

The problem with
pavement sealants:

How to avoid toxic PAHs
in your waterways and
protect public health

Huron River Watershed Council in
partnership with the Alliance of
Downriver Watersheds

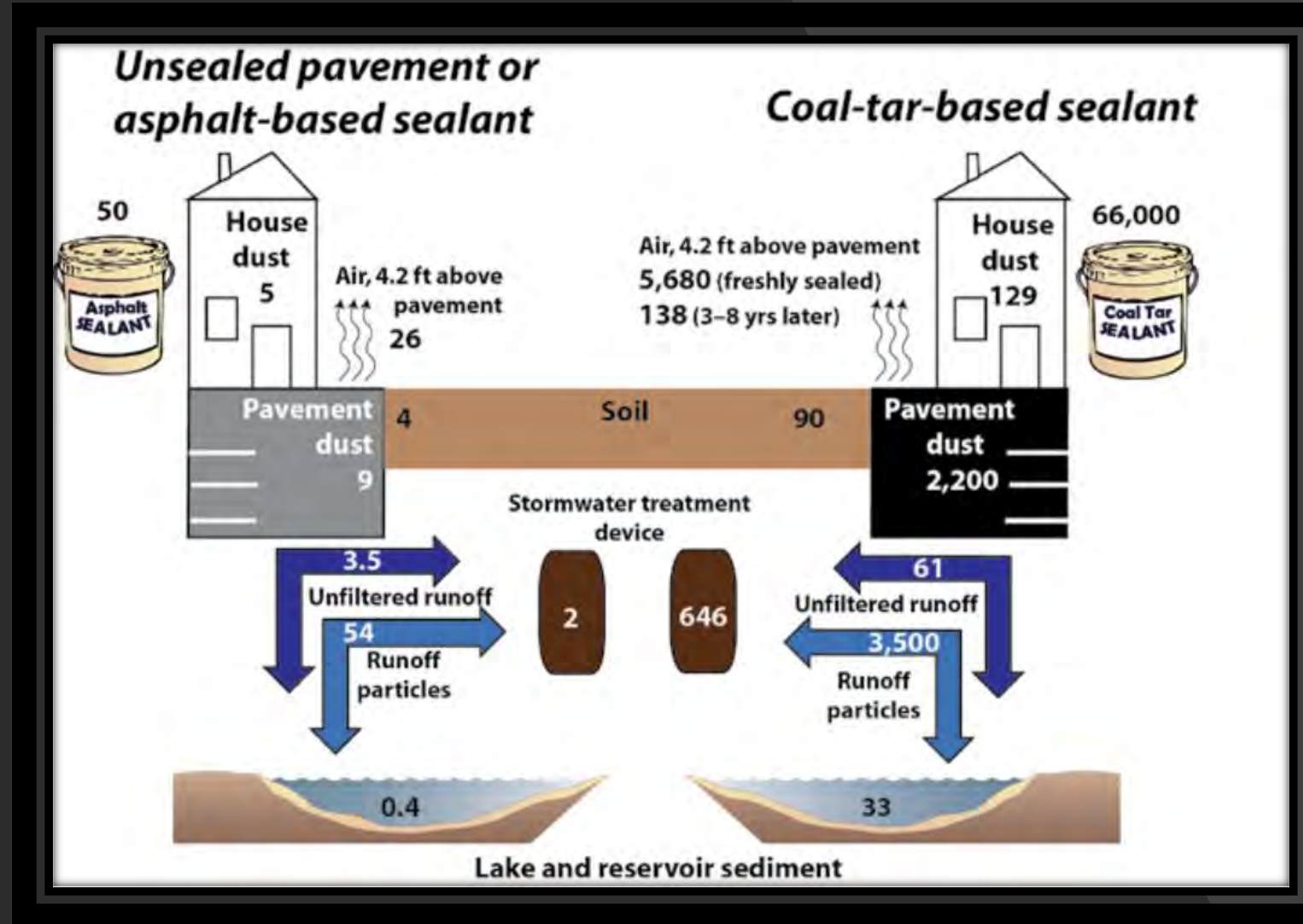
What are pavement sealants?

