Community Advisory Group (CAG) Meeting
Hudson River PCBs Superfund Site
Saratoga Springs, NY, 04 April 2013

PCBs in Fish Tissues at the Hudson River PCBs Superfund Site:

Update on Results of Baseline and Remedial Action Monitoring (2004-2012)

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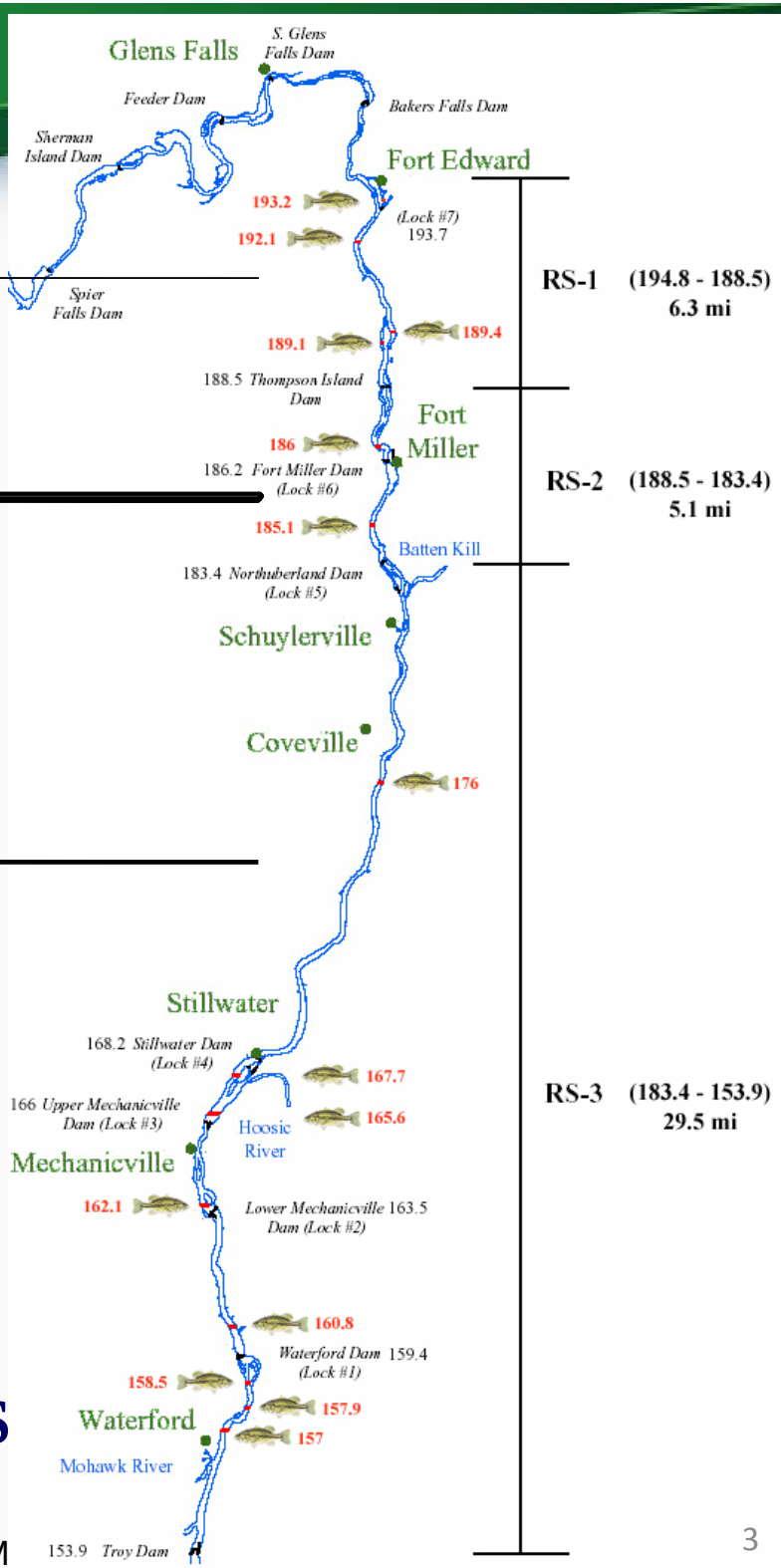
Background and Objectives

- Risk from fish consumption by humans and wildlife was the key driver for remediation
- Fish monitoring in the river since 1970s and will continue
- Since 2003: Baseline, remedial action, and post-remedy monitoring that was designed to provide statistical power to address both short- and long-term needs
  - Allows evaluation of annual (short term) changes *and* establishment of long-term trends
  - Allows documentation of interim risk reduction following the remedial action
  - We need to demonstrate that the remedy is moving toward, or achieving RAOs (remedy effectiveness)

Baseline, Remedial Action & Long Term* Fish Monitoring Plans for UHR

River Area	No. Spp. Groups	No. Indiv/Spp Groups	Total Samples
Feeder Dam	4	20	80
RS-1	4	30	120
RS-2	4	25	100
RS-3	4	30	120
Albany/Troy	4	20	80



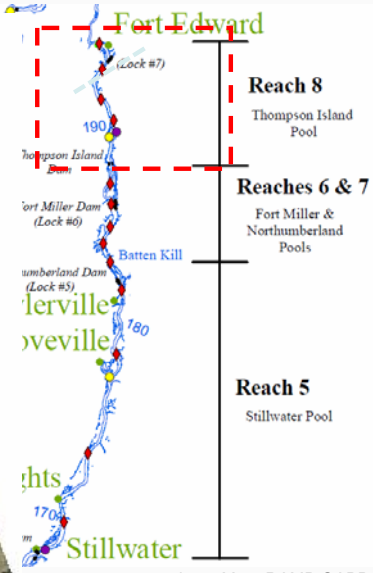
Four species/groups sampled ANNUALLY:

- Top-level pred: Blk Bass (LMB, SMB) SF
- Water col feeder: Perch (YP) SF
- Bottom-feeder: Bullhead (YB, BB) SF
- Yearling: Pumpkinseed WH

