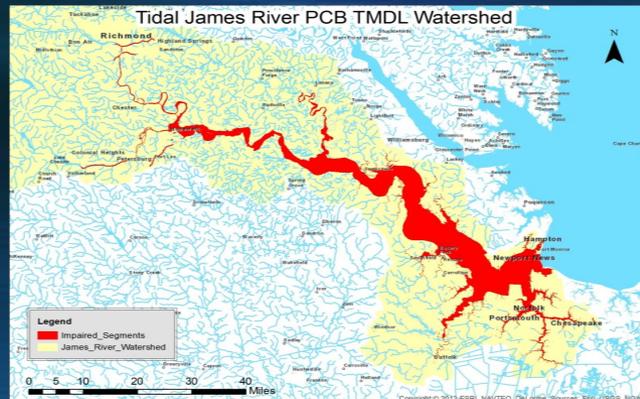


James River PCB TMDL Public Informational Update Meeting



Mark Richards
Virginia Department of Environmental Quality
March 18, 2014

Topics

- Fish Consumption Advisory
- PCB Background
- TMDL Development
- PCB Source Investigation Update
- Project Timeline

PCB Fish Consumption Advisory

DEQ Fish Tissue Monitoring

- Monitor to assess the “Fishable” Goal of the Clean Water Act - 305(b)
- Target “fat loving” contaminants that accumulate in tissue
 - PCBs, Pesticides, etc.
- Compare to threshold values (protect human health)
 - Listed on “dirty waters” report if exceeds - 303(d)



Waters Under VDH Fish Consumption Advisories

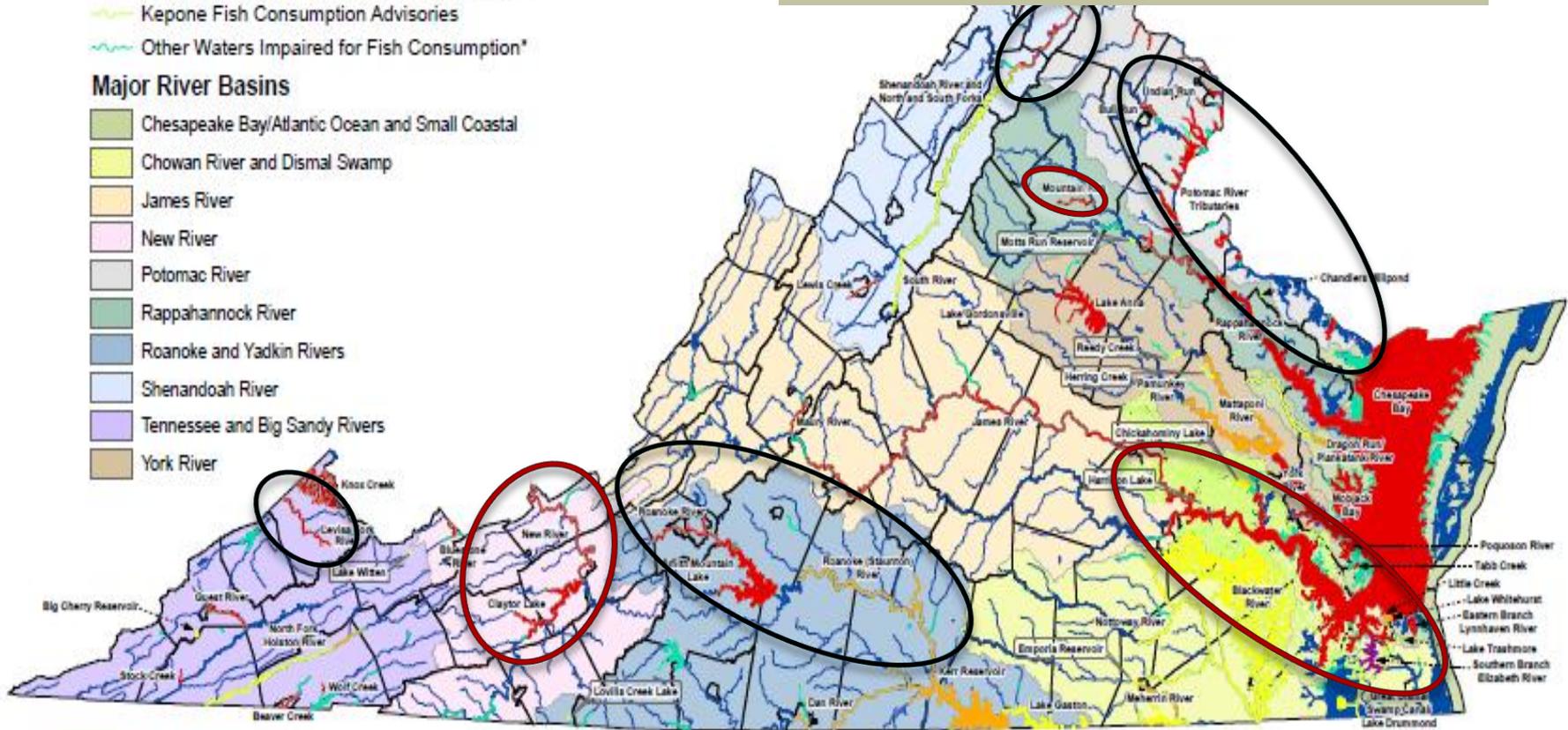
Identified in the 2012 305(b)/303(d) Water Quality Integrated Report

-  PCB Fish Consumption Advisories
-  Mercury Fish Consumption Advisories
-  PCB and Mercury Fish Consumption Advisories
-  PCB and Dioxin Fish Consumption Advisories
-  Kepone Fish Consumption Advisories
-  Other Waters Impaired for Fish Consumption*

Major River Basins

-  Chesapeake Bay/Atlantic Ocean and Small Coastal
-  Chowan River and Dismal Swamp
-  James River
-  New River
-  Potomac River
-  Rappahannock River
-  Roanoke and Yadkin Rivers
-  Shenandoah River
-  Tennessee and Big Sandy Rivers
-  York River

PCB TMDLs Underway



* Waters identified by DEQ as unsafe for fish consumption in addition to waters with VDH advisories.

Sources: Virginia Department of Health
 Virginia Department of Environmental Quality
 Virginia Department of Conservation and Recreation
 United States Geological Survey

Last Update: 18 November 2009



Tidal James River PCB Fish Consumption Advisory Timeline



VA Water Quality Criterion-Total PCBs

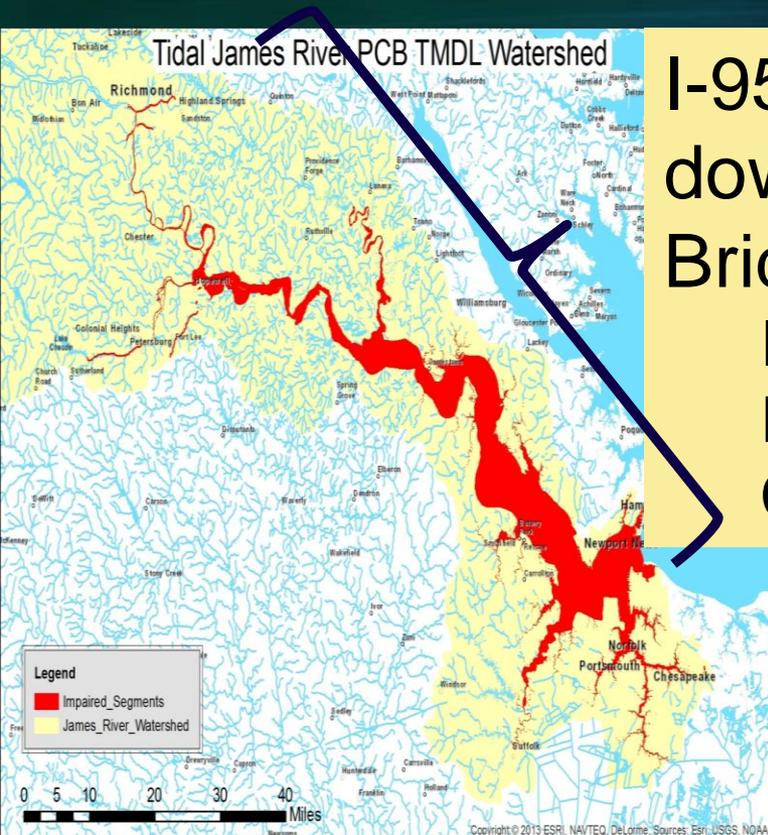
- Acute/Chronic criterion
- Tissue and Public Water Supply - criterion represents concentration in the water column where the bioaccumulation of tPCBs in fish and drinking water is minimized for safe human consumption (back-calculated from fish tissue)

PCB WQC

Consumption Advisories Fish Tissue (ppb)	Water Quality Criterion (ppb)
VDH (50) DEQ (20)	0.00064

FDA Threshold (1984) for prohibition of interstate commerce in fish tissue = 2.0 ppm (or 2,000 ppb)

PCB Fish Consumption Advisory (VDH) for the Tidal James River



I-95 bridge in Richmond
downstream to Hampton Roads
Bridge Tunnel

Includes Appomattox R., Bailey Crk,
Poythress Run, Bailey Bay,
Chickahominy R. (to Walkers Dam)

