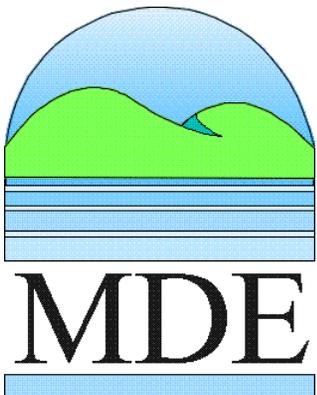


TMDLs Endpoints in the Baltimore Harbor and Back River

July 29, 2003

Stakeholders Advisory Group



Proposed Endpoints

- DO
 - Adapt CBP proposed Criteria.
- Chlorophyll *a*
 - Adapt CBP proposed narrative Criteria
 - MDE Quantifying Interpretation of the Narrative Criteria: $< 50 \mu\text{g/L}$.



DO Endpoint

Maryland Regulation

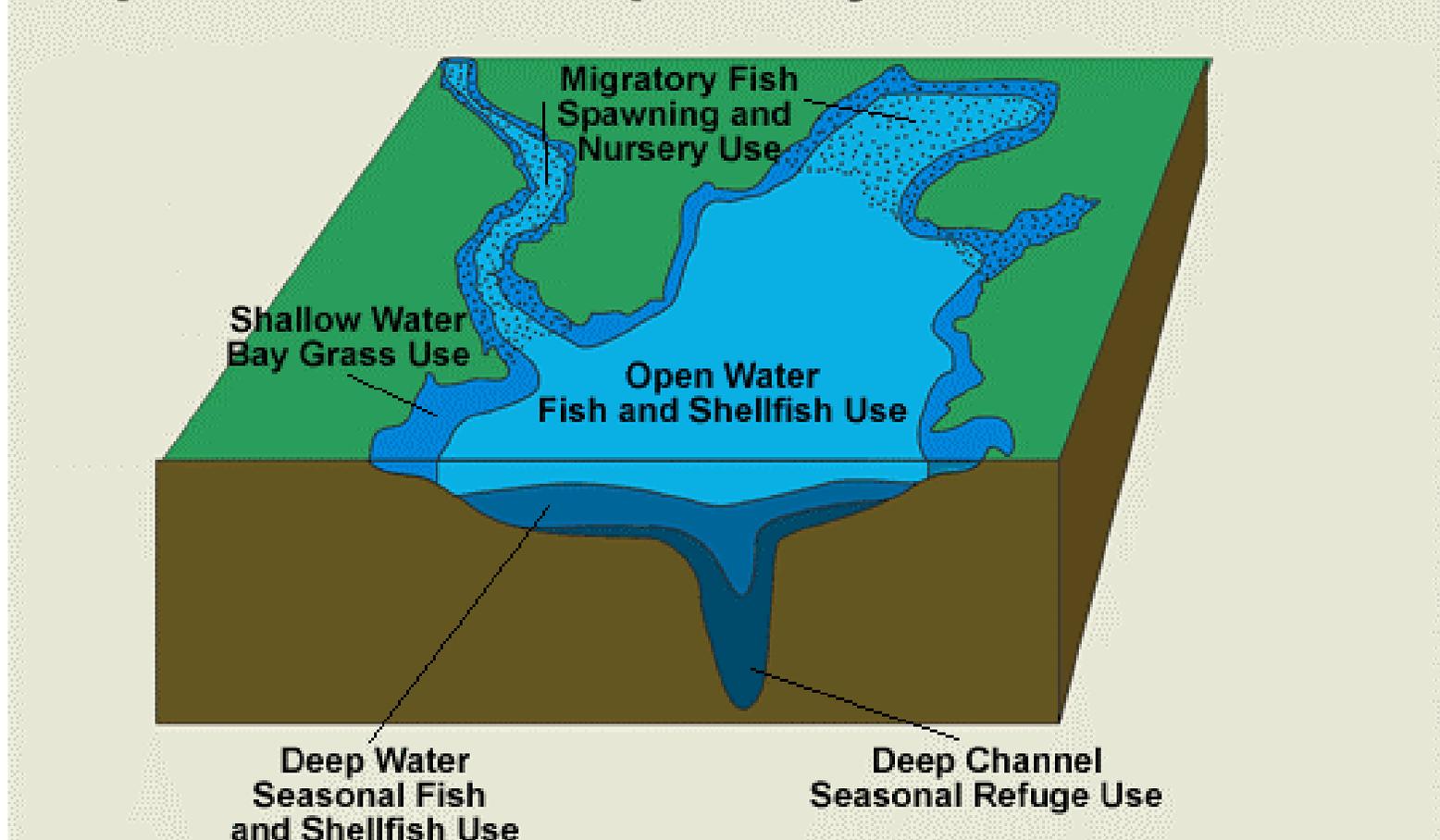
- Designated uses -- All estuarine portions of Back River and Baltimore Harbor are currently designated in the regulations as **Use-I** waters
- From COMAR 26.08.02.03-3: Criteria for **Use-I** Waters - Water Contact Recreation and Protection of Aquatic Life.
- **The dissolved oxygen concentration may not be less than 5 mg/L at any time.**
- If the natural water quality of a stream segment is not consistent with the criteria established for the stream then:
 - The natural conditions do not constitute a violation of the water quality standards; and
 - The water quality to be maintained and achieved is not required to be substantially different from that which would occur naturally.



