

ENMaR

European Network of Municipalities and Rivers



Water: local planning and management

Practical examples from England - Germany - Latvia - Spain - Sweden

Kommunale Umwelt-Aktion U.A.N.

Emåförbundet

Mersey Basin Campaign

Oldenburgisch-Ostfriesischer Wasserverband

Universidad Santiago de Compostela

University of Manchester

Vides Projekti

Project part-financed by the
European Union



North East South West

INTERREG III C



Directiva Marco del Agua

Wasserrahmenrichtlinie

Water Framework Directive

Ramdirektivet för vatten

Ūdens struktūrdirektīva

Water: local planning and management

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The pictures on the cover show the river Gauja, Lisa Stout from United Utilities presenting the results from a group work session during an ENMaR seminar in England and a landing stage for canoes at the river Hunte in Germany.



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Preface

The key aim of the Handbook is to share good practice concerning water management. Municipalities are the main target group of the ENMaR project and the Handbook will provide resources and tools to aid them in meeting the requirements of the Water Framework Directive (WFD). It is also hoped that the Handbook will help guide policy decisions at EU and Member State level. The Handbook therefore has two audiences. Firstly the municipalities and stakeholders at local level, who can compare their circumstances with other river basins and can learn from what others are doing. Secondly, decision-makers will be able to gain an accurate overall impression of the current situation concerning water management at a local level. Both audiences can therefore benefit from the Handbook, which is the main output of three years work on the ENMaR project.

The Handbook begins by the outlining the project's themes and describing the partner regions involved, focusing in particular on the case study river basin within each of the regions. Such a framework provided a starting point for the project. A chapter is given to each of the key themes of the project (spatial planning, tourism, water management, agriculture and forestry) which highlight differences and similarities among the regions. Due to the high importance placed on public participation, a chapter on stakeholder engagement has also been included. Each project partner was given responsibility for one of the key themes and for writing the relevant chapter.

During regional workshops organised by the project partners, the need for practical examples concerning water management was identified. It was considered that providing target-oriented information would be an important element in improving water status and contributing to regional development in Europe. Therefore an important component of the project was to find good examples of these and disseminate them via the report.

A difficult question often raised concerns measures for financing the initiative. Although the Handbook will not be able to answer the question 'Who is going to pay to help us achieve good water status?', it will provide information on economic elements of the WFD and on the financial aspects of the case studies described.

The target groups have provided valuable input, therefore thanks go to all municipalities and local stakeholders who attended the regional workshops and contributed their experiences and opinions as well as their good examples to the network. Hopefully these will be of interest to other municipalities and will increase involvement in implementing European water policy and in turn result in benefits for regional development.

Special thanks go to the European Union who co-financed the project through the funding programme Interreg IIIc. Without this financial support the project could not have been undertaken in this way.

Foreword

With the Water Framework Directive the European Union has given itself a comprehensive policy framework for protecting our water resources, for us and our children. It commenced with the words „Water is not a commercial product like any other, but, rather, a heritage which must be protected ...“.

Key elements of the Water Framework Directive are:

- a protection for all our waters (rivers, lakes, groundwaters and coastal waters), with the objective to achieve good quality („good status“) for all these waters as a rule by 2015,
- an obligation for thinking, planning and acting base on river basins and sub-basins,
- a broad public participation in development of the river basin management plans,
- an approach with ambitious and legally binding environmental objectives, and at the same time flexible on the paths how to achieve these objectives - thus open to innovation as well as knowledge and initiative at the local and regional level.

Involvement of citizens, local communities, NGOs and stakeholders will be at the core of implementation of the Water Framework Directive, and of achieving its objectives in a way best-suited for a particular river basin and region, and choosing - out of the environmentally possible options - the best solution.

Against this background I welcome this handbook providing guidance and good practice to citizens, local communities, NGOs and stakeholders, and to decision makers at river basin, regional and national level.

My wish for this Handbook is not only a wide readership, but also benefits for our joint objective - getting Europe’s waters cleaner, getting the citizens involved.



Helmut Blöch
European Commission, Directorate General Environment

1 Introduction

1.1 The project idea and objective

The EC Water Framework Directive (WFD) is the most comprehensive and far-reaching legislation of its kind ever produced. Implementing the directive is raising important issues and possibilities for local authorities and municipalities across Europe. From 2005 until 2007, the ENMaR project created a 'European Network of Municipalities and Rivers' that allowed municipalities in Germany, Sweden, Latvia, Spain and England to support and learn from one another. The project has established a network between a number of European municipalities and their rivers and, more specifically, their development under the WFD. ENMaR has conducted, linked and compared WFD-related development in different European regions. The differences, similarities, problems and possibilities during the implementation of the WFD on a local level have been analysed. Those with local concerns, the municipalities and other significant stakeholders, were involved throughout.

ENMaR looked at the long-term consequences of the WFD in different European regions and at the potential of these regions to benefit from one another's experiences. However, ENMaR took up the holistic approach of the WFD regarding contents. Spatial planning, water management and tourism as well as agriculture and forestry, formed the core areas of the technical work. These topics are considered crucial for regional development. Indeed, an avowed objective of the project was to support regional development using the WFD as an instrument. By providing extensive information and technical support, ENMaR enabled and encouraged municipalities to organise water management in a more sustainable way, to actively take part in local river basin management, to formulate integrative and interdisciplinary spatial planning, to positively use improved water quality in tourism marketing, and to affect the impacts of agriculture and forestry on water in a sense of quality improvement. Good examples of strategies were those which successfully motivated and where improved communication among stakeholders created a greater degree of transparency and common understanding, both preconditions for effective regional development.

On a local or regional level, ENMaR established five networks of stakeholders from the different core areas. Many workshops were offered to identify positive activities and common ideas that could then be multiplied and developed. This provided the

benefit of shared learning on the one hand, while avoiding unnecessary repetitive work on the other. Negative outcomes were also discussed in order to profit from these experiences, too. The outcome of these workshops was circulated inter-regionally, mainly through newsletters, presentations on the project web site (www.enmar.org) and of course via this Handbook.

1.2 The project partners and regions

The ENMaR network was established by seven project partners from five European regions.

From Latvia, the state enterprise Vides Projekti (Environmental Projects) joined the scheme. Vides Projekti was established in 1997 to foster environmental investment and support regional development projects, providing necessary assistance for project implementers, state institutions, international finance organisations and especially local municipalities. The partner from Sweden was Emåförbundet (the Emån Union), a platform set up by municipalities in the Emån catchment area, together with Regional Administrative Boards and NGOs, for joint action on finding solutions to a number of problems in the area, and also to work towards economic and environmental sustainability in the river basin. Like the Swedish partner, the Mersey Basin Campaign has a long tradition of river basin management planning. Launched in 1985, it is a government-backed partnership formed to clean up the rivers, streams and canals of England's North West. It was supported in ENMaR by the School of Environment and Development at the University of Manchester. The agricultural department of the Universidad de Santiago de Compostela (University of Santiago de Compostela, Spain) also lent its support to the project. The final two partners were from Germany. Firstly, Oldenburgisch-Ostfriesischer Wasserverband (the Water Board of Oldenburg and East Frisia), one of the largest drinking water suppliers in Lower Saxony, which also deals with sewage disposal. And Kommunale Umwelt-Aktion U.A.N. (municipal environmental campaign), a body closely linked to the association of towns and municipalities in Lower Saxony and which is assigned to assist these areas in solving environmental issues.

Within the project, the Kommunale Umwelt-Aktion U.A.N. was responsible for overall organisational issues such as management and co-ordination. According to their expertise and resources, the other six partners took responsibility for various core areas. Water management issues were overseen by the Oldenburgisch-Ostfriesischer Wasserverband. The Universidad de Santiago de Compostela and

Emåförbundet were responsible for agriculture and forestry. Vides Projektı dealt mainly with tourism while spatial planning was covered primarily by the Mersey Basin Campaign and the University of Manchester.

A key objective was to support regional development, though the project partners did not themselves represent regional authorities. Instead, the 'river basin' approach of the WFD was adopted, meaning that ENMaR worked across administrative and national boundaries and identified river basins as the 'regions' taking part. These were the Mersey (England), the Emån (Sweden), the Gauja (Latvia), the Miño (Spain) and the Weser (Germany). These regions will be described and compared in more detail later on.



The ENMaR river basins (source: EuroLandscape CCM, modified)

ENMaR wanted municipalities to be the real beneficiaries of this project. Even though no municipalities were direct partners, they formed a necessary and significant part of the network. The project partners have been service-providers for municipalities, establishing or intensifying the networks mentioned above. The key stakeholders have been representatives from municipalities, counties, water authorities, planning institutions, farmers' associations and other relevant groups of interest.

This formed the project's contribution to a vital aspect of the WFD, and indeed to other planning policies: public participation. Public participation was considered as underlying subject within the ENMaR project.

1.3 European water policy: WFD as the new challenge

1.3.1 Introduction to the EC Water Framework Directive

European Water Policy has undergone a long restructuring process, resulting in the Water Framework Directive. The directive was adopted in 2000 and will set objectives for future water policy. The key aims of the Water Framework Directive are:

- expanding the scope of water protection to include all waters, surface and groundwater
- achieving a good status rating for all waters by 2015
- establishing water management based around river basins
- a combined approach of emission limit values and quality standards
- getting the costs right
- cost-covering water prices
- streamlining water legislation

1.3.2 River basin management

The new system of water management is based around river basins - a natural geographical and hydrological unit - instead of around administrative or political boundaries. Positive examples exist for such an approach, including the international commission on the Rhine. While several Member States already used a river basin approach, this was not the case everywhere. For each river basin district a competent authority had to be identified, a risk assessment had to be undertaken, and a river basin management plan had to be established, including specific measures to be implemented. This plan needs to be updated every six years.

1.3.3 The objective: good status for all waters by 2015

There are a number of objectives involved in the protection of water quality. The key ones at a European level include general protection of aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. All these objectives must be integrated for each river basin.

Surface water

A general requirement for ecological protection, and a general minimum chemical standard, was introduced to cover all surface waters. These form the two elements, good ecological status and good chemical status. Good ecological status is defined in terms of the quality of the biological community, the hydrological characteristics, and the chemical characteristics. Due to ecological variability across the Community, the control limits are specified to allow only a slight departure from the biological community that would be expected in conditions of minimal anthropogenic impact. Good chemical status is defined in terms of compliance with all quality standards established for chemical substances at European level. The Directive provides a mechanism for renewing existing standards and establishing new ones. This ensures at least a minimum chemical quality, particularly in relation to very toxic substances.

Other objectives for water protection apply to more specific areas. The obvious way to incorporate these is to designate specific protection zones within the river basin which must meet the different objectives. The overall objectives for the river basin will require ecological and chemical protection as a minimum everywhere, but where more stringent requirements are needed for particular uses, distinct zones will be established and higher objectives set within them.

There is one category of uses which does not fit into this picture. It is the set of uses which adversely affect the status of water but which are considered essential on their own terms - they are overriding policy objectives. The key examples here are flood protection and essential drinking water supply. Less clear-cut cases are navigation and power generation, where the activity is open to alternative approaches.

Groundwater

The broad presumption in relation to groundwater should be that it should not be polluted at all. For this reason, setting chemical quality standards may not be the best approach as it gives the impression that a permitted level of pollution

exists which Member States can legally reach. A few such standards have been established at a European level for particular issues (nitrates, pesticides and biocides) and these must always be adhered to. For general protection the approach comprises a prohibition on direct discharges into groundwater. To cover indirect discharges, a requirement exists to monitor groundwater bodies so as to detect any changes in chemical composition and to reverse any anthropogenically-induced upward pollution trends.

Quantity is also a major issue for groundwater. There is only a certain amount of recharge into a body of groundwater each year and of this recharge some is needed to support connected ecosystems, e.g. surface water bodies or wetlands. For good management, only that portion of the overall recharge not needed by the ecology can be abstracted - this is the sustainable resource, and the Directive limits abstraction to that quantity.

1.3.4 Co-ordination of measures

There are a number of measures taken at Community level to tackle particular pollution problems. Key examples are the Urban Waste Water Treatment Directive and the Nitrates Directive, which together tackle the problem of eutrophication; and the Integrated Pollution Prevention and Control Directive, which deals with chemical pollution. The aim is to co-ordinate the application of these so as to meet the objectives established above. This is done as follows.

Objectives are firstly established for the river basin as outlined in the previous section. Then an analysis of human impact is conducted to determine how far from the objective each water body is. At this point, the effectiveness of full implementation of all existing legislation on the problems of each water body is ascertained. If existing legislation solves the problem, the objective of the Water Framework Directive is attained. However, if it does not, the Member State must identify exactly why and design additional measures to satisfy the objectives. These could include stricter controls on polluting emissions from industry and agriculture or urban waste water sources. This should ultimately ensure full co-ordination.

1.3.5 The river basin management plan

The plan is a detailed account of how the objectives for the river basin (ecological status, quantitative status, chemical status and protected area objectives) are to be reached within the required timescale. The plan will include all results of the above

analysis: the river basin's characteristics, a review of the impact of human activity on the status of waters in the basin, estimation of the effect of existing legislation and the remaining gap to meeting these objectives, and the measures designed to fill this gap. One additional component is that an economic analysis of water use within the river basin must be carried out. This is to enable a rational discussion on the cost-effectiveness of various possible measures. It is essential that all interested parties are fully involved in this discussion, and indeed in the preparation of the river basin management plan as a whole.

1.3.6 Public participation

There are two main reasons for an extension of public participation. The first is that any decisions made regarding appropriate measures for achieving management plan objectives will involve balancing the interests of various groups. The second reason concerns enforceability. The greater the degree of transparency involved in the establishment of objectives, imposition of measures, and reporting of standards, the greater care Member States will take to implement legislation in good faith, and the greater the power of citizens will be to influence the direction of environmental protection, whether through consultation or, if disagreement persists, through complaints procedures and courts. Caring for Europe's waters will require greater involvement of citizens, interested parties and non-governmental organisations (NGOs).

1.3.7 Getting the costs right

The need to conserve adequate supplies of a resource for which demand continuously increases is also one of the driving forces behind what is arguably one of the Directive's most important innovations - the introduction of pricing. Adequate water pricing acts as an incentive for the sustainable use of water resources and thus helps to achieve the environmental objectives of the Directive. Member States will be required to ensure that the price charged to water consumers - such as for the abstraction and distribution of fresh water and the collection and treatment of waste water - reflects the true costs.

source and further information: <http://www.europa.eu.int/comm/environment/water/water-framework/overview.html>

1.4 WFD and the municipalities

The implementation of the WFD will have its greatest effect at a local level. Water authorities, municipalities, environmental associations, wastewater treatment companies, drinking water suppliers, maintenance associations, agriculture and forestry representatives and other water users will all be affected by the implementation of the WFD but can also get involved in its implementation due to their local knowledge. To date it has been mainly national or regional water authorities who have overseen the transposition of the WFD into national law, as well as the risk assessments and installation of the monitoring programmes.

The next step in implementing the WFD is to develop programmes of measures and river basin management plans in co-operation with local stakeholders and experts. The water authorities and water users have to determine significant water management issues to gather further data for the risk assessment of water bodies and to develop measures for regional improvements. The development and implementation of these measures might of course have financial and planning impacts on municipalities in subsequent years and so they can be uncertain and wary about the unknown risks of the WFD and of their commitment to participate.

To ensure the optimal implementation of the WFD for the well-being of the public it is crucial to combine the local knowledge of the municipalities with the specialised knowledge of experts. The municipalities should be supported throughout the implementation of the WFD so that:

- they are actively and genuinely involved
- their ecological, economic and social interests are all considered
- links with other technical departments and interdisciplinary planning processes are established which will benefit the WFD
- win-win situations are established which are favourable for the development processes of the municipalities and for the implementation of the WFD

Furthering this concept, the implementation of the WFD could play a role in the following fields of municipal issues (with variation in the different European Member States or regions):

- sewage treatment and discharge in rivers
- water supply

- water body maintenance and the construction of waterways
- urban landuse planning with consideration of spatial planning, nature conservation and flood protection
- tourism and local recreation
- agenda 21 activities
- public participation

These individual aspects are now discussed.

1.4.1 Sewage treatment and discharge in rivers

In principle, the municipality is responsible for wastewater disposal. Discharges from drains (wastewater and rain water) contribute to the pressures of surface waters and so these were taken into account in the risk assessments of 2004. Appropriate areas of concern, which would directly involve the municipalities, could include the elimination of purification plant nutrients, the limitation of emissions or the discharge of rain water. Appendix VIII, point 4 of the WFD refers to priority substances which should be phased out in the future. The existence of such substances in the run-off from purification plants may give rise to a discussion on the re-fitting of treatment plants with a fourth purification stage, or diaphragm filtration. Concerning rain water discharge, the municipalities may find the need to implement measures to avoid, reduce or slow down storm water or to build storm water treatment plants, in order to reduce the loads concerning quality and quantity. Elsewhere, in the designation and planning of new building zones in the context of urban landuse, the planning objectives of river basin management will have to take into account issues of both wastewater disposal and storm water run-off.

1.4.2 Water supply

This issue is dealt with either voluntarily in the service of the public or by water boards and/or private enterprises. The municipalities tend either to be water-suppliers themselves, are members of water boards or, as in England, have neither such connection. The risk assessment revealed that the main reason groundwater bodies fall below a good status rating is diffuse pollution (in particular from agriculture) rather than the quantity due to water abstraction.

Possible solutions to arise from implementation of the WFD could be:

- Water supply must be brought in line with the objectives of the WFD, then the WFD itself would have impacts on planning and permission for water abstraction and might affect the rights water boards have for water abstraction for example in Germany.
- Plans for water abstraction must take into account long-term protection of existing resources. Groundwater abstraction may not exceed groundwater recharge.
- Costs for water services, meaning water supply and wastewater treatment, and including environmental and resource costs, must be covered by the polluter in each case. This could mean that the implementation of the WFD in turn might affect the cost of drinking water supply and of wastewater treatment.

1.4.3 Water body maintenance and water development for small water-courses

An obligation for maintenance in this area means:

- ensuring a proper flow to discharge excess water and, for navigable waters, maintaining their navigability
- the management and development of waters generally

Maintenance must take into account the river basin management's objectives and must also correspond with demands made in the programme of measures. Municipalities are concerned with water maintenance, if they either own waters themselves or are members of related associations.

Possible measures to improve water structure could be:

- reconstruction of migration obstacles as transverse buildings
- constructive measures to improve the hydro morphology of rivers (riverbed modelling)
- improvements to riverbanks and sole structures
- use of appropriate maintenance to allow the watercourse to develop naturally according to its own dynamics and habitat

It will always be necessary to clarify who should take responsibility for the financing of such measures.

1.4.4 Urban landuse planning with consideration of spatial planning, nature conservation and flood protection

Here are some possible links between the implementation of the WFD and urban landuse planning.

The WFD demands good ecological status of surface water. In terms of hydro morphology this means a suitable bank structure. Therefore WFD objectives are not only relevant for rivers themselves but for entire floodplains. This has to be considered in municipal landuse planning.

Building planning steers housing development and other types of landuse. For this purpose a municipality formulates landuse plans and local development plans. A landuse plan needs to demonstrate proposed landuse for the whole area of the municipality resulting from the intended building development and should take into account the needs predicted by the municipality. This includes, among other things, water bodies, ports and areas planned for water management, as well as areas to be reserved for floodplains.

If, for the implementation of the WFD, aspects such as the improvement of bank structure, the development of floodplains, the planning of waste water disposal from housing areas, and the construction of riparian zones are being tackled, then the municipalities will be concerned with general building planning.

One problem encountered by urban landuse planning is soil sealing. This practice results in increased amounts of water running into drains rather than seeping naturally into the groundwater. The need to constantly drain urban areas puts pressure on the water system, particularly as rivers are already at their limits. As the practice of soil sealing continues to grow, so does the amount of water that needs to be drained. If this continues, rivers will need to be developed to absorb the excess. The consequences would be to declare a halt to new housing developments or to construct more storm water tanks, which involve substantial costs. This is an example showing the links between implementation of the WFD, urban landuse planning and its possible consequences.

Urban landuse planning will also be affected during implementation of the WFD by the interaction of spatial planning and nature conservation. Building plans have to meet the objectives of spatial and regional planning but they must also consider the interests of environmental protection and nature conservation.

River basin management plans provide framework conditions according to the WFD but initially these are not mandatory. They do, however, need to be included in federal spatial planning (regional planning programme and landscape programme) as well as in local planning (regional spatial planning programme and landscape master plan). It needs to be ascertained whether a programme of measures or river basin management plan will be legally binding and in how much detail they will need to be reported. Some national water laws contain a regulation that, when setting up river basin management plans, the objectives and requirements of spatial planning have to be considered. The impact on regional spatial planning programmes and their processes of production have been discussed in the project.

Discussions with municipalities showed that the issue of flood protection is often the 'door opener' to establishing a commitment in terms of surface water. Flood protection affects building zone planning. The main requirement of the new European Union action programme on flood protection is to allow more space for rivers, in other words, to encourage the protection and re-establishment of floodplains as natural flood areas and in situ flood protection. There is some overlap between the programme for flood protection and the WFD, including possible measures to be taken.

In the future the implementation of the WFD will show the effects of river basin management plans on building zone planning and how binding they will be.

The requirement for compensating measures to be taken for causing environmental impact is something that could be linked with the WFD, and which would support its implementation. One premise for this approach is for the compensatory measure to be appropriate to a landscape plan for the municipality. The municipalities concerned should be fully involved in the development of a relevant programme of measures.

1.4.5 Tourism and local recreation

Municipalities can see opportunities arise in terms of tourism and local recreation in the implementation of the WFD. Synergies are possible in these areas. By developing natural looking water bodies in the process of implementing the WFD, recreational areas can result for locals and tourists alike. For example, creating alluvial landscapes can make it possible to walk or cycle once again along a river. Further positive examples are the creation of a water didactic exhibition or the reproduction of historical bridges over a river.

1.4.6 Agenda 21 activities

A benefit for the implementation of the WFD at the municipal level could be the Agenda 21 working groups on water. Agenda 21 pursues principles of sustainability and defines detailed working plans for sustainable ecological, economic and social development in the twenty-first century, including subjects such as the protection of water resources. The municipalities are at a political level closest to citizens. This level deals with many of the tasks crucial to sustainable development. Therefore municipalities are expected to establish their own local Agenda 21. For this, local authorities need to initiate a dialogue with their citizens, organisations and the private sector. An action programme has to be developed, followed by projects to bring about its implementation. The range of possible projects in the water sector is large, for example river restoration measures such as replanting river or brook banks or planting hedges to protect arable land from wind and prevent soil erosion. The crucial aspect of such measures is acceptance by the citizens and water users concerned. Acceptance, however, pre-supposes an understanding of the relationships between the issues, therefore provision of information is an important initial requirement. Where people consider a river section or part of a lakeside as their own and take part in projects, acceptance and support is at its greatest. Projects that are suitable for Agenda 21 are therefore small-scale projects that allow the people involved to identify with their water body.

1.4.7 Public participation

The WFD demands public participation. In the preamble of the Directive it states: '(14) The success of this Directive relies on close co-operation and coherent action at Community, Member State and local level as well as on information, consultation and involvement of the public including users. The Directive also says: '(46) To ensure the participation of the general public including users of water in the establishment and updating of river basin management plans, it is necessary to provide proper information of planned measures and to report on progress with their implementation with a view to the involvement of the general public before final decisions on the necessary measures are adopted.' The water authorities have to support the active participation of all interested persons, groups and organisations in the programmes of measures and river basin management plans. The municipalities are the most suitable organisations for reaching the water user as they already have experience in planning, an area that also requires public participation.

1.4.8 Conclusion

Dealing with the content and opportunities of the WFD through ENMaR has changed the point of view of municipal representatives and local stakeholders. In particular the link to water issues in the municipal concerns of landuse, building planning, spatial planning and flood protection has become more and more apparent. Opportunities are being seen for tourism and local recreation. There is a special need to clarify how legally-binding river basin management plans and programmes of measures will be, especially with regard to building planning and the responsibility for financing the measures.

1.5 Regional development

Regional development is an ongoing process within municipalities, counties, districts and regions. On all levels, decision making authorities and politicians are developing concepts and plans, implement measures or start initiatives to bring forward the development of their region.

The European Commission is supporting this approach by setting up funding programs, such as Interreg IIIC, which co-financed the ENMaR project.

1.5.1 Interreg IIIC

ENMaR is part financed by the EU funding programme Interreg IIIC, which is part of the European Regional Development Fund (ERDF). The DG Regional Policy launched the programme in 2000 with the aim of supporting regional development through interregional co-operation.

'The INTERREG IIIC-programme forms a general framework for interregional co-operation and promotion of exchanges of experience and best practice. The way to achieve this is to exploit the experiences collected with different policy instruments and project approaches and on that basis to learn from each other, and to do so jointly by interregional exchange and co-operation.

This approach is based on the notion that a number of problems and tasks are confronting European regions not only nationally, but across Europe in a similar way. This is true for regions like cities and urban areas, rural areas, border regions, or declining regions to give only a few examples. Where problems and tasks are similar, an exchange on solutions, on the policy instruments applied and the projects developed is promising.

The objective of the interregional co-operation is to improve the effectiveness of policies and instruments for regional development and cohesion. The effects will materialise both at national or regional and European level!

source: COMMUNITY INITIATIVE PROGRAMME - INTERREG IIIC, NORTH ZONE, 2004

1.5.2 Different fields of regional development

There is more than one single facet to regional development. It is an instrument to initiate different activities, to achieve different objectives and to support different fields. The ENMaR core areas of tourism, water management as well as agriculture and forestry are some of those fields, whereas spatial planning is more of an instrument itself, steering regional development with its various planning instruments and covering the different fields.

Tourism employs about 9 million people in Europe and accounts for more than 5% of European Gross Domestic Product (GDP), with an increasing trend in many areas. It also helps reduce the isolation of certain areas and promotes their development. Tourism brings people together and helps them get to know different countries, cultures and landscapes. Tourism therefore has a significant impact on structural developments.

Regional development should follow the sustainable approach especially in terms of the environment. A high level of environmental protection ensures the quality of life, which also contributes to the attractiveness of a region. One of the most important environmental factors which attracts people, is water. Besides having recreational uses such as bathing or water sports, it serves very important functions for a region such as a source of drinking water supply, water ways for navigation, cooling water with its capacity for discharges, water supply for households, industry and agriculture, fishing, the landscape element, biodiversity and having an impact on the weather and local climate.

Agriculture fulfils important tasks, which go far beyond the supply of the society with food. It shapes the rural area and contributes to the functions to be fulfilled for society. Those are for example the production of renewable resources, services such as direct marketing, landscape management as well as tourism activities. Beyond this part of regional development, agriculture contributes to economic functions, to the settlement structure, to free space, to leisure and recovery functions, to the disposal function and to ecological functions.

Forestry steers natural processes in the forest ecosystem, so that they benefit the interests of the forest owners and society as far as possible. Forestry shapes living conditions, e.g. by influencing the water cycle. The forest fulfils important functions both for humans who use the forest, and for the natural environment. Besides being a timber and paper provider, the forest provides forage, food and further natural products. The regularisation and habitat functions of the forests are extremely important and diverse. Their importance for the local and global climate is outstanding. The forest protects from soil erosion, from land and snow slide as well as avalanches, falling rocks, noise and dust. Particularly in densely populated areas, forests have become more important as recreation sites and landscape features.

1.5.3 Rural regional development

There are big cities, such as Riga, Manchester, Hannover or Liverpool, in the ENMaR regions, but the regions are nevertheless mainly characterised by rural areas. Therefore those are a focus of the project. Furthermore rural areas in general have a higher need for regional development.

Rural development in particular should be based mainly on the existing potentials of a region and its people. Co-operation between politicians, administration, the different sectors of the economy, associations and the citizens for the well-being of their rural area is the basis of successful development, as well as the identification and usage of regional potentials. All local players should participate and think about ways to support the region they live in.

Rural development is an area-related, co-operative, learning and long-term approach. The objective is a common development strategy, which integrates different sectors. It is crucial to integrate the different requirements of the rural area and to be multi-disciplinary. Win-win situations raise the acceptance for the regional development strategy. Having as many as possible beneficiaries leads to an integrated rural development process. The maintenance and development of nature and landscape are essential for regional development and its sustainability.

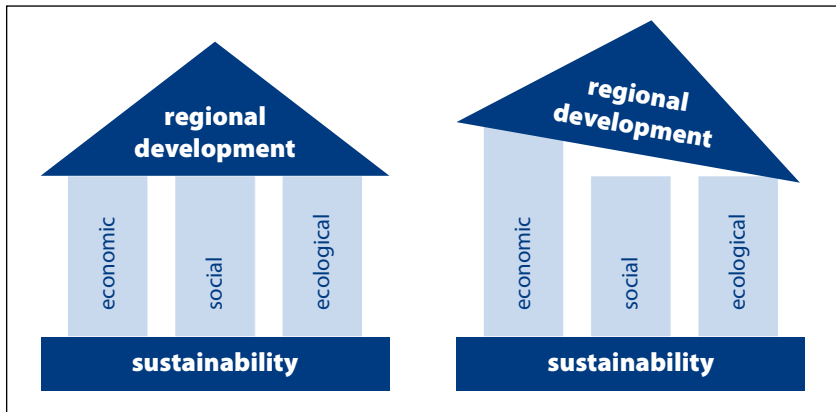
1.5.4 Urban regional development

Despite the emphasis on regional rural development, it is important to acknowledge that Europe is a heavily urbanised continent. Around 75% of Europeans live in urban areas, with this figure predicted to rise to 80% (and to 90% in certain countries) by 2020. As a consequence, urban sprawl driven by socio-economic

factors including changes in housing preference and transport modes is consuming large areas of land and is posing a real threat to the achievement of sustainable development in Europe. Around large cities in particular, rates of sprawl have been especially high. With urban sprawl come increases in the use of energy, land and water, a loss of environmental services associated with landscapes such as wetlands, and a reduced ability to adapt to challenges such as climate change. In terms of water in particular, cities contribute to problems including pollution, flooding and over-abstraction of groundwater. Addressing these challenges related to the water environment has a crucial role to play in promoting the sustainable growth of cities and rural areas.

1.5.5 Sustainable regional development

Regional development on first sight is often equated with economic development, which of course is very important. But the sustainability approach should be named in the same breath.



Economic, social and ecological aspects should be considered on even terms. Indeed, if the main emphasis lies on the economic component, then regional development will not be balanced.

Sustainable development, including protection and improvement of the environment, is one of the objectives of the European Union. Therefore several European policies exist to create same environmental conditions for all European citizens. A natural environment plays an important role in the economy and above all it is crucial for the quality of life. It provides ecological services such as a certain quality of water resources, flood protection and retention. Not only the environment

benefits from, for example, the flood protection function, but so does the economy, because this solution to flooding is more cost-efficient than technical construction for flood protection or remediating the damages. Also concerning water supply, it is more economical to avoid pollution than to clean it up. Human health is another economic factor relying on a clean environment. Due to pressures from agriculture, tourism and the management itself of water quality and quantity, providing good quality water is a costly issue.

1.6 The correlation between water policy and regional development

The integration of different policies, planning instruments and other administrative processes is the approach of both regional development and the WFD.

The preamble of the Water Framework Directive indicates: '(12)... in preparing its policy on the environment, the Community is to take account of available scientific and technical data, environmental conditions in the various regions of the Community, and the economic and social development of the Community as a whole and the balanced development of its regions as well as the potential benefits and costs of action or lack of action. ... (13) ... Priority should be given to action within the responsibility of Member States through the drawing up of programmes of measures adjusted to regional and local conditions. (16) Further integration of protection and sustainable management of water into other Community policy areas such as energy, transport, agriculture, fisheries, regional policy and tourism is necessary...'

Regional development will be supported by the effective participation of municipalities and local stakeholders as they eliminate disparities in best practice and seek common solutions. The WFD has crucial effects on regional development concerning e.g. land use, spatial plans and the economic situation of all stakeholders. Cost-efficiency is an indicator for regional development and will, supplemented by the other two pillars of sustainability, improve processes. The efficient use of water resources as well as pricing policies contribute to sustainable regional development.

River basin management with its objective for the good ecological status of water, supports regional development, especially in an ecological way.

2 Stakeholder engagement

This chapter could have been called ‘public participation’, because the WFD, under Article 14, asks the Member States to encourage the active involvement of all interested parties in the implementation of the Directive. One objective of the ENMaR project was to involve the municipalities in the processes of implementation, but it was not a formal instrument for public participation and it did not address the general public. Instead it provided a means to engage certain stakeholders, and this can definitely be considered to be part of public participation.

An explanation will be given later of which stakeholders are included in the ENMaR network, how ENMaR has engaged these stakeholders and the experiences of doing so. Before that, the following section deals more generally with public participation for the WFD in each of the ENMaR regions.

2.1 Public participation

According to Article 14, the interested parties should be involved in the production, review and updating of the river basin management plans. Additionally a timetable and work programme, an overview of the significant water management issues and a draft of the river basin management plans are to be published for the public, including users, to see. They should have the opportunity to comment on these documents. To give an idea of how the organised public participates (i.e. the relevant groups of interest such as municipalities, counties, other expert authorities and various associations), an overview of the overall organisation of the implementation processes in each region follows.

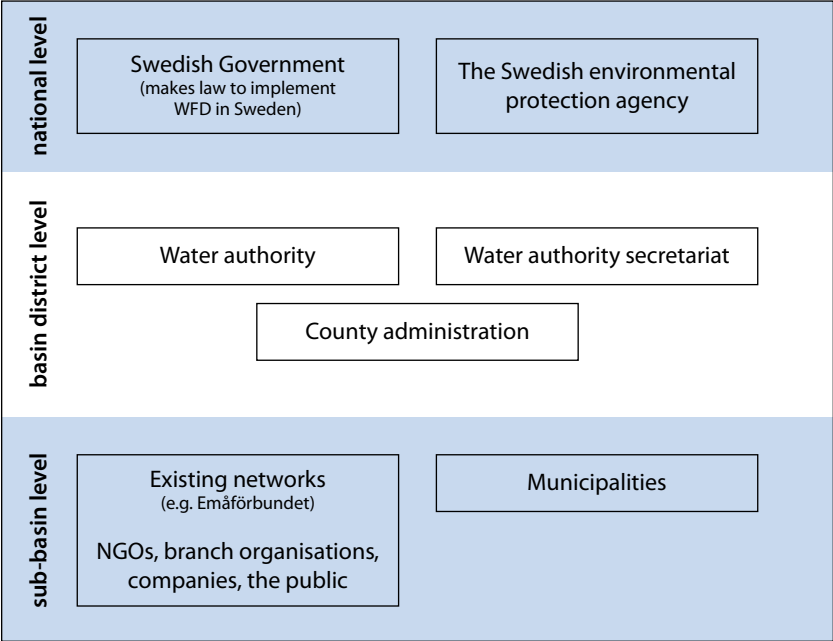
2.1.1 Emån

The Swedish government divided the country into five river basin districts. In each, one of the existing county boards was appointed as competent water authority and therefore has the comprehensive responsibility to implement the WFD in Sweden. Before that, the 290 municipalities and the 24 county boards in Sweden were mainly responsible for water management and planning. Thus, with the WFD, the responsibility was taken from a local to a regional level. To balance this out a complementary level of 110 sub-basins was created. These are managed by the water authority secretariats established in each of the 24 counties in Sweden.

The water authority secretariats are responsible for the regional co-ordination and operative work. This includes realising expert knowledge, assesment of water bodies, contacts with regional stakeholders, monitoring programmes and measures for different river basins.

In every sub-basin, a water council is supposed to be established. These will be responsible for the co-ordination and implementation of the WFD at the local level, including public participation. In the Emån basin (one of the 110 sub-basins), the ENMaR project partner Emåförbundet (Emån Union) has applied for the role of being the water council.

The Emåförbundet members and board has a wide representation of national authorities, two county boards, eight municipalities, companies and other non-governmental organisations (NGOs). Some of the work that is expected to be carried out by the water authority secretariats, has been delegated to the Emåförbundet. This approach is however quite unique for Sweden.



Implementation structure of the Emån river basin (Sweden)

2.1.2 Gauja

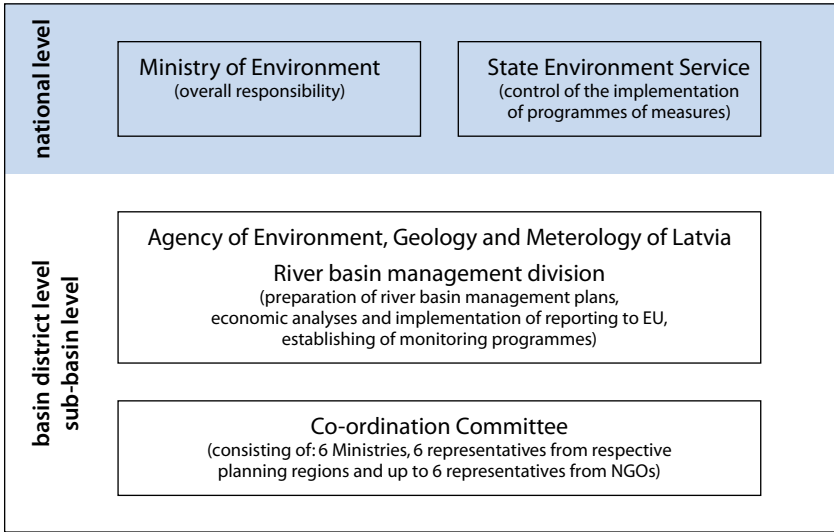
The Latvian Environment, Geology and Meteorology Agency (LEGMA) is the competent authority for river basin management planning. LEGMA is the overall responsible authority for WFD and is supervised by the Latvian Ministry of the Environment.

The law on water management of the Republic of Latvia, requires establishing a co-ordination committee for each of the four river basin districts. A co-ordination committee consists of representatives from six different state institutions: the Ministries of Economy, Health, Regional Development and Local Governments, Agriculture and Environment (2), six representatives from respective planning regions and up to six representatives from NGOs acting in the field of environment, representing water users, suppliers, managers as well as the interests of land and water body users in relation to the river basin district.

The main tasks of the co-ordination committee are as follows:

- to evaluate the developed river basin management plan and programme of measures and their conformance to the interests of society and to provide a statement and recommendations for further development of the plan and programme;
- to evaluate the proposals on the necessary financial means for the implementation of the programme elaborated by the river basin authority and to give a relevant statement;
- to give a statement on the priorities with regard to financial and other resource needs for the measures included in the programme.

The co-ordination committee shall meet at least twice a year. The meetings are open to other interested parties. Decisions taken by the co-ordination committee have an advisory character. The implementation of the programmes of measures is controlled by the State Environmental Service (SES).



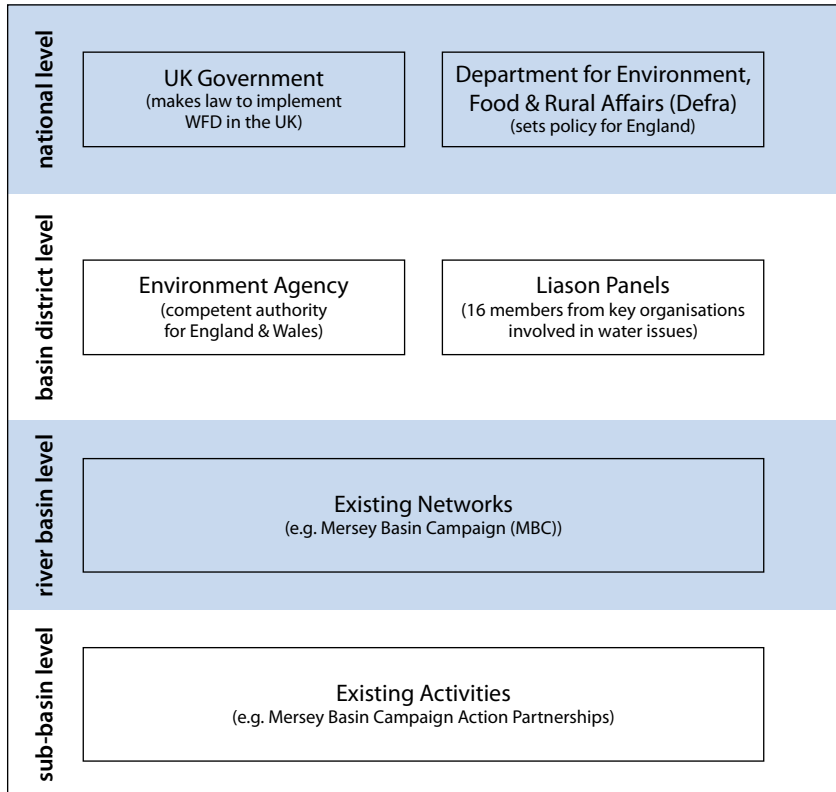
Implementation structure of the Gauja river basin (Latvia)

2.1.3 Mersey

In England and Wales, there are 11 river basin districts for the WFD, one of which is the Northwest of England including the river Mersey. The government Department of Environment, Food and Rural Affairs (DEFRA) has policy responsibility for WFD and the Secretary of State (UK Government) has ultimate responsibility. The Environment Agency is responsible for implementing the Directive and has set up river basin district liaison panels in each of the 11 districts. Each liaison panel has 16 members from key organisations involved in water issues and others who can both represent the public and help drive changes in behaviour; these are the Regional Development Agency, Regional Assembly, local authorities (councils), Natural England, water companies, environmental NGOs, farming, business and industry, national parks, county councils, rural local authorities, large landowners, environmental groups, business sector representatives or water abstractors.

There is now a Regional Water Framework Directive liaison panel for Northwest England made up of major stakeholders at a regional level. The water company in the Northwest - United Utilities, the Mersey Basin Campaign and a representative of a county council sit on the panel alongside representatives from business and envi-

ronmental groups. A challenge is how to engage wider stakeholders and the public in the process of developing the river basin management plan for the Northwest.



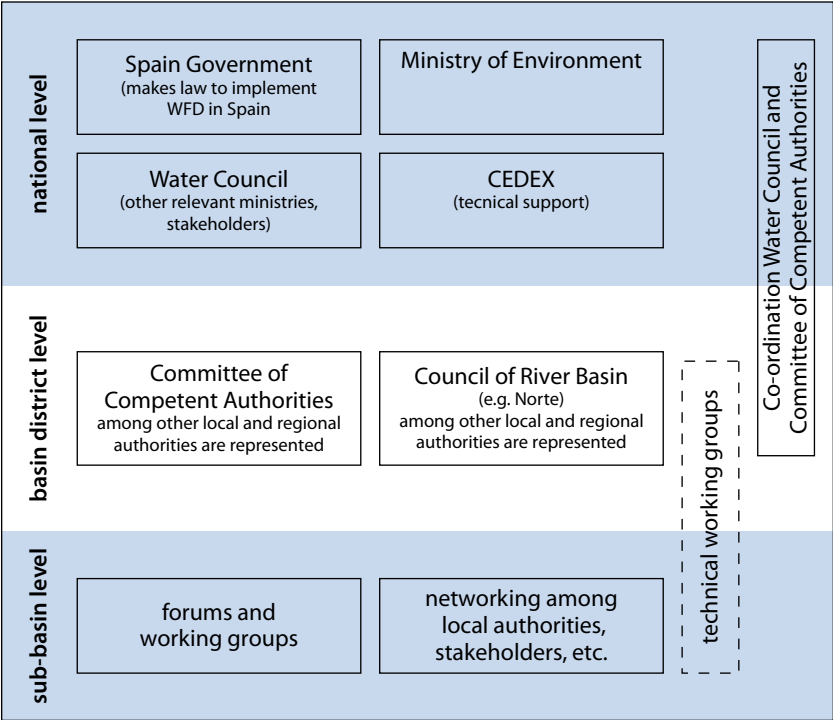
Implementation structure of the Mersey river basin (England)

2.1.4 Miño

At the national level, the Hydrographical Confederation located within the Department for Environment, is responsible for implementing the WFD in the 14 Spanish river basins. However, when a river basin is completely within the boundaries of an Autonomous Community, this Community is the competent authority, as it is the case with Galicia (Augas de Galicia-Xunta) and the Miño (Confederación Hidrográfica del Miño-Limia-Autoridad Nacional).

In order to encourage the public to participate, forums and working groups will be established on the local level. Besides that, the local and regional authorities are represented on the Committee of Competent Authorities and on the River Basin Council.

The functions of the Committee of the Competent Authorities are to support the co-operation among administrations, to stimulate the adoption of measures for the competent administrations and to provide information to the European Union via the Ministry of Environment. The functions of the River Basin Council are to promote the information, the consultation and the public information in the process of planning, to provide the Government with river basin management plans and to inform on questions of general interest concerning the basin.



Implementation structure of the Miño river basin (Spain)

CEDEX (a research and development centre established by the government) facilitates the implementation process at the national level. It provides information, technical and scientific studies to support the implementation of the WFD, in hydrological and hydraulic topics.

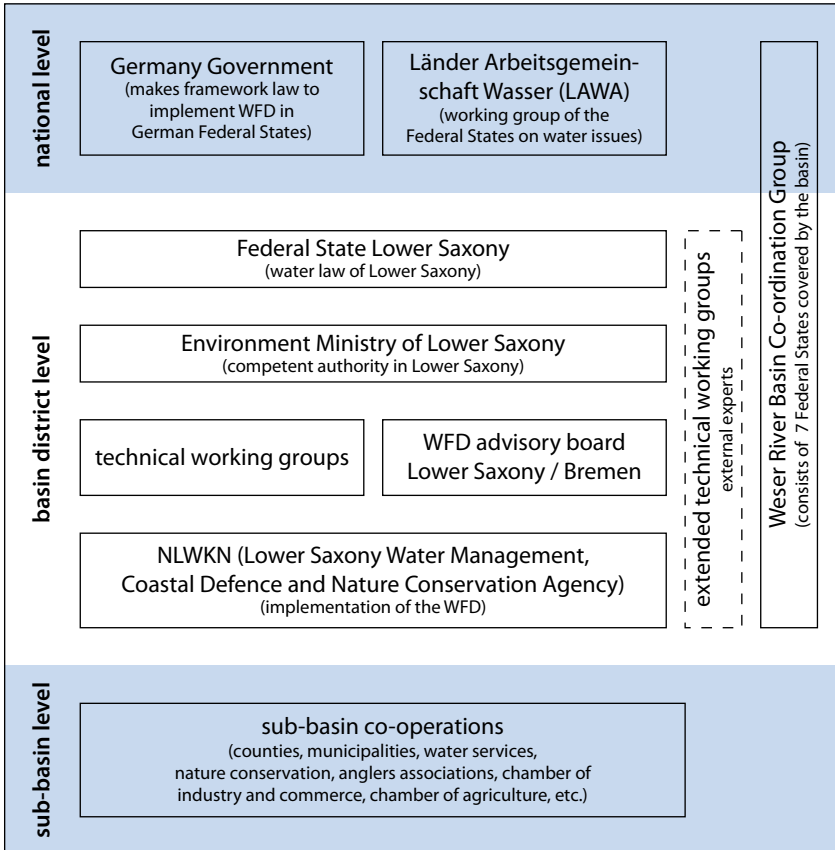
2.1.5 Weser

Water legislation in Germany is only a framework at the national level. Therefore the Länder are in charge of implementing the WFD in the ten river basins. The Weser covers seven Länder, so seven competent authorities exist, which are co-ordinated by the Weser River Basin Co-ordination Group. This consortium realises and co-ordinates water management activities throughout the Weser river basin (www.fgg-weser.de).

In Lower Saxony, the Lower Saxony Water Management, Coastal Defence and Nature Conservation Agency (NLWKN) is implementing the WFD on behalf of the Environmental Ministry. The Ministry set up technical groups to work on questions on how to implement the WFD. It has also set up extended technical groups to co-operate with external experts, who are stakeholders with a concern in the WFD. There is also a WFD Advisory Board of Lower Saxony and Bremen. The stakeholders of the board inform their members and water users by hosting information meetings and involving the public.

In Lower Saxony's part of the Weser, 'round tables' have existed since autumn 2005. 28 sub-basins co-operations have been established with about 15 to 20 representatives of counties, municipalities, water suppliers, water maintenance boards, agriculture and/or forestry, industry, environmental associations and the NLWKN. These management groups are responsible for verifying the results of the risk assessment and for discussing management objectives and programmes of measures as well as for contributing to the river basin management plans.

The municipal participation is organised and supported by a project called "WFD information forum", set up by the Kommunale Umwelt-Aktion U.A.N. (www.wrrl-kommunal.de).



Implementation structure of the Weser river basin (Germany)

2.2 Stakeholder engagement

An important aspect of stakeholder engagement is getting the right people together. Therefore one of the first steps within the ENMaR project was to develop a stakeholder map (see case study p. 184). To better represent the ENMaR core areas, not only the respective technical staff from the different departments of the municipalities have been invited to the local workshops, but also many other appropriate institutions or associations.

In the three years lifetime of the project, 52 workshops and four inter-regional conferences with nearly 2 000 participants have been organised. Two workshops on each core area and two integrating all core areas took place in each ENMaR river basin. In total 138 municipalities have been engaged. Reports and many presentations from the workshops are available on the project's website: www.enmar.org. Furthermore, a regular newsletter and an interim report have been produced, which are available on the website, too.

workshops on	Emån	Gauja	Mersey	Miño	Weser	total
spatial planning	36	32	74	55	68	265
water management	21	39	65	64	43	232
agriculture/forestry	39	51	37	63	82	272
tourism	31	47	50	48	33	209
all themes	42	37	130	66	67	342
additional workshops	-	-	250 ¹	85 ²⁺³	120 ⁴	455
ENMaR conferences		? ⁵	77 ⁶		57 ⁷	134
total	169	206	683	381	470	1909
municipalities involved	8	46	29	9	46	138

¹ Mersey - Mersey Basin Campaign Conference 2006 (12th December 2006)

² Miño - Open door seminar to inform about the WFD (15th November 2006)

³ Miño - Presentation of a remediation project from Sweden (18th May 2007)

⁴ Weser - International Conference "World Water Day" (22nd March 2007)

⁵ Gauja - Final Conference "Water: local planning and management" (18th+19th October 2007)

⁶ Mersey - International Conference "Planning for Water - Showcasing projects and case studies from across Europe" (23rd February 2007)

⁷ Weser - International Conference "The Costs of the Water Framework Directive - Chances and Risks for the Municipalities" (2nd March 2006)

Overview of the workshops and conferences organised in the frame of the ENMaR project and the number of participants attended



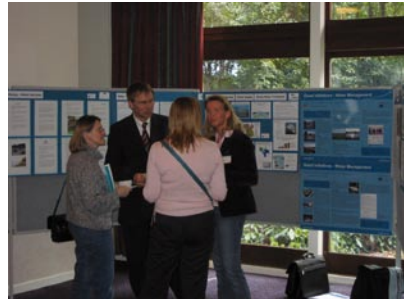
*Regional workshop on water management,
28th June 2005, England*



*Regional workshop on water management,
28th June 2005, England*



*International conference,
2nd March 2006, Germany*



*International conference with a poster exhibition
23rd February 2007, England*

The experiences of stakeholder engagement in these different basins is described in the following sections.

2.2.1 Emån

The regional network in the Emån river district is based on the so-called Emåförbundet (Emån Union). In the beginning of the 1990's the municipalities in the Emån catchment, together with the Regional Administrative Boards and NGO's decided to create a platform for discussion and joint action to find solutions to several problems in the area and to work for economic and environmental sustainability in the river basin. Participants are the eight municipalities along the river. These are Sävsjö, Nässjö, Vetlanda, Eksjö, Hultsfred, Högsby, Mönsterås and Oskarshamn. The country administrative boards in the two respective counties Jönköping and Kalmar are also involved as well as the Regional Council in Kalmar County, the Emån Water Association, the National Board of Fisheries, the National Road Administration and



River basin districts in Sweden

the European Union through structural funds (Objective 5b, Southeast Sweden).

The ENMaR project networks were integrated in existing networks where appropriate, e.g. Emåförbundet already had an agriculture and forestry network group which was able to serve as the network group for that theme within the ENMaR project.

However, Emåförbundet did create a watercourse group, which is a network established in the catchment area of the river Fuseån - a tributary of the river Emån. This group, having 14 members, consists of landowners who live and work adjacent to the river (see case study, p. 178). Most of the landowners work with agriculture and forestry and therefore have an effect on the water quality in different ways and varying degrees. The watercourse group has met on several occasions during the two years since the first seminar in December 2005. During 2007 the group itself decided to create an interim board, with the aim to call for meetings and receive information from landowners and Emåförbundet.

The existing watercourse group serves as an example of how local participation might be created with the aim of implementing the WFD on local level. The next step is to get the agriculture and forestry group in Emåförbundet to create several watercourse groups within the whole river basin.

The stakeholders were informed about the WFD and the role of Emåförbundet within the river basin. At seminars on each of the ENMaR themes, they were invited to participate in a closer network where Emåförbundet might serve as the co-ordinator for discussions, measures and results.

2.2.2 Gauja

The area of the Gauja basin is spread, partially or fully, across seven administrative districts of Latvia, according to current administrative territorial divisions.

A characteristic of Latvia is its division into large numbers of small municipalities. 129 municipalities are located in the Gauja basin, with populations ranging from 300 to 27 000. These municipalities are directly responsible for the organisation of water services and the development of local spatial planning. As such, they form the main target group for ENMaR project activities.



River basin districts in Latvia (source: Latvian Environment, Geology and Meteorology Agency)

Practical responsibility for water supply in the territories is often transferred to municipal enterprises who form an important stakeholder group. Another group is composed of environmental protection authorities who are concerned with pressure from agriculture, forestry and tourism. The views of the tourism sector in the project are represented by the tourism information centres, which are established by the municipalities.

Representing national authorities, the Ministries of Environment and Agriculture, together with their subordinate institutions and regional structures, form an important component of the stakeholders' network. They communicate policy developments from central government to local stakeholders in the Gauja basin. Various consultancies and universities contribute their knowledge and bring more theoretical aspects on water management that relate to the core areas of the ENMaR project. It is noticeable that interest from NGOs in project activities has risen during the second half of the project implementation.

As part of the ENMaR project, ten regional workshops were organised, aimed at getting local stakeholders involved. In total, 206 participants attended these events. A good level of involvement from the key stakeholder group was observed, as 50% of participants in the regional workshops were there to represent municipalities. Furthermore, this attendance represented good coverage for this stakeholder group, as 46 municipalities (in terms of geographical location) were

represented in at least one of the regional workshops. Participants in regional workshops came from both towns and rural municipalities.

Participants identified the involvement of stakeholders in activities related to water protection as being a positive aspect of the project. Many stakeholders made multiple attendance (two or three times) to regional workshops. Information on practical implementation of the WFD at a local level was noted as a key issue in these workshops. The ENMaR project team has established effective co-operation with several active municipalities, such as Cēsis, Valka and Valmiera. These contacts are essential for maintaining a link to local stakeholders and serve as consultants for the ENMaR products. In addition, active municipalities were represented at the international ENMaR conferences as well.

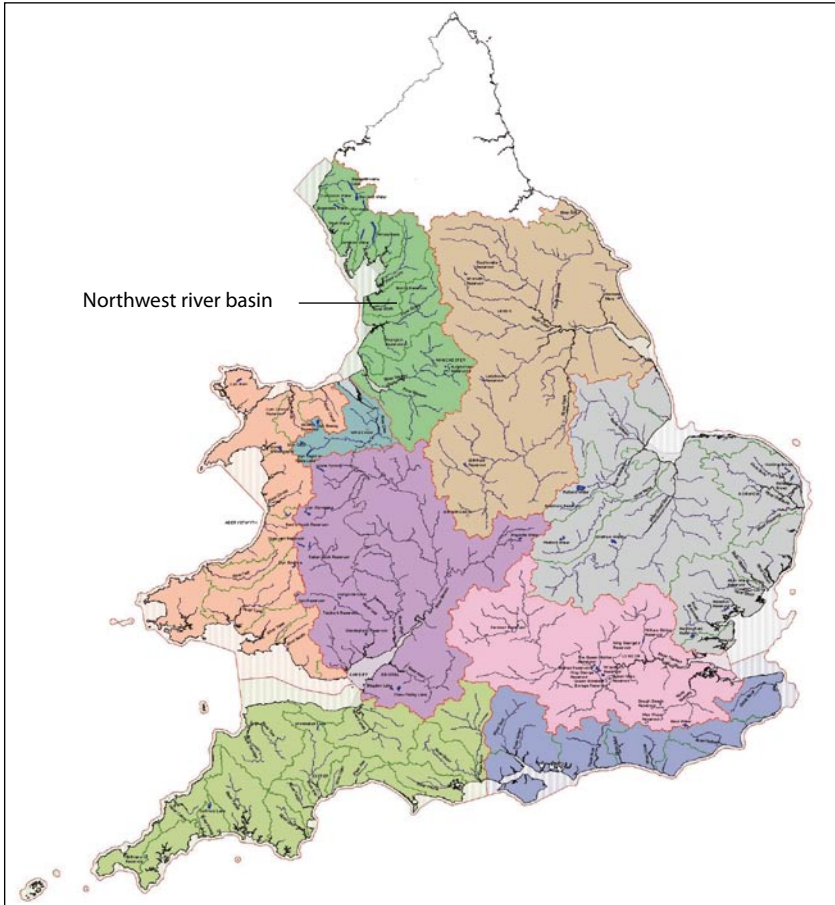
2.2.3 Mersey

At the local level, ENMaR is expanding the capacity of local authorities and other stakeholders to work proactively within the Mersey river basin by creating common solutions and highlighting good practice. In England's Northwest, the water and wastewater company United Utilities manage water services, the Environment Agency is responsible for the WFD and local authorities are responsible for the development and use of land.

