Pelagic responses to changes in dissolved organic carbon following division of a seepage lake

Abstract—Within 2 yr of dividing a multibasin lake into discrete lakes for experimentation, dissolved organic carbon (DOC) concentrations and water color (absorption coefficient $g$ at 440 nm, $g_{440}$) increased in the east basin and decreased slightly in the west basin. These changes were not explainable by watershed vegetation or groundwater chemical composition. However, $g_{440}$ increased from 0.7 to 4.2 m$^{-1}$ for water moving through the sediment–water interface in the east basin. In the west basin, $g_{440}$ of groundwater (0.6 m$^{-1}$), in-seeping water (0.7 m$^{-1}$), and lake water (0.7 m$^{-1}$) were all similar. Patterns of DOC distribution matched time trends in the surface waters. In the east basin, DOC concentration doubled and $g_{440}$ increased 3-fold from 1990 to 1993. Trends in the west basin were more complex, but in general, there was a decrease in DOC and $g_{440}$ over the same period. Changes in the light regime affected phytoplankton vertical distribution, but total areal chlorophyll and epilimnetic chlorophyll concentrations were not altered. The depth of oxygenation was changed by altered mixing characteristics and phytoplankton distribution. Changes in light-attenuating DOC affected pelagic responses to nutrient inputs.