- Low traffic impervious surface sealant used on driveways and parking lots
- Sealants are commonly coal tar pitch based (CTS) but can be asphalt based (ABS) or a growing number of new base products.
- Average PAH content of sealcoats: CTS = >50,000 ppm
ABS = <500 ppm



PAHs in the Environment

- PAH concentrations in lake and stream sediments have been increasing
- 2003 study in Austin TX. Found coal tar sealants to be primary source
- Since then many studies have been conducted



Impacts of coal tar-based sealant exposure

Environmental Health

- Acute toxicity for test species of aquatic invertebrates and fish
- Increased DNA damage and reduced ability to repair
- In urban areas, PAHs often exceed probable effects concentrations in sediments.

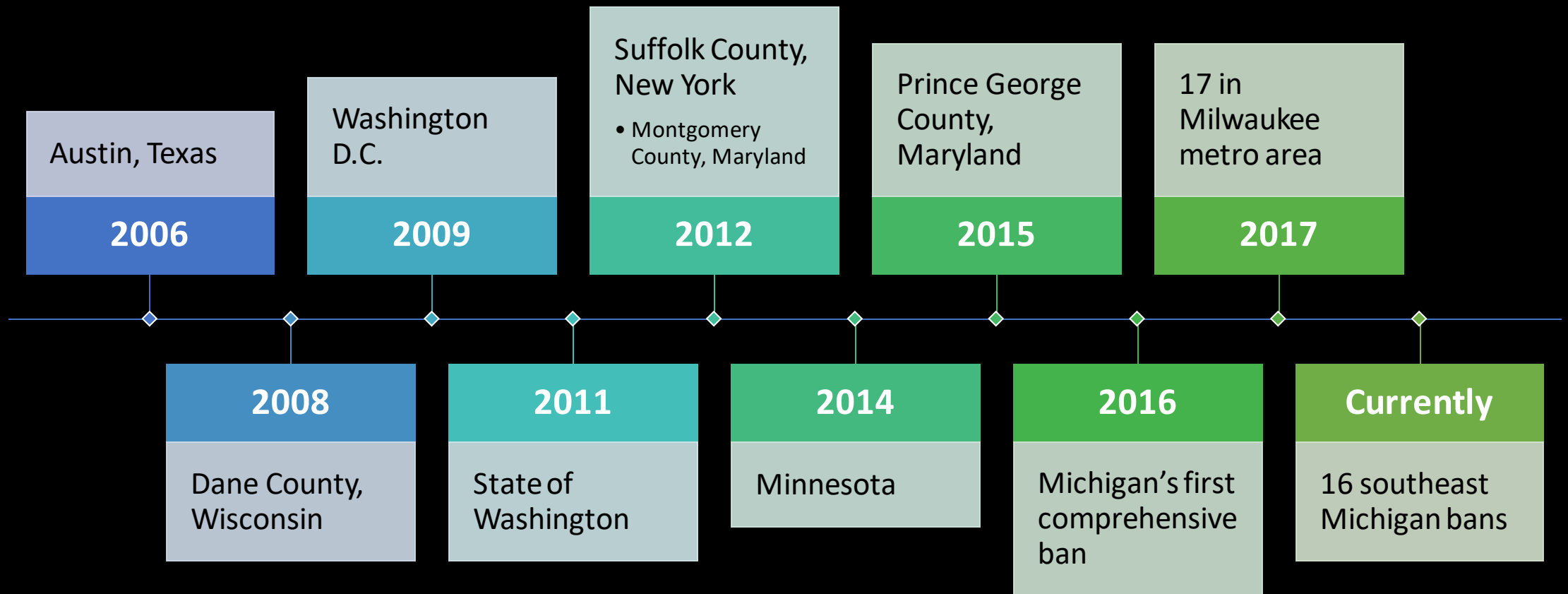
Human Health

- Several PAH compounds have been found to be: Carcinogenic (cancer), Teratogenic (birth defects) and Mutagenic (mutations in DNA)
- Studies suggest increased cancer risk up to 38 times
- Increased asthma risk and many other health issues

Stormwater Runoff

- Elevated levels of PAHs in stormwater sediments in MN resulted in disposal estimates in the billions of dollars for the Minneapolis/St. Paul area alone.

