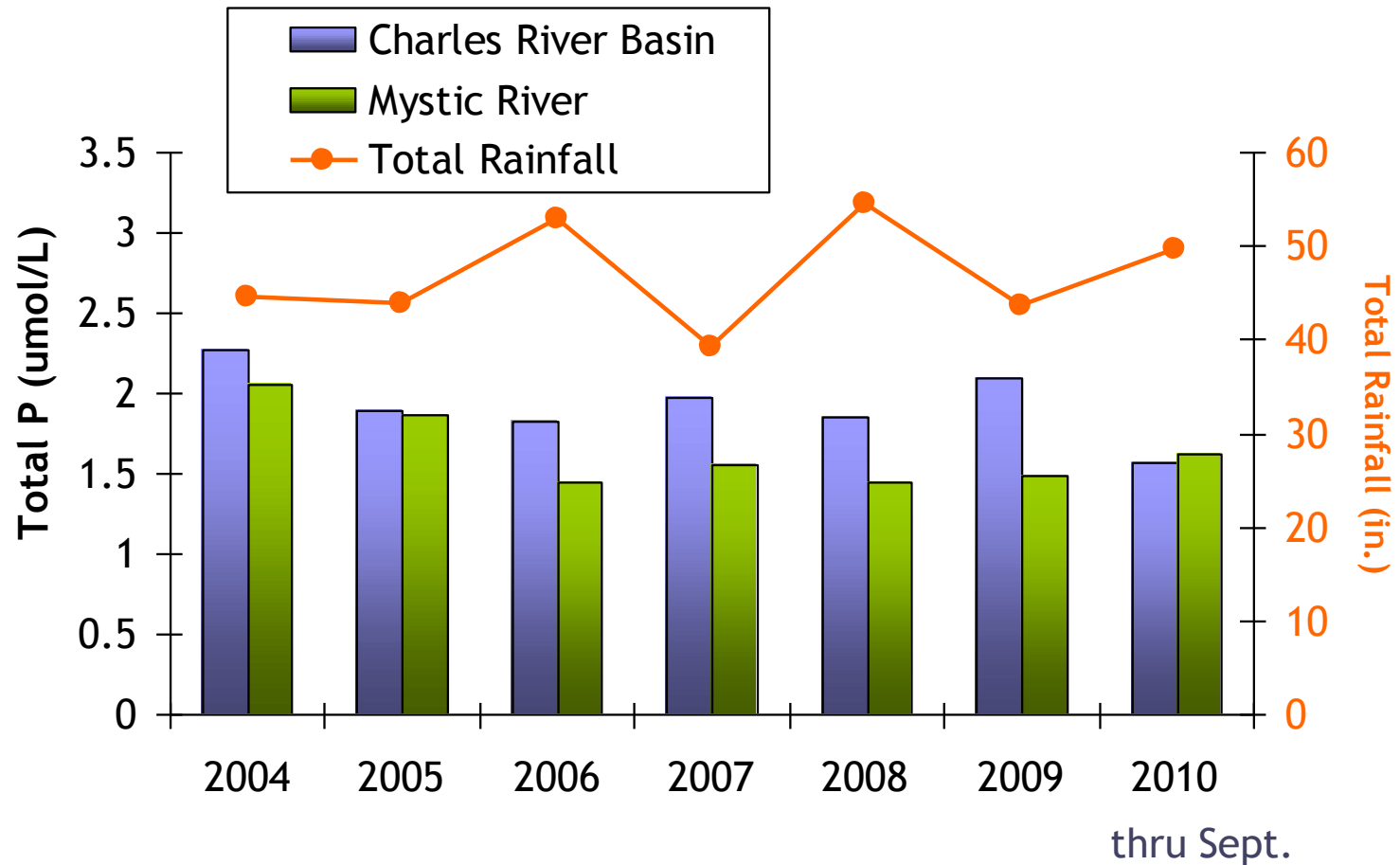


Total Nitrogen Mystic and Charles



