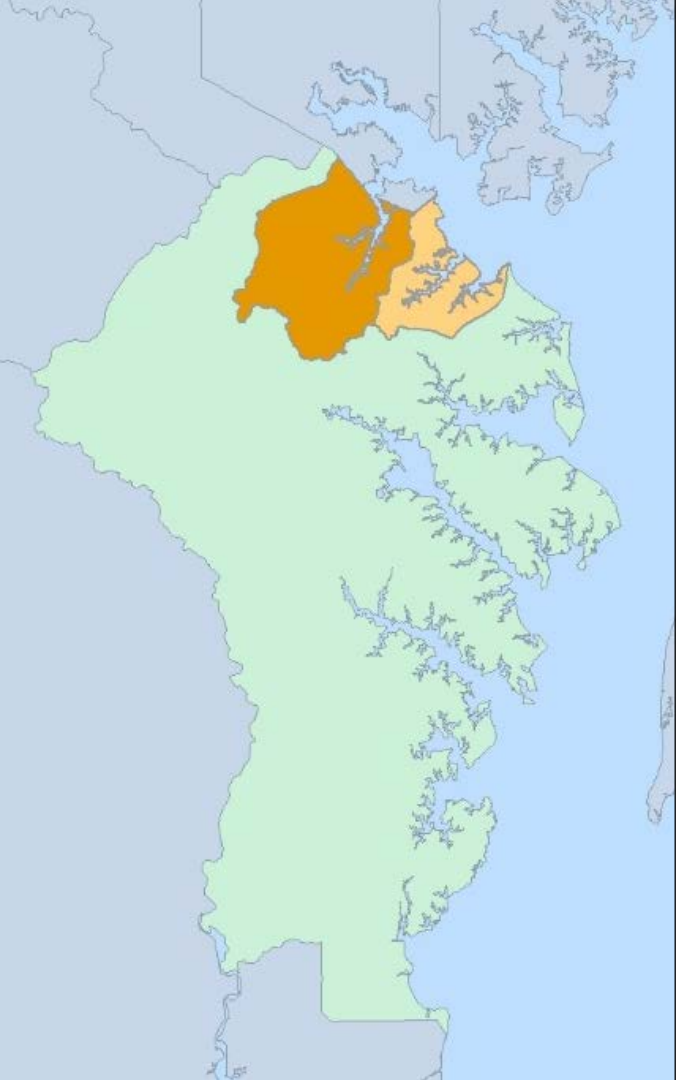
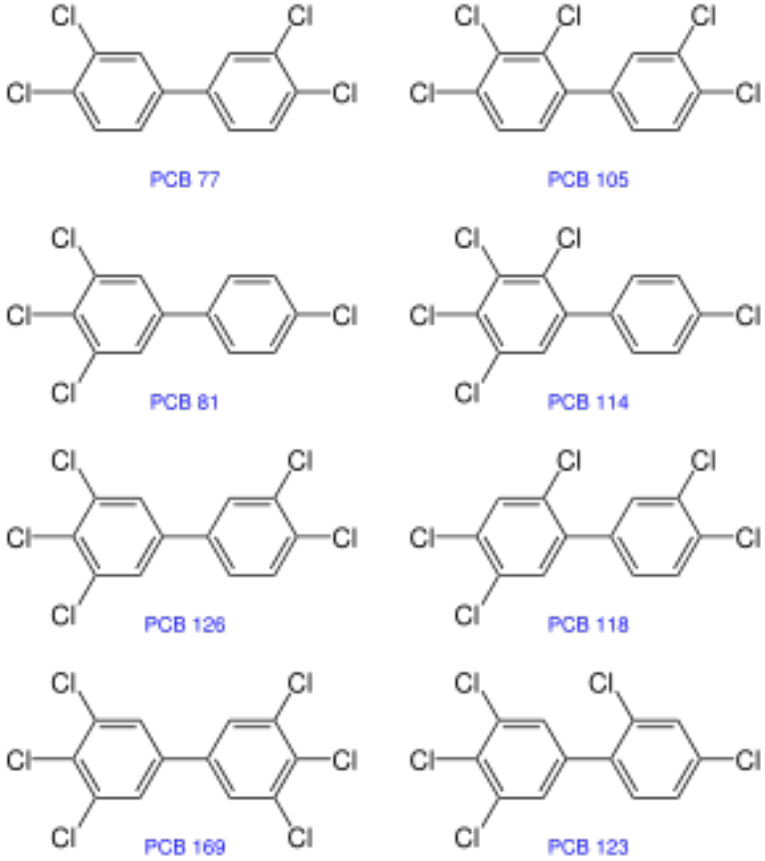
Biohabitats

