DRAFT OUTLINE for Extent and Seriousness of Toxic Contaminants in the Chesapeake Bay and its Watershed

Each chapter is expected to be 5 to 10 pages with 2-4 key figures (graphs, tables, photos). The lead author(s) for each chapter are listed below. Greg Allen and Mike Focazio are the overall lead writers for the report.

I. Executive Summary (Greg Allen, Mike Focazio and Scott Phillips)

II. Introduction and Background (Greg Allen and Mike Focazio)

A. Report Objectives
   a. Executive Order
   b. Potential Impact
      i. Fish advisories (PCBs)
      ii. Fish health issues (tumors, intersex, etc.) and potential contaminant linkages

B. Previous EPA and other reports on contaminants in Chesbay (general discussion on what has been done and major findings).

C. Conventional definitions of "legacy" and "contaminants of emerging concern" and why this does not work for this report (e.g. a legacy contaminant can also be a contaminant of emerging concern as we learn more about sublethal effects etc.).

D. Potential sources. A short discussion on potential point and nonpoint sources of contaminants in the watershed (including agricultural/urban/other landuses generally, municipal/private wastewater effluents, NPDES discharges, superfund sites, etc.). A cartoonish figure showing all these sources might be nice here.

E. Audiences--the primary audience is the decision makers in the Chesapeake Bay Program who are working to manage fisheries, habitat, water quality, and healthy watersheds. Several CBP goal implementation teams (GITs) are concerned with the potential impact of toxic contaminants. The Fisheries GIT need the findings to better understand the health of fisheries in the Bay and its watershed. The Habitat GIT wants to understand impacts on wildlife (waterfowl) that use coastal wetlands and SAV. The water-quality GIT is working to make waters both fishable and swimmable so the information will help augment nutrient and sediment reduction efforts. The Healthy Watersheds GIT is looking to prevent impacts of toxic contaminants on healthy watersheds. The GITs will use the information and work through the MB and PSC to consider and develop new goals to reduce toxic contaminants (during 2013) and more detailed strategies to carry out the goals (by 2015).

III. Extent and seriousness of contaminants (All)

A brief introductory statement to set up the section and provide context. Explain the format (i.e. extent is broken up into water, sed, tiss followed by a section on "seriousness" for each contaminant grouping.). Identify all the data sources used (provide a table) and explain the nuances of using disparate sources of state assessment (*note: a separate table that summarizes the key findings of state summaries will be provided as an appendix*) as well as other summary data in forming a cohesive statement about a given contaminant or contaminant group . Explain that where possible we focus on data/interpretations in the bay watershed or contributing states; however in other places we cite literature where appropriate for extrapolation.

Note: Each contaminant section will be formatted the same. The general template is as follows:

Contaminant Group Name

Each contaminant section will begin with two introductory paragraphs.

1) The first paragraph will include short statements defining the contaminant in terms of: a) major uses for the parent chemical(s), b) potential sources, and c) physical/chemical properties (e.g. perspective on solubility/partitioning, isomers, metabolites/degradates, etc.) for a range of representative compounds in the group. A table that lists each compound, its CAS number if one exists, and associated characteristics/sources etc. would be included.

2) The second paragraph will provide perspective on the data sources and citations used. We can do this with general statements about overall data reliability and limitations in interpretations including use of information from outside the Chesbay and its relevance, use of disparate state summaries with various reporting limits etc., and some perspective on the amount of information available (i.e. this will help show that some contaminant groups have much less data than others).

a. *Extent*
    i. *Water*
    ii. *Sediment*
    iii. *Tissue*
        1. *Fish*
        2. *Wildlife*
b. *Seriousness of Contaminant Exposures in the Environment*
    i. *Comparisons to existing health benchmarks*

ii. *Acknowledgement of sublethal effects as documented in the literature within, or outside, the Chesapeake Bay area.*

B. PCBs (Jamie)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife
b. Seriousness of PCB Exposures in the Environment
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

C. Dioxin and Furans (Angie)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife
b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