DO Endpoint

CBP Refined Designated Uses for the Chesapeake Bay and Tidal Tributaries

Oblique View of the Chesapeake Bay and Its Tidal Tributaries



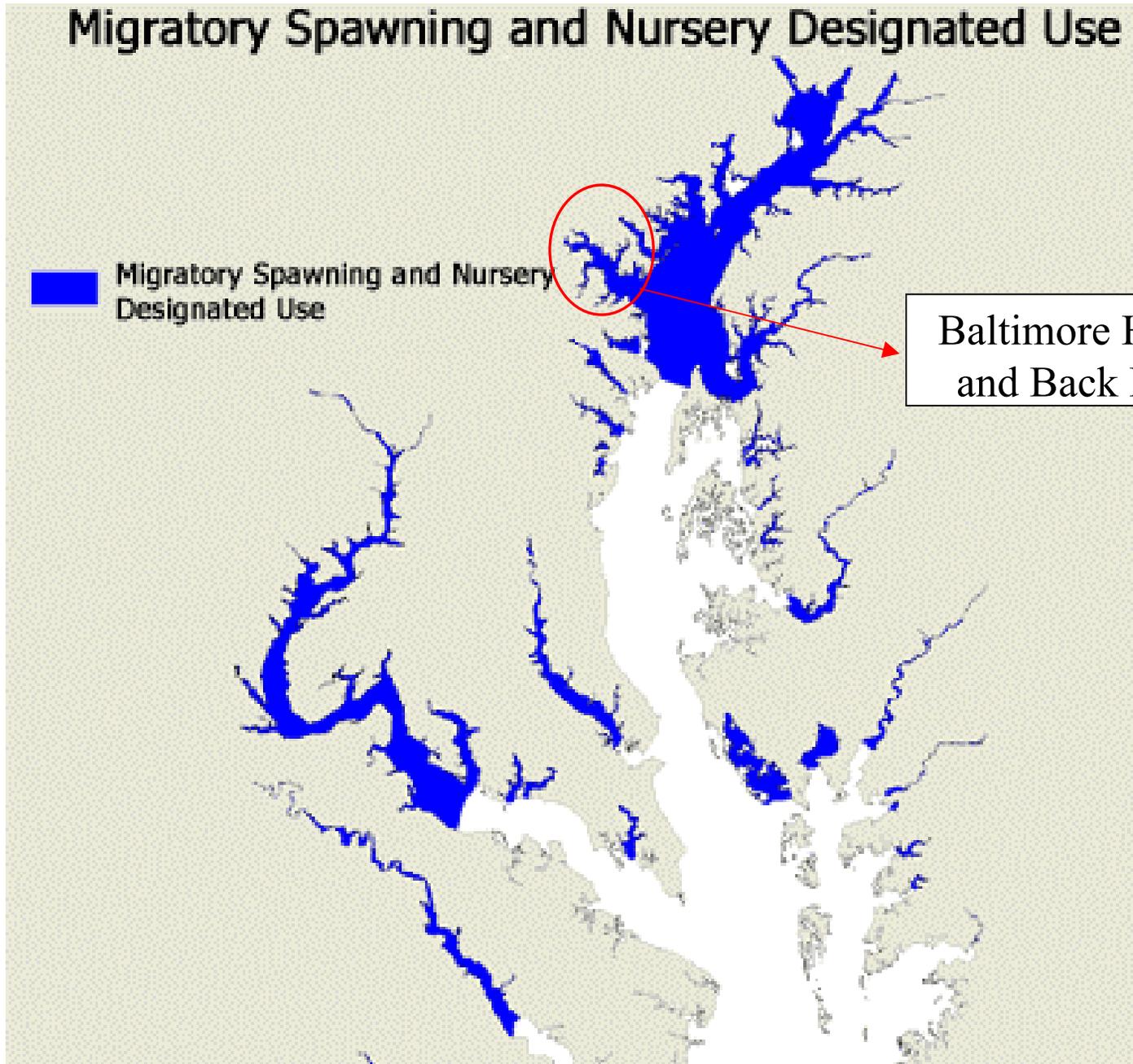
Migratory Spawning and Nursery Designated Use



