

*Community Advisory Group (CAG) Meeting  
Hudson River PCBs Superfund Site  
Schuylerville, NY, 21 July 2016*



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

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# Focus of this Presentation



- **Previous summaries given to the CAG focused on short-term impacts to fish during Upper Hudson dredging**
- **Now that dredging work is complete, as planned, our discussions include Lower Hudson River fish**
- **The project fish monitoring program has included the Lower Hudson since BMP (2004)**
- **Prior to 2004, and concurrently since 2004, NYSDEC has been collecting fish in Lower Hudson**
- **This presentation includes data collected by GE with EPA oversight as well as NYSDEC data**

# Considerations Related to Lower Hudson



## ➤ Remedial Action Objectives include:

- Reduce the cancer risks and non-cancer health hazards for people eating fish from the Hudson River by reducing the concentration of PCBs in fish
- Reduce the risks to ecological receptors by reducing the concentration of PCBs in fish
- Minimize the long-term downstream transport of PCBs in the river

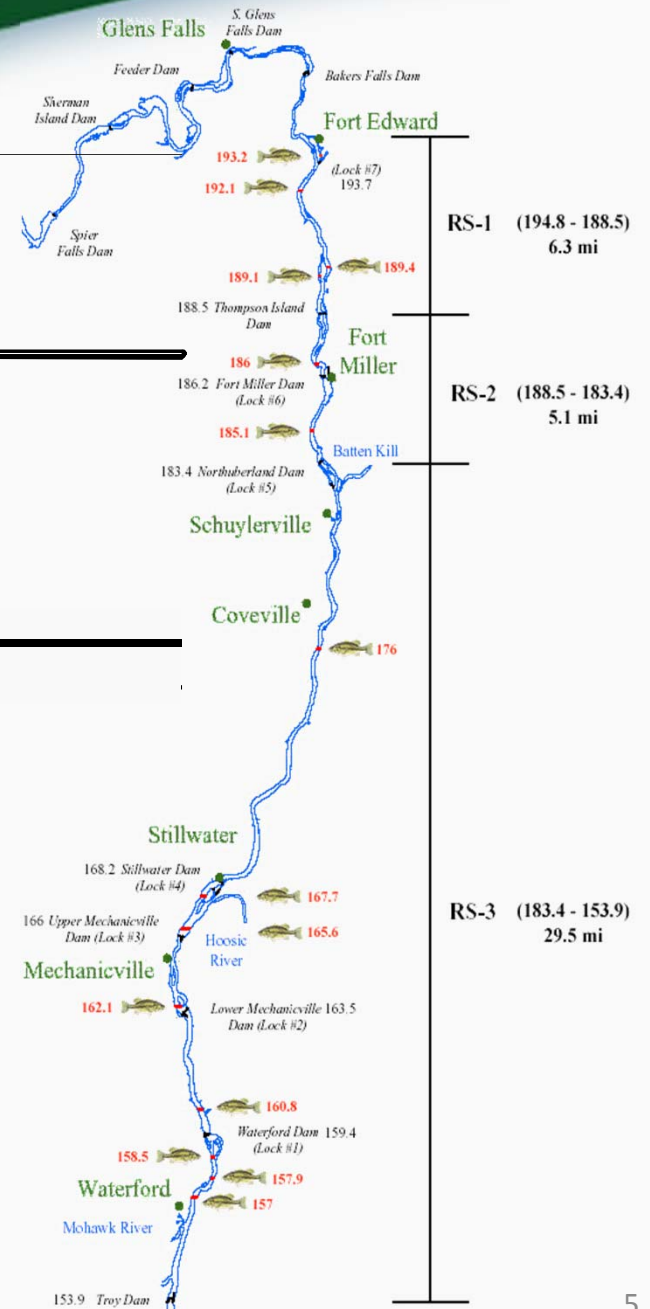
# Background and Objectives



- Since 2003: Baseline (2004-2008), remedial action (2009-2015), and post-remedy monitoring designed to provide statistical power to address both short- and long-term needs
  - Evaluate annual (short term) changes *and* establishment of long-term trends
  - Document interim risk reduction following the remedial action
  - Provide data for 5-year reviews
  - Demonstrate that the remedy is moving toward, or achieving RAOs (remedy effectiveness)

# 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*)



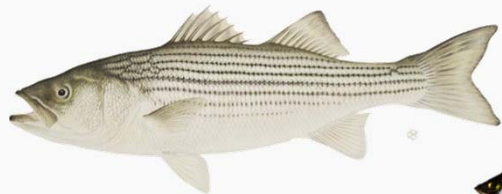
Spottail Shiner  
(*Notropis hudsonius*)

\* The LTMP may be modified after 3 years of fish data collection under OM&M

# 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*)

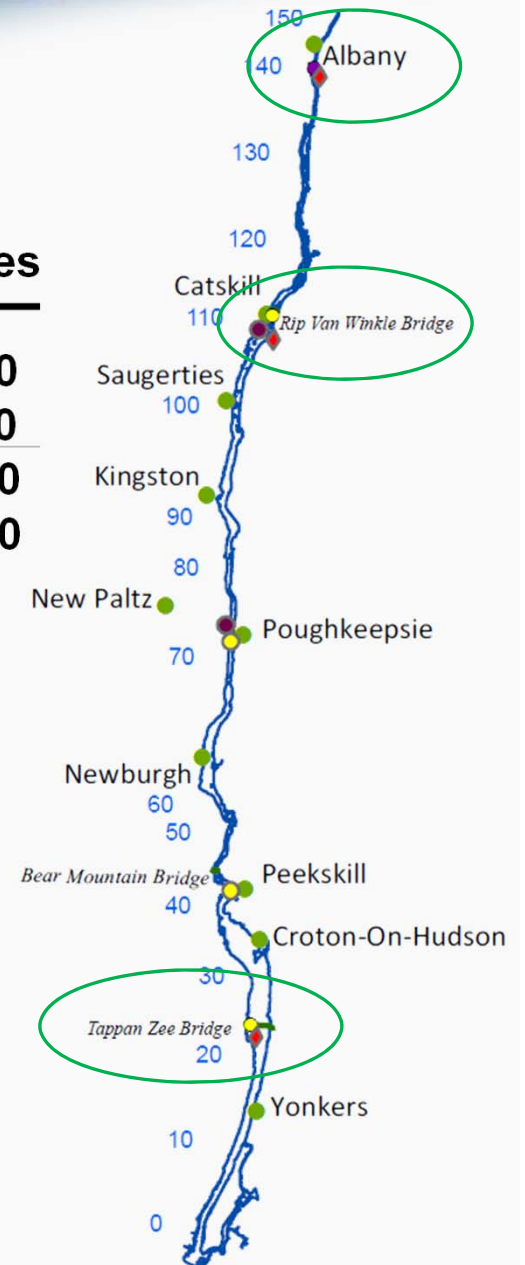
## Fall Collected & Ground Whole (Albany/Troy):



