Shallow Water Workshop Introduction: Developing Case Options and Implications for Assessing the Open Water Designated Use

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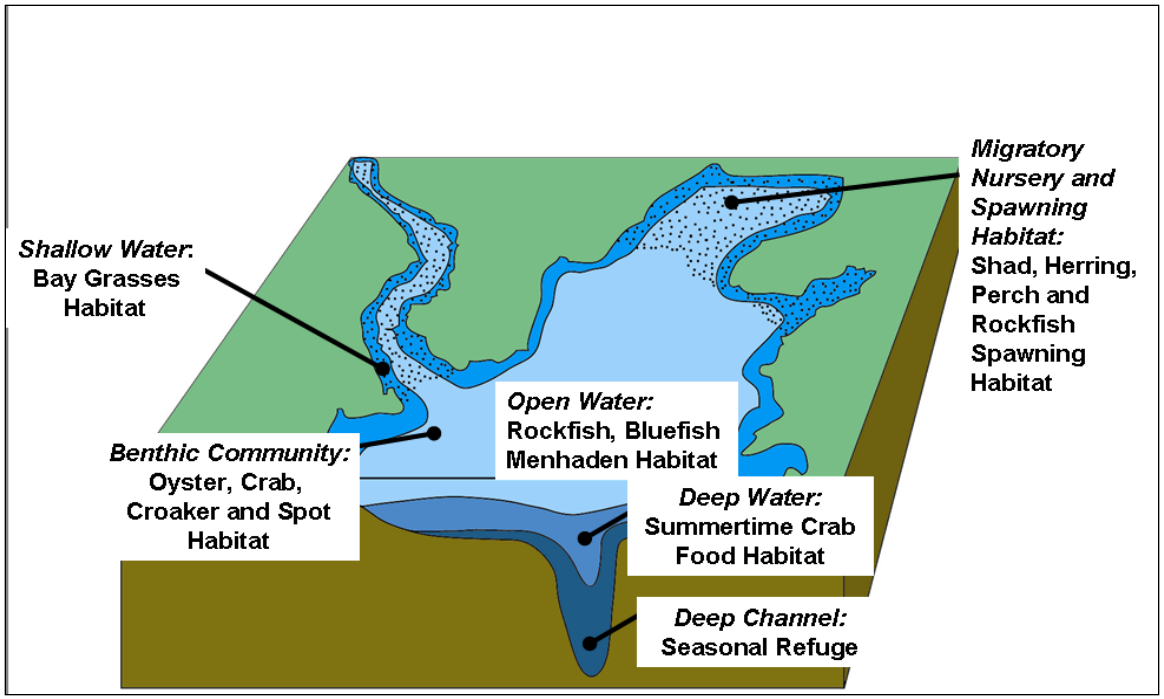
Why we are here

- Interest expressed in possibly assessing shallow water habitat separately from offshore habitats for dissolved oxygen criteria attainment:
  - Monitoring Realignment (MRAT process)
  - Umbrella Criteria Assessment Team
  - CBP-STAC workshop 2011

- Workshop Goals:
  - Review analyses that inform us on the issue
  - Develop a case for each of 3 open water assessment options.
    - Highlight their monitoring and management implications.

Summer Season
Open Water Designated Use

- *From June 1 through September 30 the open-water designated use included tidally influenced waters extending horizontally from the shoreline to the adjacent shoreline.*



