



Boreal river basins - A cost-effective decision support system for management of boreal river basins

LIFE98 ENV/FIN/000573



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Project description:

Background

Finnish rivers are some of the least polluted in Europe. However, their value for recreational use has deteriorated over the past ten years, despite preventative action. One of the reasons for this is the lack of integrated approaches to water pollution control. All land-use forms (agriculture, forestry, peat production..), produce an environmental impact on a river's ecosystem through the loading of suspended solids, nutrients, metals and acidifying substances. However, if these detrimental effects are to be limited, the river basin has to be taken as a whole and better use made of existing water pollution methods (sedimentation basins, buffer zones and wetland). General environmental awareness on behalf of the public also has to be increased. These considerations fall in line with the EU Water Policy Framework Directive (WFD) which aims to maintain and improve the aquatic environments of the Community. If these aims are to be achieved, more knowledge has to be gained on river ecology and effective water pollution control methods and this know-how translated into practical tools for cost-effective integrated management and monitoring of river basins. To meet these needs, the current project was developed by an international consortium of specialist organizations (six universities, four regional environment centers, two research institutes and two SME's with experience in environmental modelling and development of computer- based user interfaces).

Objectives

The main purpose of the project was to create a new, cost-effective, practical tool for sustainable river basin management: an interactive computer-based decision support system. This interactive computer-based system Decision Support System (DSS) would help local decision-makers in the private and public sectors to integrate environmental considerations into land-use planning and management practices. The tools developed would be tested and demonstrated in pilot projects on three rivers. This would aid the project to mark the gaps on existing knowledge on water pollution control of rivers and river status assessment and to draw up guidelines for cost-effective and adequate monitoring procedures according to the WFD. The information gained would be used to promote more effective pollution control, and ecological land-use by various target groups from decision-makers to school children through an accessible web site. The objectives would be delivered through 2 key tasks: 1) The development and dissemination of environmental information packages on the project web site. 2) The improvement of river basin management through: - Automatic monitoring - Decision Support system - Diffuse pollution and point source pollution of target rivers - Guidelines for general level river basin management - Guidelines for cost-effective river status assessment and monitoring The computer-based tools would be developed in three languages (Finnish, Swedish and English) and would be designed to be easily transferable to other EU countries.

## Results

The project achieved its principal objective of developing computer-based tools for the management of riverbasins. Wide dissemination was also carried out through conventional means (articles, seminars, conferences etc) as well as through the principal source: the project web site: [www.vyh.fi](http://www.vyh.fi), where all the relevant information was gathered, including the information packages, RiverlifeDSS, project publications and a video. The applicability of the tools were also demonstrated in 3 target rivers: River Siuranjoki, the River Simojoki, and the River Kyronjoki, and resulted in follow up environmental management proposals. However, the environmental impact of the tools and its cost-effectiveness will depend on their take-up and application by the very wide-ranging target audiences. This can only be assessed through future monitoring. The first task area produced information packages related to the ecological condition of the rivers. These included: the eco-system of the river and how it functions, the effects of land-use and harmful substances, monitoring needs and the different measures for reducing loading from different land-usages. Effort was put into making the site clear and usable. Follow up work is being done with interest groups to assess the use and effectiveness of the web site for different target groups' needs. The second task primarily developed and tested the RiverlifeDSS management tool. This "tool box" brought together a series of existing environmental assessment tools including: - GIS-tool providing graphic representation of key river basin information. - Hydrological model to measure loading effects from different land-usages - River Basin analysis to assess overall ecological state and key pollution factors. - Ecological Risk analysis for delivery of environmental impact assessment. A variety of monitoring methods were also included: division of river network for

examining the river basin, silting on river bottom, water quality through diatom and zoobenthos methods, fish stock control methods, automated monitoring and control systems, bio tests for harmful substances and different water parameter analysis. The reactions from the demo version indicated the usefulness of the system, but pointed to the need for refinement and inclusion of further material. It also raised the inherent problem of how to target the system better to a very diverse user community. The testing of several of these methods in target river basins resulted in the development of specific follow-up proposals for ecological monitoring, management and pollution control in the three areas and the drawing up of general guidelines for general river basin management. In one of the areas: the River Kyronjoki, a national pilot river basin site for implementing the WFD, a plan for ecological management and monitoring was drawn up and an automated river monitoring and control system tested out. This system can provide continuous and detailed information on water chemistry and hydrology, enabling the authorities to quickly respond to deteriorations in water quality by changing the river flow. The tools have been developed and disseminated through the web site in English and Finnish, thus facilitating easy transferability of the materials, although the contexts may have to be adapted. According to information obtained by the LIFE external monitoring team in 2004, the experience and results from the project have been extensively utilised since the project's end e.g. as follows: Classification of rivers as sources of drinking water; Kola River project (co-financed by EU) to develop water pollution control at Kola river basin in North-West Russia; the PRIMROSE project (FP5 Research) utilised RiverLife for constructed and riverine wetlands for optimal control of wastewater at catchment scale utilising e.g. the GIS tool developed. The implementation of the Water Framework Directive, regarding the river dominated watercourses and corresponding catchments has also benefited from the RiverLife results and tools, especially in the classification of the water bodies.

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Environmental issues addressed:

Themes

Water - River basin management

Keywords

land use planning, river management, decision making support, water monitoring, diffuse pollution

Target EU Legislation

- Water
- Directive 2000/60 - Framework for Community action in the field of water policy (23.10.2000)

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator	North Ostrobothnia Regional Environment Centre
Type of organisation	Regional authority
Description	North Ostrobothnia Regional Environment Centre, NOREC, is one of the 13 regional environmental administration units in Finland. The Centre is a public environmental service. It aims to improve the environmental situation in Northern Ostrobothnia as part of a sustainable development strategy based on wide-scale co-operation with public and private sectors.
Partners	University of Helsinki EIA Ltd. WFREC Associated Partners: LAPREC NKREC Univeristy of Oulu Finnish Game and Fisheries Research Institute Finnish Environment Institute

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Administrative data:

Project reference	LIFE98 ENV/FIN/000573
Duration	01-SEP-1998 to 01-SEP -2001
Total budget	853,709.13 €
EU contribution	411,995.33 €
Project location	Etelä-Pohjanmaa(Finland Suomi) Vaasan rannikkoseutu(Finland Suomi) Keski-Pohjanmaa(Finland Suomi) Pohjois-Pohjanmaa(Finland Suomi)

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Read more:

Brochure	Title: Laymans Report in English, Swedish and Finnish. Author: NOREC Year: 2001
Leaflet	Title: New methods for water pollution control in river basins Year: 2001 No of pages: 8
Project web site	<a href="#">Internet Site</a>
Publication: Article-Paper	Title: Ecological Risks in Rivers: assessment methods and application for boreal river ecosystems. Author: Kari-Matti Vuori et al. Year: 2000 Editor: Finnish Environment-Natural Resources 496
Publication: Case study	Title: Experimental methods in the assessment and monitoring of rivers: benefits, limitations and integration with field surveys. Author: NOREC Year: 2001

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