

LAKE ACIDIFICATION IN THE ADIRONDACK MOUNTAINS OF
NEW YORK: CAUSES AND CONSEQUENCES

CARL L. SCHOFIELD, Cornell University.

ABSTRACT

Current and historic geographic distributions of acidity in Adirondack lakes were examined in relation to regional edaphic, climatic, and physiographic features. Acid conditions are currently predominant in high elevation drainage lakes having small watershed/surface area ratios. Comparable levels of acidity were found only in small seepage lakes and bog ponds during the 1930's. Increased acidity in the high elevation lakes can be quantitatively related to the occurrence of excess acid forming anions of atmospheric origin. Knowledge of this stoichiometric relationship and the morpho-edaphic factors which regulate cation supply permits modeling of the acidification process and prediction of the consequences of changes in precipitation chemistry, both in terms of variations in lake acidity and in terms of the numbers and location of lakes likely to be affected. Recent surveys suggest that fish populations have been adversely affected by acidification in approximately 75% of the high elevation lakes. Effects range from complete extinction of populations to alterations in density, size structure, and growth rates. Interspecific and intraspecific differences in acid tolerance exhibited by Adirondack fishes are examined in relation to factors such as life history, size, age, and secondary water quality parameters. Management alternatives are discussed in relation to the problem of lake acidification.