



Hudson River
PCBs SUPERFUND SITE



Community Advisory Group Meeting

Fort Edward, NY

March 30, 2010



Assessment of Phase 1 Underway

- **Peer Review**
 - Introductory Session Feb 17 & 18
 - Continues to June
- **EPA & GE prepared reports evaluating Phase 1; final reports released March 8**
 - Reports draw some significantly different conclusions from same facts
- **Purpose is to evaluate Engineering Performance Standards and make appropriate changes for Phase 2**



EPA Phase 1 Evaluation Report Findings:

- Phase 1 occurred at a reduced production rate to allow EPA to evaluate progress and compliance with the performance standards
- As outlined in EPA's Phase 1 Evaluation Report, operations and processes can be improved and streamlined
- Solutions-oriented approach to Phase 2

Room for Improvement

With some changes to project design and approach, the performance standards can be met consistently and simultaneously during Phase 2

EPA's Phase 1 Overview



What Went Well (Overview)

Lessons learned in Phase 1 will improve Phase 2

- Exceeded sediment volume & PCB mass goals
- Few shut-downs with limited impact on production
- ~70% of dredged area closed in compliance with the Residuals Standard
- No measurable impacts to Lower River



Phase 1 Challenges (Overview)

- **Depth of Contamination (DoC) consistently underestimated**
- **Extent of wood debris**
- **NAPL releases**
- **Higher than normal flows**
- **Limitations on scow unloading**





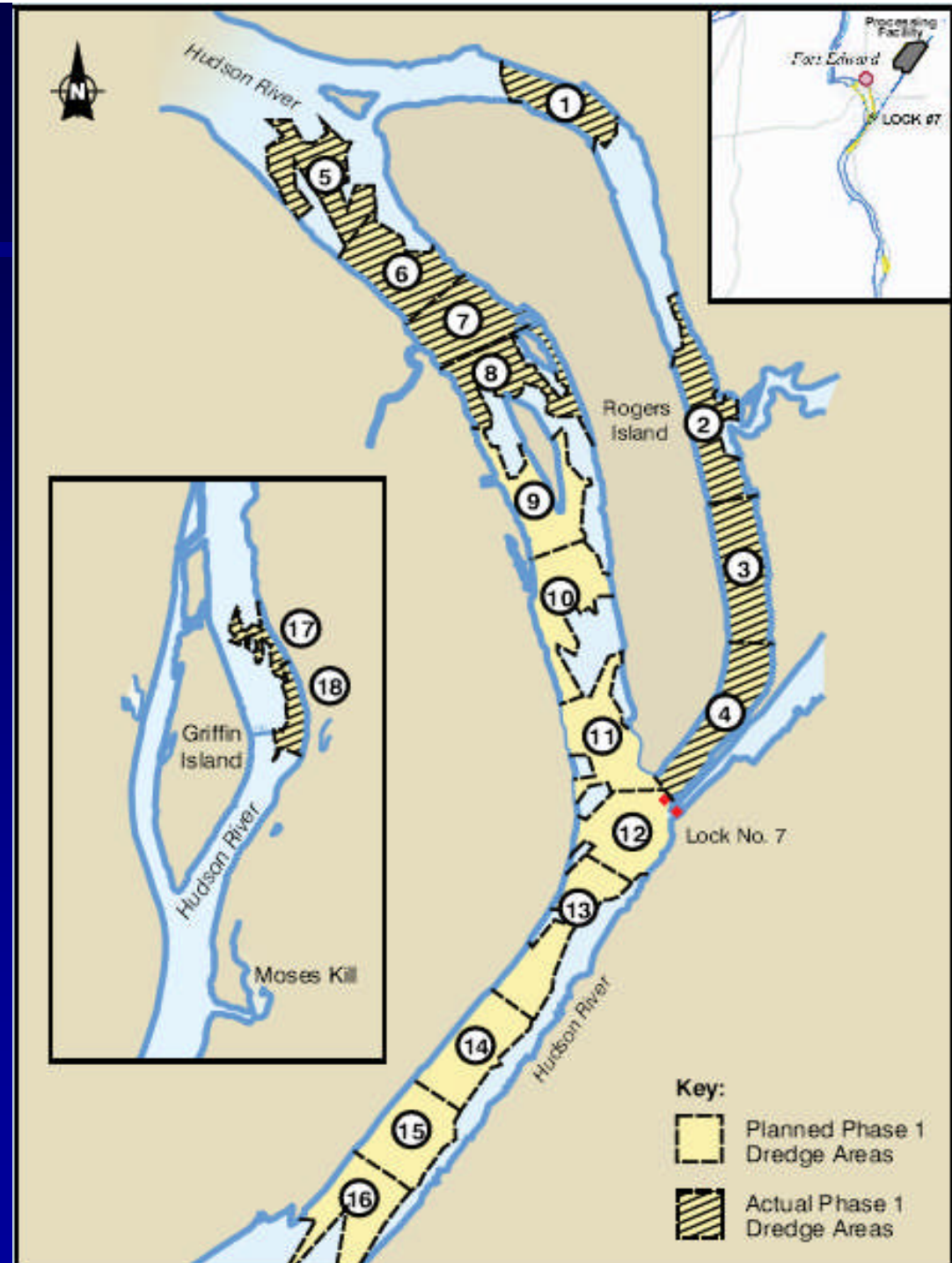
Ft. Edward Dam

Debris in Sediment



Phase 1 Dredging (Overview)

- CUs 1-8, 17 & 18
- CUs 9-16 were not dredged in 2009
- Phase 2 will begin with the CUs that could not be completed during Phase 1



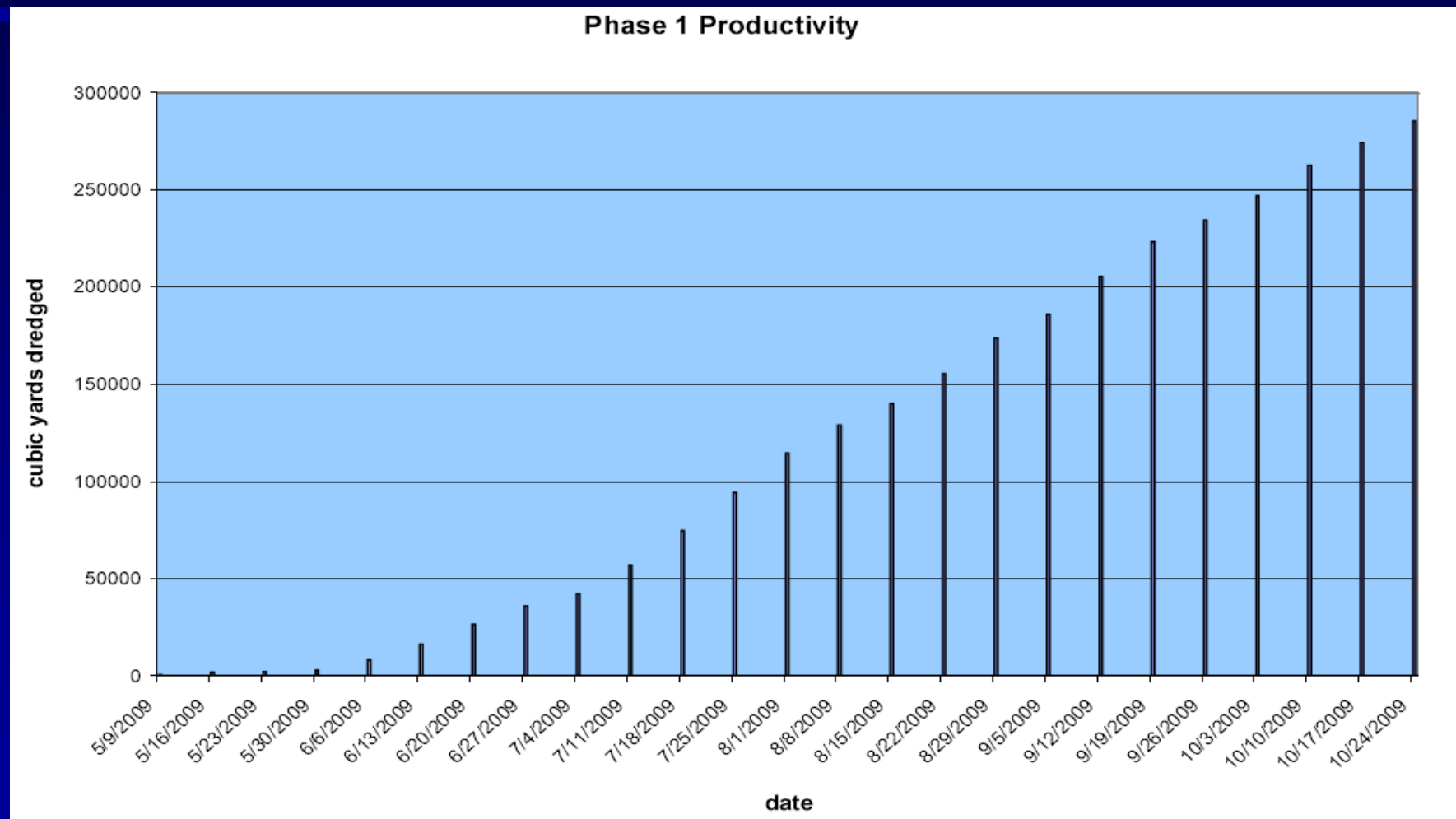
Exceeded Sediment Volume & PCB Mass Goals (Overview)