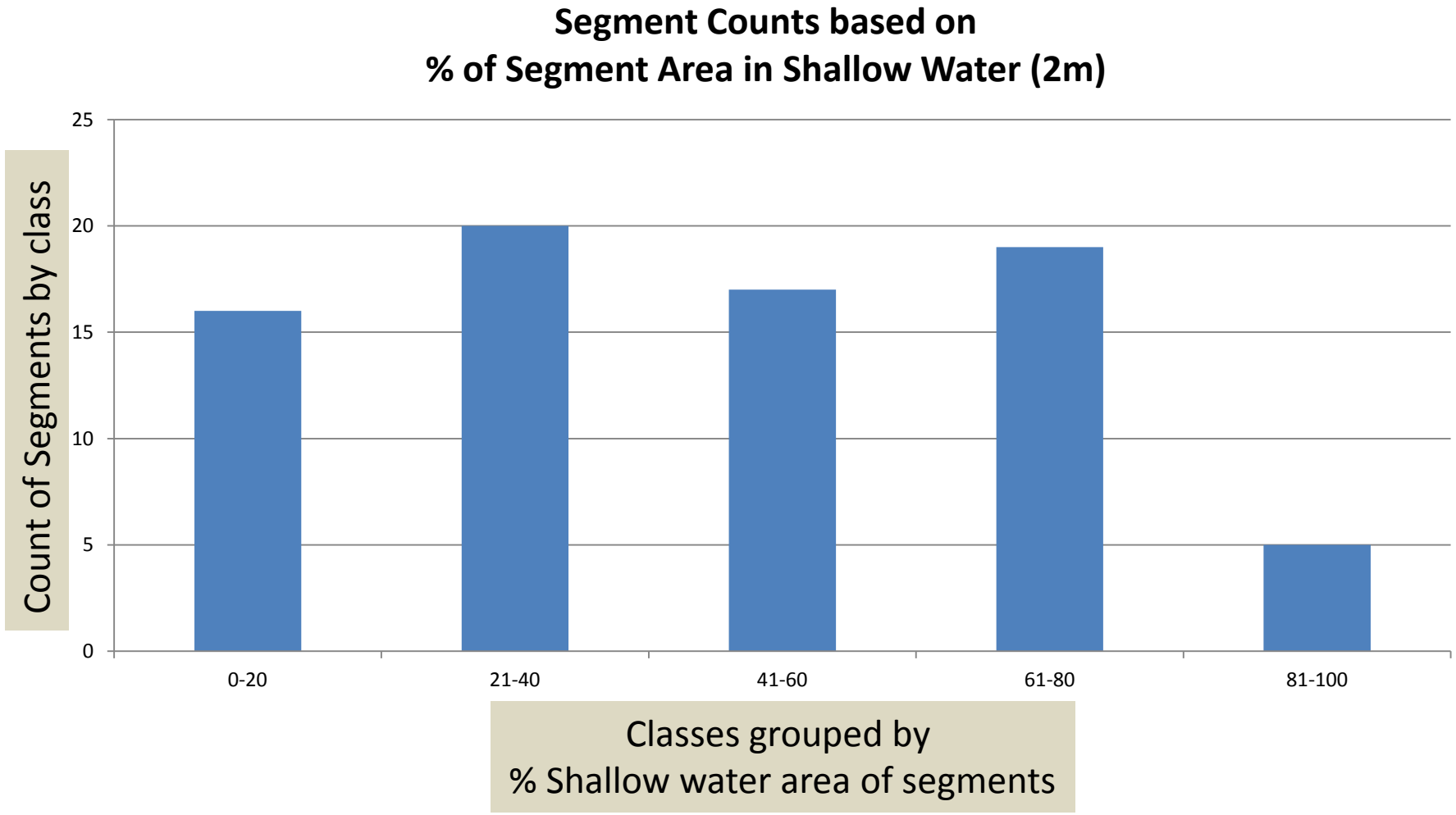
U.S. EPA 2003

- Insufficient information was available regarding differences in dissolved oxygen dynamics between offshore and shallow, nearshore habitat to support separating the two habitats into their own designated use assessments.

Chesapeake Bay Program Interest In Understanding Shallow Water Habitat Conditions