Timeline of Pavement Sealant Bans



State of Michigan – Ordinances/Bans



Comprehensive bans

Almont
Ann Arbor
Ann Arbor Township
Clarkston
Dexter
Grosse Ile
Hamburg
Pittsfield Township
Pinckney
Scio Township
Spring Lake Township
Van Buren Township
Warren
West Bloomfield
Wolverine Lake
Ypsilanti

Government restrictions

Byron Township
Charlevoix
Clark Township
Erie Township
Fruitland Township
Laketon Township
Village of Shepherd
Powell Township
Whitehall
Whitehall Township
White River Township

EGLE Sampling

Waters of the State –

41 Sediment locations

Downstream of a large CT sealed surface

Traverse City

- Scraped surface lots
- Collected Sediment

Kalamazoo

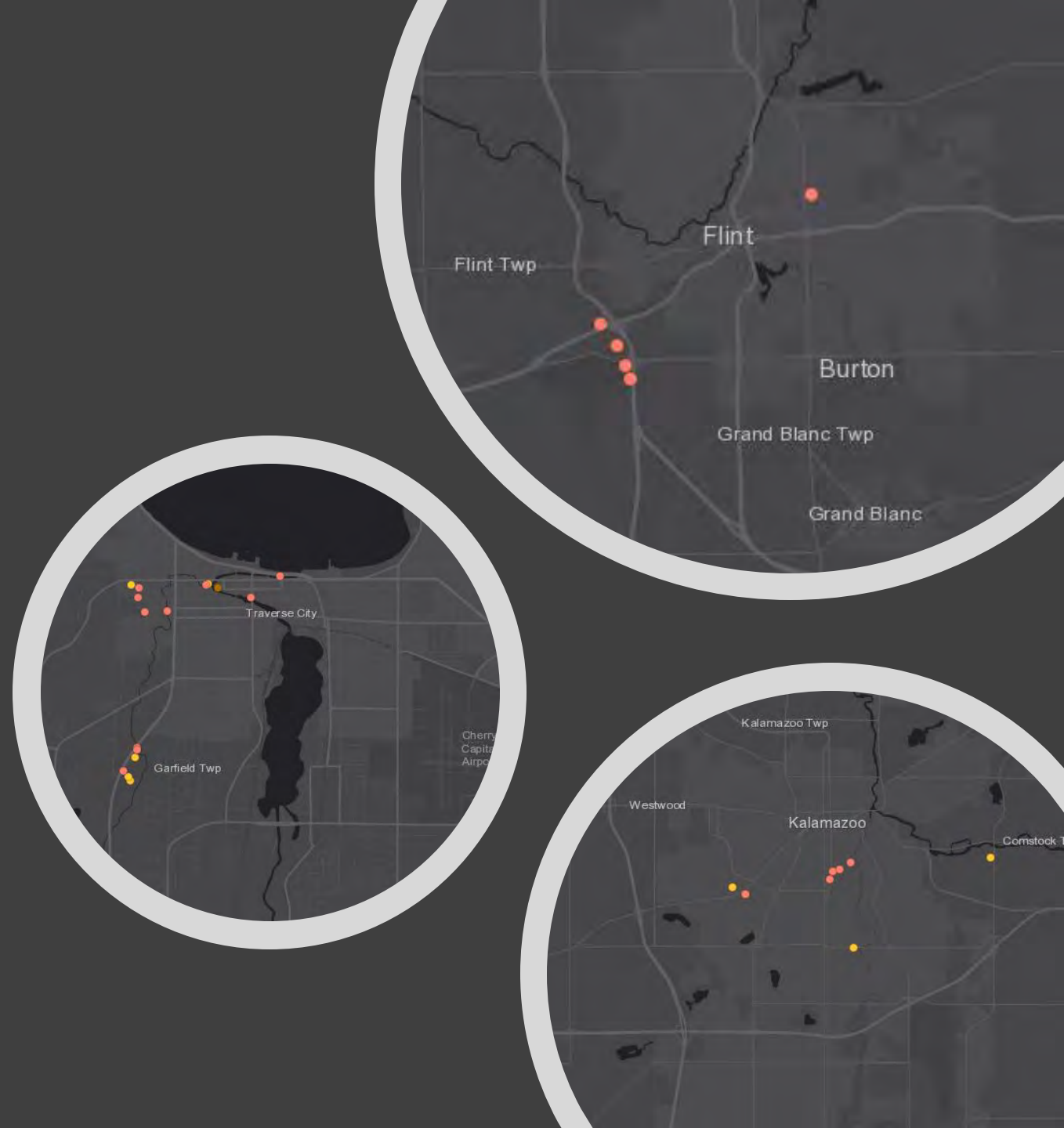
- Scraped surface lots
- Collected Sediment