Migratory Spawning and Nursery Designated Use



Baltimore Harbor and Back River



Baltimore Harbor DO endpoint

Migratory Fish Spawning and Nursery Use February 1 through May 31

CRITERIA:

5.0 mg/l 1-day minimum

~~6 mg/L 7-days average (only tidal habitats with 0-0.5 ppt salinity)~~

•BOUNDARY

The boundaries of this use are broadly delineated from the up-river extent of tidally influenced waters to the down river and lower Bay end of spawning and nursery habitats. The use extends horizontally from the intertidal zone (mean low water) across the body of water to the adjacent intertidal zone, and down into the water column to the sediment-water interface at the bottom of the tidal tributary of mainstem Bay waters.

OPEN-WATER DESIGNATED USE BOUNDARIES

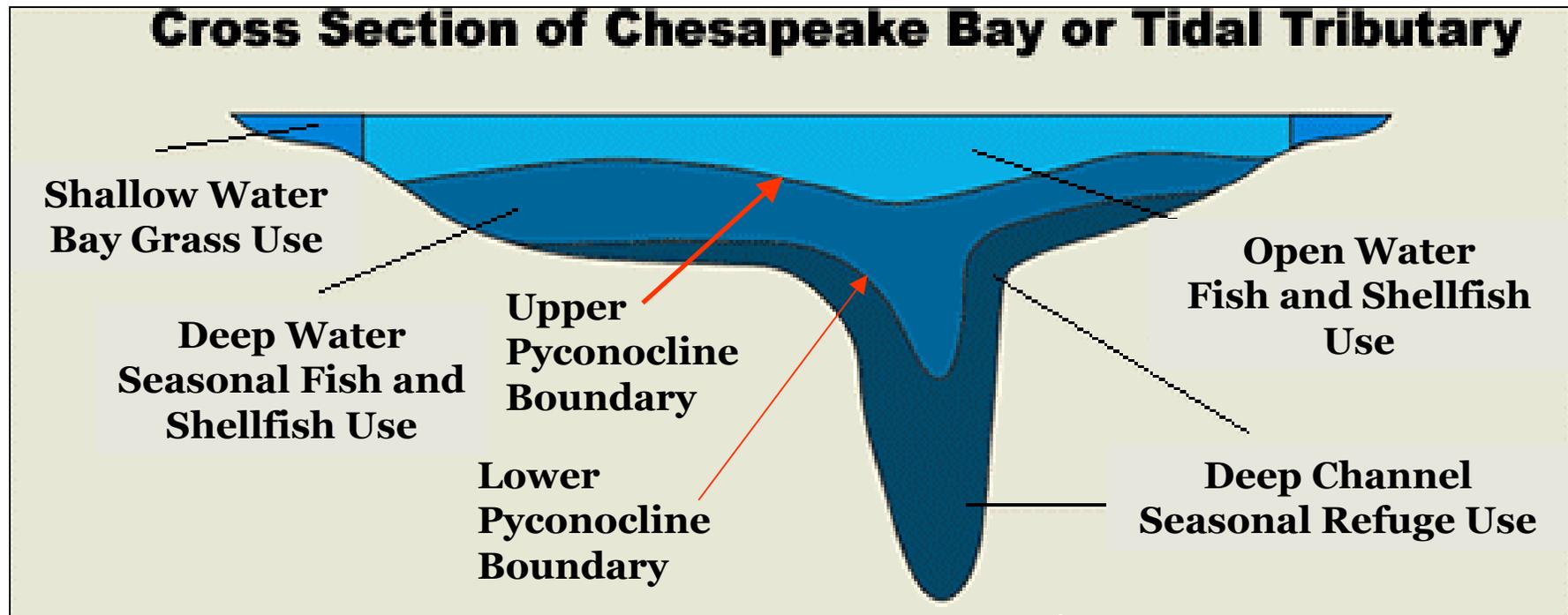


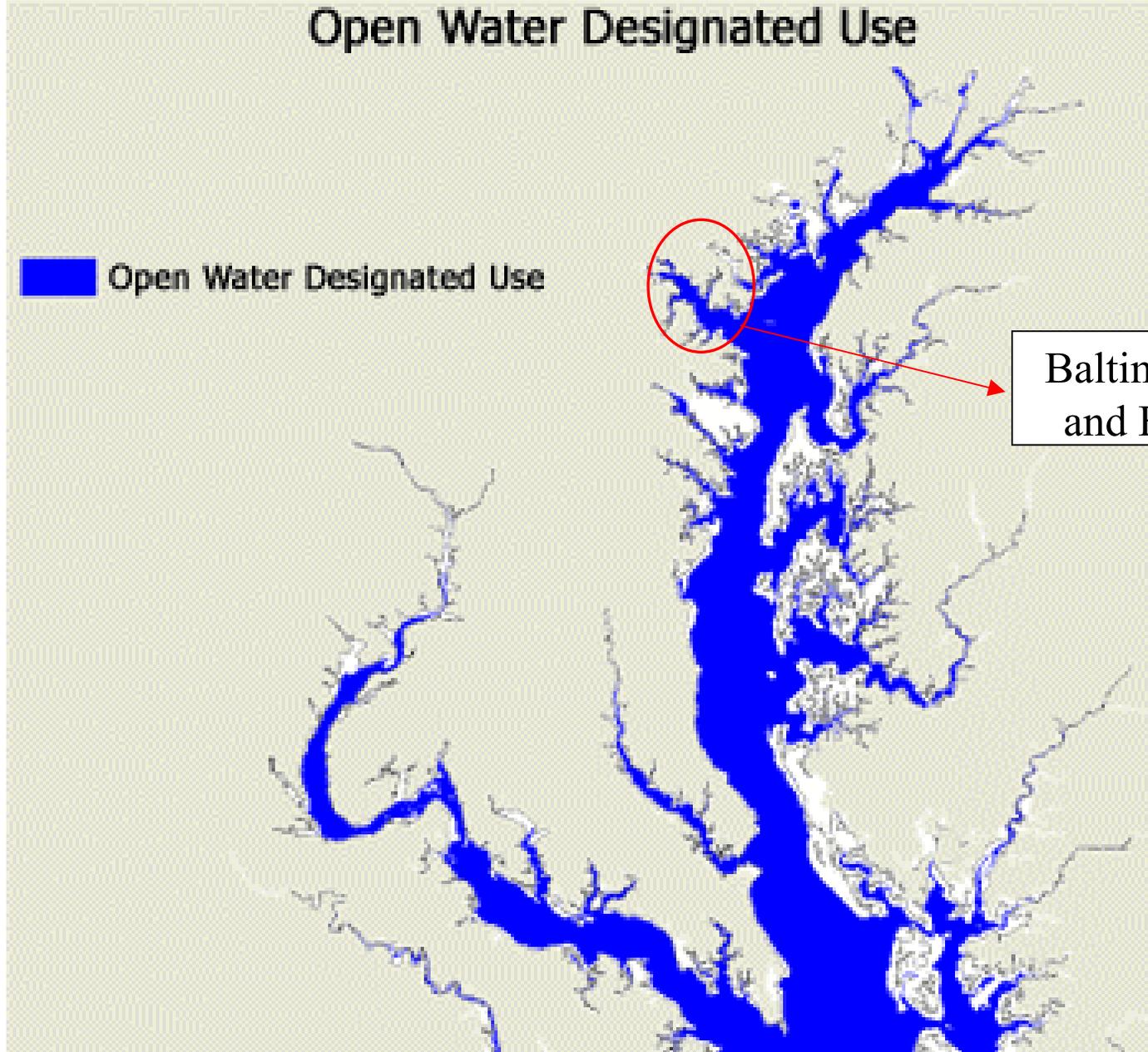
Illustration of how the upper boundary of the pycnocline delineates the lower boundary for the open-water designated use when, During June 1 through September 30, the pycnocline prevents Oxygen replenishments of deeper waters, and how the shallow-water Designated use overlays the open-water designates use.