Pumpkinseed (*Lepomis gibbosus*)



Spottail Shiner (*Notropis hudsonius*)

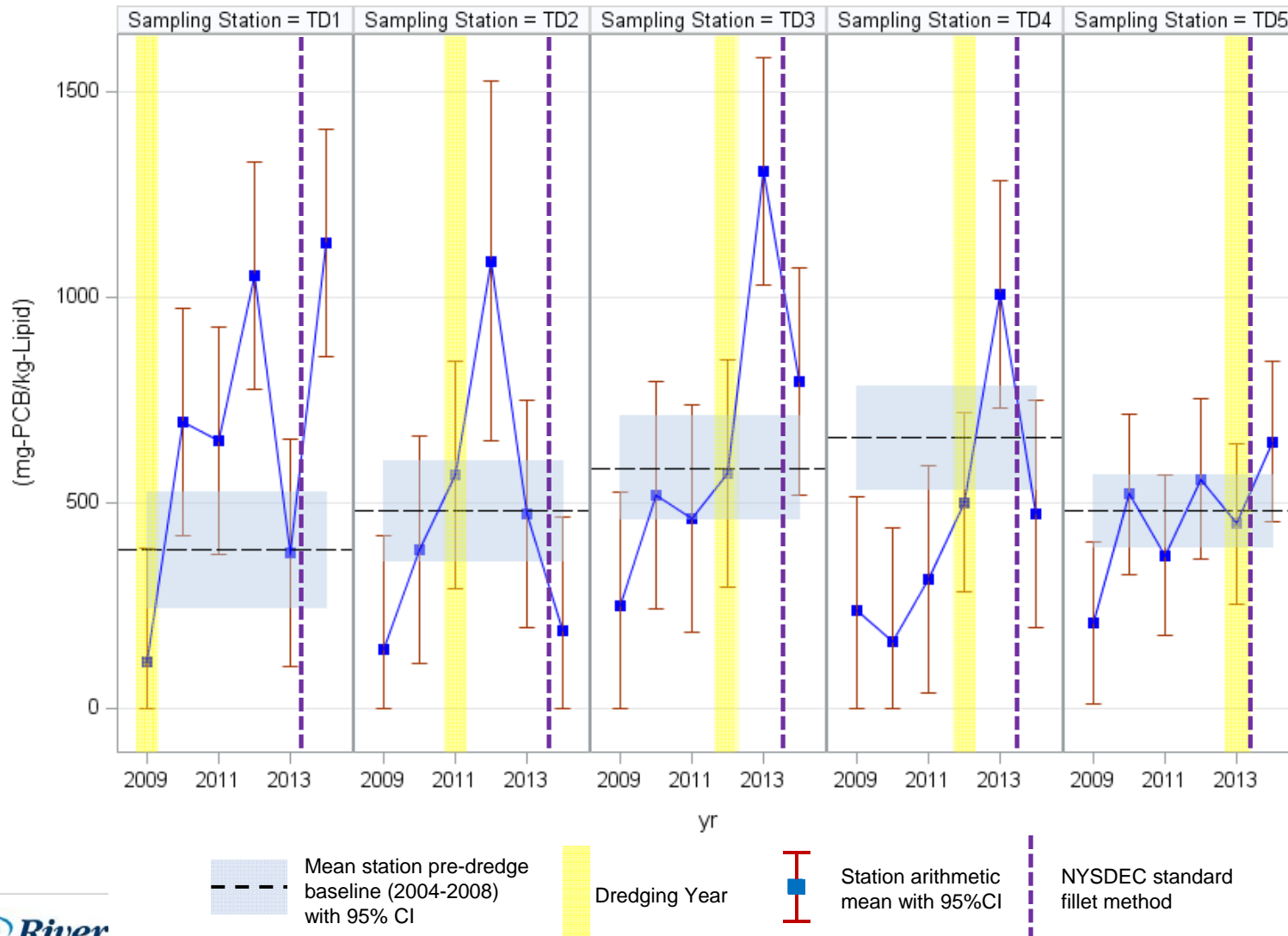


\* The LTMP may be modified after 3 years of fish data collection under OM&M

# Comparison to Baseline Upper Hudson River 2009-2014



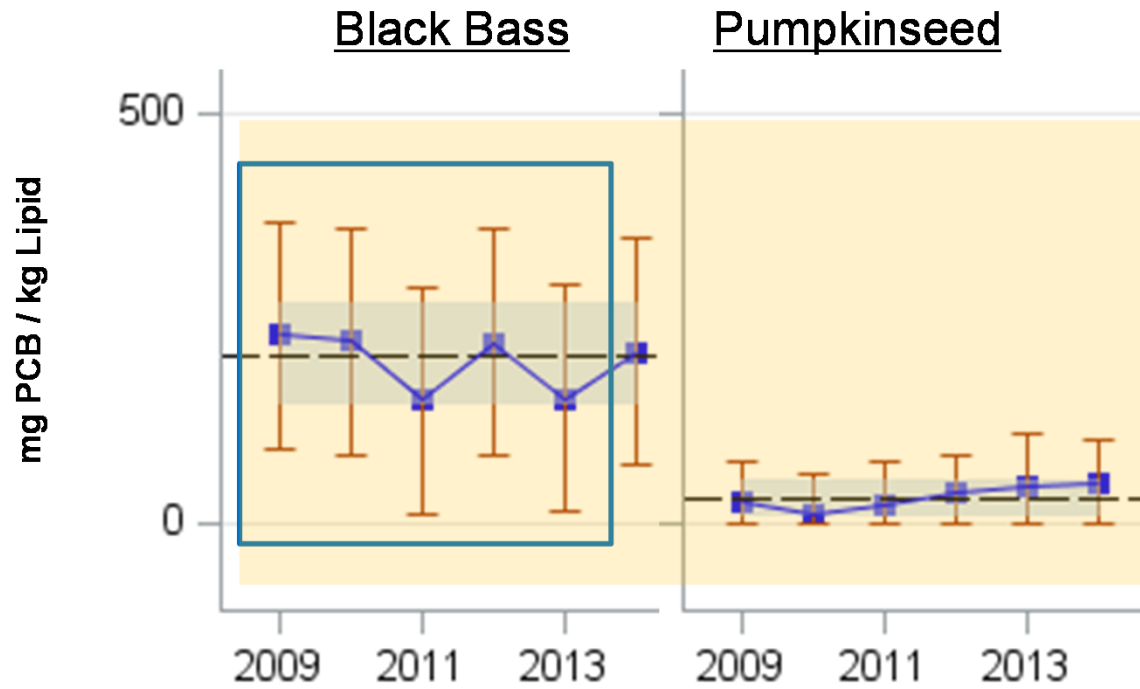
**RS1 (Thompson Island Pool-TD) Black Bass  
Spring Species (fillet processing)**



