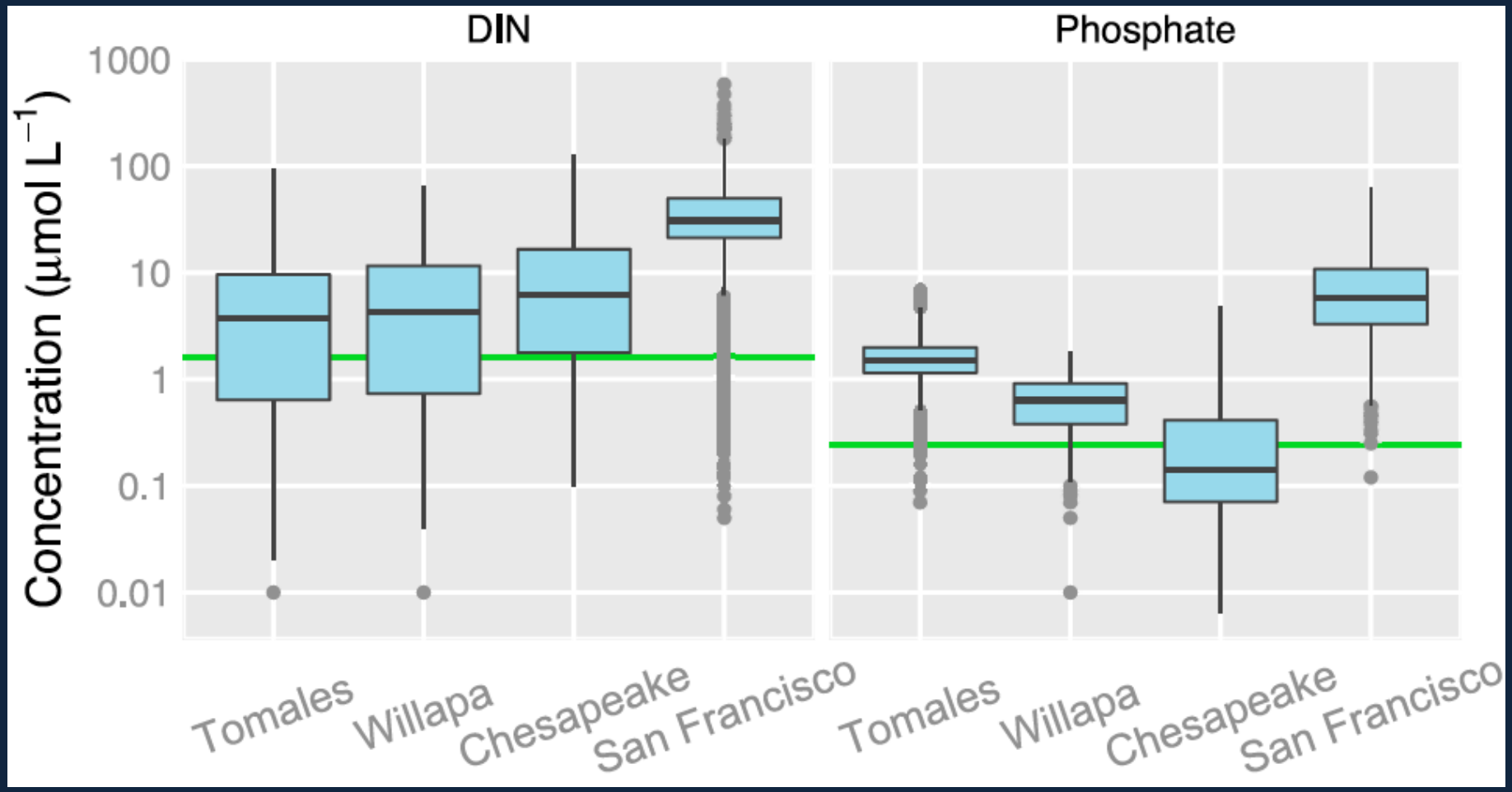
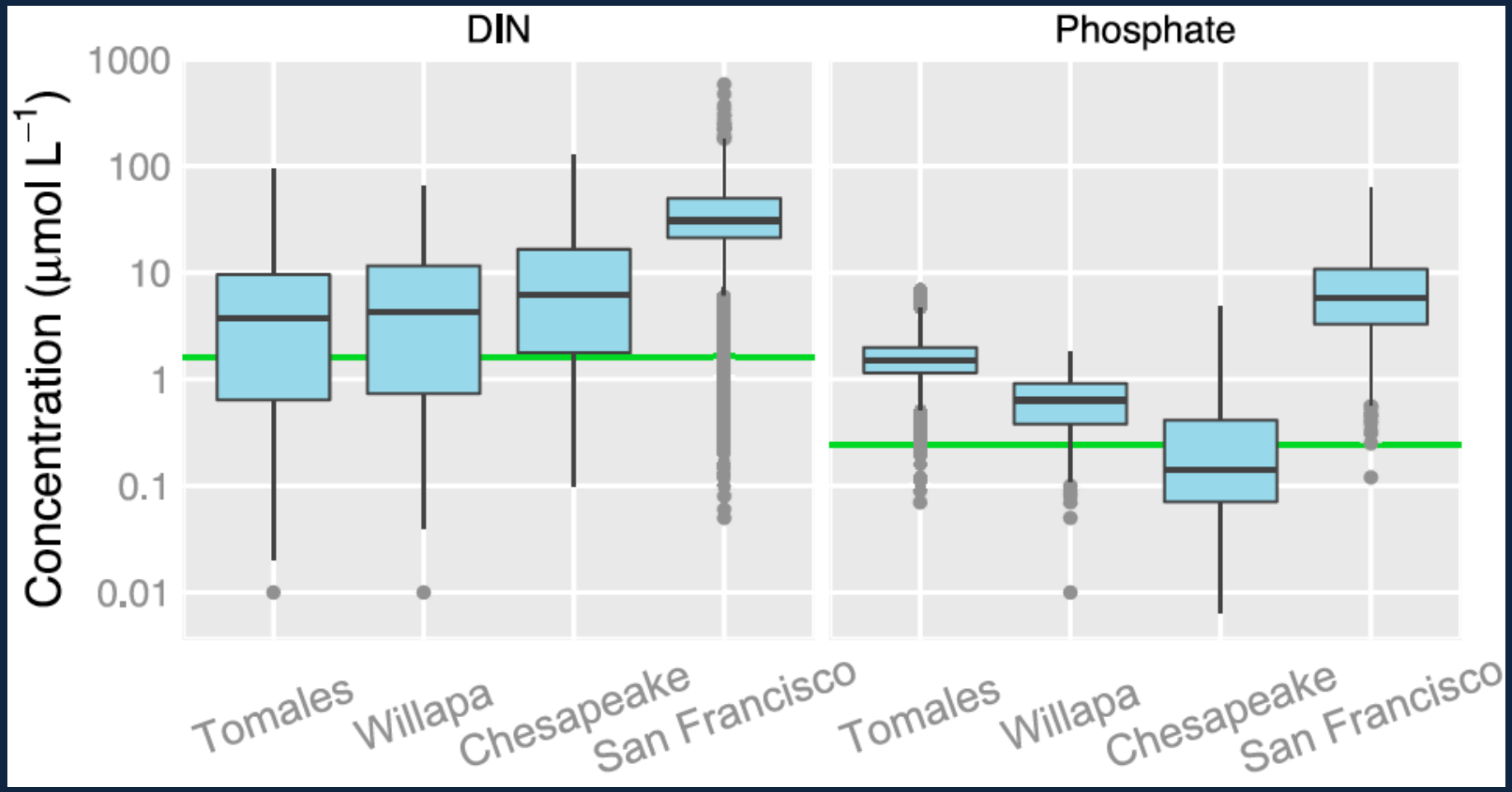
San Francisco Bay -- High N and P Concentrations

