



Evaluation of the relationship between Dissolved Organic Material (DOM), Chlorophyll-A and Algal Species in Lakes and Drinking Water Reservoirs throughout the State of Colorado

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Previous research has suggested that production of nonhumic DOM can be directly related to chlorophyll-a concentrations. In recent years, increases in dissolved organic carbon (DOC) concentrations in surface waters have been documented in many northern temperate regions and due to the underlying processes, the affects of increasing DOC on aquatic ecosystems and drinking water quality are not fully understood. In the Green Lakes Valley in the Front Range of the Colorado Rocky Mountains, yearly monitoring has shown that a pulse of terrestrially derived, aromatic humic DOM is transported into alpine and subalpine lakes during snowmelt. This pulse is characterized by a low fluorescence index (FI) and high specific ultraviolet absorbance (SUVA). Later in the summer, during the annual phytoplankton bloom, microbial sources contribute humic DOM with a high FI and low SUVA and the percentage of humic DOM decreases. Based on these results, we inferred that similar activity could be found in other alpine and sub-alpine lakes across the state of Colorado.

The aim of this study was to expand upon the findings of the effects on DOM of chlorophyll a concentrations in the Green Lakes Valley to other lakes across the state of Colorado, as well as insight into seasonal trends which could give be expanded to potential impacts of climate change. We focused on the relationship between DOM and Algal biomass/speciation. Chlorophyll-a, an indicator of algal biomass, was measured and algal species were identified using a Fluid Imaging Technologies FlowCam. Approximately 30 lakes were sampled during July and August, at the height of the expected seasonal algal bloom, and some lakes were sampled more frequently over the entire season in order to obtain a large range of chlorophyll-a concentrations. These lakes/reservoirs were sampled biweekly from May through September 2010. Preliminary results showed that diatoms and cyanobacteria are the most abundant algal groups present. The DOC and chlorophyll-a levels in the 10 water bodies, studies seasonally showed a common trend with DOC levels ranging from 2 to 8 mg/L and chlorophyll-a levels ranging from 0 to 10ug/L. For the 30 lakes, the DOC levels ranged from 2 to 7mg/L and chlorophyll-a levels ranged from 2 to 84ug/L. The relationship between DOC and chlorophyll-a levels in the lakes varied, with some lakes showing a correlation.