# LHR Fish Tissue PCBs at Albany/Troy During Dredging - Comparison to Baseline



## RM152 (Albany/Troy, NY)



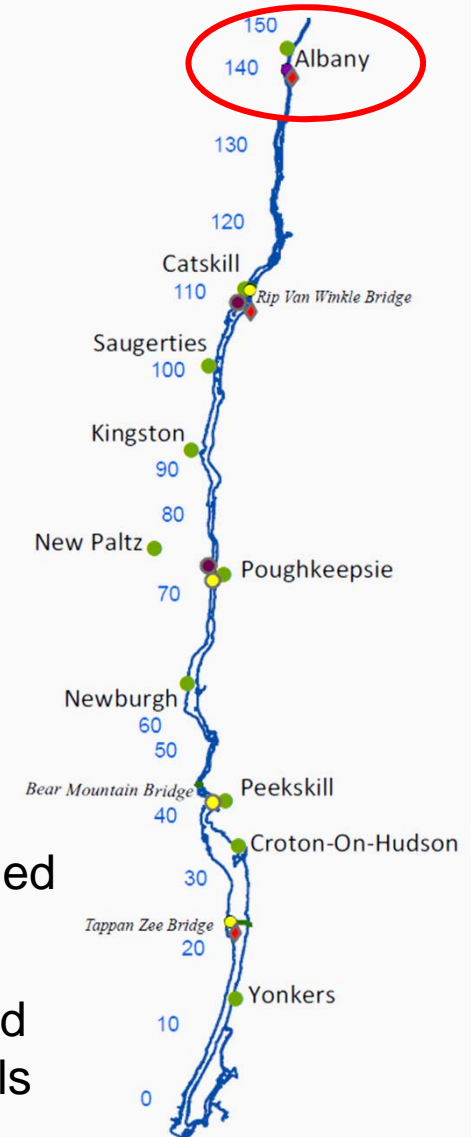
Station arithmetic mean with 95%CI



Mean station pre-dredge baseline (2004-2008) with 95% CI

NYSDEC standard fillet approach not used (2007-2013)

- Station was not dredged (it's within LHR)
- Both species remained close to baseline levels during dredging

