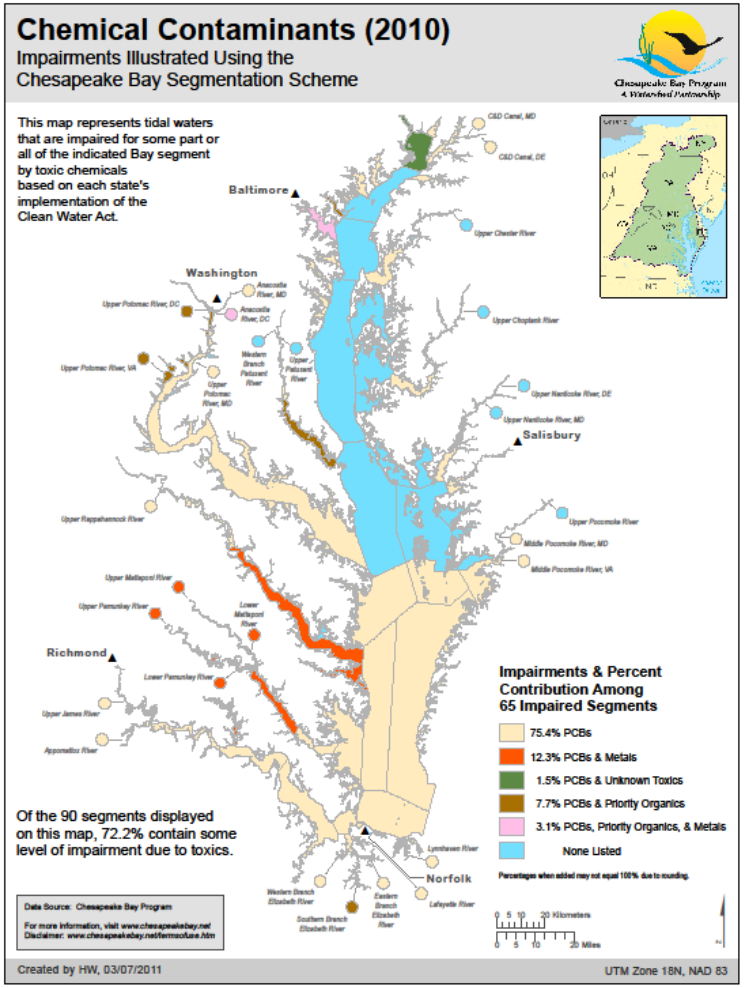
Extent and Severity of Toxic Contaminants in Chesapeake Bay and the Watershed

Scott Phillips (USGS) and Greg Allen (EPA)

Report and Objectives

- Contaminants effect fish and wildlife
- CBP Toxics 2000
- EO Strategy
- Used by EPA and CBP to consider:
  - Goals for reducing contaminants
  - Monitoring and research
- MB presentation
  - Key findings (and revisions)
  - Feedback on process for considering goals



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

Assessment Approach

- Define extent and severity
  - Widespread, localized, or uncertain
  - Information used and limitations
- Extent
  - Widespread: throughout watershed
  - Localized: limited watersheds
- Severity
  - Widespread: impairments listed at many locations
  - Localized: few locations
- Uncertain: lack of monitoring or standards

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

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)

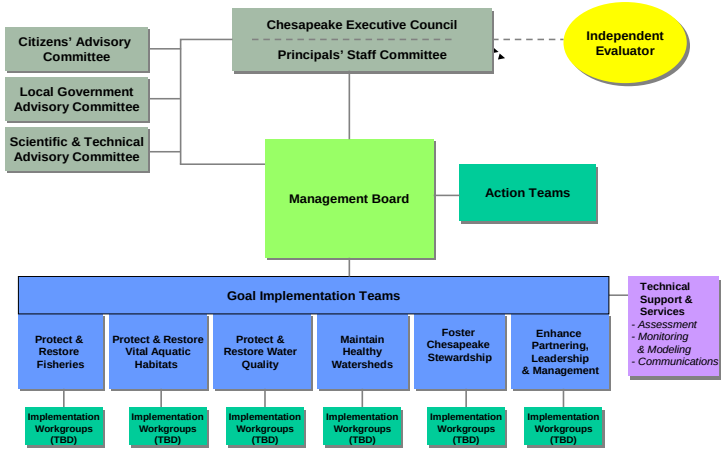
Biological Effects

- 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)

Monitoring and Research Gaps

- Monitoring to better define extent
  - Groups with “uncertain” or “localized” occurrence
- Research-Severity
  - Exposure studies
  - Multiple contaminants and stressors
  - Effects of newer contaminants
  - Sources, pathways and exposure

Partnership Considerations



- Widespread extent
- Current controls producing minimal reductions
- Impacts to CBP goals (fish, habitat, water quality) and human health
- State and federal agencies would benefit from coordination

Next Steps and Discussion

- Report released
  - CBP partner briefings
- EPA and CBP consider how to address toxic contaminants during alignment process
  - What: (Process to consider goals)
  - Who: (GITs?)
- Science to address monitoring and research gaps