



Integrating Science and Developing Approaches to Inform Management for Contaminants of Concern in Agricultural and Urban Settings

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Final report summary of the STAC Workshop held May 2019

Watershed Agreement: *Toxic Contaminants Goal*

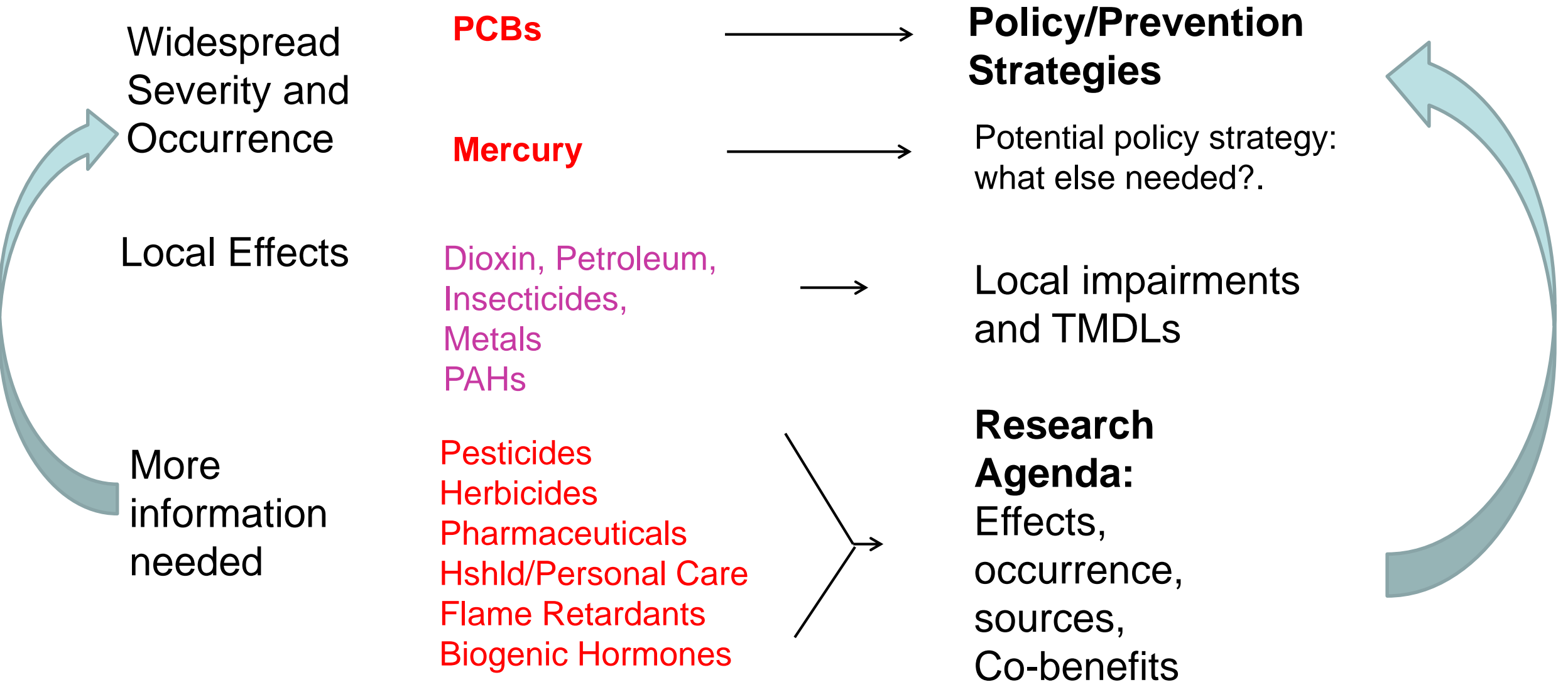
Policy and Prevention Outcome: focused on PCBs

Research Outcome

- Continually increase our understanding of the **impacts and mitigation options for toxic contaminants**.
- Develop a **research agenda** and further characterize the occurrence, concentrations, sources and effects of mercury, PCBs and other **contaminants of emerging and widespread concern**.
- In addition, **identify which best management practices might provide multiple benefits of reducing nutrient and sediment pollution as well as toxic contaminants in waterways**.



