

# Hudson River PCBs Site Review of Phase 1 Implementation

**NYSDEC Observations and  
Recommendations  
February 2010**

# Overview of Presentation - 1

- Purpose of State's presentation – first, bring historical perspective to peer review process
- Provide insight on where the data gathered during 2009 fits in with the historical data set
- Show long term trends in water / fish PCB measurements

# Overview of Presentation - 2

- Second purpose of presentation – describe observations of work done during Phase 1
- In general, work went reasonably well
- Deficiencies in design and implementation noted which led to exceedances of standards

# Overview of presentation - 3

- Third purpose of presentation – Offer suggested changes to project design and implementation as well as to standards in order to improve project quality, better meet human health and environmental protection objectives in ROD, and better meet project standards

# 2009 in Historical Perspective

# 2009 in Historical Perspective

- History of PCB use at capacitor plants from 1947 to 1977; used “neat” as dielectric fluid
- Initially used aroclor 1254, transition to aroclor 1242, subsequent use of aroclor 1016
- Until 1977, untreated discharges to Hudson River containing PCB liquid
- Abatements in late 1970s which reduced releases from capacitor plant sites

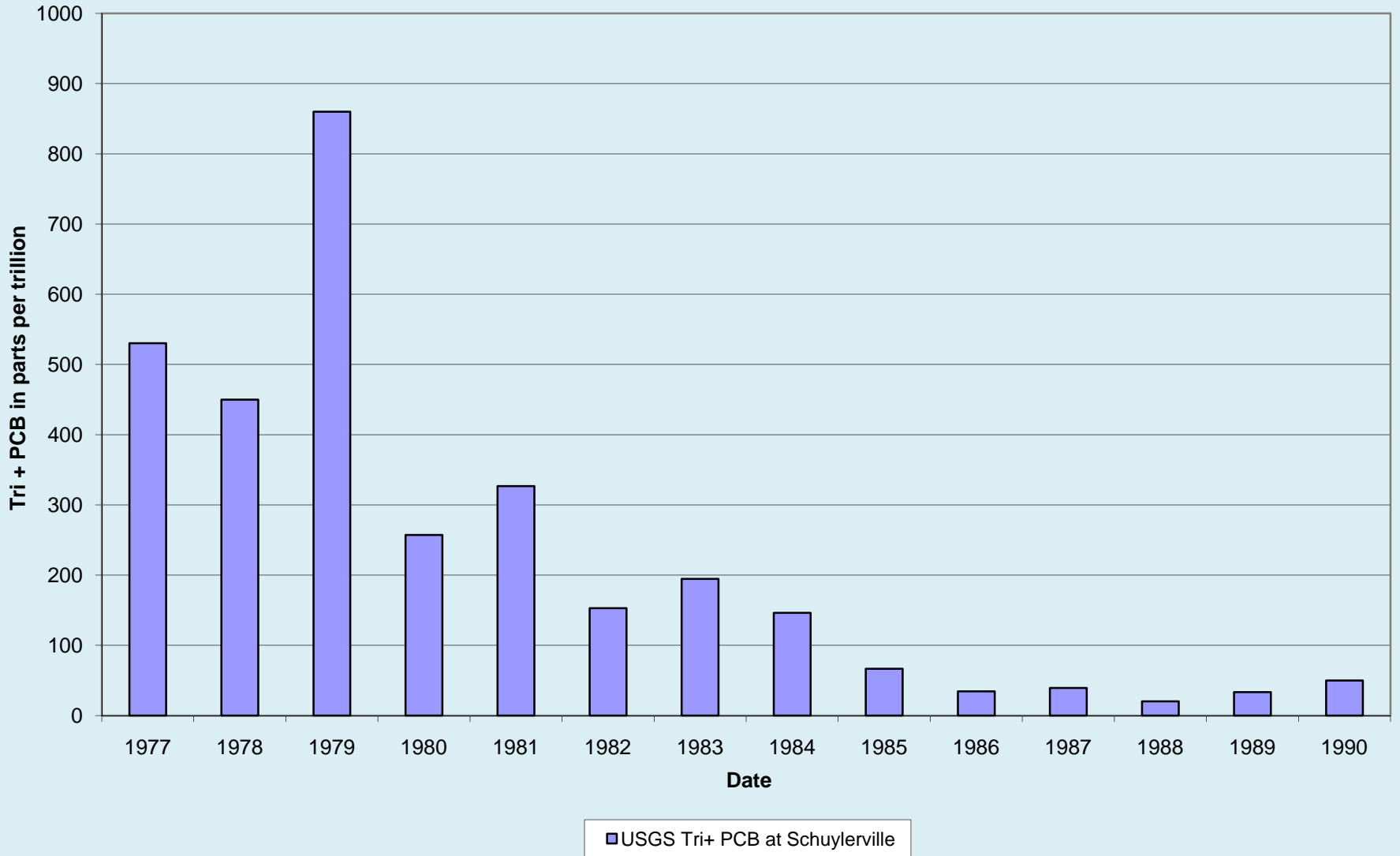
# 2009 in Historical Perspective

- 1973 removal of Fort Edward Dam immediately upstream of Rogers Island; allowed material upstream of dam to be mobilized and deposited in the channels around the island, on top of the sediments impacted by PCB releases between 1947 and 1973
- Much, but not all, of the material mobilized after the dam removal is dredged in 1970s by NYSDOT from the channels around Rogers Island