Larger than expected mass of PCBs removed during Phase 1

- Targeted 265,000 cubic yards (cy) of sediment from 88 acres in Thompson Island Pool
- Actual volume removed, 283,000 cy from 48 acres
- 1.5 times more PCB mass removed than expected
 - About the same mass as estimated in design, but from fewer acres

Both the sediment volume and the PCB mass removed in Phase 1 met or exceeded the amounts initially estimated for Phase 1

Phase 1: Cubic Yards Dredged



EPA Report (Resuspension)



Resuspension Factors

- **Several factors contributed to the resuspension of PCBs, including:**
 - **PCB mass and volume removal**
 - **Vessel traffic**
 - **Disturbance of exposed contaminated surface sediments**
 - **Backfill processes**
 - **Efficiency of dredge bucket use**



PCB-oil is a potentially important vector for PCB release

(Sheens observed during dredging)



Summary of the Resuspension Standard for Phase 1

- Resuspension standard designed to:
 - Protect drinking water intakes downriver of the dredging operations, and
 - Limit the downriver transport of PCBs
- Water Quality Criteria – 500 ng/L
 - Control Level – 350 ng/L



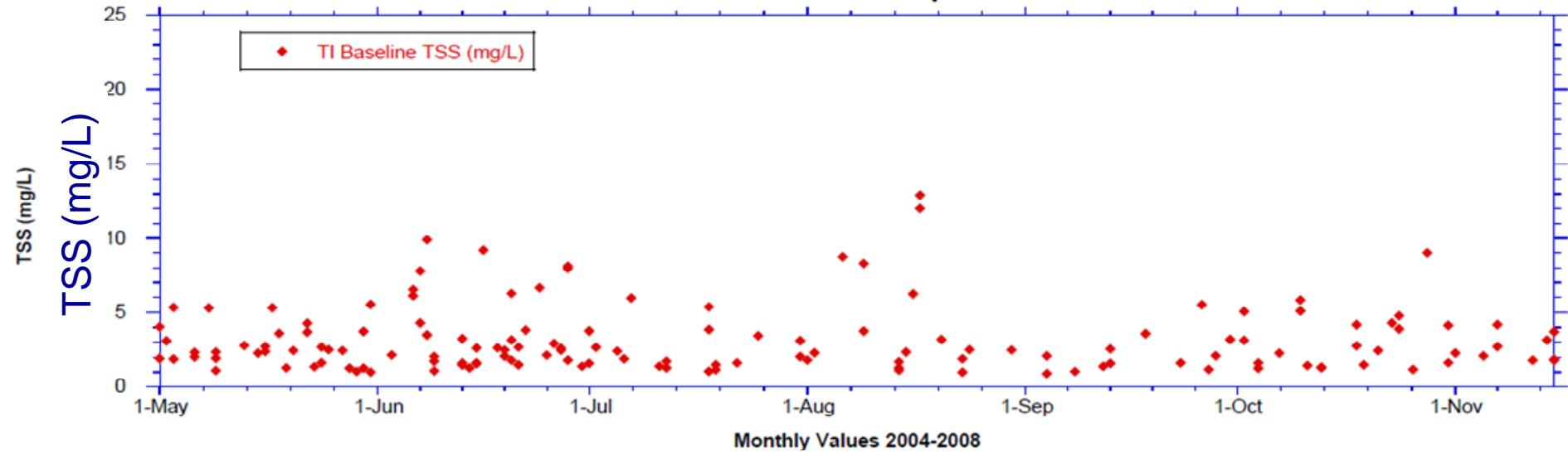
Resuspension Phase 1 Observations

- There were few shutdowns due to an exceedance of the Resuspension Standard
- Since the end of Phase 1 dredging activities, river water concentrations have returned to pre-dredging levels
 - Levels increase during high flow events

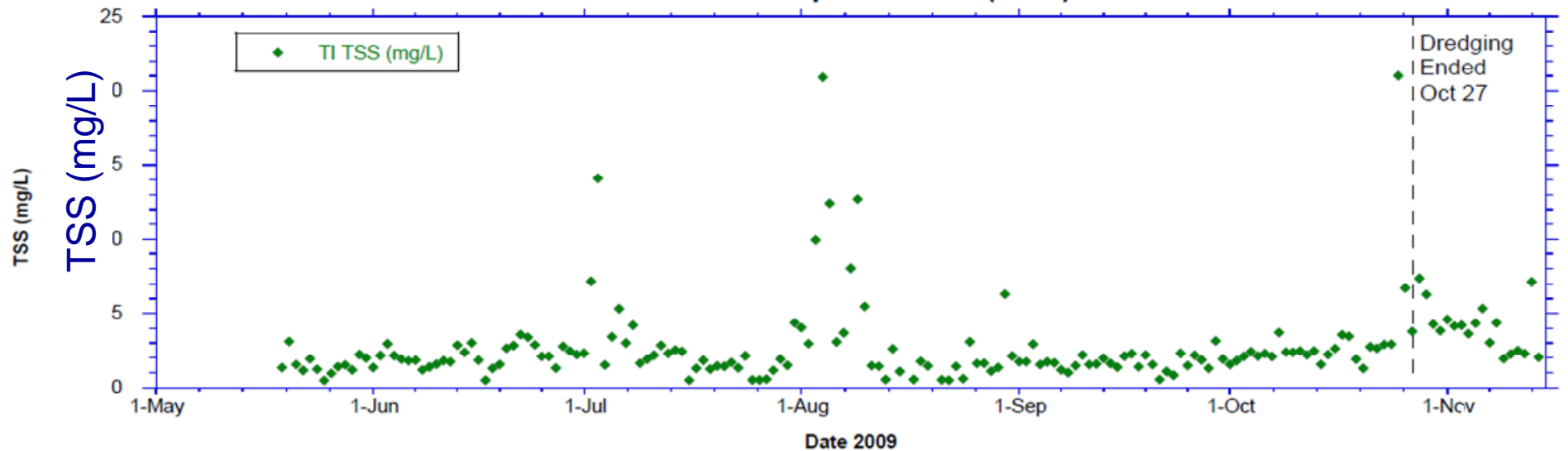


Little significant release of solids during dredging

Baseline TSS at Thompson Island



TSS at Thompson Island (2009)



EPA Report Findings: Resuspension

Standards

- Near-field TSS - 100 m
Evaluation Level - 700 mg/L
- Near-field TSS - 300 m
Evaluation Level - 100 mg/L
- Max. allowable Total PCBs in
water column -- 500 ng/L
- Far-field net suspended solids
concentration Evaluation Level
- 12 mg/L

Findings

- Av. TSS well below Evaluation
Level
- 3 exceedances; dredging activities
halted less than 4 four days
- Not exceeded



Resuspension Standard: Load

- The standard load threshold was based on the ROD estimate of 70,000 kg
 - 650 kg ~ 1% of 70,000 kg
 - 65 kg was based on ROD-anticipated 10% removal in Phase 1
 - Design indicated 18% of mass would be removed in Phase 1
 - GE's total estimated removal mass was 113,000 kg
 - Although Design estimate was raised, the Phase 1 load threshold continued to be based on ROD estimate: 70,000 kg
 - Phase 1 load Control Level was set at 18% of 650 kg, 117 kg

