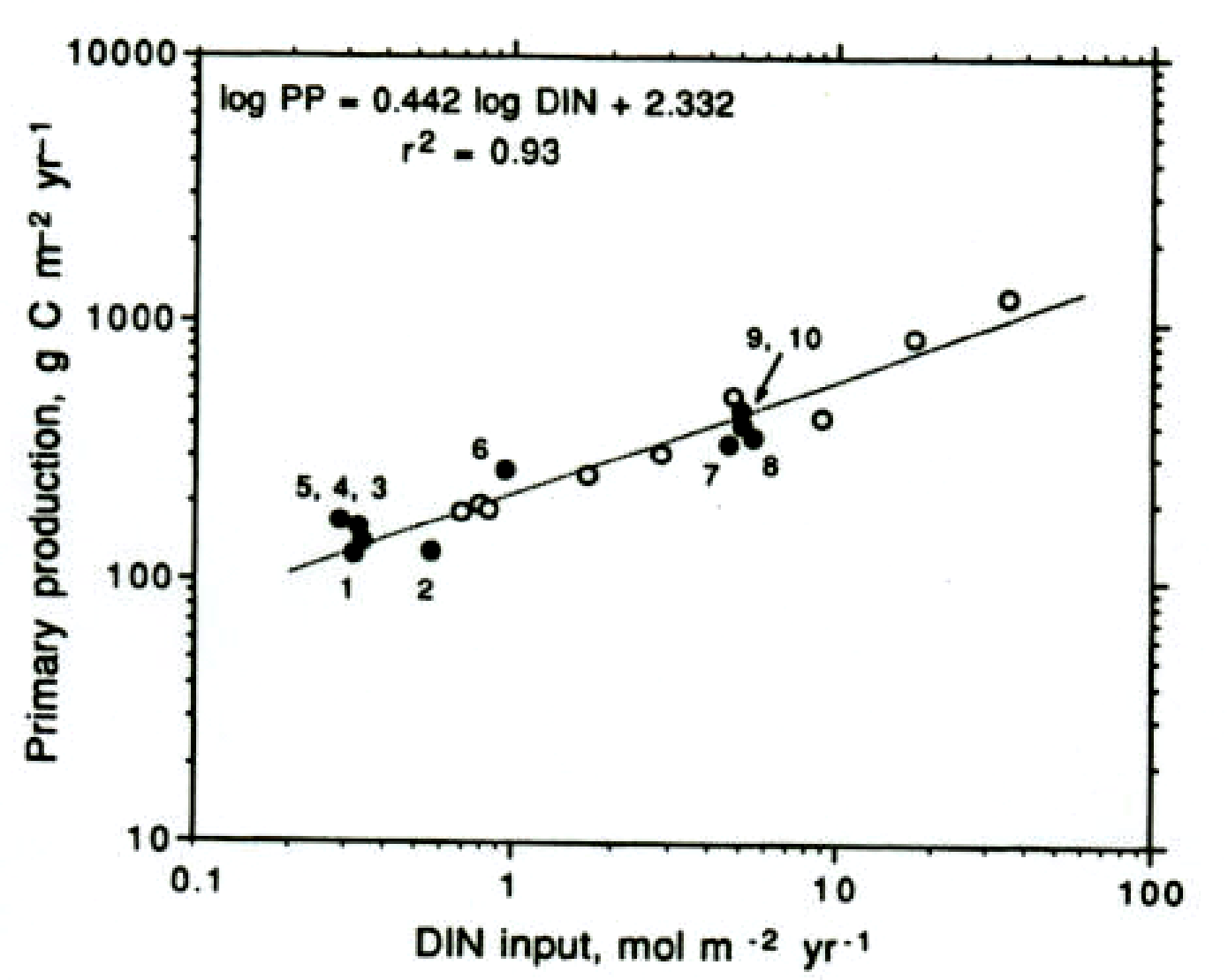
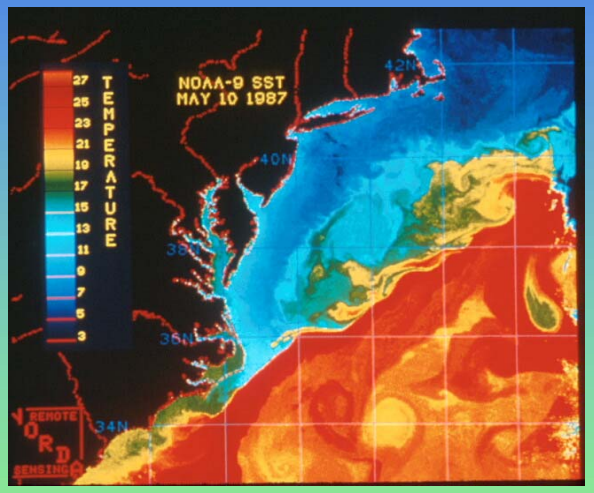
DIN Loading vs. primary production in a range of N. American and European estuaries

