Appendix N2.
Resolution of Segments Failing to Attain the SAV/Water Clarity Criteria

Introduction

After assessing attainment of the combined submerged aquatic vegetation (SAV)/water clarity criteria based on Bay Water Quality/Sediment Transport Model outputs for the draft Nutrient Allocation Scenario (190 TN/12.7 TP), seven Bay segments were initially found to be in nonattainment of the SAV/water clarity criteria.

Three of these segments—the Back River (BACOH), upper Chester River, and middle Pocomoke River—required nutrient and sediment load reductions at either the E3 or All-Forest levels to achieve the applicable SAV/water clarity criteria (see Appendix N). Those three segments were unique in that their SAV restoration acreage criteria were set using a hypothetical SAV coverage calculated though 100 percent attainment of the water clarity criteria out to the assigned applications depths (see Table V-2 on page 54 in USEPA 2007). All other Chesapeake Bay segments had their SAV restoration acreage criteria set using the single best year SAV ever observed in each Bay segment in a record that goes back at least 40 years and in some areas back longer than 70 years. Maryland has proposed changing the SAV restoration acreage criteria in their WQS regulations for these three Bay segments to be consistent with the approach used in all other Chesapeake Bay segments (see Section 3.3). Nonattainment in the three segments will be resolved by amending the SAV restoration acreage criteria in these segments to be consistent with the approach in all other Bay segments.

On the basis of recent observed SAV acre or allowance of 1 percent non-attainment of the water clarity criteria (see Section 6.2.2 and Appendix I), the four remaining segments were judged to actually be currently in attainment. Those segments are the Mattawoman Creek (MATTF), the Gunpowder River (GUNOH), the Appomattox River (APPTF), and the Virginia's portion of the lower Potomac River (POTMH_VA).

Back River

Historically, no SAV has ever been observed in the Back River (Figure N2-1), although in 2004, 30 acres were observed for the first time in 30 years. The current SAV goal of 340 acres, established on the basis of the estimated area that is equal to all the shallow-water area out to the application depth (0.5 m) divided by 2.5, is unattainable even under estimated nutrient and sediment loads of the All Forest scenario. However, adjacent Bay segments to Back River, including the Middle River (MIDOH) and upper Chesapeake Bay (CB2OH), achieved the SAV/water clarity WQS on the basis of observed SAV acres in 2009. According to all available lines of evidence, the current SAV restoration acreage criteria in Back River is excessive. If the amended water quality standard proposed by Maryland (consistent with the approach for setting the SAV restoration acreage criteria everywhere else in the Bay) is adopted, the Back River is estimated to fully achieve the WQS at the Nutrient Allocation Scenario loading levels. Further, if the Nutrient Allocation Scenario, based on achieving the proposed amended WQS, is implemented, the estimated reduction in sediment loads from the Back River watershed will be about 22 percent less than current loads as a consequence of the ancillary sediment reduction in BMPs already required for nutrient reduction for the dissolved oxygen WQS.

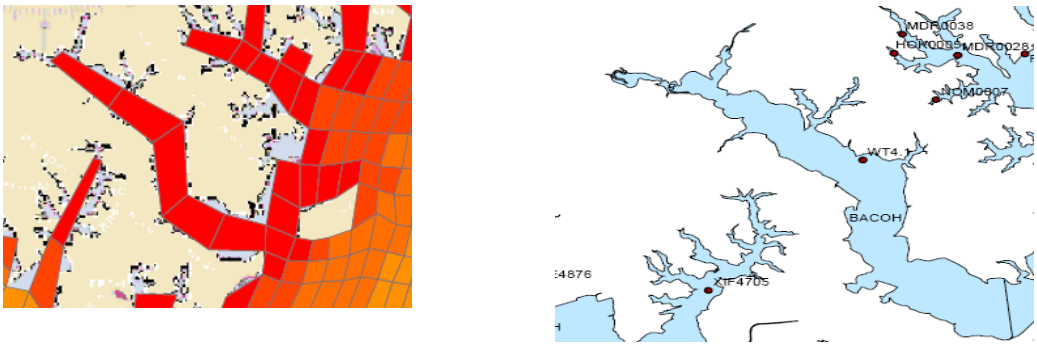

Figure N2-1. The model representation of the Back River and its locations on Maryland's Western.