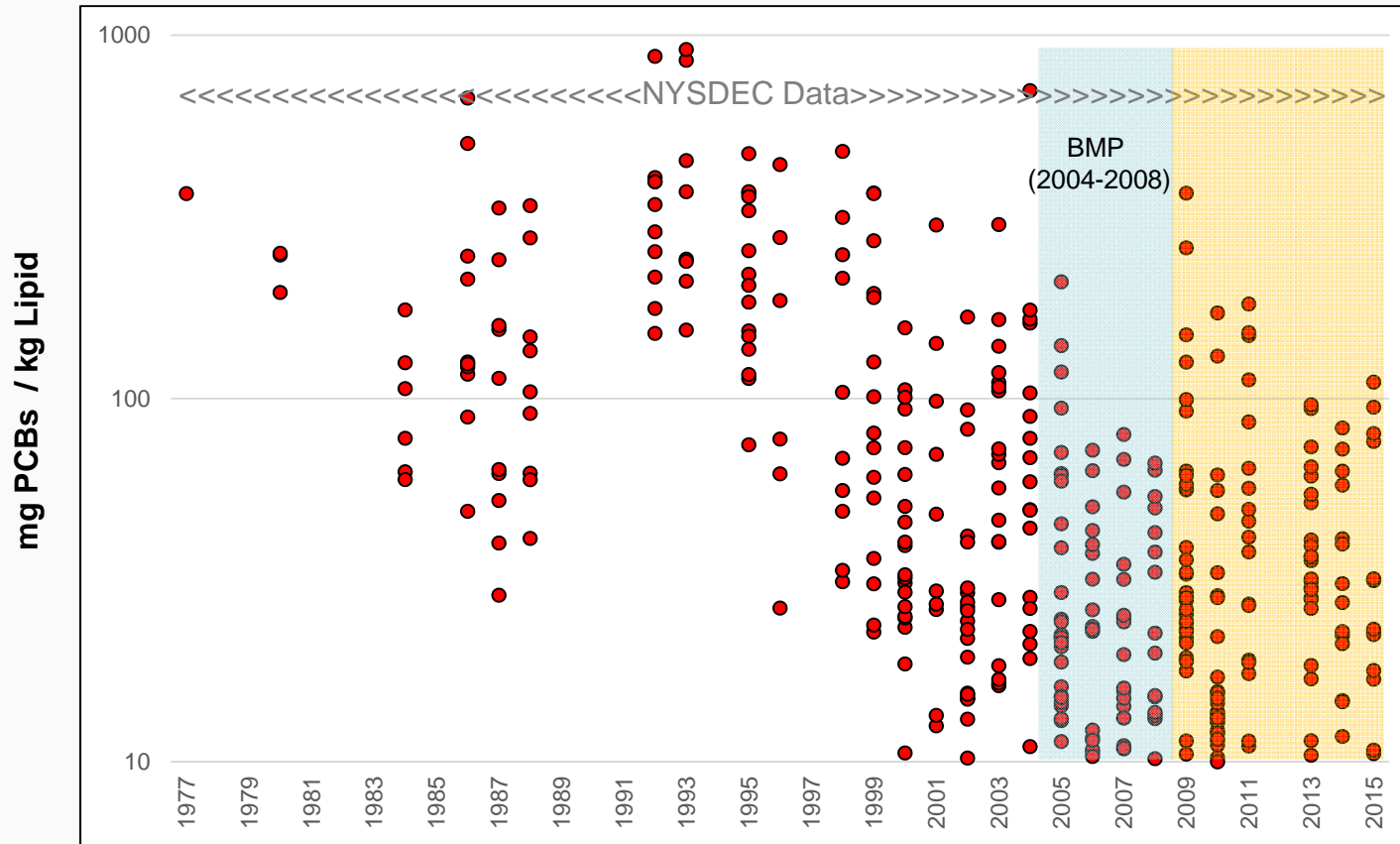




# Lower Hudson River Striped Bass Tissue PCBs at Albany/Troy (NYSDEC 1977-2015)



RM152 (Albany/Troy, NY) Striped Bass Lipid Normalized TPCB [LPCB]  
NYSDEC 1977-2015, Mean +/- 2\*SEM



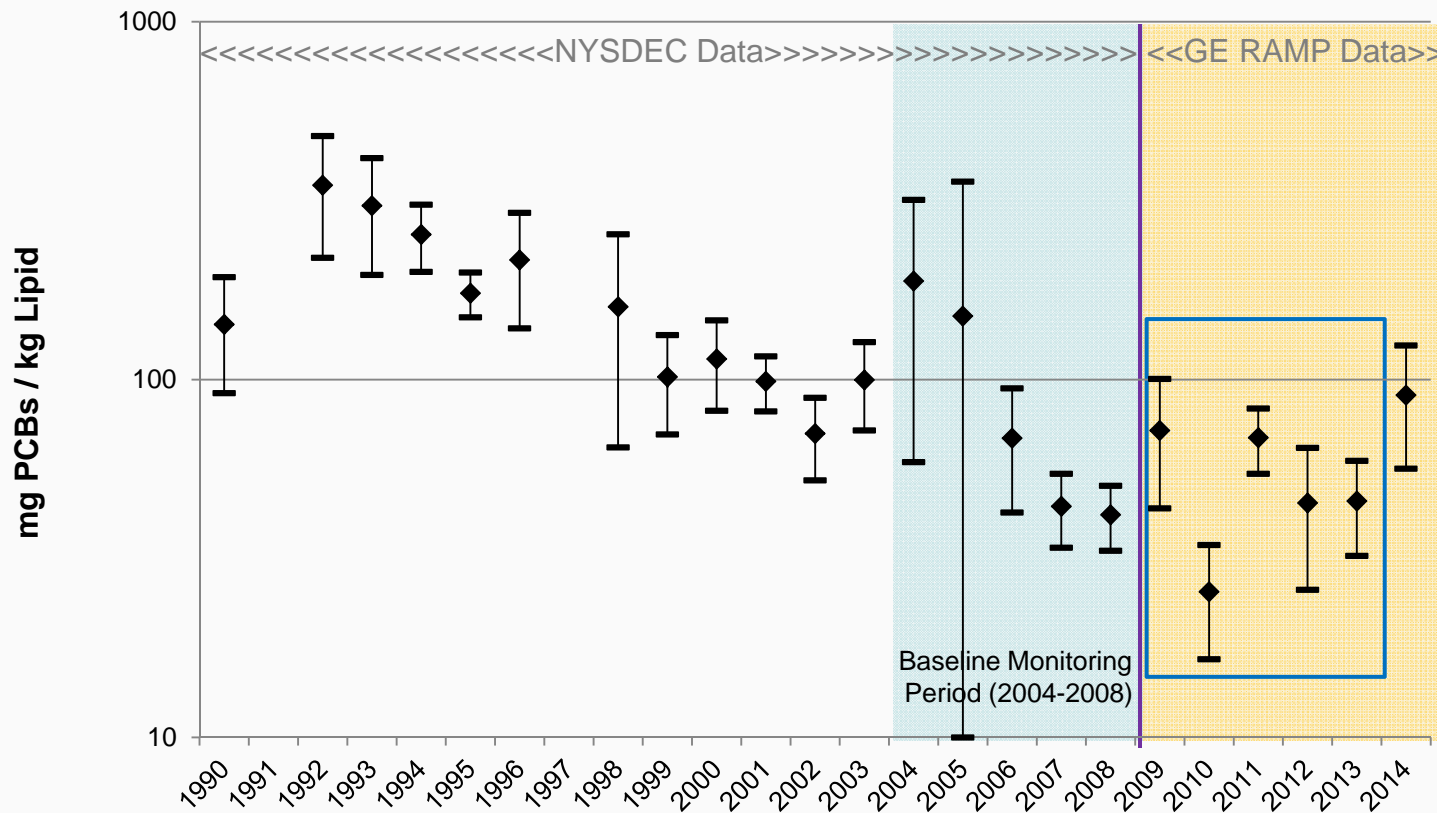
● Individual Fish Lipid Normalized Data




Upper Hudson River Dredging (2009-2015)