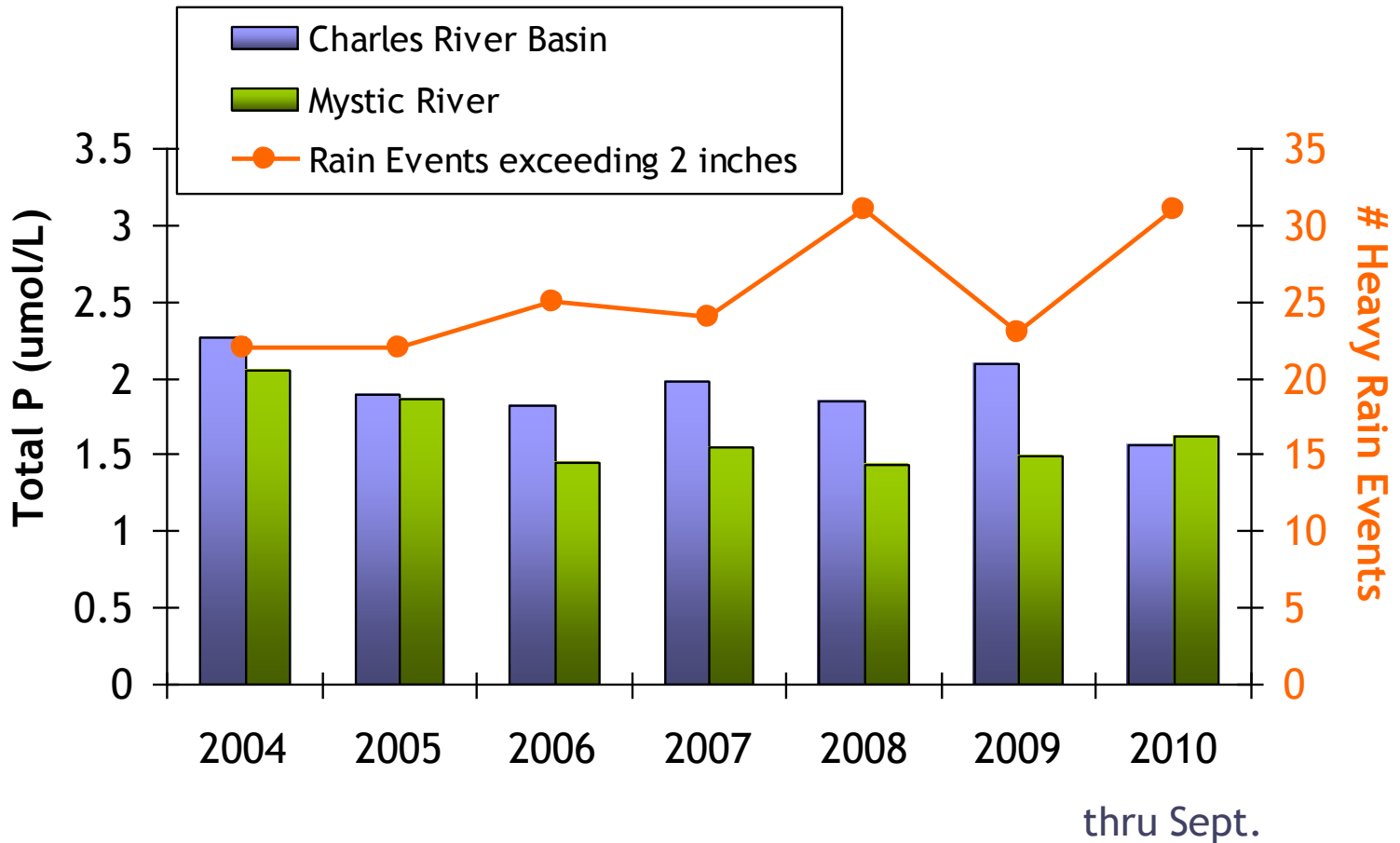


Total Phosphorus Mystic and Charles