Upper Chester River

As in the Back River, until 2005 no SAV has ever been observed in the upper Chester River (Figure N2-2) as monitored through the Baywide SAV Aerial Survey (USEPA 2003). In 2005, one acre of SAV was observed for the first time in more than 40 years of observational record. The SAV restoration acreage a criterion of 230 acres is based on the estimated area that is equal to the shallow-water area out to the application depth (0.5 m) divided by 2.5. This existing SAV restoration acreage criterion is unachievable, even at the E3 Scenario level of nutrient and sediment reductions (see Appendix N). Maryland proposed amended WQS would be achieved under the Nutrient Allocation Scenario loading levels. Sediment loads at the Nutrient Allocation Scenario based on achieving the proposed amended WQS are estimated to be about 29 percent below estimated current sediment loads in the Chester River watershed.

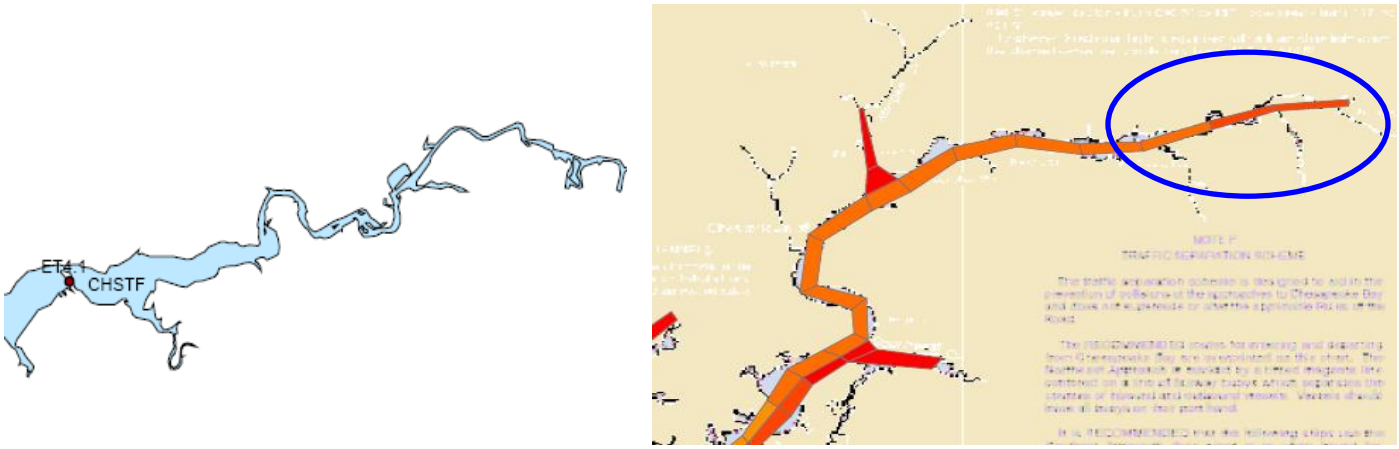

Figure N2-2. The location of the upper Chester River on Maryland's Eastern Shore (a) and its representation by the Chesapeake Bay Water Quality Model (b).

Maryland's Middle Pocomoke River

Historically, no SAV has ever been observed in the Maryland's portion of the middle Pocomoke River (POCOH_MD) (Figure N2-3). The current SAV restoration acreage criterion of 22 acres is based on the estimated area that's equal to the shallow-water area out to the application depth (0.5 m) divided by 2.5. Maryland is proposing an amendment to its WQS for the middle Pocomoke River segment which recognize this segment as an SAV no-grow zone, consistent with the adjacent upper Pocomoke River segment (USEPA 2004). In the Virginia's portion of

the middle Pocomoke River, there is no SAV restoration acreage criterion. The natural color in the Pocomoke black water system is the principal factor contributing to light attenuation and the lack of SAV presence in these waters.