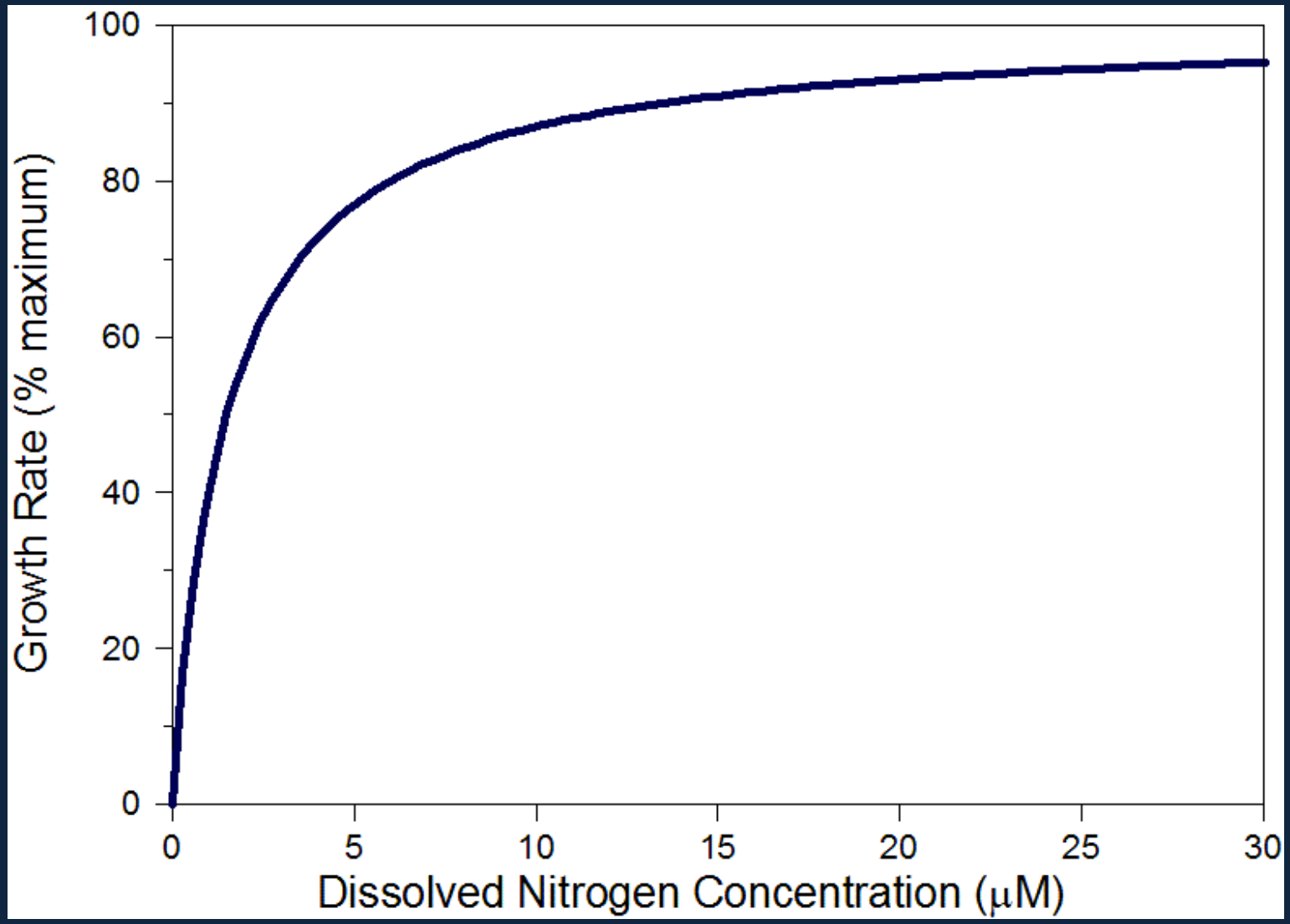


San Francisco Bay -- High N and P Concentrations

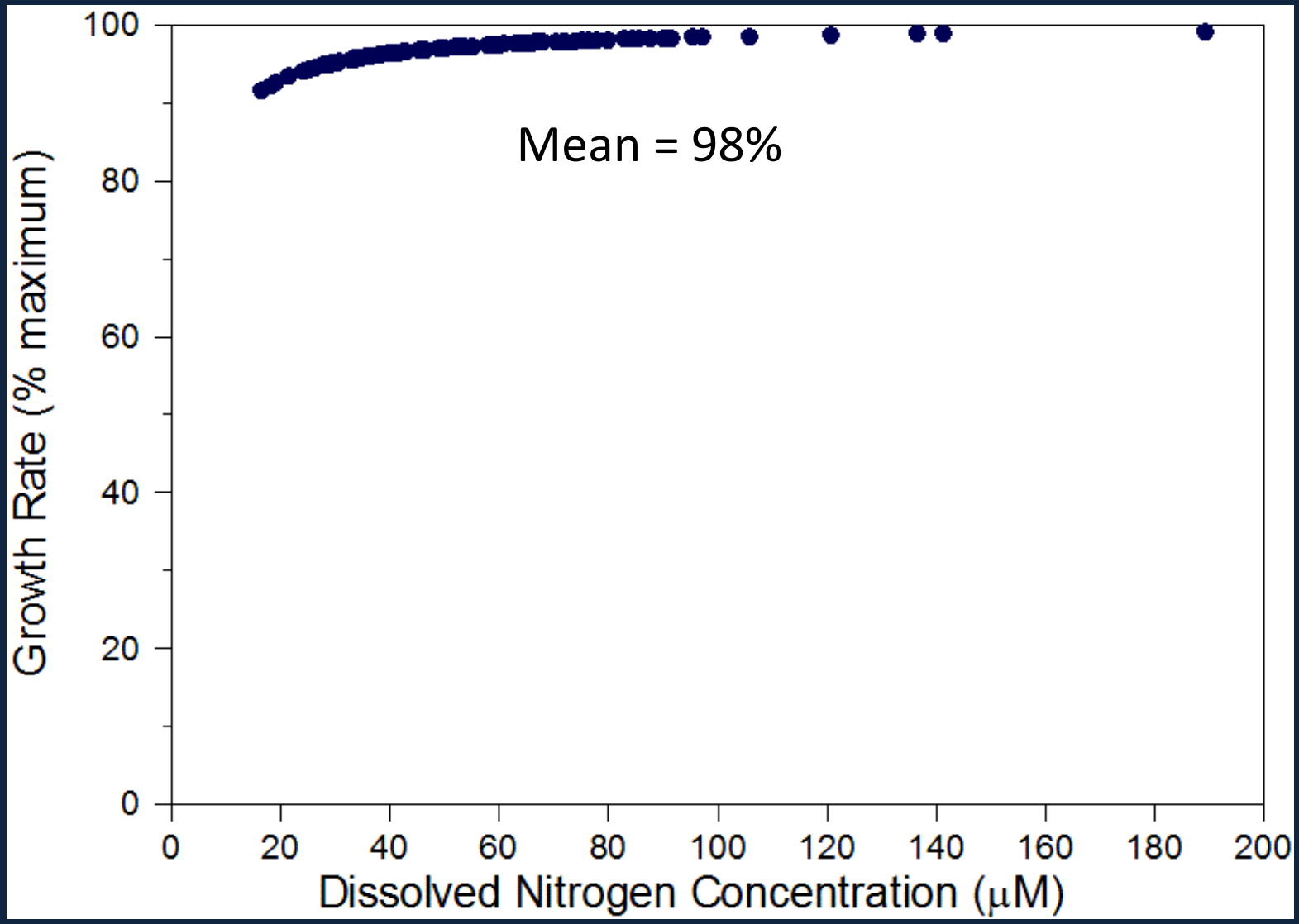