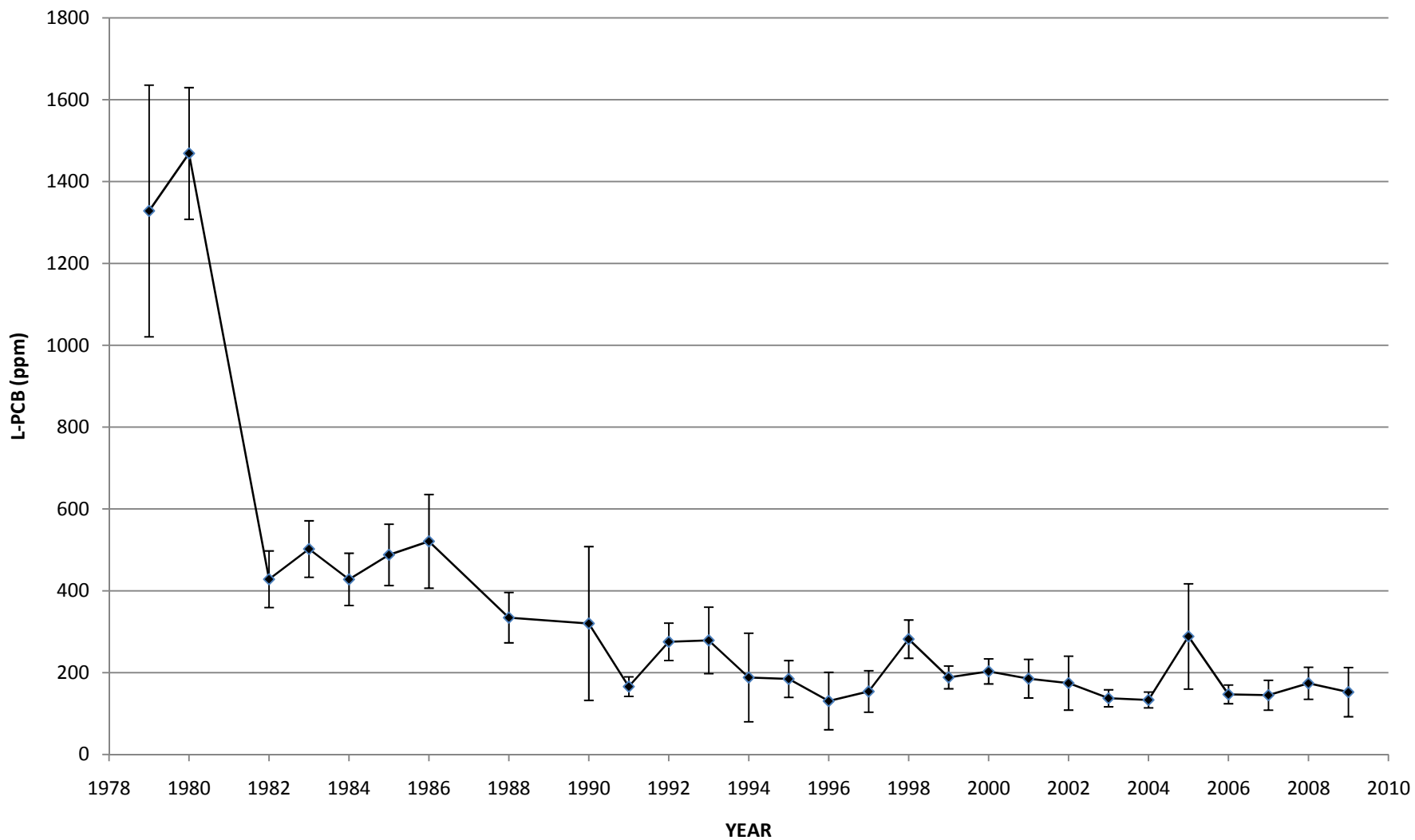
# 2009 in Historical Perspective

- Water column and fish flesh PCB showed declining concentration between the late 1970s and the mid 1980s; one basis for 1984 EPA interim “No Action” ROD
- Water column and fish flesh PCB trended toward stability by the late 1980s

Annual Average Surface Water Tri+ PCB at Schuylerville (USGS)