Because the WFD requires land and water to be managed holistically, land managers need to be involved as well as water managers. Therefore ENMaR is raising awareness of water issues with local authorities who manage the land in England's Northwest.

ENMaR seminars in the Mersey basin area are targeting local authority planners and involving relevant experts to help address water policy issues. 9 seminars have been held, with a total of 84 planners participating at one or more seminars. 29 local authorities in the Mersey basin are now involved, and with experts from other organisations such as the Environment Agency and United Utilities, there are now over 140 people in Northwest England's ENMaR network. One more additional ENMaR seminar is planned in November 2007, and the network established can be involved in future events.

Stakeholder mapping is being used to identify and categorise members of the growing ENMaR network.



River basin districts in England and Wales (source: Environment Agency)

Issues raised by workshop participants include sustainable drainage systems (SuDS), climate change, planning policy and decisions, WFD 'good status', the use and reuse of greywater, the impact of nutrients, diffuse pollution, rising water temperature, sludge, and the significance of environmental standards and regulation. ENMaR seminars are held every few months in England's Northwest and a regular e-Newsletter is being sent to the English network.

Group working helps the members of the network discuss water issues with each other and the experts present. Reports on the issues raised during the workshops highlight that practical solutions are needed, and planners desire guidance on what to do concerning the implementation of the WFD and how to do it.

One seminar, held jointly with the government department responsible for spatial planning, consulted planners on water policy. This seminar provided the opportunity for Northwest planners to present their opinions relating to the WFD to the national government body responsible for planning in England. The main conclusions were:

- Planners desire guidance on the WFD.
- There is a need to work together to implement the WFD. This is especially important as river basins do not respect administrative boundaries between local authorities.
- Water needs to be seen as a core planning issue and should be given greater priority.
- A government policy statement on water for planners would help to clarify the situation.

At the first, second and ninth workshop, delegates indicated how much knowledge they had of WFD and its key requirements.

	workshop 1	workshop 9
none	4%	8%
little	38%	18%
some	38%	54%
much	21%	22%

It is positive that this shows a shift to a higher level of knowledge of the WFD since the first ENMaR seminar. Nevertheless, planners want to know more about the WFD and specifically what is expected of local authorities to assist in its implementation.

2.2.4 Miño

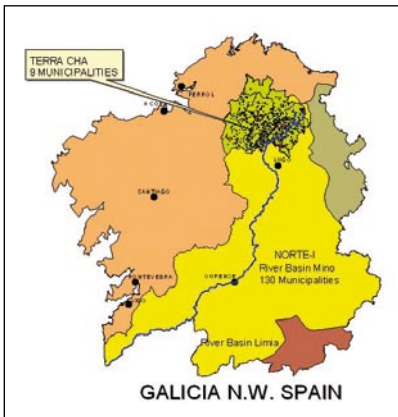
Although the Miño river basin covers half the Autonomous Community of Galicia in the Northwest of Spain, in order to achieve appreciable practical results, a smaller pilot area was selected, formed by the nine municipalities of the Terra Chá region, a sub-basin of the Miño. Based on this area, there are three target audiences:

- regional level: authorities, companies and associations with responsibilities for the overall region of Galicia
- national level: water and environmental authorities with responsibilities on a regional and local level
- interregional level: interaction with the other regions in the ENMaR project



Northbasin

The objective was to involve and encourage the nine municipalities in the area, together with relevant experts, members of government institutions, and organisations working for the environment, tourism, agriculture and water management, as well as other stakeholders, to all work together as a single unit.



Terra Chá in Galicia

These various groups of interest were collectively approached to identify problems and, through discussion, attempt to put forward solutions that will help reach the objectives of the WFD, with maximum participation from the general public.

The network was maintained through direct communication with participants via postal mail, fax, email and telephone. Personal interviews were carried out, in particular with mayors of the municipalities, and all stakeholders were openly invited to take part in various workshops and seminars.

All stakeholders displayed an interest in utilising the network for the exchange of ideas and potential resources. However it sometimes proved difficult to communicate to what degree the WFD concerned specific interests, for example of individual municipalities, farmers, or the forestry sector. In terms of these specific interests, the network was perhaps not their highest priority and as a result the degree of participation was somewhat limited.

Nevertheless, 162 people took part in the workshops, representing 73 institutions, of which 51 were local, 77 regional and 24 national, as well as 10 representatives from the other ENMaR regions.

Among these, 24 people represented the 9 local municipalities. Also involved were representatives from universities and research institutes, regional authorities for environment, agriculture, tourism, water management, industry, spatial planning, consulting offices and other companies.

Much interest was shown in the ENMaR core areas and especially in the possible environmental restrictions that may arise as necessary consequences of the implementation of European policy. In addition, there is uncertainty about the 'real' current water status and its comparison with other EU regions. Water status is considered to be good from the public point of view, therefore there are some queries regarding Article 5 of the WFD report and whether it reflects faithfully the current state of water within the Miño basin. There is some controversy regarding the existence of groundwater bodies, due to a lack of reliable data, and this gives a less than satisfying overall impression.

Technical experts and municipal representatives, as well as certain consultancies, agrarian co-operatives and water authorities, have facilitated co-operation within the network.

2.2.5 Weser

The German regional network for the ENMaR project is located predominantly within the water supply area of the public water company Oldenburgisch-Ostfriesischer Wasserverband (OOWV) in the Northwest of Lower Saxony. Representing another eco-region in the Weser catchment, the water board in the city of Peine, Wasserverband Peine (WVP), in the Southeast of Lower Saxony, contributes external expertise to the work of the OOWV in the ENMaR project.

Prior to the inception of the ENMaR project in 2005 the OOWV, circulated a questionnaire to be completed by those working in public administration, as well as other stakeholders, regarding the implementation of the WFD.

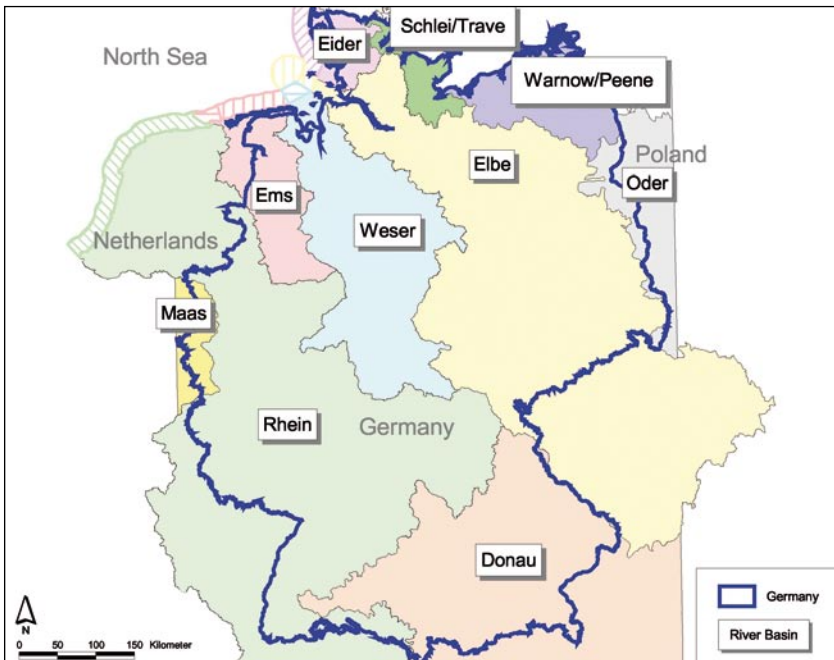
The results demonstrated an urgent need for information on all aspects of the WFD, as well as a desire for those involved in municipal politics and administration to play an active role in the implementation process. It was felt that the ENMaR project could contribute to filling this knowledge gap.

The above described structure of sub-basin co-operations has been established by NLWKN as a result of its experience of achieving good results using this method in the field of groundwater protection in the water protection areas of Lower Saxony. ENMaR has supported this process of public participation by delivering workshops on the linkages between the components of the WFD: water management, agriculture, forestry, tourism and spatial planning. The feedback from the seminars has been overwhelmingly positive. Events have been well-attended. The two workshops that combined a series of presentations with an outdoor excursion were especially well-received.

At the beginning, the priority was to introduce the WFD and the aims of the project to the participants, but once this had been achieved the focus shifted towards the costs of the WFD implementation process, as participants indicated that they especially needed information regarding funding possibilities. Within individual seminars, the main aspects of the ENMaR core areas, water management, agriculture, forestry, tourism and spatial planning, were also covered.

Seminar participants were drawn from both the administrative and political level of counties and municipalities, as well as representatives from farmers' organisations and water maintenance boards.

For the OOWV and the WVP the aim was to establish a core group of network members. However, from the beginning this turned out to be difficult to achieve in practice, as most participants attended only those seminars that specifically addressed their area of interest. There are several possible explanations for this. Firstly, people may not have been allowed by their departments to attend seminars covering aspects that fall outside their remit. Secondly, it is difficult in a region spanning more than 8 000 km² to foster a sense of belonging to a group. This is exacerbated by the fact that the workshop participants came from different authority levels, different stakeholder groups, and a wide variety of fields of interest. Thirdly, there are budget shortfalls at all levels of administration, so that many heads of department are reluctant to allow their staff to attend training events such as the ENMaR seminars, and they do not see them as an essential investment in future efficiency. Considering all these factors, it is felt that the attendance rate at the workshops has been very good; in total 46 municipalities participated.



River basin districts in Germany (source: OOWV)

Nevertheless, a special core group of attendees emerged during the project period. This group consisted of those participants who attended most of the workshops and also included persons who were engaged in many ways in the success of ENMaR. Some representatives from local authorities or other organisations in the region (chamber of agriculture, water maintenance boards) also attended the international conferences and contributed with presentations or exchanges of experiences. It would not be an exaggeration to say that a small but strong regional network has developed within the duration of ENMaR and it is expected that it will continue by generating new projects.

2.3 Summary

The WFD, Article 14, asks the Member States to actively involve all interested parties in the implementation of the Directive, in particular in the production, review and updating of the river basin management plans. Member States need to ensure that certain documents for each river basin district are published and made available for comments. The way public participation is organised in the ENMaR partner countries is varying a lot. It greatly depended on the existing administrative structure. But it was also observed, that taking into account the new river basin approach all ENMaR partner countries responded on that with changes in the existing administrative structure, for example by shifting responsibilities or setting up additional committees and working groups.

One objective of the ENMaR project was to engage the municipalities in the implementation process. Therefore ENMaR had a clearly defined target group and did not address the general public. ENMaR by itself provided a means to engage certain stakeholders, and this can definitely be considered to be part of public participation. During three years time the ENMaR project has successfully built up a network of municipalities and local stakeholders in the project regions. Seminars were organised, which provided the target groups with relevant information and workshop sessions and excursions helped to start discussions and the exchange of informations and views. 52 workshops and four inter-regional conferences with nearly 2 000 participants have been organised by the ENMaR project. In total 138 municipalities have been engaged.

3 Spatial planning

3.1 Introducing spatial planning within the ENMaR countries

Spatial planning within each of the five European countries involved in the ENMaR project is now discussed. For each country (England, Germany, Latvia, Spain, Sweden), a brief overview of the spatial planning system is given, including details of:

- the history of the spatial planning system
- the existing spatial planning policy framework
- details of different spatial plans produced
- information concerning key stakeholders involved in the spatial planning system

This provides a platform for chapter 3.2, which discusses the relationship between spatial planning, water management and the WFD in each of the ENMaR countries.

3.1.1 Emån

History

The earliest Swedish spatial planning laws date from the 13th century. These medieval laws contained regulations governing the buildings of towns, specifying issues such as street width and the location of farms (THE SWEDISH PLANNING PORTAL (UNDATED)). Advances in planning laws were made throughout the ensuing centuries, particularly during the 17th century which saw the establishment of a large number of new towns (THE SWEDISH PLANNING PORTAL (UNDATED)). The first piece of formal planning legislation, the National Building Statute, was adopted in 1874 and required the preparation of town plans. The rapid urbanisation of the 20th century resulted in many changes to this original planning legislation culminating in the passing of the Planning and Building Act in 1987.

Policy framework

The cornerstone of Swedish planning legislation is the Planning and Building Act of 1987. This Act sets a framework of regulations and standards for municipalities to consider when planning the use of land and water and when overseeing the design and building of development. The Planning and Building Act formalised spatial planning as a mandatory activity for which the municipalities at the local level are primarily responsible, leading to what is termed 'the municipal planning monopoly'. The

Swedish national constitution states that central government can only impose decisions on municipalities in exceptional circumstances, although they can nevertheless offer guidance. The Environmental Code, developed in 1999, is another key piece of legislation and aims to promote sustainable development. The Code encourages municipalities to protect the environment and use environmental resources sustainably, and provides an overarching framework for the Planning and Building Act.

Spatial plans produced

The dominance of municipalities is reflected in the fact that Sweden has no national spatial plan. Moreover, spatial plans are usually not prepared at the regional level, although one has been produced by a regional planning body for the Stockholm region to help co-ordinate the planning activities of municipalities located within the conurbations (HEDIN ET AL 2007). Several types of spatial plan are produced by municipalities. Municipal comprehensive plans (MCPs), which do not have legal standing, are prepared for each of Sweden's municipalities, of which there are 290. MCPs set out non-binding guiding principles for the long-term development and use of land and water in the municipality, and also influence the form and function of the built environment. Further, MCPs detail how national objectives, such as those contained in the Environmental Code, will be accounted for by the municipality. In order to keep them up to date and relevant, MCPs are reviewed every four years. Detailed development plans (DDPs) describe the specific activities allowed in different areas of the municipality. DDPs have legal standing and are used to aid MCP implementation and influence issues including building and infrastructure form, location, and design. Property regulation plans are sometimes attached to DDPs to aid their implementation. Once adopted by the municipality, Area Regulations are another form of legally binding spatial plan. These can be prepared to influence development in areas not covered by DDPs to ensure that municipal spatial planning objectives and issues of national interest are achieved.

Stakeholder involvement

At the national level, the Ministry of Environment passes legislation and develops guidance documents and national level policy statements to ensure that national interests are reflected in municipal spatial planning activities. The Ministry is aided by the National Board of Housing, Building and Planning and the Environmental Protection Agency, who support municipalities concerning spatial planning and environmental protection issues to help them attain national policy and objectives. These agencies are in turn assisted by Sweden's 21 regional County Administrative Boards (CABs), who provide a link between national planning legislation and

its implementation via the municipalities. They are responsible for overseeing, monitoring, and advising municipalities in matters including spatial planning. There are various opportunities for the general public and other key stakeholders (including other municipalities, CABs, the Swedish Society for Nature Conservation, and the Federation of Swedish Farmers) to become involved during the preparation of spatial plans. Comments made by stakeholders must be taken into account by municipalities during plan preparation, and the opportunity exists to appeal against planning decisions.

3.1.2 Gauja

History

Latvia re-gained independence from the Soviet Union in 1991, signalling a jump from isolation to globalisation. This event led to new objectives for the development and use of land in Latvia. Independence also stimulated changes in policy, legislative and administrative systems. New legislation and principles concerning landuse and the planning system were established. The first piece of spatial planning legislation passed post-independence was the Regulations on Physical Planning, adopted in 1994. This legislation, which has since been updated, defined several levels of planning decision making that have since remained unchanged; national, regional, district, and local (or municipal). A spatial plan is prepared at each of these levels of decision making.

Policy framework

The Regulations on Physical Planning, passed in 1994, set the framework for spatial planning. In 1998 the Law on Spatial Development Planning was adopted which contains principles that continue to influence the planning system today. This legislation, which combined principles of spatial development and physical planning, had the aim of promoting sustainable development. It defined basic spatial planning principles, procedures, tasks, and outlined responsibilities of key stakeholders. Governmental Regulations also adopted in 1998 (and updated in 2000) provided more detailed provisions and guidance on spatial planning expanding on the original 1994 Regulations. Currently, the Law on Spatial Planning, adopted in 2002 and amended in 2003 and 2005, is in force. It defines spatial planning principles to guide the planning system. These include the principle of sustainability (balancing environmental, economic, and social issues), the principle of openness (ensuring plans are developed transparently with public participation), and the principle of continuity and succession (ensuring that plans are updated to reflect changing

circumstances). Other legislation, including acts relating to municipal government, the form and function of buildings, and Environmental Impact Assessment, also influence the workings of the planning system.

Spatial plans produced

Spatial plans are produced to cover several spatial scales:

- **National level:** A national plan with the aim of promoting sustainable development is developed by the Ministry of Regional Development and Local Governments. It describes landuses within Latvia, including areas of national significance (e.g. valuable agricultural land and mineral deposits), and presents a vision and associated implementation strategy for the development of land in Latvia in the medium term (15 years). It sets a legally binding framework for planning at lower spatial scales. Guidelines and best practice examples support the plan's implementation.
- **Regional level:** Latvia has five planning regions. The Gauja River Basin district lies in the Riga and Vidzeme regions. Each region prepares a spatial plan which outlines development trends, restrictions on development, and possibilities for development in the future.
- **District level:** There are 26 districts in Latvia, each of which is required to prepare a spatial plan. The Gauja river basin lies within 7 districts. District councils, which are made up of representatives from local authorities, prepare district plans. These cover a period of at least 12 years, and provide details of existing landuse and proposed future landuse in the district.
- **Local level:** In Latvia, there exist over 500 rural and urban local municipalities (the majority are rural). Ongoing administrative reform aims to reduce this number to 160 by 2009. The Gauja river basin district covers over 100 municipalities. Municipalities prepare general spatial plans which set out existing landuses in the area and define future landuse and permitted development in the area. Detailed plans are prepared for locations selected for development within the general plan. General and detailed plans are legally binding for all individuals and organisations living and working within the municipality covered by the plan.

Stakeholder involvement

In Latvia, a hierarchical system of spatial planning exists with various stakeholders operating at different spatial scales to perform certain defined roles. At the highest level, the Cabinet of Ministers approves the national spatial plan and sets the

framework for spatial planning in Latvia, for example by defining requirements for spatial plan content and plan preparation and plan review procedures. The Ministry of Regional Development and Local Governments prepares the national spatial plan in collaboration with organisations including local municipalities and public organisations. The Ministry also checks the conformity of spatial plans produced at lower spatial scales with the national plan. The Planning Region Development Council oversees the development, implementation, and review of regional spatial plans. District local government authorities are tasked with developing and approving district spatial plans, in collaboration with other district local governments where cross-boundary spatial plans are required. Finally, the municipalities are responsible for preparing general and detailed spatial plans. Public participation is an important feature of Latvian spatial planning procedures at all levels of the planning hierarchy and every citizen has the opportunity to become involved in the planning process. Details of plan preparation procedures and opportunities for public comment must be placed in *Latvijas Vēstnesis*, a national daily newspaper.

3.1.3 Mersey

History

A legally enforced planning system has existed in England since 1947, the year of the first Town and Country Planning Act. This legislation made planning a mandatory responsibility for all local authorities. However, legislation influencing urban development had been in place for nearly 100 years before then. England and Wales experienced staggering population growth from 1801-1901, increasing from 8.9 million to 32.5 million. The corresponding expansion of cities and associated public health problems stimulated the passing of the Public Health Act in 1848. This influenced housing design, and can be regarded as the first piece of modern planning legislation. Other significant early legislation included the Housing and Town Planning Act of 1909, amended in 1919, which extended the role of local planning authorities (LPAs) concerning spatial planning. Nevertheless, the Town and Country Planning Act of 1947 was most instrumental in shaping the planning system that is seen in England today.

Policy framework

Significant changes have recently been introduced into the planning system. These changes, as contained in the Planning and Compulsory Purchase Act of 2004 (the Act) which amends the Town and Country Planning Act of 1990, aim to simplify the hierarchy of spatial plans, deliver faster planning decisions, and engage local

communities more fully within the planning process (ODPM 2003). Central government guidance documents, known as planning policy statements (PPSs), promote a consistent approach to spatial planning. They specify how regional and local planning authorities should address topics relating to spatial planning, including housing, flooding, and waste management. Further secondary legislation complements PPSs to implement the Act.

Spatial plans produced

Planning authorities implement planning legislation in two main ways; through the publication of spatial plans and by making planning decisions that influence the type and location of development. Planning decisions (known as development control decisions) must have regard to policies contained in relevant spatial plans. There is no national spatial plan. Regional planning bodies (RPBs) are therefore a powerful force within the planning system. Regional Spatial Strategies (RSSs) provide a strategic policy framework, usually covering a period of 10-15 years, outlining a spatial vision for the region to which it relates (there are nine in England). Local development frameworks (LDFs), which include a series of local development documents (LDDs), provide a detailed spatial vision for the area covered by LPAs (municipalities), of which there are around 350 in England. LDDs include a core strategy containing planning, strategic environmental assessments, and a statement of community involvement. Sub-regional plans, relating to areas such as city conurbations, may need to be prepared in some circumstances. Two further types of spatial plan (minerals and waste plans and local transport plans) are produced by county councils, organisations that exist at the sub-regional level in some areas of England.

Stakeholder involvement

Responsibility for the planning system lies with central government, specifically the Department for Communities and Local Government (DCLG). Day-to-day spatial planning is devolved to RPBs and LPAs, although the DCLG retains control over large planning decisions of national significance, for example airports. RPBs and LPAs implement planning legislation and government planning guidance. The Northwest Regional Assembly is the RPB responsible for preparing the RSS covering the Mersey catchment, within which there are 29 LPAs who must each prepare a LDF.

As spatial planning influences a wide range of sectors and activities, numerous organisations take an interest in the system. For example, the Royal Town Planning Institute (RTPI), is a professional body that provides advice to various organisations concerning spatial planning matters. Further, the Town and Country Planning

Association (TCPA) is another influential body that has played a long standing role as a voluntary organisation dealing with planning issues. There is also a range of organisations, which because of the linkages between spatial planning and their area of expertise or commercial concern, are active stakeholders. For example, due to the linkages to planning and flooding, the Association of British Insurers (ABI) publish advice and guidance on this issue. Similarly, the Royal Society for the Protection of Birds (RSPB), one of England's key environmental non-governmental organisations, publishes documents concerning the linkages between planning and environmental quality. The public is also a key stakeholder. The process of preparing development plans is open to public consultation at various stages where individuals and other interested stakeholders can comment on proposed policies or individual planning decisions.

3.1.4 Miño

History

Spatial planning is known as 'ordenacion del territorio' or 'territorial organisation'. Since the 18th Century, there has been a requirement in Spain to obtain planning permission and government permits prior to undertaking construction works (GARCIA-BELLIDO 1991). However, modern planning legislation dates from 1956 and the passing of the Land and Urban Planning Regulatory Act. Fundamentally, the spatial planning system remains based around this legislation (PAUL AND TONTS 2005). In the 1950s, spatial planning was considered to be an instrument of economic development, and related principally to urban planning and infrastructure development. Spatial planning evolved through the 1960s and 1970s, with requirements for the preparation of regional plans to address regional imbalances. Spatial planning has gradually moved towards a global view of spatial development, and with the advent of sustainable development, an environmental focus has been added to the drive for socio-economic progress.

Policy framework

The new Spanish Constitution, approved in 1978, identifies spatial planning and the related disciplines of town planning and housing development as the responsibility of the autonomous communities, of which there are 17 in Spain (which include Galicia). The autonomous communities pass their own planning legislation, within the limits of their devolved powers. In addition to the autonomous communities, Spain is divided into 50 provinces (which in Galicia include La Coruña, Lugo, Orense and Pontevedra). Their spatial planning powers have diminished since the

creation of the autonomous communities. National legislation sets a framework which the autonomous communities must consider when developing spatial plans, with the Landuse Planning and Urban Ruling Law of 1975 being important. Planning regulations created to facilitate the implementation of this law were passed in 1978, and continue to be influential. The Landuse Planning and Appraisal Law of 1998 is an important element of the legislative framework.

Galicia's earliest spatial planning legislation was passed in 1983 and regulated landuse in rural parishes. Further regional spatial planning legislation (Ley 10 / 1995 de Ordenación Territorial de Galicia or the law of land management of Galicia) was developed by the Galician Autonomous Community (Xunta de Galicia) in 1995. This legislation led to further planning law, passed in 2002 (updated in 2004), which concerns strengthening urban development planning to promote sustainable development. Regional planning law requires municipalities to prepare General Plans of Municipal Planning (Plan Xeral de Ordenación Municipal). These plans act as the key instrument for spatial planning in Galicia. Territorial Organisation Directives are also important and provide guidance and direction on relevant spatial planning issues, and exist in draft form in Galicia.

Spatial plans produced

Spain has no national spatial plan. Due to the key role of the autonomous communities in spatial planning, several regional level spatial planning instruments exist. Integrated Territorial Plans (of which there are 5 different types including co-ordinated action programmes and environmental framework plans) aim to encourage the planning of landuse and infrastructure development so economic growth and quality of life improvements can coexist with improving environments. These plans cover large areas and can encompass several municipalities. Plans for the Organisation of the Physical Environment aim to integrate the planning of areas, which because of their environmental characteristics, require specific planning and protection efforts. Natural Resources Regulation Plans are also regionally important, and are required under national and regional nature conservation legislation. In Galicia no such regional plans have been approved, although they are used in other areas of Spain.

Municipalities play a critical role in Spanish spatial planning. General Plans of Municipal Planning are prepared by municipalities (or by consultancies on their behalf) to regulate the development and use of land within their boundaries. They must adhere to a framework set by national and autonomous community planning

law, and are developed under the scrutiny of regional authorities (which in Galicia is the Department of Territorial Politics of Public Works and Transport). Municipal spatial plans classify land into different zones including urban land, land allocated to future development, rural land, and natural land. Natural land is further split into zones affording protection to water bodies, forests, and nature conservation sites for example. General Plans of Municipal Planning also include policies to regulate existing and future land use and development. Metropolitan Master Plans are prepared for large conurbations and their surrounding municipalities (e.g. Barcelona). Partial Plans are also prepared. They elaborate on issues addressed in municipal and metropolitan plans (e.g. greenspace provision, location of communications infrastructure) and provide a framework for the regulation of specific areas of land identified for development.

Stakeholder involvement

In Spain, central government ministries are involved in the spatial planning system, particularly the development of legislation and overseeing the autonomous communities. The national Ministry of Economy and Treasury and the Ministry of Public Works include departments in charge of spatial planning and urban development. In Galicia, the Department of Territorial Politics of Public Works and Transport is responsible for spatial planning, must approve General Plans of Municipal Planning prior to their publication. In the context of water, there are several regional level organisations of significance. Aguas de Galicia is responsible for the planning of water systems that fall wholly within Galicia. Also important in this context is the Confederación Hidrográfica del Norte (an organisation subordinated to the national Ministry of the Environment), a group of water bureaus responsible for water issues in river basins running through Galician territory and that of another autonomous community. Other significant stakeholders are Noragua and Adantia, which are private water companies operating in Galicia. There are some opportunities for the public to become involved in spatial planning. Plans for the development of projects must be displayed in council offices, at which point the public and other stakeholders can challenge their content. The public can also comment during the preparation of General Plans of Municipal Planning.

3.1.5 Weser

History

Germany has a long tradition of spatial planning. Regional planning started in the early 1900s in the Ruhr district, the largest industrial region in Europe at that time, to address problems of urbanisation in densely populated areas. The first formal planning legislation was passed in 1965 in response to the first national report on spatial planning. These reports are still published by the Federal Office for Building and Regional Planning, and summarise the current status of spatial planning. The reports inform politicians of problems with the system, and also of the spatial impacts of government activities. In 1975 a state level (federal states) spatial planning programme was set up. Unification brought new planning challenges in terms of the need to build new administrative structures and to deal with the socio-economic changes stemming from this event.

Policy framework

Planning policy in Germany is driven by three key pieces of legislation. These are:

- The Law of Spatial Planning: This law, first passed in 1965 and most recently updated in 1997, consists of the Federal Regional Planning Act. Spatial planning laws passed by the federal states implement this legislation at the regional level.
- The Public Building Law: This law is composed of the Building Planning Law and the Building Regulation Law. These laws relate to the design and use of buildings.
- The Federal Building Code: Approved in 1986, this code controls urban development planning. It passes responsibility for planning to the municipalities who have some autonomy in this field, although the code stops short of requiring urban spatial plans.

Spatial plans produced

Germany has no national spatial plan as the German constitution identifies planning as an area where the Federation has only 'framework competencies'. The federal states produce spatial plans known as Comprehensive Superordinated Plans which implement national planning legislation and policy guidance at the regional level. They contain policies relating to spatial development, and focus on issues concerning settlement structure, open spaces, infrastructure locations, and transport routes. In order to meet their planning responsibilities, municipalities at the local level prepare urban landuse plans. The development of urban landuse plans involves a two phase process, beginning with a preparatory landuse plan. This determines general

landuses and permitted development in the municipality. Secondly, a more detailed legally binding development plan is prepared. This formally designates areas for particular landuses, and can also define building form and function. Corresponding landscape plans addressing environmental issues are also produced to help foster the precautionary principle and sustainable development (FISCHER 2005).

Stakeholder involvement

The decentralised nature of the German state casts a significant influence on spatial planning. The federalist structure encompasses three levels of political decision making; the Federation (or Bund), the federal states (or Länder) and the municipalities. Each level has different spatial planning responsibilities, although they are linked through 'the counter-current principle,' which relies on effective co-operation and co-ordination. Moreover, the principle of subsidiarity is given institutional backing in the German planning system (FISCHER 2005), which delegates responsibility for decision making to the lowest administrative level. At the highest level, the Ministry for Transport, Building and Housing is responsible for spatial planning. Although there is no national spatial plan, the federation retains some control through the organisation of periodic conferences involving federal states ministers. Decisions made during these conferences are binding at the federal state level, and influence planning practice via planning policy principles and guidelines.

Most spatial planning activities are the responsibility of the 16 federal states and over 16 000 municipalities who, unlike the Federation, prepare legally binding plans to implement national planning law. Plans prepared by federal states must be taken into account by municipalities. Municipal conformity with planning policy is monitored by the states. In Lower Saxony the Ministry of Rural Area, Food, Agriculture and Consumer Protection oversees spatial planning. Most plan preparation procedures require some stakeholder participation including the involvement of public agencies and neighbouring municipalities, whose comments must be acknowledged by planning authorities. Key stakeholders include the Municipal Association and regional working groups.

3.2 Spatial planning, water management and the WFD in the ENMaR countries

This chapter discusses the relationship between spatial planning and water management within the ENMaR partner countries, with a specific focus on the Water Framework Directive (WFD). The five ENMaR countries are now addressed, with the following issues covered in each case:

- The policy framework governing the linkages between spatial planning, water resource management and the WFD.
- The current contribution of municipalities to meeting the WFD's requirements.
- Barriers inhibiting the contribution of spatial planning to water resource management and the goals of the WFD.

Therefore, this chapter provides an insight into the extent to which the ENMaR countries are addressing the WFD via spatial planning, and points towards barriers that are preventing them from doing so.

3.2.1 Emån

The policy framework

In 2004, the WFD was introduced into Swedish legislation via the Regulation on the Administration of the Water Environment, which gives detailed guidance regarding its implementation. The WFD's requirements are also now addressed in the Environmental Code. The National Board of Housing, Building and Planning is responsible for providing guidance on the relationship between planning and the WFD (HEDIN ET AL 2007). Water Authorities, who are responsible for implementing the WFD within Sweden's five nominated river basin districts, can request modifications to municipal level spatial plans to aid the WFD's implementation (Hedin et al 2007). There are several aspects of existing planning law that could indirectly contribute to the WFD's goals. Indeed, since the 1960s, a key aim of spatial planning in Sweden has been protecting the environment from the impacts of polluting industries. It is also significant that in 1997, a new government bill was adopted called Environmental Policy for a Sustainable Sweden, which included 15 environmental quality goals to be achieved within one generation. Several of these goals related to improving water quality in coastal areas, wetlands, lakes, rivers and groundwater. Significantly, planning is seen by the government as an important way of promoting ecologically sustainable development.

Further, the Environmental Code directly addresses the link between spatial planning and water management, and must be taken into account during plan preparation. The Code states that areas of natural value should be protected, and contains management regulations for natural areas of national interest, which include certain coastal areas and rivers. The Planning and Building Act refers to water resources. It notes that development should be located and designed to not harm the human health through groundwater pollution, that it should help to prevent water pollution more generally, and that water conservation should be encouraged (CEGINSKAS 2000). Spatial plan preparation offers useful opportunities to help meet the WFD's goals. For example, DDPs can include regulations to require sustainable drainage systems or to direct development away from rivers. Further, DDPs give the municipality rights of compulsory acquisition of land, which could subsequently be assigned to functions such as groundwater protection or flood water storage.

Contribution of the municipalities

HEDELIN (2005) found that many activities needed to meet the WFD's goals are not being undertaken by Swedish municipalities, although some WFD requirements were more commonly addressed than others within MCPs. Further, as municipalities have traditionally been responsible for the management of land and water, MCPs commonly address a range of water issues concerning the management of water quality and quantity, although this is usually not as yet in direct response to the requirements of the WFD.

There are examples from practice of the involvement of municipalities in the delivery of solutions to water management problems. In the Emån catchment a co-ordinated approach to the management of storm water has been developed and is being implemented by municipalities in the area. Further, the Municipal Comprehensive Plan for Vetlanda, a municipality within the Emån catchment, is currently under review and will be completed by 2008. The current plan does include policies that link landuse to water resource issues such as flooding and pollution of lakes and rivers. However, the forthcoming plan will go further and will also include specific policies to aid the achievement of the WFD's goals. It is apparent that a local level planning system exists that addresses land and water management in an integrated manner, which is conducive to meeting the requirements of the WFD. However, the evolving approach to water management instigated by the WFD will compromise the role of the municipalities to some degree as power over this agenda shifts to the regional level. This issue is discussed below.

Barriers to progress

There are a number of challenges associated with the implementation of the WFD which point towards the need for changes to the current planning system (HEDELIN 2005). Key issues include that water management and spatial planning responsibilities are spread over a range of different administrative levels (national, regional, and municipal), and that because the long-term planning of the water environment is undertaken at the municipal level, natural river catchments are not used as the basis for water management (HEDELIN 2005). Moreover, with the implementation of the WFD, two parallel water management systems are set to develop. These are water management through municipal planning driven by the Planning and Building Act, and also by the five Water Authorities designated as competent authorities responsible for managing Sweden's river basin districts as regulated by the Environmental Code. Water Authorities will be responsible for the preparation of River Basin Management Plans, therefore instigating a regional approach to water management. This would reduce (but not remove) the power of municipalities in this context, and would lead to a change in the scale of Swedish water management weakening the link between the existing integrated management of land and water (HEDELIN 2005, HEDIN ET AL 2007). Effective co-ordination between municipalities and with other organisations responsible for water management will therefore be necessary. Nevertheless, it still remains unclear as to exactly how the relationship between municipal level spatial planning and the WFD will work in practice (HEDIN ET AL 2007).

There are also potential barriers to meeting the WFD's requirements that relate to the weaknesses in the planning system more generally. These include (CEGINSKAS 2000):

- There is poor application and enforcement of planning legislation.
- Cuts in municipal budgets have taken place.
- There is poor co-ordination between municipalities.
- MCPs, one of the key elements of spatial planning in Sweden, are not legally binding.

It is also relevant that municipal approaches to water management have been criticised in the past, although this has improved with the preparation of recent spatial plans (HEDELIN 2005).

3.2.2 Gauja

Policy framework

In Latvia, the relationship between spatial planning, water resources and river basin district management (at the district and local level) has been established via two legally binding regulations. Regulations of the Cabinet of Ministers Nr. 770 “Regulations on Spatial Planning for District Governments”, was approved in 2005 and is binding at the district level. At the local level, regulations of the Cabinet of Ministers Nr. 883 “Regulations on spatial planning for local governments”, was approved in 2004. Paragraph 4.12 of the Regulations of the Cabinet of Ministers Nr. 883 states that when preparing spatial plans, municipalities must have regard to: “...runoff basins of first-level tributaries of surface waters, the locations of bodies of water, the locations of water points and wastewater discharge points, water treatment structures and organised places of swimming, territories of underground water protection and flood risk territories.”

Further, paragraphs 25.29 and 25.30 of these regulations, which define issues that the local spatial plan shall include, state that requirements contained within river basin district management plans, including existing programmes of measures, must be considered. In relation to the Regulations of the Cabinet of Ministers Nr. 770, which influence spatial planning at the district level, paragraph 4.17 states that district spatial plans shall take into account: “...water bodies, water streams in river basins, and river basin district management plans relevant for the scale of the district planning.”

It is clear that at the district and local level, water resource management must be addressed within spatial plans. Although the WFD is not explicitly highlighted, the spatial planning regulations do mention river basin district management plans, which are the key procedural requirement of the WFD. At the regional scale, the spatial development plan for the Riga region has recently been adopted and the spatial plan for the Vidzeme region is in its final stages of preparation. However, water management issues are not a key focus of spatial planning at the regional scale. As yet, no government guidance on the links between the WFD and spatial planning, or the links between spatial planning and water resources more generally, has been produced.

Contribution of the municipalities

There are firm legislative requirements linking spatial planning to water resource management at the district and local level. There are several aspects of spatial planning in which this is beginning to take effect, indicating that municipalities

are becoming more active in addressing water issues within their spatial plans. For example, within the Gauja river basin, the town of Cesis has designated nature protection zones, supported by a management plan, that cover over half of the area administered by the municipality. The zones aim to protect and enhance the ecological quality of the river basin, and also to improve recreation and tourism opportunities in the area. A similar zoning approach has been taken within Valmiera, a town within the Gauja river basin. Here the municipality has designated flood protection zones which restrict development in an attempt to reduce the risk of flooding. The protection of groundwater zones from inappropriate development provides another example of where Latvian municipalities are addressing water resource issues. These initiatives will improve water quality and can therefore assist in the achievement of the WFD's goals. The initiatives that protect certain zones from development are motivated by the Protection Zone Law, passed by the Ministry of the Environment in 1997 (and amended in 2005). This law specifies the width of required protection zones which, for example, must be 500 m wide on each side of the Gauja river. It also outlines landuses and other activities that are forbidden within the protection zones.

Barriers to progress

Although a legal framework to strengthen the linkages between spatial planning and water management has been established, implementing this legislation is a difficult task for Latvian municipalities. Knowledge at the local level concerning the potential of spatial planning to improve or maintain water quality is rather weak. This will affect the quality and potential effectiveness of policies contained within spatial plans that address water resource issues. Furthermore, the absence of river basin management plans as required by the WFD, which will not be ready until 2009, creates uncertainty concerning the nature of the water resource management requirements to be integrated by the municipalities into their spatial plans.

3.2.3 Mersey

Policy framework

The Planning and Compulsory Purchase Act, which outlines the legislative framework for the planning system, states that local authorities must consider environmental characteristics when planning development. Although not explicitly mentioned, environmental characteristics will clearly include water resources. Other policy documents and guidance notes make specific reference to links between spatial planning and water. Significantly, working towards the government's

vision for sustainable development, contained in the UK sustainable development strategy (DEFRA 2005), is now a statutory purpose for regional and local planning authorities (ODPM 2003). The government's sustainable development strategy makes specific reference to the links between water quality, the WFD, and landuse planning stating that (DEFRA 2005: 99-100): "We will be looking to those who use water and who may pollute it to contribute more fairly to the cost of achieving the Directive's [WFD's] environmental objectives. This has implications for agriculture, landuse and other activities..."

Moreover, this document states that spatial planning can help to manage the development and use of land to encourage the sustainable use of natural resources such as water by, for example, developing flood risk management strategies and promoting water resource efficiency techniques (DEFRA 2005). Furthermore, in a statement on the future of water resource policy (DEFRA 2002), the government has acknowledged the linkages between planning and water quality: "Landuse planning policies can significantly affect the demand for water, water use and water quality and need to be recognised more strongly in policy-making" (DEFRA 2002: 17). The Environment Agency, the key national level public body tasked with protecting and improving the environment in England and Wales (and also the implementation of the WFD), has stressed the importance of the linkages between spatial planning and the water environment (EA 2001).

Regionally, the RSS for Northwest England (NWRA 2006), which covers the Mersey Basin, refers to the WFD and addressing water quantity and quality issues through spatial planning. Policy EM5, which relates to integrated water management, notes that (NWRA 2006: 54): "Plans and strategies should have regard to River Basin Management Plans and assist in achieving integrated water management and delivery of the EU Water Framework Directive (WFD). "This regional spatial planning policy, and the national level policies that influence its development, provide a clear indication that a policy framework exists that requires municipalities within the Mersey Basin to use spatial plans to protect water bodies (surface, ground, and coastal waters) within their area of jurisdiction in the interest of meeting the requirements of the WFD.

Guidance exists to aid planning authorities in performing this task. PPS 1 (ODPM 2005) sets out the government's vision for the planning system, and requires planning authorities (regional and local) to promote the sustainable use of water resources and the use of sustainable drainage systems to manage rain water runoff. Other PPSs also link to water resources. For example, guidance on sustainable waste

management notes that when taking decisions concerning the location of waste management facilities or land fill sites, that vulnerable surface and groundwater bodies and the protection of water resources should be considered. Further, guidance on the linkages between planning and pollution control notes that the impact of proposed developments on the water environment should be considered.

Contribution of the municipalities

Although there have been relatively few spatial planning activities at the municipal level specifically directed towards meeting the WFD's goals, improving the water environment has been addressed more generally via spatial planning. For example, waterside regeneration schemes sometimes include measures to improve the quality of nearby water bodies. Further, the influence of spatial planning over the location of industrial developments in relation to water bodies can also beneficially affect water quality. Spatial planning powers are also used to promote techniques such as sustainable drainage. Existing spatial plans often included policies relating to water resources. To provide an example, Liverpool City Council included a range of policies relating to the protection of water resources within their spatial plan for the city. Policy EP12 (LIVERPOOL CITY COUNCIL 2002) states that planning permission will not be granted for developments that adversely affect the quality or supply of surface or groundwater. Existing spatial plans such as this indicate that the municipalities are taking steps to address water resource challenges through spatial planning, which will in turn assist in meeting the WFD's goals in the future.

Barriers to progress

Despite clear linkages between spatial planning and the water environment, barriers exist that inhibit planning authorities in this respect. Similar barriers limit the impact that spatial planning has on environmental issues more generally, for example in terms of improving air quality or protecting biodiversity (SEE RCEP 2002, SELMAN 2000). These factors, which are discussed below, also restrict its impact in terms of water issues.

- Knowledge of some aspects of the water environment is limited, which hinders the development of spatial planning responses to water resource problems.
- Responsibility for issues affecting the water environment, for example agriculture and urban development, is fragmented within central government. This limits the development of integrated responses and solutions to influence water resources.

- Spatial planning is politically driven, which reduces the chance of designing locally specific spatial planning solutions to meeting the WFD's requirements for good water status.
- Spatial planning lacks retrospective power; that is it has little control over the form and function of existing developments which often contribute to water resource problems.
- As water is affected by social, environmental, and economic factors extending beyond landuse, the impact of planning, which relates mainly to issues relating to landuse, is limited.
- Planning embodies a presumption in favour of development, leaving planners to deal with the impact of development on water resources rather than proactively limiting problems.
- A lack of resources compound barriers limiting the effectiveness of spatial planning.

These barriers reinforce the fact that spatial planning will only ever be part of the solution to meeting the requirements of the WFD.

3.2.4 Miño

The policy framework

Although the Spanish Constitution gives significant responsibilities for spatial planning to the regional and local level, central government retains competencies over related issues including water resource management, highways development, and mining. Consequently, central government plays an important role in water management and the implementation of the WFD. This responsibility falls largely on the Secretaria General del Territorio y la Biodiversidad (or the General Secretariat of the Territory and Biodiversity). The Ley de las Aguas (or Water Law) is the key piece of Spanish water legislation, and is currently being modified to incorporate the WFD.

Hydrological confederations have a central role in water management and help to implement government water policy, including WFD issues. In Galicia, Confederacion Hidrográfica del Norte shares this responsibility with Aguas de Galicia. The national Water Law requires hydrological confederations to prepare hydrological plans (in collaboration with other stakeholders including municipalities), which are effectively river basin management plans. Hydrological plans are the principal reference for all water-related issues in spatial plans and other policy domains relating to water. For example, when preparing spatial plans municipalities must refer to hydrological

plans, and hydrological confederations must be consulted during the plan preparation process. Hydrological plans do not correspond to administrative boundaries as they are organised around river catchments so can span different municipalities and even autonomous communities. For example the Miño river basin covers part of Galicia and Castilla-Leon. In this respect, the Spanish regulatory structure for water policy is similar to the catchment approach promoted by the WFD.

Concerning spatial planning specifically, the spatial planning law of the Galician Autonomous Community passed in 2002 (modified in 2004) aims to protect and promote the natural heritage of the region, and notes that water resources in natural areas must be protected. The law states that specific permission is needed from the Galician Autonomous Community and/or municipalities to use water resources in natural areas. For example, licences are required to utilise water for leisure activities and to develop electricity, water, or gas infrastructure. Nevertheless, spatial planning remains relatively under-developed, although urban planning and development is more advanced. At present, therefore, General Plans of Municipal Planning often pay little attention to water resources from an ecological point of view (although issues such as water supply and wastewater treatment are more commonly addressed), nor do they explicitly mention the WFD. Nevertheless, spatial planning initiatives do exist that provide a platform to address the WFD in the future. These issues are discussed in the following section.

Contribution of the municipalities

Spatial planning is beginning to make a contribution to water resource management at the municipal level. For example, the national Water Law requires municipalities to establish protection zones around certain water bodies, the size of which differ according to whether they are around a principal river or its tributaries for example. Landuse should be controlled in these protection zones through the use of spatial planning policies. General Plans of Municipal Planning are required to include an inventory of natural and artificial water bodies in municipal territory, information which assists in the identification of protection zones and in other activities related to the sustainable planning and management of water resources. Data from hydrological confederations, state and regional government departments, and data gathered by municipalities themselves, is being used by some municipalities to develop these inventories.

In Galicia, water resource issues feature prominently the Guitiriz municipal spatial plan, for example in terms of the development of aquatic thermal resources for

tourism and concerning the protection of natural resources including wetlands. Guitiriz has utilised Geographical Information System (GIS) technology to more effectively manage water resources and enhance the planning of their area more generally. The municipality has been characterised into different landuses, which include water supply and wastewater treatment facilities and natural hydrological features such as rivers, wetlands, and springs. The GIS system has helped to identifying suitable locations for development that can encourage positive water resource management. Another relevant example from Galicia concerns a programme involving municipalities, government ministries, local action groups, and private companies to develop a consortium to manage the Mandeo river in A Coruña province. Although these examples did not arise in direct response to the WFD, they do indicate the potential for meeting this legislation in Spain through spatial planning activities.

Barriers to progress

Various barriers constrain and limit the impact of spatial planning on the management of water. These relate to both Spanish legislation and culture, and to specific characteristics of Galicia.

- Spatial planning in Spain is complex involving a range of different plans, planning objectives, and tiers of government. As policy-making is thematic, it does not always promote a consistent and holistic approach to the planning of land and water.
- The Spanish Constitution does not define what is meant by spatial planning, which inhibits the autonomous communities when undertaking their spatial planning responsibilities.
- There is little guidance, either from central government or the autonomous communities, concerning spatial planning, water resource management, or the WFD.
- A lack of data concerning water issues and landscapes, for example relating to floodplains, groundwater sources, and the characteristics of water protection zones, is hampering effective spatial planning.
- Politicians, especially at the local level, are not generally concerned with water resource management and quality improvements, particularly from an ecological perspective.

In relation to Galicia, there exist further barriers. Indeed, although there has been planning legislation for over a decade in Galicia, its impact on development activities in the region has been limited as the legislation has yet to be fully implemented. Budgetary constraints and a lack of staff in the spatial planning sector

further compound this problem. Further, although there are sufficient supplies of water in Galicia, water quality problems are emerging that may negatively impact on planning and development. Particular problems concerning diffuse pollution from agriculture and pollution around the estuaries of major rivers in the cities of Vigo and Ferrol exist.

3.2.5 Weser

Policy framework

The German spatial planning system includes legislation from the Federation concerning the protection of environmental resources, including inland and coastal waters and the seas. The Nature Protection Act of 1976 sets a policy framework for protecting environmentally significant areas from uncontrolled development and reducing the environmental impact of developments (EUROPEAN COMMISSION 1999). Federal state nature protection acts translate this national legislation into planning strategies. The Federal Control of Pollution Act, some of which is enacted through the planning system, also offers municipalities the potential to protect water resources. This legislation encourages the anticipatory protection of water through avoiding pollution incidents or by requiring point source treatment of pollutants. These Acts can strengthen water resource protection, and have the potential to aid the achievement of WFD's goals.

The Federal Water Act requires the designation of water protection areas to conserve freshwater and groundwater resources. Amendments to this Act now provide a legislative framework for meeting the WFD's goals at the regional and municipal level through the passing of Water Acts at the federal state level. Also, federal state decrees have been developed across Germany in order to implement the WFD. The state development programme for Lower Saxony, which dates from 1994 (amended in 1998 and 2002) makes reference to the linkages between spatial planning and the protection and improvement of natural areas, natural resources, and ecological functions. This document states that settlement structure and building design should ensure water is used in an environmentally friendly and socially acceptable way. In November 2004, the state secretary of the Ministry for Rural Areas, Food, Agriculture, and Consumer Protection of Lower Saxony noted that: "Lower Saxony wants to implement a spatially integrated water policy. The responsible handling of the complex and sensitive water systems requires a sustainable and co-ordinated management of all land uses and within hydrologically defined regions. The framework for this approach is given by the European water policy."

This statement implicitly acknowledges that the WFD is driving change in spatial planning. The links between spatial planning and the WFD are therefore evident in policy documents applying to Lower Saxony. However, at present, there exists no guidance concerning the linkages between water resources and spatial planning, or the role that planning could play in meeting the WFD's requirements.

Contribution of the municipalities

A culture of addressing water resource issues through spatial planning is established in Germany. This happens in three main ways (European Commission 1999); the designation of protection areas, landscape planning, and requiring developments (for example industrial sites or waste treatment plants) to obtain permissions under nature protection legislation. These activities can contribute to the WFD's key goals. For example, priority and precautionary zones for drinking water are designated by the federal state and must be mentioned in state planning programmes. Areas around drinking water sites are deemed water protection zones, and landuse in these zones is controlled. Further, landscape plans are produced by the municipalities, some of which include binding provisions, and include objectives for environmental protection with special attention being given to water. Landscape plans are co-ordinated with spatial plans, and both influence landuse decisions and can therefore affect the ecological quality of water bodies. For example, landscape plans should identify areas that are suitable for water protection and sometimes include details of biotopes that depend on groundwater. This data can assist river basin characterisation, an important element of developing River Basin Management Plans under the WFD.

The federal state development programme for Lower Saxony includes objectives for water protection, and indicates that spatial planning should take water management issues into account. Further, policies are included stating that natural water bodies have to be protected so that their water quality does not decrease. This state requirement has been addressed by counties such as Leer. The draft spatial programme for Leer states that water bodies have to be protected to prevent further deterioration in quality. This document also notes that the WFD and the water law of Lower Saxony set objectives for the good ecological status for rivers, lakes, and coastal waters and the good chemical and quantitative status for groundwater, and that spatial planning should work towards meeting these objectives within the County of Leer. More generally, within Lower Saxony there may be the opportunity for spatial plans and building plans to specify compensation measures to address water resource challenges (such as storm water retention areas, the protection of

flood plains, and the creation of buffer strips between developments and water bodies) that should be included in new developments. Municipalities can access a publication concerning the links between compensation measures and the WFD.

Barriers to progress

In Germany, there are several significant barriers to progress concerning strengthening the role of spatial planning in meeting the requirements of the WFD. They can be summarised as:

- Land in Lower Saxony is in demand due to extensive urbanisation and agriculture. These social and economic interests are impacting on the water environment and cost associated with relieving the impact of these pressures are high. Spatial planning therefore has a difficult task in managing the competing demands that are placed on available land as it is not always possible to give water issues the highest priority in development decisions. To reduce pressures on hydro morphology, for example by recreating floodplains, a lot of space would be needed which would involve substantial costs to purchase the land required to renaturalise floodplains.
- The WFD's focus on river basins adds a new spatial dimension to the management of the water environment. However, river basins do not fit to the administrative borders that provide a spatial framework for spatial planning instruments.
- Different institutions are responsible for spatial planning and river basin management planning. This is hindering development of linkages between the management of land and water. Nevertheless, it is positive that in Germany local and regional planning authorities are becoming involved in the preparation of RBMP of programmes of measures.
- There is still a lack of knowledge and awareness amongst local and regional planners of the WFD. Existing information is generally quite abstract and is not linked clearly enough to spatial planning issues. Once programmes of measures and river basin management plans are published, this situation is likely to improve and it should become easier to link different spatial planning instruments to the WFD and vice versa.

3.3 Summary

Spatial planning approaches are used to manage the development and use of land. In Europe, land is a limited resource and therefore spatial planning is an important element of public policy. There are numerous demands on Europe's land resources. Around 15% of Western Europe is urbanised (EEA 2003). This figure is set to increase as urban sprawl driven by socio-economic factors including changes in housing preference and transport modes continues to consume large areas of land. Indeed, a naturally productive area the size of Luxembourg was lost to development between 1990 and 2000 alone (EEA 2006). Further, on top of the use of land for urban settlements and associated infrastructure, nearly half of the continent's land surface is farmed (EEA 2005). Such demands on land resources are posing a real threat to the achievement of sustainable development in Europe as it is also important that land is conserved for environmental reasons. For example, land is required to conserve biodiversity and ensure that underground aquifers can recharge.

Spatial planning is practiced across Europe in an attempt to balance the competing demands on Europe's land resources. Due to its influence over the nature and location of development and land use change, spatial planning has an important role to play in managing water. For example, spatial plans can include policies that limit new development around sensitive water bodies or that protect natural floodplains. However, historically, spatial plans have often been determined before their impact on water issues has been fully considered. Further, in cases where water issues are more comprehensively addressed, spatial planning decisions may nevertheless prioritise social and economic factors such as the need for housing and economic growth. This is increasingly leading to problems including water pollution from surface runoff, pressure on aquifers from housing developments, and negative impacts on aquatic biodiversity from depleted water resources and diffuse pollution. Impacts such as these will have clear implications for meeting the goals of the WFD. There is a pressing need to understand and clarify the relationship between water and spatial planning to provide a platform to strengthen the role of spatial planning in the management of water resources and the achievement of the WFD.

With this aim in mind, the ENMaR project has looked at the relationship between spatial planning, water and the WFD in five countries; namely England, Germany, Latvia, Spain, and Sweden. Each of these countries has a history of spatial planning. Although each country has a spatial planning system currently in operation, these have been established for varying lengths of time. For example, England and

Spain have national spatial planning legislation frameworks dating back over 50 years, whilst in Latvia the gaining of independence from the Soviet Union in the early 1990s signaled the development of their current spatial planning framework which dates from 1994. Although each of the ENMaR countries has a national planning policy framework few have a national spatial plan, although one is being developed for Latvia. Regional-scale spatial planning is more common, although it remains rare in Sweden where there is a 'municipal planning monopoly'. It is at the municipal level where the production of spatial plans is widespread, revealing the potential influence that municipalities have in terms of the use of spatial planning to manage water resources. Nevertheless in most countries national and regional authorities retain considerable influence over planning processes through the preparation of legislation and guidance. Aside from public sector authorities, there is a range of diverse stakeholders involved in municipal spatial planning procedures across the ENMaR countries including professional bodies, environmental interest groups, neighbouring municipalities, and private companies. Each spatial planning system also provides for some degree of public involvement. Generally spatial planning law provides opportunities for these stakeholders to become involved in planning procedures, and their knowledge and experience can be used in this arena to the benefit of the water environment.

Concerning the relationship between spatial planning, water and the WFD, the five ENMaR countries display varying degrees of synergy. In each country a framework of legislation and guidance exists that links spatial planning to various water resource issues (including flooding and water quality for example). These frameworks vary in their scope and level of detail. Nevertheless, there are examples from across the regions studied during the ENMaR project of the use of spatial planning to address water resource challenges. These examples were explored in detail within a series of case studies. These considered issues such as the use of spatial planning approaches to develop protection belts around water bodies in Valmiera municipality (Latvia), and the use of spatial planning to reduce flood risk in the city of Salford (England). Although there exists a range of good practice examples concerning the use of spatial planning to manage water resources, direct linkages between spatial planning and the WFD are less common. As the WFD is a relatively new piece of legislation this is understandable, although there are examples (including the spatial plan for the Northwest region of England) of the WFD becoming embedded within spatial planning policies. Further, there is a range of barriers to utilising spatial planning to the benefit of the WFD. These include the mismatch in spatial scales and timing between spatial plans and river basin management

plans, and a lack of time, resources, and data available to planners to address water issues within spatial plans. Despite this, the findings of the ENMaR project demonstrate that spatial planning does provide municipalities with a set of tools and procedures that can be used to manage water resources more effectively. This has clear benefits for the achievement of the key goal of the WFD which is to achieve good water status in most of Europe's waters by 2015.