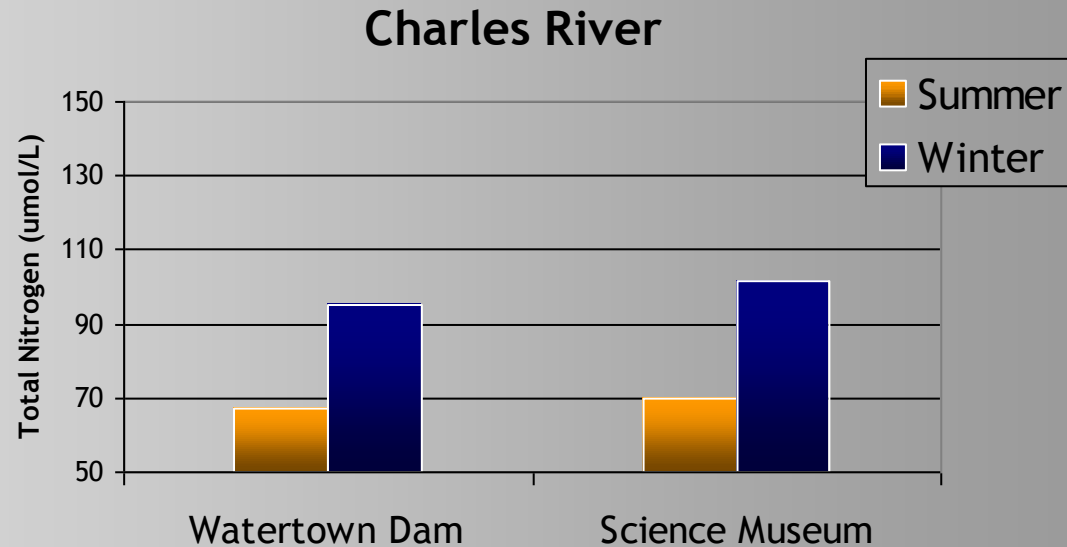
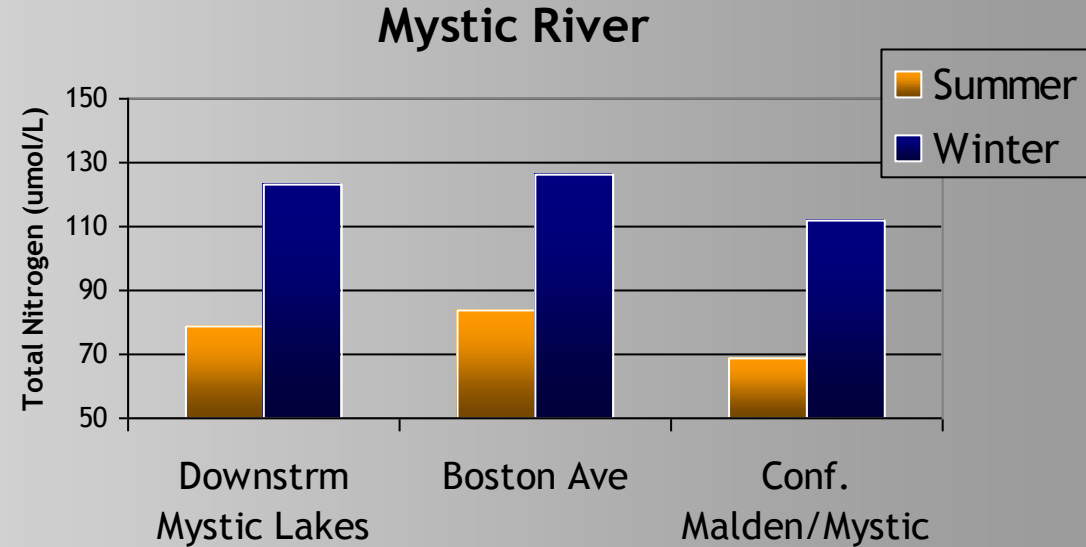