# Lower Hudson River Striped Bass Tissue PCBs at Albany/Troy (1990-2014)



RM152 (Albany/Troy, NY) Striped Bass Lipid Normalized TPCB [LPCB]  
 NYSDEC 1990-2008, GE RAMP 2009-2014, Mean +/- 2\*SEM



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

NYSDEC Standard Fillet Approach Not Used 2009-2013

Upper Hudson River Dredging (2009-2015)

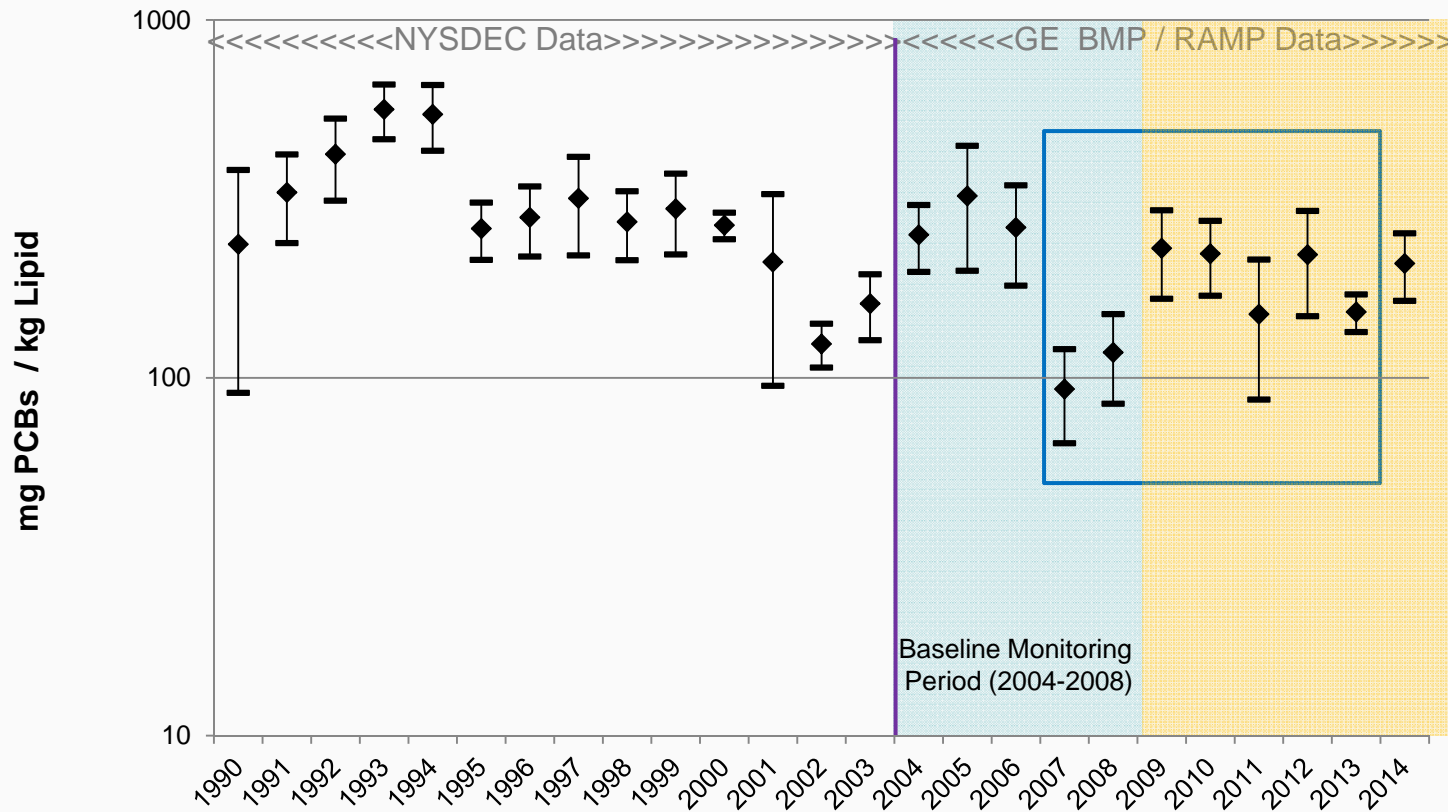
GE assumes data collection/analysis (2009)






# Lower Hudson River Black Bass Tissue PCBs at Albany Troy (1990-2014)



RM152 (Albany/Troy, NY) Black Bass Lipid Normalized TPCB [LPCB]  
 NYSDEC 1990-2003, GE BMP/RAMP 2004-2014, Mean +/- 2\*SEM



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

NYSDEC Standard Fillet Approach Not Used 2007-2013

Upper Hudson River Dredging (2009-2015)

