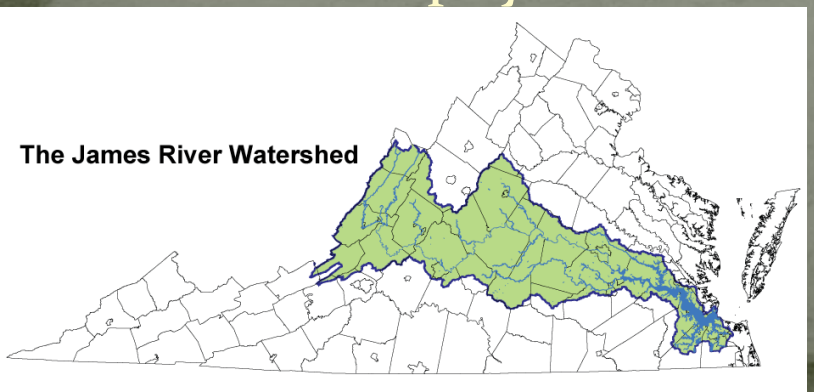
VA's James River Chlorophyll Study

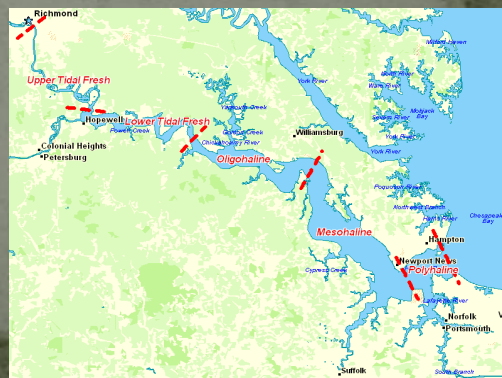
In Response To
Chesapeake Bay TMDL

Modeling Quarterly Review
Oct 3, 2012

Study Goals

- Revisit the James River TMDL allocations (Appendix O & X, Bay TMDL)
  - Develop a site specific James River water quality model
  - Re-assess attainability of chl-a criteria
- Review and confirm/adjust James River chl-a standard (WIP I - Appendix 2)
  - Scientific Advisory Panel to make recommendations
  - Conduct scientific study to review basis for setting chlorophyll standard