Load: EPA's Goal of a Maximum 1% Loss Rate Was Achieved in Phase 1

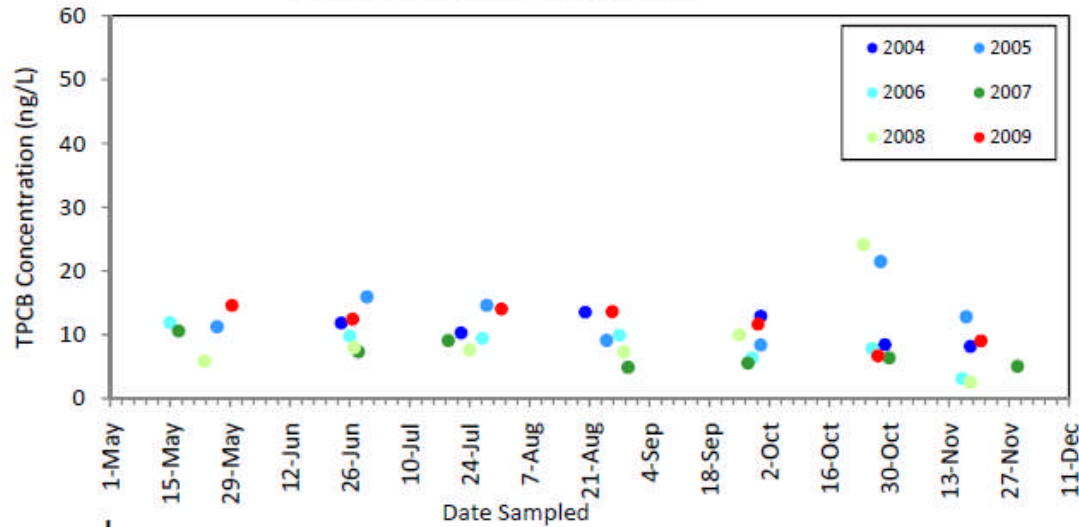
- Based on actual mass targeted, Phase 1 threshold would have been ~200 kg
- 0.13% was never used as a basis for load in the Resuspension Standard

Water column concentrations in the Lower Hudson River did not increase in response to loads from the Upper Hudson

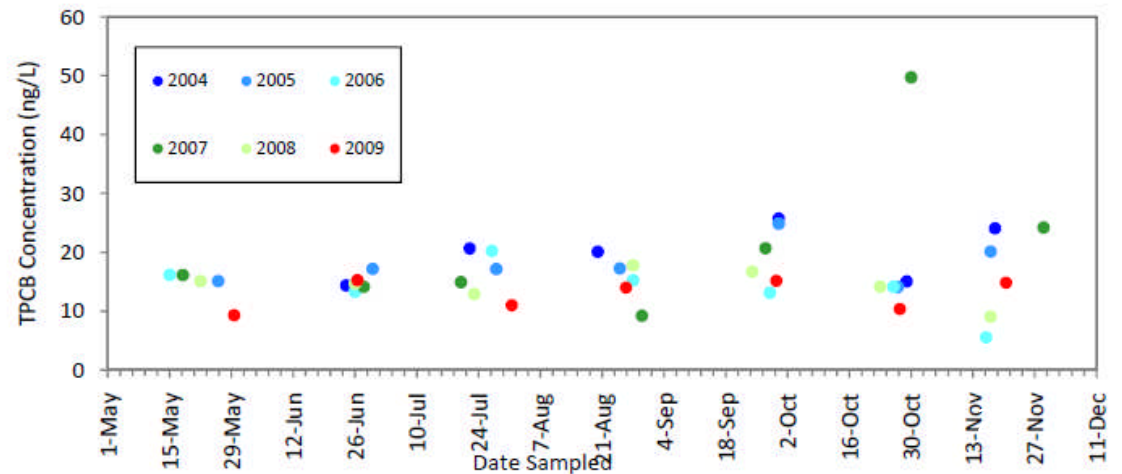


There were no observable impacts of dredging to Tri+ PCB water column concentrations downstream of Waterford

Tri+ PCB Water Coulmn Concentration atAlbany
GE BMP and 2009 Phase 1 Data



Tri+ PCB Water Coulmn Concentration at Poughkeepsie
GE BMP and 2009 Phase 1 Data

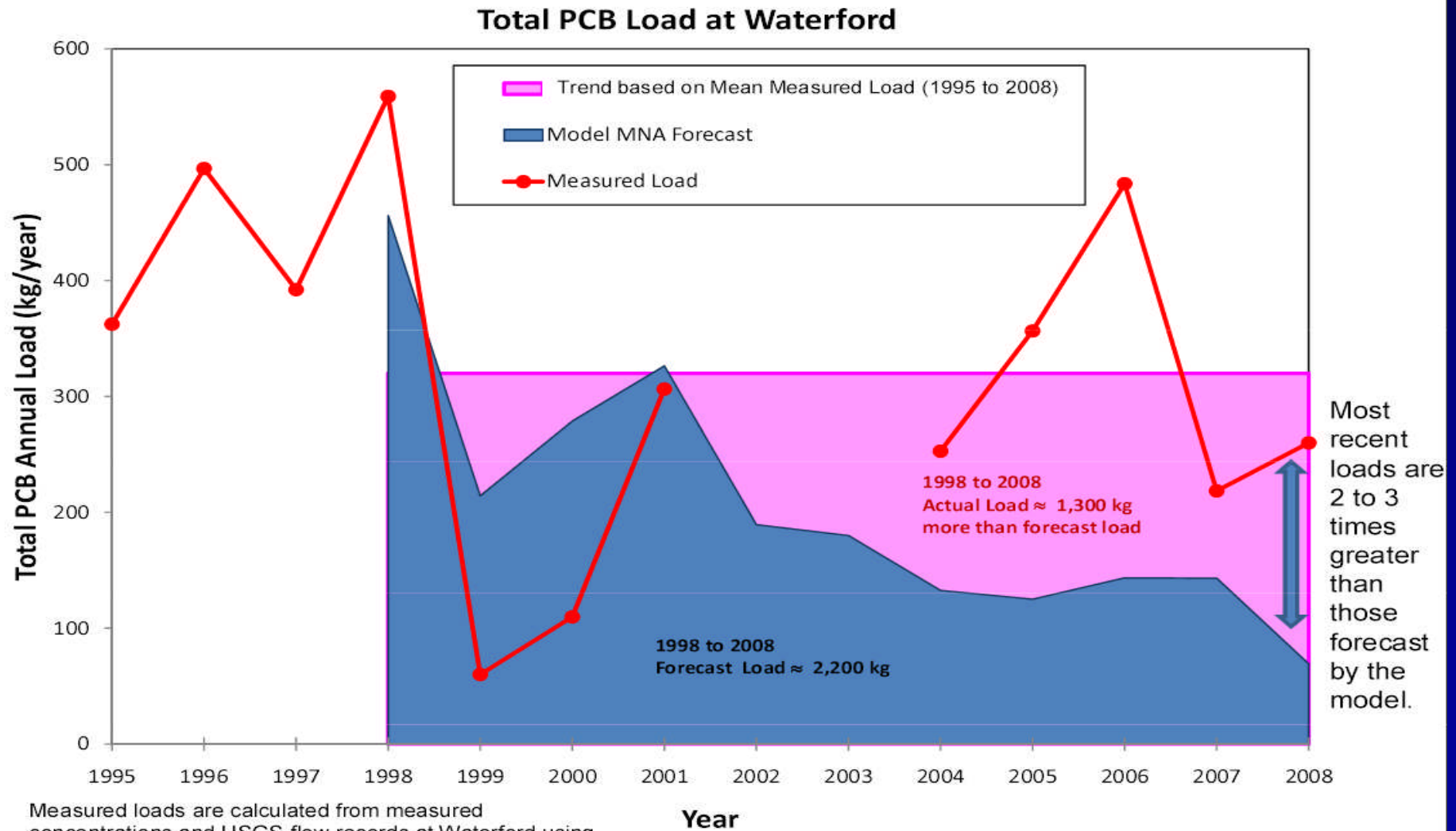


Load Criterion Should Be Revised Upward

- The PCB load criterion of 650 kg established at the time of the ROD should be revised upward to reflect the following observations:
 - Baseline loads to the Upper Hudson are about 3 times greater than EPA's model predicted
 - Surface sediments are not being buried and their concentrations are 3 times higher than predicted by the model
 - The amount of PCBs to be removed is 2-3 times higher than estimated in the ROD