SE MI area – Novi, Wixom, Ann Arbor, Waterford, Southfield and Sterling Heights

- Collected Sediment
- Detention ponds

Flint

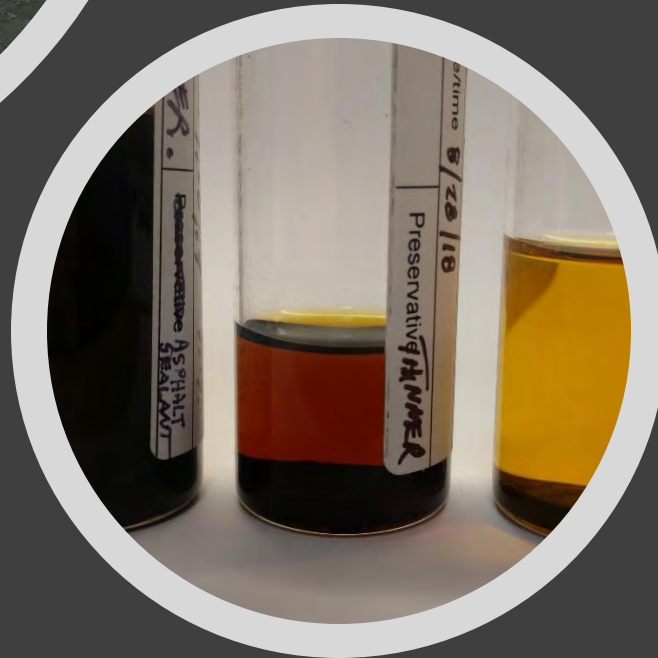
- Collected Sediment



Quick Field Test

- Supplies

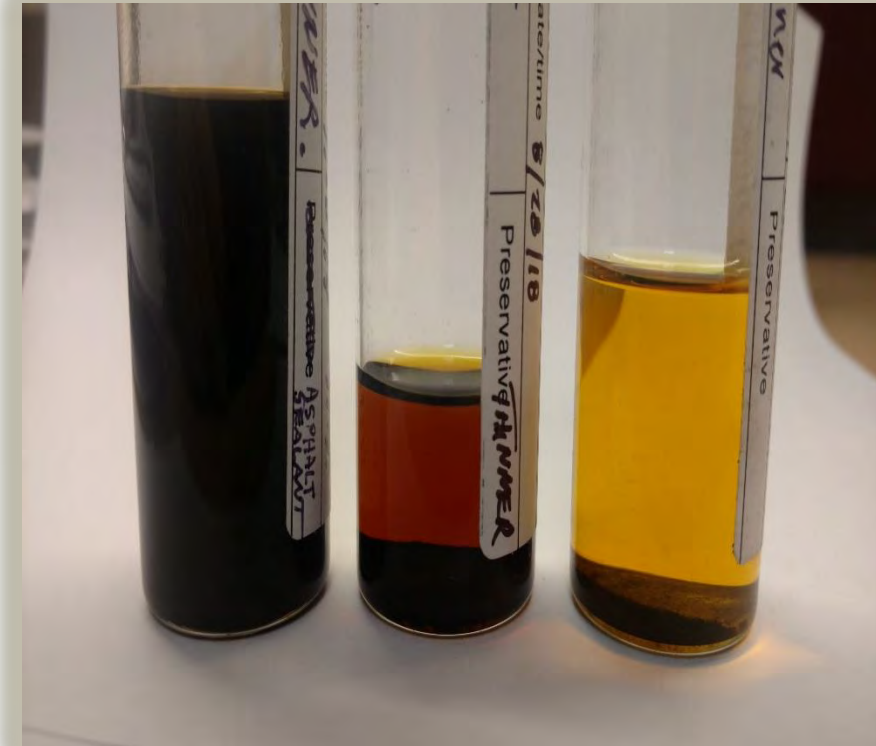
- Nitrile Gloves
- Safety Glasses
- Sample Vial
- Paint Thinner (Stoddard Solution)
- Razor Blade
- Cleaning Wipes



<https://coaltarfreeusa.com/2010/12/field-test-for-coal-tar-sealant-determination/>

