



# PCBs in Fish Tissues at the Hudson River PCBs Superfund Site: *Monitoring Update*



# Data Considerations

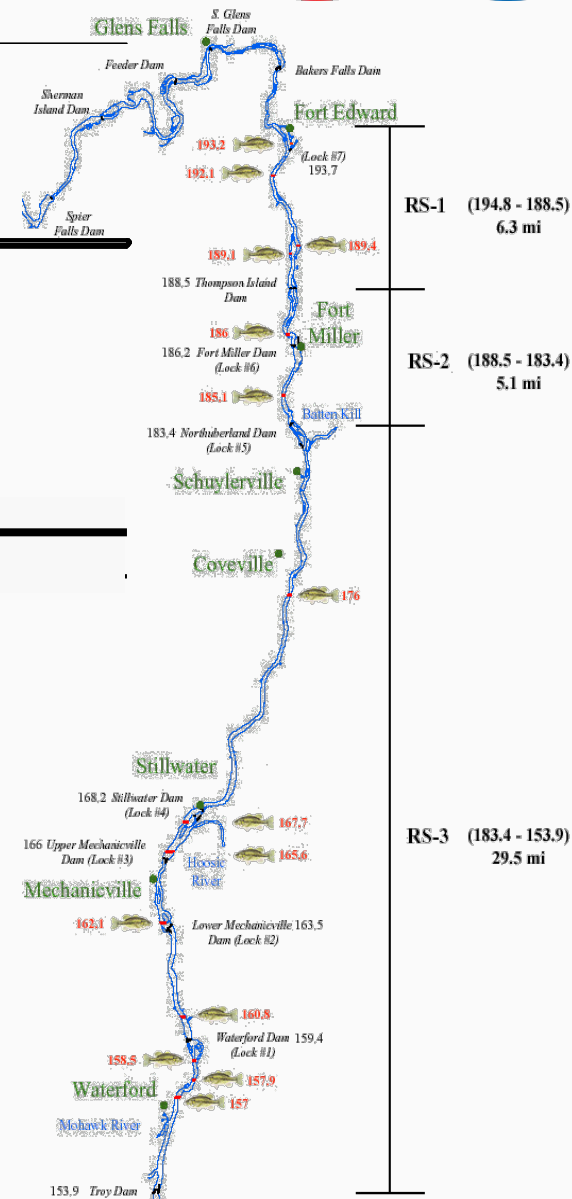


- **Format is consistent with previous CAG fish data presentations**
- **We will present lipid normalized data and point out the period during which NYS standard fillet techniques were not used**
- **We are focusing on recently received 2015 preliminary data (data is still under review)**
  - **2015 fish reflect exposure conditions associated with 2014 dredging activities**
- **Processing of the 2016 RAMP fish is complete, analyses are underway. We anticipate preliminary data by the end of the year.**
  - **2016 spring fish will reflect exposure conditions associated with 2015 dredging activities**
  - **2016 fall fish may reflect different exposure conditions due to reduced dredging activities in 2015 and these species shorter life cycles**
- **2017 fish will be the first data set that will reflect post-dredging exposure conditions**

# Baseline, Remedial Action & Long Term Fish Monitoring for Upper River



River Area	No. Spp. Groups	No. Individ/Spp Groups	Total Samples
<b>Feeder Dam</b>	<b>4</b>	<b>20</b>	<b>80</b>
<b>RS-1</b>	<b>4</b>	<b>30</b>	<b>120</b>
<b>RS-2</b>	<b>4</b>	<b>25</b>	<b>100</b>
<b>RS-3</b>	<b>4</b>	<b>30</b>	<b>120</b>



## Spring Collected (Fillet):



Largemouth Bass  
(*Micropterus salmoides*)



Smallmouth Bass  
(*Micropterus dolomieu*)



Yellow Perch  
(*Perca flavescens*)



Brown Bullhead  
(*Ictalurus nebulosus*)

## Fall Collected (Whole Body):



Pumpkinseed  
(*Lepomis gibbosus*)