PCB TMDL Action Strategy for Baltimore Harbor and Curtis Creek/Bay in Anne Arundel County



Introduction

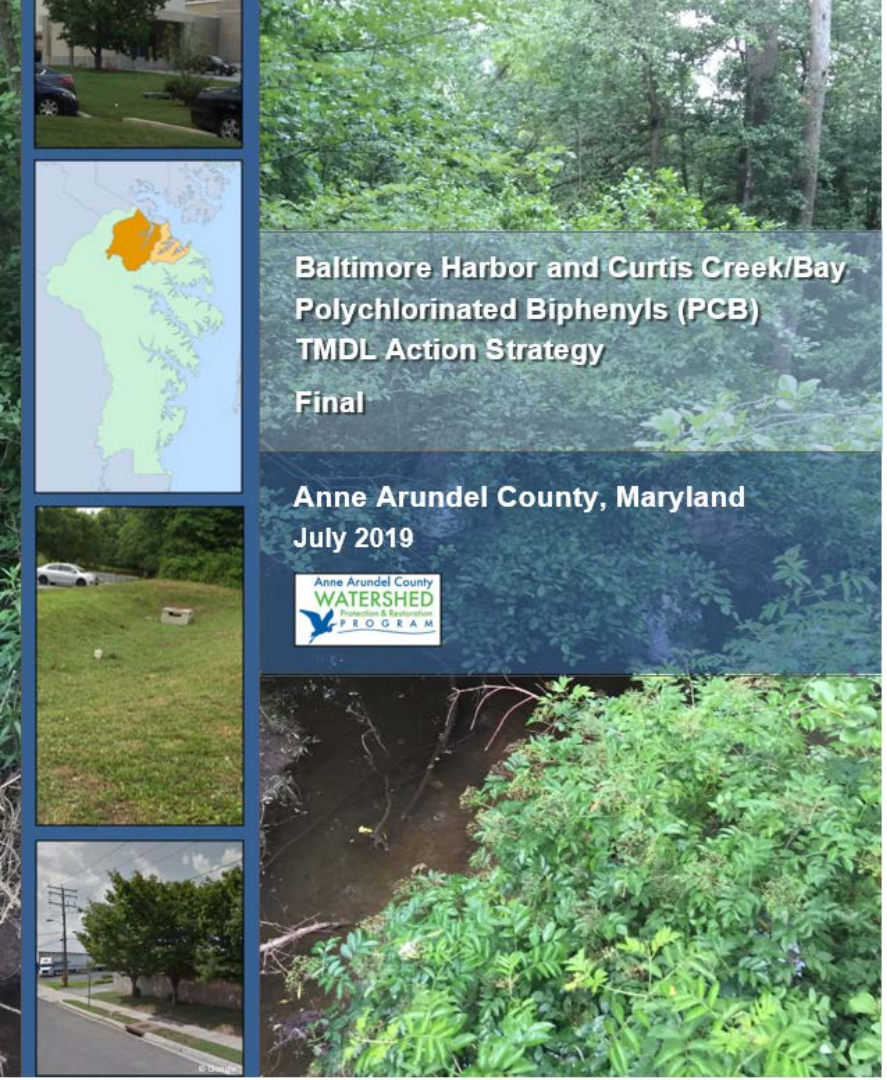
- PCB water quality impairments in Baltimore Harbor and Curtis Creek/Bay
- TMDLs developed in 2012
  - includes a stormwater wasteload allocation
- TMDL requires following reductions:
  - Baltimore Harbor: 91%
  - Curtis Creek: 94%
- Anne Arundel County's Phase I MS4 permit requires a restoration plan to address
  - Restoration plan recommends monitoring to better understand and track sources