Annual composites of Forage Fish; n=10 per RS

* The LTMP may be modified after 3 years of OM&M

River Section 1 Fish Monitoring Stations and Dredging by Year



Inset Map, RAMP QAPP Anchor/QEA 2009

Roger's Island
River Mile 194

TD1
RM 194.1

TD2
RM 193

TD3
RM 191.9

TD4
RM 190.8

TD5F
RM 190

TD5S
RM 190

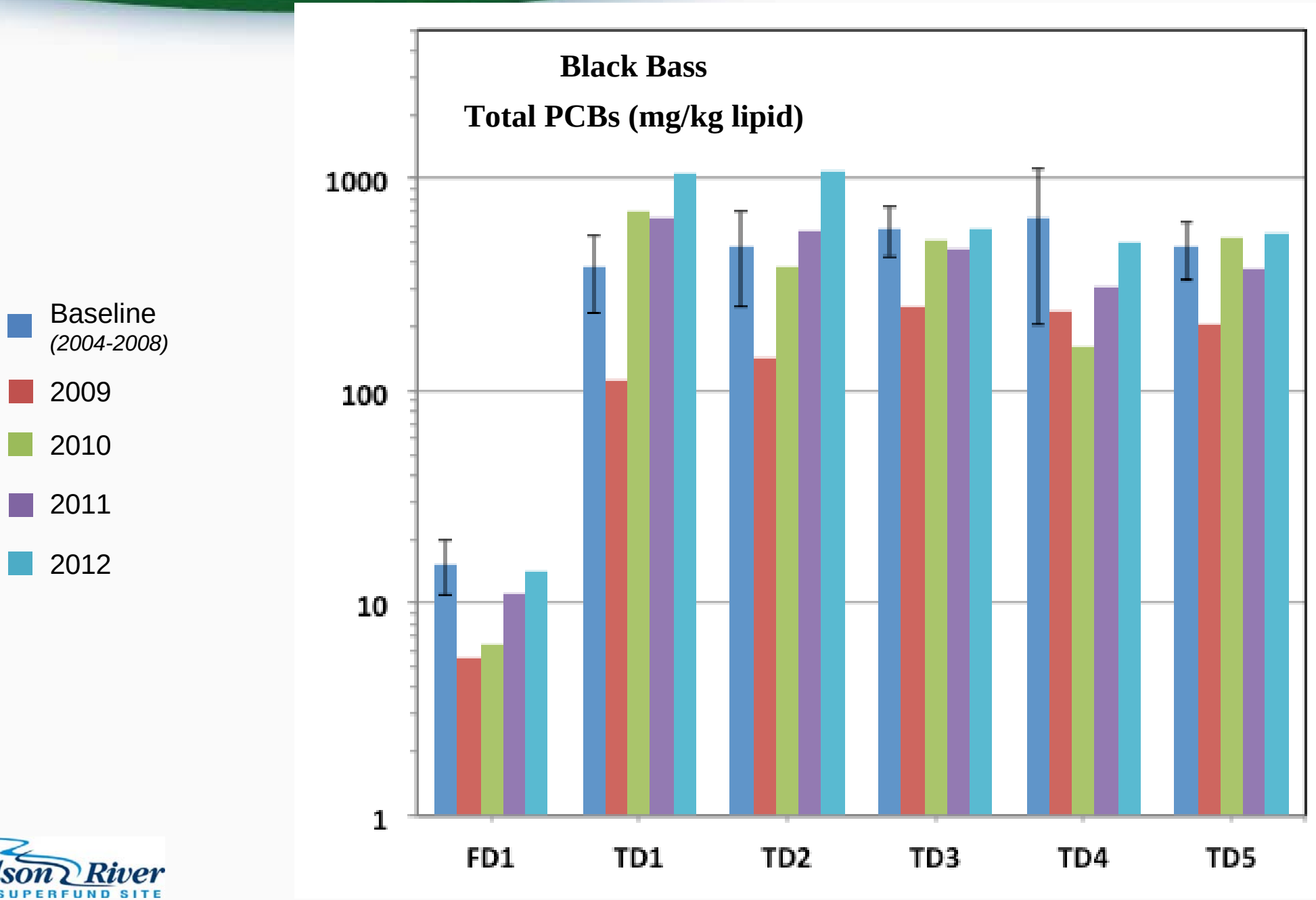
Phase 1 CU Boundaries (2009)
Ph 2 Yr 1 CU Boundaries (2011)
Ph 2 Yr 2 CU Boundaries (2012)
Ph 2 CU Boundaries to be Dredged

Thompson Island
Dam
River Mile 188.5

Note: TD5S (WGIA) not dredged before spring 2012 fish data collection

Orthoimagery From Habitat Delineation Report (QEA 2008)

