Appendix M. Chesapeake Bay Water Quality/Sediment Transport Model Management Scenario Criteria Attainment Assessment Results and 2008 303(d) List Assessment Results

This appendix presents the Chesapeake Bay water quality criteria attainment assessment results of various Bay Water Quality Model management scenarios in a *stoplight* format used by EPA its partners jurisdictions in development of the Chesapeake Bay TMDL. The stoplight spreadsheets summarize the percentage of space and time exceeding the Bay water quality criteria for each of the 92 Chesapeake Bay segments. They are produced from an assessment of Bay Water Quality Model outputs and Bay water quality monitoring data (described in Section 6.2.1). These spreadsheets were used to evaluate whether a given management scenario met all applicable criteria across all designated use-segments. Green highlighted percentages represent attainment of the applicable water quality criterion. Red highlighted percentages represent a violation or an exceedance of current water quality standards. The assessment results here in this appendix in three spreadsheets:

- Appendix M-1: Chesapeake Bay Dissolved Oxygen Criteria Attainment Assessment Results (P1_DO_Stoplight_Appendix)
- Appendix M-2: Chesapeake Bay Chlorophyll *a* Criteria Attainment Assessment Results (P2_CL_Stoplight_Appendix)
- Appendix M-3: Chesapeake Bay SAV/Water Clarity Criteria Attainment Assessment Results (P3_SAV-Clarity_Appendix)

The loading values in appendices M-1 and M-2 are derived in one of two ways. Loading values for the 1985 Scenario, 2009 Scenario, Tributary Strategy, and E3 2010 Scenario are derived from explicit management scenarios and described further in Appendix K. Loading values for the remaining scenarios were calculated as ratios of existing management scenarios to achieve particular basin-wide loading targets.

Also contained within this appendix is the Chesapeake Bay segments 2008 303(d) list assessment results spreadsheet.

Interpreting the Spreadsheets

Appendix M-1: Chesapeake Bay Dissolved Oxygen Criteria Attainment Assessment Results

The dissolved oxygen water quality criteria stoplight plots describe the degree of nonattainment (as percent of volume and time) of dissolved oxygen water quality criteria for each Chesapeake Bay segment by designated use criteria. The dissolved oxygen criteria attainment assessment results are based on assessing the open-water 30-day mean, deep-water 30-day mean, and deep-channel instantaneous minimum criteria during the June 1 through September 30 summer period (see Table 3-4 in Section 3.1.2). The green highlighted percentages represent attainment of the applicable dissolved oxygen criterion. The red highlighted percentages represent nonattainment of dissolved oxygen criterion. The rows show the percent nonattainment by Bay segment. The columns show the percent nonattainment by Bay Water Quality Model scenario and are listed from left to right in descending order of loading values for total nitrogen (TN), total phosphorous

(TP), and total suspended solids (TSS). The Bay Water Quality scenarios are grouped by 3-year water quality model assessment windows and are ordered chronologically. The Bay Water Quality Model scenarios marked with an asterisk (*) had loading values derived from the key management scenario spreadsheets (see Appendix K). All other scenarios' loading values were calculated as ratios of existing management scenarios to achieve particular basin-wide loading targets. The critical period for the Chesapeake Bay TMDL was selected as 1993–1995 for assessment of the dissolved oxygen criteria (see Section 6.1.2).

Appendix M-2: Chesapeake Bay Chlorophyll a Criteria Attainment Assessment Results

The chlorophyll *a* water quality criteria stoplight plots show the percent nonattainment of chlorophyll *a* (CL) criteria by two periods: CL Spring Seasonal (March 1 through May 31) and CL Summer Seasonal (July 1 through September 30). The green highlighted percentages represent attainment of chlorophyll *a* criteria. The red highlighted percentages represent nonattainment of chlorophyll *a* criteria. The rows show percent nonattainment by Bay segment. The columns show the percent attainment by Bay Water Quality Model scenario and are listed from left to right in descending order by loading values for TN and TP. The Bay Water Quality Model scenarios are grouped by 3-year water quality model assessment windows and are ordered chronologically. For allocation scenarios specific to the James River Basin, loading values were calculated as ratios of existing management scenarios to achieve particular loading targets. Analysis failed to identify a critical period for the chlorophyll water quality criteria so all 3-year periods had equal weight in the Bay TMDL assessment (see Section 6.1.2).

Appendix M-3: Chesapeake Bay SAV/Water Clarity Criteria Attainment Assessment Results

The submerged aquatic vegetation (SAV)/water clarity stoplight spreadsheets describe the degree of nonattainment (as percent of SAV acreage + water clarity acres—see Section 6.2.1 and Appendix O) of SAV/water clarity criteria for each of the Bay segments assigned a shallow-water bay grass designated use. The green highlighted percentages represent the percent nonattainment of SAV/water clarity criteria. The red highlighted percentages represent the percent nonattainment of SAV/water clarity criteria. The rows show the percent nonattainment by Bay segment. The columns show the percent nonattainment by Bay Water Quality Model scenario and are listed from left to right in descending order of loading values for TN, TP, and TSS.

The Bay Water Quality scenarios are grouped by 3-year water quality model assessment windows and are ordered chronologically. The Bay Water Quality Model scenarios marked with an asterisk (*) had loading values derived from the key management scenario spreadsheets (see Appendix K). All other scenarios' loading values were calculated as ratios of existing management scenarios to achieve particular basin-wide loading targets. The critical period for the Chesapeake Bay TMDL was selected as 1993–1995 for assessment of the SAV/water clarity criteria (see Section 6.1.2).

Appendix M-4: Chesapeake Bay Segments 2008 303(d) List Assessment Results

The following are short descriptions of the information/data found in each column in this Appendix M-4 spreadsheet. Green means the criterion/designated is attained; red means the criterion/designated use not is attained; and yellow means insufficient data for criterion assessment/no published criteria assessment protocol.

A: Chesapeake Bay segment.
B: Jurisdiction.
C: Designated used: MSN-migratory spawning and nursery; SWSAV-shallow-water bay grass, OW- open water; DW-deep-water; DC-deep-channel.
D: Season for criteria application: Summer-June 1 through September 30; ROY-October 1 through May 31.
E: 30-day mean dissolved oxygen criterion. Value is the applicable criterion.
F: 7-day mean dissolved oxygen criterion. Value is the applicable criterion.
G: 1-day mean dissolved oxygen criterion. Value is the applicable criterion.
H: Instantaneous minimum dissolved oxygen criterion. Value is the applicable criterion.
I: Temperature based dissolved oxygen criterion protective of shortnose sturgeon (species listed as endangered.
J: Numerical chlorophyll a criteria assessment results.
K: SAV restoration acreage criteria assessment results. Value is the applicable SAV restoration acreage.
L: Water clarity acreage assessment results.
M: Combined SAV restoration acreage + water clarity acreage assessment results.
N: Water clarity criteria assessment results.
O: Description of criteria attainment assessment results by designated use-segment.
P: 303(d) listing category
Q: Benthic community impairment status.