Total Phosphorus Mystic and Charles





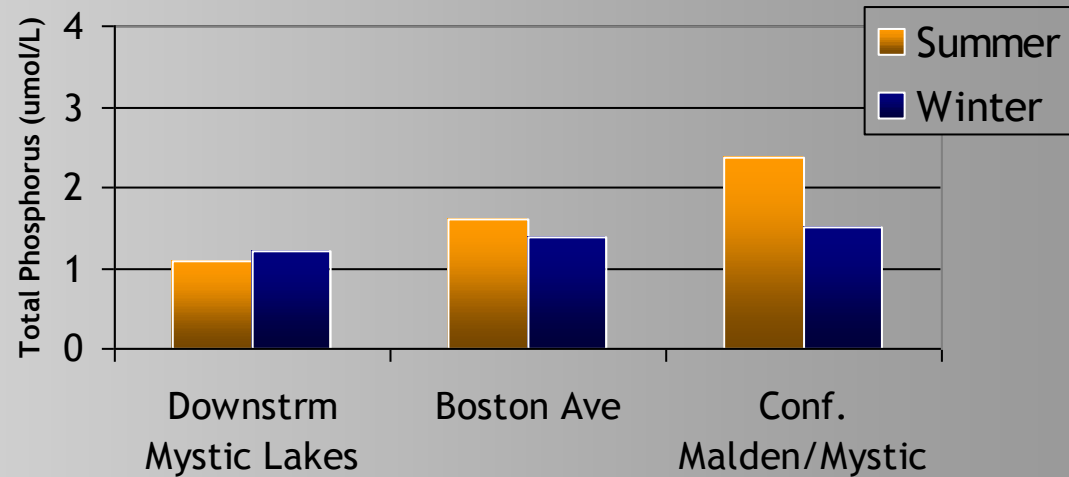
Mystic and
Charles
total
nitrogen,
upstream
and
downstream
locations
2007-2010



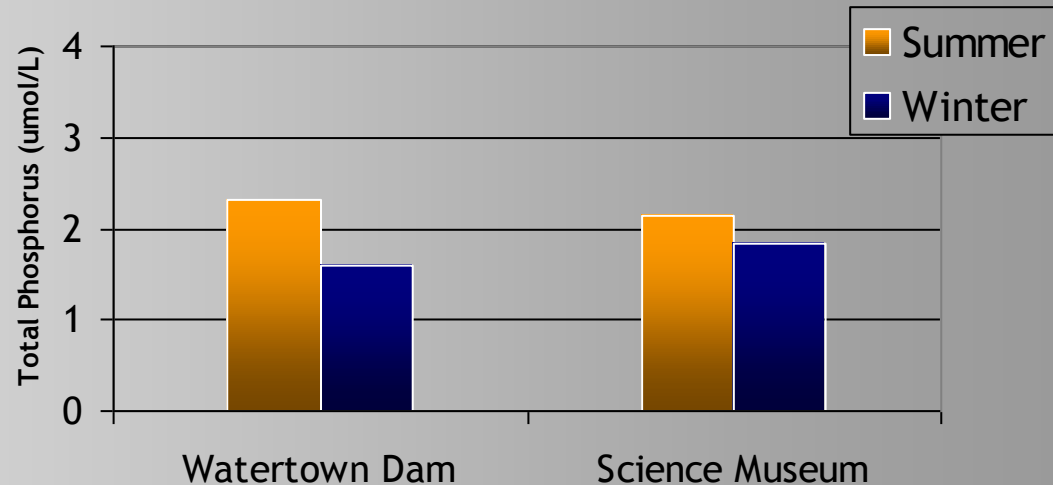


Mystic and Charles total phosphorus, upstream and downstream locations, 2007-2010

