“Acid Rain” became a major public policy issue in the 1970s and 1980s because of the evidence of widespread biological damage, such as the extensive loss of native salmon and trout populations in acidified areas of Canada and Scandinavia. Governments and industries faced intensive lobbying efforts by a wide variety of environmental groups and organizations, insisting that this problem be solved. As a result, billions of dollars have been spent in North America and Europe to develop and install new emission control technologies, modernize facilities, reduce or eliminate the use of high sulfur fuels, etc.—all in an effort to meet more stringent environmental protection regulations. From an emission control standpoint, these new regulations have been very successful, and substantial reductions in acid deposition have been achieved (1). However, the focus must now return to the aquatic resource issues, and to the biology of the impacted area. Now the question isn’t simply can we reduce emissions to meet the tolerance limit (or “critical load”) of the landscape, but will the water quality improve and the biota recover? (2–4).

The Northern Lakes Recovery Study (NLRS) was a Canadian/Norwegian cooperative study, designed as a multidisciplinary monitoring, experimental and modeling project to study biological recovery of acid damaged waters following substantial reductions in acid deposition. In terms of the breadth of its ecological focus, it represents one of the most comprehensive studies of biological recovery from acidification that has been conducted. The large majority of the papers presented in this special issue deal with recovery of damaged lakes. Previous research on restoration ecology for aquatic systems was mainly focussed on lotic systems (streams and rivers), systems that tend to respond more rapidly to environmental changes than lakes (5).

**DEFINITION OF RECOVERY**

Recovery from acidification cannot simply be judged as a return to a predisturbance state. Ecosystems are naturally changing through internal processes and are also affected by large-scale external factors such as climate change. They may also be impacted by factors that cause rather irreversible changes, such as the arrival of invasive species. Definitions for recovery must therefore recognize the regional differences among ecosystems, and the inevitability of change. A reference data approach of defining biological recovery as progress towards conditions typical of the least disturbed lakes in an area may be best. European Union Water Framework Directive (6) recommends adopting this approach by stating that their goal in restoring ecosystems or achieving recovery is to obtain:

“...the biological community which is expected in conditions of minimal anthropogenic impact...”

The working group on recovery at the Dahlem 1992 conference (7) adopted another useful definition of biological recovery based on the return of key indicator species as an index measure of the overall improvements:

“Recovery in streams and lakes has taken place if a healthy key species of fish and key species chosen from other components of the community (e.g. among sensitive phytoplankton, zooplankton, or benthic invertebrates) have returned”.

This definition has been further extended (4, 8) to recognize that not all systems historically contained fish and that starts and stops may occur before viable populations return:

“...biological recovery occurs when a number of key organisms have resumed their role in an ecological system by re-establishing viable populations”.

In this special issue all 3 of these definitions are employed.

**STUDY SITE**

The principal study site for NLRS was Killarney Park, a 48 000 ha wilderness area located 40–60 km southwest of Sudbury, On-