Open Water Designated Use

 Open Water Designated Use



Baltimore Harbor
and Back River



Baltimore Harbor DO endpoint

Open-Water Designated Fish and Shellfish Use

June 1 through January 31– above upper boundary of the pycnocline.

October 1 through January 31 -- whole water column

Criteria

- ~~5.5 mg/L 30-day mean (tidal habitats with 0-0.5 ppt salinity)~~
- 5.0 mg/l 30-day mean (tidal habitats greater than 5 ppt salinity)
- 4.0 mg/l 7-day mean
- 3.0 mg/l instantaneous minimum

Baltimore Harbor DO endpoint

Deep Water Seasonal Fish and Shellfish Designated Use

June 1 through September 30 -- Inter-pycnocline

Criteria

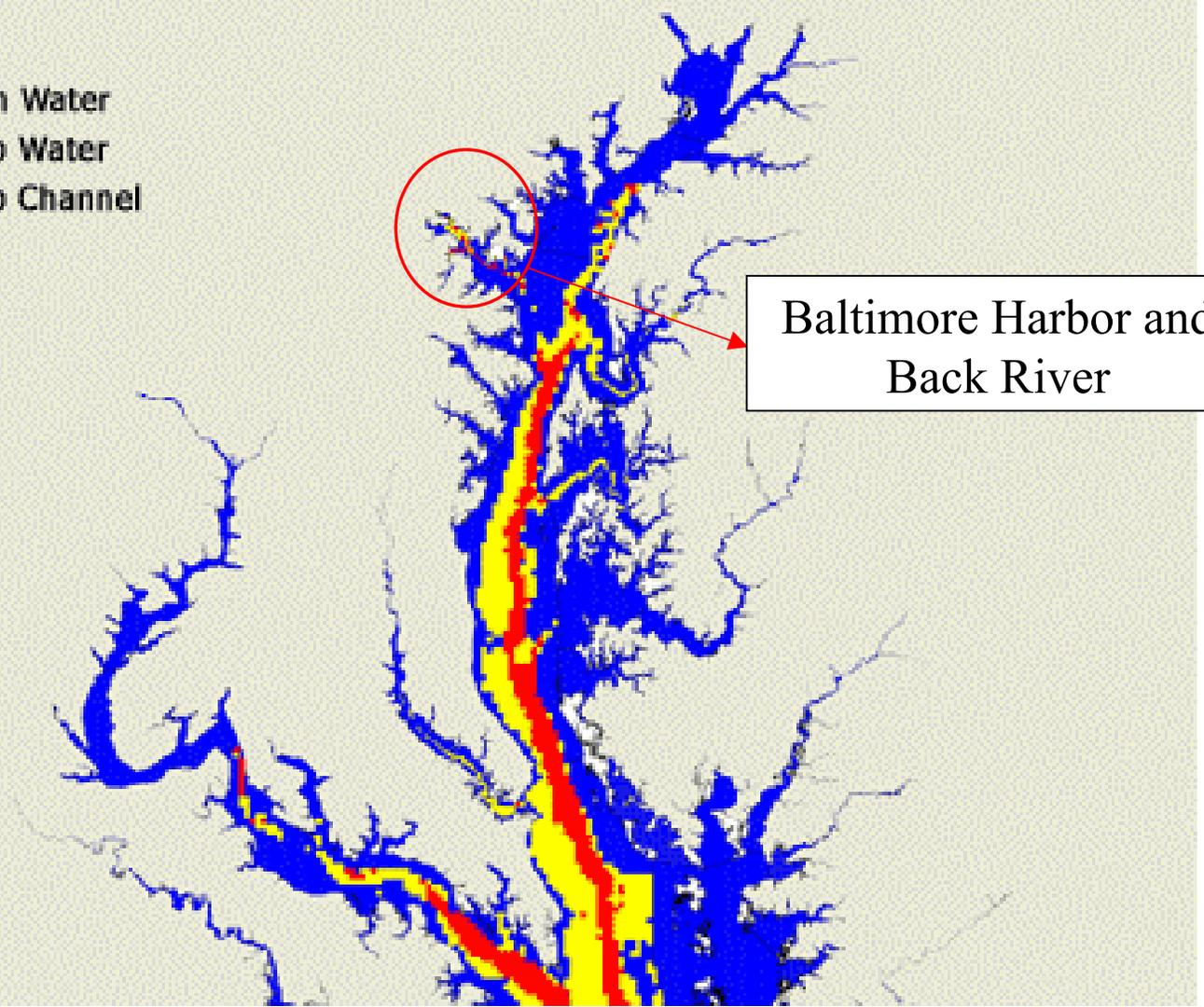
- 3 mg/l 30-day mean
- 2.3 mg/l 1-day mean
- 1.7 mg/l instantaneous minimum

