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International Cooperative Programme on Assessment and Monitoring of the Effects of Air Pollution on Rivers and Lakes

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Acidification of freshwater systems provided some of the earliest evidence of the damage caused by sulphur emissions. The sensitivity of these systems suggested that they were ideal for studying the effects of, and response to changes in, pollution deposition.

The objectives for ICP Waters are to assess, on a regional basis, the degree and geographical extent of acidification of surface waters. The data collected should provide information on dose/response relationships under different conditions and correlate changes in acidic deposition with the physical, chemical and biological status of lakes and streams.

The Programme is planned and coordinated by a Task Force under the leadership of Norway. Chemical and site data from more than 200 catchments in 24 countries in Europe and North America are available in the database of the Programme Centre at the Norwegian Institute for Water Research (NIVA), Oslo.

Monitoring of river and lake sites includes both chemistry and biology. All major chemical constituents are included in the analytical programme and are used for long-term trend analyses of water quality. For about half of the sites both chemical and biological data have been reported and these sites are used for dose/response evaluations.

Invertebrates, small animals living in or on the bottom of lakes and streams or in open water, often occur in large numbers in freshwaters. Different species have specific tolerance limits related to water chemistry, physical conditions, etc. For this reason, sampling invertebrate communities is a useful tool in environmental studies such as acidification. Similarly, diatoms, microscopic algae that are abundant in a wide range of freshwaters, also indicate water quality. However, these have the additional advantage that their remains are found in sediments, providing a historic record of the water quality.

The monitoring of fish populations became part of the ICP Waters programme in 1992. While fish species may live for many years, they often have life stages with differing sensitivities to acidification. Since changes to these stages are not necessarily detected in the same year, the fish monitoring programme employs methods to detect changes in the different life stages of the population every year.

Quality control is an important part of the programme. Annual laboratory intercalibration exercises were established in 1987, involving, in 1998, 43 laboratories in 20 countries. Database checks ensure the quality of the data which are being collected and used. Biological quality control started in 1992.

Further information is available from the Programme Centre.