Toxic Removal by BMPs in the Chesapeake Bay

TOXIC CONTAMINANT WORK GROUP
JULY 8TH MEETING

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Outline

- General Project Objectives and Schedule
- Share Citations Discovered in Literature Search
- Present Some Preliminary Findings for 10 Toxin Categories
- Next Steps

Project objectives

(1) Investigate the potential toxic contaminant reduction benefits that could be associated with the implementation of BMPs for sediment and nutrient reduction under the Bay TMDL.

(2) Provide water resource managers with better BMP data to develop more effective local TMDLs and action strategies to control toxic pollutants in the watershed.

Project Schedule

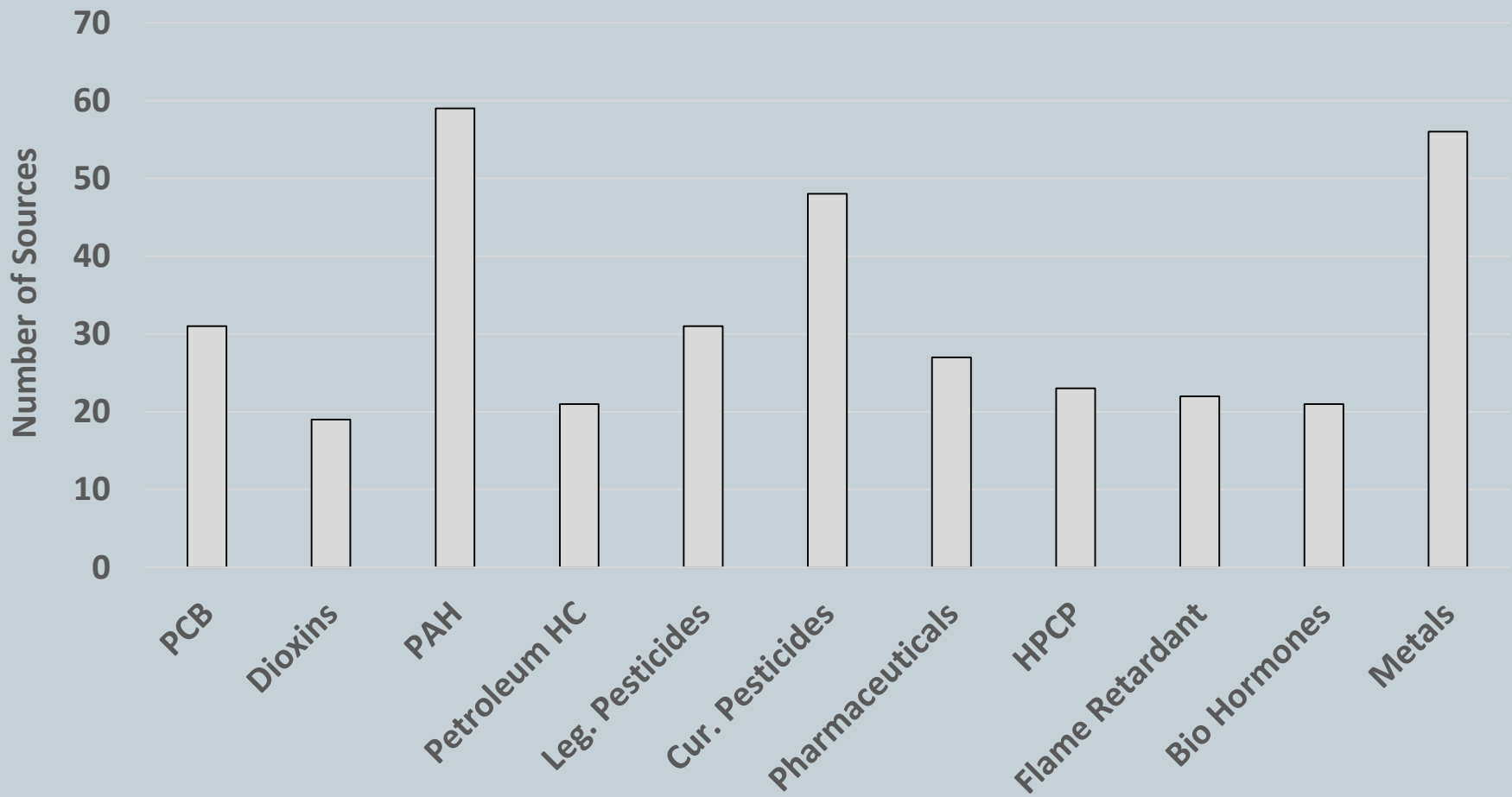
- 3/15: Work Plan Approved by TCWG
- 5/15: Complete Literature Search
- 9/15: Finish Lit Synthesis
- 10/15 Tech Memo for Workgroup Comments
- 11/15 Respond to Comments
- 12/15 Final Report