# Average Lipid Based PCB Spring Brown Bullhead in Stillwater Pool All Locations Combined (NYSDEC)



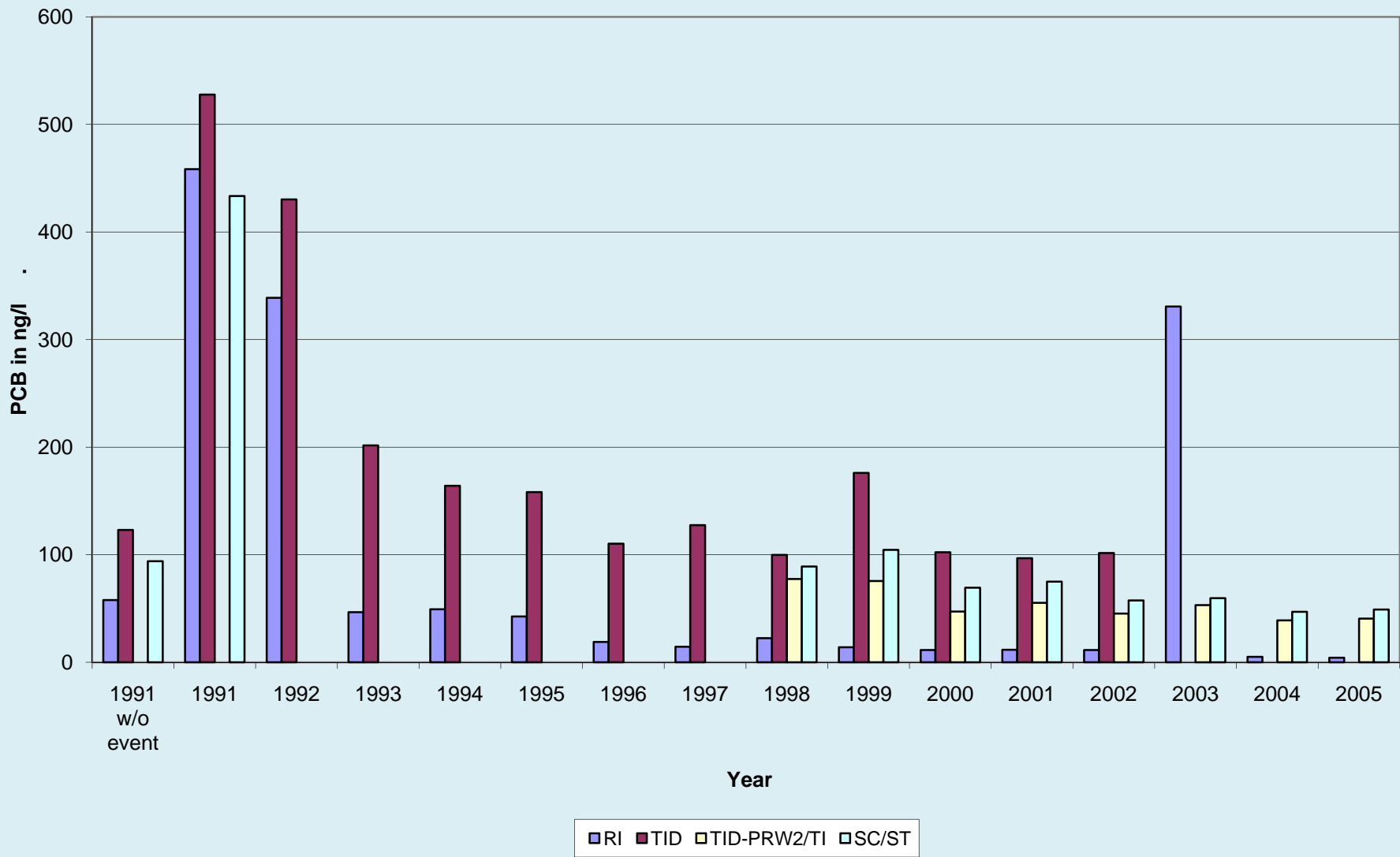
# 2009 in Historical Perspective

- Sudden releases from the GE Hudson Falls plant site between late 1991 and early 1993 triggered increases in water column and fish PCB concentrations, especially in the area immediately downstream of the capacitor plant sites
- Interim Remedial Measures 1993 – 95 abated the primary mechanisms of PCB release from the capacitor plant site.