Source: M. Van den Berg et al. (2006)

What are PCBs

- Polychlorinated Biphenyls (PCBs)
- Family of manmade chemicals
- 209 congeners
- Manufactured and widely used 1929 – 1979
- Used caulk, dyes, motor oil and electrical equipment
- Banned in 1979 due to impacts on human health and environment
- Very stable; bind strongly to sediment; still persistent in environment



Targeted Action Strategy

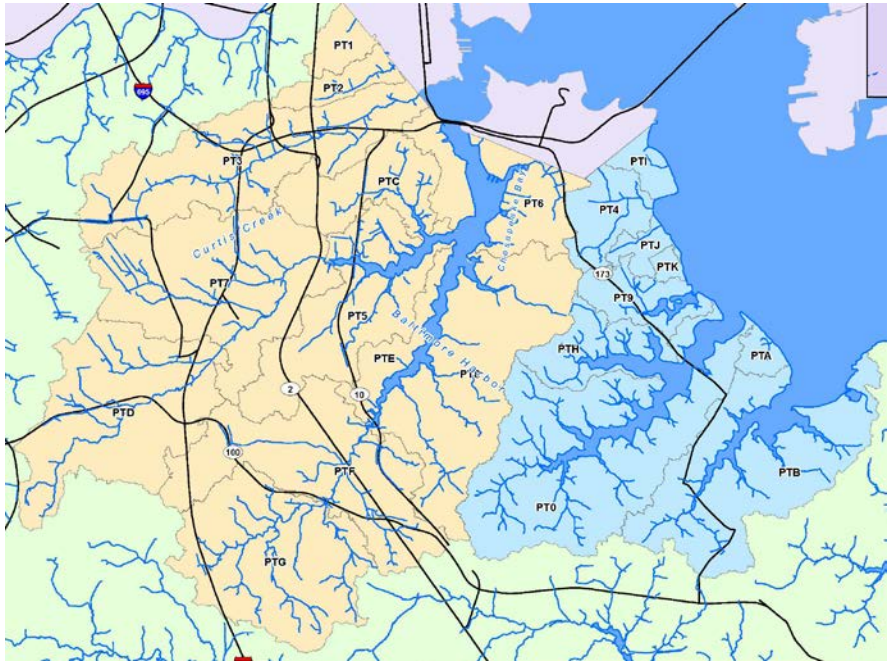
- Desktop source tracking
- Monitoring strategy
- Goals:
  - Link tributary contamination to upland sources
  - Verify desktop source tracking
  - Address identified sources
  - Inform strategy for remainder of the watersheds
- Still evolving process

Desktop Source Tracking

Catchment ID	Tier 1			Tier 2	Tier 3	Industrial Site Count	PCB Era Public Buildings	Total Sites with Potential PCB Soil Contamination
	PCB Transformer Count	LRP Site Count	NRC Count	LRP Site Count[1]	CERCLA Count			
PT1	0	0	0	0	0	0	1	**1**
PT2	0	0	0	1	0	0	0	**1**
PT3	0	1	0	6	2	1	4	**14**
PT4	0	1	0	0	0	0	0	**1**
PT5	0	0	1	2	0	1	4	**8**
PT6	0	0	0	4	1	1	0	**8**
PT7	0	0	1	1	1	2	6	**11**