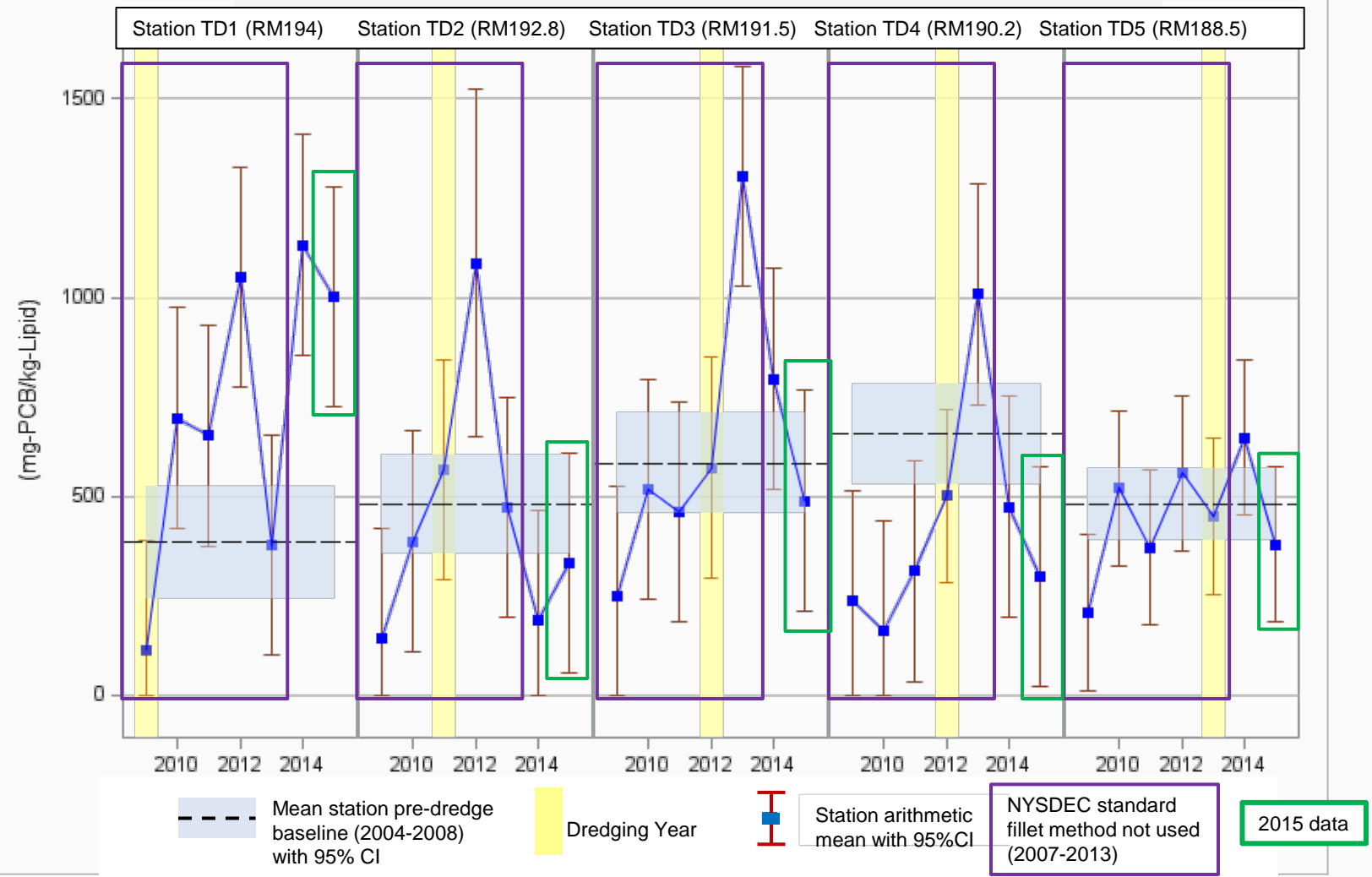
Spottail Shiner  
(*Notropis hudsonius*)

# Comparison to Baseline

## Upper Hudson River 2009-2015



Black Bass at Thompson Island Pool (TIP) 2009-2015  
Lipid Normalized PCB (LPCB, mg/kg-Lipid)