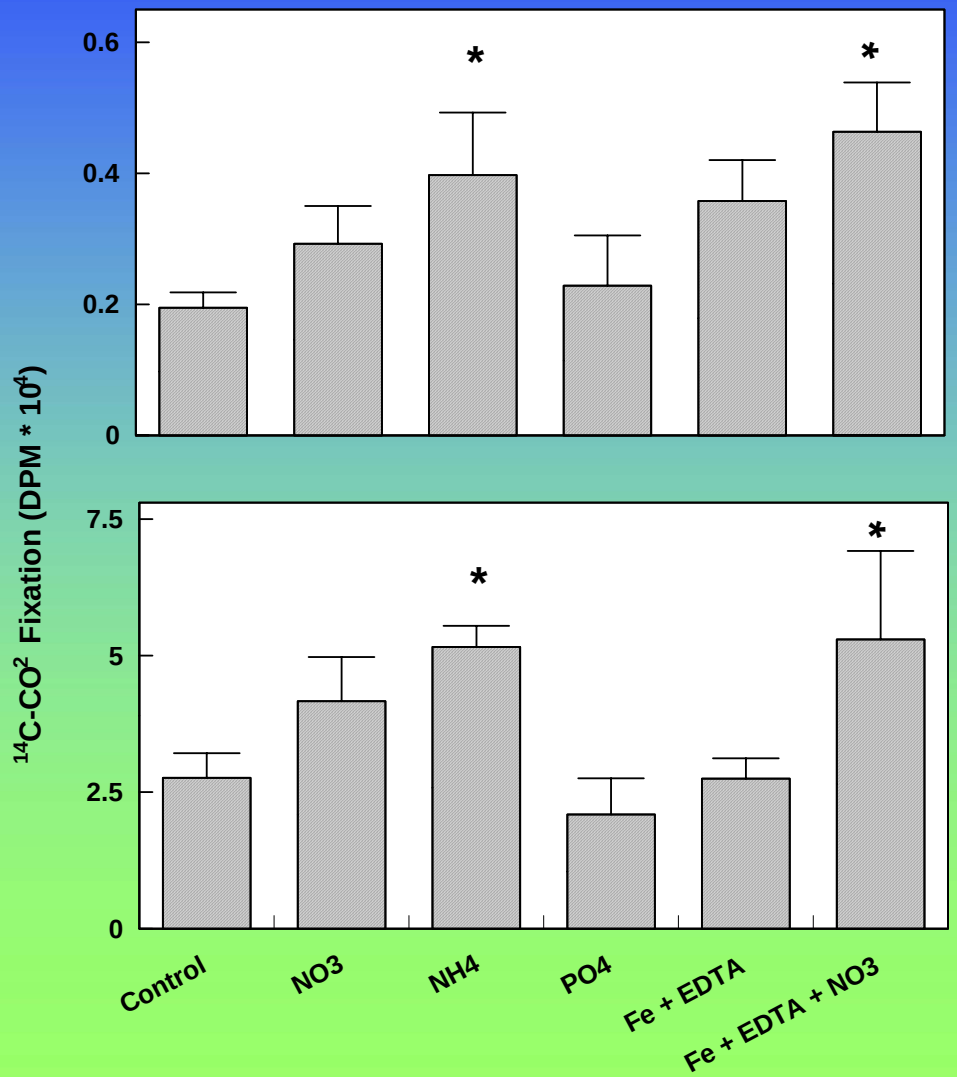


(Nixon 1996)

N stimulation of microbial* primary production in the Coastal W. Atlantic Ocean

70% is in 0.45– 60 μm fraction



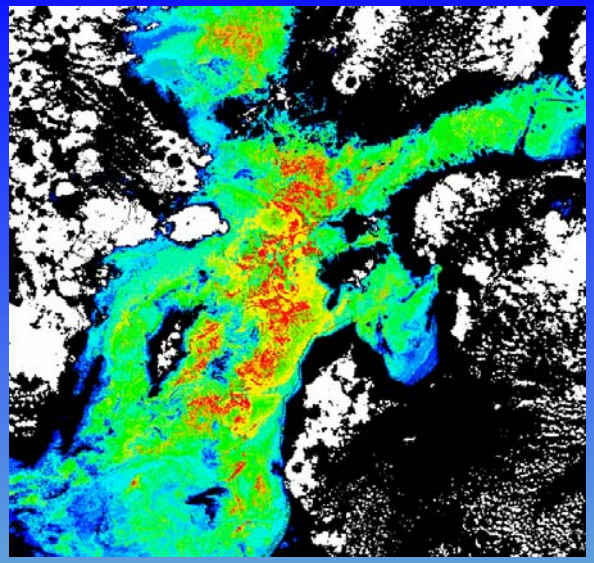


Gulf Stream

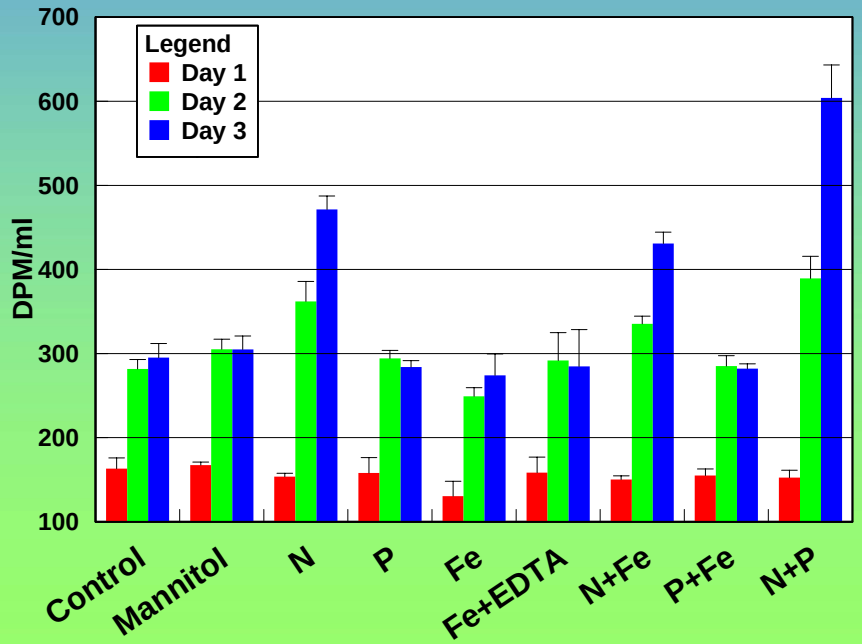
Inshore

Paerl et al., 1999

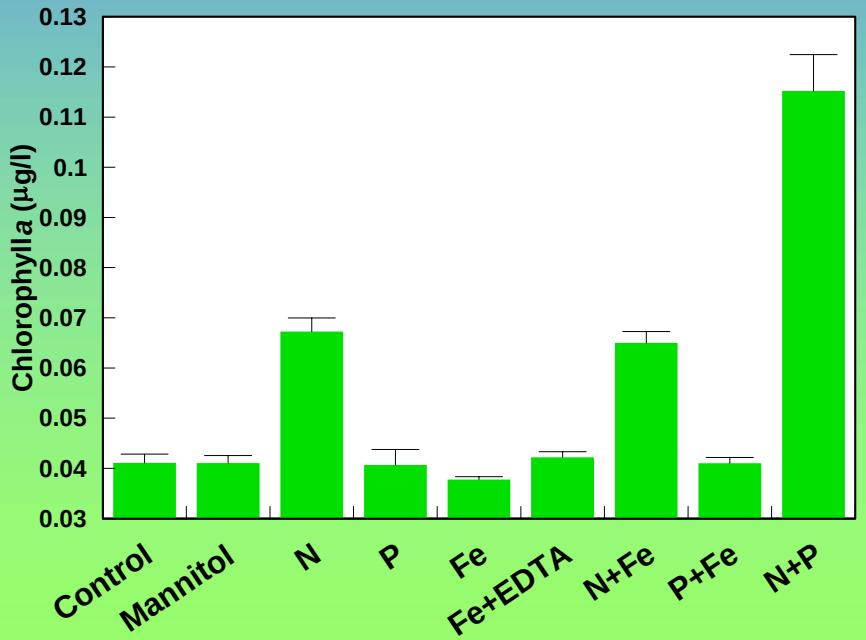
N (+P) stimulation of primary production in the brackish Baltic Sea