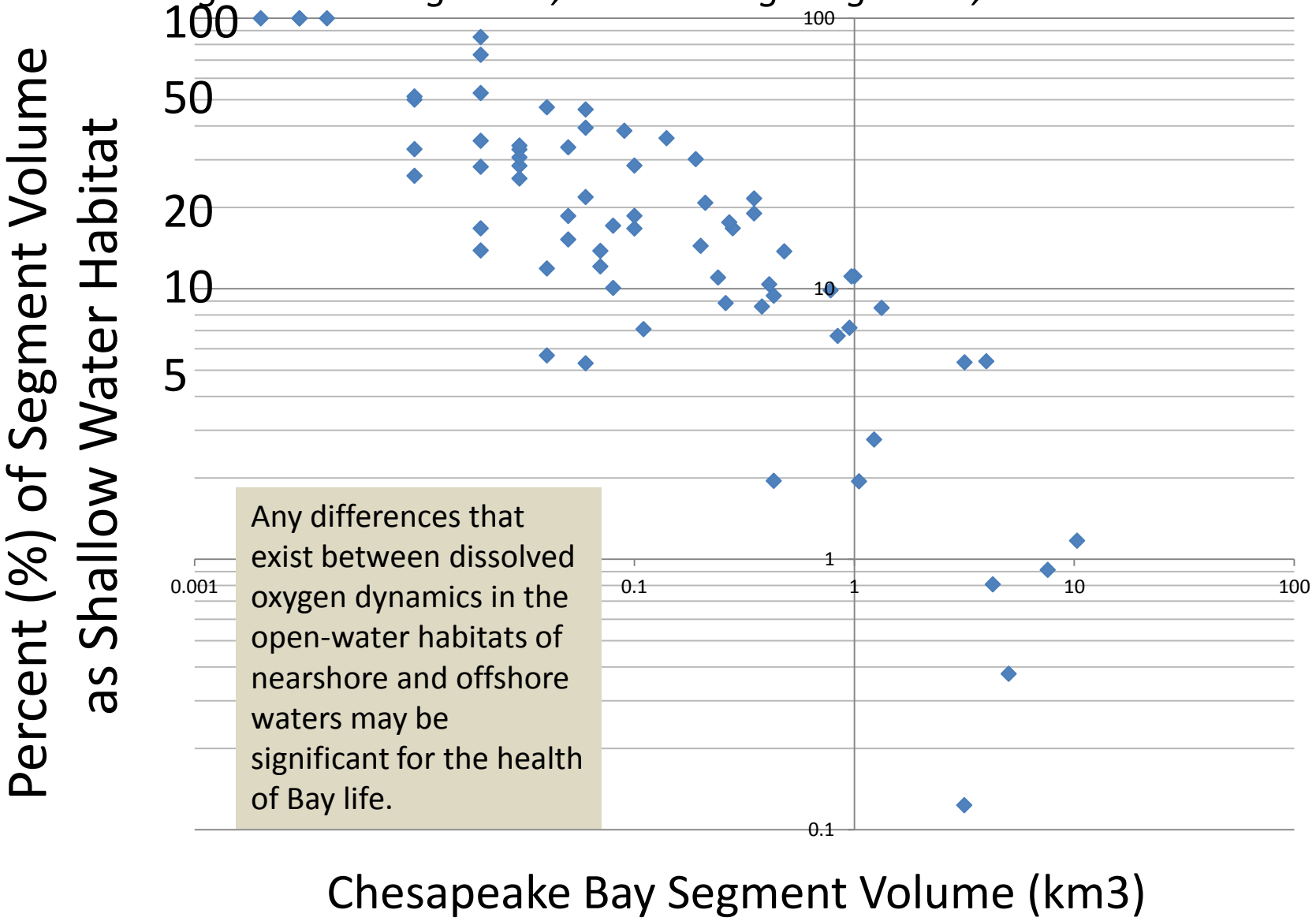
- Batiuk et al. 2000 SAV Technical Synthesis
  - Includes synthesis of mid-channel to nearshore water quality comparisons
- CBP Water Quality Monitoring Programming Changes 2003-04:
  - Defunded Zooplankton Monitoring
  - Funded new Shallow Water Monitoring Program
    - Fixed site continuous monitoring
    - DATAFLOW

Many Segments have large areas of Shallow water habitat



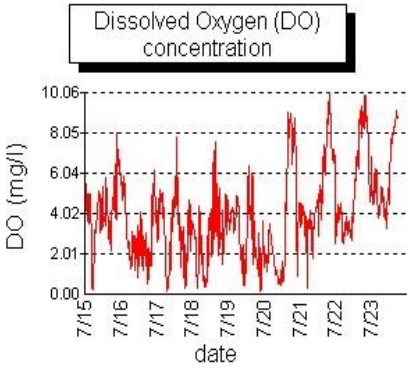
The Importance of Shallow Water in Chesapeake Bay

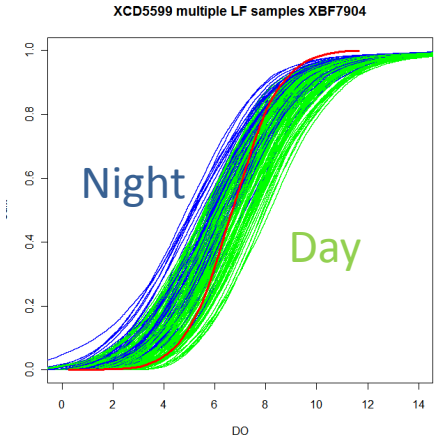
The percent of shallow water habitat is
large in small segments, small in large segments, overall abundant

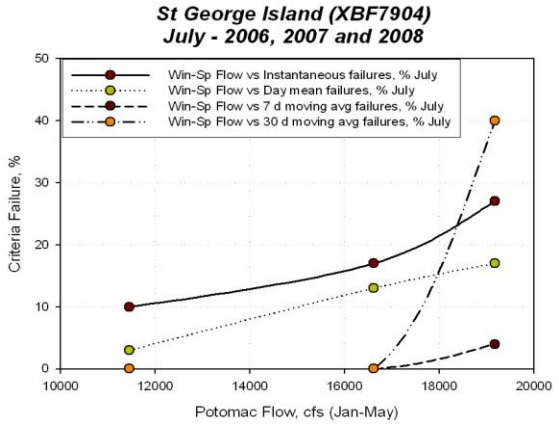


Umbrella Criteria Assessment Team Shallow water Characterization of Dissolved Oxygen Behavior

