Abstract: Cyanobacteria blooms occur in eutrophic conditions with low water turbulence, typically in the late summer. Elevated nutrient levels, especially phosphorus and nitrogen, promote these eutrophic conditions and in turn, promote cyanobacterial blooms. However, past studies have suggested that other factors are involved with the stimulation of cyanobacteria blooms; in this case, we observed the impact of increased salinity. We observed conditions in North Lake, using a dual factorial design. We found that Phosphorus stimulates algal growth. We also found that salinity does not play a significant role on the amount of nutrient uptake. Our results suggest that North Lake, in particular, is a Phosphorus limited freshwater system. The results also demonstrate that salinity possibly inhibits algal production in the case of a diatom and chrysophyte dominate lake, but does not discredit the possibility for salinity to encourage cyanobacterial blooms. The implications of this research may influence the addition to road salt on winter roads and could call for management of runoff.