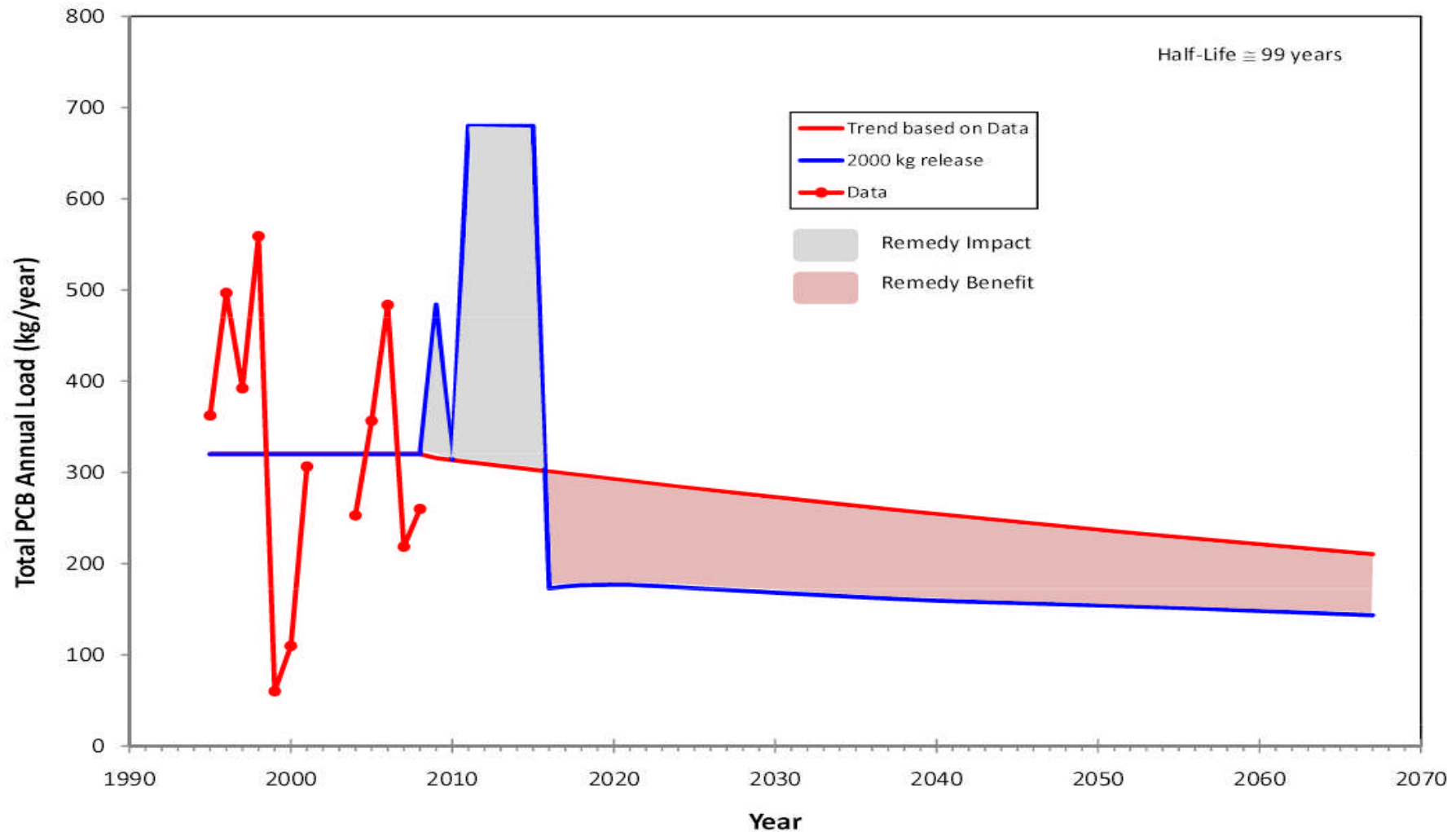
The expected short-term PCB releases will be more than offset by the long term improvements in PCB load and exposure resulting from the remedy

Total PCB Load at Waterford 1995-2008

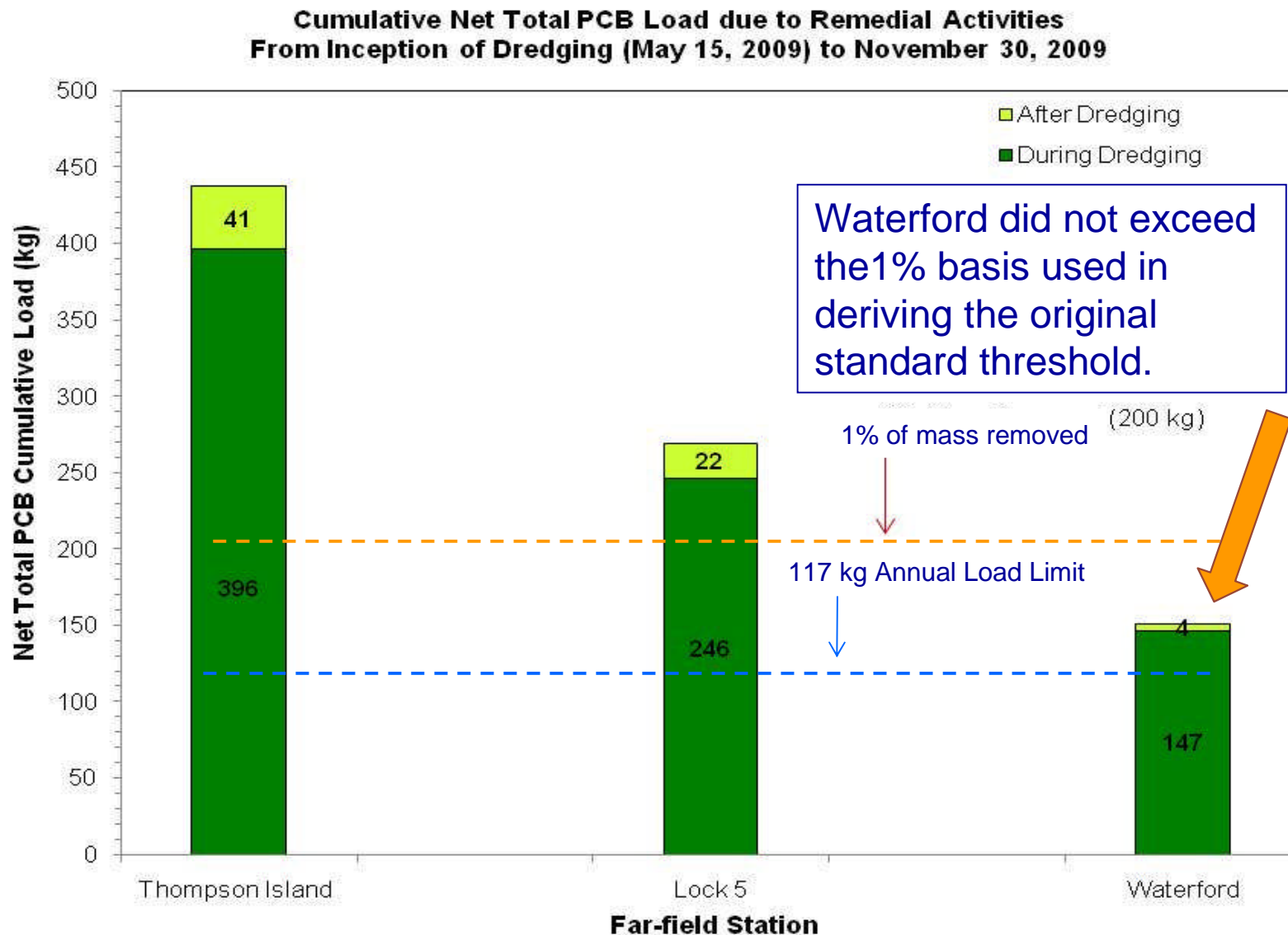


Measured loads are calculated from measured concentrations and USGS flow records at Waterford using Biele's estimator.