Comparison of Baseline to 2009, 2010 2011 & 2012



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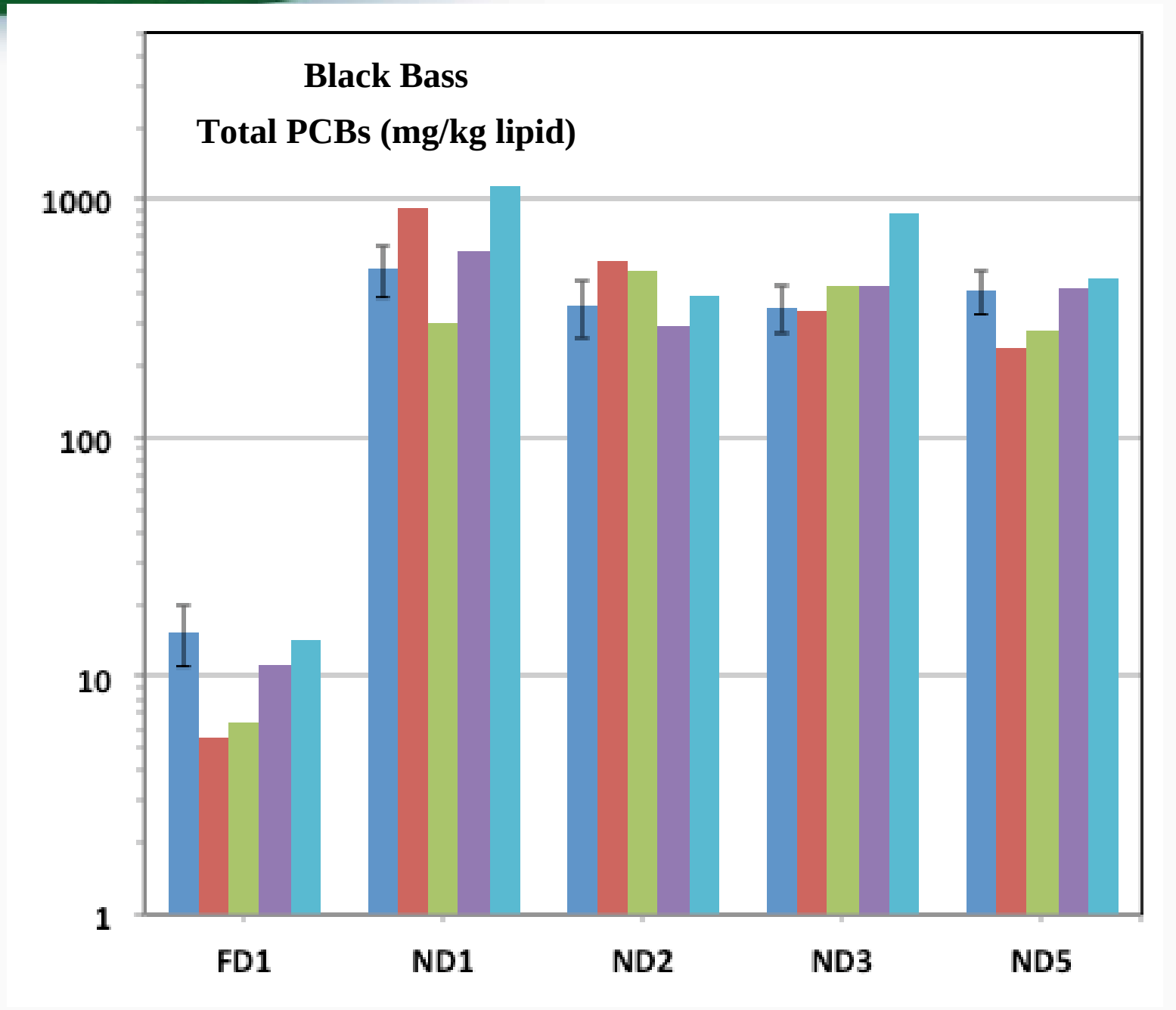

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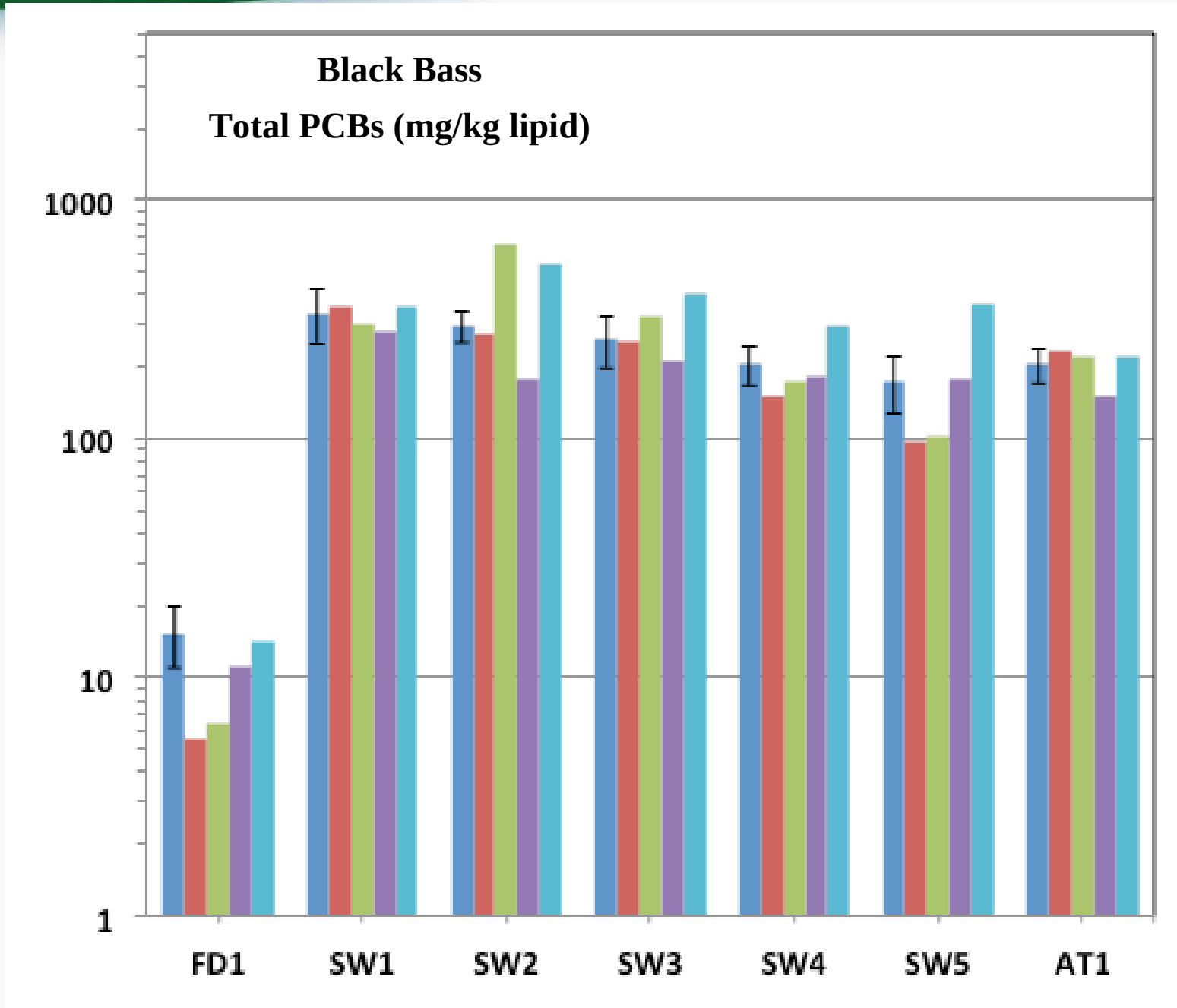