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4 Water management

4.1 Introduction to the core area water management

Water management is integral to the successful implementation of the Water Framework Directive (WFD). It plays several roles in the water cycle through processes of abstraction and discharge, directly influencing water quantity and quality. The principal activities in water management are:

- **water abstraction** required for several purposes such as drinking water, cooling water, industrial processes, irrigation and leisure, each of which has an impact on the quantity of water resources; water is taken from either groundwater or surface water
- **wastewater treatment** which impacts on water quality and quantity
- **river maintenance** with specific impacts on water quantity and biocoenosis
- **flood protection** focusing on water quantity but also influencing quality

Municipalities, or water boards at the municipality level, still hold much of the responsibility for water management within many ENMaR regions, but there are differences, especially in the field of water supply, where privatisation has taken place. In England for example only a handful of companies deliver drinking water for the whole population, whereas in Germany roughly 7 000 water companies provide the same service.

The first evaluation of the Water Framework Directive showed that:

1. It is very important to raise awareness of predicted water shortages in various European regions, including the ENMaR regions, because of unsustainable use of water or climate change reasons.
2. The chemical and ecological status of a large percentage of rivers will not attain the goals set.
3. Many groundwater bodies, the most important resource for drinking water, are at risk of not meeting the goal set to reverse existing trends.
4. There is a considerable shortage of data at the moment.

Furthermore the impact of climate change events has to be considered. They are difficult issues to predict, but influence all fields within water management.

In the implementation of the WFD, the spatial backdrop for water management are the river basins and sub-basins. Working at this scale can help to balance deficiencies in quantity and quality and to improve related biospheres if the administrative bodies, which may be from different national states, provide transparency, share responsibilities and realise co-operation. This aim will only be achieved if communication and understanding can be used to forge common goals between different stakeholders.

The following sub-chapters give an insight into the water management within the ENMaR regions. Thereby the main focus is laid on drinking water supply and wastewater treatment, which is referred to as water services.

4.2 Emån

The river Emån has a specific biodiversity with over thirty fish species and a large population of fresh water pearl mussels.

The Swedish climate is determined by its proximity to the Atlantic Ocean and the Gulf Stream. The Emån is located in the Southeast of Sweden and its source is 330 m above sea level. The annual precipitation is around 700 mm, with heavy snowfalls in winter. The temperature range over the year can vary from 30°C in summer to -25°C in winter. At the Emån river mouth the annual precipitation is around 500 mm with a narrower temperature range.

Sweden's natural resources - forestry, ore and water - have traditionally formed the basis of its national economy, but today the emphasis lies more on the processing of the raw materials. Woodwork and the cellulose production take place in close proximity to where the raw materials are exploited. The cellulose and paper industry enterprises are often located near estuaries and in forest areas.

4.2.1 Structure of water services

Water services are well developed in the Emån river basin. The drinking water is of very good quality and wastewater treatment is of high standard. In Sweden the municipalities are responsible for drinking water supply and wastewater management in urban areas. In rural areas the individual landowners are responsible for their own water supply and wastewater treatment.

The total number of inhabitants within the Emån catchment area (4 500 km²) is around 81 500, of which 65 000 are connected to drinking and wastewater supply, while a further 16 500 use private wells and wastewater treatment plants. To connect more rural areas to the municipal systems would be too expensive and would yield only limited improvements in regional development terms.

The costs for water supply and treatment vary throughout Sweden, with each municipality setting its own price. For example in Vetlanda municipality the price for drinking water supply is composed of an annual fixed price of 120 Euro per property plus the water consumption of 1.5 Euro/m³. The average annual water use in Sweden is about 50 m³ per person. The average annual cost for a household with 3 people is approximately 345 Euro per year.

4.2.2 Main problems regarding quality and quantity of water

- There are no problems with groundwater recharge.
- The status of sewage treatment plants is generally very good. The reduction in phosphorus and nitrogen is high, while some plants have an extra step for reducing nitrogen in ponds after plants are built. There are problems with private sewage treatment, as many of the systems are old and function poorly. The highest phosphorus source in Emån river basin is from private sewage treatment. Recent research in the Baltic Sea has highlighted that phosphorus most likely has a more significant impact on algal bloom than previously expected. This raises the question of whether better private treatment will be necessary in the future.
- The drinking water supply is good and of very high quality. Sweden has been spoiled because there has always been enough good quality water, meaning water protection areas have not been so important in the past. Sweden is currently working with protection areas and this work is done in the Emån river basin as well.
- There is always a risk of flooding in the river basin, especially in the middle and lower parts of the main stream. The highest risk scenario is when a combination of heavy snows in winter and the late onset of spring result in sudden warm and rainy weather. It is mostly agricultural land that tends to be flooded, but high water levels can also affect buildings close to the watercourse. Conversely, there is also a risk of drought in the area, particularly during the dry conditions experienced in August and September. A large pulp mill situated near the river mouth uses water taken directly from the Emån as part of its processes. The mill has assigned the Emåförbundet to regulate the largest lakes in the catchment, to

which they own regulation rights, to ensure that both the mill and biological life will have sufficient water during dry conditions.

- The Swedish Meteorological and Hydrological Institute (SMHI) has developed a model that calculates the predicted conditions in the Emån river basin in the event of climate change. The model's predictions say that conditions will change with yearly precipitation decreasing, but with heavy rain in shorter periods. There will also be more rain instead of snow during the winter.
- About 50% of the main stream is susceptible to flooding.
- The main threats to water quality come from an increase in humid substances, which result in very brown water. There are also threats to providing adequate drinking water supply and sufficient supply to the pulp mills for the production of paper. Another problem comes from diffuse pollution as a result of the use of medicines, cosmetics, shampoo and pesticides. These substances can be measured in the water and their biological impacts can be seen.

4.3 Gauja

The territory of Latvia is divided into four river basin districts and one of these, the Gauja, is located in the Northeast of Latvia. The Gauja river basin district covers approximately 1/5th of the state territory and contains several river basins:

- Gauja (length 460 km, basin size 8 900 km²)
- Salaca (length 95 km, basin size 3 570 km²)
- small streams to the Riga Gulf (total size 580 km²)

High amounts of rainfall are typical within the Gauja river basin, with the coast receiving between 700 and 750 mm annually, while on the elevated plain it exceeds 850 mm per year. Days with precipitation within the district range from 170 to 212 per year.

The Gauja river basin has many nature protection areas, such as the Gauja National Park and the North Vidzeme Biosphere Reserve, which are also the most popular nature and water tourism areas. The largest and most significant lake in this district is the lake Burtnieki (area 40 km²), fed by seven small rivers and is also the source of the river Salaca, the fourth most important river for salmon in the Baltic Sea region and a major reason for the degree of protection offered to the area.

4.3.1 Structure of water services

The River Basin Management Board is the competent authority established as a structural unit within the Latvian Environment, Geology and Meteorology Agency (LEGMA), supervised by Latvian Ministry of Environment. The remit of LEGMA and its structural unit is:

- to develop and prepare budget proposals for and co-ordinate and implement a new monitoring programme
- to provide the European Commission with information specified under EU legislation
- to develop and update drafts for a management plan and programme of measures
- to carry out economic analysis of water resource use
- to ensure public participation in the development and updating of the management plan and programme of measures
- to implement and co-ordinate the plan and programme
- to inform municipalities which are included in the plan's territory
- to agree management measures prior to adoption of the programme of measures, also immediate measures where needed
- to develop the budget proposals necessary for the implementation of the programme of measures
- to ensure the activities of the Co-ordination Committee co-operate with competent authorities from other countries to achieve the environmental objectives of the international river basin districts, as well as implement the joint programme of measures

A Co-ordination Committee is established to implement the management measures within the river basin district. The Committee is likely to include representatives from public authorities, municipalities and non-governmental organisations, with personnel being approved by the Minister of Environment. The State Environmental Service shall supervise the implementation of the programme of measures.

The municipalities are responsible for organising the water supply and wastewater treatment in their territories. The Latvian Water and Wastewater Association is responsible for the provision of high quality water supply and wastewater treatment. Secondary treatment plants are used predominantly for wastewater, with some of them using an enhanced biogenic reduction cleaning stage. Some primary treatment plants are still functioning also (CHARACTERISATION REPORT, 2005).

The association co-operates with government and administrative institutions to elaborate and upgrade existing laws and regulations and with municipalities in the operation of water supply and wastewater treatment companies.

4.3.2 Main results from the risk assessment regarding WFD

groundwater recharge

In Latvia, the main factor causing pressure to groundwater sources is extraction for drinking water purposes. However, analysis of extraction amounts as well as available and accessible groundwater sources has concluded that there is no foreseeable risk to water quantity (CHARACTERISATION REPORT, 2005).

status of sewage treatment plants

In the Gauja river basin, wastewater amounts to approximately 13 million m³ per year. In total there are 231 wastewater treatment plants, out of which 2 are secondary treatment with enhanced biogenic reduction, 157 are secondary treatment and the remaining 72 are primary treatment class.

- However, in addition to levels generated by the municipality, wastewater is also discharged by the private sector, including those from larger food (meat, dairy) and beverages (beer) processing plants and industrial enterprises (textiles). Those discharges are often highly concentrated and disrupt the activated sludge processes at the wastewater treatment plants (e.g. Valmiera and Cēsis).
- Generally decreasing volumes of water consumption over the last decade have resulted in more concentrated household wastewater, impacting on the efficiency of the treatment process.
- As the population of the area is fairly low, with the majority of settlements having less than 2 000 inhabitants, investment projects do not always receive the highest priority, but still are due to be implemented until 2015. However, the current high number of small discharges collectively result in significant pollution loads.
- Existing wastewater treatment facilities need upgrading every 7 to 10 years to be able to cope with stricter quality requirements for treated wastewater. Local stakeholders have suggested that performing a baseline survey on wastewater treatment facilities, especially in small rural settlements, is needed (REPORT FROM THE REGIONAL WORKSHOP, 2005).

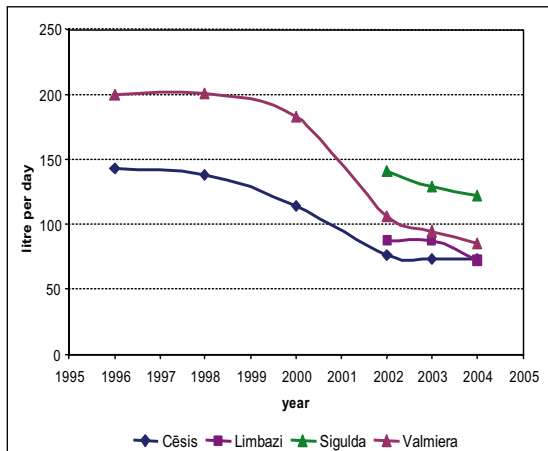
status of water supply, drinking water protection area

Drinking water is extracted from deep groundwater wells. In general the water quality is good. Water treatment is principally required to remove iron and reduce hardness. Water consumption is metered individually. The average connection rate to the drinking water supply system is 61%, but in some areas it is as high as 92%. For wastewater treatment the average connection rate is 57%, rising to 79% in certain places.

Costs for water services are calculated according to the Cabinet of Ministers Regulations and calculations are based on certain expenses (staff, materials, energy, etc.). Thus, in 2005 costs varied considerably between 0.21 Euro/m³ and 1.05 Euro/m³. A fee for drinking water and wastewater services is charged within a range of 0.57 to 1.08 Euro/m³.

Drinking water extraction wells are protected by the setting of protection belts, in accordance with the requirements of the Cabinet of Ministers Regulations Nr. 43 (2004).

- Trends indicate that water consumption is decreasing, which means service providers may face difficulties recovering the costs associated with water treatment in the future. As a result, the water supply network is to be extended to optimise connectivity levels. Cheaper water treatment technologies will also need to be developed. Adjustments to existing legislation to allow for differentiated tariffs and the support of government for fund raising opportunities will also be vital.



Water consumption is decreasing in Latvia.

- These steps will lead to an increase in water quality, which in turn affects quality of living. However, costs will dictate the optimal choice for treatment levels. The quality of supply is closely related to the conditions within the supply system (high quality water in dirty tubes will not function efficiently).
- Extension of water supply networks is important in towns and cities. Some municipalities can enforce local regulations, obliging customers to connect to the network where available. Riga has such regulations in place. Connection to the water supply network is a paid service, but the money has to be used for development and implementation of investment projects within the municipalities.

	total	at risk	not at risk
rivers	45	8 (18%)	17 (38%)
lakes	35	7 (20%)	10 (28%)

Water bodies in the Gauja River Basin District (RBD) defined to be at risk from point source pollution.

4.3.3 Main problems regarding quality and quantity of water

In the Gauja river basin the main problems can be attributed to the quality of water, with no quantity constraints observed so far.

drinking water

The quality is high, with issues caused by aesthetic and technical parameters (iron, hardness). With respect to water services, the main problems relate to the technical conditions of water supply networks (old, poor quality pipes).

wastewater

The treatment quality is the main problem. Technically there are solutions known, however, implementation of the technical solutions requires high levels of investment that are not currently sufficiently funded. Additionally, there is concern about the collection and treatment of rain and storm water, as rain water collection and wastewater systems are not separated and sometimes do not function properly.

surface water

The main problems are caused by anthropogenic pollution loads (e.g. reduced water quality at water bodies downstream bigger towns).

groundwater

Anthropogenic pollution loads are causing a serious problem at one water body (waste from former Riga crude oil factory) which is estimated at high risk due to groundwater pollution with oil products moving towards the river Gauja.

4.4 Mersey

4.4.1 Structure of water services

Water companies in England and Wales, rather than municipalities, provide both water supply and wastewater treatment.

The water industry in the UK is one of the most significant industries economically, socially and environmentally. The economic regulator is the Office of Water Services (OFWAT), appointed by the British Government. The mission statement of OFWAT is: “to regulate in a way that provides incentives and encourages the companies to achieve a world-class service in terms of quality and value for customers in England and Wales”. According to the OFWAT international comparison of water and sewerage service 2006 report, households in Great Britain had to pay an annual average of 165 Euro for drinking water and about 195 Euro for wastewater treatment in 2004.

The environmental regulator is the Environment Agency. The Environment Agency is responsible for maintaining or improving the quality of surface and groundwater in England and Wales. It aims at preventing or reducing the risk of water pollution wherever possible. The Environment Agency analyses, informs, advises and reports to OFWAT on the environmental performance of the water industry annually.

The privatisation of the water industry under the Conservative Government in 1989 brought about major investments in water pollution control, much of which was required under EU Directives. The privatised water companies have to fulfil the requirements of Asset Management Plans on a 5 year cycle, organising investments in order to achieve as much value for money as possible.

Another important role within British water services is played by Water UK, a representative organisation that brings together all the UK water and wastewater utilities and which is co-ordinating government regulators and stakeholder organisations to develop policies and improve understanding of the business of water.

Other important bodies involved in water services in England include:

- Drinking Water Inspectorate regulates the quality of water supplied to customers.
- English Nature is the Government agency that champions the conservation of wildlife and geology throughout England. All water companies, organisations,

agencies and government departments must consult English Nature over activities affecting Sites of Special Scientific Interest (SSSI).

- UK Water Industry Research (UKWIR) facilitates collaborative research for UK water operators and develops a framework for common research.
- Consumer Council for Water is the representative body for water customers in England and Wales. It represents the customers with respect to price, service and value for money. It is independent of both the water industry and the regulators.

The water company United Utilities provides water and wastewater services in Northwest England. It also manages networks providing most of Wales and parts of Scotland with water and wastewater services with over 100 water treatment plants. This covers a population of approximately 7 million and 3 million households and business premises in Northwest England. United Utilities is also involved in the ENMaR project by providing staff.

United Utilities' aim is: "to transform England's Northwest through sustainable economic development." United Utilities, as the largest operator of water systems since privatisation in 1989, has been carrying out a huge programme of investment. By the end of 2005 it had invested over 11 billion Euro to maintain and improve the region's treatment plants and network of pipes and sewers, bringing real benefits to customers and the environment.

The process of sustainable water management started due to privatisation in 1989 and the implementation process of the WFD can help to deliver sustainable economic development. Better water quality aids waterside regeneration, which in turn stimulates the economy. When land and water are managed together, better regional development can happen, and this is where local authority planners can contribute.

4.4.2 Main problems regarding quality and quantity of water

The average annual rainfall is 1 400 mm in the Mersey river basin. There are 40 groundwater bodies in England's Northwest. In England, 9% of groundwater bodies are at risk of failing to meet the WFD objectives owing to pressures of water abstraction and flow regulation. Another 17% are probably at risk.

The percentage of water bodies in England at risk of failing to meet the WFD objectives owing to pressures from point source discharges are shown in the table below.

	% at risk	% probably at risk
rivers	22	1
lakes	16	4
groundwater	1	3
transitional waters	16	32
coastal waters	5	13

Water bodies in England at risk of failing to meet the WFD objectives.

The local authorities are not responsible for water services in England. This is different to the rest of Europe, where the water authority, water and wastewater management and maintenance includes the municipalities. Nevertheless, local authorities are responsible for planning in England and water can play an important part in spatial plans at both regional and local level. The WFD requires land and water to be managed holistically, so it is important that land managers are involved as well as water managers.

4.5 Miño

Three different natural spaces can be distinguished in Galicia each with very diverse climatic characteristics: Coastal Galicia, Inner Galicia and the Mountains. Within each of these areas, there are important differences from place to place, due to the uneven terrain with many hills and valleys. The annual rainfall varies between 800 mm and 3 000 mm in the Southwest of Galicia per year. The rain falls mostly during the winter months, also droughts may occur in July when temperatures are quite high.

Owing to its uneven relief and wet climate, Galicia has many watercourses (more than 2 000 km). They range from streams to medium-sized rivers such as the river Miño. They flow through the region, forming a network deeply ingrained in the land, with many deep and narrow valleys. The Miño is, with its 308 km, the longest river and its basin covers 17 800 km². The basins of the rivers Miño, Limia and Támega span the territories of both Spain and Portugal.

River water levels vary greatly during the year as the smaller watercourses are fed by rainwater. Thus the volume of flow is directly related to rainfall. As a result, water

levels are highest during the winter, especially of the rivers, whose sources are located in the northern and western mountains. By contrast, the rivers that come down from the eastern and southeastern mountain ranges, which see regular snowfalls, see two periods of high water levels corresponding with high precipitation levels in autumn and winter and another smaller one during the spring thaw. Flooding however is not common.

4.5.1 Structure of water services

The water services organisation in Spain is based around the Hydrographic Confederation that, in spite of its early birth in Spain, has not been used to its full advantage. Organisationally, the Confederation is divided into: control systems (the Cabinet and Presidency), management departments (the Users Assembly, the Reservoir Withdrawal Commission, the meetings of operation and the work meetings) and the planning department (the water council).

River Basin Water Councils facilitate public participation which is required by the water laws and the WFD. Concerning water users, participation is restricted to certain groups, such as irrigation or the National Water Council. Also groups concerned with environmental issues are represented at the River Basin Water Councils and in the National Water Council, although it is perceived that they achieve little of environmental value. To implement the WFD and to reach the environmental objectives the Spanish institutional hydrographic structure needs to be modified.

Law 8/1993, which regulates the Galician Office of Water Resources, constitutes that the Autonomous Community should exercise its competencies and responsibilities for water resources and related projects through the administrative and public organisations that form part of the Office of Water Resources. Article 2 states that the Council of the Galician Government (Xunta de Galicia) and the Ministry of Environment are the administrative organisations with competencies in this area in conjunction with special organisations that include the Office of Water Resources, the autonomous organisation Waters of Galicia and the public company Hydraulic Works and Services. The latter falls within the scope of the Ministry of Territorial Politics, Public Works and Housing.

The autonomous organisation Waters of Galicia has been granted full autonomy in order to carry out the following functions, as assigned by Law 8/1993:

1. elaboration, implementation and revision of hydraulic programmes
2. administration and control of public hydraulic domain
3. administration and control of hydraulic projects
4. planning, construction and usage of hydraulic works
5. authorisation of works and discharge in Galician coastal areas and the policing of those areas
6. exercise any other function attributed to the organisation by the Galician government

Costs for water services in Galicia are based on consumption levels and vary around the region. Miño river basin inhabitants have to pay an average price of 0.24 Euro/m³ in Pastoriza and Begonte. In Lugo and Villalba, the average price is 0.45 Euro/m³.

	Euro/m ³
services, captation, transportation, storage costs	0.08
services, distribution and treatment costs	1.19
total	1.27

Water costs in Galicia

The current population of Galicia is 2.7 million inhabitants, of which 1 million live in the main eight cities, where the population is well connected to the public water supply network and wastewater treatment. However it is a different story in rural areas, towns and villages, as the figures from 2000 below demonstrate.

Population connected to public network	Population not connected to public network	Households connected	Households not connected
770 000	800 000	380 000	350 000
49%	51%	52%	48%

Rate of connection with the wastewater treatment

Due to the lack of official data, an approximate estimation has been carried out:

- In the main cities, 99% of the population is connected to the public water supply.
- In the rural areas, 50% of the population is connected to the public water supply.

For wastewater treatment, treatment plants with chemical and biogenic reduction cleaning stages are used predominantly, but also primary treatment plants are still in place.

4.5.2 Main problems regarding quality and quantity of water

Throughout the Miño river basin, 76% of the groundwater bodies cannot currently be evaluated due to a lack of data. From available figures, only 1% of the groundwater bodies are at risk of insufficient quantity.

Point sources of cadmium, mercury and also nitrate affect 13% of the surface water bodies in the catchment.

21% of the surface water bodies are currently being investigated, as further data is required to evaluate the risks from diffuse pollution.

The northern part of the river basin is predominantly used agricultural, with 77% of the land given over to farming, which is above the national average of 68%. In the Terra Chá area, increasing numbers of dairy cattle have led to a heightened demand for fodder. This problem has been addressed by increased specialisation and automation of operations in the area, which has in turn led to new environmental problems for water management. The application of slurry mixed with fertilizer has led to runoff into water channels, causing serious problems on many occasions. The Galician Administration published a „Galician Good Practices Guide“ in 1999. The manual seeks answers to commonly occurring problems in water management for agrarian uses, cattle ranch and irrigation, as well as recommendations to follow to either mitigate or avoid future problems. As yet, it has not brought about the desired effect.

During the summer months, especially in July and August, the use of water for irrigation has caused droughts in the Miño river. The Community of Irrigation but also illegal irrigation practices have had grave effects on water resources. Attempts to solve the problem were made through the modernisation of irrigated land systems and by improving the management of irrigation water. However, the problem of illegal irrigation and the associated non-permitted wells, are difficult to resolve.

Controlling their use requires large numbers of agents, which the Hydraulic Administration in Galicia does not have at present.

In order to receive a clear statement of the water quality in the catchment area of the Miño, further investigations and an improvement of available data are essential over the next few years.

4.6 Weser

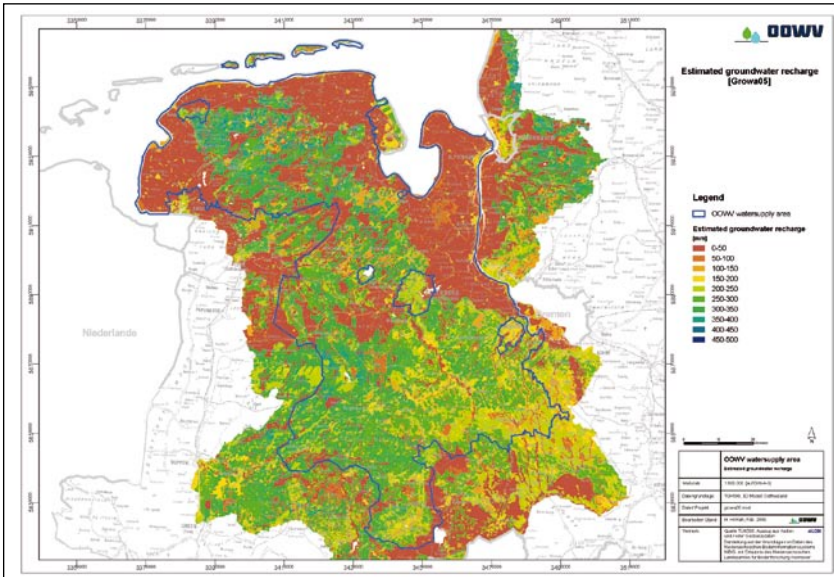
The German ENMaR region is the Weser, a large river basin of 49 000 km². It covers the main part of the Federal State Lower Saxony. It spans administrative and geographical boundaries, which will be evident in how data and information is sometimes shown in this section. To make it more comparable with the other basins, the Northwest of the basin (the former government district Weser/Ems) is the focus of this description. The table below shows the results from the risk assessment of the water bodies in the Weser catchment.

	surface water bodies	groundwater bodies
total	1398 *	141
not at risk	19%	30%
unclear biological and chemical conditions	33%	65%
at risk	48%	3%
* 1377 water courses, 15 lakes, 6 coastal and transitional waters		

Results from the risk assessment of the water bodies in the Weser catchment

Lower Saxony has a long coastline, with inland areas protected from the North Sea by dikes, which require special maintenance to be effective against flooding due to storm tides.

Climatically, the Weser region is situated within the temperate humid zone of Central Europe. In Lower Saxony, mean values of rainfall vary between 550 mm and > 1 000 mm per annum. Groundwater recharge is variable; the west sees annual rainfalls of around 800 mm that lead to a groundwater recharge of 300 mm in comparison to the east, where the annual rainfall is significantly lower. Flooding due to heavy rainfalls in summer and extreme weather events causes more and more problems for the municipalities and landusers in Lower Saxony.



Estimated groundwater recharge in the service area of the OOWV

4.6.1 Structure of water services

In Germany, approximately 7 000 mostly publicly owned non-profit water supply boards are responsible for drinking water supply at the municipality level. By comparison, there are 374 in Lower Saxony, 10 in Great Britain, 4 in France and 15 in the Netherlands.

Within the area of accountability of the OOWV the drinking water supply comes from groundwater only. The water is not treated, only aerated and filtered to avert ferrous and manganese content. Water consumption is metered individually. Costs vary in Lower Saxony between 0.90 Euro/m³ and 1.48 Euro/m³, including a fee of 0.05 Euro/m³ which the consumers pay to finance groundwater protection measures such as afforestation, ecological farming and special groundwater protection orientated landuses for which farmers receive compensation payments.

Municipalities are also responsible for wastewater management. They have to provide and maintain infrastructure for wastewater treatment. In the Weser river basin there are 550 municipal sewage treatment plants and 138 relevant industrial dischargers. Larger industrial plants often run their own sewage treatment plants.

Inspections take place regularly in form of discharger inspections and sewage treatment plant inspections. The quality of water returned as surface water and the remnant sludge is mostly very good with concentrations below legal limits. Agriculture uses sewage sludge as organic fertilizer.

Users have to pay according to their consumption of drinking water, a price which varies between 2.5 and 3.5 Euro/m³. Small-scale treatment plants for private households are more common in the Northwest of Lower Saxony (altogether 200 000).

In Germany, watercourse maintenance to ensure water discharge for private and public landowners is predominantly the duty of regional water boards. This service is also offered by small-scale enterprises, especially in Lower Saxony where mostly self-organised groups of farmers and local landowners pay according to land size. Water maintenance boards also aim at supporting nature conservation.

Flood protection is an important matter for inhabitants of the Weser/Ems region, which is influenced tidally. They have to pay an annual fee as a contribution to the dike board, which is responsible for the maintenance and heightening of dikes.

After administrative rearrangements in 2005, the responsible authority for the implementation process of the WFD became the Water Management, Coastal Defence and Nature Conservation Agency of Lower Saxony (NLWKN). The main instrument for providing transparency and ensuring public participation are sub-basin co-operatives with representatives from all affected stakeholder groups in the region.

4.6.2 Main problems regarding quality and quantity of water

Point sources play a subsidiary role to groundwater and surface water bodies in the Weser river basin. Numerous old mining sites in and around the Harz mountains are sources of diffuse pollutants in ground and surface waters. However, in the Northwest Weser region, it is intensive agriculture that is the main cause of diffuse pollution (i.e. nitrate, phosphorous and pesticides, resulting in an approximate 100 kg N/ha nitrogen surplus), particularly where groundwater recharge seems to be sufficient. Buffer strips are rarely used to protect watercourses that have a close hydrological relationship to groundwater.

In the Weser catchment there are 4 700 transverse constructions that interrupt the continuous flow of water. Barrages and dams are obstacles to fish migration. The retained water upstream creates an atypical river biocenosis.

Only about 15% of waters in the Weser river basin are predominantly unimpaired. The rest of them have no or little natural dynamics due to changes in the morphology of waters. Banks with reed and woodland are exceptions.

To avoid water shortages, abstraction does not tend to exceed recharge rates, a practice that underlies a system of continuous control and licensing. Nevertheless in the region of the rivers Aller and Leine, four groundwater bodies need to be supplemented with additional water.

Discharges of cooling water from fourteen power plants and two industrial plants in the Weser catchment contribute to a significant warming of surface water bodies. Other environmental problems are caused by the potash salt industry along the river Werra, while in the east of Lower Saxony discharges of salty sewage water have been measured downstream as far as the middle Weser.

4.7 Summary

The implementation process of the Water Framework Directive is influencing water management across all European regions. Water supply, wastewater treatment, flood protection, regional water management and water maintenance are, for the most part, the task of municipalities. The different aspects of water management are being affected by various fields such as agriculture, forestry, tourism and spatial planning, all of which in turn have knock-on effects on regional development, agriculture and tourism.

impact of other components	water management	impact on other components
agriculture, spatial planning, tourism	drinking water supply	agriculture, regional development, tourism
regional development, tourism	wastewater treatment	regional development, tourism
agriculture, forestry, spatial planning	flood defence	agriculture, tourism, regional development
agriculture	watercourse maintenance	agriculture, tourism

This means that in most regions there is an urgent need for municipalities to communicate and co-operate with stakeholders from all different fields to share

responsibility in order to achieve good status in WFD terms and to ensure positive conditions for successful regional development in the long run. For example, research within the ENMaR project has shown that well-developed water service systems in Latvia are essential for ensuring water supply in good quality and wastewater treatment according to the standards, but are also providing favourable conditions for economic development by attracting new customers.

The ENMaR project is a facilitator to catalyse the communication process towards a more holistic approach. This is shown in the role of politicians in the Emån region in Sweden who are learning what the WFD means to them. The plan for the future is that the Emåförbundet shall be the link between the water authority and the municipalities in the Emån river basin.

Also in regions where the municipalities are not in charge of water services, such as England, water plays an important role within spatial planning, which lies within the sovereignty of municipalities. Spatial planning will form the foundation of regional development in the future, providing municipalities with information to guide their development potential through different pressures. One of those pressures will be flood defence, which is closely linked to the components of agriculture, forestry and tourism, all of which bear influence on regional development.

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5 Agriculture

5.1 Introduction

Agriculture represents one of the major landuse in Europe and is therefore strongly related to issues of water management. On the one hand it shapes the landscape with its watercourses, while on the other hand its activities impact on surface and groundwater quality due to soil erosion and the application of nutrients and pesticides. Agriculture consumes approximately 30% of water resources in the EU and in certain countries, Spain for instance, the consumption rate rises to 80%. In most European Member States agriculture was named as a major contributory factor as to why many water bodies are at risk concerning their 'good' status. The following paragraphs describe agricultural conditions in the ENMaR river basins.

5.2 Natural geography and climatology

	Emån	Gauja	Mersey	Miño	Weser
area (km ²)	4 500	13 000	4 700	17 800	49 000
altitude	0 - 325	0 - 225	0 -1000	0 - 2100	0 - 800
rainfall (mm/year)	600	725	1 300	1 200	600 – 1 900*
annual mean temperature (°C)	6.5	6	8	11	5 - 9
maximum mean monthly temperature	20.5	17	18	22.8	
minimum mean monthly temperature	- 6.5	- 5.0	1	5.5	
* The maximum value is reached only in the Harz Mountains.					

5.2.1 Emån

The bedrock of the Swedish historical province of Småland is principally made from igneous rock such as granite which is very resistant to erosion and produces poor soils. There are also areas of metamorphic and sedimentary rock types (amphibolites, sandstone and greenstone), which give rise to more fertile soils. The terrain in the Emån catchment area shows typical features of the southern Swedish highlands. A forested undulating plain with small hills and countless lakes and

moors dominates the topography. Only in certain locations, notably the Kalmar Plains where the Emån enters the Baltic Sea, there are large floodplain plateaus, formed during the last ice age, creating the best conditions for agriculture in the area. Despite its northern latitude, position, and great length, Sweden enjoys a mostly temperate climate which is influenced to some extent by the Gulf Stream. The average annual precipitation in the Emån catchment area is 600 mm. There is however a precipitation gradient across the catchment. The northwest, referred to as the south Swedish highland, has a mean annual precipitation of approximately 700 mm, whereas the southeastern part is dryer, with around 500 mm. Summers are fairly hot and longer than in the north of the country.

5.2.2 Gauja

Latvia has over 12 000 small rivers and over 3 000 lakes. Most of the country consists of fertile, low-lying plains with some hills in the east, the highest point being the Gaiziņkalns at 312 m. The dominant geographical features of eastern Latvia are its two main river valleys: the Gauja to the northeast of Riga, and the Daugava to the southeast. The Gauja river basin is characterised by rather low elevations above the sea level with plain, low parts (50 to 150 m) and uneven highlands (200 to 250 m). From its source in the hills southeast of Cēsis until it reaches the Baltic Sea a short distance north of the capital, the Gauja flows through a region of rolling hills. Much of the stretch of valley between the towns of Sigulda and Valmiera falls within the boundaries of the Gauja National Park. The climate in the basin is continental and humid, influenced by its proximity to the sea. Winters are cold due to maritime polar air masses, though relatively warm with frequent thaws in the coastal areas, ranging to much colder towards the interior. Snow falls from mid-December and can continue until mid-March. Weather conditions are very changeable during the other seasons, though springs and autumns tend to be rainy, while summers are fairly cool and cloudy. Average precipitation is around 725 mm a year and about 40% of days during the year are cloudy.

5.2.3 Mersey

The Mersey river basin can be divided into three broad topographic zones: the lowlands, the uplands, and the river valleys. The Irish Sea in the west and the Pennines to the east, together with a prevailing wind from the southwest and the presence of the Gulf Stream, create relatively warm and humid weather. Rainfall is plentiful all year round, though the seasons are quite variable in temperature. Average rainfall in the northwest of England is ~ 1 300 mm, with most rainfall occurring from

October to January and least rainfall in April and May. The warmest months are July and August with average temperatures over 18°C. The coldest months are January and February with average temperatures below 1°C. Further inland the climate becomes colder and wetter. Though uncommon, snowfall can occur in winter and early spring in the lowlands.

5.2.4 Miño

Although the Miño river basin is a heterogeneous region with many climatic and geological differences, the sub-basin Terra Chá, which literally means 'flat land', is rather uniform. It occupies the flat central part of the Lugo province and is mostly surrounded by low mountains. In the low central part of the region, the plain that overlies the bedrock forms the most characteristic part of Terra Chá. Scattered through the lowest parts of the region are ponds and marshlands of natural interest and popular with tourists, created as a result of poor drainage conditions due to clay accumulations. The altitude varies between 400 - 500 m above sea level, though the northern part is higher with altitudes exceeding 650 m. Galicia has an oceanic climate with a Mediterranean influence. There is a pronounced dry season coinciding with the hot season. The weather of Terra Chá is more extreme than in other parts of the region largely due to its location in the interior and the increased altitude. The average temperature is around 11°C with a daily variation of around 20°C. Annual rainfall is about 1 200 mm, increasing slightly in the western parts.

5.2.5 Weser

The Weser river basin shows an amazingly varied natural landscape, encompassing the forested highlands of the Harz Mountains, the hilly regions of Weserbergland, the flat lowlands of central northern Lower Saxony, and the flat coastal area of Friesland. The Weser flows through a hilly region and extends from the confluence of two rivers, the Fulda and the Werra, on to the Porta Westfalica, where it runs through a gorge in between two mountain chains, the Wiehengebirge in the west and the Weserbergland in the east. Before emptying into the North Sea near Bremerhaven, the Weser crosses the northern half of Lower Saxony, which is absolutely flat. Wetlands and marshy conditions are found in depressions dotted around the plain. Although the area lies in the temperate humid zone of central Europe, different climatic sub-regions can be distinguished. In the 'Lower Saxony Lowlands' region, affected by the Atlantic, the climate is rather oceanic and rain falls all year round. Winters are relatively mild and summers comparatively cool, though temperatures can reach above 30°C. The southern part of the Weser river basin including the basins

of Werra and Fulda are more mountainous and present a more continental climate, with cold winters, little rainfall and cool summers. The Harz mountains are characterised by an alpine climate with annual rainfalls between 1 000 and 1 900 mm.

5.3 The economic importance of agriculture

Agriculture does not simply refer to farming but encompasses agricultural supply and the ongoing processing of agrarian goods by the food industry, as well as the energy sector and other related businesses. These represent significant support structures for agriculture and so wield some influence on the sector. The economic weight of agriculture is closely related to farm size and type of landuse. Typically, the income of farms, and therefore the contribution to the GDP, increases with size and intensity of landuse.

In all ENMaR regions, agriculture is largely shaped by livestock production, but there are other important factors specific to each. In the Mersey region dairy cattle and sheep are the predominant types of livestock. In the Emån region the forestry sector is of crucial importance while cattle and poultry are the most representative sectors concerning livestock. In the Weser region the livestock industry is mainly dedicated to intensive production, the major sectors being poultry and pig farming. The region of Weser/Ems is known throughout Europe as an area of intensive animal husbandry. Every second cockerel is produced in Lower Saxony, every third egg-producing hen, every fifth pig and every third turkey-hen (approximately three million) are produced in the region of Weser/Ems. In the Miño region dairy cattle dominate, though sheep also represent a major portion in terms of meat production.

	Emån	Gauja	Mersey	Miño	Weser
agricultural land	13%	32%	< 72%	32%	61%
forestry land	76%	52%	4%	62%	27%
other	11%	16%	>24%	6%	12%

Landuse in the ENMaR regions

5.3.1 Emån

The Emån river basin is a sparsely populated area with approximately 82 000 inhabitants. Of these, just over 16 000 live in the countryside, while less than 2 000 work as full or part-time farmers. There are approximately 650 holdings with an average

of twenty cattle each. These are referred to as 'small holdings' with an output of around 400 hours of work per year, i.e. part-time employed farmers. The fifteen largest farms, those with 100 - 300 cattle, are mainly situated in the lower parts of the river basin and have more than 1 or 2 people employed. There are no reliable figures regarding employment, turnover or profits of agriculture in the river basin. Agriculture is regarded as being non-profitable on a small scale, in other words large areas and big investments are required to attain a sustainable and profitable output in the Emån river basin.

In terms of significance, agriculture plays a secondary role to forestry in the Emån catchment due to its uneven terrain, the predominance of thin, poor, acid, stony or sandy soils, and the abundance of lakes and wet areas. All these features make the land largely unsuitable for agriculture except in certain locations. Instead forestry dominates land use (76%). Agricultural land (13%) is situated mainly in floodplains and adjacent areas of the Emån and its larger tributaries, especially along the Emån's lower parts, in the municipalities of Hultsfred, Högsby, Mönsterås and Oskarshamn. There are over 57 000 ha of agricultural land in the catchment, of which 38 500 are arable and 18 500 are permanent pastures. The most important crop in the basin is pasture for haymaking while one third of the total agricultural area represents pasture for animals. Other important crops are spring and autumn sown grain, which constitute 17% and 1% respectively.

5.3.2 Gauja

The total area of the Gauja river basin is 1.3 million ha, 52% of which is forest and 32% agricultural land. Mires, water, yards, roads and other uses account for the remaining 16%. Meadows and pastures occupy 33% of agricultural land. The remaining arable land is used mostly to grow cereals and perennial grass, and to a lesser extent crops such as potatoes, industrial crops, fruit and vegetables. The extent of forage crops (20% of the total area and 60% of agricultural land) reflects the fact that the Latvian agrarian sector is dominated by breeding cattle and pig production.

In 2003 there were around 130 000 farms in Latvia with a total land area of 2.8 million ha, covering 1.8 million ha of agricultural land, the rest being mainly forest. Private farms predominate, while public sector farms cover only 0.3% of the farming land. Latvian small farms (those with less than 10 pigs or cattle) have a 97.5% share of the total, medium-sized farms have 2%, while only 0.3% is attributed to large farms. The number of farms in the Gauja region shows a decreasing trend (31 750 in

2001 to 29 340 in 2003). This is mainly due to smaller farms folding under economic pressure. However, the agrarian contribution to the Latvian GDP (including forestry, hunting and related services) is now slightly above 4%, and continues to increase. Although the number of farms has fallen, total production has increased due to existing farms increasing their size and efficiency.

5.3.3 Mersey

The agricultural sector of the Northwest has over 22 000 farm businesses employing some 40 000 people. While the sector contributes less than 1% of the region's GDP, this figure masks agriculture's contribution to the local economy in remote rural areas like Cumbria, where it is significantly higher than 1%. In addition to those directly employed within agriculture, related industries such as agricultural supply sectors and food processors employ significant numbers in the Northwest. The food and drink chain in the Northwest is a major employer, employing some 370 000 people. The combined contribution of agricultural and food sectors to the region's economy is 12% of the GDP. Farmers play a significant role in maintaining the region's farmed landscape and rural environment. Maintenance of this landscape is vital to the region's tourism industry, which makes a much greater contribution to GDP than farming.

The Northwest of England is a region of great contrasts. Almost 80% is considered rural. There are approximately 17 400 main agricultural holdings, 37% of which are classified as cattle and sheep, and 24% as dairy holdings. This compares to national figures of 28% and 12% and so highlights the importance of the livestock sector in the Northwest. The region presents three distinct areas relating to the climatic and topographic conditions described above, each with their own rural development issues. The relatively warm and dry lowlands of South Lancashire, the Fylde, Greater Manchester, and Merseyside have the most versatile land, used mainly for intensive horticulture and arable cropping. The good to moderate land of Cheshire, Lancashire and the Cumbrian lowlands is used for dairying, cattle and sheep production. Sheep and cattle mainly graze in the cool and wet uplands of Cumbria and the Pennines.

As the livestock sector is of major importance, grassland represents the predominant use of the agricultural land in Northwest England. Although there is agricultural land of significant quality in Southwest Lancashire and Merseyside, the vast majority is used for permanent pasture. A high proportion of the agricultural land, mainly in the upland areas, is difficult to farm due to its geomorphologic conditions and poor soil cover. In addition, the growing season in these areas is short and they are

situated far away from markets. Such disadvantages have seen these areas designated as 'Less Favoured Areas'. The region has 28% of England's 'Less Favoured Areas'.

5.3.4 Miño

Around 62% of the total area of Terra Chá is given over to forests, 32% to agriculture, and the remaining 6% to other uses. Land use distribution varies throughout the area. The north contains grasslands and meadows in the higher and steeper zones. The west and southwest have wide open spaces with plantations for pines and scrubland with small areas of arable land. The central area is a mixture of cultivated land and woodland. Grasslands and crop cultivations dominate the southeast.

Terra Chá specialises in bovine milk farms with little productive diversity. These account for 24% of farming in the municipalities, while in the rest of Galicia the percentage is around 9%. Most farms, aside from having a strong presence of livestock, also use a part of their land for other agricultural purposes such as the production of cereals, potatoes and maize. Farms are generally small with an average of 18 plots of land and an average surface area of 12 ha, only 6 ha of which is used for agricultural purposes.

The total employed population in the Miño region is around 250 000 people, of whom 56 000 variously work in agriculture, farming and fishing, representing 21% of the total. Agriculture accounts for 5% of the total GDP in the Terra Chá region.

Agrarian and environmental authorities are key determining factors in agriculture, firstly because they establish restrictions, secondly because they grant subsidies, thirdly, they provide services needed by the farmers, and finally because they establish promotional plans and policies for certain agricultural activities. Agrarian co-operatives are steadily becoming more influential within this sector.

5.3.5 Weser

The Weser basin is 49 000 km², of which 48% is arable land, 13% pasture, 27% forest, 7% urban and 5% water and wetlands. A third of arable land in Lower Saxony is located in the region of Weser/Ems (Northwest of the state) where farming is very intensive. In Lower Saxony the overall number of farms is steadily decreasing, this is most evident for small farms, while the number of farms of 100 ha or more is growing. Development patterns from past decades show a concentration in agriculture that benefits large-sized farms. Between 1971 and 2003, 60% of farms closed while

6% of farm land was lost. Most farms that are 100% subsidised have between 75 ha to 100 ha of farmland (88% of them are full-time farms where agriculture is the pillar of the family economy). Sideline farms are mainly small (90% of 2 to 5 ha, farms are not in continuous use).

The Weser region has 8 million inhabitants, the working population is 3.4 million of whom 5% are employed by the agricultural sector. In addition to those employed directly by agriculture, related industries such as agricultural supply sectors and food processors employ significant numbers in the northwest. The largest slaughterhouses are situated in Weser/Ems. For labour-intensive crops such as asparagus and strawberries, labourers from Poland and other Eastern European countries are in demand. Farmers play a significant role in maintaining the region's farmed landscape and rural environment and thus take advantage of other additional sources of income, such as nature conservation, tourism and production of renewable energy.

5.4 Pressures and impacts of agriculture on water status

Eutrophication through diffuse pollution by nitrates and phosphorus

The main negative ecological consequence of eutrophication is the proliferation of algae leading to limited oxygenation conditions and decreased water transparency. Nitrogen and phosphorus reach the water via the process of diffuse dispersion of nutrients in agricultural soils.

Unpolluted surface water bodies have total phosphorus concentrations of less than 0.4 mg PO_4/l . More than 50% of European rivers have a higher concentration than this. This is a more common situation in the Weser river basin than in the Miño or Gauja river basins, for example. In the Emån river basin, levels of phosphate are considered to be high, reaching levels greater than 0.4 mg/l.

Certain types of aquifers are more vulnerable to pollution by nitrates than others. In general, deep or confined aquifers (which are the main type in the Miño basin) are better protected, whereas alluvial and shallow aquifers are extremely sensitive to pollution by nitrates. High levels of nitrate entirely have their origin in agrarian activities. It is considered that concentrations of 2 to 10 mg NO_3/l approximate natural concentrations. The majority of total nitrogen contained in the surface water is in form of dissolved inorganic nitrogen, especially nitrate and ammonia. Nitrate concentrations are very high in the Weser river basin, reaching 140 mg/l, while in the Miño river basin they range from 20 to 40 mg/l.

Agricultural irrigation

The intensity of irrigation use varies according to climate, type of cultivation and applied methods of farming. Irrigation plays no particularly vital role in the ENMaR river basins as they are all located in the relatively humid continent of Europe. However, even there irrigation is used. In the Miño river basin, there are two zones of irrigation. One of these is in the region of Terra Chá, where irrigation is used to achieve better yields in the cultivation of maize and meadows. In the German region of Weser/Ems, cultivation of vegetables depends to a degree on irrigation. The issue of irrigation is set to intensify in future due to the effects of climate change.

Drainage and regulation of the watercourses

The physical alteration of the landscape to increase agricultural land has decreased the availability of water sources for drinking water, recreational activities, fishing, etc. The regulation of watercourses and the drainage of land can also lead to a decrease in groundwater, which can be accompanied by a greater abstraction from places where the natural cover of the soil has been transformed to be used for intensive irrigation for agricultural purposes. This situation is common in the Weser river basin where soil drainage is an important issue for farmers. However, drainage also contributes to the high nutrient level of watercourses. Water percolates under arable land and those fertilisers not taken up by plants leach into it. This is the main problem faced by suppliers of drinking water.

Pollution by pesticides

Pesticide pollution in water can have significant detrimental impacts on flora and fauna and limit potential water uses. However it is complex and costly to implement efficient control of the residues produced by pesticides in the environment. Many pesticides have not even been researched yet. The Directive 97/57/CEE, in agreement with the modification of the Directive relating to drinking water (98/83/CEE), establishes the maximum concentration of pesticides at 0.1 µg/l. Within the ENMaR regions this type of pollution closely correlates with intensive agriculture, for example in the Weser river basin, whereas in the Miño river basin it is not of significance.

Increase of sediments

The loss of cover of natural vegetation due to the felling of land for agricultural use, as well as the effects of farming practices themselves, have significantly contributed to the degradation of watercourses. This could have harmful effects on ecosystems since habitats are diminished for those flora and fauna which require low

turbidity. Where an intensive landfill of the wetlands takes place, this can constitute a particular problem for some types of smaller wetlands in rural areas, which are already suffering the effects of drainage activities.

In Galicia forest fires are an increasingly serious problem. Dragging particles cause erosion and damage in surface waters. Galician orography is also a determining factor. Increased sediment load of the rivers is a very common problem. The excavation of transported sand material is very costly, so it is not always worthwhile to remove the sediment load from the river.

5.4.1 Emån

Agriculture is associated with the leakage of nutrients into surface and groundwater. The most pronounced influences on water quality in the Emån catchment come from the discharge of nitrogen and phosphorus compounds into freshwater systems. The main problem resulting from this discharge is eutrophication in the lacustrine and marine environment. The problem increases due to heavy drainage of wetlands and the straightening of watercourses and with increased usage of artificial fertilisers and more intensive cultivation. The leakage of phosphorous and nitrogen in the Emån basin derives from different sources, but agriculture contributes the majority, around 45% of the total.

5.4.2 Gauja

Evaluation of pollution levels in the Gauja river basin shows that the biggest source of pollution is from the processing of agricultural products and food production. Poor quality and maintenance of manure storage facilities can cause leakages which pollute the water. Degradation of agricultural lands, the increase of abandoned land and the absence of buffer zones along water bodies cause further pollution from surface run-off. Pressures from agriculture can be related to management practices, as good management should maintain good environmental and agricultural practice, cattle welfare and hygienic requirements in farming and agricultural production. The pollution of water bodies from agricultural activities must be prevented by means of promoting an adequate environment for agricultural production and raising stakeholders' awareness.

5.4.3 Mersey

Diffuse pollution from agriculture is the main pressure here. It is mostly associated with the use of specific substances in agriculture (fertilisers, pesticides) which enter the water cycle. Agricultural intensification, such as increased stocking, fertiliser and pesticide use, has resulted in increased pressure and impact on water environments. Tackling diffuse pollution caused by agriculture is a key concern of the WFD. It can be expected that the cost-effectiveness of actions needed to implement the programmes of measures will be enhanced by voluntary agreements. Moreover, the WFD requires that rising trends in pollution be reversed and further deterioration be prevented. As mentioned, agreements between farmers and water companies aim at preventing further pollution and avoid the need for future water treatment or other measures, such as closing wells and conveyance of remote resources. Consequently, agreements promote sustainable water use based on the long-term protection of available resources. Thus, many voluntary measures to tackle the problem of diffuse pollution caused by agriculture have been launched. However, they are based more on governmental agro-environmental programmes rather than on direct negotiations between water companies and farmers in local catchments.

5.4.4 Miño

Small farms are disappearing, while remaining farms are increasing in size, which means growing intensification of production by those farms, which puts extra strain on the environment. The number of livestock is increasing while useable agricultural land for livestock farmers has diminished due to an increase in the forested areas.

There are no regulations or legislation to regulate the use of organic feed as fertilisation. Also fertiliser dispersing equipment is not fit for the purpose of a correct distribution of fertiliser, either dimensionally or functionally. This encourages the owners to dump it as waste.

There is no adequate system in place for the collection and treatment of phytosanitary water supplies, oils or plastics made for agricultural use. For instance in slope terrains the run-off water can produce an overflow in slurry tanks, flooding surrounding land and posing a major pollution risk. This unfortunately is a fairly frequent occurrence in some areas of Galicia. The municipalities are responsible for the monitoring and surveillance of these slurry tanks, ensuring they are built up in an appropriate way.

5.4.5 Weser

In the region of Weser/Ems a surplus of 100 kg N/ha has been identified as originating from agricultural sources (diffuse pollution). This is a significant burden to surface and groundwater. Sandy soils and a positive water balance of up to 300 mm are responsible for a high leaching rate into groundwater. All streams end up in the North Sea, already a nitrate-sensitive area. For two-thirds of groundwater bodies the aims of the WFD will not be reached. The booming growth of bio energy plants will intensify the tendency of a high N surplus in the region of Weser/Ems as maize will be grown to feed them. More nitrogen will remain on the field, rather than being absorbed into the production of protein and meat.

To improve groundwater quality in the protection areas of Lower Saxony (13% of Lower Saxony), funds are available to help farmers changing their methods of landuse for more water-protective alternatives. Stakeholders in the sub-basin co-operations are asked by the water authority to select only those measures which help implement the WFD. These can be funded. The environmental ministry wants to use a proportion of money paid by the consumer for wastewater treatment services up to 2009 to invest in some of these measures. It seems though that the aims of the WFD are not easy to fulfil in Lower Saxony.

5.5 The Common Agricultural Policy and the Water Framework Directive

To reduce the negative effects of agriculture on the environment described above, the Common Agricultural Policy (CAP) was reformed in 2003 to address environmental issues in a more efficient way. CAP can now play a significant role in water protection.

In the first 'pillar' of the CAP, payments are decoupled from production, and this is expected to reduce intensive production. According to the cross-compliance tool, such payments depend on adherence to agreed environmental standards. Thanks to modulation, funds can be transferred to the second pillar and therefore increase the budget for measures which benefit the WFD such as maintenance of grassland, winter soil cover, organic farming, buffer strips or various water-saving solutions.

Similarly, the approach of the WFD will affect the agricultural sector more strongly than before. One possible link between both policy areas is water pricing by relating the payment mechanism of the CAP with the effects of the WFD on water costs,

specifically through the selection of a set of cost-effective measures for WFD implementation, the polluter-pays principle, cost-recovery and incentive pricing.

The intention is to create a new agrarian model in which agriculture plays a multi-functional role that includes an important facet regarding environmental protection, landscape, safety and food quality and animal welfare, while also favouring the competitiveness of European farmers. Through the CAP, subsidies should encourage better management and a decrease in detrimental environmental impact. This should have a positive effect on water quality.

5.6 Objectives and potentials of agriculture

5.6.1 Emån

Several local, regional and national campaigns have been implemented to decrease the discharge of nutrients. Aside from specific legislation, regional and national 'environmental goals' decided by the government are working on such issues as increased water quality by means of changes in the processes of agriculture.

In the autumn of 1997, the Emåförbundet formulated a series of objectives to reduce nutrient leakage and improve water quality in agricultural areas of the basin. The aim was to achieve these objectives through the creation of 'watercourse groups' made up of land owners equipped with information, in other words by increasing local public participation. Ten years later there is still much work to do, but with help of the WFD it will now be easier to create a stable ground for monitoring, planning and implementing measures that are in agreement with the national environmental goals and the WFD, as well as with the initial goals of the Emåförbundet itself.

5.6.2 Gauja

The development of the agriculture and forestry sectors should firstly encompass environmentally friendly practices such as organic farming and other alternative agricultural activities. These types of measures can be supported with a number of aids and allowances. Another important aspect should be the elimination of pollution to water bodies from the processing of food and agricultural products, currently the biggest sources of pollution in the Gauja river basin. Also of vital importance is increased public awareness of the importance of preserving and protecting ecosystems and biodiversity while developing agricultural and forestry activities.

There are potential risks to take into account. Delays in the development and introduction of the compensation system for environmentally sound management (for example the promotion of organic farming, the preservation of biodiversity in grasslands, the establishment of buffer zones, etc.) will hinder the development of an environmentally friendly economy. Neglecting the appropriate environmental quality standards in production will increase pollution loads to water bodies (through surface run-off from fields for example). Another potential risk is related to the implementation of heavy measures (for example wastewater treatment facilities) where prohibitive additional funding may prevent successful implementation.

5.6.3 Mersey

In Northwest England, the most predominant agricultural product is milk, followed by beef and sheep. The region historically is one of the largest producers of milk. There are now fewer farms, although existing farms tend to be larger in size. Milk production enormously depends on the supermarket price of milk. As this is currently quite low, meaning low profits for milk producers, there is a decline in milk farming in the region. Sheep farming is also in decline. The foot and mouth disease crisis a few years ago saw many farmers leaving the agricultural sector altogether.

In 2000 approximately 3 500 ha of land in the region was farmed organically, 0.4% of the total agricultural land. By 2005 this had risen to 22 600 ha, 2.5% of agricultural land (DEFRA 2005).

The extent of agro-environment activities in the Northwest also increased significantly. In 2000, Countryside Stewardship Agreements and Environmentally Sensitive Areas covered ~ 160 000 ha of land (MAFF 2000). By March 2005, comparable land coverage for these schemes was ~ 280 000 ha (DEFRA 2005).

5.6.4 Miño

The main objectives are to acquire economic aid to help reduce pressure on the environment, to improve the availability of technical assistance for farmers, to make farm careers attractive to younger people, to promote alternative and complementary activities in the agrarian sector, to provide capacity for pressure to improve agricultural prices, to increase dairy production in Galicia due to economic dependence on this particular sector, to provide economic support for installing septic tanks for pesticides, to prohibit afforestation of agricultural areas and to establish acceptable norms for the use of fertilisers.

5.6.5 Weser

Agriculture faces big pressure in Lower Saxony. Competition with world market prices and new frames set for example by lower prices for sugar beets are dominating the decisions taken by the farmers to intensify the production and to look for alternatives for generating income. Politics are supporting farmers in that direction. Especially the bio energy plants are well sponsored by the Ministry of Agriculture. Energy farming will become a competitive branch, prices for food will rise and prices for land will rise making it difficult to get access to land, in order to switch to more environmental friendly ways of producing food.