Total PCB Annual Load at Waterford



The load at Waterford did not exceed 1% of the mass removed



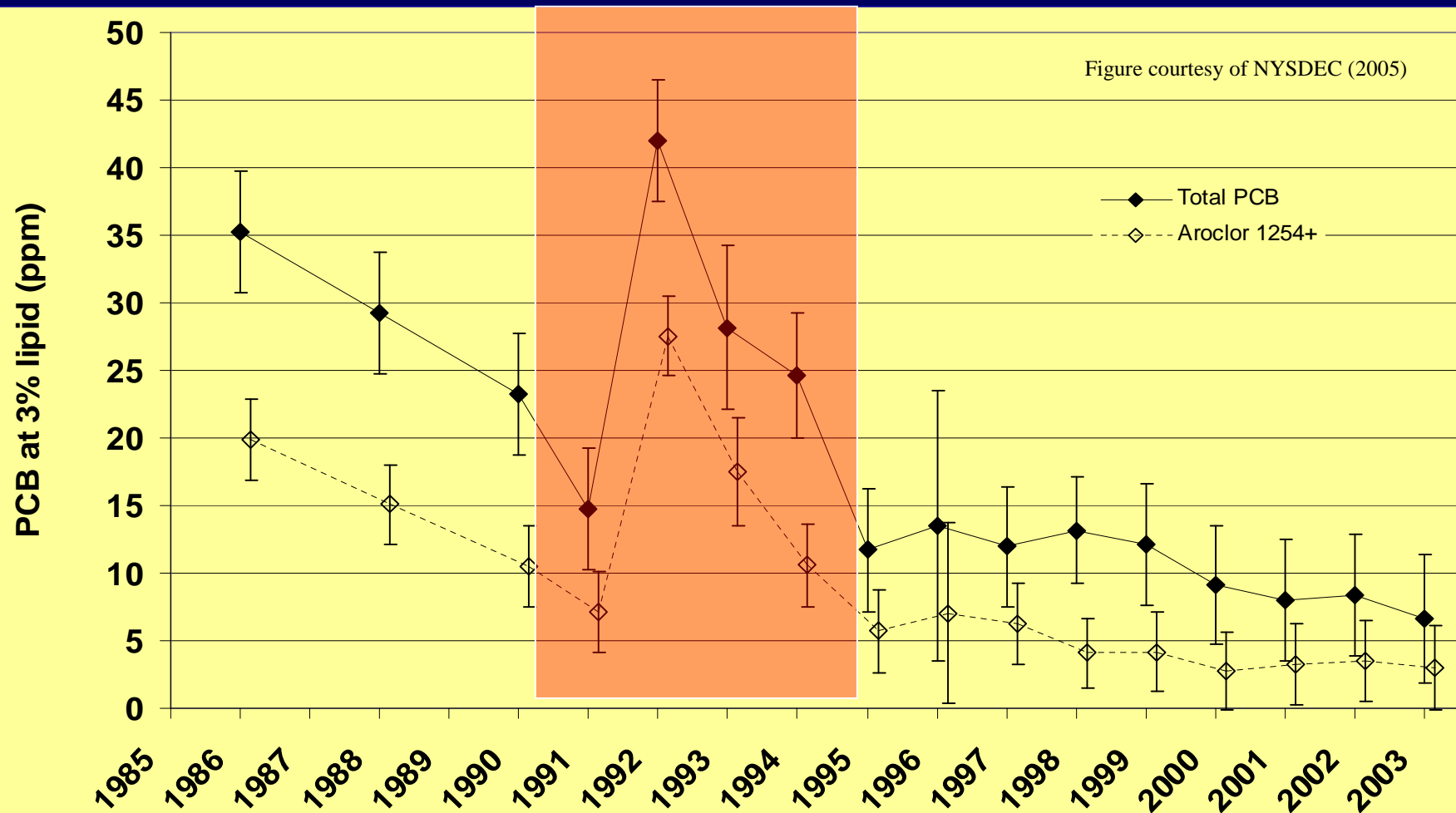
PCB Levels in Fish

- **Some increases in fish tissue PCB levels were seen in 2009 compared to baseline data in the Thompson Island Pool**
- **There were no increases in fish tissue PCBs below river mile 180 near Schuylerville**
- **EPA expected short-term increases; EPA also expects PCB levels in fish to return to baseline relatively quickly following the cessation of dredging, and that levels will continue to decline**

Fish tissue impacts were limited to within 2-3 miles downstream of the Thompson Island Pool

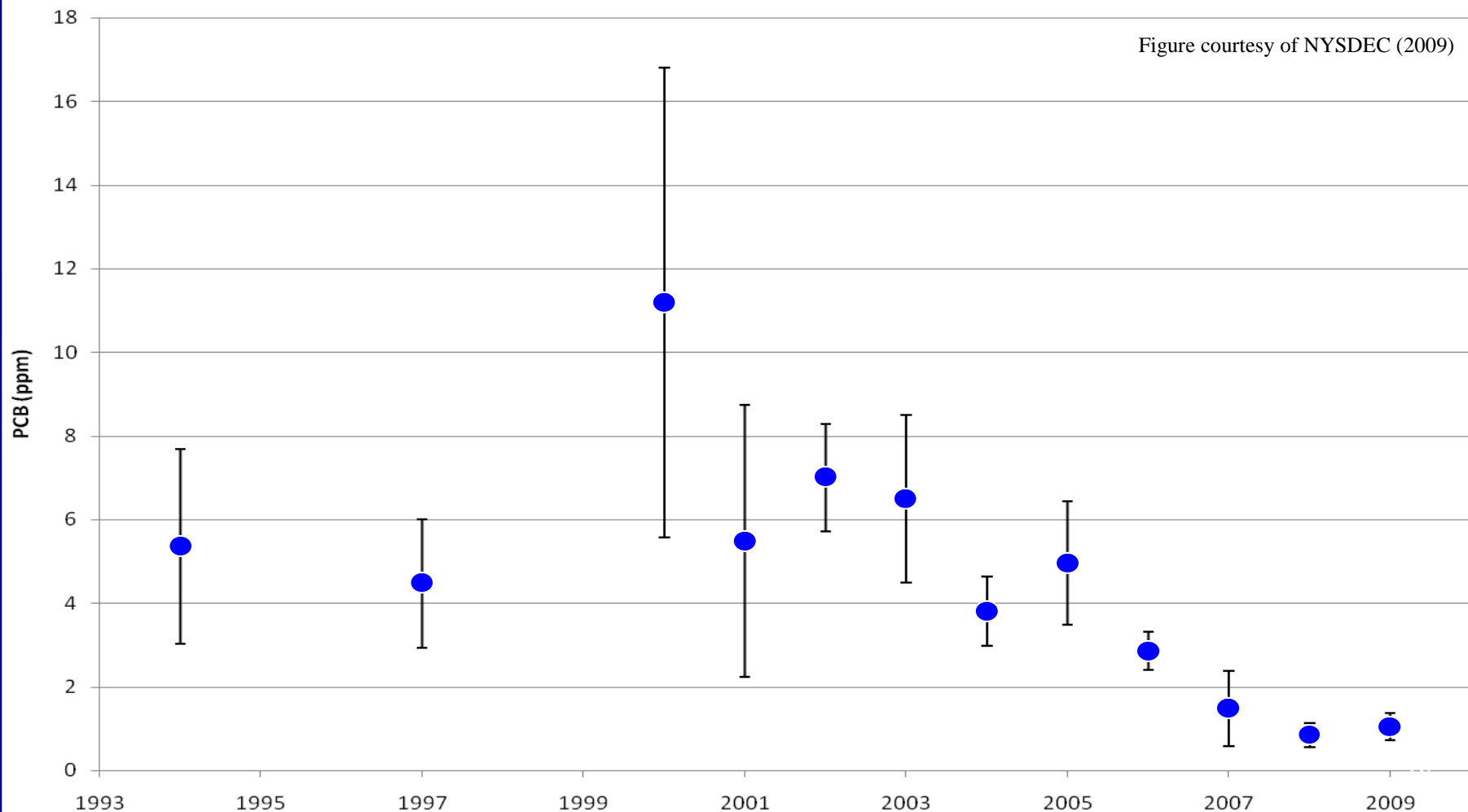
Spikes in tissue concentrations linked to exposure events have been observed to recover