Fish Species

Advisory

**Gizzard Shad, Carp, Blue Catfish
& Flathead Catfish \geq 32 inches**

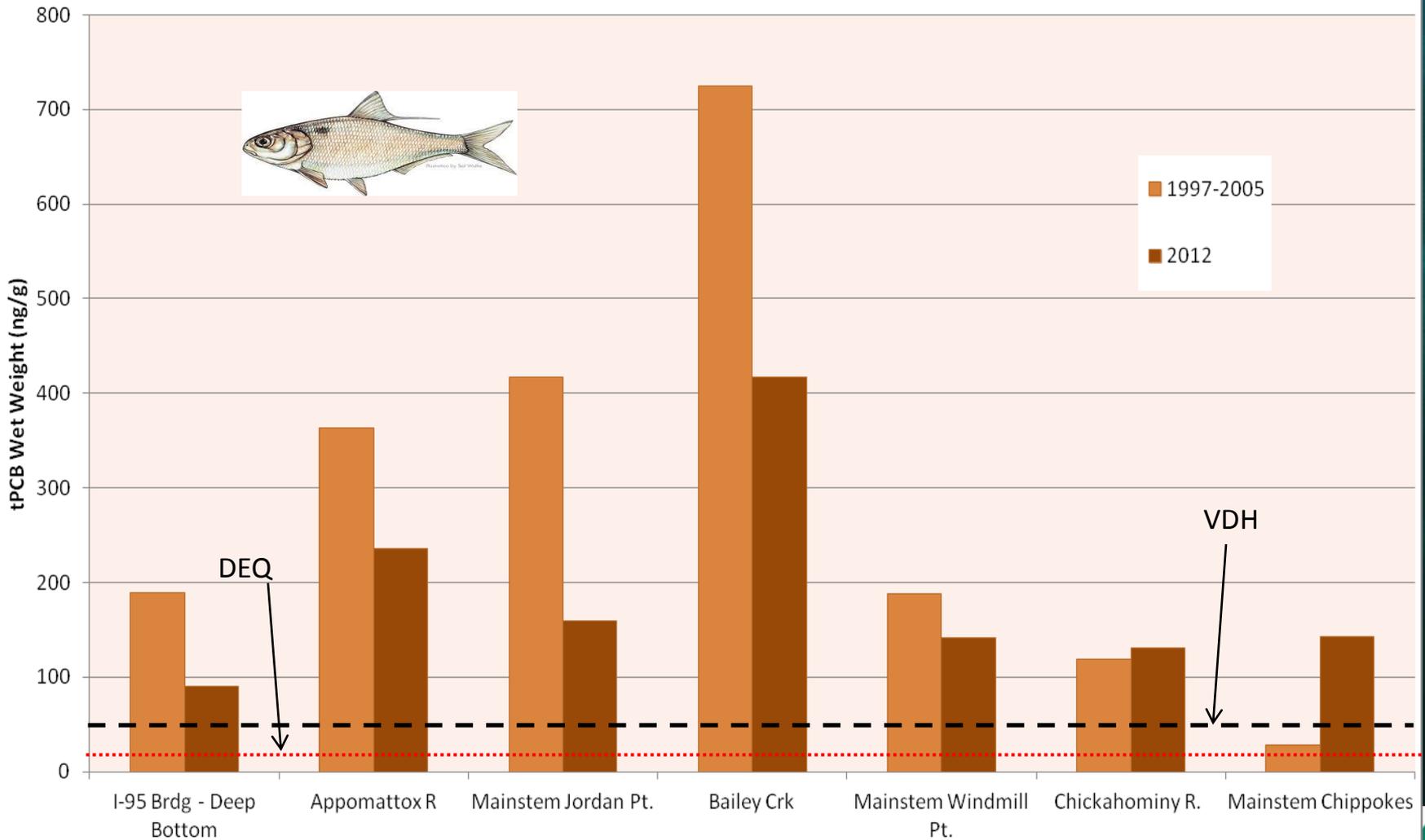
Do Not Eat

**Blue Catfish & Flathead Catfish <
32 inches, Channel Catfish, White
Catfish, Largemouth Bass, Bluegill
Sunfish, American Eel, Quilback
Carp sucker, Smallmouth Bass,
Creek Chub, Yellow Bullhead
Catfish, White Perch, Striped Bass,
Hickory Shad**

**No more than
two
meals/month**

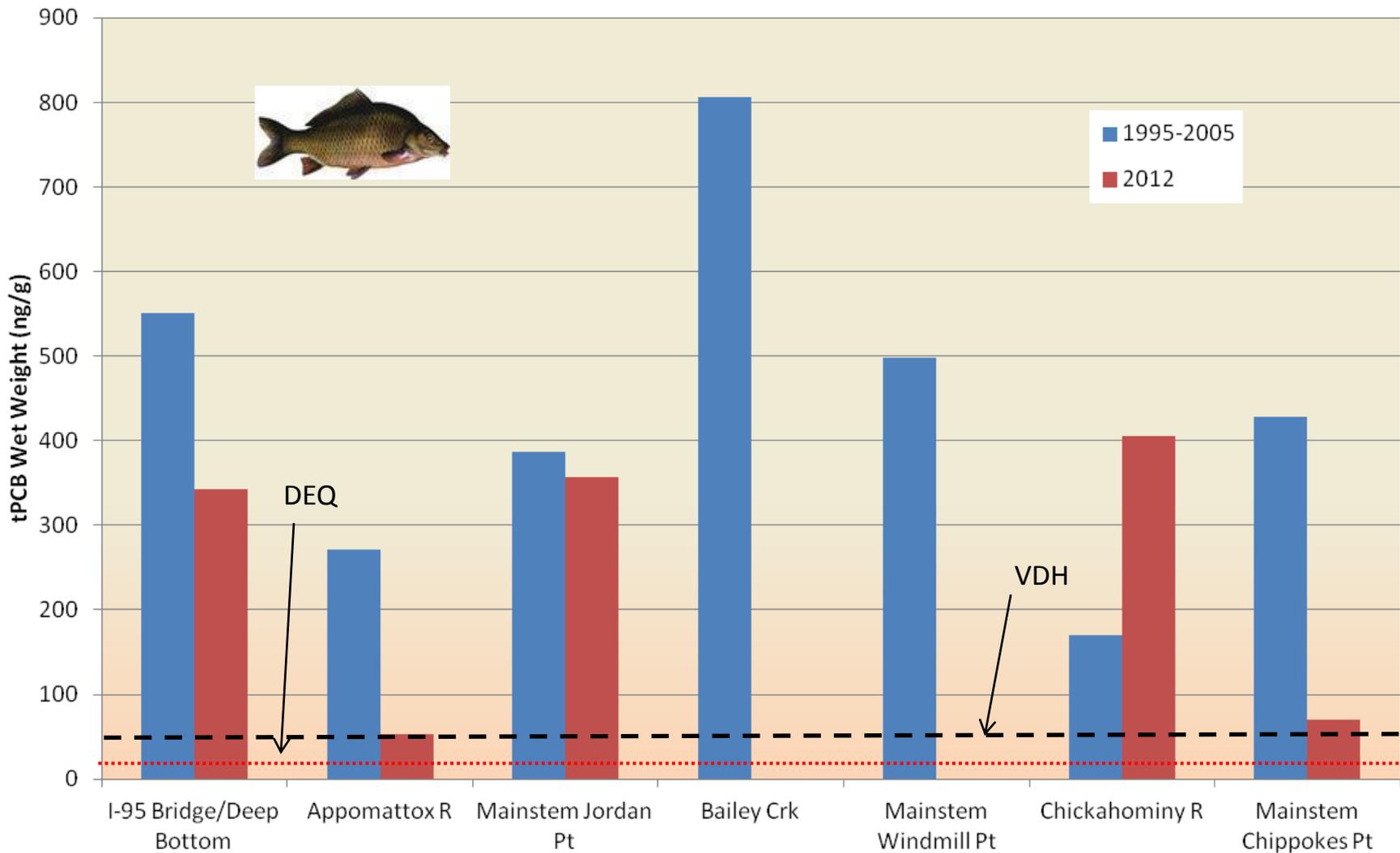


Mean Concentrations of Total PCB in Gizzard Shad Collected in the Tidal James River and Selected Tributaries (1997-2005 & 2012)



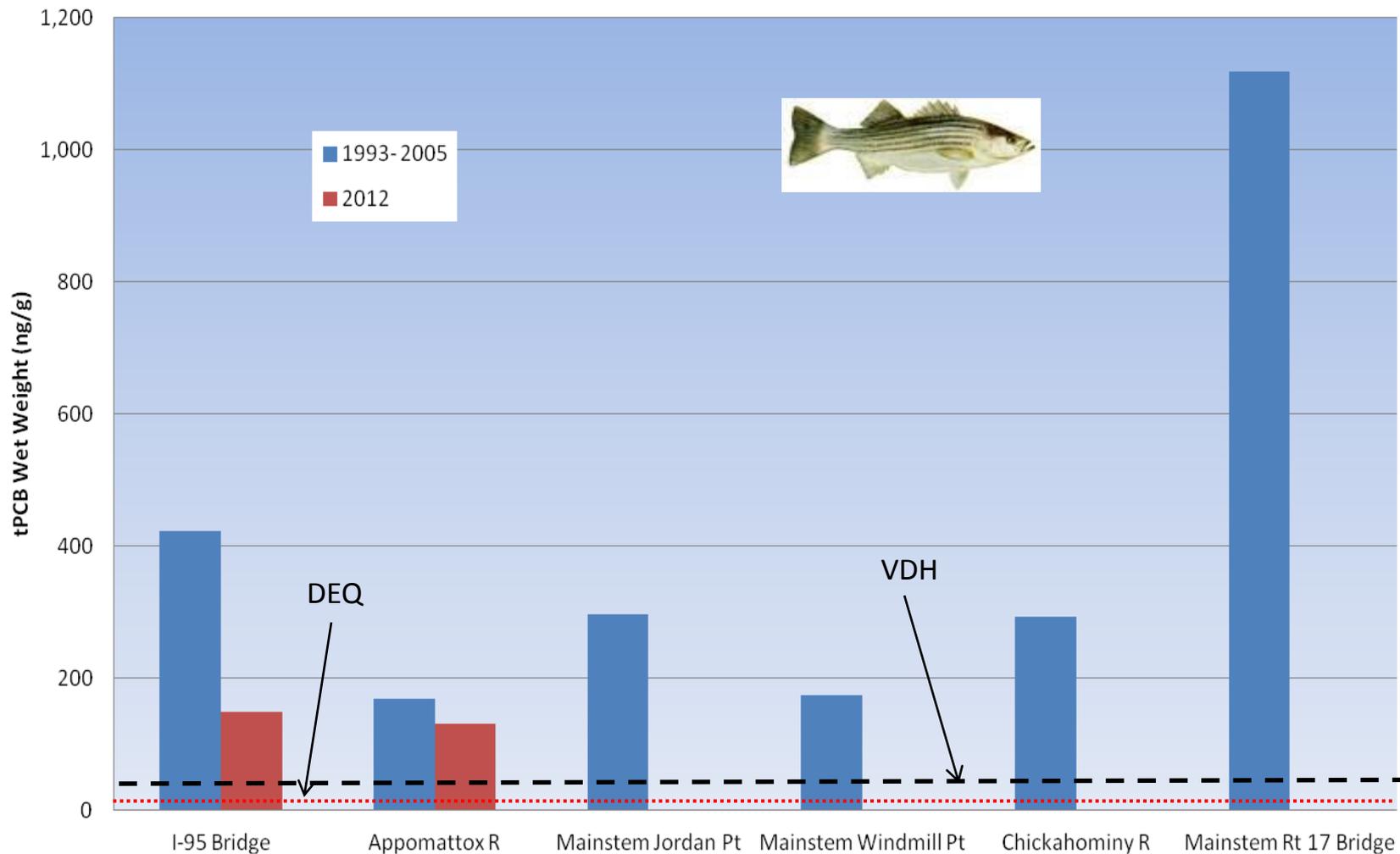
ng/g = ppb

Mean Concentrations of tPCB in Carp Collected in the Tidal James River and Selected Tributaries (1995-2005 & 2012)