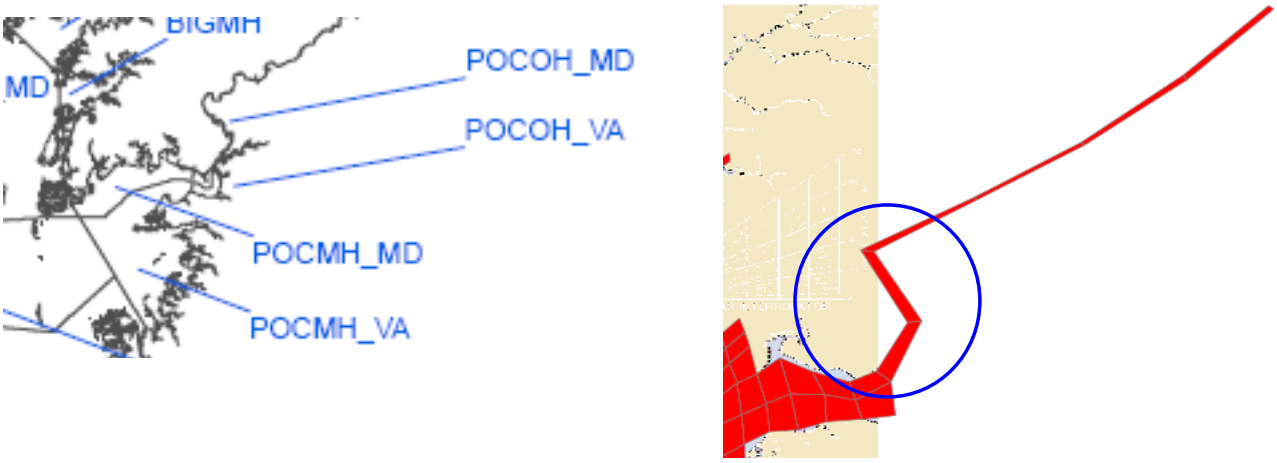

Figure N2-3. The location of the Maryland (here represented as POCOH_MD) and Virginia (POCOH_VA) portions of the middle Pocomoke River on the Eastern Shore (a) and its representation by the Chesapeake Bay Water Quality Model (b).

Virginia Middle Potomac River

The SAV restoration acreage criterion is for 4,250 acres for Virginia's portion of the middle Potomac River (POTMH_VA) (Figure N2-4). At the Nutrient Allocation Scenario loading levels, but was 10 percent nonattainment. Nonattainment was persistent and was estimated to be 9 percent at E3 Scenario and 6 percent at the All Forest Scenario nutrient and sediment load levels (Appendix N). With its high SAV restoration acreage criterion and the low levels of SAV acres estimated by the assessment approach described in Appendix O for this segment, the level of attainment is largely achieved through water clarity acres only. As a consequence of the high SAV restoration acreage criterion, the calculated water clarity acreage-based criterion is also very high—10,625 acres. However, the available shallow-water area out to the maximum application depth of 2 meters is less than the water clarity acres criterion for this segment.

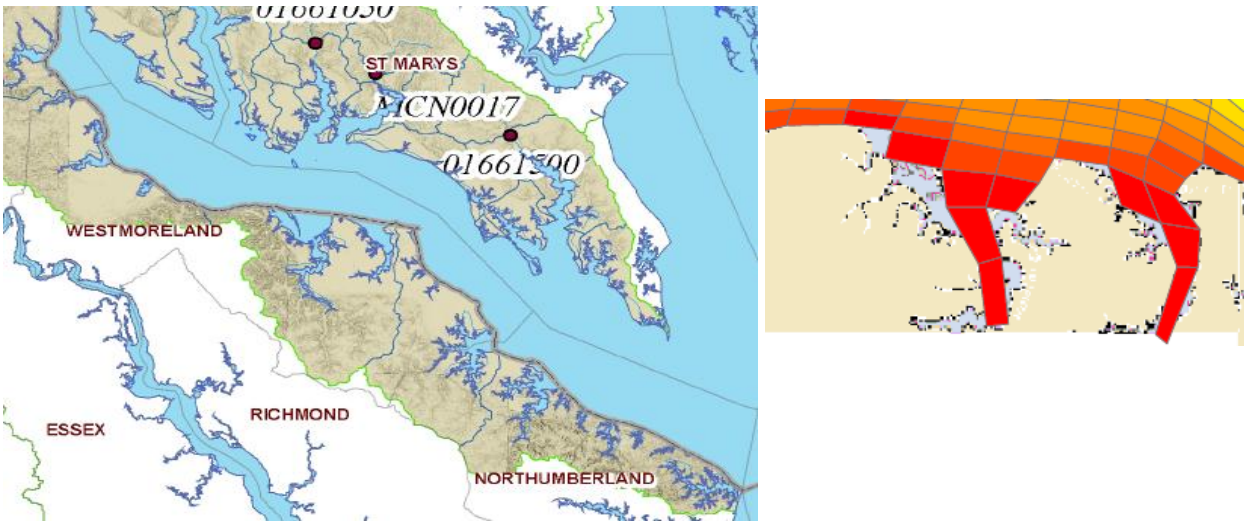

Figure N2-4. The location of the different embayments of Virginia's portion of the lower Potomac River (a) and its representation of the Nomini Bay region of the segment by the Chesapeake Bay Water Quality Model (b).