Brown Bullhead - Thompson Island at Griffin Island (RS-1; RM 189)



Spikes in tissue concentrations linked to dredging events have been observed to recover

Cumberland Bay Site, Plattsburgh, NY – Yellow Perch, Wilcox Dock



Proposed Revisions to the Resuspension Standard

- Adjust the Evaluation and Control Level loads upwards, in accordance with new information on the inventory of PCB targeted for removal
- The near-field and far-field solids criteria should be adjusted for Phase 2
- The water column Standard Level of 500 ng/L should be maintained

Dredging operations and processes can be improved and streamlined to increase productivity and reduce resuspension

EPA Report (Residuals)



Residuals Standard Phase 1 Observations

- Larger than expected mass of PCBs removed during the first Phase – 1.5 times higher than original estimates
- The Residuals Standard was designed to remove most of the contaminated sediments in the first dredging pass

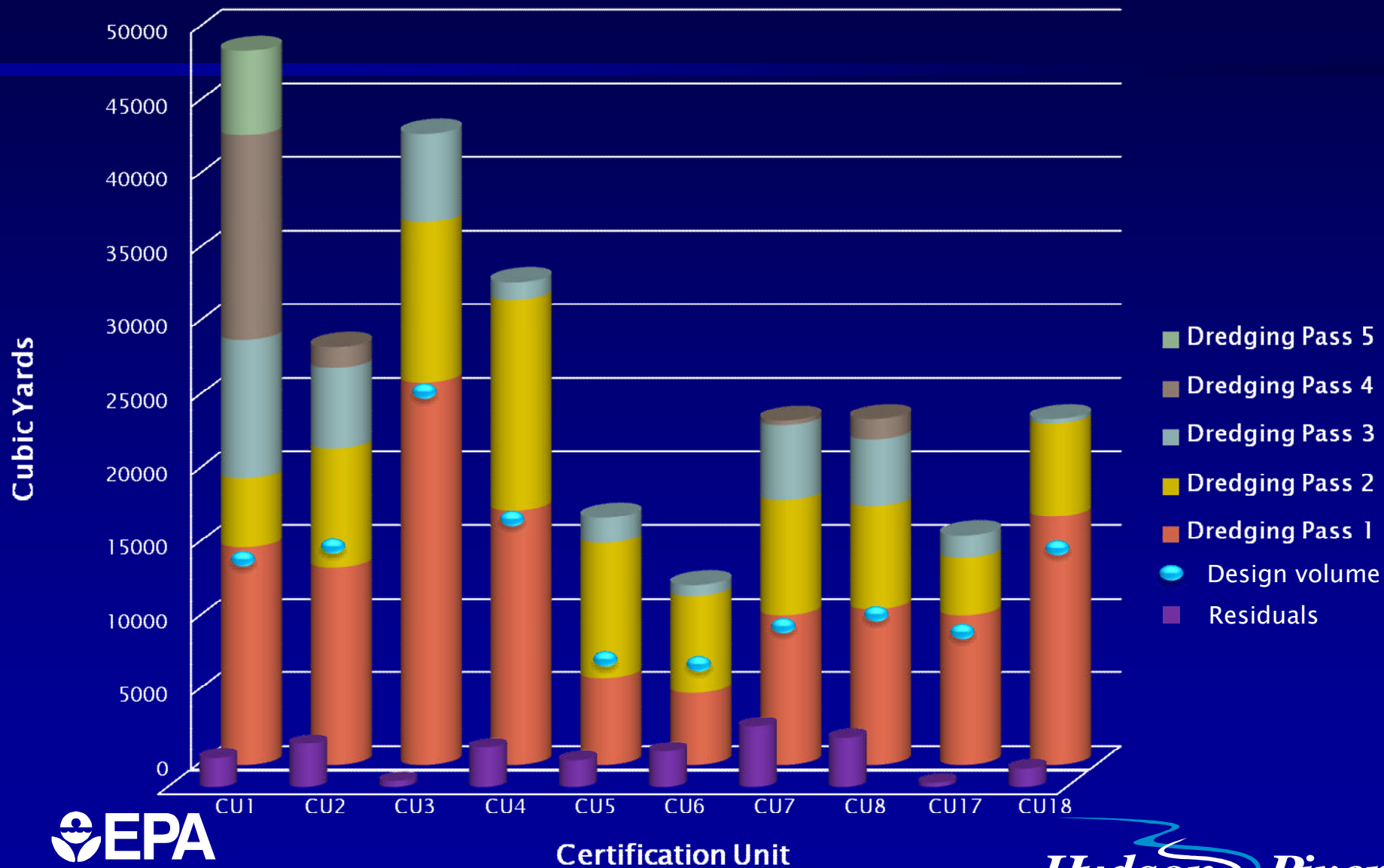


Residuals Standard Phase 1 Observations (cont)

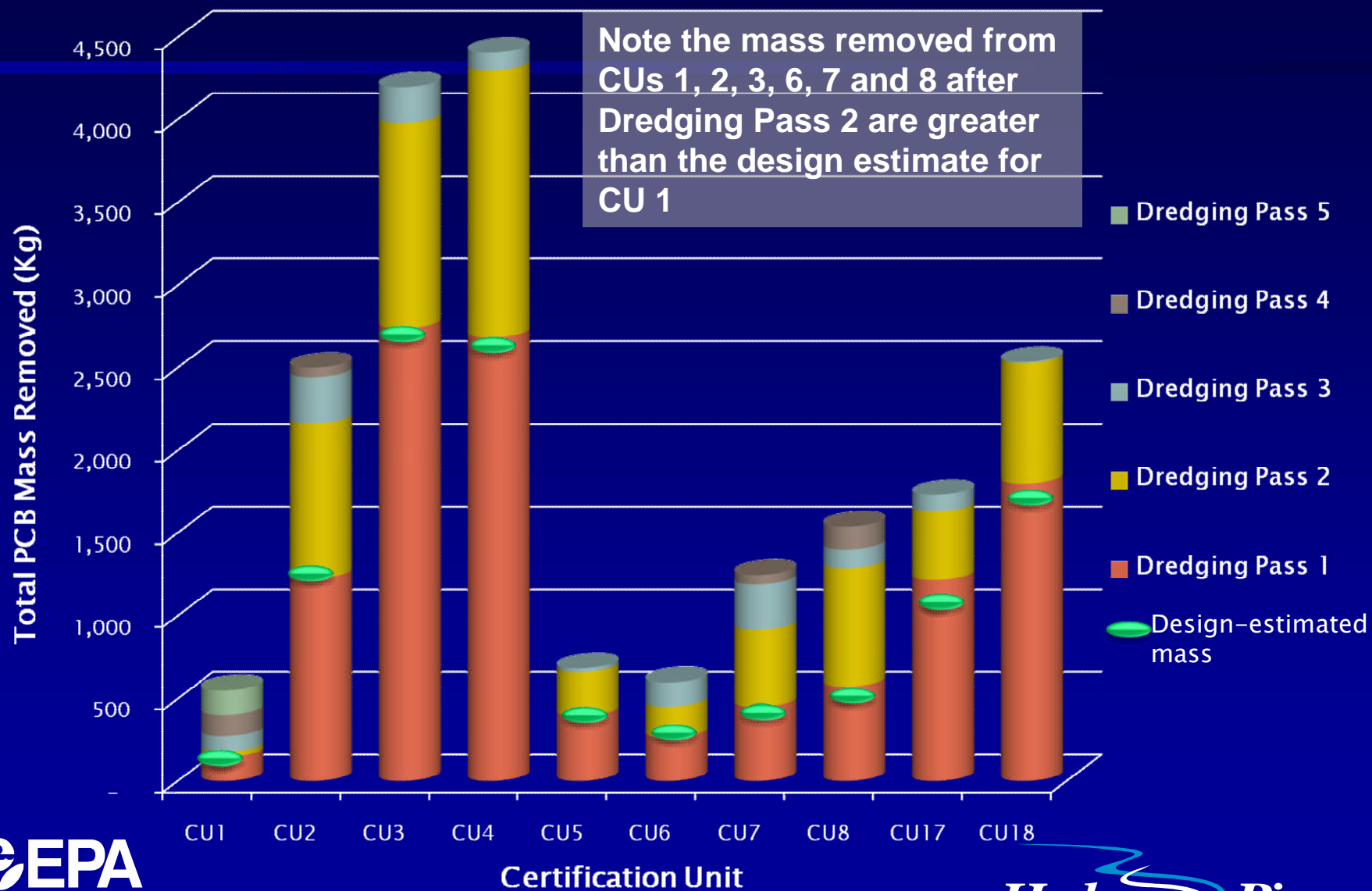
- Efficient dredging and closure of areas in Phase 1 were hampered by inaccurate DoC estimates
 - Core samples used for design were often incomplete, yielding inaccurate cut lines
 - Multiple dredging passes were required to remove the contaminated sediments; this adversely affected resuspension and productivity