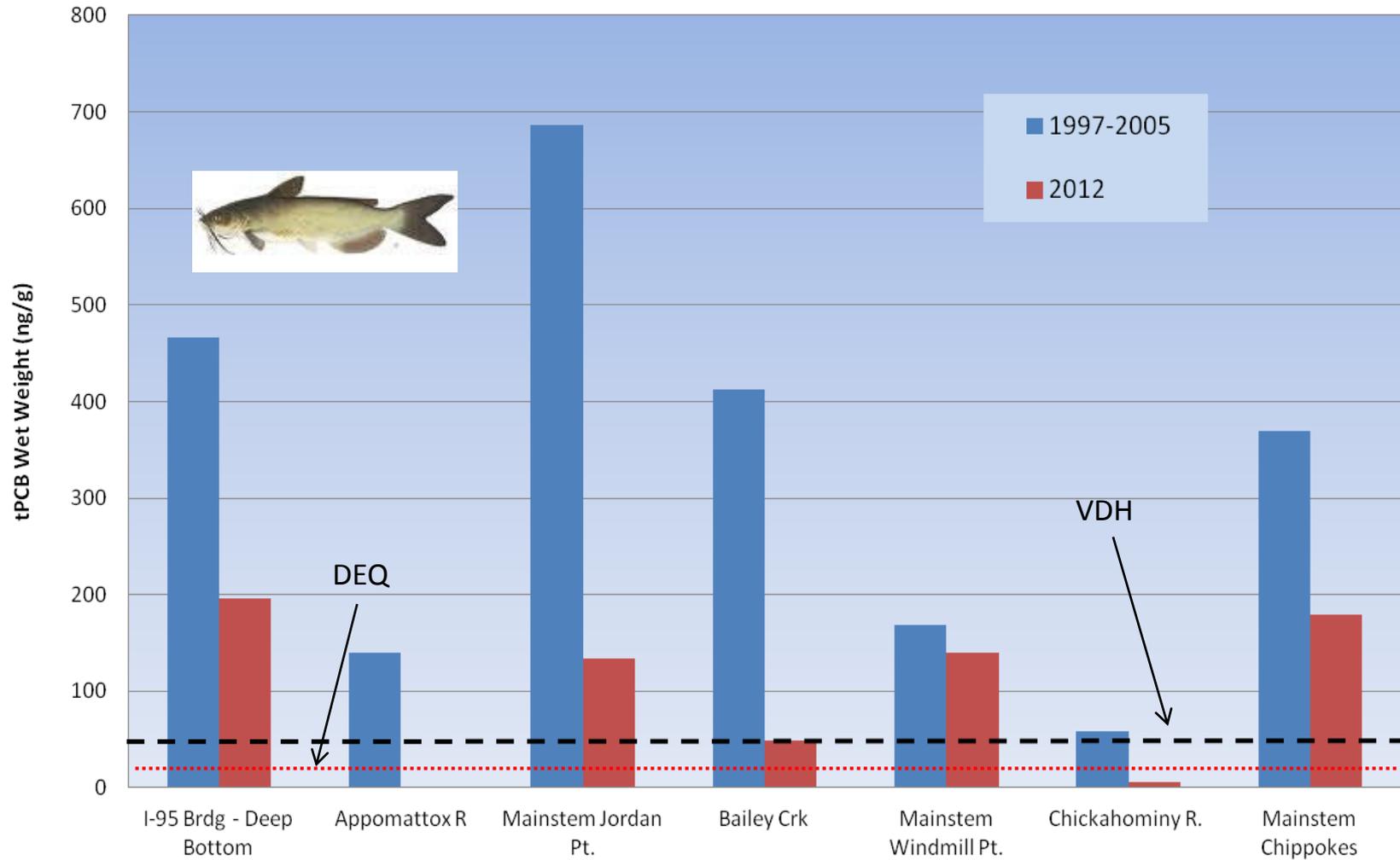
ng/g = ppb

Mean Concentrations of Total PCB in Striped Bass Collected From the Tidal James River and Selected Tributaries (1993 - 2005 & 2012)

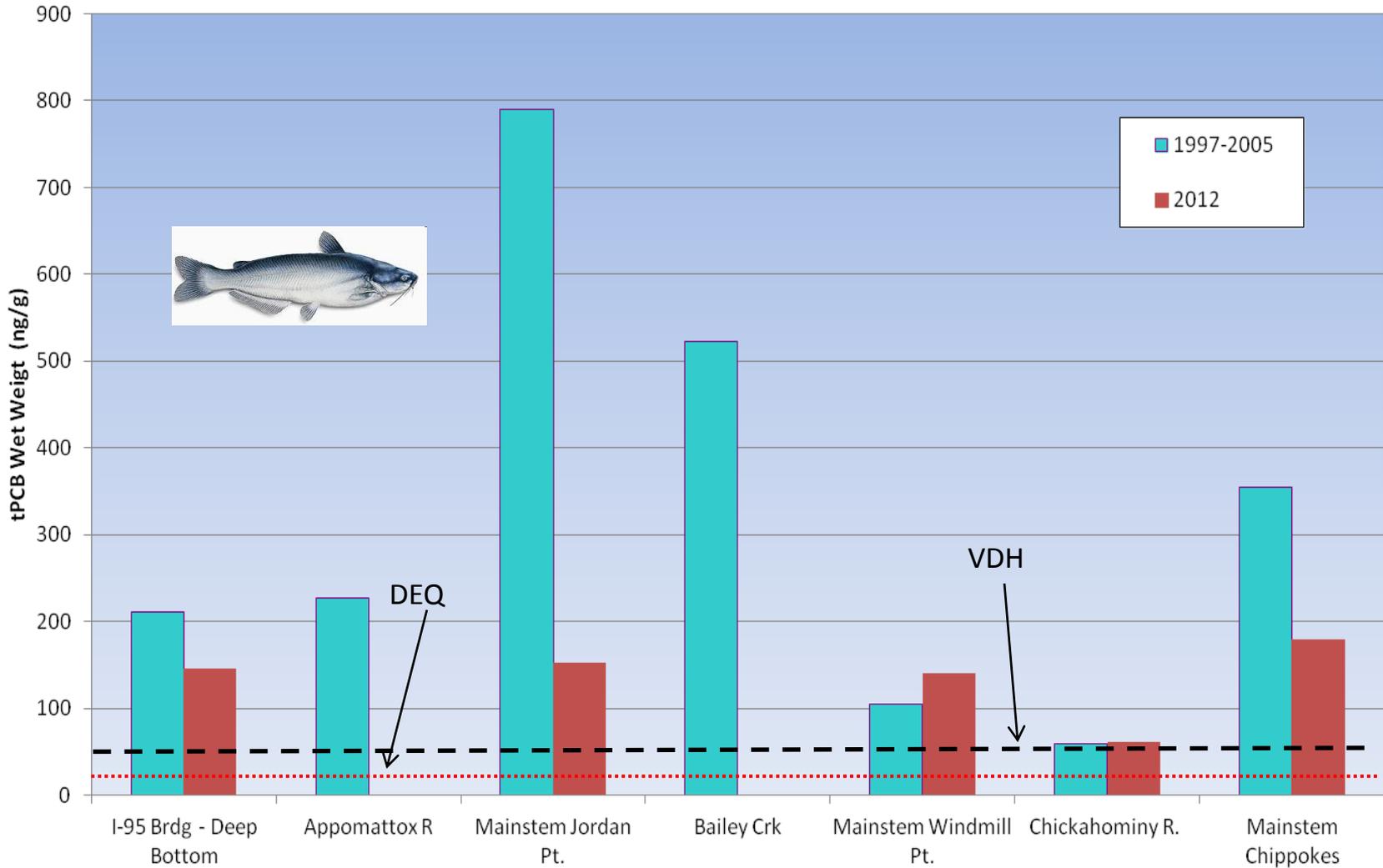


ng/g = ppb

Mean Concentrations of tPCB in Catfish species Collected From the Tidal James River and Selected Tributaries (1997 - 2005 & 2012)