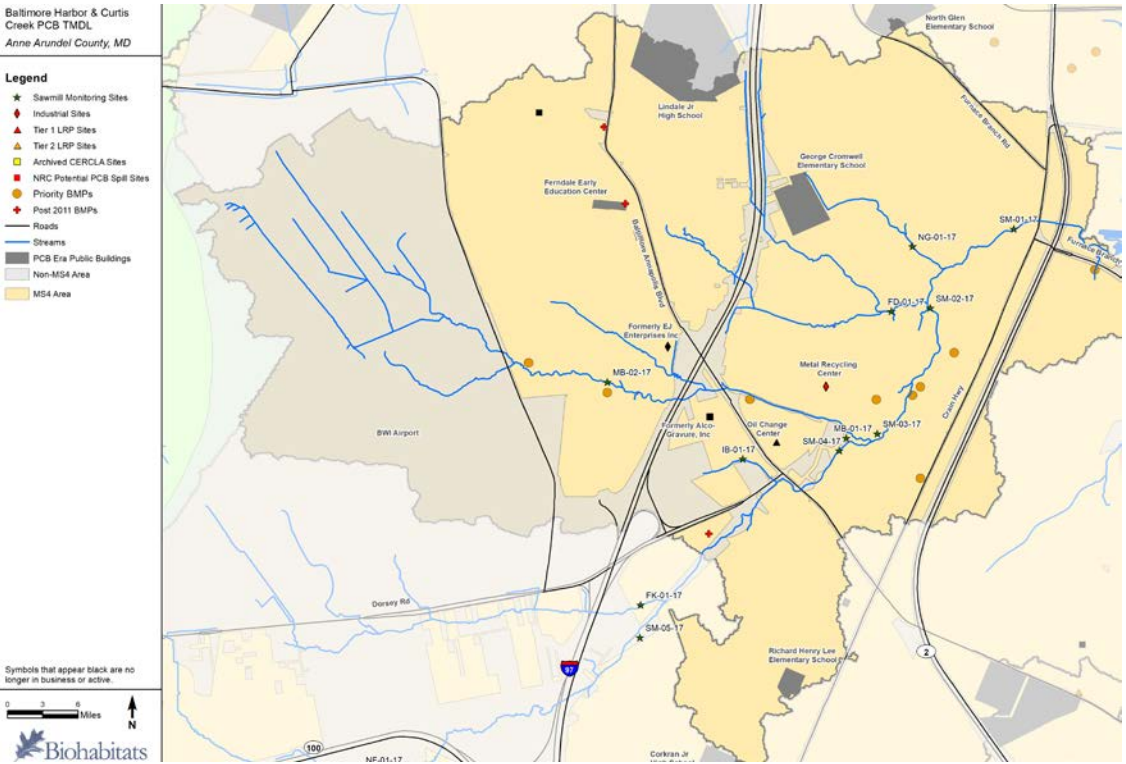
Potential sources of PCB contamination

- Tier 1 Sites
  - EPA PCB Transformer Registry
  - MDE Land Restoration Program Sites (w/ confirmed PCB contamination)
  - National Response Center Database
- Tier 2 Sites
  - MDE Land Restoration Program Sites
- Tier 3 Sites
  - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, aka Superfund) Sites
- Additional Sites, MDE recommended:
  - Industrial discharges assoc w/ potential historical use or storage of PCBs
  - PCB-era buildings on public property



Pilot Catchment

- Identify catchment for comprehensive monitoring strategy
- Focus on catchment with:
  - Potential sources of PCB contamination
  - Smaller catchment size to facilitate source tracking
  - Good stream access