Quick Field Test Results

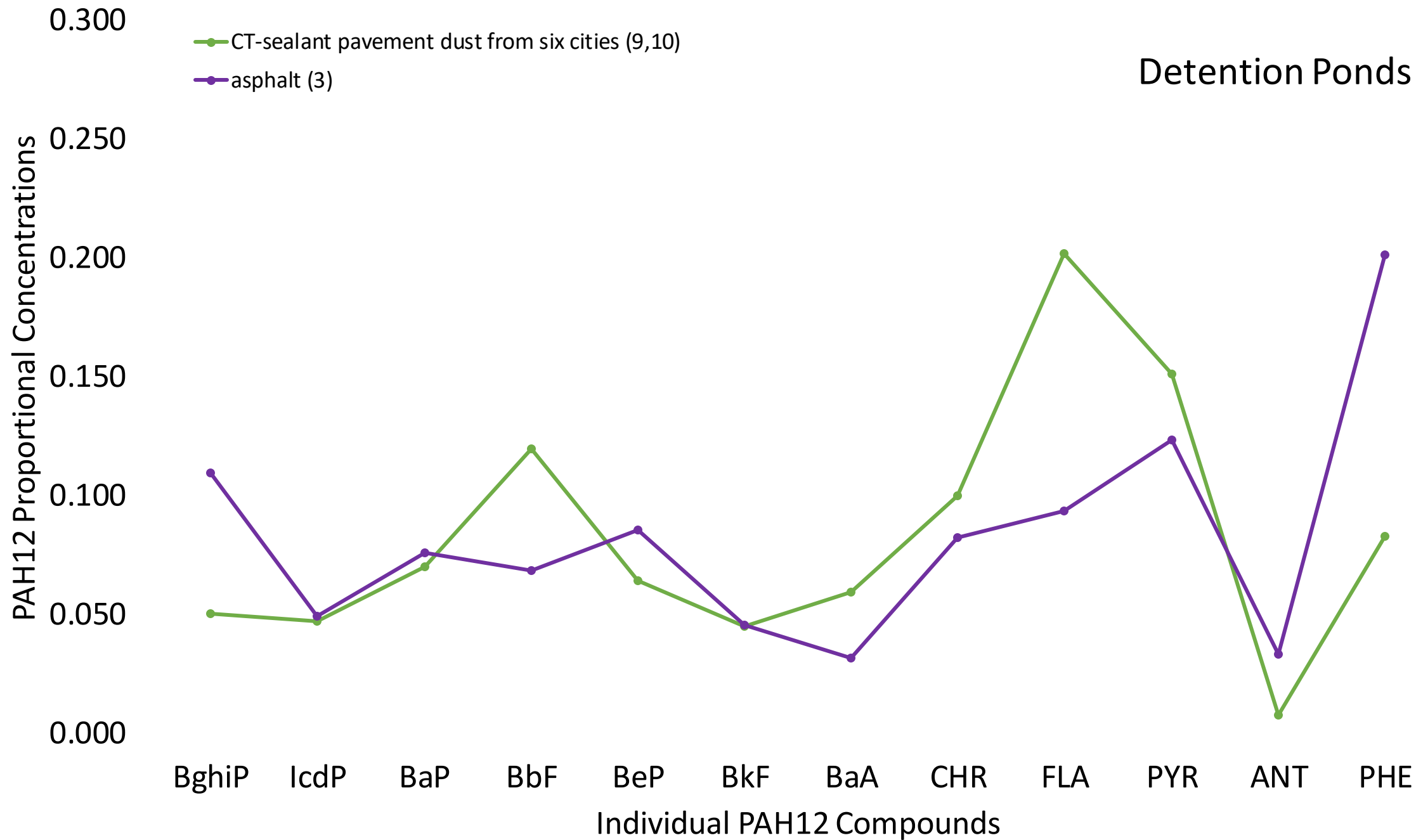
Location	Coal-Tar Sealed	Mix Sealed	Asphalt Sealed
Ann Arbor	14	1	0
Kalamazoo/Portage	5	0	0
Lansing	1	0	0
Manistee	1	0	1
Southeast Michigan*	10	1	0
Traverse City	5	1	0
Total (40 locations)	36	3	1
Percent %	90%	7.5%	2.5%