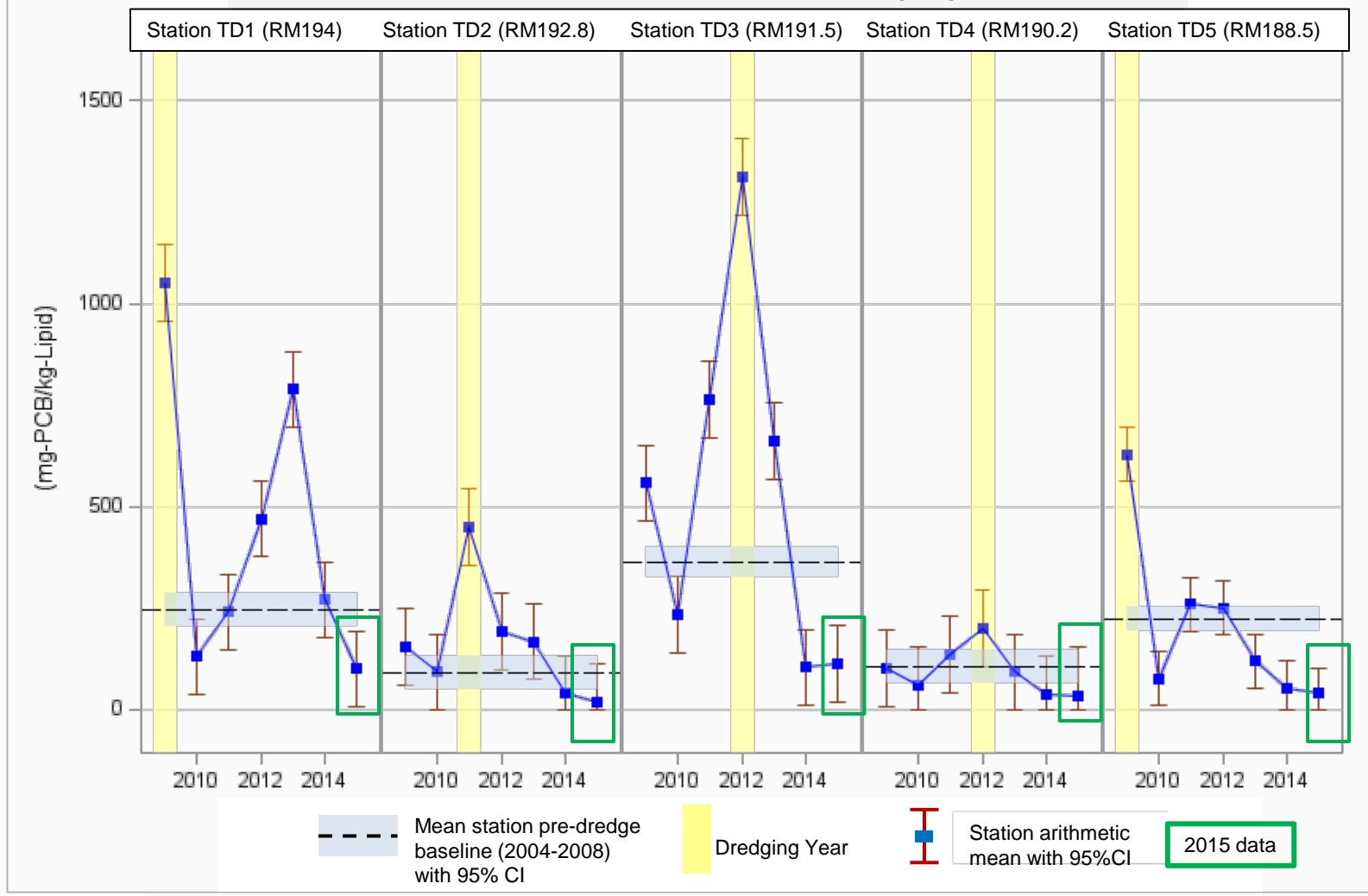


# Comparison to Baseline

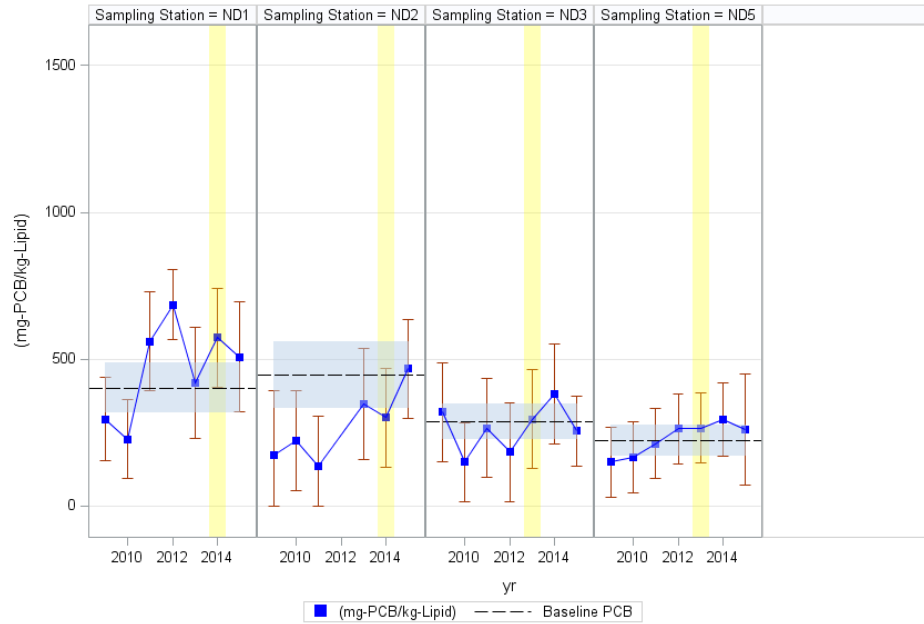
## Upper Hudson River 2009-2015



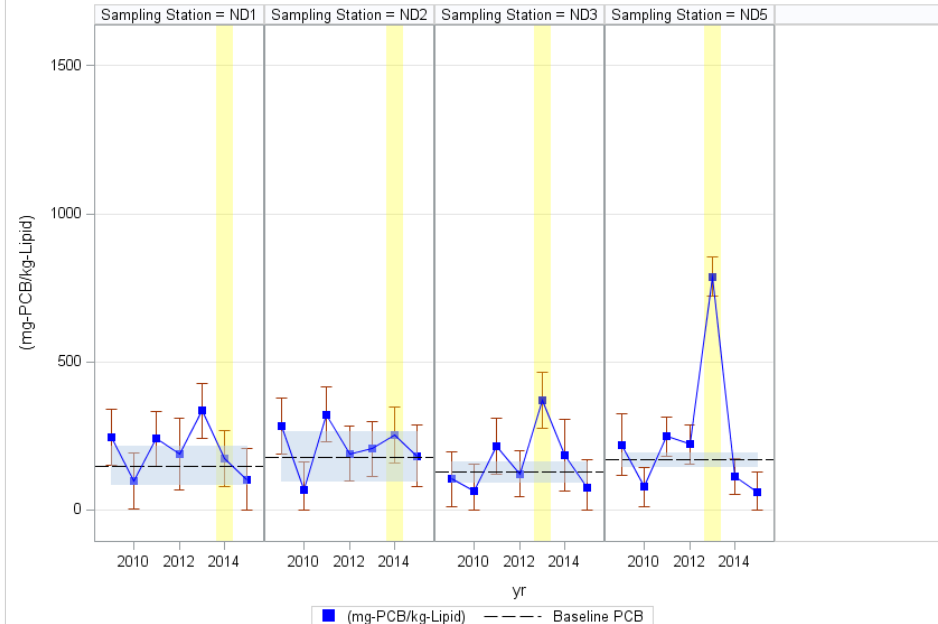
Pumpkinseed at Thompson Island Pool (TIP) 2009-2015  
Lipid Normalized PCB (LPCB, mg/kg-Lipid)