Contaminant Groups and Strategies



STAC Workshop Objectives

- Discuss contaminants related to fish consumption advisories, fish health, and emerging concern;
- Identify sources, occurrence, and transport of contaminants in agricultural and urban settings;
- Characterize opportunities to mitigate effects of contaminants in each setting by taking advantage of nutrient and sediment reductions, and other innovative approaches;
- Identify future needs for research and more integrated management approaches



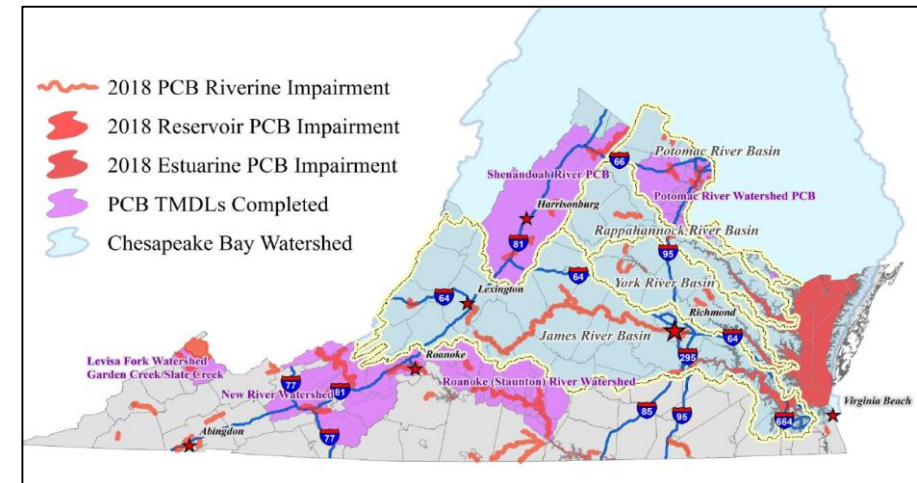
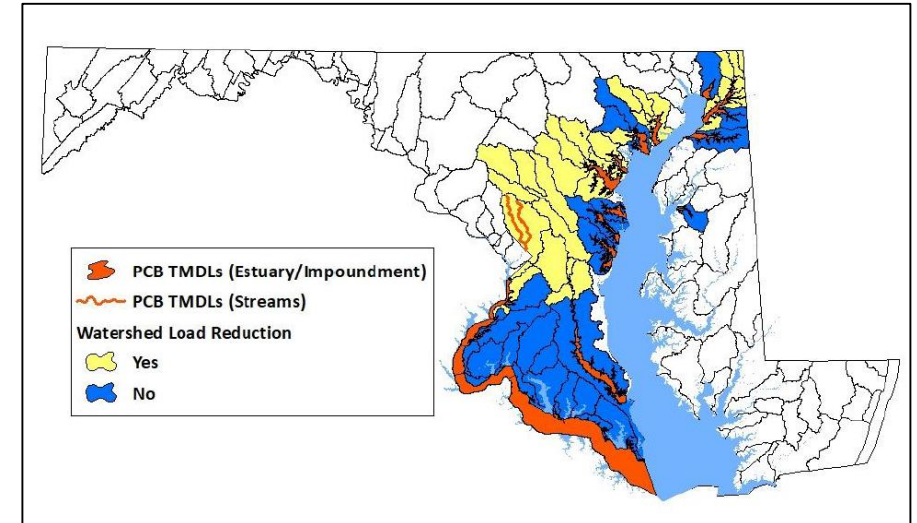