5.7 Summary

The situation of agriculture in the ENMaR regions and its relation to the WFD

Different methods of farming and their positive and negative impacts on the environment in the ENMaR regions have been discussed throughout the project. In the Mersey district for instance sheep farming is the main agricultural activity, whereas Galicia relies much more on cattle production. The smaller farms in the Gauja district concentrate on poultry farming, which plays a role in the Emån river basin as well, but less so than veal production. Agriculture in the lower part of the Weser region is heavily industrialised. The Miño region has mainly forest crops, grasslands and natural pasture land being predominant. The area around the Emån is dominated by trees, and so wood is important in that area. The Mersey district is mainly pasture land and forage crops, whereas over 50% of land in the Gauja river basin is used for cereals. 61% of land in the Weser river basin is used for agricultural purposes. Although the intensity of farming varies considerably, farmers face an economic situation that is becoming more and more difficult everywhere.

Applying the WFD it is necessary to bear in mind some of the geographical and temporal variations:

- the natural differences between the regions (for instance climatic differences, proper usage of soil and water during drought periods, etc)
- the economic differences, for instance Galicia is classified as region objective 1, so it is strongly funded by the EU, unlike the Mersey river basin for instance
- differences within a country or even a river basin due to variations in the type of soil and bedrock and especially differences in the hydrological systems. It is possible to see similarities between regions that are far away from one another, for instance Sweden and Galicia. Hydrography and bedrock type are determining factors here.

This high degree of variability means that it is difficult to find a suitable general approach for managing agriculture and water. Solutions must adapt appropriately to each basin (and sub-basin), considering factors on a European, national and regional level each time. By means of water management at a basin level, the WFD provides a flexible framework which adapts to integrate these differing factors and levels of intervention. The basic idea is that measures should be transferable but have to be adjusted to specific regional conditions.

Agriculture and water resource management

All over Europe diffuse pollution of ground and surface water is identified as one of the main reasons why water bodies fail to obtain 'good status'. The main source of this type of pollution is agriculture, although the dimension of the impact differs considerably between different areas. The same applies for the ENMaR regions. The environmental impact of agriculture results in diffuse pollution of nitrogen of less than 2.5 mg/l and phosphorous of less than 0.09 mg/l in water bodies within the Gauja river basin. The picture is similar in the Emån river basin where forests are also sources of nitrogen and phosphorous, though much less than agriculture. In the Mersey and Weser river basins the figure is more than 50 mg/l. In the Miño catchment, levels of nitrogen are between 15 mg/l and 50 mg/l depending on the area. These agricultural impacts pose a major economic, social, environmental and political challenge, one that is of crucial importance in the successful implementation of the WFD but also for regional development. There is a strong need to link agriculture with water policy, and water authorities should be interested in this issue due to the benefits for drinking water supply, flood protection, landuse and general quality of life for the inhabitants of their catchment areas.

The Common Agricultural Policy set up by the European Union is considered by 'water policy people' as one big solution for diffuse pollution, regulating market conditions and paying measures. It will hopefully be able to unify all good practices from all regions and educate those who work in agriculture towards treating water supplies with the due respect, while conserving the richness and diversity of agricultural practice in all EU countries. CAP reform has the mechanism to change agricultural practice in order to contribute to improving the ecological status of water.

6 Forestry

6.1 The regions

6.1.1 Emån

Landuse in the Emån river basin is dominated by forestry land, approximately 340 000 ha. This is 76% of the land area of which 65% is considered productive forest and the remaining 10% is classed as impediment (annual growth less than 1 m³/ha/yr).

All sub-basins have forest coverage of more than 65% with 75% being the average, and the most afforested sub-basins are those in the middle part of the basin, on a north-south transect. Sub-basins with the lowest share of forest (around 65%) are situated in the Emån flood valley, where the most intensive agriculture occurs.

6.1.2 Gauja

Timber is the most important export product in Latvia and the total forest-covered area is nearly 3 million ha or 45% of its territory. In the Gauja river basin, the total woodland area is about 52% of its territory.

It is frequently claimed that the Latvian woodlands are over-utilised and will soon be completely depleted. In Latvia, owing to natural factors (soils, climate) and the management practices (less need for farmlands), the forest cover has nearly doubled over the period between 1923 (23%) and 2003 (45%). This is because of the natural overgrowth of abandoned farmlands and afforestation, a trend that is expected to continue. Along with an increase in forested areas the entire standing volume is estimated at 578 million m³ by the beginning of 2004, which is 249 m³ per head of the population.

6.1.3 Mersey

The proportion of woodland in Northwest England is approximately 7% (~ 96 000 ha) yet it contains some of the country's finest Ancient Semi-Natural Woodland (ASNW), woodland landscapes and forest parks. The sub-region, Merseyside, has a woodland cover of only 4% of the total area, which is regarded as quite low.

Nevertheless, the importance of trees and woodlands to the Northwest cannot be overestimated. This region has wooded areas that are considered internationally, nationally and locally important in landscape and biodiversity terms. These need to be considered in region-wide strategies such as the Regional Spatial Strategy and in Local Development Frameworks for the protection and enhancement of the economic, social and environmental benefits they can provide (NORTHWEST REGIONAL FORESTRY FRAMEWORK).

6.1.4 Miño

In Galicia there are more than 600 million trees. Almost 69% of the region is woodland and its forests are worth more than 28 billion Euro. This explains the need for attaining sustainable woodland management in the framework of pan-European conferences on woodland protection. Although Galicia has a higher potential for productivity compared to other Spanish regions, forest planning has yet to be well implemented. This is mainly because of the structural, historical and social conditions of Galician rural land and also because of inadequate forest policies. Until now, forests have not been employed to their full potential, being used as a „savings bank“ that is cut to satisfy precise necessities to support other activities, and as such the necessary tending of stands does not occur. Due to a lack of infrastructure and the traditional forestry culture, optimal results have not been achieved yet. Production levels could be increased, especially in a qualitative way (EUROPEAN FOREST INSTITUTE).

6.1.5 Weser

In many cases there are no exact figures for the Weser river basin, therefore information is often provided for Lower Saxony, which covers the largest part of the Weser river basin. Slightly more than 13 400 km² are woodland in the Weser river basin. Over the last few centuries, the forests have been dramatically influenced and regionally destroyed by different users. Saltworks, charcoal production and glassworks used large amounts of timber. Forest litter was used as fertiliser for poor agricultural land. Then, sustainable management in forestry was established in Lower Saxony. Johann Georg von Langen (1699-1776) was the first to introduce sustainable methods of orderly forestry. This led to reforestations in the Harz mountains and the Lüneburg Heath. Nowadays, forests cover 27% of the Weser river basin ([HTTP://WWW.HOLZ.UNI-GOETTINGEN.DE/FORESTRY](http://www.holz.uni-goettingen.de/forestry)).

6.2 Forest ownership

river basin*	private owners %	municipalities %	state %	companies %	others %
Emån	51	6	18	24	1
Gauja	56	0	44	0	0
Mersey	49	3	23	18	7
Miño	63	2	2	33	0
Weser	56	7	37	0	0

Structure of percentage forest ownership by sector within the 5 river basins. Note that some figures might be divided into more sector categories (e.g. state and companies) depending on the original data.

*The structure for forest ownership in the river basins is not available, therefore national, state or regional figures are given here.

Forest ownership in Galicia is almost exclusively private (96% of the area). Individual ownership represents two-thirds of forest, including the most productive land with the highest share of woodland cover. This area is separated into allotments, meaning that 80% of these plots are less than 0.5 ha in area. Collective ownership accounts for the other third of land containing forest, although the plots are generally of less quality with only a small part being woodland. Its principle use is the production of brushwood. This kind of ownership is more common in the inner mountain regions.

In Lower Saxony private forest is mainly managed in small parcels of forestry land, because of historical farmer ownership and right of succession. Nowadays, only 50% of private forest is in farmers hands. Only 10% of private forest is managed in units of more than 500 ha and a further 10% in units of 200 to 500 ha size. About 50% of private forest is managed in units of less than 20 ha and about 11% is managed in units less than 1 ha forest land; 6 ha is the average of farmer ownership. Reasonable management is assumed to be possible from 50 ha upward. Moreover, owners of small-sized forest parcels are often estranged from their forest and are not interested in economic or other uses. Timber industries on the other hand are not interested in harvesting small forest areas since it is not economically viable.

Lower Saxony's politics encourage and support forestry associations to act as service and consultant centres in rural areas to assist private forest owners in managing their forests sustainably. With regard to the availability of timber for manufac-

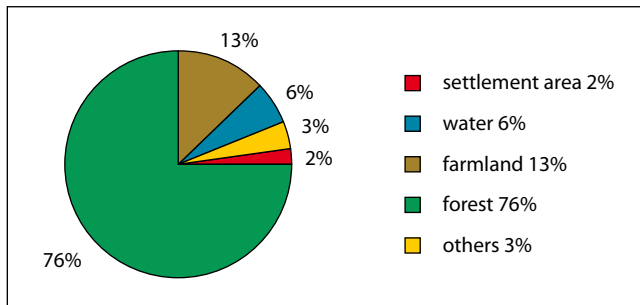
turing industries the forest department within the chamber of agriculture helps owners of small and medium-sized forests to activate the existing timber reserves and provides them with information (NIEDERSÄCHSISCHES MINISTERIUM FÜR DEN LÄNDLICHEN RAUM, ERNÄHRUNG, LANDWIRTSCHAFT UND VERBRAUCHERSCHUTZ, HEFT 55 DER WALD IN NIEDERSACHSEN, ERGEBNISSE DER BUNDESWALDINVENTUR II, 2002).

6.3 Forest and its economic value

6.3.1 Emån

Landuse and forest area

The second dominant type of landuse (after forests) in the Emån river basin is agriculture, both arable land and pasture (see figure below) which comprise about 13% of the total basin area. The third common type of landuse is surface water, which covers nearly 26 800 ha. The Emån river basin comprises approximately 800 km watercourses and 950 lakes (larger than 0.5 ha).



Landuse in the Emån river basin (4 500 km²)

productive forest land	302 000 ha
protected productive forest land	716 ha
wasteland *	40 200 ha

Forest land in the Emån river basin

* referred to as an area that produce less than 1 m³/ha/year, called "impediment" in Sweden

Standing volume by tree species and felling

The most common tree species in the Emån river basin are spruce, pine and birch. Coniferous forests cover approximately 71% of the whole basin (~ 320 000 ha) whereas broad-leaved forests are sparse and cover about 4% of the basin (~ 17 800 ha). The most common broad-leaved tree species are birch, common alder, aspen and mountain ash in the higher parts of the basin. The lower parts in the southwest have a greater dominance of selected broad-leaved forest species such as oak, beech, elm, Norway maple and ash.

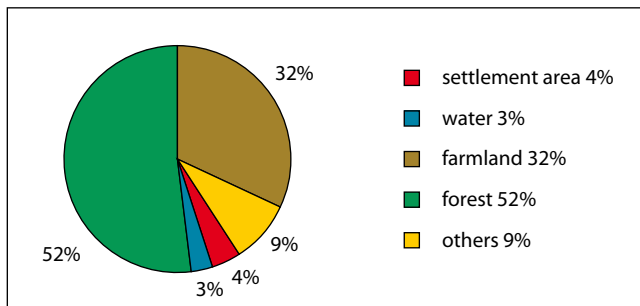
There are as yet no exact figures of the standing volume by tree species in the Emån river basin. The total standing volume in Sweden comprises approximately 3 billion m³, of which the Emån river basin comprises less than 1% - i.e. approximately 24 million m³. Of these, approximately 95% are coniferous forest and about 5% are broad-leaved forests.

The annual gross felling in Sweden was 85 million m³ during 2004. The average felling area was 4.4 ha, according to statistics from the national board of forestry. The annual gross felling within the Emån river basin has not yet been calculated. A rough estimate, however, would be approximately between 600 000 and 700 000 m³ gross felling per year.

6.3.2 Gauja

Landuse and forest area

The total area of the Gauja river basin is approximately 13 000 km² and the dominating landuses are forest and farmland.



Landuse in the Gauja river basin (13 000 km²)

Although conifers generally dominate Latvian woodlands in state-owned forests, the species composition is somewhat different than in other ownership forests. In state-owned forests the conifers (pine and spruce species) prevail, making up 69% of the total area. In other ownership forests the conifers account for only 43%, with a higher proportion of broad-leaves (birch 36%, grey alder 13%, and aspen 4%). This is due to these forests being on land that has overgrown naturally in recent decades. Productive forest land covers 92% of all forest-covered land in the Gauja river basin.

Standing volume by tree species and felling

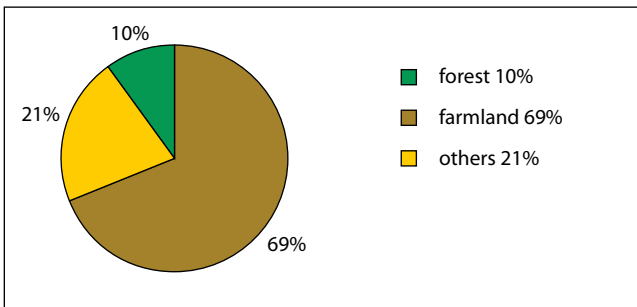
The most common tree species in the Gauja river basin are pine, spruce and birch that comprise nearly 165 million m³ of the total standing stock (approximately 185 million m³). The distribution of conifers and broad-leaves are 65% and 35%, which is a significantly higher number of broad-leaves than in the Emān river basin.

Gross felling in the Gauja river basin forests is about 3 million m³, over a felling area of 41 000 ha, per year (2004). Annually felling across Latvia is roughly 16 million m³, although this was as low as 11 million m³ in 2005.

6.3.3 Mersey basin

Landuse and forest area

The total land area of England as a whole is 13 million ha of which 10% is forest land (FORESTRY COMMISSION 2005).



Landuse in England (130 000 km²)

The woodland in England is dominated by broad-leaved species (66%) such as oak, elm and ash, i.e. native species. Regarding the coniferous species (34%), there are great amounts of introduced species such as sitka spruce, hybrid larch, douglas fir and corsican pine.

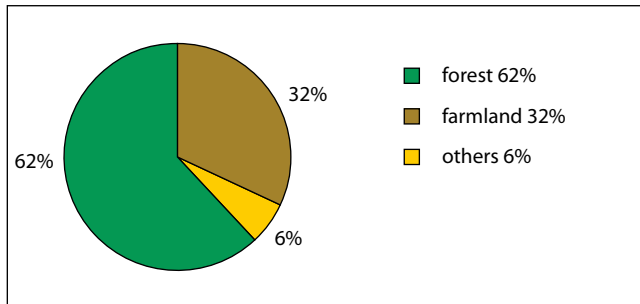
Standing volume by tree species and felling

During 2004 there were approximately 11 million m³ standing volume (wood production) in GB (no figures for Mersey basin available). Of these, 98% were conifers and the remaining 2% broad-leaved species (FORESTRY COMMISSION 2005), hence almost the opposite of the Emån river basin where the conifers dominate.

6.3.4 Miño

Landuse and forest area

The area of Galicia is approximately 3 million ha and the dominating landuse categories are forest and farmland.



Landuse in the Miño river basin (17 800 km²)

Forested land in Galicia has increased during the last decade by 36%, while timber volumes have increased by 150% to ~135 million m³ (Bermúdez & Touza 2000). This was possible due to a decrease in forest fires and the increase of reforestation measures. There are however deficiencies, for example planting is not as dense as it could be at only 86 m³/ha. Another problem is the poor quality of broad-leaved trees for the processing industry.

The conifer forests are under considerable pressure, which impedes the development of these pine stands in terms of volume and quality. As a result, factories need to import pine for sawmills, boards and carpentry. This does not apply to the stock of eucalypts, where growth currently outstrips demand.

Standing volume by tree species and felling

48% of the forested land is given over to commercial forestry. The growth rates are very high, the average being 8.5 m³/ha/year. However, it is possible to reach 30 m³/ha/year for eucalyptus on the best terrain.

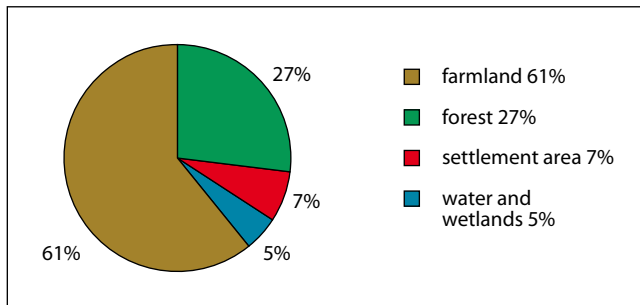
The most common species in Galician forests are pine (390 000 ha), oak (195 000 ha), and eucalyptus (178 000 ha). These forests cover more than 55% of the forest land (BERMÚDEZ & TOUZA 2000).

A little less than 6 million m³ were cut in Galicia in 1998. The wood cut due to fires accounts for a decreasing percentage over recent years, whereas the percentage of volume of wood for final cut has increased enormously.

6.3.5 Weser

Landuse and forest area

Landuse in the Weser river basin is dominated by farmland and forest.



Landuse in the Weser river basin (49 000 km²)

Between 1987 and 2002 about 18 200 ha of forest area were transferred to other landuses. The majority of that land (15 000 ha) was owned by private owners, co-operatives, municipalities and boards.

During the same period about 59 000 ha new forest was developed. Half of that increase is due to natural succession on former wetlands of degenerated moors and on wasteland (countryside and urban). Those forest areas, however, are not used economically. About 47% of the new woodland is on former agricultural land and will be managed sustainably. Increases in state forests were mainly in the supply area of the OOWV, where arable land in water protection areas was bought and given to the state forestry agency for management.

On newly forested areas there are more broad-leaf trees, especially oak trees. Among coniferous trees the pine tree decreased, mostly to the benefit of the douglas fir.

Forest is defined as overgrown area with stocking forest plants. This also includes parcels within the forest with at least 50% stand density, covered with plants of more than 5 years age, i.e. heathland. About 27% of the Weser river basin is forested of which 96% of the forest area in Lower Saxony is considered commercially productive land, including temporary bare plots and tracks.

timber land (total)	1 096 678 ha (accessible growing stock area)
pure broad-leaf forest	24%
pure coniferous forest	30%
coniferous forest with broad-leaf trees	28%
broad-leaf forest with coniferous trees	18%

Forest area in Lower Saxony (source: Niedersächsisches Ministerium für den ländlichen Raum, Ernährung, Landwirtschaft und Verbraucherschutz)

Large-scale losses of forest due to world wars, storms and fires in the 1970s were replaced by fast-growing and easy to cultivate coniferous trees. This was economically useful and, moreover, those trees were much better able to cope with the rough climate on bare lowlands than broad-leaf trees. With respect to international timber markets, nowadays policies aim at strengthening the production of broad-leaf trees, since many broad-leaf trees grow only in this region whereas many coniferous trees can be produced more cost-effectively in other parts of Europe.

Standing volume by tree species and felling

Growing stock reserves are counted as solid m³ of timber above ground with a diameter of 7 cm or more. About one third of total growing stock reserves belong to private forest units of less than 50 ha and is therefore of little economic use.

Regarding international competition, a strong point of Lower Saxony's forest is its diversity of wood species, which shall be strengthened through growth of broad-leaf trees. The distribution of coniferous and broad-leaf trees respectively are quite even, with 57% of the former and 43% of the latter.

The average of timber stock is about 267 m³/ha in Lower Saxony. This is due to poor soil, high share of trees with low production rates (i.e. pine tree, birch tree) and unfavourable composition of age classes. For those reasons, stocks are built up continuously with annual gross felling below annual increment.

6.4 Nature and environment

6.4.1 Emån

There are 14 nature reserves in the Emån river basin and they comprise an area of 716 ha. The largest reserve is the flood valley of the river Sällevadsån, of 448 ha. There are different kinds of protection instruments; national parks and nature reserves are those owned by the state and municipalities (nature reserves). Another kind of protection is implemented by the Swedish forest agency (former regional and national board of forestry), called "biotope protection". They have the same power of protection but normally cover smaller areas of between 2 and 5 ha.

6.4.2 Gauja

The Act on Specially Protected Areas of Nature provides for the establishment of seven categories of protected areas: strict nature reserves, national parks, biosphere reserves, nature parks, natural monuments, restricted nature areas and protected landscape areas.

In relation to woodlands, the protection regime implies a variety of restrictions in forest management and utilization. No management activities are envisaged for the nature reserves, nature reserve zones of national parks, microreserves, and partly also in specially protected forest compartments. Felling and thinning activities are banned in the conservancy zones, i.e. at the North Vidzeme Biosphere Reserve. Restrictions refer to the dominant stands specified as follows: pine and oak over 60 years old, spruce, birch, common alder, ash, linden over 50 years old and aspen over 30 years old. Furthermore, felling is not allowed in the protected dune belt along the coasts of the Baltic Sea and the Riga Gulf and also in some specially protected forest compartments.

No clearfells are allowed in the conservancy zones of national parks (in the Gauja National Park it refers to the state and local government forests), in nature parks, the restricted management zone along the coast of the Baltic Sea and the Riga Gulf, in protection zones along the waters, wetlands and urban centres. In the majority of protected areas other restrictions are also imposed apart from the restrictions in forest management.

6.4.3 Mersey

The Lake District National Park is the only National Park in the Northwest of England and it covers an area of 229 000 ha. In the Northwest region there are 105 woodland Sites of Special Scientific Interest, 9 woodland Special Areas of Conservation, 8 woodland National Nature Reserves, 6 Community Forest and Woodland Initiatives and 4 Areas of Outstanding Natural Beauty.

The Red Rose Forest and the Mersey Forest are the two Community Forests in the region. The Red Rose Forest was established in 1991 and covers almost 75 600 ha of Greater Manchester and around 1 200 ha of woodland has been planted. The Mersey Forest covers 109 000 ha of Merseyside and North Cheshire. In the 12 years since it was established over 3 500 ha of new habitat have been created and around 9 million new trees planted. The aim of community forestry is to transform the landscape through woodland planting and the creation of associated habitats to produce long-term, sustainable benefits for the economy, people and wildlife.

The Northwest Development Agency (NWDA) has supported the Newlands (New Economic Environments through Woodlands) project, at a cost of 34 million Euro, which will transform 435 ha of derelict and neglected land in the Mersey Belt into new areas of community woodland. There are 6 other areas in the Northwest which will benefit from this scheme over the next 30 years.

3.4.4 Miño

In 1998 there were 38 000 ha of nature parks but only 1% of the total area of Galicia was protected, much less than the rate recommended by the EU Biotopes/Corine Project, which considers 15% as the minimum advisable. In Galicia there are 58 parks with a total of 325 000 ha, which were included in Natura 2000. The share is 12% of the whole of Galicia. Dividing this into provinces, Lugo for example has 44%.

Forest fires are a special issue in the Miño river basin. From 1968, when statistical records began, to 1989 there were more than 55 000 fires that spread through 1 million ha of forest, which accounts for 60% of the forested area in Galicia. There are many possible causes of forest fires, but there are determining factors for the initiation and propagation of the fire: the use of fire in agricultural practices, forests containing largely pyrophit species and the abundance of understorey in forests because at present it is not used and forests are in a generally abandoned state. Nevertheless, forest fires in Galicia are an intentional problem.

6.4.5 Weser

About 8% (~ 95 000 ha) of Lower Saxony's forest is protected as nature reserve. Major parts of this forest are located in the hilly regions of Weserbergland, the northern part of the heathland close to the city of Lüneburg or in the Harz mountains. In those areas the groundwater level is quite deep. Other parts are alluvial and swamp forest according to the originally rather "wet" regional natural landscape.

6.5 Forestry and the WFD

6.5.1 Emån

The WFD has influenced the forestry sector in Sweden mainly with a top-down perspective. Since 2003, the Swedish forest agency (Skogsstyrelsen) has been a beneficiary of an EU Life project called "forests for water", which aims at demonstrating how forestry in Europe could assist in the achievement of the objectives of the WFD. The Emåförbundet has been working with forestry-related issues through the "agriculture and forestry group", a reference group consisting of people from different forestry sectors within the Emån river basin.

It is a well-known fact that forestry actions have impacts on water quality to different degrees. The most pronounced influences are those created during final felling, soil scarification, protective ditching and cleaning of ditches and logging and driving. The main problems due to these actions are leakage of nitrogen and phosphorous compounds, methyl mercury and organic/inorganic substances.

These different sources of leakage will in turn cause problems with both the water chemistry and biology. Besides the chemical problems, forestry actions also might cause physical damage to water bodies, shores and especially the riparian zones.

Another problem is forest road building that often causes migration obstacles within the watercourses.

Swedish forestry is known to be ecologically careful. Most entrepreneurs today are certified with FSC or PFSC - stewardship councils to promote responsible management of the world's forests. The Swedish Forest Act also takes nature values into account, but unfortunately not enough. It is however looking much better today than 20 or 40 years ago, when absolutely no consideration to ecology was given during forestry actions. The problems that were caused during this period have not yet been recovered today.

For the last 10 years the consciousness and knowledge of the aquatic environment has increased within forestry organisations and the National Board of Forestry. This has led to many training courses, demonstration areas and some good information material. The funding for water-related research has also increased which is necessary for better knowledge and effective forestry.

The WFD will hopefully become a tool for a strategic and economic influence on the issue of forestry versus water quality. Nothing has yet been decided but some common ideas are to:

- point out and try to protect certain areas and water bodies against intensive forestry actions
- introduce fixed buffer zones along several watercourses
- lobby for more effective and adapted legislation
- contribute to increased law supervision concerning violation of the law
- promote decreased ditching and intensified trials of ditching applications
- contribute to more information, education and measures within the framework of water quality and water ecosystems
- promote better forestry planning by means of looking at the whole river basin instead of single private properties

6.5.2 Gauja

Forests have a dual character regarding water quality. Protected forested belts around water bodies are important barriers to pollutants entering water. On the other hand, forest management causes diffuse pollution.

The Latvian Environment, Geology and Meteorology Agency (LEGMA) published the report “Characterisation of river basins, evaluation of anthropogenic load on ground and surface waters, economic analysis”. Potential impacts from diffuse sources were displayed on maps, indicating quite substantial pollution loads from forestry in the Gauja river basin.

More detailed investigations are made for water quality within the Salaca river basin (tributary of the Gauja). Although results indicate high and good ecological quality of water, precautions still have to be considered due to the Salaca being a salmon river (The Salaca river is the fourth most significant salmon river in the Baltic Sea region).

Forestry is not among the largest polluters regarding diffuse pollution by nitrates (5%) and phosphorous (6%). It has been estimated, that the pollution load from agriculture and forestry will possibly increase due to more intensive use of fertilizers and the enlargement of forestry lands.

No extended investigations have been performed yet in the protection zones of forests along watercourses in Latvia. It is very important to investigate for the development of territorial planning. Some projects are currently in development.

Intensive uncontrolled afforestation is not favourable. Here new stands develop a new ecosystem and previous species are forced out. Ecological planning of landscapes, which involves the development of networks and the transformation of certain territories, is important.

6.5.3 Mersey

There are two main reasons for the planting of trees in surface water catchment areas in England’s Northwest. Firstly, because most of the reservoirs were built as dammed valleys and the upper slopes of the reservoirs needed to be stabilised, this was done by the planting of trees on these slopes. Secondly, the trees slowed down the flow of water from off the slopes, the slowing down of the water stopped erosion along with discolouration of the inflowing water. The treatment of discoloured

water is a very costly process. There is an added bonus of forestry income as the trees needed to be grown in a cycle to produce continuous cover on the slopes. Trees were also planted for aesthetics, to screen out water structures or to just make the place look pleasing to the eye.

The forest cover of the geographical area of England's Northwest is 7% and much of this is outside the Mersey river basin. Moreover, the share of forestry in the economy of the Northwest is in decline. Thus, there is a very low impact on water from forestry in the Mersey river basin and this is unlikely to change over the next few years. The relationship between the WFD and forestry might be of greater importance in the future if, for example, there is a need for buffer zones along watercourses.

6.5.4 Miño

The WFD has to be taken into account with many of the factors related to forestry. The strain taken on the water through the propagation of more trees and the need for a large quantity of rainwater for the trees native to this wet region mean that the WFD is essential to the continuance of successful wood production.

One of the major difficulties that needs to be overcome by the WFD is the problem of forest fires. The fires put an inevitable strain on water resources in preventing fires spreading. A successful plan for managing this water and keeping the localities safe is of utmost importance. Another important issue is education in protecting forests.

The WFD will also be very useful for updating a very old system of management whereby the land along the rivers is run by individuals who often have no means for organising themselves. The WFD will give them a point of reference for consultation and will help them create groups, whereby they can collectively ensure the continued safety and quality of the land around them.

6.5.5 Weser

The region of the Weser is dominated by high deposition rates of nitrogen, both wet and dry deposition, due to industrialised animal husbandry in Lower Saxony. There is at least 30 kg N from deposition. Coniferous stands give even higher deposition rates due to the higher amount of dry deposition.

Because of non-calcareous sandy soils in the west of Lower Saxony, it is not unusual to have more than 50 mg NO₃/l in the water below the root zone of elder stands. Additionally, the acidification of the soil is very high under coniferous stands, and aluminium might reach toxic concentrations.

Even so, afforestation has been practised within the last ten years as a measure to take arable land out of the production and to guarantee a low leaching rate of nitrate to groundwater. Using broad-leaf trees and a ground-cover crop after liming the plots are giving good results (see further and detailed information available at www.water4all.com, see partner: Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (D) and Niedersächsische Forstliche Versuchsanstalt, Abteilung Umweltkontrolle).

Afforestation is a WFD measure for improving the quality of groundwater, but regarding cost-effectiveness it is a very expensive option in Lower Saxony, due to high prices for land. In two of the water protection areas (13% of Lower Saxony) the local water supplier bought land on a larger scale (1 500 ha) and handed it over to the state forestry for the purpose of afforestation. Purchase of land and afforestation is funded by the water consumer, with a 0.05 Euro/m³ contribution to a fund set up to finance measures to protect groundwater.

Outside of the water protection areas, there are no drivers for tackling afforestation in Lower Saxony, mainly because of the high prices for land caused by the strong agricultural production.

Another restriction is, that if landuse is changed to forest land in Germany, the owner will not be allowed to change it back again. Therefore, farmers sometimes do not want to sell land, if afforestation is planned to be the next landuse.

Forestry can definitely contribute to improving the situation in groundwater and surface waters in Lower Saxony. A range of good practice measures is available which exceeds the legal framework. Knowledge is available regarding better practise of forestry landuse, but decisions upon financing the measures have not been taken yet.

The measures can be grouped into four categories:

forestry

- afforestation
- replacing species which are unsuitable for the location by suitable species
- prohibition of clear-cutting
- underplanting with broad-leaf trees

water and soil protection

- liming with respect to location and to C/N-ratio
- soil management

harvesting

- avoiding soil compression by enlarging the distance between new thoroughfares in the forest

water management

- restoration of surface waters which are semi-natural
- re-conversion of drainage systems
- re-naturalisation of bogs and alluvial forests

The measures mentioned above go further than the legal guidelines. They would only be enforceable with volunteer agreements and financial compensation which are comparable to the long tradition of compensation on farmland.

6.6 Summary

The forestry sector in the five river basins shows quite large differences due to natural conditions, history, culture and forestry politics – hence the dignity as a business sector and its impact on water quality.

Gauja and Emån river basins have the most intense forest industry due to forestry being the dominant landuse and probably the greatest impact on water quality. Domestic species are the main product. But there are quite large differences in terms of bedrock and soil texture, being evident when comparing water chemistry between these two river basins. The Emån river basin is dominated by granite and moraine whereas the Gauja river basin to a large extent consists of sedimentary

bedrocks and more alkaline soils. This will in turn lead to differences in amounts of nitrogen and phosphorous compounds, groundwater pH, humic acids and heavy metals that are released to the surface waters due to forestry activities.

The Weser and especially the Mersey river basins have less forest cover, but with great social values (ancient woodlands) and also as a protection to the groundwater supplies (Weser river basin). Due to the higher population density, the forests fulfil an important recreational function, too.

The Miño river basin is covered with nearly 62% forests but this is still not as heavily utilised as the Emån and Gauja river basins. This is mainly because of a greater amount of private owners in combination with a lack of adequate forest planning, poor infrastructure and annual forest fires.

Although there are clear differences between the river basins, the WFD will probably have an influence on forestry within these basins to some extent and in different ways. Nevertheless, it will be a great challenge to reach the goals of good ecological status for water by taking necessary forestry measures. Within the ENMaR project, one of the goals was to inform municipalities and other land owners within the river basin on how adapted forestry methods might affect water quality in a positive way and what kind of measures could be carried out to avoid and reduce the negative impacts on water.

To reach the WFD demands in e.g. the Emån and Gauja river basins, it will be necessary to develop adapted forestry methods and perhaps more comprehensive "landscape" planning tools, to complement forestry planning within properties. It is also important to co-ordinate and develop suitable monitoring methods to be able to screen and collect data on the impact of forestry on water quality. Economic factors make it difficult to inspire farmers to give up their land for afforestation, and for the state forest to invest in afforestation. The Mersey river basin shows a great lack of forest cover and would undoubtedly gain in both water quality as well as nature and social benefits if the river valley was partly afforested. The Miño river basin is an "outsider" in both these concepts and the question is whether the most important measure would be to produce a regional forest policy and adapted methods to meet the demands of the WFD.

7 Tourism

7.1 Tourism development in Europe and the ENMaR regions

Tourism is a significant sector for the economies of Europe. For many years Europe has remained the top worldwide destination for tourism. According to estimates from the World Tourism Organisation (WTO), Europe attracts 60% of all international arrivals, and the number of tourists visiting Europe is expected to double over the next 25 years. 91% of European residents choose a location in Europe as their travel destination (EEA, 2001). The tourism industry by itself creates more than 4% of the European Union's GDP, but taking into account the links to other sectors, the contribution of tourism is estimated to be as much as 11% of total GDP. Tourism in Europe provides employment to over 24 million people (EUROPEAN COMMISSION, PRESS RELEASE, 2006).

The increased number of tourists has brought with it a more diverse and complex range of economic activities. Growing demand for tourism as a form of recreation, involving wider groups of society with different needs and interests, has stimulated extensive specialisation of tourism activities. Active, nature-based activities in areas of high environmental and landscape value, rich biodiversity and low in pressure from human activities have become more and more popular. Often those places are the most sensitive areas, with a low resistance to disturbance caused by tourism. Many of the tourist destinations considered attractive are water-related ecosystems, such as coastal zones, rivers, or lakes.

Richards G. (1994) identified the following types of holiday, ranking them by their popularity: sun and sea (37%), city tour (21%), special cultural holidays (19%), adventure holidays (18%) and skiing (6%). Using these estimations it can be said that 60% of all tourism activities in Europe include the natural environment, while the other 40% target urban or cultural elements. All the nature-based activities are impacted by, or even dependent upon, water quality.

All the countries involved in the ENMaR project consider tourism to be a developing sector that stimulates economic growth at the national, regional, and local level. The UK and Spain already belong to the most popular world tourism destinations, while Germany is expected to follow suit in the near future. The other two ENMaR countries, Sweden and Latvia, have a great potential for tourism development because of their well preserved natural and cultural heritage.

The degree and significance of the tourism sector is different for each of the countries involved in the ENMaR project. However despite the geographic and socio-economic diversity of the ENMaR countries, water based activities play a significant role in the tourism offering of all the areas involved in the project.

7.1.1 Emån

The environment in Sweden is less disturbed by human activity than many other parts of Europe and is experienced as a healthy and refreshing place - "Europe's wilderness". The natural and cultural landscape constitutes the basic resources and conditions necessary for tourism. Tourism in the Emån river basin either includes passive tourism activities like staying in a cottage and sightseeing by car, or more active forms like angling, hiking, mushroom picking, bird watching, or canoeing. Renting or buying a cottage out in the forest or by a lake is a very common form of tourism in the area. Another popular activity is camping - mostly organised on designated campsites, but sometimes also occurs as free camping in the forest.

Tourism is at its peak during the summer months, July through to September. Swedish visitors usually come in July, being replaced by the increasing numbers of foreign visitors in August. Tourism during winter is largely concerned with local weekend tourists involved in some form of winter sport, such as skiing or long-distance skating.

From January 2006 tourism nationally has been taken over by the Swedish Agency for Economic and Regional Growth (Nutek), responsible for the production and development of market information and statistics on tourism in Sweden.

The development of the Swedish tourist industry is co-ordinated by a professional organisation, Swedish Tourism Associated, which represents the local and regional tourism organisations as well as those companies that organise trips in Sweden. Swedish Tourism Associated also has responsibility for the accreditation of Sweden's tourist bureaux. There is a tourist bureau in every municipality within Emån's catchment (8 in total).

Visit Sweden is the national organisation responsible for the promotion of Sweden as a business and leisure travel destination. It is owned equally by the Swedish Government and by the Swedish tourism industry.

Sverigeturismen (Sweden Tourism) looks after Swedish domestic tourism as well as working to increase foreign access to Swedish products. It also facilitates on good relations between authorities, industry, and the mass media, and is part of Svensk Turism AB (Swedish Tourism Ltd.). Swedish Tourism Ltd. promotes tourism on a political level. It also works to market Sweden as a tourist destination.

The national tourism organisations support the regional organisations. In Småland three organisations are responsible for one county each, Smålands Turism AB, Södra Smålands Turistråd, and Regionförbundet i Kalmar län. Within the regions, local tourist offices work alone and/or in co-operation as for example Höglandets Turism (Highland).

7.1.2 Gauja

Tourism in Latvia is considered an essential economy sector with great potential for development. All national and regional strategies and development plans aim to increase levels of tourism, as one of the preconditions for improvement of the local economy. Currently the tourism sector in Latvia makes up 2% of the gross domestic product (GDP), which is not a substantial statistic by itself. When compared to other important sectors as agriculture (which makes 4% of GDP), it shows the potential that tourism has in Latvia. According to estimates, the number of tourists is likely to triple by 2015.

The Gauja river basin district, thanks to its historic cultural heritage and unspoilt natural resources, is one of the most popular tourism areas in Latvia. The most significant tourism destinations here are Sigulda and Cēsis with their well preserved German Order castles and scenic views over the ancient Gauja river valley, but towns such as Valmiera, Mazsalaca, Saulkrasti, and Salacgrīva also provide good opportunities for tourism and attract many visitors. Moreover, the Gauja river basin district includes the most popular nature and water tourism areas. These are the Gauja National Park (GNP), which is home to several rivers including the Gauja, Amata, and Brasla, and the North Vidzeme Biosphere Reserve (NVBR), which includes the rivers Salaca, Svētupe, Vitrupe, and also Lake Burtnieks. The lake and rivers of the Biosphere Reserve (especially Salaca, which is the 4th biggest salmon river in the Baltic Region), are very popular angling destinations. The most popular recreational areas at the coastline are in Saulkrasti, Tūja, near the mouth of the river Vitrupe, and Vidzeme's stony beach.

The highest tourism intensity in urban and rural areas is during the summer season. Canoeing in rivers starts from May and continues until the end of August, while

licensed salmon-angling in Salaca starts earlier during March or April. During winter Sigulda and Cēsis are the areas most visited, where the slopes of the Gauja River valley are equipped for downhill skiing.

On a national level, key institutions responsible for tourism development in Latvia are the Department of Tourism in the Ministry of Economy and the Tourism Development State Agency.

On a regional level, the Vidzeme Bureau of the Tourism Development State Agency and the Vidzeme Tourism Association both deal with promotion, marketing, and increasing opportunities for private tourism initiatives. The Vidzeme Development Agency is the key institution for developmental planning at the regional level. Tourism is one of several areas in which the Agency develops and implements projects. An example of such a project is the recently begun Phare financed project aiming to improve tourism infrastructure across 9 rivers in Vidzeme. The project is being implemented in co-operation with local authorities and the Vidzeme Tourism Association.

At a regional level, the administrations of the Gauja National Park and the North Vidzeme Biosphere Reserve play key roles in the development of tourism. Plans for the development of tourism and new infrastructure in areas such as these, which are protected for conservation, are usually co-ordinated by their relevant administrations. The administration of the Gauja National Park has established, and is maintaining, a network of campsites and nature trails, as well as implementing other projects to further improve tourism infrastructure in the park.

Each local authority has a person responsible for tourism, and many also have a Tourist Information Centre. Tourism Information Centres are set up in the largest towns such as Sigulda, Cēsis, Valmiera, Limbaži, Salacgrīva, Mazsalaca, and Saulkrasti. Recently an Information Centre was established in Cēsis Vidzeme providing tourism information about the entire Vidzeme region.

There are also non-governmental organisations that act at the local level within the Gauja river basin district, such as the Sigulda Region Tourism Association, Straupe Tourism Union and various associations for local entrepreneurs. Some of these organisations, like Straupe Tourism Union, concentrate on practical environmental management, carrying out such tasks as cleaning up the river Brasla, maintaining campsites, or setting up nature trails.

7.1.3 Mersey

England's Northwest is a popular place for nature- and water-based tourism activities. The region encompasses 32 National Nature Reserves, four Areas of Outstanding Natural Beauty, three National Parks, and a Heritage Coast. There are 37 bathing waters designated under the EU Bathing Waters Directive, including 3 sites on Lake Windermere designated in 1991 and 34 coastal sites designated in 1987.

The Northwest of England has experienced a significant development of the tourism sector during the last few years – the number of tourist trips to this region has increased by 40% since 1990. Currently there are 260 million visitor trips made per year, 90% of which are single day trips. The tourism sector provides employment for ca. 150 000 people.

The patterns of tourism in the Northwest of England have changed over the last 20 years. The long stay traditional bucket and spade holidays by the seaside are not so popular any more. Instead people choose more often package holidays abroad or short trips to the seaside related to various water sports.

The key stakeholders involved in the development and promotion of the tourism sector in Northwest England are the Northwest Regional Development Agency, the new Regional Tourist Forum, and five sub-regional tourist boards as well as the planning authorities, tourism representatives, and public bodies. Important roles are also played by the stakeholders from other sectors affected by tourism e.g. water resource managers, nature conservation bodies, etc.

7.1.4 Miño

While the Terra Chá region has not traditionally been a major tourist destination for Spain, visitor numbers have increased in recent years. A major contributing factor to this is the reopening of the ancient spa in the village of Guitiriz, as well as a general increase in the number of visitors to Galicia. The majority of visitors to Terra Chá are residents of Galicia, and day trips make up a high percentage of visits to the area.

The Pilgrimage of St James, the Northern Way of which passes through the Terra Chá region, brings a lot of people to the area. However, the revenue from these tourists does not have a significant impact on the region's economy.

Angling is a popular tourist activity in the region, with most anglers not staying in tourist accommodation overnight. There are several rivers in the Terra Chá where

fishing is permitted. In the province of Lugo more than 20 000 fishing licences are granted each year and it is still possible to fish indigenous species due to the high quality of its waters.

Several recreational areas have been set up next to the rivers like barbecues, angling points and parking areas near trekking paths and birdwatching hides. The whole of the Terra Chá area is included in the Terras do Miño Biosphere Reserve, a traditional cultural landscape with many highly important natural habitats. Here there is an erosive accumulation of terrace systems associated to specific sections of the river Miño.

Authorities responsible for the development of tourism in the Terra Chá include: the Ministries of Industry, Tourism, and Commerce on the national level, the Regional Government of Xunta de Galicia, and the Regional Foundation of Terra Chá on the regional level, as well as the municipalities of Castro de Rei, Guitiriz, Muras, Vilalba, Xermade, Begonte, Cospeito, A Pastoriza, Abadín on the local level.

7.1.5 Weser

Lower Saxony (Niedersachsen) has many water bodies (around 9% of the state's surface area is water), including rivers, canals, spacious lakes, and the broad coastline of the North Sea. The largest inland water body is Steinhuder Meer, at roughly 30 km², followed by Lake Dümmer, near Osnabrück, around half that size. The Weser is Lower Saxony's longest river (379 km), followed by sections of the Elbe (262 km) and the Ems (241 km), all of which run into the North Sea. These rivers are also the most important navigable waterways in the area, which is known as the "land of three rivers". In addition to the natural river network, the Mittelland canal, the Dortmund-Ems canal, the Elbe-Seiten canal, and the Coastal canal are important waterways for inland shipping.

Lower Saxony's rivers, lakes, and canals offer various possibilities for water sports and recreational activities. Numerous cycle routes follow the rivers and canals, offering the opportunity to explore the landscape. The most popular is the Weser-cycle path, attracting thousands of cyclists every year. Smaller rivers such as the Oker, Jeetzel, and Fuhse offer good opportunities for canoeing tours. A further important destination for nature tourism is a unique conservation area on the North Sea coast that covers an area of some 2 400 km².

It is the opportunities for angling, swimming, sailing, surfing, kiteboarding, or boat trips that attract many visitors to the Steinhuder Meer and its Nature Park, particularly during the summer months. The Steinhuder Meer is also famous for its eels. Smoked eel specialities can be found in many local restaurants. Due to the quality of angling, the National Anglers' Association is an important stakeholder in the area.

Lake Dümmer Nature Park offers peaceful and diverse opportunities for relaxation all year round, particularly for walkers and cyclists. The lake is also a superb area for water sports such as sailing, windsurfing, rowing, and canoeing, although high levels of silt threaten to spoil this. Substantial investment is required every year to maintain its current condition. In winter, ice-sailing and skating on the frozen lake surface are the dominant activities. Also the Zwischenahner See (the third largest lake in Lower Saxony) is a popular destination for water sports and local recreation. For nature conservation reasons and to avoid disturbing visitors, there is a complete ban on motorboats on the lake.

The River Weser offers many opportunities to go on boat trips with the Weser Fleet. Also at the river is the Meyer shipyard, which builds luxury cruise liners almost 300 m long and more than 12 stories high. The launching of a cruise ship towards the North Sea is always a huge event with a party atmosphere. Thousands of people follow the action as the ocean-going giants are towed out of the dock onto the River Ems.

In Germany the Federal Ministry of Economics and Technology is responsible for tourism at the national level. The Ministry lobbies for the improvement of conditions for the tourism sector. It develops various programmes to promote and support tourist activities in Germany. The Ministry also takes responsibility for positioning Germany in the worldwide tourism market and generating new strategies for tourism. The Ministry of Economics and Technology reports regularly to a committee responsible for tourism in the German parliament. At the Federal State level, for the most part the Ministries of Economics are responsible for the tourism sector. In Lower Saxony the Ministry of Economic Affairs, Labour, and Transport is the relevant authority.

The development of tourism in the municipalities comes both from the voluntary sector and from private initiatives. Planning for tourism is mostly carried out by consultancies that take responsibility for promoting cities and regions, developing mission statements, concepts, and site appraisals.

Regional tourist organisations are established in different areas of Lower Saxony, and are financed by their members, such as counties, municipalities, or hotels. In order to position Lower Saxony more competitively in the national and international tourism market, the TMN-Tourismus Marketing Niedersachsen GmbH (Tourism Marketing Lower Saxony Ltd.) was founded in 2001. The Tourismus Marketing Niedersachsen GmbH is a public-private partnership model for professional marketing of holiday destinations. Its partners are the most important regional tourist organisations, industry enterprises, and the Ministry of Economic Affairs, Labour and Transport for Lower Saxony.

7.2 Importance of water quality for tourism

As with other sectors of the economy, tourism is reliant on natural resources, including water. Good water quality is one of the most important conditions required for all water based tourism activities. Water quality has a direct effect on bathing activities and angling, which are essential to recreation in all water environments, coastal areas as well as lakes and rivers. Yachting associations also have to get involved into the process of implementing the WFD, by promoting wastewater treatment on boats. Good quality of water is very important also to canoeing, surfing, diving, and other active water sports. Cycling and hiking along the water bodies can also be affected by the water quality, since it is often done in conjunction with bathing or the use of campsites on river banks or lake shores. Therefore clean water and well-preserved natural resources are very important to the successful marketing of nature tourism.

Deterioration of water quality caused by agriculture, forestry, and industrial pollution, as well as insufficient wastewater treatment from settlements near to water bodies, might lead to a decrease in the attractiveness of the area for water-based tourism. As a result of eutrophication, water bodies are overgrowing with aquatic vegetation. This process is going on most intensively in the rapids and riffle areas, which are important sites for fish spawning and, at the same time, the most interesting parts of the river for canoeing. Insufficient water quality caused by eutrophication, acidification, or other pollution has a direct effect on fish resources, thus reducing angling possibilities. Another problem, which influences angling and canoeing, is the damming of rivers for hydroelectric power stations, which create obstructions to fish migration and inconveniences for water tourists.

At the present time, low water quality has a direct effect on tourism activities within the ENMaR project areas. This is predominately felt in Latvia and Sweden, but also to some extent in Germany.

In the Gauja river basin district, overgrowth of vegetation as a result of eutrophication is causing serious problems in several rivers and lakes. It is negatively affecting canoeing and angling activities on the river Salaca, Svētupe, the upper reaches of the Gauja, as well as in the lake Burtnieks and its tributaries. Overgrowth is also limiting recreation possibilities on the banks of the lake Burtnieks as it prevents easy access to the lake for swimming.

Another essential problem in Latvia is the damming of smaller rivers for hydroelectric power stations, which has become very popular in recent years. Many such developments fail to provide suitable fish passes, disturb the hydrological regime, and damage habitats. There is also a problem with old, partly destroyed dams, which are unlikely to have any functioning fish passes. In the river Salaca, water tourism and angling is affected by a dam built for a former paper mill in the town of Staicle, which closed down in 1987. The remains of the dam hinder the migration of salmon, sea trout, and river lamprey to the upper reaches of Salaca, thus excluding certain types of licensed angling activities in this area and reducing income possibilities for the local municipalities in the tourism sector.

In Sweden certain parts of the Emån river basin are affected by acidification. Currently the water quality is maintained using a comprehensive liming operation. High mercury content in fish, particularly in pike, has been recorded in the most acidic lakes. This clearly reduces the attractiveness of the lake for angling. Some lakes have also been polluted by older industrial operations such as wood preserving installations, wood pulp industries, and paper mills. Locally the extent of the impact is recognised as having a significant negative effect on biodiversity.

In Germany, on a smaller scale, there are seasonal problems related to overgrowth of aquatic plants in water bodies because of eutrophication. This might have impacts on recreation at the local level, however this has not been researched yet. There are also many obstacles in the rivers causing the disappearance of migratory fish such as salmon. Many local efforts have been undertaken in Lower Saxony to encourage the salmon's return through deconstruction of the obstacles. In some of the rivers salmon have already returned, helping the tourism sector to promote angling activities.

The quality of bathing waters is recognised as an essential issue in Northwest England, Germany, and in Latvia. England and Germany have undertaken significant efforts to guarantee high quality bathing water and achieved good results.

However, in Germany the deterioration of water quality is sometimes caused by the growth of toxic algae in the lakes during unusual hot summer periods.

Because of comparatively low importance of the Terra Chá area in Spain for water-based tourism activities, low water quality has not been recognised as a significant problem for tourism there.

7.3 Relations between tourism, WFD and regional development

The main connection between the tourism sector and the WFD is good water quality. It is the main objective of the WFD, as well as an important factor for the successful development of tourism.

Tourism and its relationship to the WFD can be addressed from two perspectives; firstly by an assessment of significant users (use of water resources by tourism services) and secondly an assessment of pressures exerted (impact of tourism on water quality). The significance of water resources to the tourism sector has been reflected upon in the previous chapter, and now the impacts of tourism on water quality will be analysed in the following chapter.

An economic analysis of the tourism sector, for an area with water-related tourism, must take into account the impact of increasing tourism on water quality, and vice versa. Procedures for this are specified in the WFD. Economic analysis includes an assessment of cost recovery (i.e. realisation of the polluter pays principle and setting a price incentive policy to promote rational use of water resources) and the cost-effectiveness of management measures, including cost-benefit analysis.

According to the WFD, if the cost-benefit analysis shows that benefits significantly exceed the costs, then development of the sector can continue, applying less strict quality criteria. The main benefits from an increase in tourism are an increase in revenues from the expenditure of tourists as well as recreational value of water bodies, while negative effects are the deterioration of water quality and related costs of environmental damage. However, it is important to remember that possible losses, in cases where deterioration of water quality could reach a critical level, might negate all expected benefits from tourism development.

The main instruments employed to regulate pressure from tourism are the different planning documents; spatial development plans, nature management plans for protected areas, river basin management plans, as well as tourism development strategies. It is important to incorporate sustainability principles in these documents, as well as to ensure their integrity, which might be the significant obstacle in some of the countries (for example Latvia where very different deadlines exist for these planning documents; spatial development plans for all municipalities shall be elaborated by the end of 2006, while river basin management plans are expected for 2009).

In most of the ENMaR project countries, the municipalities take a leading role in the spatial planning process, and thus exert an influence on tourism development. Spatial planning documents define the areas important for tourism development, and also set objectives and conditions. Furthermore municipalities take an active role in the practical organisation of tourism activities through the operation of tourism bureaux, provision of tourist information, and taking part in regional tourism development projects. In some cases they are also responsible for maintenance of the tourism infrastructure in their area.

7.4 Impacts of tourism on water quality

None of the national river basin characterisation reports from the ENMaR project countries cited tourism as being a significant source of pressure on water quality. That said, the countries have admitted that there is insufficient information to provide an objective evaluation of the impact of tourism. Statistics often generalise, and the impacts of tourism are grouped together within other sectors such as water services. There are no specific surveys carried out to gauge the impacts of tourism on water quality, which might lead to the assumption that this sector does not pose a major threat to the environment within the ENMaR project countries.

However, a recent study about the carrying capacity of European tourism destinations commissioned by EC recognised the tourism industry as being a large consumer of natural resources, producing significant amounts of waste, and often exceeding the holding capacity of ecosystems. Tourism tends to consume the 'best' resources; the most attractive, and the most sensitive sites (LABORATORY OF ENVIRONMENTAL PLANNING, 2002).

Pressure from tourism is most evident in coastal areas, where a high concentration of visitors often results in a decrease of water quality. There are several reasons for

this, such as discharges of untreated wastewater, terrestrial pollution caused by inappropriate waste disposal, overexploitation of natural resources, loss of biodiversity and coastal erosion due to inappropriate construction of marine infrastructure (jetties, beach defences, etc.). Both urban and rural tourism, which can attract high numbers of visitors throughout the year, can exert high pressure on environmental and water quality if not organised in an environment-friendly way. Increasing the number of visitors can negatively impact environmentally sensitive inland nature areas if insufficient infrastructure and mechanisms are developed to direct their movement. The principal impacts to such areas tend to be damage to habitats, disturbance of species, and littering.

The table below outlines the impacts of different tourism activities observed in the ENMaR project areas.

Tourism activity	Impacts	DE	UK	SE	ES	LV
urban and rural tourism, including recreational cottages	additional load on use of water resources	x	x	x	x	x
	eutrophication, caused by insufficient wastewater treatment			x	?	x
canoeing and other active water sports	damage to surrounding habitats, causing erosion	x	x			x
	littering			x		x
	disturbance to threatened species	?		x		x
motor-boating	oil leaks	x		x		x
	noise, disturbance	x		x		x
angling and poaching	damage to surrounding habitats, causing erosion	x			?	x
	littering	x			?	x
	overexploitation of fish resources	-	x		?	x
bathing	damage to coastal habitats, causing erosion	x				x
	littering	x	x			x
thermal tourism		-			x	-
golf		-			x	-

Impacts of tourism in ENMaR regions

From the impacts listed above it can be concluded that the most direct effect on water quality is caused by urban and rural tourism, while the water-based tourism activities tend to impact the ecosystems surrounding the water bodies.

To assess the significance of certain impacts in the particular ENMaR project areas, the existing and projected visitor numbers need to be evaluated. However the available statistics about the amount of tourists in the project areas are rather scarce.

Within the ENMaR project areas, the greatest number of visitors is to Northwest England with 260 million visitor trips per annum. More than 60 million visitors per year have been registered in Lower Saxony, Germany, while at the Miño river basin, Spain 5.1 million tourists have been counted at the most popular destinations (Santiago de Compostela and A Coruña in 2005). In the Emån river basin, Sweden, between 100 000 and 200 000 visitors are estimated per high season. In addition around 350 000 visitors per year attend the well-known Astrid Lindgren's World in Vimmerby, of which Emån area also attracts part of this stream. The estimates for visitors to the Gauja river basin district are only available for a few of the most popular tourism destinations, including Cēsis (210 000 in 2004), Gauja National Park (80 000) and North Vidzeme Biosphere Reserve (35 000 in 2002).

A good overview of tourism intensity can be obtained from accommodation statistics. For example, in Lower Saxony in 2004 there were 31.5 million overnight stays counted in places with more than 9 beds and an additional 21.3 million overnight stays are estimated at camp sites, while a further 14.1 million stayed in private accommodation. In some countries statistics have only been provided for the amounts of accommodation available, which illustrates the present tourism capacity of the area (see the table below illustrating Terra Chá, Spain). However all the accommodation outlined excludes day trips, which do make up a significant proportion of tourist visits (e.g. 90% in Northwest England).

Types of accommodation	UNITS	PLACES
hotels	6	502
hostelry	6	186
boarding-houses	17	290
apartments	2	32
campsite	1	96
rural tourism	10	122
total	42	1228

Accommodation offers in Terra Chá in 2005

In Latvia more comprehensive statistics are available about the number of visitors to the Tourism Information Centres, but these figures show only a small proportion of the overall tourist numbers.