Impact of inaccurate DoC resulted in removing only 49% of the actual inventory by volume and only 58% of actual inventory by mass in the first dredge pass

Sediment Volume Removed By CU



Mass of Total PCB Removed (Kg)



Backfilling/Capping

- Substantial removal of inventory confirmed in all CUs
- In some areas, uneven bedrock and boulders hindered sediment removal
- Where inventory left in place, engineered caps were constructed to isolate the remaining inventory (per the requirements of the standard)



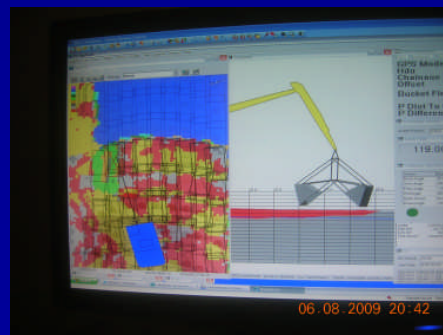
Backfilling/Capping

- Approximately 36% of dredged area was capped
- 31 acres backfilled; 17 acres capped
- Significantly less capping expected in Phase 2
 - East Rogers Island area is atypical of rest of River – about 11.5 acres capped
 - About half of the remaining capped areas were buried under several feet of clean backfill to address habitat concerns

Approximately 70% of the dredged area was closed in compliance with the Residual Standard

Residual Standard – Summary of Findings

- Resuspension, Productivity and Residual standards are related
- Basic problems associated with uncertainty in the design DoC
 - Core samples used for design were often incomplete, yielding inaccurate design
- Modifications needed in the approaches for dredging and post-dredging sampling
- EPA is recommending simplifications to the Residuals Standard but not changes to the basic approach



Proposed Residual Process Changes for Phase 2

- Inventory dredging passes should reach the bottom of the 1st core segment with concentration < 1 ppm plus 3”
 - Fewer bucket cuts and minimize fine grading



Collection of Post Dredging Cores

- When design depth is reached, collect post dredging cores
 - Analyze full length of 24” core to identify depth of contamination
 - Achieve at least two successive 6-in segments below 1 mg/kg at the bottom



EPA Report (Productivity)



Phase 1 Productivity Standard & Volume Achieved

The volume of contaminated sediments dredged during Phase 1 exceeded the required volume by 40% and also exceeded the targeted volume

Phase 1 Standard: 200,000 CY Minimum Vol.

265,000 CY Target Vol.

Volume Dredged: 273,600 CY (EPA Est.)

282,900 CY (GE Est.)

Target Maximum Monthly Production: 89,000 CY

Actual Maximum Monthly Production: ~78,000 CY



Phase 2 Productivity Requirements*

Phase 2 volumes are expected to increase by about 1.5 times over GE's original design

<u>Year</u>	<u>Required Volume</u>	<u>Target Volume</u>
2 through 5	475,300 CY/Year	528,100 CY/Year
6	475,300 CY	264,100 CY
Avg. Daily Rate**	3378 CY	3745 CY
Avg. Monthly Rate***	86,420 CY	96,020 CY

* Based on 2,650,000 CY total volume for Phases 1 and 2

** Based on 6-day week (141 actual days dredging)

*** Based on 5.5 month dredging season (May 1 – Oct. 15)



Major Factors Affecting Productivity During Phase 1

- Scow Unavailability Due to Scow Unloading Capacity at Dewatering Site
- Presence of Slab Wood Debris in Sediment
- Limited Capacity of Mini-Scows
- Underestimated DoC
- Fine Grading to Meet Cut Line Tolerances



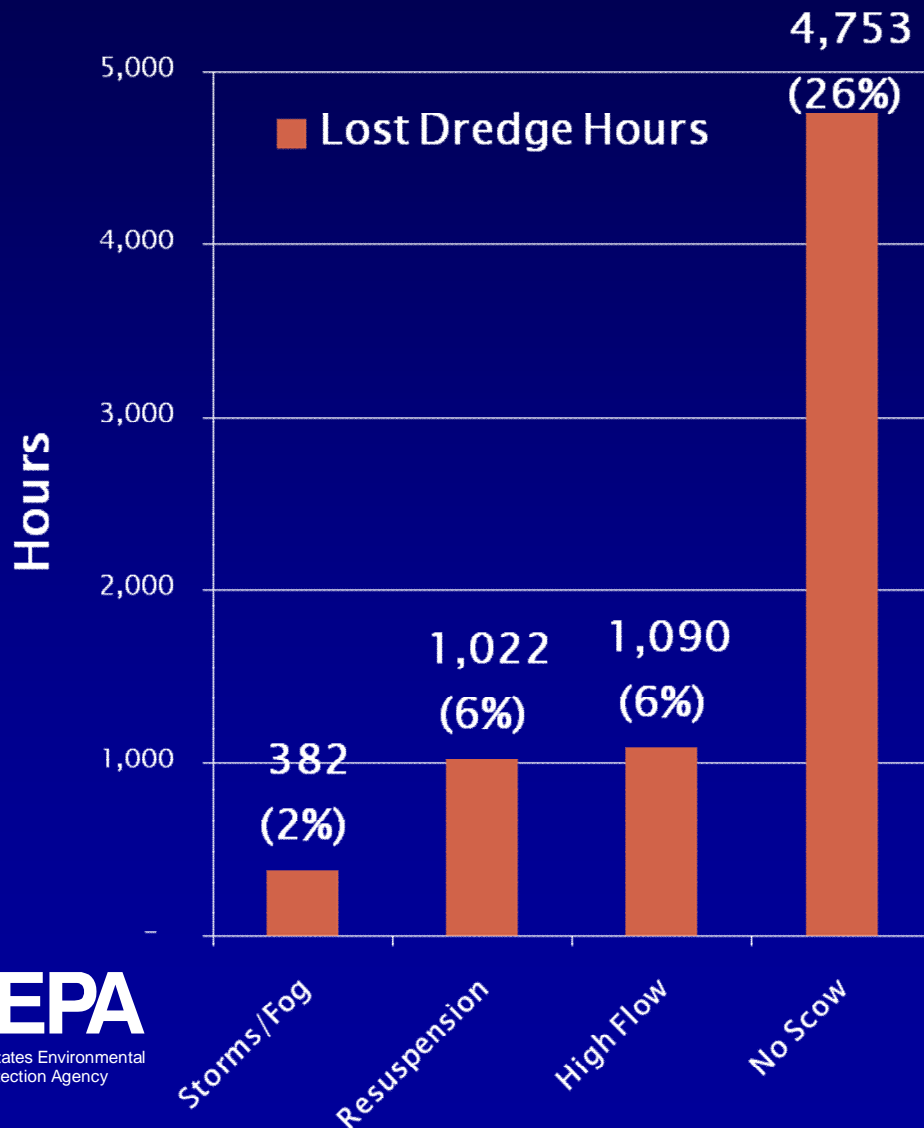
The production rate was largely limited by an inability to unload scows (barges) arriving at the dewatering site at the rate that they were filled by the dredges