The observed SAV record shows overall improvement in SAV coverage in recent years. Given the 1993-1995 SAV coverage was close to its lowest recorded acreage, EPA used the recent observed SAV area (2004–2005) in the SAV/water clarity criteria assessment procedure described in Appendix O. Starting with this SAV acreage, more consistent with recent years of observed SV acreage (Figure N2-5), Virginia's portion of the lower Potomac River achieved its SAV/water clarity WQS at the proposed Nutrient Allocation Scenario loading levels. Further, estimated sediment loads at the Nutrient Allocation Scenario are 20 percent below estimated current sediment loads in this watershed.

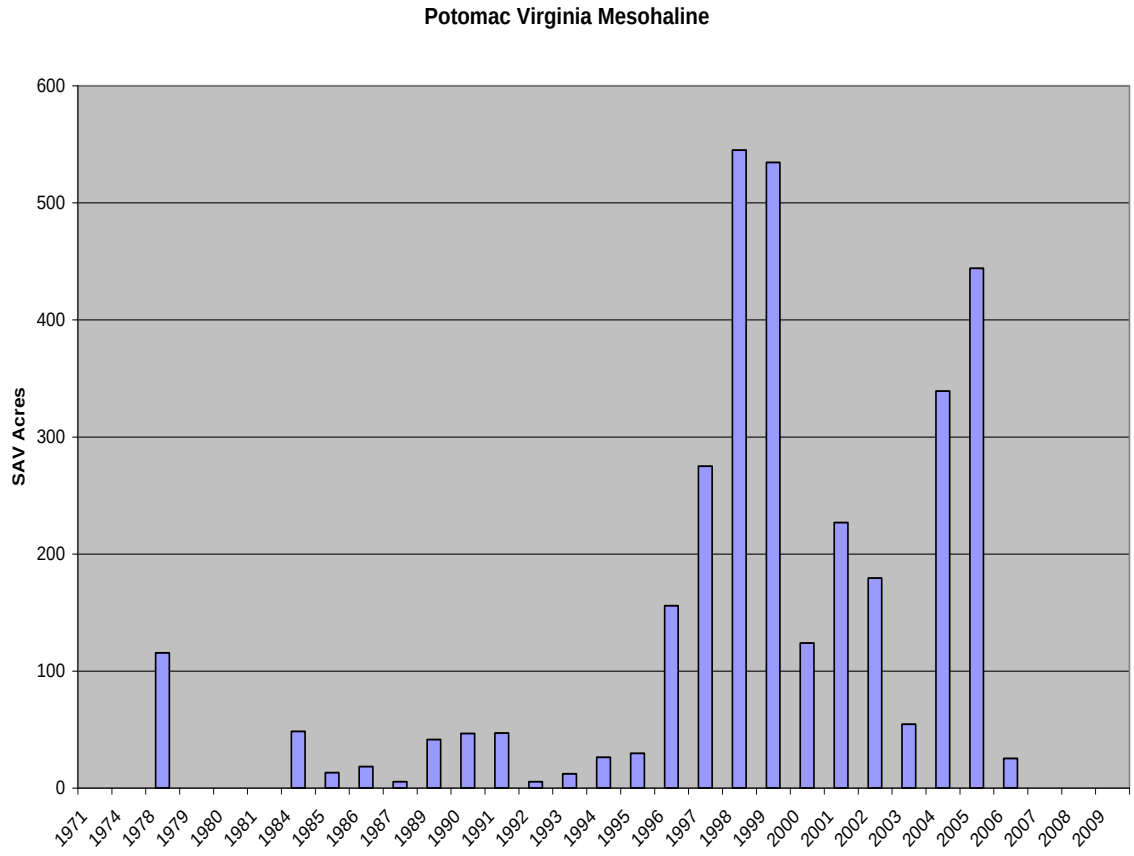

Figure N2-5. Observed SAV acres in Virginia' lower Potomac River segment.