Although none of the ENMaR countries hold specific statistics about the tourism sector's impact on water consumption levels or water quality, an effect of the tourism sector on overall water discharges can be assessed using general statistics. For example, figures from a popular tourism destination in Lower Saxony (Langeoog, an island in the North Sea) show that the raw water discharge almost doubles during the tourist season (March - October), reaching its peak in August. It has been estimated that the average tourist consumes 300 litres of water and generates 180 litres of wastewater per day (usually tourists consume more per capita than the local population).

The limited information available makes it difficult to assess the impacts and pressures exerted by tourism in the ENMaR project areas. The Northwest of England bears the highest tourism load compared to other project areas, but little is understood about the industry's impact on water quality. Latvia has a comparatively small number of tourists, but various impacts of tourism have been identified. While all countries have experienced an overall increase in use of water resources as result of urban and rural tourism, other impacts relate closely to specific tourist activities and not just tourism intensity.

The common opinion is that tourism currently has much less impact on water quality compared to other such sectors as agriculture or forestry. However, when taking into account the envisaged increases in tourism over the coming years, the potential threats, particularly with regard to popular tourist destinations, could realise and should be addressed now.

7.5 Objectives and potentials for sustainable tourism development

The majority of tourism development strategies in Europe focus on improving marketing of tourism products in the hope of attracting higher visitor numbers. In national strategies tourism is recognised as an essential economic activity that provides income and employment to local communities. The concept of sustainable tourism is also gaining popularity in national strategies as a way of balancing economic, environmental, and social interests.

The concept of sustainable tourism is defined by the WTO:

“Sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunities for future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems.”

Strategies aimed at sustainable development should involve the integration of tourism development and environmental management policies at the local, regional, and national level as well as increasing local capacity to cope with environmental issues, particularly in rapidly developing tourism destination areas (LABORATORY OF ENVIRONMENTAL PLANNING, 2002). The main instruments for ensuring sustainable development should be regional development and spatial planning documents, which should integrate all the relevant factors, including the objectives of the tourism development strategies, river basin management plans, and nature conservation. Carrying capacity (including physical, ecological, social, and economic) could be considered as a measure of sustainable tourism and also a tool to maintain the balance between development and conservation.

During the stakeholders’ discussions and meetings for the ENMaR project the following objectives have been defined for the tourism sector:

- Development of nature-based, environment-friendly tourism should be promoted, that generates employment opportunities and boosts incomes for local communities, yet provides better economic preconditions for conservation work.
- The carrying capacity (including ecological) of popular tourism areas should be evaluated against predicted tourism development trends.
- Regional development and tourism development plans should consider the carrying capacity of popular tourism destinations and develop strategies to replace mass tourism with more selective types of activities and mechanisms for directing visitor flows to spread the concentration of tourists over time and space.
- Less popular tourist destinations should be promoted as an instrument to regulate tourism intensity, directing it away from the “hot spots”.
- Tourism infrastructure should act as an instrument to minimise the negative impacts of tourism to specific sites.

- The ‘user pays’ principle should be integrated in the price of tourism services. This should apply not only for water consumption fees, but also for use of tourism infrastructure, and licenses for canoeing, angling, and other activities.
- Awareness of environment-friendly tourism principles should be increased, not just amongst tourists, but for tourist service providers also.

7.6 Summary

Tourism in all the countries involved in the ENMaR project, as elsewhere in Europe, is regarded as a rapidly developing sector that stimulates economic growth at the national, regional, and local level. UK, Spain, and Germany can be listed among the most popular tourism destinations in the world, while Sweden and Latvia have great potential for development of the tourist sector.

A growing demand for recreational tourism involving wider groups of society with different needs and interests has stimulated greater specialisation of tourism activities. Nature-based tourism activities targeted at areas of high environmental and landscape value, rich in biodiversity and low in pressure from human activity, have become more and more popular. At the same time these areas are often the most sensitive with low resistance to disturbances caused by tourism.

One of the essential environmental conditions for tourism development is good water quality. Intensive tourism may cause negative impacts on water quality if precautionary measures are not taken, or if the carrying capacity of water-related ecosystems has been exceeded.

In each of the ENMaR countries, water-based activities form an essential part of the tourist activities on offer. Activities such as bathing, canoeing, motor boating, and angling are very popular. These activities may bring negative impacts to surrounding ecosystems (destruction of habitats, disturbance of species, littering) should an increase in tourist numbers not be regulated using appropriate infrastructure and management of visitor flows. General urban and rural tourism, not necessarily directly linked to water, may have greater direct impact on water quality due to the additional load it places on water consumption or through insufficient wastewater treatment.

In relation to the Water Framework Directive tourism might be addressed from two perspectives: assessment of pressure exerted by tourism and assessment of significant users. In none of the national river basin characterisation reports from ENMaR project countries was tourism recognised as being a significant source of pressure. This is most likely due to insufficient information being available to provide an objective evaluation of the impacts of tourism on water quality.

The common opinion is that tourism currently has much less impact on water quality compared to other sectors as agriculture or forestry. However, when taking into account the envisaged increases in tourism over the coming years, the potential threats, particularly with regard to popular tourism destinations, could cause future damage and should be addressed now.

Strategies for tourism development should be based on sustainability principles, giving equal regard to economic, environmental and social benefits. Sustainable tourism should also take into account the carrying capacity of tourist destinations, establishing thresholds that planned development may not exceed.

Balancing tourism development and environmental protection interests can be achieved through spatial planning, which should integrate the objectives of tourism strategies, river basin management plans, and nature management plans for protected areas.

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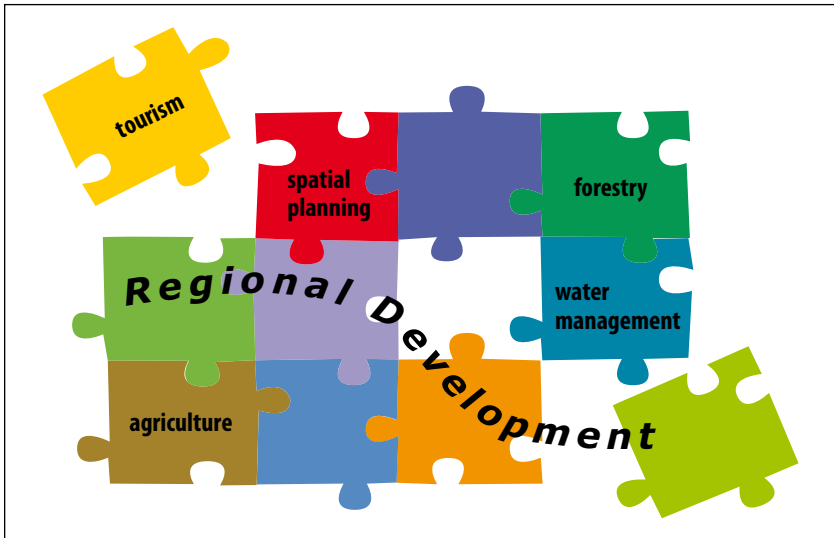
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8 Interlinkages of the ENMaR core areas

It was an objective of the project to raise awareness on the interaction between tourism, spatial planning, water management, agriculture and forestry, the core sectors of ENMaR. The previous chapters demonstrated the close links between the different sectors explored during the ENMaR project.



ENMaR core areas in the context of regional development

Rural areas are characterised by agriculture and forestry as the dominant landuses. These sectors therefore determine features of the landscape, especially areas of low population and less so in urban areas. These landscapes attract people from the cities and tourists from other regions. Ecologically friendly agriculture and forestry are an added value for tourism as well as for good water quality. Indeed, good water quality can have an added value for rural and sustainable tourism. It is important to emphasise that water management cannot be detached from the natural environment and existing landuses, something that the WFD recognises with its emphasis on river basins. Due to its influence over the development and use of land, spatial planning has been identified as a key tool to help promote the integration of land and water. Agriculture, forestry, and tourism are important landuses

and consume land resources. They are subject to spatial planning procedures, which can help to enhance the contribution of these sectors to water management. Spatial planning has an important role to play in balancing the various needs of agriculture, forestry and tourism against the conservation and enhancement of the water environment.

In many cases it is a question of scale. Intensive development, no matter if it is for agriculture or tourism for example, causes pressures on the environment. In the future, it will be increasingly important to maintain a healthy balance between these different sectors and the needs of the natural environment. River basin management plans and other spatial planning instruments have an important role to play here. Ideally, multi-functional benefits can be achieved, which are needed in order to achieve regional development.

Tourism is considered as a development opportunity for many regions because of its direct economic benefit. But tourism also demands resources including natural environments and water. In rural areas there can be a strong link between tourism and agriculture. In these areas, tourism should take an integrative approach, covering different disciplines such as nature conservation, water protection, farming and other rural activities. Agriculture and water management can play an important role in sustainable tourism and recreation. In some regions without tourism development, these sectors can be an important initial step for promoting tourism activities. But on the other hand, mass tourism can destroy quality of life and good status of water. Tourism infrastructure, especially the provision of water services, are crucial to the sustainable growth of the industry. The role of spatial planning in tourism development and in ensuring its sustainability has been described in more detail within the previous chapters.

River basin management, as proposed by the WFD, offers a framework that can act as 'glue' to bring the different sectors explored during the ENMaR project together, because they all either impact on the water status or rely on it. It is important to recognise that without an integrated approach to land and water management, the goals of the WFD will be difficult to achieve.

9 WFD and economics

9.1 Economic elements of the WFD

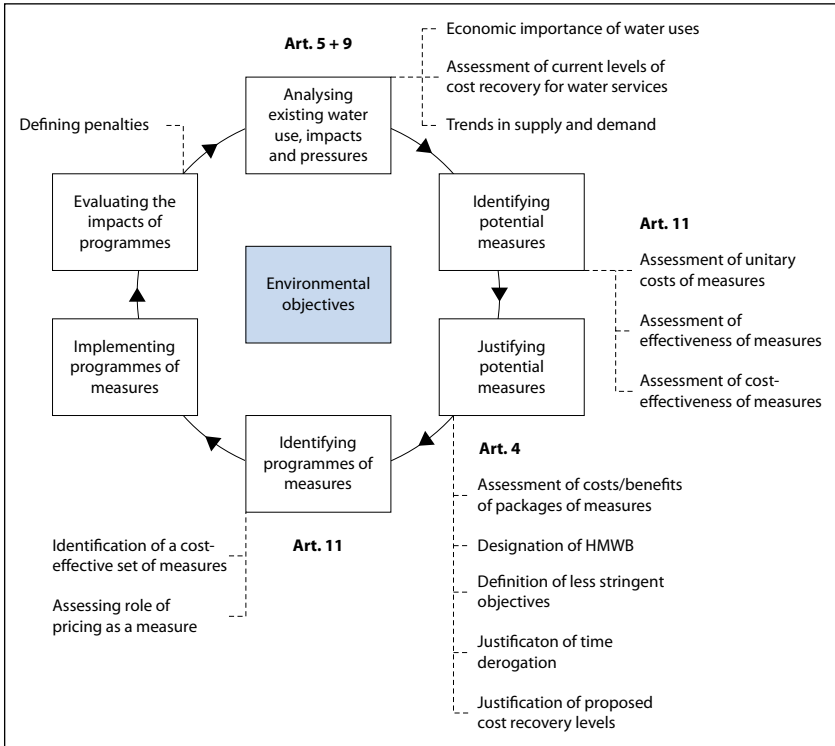
The objectives of the WFD are ambitious, and to achieve them substantial administrative and financial resources will be required. A number of economic approaches are suggested for the implementation process of the WFD (PIELEN 2007) and certain economic principles (e.g. the polluter-pays-principle), instruments (charges and taxes) and methods (e.g. cost-effectiveness or cost-benefit-analysis) will play a crucial role.

This is outlined in the following WFD articles:

- Article 5 requires an economic analysis of water use. This is the basis for all economic considerations and decisions in the subsequent implementation.
- Article 9 demands that the water-pricing systems of Member States should consider the principle of cost recovery in water services, creating incentives for more efficient use of resources. This should include environmental and resource costs.
- Article 11 recommends the use of cost-effectiveness analyses when initiating programmes of measures.
- Article 4 regulates the justification of exemptions. Extended deadlines (Art. 4.4) or less stringent environmental objectives (Art. 4.5) can be applied for based on economic assessments, determining whether measures to achieve good water status can only be achieved with disproportionate costs.

By integrating these economic components, the WFD intends to pursue the following three outcomes:

1. To make implementation as cost-efficient as possible. Cost-effectiveness is to be measured while instigating the programmes of measures.
2. To use market mechanisms while achieving the WFD's ecological objectives. Market failures that lead to negative impacts on water quality shall be diminished.
3. To establish critically and case-by-case whether the politically-defined objective (to achieve good ecological status for all water bodies in the EU) is economically reasonable, therefore judging the justification of its implementation. If it is found to be economically inefficient, Art. 4 allows for an adjustment of objectives with exemptions regarding time and quality.



Economic elements of the WFD (Wateco 2002, modified by Bräuer 2007)

The above figure shows the scheduling for the implementation of the WFD's environmental objectives and refers to relevant economic articles of the directive. The first step, in accordance with Article 5, seeks to characterise each river basin in economic terms through the analysis of water use, including identifying the degree of cost recovery of water services, and an estimation of trends in water use and therefore potential pressures in the future. The next step, as required by Article 11, is an estimation of the cost-effectiveness of potential measures. Based on these figures, the total costs towards achieving good ecological water status can be calculated and checked to decide whether they appear disproportionate (Art. 4). If they do not, the next step is to select the most cost-effective programme of measures (Art. 11). This process undergoes periodical reporting, allowing the process to be perfected and intensified each time it is repeated.

9.2 General issues between municipalities and the WFD

As mentioned in chapter 1.4, municipalities are affected by the WFD in terms of tasks and responsibilities in the following fields. These of course may differ between Member States:

- sewage treatment and discharge into watercourses
- water supply
- water body maintenance and construction of waterways
- urban development in terms of spatial planning, nature conservation and flood protection
- tourism and local recreation
- agenda 21 activities
- public participation

The role played by each of these fields in each of the different regions while instigating the programme of measures is not clear yet. They will, however, vary according to interpretations and emphases of the environmental objectives.

9.3 Economic terms in the WFD

Within the economic approaches of the WFD, the terms of effectiveness, efficiency and external effects play a crucial role. These will be explained in the following:

- Effectiveness is the ability of a measure to achieve its objectives. The cost-effectiveness of a measure is defined as the cost of achieving certain objectives quantified in physical terms. Cost-effectiveness analyses serve two purposes: either (1) to identify the best way to achieve the maximum of (ecological) effects with a given budget, or (2) to establish how a defined objective can be achieved at the lowest costs. In the case of the WFD, the defined objective is good ecological status of water bodies. Hence cost-effectiveness refers always to the second purpose listed above.
- Efficiency describes the proportion of the social benefits and costs of a particular measure. Measures are considered to be efficient if they lead to increased welfare. Ultimately, efficiency seeks to maximise the welfare of all members of society through the optimal allocation of existing resources.

- External effects are the impacts of economic actions on a third party, which are not carried by the initiator and from which the initiator does not profit. The consequence of this market failure is, that not all costs and benefits of a traded service or commodity, are valued by the market. Therefore the commodity or service is not provided or consumed in the optimum amount. Accordingly, this reduces the overall social benefit. External effects can result in either damage to a third party (external costs) or improved circumstances (external benefit). For example, a discharge of untreated wastewater into a river can result in additional costs to anglers downstream. Alternatively, the establishment of flood plains can increase recreational value for local residents, who do not contribute to the costs but who experience the benefits (see chapter 9.5). To better take the costs of external effects for the society into account, the WFD is introducing environmental and resource costs to water pricing.
- Resource costs refer to the costs of using an economic resource, in this case water, in terms of its scarcity. They occur when not all possible uses of a water body can be capitalised due to competition from different users. They measure the potential lost benefits of alternative water uses. For example, an excessive use of water in the irrigation of farmland can limit the availability of drinking water which in turn would hinder the development of tourism in a region (GÖRLACH & INTERWIES 2004). The WATECO working group is also adding a time dimension to this definition. Hence resource costs arise through an unsustainable use of scarce water resources which go beyond natural regeneration capacity (INTERWIES ET AL. 2004).
- Environmental costs are defined as costs generated by reduced environmental quality attributable to water services (GÖRLACH & INTERWIES 2004). Reasons can include the derogation of either water quality or quantity and its effect on natural habitats, ecosystem functions and biodiversity. Costs can arise through damage to wetlands by exceeding water abstraction or through the pollution of drinking water by the fertilisation of arable land.
- Water services are all services providing the following for households, public institutions or any economic activities:
 - abstraction, impoundment, storage, treatment and distribution of surface water or groundwater
 - wastewater collection and treatment facilities which subsequently discharge into surface water, (Art. 2.38)

- Water uses, according to Article 2.39, refers to those water services, as well as any other activities identified under Article 5 and Annex II, which have a significant impact on water status. This includes all other agricultural and economic activities. Member States have further clarified the definition and given a narrower scope in terms of what water services are, limiting the definition in most cases to water supply and wastewater treatment. A differentiation of water services from the group of water uses is relevant for the implementation process because cost recovery, which takes into account the polluter-pays-principle, is a requirement for water services, whereas water users only have to adequately contribute to cost recovery (Art. 9).

9.4 Description of programmes of measures and their role within the WFD

Programmes of measures consist of basic measures and supplementary measures. The former refer to the minimum requirements of the WFD (efficient and sustainable water use (Art. 4); objective for drinking water resources (Art. 7); cost recovery of water services (Art. 9); combined approach for discharges and emissions (Art. 10)) and other relevant directives.

Supplementary measures have to be implemented in order to achieve the environmental objectives, particularly for water bodies at risk. They include legal instruments, codes of practice, supervision of abstractions, etc. (HAAKH 2006). The WFD requires the second category of measures to follow the cost-effectiveness principle.

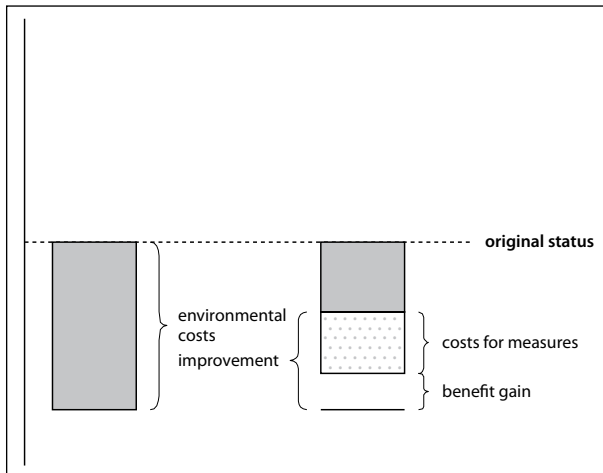
This means setting resources used in relation to the benefits achieved. The appropriate data therefore have to be harmonised and quantifiable to assure comparability is possible. For instance, a measure with costs X can reduce nitrates by Y tons. The most advantageous method is to choose measurable criteria such as Euro/kg pollutant reduction. However, not all measures work towards a single parameter such as this. Individual measures may influence a whole set of parameters. In this case an exact correlation to single cost categories may not be possible. Many environmental measures develop positive side effects later on without direct relation to the original objective. These can range from increased recreation value through renaturalisation measures to a complex interrelation of flora and fauna in a river basin landscape. Positive external effects such as these might not be considered

within a one-dimensional cost-effectiveness analysis which may lead to misleading results in respect to the total cost-effectiveness of measures.

Thus, a simple comparison of costs for a certain target value might not be sufficient for selecting a programme of measures. Furthermore, all effects of a particular measure have to be considered as far as possible.

There are pilot projects dealing with the selection of cost-effective combinations of measures. Worth mentioning here is the UBA-Handbook (INTERWIES ET AL. 2004) as well as the 'Weiße Elster Project' of the environmental research centre UFZ (KLAUER ET AL. 2007A), described below.

Environmental and resource costs need to be reduced with appropriate measures. In most cases, implementing measures generates costs. Therefore a comparison of the costs for improvement with the resultant benefits is useful. This is demonstrated in the figure below.



Differentiation of costs for measures, environmental costs and benefit, respectively net benefit for measures to improve the environmental quality.

Economic costs arise when the current use of a water body influences ecological status in a negative way (fig. p. 155). The relating environmental costs can be avoided or reduced by using measures that aim to achieve the environmental objectives of the WFD (fig. p. 155, right part). Hence, improvement of the environment represents a benefit gain. However, the measures taken often incur costs themselves, and so the net economic benefit of the implementation of water protection measures is thus diminished. It is apparent however that when not taking direct implementation costs of the measures into account, the overall social benefits are overestimated.

9.4.1 Problems of choosing the most cost-effective measures

The most cost-effective measure might not necessarily achieve a given objective in full and so further measures will be necessary which are more expensive. The most overall cost-effective programme of measures will be achieved by commencing with the single most cost-effective measure, then following with the next most cost-effective supplementary measure and so on until the objective is achieved (PETRY ET AL. 2006, INTERWIES ET AL. 2004). The economic effectiveness of a single measure may be increased if it can lead to side-benefits additional to water protection, for example an increase in the recreational value of a region due to afforestation, or an increase in biodiversity due to organic farming.

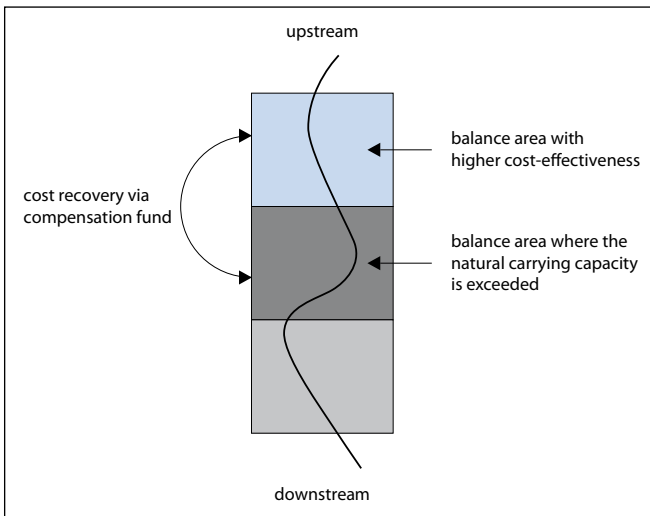
9.4.2 Fair distribution of programmes of measures between riparian owners and between polluters

Within the WFD, combinations of measures are to be considered, selected, implemented and co-ordinated at a river basin level. Studies on the cost-effectiveness of measures have demonstrated that they are highly dependent on local conditions. The effectiveness of single measures, as well as their costs, depends to a significant degree on location.

When establishing a programme of measures it will be assumed, for reasons of cost-effectiveness, that they will mainly target certain areas of the river basin. The size of a river basin district, covering several administrative units, means that for some municipalities a disproportionate number of measures will be implemented within their territory, even though the municipalities themselves are not responsible for these problems to a comparable degree. An absolute focus on the principle of cost-effectiveness carries the risk of an infringement of the polluter-pays-principle. As the entire river basin will benefit from the measures (in many cases

predominantly the downstream areas), compensation mechanisms are required, such as a common fund raised by concerned parties (regions, municipalities, etc.) to maintain cost-efficiency for the selection of measures and to consider the polluter-pays-principle at the same time.

In the framework of the 'Weiße Elster Project' (KLAUER ET AL. 2006) a conceptual proposal was developed in order to achieve this. KLAUER ET AL. (2006) suggested dividing river basins into sub-areas for which nutrient balances are calculated (see figure below). Activity objectives for achieving desired water quality can then be formulated around these figures. This is done by identifying a physical load for each sub-area which identifies that area alone. That way riparian owners in whose territory the limits for certain substances are exceeded do not have to bear the total burden. The concept of sub-areas means that from the furthest upstream sub-area onwards an activity objective is formulated for every sub-area further downstream. This results from regional discharges and considers the self-purification potential within the sub-area. This theoretically ensures that only surface water which meets the requirements of the WFD will leave each of the sub-areas. Thus, decision-making for the selection of measures across sub-areas is tied together.



Upstream and downstream area difficulties in setting up cost-effective combinations of measures by using a compensation fund (Schiller et al. 2007, modified by Bräuer 2007)

The need for actions is precisely defined for each riparian owner by the specific reduction objectives of their particular sub-area. If the objectives require a combination of measures within the river basin, the total costs can be divided accordingly amongst the sub-areas.

With simultaneous consideration of distribution issues a better standard of cost-effectiveness of a programme of measures can be established in a river basin. Additionally, those mechanisms could be relevant, if sub-goals cannot be achieved in a downstream area, but can be compensated in an upstream area, or if measures at a downstream area are associated with disproportional costs (KLAUER ET AL. 2007A).

9.5 Cost recovery and environmental and resource costs

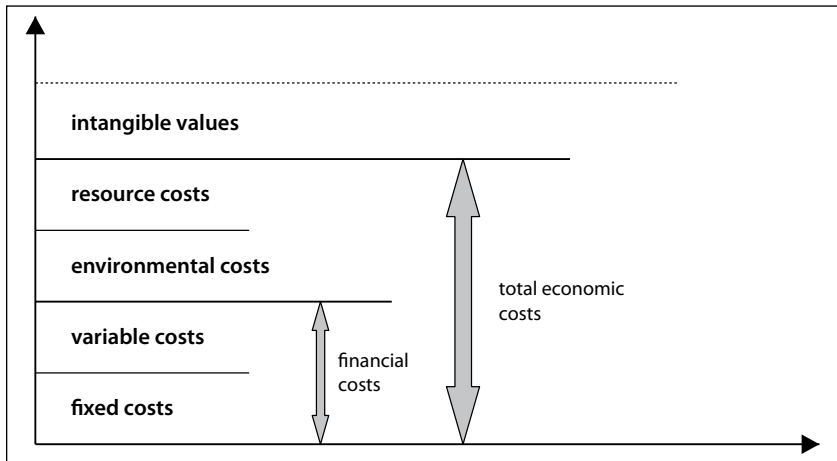
The principle of cost recovery derives from Article 9 of the Water Framework Directive and suggests that EU Member States take into account the principle of cost recovery for water services including environmental and resource costs. Thereby the polluter-pays-principle is to be implemented and explicitly incorporated in all economic analyses. According to Article 9 of the WFD, cost recovery for water services must be secured. Further on, different water uses (e.g. industry, households, agriculture) with heavy impacts on water status need to contribute in an adequate way towards cost recovery. The principle of cost recovery thereby refers to the degree to which water-use costs are paid by those who generated them. Environmental and resource costs are referred to as vital in reference to water services but are not defined in the WFD.

By 2010, Member States must ensure that water prices provide adequate incentives to users to treat the resource efficiently and that the different water users make an adequate contribution to the cost recovery of water services. Through cost-effective water pricing the following objectives are aimed for (FRIES & NAFO 2006):

- Informational function: All associated costs are made apparent to water users which should lead to a greater appreciation of the value of the resource.
- Steering function: Water users have to pay for all direct and indirect costs of their water use and are thereby challenged to compare the benefit of this expenditure with alternative uses. This is to encourage a more efficient use of water.
- Financing function: Using cost-covering payments for water uses, sufficient funds should be provided to guarantee future measures for water services and water protection in the long run.

According to Article 9, the WFD calls for full cost recovery for water services, but only demands adequate contributions to cost recovery for the broader category of water uses (PIELEN 2007). The exact costs for water services defined here will influence the polluter-pays-principle's level of implementation as well as the rate of cost recovery (PIELEN 2007). While REINHARDT (2006) critically scrutinises whether it is possible to legally define an adequate contribution to cost recovery, UNNERSTALL (2005) argues as follows. Uses of water which do not represent water services but which generate some of the costs for water services have to make an adequate contribution to the recovery of the respective water services expenses (UNNERSTALL 2005). For example, agriculture, as a polluter, would have to bear the additional costs for treating drinking water, the pollution which arises from excessive use of fertilisers (UNNERSTALL 2005). Under these terms the polluter-pays-principle would be fulfilled.

A careful differentiation between water services and water use, and a careful definition of the terms environmental costs and resource costs, is essential if cost-covering water prices are to be determined according to the principles of the WFD.



Cost categories for calculating the economic costs of water services.

According to ROGERS ET AL. (2002), the total cost of water services and water uses can be calculated as in the above figure. It is important that environmental and resource costs are added to the investment (fixed costs), maintenance (largely variable costs) and operational costs (variable costs) of the financial cost accounting in order to calculate the economic effects.

Strictly speaking, all relevant costs and benefits should be included in any total economic examination but there is dissent in economic literature whether in fact all environmental resources and values can be recorded by monetary valuation methods. In this case economists talk about intangible values. As these cannot, by definition, be monetarily valued, they have to be considered purely in a qualitative argumentative way.

The WFD demands an economic analysis, i.e. an examination of the total economic costs in order to determine cost-effective prices. Previous studies in some Member States on the cost recovery ratio of water services, as reported to the Commission in Article 5, are considered insufficient, according to the WFD.

9.5.1 Examples for the calculation of cost-effective water prices in Germany

The current data on cost recovery of water services and water use is insufficient, partly due to unclear definitions of individual cost categories (PIELEN 2007). Surveys on cost recovery ratios have mainly been carried out from a financial business economic perspective. Two examples will follow, of which one - the survey in the Federal State Rhineland-Palatinate - is based on the collection of primary data from the individual water service providers, while the survey in the Federal State Hesse confines itself to the analysis of statistical data. The latter approach is less cost- and labour-intensive, but is also less accurate.

A survey on the cost recovery of water services in the Rhineland-Palatinate ascertained the cost recovery ratios of water service providers at about 100% (MUF 2005). Based on a questionnaire, information on legal aspects such as the type of fees and legal forms, technical aspects like quantities of water, as well as specific economic data like profit and loss accounts, balances, statements of allowances and allocations, accounting, etc. were all gathered. About 80% of fees were covered by quantity charges. Cost recovery ratios of wastewater disposers in Rhineland-Palatinate were also around 100%. Cost recovery ratios in both services tend to be lower in rural than in urban areas (MUF 2005).

In Hesse, cost recovery ratios of local wastewater disposers are close to 100% (MICHEL ET AL. 2004). They were established on the basis of the municipal financial statistics. The average is 94%. Environmental and resource costs are partly internalised through charges paid by water users. The total wastewater fee for Hesse was 41 million Euro, while the groundwater fee amounted to 109 million Euro (MICHEL ET AL. 2004). The fees are used for groundwater and water protection measures as well as for economic water use.

9.6 Exemptions

According to Article 4 of the WFD, exemptions with sufficient justification can (1) permit an extension of the deadline to achieve good ecological status for selected water bodies, or (2) allow a definition of less stringent objectives. Reasons for this can either be a practically impossible improvement of the status due to technical feasibility or natural conditions, or disproportionately expensive implementation of the relevant measures. Exemptions are also possible when measures have already been taken, but impacts diminish only slowly because of the natural conditions (e.g. atrazine application) (RECHENBERG 2006). Less stringent environmental objectives can be defined when good status cannot be achieved in the long run. This can be due either to human activities or natural conditions.

Generally, each check on the disproportionality of costs for measures requires an estimation of the costs and benefits of the measure in order to do a cost-benefit-analysis. Due to the known difficulties in estimating the benefits of these measures, this procedure is only suitable to a limited extent. Accordingly, in the Member States of the EU, there are as yet no definitive decisions about which alternative criteria should be applied in the determination of disproportionate costs, or how to proceed methodically in the assessment of the disproportionality of costs for measures.

Some countries have undertaken initial efforts (see box). An extensive examination can be found in the project report for LAWA (<http://www.ecologic.de/download/projekte/200-249/201-20/201-20-final-report.pdf>).

The objective of KLAUER ET AL. 2007_B was to propose criteria that allow a workable procedure to check cost disproportionality. Thus, mainly criteria have been proved working as far as possible without a monetary valuation of positive environmental effects. As a consequence of focussing on costs for measures, proportionality is primary defined through the financial capacity of private or public sponsors/bodies who bear the costs.

Though, it is differentiated between screening criteria and criteria contributing to actually assess disproportionality. Naturally, the latter are supposed to have a high significance.

These screening criteria have been proposed as suitable: (1) the costs relation or (2) the cost-effectiveness-relation of single measures respectively (3) of programmes

of measures in different water bodies and (4) the costs in relation to former public expenditure for water protection.

The following criteria have been considered suitable to estimate disproportionality for private actors/bodies: (1) the average proportion of a sector's business volume that goes towards water protection/environmental expenditure; (2) the relation of these costs to the average household income, and (3) the cost capacity of households in comparison to the national average.

In order to test disproportionality for public bodies/budgets, KLAUER ET AL. (2007B) propose a comparison of costs for measures against GDP and the relation of this portion to the EU average. But a comparison of costs having effects on public budgets in relation to the public budget is not considered suitable.

Theoretical examples for the assessment of disproportionate cost

- **France** follows two pragmatic approaches. (1) In Seine-Normandie, annual costs for measures are related first in a pre-assessment to the previous year's costs for water management. If those are at least 20% higher, the disproportionality will be assessed through a cost-benefit-analysis and the result will be discussed with local stakeholders (LAURANS 2006). (2) In Artois-Picardie, it has been proposed to quantify the share of the average water bill of the average available household income on the municipal level (COURTECUISSÉ 2005). According to thresholds of the OECD and the EU, this proportion should not be higher than 2%. This means for the relevant municipality, that it is disproportionate, as soon as the costs related to a programme of measures lead to an increase of the water bills of private households above this threshold.
- **In the Netherlands** a combined approach is proposed for the assessment of disproportionality (SYNCERA 2005). On the one hand, the overall economic effects are quantified by doing an economic cost-benefit-analysis. On the other hand, the capacity of single stakeholders and sectors are estimated based on these cost-benefit-analyses. The monetary benefit of the measures is to be evaluated through willingness-to-pay-analyses (MARGGRAF ET AL. 2005). Thresholds for disproportionality will then be politically defined. Prior to this, an expert forum could estimate the

significance and ability to quantify underlying costs and benefits in order to use complex cost-benefit-analyses only in those cases, where conflicts about disproportionality could arise. A first national estimation showed that the willingness-to-pay of the Dutch households for the improvement of the water status is 20% higher than the current expenditures (SYNCERA 2005).

- **In Great Britain** many approaches are investigated to define disproportionality. For example a flexible approach is proposed in which the depth of the analysis depends on the complexity of the decision situation (RPA 2004). The analyses range from simple estimations to the cost-benefit-analysis. Amongst other things, the intensity depends on whether stakeholders generally agree on the implementation of measures, whether the various measures have different impacts on the dimension of good ecological status, or whether significant costs and advantages for a third party exist. Criteria for the appraisal of disproportionality could be:
 - a defined threshold between social costs and benefits
 - relation of costs between different measures, sectors and river basins to achieve a certain effect
 - the marginal cost-benefit-relation additionally to the existing combination of measures, that is: are any measures disproportionately expensive as comparable measures, which have already been implemented
 - cost distribution among sectors, under consideration of the polluter-pays-principle and in order to demonstrate cross-subsidisation
 - expenditures for water protection of a sector over a past period of time
 - the impact of additional costs on the economic ability of a company or a sector to survive including economic follow-up effects
 - simplified tests regarding the economic viability of the companies or sector level

But in this case as well, it is assumed, that the relevant thresholds for disproportionality will finally be decided politically.

9.6.1 The designation of heavily modified water bodies (HMWB)

As economic approaches play a crucial role in justifying the disproportionate costs of certain measures, so they can do the same for the designation of heavily modified water bodies (HMWB). According to Article 4(3) (b) of the WFD, water bodies can only be designated as HMWB if the measures required for good water status would have significant adverse effects on the wider environment, navigation and recreation, water storage and regulation or other important sustainable development activities, or if the objectives for the modified water body cannot be achieved through other measures because of technical feasibility or disproportionate costs. Here, cost comparisons of alternative measures can be used to make economic justification for HMWB designation (CIS 2002). For marginal cases or situations regarding high investments, a more complex economic analysis is useful (CIS 2002).

9.6.2 Questions concerning cost allocation between the local and national level

Throughout the implementation of the WFD, requirements for water body maintenance are changing. Apart from drainage and navigation, the development of watercourses and the physical environmental objectives in Article 4 all have to be taken into account. Therefore, a clear differentiation between maintenance and constructive development is a precondition for handing over costs to the bodies responsible for water maintenance. If public entities such as municipalities or waterboards are responsible, their financial capacities for implementation of the WFD must be considered by national governments (REINHARDT 2007).

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9.7 ENMaR findings

In addition to the more scientific outline above giving an overview of the legal basis and their interpretations, the following are some statements and recommendations from the ENMaR workshops and discussions within the network:

- The WFD is a huge challenge for all stakeholders and many measures will be necessary to achieve the good status. But it is not clear how those measures will be financed. Municipalities fear being made responsible for implementing and financing measures. But the financial situation of most municipalities is not sufficient to do so. For the implementation on the local level financial support is needed from regional or national governments or the European Union.
- Nevertheless, there are ways for municipalities to contribute and finance WFD measures, as demonstrated in the case studies. Measures taken in the former programming period have shown that rural development measures can have positive impacts on water bodies.
- Funding options given in other fields or disciplines should be used, such as for example within the rural development programme. Measures within this Axis 2 of the CAP should serve the WFD. Measures can reduce water costs by decreasing the environmental costs.
- Approaches such as affordability-to-pay; polluter-pays-principle; cost-effectiveness, disproportionate costs, etc. should be taken into account. The introduction of those economic instruments should be facilitated with general information and a dialogue with the water users.
- In order to implement the polluter-pays-principle, stricter controls are necessary regarding diffuse pollution, and also especially for water abstraction due to the increasing drought risk and the negative impacts on water quality.
- People need to be aware of the value of water resources, water consumption cannot be for free.
- Water pricing could be the effective economic instrument for supporting efficient and sustainable water use by the various consumers. But

charges for water abstraction, wastewater treatment, etc. should be earmarked. Economic incentives might work better than rising costs.

- However costs for water use and protection measures need to be in balance with the willingness to pay by the users. A balance between water protection and the human needs is necessary, without endangering the social and economic development of a region.
- Water resources and the related sectors need to be considered holistically. Measures which serve various benefits should have highest priority, e.g. WFD and Natura 2000.

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10 Case studies

A need for practical examples concerning water management and its related sectors has emerged from the regional workshops organised by the project partners. Providing target group oriented information is considered an important element of encouraging improvement in water status and contributing to regional development in Europe. Therefore, an essential exercise of the ENMaR project has been to look for case studies dealing with water management in its broadest sense.

The WFD requires the development of measures to achieve good status of most waters in Europe by 2015. Through providing examples of good practice, this Handbook can be viewed as a vehicle to help achieve this aim of the Directive.

This Handbook contains 60 case studies, selected from good examples of projects on-the-ground in the ENMaR regions. These case studies are current or planned, and operate at a local level in the river basins and should contribute to achieving the aims of the WFD. Although there are many good examples that have already been completed or are being planned, only two case studies per theme from each region have been selected for inclusion in the Handbook. They are relevant to the ENMaR themes, and have been organised by theme, although many of them relate to more than one. Aside from the key ENMaR themes, stakeholder engagement is included as it is considered to be crucial in the context of the WFD.

An overview of each case study is given here with signposting to where more detailed information can be found including contact details for the person responsible for the initiative. The most important information might be the relevant contact person for each example. The aim is to provide a snapshot of progress in this field and to highlight a range of good examples from across Europe.

The case studies comprise:

- constructive measures (e.g. removal of a dam, building a fish by-pass, afforestation etc.)
- tools (e.g. legal or planning instruments, drinking water regulations etc.)
- activities (e.g. bathing day, cleaning up the river banks, etc.)

The case studies have been chosen from the ENMaR river basins, namely the Emån, Gauja, Mersey, Miño and Weser. The main criteria for choosing the case studies have been:

- the relevance to an ENMaR theme, or preferable more than one theme
- the degree of stakeholder engagement
- the transferability of the key ideas across Europe
- the availability of information on costs and funding options

Within the chapter stakeholder engagement the good examples focus on information, organisation, co-operation and encouraging involvement. The spatial planning case studies can be subdivided into plans or strategy and approach or tools. For water management there are case studies on water quality (surface and groundwater), water quantity, drinking water supply, waste water treatment, flood protection, restoration and on water body maintenance. The issues tackled within the agriculture case studies are diffuse pollution, water consumption, point sources, habitat protection and farming practise. Similar aspects are referred to concerning forestry, those are diffuse pollution, adapted forestry methods and habitat protection. And finally, tourism case studies are describing infrastructure development as well as soft measures.

The following chart provides an overview of the case studies chosen.

core area	country	initiative	page	other themes covered						category		scale			
				water management	spatial planning	agriculture	forestry	tourism	stakeholder engagement	activity	measure	tool	local	regional	national
stakeholder engagement	SE	Emån Water Prize	176	x					x	x			x		
	SE	Watercourse Groups	178	x	x	x		x	x			x			
	LV	Capacity-Building and Raising Awareness of Integrated Resource Management amongst Local Residents	180						x	x			x		
	LV	The Fish Resource Protection Programme „Living Water“	182				x		x	x			x	x	
	UK	Stakeholder Mapping for the Ribble Pilot	184						x			x	x	x	
	UK	Balsam Bashing	186	x		x	x		x	x			x		
	ES	Proyecto Rios (The River Project)	188	x					x	x				x	
	ES	Centre for Environmental Education: As Corcerizas	190	x	x	x	x	x	x	x				x	x
	D	Concept for an Extracurricular Place of Learning Essen (Oldb.) - Cultural Landscape on the Waterside	192					x	x	x			x	x	
	D	Gute Güte (Good Quality)	194	x	x				x	x	x			x	x
spatial planning	SE	The Emån Catchment Storm Water Policy	196	x	x				x			x		x	
	SE	The Preparation of the Vetlanda Spatial Plan	198		x				x			x	x		
	LV	Planning of Nature Protection in the City of Cēsis	200	x	x	x	x	x	x			x	x		
	LV	Designation of Water Protection Belts in the City of Valmiera	203	x	x	x	x					x	x		
	UK	City of Salford Strategic Flood Risk Assessment	206	x	x					x			x	x	
	UK	The River Mersey Development Plan	209	x	x					x			x	x	

core area	country	initiative	page	other themes covered						category		scale	
				water management	spatial planning	agriculture	forestry	tourism	stakeholder engagement	activity	measure	tool	local
spatial planning	ES	Biosphere Reserve 'Terras do Miño' (The Lands of the Miño): Parga-Ladra-Támoga Site of Community Importance (SCI)	212	x	x	x	x		x		x		x
	ES	Guitiriz Geographic Information System	215	x	x				x		x	x	
	D	The Use of Compensation Measures to Renaturalise the River Else	218	x	x				x		x		
	D	River Development Plan "Mittlere Leine"	221	x	x			x	x		x		x
water management	SE	Biotope Restoration	224	x		x	x				x		x
	SE	Fish Bypass	226	x		x	x		x		x		x
	LV	Water Services in the City of Cēsis	228	x							x		x
	LV	Protection of Habitats and Species in the Rāzna Nature Park (LIFE-Nature Project)	230	x	x	x		x	x		x		
	UK	Broadfield Pond	232	x			x			x			x
	UK	Manchester Ship Canal Regeneration and Oxygenation Project	234	x				x	x		x		x
	ES	Santoña Marshes	236	x					x		x		x
	ES	GIS Tool to detect Point Sources in a Catchment Area	238	x	x	x			x			x	
	D	General Drainage Plan in Oldenburg	240	x	x							x	x
	D	Relocation of a Dyke at the River Aper Tief	242	x	x	x		x	x		x		x
agriculture	SE	Irrigation Union	244	x		x			x		x		x
	SE	Focus on Nutrients	246	x		x			x	x			x
	LV	Restoration of Latvian Floodplains for EU Priority Species and Habitats (LIFE-Nature Project)	248	x	x	x		x	x		x		x

core area	country	initiative	page	other themes covered							category	scale					
				water management	spatial planning	agriculture	forestry	tourism	stakeholder engagement	activity		measure	tool	local	regional	national	
agriculture	LV	Organic Farm "Lielkrūzes"	252	x		x				x	x			x			
	UK	Stop Every Drop	254	x		x				x	x					x	
	UK	Fencing of Rivers and Creation of Buffer Strips along the Banks of the Yarrow and its Tributaries	256	x		x				x	x			x			
	ES	A Collaboration Programme between an Agrarian Co-operative and a University for the Sustainable Use of Fertilisers	258	x		x				x	x			x			
	ES	Decree of Agricultural Utilisation of Sludges from Filter Systems	261	x		x	x							x		x	
	D	Voluntary Agreements and Co-operation Committees	264	x		x				x				x	x	x	x
	D	Organic Farming	267	x		x	x							x	x	x	x
forestry	SE	Forestry Measures along Watercourses - Improvement and Creation of Riparian Zones	270	x			x							x			
	SE	Forestry Measures along Watercourses - Crossings over Watercourses	273	x			x							x		x	
	LV	Restrictions in Protective Belts around Water Bodies Regarding Forests (Law on Protective Belts)	275	x			x							x			x
	LV	Studying the Effect of Intensive Forestry on the Water Regulatory Properties of Forests	277	x			x							x			x
	Uk	Sustainable Catchment Management Programme (SCaMP)	279	x	x	x	x			x				x			x

core area	country	initiative	page	other themes covered							category	scale		
				water management	spatial planning	agriculture	forestry	tourism	stakeholder engagement	activity		measure	tool	local
forestry	UK	Newlands - New Environments via Woodlands	282	x	x		x	x	x		x		x	x
	ES	ASEFOGA (Asociación Sectorial Forestal de Galicia) - the Association of the Forestry Sector in Galicia	284	x			x		x		x			x
	ES	Programme for the Endorsement of Forest Certification Schemes (PEFC)	286	x			x				x			x
	D	Afforestation	288	x	x	x	x	x	x			x	x	x
	D	SILVAQUA	290	x	x		x		x			x		x
tourism / local recreation	SE	Sport Fishing Entrepreneur Network	292					x	x			x	x	x
	SE	Emån River Basin Eco-Museum	294					x	x	x			x	x
	LV	Development of Tourism Infrastructure in the Gauja River Valley	297					x	x		x			x
	LV	Engure Lake Nature Park Tourism Development Plan	300		x			x	x			x	x	
	UK	ICREW - Improving Coastal and Recreational Waters for All (Pilot Action 5 - Re-Identifying Recreational and Bathing Waters)	302	x				x	x			x		x
	UK	Mersey Waterfront Regional Park	305	x	x			x	x			x		x
	ES	Guitiriz Thermal Town „The Sense of Water“	309	x				x	x	x			x	
	ES	Camino del Miño (Miño's Path)	311	x		x		x			x		x	
	D	Olantis	314	x	x			x			x		x	
	D	Environmentally Sound Canoeing on the River Hunte	317	x				x	x		x		x	x

Emån Water Prize



Sweden, region: Emån river basin

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: 1999 to: ongoing duration: ongoing

background

Emåförbundet would like to raise the profile of water-related issues and give due credit to good initiatives.

objectives

The prize aims at increasing public participation in water issues by showcasing good examples carried out each year. The prize is awarded to a person, organisation or company that has been involved in any type of good water-related project.



The Water Prize

key players

The original idea came from Emåförbundet. To decide who the prizewinner will be, Emåförbundet assembles a committee. Both the public and stakeholders within the Emån river basin can nominate suitable candidates for the prize.

implementation

The idea is presented to the committee and members of Emåförbundet as well as to the local media.

financing

The initiative did not incur any costs aside from a couple of meetings, while the prize consists of a crystal sculpture in the shape of a water drop, handmade by a local craftsman.

challenges

There is some difficulty in finding a suitable prizewinner every year.

benefits

This initiative will hopefully lead to increased public participation in water quality initiatives and spread information about the Emån river basin.



The Water Prize is handed over to the year's prize winner in 2007.

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Watercourse Groups



Sweden, region: Emån river basin, location: river Fuseån sub-basin

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: December 2005 to: August 2007 duration: 21 months

background

We intend to implement the Water Framework Directive through information, inspiration and active measures. For us, public participation is a key concept when putting the WFD into action. We believe this is a concept that works well, and that it is probably the best way to gain acceptance and generate landowners' interest in the Water Framework Directive.



A group meeting in March 2006

objectives

The main objective is to inform members of watercourse groups about the Water Framework Directive and its relation to forestry and agriculture. The landowners will learn more about their own river basin in terms of water quality and biology and how they are influenced by different landuses. Meetings with the watercourse groups, both indoors and outdoors (along the river), will hopefully create a better understanding of water quality, stream ecosystems and the effects of forestry and agriculture on them.

This 'new' knowledge can then be locally related to the objectives and purposes of the Water Framework Directive. The next step is to inspire the watercourse groups to create and implement a package of measures aimed at decreasing the negative influences of agriculture and forestry on water quality in the river. This will be encouraged through excursions to other river catchments and the use of different governmental subsidies which will be applied in form of assistance from the Emåförbundet. Hopefully some, or perhaps all, of the measures will be carried out during the project time.

key players

Sixty-five landowners, whose properties are adjacent to the river, were contacted and invited to a seminar in December 2005. Of those sixty-five people, twenty attended the seminar and fourteen became members of the watercourse group.

implementation

It began with a seminar called 'Water Framework Directive and Landuse', where all landowners adjacent to the river as well as other stakeholders were invited.

financing

The total costs are not easy to calculate. Emåförbundet has contributed around 10% of the costs for the year 2006, which worked out at approximately 6 400 Euro for staff costs, and a further 5 000 Euro for administration, seminars, and travel. Emåförbundet will make a similar contribution in the year 2007.

challenges

The most common problems are:

- getting people involved and interested
- keeping the group intact
- arranging meetings (These were most often in the evening as many of the members are farmers with little spare time.)
- keeping the group 'alive' after the project ends



Visit on site in September 2006

benefits

The initiative will highlight the importance of several aspects of water quality giving it high priority within the framework of sustainable regional development.

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Capacity-Building and Raising Awareness of Integrated Resource Management amongst Local Residents



Latvia, region: Gauja river basin, location: city of Cēsis

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: May 2005 to: September 2005 duration: 4 months

background

It is essential to involve communities in environmental activities in their local areas. However, it has been observed that local stakeholders can be difficult to engage, due to the cumulative effect of a lack of motivation and a perception of other residents as too passive. The initiative therefore aims at engaging local stakeholders in the city of Cēsis, with emphasis on raising awareness and joint actions to involving local residents. The initiative illustrated that taking active environmental measures can be better dealt with by daily work than the organisation of a spectacular campaign.



Cleaning of a small stream

objectives

The initiative aimed at achieving a greater understanding of relevant legal requirements and promoting the practical participation of local stakeholders such as residents, businesses and NGOs within the municipalities. The proposed approach was tested in Cēsis.

key players

NGO 'Baltijas Vides Forums' (Baltic Environmental Forum, Latvia) took the initiative which was implemented in close co-operation with the Cēsis City Council.

implementation

The initiative comprised two distinct aspects: raising awareness and the practical involvement of local inhabitants. Raising awareness involved the preparation and

dissemination of information leaflets in the area. The leaflets were designed to be easily understandable and provided the key principles of legislation as well as practical advice and contact details for management companies. This was supplemented by awareness-raising meetings with residents which offered the opportunity for the public to participate, ask questions and get involved in the discussion. Practical involvement included a joint investigation of pollution sources in Cēsis, a discussion of available options for eliminating pollution and joint work action on a small stream called Pirtsupite in Cēsis. Local inhabitants and municipal employees cleared fallen trees from the banks, eliminated Giant Hogweed (a plant which can cause severe burns) and cleaned up waste from the area.

financing

The total costs of the project were 8 900 Euro. The project was funded by the Embassy of the Kingdom of the Netherlands, under the MATRA programme (project no. LV/KAP/012/05).

challenges

The most difficult step in implementing the initiative was motivating local residents to join in the activities. A large number of invitations was sent out but the response rate was rather low. However, the activities of this initiative form the foundation for an ongoing process towards more active public participation in the city of Cēsis. The participants in the implementation of this strategy are to be named as 'precursors' and their experience can be used to continue and expand public involvement in the city.

benefits

Good experience has been gained in methods for raising awareness and capacity-building within the Cēsis municipality. Other municipalities besides Cēsis have also benefited as a result of an exchange meeting that was held to share experiences through interactive discussions. A network of contacts between municipalities could exchange best-practice experience on awareness-raising methods and the implementation of measures up to a regional level.

contact

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The Fish Resource Protection Programme “Living Water”



Latvia

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input checked="" type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: 2001 to: ongoing duration: ongoing

background

The initiative came about because anglers had noticed a decline in the fish population in Latvian streams and lakes. The overexploitation of fish resources coupled with illegal fishing (particularly during spawning periods) were some of the key causes. Anglers felt their enjoyment of the sport diminishing and decided it was time to raise public awareness.

objectives

The overall goal of the initiative is to ensure the protection of fish species in Latvian waters, particularly migratory and spawning ones. Another important aim is to improve and develop a long-term flexible co-operation mechanism between government authorities, environmental bodies, municipalities, and anglers' associations to protect fish species in Latvia. Moreover, the campaign aims at promoting public awareness of these issues.

key players

The Latvian Anglers Association not only enjoys angling, but also puts great effort into the protection of wildlife. The initiative of the new programme “Living Water” is a follow-up to the initiative “Let There Be Salmon!” which aimed at protecting wild salmon and related fish species during the autumn spawning season. Both programmes were and are supported by the following stakeholders: The Ministry of Environment (the Minister being the patron of the programme), the State Police, the Board of the Sea and Inland Waters of the State Environment Service, Coast Guards and local inhabitants.

implementation

In 2006, one of the key actions was to control fishing activities through spot-checks on lakes and rivers across the country. A special unit called “The Mobile Team of the Latvian Anglers Association” was set up, consisting of members of the Latvian Anglers Association. They were given the status of “Authorised Persons of the State Environment Service”. During the year, 800 spot-checks were carried out, with over 800 km of illegal fishing nets seized and roughly 1000 poachers punished. To increase engagement, a new boat was awarded to the programme’s most active “Mobile Team”. To raise public awareness about poaching, special programmes were regularly broadcasted on TV, while radio stations devoted various features to describing the issues. Many celebrities helped to promote the programme, including politicians and businessmen, thus increasing the profile of the issue.

financing

The initiative has been financially managed by the Latvian Anglers Association and supported by many organisations. A grant from the Latvian Fund for Environmental Protection (approximately 50 000 Euro in 2007) was given, amongst others. The greatest success of the initiative, however, was the voluntary work undertaken by many stakeholders.

challenges

One of the key challenges to protecting fish species is the existing weakness in national legislation. The current punishments do not act as a sufficient deterrent to illegal fishing. In the past, local municipalities and police forces have been passive in enforcement and in organising fish resource management. Latvian municipalities are comparatively small and as such their capabilities are limited which can result in poor water management.

benefits

This initiative was targeted at the social and environmental components of sustainable regional development. This action encouraged local inhabitants to undertake real protection measures by safeguarding fish species.

contact

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Stakeholder Mapping for the Ribble Pilot



Northwest England, closest city: Preston, location: river Ribble

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input checked="" type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: June 2003 to: February 2004 duration: 8 months

background

When the Ribble Pilot project proposed to test public participation, the Mersey Basin Campaign saw that there was a need to identify stakeholders in the Ribble river basin and volunteered to undertake this work. The methodology was based on United Utilities' procedure for stakeholder mapping, and developed by Caroline Riley, who is on secondment to the Mersey Basin Campaign from United Utilities. The approach has been developed specifically to meet the needs of the Water Framework Directive for the Ribble river basin but the principles could easily be applied elsewhere.

objectives

- to identify the relevant stakeholders
- to categorise the stakeholders according to set criteria such as location, interests and willingness to be involved
- to use the data to select appropriate stakeholders for visioning workshops on the Water Framework Directive pilot project on the river Ribble

key players

Mersey Basin Campaign (MBC), United Utilities, Environment Agency (EA)

implementation

1. Categorise and sub-categorise the stakeholder groups at the various levels.
2. Identify a contact within each organisation. Some stakeholders referred details of other contacts to be included in the stakeholder map, thus spreading the mapping.
3. Send a questionnaire, along with an explanatory letter and information leaflet to the contacts identified. The questions were designed to determine the stakeholders' geographical area of interest in terms of rivers, size of group, interests, desired level of involvement and preferred method of communication.

4. Design and develop a database to map the stakeholders. Data input forms were designed which mirrored the questionnaire to make data input easier.
5. Analyse the results. 35% of questionnaires sent out were returned.

financing

The cost was minimal, only requiring postage on 400 letters. A full-time manager was required to oversee the initiative and this was provided by United Utilities.

challenges

A confidentiality check was included on the questionnaire to ensure that contacts of the MBC were happy to share their details and the information they supplied with the EA in order to comply with the Data Protection Act. The CIS guidance on public participation was considered when developing the approach and many of its recommendations have been used. For example, the level of interest of stakeholders has been captured by distinguishing those who wish to be: actively involved/consulted/informed.