JR Chl-a Study Schedule

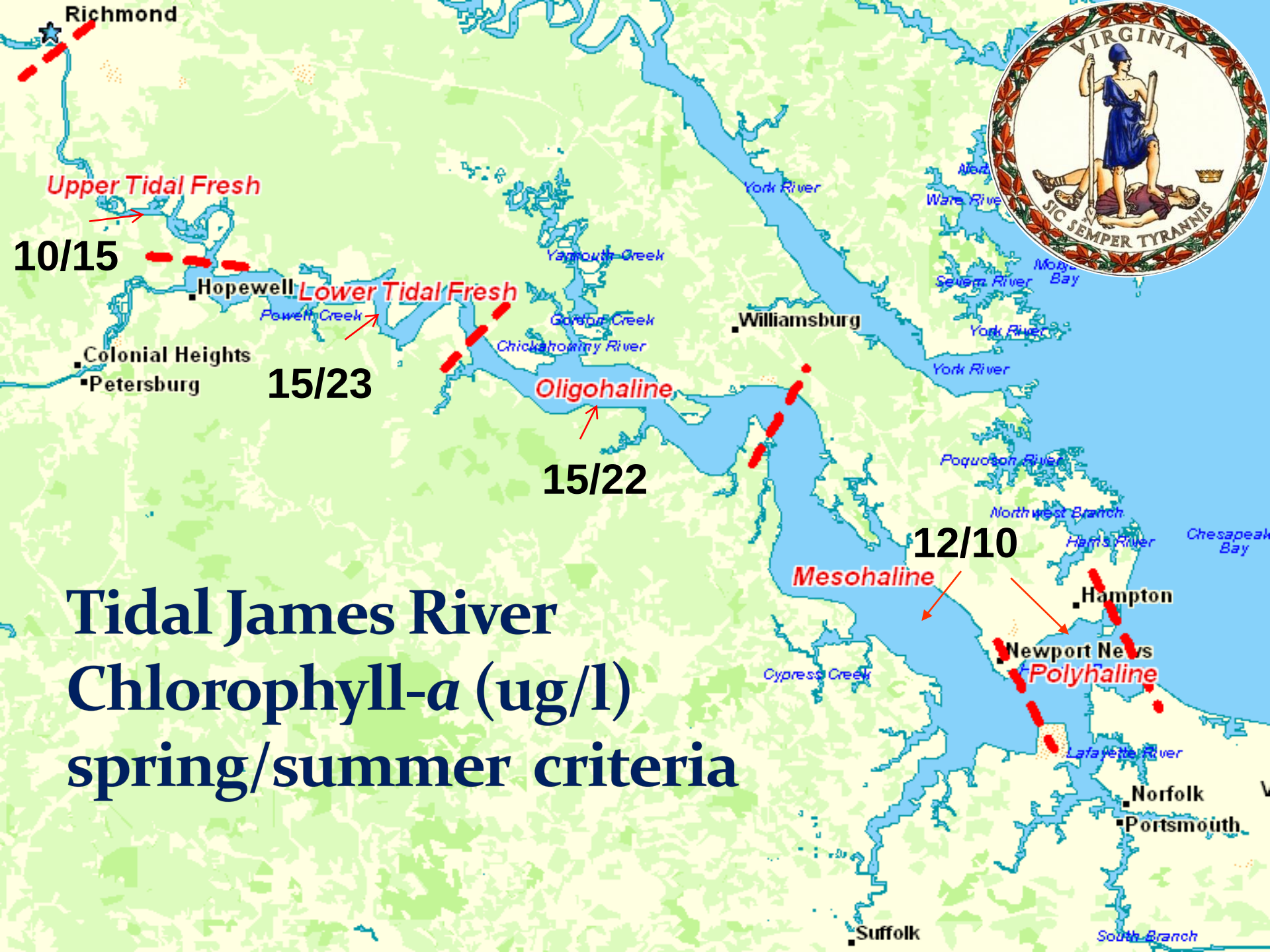
2011	Workplan Developed
	NOIRA issued
2012	Workplan Implementation
2012-14	Monitoring and Modeling
2015	Panel Recommendations and Assessment Review
2016	Develop Regulatory Proposal (if warranted)
2017	Regulatory Review (if necessary)
	Complete WIP III

http://www.deq.virginia.gov/wqs/rule.html#James_Chl_A_study

Recent Activity

- Modeling Subcommittee
  - April, July, Oct
- Scientific & Technical Advisory Committee
- James River Chl-a Study
  - Scientific Advisory Panel
  - Stakeholder Advisory Group

http://www.deq.virginia.gov/wqs/rule.html#James_Chl_A_study



Tidal James River Chlorophyll-*a* (ug/l) spring/summer criteria

Critical conditions (TMDL Appendix G)