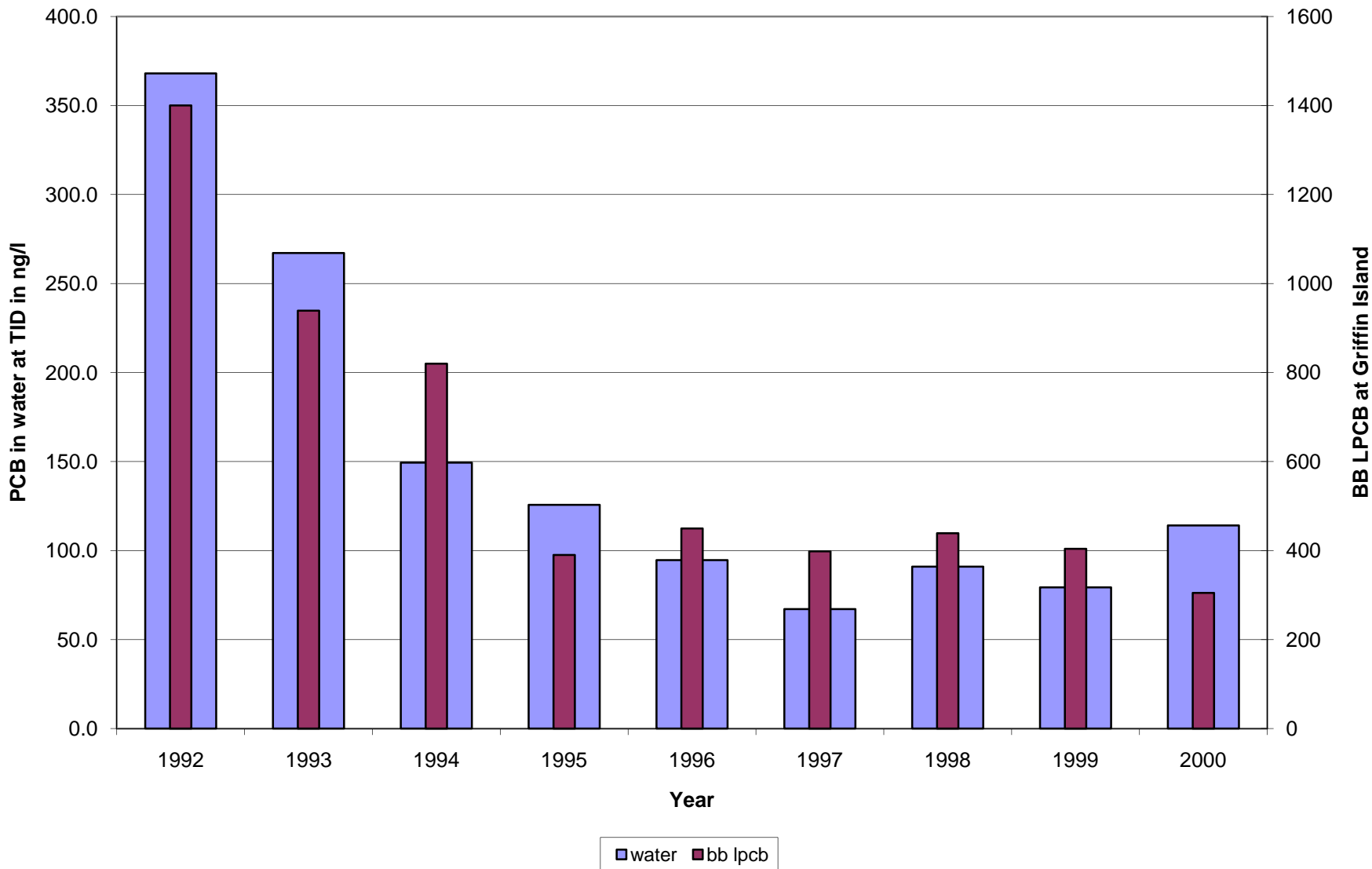
# 2009 in Historical Perspective

- Once the primary PCB release mechanisms from the capacitor plant sites were abated, PCB concentrations in water and fish quickly returned to pre-release conditions; appeared to be a one year lag between IRMs and response in fish flesh PCB concentrations
- PCB concentrations in water and fish react fairly quickly to changes in source conditions

### GE Surface Water Total PCB 1991 – 2005 (May-Sept Average)



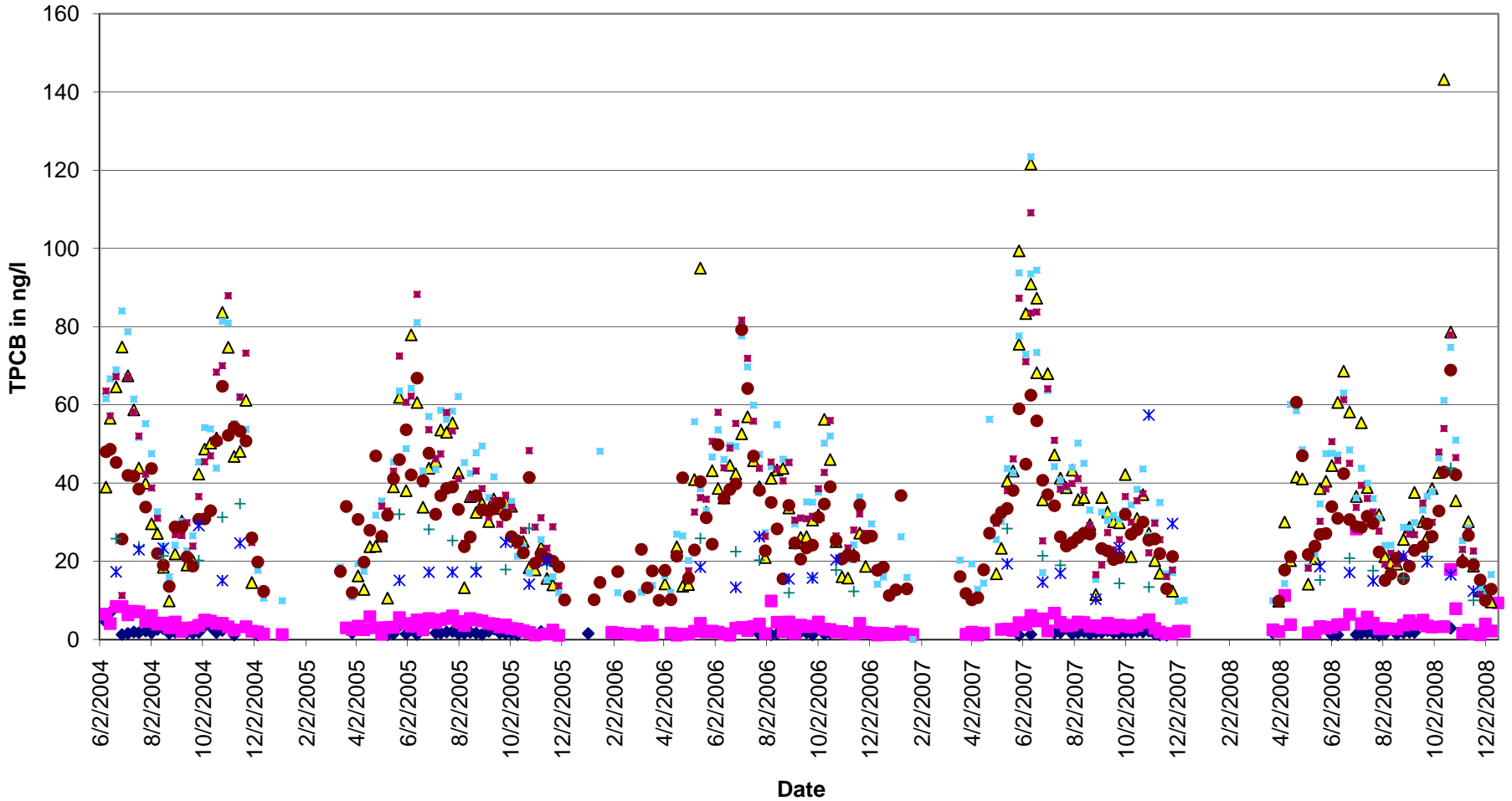
### Brown Bullhead Lipid based PCB and previous year Thompson Island Dam Surface Water Total PCB