Stakeholder type	Stakeholder group	Scale			Interests										Area			Factors		
		National	Regional	Local	Diffuse pollution	Climate change	Flooding	Landscape	Protected areas	Land quality	Regeneration	Heritage	Rural economy	Water costs	Involving people	River Ribble	River Hodder		Lakes/reservoirs	Coastal waters
Government	EA	x	x		x	x	x	x	x	x				x	x	x	x	x	x	8000
	DTI	x				x							x	x		x	x	x	x	15000
	Local Authorities						x	x	x	x	x	x	x		x	x	x	x	x	12000
NGOs	Wildlife Trusts		x				x	x	x	x				x	x	x	x	x	x	59
	NFU	x			x		x	x		x		x	x							13790
Partnership Bodies	E. Lancs P'ship										x			x	x	x				250
	Coastal Forum						x	x						x				x		78
Community Groups	Anglers		x		x		x	x	x					x	x	x	x	x	x	28000
	Boating groups			x			x	x												450
Industry Organisations	CBI	x										x	x		x	x	x	x	x	480
	CIA	x			x							x	x	x	x	x	x	x	x	148
Businesses	ICI	x	x		x		x	x	x	x		x	x		x	x				800
	BAe	x		x					x			x	x		x					5000

benefits

The Water Framework Directive is aiming at improving the region's waters with a River Basin Management Plan that takes account of stakeholders' views. Identifying the stakeholders is the first step in involving them.

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website: www.merseybasin.org.uk

Balsam Bashing



England, region: Lancashire, closest city: Preston, location: various

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: May 2006 to: July 2006 duration: 2 months

background

The original motivation for this project was to rid the banks of the River Yarrow of Himalayan Balsam in 2005 with a view to repeating the activity every year and give native species a chance to colonise. However after finding that Balsam is almost impossible to remove completely, awareness raising became the priority. This is now the main reason for organising balsam bashes across the whole catchment. People getting out in their local environment see the problem, and actively being involved in removing it makes them feel that they are making a difference.

objectives

- to tackle the same sites each year and monitor the success of pulling the balsam
- to raise awareness of the plant and why it is a threat to habitats and native species
- to stop people from popping the seed pods and encourage them to pull the plant up instead as each plant has the potential to spread hundreds of seeds which can lay dormant for around two years

key players

Action Darwen and Yarrow co-ordinated the events with Chorley Borough Council and South Ribble Borough Council and countryside officers at West Lancashire District Council.

implementation

The same sites were tackled in 2006 as in 2005 plus one new site. A total of 12 Balsam bashes took place over two months involving



Cuerden Church School pupil

nearly 200 volunteers. Chorley Borough Council, South Ribble Borough Council and West Lancashire District Council liased with local groups and schools to organise balsam bashes. Action Douglas and Yarrow co-ordinated the project, sent out press releases, advertised events and organised balsam bashes. The events were advertised in local libraries, council buildings, local newspapers, Mersey Basin Campaign website and in free council papers. All the Balsam bashes were carried out manually. To prevent further spreading of seeds at landfill it was left what was pulled up on site. As the plant has high water content, it does break down and die very quickly once it has been pulled up.

financing

A Lancashire County Council Green Partnership Award was given to help fund the event. Adult and childrens gloves were purchased as well as refreshments. Money was also spent on printing posters to advertise the event. This was a low cost event to run as the Balsam was pulled up manually.

challenges

The main problem was with attracting volunteers. Advertising for volunteers was not as successful as directly approaching a group. Few people new to volunteering came as a result of the posters/press articles. This is something to be improved upon next year. Volunteers came from United Utilities, Friends of Worden Park, Charnock Richard Rainbows, Yarrow Valley Junior Rangers, Cuerden Church School pupils.



Volunteers

benefits

The Lancashire Biodiversity Action Plan highlights rivers and streams as one of its key habitats to protect and a Habitat Action Plan has been produced. The Balsam bashing initiative is contributing to one of the broad objectives of the Habitat Action Plan which is improving bankside habitat. By removing the alien species from banksides, native species are given a chance to grow.

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→ local action → Action Douglas &
Yarrow

Projecto Rios (The River Project)



Spain, region: Galicia

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: January 2005 to: ongoing duration: ongoing

background

The River Project has a special interest in the conservation and knowledge of the ethnographic heritage associated with fluvial ecosystems. Galician rivers are strongly humanised and there is a rich cultural heritage to defend and preserve. This interest has inspired a sub-project called 'Ríos de Lingua e Cultura' ('Rivers of Language and Culture') which aims at recovering lost names for flora and fauna from the Galician language. The River Project is currently considering expansion to create a pan-Iberian River Network.

objectives

The River Project is an initiative to protect the rivers of Galicia by increasing awareness, education and public participation. It is based on inspections of river conditions carried out by groups of local volunteers. Each of these groups takes responsibility for the monitoring of the stretch of river that passes through their village. The River Project covers the whole of Galicia and its main objectives are:

- to bring the population closer to the natural environment
- to raise awareness of the importance of protecting and improving the environment
- to improve the quality of the river ecosystems
- to stimulate public participation in the conservation of natural heritage
- to establish an active public network that monitors and protects the health of rivers by preventing and solving problems.

key players

ADEGA (Association for the Ecological Protection of Galicia), Environmental Ministry of Galicia, Vice-president of the Xunta de Galicia (government of the autonomous region of Galicia)

implementation

Inspections are performed at least twice a year using methods and materials provided by the River Project. The findings are recorded in standardised inspection sheets and sent to the Project headquarters. Annual reports are prepared from this data and made accessible on the Internet. This has helped interested groups to actively participate in the Programme of Rivers Adoption and to monitor the stretch of river they are responsible for. The River Project is open to any person or collective who is prepared to make a commitment, such as residential, angling or sports associations, cultural, social and educational centres, schools or groups of families and friends. Everybody is welcome regardless of their previous knowledge.

financing

In 2007, the project had an annual budget of 80 000 Euro with the majority of funding provided by the Environmental Ministry of Galicia and the Vice-presidency of the Xunta de Galicia. Funding has also come from local councils in the River Project area.

challenges

One of the major problems at the start was finding sufficient funding to consolidate the project. It is the only project in Galicia which involves the public in the conservation of fluvial ecosystems. It is necessary to emphasise that in the early stages there was a low level of public awareness about the project. There were few financial resources and the media did not give the project much attention. Currently the major problem is encouraging project participants to complete and return their inspection results. Although a great number of volunteer groups exists (over 200), less than 50% of inspection results have been returned so far.

benefits

The River Project is the first of its kind to be developed by environmental volunteers with a regional scope. The majority of existing projects are aimed at a local level. The River Project also filled an existing void in Galicia for public participation as outlined in the Water Framework Directive. It commits to a compliance with the Directive on public participation by getting people involved. This promotes an increase in overall public awareness about a 'New Water Culture'.

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Centre for Environmental Education: As Corcerizas



Spain, region: Galicia, location: Vilar de Barrio, Serra de San Mamede

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: September 2004 to: ongoing duration: ongoing

background

There is a lack of public environmental awareness, in part due to a lack of available information. The goal of this project is to provide high quality environmental education. Sustainable environmental relationships are promoted and social work is performed to increase public awareness in the conservation of environmental resources. It intends not only to contribute information, but also to provide direct and personal experiences that engage the participants. It intends to be open and plural, encouraging people to be critical and to actively participate.

objectives

The aim of the Centre is to raise awareness of topics related to the environment and its progressive deterioration and to promote sustainable attitudes and processes and the preservation of cultural heritage and the natural environment. This is to be achieved through the organisation of workshops on restoration of ecosystems, climate change and eco-construction, by encouraging public participation and by establishing co-operative links by means of cultural interchanges, work camps, workshops, and seminars.



Centre for Environmental Education: As Corcerizas

key players

The local association 'Amigos dos Milagres e San Mamede' received advice and support from 'Amigos da Terra Galicia', an NGO that currently manages the facilities. It also promotes environmental protection by encouraging local and global exchange. This entity belongs to, and forms an active part of the federation 'Friends of the Earth International'.

implementation

The project is strategically located in a designated site of community importance (SCI). The building consists of a class room, dining room, hostel and the 'House of Energy'. The Centre meets its own energy requirements using renewable sources of energy (solar thermal, solar photovoltaic, wind, microhydraulic and biomass). Furthermore, it has its own wastewater treatment facilities making this environmental centre an educational resource in itself to visitors. The Centre offers a wide range of activities including workshops, camps, field trips, interpretive routes, training programmes, seminars, meetings, cultural interchanges, animation and leisure projects, visits and ethnographic activities.

financing

Funding bodies: INEGA - the Energy Institute of Galicia, AGADE - Galician Agency for Rural Development, Xunta de Galicia - the Government of Galicia, Vice-presidency of Equality and Well-being, Headquarters of Youth and Solidarity, MAPA - Ministry of the Spanish Government, the Department of Agriculture, Fishing and Nourishment, PRODER - the Social European Fund

challenges

When the Centre was constructed, there was little knowledge of eco-construction in Galicia and it was difficult and costly to obtain the environment-friendly building materials. Access to the Centre was initially poor, especially for buses. This is in the process of improvement.

benefits

The project has brought about improvements in education, training, dissemination of information, co-operation, engagement and public participation. Participants have acquired knowledge and had their attitudes altered towards such topics as preserving the environment, renewable energies, eco-construction techniques, bioclimatic architecture and wastewater treatment. The activities of the centre have helped people to better understand and value their resources. Overall social awareness towards nature conservation will increase in the long term.

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Concept for an Extracurricular Place of Learning Essen (Oldb.) - Cultural Landscape on the Waterside



Germany, region: Lower Saxony/Administrative District Cloppenburg
location: Essen (Oldenburg)

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: September 2006
<input type="checkbox"/> measure	<input type="checkbox"/> regional	to: March 2007
<input checked="" type="checkbox"/> tool	<input type="checkbox"/> national	duration: 6 months

background

- to provide education on water/water bodies in an exciting way
- to offer interesting leisure facilities for families with children
- to encourage local institutions to get involved

objectives

- create an extracurricular place of learning with a thematic focus on water/water bodies
- posit a reasonable linkage of the concerns of water management (Water Framework Directive), nature conservation, landscape experience and free space utilisation
- gain a consensus for the concept from interested stakeholders

key players

initiators: Water Board of Oldenburg and East Frisia (OOWV), Municipality of Essen (Oldenburg)

other stakeholders: Essen School Centre (Oldenburg), Essen District Council (Oldenburg), Essen Angling Club (Oldenburg), Club for the Preservation of Local Tradition, Essen Hunting Association (Oldenburg), Hase-Wasseracht Maintenance Board, Cloppenburg Administrative District (Department of Nature Conservation), Lower Saxony Water Management, Coastal Defence and Nature Conservation Agency (NLWKN; division in Cloppenburg), GLL - Oldenburg Office for Land Development

implementation

The implementation of the concept was carried out in two stages. During both stages a workshop with local stakeholders was organised.

stage 1: workshop discussions in order to gather ideas collectively, working out interest-spanning concept components, draft initial version, dialogues on individual interests; stage 2: workshop discussions about the concept of measures, reevaluation of the concept, final report

financing

18 700 Euro were spent for the development of the concept, including two workshops, financed by the OOWV and the Municipality of Essen (Oldenburg).

challenges

not applicable

benefits

The project provides a basis for learning for children and young people, a basis for further development and extension of nature-orientated forms of tourism (cycling, paddling, hiking, etc.) and chances for local and regional initiatives to get involved in the concept.



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Gute Güte (Good Quality)



Germany, location: Greater Hannover

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: March 2006 to: October 2006 duration: 8 months

background

The project was initiated as a result of the WFD which sets binding limit values for water quality. The BUND wants to communicate the relatively unknown and unnoticed WFD as widely as possible. It also wants to raise public attention and awareness of water quality and demonstrate a willingness to implement accordant measures. It aims at making people aware of rivers as open spaces in cities. 'Gute Güte' ('Good Quality') consists of the programme 'Eintauchen - Mitmachen' ('Immerse - Join in') and the first Hannover Leine bathing day, 'Hannover geht baden' ('Hannover goes for a swim').

objectives

Gute Güte is a project of the BUND (Friends of the Earth, Regional Association of Lower Saxony). It promotes responsible use of precious water resources and strives towards 'good quality of waters' for our lakes and rivers. The programme revolves around water and the BUND aims at achieving clean water through public engagement.

key players

Funded by: BINGO (the Environment Lottery), the Environment Foundation of Lower Saxony, BUND (Friends of the Earth, Regional Association of Lower Saxony), Enercity (a public utility company), Region of Hannover, City of Hannover, Urban Sewage Department of Hannover, District Council Linden-Limmer, private businesses: Polymorphing, Aquaplaner, Mintgold, Hesse Blandzinki Design
Co-operation partners: Brassberries, Bufo expedia, Crêpes on Tour, Hannover Passenger Shipping limited company, Monja Klein, St URBANE LANDSCHAFTEN, Traumraum, German Federal Agency for Technical Relief Ronnenberg, Werk-statt-Schule e.V., WAS! Waterless Sanitary Systems, Velvet Sounds, unten_durch, Fish Hampe, YogaYou, guacamole aqui, First WaterskiClub Hannover, DLRG, Zoo Hannover, üstra, Föderation, Egge.

implementation

From March to October 2006, 70 events were offered by 25 partners. The series of events was promoted using the internet and by circulating 3 000 programmes. Several events were also promoted in event guides and the local press. 'Hannover geht Baden' ('Hannover Goes for a Swim'): On 15 July 2006, the first Hannover Leine bathing day took place on the banks of the river Leine in the city of Hannover. With 2 500 visitors and more than 600 swimmers, expectations for attendance were far exceeded. Four local newspapers reported on the bathing day and 20 event partners offered 25 different water-related activities. The bathing day was promoted with 2 banners, 1 000 posters, 6 000 flyers, via the internet and using the information system of Hannover's public transport system, as well as through event guides and local press.

financing

The total budget was around 40 000 Euro, raised by the above-mentioned sponsors. Numerous additional payments were made possible voluntarily and/or with the help of sponsoring and mutual promotion.

challenges

Following the event, some conflicts arose with other water users, such as water-skiers. Despite numerous safety warnings, the bathing place, which was initially set up for only one day, quickly became a magnet for local recreation. Under the EC Bathing Water Directive the bathing site was not of sufficient water quality for everyday use due to discharges from the wastewater system in the city centre, particularly after heavy rain-falls. Unfortunately locals' expectations and calls for a permanent bathing place cannot be satisfied at present. Fundraising efforts have not yet secured sufficient promises of sponsorship. However, after the pioneering work and immense success of 2006, similar events planned for 2007 and 2008 should be met with great public interest.

benefits

The central idea is the effective use of water and an ecologically-minded, sustainable handling of our natural water features (lakes and watercourses). Effective water use is an important factor concerning drinking water supply as well as in its function for local recreation, especially in urban areas.

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The Emån Catchment Storm Water Policy



Sweden, region: Jönköping and Kalmar counties

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: 1998 to: 2000 duration: 2 years

background

Analysis of water within the Emån river basin identified that substances including copper (from roofs), zinc (from lampposts) and lead (from cars) were making their way into water bodies via contaminated storm water runoff. Responses by municipalities within the basin to address this water quality problem were generally unco-ordinated and insufficient. A need was therefore identified to create a policy to be utilised by municipalities to develop a common approach and cost-effective measures to reduce the impact of contaminated storm water.

objectives

The key objective was to develop a storm water policy for use by municipalities within the Emån river basin to help address problems associated with storm water for humans and the natural environment. The principal concern was reducing pollution of watercourses from contaminated runoff. However, it was realised that in developing measures such as dams and water storage basins to address this problem, that future flood risk could also be lessened. Going forwards, it is hoped that the policy will help to maintain the natural balance of the water cycle in areas where new developments are being built or planned.

key players

The Emåförbundet developed the storm water policy. A hydrologist was employed to assist in this process. Municipalities within the Emån river basin (eight in total) supported the development of the policy and have worked to implement it within their spatial plans.

implementation

Initially, an inventory was made by a hydrologist of the different storm water systems within the Emån river basin. In total 598 were counted, 33 of which were identified

as representing ‘hotspots’. Hotspots are areas where the storm water could increase flood risk, or because of its level of contamination with pollutants have negative effects on water bodies. Subsequently, a number of measures to deal with these hotspots were developed. For existing development measures included developing dams and associated infrastructure to filter contaminated storm water, and also creating visually attractive storm water collection basins. For new developments measures included techniques to ensure that no contaminated storm water is discharged into natural watercourses, and wherever possible dealing with storm water on-site. Municipalities within the Emån river basin have begun to adopt these measures.

financing

The storm water policy cost around 100 000 Euro to develop. The key element of the total cost was the salary of the hydrologist. The policy’s development was half-funded by EU sponsored projects. Local municipalities provide the Emåförbundet with funding to perform their function as a service organisation to assist municipalities with water resource issues. This money funded the remainder of the costs.

challenges

It took some time to develop the storm water policy. Indeed, the whole process including the classification process (which included complex GIS work), developing measures and gaining political agreement within the municipalities took 2 years. An important element of the future success of the policy concerns the effective implementation of associated measures. The Emåförbundet does not have time or funding to assist in the implementation of the policy. Its future success therefore depends on continued political commitment within the municipalities.

benefits

The storm water policy has increased awareness of associated issues amongst municipalities, and new spatial plans covering the Emån river basin now address storm water as a matter of course. As a result of actions being taken on the ground improvements in water quality can be expected. It is also significant that measures including the building of storm water retention dams will help to reduce future flood risk to communities in the Emån river basin. The policy will therefore benefit the local population and the ecology of the area. Although it was developed prior to the WFD, the storm water policy will have clear benefits for reaching the goals of the Directive in the future.

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The Preparation of the Vetlanda Spatial Plan



Sweden, region: Jönköping and Kalmar counties

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2007 to: ongoing duration: ongoing

background

Swedish planning legislation requires municipal spatial plans (known as general plans) to be reviewed every 4-5 years to update their content. In 2007, the municipality of Vetlanda which is situated in the Emån river basin in Southeast Sweden began to review their general plan. The updated plan will be published in 2008. The Emåförbundet (a service organisation established in 1992 to assist municipalities with issues concerning water) is helping Vetlanda during the development of their general plan to enhance its contribution to the management of water issues in their area.

objectives

The Emåförbundet offers municipalities within the catchment a comprehensive overview of the water environment in the local area. They hold data and experience on a range of issues including water quality, aquatic biodiversity and the location of groundwater aquifers. The key aim of the collaboration between Emåförbundet and Vetlanda municipality is to use these resources to strengthen the Vetlanda general plan in the context of water issues. It is hoped that this will provide a framework to ensure that the development and use of land in Vetlanda will address water issues more comprehensively in the future.

key players

Employees from the Emåförbundet and Vetlanda municipality are involved in the process of strengthening the Vetlanda general plan to improve its relationship to water issues.

implementation

General plan preparation follows a process involving a number of stages specified by national planning legislation. This contains provisions for the involvement of

organisations such as Emåförbundet (and other relevant stakeholders). Collaboration between Emåförbundet and Vetlanda municipality centres on meetings and technical assistance. For example, areas at risk of flooding have been identified using GIS technology, and Emåförbundet has considered where protection zones around drinking water supplies and groundwater aquifers should be established. Emåförbundet is taking a lead role in writing the water resources chapter within the general plan which will include policies concerning the achievement of the WFD's requirements in Vetlanda's waters.

financing

Municipalities within the Emån river basin (there are 8 in total) pay Emåförbundet an annual fee to act as a service organisation to support their activities regarding water issues. Emåförbundet draws on these finances when assisting municipalities such as Vetlanda during their general plan preparation.

challenges

Emåförbundet has supported municipalities such as Vetlanda during the preparation of their spatial plans for almost a decade. Experience has shown that the success of these collaborations is based on developing mutual trust between the parties involved in the plan preparation process, developing effective approaches to facilitate communication and joint working, and maintaining a good quality data resource on the local water environment.

benefits

This case study provides a good example of where spatial plans can be strengthened in the context of water issues by an organisation (in this case Emåförbundet) external to municipalities. More specifically, input from Emåförbundet means that Vetlanda municipality does not need to gather data on the local water environment themselves, saving time and money. The local water environment, and the people and biodiversity that depend on it, stand to benefit from the preparation of the new Vetlanda general plan as it will more comprehensively address water issues. Further, this will aid the achievement of the WFD's goals in this area in the future.

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Planning of Nature Protection in the City of Cēsis



Latvia, region: Vidzeme, location: Cēsis

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: June 2005 to: April 2007 duration: 22 months

background

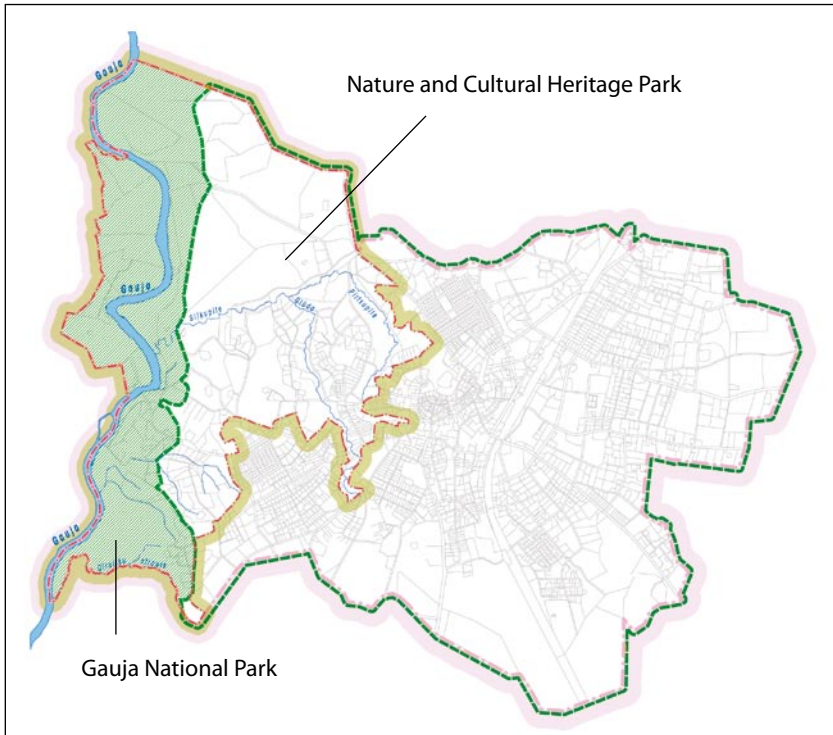
Cēsis is a medium-size town of around 18 500 inhabitants and is located in the Vidzeme Region of Latvia. It has traditionally been attractive for tourism and recreation. Due to factors including increased demand for housing and pressure on surrounding forests from timber companies, natural areas around Cēsis (including valuable semi-natural grasslands) are under threat. For these reasons, Cēsis Town Council has decided to establish a Park as a special nature protection area. A national law on special protected areas gives municipalities such as Cēsis the opportunity to develop such initiatives.

objectives

Cēsis Town Council has established a protected area of local importance covering almost half of the town. The area includes parts of the Gauja River valley and its tributaries, surrounding forests, and an area known as the Cēsis Nature and Cultural Heritage Park. This Park (which is supported by a Management Plan) was established to avoid degradation of the natural, cultural, and historical assets of Cēsis, and to promote sustainable development, recreation, and tourism in the area. The initiative will also protect ecological corridors formed by the Gauja river valley and its tributaries.

key players

The Development Department and the Environmental Committee of Cēsis municipality led the initiative. A management plan for the Nature and Cultural Heritage Park was developed by the Baltic Environmental Forum (an organisation that provides assistance to Baltic States on environmental issues) in collaboration with the Cēsis Environmental Committee and with input from public hearings.



The map shows the administrative boundaries of the city of Cēsis and the location of the Nature and Cultural Heritage Park. (source: Baltic Environmental Forum)

implementation

An evaluation of the ecological value of Cēsis municipality in 2004 resulted in a decision to establish a special protected area. As a result, the Cēsis Nature and Cultural Heritage Park was developed, covering 767 ha, which is about 40% of the town's area. Local regulations defined by the Town Council specify activities and landuses allowed in the Park. Also, the Cēsis spatial plan now includes policies that support the achievement of the Park's objectives. A management plan for the Park was launched in 2005. The development of the management plan involved:

- analysis of existing flora, fauna, and natural habitats
- definition of management goals, measures, and costs
- development of a zoning approach to landuse in the protected area

financing

The initiative was funded by Cēsis Town Council and co-financed by the Latvian Environmental Protection Fund. The development of the management plan cost 5 700 Euro. Costs associated with the implementation of the management plan are expected to be around 100 000 Euro over a period of 10 years.

challenges

The key challenge faced by the municipality in developing the special protected area was to strike a balance between the needs of nature protection and economic development in the area. This involved considerable collaboration with local stakeholders to develop an approach that could be widely supported. It was a particular challenge to convince private land owners to limit development on their land.



Impressions from the Cēsis Nature and Cultural Heritage Park

benefits

This case study illustrates that by using spatial planning tools, significant benefits can be generated for the environment of municipal areas in Latvia. Aside from protecting and enhancing the natural environment, the Park and associated management plan have provided a basis for strengthening tourism and recreational activities in the area. This has an economic value and will contribute to regional development.

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Designation of Water Protection Belts in the City of Valmiera



Latvia, region: Vidzeme, location: Valmiera

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: April 2005
<input type="checkbox"/> measure	<input type="checkbox"/> regional	to: April 2007
<input checked="" type="checkbox"/> tool	<input type="checkbox"/> national	duration: 2 years

background

In 2005, Valmiera City Council developed a new spatial plan to meet the requirements of national planning legislation and regulations. These regulations require spatial plans on municipal level to designate water protection belts around all water bodies (including rivers, lakes, groundwater bodies, and artificial water bodies). This obligation stems from the national Law on Protection Belts (adopted in 1997 and last amended in 2005), which has been integrated in national spatial planning regulations. Therefore, this initiative was ultimately motivated by the need to meet national legislation.

objectives

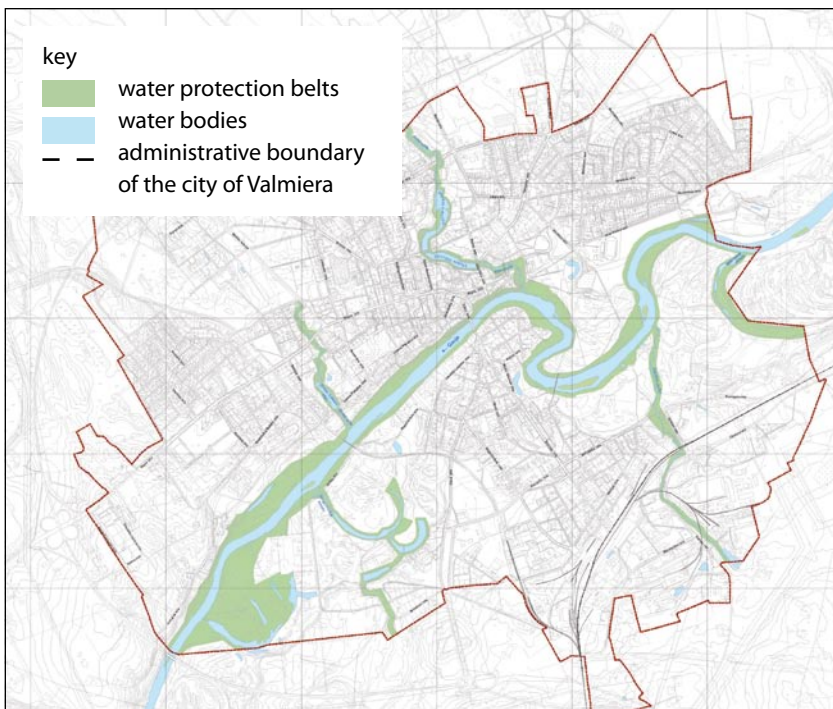
Protection belts have been defined by Valmiera City Council for natural surface water bodies and artificial water bodies. The objectives of the protection belts centre on protecting and enhancing aquatic environments in the area. Specific objectives concern reducing negative impacts of pollution, restraining erosion processes, limiting development on floodplains, and protecting and enhancing the landscape character. The Law on Protection Belts was developed before the WFD, and therefore meeting the requirements of the Directive was not an objective of this initiative. Nevertheless, it will have a beneficial impact on the WFD's goals in the future.

key players

A special working group on environmental issues was set up within the Development Department of Valmiera City Council to assist in the preparation of the spatial plan. This group was responsible for designating the location of water protection belts in the city.

implementation

Valmiera City Council was required to define protection belts around water bodies in their territory at a distance of not less than 10 m from the average water level. However, where land close to water bodies already contains existing development, this requirement does not apply. Valmiera City Council chose to designate wider protection belts (larger than 10 m) around all floodplain areas. Water protection belts were defined using topographical maps and field measurements, which were supplemented by landuse maps of the area. Data on the hydrological regime of local watercourses was used to determine the extent of floodplain protection belts. Once defined, the protection belts were included in the spatial plan for Valmiera city. The spatial plan also includes policies that outline permitted activities and landuses within the protection belts.



The map shows the Spatial Plan of the city of Valmiera 2006 - 2018. (source: city of Valmiera)

financing

There were no direct costs associated with this initiative. The principal cost was the time of the individuals at Valmiera City Council who were responsible for undertaking work on the designation of the water protection belts and the preparation of the spatial plan.

challenges

No specific problems were experienced during the process of defining water protection belts. The availability of good data was the key to the success of the process. Indeed, additional data enabled protection belts to be created around floodplains where the original strategy did not envisage this taking place. This highlights the importance of good information in developing effective water management initiatives.



The aquatic environments in the city of Valmiera are secured by water protection belts.

benefits

Initially, the designation of water protection belts was seen by landowners and developers as a constraint on development activities. However, stakeholders in the city now recognise that by protecting floodplains, a range of benefits can be experienced. These include the reduction of flood risk through the storage of rainwater and the protection of natural habitats. Also, by improving the natural environment, the area has become more attractive for tourists who bring revenue to the region. Moreover, the city is now a more attractive place for local residents to live and work.

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City of Salford Strategic Flood Risk Assessment



Northwest England, closest city: Manchester, location: city of Salford

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: March 2004 to: November 2005 duration: 20 months

background

Salford is at significant risk of flooding. However, the Council has identified large areas of existing development on floodplain land for future regeneration, which will involve considerable government and private sector funding. The Council and its partners needed the confidence to know that this regeneration could proceed without incurring statutory objections from the Environment Agency (EA), who were concerned about the risk of flooding to housing and mixed use developments. Consequently, the Strategic Flood Risk Assessment (SFRA) was undertaken to expand knowledge of flood risk issues in the area to enable development to continue in a way that addresses flooding problems.

objectives

The key objective of the SFRA was to develop a planning tool to take a strategic overview of flood risk issues within the city, particularly concerning future regeneration ambitions. The Council will utilise the SFRA's findings to inform planning procedures and the development of sustainable land allocations, and in order to meet government guidance on flooding and planning. The SFRA will help the development of strategies to minimise the risk of flooding in the area, and if flooding does occur to ensure that mitigation measures are in place commensurate with the scale of risk.

key players

Due to concern that the threat of flooding might compromise long-term regeneration ambitions, JBA Consulting (an environmental consultancy) was commissioned by Salford City Council to undertake a SFRA for the Salford District. The SFRA was undertaken in conjunction with the EA.

implementation

JBA Consulting used resources including EA Indicative Floodplain Maps and Flood Zone Maps, the ISIS Hydraulic Model, EA LiDAR topographic data, and historical flooding event data to undertake the SFRA. The SFRA's outputs included:

- a review of different flooding causes including from the River Irwell and its tributaries, sewer flooding, and surface drainage flooding
- categorisation of the area into flood risk zones (high, medium, low, and localised drainage issues)
- detailed SFRA for sites identified as being at high risk
- guidance for developers to help them reduce flood risk associated with developments
- specific mitigation measures to be integrated within the public realm, including infrastructure to minimise the impact of flooding

financing

The SFRA was funded in its entirety from Salford City Council's planning budget. Data was supplied by the EA and advice with respect to flood modelling was provided. The costs were 26 000 Euro.

challenges

There were specific challenges for the planners, as this was the first time that they had become embroiled in the assessment of flood risk. Understanding SFRA terminology was a particular challenge in this respect. Further, managing the needs and expectations of the stakeholders involved in the SFRA and the regeneration process including the Council, the developer, JBA Consulting, and the EA, was crucial to the success of the initiative. This was a time-consuming process for the Council, adding around 6 months to the timescale of the project.



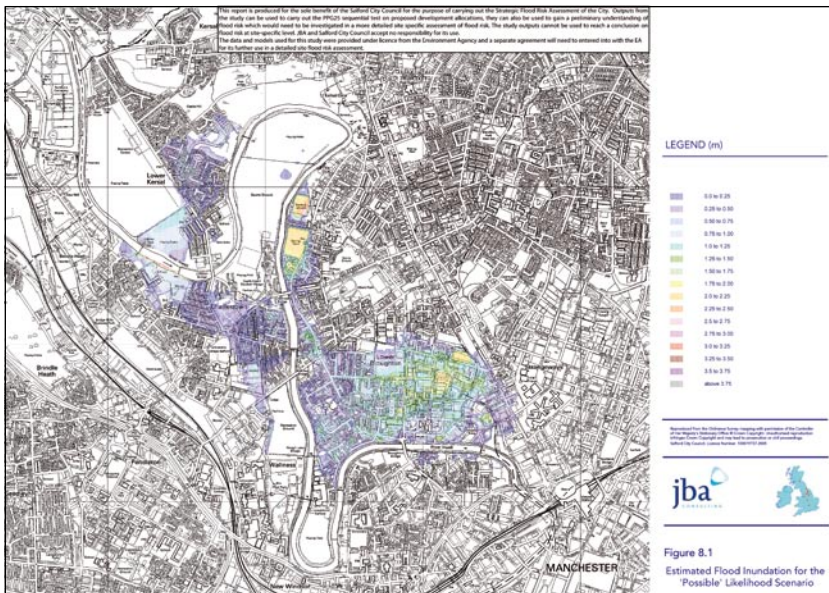
High water levels on the River Irwell



Flood alleviation basin

benefits

Due to its strategic location, the legacy of its industrial past, and present-day social problems, Salford is a favoured site for urban regeneration. By enhancing knowledge of flooding issues, the SFRA enabled the regeneration of certain areas to proceed where the EA had previously objected to new development on flood risk grounds. This will also have benefits for water quality in terms of reducing diffuse pollution, and will reduce the impact that flooding has on aquatic habitats. The SFRA has contributed to an understanding of necessary measures to meet the challenges of flood risk, establishing a level of confidence that flooding can be managed through large-scale master planning and appropriate mitigation measures.



City of Salford Strategic Flood Risk Assessment - the map shows the estimated flood inundation for the 'possible' likelihood scenario. (source: JBA Consulting (2005), the final report is available online at: www.salford.gov.uk/sfra-final-version-november-2005.pdf)

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The River Mersey Development Plan



Northwest England, closest city: Manchester, location: Stockport

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: 2002
<input type="checkbox"/> measure	<input type="checkbox"/> regional	to: ongoing
<input checked="" type="checkbox"/> tool	<input type="checkbox"/> national	duration: ongoing

background

Several key factors motivated the preparation of the Plan.

- The development of the M60 Gateway Strategy committed the council to regeneration around the M60 motorway corridor, an area that includes the town centre and immediate environs, which include the Goyt/Tame confluence that forms the river Mersey.
- The council adopted a range of policies under the banner 'cleaner, greener, safer, stronger'. Making better use of the river was central to this agenda.
- The River Mersey and its tributaries are rapidly being cleaned up. This stimulated the council to think about how they could improve the river in their area.

objectives

The Plan aims at guiding and securing waterside regeneration in the Stockport area. A number of objectives support this aim. These are:

- to stimulate the strategic development of attractive and sustainable waterside environments
- to mitigate and reduce environmental problems from litter and derelict, contaminated, and neglected sites
- to promote usage, access, and awareness of the area's waterside environments
- to conserve and enhance the natural history and heritage of the river corridors
- to encourage people to utilise, value, and cherish the water-courses and waterside environments
- to ensure long-term management of the waterside environment



River Mersey at Stockport

key players

Stockport Council was responsible for producing the plan and also organising its implementation. Other organisations that were instrumental in the development of the plan included the Mersey Basin Campaign, the Environment Agency, the Countryside Agency, and a range of local stakeholders including the British Canoe Union.



Opening of the Mersey Valley Nature Park at Stockport

implementation

The implementation of the plan is guided by a series of objectives, each of which has its own action plan. These include short-term actions (0-2 years), such as river clean-up events, and medium-term actions (3-5 years), such as producing a database of derelict, unused, or neglected sites on the river. Targets and performance indicators help to determine the success of the actions.

The plan is a five-year strategy which began in 2002 and ends in March 2007. The council's spatial plan is currently being reviewed and a new set of

objectives and plans will be drawn up for the future. The council's parks and recreation team continue to work in the nature park with the Mersey Basin Campaign. They have been awarded further Artery Project funding to continue developing the nature park with the local community and to staff the park. The council also hopes to extend canoe access.

financing

Total plan implementation costs have been around 2.2 million Euro. The development of the nature park has cost 1.2 million Euro which involved land acquisition, remedial works to the land, and the development of paths. Principal funders have included Stockport Council, the INTERREG Artery project, the Environment Agency, and the Countryside Agency.

challenges

Most of the plan objectives have been achieved. However, certain physical barriers must be resolved before the objectives of the plan can be satisfied. For example, around the town centre development extends to the river's edge, making it difficult to complete riverside paths. There are also issues of land contamination, access, and dereliction in certain areas.

The council is tackling these issues and plans are in place for access improvements. The council also had problems in the initial stages of plan preparation concerning securing funding issues.

benefits

As a result of the plan, there is now a large proportion of the river Mersey flowing through Stockport that has been improved and is accessible to the public by path networks and a canoe trail. This has helped to raise public awareness of the river. The river is now also cleaned on a regular basis, with clear environmental and water quality benefits. The plan has therefore changed people's perceptions of the river in Stockport, and how it should be valued as a key asset where traditionally people have turned their back on it. This will have benefits in terms of attracting economic investment into the region.



Public art on the banks of the river Mersey at Stockport



River Mersey canoe trail

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→ business → regeneration

Biosphere Reserve 'Terras do Miño' (The Lands of the Miño): Parga-Ladra-Támoga Site of Community Importance (SCI)



Spain, region: Galicia, location: the upper Miño river basin

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: 2001 to: 2006 duration: 5 years

background

The 'Terras do Miño' reserve is part of the UNESCO Man and Biosphere programme. This has developed the World Network of Biosphere Reserves which encompasses over 480 sites in 100+ countries. The network aims at promoting environmental sustainability and reducing biodiversity loss. The EC Habitats Directive stimulated the creation of the Parga-Ladra-Támoga Site of Community Importance which is situated within the biosphere reserve. Locally, observed changes in landuse (for agriculture, urbanisation, and recreation) and the consequent destruction of natural habitats provided further incentive to develop plans and strategies to lessen these impacts.

objectives

The 'Terras do Miño' biosphere reserve had several objectives.

- spatial planning to promote environmental sustainability
- to conserve genetic resources, including ecosystems, species, and habitats
- to promote local economic development that is culturally, socially, and ecologically sustainable
- to encourage local stakeholders to use land sustainably
- to improve the environmental awareness of the local population

The Parga-Ladra-Támoga Site of Community Importance is targeted on achieving the objectives of the biosphere reserve.

key players

Developing the Parga-Ladra-Támoga Site of Community Importance involved 3 key stakeholders:

- INLUDES (Lugo's Institute of Economic and Social Development): an organisation operating within the Regional Delegation of Lugo
- Government of Galicia (Ministry of Environment)
- Universidad Santiago de Compostela

In addition, prior to setting up the 'Terras do Miño' biosphere reserve, all municipalities in the area (26 in total) agreed to its creation.

implementation

The first stage was to develop a plan for the reserve, which was published in 2003. This plan includes binding regulations concerning land use, and is based around a zoning approach to conservation and development. The 'core' zone includes landscapes of the greatest ecological value, principally mountain and aquatic habitats. There is also a 'buffer' zone around the central 'core'. Finally there is a 'transition' zone including key population centres and farmland.

Within the reserve there are specific initiatives taking place. One example is the Parga-Ladra-Támoga Site of Community Importance. These sites aim at contributing to the maintenance or restoration of important habitats or biodiversity. Initially, land with high nature conservation value was purchased to expand the size of the site. Work was then undertaken on restoring several habitats. Wetland areas were repopulated with threatened species of fish, amphibians, and plants and non-native tree species were removed. Also, vegetated channels were created around water bodies to lessen the impact of agricultural pollution. Monitoring and education/training programmes to increase environmental awareness of the local population continue to take place.

financing

The total budget of the Parga-Ladra-Támoga Site of Community Importance is around 1.5 million Euro. 50% of this sum was contributed by the European Commission, 26% by Regional Delegation of Lugo, and 24% by the Government of Galicia.



"As insuas" or river islands in the course of the river Miño

challenges

Significantly, farmers and other landowners do not obey or respect new procedures and restrictions developed to safeguard the biosphere reserve. Essentially, there is a problem of enforcement. Consequently, human activities since the establishment of the reserve, including the construction of roads, the intensive use of water, and the expansion of commercial forestry schemes, have contributed to environmental degradation and reductions in certain sensitive species of flora and fauna.



Biosphere reserve Terras do Miño (source: www.turgalicia.es)

The biosphere reserve has a surface area of 363,668 ha distributed among 26 municipalities in the centre of the province of Lugo, constituting almost 40% of its total surface area. The province of Lugo is situated within the Autonomous Community of Galicia.

All biosphere reserves have three clearly differentiated areas which help to define conservation and development objectives: the core area, the buffer zone and the transition area. The core area comprises the most important areas for conservation. The core area is representing 10% of the reserve's territory. Along with the Serra do Xistral SCI, the Parga-Ladra-Támoga SCI forms a part of the core area of the Terras do Miño biosphere reserve. The Parga-Ladra-Támoga SCI occupies a surface area of more than 4,900 ha in the biosphere reserve.

benefits

The reserve and associated spatial planning zoning approach has integrated an environmental perspective into landuse decisions in the area. In the case of the Parga-Ladra-Támoga Site of Community Importance this has created specific benefits. These include the restoration of a previously dystrophic lake, the protection and enhancement of important habitats (including alluvial forests and raised peat bogs) and species (including the floating water plantain and the freshwater pearl mussel). Flooding problems have also been reduced. Successful conservation practices undertaken within the reserve are spreading to other areas. Economic benefits include the enhancement of tourism activities within the reserve.

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Guitiriz Geographic Information System



Spain, region: Galicia, location: Villalba, Guitiriz

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: 2006
<input type="checkbox"/> measure	<input type="checkbox"/> regional	to: ongoing
<input checked="" type="checkbox"/> tool	<input type="checkbox"/> national	duration: ongoing

background

There is a complex matrix of landuse in the Guitiriz municipality, which is predominantly rural and also includes three urban centres. It was recognised by the municipality that their understanding of landuse in Guitiriz was not adequate. This was contributing to negative impacts associated with unplanned urban development, including the unsustainable use of water resources and the pollution of water bodies. The Geographic Information System (GIS) tool was developed in order to provide the municipality with more accurate data on landuse to aid spatial planning.

objectives

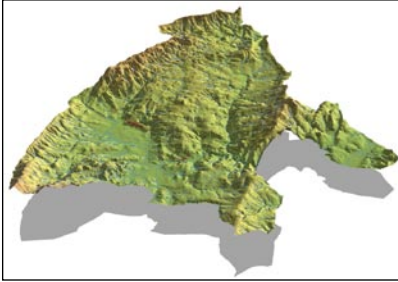
The initiative is a pilot project, and represents the first time that GIS has been used in Galicia to aid spatial planning activities. The GIS tool was developed to obtain a more accurate perspective of the built and natural environment of the Guitiriz Municipality. The key objective of the initiative is to strengthen spatial planning decision making in the municipality in the future. Moreover, the information generated by the GIS tool is contributing to the preparation of the General Plan of Municipal Planning, which all municipalities must prepare according to Spanish spatial planning law.

key players

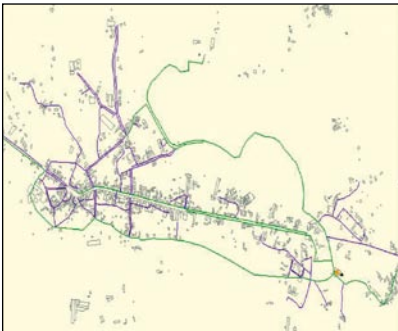
The initiative was led by Guitiriz Municipality. Three principal stakeholders were involved.

- Guitiriz Municipality
- University of Santiago de Compostela (USC) - Agrarian-Forestry Engineering Department

- Architecture and Urban Development Bureau – situated in the USC, this private consultancy provides advice on spatial planning matters to municipalities and other stakeholders.



3D-model



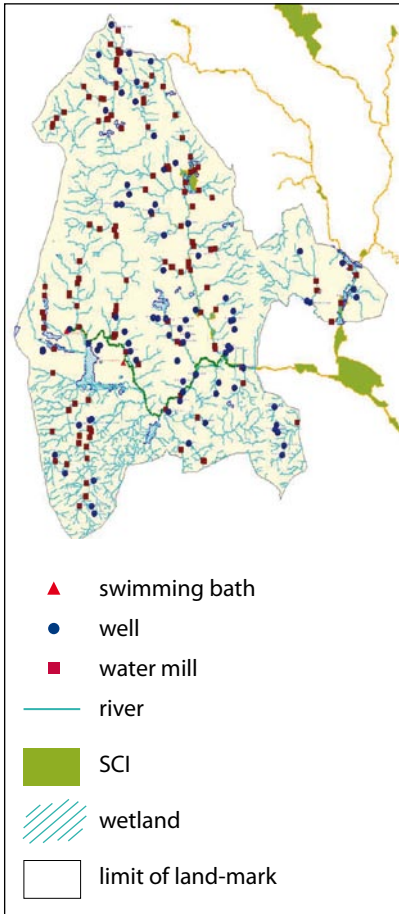
Municipal wastewater treatment system. The map shows the sewage network and the location of the sewage treatment plant in a settlement.

implementation

The GIS tool was developed at USC as municipalities do not have the expertise in-house. The GIS process involved overlaying different layers of geographic information to construct maps and digital models (including 3D-models) to visually represent landuse in the municipality. This included data on the built environment and infrastructure (houses, industrial/retail development, roads, water supply, wastewater treatment, etc.), the physical environment (soil types, agricultural landuses, etc.), and hydrographic data (river basin boundaries, rivers, lakes, wetlands, etc). Information on administrative boundaries and relevant hypsometry (height above sea level, etc.) was also represented. Through the analysis of this information, simulations and models of landuse change were developed to facilitate a more holistic and sustainable approach to spatial planning.

financing

USC developed the initiative as a pilot project to design and implement a GIS tool to be used at the municipal level. To date the associated costs total around 120 000 Euro. The Guitiriz Municipality and the Government of the Autonomous Community of Galicia (the regional government) have provided these funds. In future, the Guitiriz Municipality will need to find funds to maintain the GIS system and to train staff to use it.



Map of water in the region

challenges

Obtaining geographic information relating to the Guitiriz Municipality, which was needed to successfully implement the GIS tool, proved to be difficult. This was because it often concerned official data held by local and regional public administrations. Due to this lack of data, which in terms of the water environment concerned the location of wells for example, the interpretation of aerial photographs and field work was performed to gather information. This increased the costs of the process.

benefits

The GIS has improved provision of municipal services including water supply and wastewater treatment, refuse collection, and street lighting. Concerning water management, the identification of water bodies is helping to improve issues concerning abstraction and pollution incidents. The GIS tool is currently in the implementation phase. However, it is intended that staff at the municipality will be trained so it can be used in the future. It is hoped that the GIS tool will be used by other municipalities, who like Guitiriz, will be able to use GIS to strengthen spatial planning in their area.

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The Use of Compensation Measures to Renaturalise the River Else



Germany, region: Lower Saxony, closest city: Osnabrück, location: Melle

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: June 2003
<input checked="" type="checkbox"/> measure	<input type="checkbox"/> regional	to: September 2004
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: 15 months

background

A warehouse was constructed in the outskirts of the city of Melle on brownfield land close to the river Else. This changed the character of the surrounding landscape, particularly concerning natural runoff behaviour. According to building law in Lower Saxony, developers are required to pay compensation for such impacts. Nature conservation legislation also requires such compensation measures. These measures usually take place on the development site. However, in this case, they occurred away from the site around the river Else. Ultimately, legislation was the key driving force behind the initiative.

objectives

The initiative was centred on developing measures to compensate for the negative impact of a newly constructed warehouse on the landscape character of the local area. These measures took place in the floodplain of the river Else around the city of Melle. A key objective of the initiative was to help renaturalise the river Else and its surrounding floodplain to reduce flood risk and to protect and



The warehouse



The river Else

enhance biodiversity. Significantly, helping to meet the requirements of the WFD was another objective of the initiative.

key players

The city of Melle, particularly the departments of planning and building and nature conservation, helped to organise the initiative. The county of Osnabrück (which encompasses the city of Melle) is the responsible water and nature conservation authority and was also centrally involved. Also significant was the river maintenance board, which consists of several landowners, and is accountable for managing a stretch of the river around Melle. The developer of the warehouse was another key stakeholder.

implementation

The initiative began with a private planning consultant (in coordination with the city of Melle) assessing the impact of the warehouse on the landscape of the area. Measures were proposed that could help to minimise or compensate for these impacts.

Approvals from the county of Osnabrück were then required. This involved the use of a set of indicators (developed by the county of Osnabrück) to assess the potential impacts of development proposals. The proposal was also checked for its consistency with the River Else Development Concept (designed by the city of Melle and the river maintenance board), which is effectively a 'Water Development Plan' aiming to renaturalise the river and surrounding floodplains to help meet the WFD's goals.

Once the project was given the necessary approval, two sections of the river Else were chosen as sites for modifications to help the river develop more naturally. These modifications involved the removal of stones that had previously been placed on the river bank and remodelling and flattening of the bank in other areas. 780 metres of river were improved as a result of the initiative.

financing

The total cost of the initiative was 155 000 Euro, which was mainly financed by the developer and the city of Melle. Maintenance costs, which have been calculated for a period of 30 years, were included in the budget. If additional costs for maintenance are necessary in the future, these will be paid by the developer.



River Else - remodelling of riverbanks

challenges

The duration of the initiative, from the submission of the application by the developer to the implementation of the measure on the river, took 15 months. Discussions between political stakeholders prior to signing the contract, the purchase of land along the banks of the river Else, and the process of gaining approval from the water authority all took time. To ensure the success of the initiative, it was important for all the stakeholders to reach consensus on key issues, particularly the relationship between the measures and the River Else Development Concept. This required a considerable amount of effort on the part of the stakeholders.

benefits

Modifications to the banks of the river Else have improved access to the river. Pathways along the riverbanks are now being used more frequently by cyclists, walkers, and horse riders. Awareness of the river by residents and visitors to the area has therefore increased. Further, discussions are now taking place as to whether the Else-Werre cycle path should be extended along the sections of the riverbank that have been improved. However, as a result of the increased popularity of the area, a conflict between nature conservation and tourism has surfaced. This has yet to be resolved.



Space for compensation measures (98 ha) in the area of the River Else Development Concept (source: city of Melle)



Space for compensation measures in the Else floodplain (84 ha) (source: city of Melle)

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River Development Plan “Mittlere Leine”



Germany, region: Lower Saxony, closest city: Hildesheim, location: Gronau

category	scale	duration
<input type="checkbox"/> activity	<input type="checkbox"/> local	from: January 2002
<input type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: February 2004
<input checked="" type="checkbox"/> tool	<input type="checkbox"/> national	duration: 25 months

background

Severe floods in 1946, 1986 and 1989 in Lower Saxony stimulated the state government to consider developing measures to help address this problem in locations at particular threat of flooding. The federal state of Lower Saxony therefore passed a planning approval procedure (according to the relevant water law) with the aim of addressing the flooding problem. This process paved the way for the preparation of the River Development Plan “Mittlere Leine”. This was created to deal with flooding and other challenges concerning the water environment along a section of the river Leine and surrounding tributaries around the town of Gronau.

objectives

River development plans concern nature conservation and water management issues and are used to promote the renaturalisation of rivers and their floodplains. They are not required by legislation, but are nevertheless used across Germany. They are sometimes considered by other planning procedures, for example during the development of spatial plans. The overall objectives of the River Development Plan “Mittlere Leine” were to maintain and enhance the ecology of the river and to reduce the risk of flooding in the local area.

key players

The development plan was led by the District Government of Hanover. Other stakeholders involved in the plan-making process included representatives from sectors including municipalities, water authorities, agriculture, nature conservation, fisheries, hydro power, and raw material exploitation.

implementation

Plan preparation involved three main steps:

- Characterisation of the river Leine catchment and surrounding floodplain (which covers an area of 66 km²) took place. Issues such as hydromorphology, habitat types, landuse, and water quality were researched.
- A vision for the future of the river was agreed on in consultation with the key stakeholders and taking into account existing spatial planning instruments. A series of objectives were designed to help achieve this vision. These included renaturalising the river and opening up the natural floodplains.
- Proposals for measures relating to the plan's vision and objectives were developed. Unanimous agreement among key stakeholders was reached on 104 of 108 of the proposals. Measures included creating stormwater holding facilities, naturalising alluvial morphology, relocating the Leine cycle path, creating fish by-passes and a salmon breeding station, restoring 2 wooden bridges, and instigating the Leine community action day.



*Fish by-pass close to municipality of Alfeld
(source: Micheal Jürging, agwa)*



*River pool at the Leine in former times
(source: Museum of Gronau)*

financing

The preparation and implementation of the water development plan was financed in part by the Environmental Ministry of Lower Saxony.

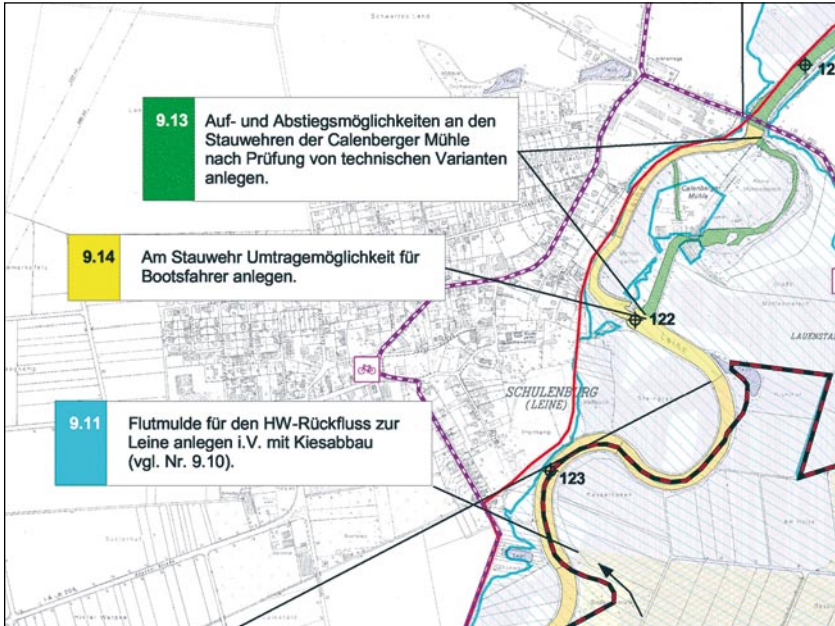
challenges

Reaching agreement on measures relating to the implementation of the development plan was one of the key challenges faced. The conflicting interests of agriculture, hydro power operators, nature conservationists, fishery associations, gravel diggers, and the municipalities had to be addressed. Numerous meetings led to a jointly agreed on catalogue of measures. Two mediators from an engineering office and the local Chamber of Agriculture assisted in this process.

benefits

The development plan has contributed to the development of the region in numerous ways. For example, both banks of the river running alongside a local housing area are now accessible for

several kilometres. Previously, the river could not be accessed as the banks were either privately owned or used for agriculture. Also, the success of the initiative has stimulated other actions to improve the water environment in the area, including the development of a bathing site.



An extract of the River Development Plan "Mittlere Leine", highlighting the planned measures at this stretch of the river. (source: engeneering office agwa)

measure 9.11: construction of a flood channel, which enables the flood waters to flow back into the river, in connection with gravel quarrying

measure 9.13: creating possibilities to migrate up- and downstream at the weirs of the mill "Calenberger Mühle", after checking different technical alternatives.

measure 9.14: construction of a passage for canoeists at the weir

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Biotope Restoration



Sweden, Emån river basin, mainly small to medium-sized tributaries

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2001 to: ongoing duration: ongoing

background

The aim of biotope restoration is to restore and improve physically damaged water-courses. The most common reasons for this damage are due to industry, agriculture, and forestry - i.e. logging, damming, ditching, cleaning, mills, and hydropower stations.

objectives

The objective is to recreate the previous natural conditions to support stream-living organisms such as trout, minnow, freshwater pearl mussel, and invertebrates. In most cases it includes replacement of boulders, stones, large woody debris, and spawning gravel for trout and salmon.

key players

Emåförbundet, county boards, municipalities, fishery management organisations, and sport-fishing organisations

implementation

Boulders and stones are put back into the watercourse, either by hand or vehicle (see photo). Trees are cut down into the watercourse to increase the amount of LWD (Large Woody Debris - „dead wood“). This will create a much greater diversity and mosaic of habitats for all kinds of stream fauna. LWD is very important for the natural dynamics of watercourses and the cutting of trees into the watercourse will often increase e.g. fish density and also create new micro-habitats. If there are trout or salmon, it is a good measure to recreate spawning and YOY sites (Young of the Year, i.e. 0-2 years old). This is done by putting natural gravel (2-5 cm in diameter for brown trout and 5-15 cm for salmon and sea trout) in appropriate areas into the watercourse. It is important to make quite thick gravel beds (20-40 cm) and suitable

places for them including stream necks and riffles (see photo). The final measure, if possible, is to protect or restore the riparian zones adjacent to the watercourse.