Mystic River

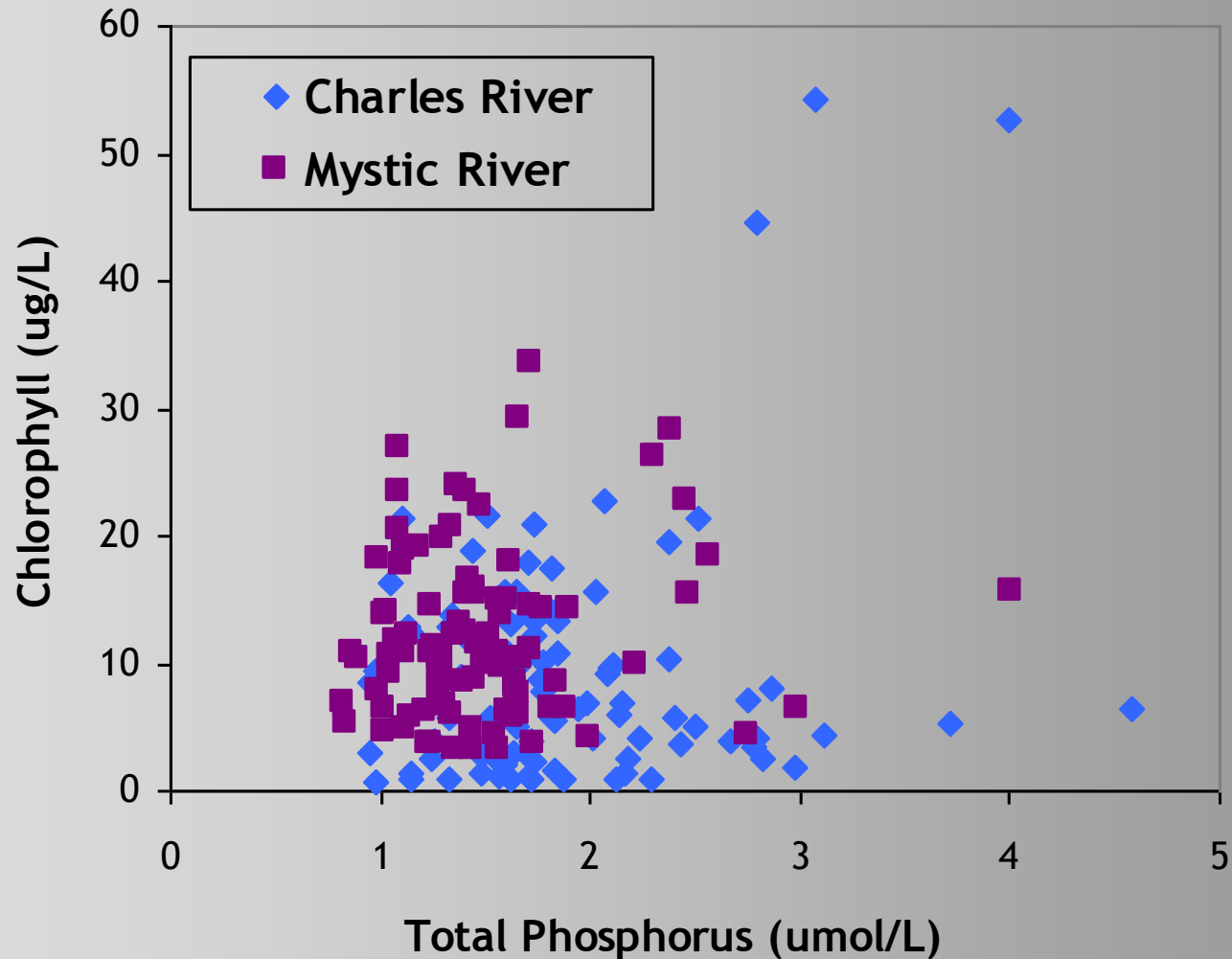


Charles River





Phosphorus and Chlorophyll Mystic and Charles





Mystic Nutrients

- Nitrogen concentrations in the *Mystic* are substantially higher than in the *Charles*
- Phosphorus concentrations are more elevated in the *Charles* than in the *Mystic*
- Relationship between phosphorus and chlorophyll is relatively poor in both rivers, however concentrations in both rivers are elevated and neither is likely to be phosphorus-limited.



Mystic Nutrients

- Nutrient loadings within the rivers cannot be inferred from concentrations alone; more information is needed to address unknowns
- Cannot assume that greater eutrophication is the result of higher nutrient loadings
- Factors include flushing rate of basin, physical structure of the water column, reservoir of nutrients in sediments (especially phosphorus), contributions from sub-watersheds and proportion of various inputs





Map of MWRA
sampling
locations in
Alewife Brook,
Mystic River
and Malden
River