# 2009 in Historical Perspective

- After 1995, trends in water column and fish flesh PCB concentrations again stabilized , with only slow, gradual declines over time
- BMP began in 2004 with issuance of EPA ROD and agreement by GE to conduct project design, resulting in further changes to monitoring locations and techniques
- BMP water column data continue to show only slow, gradual decline in PCB concentrations

### GE BMP Surface Water Total PCB Data June 2004 to December 2008

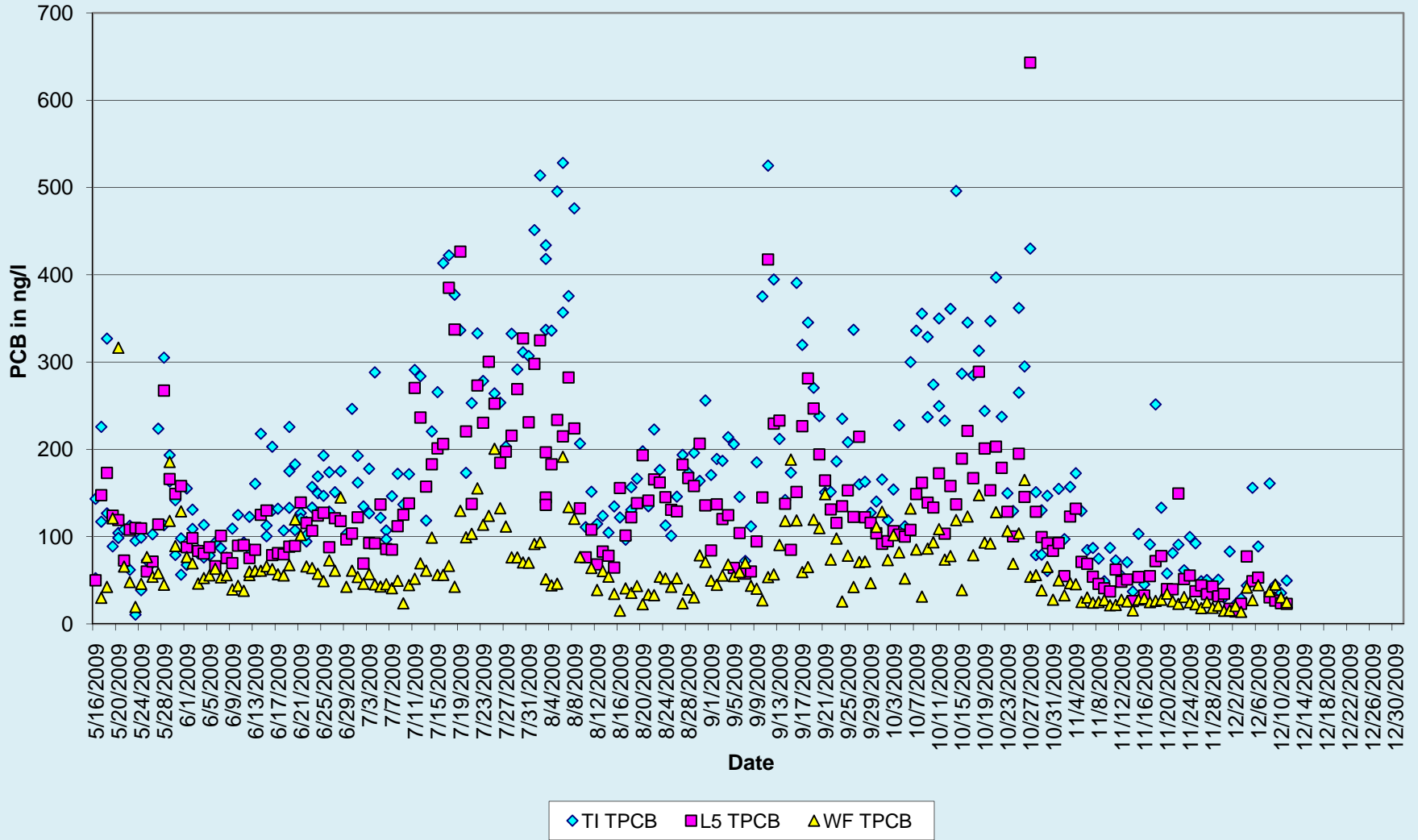


- |                         |                          |                            |                          |
|-------------------------|--------------------------|----------------------------|--------------------------|
| ◆ Bakers Falls RM 196.9 | ■ Rogers Island RM 194.2 | ▲ Thompson Island RM 187.5 | + Schuylerville RM 181.4 |
| ■ Stillwater RM 168.4   | ● Waterford RM 156       | + Albany RM 145            | * Poughkeepsie RM 75     |