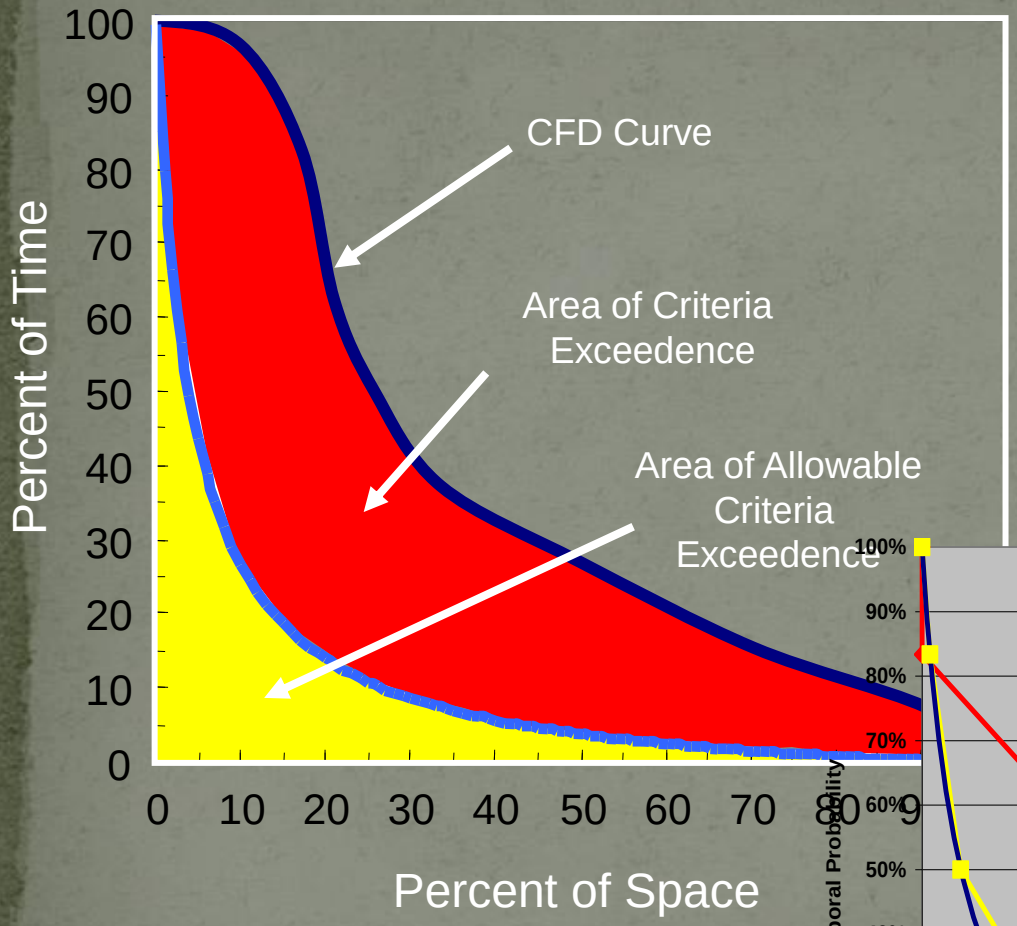
Critical Period –The WQGIT agreed that the critical period should be representative of an approximate 10-year return period. This was defined as the average period of time expected to elapse between occurrences of events at a certain site. For DO, the critical period was 1993-1995.

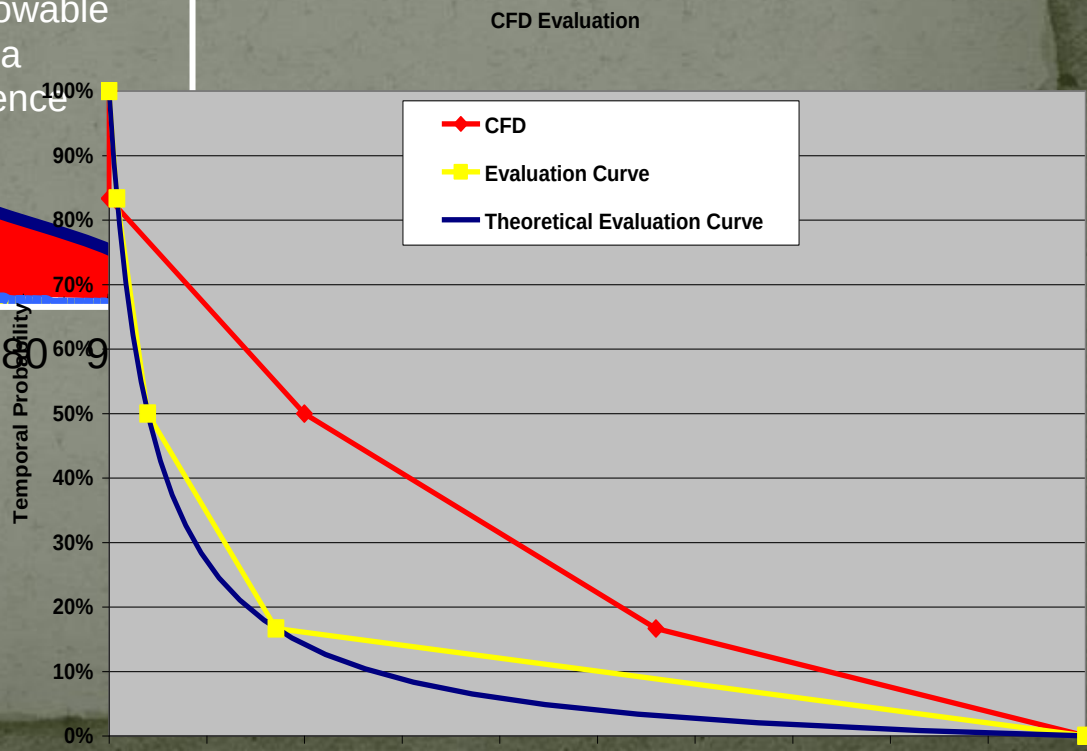
"Because the James River did not exhibit a correlation between high flow and chlorophyll-a violations, a critical period was not selected…"