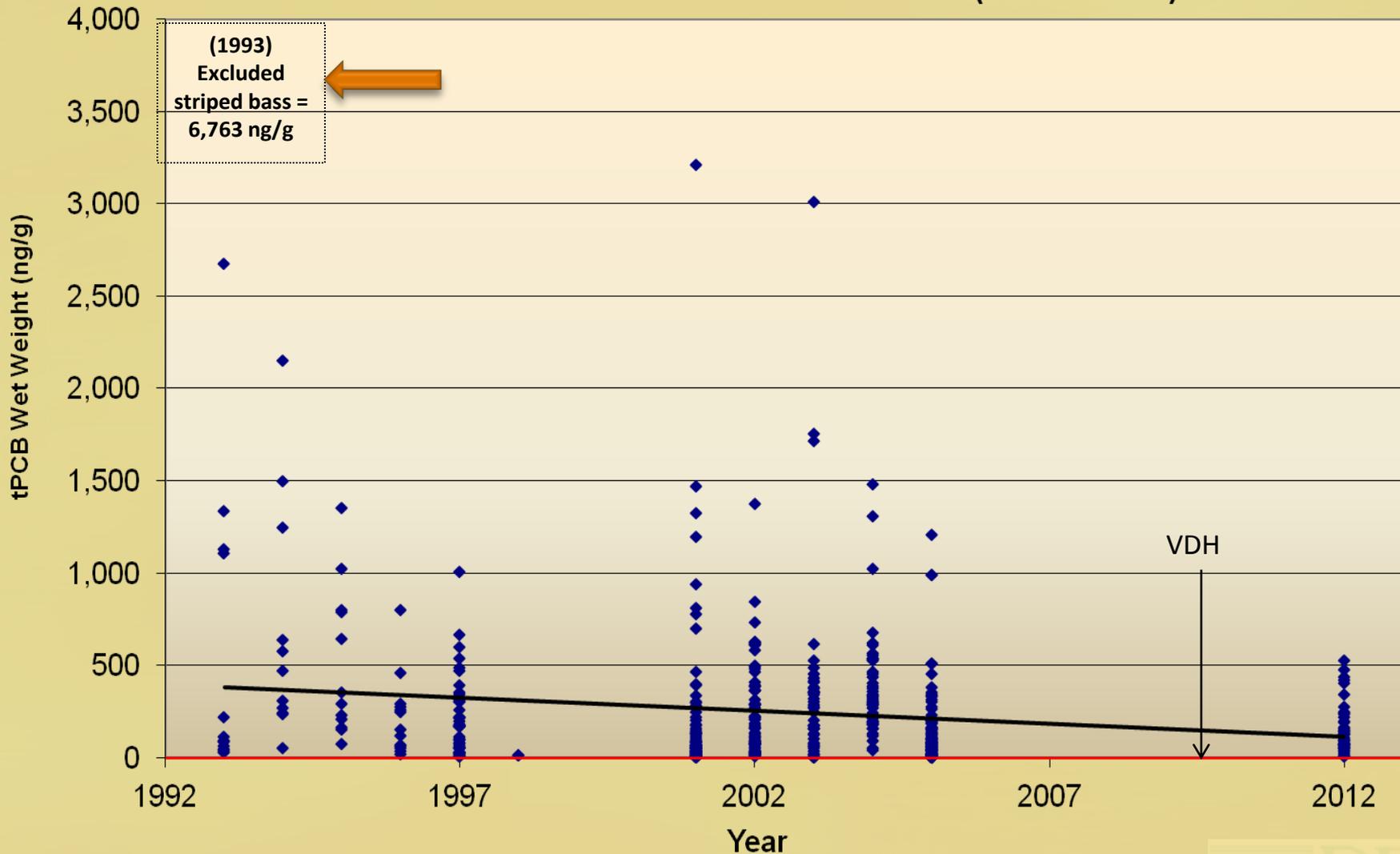


Mean Concentrations of Total PCB in Blue Catfish Collected From the Tidal James River and Selected Tributaries (1997 - 2005 & 2012)



ng/g = ppb

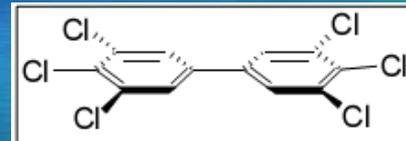
Trend of Total PCB (ng/g) Concentrations in all Fish Species Collected from the Tidal James River & Tributaries (1993 - 2012)



ng/g = ppb

PCB Background

Polychlorinated Biphenyls



- 209 Distinct PCB compounds (mixtures = Aroclors)
- Highly valued properties – chemically inert, non-flammable, heat resistant
 - Used as a coolant & insulating fluid in electrical equipment
 - Other uses: plasticizers, lubricating oil, hydraulic fluid, carbonless copy paper
- Legacy Contaminant
 - Banned in the late 1970's
 - Not detected in wastewater since the 1980's (methods lack sensitivity)



PCBs Continue to be an Issue – Why?

- Fish impairments based on human health concerns

- Fish consumption is significant exposure pathway

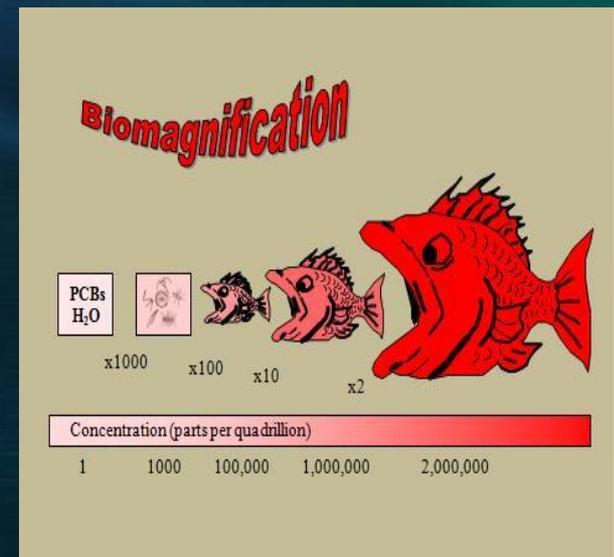
- Suspected carcinogen (EPA)

- **IARC upgraded to carcinogen**

- Immunotoxicity, reproduction and developmental, hepatotoxicity (liver), etc.

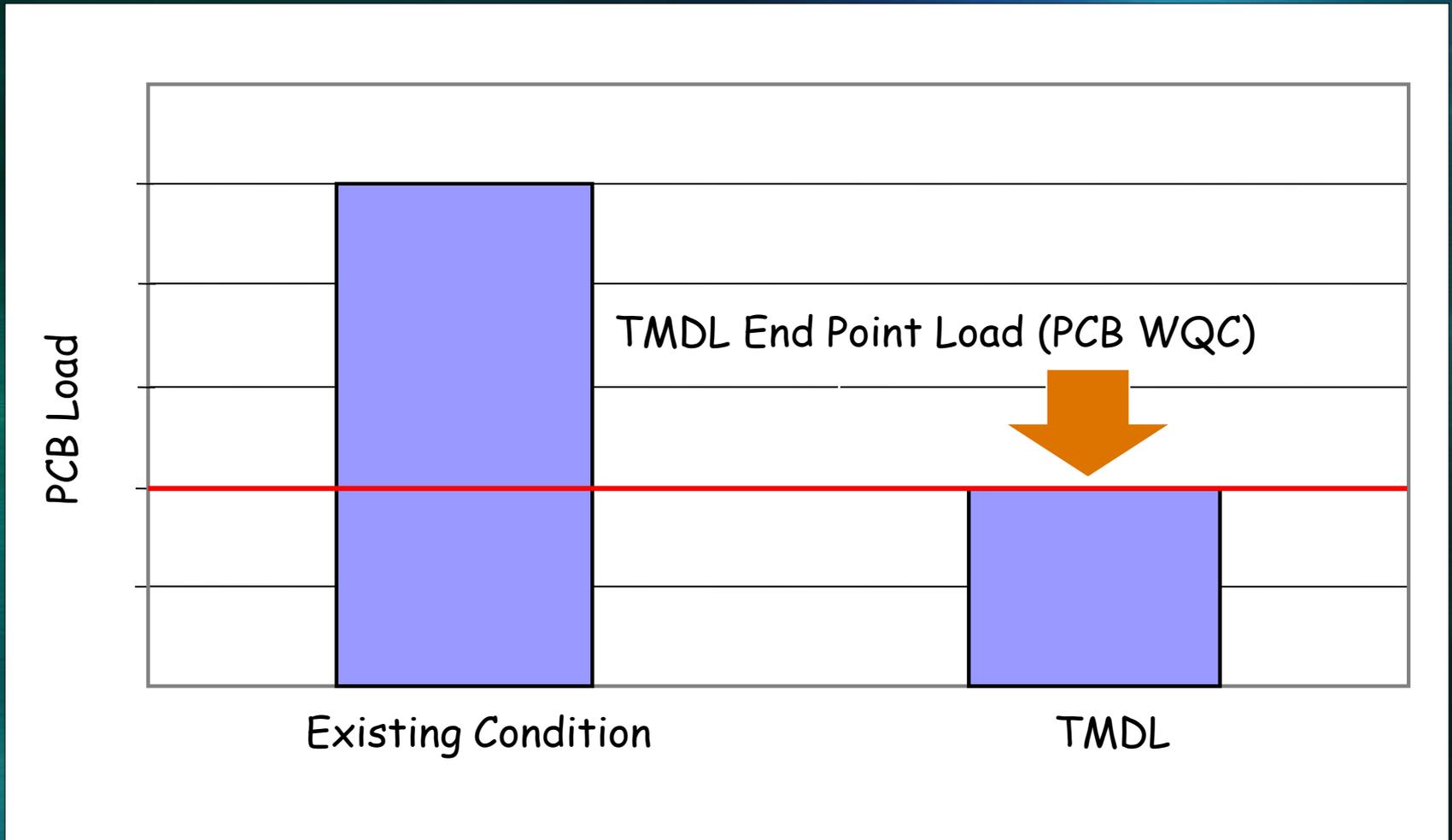
- Persistent, bioaccumulates at low conc. (pg/L) & biomagnifies