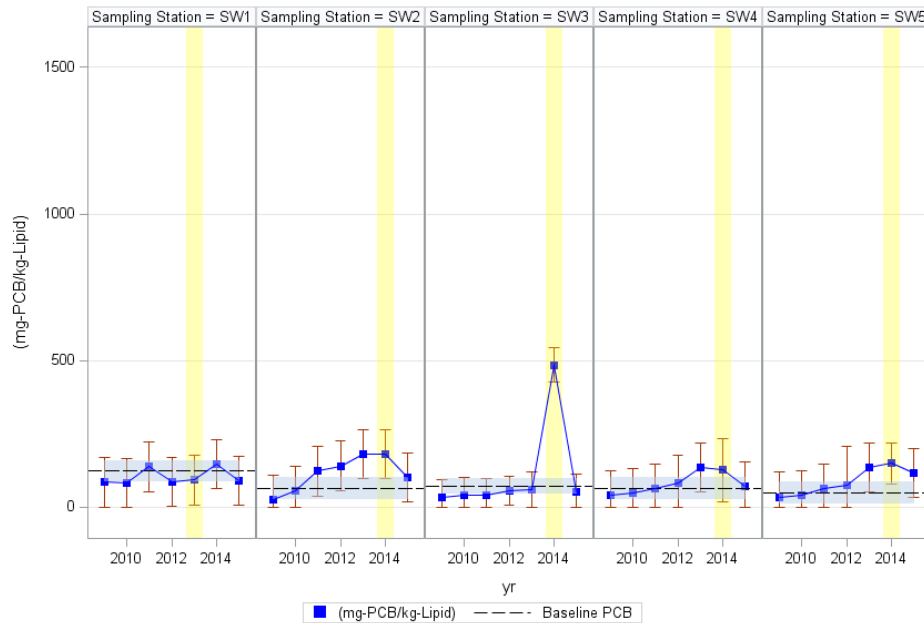
**Brown Bullhead at Northumberland Pool 2009-2015**  
Lipid Normalized PCB (LPCB, mg/kg-Lipid)



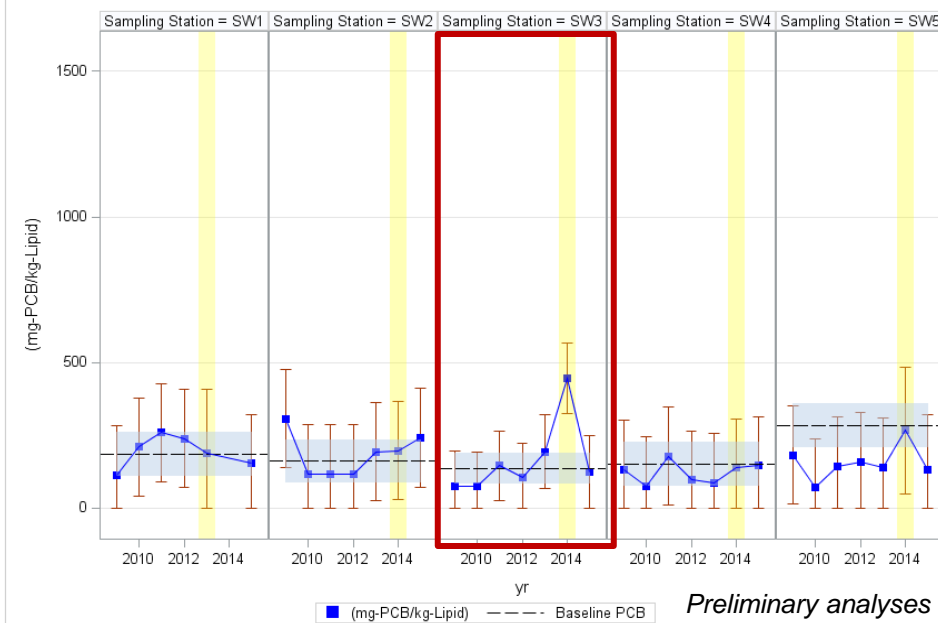
**Pumpkinseed at Northumberland Pool 2009-2015**  
Lipid Normalized PCB (LPCB, mg/kg-Lipid)