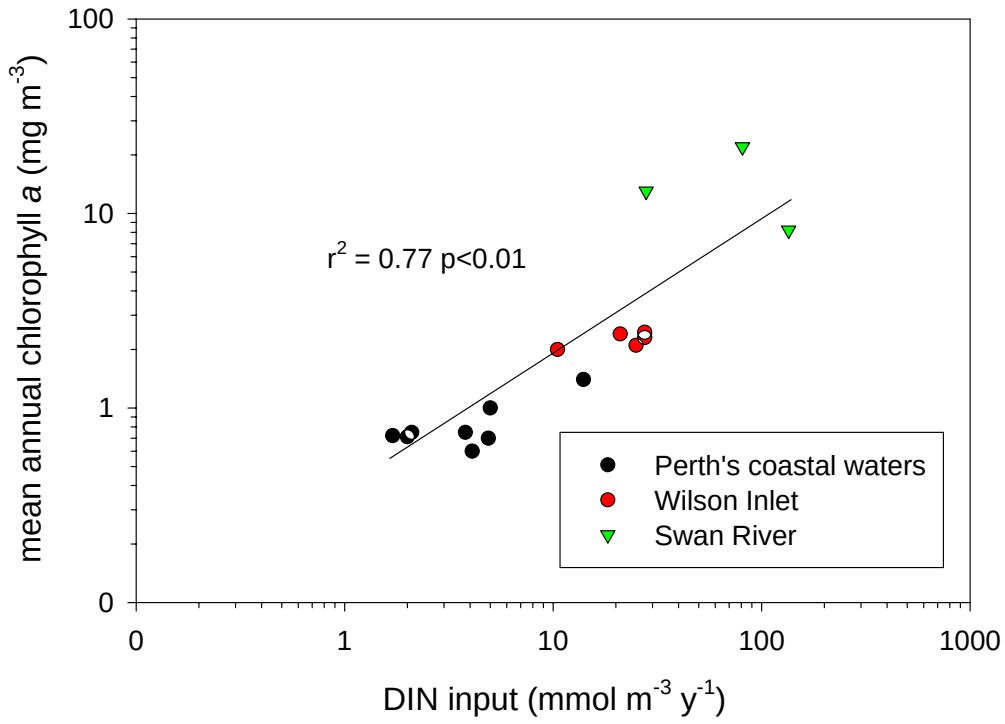
Baltic Sea 2000, Bioassay A
Primary Productivity