- Confirmed on-going releases



PCB TMDL Development

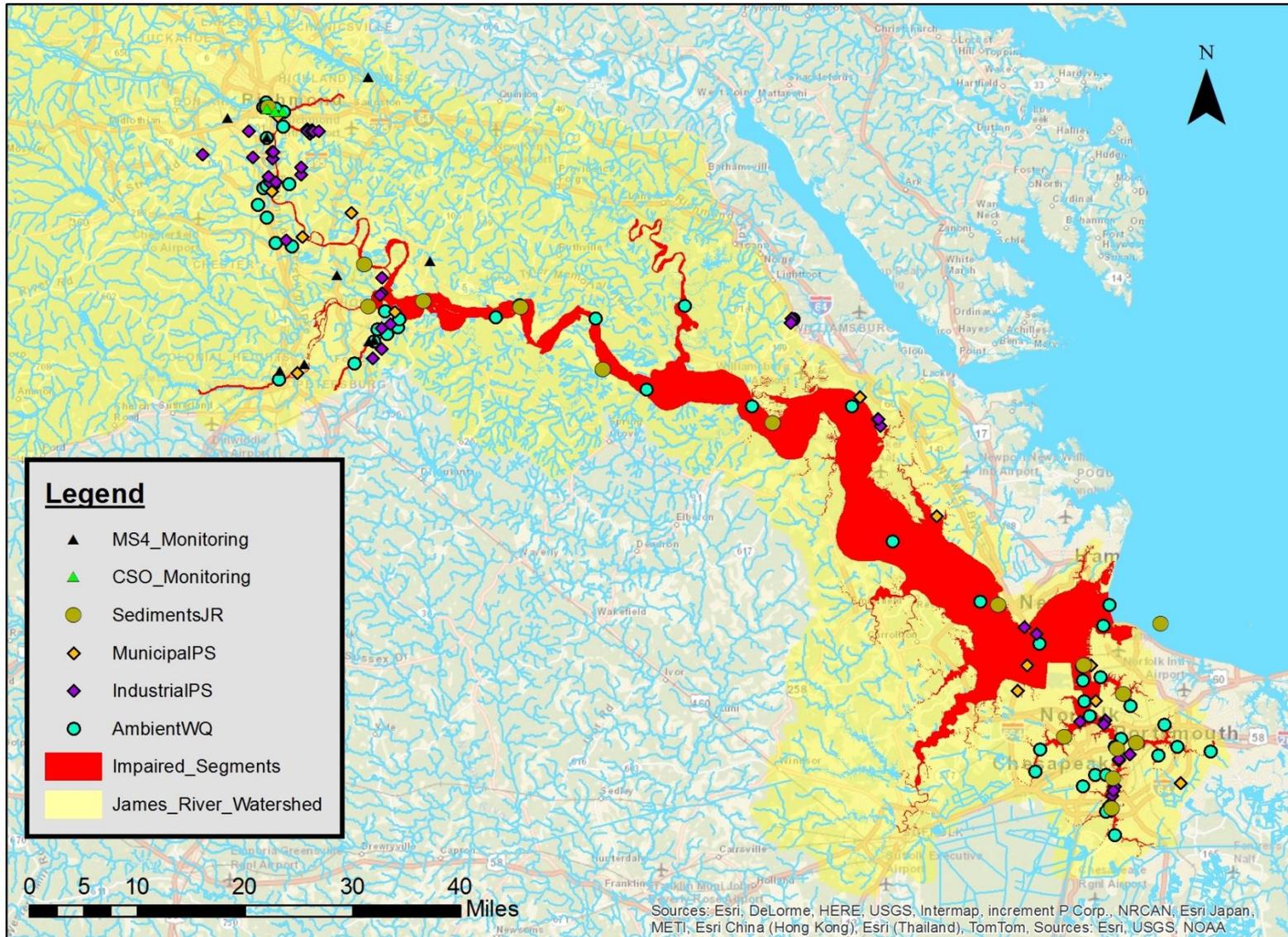
An Example TMDL



Reducing existing pollutant load to the TMDL end point load is expected to restore fish consumption use

PCB Source Investigation Update

TMDL Source Investigation Monitoring Stations

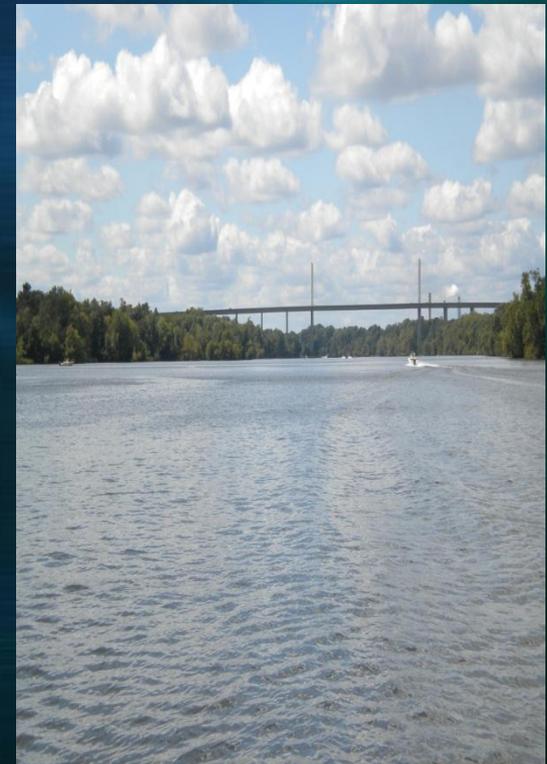


TMDL Source Investigation -

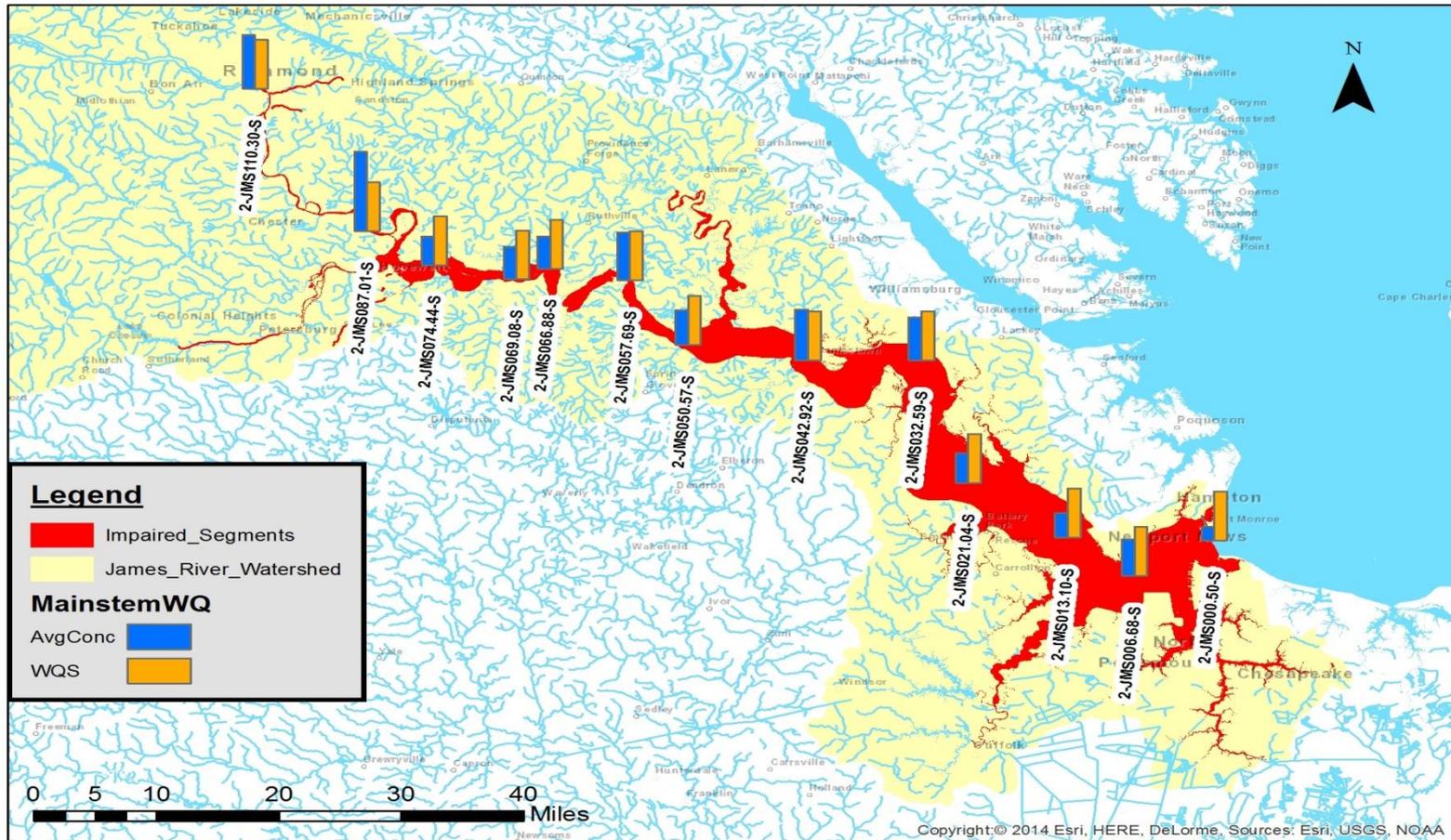
- PCB Field Study
 - PCBs hydrophobic but found in water matrix (TSS)
 - PCB data from water matrix a TMDL need
- Improved PCB analytical methods
 - EPA Method 1668 – Detects PCBs in water (ultra-low concentration)
 - Important PCB TMDL development tool
 - Establish concentrations from a source & convert to active PCB loadings
 - Applicable to all TMDL Source Categories when data available