Workshop Agenda and Participants

- 50 participants: all CB jurisdictions, other National efforts
- Jurisdictional Panel: Overview of issues and mitigation efforts
- Session 1: Primary contaminants related to fish consumption advisories and fish health
- Session 2: Primary contaminant sources, fate, and transport
 - **Breakouts:** Urban and agricultural groups
- Session 3: Mitigation and potential of nutrient and sediment management actions for contaminant reductions
 - **Breakouts:** Urban and agricultural groups

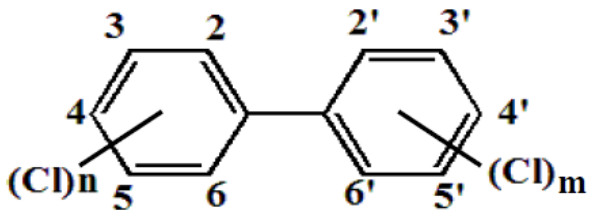
Jurisdictional Panel Highlights

- Most jurisdictions using local TMDLs to address toxic contaminants
 - PCB dominated
- NPDES permits
 - MS4
 - Industrial
 - Individual
- Other
 - DC coal tar sealant ban (PAHs)
 - Anacostia sediment study (megasite)
 - DE integrated cleanup and TMDL (WATAR)



What are the chemicals contributing to fish consumption advisors?

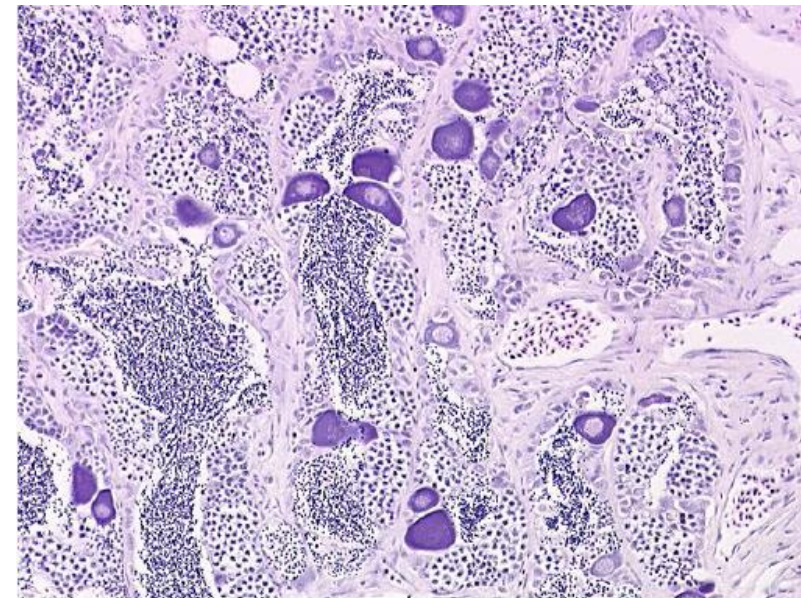
- **PCBs & Mercury:** widespread fish consumption advisories
 - Range from “No consumption to 8 meals per month”
- **Organochlorine pesticides:** lesser extent
- **Emerging contaminants:** fish consumption advisories not established
 - Exception of PFAS in NJ



(Photo: Kjellerup, 2019)

How are contaminants affecting fish health?

- **Agricultural settings:**
 - Fish kills, low chronic mortality, skin lesions, reproductive endocrine disruption observed
 - Increased susceptibility to infectious agents and disease susceptibility (ag land use and chemicals present)



Science needs and recommendations

- Fish health
 - Early indicators of sub-lethal effects
 - Risk factors contributing to skin tumors and skin lesion
 - Identify chemical concentration thresholds
- Management actions to reduce exposure
 - Sources of pollutants entering the food chain & causing consumption advisories
 - BMPs and effects on fish health
 - Monitoring in Potomac
 - Small mouth bass populations