Issues (con't)

- Assessment (TMDL Section 3.3.3)
  - CFD criteria assessment since no biologically based reference curve not available (USEPA 2007)
  - 10 percent default reference curve
  - Seasonal means of observed data; data transformed and then interpolated spatially within designated use area for each cruise. The interpolated value of each cell averaged in time across the entire season and then the spatial violation rate calculated as the fraction of interpolator cells failing the designated use (USEPA 2010)
  - Chlorophyll assessment was based on attainment over the 1991-2000 time series (Appendix O)

CFD-Based Attainment Assessment





Modeling Project Team

CEC

Dave Jasinski (Project Administrator) Data management & analysis.

VIMS

Roger Mann – (Project Manager) Fisheries scientist
Harry Wang – Hydrodynamic & Pollutant modeling
Jian Shen – Hydrodynamic, Water Quality, and Pollutant modeling
Bo Hung – Hydrodynamic & Water Quality modeling
Mac Sisson – GIS & Numerical modeling

HDR|HydroQual

James Fitzpatrick – Water Quality Modeling
Andrew Thuman – Water Quality Modeling
Thomas Gallagher – Water Quality Modeling

Tetra Tech

Andrew Parker – Hydrologic, Hydrodynamic, & Water Quality modeling
Peter von Lowe – Point & Non Point source pollution assessment
John Hamrick – EFDC Modeling
John Riverson – Watershed modeling
Sen Bai – Watershed & EFDC modeling

ODU

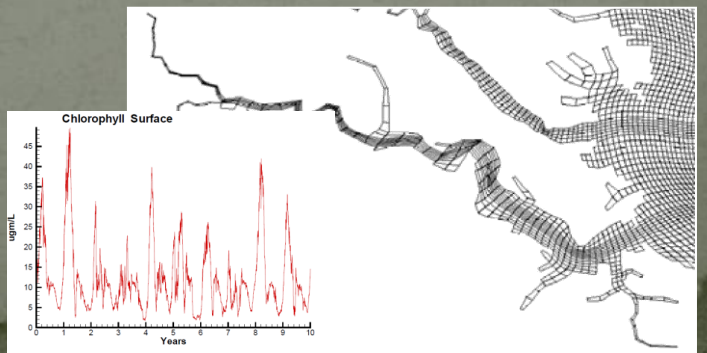
Margaret Mulholland – HAB expert

UNC

Hans Paerl – HAB/Plankton expert

VCU

Paula Buckaveckas – Plankton Dynamics



Model Review / Selection

- Subtask 3.1 – Watershed/Loading Model
- Subtask 3.2 – Hydrodynamic and Water Quality
- Models
- Subtask 3.3 – Phytoplankton/HAB Model
- Subtask 3.4 - Probabilistic – Empirical Model
- Subtask 3.5 – Predictive Accuracy