A handmade biotope restoration in river Silverån, a valuable brown trout stream in the Emån river basin



Biotope restoration made by means of a vehicle in river Silverån.

financing

The absolute costs are not easy to calculate. They vary depending on kind of measure, use of vehicle, materials, locality, etc. However, the county boards have made calculations that show average costs of approximately 550 Euro/100 m without vehicles and 2 500 Euro/100 m with use of vehicles.

challenges

The most common problems are eventual conflicts between landuse interests (agriculture and forestry) and hydropower stations (putting back boulders and LWD will sometimes cause a decreased flow in the watersystem). Another problem is to get funding for the measures. There are only a few possibilities to achieve governmental subsidies for biotope restoration and it is sometimes hard to convince the landowners to pay for the measures.

benefits

This will increase biodiversity and fish density, which in turn might lead to increased sport-fishing and eco-tourism. For people living in the area it is a matter of life quality to have healthy and rich waters in the neighbourhood.

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Fish Bypass



Sweden, Emån river basin, river Emån and tributaries

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2001 to: ongoing duration: ongoing

background

A biotope mapping of the Emån river basin from 1997-1999 showed that there were more than 250 artificial migration obstacles in the river system. This alone was a good enough reason for beginning restoration, but many different stakeholders within the fishery management industry also demanded action to increase the possibilities for fish migration in the river basin.

objectives

The main objective of fish bypasses is to offer a possibility for migrating fish and invertebrates to get around existing obstacles. This is an important measure to increase, restore, and preserve viable fish populations and aquatic biodiversity. The best type of fish bypass is undoubtedly the „natural fish bypass“, where a small stream is dug adjacent to the main watercourse. This type provides an opportunity for almost all fish species and bottom fauna to migrate up- and downstream in watercourses. Most often it also serves as a suitable growth and spawning area for trout. Furthermore, it is of great indirect importance to sport-fishing businesses and regional development as brown trout, anadromous salmon, and sea trout in particular draw tourists to the Emån region.

key players

Emåförbundet, county boards, municipalities, fishery management organisations and sport-fishing organisations

implementation

The measure starts with a lot of planning. Investigations, measurements, construction drawings, and the searching for possible funding sources are all carried out. Following the initial stages, a measure normally requires an Environmental Impact

Statement (EIS) under legislation and the approval from landowners. If the EIS, funding, and landowners acceptance is approved, the work usually starts during a period of low flows to avoid turbidity.

financing

The costs of this measure vary greatly depending on: 1) the height of the migration obstacle, 2) the physical character of the area, variables such as elevation, soil texture, or bedrock, 3) the hydrology of the stream, particularly the rate of flow, 4) the type of fish bypass (traditional fish ladder, denile, natural bypass, etc.), and 5) the technical solutions required for construction (materials used, length, etc.). The mean costs for fish bypasses constructed in the county of Jönköping (within the Emån river basin) are approximately 18 000 Euro per m in height for large, technically difficult solutions, 11 000 Euro per m in height for a natural bypass and between 1 600 and 3 000 Euro per m for small obstacles with low height, including road conduits.



At the Finsjö fishbypass an advanced fish counter and infrared scanner was installed.

challenges

The most critical criteria for a fish bypass are: 1) acceptance from landowners or hydroelectric power station owners, 2) technical solutions, 3) the costs, as governmental subsidies for this measure are normally very low, and 4) the implementation of fish bypasses, as it demands a very high level of experience.

benefits

The increased possibilities for fish migration will lead directly to more viable populations since the fish will reach and spread to new growth and spawning sites upstream. Indirectly this may lead to the possibility of ecologically sustainable fishing, and increased sport-fishing opportunities for tourists.

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Water Services in the City of Cēsis



Latvia, region: Vidzeme - Gauja river basin

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: 1996
<input checked="" type="checkbox"/> measure	<input type="checkbox"/> regional	to: 2010
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: 15 years

background

Municipal water service companies are the main responsible bodies for the supply of drinking water and wastewater treatment in Latvia. In Cēsis the municipal company (Vinda Ltd.) has implemented large investment projects over the last decade to improve drinking water treatment, the water supply network, and wastewater management operations. There are considerable challenges for water service providers to ensure an efficiently working system and to extend the existing network through connection of smaller neighbouring settlements.

objectives

Cēsis is one of the pioneer municipalities in Latvia for upgrading its water services, including drinking water treatment, supply systems, wastewater collection and treatment facilities. It is a large-scale investment project supported by the EU.



Scope of services of the water management company Vinda Ltd. in Cēsis

key players

The municipal water services company (Vinda Ltd.) and Cēsis City Council

implementation

The upgrading and investment in the water services system in Cēsis has been done in three stages:

- Stage 1 - saw the construction of a new drinking water treatment plant, wastewater treatment facilities, and established new water intake drill fields between 1996 and 2000.
- Stage 2 - was the upgrading and extension of the existing water network.
- Stage 3 - is planned to take place between 2006 and 2010 and will involve the upgrading and extension of the water networks in existing and planned housing zones.

financing

The largest investment projects have cost tens of millions of Euros, the main co-funding sources being EU cohesion funds.

challenges

One of the potential critical aspects may be the assumption that large-scale investment was needed to realise the benefits. Also, as the preparation and approval of investment projects involves several institutions as well as project partners, good co-operation and unity of actions are crucial.

benefits

Good quality water supply and appropriate wastewater treatment are the key factors contributing to regional development.



Water storage tower

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Protection of Habitats and Species in the Rāzna Nature Park (LIFE-Nature Project)



Latvia, 8 municipalities in Ludza, Rēzekne and Krāslava districts

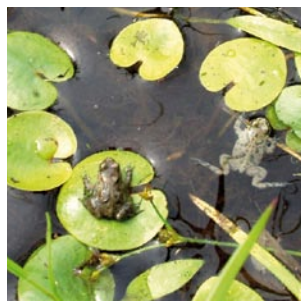
category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: 2004 to: 2008 duration: 4 years

background

The site for the project, Rāzna Nature Park, is an area of outstanding biological diversity. It contains a variety of water bodies including lakes, ponds, streams, and wetland habitats, some of which are considered to be of European importance. However there are many threats to the biological diversity in the park, such as the use of motorboats, overgrowth of aquatic plants, and industrial and illegal fishing activities.

objectives

The main objectives are to perform a detailed investigation of biological values within the territory of Rāzna Nature Park, restore habitats for fish spawning, and re-introduce a local population of the fire bellied toad (*Bombina bombina*). Management plans for Rāzna Nature Park and 5 major lakes within the park will also be developed.



Fire bellied toad (*Bombina bombina*)

key players

The Daugavpils University initiated the project. Municipalities involved included Andrupene, Andzeļi, Čornaja, Ezernieki, Kaunata, Lūznava, and Mākoņkalns. State authorities such as the Latvian Ministry of Environment, Daugavpils and Rēzekne Regional Environmental Boards were also involved, as was Latgale Zoo.

implementation

- adequate control and protection of fish species habitats secured at 5 major lakes of Rāzna Nature Park
- restoration of 38 ha of fish spawning grounds at lake Rāzna
- improved industrial fishing techniques implemented at 5 major lakes within the park territory, preventing harm to the protected fish species
- digital mapping of the Rāzna Nature Park territory
- development of plans for protection measures for the whole territory and lake management plans for 5 major lakes within the park territory
- re-introduction of the fire bellied toad (*Bombina orientalis*), restoration of local population of this species
- raising of the overall public awareness

financing

not applicable

challenges

One potential negative aspect may be the complexity of the project's administration. The large number of stakeholders means that good co-operation and information exchange are crucial.



View on the Rāzna Lake

benefits

The work at Rāzna Nature park integrates aspects of water protection, spatial planning, species and habitat protection, tourism, and use of local resources. Such integrated systems are of very high importance for the region and its further development. Rāzna Nature Park is also a good reason for co-operation between local, regional, and national stakeholders.

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Broadfield Pond



Northwest England, closest city: Manchester, location: Rochdale

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: February 2005 to: March 2006 duration: 1 year

background

The Rochdale Park lake as it was originally known, is a former duck pond constructed at the eastern boundary of Broadfield Park. Once a popular feature in the grounds it began to decay soon after the construction of Manchester Road, which dissected the pond's edge, and the ability of the pond to hold water was compromised. Subsequent silting up and growth of reedmace (*Typha latifolia*) further reduced the aquatic habitat.

objectives

- to remove silt and reedmace from the body of the pond
- to remove the island feature that had become a nest to a colony of rats
- to enable the pond to hold water again
- to create walkways around the pond to facilitate school visits
- to open up the dense canopy of trees and shrubs from around the pond, whilst retaining attractive specimens
- to install a new overflow control mechanism
- to establish native wetland plants of local provenance

key players

Mersey Basin Campaign - Action Irk & Roch,
 Rochdale Metropolitan Borough Council (RMBC),
 Environment Agency (EA)



Broadfield Pond, February 2005

implementation

The tree canopy surrounding the pond was thinned of weaker and overcrowded specimens. The body of the pond was cleared of silt and reedmace, whilst the redundant island feature was reused to form an attractive path edge. Around 120 tons of additional clay were delivered to the site to create walkways and re-seal the pond. A new outlet was installed to maintain the water level and an attractive cascade feature was made of one of the pond's inlets. The area surrounding the pond has been landscaped and a very successful informal lawn area and a wild-flower meadow have been created as a low maintenance, environmentally friendly alternative to intensively managed grass. The pond edges have been planted up with a number of native and local wetland plants including yellow flag iris, flowering rush, purple and yellow loosestrife. The Rochdale Observer newspaper has reported on the pond and many pedestrians walking past the site have commented on the improvement.

financing

EA 13 000 Euro, RMBC (Parks) 10 500 Euro, RMBC (Highways) 3 000 Euro, Total 26 500 Euro

challenges

The site was subject to pollution from two wrong connections from houses above the park.

benefits

After spending several decades as a polluted, overgrown eyesore infested with rats, the pond at Broadfield has now been restored to its former glory. The pond is now attracting a lot of attention from wildlife as well as the public. After only a few weeks, we saw a pair of ducks as well as a number of aquatic insects and even tadpoles in the pond. The project has generated a lot of public support. It is the area of the park most people see when they walk into town. The pond has been returned to Rochdale.



Broadfield Pond after restoration

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Manchester Ship Canal Regeneration and Oxygenation Project



Northwest England, closest city: Manchester, location: Salford

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2000 to: 2010 duration: 10 years

background

The Mersey Basin, including the Manchester Ship Canal, was one of the most polluted waterways in the UK following the impact of a long industrial heritage. It was described as fishless as recently as the 1950s. It acted as a barrier to fish movement, preventing the upstream migration by a variety of species, not least salmon, into the rivers and tributaries of the Upper Mersey catchment. In the 1980s, the Port of Manchester closed leaving the upper reaches of the Canal derelict. This required solutions to revitalise the area using landward regeneration and water quality improvements together.

objectives

Conditions in the Manchester Ship Canal were very poor, especially in the summer months when the rise in temperature resulted in bottom water anoxia. A study carried out by APEM in 1989 showed that bubbling and foul odours were more likely to occur when dissolved oxygen (DO) concentrations fell below 4 mg per litre. The solution was to artificially oxygenate the water using pure oxygen. The objectives of the oxygenation project are to maintain the bottom water oxygen concentrations above 4 mg per litre to prevent bubbling odours and that, ultimately, the water be capable of supporting fish life.

key players

This water improvement programme was undertaken as a partnership. Partners: The Mersey Basin Campaign (MBC), APEM Ltd, United Utilities, Environment Agency, The Manchester Ship Canal Company

implementation

Research identified an absence of oxygen in the deep waters of the canal. The solution was to vaporise liquid oxygen and inject it directly into the canal. Five injection units can now inject up to 15 t of oxygen a day at high speed into a 2 km stretch of the canal. The system is planned to run for 10 years from 2001. It has been designed to kick-start water quality improvements that would otherwise take decades to bring about naturally. The oxygenation units have already led to improvements in water quality, with 98% overall compliance with the 4 mg per litre target for dissolved oxygen. In 2003 up to 30 different species of macro-invertebrate were recorded in the canal, and fish are now colonising the area throughout the whole year. These environmental improvements are literally breathing new life into the Ship Canal waters.

financing

The whole system, from design and development through to operation and monitoring costs 6.5 million Euro. United Utilities is providing funding.

challenges

The Upper Manchester Ship Canal in the oxygenated area was once a grossly polluted aquatic system. During the summer months prior to oxygen injection, fish could not survive. The area now provides habitat for a much more diverse collection of macro-invertebrates, including 'clean water' species and promotes high levels of fish growth. Fish now colonise the area throughout the year and take advantage of the increasing macro-invertebrate diversity and abundance.

benefits

This oxygenation programme contributes to the catchment management of the River Mersey, through improvements in water quality. The improved water quality has brought waterside regeneration. The area around Salford Quays and the Manchester Ship Canal is now a hive of activity due to the developments stimulated by the waterside location. The clean environment attracts visitors from a wide catchment who can enjoy the shopping and eating facilities of the Lowry Centre, a highly visible demonstration of sustainable development in Salford.

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Santoña Marshes



Spain, region: Cantabria, location: Santander

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 1992 to: 2000 duration: 9 years

background

The Santoña marshes (Marisma de Santoña) are made up of three coastal wetlands. The wetlands are situated in the North of the Iberian Peninsula, in the autonomous community of Cantabria. The Santoña marshes are the most important wetlands for waterbirds in the north of Spain. The wetland meets the numerical criteria of the Ramsar Convention for being considered of international interest. In March 1987, the SEO (Spanish Society of Ornithology, currently SEO/BirdLife) and ARCA (Association for the Defence of the Natural Resources of Cantabria) raised the public awareness of the indiscriminate damage inflicted on the Santoña marshes, endangering the habitat of thousands of migratory birds. As a response, a plan for the restoration of the wetlands (Plan de Ordenación de los Recursos Naturales) was set up. The Santoña marshes have been declared a nature reserve since 1992. Since 1994 the marshes are a Ramsar Site.

objectives

Wetland habitats are extremely vulnerable and today they are facing a continuing degradation due to over-exploitation of groundwater resources and drainage for agriculture, settlements, and urbanisation as well as hunting and pollution, etc. The plan, set up to better manage and preserve the marshes, included different measures, such as awareness-raising and educational programmes but also technical measures. Urbanisation and development put a high pressure on the area and, due to an inappropriate treatment of wastewater, the water quality was deteriorating. The plan scheduled the provision of sufficient wastewater treatment for all municipalities in the area.

key players

The Spanish Society of Ornithology (SEO/BirdLife), Hydrographic Federation of the North (Confederación Hidrográfica del Norte)

implementation

To collect the wastewater, a network of sewage pipes was built in the area of the marshes. This network also extends to the municipalities of Noja and Arnüero outside the area of the marshes. The network includes outfalls and pumping stations. To properly treat the wastewater, a purification plant was built close to San Pantaleón. This wastewater treatment plant works with primary and secondary treatment. To discharge the treated wastewater in an adequate distance to the coastline and to the protected area into the sea, an ocean outfall was constructed. It brings the discharge three kilometres off the coastline.

financing

The investments amount to a total of 210 million Euro. The Spanish Ministry of Environment bore over 85% of the costs, the Government of Cantabria paid 15%.

challenges

The main problem was the overall lack of awareness and involvement of the landowners from the surrounding areas.

benefits

Due to the proper treatment of the wastewater in the area the quality of the water within the marshes improved remarkably. As a result of the preparation of the restoration plan policy and decision makers got aware of the interconnection between functioning ecosystems and people's livelihoods. They understood that wetlands are multi-functional ecosystems that can subserve a great variety of sectors and stakeholders, if approached in a multi-sectoral manner and if managed properly. An extensive educational programme is also campaigning for the protection of the wetlands and therefore helps to conserve them.



Santoña marshes
(source: www.aytosantona.org)

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GIS Tool to detect Point Sources in a Catchment Area



Spain, region: Galicia

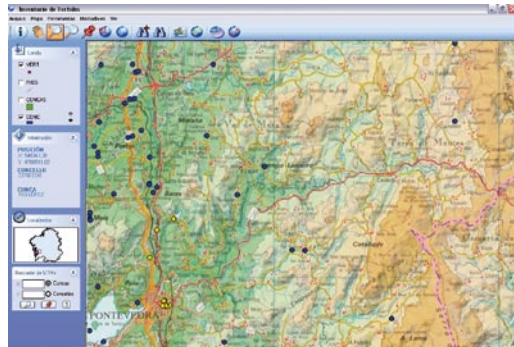
category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: August 2004 to: June 2006 duration: 23 months

background

The initiator of this project is a private engineering company called Adantia, S.L. The company works in the field of environmental planning and integrated water management and also has experience in the inspection and treatment of wastewater. The idea was to create a tool, which helps to allocate discharges in a catchment area simply and rapidly. The tool would take a spatial perspective to the causes of pollution rather than taking a case by case approach currently employed.

objectives

- survey of the pollutants generated by industrial activities in Galicia
- development of models which determine the average annual flow of any point within a watercourse
- development of a new map-based system
- creation of a transparent, usable computer application that allows cross-referencing of layers of geographical information to detect point sources in catchment areas



The map, generated with the help of the GIS application, shows the detected point sources in a certain area.

key players

engineering company Adantia, S.L. and the Government of the Autonomous Community of Galicia (Xunta de Galicia)

implementation

Initially, a model is used to mark off the area of the river basin. The model is then used to mark the point where pollution has been discovered, and its expected route. It is then used to map the possible point sources. To determine the point source a comparison is made between the type of pollution and the activities of the possible originator. A database is used to compile and store the information collected. This allows faster results by detecting point sources in the future. The application is simple and easy to use.

financing

The project budget amounts to 160 000 Euro. The project was implemented within the scope of a R&D project (research and development) and got a subsidy of 50% from the Government of the Autonomous Community of Galicia (Xunta de Galicia).

challenges

The model is being used to determine the direction of flux and the distance between the source and the point of detection, selecting only data above the legal limit. There have been difficulties with how data results have been presented. Differing values for expressing pollutants, concentrations and detection methods made an adjustment of the database necessary to display results in common units. The model does not take unauthorised discharges into account or whether known levels of discharge currently within legal limits are increasing or decreasing, and might become illegal in the future.

benefits

It has increased efficiency in managing and preserving water quality as a result of increased detection rates of pollutant sources. It is a key application for water resource managers, and also has benefits for strategic land management. The ability to identify polluting companies at an early stage allows for effective conservation measures to be put in place.

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General Drainage Plan in Oldenburg



Germany, region: Weser/Ems, location: Oldenburg

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2004 to: 2007 duration: 3 years

background

The Water Board of Oldenburg and East Frisia (OOWV) initiated the development of the General Drainage Plan (GDP) for the city of Oldenburg, considering the capacity of the sewage treatment plant and the pipe system, for which the OOWV took responsibility in 2001. It emerged that the canal system showed leaks and had a low and insufficient capacity. During heavy rainfall, the rain and wastewater sewer system flows combined in the receiving watercourses resulting in water pollution. Water treatment plants become overloaded, because the retaining capacity of the canal system is not sufficient. The quality and quantity of all the natural watercourses of Oldenburg had not been considered in the beginning of the planning phase, therefore the GDP for the city of Oldenburg was extended, to include the watercourses in the catchment of the river Haaren and canals of the western part of the city. This meant the requirements of the Water Framework Directive (WFD) were integrated for one part of the city. The state government of Lower Saxony supported the integrated planning for the city of Oldenburg as a pilot to implement the WFD.

objectives

- integrated planning of water quality and quantity issues within watercourses, canals, and the piped drain system to enhance ground and surface water protection
- examination of the effects of combined sewer systems on watercourses in urban areas
- achievement of an efficient canal system with high capacity and no leakages
- evaluation of water quality and finding measures to improve water quality
- reaching the goals of the WFD within the urban area of the city of Oldenburg

key players

Federal State Lower Saxony, State Agency for Water Management, Coastal Defence and Nature Conservation of Lower Saxony (NLWKN), city of Oldenburg, Maintenance Board Hunte Wasseracht, Waterboard of Oldenburg and East Frisia (OOWV)

implementation

- development of a discharge simulation model, a software model to highlight the weaknesses of the sewage system
- calibration using real discharge readings to confirm the model data
- development of the simulation model using aerial photography to determine all impermeable areas and rainfall-data from the German Weather Service

financing

The OOWV spent approximately 320 000 Euro for the preparation of the GDP for the city of Oldenburg, which needs to be continuously updated. The additional costs of approximately 200 000 Euro for integrating the watercourses into the plan were covered by the state government of Lower Saxony. To implement the plan for reconstruction of the wastewater system and water conservation measures such as rain water storage and extension of wastewater treatment plants in the following years, the OOWV plans to spend at least 10 million Euro from the wastewater fee paid by the citizens in the next 10 years.

challenges

Watercourses and canal systems need to be considered differently, due to their varying functions. Canal systems have to cope with sudden heavy rain events. Opposed to that watercourses have a bigger catchment area, only rain over a long period can cause flooding. The planning period took more time than initially anticipated.

benefits

The General Drainage Plan is an instrument for urban development. A sustainable, non-leaking canal system with high capacity prevents flooding and leads to added security in land development and stimulates economic development of the municipalities. Integrating the demands of the WFD has not been the focus but the GDP will definitely contribute to achieving the aims of the directive. The transferability of integrated planning to other municipalities or cities in the Weser/Ems region is very important.

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Relocation of a Dyke at the River Aper Tief



Germany, region: Weser/Ems, location: Apen

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: 2003
<input checked="" type="checkbox"/> measure	<input type="checkbox"/> regional	to: 2005
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: 3 years

background

In the catchment area of the river Aper Tief the hydrographic situation is very special. It is influenced by tides and drained artificially. The catchment area is only a few metres above sea level, thus the flood risk is very high. The project area is located in the south of the village Hengstforde. In this area the existing dyke did not meet the requirements for flood protection any longer and, following the course of the river Aper Tief, it separated the river from its floodplain. And also the pumping station, draining both the northern and southern part of the area, was not sufficient any more.



Project area, south of Hengstforde (source: NLWKN)
 a) old dyke, b) relocated dyke
 c) nature protection area



objectives

- improvement of flood protection
- creation of additional water retention zones
- development of the existing nature protection area
- to enable urban development for the municipality of Apen
- encouragement of local recreation

key players

Departments for Water Management and Nature Conservation of the county of Ammerland, State Agency for Water Management, Coastal Defence and Nature Conservation of Lower Saxony (NLWKN), local authority Apen, Chamber of Agriculture Weser-Ems, Alliance for reparcelling of agricultural land in Apen, Dyke Association Leda-Jümme, Water and Soil Board Ammerländer Wasseracht

implementation

- August 2002: Application for planning permission.
- November 2002: Planning permission is granted by the county of Ammerland.
- between 2003 and 2004: The drainage systems in the northern and southern parts of the project area get separated and two pumping stations and a culvert are built. One pumping station is designed as a lookout and serves as an information point.
- 2005: The dyke is relocated around 75 ha of floodplain, which was designated as nature protection area in 1994.
- 2003/2004 and 2006: The development of the nature protection area was monitored by the University of Oldenburg before and after the relocation of the dyke.

financing

The overall costs were approximately 2.6 million Euro. Thereof, 1.1 million Euro were spent for rebuilding the dyke. The measure was 100% funded by the Federal Republic of Germany and the Federal State Lower Saxony. The rearrangement of drainage capability cost 1.5 million Euro. The measure was funded by EU-Funds (50%), Federal State of Lower Saxony (20%) as well as County of Ammerland, Municipality of Apen, and Water and Soil Board Ammerländer Wasseracht (30%).

challenges

As a result of the relocation of the dyke and the changed water regime in the area of nature protection, rare species were lost on the one hand, but on the other new rare types of biotopes such as mud flats resettled. Tight timescales placed additional pressure on the project.

benefits

- successful co-operation of flood protection and nature conservation
- an overall enhancement of an area's perspective towards flood protection and ecology
- improvements for urban development and local recreation in the municipality of Apen

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Irrigation Union



Sweden, region: Emån river basin

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: 1992 to: ongoing duration: ongoing

background

During the late 1980s and 1990s there were several summer droughts in the Emån river basin. Farmers used considerable amounts of water for irrigation to prevent crop damage. The lack of water caused severe difficulties for the largest pulp mill in the basin and for other industries. The pulp mill is situated at the mouth of the river Emån and the Water Court has permitted the mill to use 1.5 m³/s. At the same time at least 3 m³/s must reach the Baltic Sea. During the dry summer of 1992 agricultural irrigation was intensive, which prevented the paper mill from getting sufficient water. The drought problems prompted the formation of an irrigation union, accompanied by the Water Court, to determine the legal rights of members in the union. The Irrigation Union attempted to include as many farmers and other water users as possible.



Flow metre station with solar cell



Flow metre station, close view of the cabinet

objectives

The overall objective is to manage water use in the catchment area. The demand for water to use in irrigation and mills has to be regulated, especially during drier summers. The Water Court is tasked with allocating water rights and has passed a judgement apportioning each of the Irrigation Union's 112 members with a limited amount of water for irrigation purposes. A critical limitation, which applies to all members, is the water flow

measurement, taken at a specific point upstream. Should water flow fall below 0.3 m³/s at this particular point, irrigation is not permitted. The actual flow in the river Emån is measured continuously by 20 solar-powered flow meter stations. The data is sent by a modem positioned inside a cabinet.

key players

The initiative to establish the Irrigation Union was taken by a major pulp mill together with the county authorities following problems experienced during the dry summer of 1992. Emåförbundet, 112 members of the Irrigation Union, pulp mill industries, local and regional authorities and the SMHI (Swedish Hydrological and Meteorological Institute), amongst others, are all involved.

implementation

The process started around 1992 and the final judgement and formalisation of the Irrigation Union occurred in 2002. The processes of the Union are extensive and cannot be readily condensed but comprise of meetings, consultations and reviews.

financing

The principal costs are of an administrative character, relating to the organisation of meetings and the submission of applications. The precise total is not available, but it ran to several ten thousand Euro.

challenges

The formation process was lengthy and is still not completely satisfactory. However, before the Irrigation Union was formed, the lack of water caused severe problems for farmers, industries and aquatic organisms in certain areas and periods of the year. The Irrigation Union is a compromise that intends to strike a balance between water consumers, the industry and ecology.

benefits

The Irrigation Union and the establishment of water rights make resource allocation easier for local and regional authorities. They allow Emåförbundet to better co-operate and communicate with water consumers, in particular farmers. It may in future help all water consumers continue their work, thus serving an important economic function as well.

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Focus on Nutrients



South and Middle Sweden, areas that are pointed out to be nitrate sensitive according to the EU Nitrate Directive

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: 2001 to: 2010 duration: 10 years

background

The background of the project are the new Swedish national goals for environmental quality. Focus on Nutrients is aiming at reducing losses of nutrients to air and water from livestock and crop production. The project takes form of a campaign to provide training and advice, and its name reflects the project's aim of encompassing the entire flow of nutrients on a farm.

objectives

The objectives of the project are to reduce losses of nitrate and phosphorus from farmland, reduce ammonia emissions from manure and avoid the spreading of pesticides into surface and groundwater. By means of awareness-raising and further training, nutrient management efficiency should increase. The project is targeted at farmers. Education and advice are given to them by individual visits by farm advisers.

key players

Swedish Board of Agriculture, County Administration Boards, Federation of Swedish Farmers, a number of companies in the farming business, Emåförbundet

implementation

Providing individually tailored advice is central to Focus on Nutrients. The advice offered has been divided into fifteen different modules. Some of these are basic for all farms, e.g. the nutrient balance. The service is based on not just a single farm visit but relies on the adviser returning to follow up the advice given. Setting up a nutrient balance plan means calculating the incoming and outgoing proportions of nitrogen (N) and phosphorous (P). Active measures after setting up the plan are e.g. to balance the amount of manure spread on the arable land and to reassess the

use of artificial nutrients. Advice is also given on different winter-grown crops that will retain the nutrients until springtime when they are ploughed in. All measures serve both the economical and the environmental aspect on the farm, especially the water quality of ground and surface waters. For the advisory service to be effective, farmers must have a basic understanding of the causes of nutrient losses in livestock and crop production. To be eligible for the advisory service they are required to take a basic course in plant nutrition. Education is also offered in the form of study circles that often take place in the evening. These study circles are usually led by a farmer. Emåförbundet took part in this project by means of creating watercourse groups along the river Emån and its tributaries during 2000-2002. The groups consisted of farmers and they received free information and advice about good and cost-effective measures to reduce N and P losses into the water system.

financing

The project is financed by the European Union, the Swedish Government and the Federation of Swedish Farmers (through environmental taxes). The total budget is around 16 million Euro and expenses in the latest few years have been approximately 4 million/year where 75% has been used for free individual advice to farmers.

challenges

It is not possible to make nutrient balance plans on all farms, due to time and costs, so the results will only have an effect on a local scale.

benefits

So far, the national project has gained nearly 7 000 members (farmers), and since the start more than 24 000 individual pieces of advice have been given out. 25% of the members stated that the consulting service has led to great changes on their farms. Emåförbundet considers this project/concept very successful since the greatest part of diffuse pollution to the river is from agriculture, and it is very important that the farmers themselves get involved and take initiatives on their own. The watercourse groups in the Emån river basin will hopefully continue their work and this will in turn lead to improved water quality and, in some aspects, sustainable regional development.

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Restoration of Latvian Floodplains for EU Priority Species and Habitats (LIFE-Nature project)



Latvia, 16 specially protected areas - Natura 2000 sites

category	scale	duration
<input type="checkbox"/> activity	<input type="checkbox"/> local	from: October 2004
<input checked="" type="checkbox"/> measure	<input type="checkbox"/> regional	to: June 2008
<input type="checkbox"/> tool	<input checked="" type="checkbox"/> national	duration: nearly 4 years

background

Floodplains in Latvia are currently threatened by two opposing processes. Firstly, the intensification of agriculture and abandonment. All sixteen project territories represent typical floodplain meadow areas which are more or less regularly flooded. Because of this, these areas have never been used for intensive agricultural production. During the twentieth century most have been partially improved (drained) to expand areas for hay production. However, in the 1980s the need for hay as cattle food during winter decreased and eventually became insignificant following the collapse of the collective farms that operated under the socialist system. This was because the number of cattle more than halved. As a result, much of the less productive land for agriculture (floodplain meadows) was abandoned and

eventually became overgrown. At the same time, with EU agricultural subsidies becoming available in 2004, farming is becoming more intensive. This trend is affecting those project areas which are easier to access. Therefore this initiative was urgently needed to support restoration of abandoned land and to ensure sustainable management of those areas threatened by intensification. The project conforms to the priorities listed in the European Action Plans for Lesser Spotted Eagle (*Aquila pomarina*), Corncrake (*Crex crex*) and the International Action Plan for Great Snipe (*Gallinago media*). The project encompasses the best



Access to some of the project sites is really difficult.

floodplain meadows from all regions of Latvia that have significant natural values and which have not been dealt with under other nature conservation projects. All selected sites are of outstanding regional, national and international importance.

objectives

- to restore the most biologically significant and the most neglected floodplain areas
- to ensure the subsequent continuous management of these areas for the benefit of species (e.g. Corncrake (*Crex crex*), Lesser Spotted Eagle (*Aquila pomarina*), Greater Spotted Eagle (*Aquila clanga*), Great Snipe (*Gallinago media*), Beetle (*Osmoderma eremita*)) and habitats (e.g. 6 530 ha of Fenno-Scandian wooded meadows, 6 230 ha of species-rich *Nardus* grasslands) by using EU agri-environmental measures
- to provide local landowners with information and education about biodiversity and agri-environmental issues related to floodplain meadows



Floods in the project site Dviete - one of the largest flooded areas in Latvia

Agrarian uses for the floodplains are permitted, indeed the principal idea is to get farmers to use the abandoned and neglected meadows for hay-making or animal grazing (cows, horses, sheep). Following the first management of the sites, farmers can obtain EU agricultural subsidies and additional subsidies for managing Natura 2000 sites. Intensive agriculture (crops) will not be allowed there as all the sites have high biological value. In other words, these meadows have to be kept as meadows.

key players

Latvian Fund for Nature was the leader of the initiative, partners included: Nature Protection Board, North Vidzeme Biosphere Reserve, Latvian Ornithological Society and twenty-two local municipalities

implementation

The project implementation included the preparation or upgrade of nature management plans for the selected sites. This process included wide public consultation. The main project activity is floodplain habitat restoration in the most overgrown areas. Methods include shrub removal (1 000 ha), destruction of shrub

root systems (8 ha), restoration of wooded meadows (112 ha), controlled burning (580 ha) and initial mowing (2 400 ha). Practical restoration work is supplemented by a wide public education and involvement process. This process includes seminars, study tours, work with regional and local media, support of tourism development in local municipalities (information stands, booklets, etc.). Information exchange on floodplain meadow management methods has also taken place with the help of a grassland restoration handbook, experience-exchange seminars and study tours.

financing

1.6 million Euro, financed through the EU LIFE-Nature Fund, UNDP, Nature Protection Board, Environmental Protection Fund, Ministry of Environment

Twenty-two municipalities are participating as project partners. Between them they contributed 105 000 Euro to the total cost.



Floods in the project site Dviete

Floods in the project site Rakupe

challenges

The major problems are caused by land ownership. There is an active land market and regular changes in ownership, some of whom are not interested in farming. Developmental pressure also causes problems in some of the project sites. These are mainly political and economical aspects, and it is quite difficult to influence them. Some aspects, such as development, can be limited by legislation as they are Natura 2000 sites, but to overcome the low interest in farming in these abandoned meadows is difficult. The project is trying to raise awareness with a campaign and some economic incentives such as the financing of bush-cutting and first mowing of abandoned meadows.

benefits

- Viable site management plans were prepared or upgraded for fifteen floodplain sites. These plans serve as guides to ensure sustainable regional development as they recommend management activities in areas of nature conservation, tourism development, fisheries, hunting, recreation, etc.
- The most urgent restoration measures will be carried out in sixteen areas covering approximately 3 500 ha. This will prevent decline in existing bird populations and support agri-environmental farming methods in those areas.
- The project will enhance the local municipalities' knowledge of biodiversity and provide tools for sustainable development.
- Farmers and landowners will be informed about their options and assistance will be given with applying for grassland management subsidies, as foreseen in the Rural Development Plan. This will support continuous management of the restored and other biologically valuable grassland areas and support rural development at the same time.
- Data from this project would significantly help the River Basin Authority in formulating water status objectives for the selected sixteen Natura 2000 sites.

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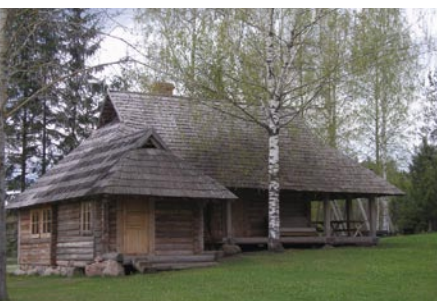
phone: +371-7830999
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floodplains

Organic Farm “Lielkrūzes”



Latvia, region: Cēsis district, location: Jaunpiebalga parish “Lielkrūzes”

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: late 1980s to: ongoing duration: ongoing



Guest house at the farm

background

After the Republic of Latvia became independent in 1989 many people whose properties had previously been appropriated by the Soviet Union regained ownership of their land. Many small farms appeared, but were not economically successful. Some of the small- or medium-scale farmers chose to farm organically. The Association of Latvian Organic Agriculture (ALOA) was founded on 7th April 1995. It is a professional organisation uniting people who produce, process and sell organic agricultural products and

those supporting the organic movement. ALOA co-operates with the Ministry of Agriculture and Environment, specialists from other ministries, organisations and the media to develop and implement environmentally friendly household management methods, diversify employment in the countryside and realise good domestic policies in Latvia.

objectives

Sustainable high-quality healthy food production, rather than maximum yield production, while maintaining the diversity of cultivated plants and domestic animals, and protecting the environment. There also shall be training opportunities for Latvia’s farmers and food producers to build their knowledge of organic food production through collaboration with educational institutions in Latvia.

key players

Owners of the farm: Guntars Dolmanis and Valentīna Dolmane and the Association of Latvian Organic Agriculture (ALOA)

implementation

The “Lielkrūzes” farm is unique in its exclusive use of biological products that are not harmful to nature. Organic fertilisers such as manure and pond sediment are produced on the farm, large parts of which lie on the banks of the River Gauja, and these have a beneficial effect on water quality, as well as biodiversity. Even the fishponds are organic. Forestry, agriculture and fish-farming are complementing each other on the 80 ha farm. It should also be noted that characteristic buildings of Piebalga have been renovated and new ones were built and all fit well into the local landscape.

financing

There are some indirect costs but generally this farm is economically viable and agricultural activities are profitable.

challenges

The main difficulties are caused by inconsistencies in subsidisation, either from State or EU Funds.

For small-scale farmers it is often difficult to meet all the requirements of the different funds. Occasional rule changes to EU criteria sometimes leave farmers unsure if they are eligible to receive subsidies or not. Subsidising agriculture is a new process in Latvia and it has taken some time for farmers to get used to it, particularly in the organic sector where administration is often complex.

benefits

One benefit is the reduction in the levels of water and air pollution. Watercourses are free from pesticides and mineral fertilizers resulting in decreased treatment costs to the State.



National celebration at the farm

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STOP every DROP



England and Wales

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: August 2006 to: August 2007 duration: 12 months

background

'Stop Every Drop' is an industry-led initiative to help farmers and contractors to further develop best practice and reduce pollution incidents from sheep dipping. It engages stakeholders such as farmers, industry bodies and angling and conservation groups. Stopping run-off from dipping areas and livestock from polluting ground and surface water are key areas. The campaign is aimed at providing sheep producers and contractors with best practice guidance notes on the use and disposal of dips, and flock management that avoids water pollution.

objectives

Three priority actions for the twelve months:

- Conduct a study to see if cypermethrin-based sheep dip products could be removed from the market without jeopardising animal welfare.
- Raise user awareness of the environmental risk associated with use of sheep dip products and ensure that farmers and contractors adopt best practice when dipping. This is the 'STOP every DROP' element.
- Monitor rivers and streams nationally in order to measure the extent of the problem and to provide a baseline against which improvements can be measured.



Logo from the campaign

key players

National Farmers Union (NFU), Veterinary Medicines Directorate (VMD), Environment Agency (EA), National Sheep Association (NSA), National Association of Agricultural Contractors (NAAC)

implementation

The initiative was launched in August 2006 at the National Sheep event and awareness of the campaign was raised in the farming press with the launch of a new logo and the strap line 'STOP every DROP'. The National Farmers Union, National Sheep Association and National Association of Agricultural Contractors have distributed leaflets to members via post and their publications. The Environment Agency have received 3 000 leaflets to distribute both internally and externally. The specially-qualified personnel who are present at the point of retail for sheep dip have received 1 750 copies of the leaflet for reference as well as guides that they can distribute to purchasers of dip. The aim is to have the leaflets distributed to auctions around the country and to use the British wool marketing board's registered keepers list to mail a copy to each producer.

financing

Development of a logo 600 Euro, initial print-run of 5 000 laminated leaflets for 'Sheep 2006' 1 900 Euro, reprint of 5 000 reworded leaflets 1 900 Euro, financed by National Farmers Union, Veterinary Medicines Directorate and the Environment Agency

Quote for 40 000 leaflets to be circulated to producers 10 000 Euro, funding could possibly come from other industry bodies, the sheep-dip manufacturers or the veterinary medicine companies

challenges

Initial problems were co-ordinating the relevant companies, getting the wording of the leaflet right such that all parties were in agreement as to the key points and establishing a national distribution system to ensure the whole country was covered.

benefits

The initiative makes possible a balance between profitable and sustainable sheep production whilst enhancing the environment, improving both the health of the nation's sheep flocks and the watercourses. In many areas, sheep production allows the countryside to be enjoyed by millions, and if the quality of the waterways is also improved by this initiative then there are extra benefits in terms of biodiversity and in the economy of rural areas.

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x10438.xml](http://www.nfuonline.com/x10438.xml)

Fencing of Rivers and Creation of Buffer Strips along the Banks of the Yarrow and its Tributaries



Northwest England, region: river Yarrow from Anglezarke to Croston (29 km)

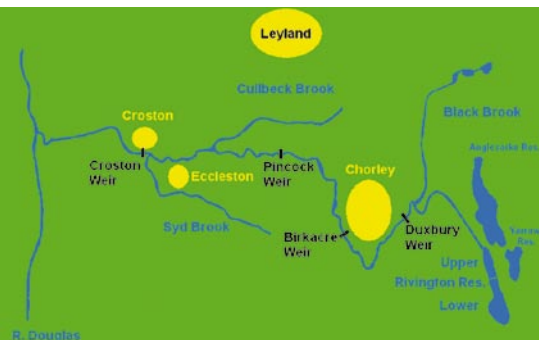
category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: August 2000
<input checked="" type="checkbox"/> measure	<input type="checkbox"/> regional	to: October 2006
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: 6 years

background

The following problems gave rise to the initiative:

- diffuse pollution from farming
- obstructions from fallen trees and accumulated debris
- serious erosion and consequent siltation on one section of the Yarrow
- the loss of many species of wildlife

These problems are addressed in the first instance by fencing banksides, which prevents stock access and encourages the growth of bankside vegetation and the planting of trees. This in turn provides a more attractive habitat for invertebrate species, voles and otters. Volunteers have planted over 3 000 trees and removed some of the alien plant species such as Himalayan Balsam.



A map of the river Yarrow. 3 fish-passes at the existing weirs have been constructed during the project.

objectives

Improving the quality of the river, its wildlife and its environs by fencing off the river bank from grazing cattle and sheep. Reintroduction of migratory fish, salmon and sea trout.

key players

'Friends of the River Yarrow', a local community group of volunteers and a local fencing contractor, Anthony Rogerson, a farmer who specialises in riverside fencing.

implementation

In 2003/2004 an additional 7 000 m of fencing has been erected. The overall total now stands at 13 000 m. The work was concentrated on a section of the river Yarrow. Before stock fencing could be installed it was often necessary to remove a large number of fallen willow trees and branches obstructing the line of the fencing. Before stock-proof fencing can be installed it is essential to ensure that drinking facilities for stock are in place. In this case a new connection was made to the United Utilities water main in Lydiate Lane and new drinking troughs were installed using this mains water supply. The new water troughs replaced the previous direct access to the River Yarrow and fenced cattle crossing points were introduced to limit stock access to absolutely essential needs.

financing

260 000 Euro financed by the Lancashire Environmental Fund, Chorley Borough Council, Awards for All and the Environment Agency, plus fund-raising from local events such as raft races, canoeing and social events.

challenges

To encourage the use of recycled materials, two demonstration styles were erected downstream of Eccleston Bridge made out of recycled plastic, derived from farm waste, plastic, hay and straw. In the built area of Croston, the Environment Agency have protected the training walls of the Yarrow by a novel technique known as 'Soil Nailing'. Sections of the masonry walls, which are vital in supporting adjoining buildings, as well as the road, were showing signs of movement and cracking. The 'nailing' has the advantage of not requiring direct access to the house gardens. The two metre steel nails are 'driven' and grouted directly from the river bed.

benefits

Stock fencing is a key factor in reducing erosion and encouraging bankside vegetation, resulting in improved habitats for a variety of species, from the invertebrate insect-life which provides an important food source for fish and birds, and, in the future, for mammals such as water voles and otters. The first signs of these have recently been spotted. Also, the first salmon in living memory have been seen in the river following construction of three fish-passes.

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A Collaboration Programme between an Agrarian Co-operative and a University for the Sustainable Use of Fertilisers



Spain, region: Galicia, location: Bretoña, A Pastoriza

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2001 to: approx. 2008 duration: 7 years

background

The inappropriate use of fertilisers, deficient manure management and a lack of information about the environmental impacts of such actions were the reasons this project was implemented, as well as lack of information about water quality in Galicia. It is important that farmers understand the restrictions that may be placed on them due to the application of European Directives. There is an absence of legal obligations regulating the use of fertilisers, instead there is a best practice guide whose proposals are voluntary.

objectives

The objective is to rationalise the use of fertilisers, especially nitrates and, as a consequence, to reduce the effect of fertilisers on water quality. Other objectives are to obtain information about the status of water quality and to offer technical advice to farmers.



The project informs farmers about the environmental impacts they cause and give recommendations to reduce them.



Cause of nitrogen leakage

key players

Gancobre Co-operative, University of Santiago de Compostela (USC)

The personnel was comprised of a technician, two agricultural engineers and two co-ordinators from the University and the Co-operative.

implementation

A laboratory was created in the head-quarters of the Co-operative, in Bretoña, A Pastoriza. A network of partners was set up. Soil, manure, fodder and water samples were analysed.

Fertilisation plans have been elaborated and involve:

1. recommendations on the dosage of fertiliser (amounts of N, P, K)
2. quantity and application of the fertiliser



The laboratory

The implementation of these fertilisation plans allows Co-operative members to undertake analyses at a subsidised rate. The analysis tools were also offered to other co-operatives, enterprises and farmers, although not at the subsidised rate.

financing

The project was founded jointly by Gancobre and the USC and was subsidised by the Government of Galicia. The costs of the project are approximately 75 000 Euro representing one element in a total of three projects with a total cost of 200 000 Euro. This covers personnel costs, equipment, sampling and analyses.

challenges

There is a lack of overall awareness of environmental issues, with many farmers not considering the inappropriate use of fertilisers to be an environmental problem. It is difficult to obtain representative samples of slurry. The methods carried out in this programme have not strongly influenced members of the Co-operative which indicates they are likely to have the same lack of effect on farmers outside the Co-operative.

benefits

Improvements in training and technical development of farmers. Improvements in water quality through the reduction in fertiliser use. Encouragement of co-operation between private institutions (such as the Agrarian Co-operative) and the public University.



The main agrarian activity in Terra Chá is dairy cattle farming, combining traditional techniques with more developed ways of production.

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Decree of Agricultural Utilisation of Sludges from Filter Systems



Spain, region: Galicia

category	scale	duration
<input type="checkbox"/> activity	<input type="checkbox"/> local	from: 2004
<input type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: ongoing
<input checked="" type="checkbox"/> tool	<input type="checkbox"/> national	duration: ongoing

background

There is a need to regulate the accumulation of sludge in fields. At the same time, farmers need to apply an effective form of fertilizer which is economical, versatile, sanitary and environmentally friendly. The application of fertilizer needs to be adjusted according to general conditions such as crop rotation, climate change, etc. It will be necessary to anticipate variation in these and other appropriate areas. The system must be economic and profitable for the system managers, thus the whole chain needs to be economically viable. At the same time the farmers should continue receiving fertilizer, which is currently free of charge to them, with the same guarantee of sanitation. It will have to be environmentally friendly and, so as to fully meet the requirements, any visible environmental alterations at the point of accumulation in the distribution land should be avoided. The sanitary conditions of the accumulated sludge will improve in conditions where greater purification can be achieved than the original purifying station.

objectives

This tool is for monitoring, supervising and surveying the use of sludge and also to market the sewage treatment plant's sludge.

The objective is to develop general instructions for the application of sludges from filter systems in agricultural areas. These are:

1. conditions demanded by the agent of residues
2. technical report from the environmental authority after analysis of the sludge and the receiving soil and commitment to use this soil

3. reference of report favourable to the agrarian authority
4. quarterly analysis of the sludges, if the subsequent reports are unfavourable the authorisation will be revoked
5. instructions for calculating the maximum quantity of filter system sludge that can be applied in agricultural areas
6. basic procedure for accumulation of filter system sludges in the field

key players

Regional Government of Galicia (Xunta de Galicia), Ministry of Agriculture, Cattle, and Agrarian-food Politics, Ministry of Environment

The decree is a legal tool which is guided, controlled and supervised by the Regional Government of Galicia.

implementation

Two phases in the implementation of this decree can be distinguished.

phase one

The authorisation phase in which as well as the general documentation to be presented at the request of the residues' manager, the following documentation must be presented to the Environmental Ministry:

1. landowners' authorisation for the sludge distribution
2. sludge analyses regarding pH, percentage of dry matter, nitrates, phosphates and heavy metals i. e. Cr, Cu, Ni, Zn, Cd, Pb and Hg expressed in terms of milligrams/kilograms of dry matter
3. soil analyses containing the same data and parameters as for sludge, and they should be expressed in the same units as in the case of sludge except for the nitrogen

phase two

The management phase, which is the responsibility of the other Ministry involved, i.e. Ministry of Agriculture, Cattle and Agrarian-food Politics which follows up the correct application of sludge. This Ministry gathers the sludge's analytical quarterly report and its application in agriculture.

financing

This initiative is financed by the Environmental Ministry and the Ministry of Agriculture, Cattle and Agrarian-food Politics of the Regional Government of Galicia (Xunta de Galicia). It does not require investment from the farmers.

challenges

Galicia has not declared nitrate vulnerable zones. Excess manure from bovine, intensive pig and poultry farming could cause problems. Agriculture is regarded as an acceptable receptor for urban water treatment waste and agrarian waste, if kept within the regulatory limits. Problems include access to land, crops unsuitable to receive sludge, farmers' need to distribute manure from their own farming, nitrogen or phosphorus pollution of watercourses, the pathogenic contents of the sludge and smells.

benefits

By means of utilising filter system sludge, a better use of resources is possible as well as environmental benefits, entrepreneurial work and the creation of new jobs.

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Voluntary Agreements and Co-operation Committees



Germany, region: Weser/Ems, location: water protection areas

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: 1992
<input type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: ongoing
<input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> national	duration: ongoing

background

The farmers in the Weser/Ems region of Lower Saxony have historically suffered from poor soil conditions (either sand or peat). At the beginning of the twentieth century a railway connection between the harbour cities of the north and the densely populated Ruhrgebiet in the south provided the opportunity for farmers to easily transport livestock to the marketplace, resulting in the industrialisation of animal farming. This practice further intensified in the last quarter of the century with a great deal of success. The water suppliers, producing drinking water from groundwater only, benefited greatly from sandy soils, geological formations and a positive water balance in excess of 300 mm in the Weser/Ems region and were able to build several productive waterworks. Intensive animal farming however, with its high amounts of slurry applied to sandy soils, led to high leaching rates and in turn high nitrate values in the groundwater. In the 1980s, a production well had to be closed down at a waterworks in the south of the Weser/Ems region due to nitrate and pesticide levels. At that time high nitrate levels existed across the groundwater resources of Lower Saxony.

objectives

Ground and surface water are at risk from diffuse pollution and an important aspect of implementing the Water Framework Directive is how to reduce this risk. Agricultural practises need to employ less fertiliser, have fewer animals per hectare and practise better management. The Voluntary Agreement Initiative has a positive effect on reducing nitrate-leaching caused by farming practices.

key players

In 1992 the government of Lower Saxony issued a decree demanding that farmers and landusers in water protection areas co-operate with water suppliers and the Chamber of Agriculture to form local task forces in order to discuss, implement and monitor measures to protect groundwater.



Co-operation in water protection (source: OOWV)

implementation

A catalogue of methods was developed, describing measures deemed more beneficial to groundwater protection than common agricultural practices. The catalogue also gives recommendations on a variety of farming techniques, for example regarding application of artificial fertilisers, a time horizon for ploughing and sowing dates and the rate of compensation to be paid per hectare. The number of farmers joining and co-operating with the local task forces is still increasing. Voluntary agreements show a growing acceptance of the need for groundwater protection within the farming community, and it is already contributing a great deal to improving the nitrate levels in these water protection areas.

financing

In 1992 the Lower Saxony State Government reacted to the problem of nitrate in groundwater by introducing a water abstraction charge of 0.05 Euro per m³ drinking water ('water penny'), paid by the consumer. 40 % of the accumulated budget is spent on the protection of drinking water. During 2004, 35 000 ha had groundwater protection measures enforced upon them within the Weser/Ems region. In return 2.5 million Euro were paid out for compensation to farmers that year.



Knowledge exchange on site



Maize with undersown crops

challenges

Initially farmers strongly denied responsibility for the presence of nitrates in groundwater. Data were necessary to describe and analyse the problem, and groundwater protection measures needed to be developed. Within the farmers' lobby it was necessary to find support for groundwater protection, as it was not possible to solve the problems only by means of laws and enforcement. Introducing a water abstraction charge to the consumer, issuing a decree for groundwater protection areas and establishing voluntary agreements were tools implemented during the 1990s, which caused some political irritation as they were founded by a new ecologically-orientated Green Party and influential NGOs.

benefits

The Voluntary Agreements in water protection areas in Lower Saxony is a partnership approach rather than a top-down initiative. Good co-ordination and communication between administrators, farmers and the water supplier are essential to its success. The measures introduced and the knowledge transferred mean that acceptance for issues of groundwater protection are fostered, with farmers

and other landusers identifying themselves with the movement. It has been fifteen years since water abstraction charges were introduced and voluntary agreements implemented, and as such the landscape has developed in a different way. Within water protection areas, maize production is now below 30 % with fields left to grow over winter. These areas are now very attractive for leisure and tourist activities.

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Organic Farming



Germany, region: Weser/Ems, closest city: Oldenburg

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: 1992
<input type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: ongoing
<input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> national	duration: ongoing

background

The main cause of diffuse pollution is intensive animal farming which has been made possible by the import of fodder from developing countries. Only a small part of the imported protein is present in the sold meat product, meaning there is an imported nitrogen surplus on the farm year after year. Too much slurry is applied to soils and too much nitrogen leaches into groundwater and drinking water. Organic Farming, as defined under the EU declaration 2092/1991 (and further restricted under German Organic Farming Associations) reduces the need for imported fodder, creating a balance between imported and exported nitrogen from the field. This has successfully been proven in field studies.

objectives

The most important advantages of Organic Farming are that it enforces a lower number of livestock per hectare compared to current practices and that it prohibits the use of pesticides. The positive effect on lowering nitrate-leaching under arable plots was investigated, with biodiversity enhanced and soil erosion minimised. It is a very good tool for reducing diffuse pollution.

key players

The Waterboard of Oldenburg and East Frisia (OOWV), a water supplier, purchased land which it then leased to farmers undertaking organic farming. This was done in accordance with the 1991 EU Regulation 'Organic Farming' and with stricter German regulations from growing associations like 'Naturland', 'Demeter' and 'Bioland' to ensure the strict requirements were met. In the region of Weser/Ems around 1 000 ha are used for organic farming. Organic farming is also supported by the Federal State Government within the national agri-environment scheme.

implementation

The OOWV purchased land in water protection areas with vulnerable soils and leased it to those farmers employing organic farming practises. On one farm, which is partly owned and partly leased, an information centre has been built. The 'Biohof Bakenhus' has become a visitor attraction for school children and other interested parties who can follow an education trail for groundwater protection or attend seminars on agriculture and groundwater protection.

financing

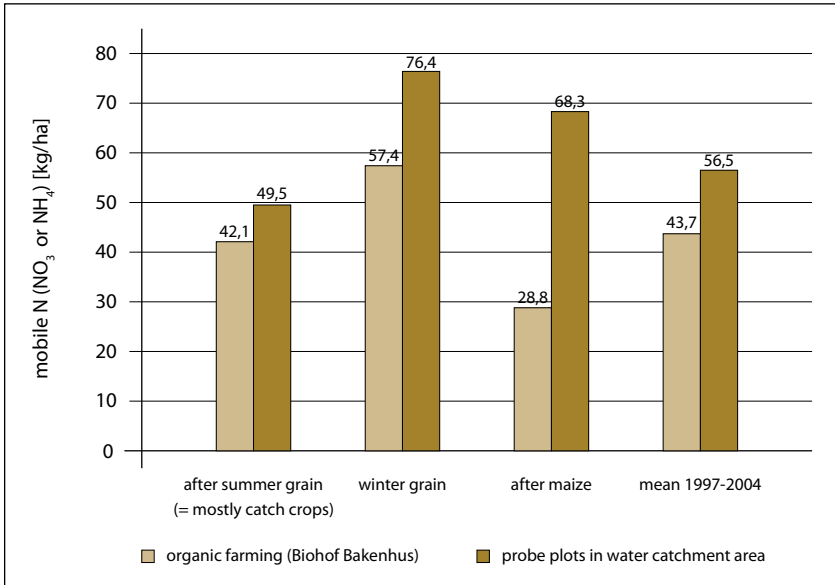
Firstly, the land had to be purchased, which cost between 15 000 and 40 000 Euro per hectare. The farmers receive additional funding via the agri-environmental schemes, varying from 285 Euro for the first two years, to 160 Euro per hectare in subsequent years. To persuade farmers to start farming organically, the landowner, who has a strong interest in protecting groundwater quality, offers a lower rental rate than would be paid by non-organic farmers. In comparison to other initiatives like Voluntary Agreements, Organic Farming is a very costly initiative but yields good results in terms of reducing diffuse pollution.

challenges

Farmers make more money if they can sell products directly to the consumer. Organic farmers need to be entrepreneurial in business and marketing. It is a big step to alter farming management systems towards organic practices and it should be noted that not all farms are suitable for an organic farming system because of their existing infrastructure. Given the total number of hectares available, more participants were anticipated.

benefits

Organic Farming has its own way of processing and marketing. Shops, dairies, breweries and butcheries were opened solely for processing and selling organic food. Markets were established for organic farm products and now supermarket chains are developing their own, more costly, lines of organic food to satisfy consumer demand. Regional development is enriched by organic farming. Sustainable development in terms of agriculture is based on organic farming, which means not allowing imported fodder, the most critical aspect of industrialised agriculture. The organic farming movement has also influenced the promotion of typical regional products, which are also vying for their share of the market. Increased consumption of agricultural products in their region of origin leads to a reduction in transport and emission costs.