Lesions decreasing

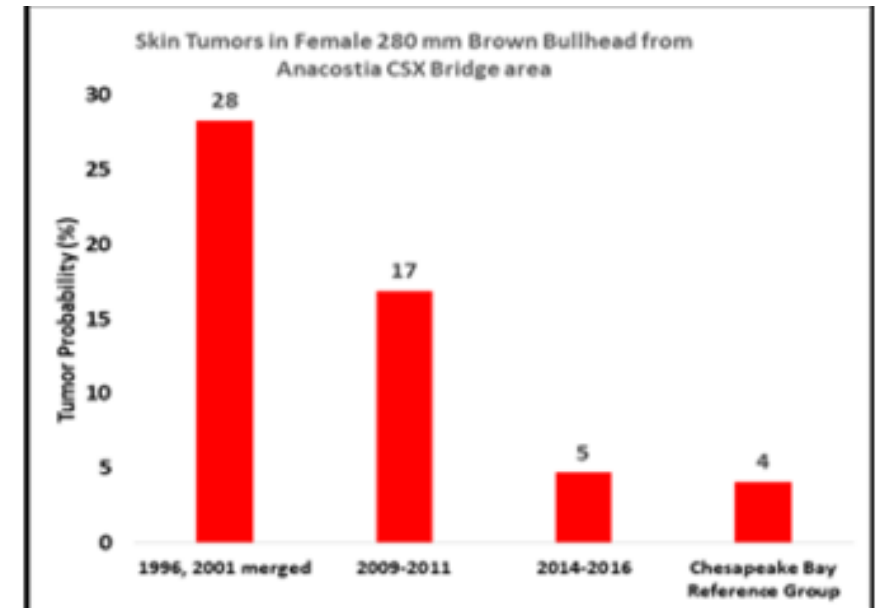
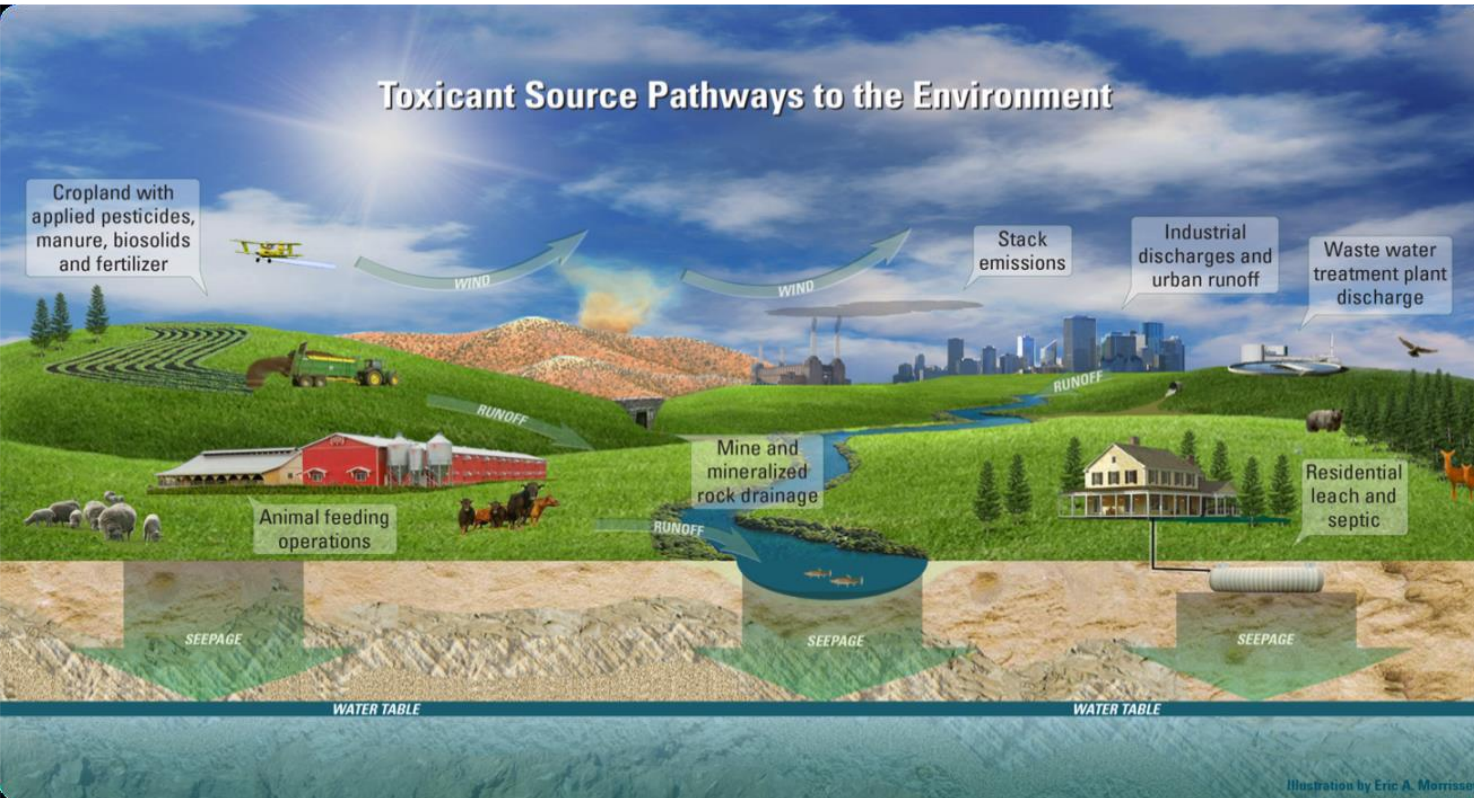


