chapter ii

Chesapeake Bay Nutrient and Sediment Enrichment Criteria

The *Chesapeake 2000* agreement committed its signatories (the states of Pennsylvania, Maryland and Virginia; the District of Columbia; the Chesapeake Bay Commission and the EPA) to "define the water quality conditions necessary to protect aquatic living resources" in the Chesapeake Bay and its tidal tributaries. New York, Delaware and West Virginia agreed to the same commitment through a separate six-state memorandum of understanding with the EPA.

EPA Region III has identified the water quality conditions that are necessary to protect living resources through the Chesapeake Bay-specific water quality criteria for dissolved oxygen, water clarity and chlorophyll *a* published in this document. The Chesapeake Bay criteria have been derived to protect a series of five *refined tidal-water designated uses* which, in turn, reflect important and unique habitats throughout the Chesapeake Bay and its tidal tributaries (Appendix A). More detailed descriptions of these refined subcategories of tidal-water designated uses and their recommended boundaries can be found in the EPA Region III publication, *Technical Support Document for the Identification of Chesapeake Bay Designated Uses and Attainability*. Collectively, these three water quality conditions provide the best and most direct measures of the effects of too much nutrient and sediment pollution on the Chesapeake Bay's aquatic living resources–fish, crabs, oysters, their prey species and underwater bay grasses.

Fish and other aquatic life require specific levels of *dissolved oxygen* to survive. Seasonal algae blooms, when uneaten by fish and shellfish, deplete dissolved oxygen, potentially rendering the deep waters of the Bay uninhabitable to certain species during certain times of the year. The Chesapeake Bay dissolved oxygen criteria were based on the oxygen levels required by different aquatic communities inhabiting distinct habitats in the Bay's tidal waters during different times of the year (Chapter III).

Underwater bay grasses are an essential component of the Chesapeake Bay's habitat and an important food source for waterfowl. Decreased *water clarity* inhibits the growth of underwater bay grasses. Building on decades of scientific research, the

Chesapeake Bay water clarity criteria were derived to protect the minimum light required by both low and higher salinity underwater plant communities (Chapter IV).

Measurements of *chlorophyll* a indicate levels of phytoplankton or algal biomass in the water column. Levels that are too high indicate algal blooms, which lead to a proliferation of less desirable species, shade the light in shallow-water habitats and cause low dissolved oxygen conditions, as uneaten algae die off and sink to the bottom. Narrative Chesapeake Bay chlorophyll *a* criteria were derived to support desired ecological conditions and protect against an array of water quality impairments (Chapter V).

The EPA provides Chesapeake Bay criteria *implementation procedures* as additional regional guidance to the Chesapeake Bay watershed states and other agencies, institutions, groups or individuals for consideration of how to apply the criteria in order to determine the degree of attainment of those criteria (Chapter VI). These implementation procedures are published in this document to promote consistent, baywide application of the criteria across jurisdictional boundaries.

A series of *diagnostic procedures* and tools designed to explain the reasons for non-attainment of the water quality criteria are documented (Chapter VII). Approaches for addressing natural exceedances of the criteria not already accounted for in the implementation procedures are provided for consistent application across all tidal water habitats.

The EPA is publishing this *Regional Criteria Guidance* to further to goals of the Clean Water Act and, specifically, pursuant to Sections 117(b) and 303(c) of the the Act.