**Yellow Perch at Stillwater Pool 2009-2015**  
Lipid Normalized PCB (LPCB, mg/kg-Lipid)

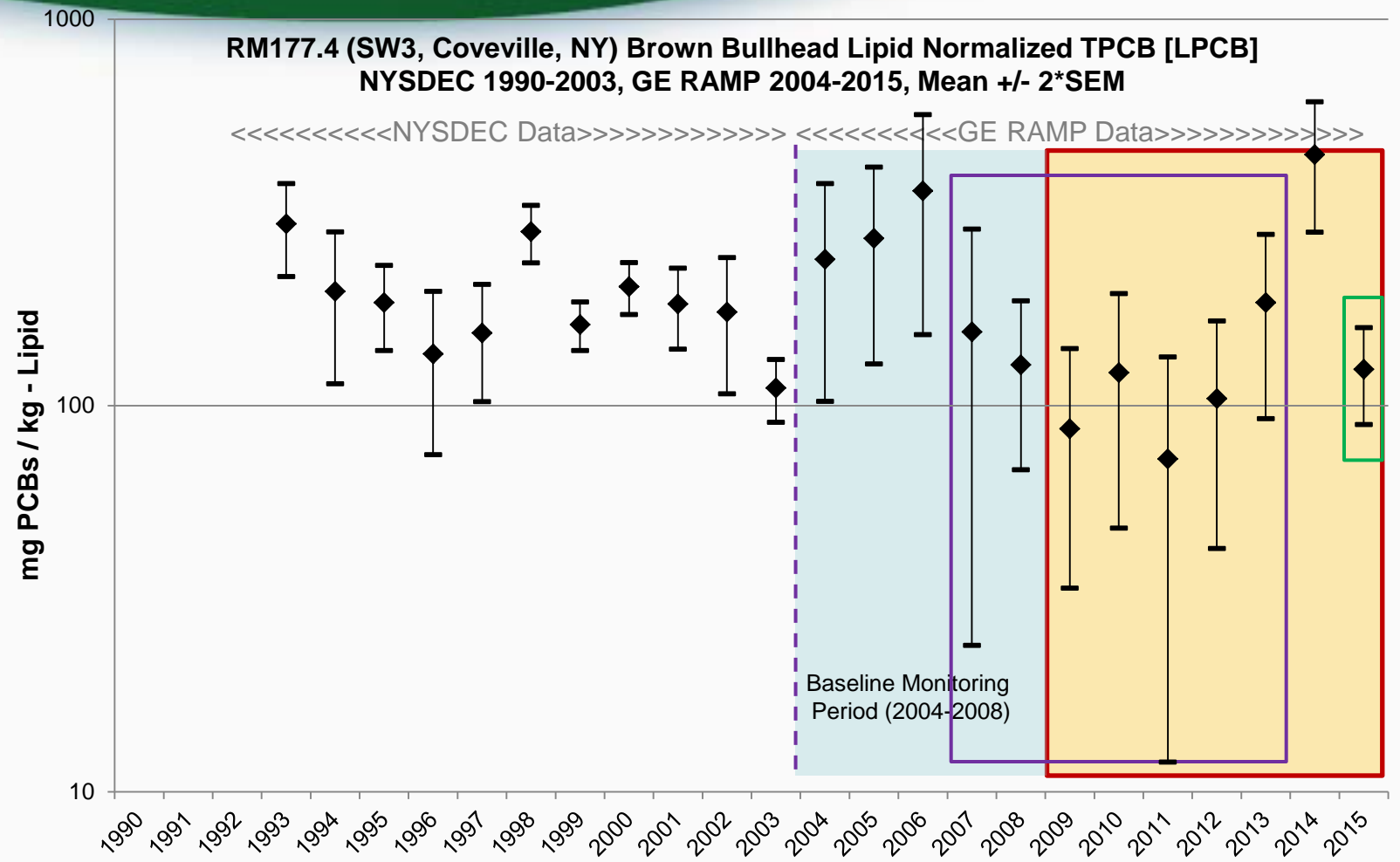


**Brown Bullhead at Stillwater Pool 2009-2015**  
Lipid Normalized PCB (LPCB, mg/kg-Lipid)



*Preliminary analyses*

# Upper Hudson River Brown Bullhead Tissue PCBs at Coveville, NY (1990-2015)



Mean Lipid Normalized TPCB + 2x Standard Error of the Mean  
 Mean Lipid Normalized TPCB sum of Aroclors  
 Mean Lipid Normalized TPCB - 2x Standard Error of the Mean