- Intrasite variability
  - Low DO events, Duration of events, day vs. night
- Intersite variability
  - Changes along condition gradients
- Seasonal variability
- External factors
  - River flow, eutrophication, temperature, solar angle

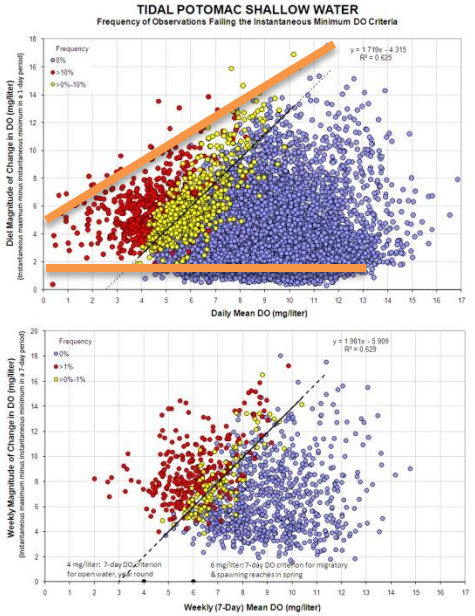






General Comparisons of Offshore – Nearshore Dissolved Oxygen Behavior

- As 30-day mean DO concentrations increase, variability in DO concentrations increase.



C. Buchanan

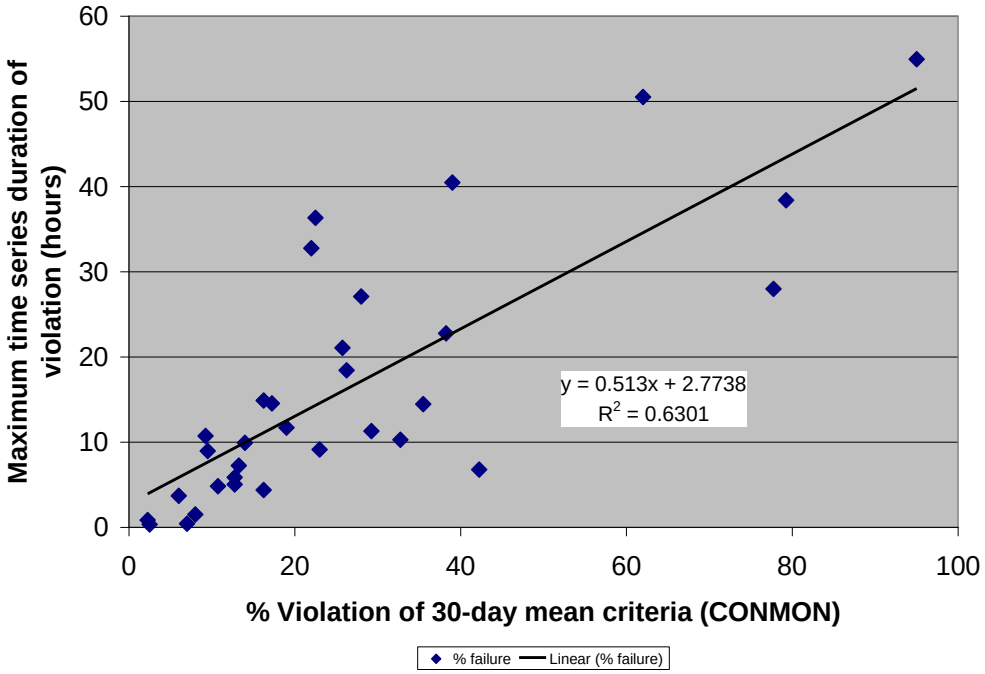
- As the summer 30-day mean increases, the probability of violating shorter duration criteria declines

sensor depth	6	5	4	3
Monthly Mean DO	5.0058	5.6732	6.3407	7.0082
7 day criterion failure rate	16.6%	5.5%	1.5%	0.5%
rate of instantaneous criterion > 10%	47.6%	32.5%	25.3%	18.5%

