

## **Relationships between Concentrations of Phytoplankton Chlorophyll *a* and Total Nitrogen in Ten U.S. Estuaries**

Edward H. Dettmann

U.S. Environmental Protection Agency, Office of Research and Development, NHEERL,  
Atlantic Ecology Division, 27 Tarzwell Dr., Narragansett, RI 02882.

This presentation focuses on the summertime response of phytoplankton chlorophyll to nitrogen concentrations in the upper water columns of ten U.S. estuaries. Using publicly available data from monitoring programs, regression relationships have been developed between summer surface concentrations of phytoplankton chlorophyll *a* and total (inorganic + organic) nitrogen (TN) for four estuarine embayments and six riverine estuaries on the U.S. Atlantic and Gulf of Mexico coasts. All systems show spatial gradients in chlorophyll *a* and nitrogen concentrations, and regressions over all stations within each estuary reveal substantial year-to-year variability in relationships between summer chlorophyll *a* and TN. Averaging data by station over several summers gives a measure of the mean response of chlorophyll *a* to TN for individual estuaries over an extended period, and facilitates comparisons among estuaries. Relationships found in this study fall into two classes. Relationships between chlorophyll *a* and TN for the four estuarine embayments are similar, with differences explained by concentrations of total suspended solids (TSS), used as a proxy for water clarity. Relationships between chlorophyll *a* and TN concentrations for the six riverine estuaries are weaker and more system-specific than for estuarine embayments. Unlike the estuarine embayments, these riverine systems exhibit substantial spatial gradients in TSS. When chlorophyll *a* – TN relationships are derived for spatial zones having relatively constant TSS, these relationships strengthen, with differences among most riverine estuaries explained by water clarity, as is the case for estuarine embayments. Included will be discussion of: 1) year-to-year variability in chlorophyll *a*–TN relationships, 2) similarities in long-term chlorophyll *a*–TN relationships among estuaries, and 3) implications of these results for classification of estuaries.

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