# 2009 in Historical Perspective

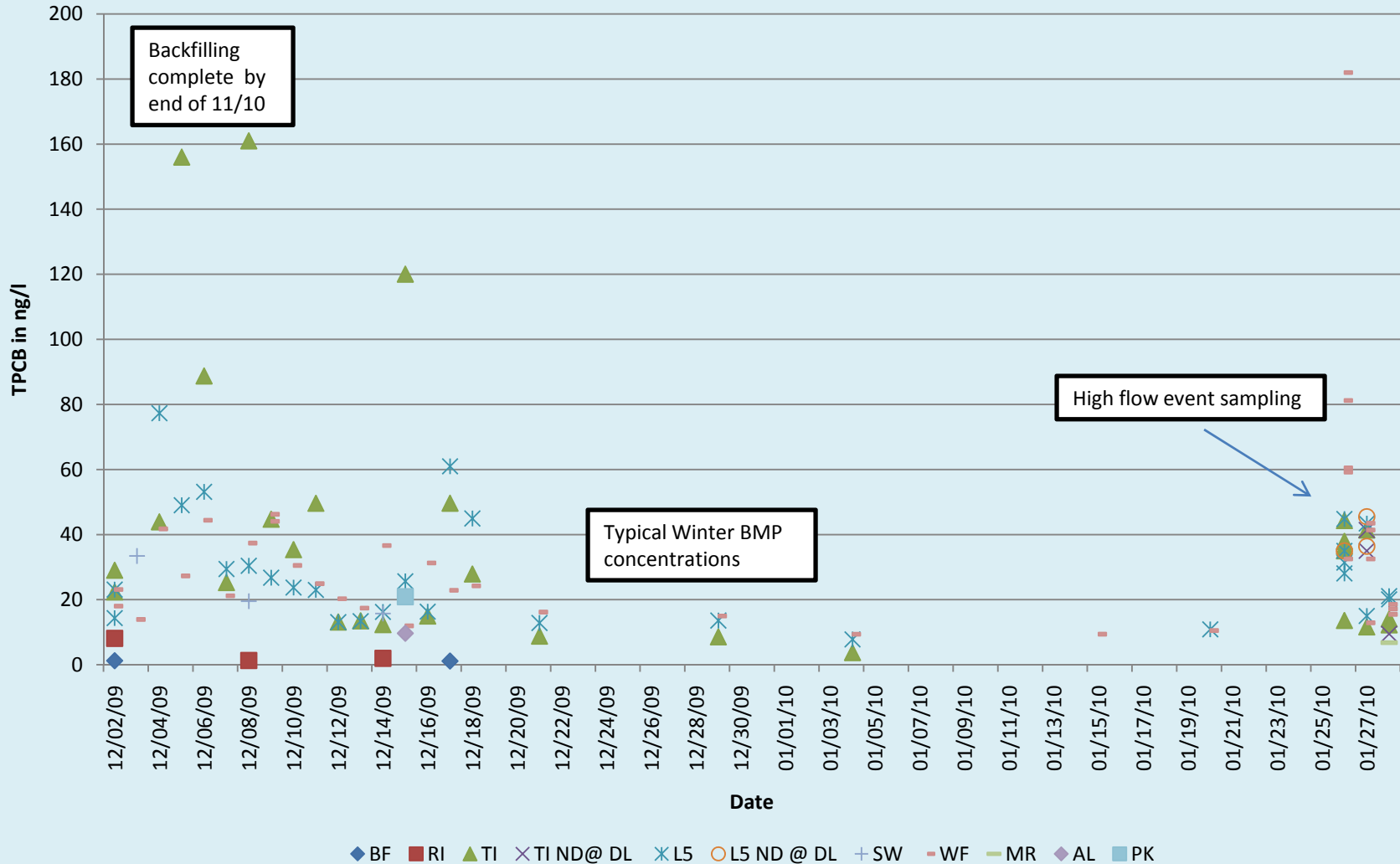
- Dredging began in May 2009
- Water column concentrations increased, abated ~ 3 weeks after backfilling was completed
- Fish collected in spring 2009 may or may not represent impacts of dredging work done at start of project
- Fish collected in fall 2009 showed impact in vicinity of dredging work

### Hudson River Project RAM Far Field PCB Surface Water Composite (12 hr and 24 hr) Sample Results at Thompson Island, Lock 5, and Waterford



