Integrated management and monitoring of boreal river basins: an application to the Finnish River Siuruanjoki

A. Laine, K. Heikkinen, M. Heikkinen and S. M. Karjalainen

Abstract: The European Union Water Framework Directive aims at maintaining and improving the aquatic environment of the European Community. It focuses especially on factors describing the ecological status of rivers. Realization of the aims of the Directive requires knowledge of a wide area of river ecology and of water pollution control methods. Also practical tools are needed for the integrated management and monitoring of river basins. In this paper, an application for integrated river basin management plan is presented for a humic boreal River Siuruanjoki in northern Finland.

Introduction

Finnish rivers are some of the least polluted ones in Europe. Their value for recreational use has nevertheless deteriorated over the past decades. At the same time with decreasing point loading, loading from non-point sources such as forestry, agriculture and peat mining has increased. This diffuse loading constitutes the most significant loading in the rivers that discharge into the Bothnian Bay, the northern tip of the Baltic Sea (HEIKKINEN 1990a; HELCOM 1996). The loading of suspended solids, nutrients, dissolved organic matter, iron, locally also aluminium and acidifying substances, affects all levels of the ecosystem and deterioration symptoms are common. On the European scale, the special feature of these rivers is their naturally high content of dissolved organic matter, consisting mainly of humic substances, which give the water a brownish colour. The humic substances are formed mainly in the wide peatland areas of the river basins and they affect the material transport and transformation processes in many ways.

The EU Water Framework Directive emphasizes factors describing the ecological status of rivers. Ecological status assessment is based on biotic factors, and on relevant hydromorphological and physicochemical factors. The aim of the