Boundary

Tidally influenced waters located between the measured depth of the upper and lower boundaries of the pycnocline in areas where a measured pycnocline is present and presents a barrier to oxygen replenishment.

Refined Chesapeake Bay Open Water, Deep Water and Deep Channel Designated Uses: Horizontal Extent through September

- Open Water
- Deep Water
- Deep Channel



Baltimore Harbor and Back River

Baltimore Harbor DO endpoint
Deep Channel Seasonal Refuge Designated Use
June 1 through September 30 -- below lower boundary of
the pycnocline

Criteria

- 1.0 mg/l instantaneous minimum
- ~~Incidence of sustained, periodic anoxic conditions acceptable~~
~~(narrative criteria applies only to the seasonal anoxic region from July~~
~~1 through August 31)~~

Boundary

Tidally influenced waters located at depths greater than the measured lower boundary of the pycnocline in isolated deep channels.

DO Endpoint

Pycnocline Distribution

- The protocol for calculating the presence of a pycnocline can be found in CBP's Technical Support Document (TSD) Appendix D for conducting Use Attainability Analyses (UAAs) .
- Time Variable pycnocline will be calculated based on CBP methodology.

Median Station Pycnocline Depths and Percent Occurrence: 1985-2000

BALTIMORE HARBOR Only	Upper Depth (m)	%Upper	Lower Depth (m)	% Lower	Interpyc Depth (m)
Spring (March-May)	5.5	98	10.5	58	4.0
Summer (July-September)	6.5	90	11.5	59	3.0

Designated Uses Code

- Designated Use I: **Migratory Fish Spawning and Nursery Use**
- Designated Use II: **Open-water Designated Fish and Shellfish Use**
- Designated Use III: **Deep Water Seasonal Fish and Shellfish Use**
- Designated Use IV: **Deep Channel Seasonal Refuge Use**

Baltimore Harbor

Proposed Designated Uses and DO Endpoint

	Feb 1 – May 31	June 1 – Sept 30	Oct 1 – Jan 31
0 – upper pycnocline	I	II	II
upper – lower pycnocline	I	III	II
lower pycnocline - bottom	I	IV	II

Designated Use	30-day mean	7-day mean	1-day mean	Instantaneous minimum
I				5.0
II	5.0	4.0		3.0
III	3.0		2.3	1.7
IV				1.0

Back River

Proposed Designated Uses and DO Endpoint

	Feb 1 – May 31	June 1 – Jan 31
Back River	I	II

Designated Use	30-day mean	7-day mean	1-day mean	Instantaneous minimum
I				5.0
II	5.0	4.0		3.0
III	3.0		2.3	1.7
IV				1.0

Chlorophyll *a* Endpoint

- COMAR do not state criteria for Chlorophyll *a*
- Recommended Chesapeake Bay Chlorophyll *a* Narrative Criteria:
“Concentrations of chlorophyll *a* in free-floating microscopic aquatic plants (algae) shall not exceed levels that result in ecologically undesirable consequences -- such as reduced water clarity, low dissolved oxygen, food supply imbalances, proliferation of species deemed potentially harmful to aquatic life or humans or aesthetically objectionable conditions - or otherwise render tidal waters unsuitable for designated uses.”



Baltimore Harbor and Back River Proposed Quantifying Interpretation of CBP Chlorophyll *a* Narrative Criteria

- MDE will be adapting proposed CBP narrative Chla criteria to be implemented by existing Chla guidelines.
- Existing MDE Guidelines: < 50 µg/L.
- Eutrophication model will be used to check Chla levels when DO reaches attainment.
- Using Chla rolling monthly average for attainment comparison.