Source: http://www.vims.edu/bio/sav

Mattawoman Tidal Fresh—MATTF

Initially, the Mattawoman Creek (Figure N2-6) appeared to be in nonattainment of its SAV/water clarity standards based on Bay Water Quality Model simulation of the Nutrient Allocation Scenario loading levels. Subsequently, a fuller analysis that included the recent SAV monitoring data found that the Mattawoman Creek segment had 877 acres of observed SAV in 2008, and 866 acres in 2009 (Figure N2-7). Both recent years of observed SAV exceeded the 792 acres SAV restoration acreage criterion. From the recent observed SAV data and the upward trend of SAV expected with continued nutrient and sediment reduction in the Mattawoman Creek, these other lines of evidence supported the finding that further sediment reductions beyond the phosphorus-based sediment loads within the Nutrient Allocation Scenario would be unwarranted.

Figure N2-6. The location of Mattawoman Creek in the upper Potomac River (a) and the Chesapeake Bay Water Quality Model representation of Mattawoman Creek (b).

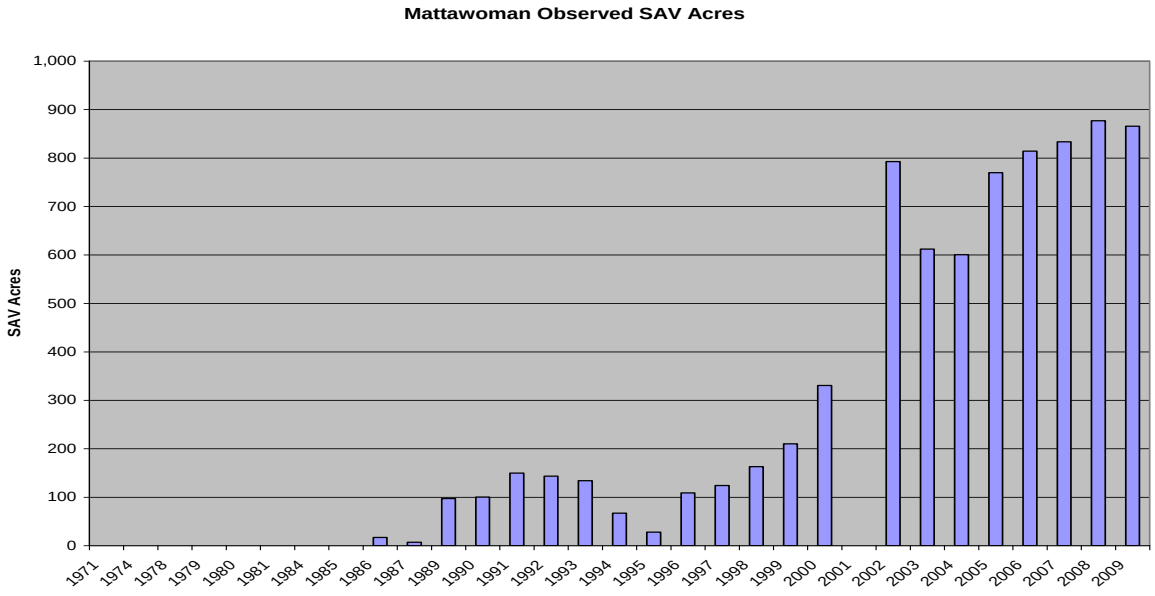

Figure N2-7. The observed SAV data for Mattawoman Creek from 1971 to 2009.

Gunpowder River

Initially, the Gunpowder River (GUNOH) (Figure N2-8) appeared to be in nonattainment of its SAV/water clarity standards based on Bay Water Quality Model simulation of the Nutrient Allocation Scenario loading levels. Subsequent analysis found that the Gunpowder River segment had essentially reached its SAV restoration acreage criterion of 2,432 acres in recent years (2000, 2004) and found a generally increasing trend of SAV expansion as nutrient and sediment loads continue to decrease toward the allocation scenario loads (Figure N2-9). Consequently, this other line of evidence supported the finding that further sediment reductions beyond the phosphorus-based sediment loads within the Nutrient Allocation Scenario would be unwarranted.