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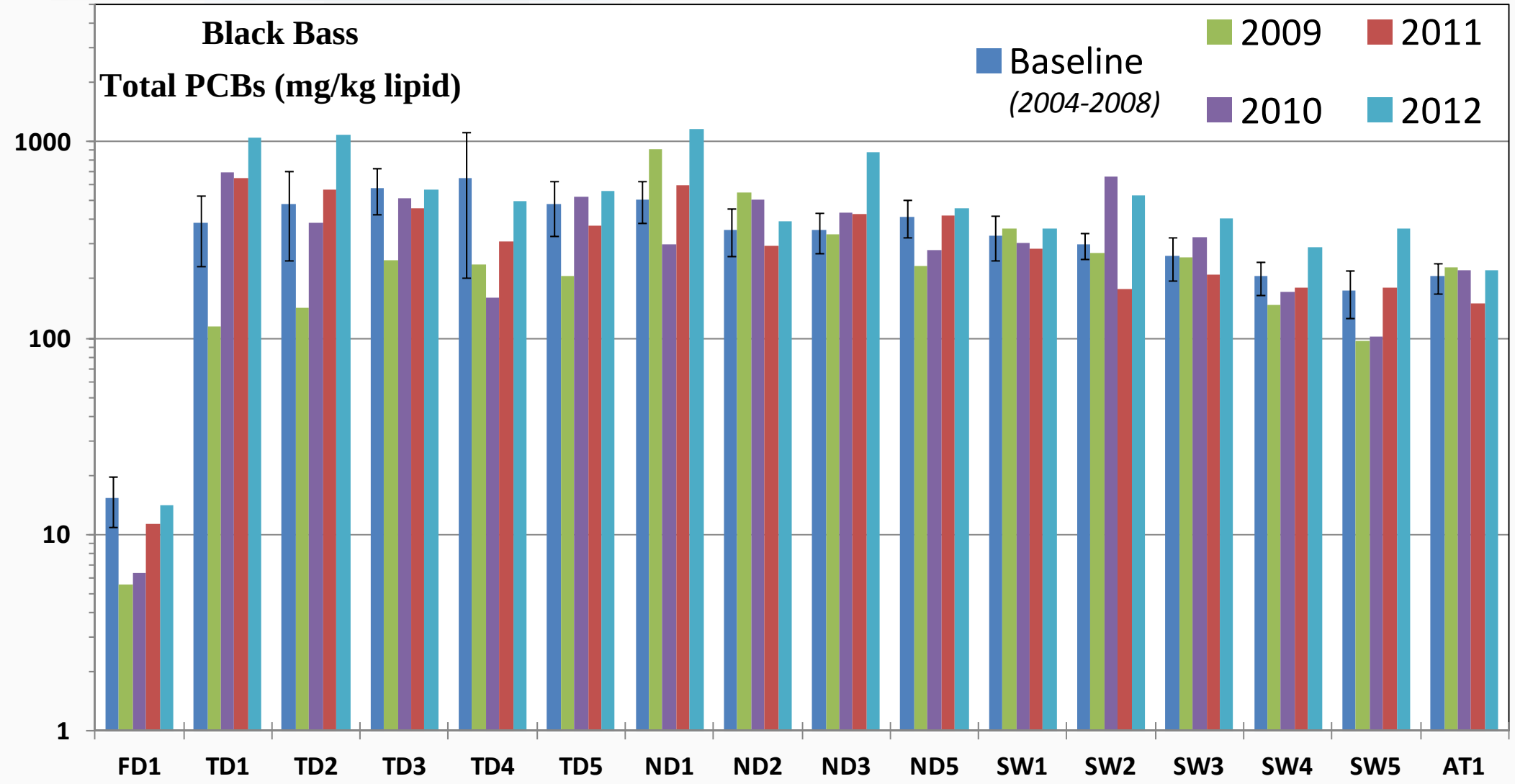

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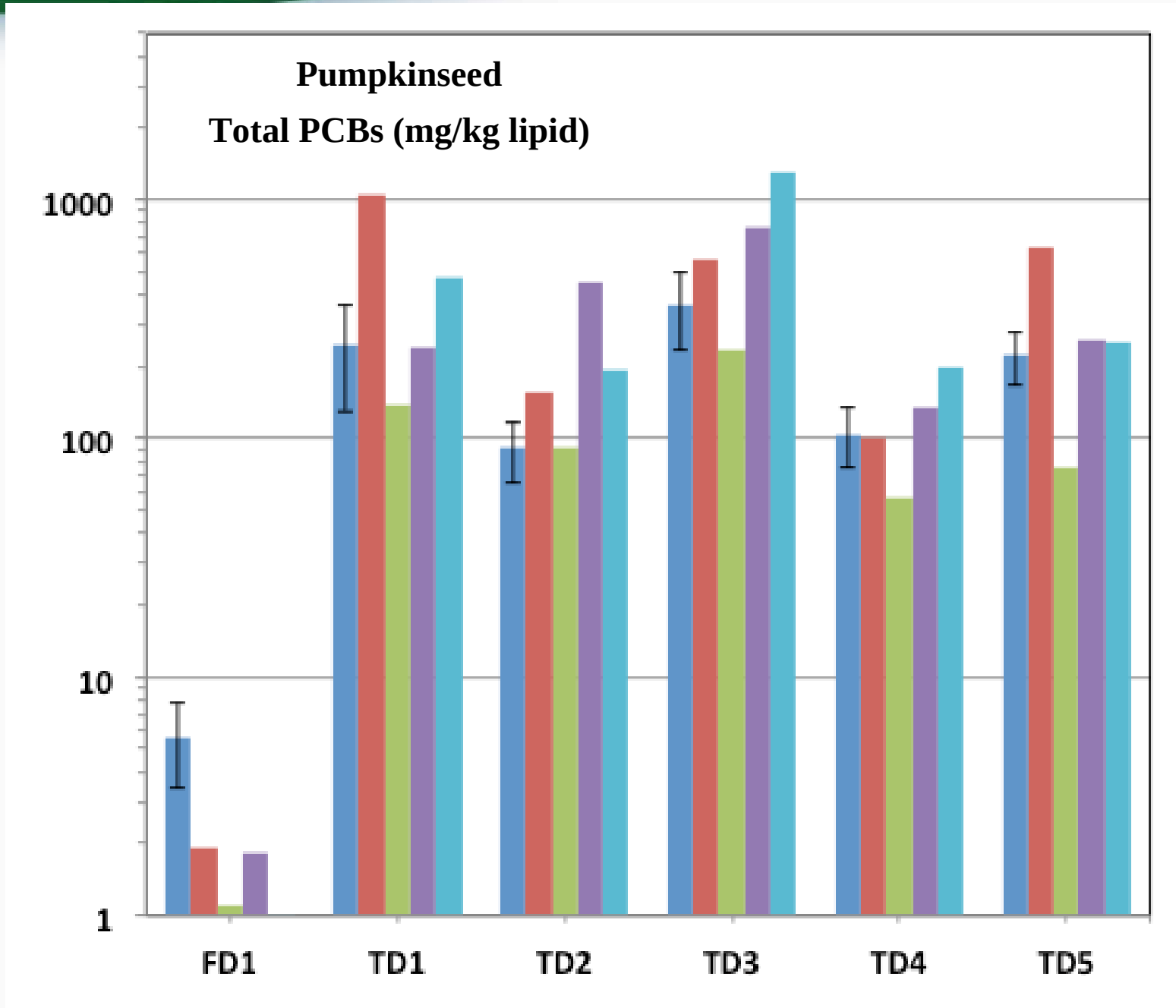