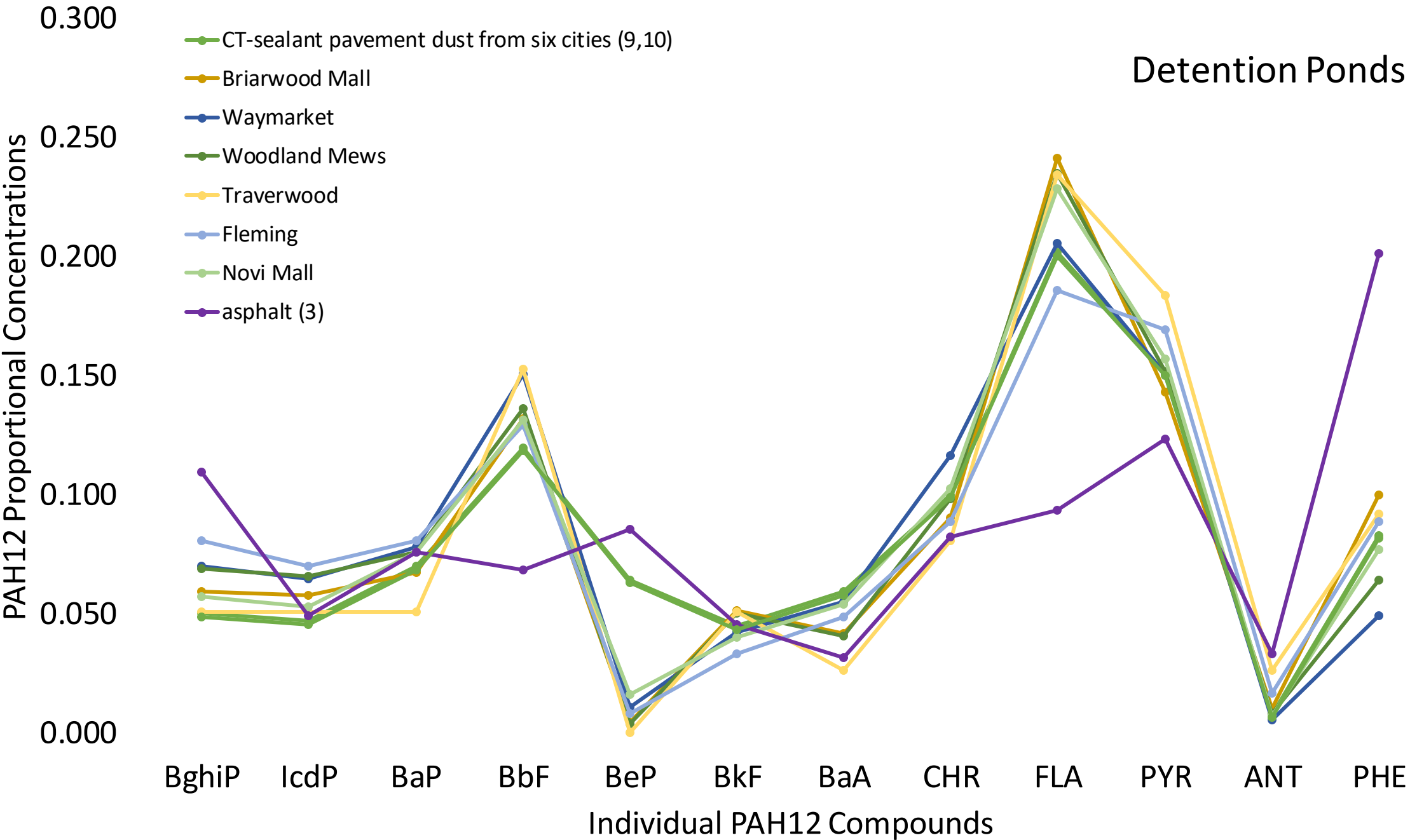


*SEMI included Novi, Wixom, Waterford, Southfield and Sterling Heights

Sediment Quality Guideline Exceedances

Locations	PAH16 (>22,800 ug/kg)
Detention Ponds (7 Total, 4 dropped due to ND)	
Ann Arbor – Det Ponds (6)	6 (65,700 - 743,500)
Southeast Michigan* – Det Ponds (1)	1 (72,950)
Streams (35 total, 3 dropped due to ND)	
Kalamazoo (4)	3 (20,130 – 349,450)
Southeast Michigan* - Streams (15)	13 (7,855 – 509,450)
Traverse City (6)	1 (9,390 – 30,075)
Ann Arbor – Streams (3)	2 (19,565 – 60,150)
Flint (7)	6 (4,460 – 828,300)
Percent % of Total	65%