Figure 2.2 Decrease in skin tumor probabilities for female 280 mm brown bullhead from the Anacostia River (Pinkney et al. 2019)

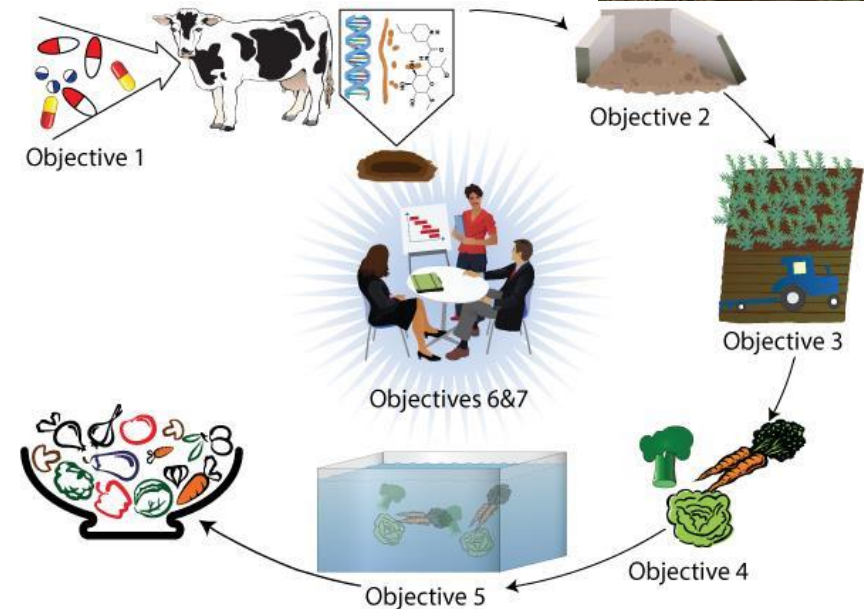
Agricultural Areas: Contaminant Sources, Fate, Transport



- Sources of contaminants are relatively well defined
 - Pesticide use
 - Manure storage/application
 - Biosolid application
 - Irrigation treated WW, septic
- Detailed information on many CECs is currently limited