Nutrients → Phytoplankton

Phytoplankton Growth Rate vs. N Concentration

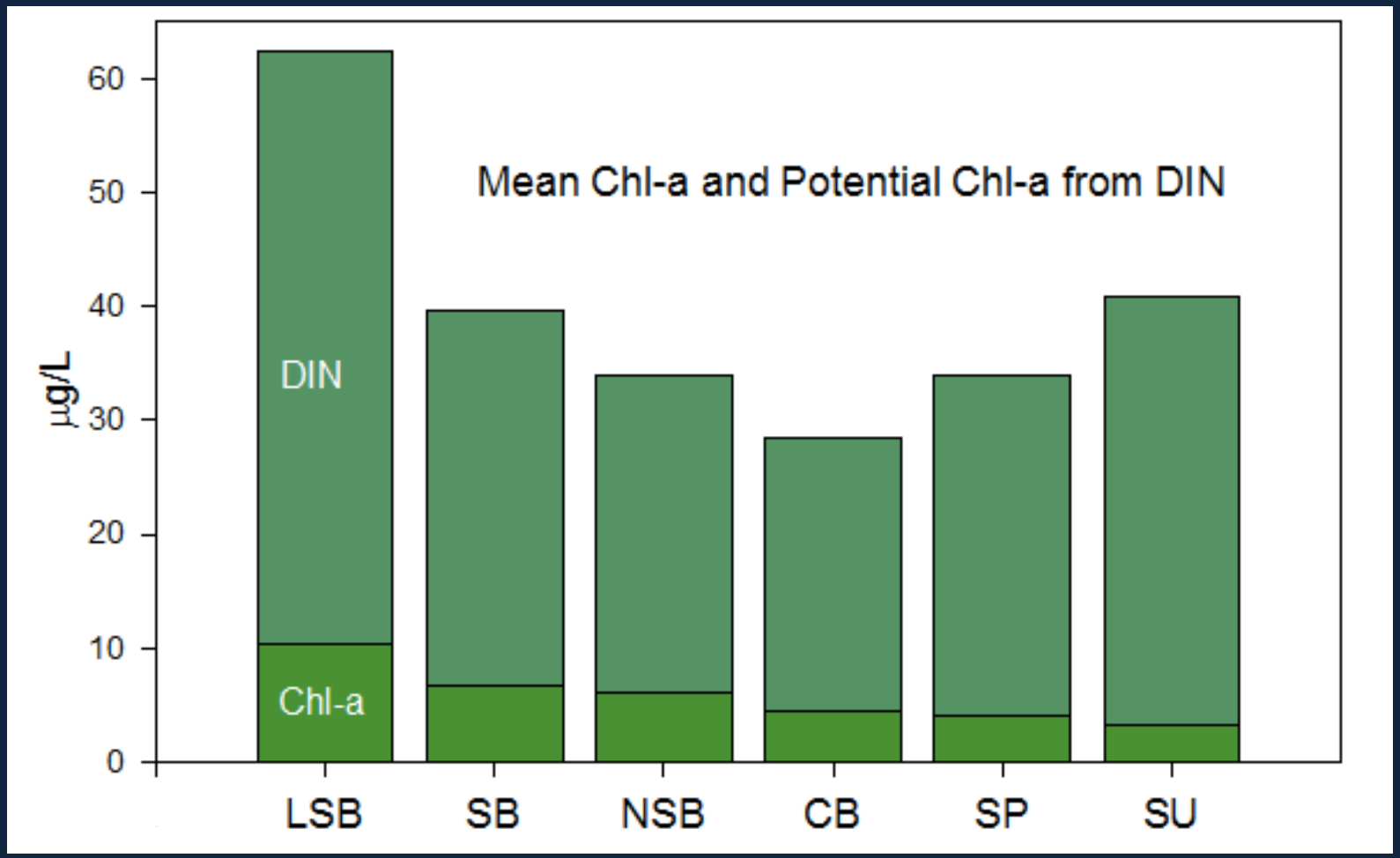