TMDL Source Identification Studies

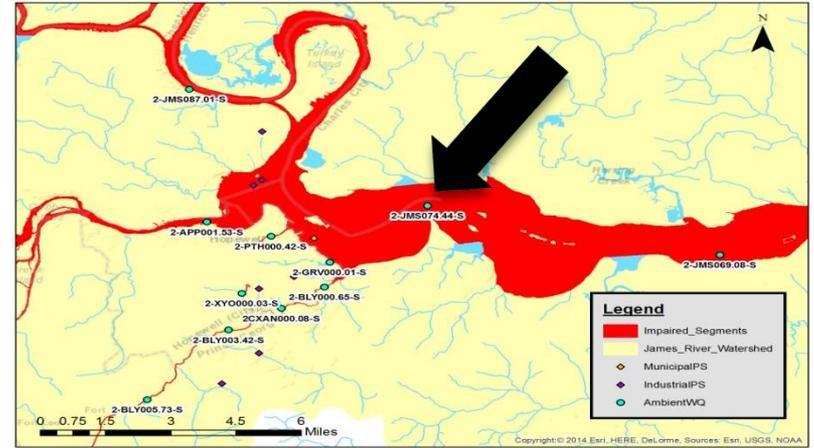
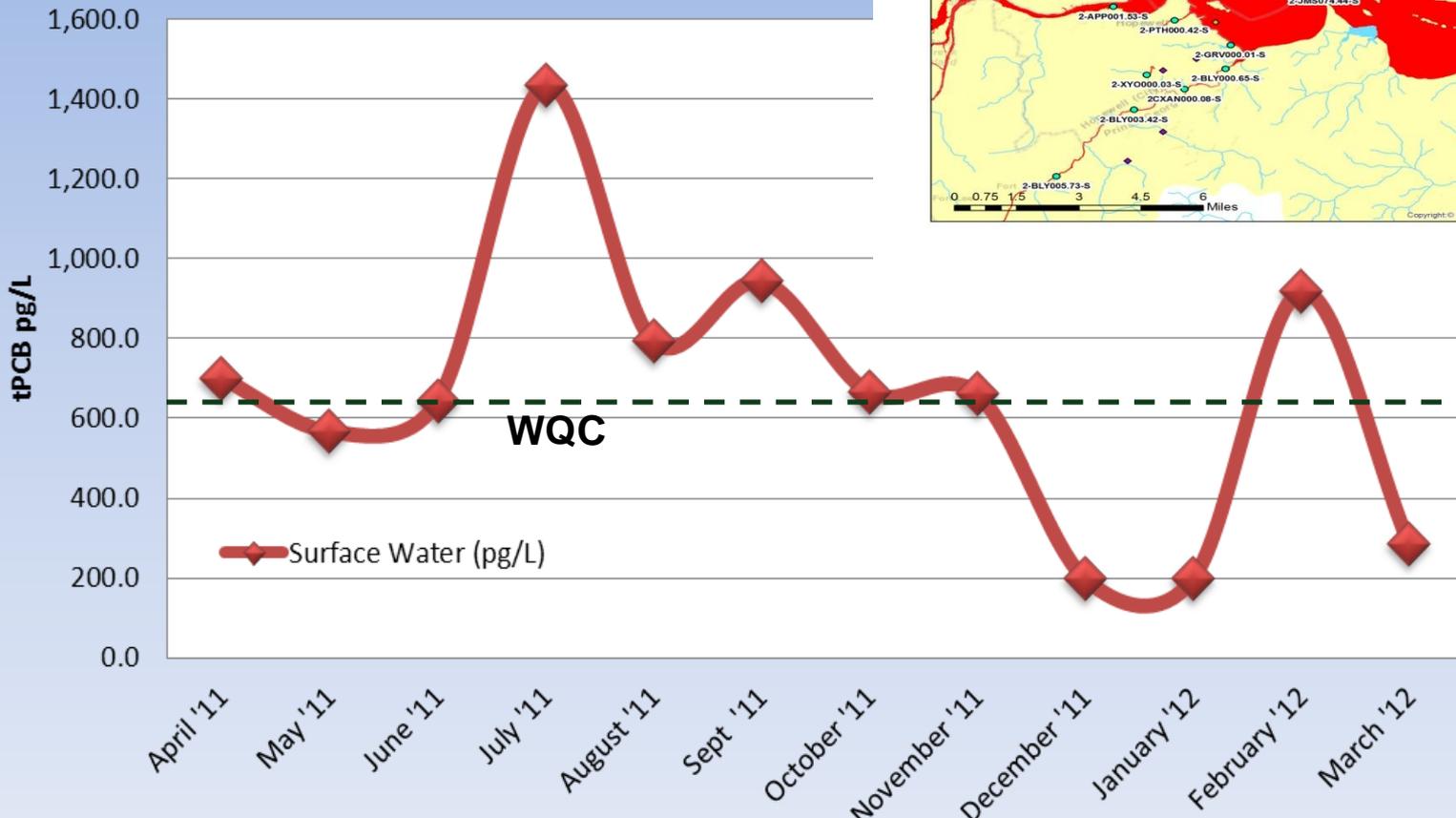
- Ambient water PCB results necessary to develop TMDLs
 - Source identification
 - Assist in the development of site specific PCB endpoints if necessary
 - Fate & Transport model calibration/validation
- Tidal James & Elizabeth Rivers (2009 - 2013)
 - 68 Sites and 193 samples
 - Baseline and/or elevated flows



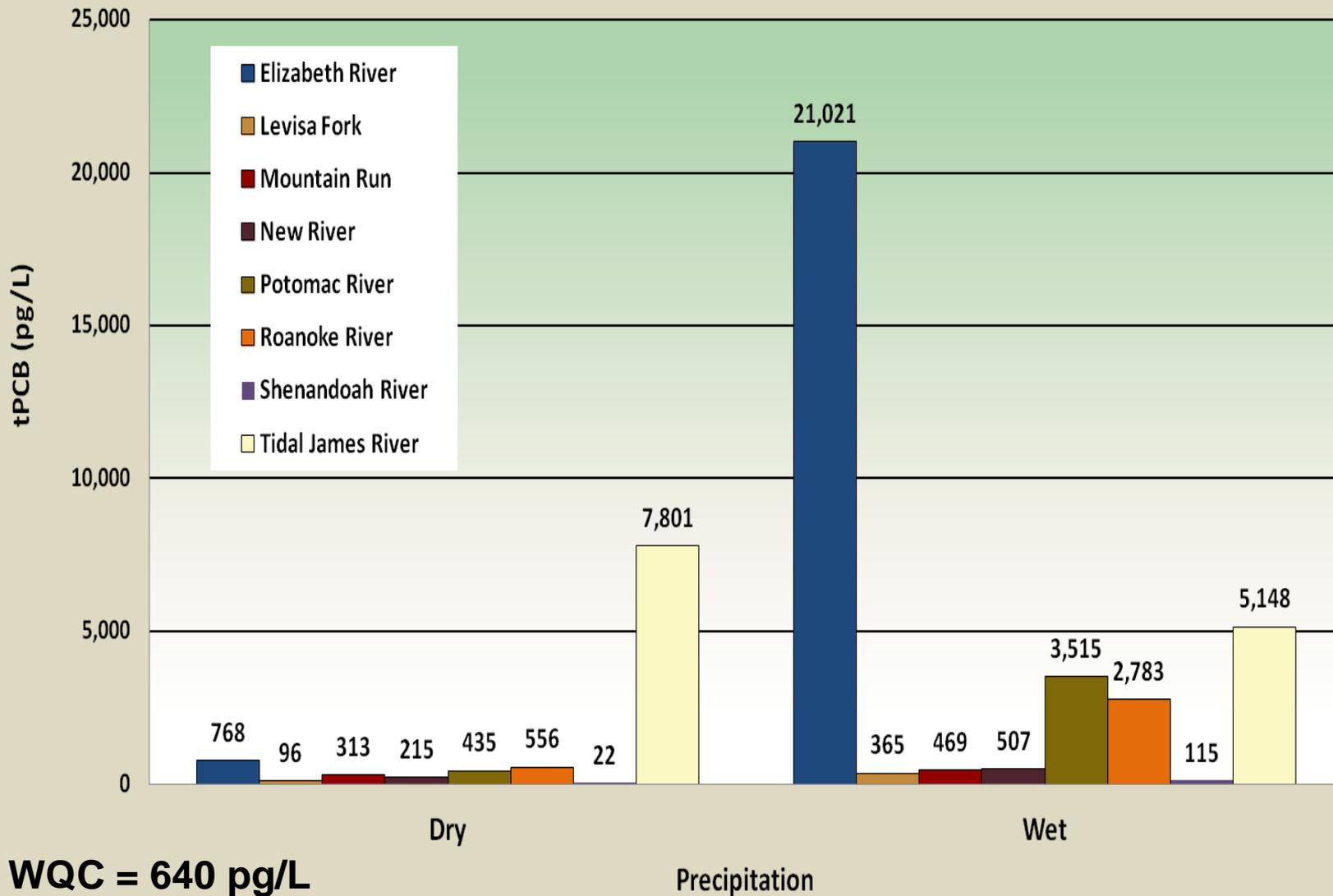
Tidal James River Ambient Water Total PCB Results



Monthly tPCB Results Collected from the Tidal James River Near Hopewell, VA (RM074.44) for a Period of One Year

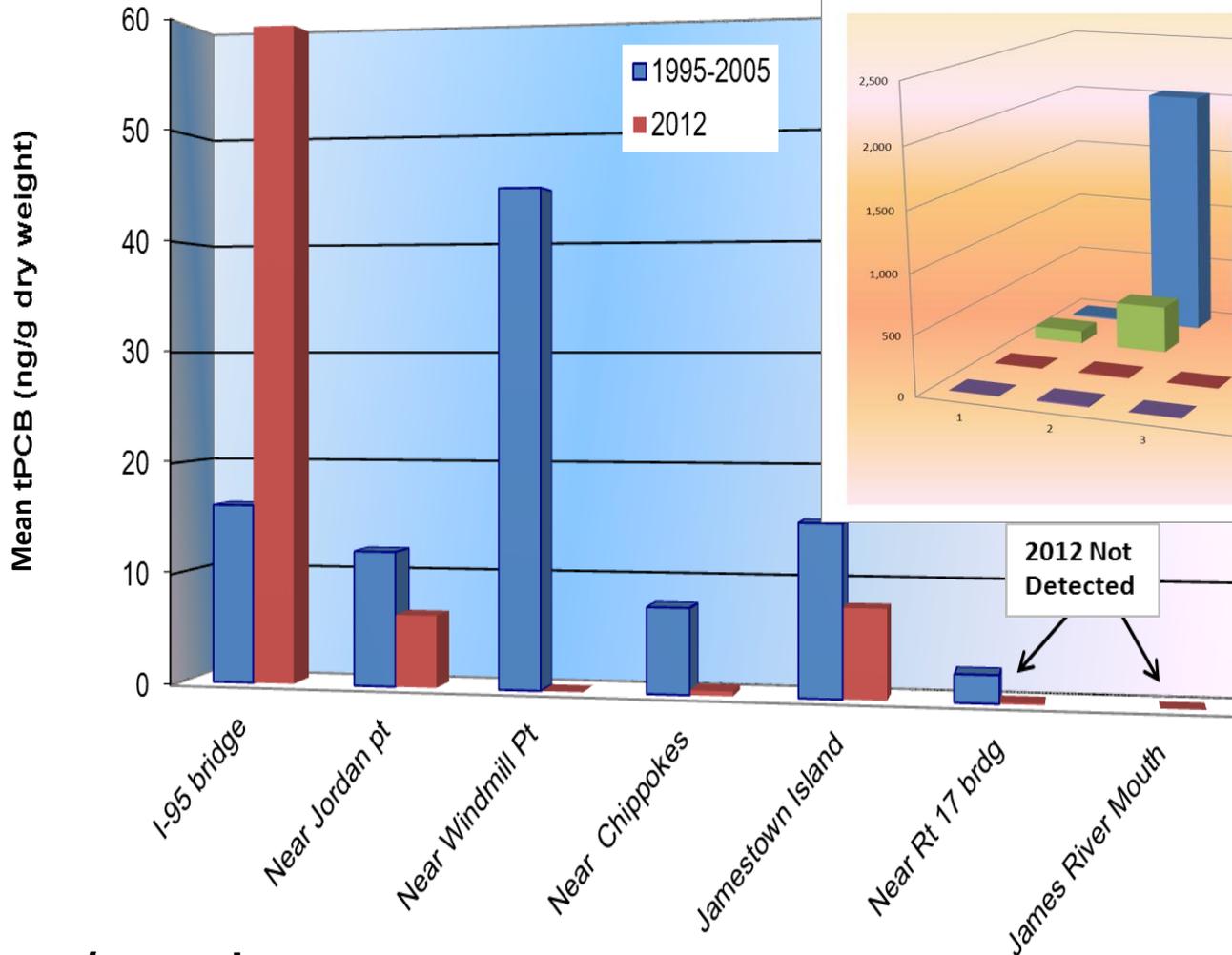


Mean tPCB (pg/L) Concentrations from Ambient Water in Six Watersheds Collected Before and After Precipitation Events