GE assumes data collection/analysis (2004)

NYSDEC Standard Fillet Approach Not Used 2007-2013

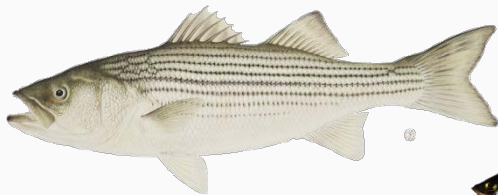
Upper Hudson River Dredging (2009-2015) and station (SW3) outlined on previous slide

# Baseline, Remedial Action & Long Term Fish Monitoring for Lower River



River Area (Station)	River Mile	No. Spp. Groups	No. Individ/ Group	Total Samples
Albany/Troy (Spring)	152	4	20	80
Albany/Troy (Fall)		2		30
Catskill	113	3	20	60
Tappan Zee	25	1	20	20

## Spring Collected & Filleted:



Striped Bass (*Morone saxatilis*)



White Perch (*Morone americana*)



Smallmouth Bass (*Micropterus dolomieu*)



White Catfish (*Ictalurus catus*)

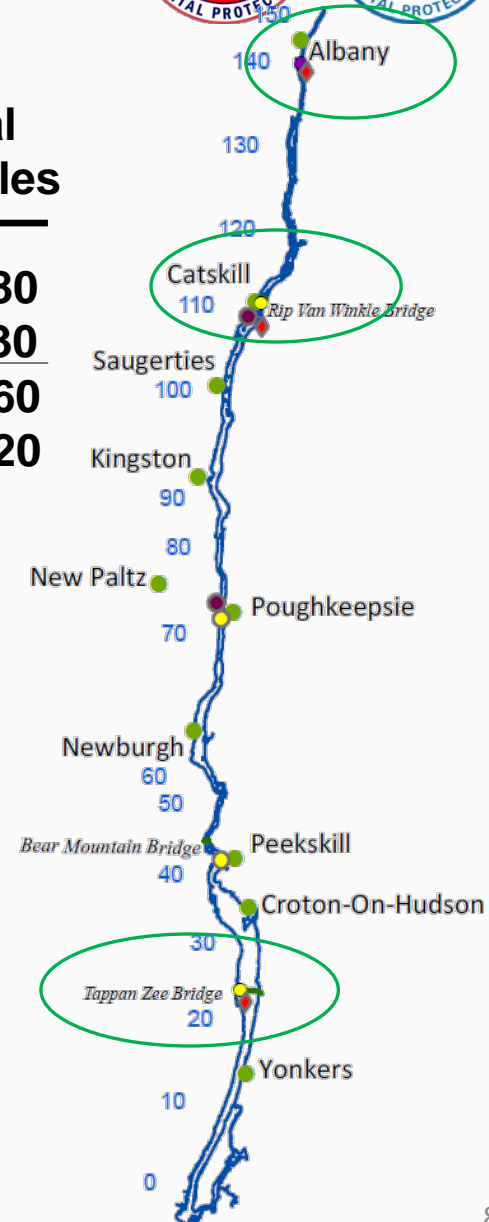
## Fall Collected & Ground Whole (Albany/Troy):



Pumpkinseed (*Lepomis gibbosus*)

