

Double trouble for water life

May 18 2009

Excess phosphorus and nitrogen produced by human activities on neighboring land is making its way into our coastal waters and degrading both water quality and aquatic life. Although historically the priority has been to control phosphorus, Professor Hans Paerl, from the University of North Carolina in the US, argues that nitrogen imbalance is equally damaging. He adds that a dual nutrient strategy - tackling both phosphorus and nitrogen surplus - is necessary to manage effectively this nutrient over-enrichment and resulting habitat degradation of coastal waters in the long-term. His perspective is published online in Springer's journal *Estuaries and Coasts*.

The combination of human population growth, urbanization, and agricultural and industrial expansion is causing unprecedented and alarming rates of [nutrient](#) over-enrichment and accelerated plant growth in receiving waters worldwide. The increasing levels of nitrogen and phosphorus are of particular concern because an excess of these two nutrients promotes accelerated production of plant-based organic matter (or eutrophication) to the extent that excessive production, including harmful algal blooms, contributes to the expansion of marine 'dead zones' and leads to the destruction of fisheries habitat.

The [negative consequences](#) of eutrophication have been apparent in freshwater habitats for a long time and phosphorus has been identified as the key nutrient responsible. While freshwater lakes have, over the past few decades, received continual doses of phosphorus, many coastal systems have experienced ever-increasing nitrogen loads from rapidly growing human sources, with severe negative impacts on ecosystem

structure and function. This has led to the need for [nitrogen](#) control measures.

Professor Paerl shows that the argument for reducing surplus phosphorus alone, to control eutrophication, is idealized and conceptually and technically inapplicable to many freshwater and [marine ecosystems](#). He adds that focusing on [phosphorus](#) alone ignores the fact that natural and human influences that affect upstream waters have significant adverse consequences on downstream waters. Therefore, it is essential to look at nutrient control measures and their effects across the entire freshwater to marine continuum, not each one in isolation.

Professor Paerl concludes that "the dual nutrient approach represents an evolutionary step in arresting eutrophication, with consideration of the larger scale freshwater-marine continuum being the driving force. Only focusing on a stream, lake, or river within this hydrologic continuum may at best only solve part of the larger scale eutrophication problem and at worst aggravate downstream ecological conditions."

More information: Paerl HW (2009). Controlling eutrophication along the freshwater-marine continuum: dual nutrient (N and P) reductions are essential. *Estuaries and Coasts*; DOI 10.1007/s12237-009-9158-8

Source: Springer

Citation: Double trouble for water life (2009, May 18) retrieved 17 April 2024 from <https://phys.org/news/2009-05-life.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.