Baltic Sea 2000, Bioassay A
Chlorophyll

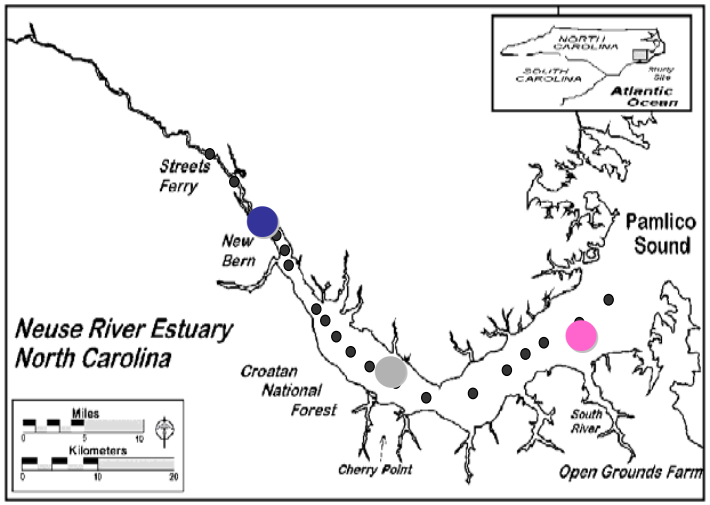


DIN input v. chlorophyll *a* in Australian Estuaries

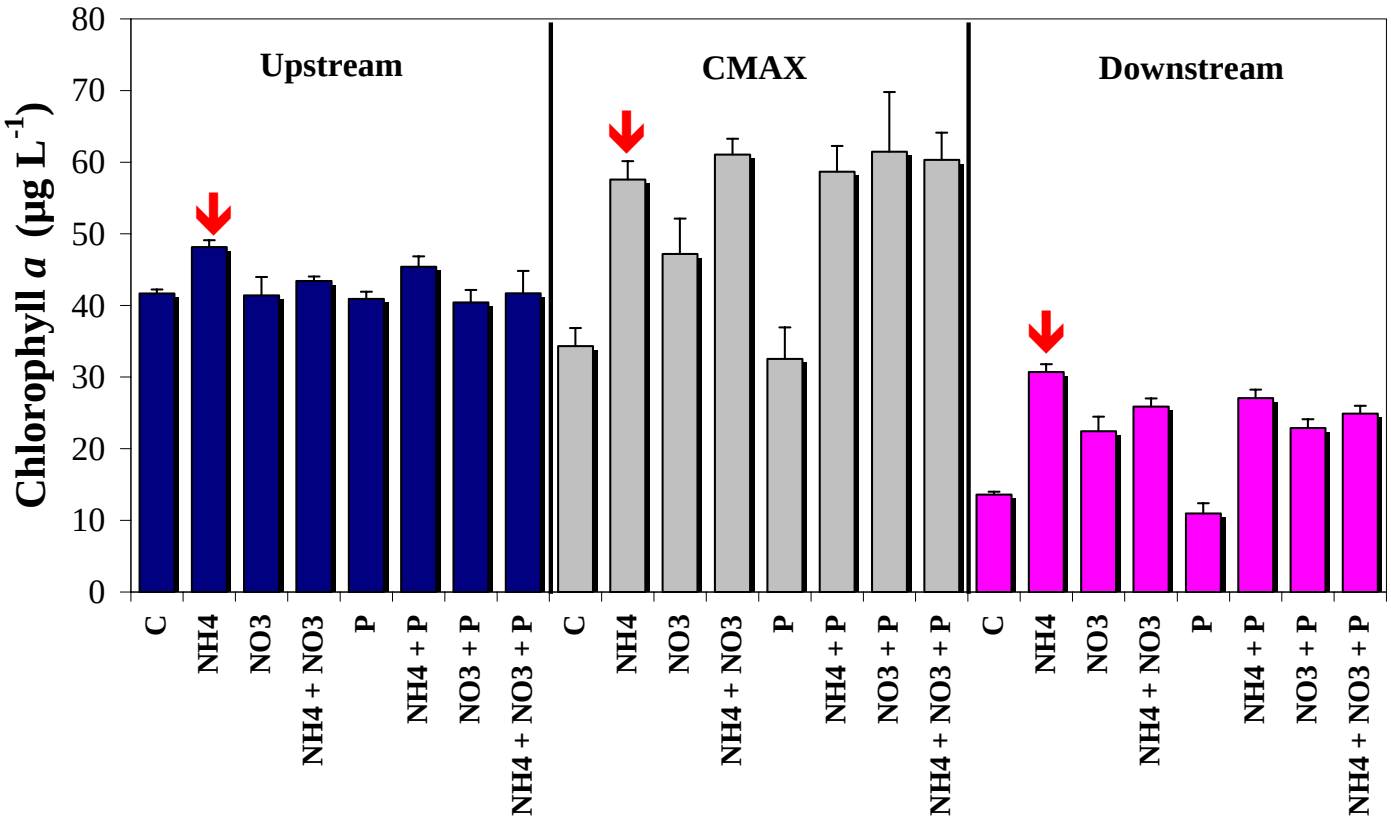


Twomey 2001

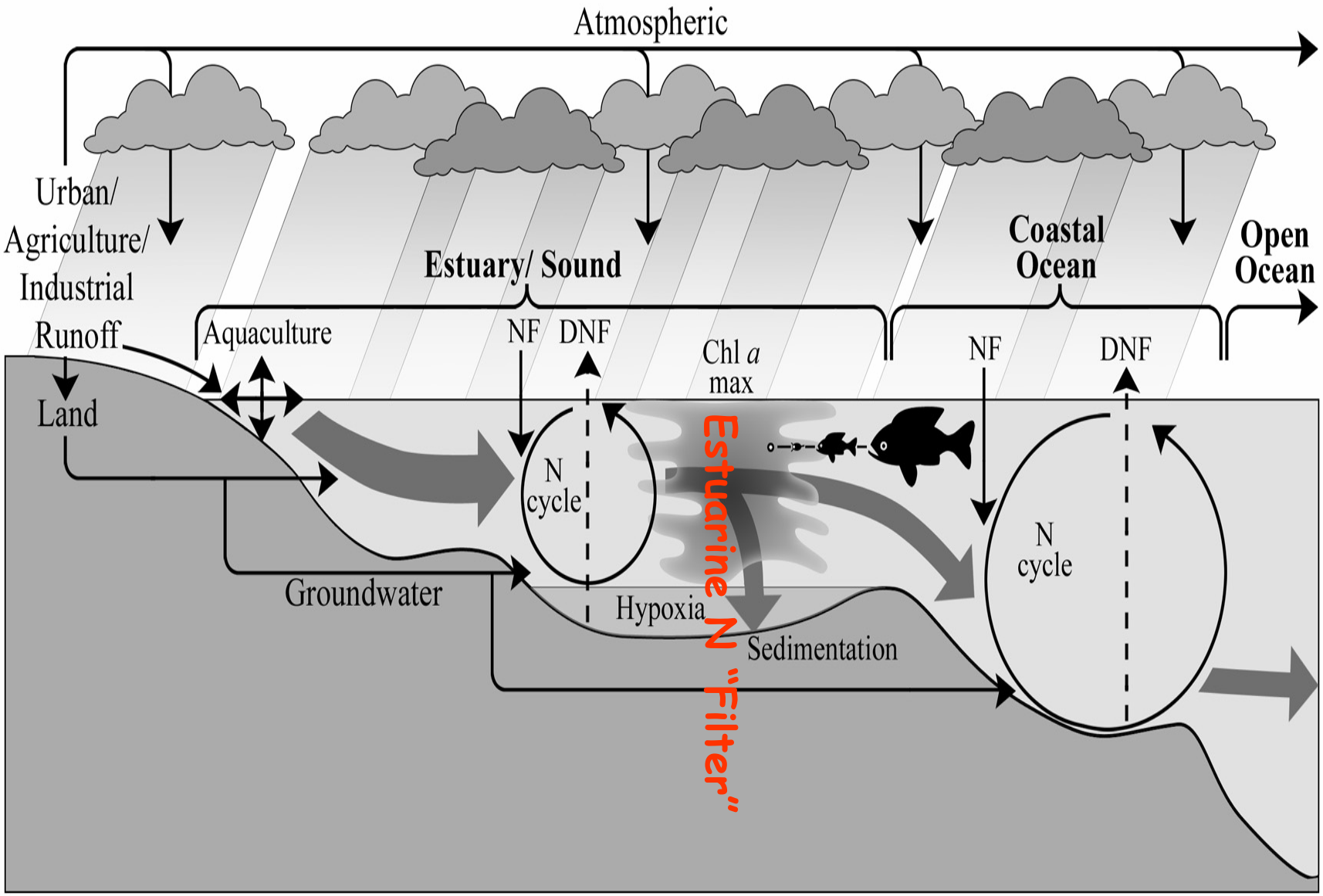
Ammonium is a preferred N source by phytoplankton



