

1.2 AQUATIC ECOSYSTEM IMPACTS

The potential impacts from the deposition of acid and associated ions (SO_4^{2-} , NO_3^- and others) on water quality, and on the aquatic ecosystem, appears to be more fully quantified and understood than for terrestrial ecosystems. A number of examples have occurred where dramatic changes in water quality are believed to be directly attributable to acidic deposition. The findings and conclusions of the work group with respect to these impacts are contained in the following statements:

- ° Nitric acid contributes to the acidity of precipitation, but is less important than sulphuric acid in acidification of surface waters, except during snowmelt in some areas. Sulphuric acid has been identified as the dominant compound contributing to the surface water acidification process. Studies of lakes in Eastern North America have provided strong evidence that it is atmospheric deposition that accounts for the elevated sulphate levels of surface waters.
- ° Trend analyses in acidification of streams and lakes date back 17 years in New Jersey and forty years in the Adirondacks and show a marked decline in pH values. The Adirondacks is one of the most sensitive lake districts in the eastern United States. A recent inventory has indicated that at least 180 former brook trout ponds will no longer support trout because of acidification.
- ° In Nova Scotia the pH measured in a number of salmon spawning rivers has shown a marked decline in the period 1954-55 to the present. Concurrently there has been a statistically significant decrease in angling success. Recent surveys have attributed this decrease in pH to an increase in sulphate loadings from anthropogenic sources.
- ° Many changes in aquatic life have been linked to acidification. In some instances a causal relationship with depressed pH has been established, but in the majority of cases, the observed changes in biota have simply been correlated with observed changes in pH. Results show that for most biological communities, acidification has been accompanied by decreases in species richness and changes in species dominance. Acidification results in changes in the makeup, size and metabolism of plankton communities. These alterations hold important implications for other organisms higher in the food chain.
- ° Short term depressed pH values and elevated metal concentrations have been observed during snowmelt periods in many streams.
- ° Evidence of stressed fish populations has been observed in lakes which experience short-term low pH and elevated metal concentrations. Adult fish kills have been observed in one study lake experiencing these conditions.