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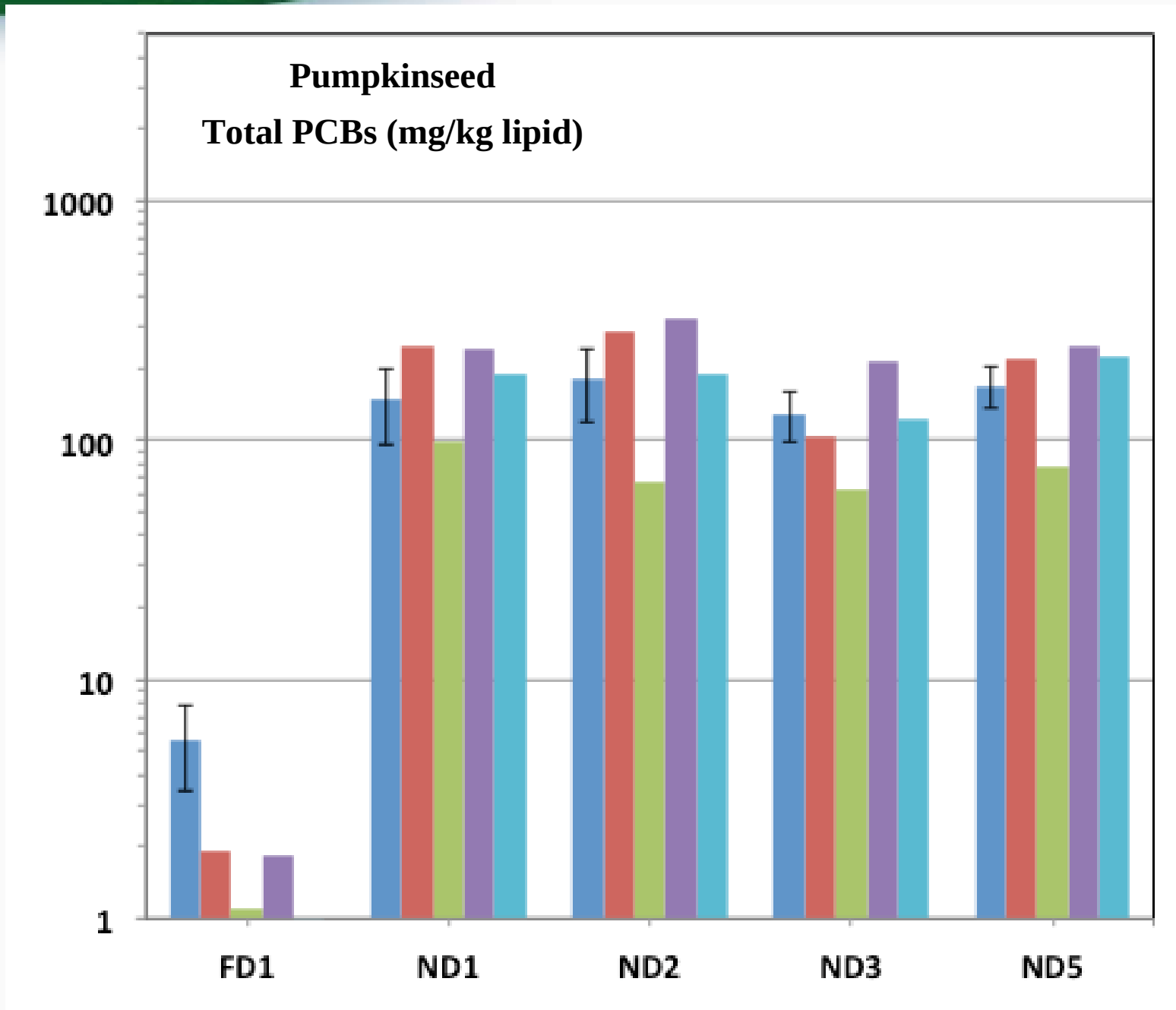

