National Institute of Environmental Health Sciences

Assessing human alteration of phytoplankton and water quality dynamics in a world experiencing climatic change

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Abstract:

Harmful cyanobacterial blooms (CyanoHABs) are proliferating globally due to accelerating human nutrient enrichment. Traditionally, phosphorus (P) input reductions have been prescribed to control blooms because P-limitation is widespread and some CyanoHABs can fix nitrogen (N2) to satisfy their nitrogen (N) requirements. However, anthropogenic N loading is increasing rapidly world-wide, promoting dominance by non N2 fixing CyanoHABs that are N and P co-limited or N limited. Increasingly, N and P input constraints are needed for CyanoHAB control. Climatic changes, specifically warming, salinization, and intensification of storms and droughts, play additional, interactive roles in promoting CyanoHAB frequency, intensity, distribution and duration. Therefore, in addition to reducing in N and P inputs, water quality managers need tools to break the synergy between nutrient loading and climatic hydrologic regimes made more favorable for CyanoHABs by climate change. These include (1) altering the hydrology to enhance vertical mixing and/or flushing and (2) decreasing nutrient fluxes from organic-rich sediments. CyanoHAB management approaches must incorporate both N and P loading dynamics when considering altered thermal and hydrologic regimes associated with climate change.

Source: http://dx.doi.org/10.1111/j.1529-8817.2011.01050.x

Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Other Communication Audience: Water quality managers

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Quality

Food/Water Quality: Biotoxin/Algal Bloom

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☒

resource focuses on specific location

Global or Unspecified

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Marine Toxin Syndrome

Mitigation/Adaptation: ☒

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Resource Type: ☒

format or standard characteristic of resource

Review

Timescale: ☒

time period studied

Time Scale Unspecified