

NUTRIENT INPUTS AND PHYTOPLANKTON BLOOMS: IT'S QUALITY NOT JUST QUANTITY THAT COUNTS

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One of the major environmental issues facing the Barnegat Bay estuarine system, like many coastal bays and estuaries, is the proliferation of harmful algal blooms. There is a growing consensus that many of these blooms are linked to eutrophication and nutrient loading associated with population growth and development and agricultural in the watershed. Yet, specific relationships with nutrients are not always straightforward, and in some cases, it is perceived that there are no direct relationships between bloom development and inorganic nutrients. Several lessons gleaned from studies in comparative ecosystems are: 1) inorganic nutrients are a useful, but not a sufficient, index of eutrophication of a system; 2) organic nutrients play a significant role in the ecology of many harmful bloom species; 3) the role of nutrients may be indirect, and thus out of phase temporally or spatially, with bloom outbreaks, particularly for those species displaying mixotrophy; and 4) other environmental factors, such as temperature and community composition at the time of nutrient delivery, will impact the degree to which nutrient inputs may lead to the development of harmful bloom species. Thus, the same nutrient load – in quantity and quality – may have differential impacts in different sites, or at different times, because of the ambient environmental conditions at the time of delivery. Management must include organic nutrients in monitoring efforts, and emphasize nutrient reduction strategies for nonpoint source nutrients.

Management Strategies should include:

- 1) consistent and sustained monitoring of inorganic and organic nutrient loading
- 2) consistent and sustained monitoring of specific HAB species
- 3) focused efforts on reductions of nonpoint source nutrient loadings
- 4) formalized partnerships between the scientific and management communities