Pilot Catchment: PT7

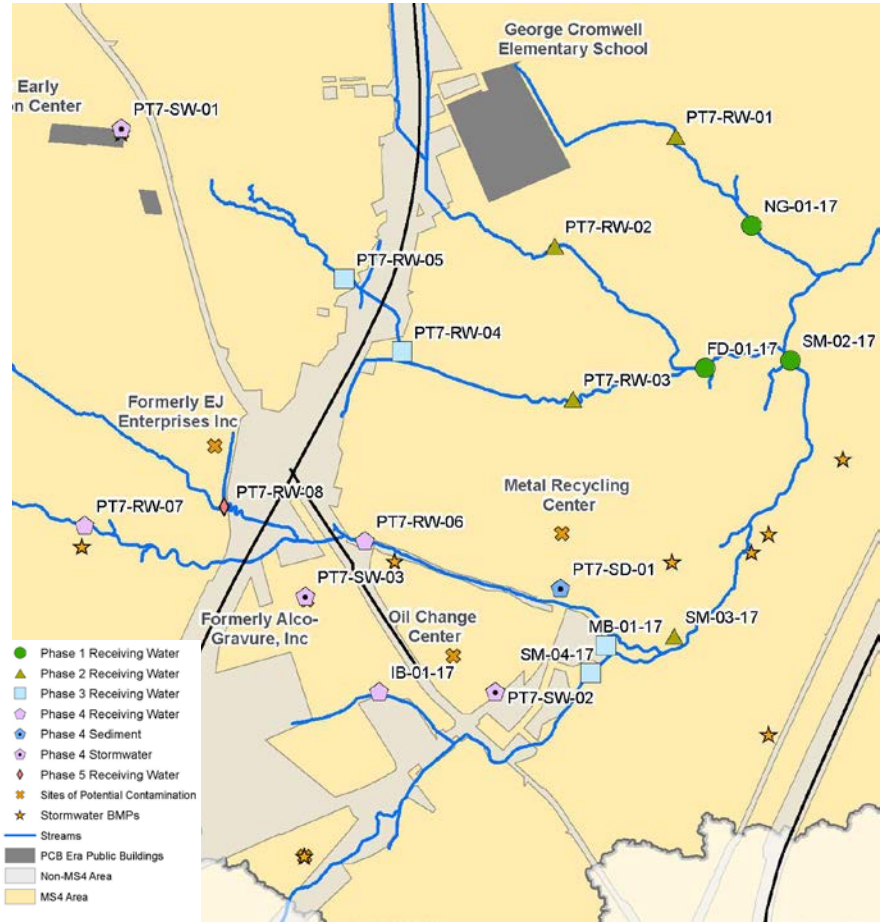
- 2,900 acres w/ 2,000 acres in MS4
- Western portion occupied by BWI
- Several state roadways including 97
- No confirmed PCB contaminated sites, but several potential PCB release sites
- Existing established monitoring sites

Monitoring Strategy

- 2 Phases:
  - Synoptic monitoring
  - Trackback method

Phase 1: Synoptic Monitoring

- Receiving water
- Passive samplers
  - Submerge in receiving waters until equilibrium is achieved; apx 2 months
- Reference site



Phase 2: Trackback Monitoring

- Based on results of synoptic sampling
- Sample upstream of hotspots
- Stormwater and sediment grab samples

Type	PCB Water Quality Standard
Human Health	0.64 ng/L (0.00064 ppb)
Freshwater Aquatic Life	14 ng/L (0.014 ppb)
Sediment	180 ng/g[1] (180 ppb)

1: Not an official WQS; corresponds to the Effect Range Median in accordance with methodology developed to assess toxic impairments in sediment

Standard	PCB Level
Water Column TMDL Endpoint	0.27 ng/L (0.00027 ppb)
Sediment TMDL Endpoint	3.1 ng/g (3.1 ppb)
Sediment Quality Guideline (SGQ) Threshold Effects Level (TEL)	21.6 ng/g (21.6 ppb)
Voluntary Cleanup Program Soils Stds Residential/ Non-Residential	3.20E-01 / 1.4E+00 mg/kg (320 / 1400 ppb)

Phase 2: Trackback Monitoring

- What are hotspots?
- Still to be determined, but several water quality standards that could be used for comparison depending on scenario

Source: roadsandbridges.com

Monitoring Strategy: Special Considerations

- Define contributions from non-MS4 areas
- BWI
  - Monitoring just downstream of BWI
- State Roads
  - Monitoring above and below 97

Remediation

- County-owned
  - Work with EPA and MDE to identify actions and remediate
- Privately-owned
  - Report contamination to EPA
  - Determine regulation under Toxic Substances Control Act (PCBs ≥ 50 mg/kg)
  - Not regulated, will refer to MDE's Voluntary Cleanup Program

Source: K.Salo

Remediation

- Methods - Traditional
  - Incineration
  - Hazardous waste landfilling
  - Capping
- Methods – Emerging
  - Bioremediation
  - Biochar
  - Thermal Desorption

Treatment Options

Considerations	Treatment Options					
	Incineration	Hazardous Waste Landfilling	Capping	Bioremediation	Biochar	Thermal Desorption
In Situ Treatment			X	X	X	X
Ex Situ Treatment	X	X				X
Light contamination		X		X	X	
Heavy contamination	X	X	X	X		X
Groundwater contamination concerns		X	X			
Low to no long-term maintenance	X	X			X	X
Highly chlorinated congeners	X	X	X			X
Immediate/near-term reuse of site	X	X				X

Questions?

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