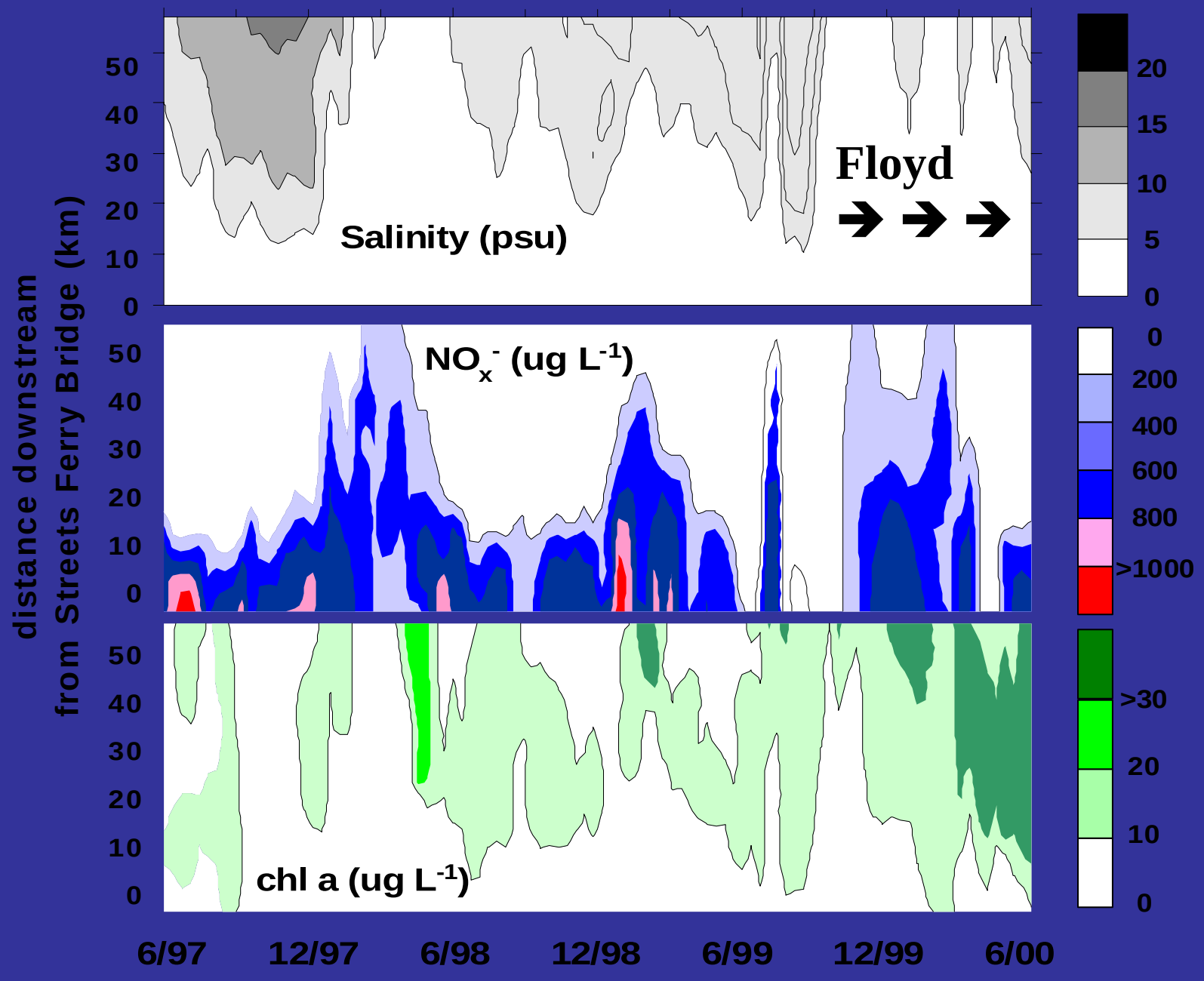
Nutrient Addition Bioassay Experiment, T1
Neuse River, July 2003



Atmospheric N inputs can bypass the estuarine N "filter"



ModMon: linking nutrient inputs to Algal Production (Chl a) in N the Neuse R. Estuary