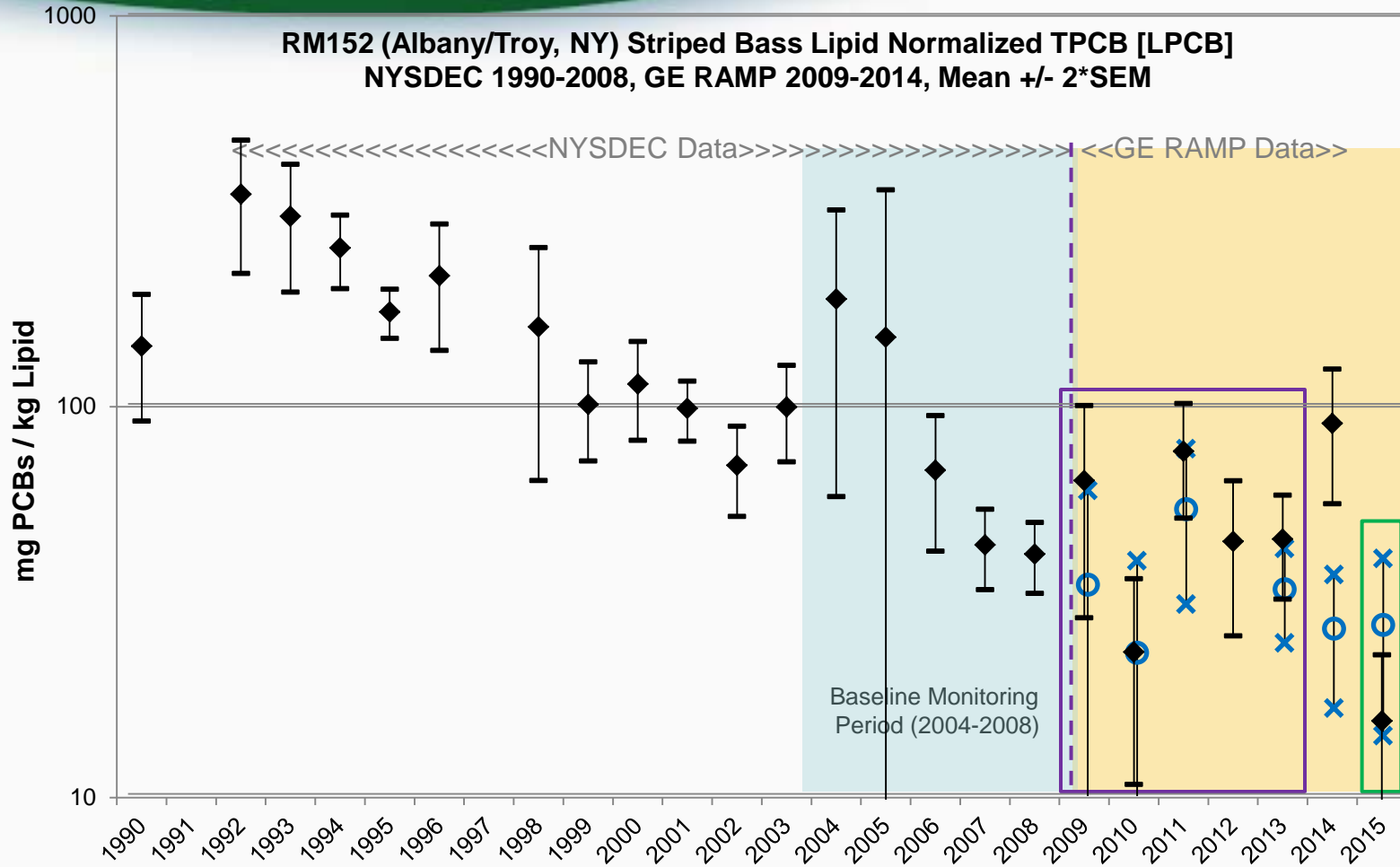


Spottail Shiner (*Notropis hudsonius*)