Southeast MI Surface Water

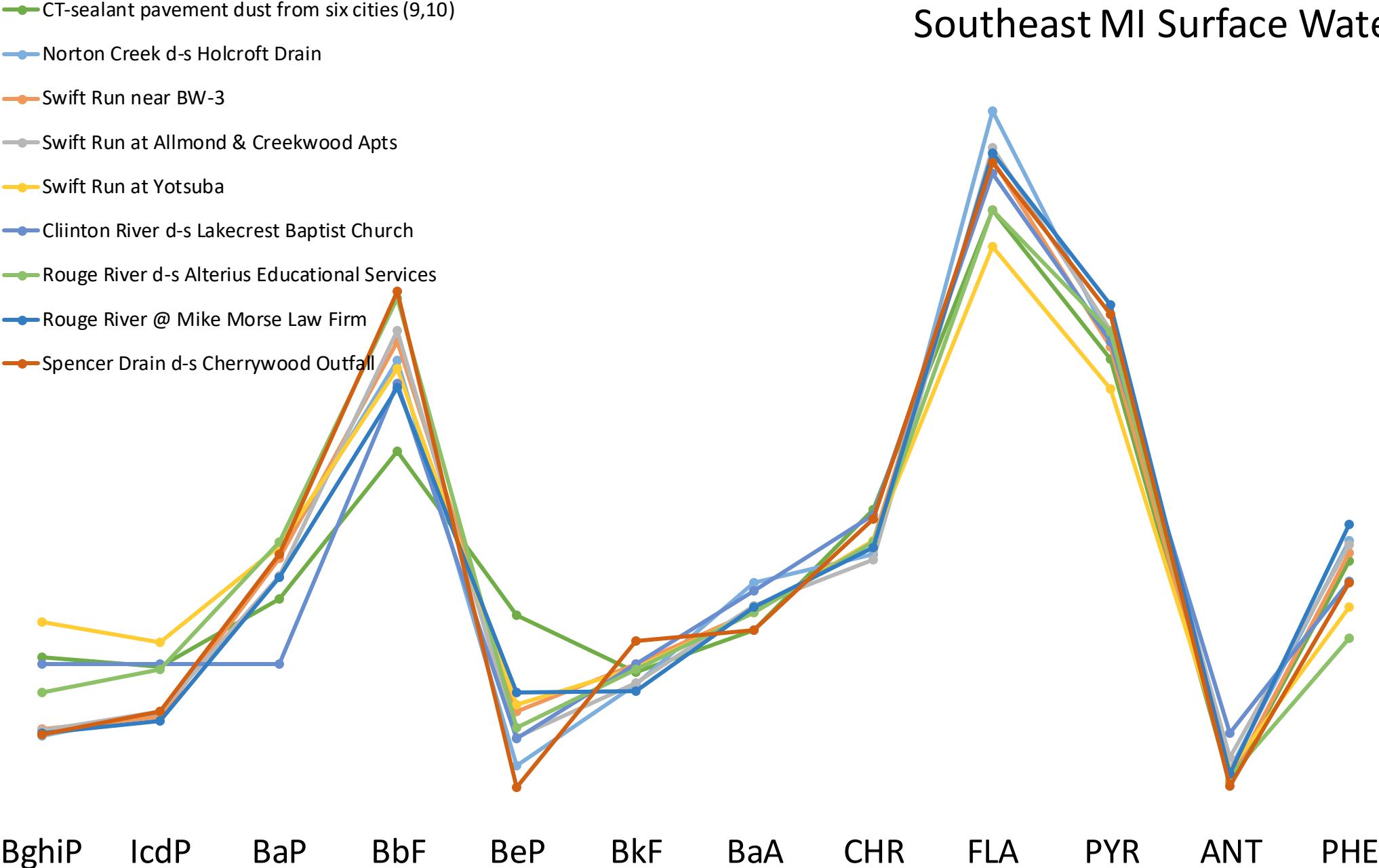
PAH12 Proportional Concentrations

- CT-sealant pavement dust from six cities (9,10)
- Norton Creek d-s Holcroft Drain
- Swift Run near BW-3
- Swift Run at Allmond & Creekwood Apts
- Swift Run at Yotsuba
- Cliinton River d-s Lakecrest Baptist Church
- Rouge River d-s Alterius Educational Services
- Rouge River @ Mike Morse Law Firm
- Spencer Drain d-s Cherrywood Outfall

0.250
0.200
0.150
0.100
0.050
0.000

BghiP IcdP BaP BbF BeP BkF BaA CHR FLA PYR ANT PHE

Individual PAH12 Compounds



How do we reduce PAH
contamination of our homes
and environment from toxic
pavement sealants?