Potential Phytoplankton Growth Rates in the Bay



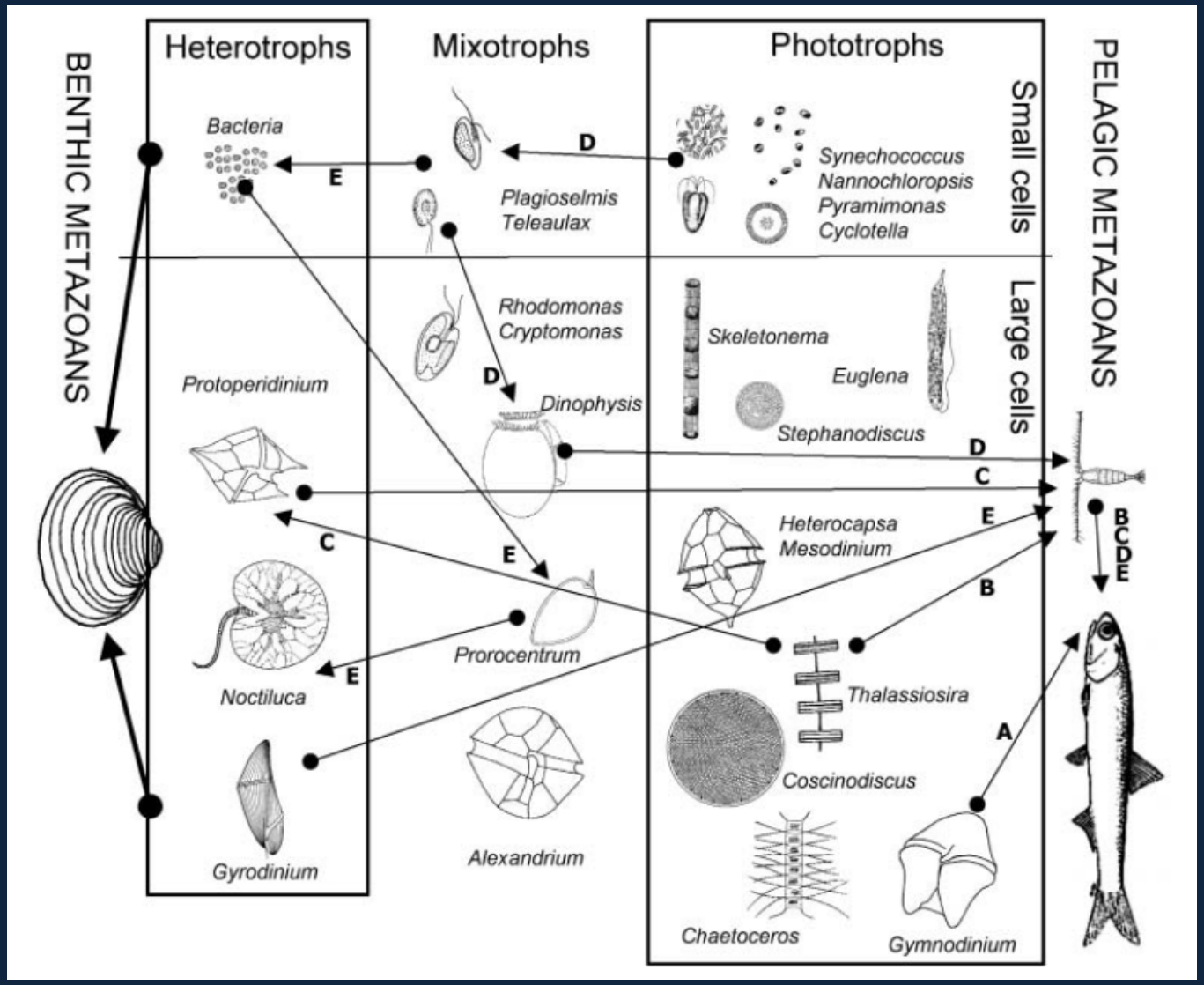
measurements at 8 core stations, Nov. 2014-Aug. 2015