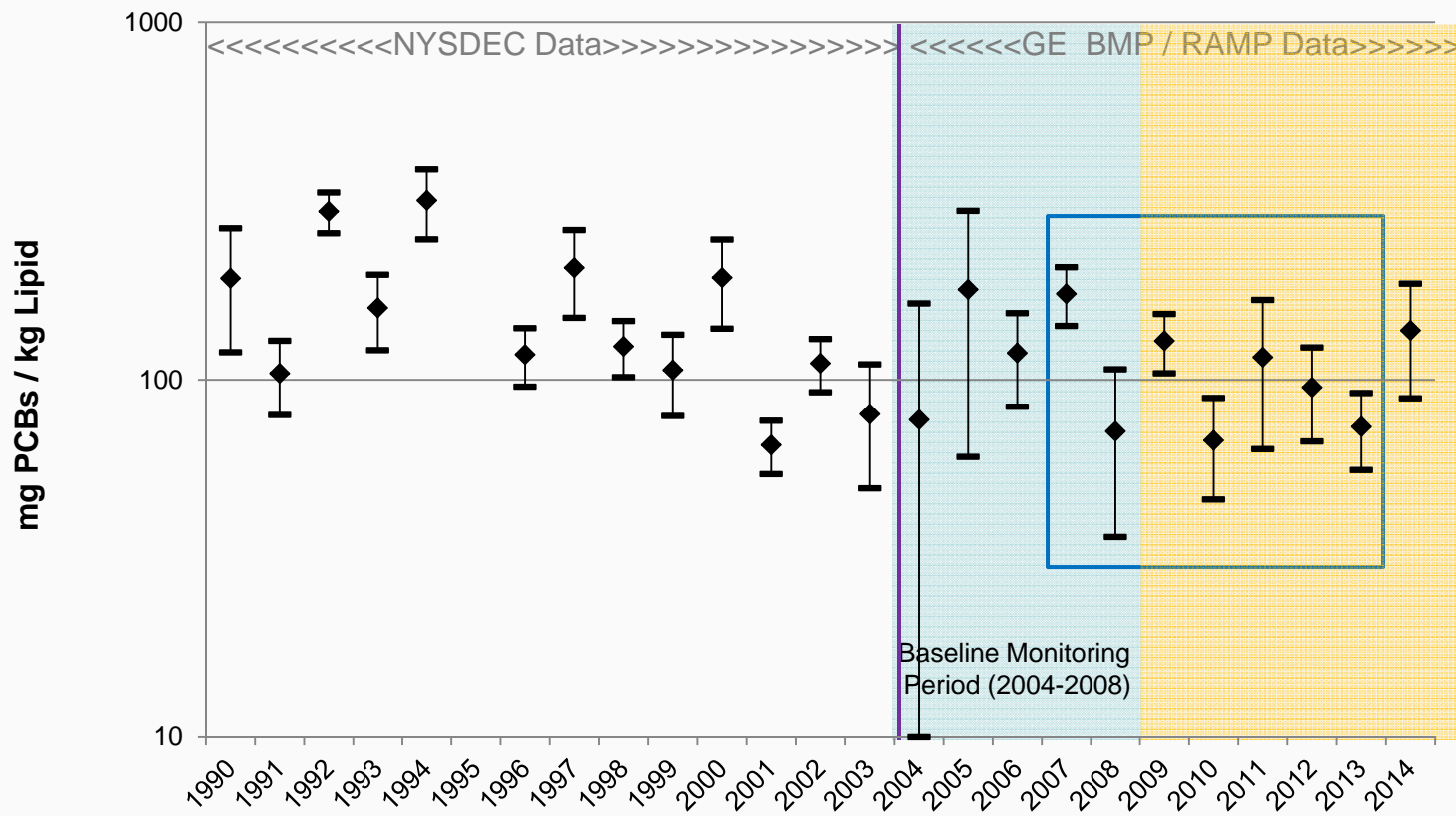
GE assumes data collection/analysis (2004)






# Lower Hudson River White Perch Tissue PCBs at Albany/Troy (1990-2014)



RM152 (Albany/Troy, NY) White Perch Lipid Normalized TPCB [LPCB]  
 NYSDEC 1990-2003, GE BMP/RAMP 2004-2014, Mean +/- 2\*SEM



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

NYSDEC Standard Fillet Approach Not Used 2007-2013

Upper Hudson River Dredging (2009-2015)

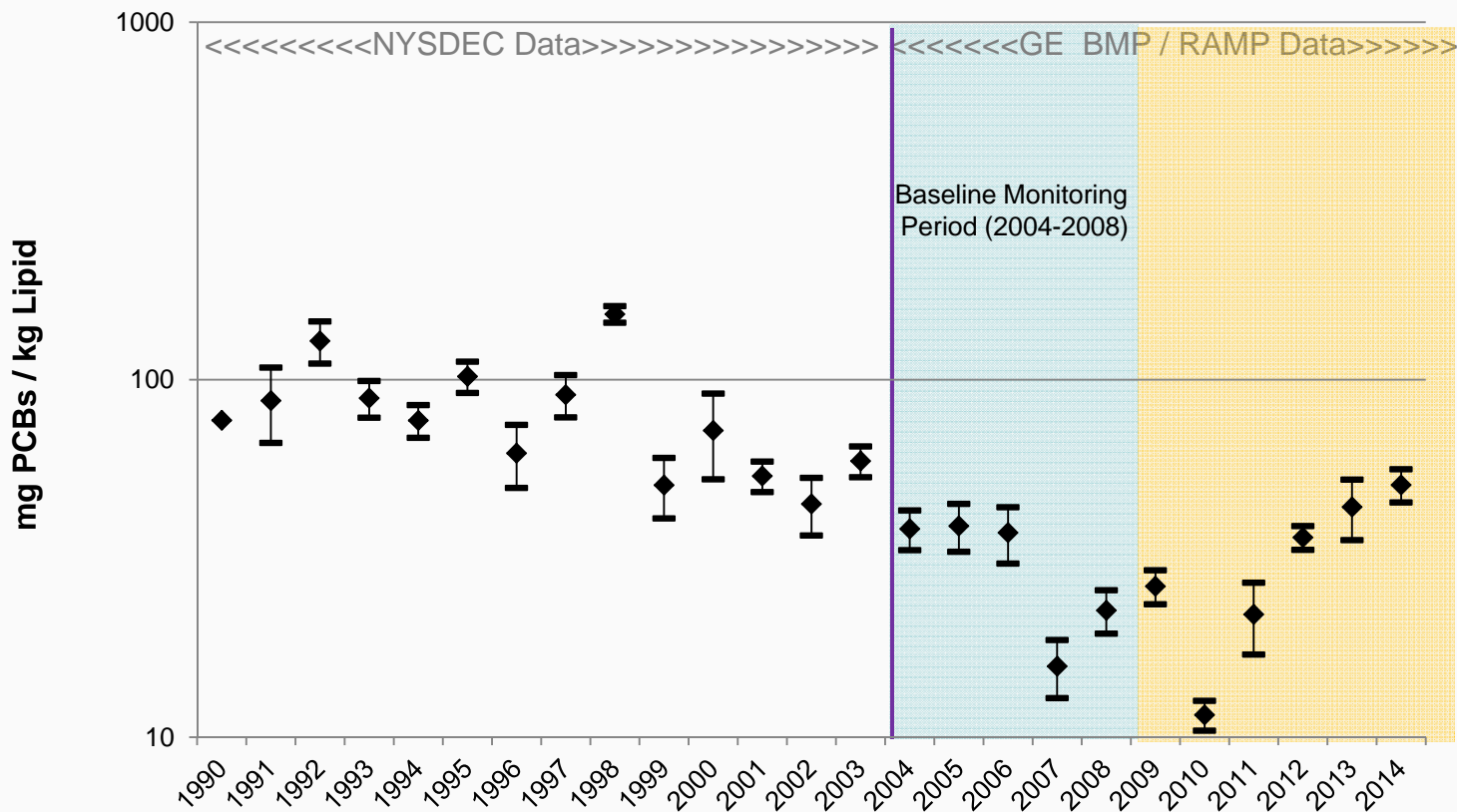
GE assumes data collection/analysis (2004)