Pillars of a PAH reduction strategy

Research

- EGLE
- USGS

Education/ Outreach

- Residents
- Elected Officials
- Industry

Regulation

- Local ordinances
- Sediment standards
- State legislation
- Compliance work

Van Buren Township – Matt Best



Grosse Ile – John Leon



Options for Action

Education –

- Newsletters articles
- Social media posts
- Webpage
- Brochure distribution
- Brochure mailing

Milford, Hamburg, Belleville and Van Buren Township have done direct mailings to residents



Options for Action

Regulatory and Policy

- Resolution: voice support for state level action with your Michigan legislators
- Resolution: commit to using safe sealants on all municipal projects
- Policy: RFPs require bidder use only safe sealant options
- Ordinance: pass ordinance to restrict the use of high PAH sealants anywhere in the municipality



HCMA and Washtenaw County require the use of safe sealants by anyone bidding pavement maintenance work

16 Communities in Michigan have adopted ordinances

Support HRWC can provide through funding from the ADW

- (1) Presentation to Boards, Councils or Commissions
- (2) Outreach package with newsletter, webpage and social media text and images
- (3) Customized brochure and printing
- (4) Ordinance language, or resolution language and adoption support
- (5) Policy and/or request for bid language

Next Steps

Tomorrow you will receive:

- Copy of this presentation
- An example brochure
- A follow up survey

With a month you will receive:

A call from HRWC staff to discuss next steps for your community

Questions?

For more information

www.hrwc.org/coaltar

model ordinance for Michigan communities

downloadable brochure

www.tx.usgs.gov/sealcoat.html

research articles

comprehensive fact sheets

www.doe.dc.gov/coaltar

www.pca.state.mn.us/water/restriction-coal-tar-based-sealants

implications for stormwater management

Rebecca Esselman
resselman@hrwc.org

Extra slides



EGLE Sampling - Detention Pond Sediment

- 11 Detention Ponds
 - Novi & Wixom
 - Ann Arbor



Sediment Quality Guideline Definitions

Probable Effect
Concentration
(PEC; for PAH16 =
>22,800 ug/kg)

- The concentration above which harmful effects on sediment-dwelling organisms are expected to occur more often than not; MacDonald et. al. 2000

Equilibrium
Partitioning
Sediment
Benchmark Toxicity
Unit (ESBTU; >1.0)

- Used to estimate potential ecological risk associated with exposure to porewater that is in equilibrium with a measured concentration of the contaminant in the sediment; EPA 2003

Probable Effect
Concentration
Quotient (PEC-Q;
>0.5)

- Use to evaluate the combined effects of chemical mixtures on the toxicity of sediments to benthic organisms. Can be used in part or individually; Ingersoll et. al. 2001

Draft - Sediment Quality Guideline Exceedances

Locations	PAH16 (>22,800 ug/kg)	ESBTU (>1.0)	PEC-Q _{PAH} (>0.5)
Detention Ponds (7 Total, 4 dropped due to ND)			
Ann Arbor – Det Ponds (6)	6 (65,700 - 743,500)	3 (1.46 - 10.58)	6 (0.50 – 3.84)
Southeast Michigan* – Det Ponds (1)	1 (72,950)	1 (2.80)	1 (0.97)
Streams (35 total, 3 dropped due to ND)			
Kalamazoo (4)	3 (20,130 – 349,450)	3 (0.78 – 7.91)	2 (1.54 – 2.69)
Southeast Michigan* - Streams (15)	13 (7,855 – 509,450)	10 (0.42 - 25.11)	10 (0.55 – 9.28)
Traverse City (6)	1 (9,390 – 30,075)	2 (0.28 – 1.45)	0 (0.09 – 0.49)
Ann Arbor – Streams (3)	2 (19,565 – 60,150)	3 (2.29 - 6.54)	3 (0.78 - 2.26)
Flint (7)	6 (4,460 – 828,300)	4 (0.54 – 3.39)^	2 (0.73 – 1.18)
Percent % of Total	65%	49%	49%

*SEMI included Novi, Wixom, Waterford, Southfield and Sterling Heights

^Missing TOC data for some locations

Mean Profile of 44 Michigan Sediment Samples

CT-sealant pavement dust from seven cities (9,10,11)