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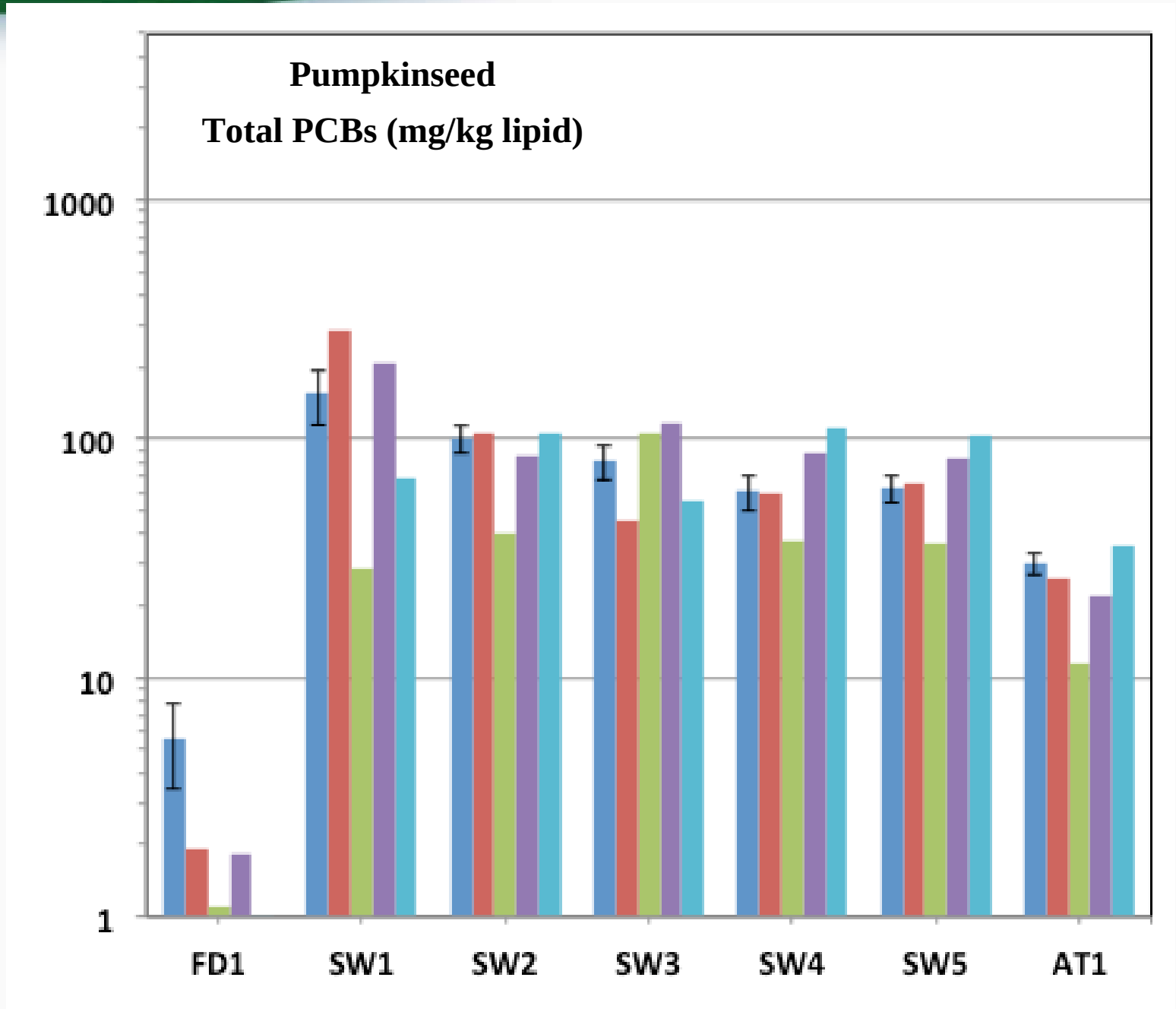

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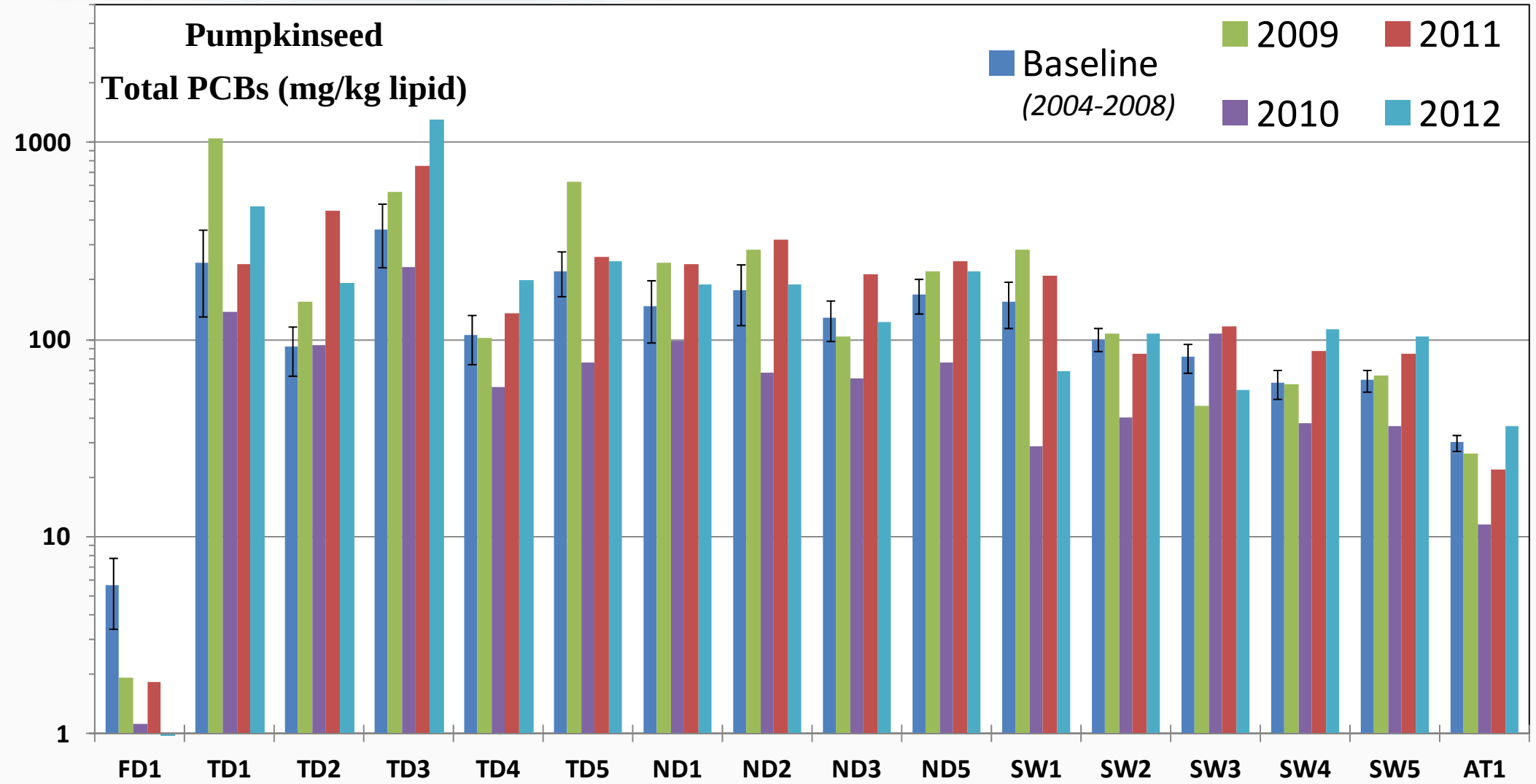