Potential Phytoplankton Biomass in the Bay



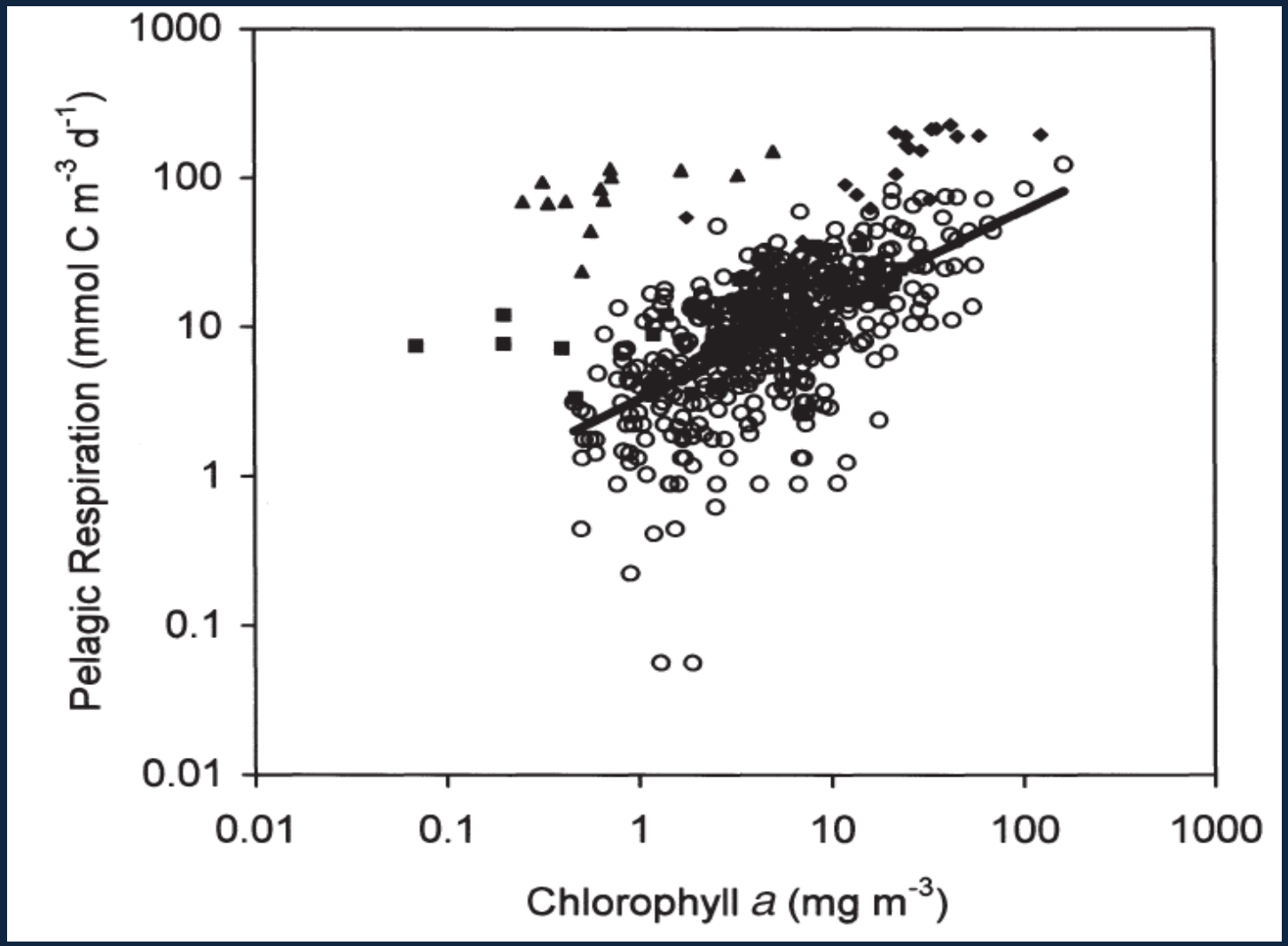
all USGS data, DIN and Chla, 2006-2014

Phytoplankton Provide a Vital Ecosystem Function



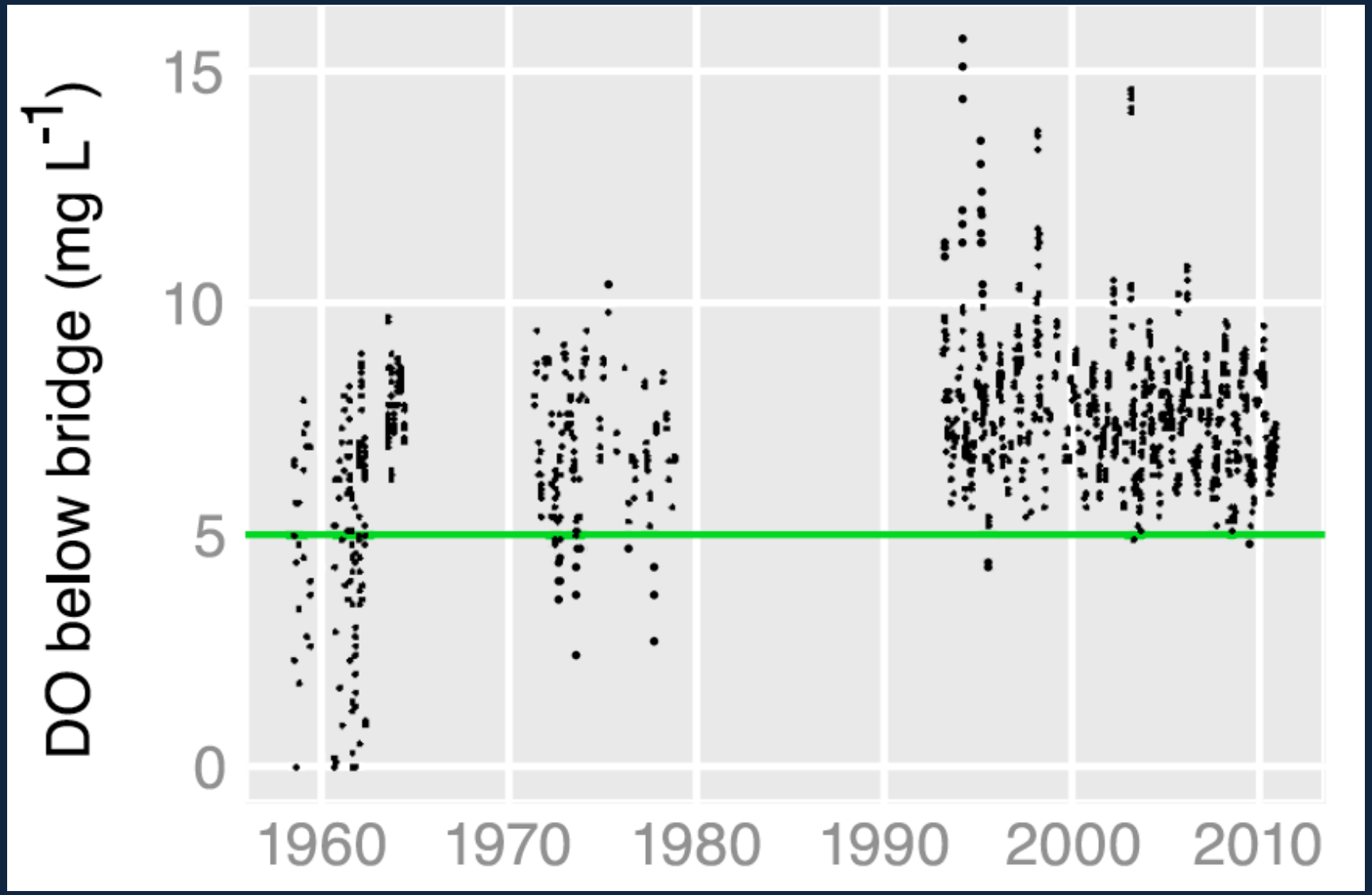
But Excess Production Can Lead to Problems