# Lower Hudson River Pumpkinseed Whole Body PCBs at Albany/Troy (1990-2014)



RM152 (Albany/Troy, NY) Pumpkinseed Lipid Normalized TPCB [LPCB]  
 NYSDEC 1990-2003, GE BMP/RAMP 2004-2014, Mean +/- 2\*SEM




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

*Note that pumpkinseed are processed whole body, not filleted.*

GE assumes data collection/analysis (2004)

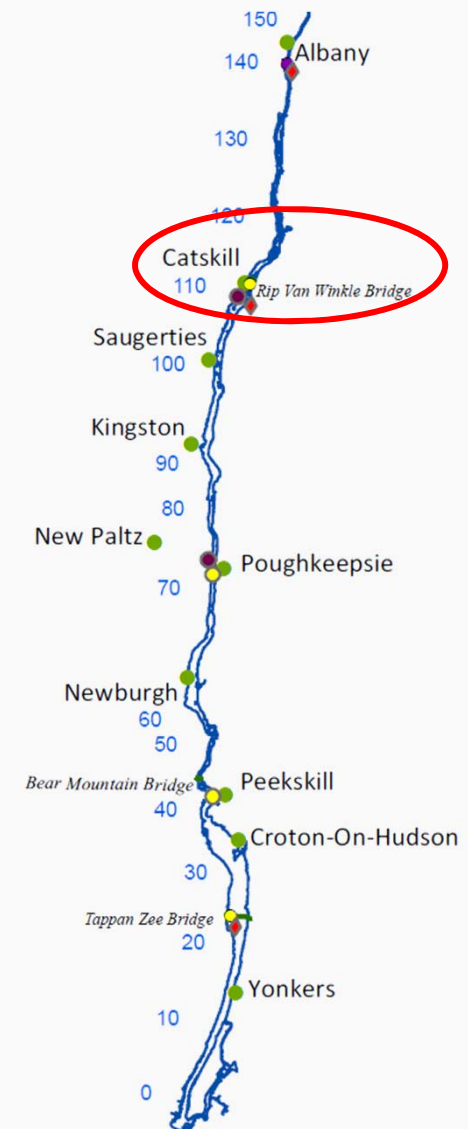
Upper Hudson River Dredging (2009-2015)



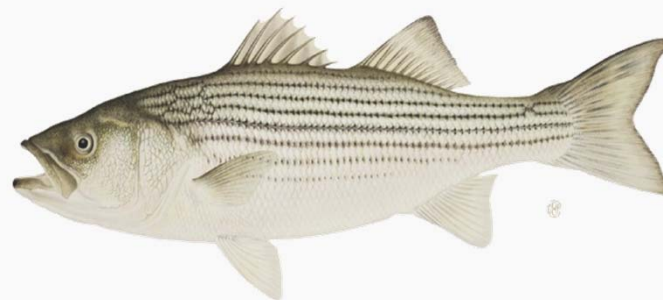
# Lower Hudson River Fish Tissue PCBs at Catskill (1990-2014)



- Station not dredged
- Striped Bass, black bass, bullhead/catfish collected by NYSDEC and GE
- Striped bass and black bass reflect GE collection and processing since 2010
- Perch and pumpkinseed historically collected and processed by NYSDEC at this station



Pumpkinseed  
(*Lepomis gibbosus*)