Priority Contaminants Investigated

#	*Toxic Category*	*Individual Contaminants*
1	PCBs	Total PCBs
2	Dioxins	Dioxin and furans
3	PAH's	Total PAH, benzo(a)pyrene, napthalene
4	Petroleum HC	TPH, oil and grease, benzene
5a	Legacy Pesticides	DDT/DDE, chlordane, dieldrin, diazinon, chloropyrifos
5b	Current Pesticides	atrazine, acetochlor, glyphosate, fipronil, simazine, metolachlor, prometon, carbaryl, malathion, 2,4-D, dichlorvos, neonictinoids, pyrethroids
6	Pharmaceuticals	caffeine, acetaminophen, carbamazepine, tetracycline
7	HPCPs	pthalates, triclosan, triclocarban, surfactants
8	Flame Retardants	PBDE
9	Biogenic Hormones	Estradiol, estrone, testosterone
10	Trace Metals	As, Cu, Cd, Cr, Hg, Pb, Zn, Chloride

Codes: PCB's = Polychlorinated Biphenyls, PAH= Polycyclic Aromatic Hydrocarbons, HPCP= Household and Personal Care Products, PBDE = Polybrominated Diphenyl Ether, TPH: Total Petroleum Hydrocarbons.

Scope of Literature Search (N = 200)



Search Objectives

- Confirm sources, generating sectors and watershed pathways for toxin categories
- Establish runoff EMCs or sediment enrichment factor (or at least a range) to quantify loads
- Discover any existing BMP removal data
- If not, relate toxin properties to conventional pollutants (TSS, TP, TN)
- Look for unique pollution prevention practices

Toxics and TMDLs in US

Rank	Pollutant	# of TMDLs in US
1	**Mercury**	**21,545**
2	Pathogens	13,016
3	**Metals (excluding Hg)**	**9,828**
4	Nutrients	6,034
5	Sediment	3,922
11	**Pesticides**	**1,233**
13	**PCBs**	**698**
17	**PAH and Toxic Organics**	**158**

PCBs and Dioxins

- About 50 sources found
- Useful data on sources, generating sectors, and pathways
- Limited data to establish runoff and/or sediment levels
- Most data collected outside of Chesapeake Bay
- No BMP removal data at all
- Pollution prevention practices used

PAHs and Hydrocarbons

- About 80 sources found
- Unique urban sources: coal tar sealants and vehicle emissions
- Sufficient data to establish runoff and sediment conc.
- Strong affinity for sediment particles, fine and coarse
- First flush pollutant, behaves like sediment
- Ten BMP studies show high removal rates (80 to 90%)
- Concern about PAH accumulation in pond sediments in two states
- TPH degradation in rain gardens

Pesticides

- ~ 65 sources found
- Still detecting legacy pesticides (DDT/DDE/Diazinon etc) but at progressively lower levels
- Greatest risk are for “new “ ag and urban pesticides
- Pyrethoids, neonectonoids and glyphosate
- High rates of detection in stream samples
- Limited real BMP data beyond the standard and un-quantified Integrated Pest Management

Emerging Toxics of Concern

- Pharmaceuticals
- Household and personal care products
- Flame Retardants
- Biogenic hormones

- About 20 to 25 sources for each category
- These four categories have not been reviewed yet

Trace metals

- Over 60 studies found and 3 national databases searches
- For **Cd, Cu, Pb and Zn**: 50 to 100 estimates of EMC and/or BMP removal for each of the metals, plus good data on toxin sources, pathways and generating sectors.
- Much less data for **Cr and As**, and especially **Hg** (leading cause of water quality impairment in US

Next Steps

- Contact CSN at watershedguy@hotmail.com