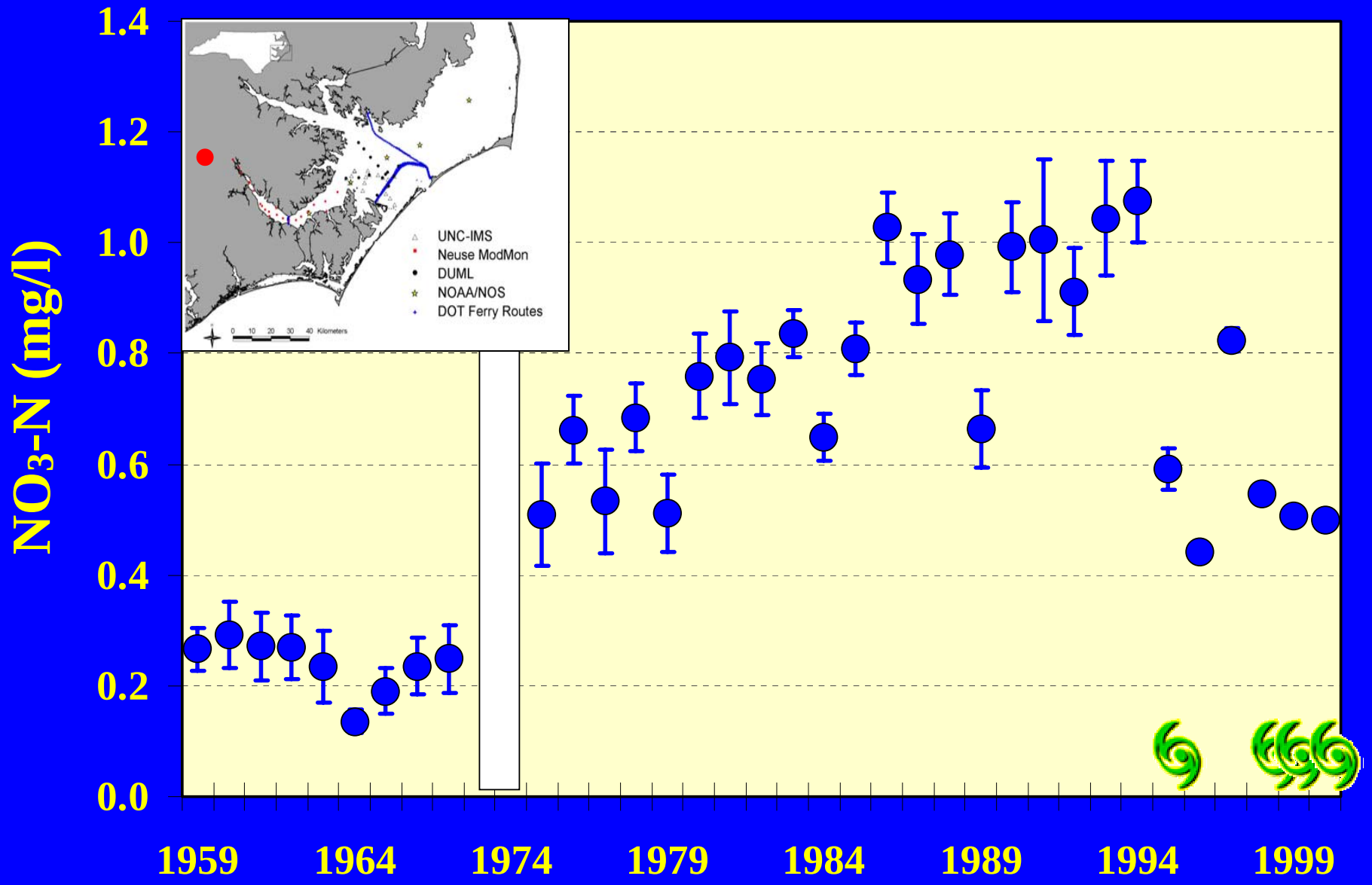


Importance of long-term, integrated monitoring data sets

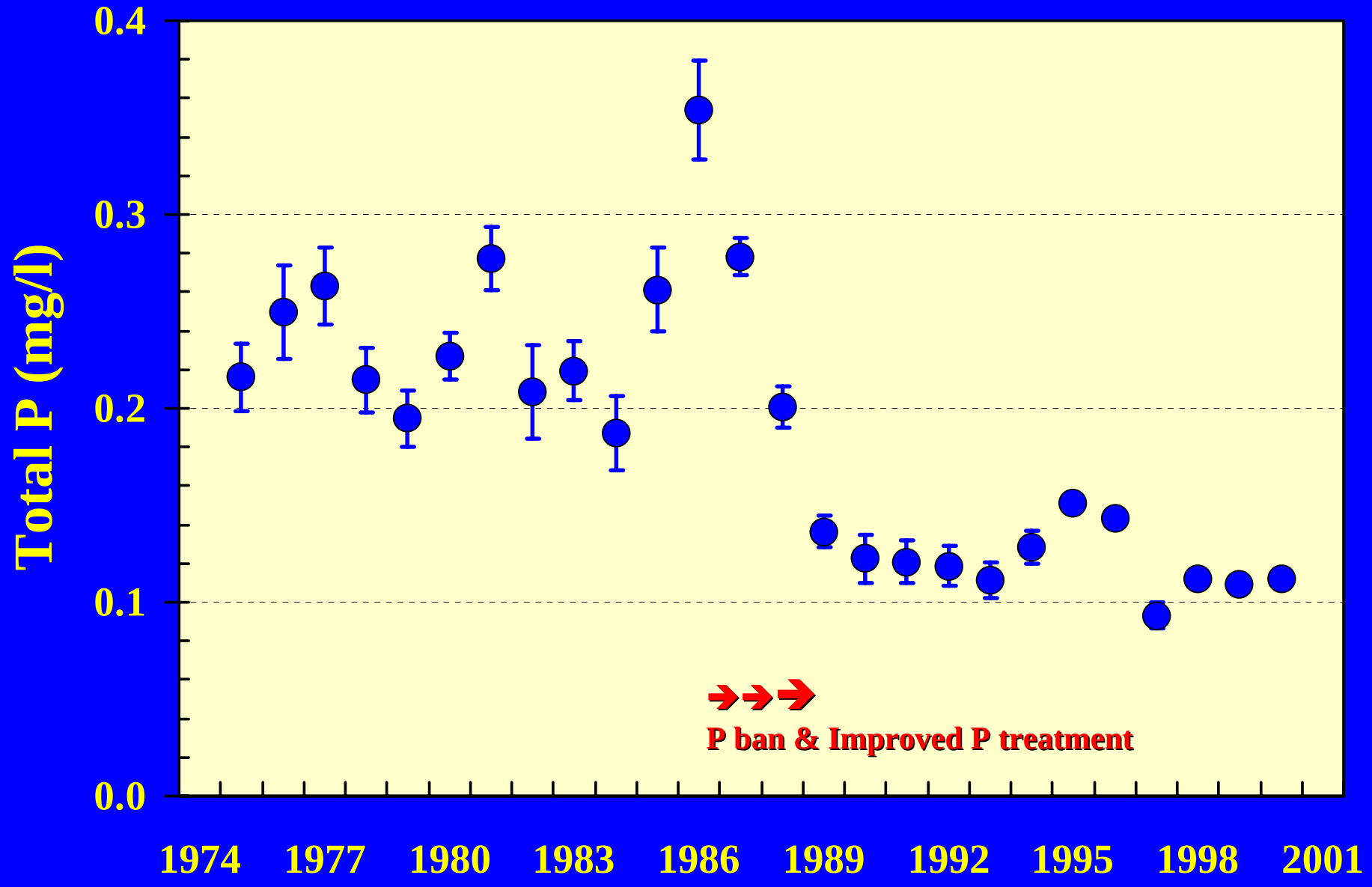
Clarifying impacts of nutrient loads on Eutrophication of the Neuse

1. How did we get there?
2. Evaluating management actions
3. Gauging progress
4. Formulating Long-term nutrient management

