Research Outcome

Toxic Contaminants Workgroup

December 10, 2014

Contaminants 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.

Contaminants Report

- Biological effects
- Contaminant groups
  - Extent
  - Severity
  - Jan, 2013
- Policy and Prevention

Severity

Widespread: PCBs and mercury

Localized:

– dioxins/furans, PAHs, petroleum,

– Insecticides: aldrin, chlordane, dieldrin, DDT/DDE, heptachlor epoxide, mirex

– Metals: Al, Cr, Fe, Pb, Mn, Zn

Uncertain:

– pharmaceuticals, care products, flame retardants, biogenic hormones

– herbicides (atrazine, simazine, metochlor, and their degradation products)

Conceptual Framework for Toxic Contaminants Outcomes

Ten contaminant groups

- **Multiple stressors**
- **Mixtures**

Research to determine occurrence, concentrations, and effects

Prioritized contaminants for prevention and reduction strategies

- PCBS
- Mercury?
- Other groups based on research findings
- **Mixtures**
- **Locations**

Sources

Research Agenda: Guiding Principles

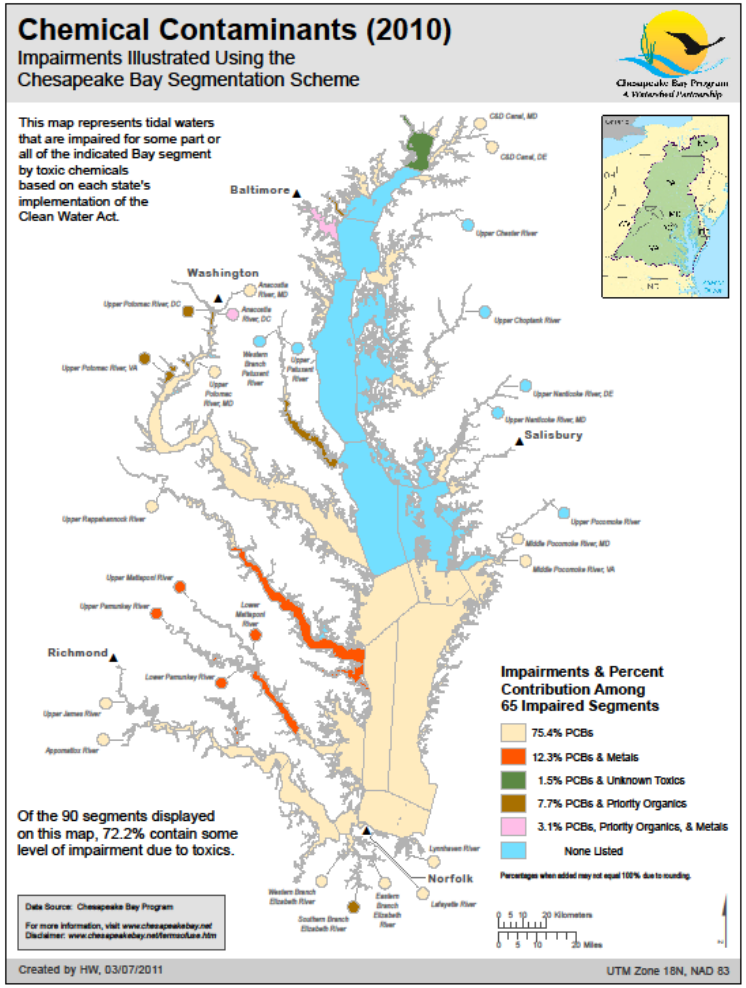
- Focus on areas where fish and wildlife have been degraded and human health concerns
- Better understand contaminant groups contributing to problem
  - Multiple stressors, mixtures, EDCs
- Identify sources and inputs of contaminants
- Provide implications for reducing effects
  - Address stresses and mixtures
  - Nutrient and sediment
  - Success stories

Biological Effects

- Degraded fish health
  - Infections and parasites
  - Feminization
  - Reduced reproduction
  - Tumors
- Wildlife: Reproductive impairment in water birds
  - Eggshell thinning (DDE)
  - Embryo lethality (pesticides)
  - Hatching success (PCBs)

Biological Effects: Research Directions

- Degraded fish health and kills
  - Primary focus
  - Human health (advisories)
  - Causes
    - Multiple stressors
    - Mixtures, EDCs
    - Algal toxins, parasites
  - Where
- Wildlife: waterbirds
  - secondary focus
- Other: Benthos, SAV



Research Agenda: Guiding Principles

- Focus on areas where fish and wildlife have been degraded and human health concerns
  - Risks to other living resources (SAV, benthos)
- Better understand contaminant groups contributing to problem
  - Multiple stressors, mixtures, EDCs
- Identify sources and inputs of contaminants
- Provide implications for reducing effects
  - Policy and Prevention
  - Nutrient and sediment
  - Success stories

Contaminant Groups

- Polychlorinated biphenyls
- Dioxins and Furans
- Polycyclic aromatic hydrocarbons
- Petroleum hydrocarbons
- Pesticides
- Pharmaceuticals
- Household and Personal Care Products
- Polybrominated diphenyl ether Flame Retardants
- Biogenic hormones
- Metals and Metalloids

- Effects on fish and wildlife

Extent

- Widespread:
  - PCBs, PAHs, Mercury
  - some herbicides (atrazine, simazine, metochlor, and their degradation products)
- Localized:
  - Dioxins/furans, petroleum hydrocarbons
  - Insecticides (aldrin, chlordane, dieldrin, DDT/DDE, heptachlor epoxide, mirex)
  - Metals: Al, Cr, Fe, Pb, Mn, Zn
- Uncertain: pharmaceuticals, care products, flame retardants, some pesticides, hormones

Research Directions: Multiple Stressors

Ten contaminant groups

- **Multiple stressors**
- **Mixtures**

Research to determine occurrence, concentrations, and effects

Prioritized contaminants for prevention and reduction strategies

- PCBS
- Mercury?
- Other groups based on research findings
- **Mixtures**
- **Locations**

Sources

Research Agenda: Guiding Principles

- Focus on areas where fish and wildlife have been degraded and human health concerns
  - Risks to other living resources (SAV, benthos)
- Better understand contaminant groups contributing to problem
  - Mixtures will make more difficult, EDCs
- Identify sources and inputs of contaminants
- Provide implications for reducing effects
  - Policy and Prevention
  - Nutrient and sediment
  - Success stories

Providing implications

- Policy and Prevention
  - Utilize existing programs
  - Multiple contaminants and stressors
  - Effects of newer contaminants
  - Sources, pathways and exposure
- Nutrients and sediment
  - Practices that provide multiple benefits
  - Phase 3 WIPs
  - RFP
- “Success” stories

Discussion and Feedback

- Biological Effects:
  - Initial focus on fisheries
  - Intersex conditions and kills
    - Multiple stressors
  - Where problems are occurring
- "Groups" and sources contributing to problem:
  - Mixtures
  - Single groups
- Management Implications:
  - How to address multiple groups
  - Nutrient/sediment reduction (Phase 3 WIPs)