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NUTRIENT-CHLOROPHYLL RELATIONSHIPS IN THE INDIAN RIVER LAGOON, FLORIDA

The Indian River Lagoon is a highly diverse estuary located along Florida's Atlantic coast. The system is made up of the main stem and two side-lagoons: the Banana River and Mosquito Lagoon. We segmented the main stem into three sections based on spatial trends in water quality and locations of inlets from the ocean or side-lagoons. Total nitrogen (TN), total phosphorus (TP), and chlorophyll-a concentrations from 31 stations were averaged for wet (June through October) and dry (November through May) seasons. The data were analyzed by season for individual years, as well as for long term responses by season from 1997 to 2008. From north to south, TN concentrations decreased while TP concentrations increased. Regressions by season between TN or TP and chlorophyll-a showed significant year-to-year variability. Correlations between long-term average concentrations of chlorophyll-a and nutrients were strong for TN, TP or both, with some variability between seasons and among segments. Molar TN:TP ratios suggested phosphorus limitation in the northern and central segments and co-limitation by nitrogen and phosphorus in the southern segment, although regressions between chlorophyll and nutrients suggest some degree of co-limitation by TN and TP in all three segments of the main stem. The regressions between chlorophyll-a and nutrients provide a basis for relating nutrient concentrations to long-term average phytoplankton abundance in lagoon segments. An outstanding question is why there is such a significant amount of year-to-year variability in these relationships.

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Keywords: chlorophyll-nutrient relationships; Florida; Indian River Lagoon; nutrient limitation; seasonal variation; year-to-year variation

Purpose:

The purpose of this work is to develop short- and long-term relationships between chlorophyll concentrations and concentrations of total nitrogen and total phosphorus in the Indian River Lagoon, Florida. These chlorophyll-nutrient relationships form part of the basis for managing water quality in this system.

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