1: Oxygen Depletion

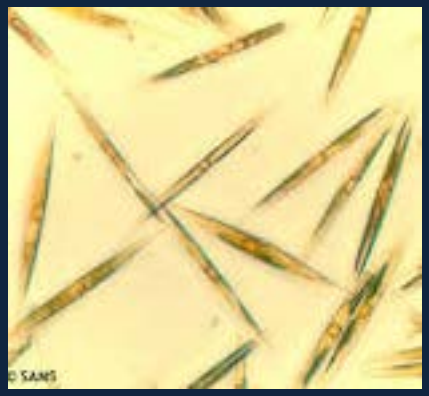


Hopkinson & Smith 1985

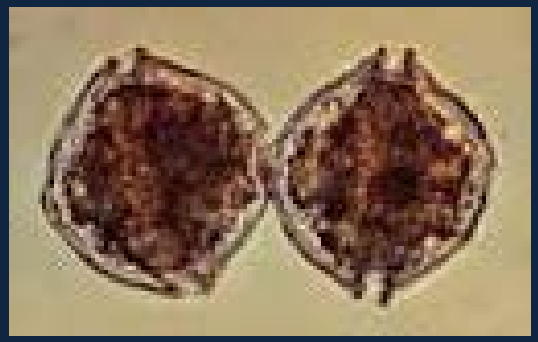
Regions of the Bay have a Finite Assimilation Capacity