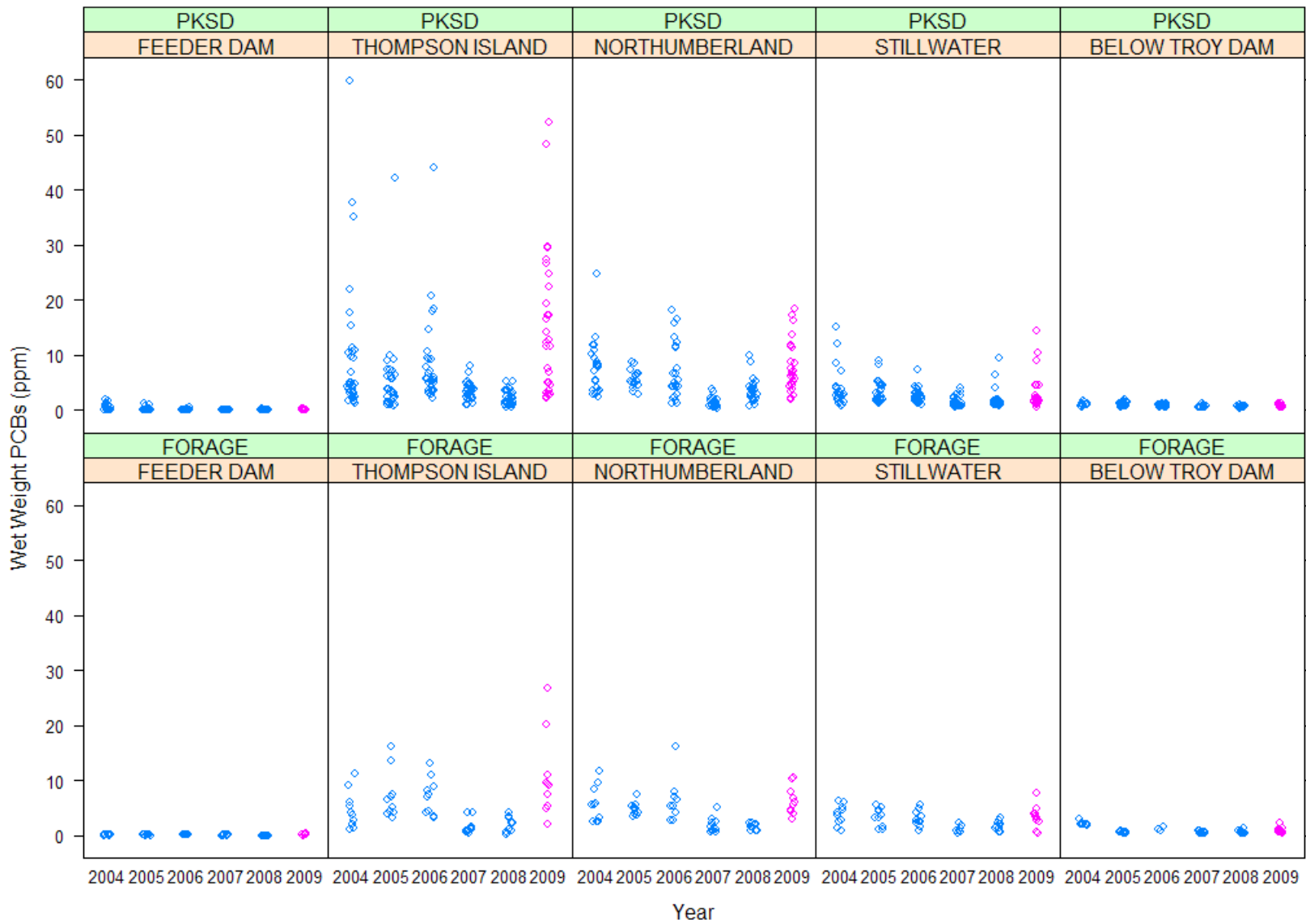
# Hudson River Surface Water TPCB Data Post Dredging / Backfilling 12/1/09 to 1/31/10

Bakers Falls, Rogers Island, Thompson Island, Lock 5, Stillwater,  
Waterford, Mohawk River, Albany, Poughkeepsie



### PCB Levels BMP and RAMP Fish

BMP ◇  
RAMP ◇



# 2009 in Historical Perspective

- Based upon observations in 1990s, expect to see increased PCB concentrations in fish collected in spring 2010 in response to elevated water column concentrations during dredging in 2009
- Fall 2010 forage fish concentrations , and spring 2011 resident fish concentrations, will likely respond to the conditions during spring and summer 2010

# Observations from Phase 1 Dredging Oversight by State

## Recommendations for Phase 2

# Observations from Phase 1

- State performed extensive oversight during Phase 1 implementation
- Oversight by NYSDEC, NYSDOH, NYS Canal Corporation
- Report containing observations and recommendations for Phase 2 provided to EPA
- Highlights of these observations and recommendations follows

# Observations from Phase 1

- The near field total suspended solids and turbidity monitoring program did not accurately reflect the magnitude of PCB release to the water column
- The underestimation of the depth of contamination (DoC) and the volume of material to be removed contributed to the exceedances of the resuspension standard, as well as problems with meeting the residuals and air standards

# Observations from Phase 1

- Releases of PCB during dredging in the form of a non-aqueous phase liquid (NAPL) contributed to the elevated PCB surface water concentrations and exceedances of the resuspension standard. The State believes that the observed sheens were only a fraction of the total PCB released as NAPL. The dredging program was designed with the assumption that if solids releases were controlled, then the PCB releases would be controlled.