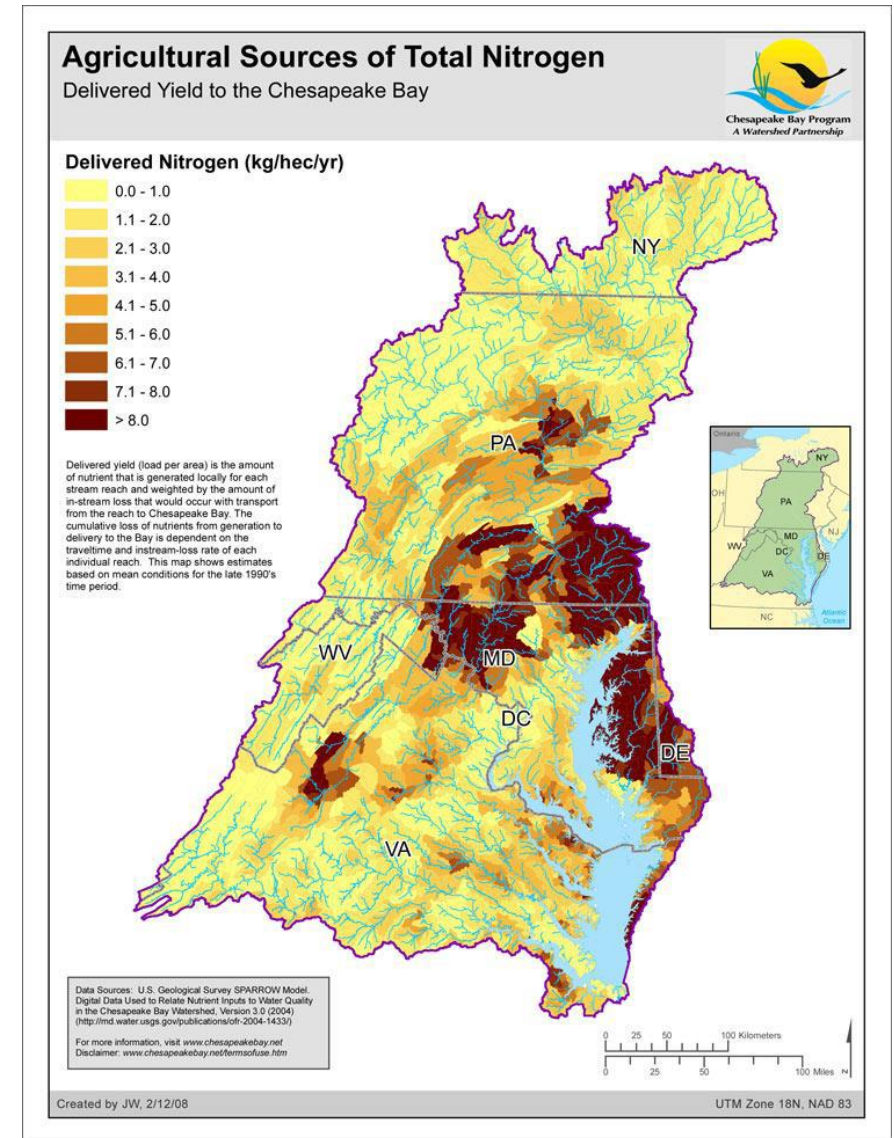
Agricultural Areas: Opportunities to Reduce Toxic Contaminants

- Activated carbon or biochar to established BMPs effectively reduces contaminant transport
- Retention ponds and vegetative treatment reduces pesticide loading
- Manure management including composting, subsurface application, buffer strips, etc. reduce antibiotics and antibiotic resistance



Agricultural Areas: Science Needs and Recommendations

- Help prioritize BMP implementation
 - Identify contaminants that require reduction (exposure)
 - Desired outcome (e.g., fish health)
 - Establish how the BMP functions in relation to this outcome
- Compile/communicate findings of nutrient and sediment BMPs effectiveness to reduce toxic contaminants
- Build qualitative frameworks to answer questions related to co-benefits for toxic contaminants





STAC Report

- <https://www.chesapeake.org/stac/document-library/integrating-science-and-developing-approaches-to-inform-management-for-contaminants-of-concern-in-agricultural-and-urban-settings/>