2: Harmful Algal Blooms



Pseudonitzschia



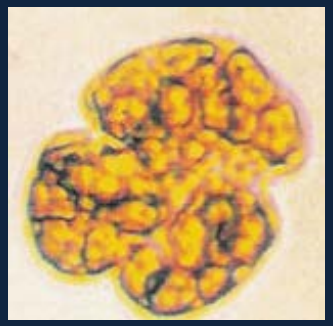
Alexandrium

Dinophysis

Toxic or Harmful Species

Akashiwo

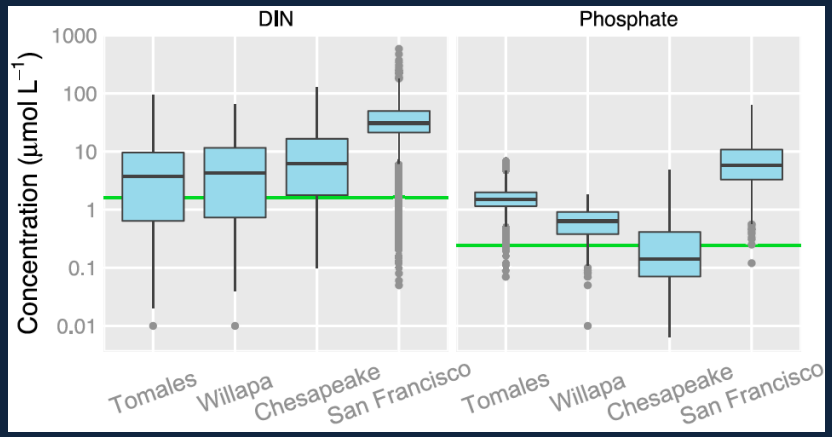
Chattonella

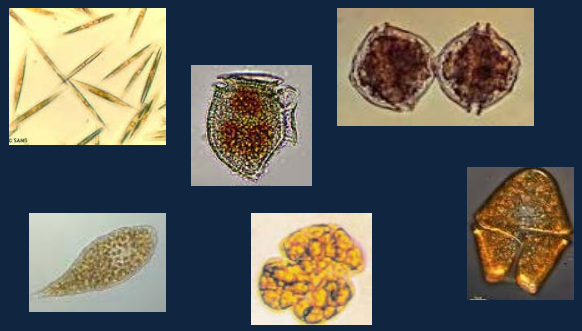


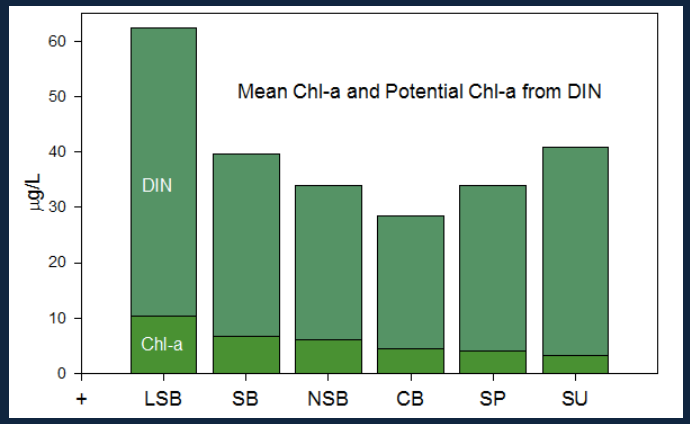
Karlodinium

Two Big Challenges

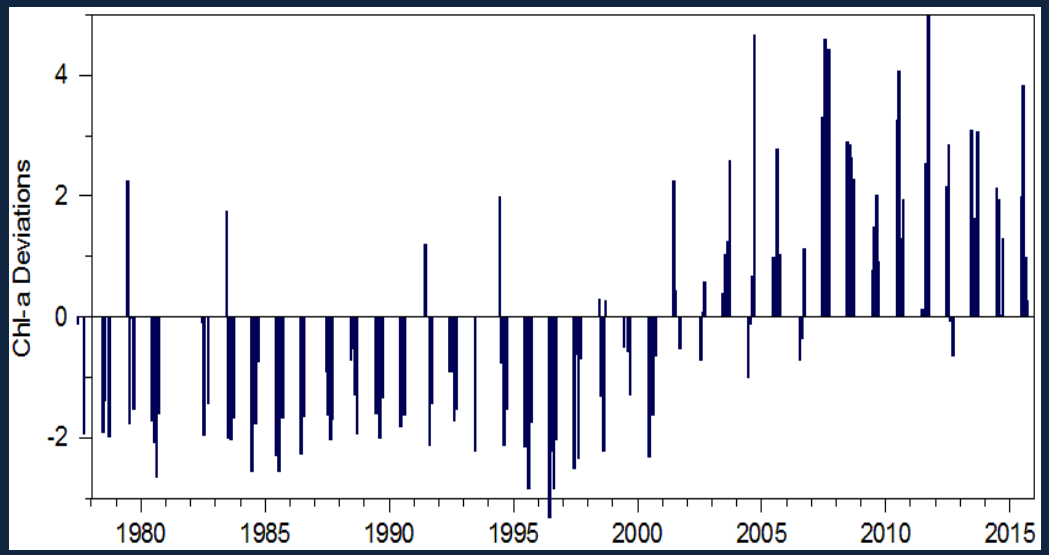
1: Assess Nutrient Effects