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Total PCBs in Fish Tissues: Means Comparisons

SECTION	STATION	Approx. River Mile	Black Bass	Bullhead	Yellow Perch	Pumpkin-seed
1	ALL	188.5-195	-		-	+
2	ALL	183.4-188.5	(-)		-	+
3	ALL	168.2-183.2		-	-	

2009 vs. Baseline
(Phase 1)

1	All	188.5-195	+		+	-
2	All	183.4-188.5	(+)		(+)	-
3	All	168.2-183.2	(+)	(-)		-

2010 vs. 2009
(No Dredging)

1	All	188.5-195				-
2	All	183.4-188.5		-		-
3	All	168.2-183.2		-		-

2010 vs. Baseline
(No Dredging)

1	All	188.5-195			+	+
2	All	183.4-188.5			+	+
3	All	168.2-183.2				+

2011 vs. Baseline
(Phase 2, Yr 1)

1	All	188.5-195		+	+	+
2	All	183.4-188.5		+	+	(+)
3	All	168.2-183.2	+			

2012 vs. Baseline
(Phase 2, Yr 2)

	Neutral p>0.10	+	Increase Post Dredging; p < 0.05
-	Decrease Post Dredging; p < 0.05	()	0.05< p < 0.10

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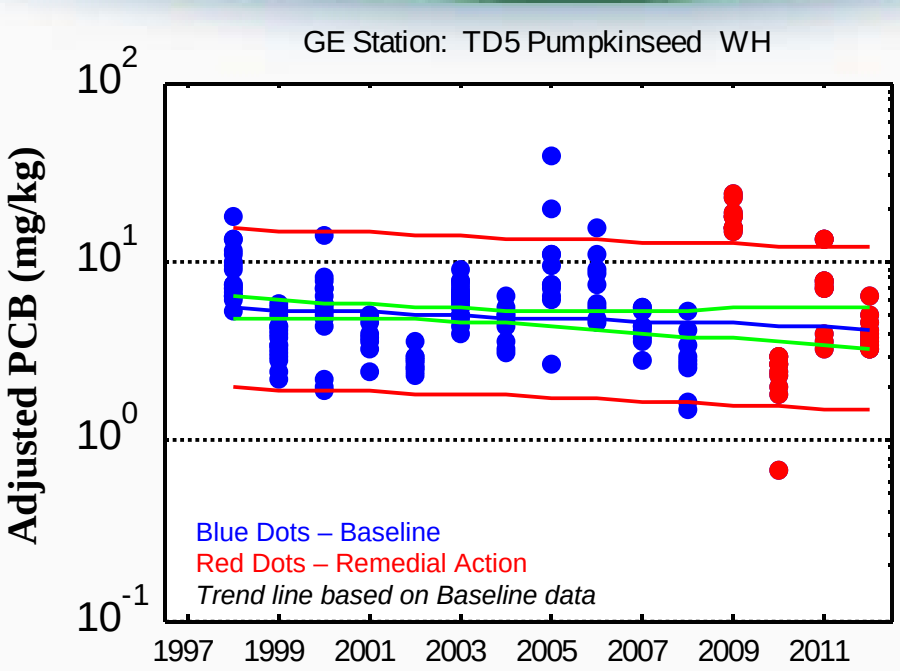
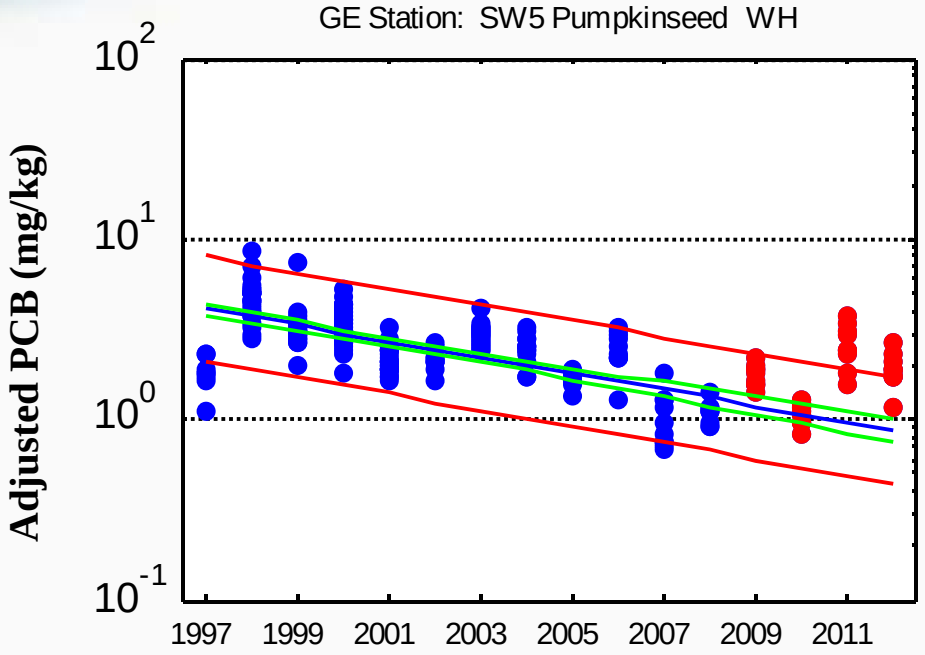
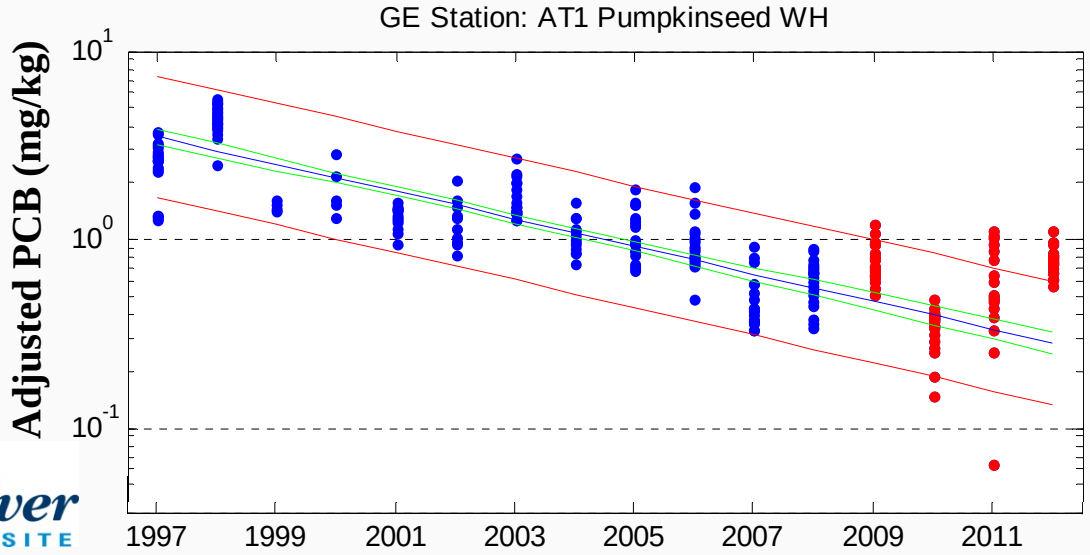
Ability to evaluate annual & spatial patterns is important