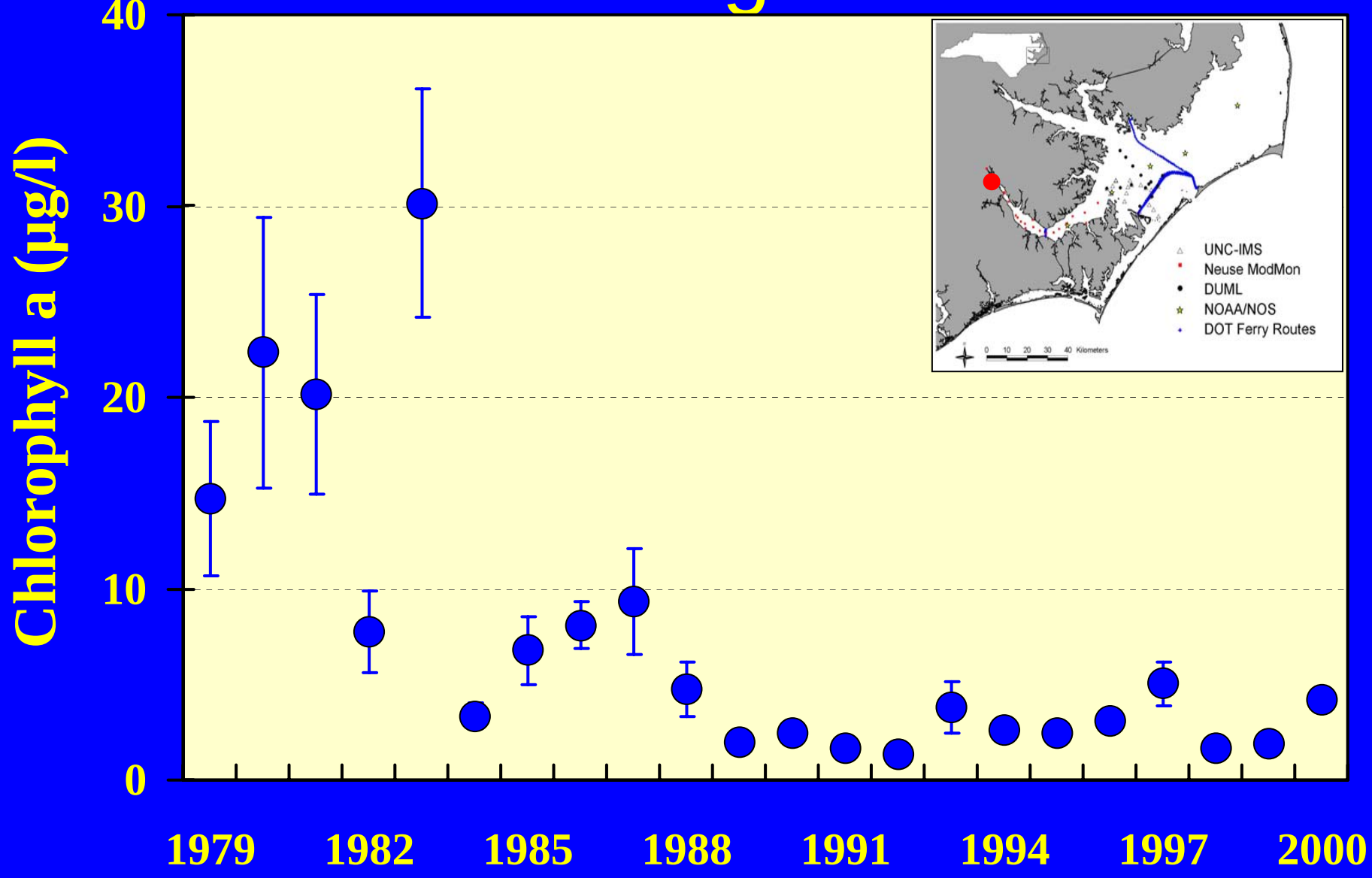
Neuse River @ Kinston



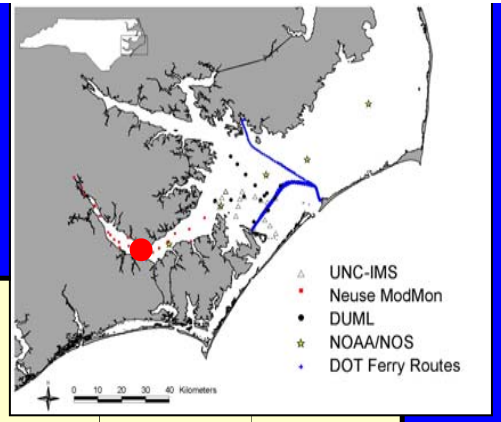
Neuse River @ Kinston

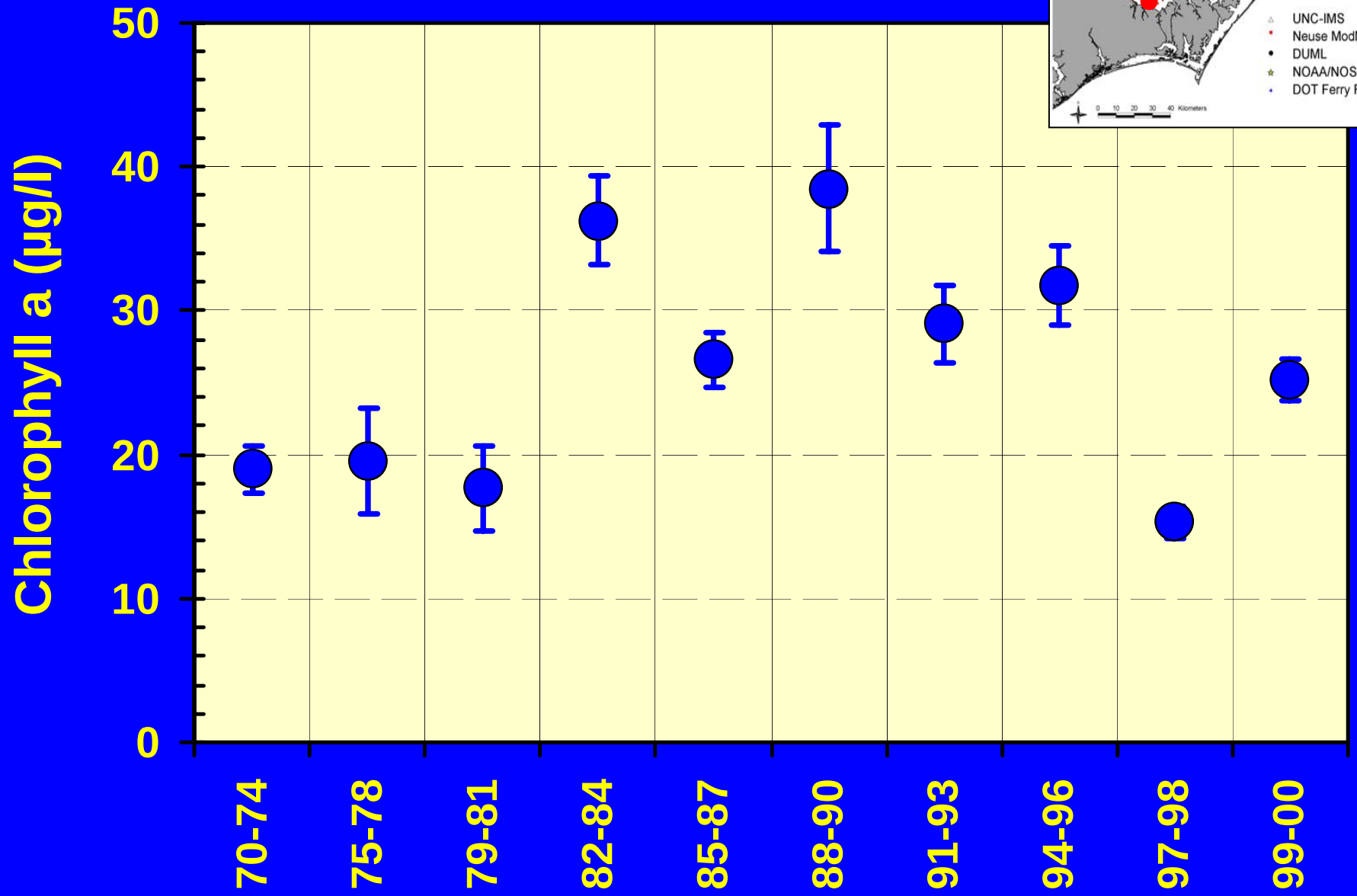