E. Perry

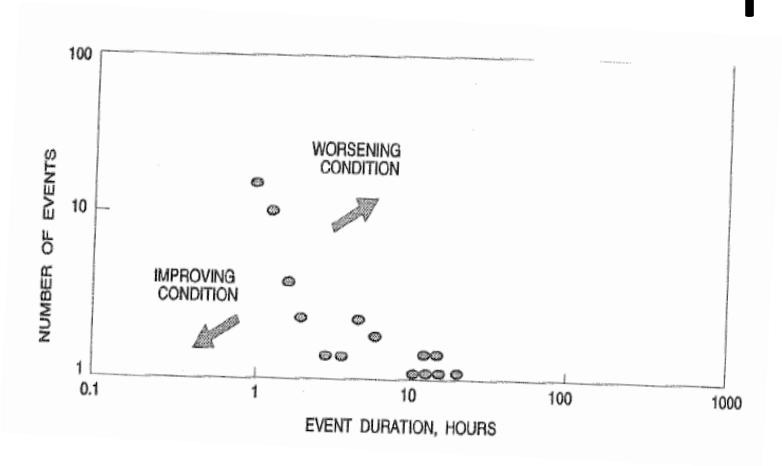
General Comparisons of Offshore – Nearshore Dissolved Oxygen Behavior

- As violation rates increase, duration of hypoxic/anoxic events increase
- (IMO: This is an underlying premise of the TMDL)



Hall/Boynton data

Nearshore and Offshore DO behaviors may not be identical but appear parallel



Jordan et al 1992

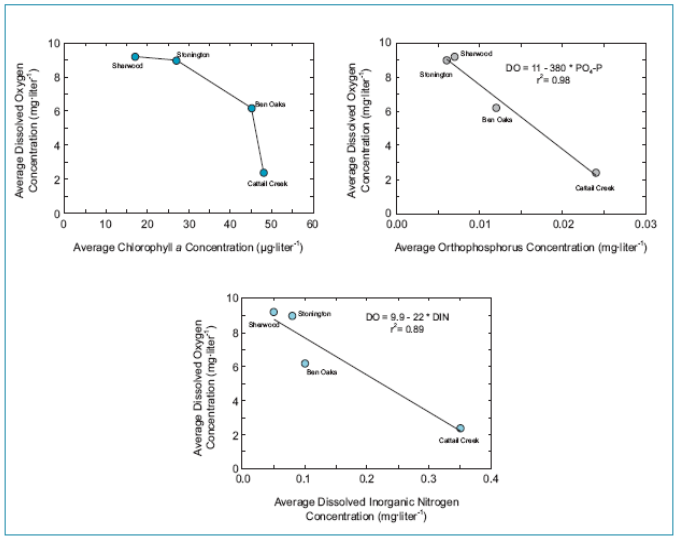
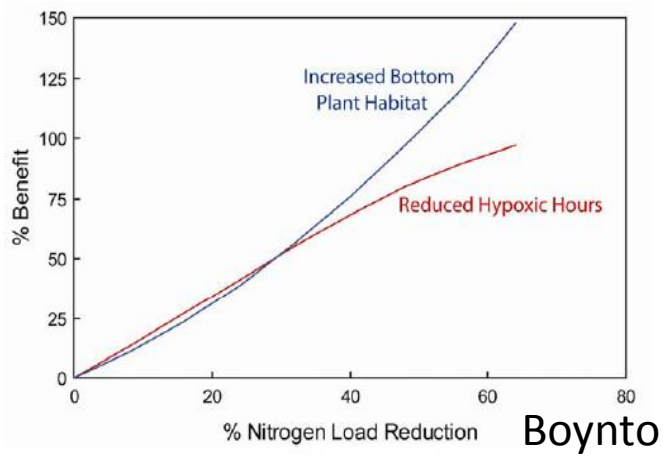


Figure IV-11. Significant relationships among average concentrations of the continuous monitoring surface chlorophyll *a*, orthophosphorous, and dissolved inorganic nitrogen data versus dissolved oxygen concentrations for the tidal Magothy and Severn rivers.

T. Fisher



Boynton et al.

Workshop Challenge:

Develop the language and highlight the support behind 3 cases for policy makers to consider in assessing the open water designated use

- The case for keeping shallow water embodied within the open water designated use

- The case for separating shallow water as a dissolved oxygen based sub-segment in the open water designated use.
  - I. Setting the offshore/nearshore boundary – what separates shallow water from offshore water for dissolved oxygen assessments
  - II. Same criteria, separate criteria – what are they and why?
  - III. Applicable seasons and definitions
  - IV. Monitoring
  - V. Assessment

- The case for only assigning subsegmentation of shallow water habitat in special cases

- Include Management Implications of the three cases.
- Indicate other analyses we may like to provide supporting information to any or all cases.