# Lower Hudson River Striped Bass Tissue PCBs at Albany/Troy (1990-2015)

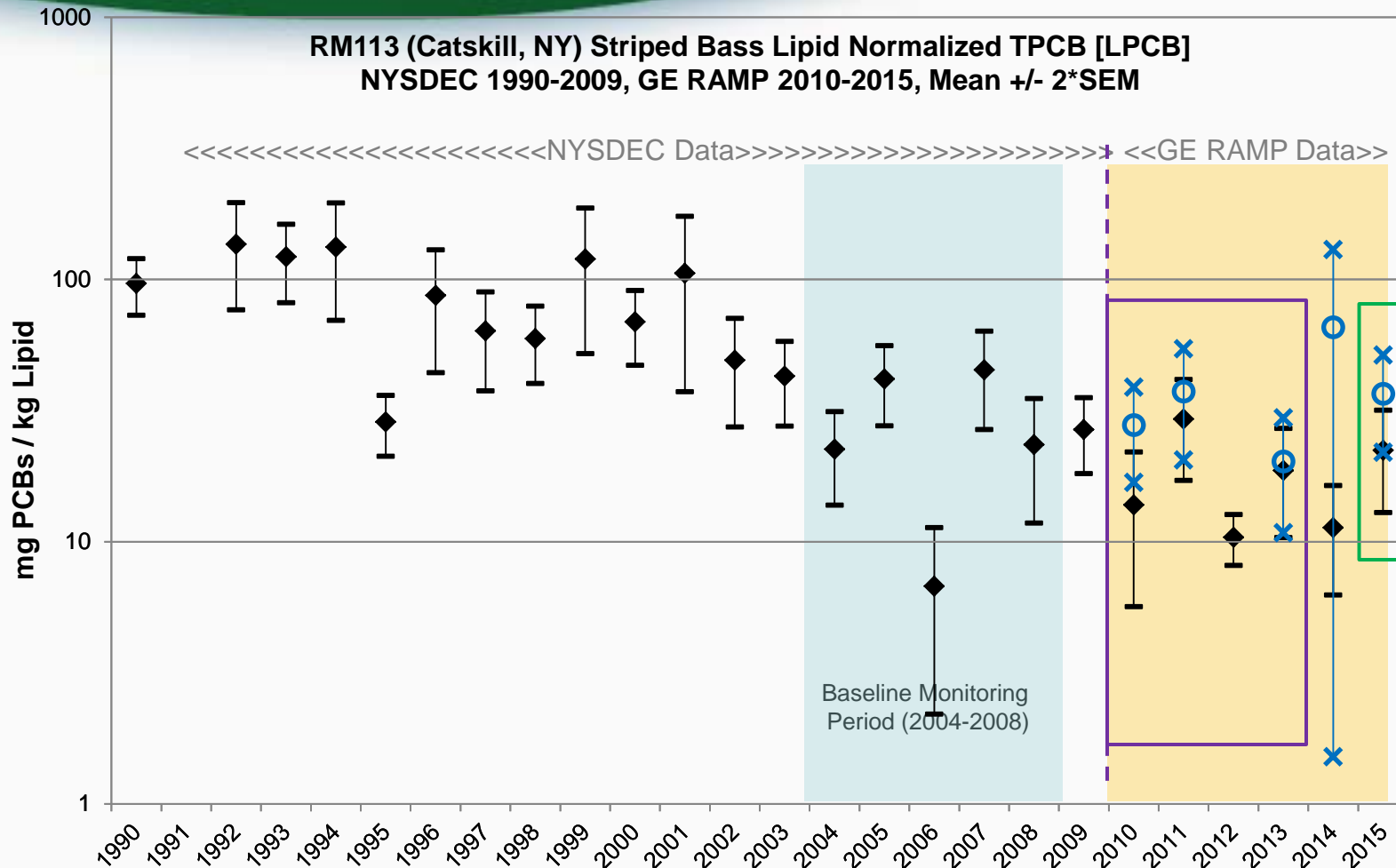


Blue circles are LPCB means and X's are +/- 2\*SEM. Data collected by NYSDEC during dredging and concurrent with RAMP

Mean Lipid Normalized TPCB + 2x Standard Error of the Mean  
 Mean Lipid Normalized TPCB sum of Aroclors  
 Mean Lipid Normalized TPCB - 2x Standard Error of the Mean



# Lower Hudson River Striped Bass Tissue PCBs at Catskill (1990-2015)



Blue circles are LPCB means and X's are +/- 2\*SEM. Data collected by NYSDEC during dredging and concurrent with RAMP

Mean Lipid Normalized TPCB + 2x Standard Error of the Mean  
 Mean Lipid Normalized TPCB sum of Aroclors  
 Mean Lipid Normalized TPCB - 2x Standard Error of the Mean

NYSDEC Standard Fillet Approach Not Used 2009-2013

GE assumes data collection/analysis (2009)

Upper Hudson River Dredging (2009-2015)

# Species Weighted Average Fish Tissue PCBs (2004-2015)



## UHR Largemouth Bass, Brown Bullhead, and Yellow Perch Expressed as Species Weighted Average (mg/kg-wet weight, TPCB-Aroclors) 2004-2015

RS and Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
RS1 Largemouth Bass	1.98	2.29	2.53	2.04	1.45	0.67	2.16	1.05	1.56	2.36	2.18	2.50
RS1 Brown Bullhead	8.33	4.02	3.99	4.30	2.11	3.57	5.14	3.41	5.63	4.03	3.93	1.61
RS1 Yellow Perch	2.39	0.66	1.61	0.84	0.61	0.64	0.84	1.12	2.00	1.11	1.37	1.07
RS2 Largemouth Bass	2.72	1.94	2.33	1.64	0.87	0.77	1.63	1.43	2.02	1.84	2.85	2.05
RS2 Brown Bullhead	5.63	5.80	4.14	3.15	5.19	3.96	2.70	3.98	5.65	4.69	5.00	1.98
RS2 Yellow Perch	1.65	0.61	1.29	0.43	0.45	0.50	0.76	0.75	1.27	1.52	1.81	1.23
RS3 Largemouth Bass	1.33	1.55	2.55	0.82	0.54	0.67	1.25	0.69	2.47	1.65	1.73	0.83
RS3 Brown Bullhead	2.42	3.53	3.93	3.15	1.66	2.00	1.81	2.46	2.14	2.12	3.81	1.75
RS3 Yellow Perch	1.31	0.37	0.66	0.42	0.28	0.20	0.26	0.36	0.55	0.44	2.53	0.62
ROD Spp*Length UHR Weighted Avg	2.53	2.56	3.01	2.03	1.33	1.44	1.78	1.67	2.52	2.10	2.87	1.42
RS1 Spp Weighted Avg	4.81	2.91	3.09	2.93	1.66	1.94	3.35	2.10	3.39	2.98	2.88	1.98
RS2 Spp Weighted Avg	3.90	3.52	3.03	2.20	2.74	2.15	2.02	2.49	3.55	3.07	3.70	1.94
RS3 Spp Weighted Avg	1.81	2.31	2.98	1.81	1.01	1.21	1.41	1.44	2.15	1.75	2.72	1.21

\* 2015 data are preliminary (data validation is on-going)

# Key Points



- **We expected that short-term increases in fish PCB levels would be observed during dredging**
- **The long-term data generally indicate a pre-dredge period of natural recovery that we expect will recur now that dredging and source control efforts have been implemented**
- **Observed changes in fish tissue concentrations are consistent with expectations**
- **Future:**
  - **EPA is preparing fish data on a homolog equivalent basis for comparative purposes**
  - **Annual Monitoring will continue, OM&M monitoring plan for fish and water will be further discussed in 2017**



Questions?