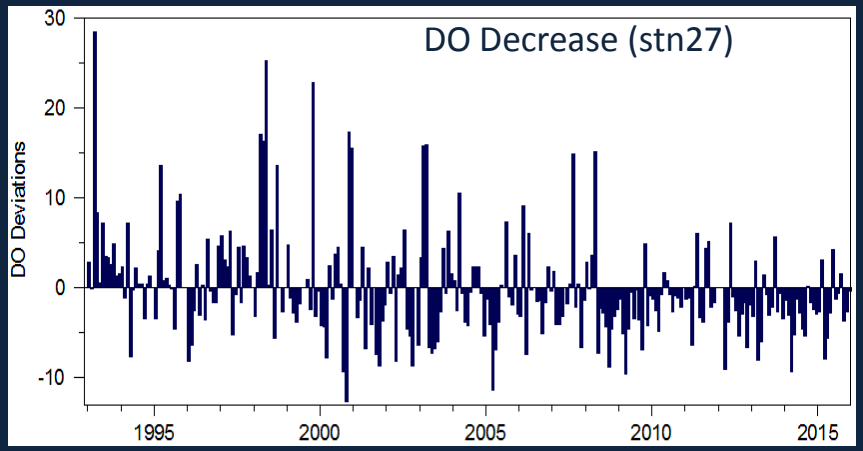


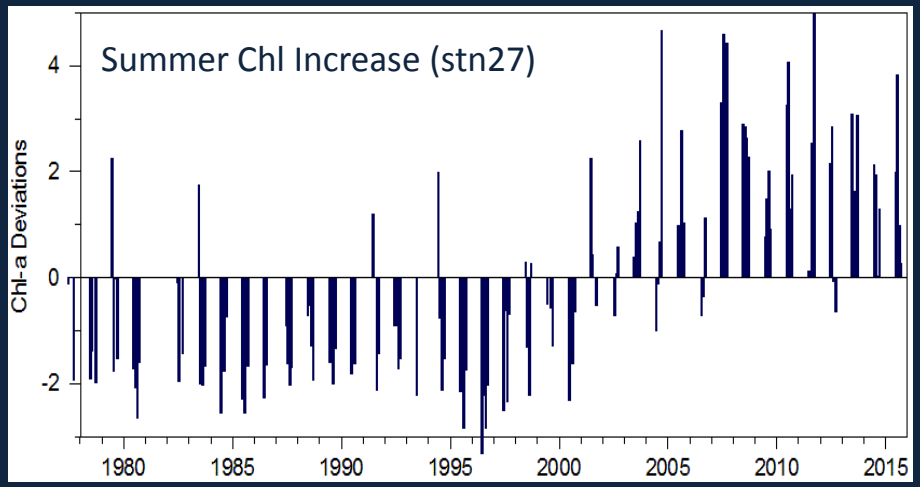


2: Keep the Observational Programs Going

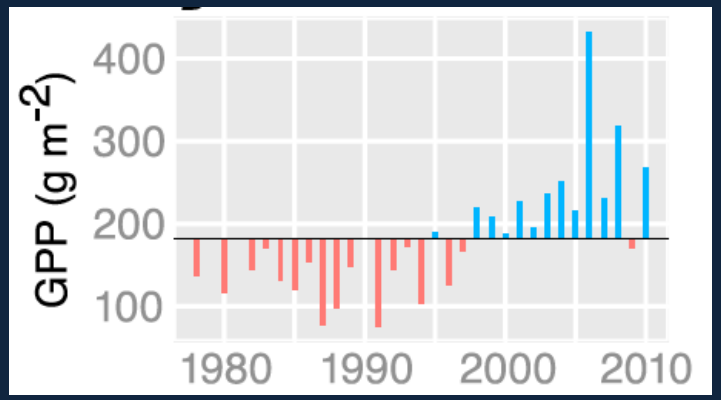


Because the Bay is in a Continuing State of Change

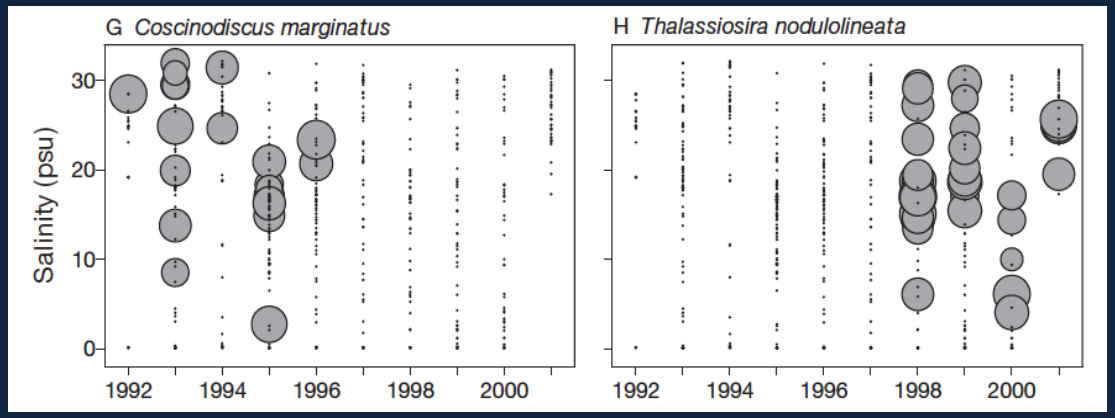


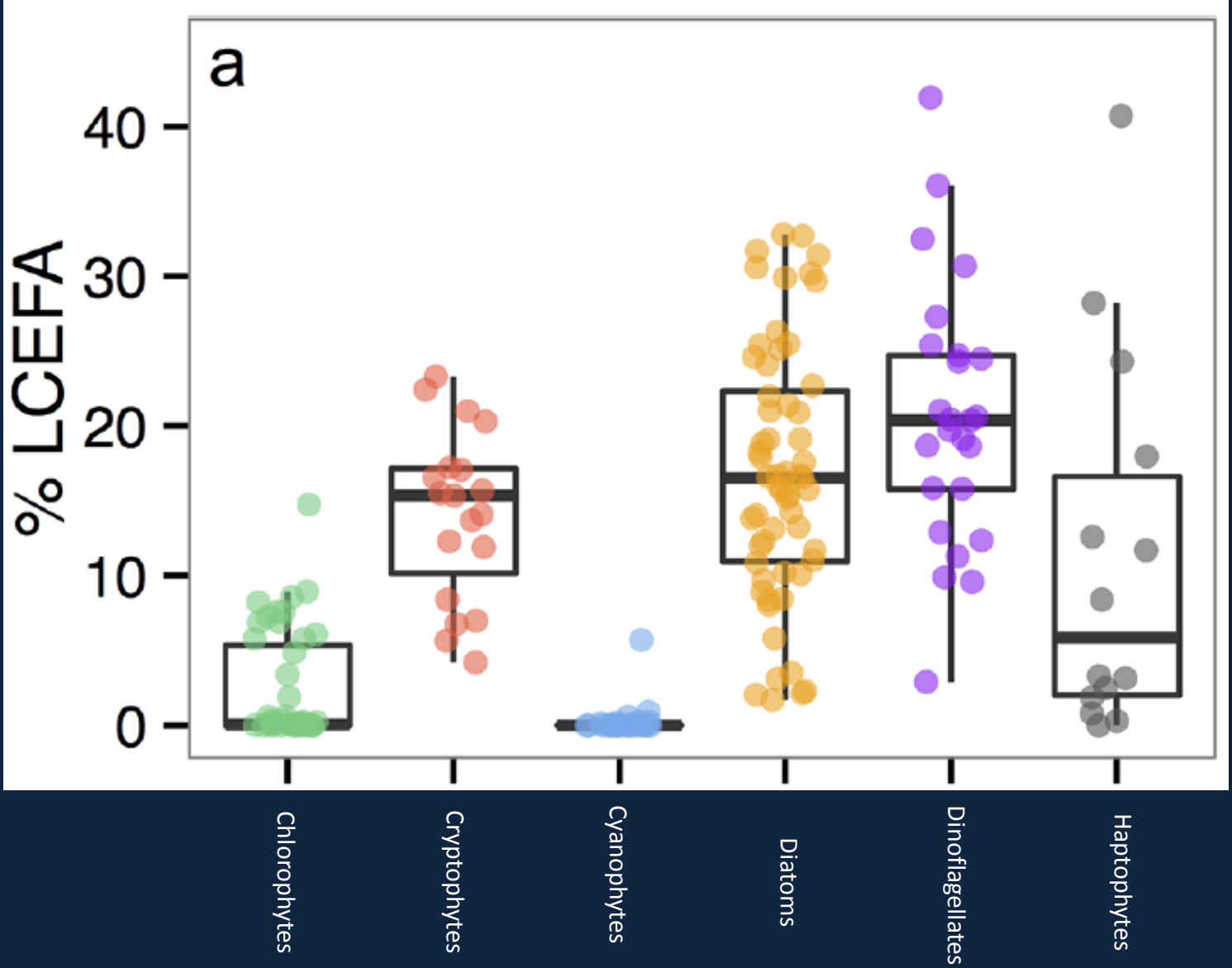


Primary Production Increase (SB)



Species Come and Go



Community Composition is Important

Food Quality