Workshop materials

- <https://www.chesapeake.org/stac/events/integrating-science-and-developing-approaches-to-inform-management-for-contaminants-of-concern-in-agricultural-and-urban-settings/>

Next Steps: STAC Letter to CBP



- Gaps in compiling and communicating potential removal efficiencies for contaminants
 - Continued expansion and compilation of BMP studies
 - Examine known and emerging contaminants
 - Capitalize on possible co-benefits
- BMPs are necessary investment to reduce contaminant loads and improve water quality
 - Research investment to understand co-benefits or negative impacts
 - Close working relationship between researches and management community to develop tools
- Prepare CBP responses to STAC

Potential CBP Responses to STAC

STAC:

- Gaps in compiling and communicating removal efficiencies
- Close working relationship between researches and management community

CBP Action 1: Enhance Interaction with Audiences for Contaminant Information

- Jurisdictions:
 - Implementing Phase 3 WIPs
- Water Quality GIT & workgroups
 - Ag, Stormwater, WWTP
- Local TMDL implementation
 - States, DC, and local jurisdictions
- Science providers

Potential CBP Responses

STAC: Close working relationship between researches and management community

CBP Response 2: Take advantage of Phase 3 implementation

- Nutrient and sediment BMPs with contaminant benefits
- Jurisdictions consider BMP planning
- New findings provided 2 years
- Materials to inform decisions

2020	2021	2022	2023	2024	2025
Phase 3 WIPs	New findings		New findings		New findings

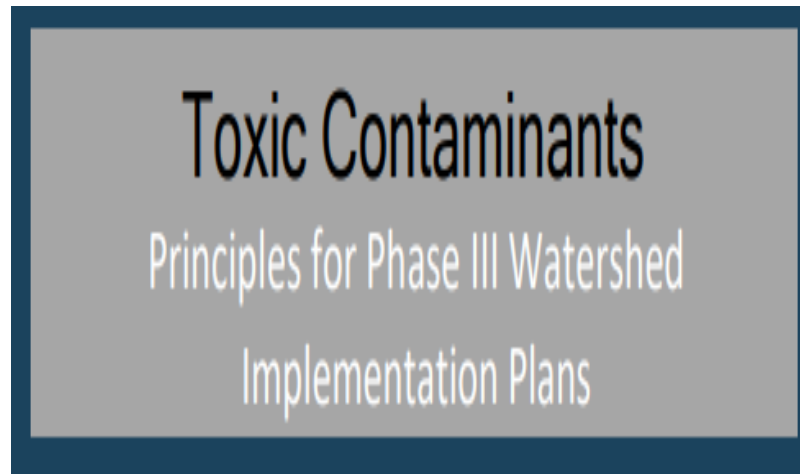
Potential CBP Responses

STAC: Gaps in compiling and communicating removal efficiencies; close working relationships

CBP 3: Enhance Communication Materials to Inform Decisions

- Stakeholder input on most useful topics
 - Ag, Urban, WWTP WGs

- Fact Sheets/
Briefing Materials



Best Management Practices for Toxic Contaminants		
Best Management Practice	Urban Pollutants	Agricultural Pollutants
Ag Forest Buffer		4
Streamside Forest Buffers		3
Narrow Forest Buffer	3	3
Runoff Reduction	2.5	
Wet Ponds	2.5	
Urban Forest Buffers	2.5	
Filtering Practices	2	
Infiltration Practices	2	
Dry Ponds	2	
Bioretention	1.5	

Potential CBP Responses

STAC:

- Research investment to understand co-benefits or negative impacts;
- Gaps in compiling and communicating potential removal efficiencies for contaminants

CBP 4: Compile results and expand BMP studies

- Science needs updated
- Synthesis of BMPs from existing studies
- Expand studies for contaminants of most concern
- Ag, Urban, WWTP WGs

CBP 5: Selected BMP results into CBP tools

- Watershed Dashboard, modeling, and CAST