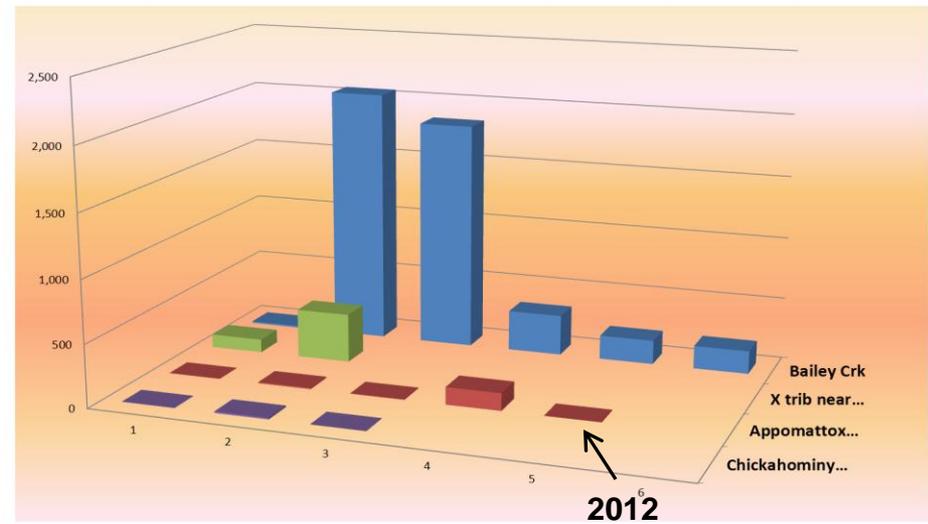
Concentrations of tPCBs in Sediments Collected in the Mainstem Tidal James River

(Many Stations combined into specified river location as sites varied over time ± 10 mi)



ng/g = ppb

Mean tPCB (ng/g) Concentrations in Sediments Collected from Tributaries to the James River (Samples Collected '96-'05)



TMDL Source Category - Point Source

Results from Facilities Located in PCB Impaired Waterbodies

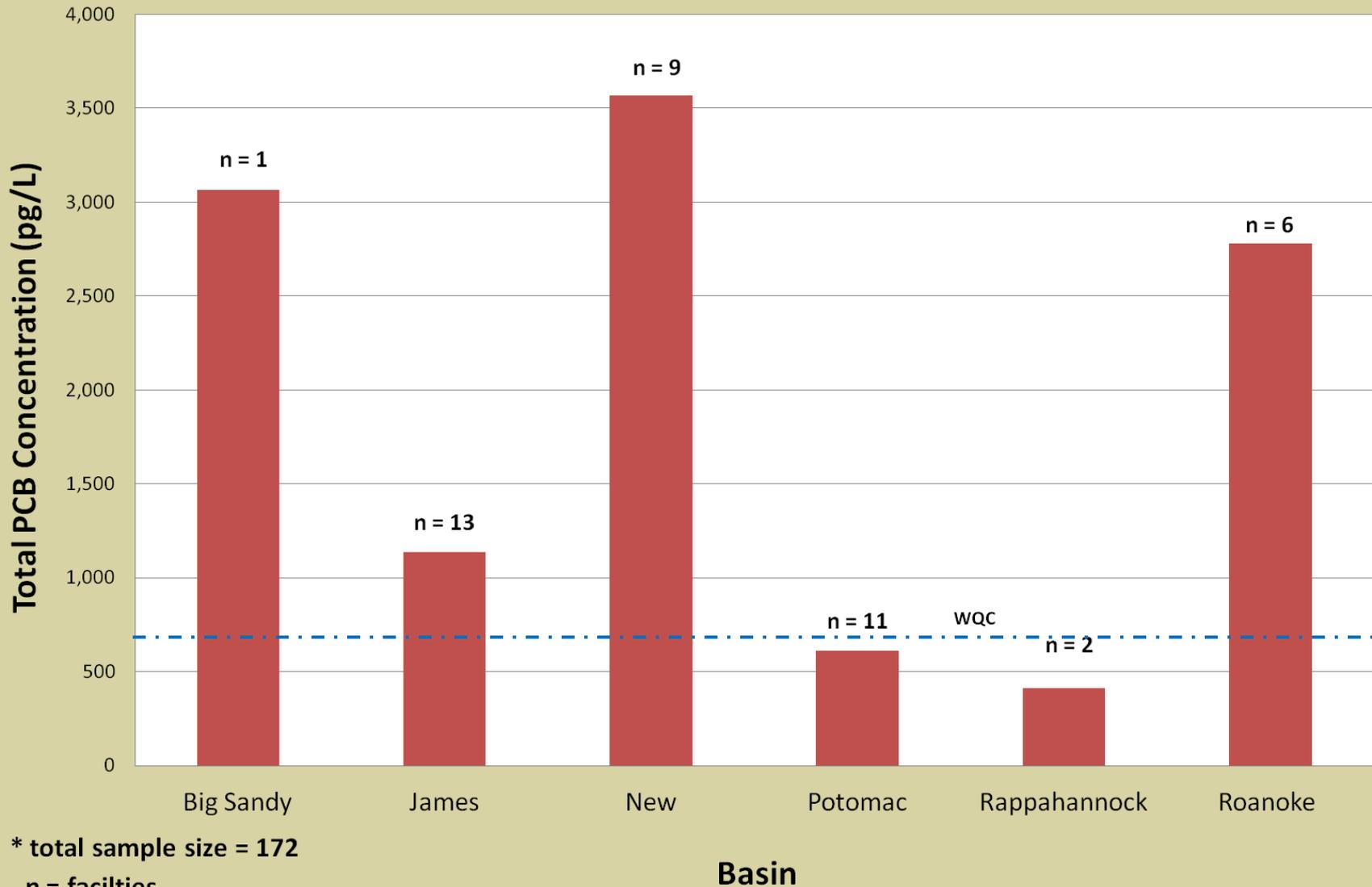
WQC = 640 pg/L

Basic Statistics		
	Statewide	Tidal James River
Facilities monitored	141	21
Total PCB Results (n)	587	65
Mean Concentration (pg/L)	65,290	10,802
Median Concentration (pg/L)	1,342	1,170
Min/Max (pg/L)	0 – 7,477,679	57 – 254,016
Results > 10,000 pg/L	108	9
Results > 500,000 pg/L	16	0

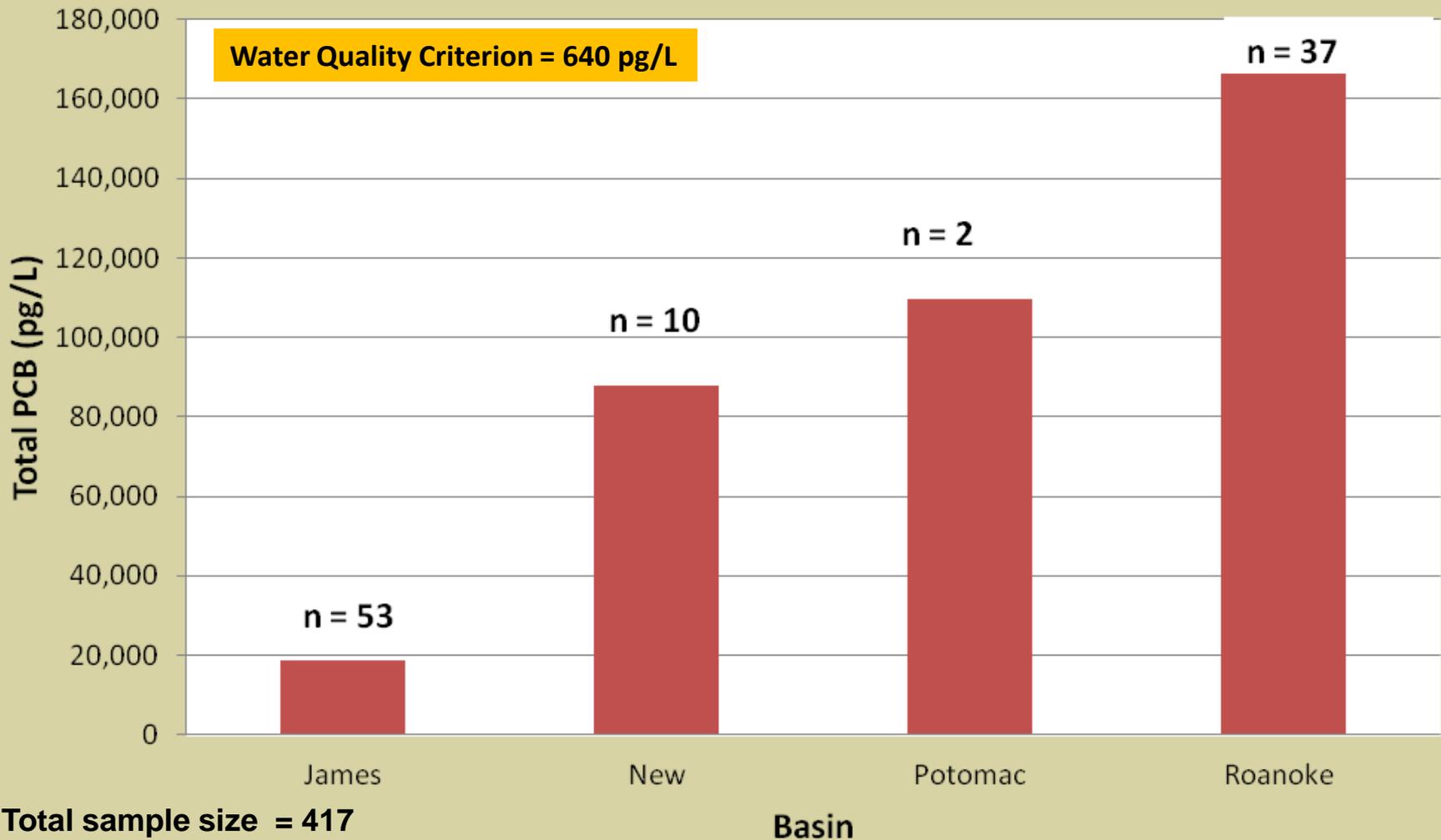
(Excludes Eliz. R.)



