

# Spatial Variability of Phytoplankton in the Hudson River

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The Hudson River is a highly urbanized estuarine river system, which has the potential to be highly vulnerable to harmful algal blooms (HABs). Although historically the Hudson River has few issues with HABS, and generally has low levels of productivity, the threat these photosynthetic organisms potentially pose must be examined. Scientists have attributed these low levels of primary productivity to “bottom-up” factors in the river, primarily to the turbidity seen throughout the system. Because light energy is vital phytoplankton productivity, studying other factors that may be keeping the communities at bay has been neglected. This study serves to not only examine how phytoplankton communities vary along the Hudson River, but also in areas hypothesized to have higher light penetrability, such as tributaries and along the river’s shoals. Understanding how these communities change along the river and across the river gives insight into the future phytoplankton composition of the Hudson River. In addition to studying spatial variability, a grazing experiment was conducted to understand the role micro-zooplankton play in keeping primary productivity levels relatively low. Substantial evidence was found indicating that the Hudson River is in fact a much more delicately balanced system with “top-down” limiting factors eliminating a substantial amount of daily primary productivity. Finally, through examining the relative abundances of the different phytoplankton taxa present in the water samples, an understanding of which potentially harmful species are currently present in the Hudson River and where they are located. Areas of concern have been identified, such as in Newtown Creek, a highly polluted tributary running into Brooklyn, and are in need of future monitoring to ensure that these harmful species do not bloom to cause an environmental or health hazard.