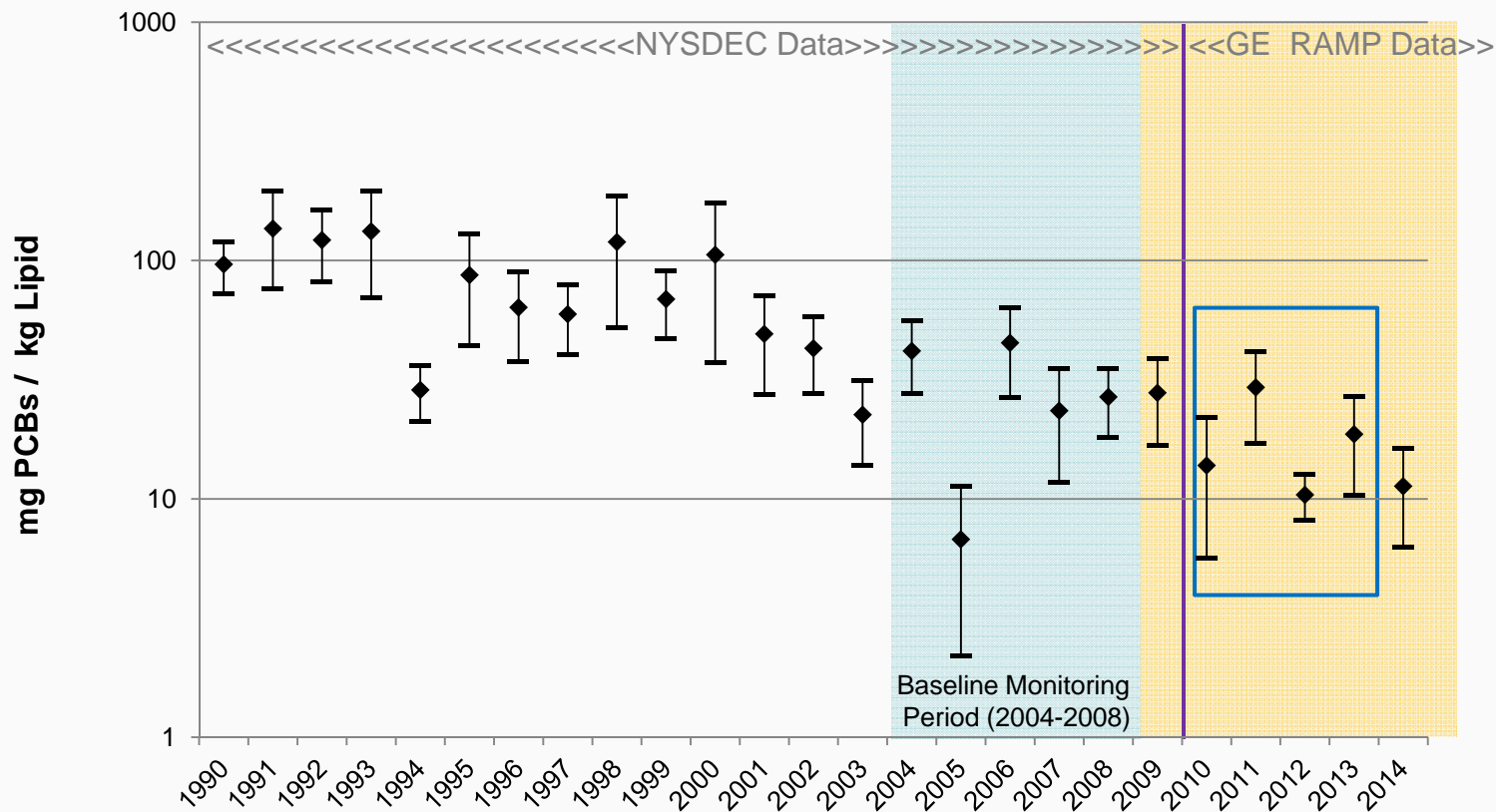





Striped Bass (*Morone saxatilis*)

# Lower Hudson River Striped Bass Tissue PCBs at Catskill (1990-2014)



RM113 (Catskill, NY) Striped Bass Lipid Normalized TPCB [LPCB]  
 NYSDEC 1990-2009, GE RAMP 2010-2014, Mean +/- 2\*SEM



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

NYSDEC Standard Fillet Approach Not Used 2010-2013

Upper Hudson River Dredging (2009-2014)

GE assumes data collection/analysis (2010)







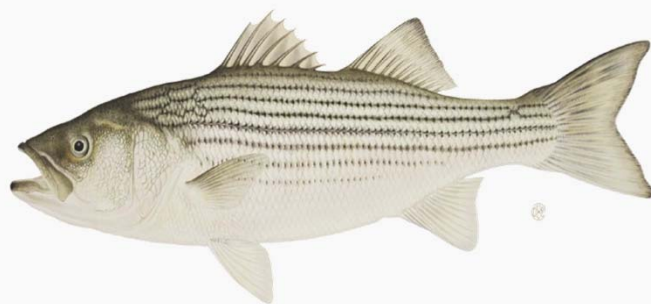


# Lower Hudson River Fish Tissue PCBs at Poughkeepsie & Newburgh (1990-2011)



RM 75 (Poughkeepsie, NY) and RM 50 (Newburgh, NY)

- All data at these stations collected by NYSDEC



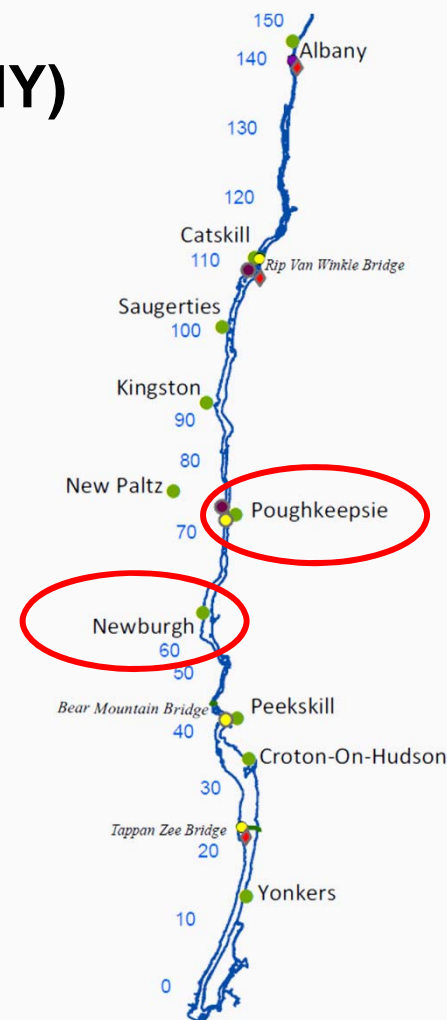
Striped Bass (*Morone saxatilis*)



Smallmouth Bass (*Micropterus dolomieu*)



White Perch (*Morone americana*)









# Perspectives on Hudson River Tissue PCBs Data



- **We expected that short-term increases in fish PCB levels would be observed during dredging**
  - For example we observed slight increases in whole body pumpkinseed PCB levels near the end of the dredging program as we approached Albany/Troy
    - Note: These levels appeared to be consistent with baseline levels
  - We also observed decreases in striped bass tissue PCBs at Albany/Troy and Catskill
- **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**

# Parting Thoughts



- **Several factors in this system influence PCB levels in fish:**
  - Natural variability (exposure, species, location)
  - Flooding, storms, flow conditions
  - Other potential PCB sources in Lower Hudson River
- **Observed changes in fish tissue concentrations are consistent with expectations**
- **Annual Monitoring will continue**
- **OM&M monitoring plan is currently under discussion**