Mean tPCB Conc. (pg/L) from Waste Water Treatment Facilities Located in Six Virginia River Basins



Mean tPCB Conc. (pg/L) from Industrial Facilities Located in Four Virginia Basins



TMDL Source Category – Point Sources (Tidal James River)

- Point Source Guidance (TMDL GM 09-2001)
 - Voluntary requests to generate PCB data (several '09-'13)
 - Facil. requested = 97; participants = 23 (~24%)
- Participating Facilities (TMDL process)
 - All facil. asked to participate will receive a Waste Load Allocation (WLA)
 - Baseline PCB concentration calculated using tPCB concentration and flow
 - Comparison of baseline with WLA will determine need for reduction

TMDL Source Category – Point Sources (Tidal James River)

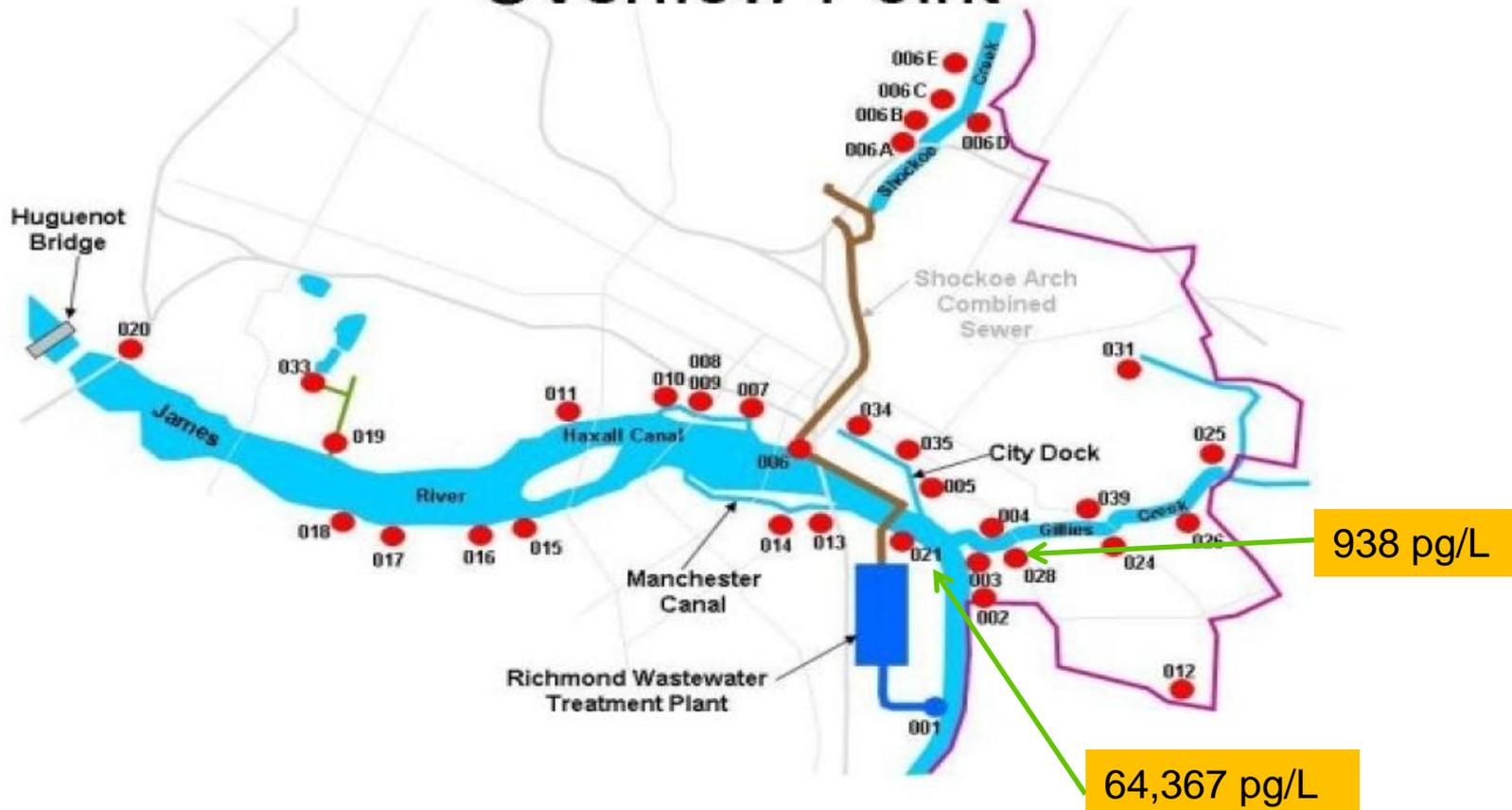
- Non participating facilities
 - Default PCB concentration to be used for TMDL baseline load
 - Will be compared to WLA
 - PCB effluent screening requirement will be included as future VPDES permit special condition
 - Applicable General Permit holders will receive the request via letter

PCB TMDLs – Point Sources

- Recent Guidance development
 - *“Procedures for reviewing and deriving total PCB concentrations from samples analyzed using low-level PCB method 1668 to be used in development and implementation of TMDLs”*
 - TAC meeting held November 2013
 - Under final internal review
 - Target completion March 2014 (?)
 - Will be posted on DEQ’s TMDL (PCB) website
- Finalize PCB concentrations for loading calculations

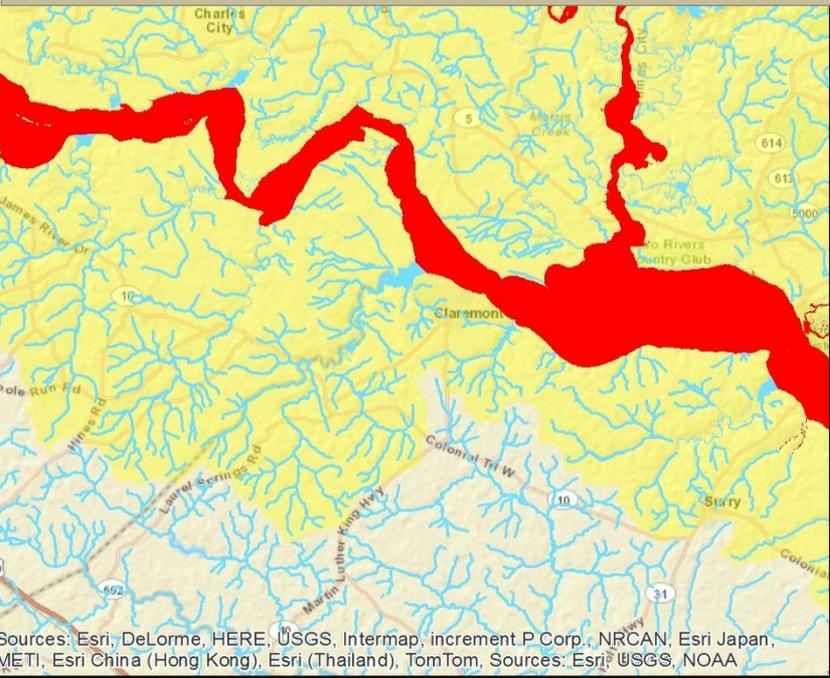
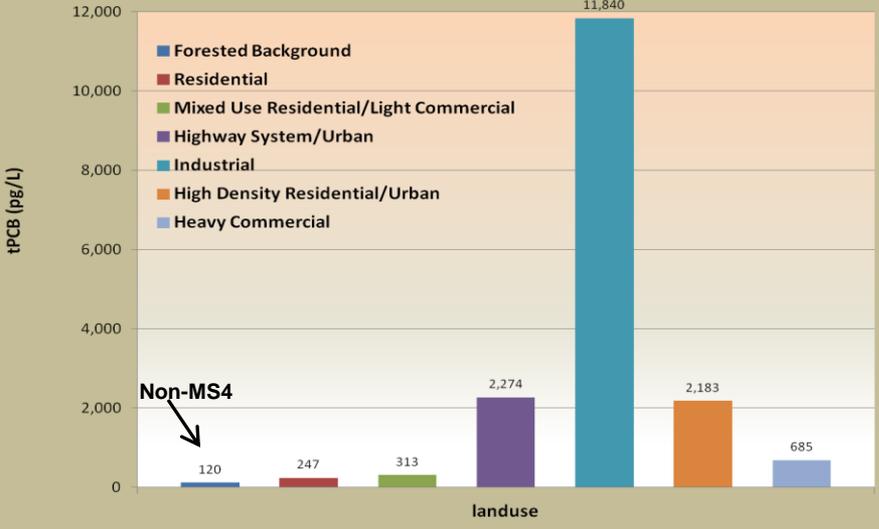
TMDL Source Category - CSO

Location of Combined Sewer Overflow Point



TMDL Source Category - MS4

MS4 Outfall tPCB Concentrations (pg/L) Representing Different Landuses from the Richmond, VA Metro Area



Sources: Esri, DeLorme, HERE, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, Sources: Esri, USGS, NOAA

TMDL Source Category- Contaminated Sites

- Military Installations
- RCRA Corrective Action
- Voluntary Remediation Program
- Landfills
- Miscellaneous spill sites



Project Timeline

Next Steps (External Model Inputs)

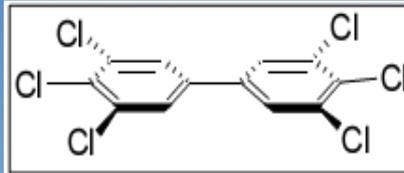
- Calculate baseline PCB loads from point sources (to include MS4s and CSOs)
- Estimate PCB loads from contaminated sites
 - Compiling list
 - Establish site coordinates/footprint
 - Use available PCB data
 - Apply model (e.g., RUSLE2) to simulate runoff/load
- Estimate PCB loads from atmospheric deposition

Tidal James River PCB TMDL Development

- Goal – Restore Fish Consumption Use
- Prospective timeline

Item	2009	2010	2011	2012	2013	2014				2015		
						Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
PCB Field Monitoring			complete									
Fish Tissue Monitoring												
Pt. Source Monitoring												
Technical Advisory Comm												
Public Meeting												
Model Development												
External Inputs												
Draft TMDL (Development)												
Public Comment Period												
Complete TMDL												

* Additional TAC/Public Meetings can be held as necessary



Questions

Mark.richards@deq.virginia.gov

<http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/PCBTMDLs.aspx>