Variability:

Approx. one order of magnitude range of conc.

- Within each yr;
- Within & among stations
- Within reach or section

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Perspective

- We have expected that short-term increases in fish PCB levels would occur during dredging
  - These apparent dredging impacts were observed in 2009 within or immediately below the Phase 1 dredging areas
  - Recovery of the pumpkinseed (rapid integrators) was observed in 2010 (no dredging)
  - Pattern of increases in tissues was observed again upon Phase 2 dredging

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Perspective

- We anticipate that short-term, dredging related increases of PCBs in fish will rapidly return to baseline levels, and continue to decline thereafter following remediation
  - Exposures related to dredging are expected to be brief
    - Dredging only occurs in a given area for single dredging season, or a portion thereof (weeks to months)
    - Tissue concentrations of PCBs in fish have been shown to decrease rapidly following spikes related to exposure events and environmental dredging.

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

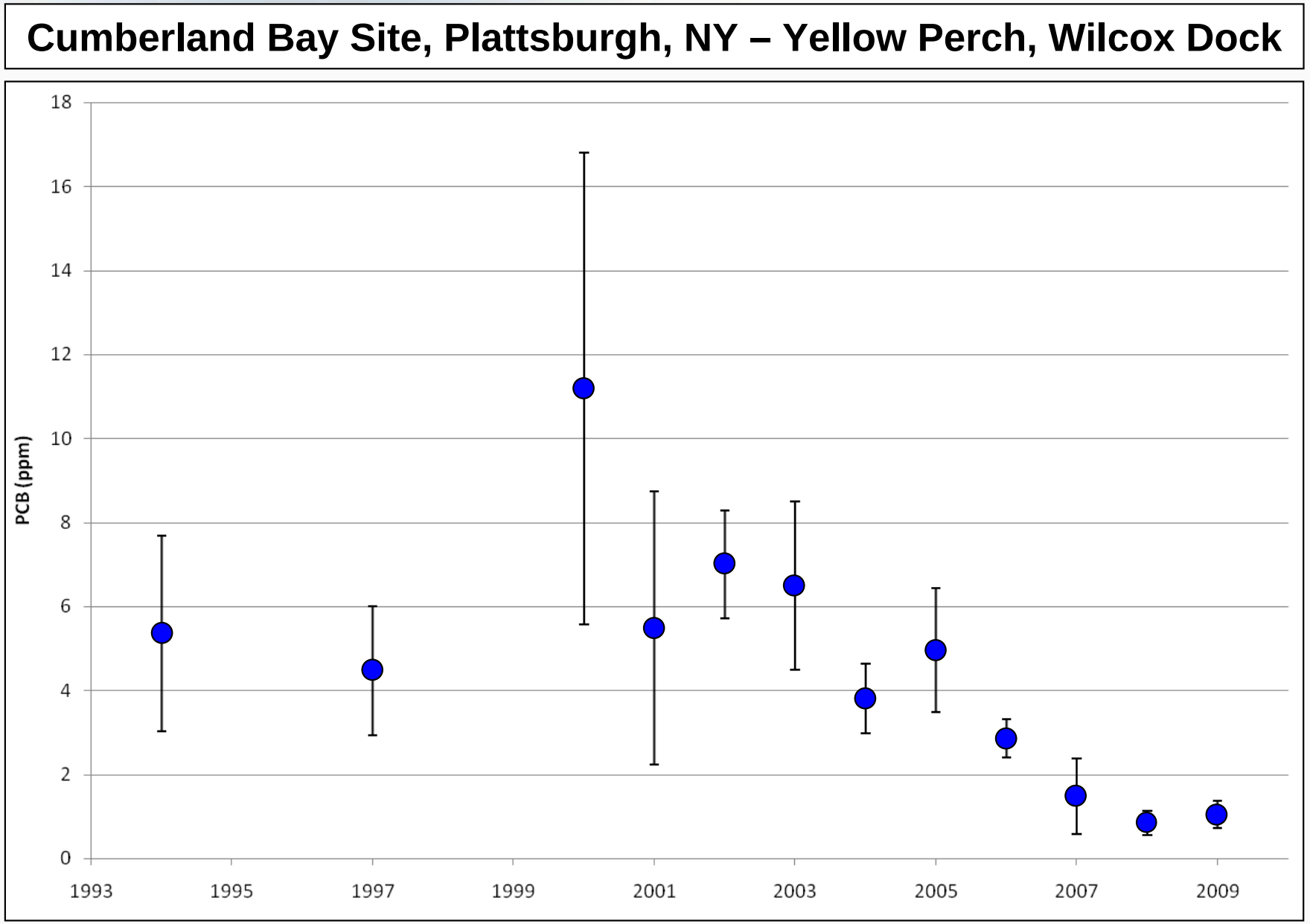

Figure courtesy of NYSDEC (2009)

Parting Thoughts

- Dredging program is not the only factor in this system influencing PCB concentrations in fish
  - Natural variability
  - Flooding, storms, flow conditions

- We have not observed changes in fish tissue concentrations that are outside of expectations

Annual monitoring will continue