Scow Unloading Capacity

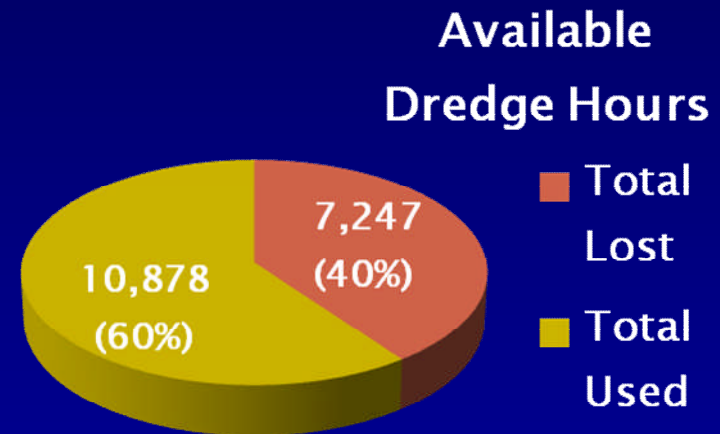
- Unloader Operated 7 Days/Week
- Max. Volume Unloaded: 17,921 CY/Week
- Avg. Volume Required for Phase 2: 22,000 CY/Week
- Max. Volume Required for Phase 2: ~25,000 CY/Week



PCB resuspension resulted in a loss of only approx. 6% (1,000hrs) of available dredging time during Phase 1



Lost Dredging Time



**Total Available Hours
18,125**

Effect of Inadequate Unloading Capacity

- Target Production Rate: **89,000 CY/month**
- Actual Max. Production: **78,000 CY/month**
- Time Lost Awaiting Empty Scows: 1400 hours (same period)
- Production Lost Awaiting Empty Scows: 1400 hours X 26 CY/hour = 36,400 CY
- 78,000 CY + 36,400 CY = **114,400 CY**

Had empty scows been available, the maximum monthly dredging rate could have exceeded 110,000 cy

Phase 2 Productivity Standard Can be Met by:

- Addressing uncertainty in DoC to minimize passes
- Improving scow unloading capacity
- Minimizing fine grading
- Conducting access dredging where needed



The targeted volume of sediments to be removed on a monthly basis during Phase 2 (86,000 CY) can be obtained through improvements in operations

Achieving Project Goals



Simultaneously Meeting Standards

- Efficient dredging of inventory with fewer cuts (**productivity**) leads to fewer bottom disturbances and smaller dredging releases (**resuspension**) and quicker certification of post-dredging concentrations (**residuals**) reducing duration of exposed bottom surface (**resuspension**)
- Per Residuals Standard, appropriate selection of cut lines is important in minimizing re-dredging...and therefore in meeting the standards simultaneously

Phase 1 Reinforces Overall Benefits of Project

- Far more PCBs in the river than estimated
- The river is not “cleaning itself” at the rate predicted by the model used in the 1990s
 - Sediments are not being buried
 - Surface concentrations are 3x higher, and water column concentrations are 2-3 X higher, than 1990s model predicted
 - Both show little or no decline over a decade

Even with an increase in the resuspension standard, completion of the dredging project will result in significant and lasting benefits

Schedule & Public Comment Period



Next Steps

- Final evaluation reports available for public review and comment (through April 22)
- Peer review panel meeting (1st week of May, 3 days)
- Habitat replacement (May-June 2010)
- Peer review panel prepares and delivers report (June 2010)
- EPA and GE discuss potential Phase 2 changes
- GE indicates intention for Phase 2 (Fall 2010)
- Final design/contracting/construction
- Start Phase 2 dredging (2011)

Public Comment Period

- The 45-day public comment period on the Final Phase 1 Evaluation Reports ends on April 22, 2010
- The public can submit comments in writing via **hard copy** or **the Web**

All comments should be sent to:

Hudson River Field Office
421 Lower Main Street
Hudson Falls, NY 12839

Or submitted online:

www.hudson dredging data.com/comments

A screenshot of a web browser displaying the 'Comments Submission Form' for the Hudson River PCBs Superfund Site. The page features the site's logo and a list of monitoring categories on the left, including Water Quality Monitoring, PCB Load, Air Quality Monitoring, and others. The main content area contains a form with various input fields and a 'Submit' button. A small text box at the top right of the form provides instructions for submitting comments.

Where To Find the Report

Hard-copy versions of the EPA Phase 1 Evaluation Report are available at the information repositories located in:

Glens Falls
Fort Edward (Hudson River Field Office)
Ballston Spa
Albany
Poughkeepsie
New York City (EPA Region 2 Office)
Edgewater, New Jersey

Electronic copies can be found online on the Hudson Dredging Data Web site: www.hudsondredgingdata.com/report

GE's Report is available at: www.hudsondredging.com



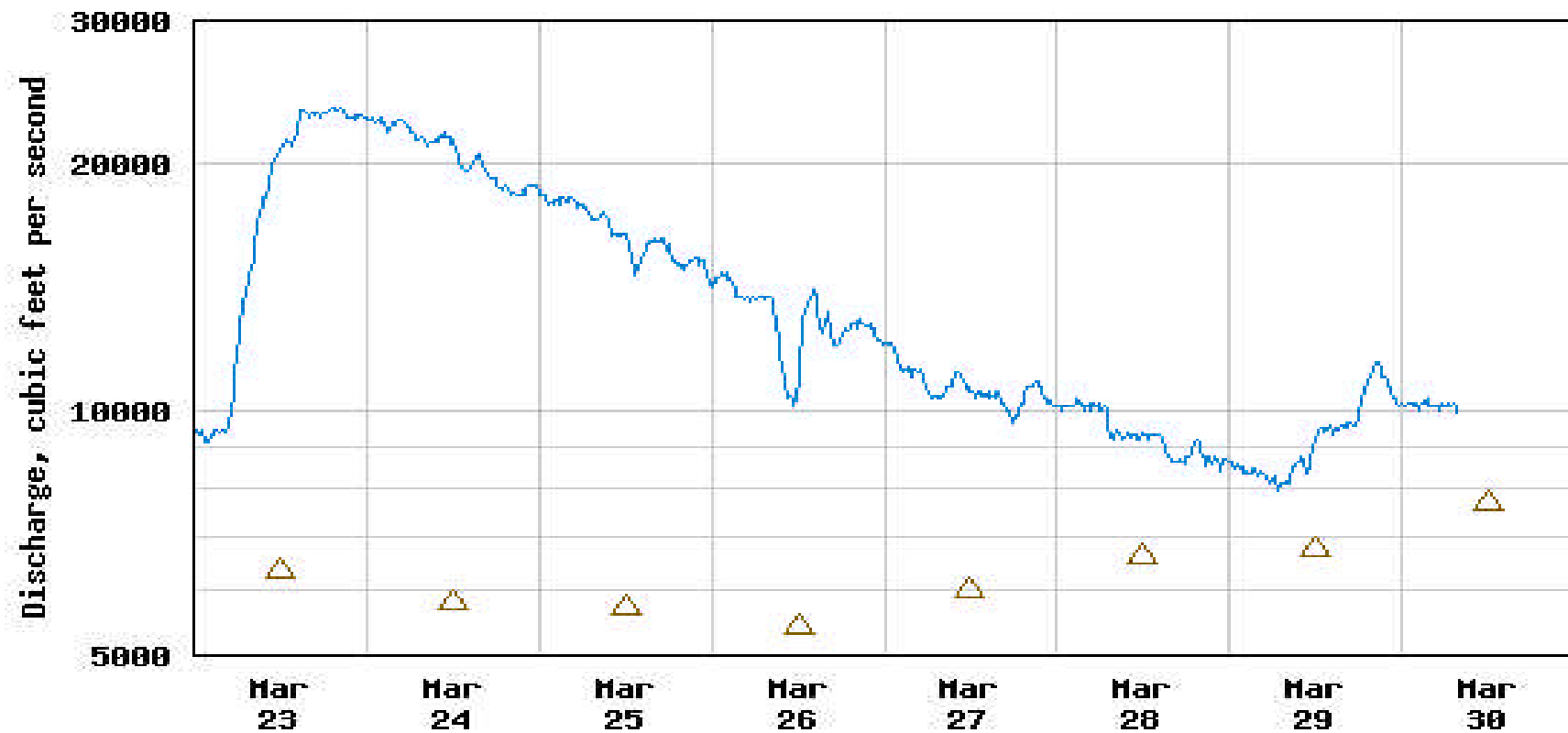
Discussion of Thompson Island Results



Recent Flow Data – Fort Edward



USGS 01327750 HUDSON RIVER AT FORT EDWARD NY



---- Provisional Data Subject to Revision ----

△ Median daily statistic (32 years) — Discharge

Comments/Questions