# Observations from Phase 1

- Estimates of PCB release rates used in developing the resuspension performance standard did not account for the potential for PCB NAPL to be mobilized; as a result, the technologies evaluated for control of PCB release in the project design did not specifically address this pathway

# Observations from Phase 1

- Resuspension of contaminated river sediment due to scow / tug traffic contributed to PCB resuspension, which could have been reduced if additional access dredging was done to increase channel depth and allow for more laden draft and propeller driven scour (prop-wash) clearance depth to be available in the channel areas.

# Observations from Phase 1

- Due to the error in DoC in the Phase 1 design, the proportion of river bottom capped during Phase 1 was excessive given that the remedial alternative selected in the ROD was removal
- Capping decisions at times appeared to be driven not by the ability to successfully remove the inventory of contaminated sediment and achieve the 1 part per million (ppm) PCB residuals standard, but rather by the schedule for ending the dredging season

# Observations from Phase 1

- The underestimation of the DoC to be removed contributed to the problems with meeting the residuals standard. The need for multiple iterations of testing for compliance with the standard between dredge passes, caused by the underestimation of the DoC, resulted in delay

# Observations from Phase 1

- Offloading delays at the sediment processing facility decreased empty scow availability and served as a bottleneck relative to productivity
- Canal traffic throughput has an upper bound which may impact productivity

# Observations from Phase 1

- Several issues were identified which impacted the ability of the project operations to be conducted within the air standards including the presence of uncontrolled NAPL, the use of mini-hoppers, delays in offloading at the dewatering facility, and the presence of sediment and debris in open stock-piles at the dewatering facility

# Recommendations for Phase 2

- USEPA should evaluate whether the Productivity Standard should be considered subordinate to the Resuspension and Residuals Standards
- The Phase 2 design should also include specific mitigation measures to control air releases beyond those limited measures taken during Phase 1, including the use of spray-on cover material for use in the scows and more proactive containment and immediate collection of NAPLs generated during dredging operations

# Recommendations for Phase 2

- USEPA should continue to evaluate the data generated during project monitoring, and observations made during project oversight, in order to direct necessary changes to project operations to maximize project quality, minimize any negative impacts related to the work, and to maximize the opportunities for the project work to meet the remedial action objectives set in the ROD

# Recommendations for Phase 2

- The near field solids monitoring program should be significantly reduced, and the resources reallocated to direct near field and mid field PCB measurements
- The DoC underestimation should be corrected before the Phase 2 design is implemented. This will likely entail a combination of additional data gathering and application of a correction factor to existing calculations in the dredge area delineation process to be applied in both redrawing the dredge area boundaries and in resetting the dredging depths in Phase 2

# Recommendations for Phase 2

- Existing project specifications should be modified and expanded to include not only the existing general broad requirement that NAPL sheens be contained and cleaned up, but also to include an expanded description of the purpose of the specification, and the minimum effort required to collect and recover the NAPL released during dredging

# Recommendations for Phase 2

- Access dredging should be done in areas which would allow full-sized scows to be used in areas which otherwise would be candidates for dredging proposed to be dredged using mini-hoppers. Access dredging in this case would reduce the number of tug trips in a work area to change out the mini-hoppers, allowing for more efficient use of the dredge platforms, and reduce the resuspension due to prop wash and grounding in the shallows

# Recommendations for Phase 2

- Areas for which there is not remaining time in the dredge season to remove a remaining inventory of un-dredged contaminated sediment should be sampled to determine the remaining surface sediment concentration as well as the remaining thickness of inventory to be removed. In areas where the remaining surface sediment PCB concentration remains significantly elevated, backfill should be placed to stabilize the area until the remaining inventory can be removed the following dredge season

# Recommendations for Phase 2

- DoC should be redefined after the first dredge pass through analysis of the entire cored interval, instead of only analyzing the uppermost samples of a core collected to check for compliance with the standard
- Any subsequent dredge pass would be much more likely to be based upon a correct understanding of the remaining un-dredged inventory of contaminated sediment. This change would take into account any changes to the river bottom since the data upon which the design was based were gathered, and eliminate any potential sampling bias associated with the overlying material on the river bottom which was removed during the first dredge pass

# Recommendations for Phase 2

- The Phase 2 design should include installation of redundant offloading and processing equipment at the offloading wharf. The rate at which scows could be offloaded and returned to the dredge platforms would be increased, and sufficient redundant capacity would be available to allow for maintenance and repair of the equipment to reduce down time

# Recommendations for Phase 2

- The Phase 2 design should include specific mitigation measures to control air releases beyond those limited measures taken during Phase 1, including the use of spray-on cover material for use in the scows and more proactive containment and immediate collection of NAPLs generated during dredging operations

# Lessons Learned

- The State believes that the experience gained by performance of Phase 1 should allow for revisions to the design for Phase 2 to improve project performance and better meet the Performance Standards
- The State believes that revisions to Phase 2 should not be limited solely to changes in the Performance Standards, but rather the lessons learned by studying the results of Phase 1 should be applied to the design of Phase 2