D. PAHs (Greg)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife
b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

E. Petroleum (Jamie)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish

2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

F. Pesticides (Mike and Greg). Consider groups representing herbicides, insecticides, fungicides, others…

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

G. Pharmaceuticals (Mike and Diane).

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

H. Household and Personal Care Products (Mike and Diane).

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

I. Flame Retardants (Mike)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish

2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

J. Surfactants (Mike)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

K. Inorganics (Ashley)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

L. Biogenic Hormones (Mike)

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish
        2. Wildlife

b. Seriousness
    i. Comparisons to existing health benchmarks
    ii. Acknowledgement of sublethal effects

M. Other (All). This is where we lump all other organic contaminants not identified by the groupings above

a. Extent
    i. Water
    ii. Sediment
    iii. Tissue
        1. Fish

2. Wildlife

b. Seriousness
   i. Comparisons to existing health benchmarks
   ii. Acknowledgement of sublethal effects

IV. Overview of biological impacts on fish (Vicki Blazer, USGS and Fred Pickney, FWS; and A.K. Leight from NOAA)

Under individual contaminant groups we will summarize what is known about the occurrence and seriousness of contaminants in fish. However, issues such as tumors and intersex conditions needs to be in one chapter because they are due to a mixture of compounds. We will have this chapter focus estuary waters and streams in the watershed—not information on lakes.

V. Overview of impacts on wildlife (Barnett Rattner, USGS)

Under individual contaminant groups, we will summarize what is known about the occurrence and seriousness of contaminants in wildlife. This chapter would summarize information we have about the impacts on wildlife near the estuary. We suggest using data collected since 1990. This chapter will not look at amphibians and "aquatic life" up in the watershed.

VI. Discussion (Greg Allen, Mike Focazio, and Scott Phillips)

A. Summary of extent and seriousness of contaminants.

a. summarize the major findings

b. explain the uncertainties and qualifications in our interpretive statements

B. Potential future issues impacting extent and seriousness of contaminants in Chesapeake bay watershed

a. Energy extraction and production activities
   1. Conventional (e.g. coal, nuclear, etc.)
   2. Alternative (e.g. natural gas/hydrofracking, etc.)
b. Climate Change
c. Invasive species (e.g. as additional stressors on native flora/fauna invasive species may enhance effects of contaminants)
d. BMPs (are current management actions expected to mitigate contaminants?). A short statement, largely speculative, to provide

perspective on current activities in place to mitigate these contaminants (i.e. not much!).

e. Future insights regarding health effects (e.g. sublethal, mixtures, etc.) will be realized as new tools and research are developed.
f. Other

C. Considerations for the Development of Federal-State Toxic Reduction Goals and Strategies

a. What was agreed to in the Toxic Reduction Strategy and still potentially relevant for new toxic contaminant goals

b. What are some of the highest priorities to consider for developing toxic reduction goals

c. What are some potential initiative to consider for reducing contaminants.

d. What are some of the major challenges in developing new reduction goals

D. Recommendations for Further Research (NOTE: we should make sure that this topic is mentioned in appropriate places throughout the text and then we can simply summarize it here.

a. Suggestions for Improved/Streamlined Monitoring
    1. Prioritization of contaminants
    2. Development of new analytical methods
    3. Long term monitoring
b. Need for more source-to-receptor research (in lab and field settings)
c. Need for research related to "potential future issues" identified above

E.

VII. Conclusions (Greg, Mike, Scott).

VIII. Appendix:

A. Progress toward Chesapeake 2000 Toxic Reduction Strategy (Greg Allen)

B. State Summaries of extent and seriousness of toxic contaminants (Ashley, Melanie, Jamie?)

*Things to highlight during jurisdictional summaries: effects of acid mine drainage, flue gas desulfurization at coal-powered plants, and mountaintop mining on surface water quality; also include the three focus areas discussed in the strategies (Elizabeth, Patapsco, Anacostia) within each jurisdiction.