Questions & Discussion

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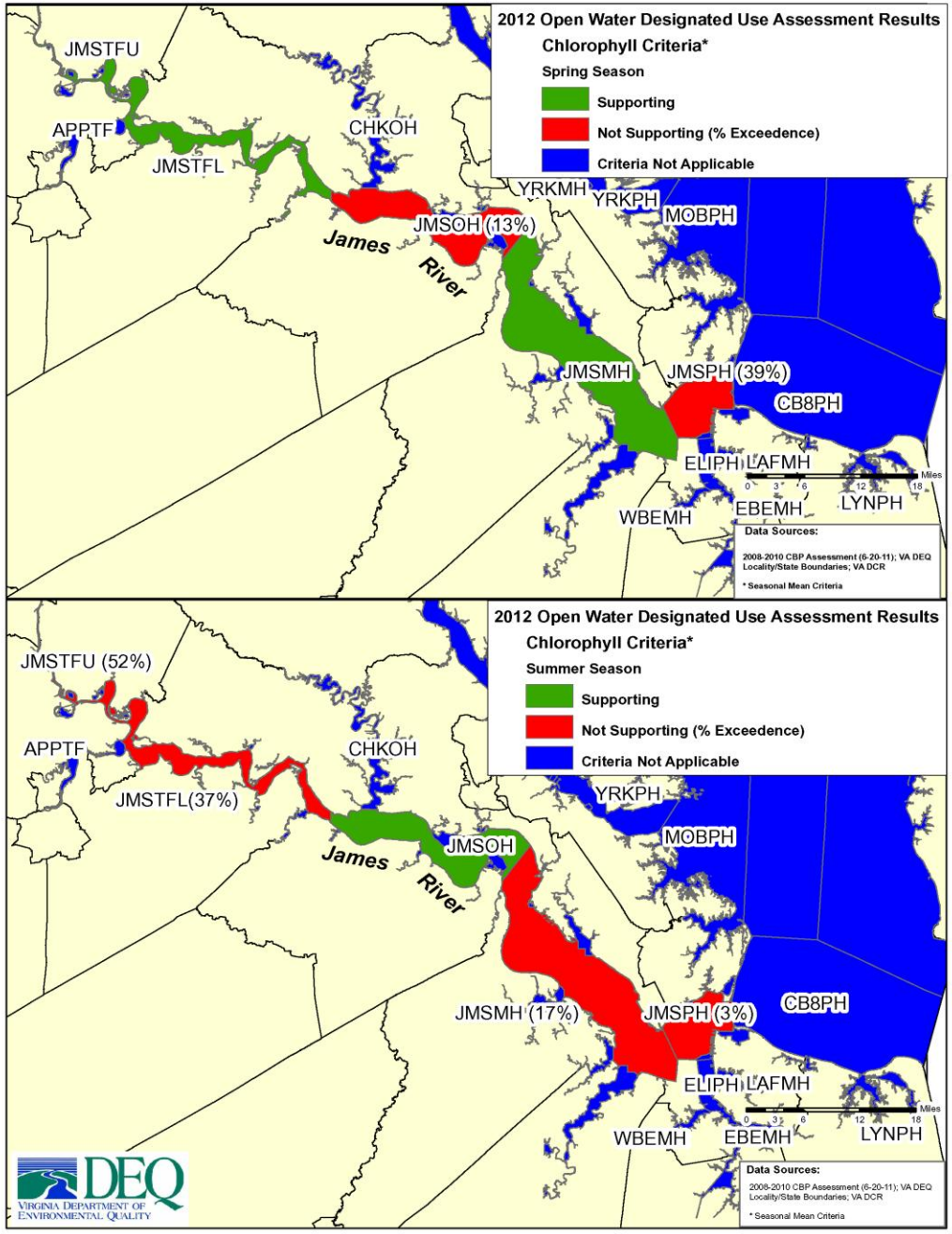
Ches. Bay and Tidal Tributaries:

- Numeric Chlorophyll criteria only apply to the James River
- Criteria were met in:
  - Upper & Lower James during the spring season
  - Middle James during the summer season



Chesapeake Bay TMDL

- Issued December 29, 2010
- Set Jurisdictional Allocations
  - VA
    - TN= 53.42 millions lbs/yr (mpy)
    - TP=- 5.36 mpy
    - Sediments = 2,578.9 mpy
  - James River Watershed (Appendix O)
    - TN=- 23.5 mpy (2003 cap loads = 26.4 mpy)
    - TP = 2.35 mpy (2003 cap loads = 3.41 mpy)
  - Appendix X – Staged Implementation
- Watershed Implementation Plan I
  - Study Plan for review and update of James River Site-specific Numeric Chlorophyll-a Water Quality Criteria (Appendix 2)