Outline

Synthesizing lessons learned about water-quality improvements from BMP case studies

I. **Executive Summary**

This section will summarize the results from case studies specific to the Chesapeake Bay and its watershed, as well as other key national and international results. The results will be summarized for watershed and tidal studies and key findings will be presented about response time and the associated factors affecting the response. We will attempt to organize the lessons learned by major sources sectors (point sources, non-point sources) and provide implications for managers. This section will also summarize how managers can use the new CBP decision framework to apply adaptive management in using these results.

II. Purpose

This section will include the intended audience and the scope of the synthesis. In particular, it will focus on the fact that these are monitoring program results, not modeling results. It will be important to highlight the ability of this information to answer specific questions, including its inability to answer questions specific to model BMP efficiencies.

III. **Introduction**

The section will give an overview of why we are doing the synthesis and will address the following questions – 1). Are there improvements to water quality associated with management actions?, 2). How long does it take to see a response and what factors might be influencing the observed lag times in response? 3). What is the magnitude of the response? and 4). What are the factors affecting the success of these BMP projects?

IV. Overview of changes in water quality associated with management practices

This section will address the following question: Was there an observed response in water quality variables (nutrients and sediment for the watershed; chl a, DO, and clarity for the Bay) attributable to the management action? Results will be separated into tidal and nontidal and organized by study and source sector.

Nontidal results

a. Overview of key findings from the 10 most important case studies addressing the response in water quality to management actions within the Chesapeake Bay watershed.
b. Summary of key findings in table format for each study, this table will highlight: implemented practice, effectiveness, duration of response time (if response detected), magnitude of the response, and what factors affected response time (table 1).
c. Discuss how Chesapeake Bay-specific results compared to selected key national and international studies of BMP effectiveness. We will provide an overview of selected national

and international studies that were examined and how theseresults compared to Chesapeake Bay-specific studies.

Table 1- – Summary of water quality changes in nutrients and sediment from selected BMP studies in the Chesapeake Bay watershed (example)

Study Name	Practice	Did practice lead to WQ improvement? (N,P,S)	Response time	Major Factors affecting response	Magnitude of response
S1					
S2					
S3					
S4					
S5					
S6					
…					

Tidal results

d. Overview of key findings from the 10 most important case studies addressing the response in water quality to management actions within the Chesapeake Bay.
e. Summary of lessons learned in table format for each study, this table will highlight: implemented practice, effectiveness, duration of response time (if response detected), magnitude of response, and what factors affected response time (table 2).
f. Discuss how Chesapeake Bay-specific results compared to selected key national and international studies of water-quality response in estuaries. We will provide an overview of selected national and international studies that were examined and how these results compared to Chesapeake Bay-specific studies.

Table 2 – Summary of water quality changes in DO, clarity, and chl a from BMP case studies in the Chesapeake Bay (example)

Study Name	Practice	Did practice lead to WQ improvement ?(DO, Chl a, WC)	Response time	Major Factors affecting response	Magnitude of response
S1					
S2					

S3					
S4					
S5					
S6					
…					

V. **Response times**

This section will address the following question: How does the lag time in water quality response associated with a given implementation strategy vary across case studies in the Bay and its watershed? We may organize the section by: time it takes to implement practices, lag times associated with three major variables in the watershed (nitrogen, phosphorous, and sediment), and lag times associated with responses in estuary (DO, clarity, and chlorophyll).

VI. Factors affecting response

This section will address the following question: What are the primary factors affecting response in water quality or lack thereof in the presented case studies and what is the magnitude of the response, if detected? We will discuss both for the watershed and the estuary. This will likely include both anthropogenic factors (implementation rates, etc.) and natural factors (precipitation, non-native species invasion, etc.)

VII. Information Needs

This section will focus on the unknowns out there when trying to evaluate the effectiveness of BMPs. The discussion will include a list of the information we still need to know or that is lacking or limited and the subsequent limitations to conclusions based on those data/information gaps.

VIII. Recommendations

Recommendations specific to managers for how to use lessons learned from past BMP studies to inform policies on implementation using the new CBP adaptive management framework. What can we do differently to improve implementation and monitoring?

IX. **Appendix**

Summaries of the 15-20 case studies within the Chesapeake Bay and its Watershed in consistent format.