Figure N2-8. The location of the Gunpowder River (a) and the Chesapeake Bay Water Quality Model representation of Gunpowder River (b).

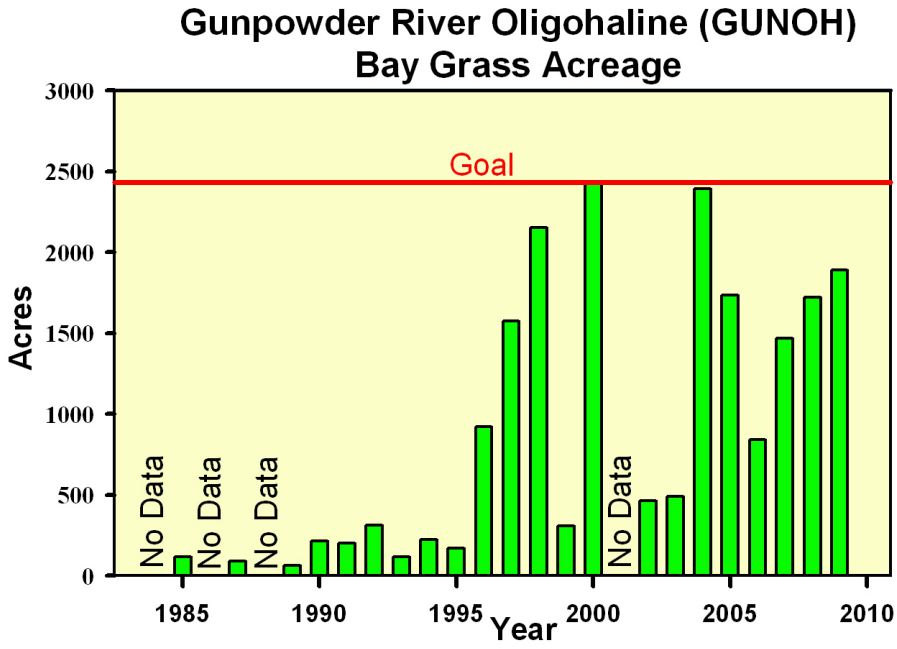

Figure N2-9. The observed SAV data for the Gunpowder River from 1985 to 2009.

Appomattox River

In the Appomattox River (Figure N2-10), the SAV restoration acreage criterion is 379 acres, though no SAV has been observed from 1978 to present. A persistent low level nonattainment (1 percent), which is based on attainment of the water clarity criteria only, is estimated at the Nutrient Allocation Scenario loading level. Allowance of 1 percent persistent non-attainment of the water clarity criteria moves this segment into attainment .

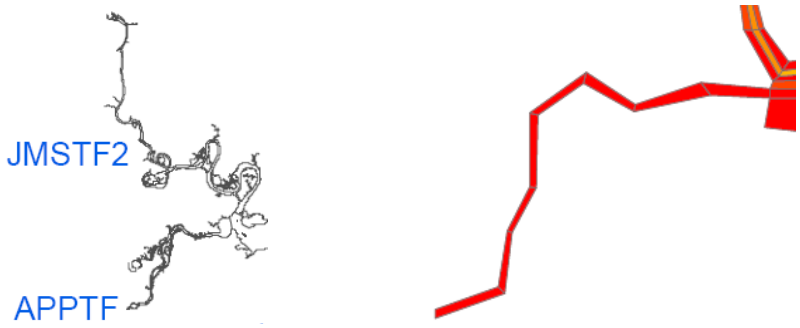

Figure N2-10. The location of the Appomattox River in the upper tidal James River (a) and its representation by the Chesapeake Bay Water Quality Model (b).

References

USEPA (U.S. Environmental Protection Agency). 2003. *Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability*. EPA 903-R-03-004. U.S. Environmental Protection Agency, Region 3, Chesapeake Bay Program Office, Annapolis, MD.

USEPA (U.S. Environmental Protection Agency). 2004. *Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability–2004 Addendum.* EPA 903-R-04-006. U.S. Environmental Protection Agency, Region 3 Chesapeake Bay Program Office, Annapolis, MD.

USEPA (U.S. Environmental Protection Agency). 2007. *Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries—2007 Addendum*. EPA 903-R-07-003. CBP/TRS 285-07. U.S. Environmental Protection Agency, Region 3, Chesapeake Bay Program Office, Annapolis, MD.