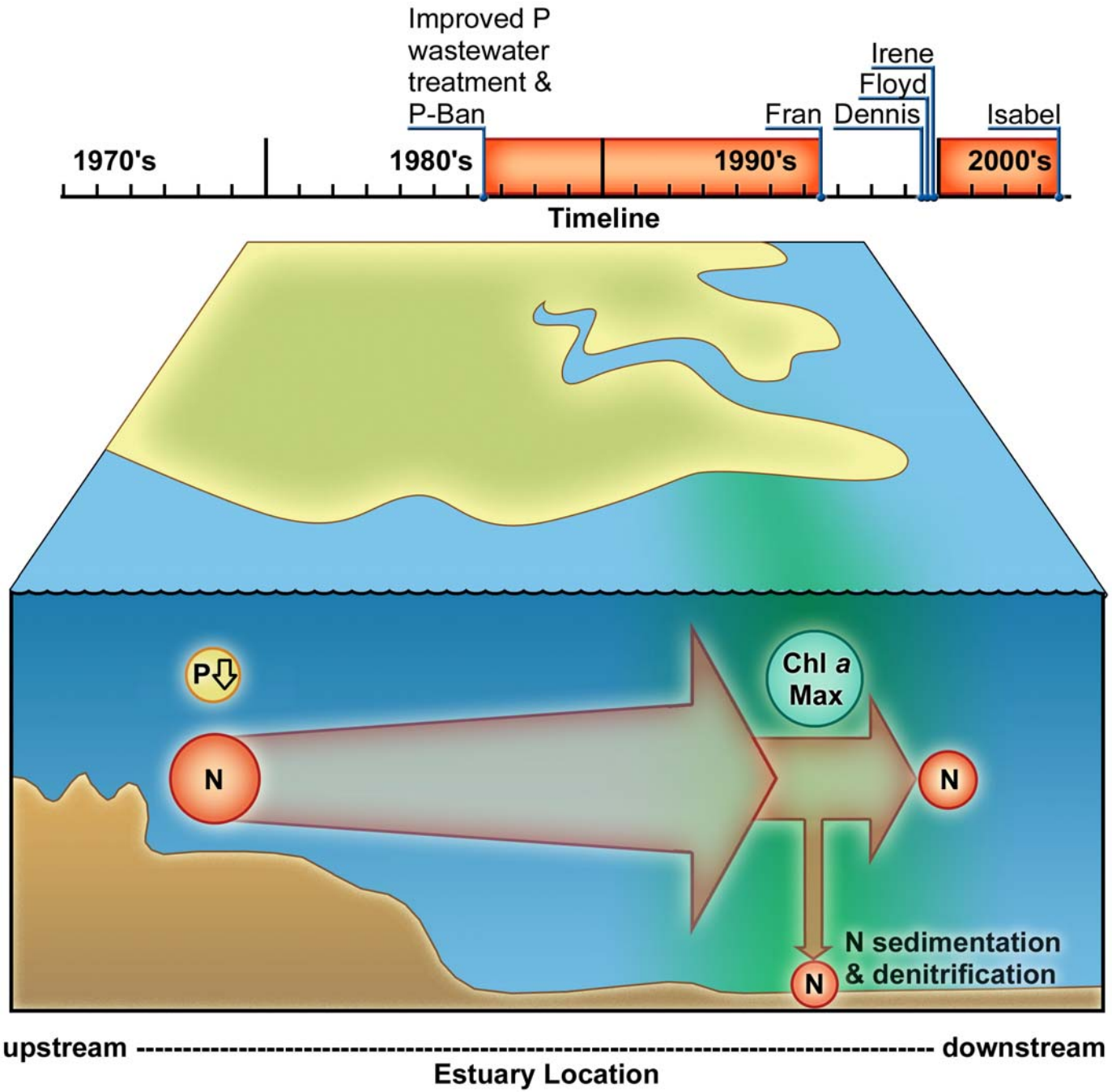
Neuse River @ Streets Ferry Bridge



Neuse Estuary @ 2-7 psu







Paerl et al. ES&T 38:3068-3073 (2004)