Leachable nitrogen residues in late autumn, mean value of 8 years (1997-2004) (source: OOWV)

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Forestry Measures along Watercourses - Improvement and Creation of Riparian Zones



Sweden, across the country

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: increased since the 1990s
<input checked="" type="checkbox"/> measure	<input type="checkbox"/> regional	duration: ongoing
<input type="checkbox"/> tool	<input type="checkbox"/> national	

background

The amendment of the Swedish Forestry Act in 1993 showed a greater respect for environmental issues and allowed them to be given more equal consideration compared to economic factors. At the same time, the National Board of Forestry (among others) realised that sufficient care for watercourses had not been given in forestry practice and that action must be taken. This led to the 'Greener Forests' project that started in 1999 as an educational programme for forest entrepreneurs, forest owners and the staff of various forest companies. The objective was to increase the ecological sustainability of the profitable forestry industry. This was probably the start of the concept for improved riparian zones along watercourses and following this it is now more common to see a saved riparian zone adjacent to a watercourse in a clearfelled area.

objectives

The long-term objective is to replace the commercial forest species (mainly spruce) alongside watercourses with broad-leaved trees, either through natural succession or through managed schemes using tree thinning and the application of large woody debris to watercourses. A significant number of natural riparian zones alongside watercourses in Sweden have been ditched and afforested with spruce which has reduced water quality, decreased biodiversity and reduced instream production. The initiative will increase both terrestrial and aquatic biological diversity whilst allowing landowners to use the improved water conditions to make a profit through the recreational fishing industry. The riparian zones will also serve as natural 'filters' against nutrient leakage from clearfelled areas so that nitrate and phosphate will not enter the surface water in such large amounts. The riparian zones will also

be free from forest machines that cause ground damage and erosion at the water's edge.

key players

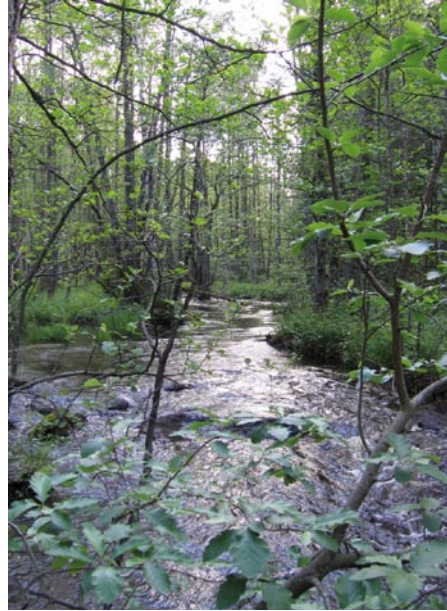
An awareness of the importance of riparian zones arose in the early 1990s as a consequence of harsh forestry practices in Sweden, resulting in the loss of biodiversity and damage to both the terrestrial and aquatic ecological balance. Several national and regional nature management associations brought this to the attention of the National Board of Forestry and County Administrative Boards. It was also discovered by the authorities themselves through monitoring surveys. Many organisations, authorities and individuals have been involved, with several projects and scientific surveys being carried out.

implementation

Using biotope mapping of 800 km of river Emån watercourses it was recognised that roughly 50% of riparian zones in the Emån basin were insufficient. This was taken into account by the comprehensive Fisheries Management Plan for the river Emån, created by the Emåförbundet and today the improvement of riparian zones is an integral part of fisheries management measures and to a certain extent forestry planning, too.

financing

It is difficult to accurately measure the costs of this initiative as it involves landowners refraining from clearcutting and allowing more broad-leaved, naturally existing tree species to grow along watercourses instead. Hypothetically, if a landowner were to set aside 10 m of forest either side of a river it would result in the loss of 1 ha of productive forest land for every 500 m of watercourse. Commercial forests in Sweden produce on average 150 m³ of timber per ha at a price per m³ of 35 Euro. This would mean a net loss of roughly 5 500 Euro per ha per growth cycle (60-80 years). However subsidies are available to landowners for this measure through the National Board of Forestry, which can be up to 80% of the staff costs if the landowner recreates a riparian zone, although the production loss is not compensated for.



A natural riparian zone with high ecological values

challenges

The situation is still far from perfect, from both regional and national perspective. It would be encouraging to see more stringent legislation to prevent landowners clearcutting along the length of watercourses. Since the Swedish Forestry Act does not enforce this, instead advising landowners to leave riparian zones during forest harvesting, it is difficult to achieve substantial results through legal measures, relying instead on educational measures and advice to guide landowners towards achieving these goals.

benefits

Sustainable forestry practices alongside watercourses will have benefits to both landowners and visitors due to an increase in natural value through, for example, improved water quality and good fishing. In comparison with many other European countries Sweden (and the Emån river basin) has great potential for 'ecological tourism'. Therefore it is a common aim to improve its natural values and quality while maintaining a profitable forestry industry.



A typical poor and insufficient riparian zone in the Emån river basin



Recreated riparian zone at the river Nömmenån, made by a landowner

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Forestry Measures along Watercourses - Crossings over Watercourses



Sweden, across the country

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: increased since the late 1990s duration: ongoing

background

Since the late 1980s heavy rainfall and mild winters in Sweden have made it difficult for the forestry industry to locate cutting areas with sufficient ground-bearing capacity. They have also caused physical damage, nutrient leakage and sedimentation in small watercourses adjacent to clearcutting areas. Poor ground-bearing capacity also causes significant cost-increases to the forestry industry due to the irregular flows of raw material. For this reason, the Forestry Research Institute of Sweden (Skogforsk), funded by the forest industry and Swedish government, began to research possible solutions to these problems.

objectives

The main objective is to illustrate different ways to reduce and/or avoid damage to watercourses and the ground alongside by means of best practice techniques and good forestry planning tools. The most common techniques involve covering the ground or watercourse with mats of spruce or birch twigs, or even better, with branch wood. Temporary bridges made of steel or very strong plastics work very well but are still not common. Some small Swedish companies, e.g. Martinsson AB and Hultdins are manufacturing good constructions. An increasingly popular method is the use of CTI Tyres (Central Tyre Inflation) where air pressure in the tyres can be adjusted during driving to modify the ground pressure. In addition to these techniques it is of great importance to carefully plan the whereabouts of base-hauling roads and access roads so as to avoid driving in wet areas.



A portable steel bridge from the company Hultdins

key players

Entrepreneurs, manufacturers, the forest industry, National Board of Forestry, Forestry Research Institute of Sweden (Skogforsk) and nature protection NGOs



A portable wood bridge from the company Martinsson AB



A twig mat made of birch - the cheapest method to minimise damage to the ground and to the watercourses

implementation

The methods presented by the Forestry Research Institute of Sweden are based on interviews with five forestry companies or co-operatives at the regional and district levels as well as interviews with more than ten subcontractors. The results were published in the brochure 'Skogforsk Resultat', No. 4, 2002 and since then initiatives such as a EU-Life Project have tested these methods. Companies in Sweden have started to manufacture portable bridges.

financing

A cover with spruce twig mats will cost around 2 Euro per m and the more long-lasting branch wood mats cost approximately 16 Euro per m. The costs for the different bridges vary between 1 600 to 3 200 Euro. CTI will increase the wear to the tires what in turn will lead to a tire-change more often.

challenges

No specific difficulties occurred during implementation, but the most problematic aspects of the different techniques are the additional costs and this is the main reason why the situation is not yet satisfactory.

benefits

The described measures help to reduce nutrient leakage and sedimentation in watercourses and therefore assist to preserve the rivers.

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Restrictions in Protective Belts around Water Bodies regarding Forests (Law on Protective Belts)



Latvia

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input type="checkbox"/> local <input type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: 1997 to: ongoing duration: ongoing

background

According to the Law on Protective Belts (Protected Zone Law) of Latvia, it is prohibited to perform a clearcut within 50 m of a watercourse. Exceptions include cutting trees in an emergency, removing the results of windthrow, windfall and tree breakage by snow and the renovation and management of floodland meadows. If the protection zone is narrower than 50 m, clearcut is prohibited for the entire width of the zone. These protective belts are established for the sake of water quality as well as for the protection of biological diversity around the water bodies. Nevertheless, there are no scientific data about the impact of forest management around these water bodies. The law enforces specific restrictions on forest practices near water bodies and wetlands. The use of artificial fertilizers and pesticides is prohibited within 10 m of a water body. Such substances are not standard practice in forestry however.

restrictions:

- clearfelling prohibited within 20-100 m of mires (100 m if the area is greater than 10 ha)
- clearcutting prohibited within 50 m of water bodies
- clearcutting prohibited of black alder, oak, ash, willow, elm, lime-tree and maple in areas of protective belts (10-500 m from water body depending on size)
- main felling prohibited within 10 m of water bodies



Selective forest cutting

objectives

Protection belts are put in place for watercourses, streams and artificial water bodies. Their purpose is to reduce the negative impacts of pollution on aquatic ecosystems, to prevent erosion, to limit economic activities in potential flooding areas and to maintain the landscape.

key players

The Republic of Latvia, forest owners, forestry companies and municipalities

implementation

The law is enforced through the State Forest Service (SFS), an administrative civil institution within the Ministry of Agriculture, which is responsible for pursuing a unified forest policy in all of Latvia's forests, controlling observance of the provisions of statutory acts and implementing support programmes aimed at ensuring sustainable forest management. One of the functions of the State Forest Service is to ensure observance of laws and regulations on forest management and utilisation in Latvian forests. Forest owners are informed of restrictions through forest management plans (inventories) and so-called felling confirmations (or permits), issued by State Forest Service for almost all forest management activities. The SFS is comprised of a Central Office and its territorial units. The State Regional Forest Districts function as the forestry authority for a defined territory and the entities for performing particular tasks.



Forest within the protective belt

financing

Costs are mainly indirect and occur largely due to the limitations in economic activities in the area.

challenges

Implementation of the Law on Protective Belts can sometimes be an economic burden on forest owners.

benefits

The main benefit is preserving water resources as well as biodiversity around water bodies.

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Studying the Effect of intensive Forestry on the Water Regulatory Properties of Forests



Latvia, closest city: Madona, Pļaviņas, location: Kalsnava forest district

category	scale	duration
<input type="checkbox"/> activity	<input type="checkbox"/> local	from: 2005
<input type="checkbox"/> measure	<input type="checkbox"/> regional	to: ongoing
<input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> national	duration: ongoing

background

According to the Law On Protective Belts (Protected Zone Law) of Latvia, it is prohibited to perform a clearcut within 50 m of a watercourse. Exceptions include cutting trees in an emergency, removing the results of windthrow, windfall and tree breakage by snow and the renovation and management of flood-lands meadows. If the protection zone is narrower than 50 m, clearcut is prohibited for the entire width of the zone. These protective belts are established for the sake of water quality as well as for the protection of biological diversity around the water bodies. Nevertheless, there are no scientific data about the impact of forest management around these water bodies.

objectives

The initiative aims at researching the optimal width of protective forest belts alongside watercourses in clearcut areas.

key players

The Latvian Forestry Research Institute 'Silava' (LFRI 'Silava')

implementation

Permanent plots are established to research the effects of silvicultural activities on water quality in the forests. Plots are established in three different forest site types, chosen to characterise oligotrophic, mesotrophic and eutrophic nutrition conditions. Research is carried out on the impact of clearcuts and selective cutting on ground and surface water quality.

financing

25 000 Euro per year from the Forest Development Fund (Latvia)

challenges

Problems are mainly caused by inconsistencies in legislation and the low levels of participation by local landowners.

benefits

Implementing the Law on Protective Belts can be an economic burden on forest landowners. The scientific data need to be clarified to help implement the goals of the Law on Protective Belts and to justify or disprove the impacts of protective belts on water quality.



Digging of the sampling well in the forest protective belt

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Sustainable Catchment Management Programme (SCaMP)



Northwest England, closest city: Manchester,
location: Forest of Bowland, Longdendale, Goyt, Peak District

category	scale	duration
<input type="checkbox"/> activity	<input type="checkbox"/> local	from: April 2005
<input checked="" type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: April 2010
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: 5 years

background

United Utilities owns around 58 000 ha of land in the Northwest of England from which it gathers much of the water that it treats and supplies to customers. Many areas of the land have been designated as Sites of Special Scientific Interest (SSSI) which are classified as being in poor condition. Sustainable Catchment Management Programme (SCaMP) seeks to improve these conditions and enhance biodiversity. The colour observed in raw water from the upland catchments is also poor and SCaMP will hopefully improve raw water colour.

objectives

- restoring landscapes and habitats for wildlife
- encouraging sustainable farming
- involving farmers in sustainable land management
- exploring ways of managing land in the uplands to reduce raw water colour

key players

United Utilities took the initiative in partnership with the Royal Society for the Protection of Birds (RSPB). Other partners involved were:

- Lancashire Rural Futures
- Peak District National Park Authority
- tenant farmers

implementation

SCaMP has developed whole farm plans for land holdings covering 20 000 ha of land. The farm plans cover moorland restoration, farm operation, farm building improvements and the grants available. The plans are economically as well as environmentally sustainable. There are plan agreements and permission to seek grants for over 75% of SCaMP land. United Utilities has made improvements at Whitendale Farm, including buildings refurbishment, moorland rewetting and woodland planting. In 2006, SCaMP began planting 50 000 new trees on Whitendale Farm. The new woodland will become an 84 ha wood. It is the largest planting scheme in the North of England in this year and more is anticipated over the next three years.



Grip Blocking at Whitendale

financing

United Utilities has been allowed to fund this 15 million Euro programme as part of its Asset Management Programme contract with OFWAT, the Water Services Regulation Authority. The programme was funded to carry out work in two areas and covers some 20 000 ha of land. The funding is used to enable both moorland restoration work on United Utilities' catchments and farm infrastructure changes to allow sustainable farming. This investment allows tenant farmers to gain access to agri-environment grants which enable the tenant to operate in the desired manner.

challenges

Developing farm plans under a new agri-environment scheme and within the first 12 months proved challenging. The uncertainty of agri-environment grant funding nationally makes planning the work difficult, which can be unsettling for tenants and can delay implementation. Persuading OFWAT, the financial regulator, to allow United Utilities to fund SCaMP was difficult, but with support from organisations such as the RSPB, Natural England and DEFRA, it was allowed on two of United Utilities' estates.

benefits

The SSSI will be restored and habitats and biodiversity will be enhanced. The process will ensure that SSSI continue to be protected from over-grazing and unsympathetic vegetation management in the future. The uplands landscapes will benefit from sympathetic farming, improving farm buildings and farmers being able to gain access to agri-environment payments. Reducing the colour of the water that comes from upland sources could reduce the amount of power and chemicals consumed in the removal of water colour at treatment works.



Blocked Grip at Sykes

contact

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Newlands - New Environments via Woodlands



Northwest England, region-wide

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: 2003 to: 2015 duration: 13 years

background

Newlands will tackle the problems caused by dereliction through the restoration of brownfield sites via woodland creation. It will hit social, economic and environmental targets and will operate strategically across the region. Sites will be identified according to public benefit surveys, strategic regional plans and regeneration priorities. A series of overlapping programmes will ensure woodland restoration across the region in the long term. 900 ha of land will be restored to community woodland and there will be new and improved public access routes.

objectives

Newlands is a 87 million Euro scheme that is transforming large areas of derelict, underused and neglected land into thriving, community woodlands. 7 million Euro of regeneration funding will create and manage the largest Newlands project called LIVIA in Salford, Greater Manchester. This will transform 97 ha into one of Europe's largest City Parks with enhanced access routes, sculpture trails, outdoor classrooms, informal play areas and a mountain bike course. The LIVIA project aims at attracting business investment and increasing commercial and residential land values.

key players

Core partners are the Northwest Regional Development Agency (NWDA) and the Forestry Commission. Other partners include Community Forests Northwest, Groundwork and Mersey Basin Campaign.

implementation

Newlands is now working across the whole of the Northwest region. Phase one is already delivering in the Mersey Belt area with Moston Vale in North Manchester being the first project to have been completed under Newlands. Work began in

August 2005 and the delivery stage of the project was complete by April 2006. Moston Vale is now entering its management phase. The NWDA has invested into each project sufficient funding to manage the sites for 15 years after the initial development. Several other projects are well underway. Phase two (which was confirmed in June 2007) will deliver across Lancashire, Cheshire and Cumbria.

financing

87 million Euro from the NWDA, 34 million Euro for phase one and 53 million Euro for phase two, 750 000 Euro from Landfill Tax credits, 1.8 million Euro ERDF Objective 1 funding. Applications are also lodged with the Lottery Commission. Phase one delivers within the Mersey Belt, phase two will deliver across the Northwest.

challenges

The ever-changing legislative background to the remediation of contaminated land as well as the different interpretations placed on the Environmental Protection Act Part 2 A by land owners, local authorities and statutory agencies. The difficulties of registering untitled land and delivering a lease or management agreement for the Newlands projects. Managing the expectations of the partnership, funding bodies and the community in what is a very complex project.



The Blue Path feature on Moston Vale, Harpurhey Manchester

benefits

The impact of Newlands at a local as well as regional level is significant and wide-reaching. Newlands is increasing land value, driving investment into the region and supporting other strategic investments. In addition, Newlands is enhancing Housing Market Renewal areas. Partners such as Groundwork are engaging and consulting with local communities from the beginning of the project and after the initial development work. Each Newlands project is therefore developed to reflect local community needs as well as the needs of the local and regional economy.

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ASEFOGA (Asociación Sectorial Forestal de Galicia) - the Association of the Forestry Sector in Galicia



Spain, region: Galicia

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: 1996 to: ongoing duration: ongoing

background

ASEFOGA promotes efforts of all kinds relating to the forestry sector, whether from an economic, environmental, or social perspective. It promotes multifunctionality, diversification and partnerships within the Galician agrarian forestry sector.

objectives

The Association of the Forestry Sector in Galicia wants to encourage the development of the forestry sector and protect the interests of collective mountain owners. It aims at attaining a forest culture in Galician society through collaborative efforts and in accordance with the strategic importance of the mountain and forestry sectors. It also aims at training forest owners, promoting and enhancing the economic, conservationist resource management and social and recreational values of the mountains.

key players

ASEFOGA is a non-profit, free to join, professional association, based in Santiago de Compostela, founded in 1996. Currently it has an agreement with the Xunta de Galicia to act within the forestry and rural development sectors in Galicia. Projects are also undertaken in agreement with the Biodiversity Foundation, funded jointly by the European Social Fund.

implementation

The project offers support and assistance in the management of mountains and forests, both technical and administrative. It may provide help in applying for official subsidies for forestry and planning works or advice on the formation of viable management units for particular mountains. Support is also given in form of train-

ing courses and lectures on land management and improving forestry techniques, as well as in fiscal matters such as accountancy, goods inventories and taxation issues relevant to the mountain collectives. Preparatory work is also carried out to formally classify the boundaries of local mountain associations and forming governing boards.

financing

Costs are calculated on a project basis and there is an annual quota for each proprietor. The principal costs relate to personnel, non-renewable materials, rent on facilities, general expenses, valuable materials, displacements and diets, external services and advertising.

challenges

not applicable



Forest in Galicia

benefits

The development of sustainable forestry plans for private owners or 'mountain collectives' (where several people own part of a mountain). By running campaigns, educating on environmental issues and offering specialised training courses, the project leads to collaboration between different communities in the drawing-up of bylaws and governing boards in order to promote economic activity.

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Programme for the Endorsement of Forest Certification Schemes (PEFC)



Spain, region: Galicia

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: 1998 to: ongoing duration: ongoing

background

The Programme for the Endorsement of Forest Certification Schemes (PEFC) was born in 1998 as a voluntary initiative of private forest owners based on the criteria and indicators laid down at the Ministerial Conferences of Helsinki (1993) and Lisbon (1998) for the protection of European forests. PEFC is a system designed to promote and certify sustainable forest management and which national certification systems are based on in order to guarantee mutual recognition across Europe.

objectives

This is a management system that is respectful to the environment, socially beneficial and economically viable. It strengthens and improves the positive image of the forest and wood as a renewable raw material. It also guarantees to the consumer that these products come from sustainably managed forests.

key players

Spain joined the PEFC initiative in June 1998 and in May of the following year, PEFC-Spain was formed and recognised by the PEFC Council as the Certification Society for Spain. This is a non-profit foundation open to participants from public and trade associations, forest producers, industrial concerns, traders, consumers and private organisations interested in sustainable forest management. This process involves both private timberland owners and proprietors representing either the State, regional government, or even local communities. At the same time, forest-based industries, traders, professional colleges and associations, public and private research centres, consulting firms, universities, trade unions and consumers are also represented.

implementation

Certification is a process leading to a written statement (certificate) that validates the source of untreated wood, as well as its situation and/or properties, based on the assessment of an independent third party. PEFC-Spain certifies sustainable forest management in accordance with a series of UNE (Una Norma Española) standards for Sustainable Forest Management drawn up by AENOR (Asociación Española de Normalización y Certificación) within a programme open to all interested parties. These standards develop the pan-European criteria and indicators used for certification in Spain by certification societies that are fully independent of PEFC-Spain. The accreditation of these societies to certify forests and forest-based products within the PEFC-Spain framework is the responsibility of ENAC (Entidad Nacional de acreditación).

financing

The initiative is financed by the Spanish Ministry of Environment and PEFC-Spain, the Certification Society for Spain.

challenges

The main disadvantage is that this represents a middle-to-long-term investment that does not produce immediate profit. The Spanish forestry sector is highly fragmented. The lack of participation of the owners can stall the process of certification.

benefits

Sustainable forest management helps to conserve and improve the forest. It improves competition and adds value to products thanks to the environmental guarantees it certifies. Management is made easier and the costs of implementing sustainable forest management are reduced. It establishes quality and safety levels for the products and services under certification. Apart from producing wood, the forests also provide pastures, resins, cork, firewood, etc. All these products are beneficial in helping to generate employment and strengthen social welfare. Environmental management leads to the development of rural areas as well as new leisure activities related to the enjoyment of nature.

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Afforestation



Germany, region: Weser/Ems

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input checked="" type="checkbox"/> regional <input checked="" type="checkbox"/> national	from: 1992 to: ongoing duration: ongoing

background

Due to intensified animal husbandry in the sandy region of Weser/Ems during the second half of the twentieth century, nitrate values in the groundwater rose beyond acceptable levels for drinking water. The water supplier, together with the district administration, looked for alternative landuses and decided, together with the national forest administration, to enlarge the percentage of forest in the area for the purpose of groundwater protection.

objectives

Diffuse pollution causes problems to surface, ground and drinking water. It is often caused by intensive agriculture. This poses a major challenge for the European Water Framework Directive which aims at reducing intensive farming and promoting alternative landuses that are beneficial to groundwater. Afforestation is one such alternative, provided broad-leaf tree species are planted and the soil's pH levels controlled. Atmospheric deposits captured by trees react with nitrogen in the soil leading to a negative impact on pH levels. This can lead to aluminium leaching if the soil does not have sufficient buffering capacity. Coniferous trees have higher interception rates which can even lead to nitrate leaching in older forest stands. Planting broad-leaf trees within existing coniferous plantations is also an objective.

key players

The Waterboard of Oldenburg and East Frisia (OOWV) took the initiative of buying land from farmers in, or close to, water protection areas in the south of the Weser/Ems region for the purpose of afforestation. The OOWV also entered into negotiations with the National Forest Administration of Lower Saxony.

implementation

To reduce diffuse pollution, the water supplier OOWV decided to buy land within the water protection areas in the region of Weser/Ems. 500 ha were purchased in total, a significant proportion of which was handed over to the state forest agency of Lower Saxony to be planted with broad-leafed species. The local forestry offices can make use of the forests, but only without lowering the groundwater level or using pesticides. The percentage of forested land in the water protection area is 39%.

financing

The initial investment by the OOWV was the purchase of land which varied between 15 000 to 40 000 Euro per ha. Additionally, the National Forest Administration had to pay between 5 000 and 8 000 Euro per ha for planting, plus an additional 2 000 to 4 000 Euro per ha for replanting and the control of competitive plants. Afforestation is a costly initiative in the first twenty years, but in the long-run may turn out to be cost-efficient.



Afforestation on prior purchased land

challenges

Legally it is not permitted to turn an afforested plot back into arable land. Indeed, a new investor is obliged to plant trees on the site. This has led to the reluctance of many farmers to sell land to those intending to create a plantation. Not every plot is suitable for afforestation. Some might be too small, while topsoil in others may be nutrient-rich to the point that leaching becomes a problem. A forested field may suffer from damage caused by mice, competitor plants, drought, or frost, so tree species selection must be well adapted to the particular site.

benefits

Afforestation will increase the percentage of woodland cover in the region which could be beneficial for the region in terms of attracting greater tourism and leisure activities. Afforestation with broad-leaf trees enhances biodiversity and increases soil and water protection, which are important factors in sustainable landuse.

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SILVAQUA



Germany, region: woodlands Harz and Elm in Lower Saxony,
closest city: Goslar and Braunschweig, location: Oker river basin

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: September 2005 to: March 2008 duration: 31 months



Groundwater monitoring level in the valley of the river Lange Bramke

background

In general, woodlands are not perceived as being problematic in terms of water protection. Atmospheric emissions, as well as changes in forest structure and utilisation, can have an effect on the state of the water bodies in the forest. Quality, volume and dynamics of the water runoff can be affected. With the WFD in mind, the following problem areas of forest landuse are to be dealt with:

- dynamics of water runoff
- acidification
- heavy metal mobilisation
- nitrogen saturation and nitrogen release

objectives

Using spatially-based knowledge and a support system for decision making, the project within the Oker river basin aims at demonstrating how the consequences of alternative actions in forest planning can affect the quality and quantity of seepage and surface water in afforested basin areas. These actions could be factored into the development of WFD river basin management plans. In this process, forest measures are judged by their effectiveness in fostering good quality water bodies.

key players

Maintenance Board of Oker, the regional water supplier, two institutes from the University of Göttingen, the Forest Planning Authority, the State Forestry Research Institute and relevant state agencies

implementation

The project aims at creating a central geological information system, a hydrological area model, a mass transport model and a knowledge-based forest management model. Focus has also been given to an economic evaluation of the developing concepts for forest water protection. A catalogue of potential forestry measures has been developed including optimisation of space-oriented management scenarios to understand the most efficient combinations of measures in the Oker area. Public relations are very important, as there has been little interaction and understanding between forestry, forest planning and water agencies to date.

financing

Project Oker SILVAQUA (project volume 1.18 million Euro, subsidies up to 652 000 Euro), Project Oker SILVAQUA PLUS (project volume 76 000 Euro, subsidies up to 56 000 Euro), both projects are co-financed by the Environmental Ministry of Lower Saxony

challenges

A shortage of available data and inadequate reference to existing data in respect of the possible scenarios for managing forest units constituted a problem.

benefits

The project provides assistance in decision making in sustainable development with the following measures:

- acting as a planning instrument in physically sustainable forestry
- supporting forest management measures which are aimed at water protection (such as choice of tree species, level of use, felling methods, etc.)
- forecasting how forest management scenarios will affect the development of water bodies

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Sport Fishing Entrepreneur Network



Sweden, region: Emån river basin

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: 2005 to: ongoing duration: ongoing

background

The potential for sport fishing in the Emån river basin has long been recognised, as have its benefits for tourism and local residents. The greatest problem is the co-ordination of fishing license sales and adequate information about where to fish. This is why the Emåförbundet took the initiative to create a sport fishing entrepreneur network within the river basin to improve the availability and quality of information for people interested in sport fishing, while making it easier for tourist entrepreneurs to operate.

objectives

The aim of the network is to improve tourism offering through a more effective dissemination of knowledge and information and also to co-ordinate activities such as fishing license sales and guide services. This is likely to make the prospect of sport fishing in the Emån river basin more attractive. There is great potential to increase the number of sport fishing visitors to the area, as there are hundreds of lakes and several hundred kilometres of watercourses open to the public. This will also benefit regional development.



Ice fishing

key players

The Emåförbundet took the initiative in 2005 to establish a network between sport fishing entrepreneurs and fisheries management associations within the river basin. Today the network consists of eleven members and the intention is to increase membership.

implementation

As kick-off for the network, members went on a research study trip to Ireland, a country where sport fishing tourism is of great importance in regional development. This was an excellent introduction to bringing the network together, witnessing high standards that conveyed both knowledge and inspiration. Following the study trip, meetings have taken place and the network has produced a brochure called the 'Fishing Guide for the River Emån' which has been sent out to all tourist offices and destinations in the river basin. The network also held an exhibition at the 'Sport Fishing Fair' in Jönköping in March 2007, the largest of such events in Scandinavia.



Network's kick-off in Ireland

financing

The project is ongoing and has had a single officer in post for the past year, partly funded by the EU. It is anticipated that the post will continue for another year. Once the network is complete there will be no associated staff costs, instead the commitment of the people involved in the network will be crucial to its continuity.

challenges

The principal problem is maintaining and expanding the network. A network will function only as long as its members have something to gain from continued co-operation. This is partly the reason why the project started with just a small number of experienced members with the strength and knowledge to begin the initiative from scratch.

benefits

The network will hopefully increase the amount of sport fishing taking place and also increase co-operation between the different members enabling them to benefit from and develop sport fishing within the river basin.

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Emån River Basin Eco-Museum



Sweden, region: Emån river basin

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: 2002 to: ongoing duration: ongoing

background

There is the potential to increase the number of visitors in the countryside, and tourism is an important source of income for small municipalities and their inhabitants. This was one of the main reasons for launching the project. Another reason was to improve the availability and quality of visits for people interested in visiting the Emån river basin and at the same time increase the basic conditions for entrepreneurs to make profits on tourist activities. Emåförbundet took the initiative to create the network in the river basin and the result is the 'Emån river basin museum - An ecological museum to travel in'. In the Emån river basin there is no 'big tourism magnet' that automatically draws people this way. Instead there are a lot of small but very nice places to visit. However, these small businesses have little financial (economic) resources to market themselves and their tourist attractions. By working together they will be able to make themselves more attractive.

objectives

The network aims at bringing together different kinds of sights worth seeing in the river basin. It aims at improving the tourist service with more effective dissemination of information and co-ordination.

key players

Emåförbundet took the initiative to build up a living network between all the interesting places for enjoyment of the countryside in the whole basin in winter 2002. Members are local history associations, different museums and tourism entrepreneurs. Today the network consists of 27 members.



A map showing all the different attractions to visit in the Emån river basin, brought together under the banner of the museum.

implementation

In the beginning an inventory was made of the tourism activities in the Emån river basin in co-operation with tourist offices. All activities were visited to ensure that they were good quality and had something serious to offer. After that, all those who wanted to be part of the network were taken on a study trip in the river basin to visit all the activities. This was a great 'kick-off' to bring the network together and give them an initial position with lots of inspiration and knowledge. After the study trip there has been a continuous series of meetings with the network. A brochure 'Emån river basin museum - An ecological museum to travel in' was created and sent out to all tourist offices and destinations in the river basin. To improve the service for people who want to visit the area, nine large maps with tourist information have been strategically placed at main roads that enter the Emån river basin.

financing

This is an ongoing project, employing one person for the past two years, partly funded by the EU. Producing a brochure and road signs cost approximately 60 000 Euro. Total costs are approximately 135 000 Euro. There will probably be a sequel to the project for another five years (2008-2013), funded by Countryside

Development Agency (LBU), County Administrative Board and EU, but the commitment of the people involved in the network will be of crucial importance to its continuation.

challenges

The problem, as always, is keeping the network alive and having a 'river basin feeling' instead of that of other administering boards. But maintaining these networks requires economic resources. Bringing together people from a large area is expensive and difficult. A network also works as long as everybody gains something from the co-operation and the entrepreneurs must take an active interest. Furthermore, it is very important that the network is a living process and not static.

benefits

The network brings together people from different activities and different backgrounds. That hopefully leads to dynamic development of every single participant and co-operation between the different members. In the end this will bring about development of a tourism branch within the river basin and it is far more cost-effective to have common marketing. It is also important to achieve countryside development.



Nine display boards with tourist information are placed at the main roads that enter the Emån river basin.

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Development of Tourism Infrastructure in the Gauja River Valley



Latvia, region: Vidzeme, Riga, Cēsis and Valmiera districts

category	scale	duration
<input type="checkbox"/> activity	<input type="checkbox"/> local	from: 1973
<input checked="" type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: ongoing
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: ongoing

background

The Gauja National Park (GNP) is the most popular tourist destination in Latvia outside Riga. The Gauja river is actively used for canoeing and is a popular destination for foreign tourists. The water tourism around the Gauja river is the most developed in Latvia. In recent years the number of tourists has risen considerably, putting pressure on the existing infrastructure. A significant problem is waste management. To improve and maintain the site and to improve visitor management the GNP's administration has initiated several projects financed by local sources as well as the European Regional Development Fund (ERDF).

objectives

The overall aim of the infrastructural development is to encourage tourism and to develop visitor management while maintaining the natural and cultural heritage of the park. The objectives of GNP include:

- protection of the ancient Gauja river valley and its tributaries, as well as the natural and cultural values of the region
- provision of opportunities for nature-based tourism and recreation
- provision of information and education to the public on natural and cultural values of the area



The Gauja river

key players

Infrastructural development and restoration in the GNP is the responsibility of the park's administration. Maintenance of the existing infrastructure is subcontracted.



Part of the infrastructural development was the positioning of information boards and signs.



A resting area

implementation

The GNP was established in 1973. Since then tourism has increased and developed, though certain elements such as nature trails were already in place. The current tourist amenities include thirty campsites, around 100 km of nature trails, three information centres and four parking lots, as well as a system of information boards and signs around the area. Maintenance of this infrastructure takes significant effort and the GNP subcontracts this to local service-providers. One of the most intensively used elements are the campsites. The GNP administration has assessed the impact of campsite tourism on the area and established a regular monitoring system. With support from ERDF funding, there are plans to establish new information centres and extend the nature trail along the banks of the Gauja river.

financing

Development of the existing infrastructure was mainly state-financed. Development of the new infrastructure is carried out through projects financed by the Latvian Environmental Protection Fund (LEPF) and European Regional Development Fund (ERDF).

- costs for maintenance of existing infrastructure: approx. 31 300 Euro per year
- project costs to assess impact of tourism: 13 500 Euro
- project grant from the LEPF for new infrastructural development: 27 000 Euro

The sum from the ERDF is not yet known and will likely change due to increased building costs.

challenges

The main problems occur in maintaining the existing infrastructure, particularly the campsites. Overuse of campsites during the summer season (they often are used for parties by local inhabitants) results in the development of spontaneous campsites, demolition of existing campsites, difficulties in securing firewood and problems with waste management. One reason for the difficulty in tackling problems is insufficient financing. Implementation of the ERDF's new infrastructure development grant has been delayed due to substantial increases in construction costs.

benefits

Tourism plays a significant role in the local economy and regional development in and around the GNP. However, more careful tourist development planning is needed to ensure that natural and cultural values are not endangered by the success of tourism in the area and that income from tourism stays with and benefits local service providers.

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Engure Lake Nature Park Tourism Development Plan



Latvia, region: Kurzeme, Talsi and Tukums districts

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: January 2006 to: June 2006 duration: 6 months

background

Engure Lake Nature Park is a significant nature protection area and is included in the list of the Ramsar and Natura 2000 sites. It is the biggest lagoon lake in Latvia, hosting a great variety of wildlife. 83% of nesting bird species in Latvia can be found here. The area has maintained a traditional fishing village culture. At the same time it is a popular site for recreation, tourism and environmental education. There are five boat launches, ten campsites, four bird watching towers and two nature trails in the park.



Nature trail

objectives

The overall aim of the infrastructural development is to encourage tourism and develop visitor management while maintaining the natural and cultural heritage of the park.

key players

The instigators were the Latvian Rural Advisory and Training Centre (LRATC) and the Latvian Fund for Nature (LFN). The NK Consultancy Bureau developed the plan. Experts on tourism, environment and spatial planning, local municipalities and tourism entrepreneurs have been consulted on the plan.

implementation

The plan was developed as an interactive process. Thirty interviews were carried out with representatives of local authorities and tourism entrepreneurs. Four workshops were organised for local inhabitants, heads of municipalities, representatives of the tourism industry and relevant experts. Five field studies were carried out to

assess the existing infrastructure and its development possibilities. As a result of this process a development plan was elaborated consisting of four parts:

1. analysis of socio-economic characteristics within the park, natural values and tourism development from 1991–2006; SWOT analysis of tourism resources
2. tourism development visions and goals
3. description of planned activities, expected costs and a potential financing mechanism
4. monitoring and feedback, including activities to assess the carrying capacity of frequently visited tourism areas

Such a tourism development plan for protected areas is a pilot project for Latvia.

financing

The plan was prepared within the framework of the GEF 'Baltic Sea Regional Project', Component II 'Inland and coastal areas management activities' which is financed by the World Bank. The LRATC and LFN are responsible for the implementation of the component in Latvia. The costs for developing the plan were around 24 000 Euro. The estimated costs for the implementation of the plan were approximately 1.2 million Euro.

challenges

The implementation of the plan will take some time. To ensure success, it is crucial that municipalities accept and integrate the plan into their development strategies. Within the development plan it is vital that tourist flows are regulated to divert them away from vulnerable species and biotopes and to protect biodiversity in the area.

benefits

It has been proven that tourism helps to support regional development in various ways, such as diversification of the economy, an increase in job opportunities, as well as infrastructural and service improvements. Well-planned and directed tourist development also brings social and economic benefits to local populations. In the region of the Engure lake, around 11% of enterprises and 3.7% of inhabitants are directly involved in the tourism sector. Economic studies of the regional tourism sector (2001-2005) demonstrate the benefits of this sector to regional development.

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ICREW - Improving Coastal and Recreational Waters for All (Pilot Action 5 - Re-identifying Recreational and Bathing Waters)



England and Portugal, region: Northwest England and Alentejo

category	scale	duration
<input type="checkbox"/> activity <input type="checkbox"/> measure <input checked="" type="checkbox"/> tool	<input type="checkbox"/> local <input checked="" type="checkbox"/> regional <input type="checkbox"/> national	from: April 2003 to: April 2006 duration: 3 years

background

Patterns of tourism have changed in the UK and Portugal since bathing waters were first designated. In the UK, there has been a downward trend in traditional seaside holidays, as more people are choosing cheap package holidays to foreign destinations. At the same time in Portugal, bathing waters are under pressure from the increasing numbers of tourists. Therefore, in both countries there was a need to re-assess the current bathing water designations and check that current designations reflected current usage.

objectives

1. to identify bathing waters in the region that have potential for designation under the revised Bathing Water Directive (2006/7/EC)
2. to identify which recreational waters should be promoted
3. to implement new assessment criteria and surveying techniques to lead to improving bathing water
4. to identify sites for designation/de-designation
5. work with planning bodies and local communities to optimise recreational, economic, tourism and community benefits from bathing waters



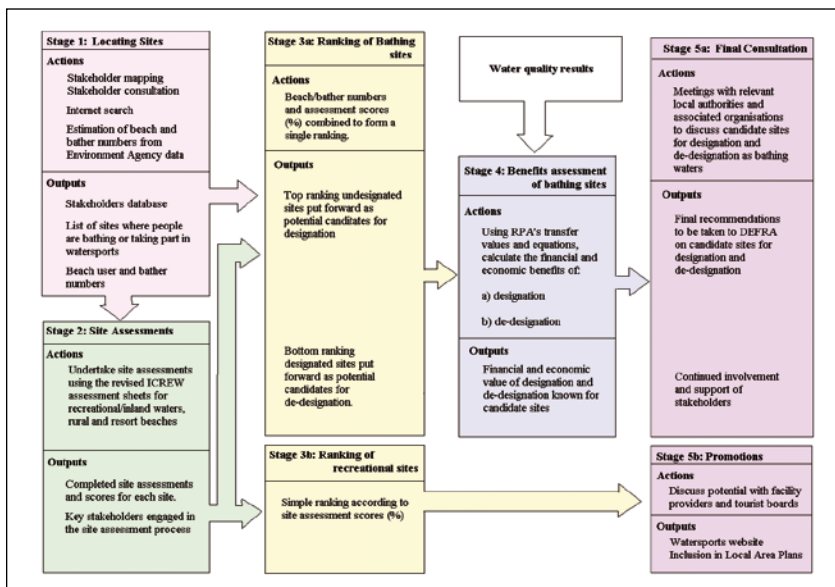
Canoeing on one of the inland waters in England's Northwest

key players

The Mersey Basin Campaign was the lead partner working with the Environment Agency in the UK and Instituto da Agua, Comissao Coordenacao e Desenvolvimento Regional do Alentejo and Instituto Superior Tecnico in Portugal.

implementation

The five stages to re-identify bathing and recreational waters were: location of sites, assessment of sites, water quality testing, economic analysis and final selection for designation/de-designation. Further detail on this process can be found in the summary report (see website: www.irew.info) and in the protocol diagram. The selected sites for recreational waters in England's Northwest are now being promoted via the website www.merseybasin.org.uk/watersports to encourage recreation and tourism.



Pilot Action 5 - protocol diagram

financing

The ICREW project was funded by the European Union Interreg IIIb for the Atlantic Area. The project budget for ICREW Pilot Action 5 was 1.04 million Euro.

challenges

The main problem in the UK was that bathing water designation was not high on the agenda for local authorities. This made it difficult to arrange meetings to discuss potential sites for designation/de-designation. This problem was not reflected in Portugal because bathing waters are considered of high importance and are incorporated into local plans.

benefits

Pilot Action 5 of the ICREW project has reviewed and re-identified the best bathing waters in the region, and identified the resource offered by inland waters for recreation and tourism. Local people and tourists can enjoy the recreational waters identified. Promotion of the best recreational waters in England's Northwest encourages tourism as well as local recreation. This has all helped sustainable regional development.



Aerial survey of Blackpool Pleasure Beach, UK

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Mersey Waterfront Regional Park



Northwest England, location: The coast of Merseyside and river front of the Mersey and Dee Estuaries, along 135 km coastline from Southport (Sefton) to Widnes (Halton) and Runcorn (Halton) to Heswall (Wirral).

category	scale	duration
<input type="checkbox"/> activity	<input type="checkbox"/> local	from: 2003
<input type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: planned 2020
<input checked="" type="checkbox"/> tool	<input type="checkbox"/> national	duration: 15 years

background

Mersey Waterfront was born out of the 2002 Action Plan for the City Region, in which it was one of two big ideas to facilitate a step change in the sub-region's economic, social and environmental fortunes. The concept is simple. Mersey Waterfront seeks to use the current and latent assets and opportunities around the waterfront to improve the quality of life for residents, visitor experience, environmental quality, economic prosperity as well as image and perception of the City Region. The basic premise for this is that the collective sum of the parts is considerably more compelling and powerful than the individual components. The area had a number of important assets as well as vast areas of public realm that had suffered from neglect and lack of investment. The Mersey Estuary had undergone a transformation from the dirtiest river in Europe but there was still a need to get this message across to people. This requires a long-term commitment (approx. 15 years), collaboration across and between public, private and voluntary sectors and considerable investment.

objectives

- to transform, energise and connect the Mersey Waterfront assets to create a unique sense of place and a greater sense of pride and awareness of the Waterfront
- to firmly embed Mersey Waterfront as a key component in the Liverpool City Premier Destination offer by generating greater awareness, use and ownership of the Mersey Waterfront as an exceptional coastal amenity
- to grow the City Region tourism sector, enhance the built and natural assets of the coastline and improve existing environmental resources

- to contribute to an enhanced 'Quality of Life' offer within the City Region
- to provide new and enhanced opportunities for leisure and recreation
- to explore opportunities for other sources of funding for the ongoing development of Mersey Waterfront

key players

Mersey Waterfront extends across 8 local authorities (municipalities) and stretches along 135 km of coastline. Wirral Metropolitan Borough Council is the accountable body and the team is hosted by The Mersey Partnership. The programme has an independent board with representatives from the local authorities and other partners including The Trinity Mirror Group, Mersey Basin Campaign, Merseytravel, North West Development Agency and Mersey Maritime.



Pierhead in Liverpool

implementation

Mersey Waterfront is a regeneration initiative tasked with transforming 135 km coast in the Liverpool City Region. The Commencement Programme (2003 -2007) was the foundation block, or test bed, for the concept of a regional park focussed on the Mersey estuary and coast. In this programme 60 projects of various sizes and scales were funded. It looked at projects that had both a local and pan-waterfront impact that would improve the quality, environment and offer of the Merseyside coastline. A number of

major developments will see lots of attention focused on Liverpool's Pier Head. With the new cruise liner facility underway, the Leeds-Liverpool Canal Link and new ferry terminal, Mersey Waterfront has co-ordinated a design plan to make sure that the different schemes complement each other. International landscape architects were brought to come up with ideas for a more user-friendly public space at the Pier Head, aimed at using this space as a central gathering point. Other projects include e.g. cruise liner terminal, promenade regeneration, environmental improvements such as Speke and Garston Coastal Reserve, Another Place sculpture installation and footpath construction. In 2006 Mersey Waterfront helped to fund the creation of a new visitors centre, that utilises sustainable energy/resources and provides visitor and education facilities.

financing

- Commencement Programme 2003/2007
- funded by the North West Regional Development Agency 13 million Euro
- Succession Programme 2007/2010 - funded by the North West Regional Development Agency (approx. 16 million Euro) and Government Office North West through the ERDF Obj 1 programme (approx. 19 million Euro)
- potential future funding is needed to support the programme to 2020



The promenade at Otterspool

challenges

- Delivering pan-Estuary projects across local authority boundaries
- Securing resources for ongoing management and maintenance of Estuary assets

benefits

Through Mersey Waterfront, the assemblage of diverse and often unique assets we have on our coastline are brought together under one coherent investment and promotional programme. Visitors to the Liverpool City Region will benefit from a more coherent and higher quality tourist offer, which will help encourage repeat visits and longer stays. Through regular survey and market research work, the views of visitors to the Waterfront will be used to help shape Mersey Waterfront projects and the wider strategic direction of the programme.

Waterfront Businesses - The Mersey Waterfront Succession Programme will proactively support the waterfront economy and its businesses through activities developed with, for example, The Mersey Partnership as the destination management organisation for Merseyside's tourism sector. Mersey Waterfront also has a significant role to play in shaping, influencing and supporting wider strategic development of key economic activity around the waterfront such as the Port Growth Strategy and activities associated with other relevant programmes such as the potential to support existing and new social enterprise initiatives at the Speke & Garston Coastal Reserve and the Pride in our Promenades Leeds & Liverpool canal corridor.

Residents - Through the Mersey Waterfront investment in the public realm and leisure facilities on the Waterfront, recreational opportunities, leisure potential and quality of place will be improved for local residents.

Investors - Mersey Waterfront's contribution to making the Liverpool City Region a more attractive proposition with a unique sense of place will impact positively on future investor behaviour and associated multiplier effects. This will benefit existing investors, encourage greater future investment and ultimately enhance the economic performance and stability of the sub-region.

Communities of Interest - Some of the Mersey Waterfront activities will benefit specific communities of interest or user groups.

Local Authorities - The Local Authorities will benefit from Mersey Waterfront as the pan-waterfront approach provides a strategic justification, framework and associated funding for projects that might otherwise not progress as stand-alone projects. Mersey Waterfront also provides an arena for collaboration, shared experience and joint working.

Regeneration Specialists - Through the ongoing programme of international research, advocacy and www.globalwaterfronts.com website, Mersey Waterfront is providing a knowledge base of international experience and best practice.



The Mersey

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Guitiriz Thermal Town “The Sense of Water”



Spain, region: Galicia, location: Guitiriz

category	scale	duration
<input checked="" type="checkbox"/> activity <input type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2006 to: 2010 duration: 4 years

background

Guitiriz relies on a very old thermal tradition. The water here has been used for healing since the 17th century. The Bath of Guitiriz was opened in 1908. It was one of the great spas of Galicia. After being abandoned for some time, the spa re-opened in 2003. Today the city is dominated by tourists coming to visit the spa. The reputation of the waters at Guitiriz give the town great potential for socio-economic development. In addition, the city council depends on important natural and cultural spaces.

objectives

The idea to promote Guitiriz as a spa town is the strategic axis of the plan for the development of sustainable tourism in Guitiriz. This gives just recognition to cultural and natural resources related to the abstraction of medicinal water. In collaboration with tourist operators, it is promoting a product which facilitates socio-economic development of the locality and improves the quality of life of its inhabitants through a process of participation and co-ordination of urban, environmental planning and planning for tourist purposes.

key players

Guitiriz municipality, Crecente Asociados, Universidad Santiago de Compostela

implementation

The project aims at creating a geo-referenced database to provide thematic cartography and to define the boundaries of protection areas and water protection zones. In addition, a strategy was developed to enhance the infrastructure of the municipality, which includes the construction of bridges, thoroughfares and paths as well

as the installation of urban furniture. During the project, funds were provided for private initiatives.

financing

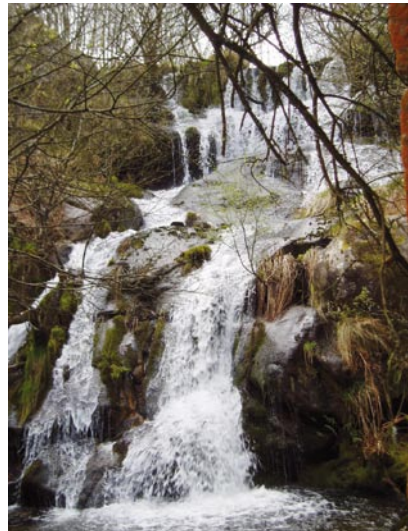
- tourist infrastructure project 4 million Euro
- valuation of the resources 2.23 million Euro
- interpretation and territorial information 6.15 million Euro
- training 36 000 Euro
- promotion 84 000 Euro
- marketing 360 000 Euro
- project management 42 000 Euro per year

challenges

The challenges of the initiative were the co-ordination of the different project partners, the municipality of Guitiriz, hotel and catering businesses, Guitiriz's spa, the Environmental Ministry of the Autonomous Government of Galicia and landowners, most of whom are farmers.

benefits

The resurrection of the spa town will help Guitiriz to position itself within the tourist market, to increase tourism, to create jobs and new products, to protect the resources and to contribute to the development of the city.



Waterfall of Ruxida

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Camino del Miño (Miño's path)



Spain, region: Galicia, location: Terra Chá

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: June 2005
<input checked="" type="checkbox"/> measure	<input type="checkbox"/> regional	to: April 2008
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: 33 months

background

The activity has been designed to be environmentally friendly, and the recovery of the natural and cultural heritage brings indisputable economic benefits to the whole territory. These activities are also linked to the development of leisure services in the rural environment, thermal facilities, regional gastronomy, refuges and riding routes, etc. A link will be created among three Saint James Ways that cross the province of Lugo (French Way, North Way and the Original Way), taking advantage of the constant flow of pilgrims for the benefit of local municipalities. The project also tries to recover and give value to the heritage given by natural features (nature network, forests, natural protected areas, lagoons, islands, etc.) and by culture and ethnology (mallets, hydraulic - ethnographic sets, mills, waterwheels, etc.).

objectives

This is a project of territorial co-operation intended to create wide fluvial routes that link the natural, cultural and ethnic resources. This project pursues the formation of two hiking routes that run alongside the Miño and Támoga river bank in the municipalities of Castro de Rei, Cospeito and A Pastoriza. It is expected to take advantage of thoroughfares and existing roads. The actions involved will be cleaning and repairing damaged zones and the creation of thoroughfares in the stretches where they do not already exist or are very damaged. In other stretches a footbridge will be built to preserve the existing riverbeds and elsewhere the existing bridges are to be used. The stretches are the following: A) Route Miño has an approximate length of 43 km and goes through two places at the same time in three stretches: the first is MEIRA-ANLLO, the second is ANLLO-XUSTAS and the third is XUSTAS-SAN ROQUE. B) Route Támoga has a length of approximately 17 km.



Impressions from the Miño path

key players

Union of municipalities within the region of Terra Chá, Regional Foundation for the Terra Chá Development and the GAL Terras do Miño

implementation

This project is carried out under the banner of the community initiative Leader. The process was initiated by the union of municipalities of Terra Chá, which made a request to the Regional Foundation Terra Chá, which produced a report on the project. This is presented to AGADER, which sends a recommendation for the request to the Terra Chá Foundation. Once it has received the report, it carries out the contract with the union of Terra Chá's municipalities. Once the contract is signed the implementation of the project by the union of Terra Chá's municipalities begins. So far this project has received authorisation from the Hydrographic Confederation of the North for implementing the activities on the river banks, but it has not yet received the final resolution. Until now the only thing that has been done has been the purchase of material.

financing

Total investments planned: 556 000 Euro

fundes:

- FEOGA (383 000 Euro)
- Department of Agriculture, Fishing and Nourishment (79 000 Euro)

- Agency of Rural Development (AGADER) (90 000 Euro)
- local authorities (Castro de Rei, Cospeito and A Pastoriza) contribute 4 000 Euro

challenges

Until now there have been no problems with the introduction of the initiative described. Although there were some bureaucratic problems. The landowners are not interested in this kind of measure, they believe that these measures are not profitable and could even oppose the implementation of this project. Contrary to that, the municipal authorities are really interested.

benefits

The project enhanced public enthusiasm to recover and value the natural and cultural heritage. The project itself is transferable to all those municipalities that want to promote tourism for health and appreciation of nature.

Moreover, this project aims at generating more fluvial hiking routes linking the natural, cultural and ethnographic resources, physically and thematically. These activities are linked to the development of leisure services in the natural environment. The goal of all this will be the creation of a wide fluvial park in Galicia whose axis will be the river Miño. This project is complementary to the promotion of the Saint James Way since it tries to link the big fluvial routes with the Ways of Santiago de Compostela that cross the province of Lugo (French Way, North Way, Original Way). Likewise it contributes to the excellence and sustainability of the tourist destinations related to health and nature tourism since it leads to the recovery of tourist natural and cultural resources.

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Olantis



Germany, region: Weser/Ems, location: Oldenburg

category	scale	duration
<input type="checkbox"/> activity <input checked="" type="checkbox"/> measure <input type="checkbox"/> tool	<input checked="" type="checkbox"/> local <input type="checkbox"/> regional <input type="checkbox"/> national	from: 2004 to: 2006 duration: 3 years

background

In past times the river was used for swimming by the citizens of Oldenburg. However, in the 1980s swimming became impossible due to water pollution by diffuse sources from the surrounding areas. An indoor and outdoor swimming pool had been built near the river Mühlenhunte, but there was no connection to the river. The city of Oldenburg wanted to reanimate the use of the river for leisure activities following a scheme to improve water quality in 2000. They decided to include the river in the swimming pool area, providing a chance to swim in unchlorinated water. The city of Oldenburg initiated a project called 'Olantis'. A project for recreational activities and naturalisation of watercourses in Oldenburg, providing a swimming pool in the river Mühlenhunte within a landscape conservation area. The name **Olantis** is a combination of the word **Oldenburg** and the immersed island of **Atlantis**.

objectives

- to construct a combination of indoor and outdoor swimming pools, as well as a natural swimming pool following naturalisation measures to the river Mühlenhunte
- to improve water quality in the river Mühlenhunte
- to integrate the plan into the Green Star of Trails (Grüner Wege Stern) network within the city of Oldenburg
- to reintroduce swimming to the river Mühlenhunte
- to provide additional leisure activities
- to use filtered water from the river Mühlenhunte for the outdoor swimming pool in order to save money and become more self-sufficient



An aerial view of Olantis, with indoor and outdoor swimming pool and the possibility to swim in the river Hunte.

The measure should be seen as a combination of natural swimming pool and nature conservation area. The area is an extension of the Schloßgarten recreation area (the park around the Castle of Oldenburg).

key players

The city of Oldenburg initiated and implemented the project and also operates Olantis. The planning was done by Polyplan, a private engineering office.

implementation

data for the swimming area:

surface area of the water, extension: 85 x 40 m max.

water depth: 2.10 m

surface water to be used: 2 468 m²

for swimmers: 1 230 m², for non-swimmers: 1 238 m²

water quantity: 2 450 m³

Olantis island:

sun bathing area: 5 126 m²

sand beach: 1 348 m²

nature conservation island with bank close to nature: 306 m²

bypass for water: 3 217 m²

filter area with gravel: max. 8 000 m³/day (upheaval)

filter for upheaval: 5 000 m³/day (recharge)

As mentioned, there are two outdoor swimming areas. One artificial pool with 50 m swimming lanes and, close by, the natural swimming area in the river Mühlenhunte. The water in the river Mühlenhunte swimming area will be rotated and filtered twice a day. In future the aim is to pump filtered water out of the Mühlenhunte and into the outdoor swimming pool.

financing

A precondition was that filtered water from the river Mühlenhunte would be used for the outdoor swimming pool. Planning permission for building Olantis was dependent upon this and it results in savings of around 60 000 Euro per year.

challenges

- It was a unique measure in Germany so there was little experience to draw upon.
- There are strong regulatory controls regarding water quality and pollution, and strong licensing requirements and orders must be met.
- Maintaining clean water is difficult, especially due to avifauna which cause a lot of pollution (e.g. excremental).



Natural swimming pool in the river Hunte

benefits

In Oldenburg a swimming pool was seen as essential for visitors and residents. The dimension of Olantis ensures a good recreational swimming experience but also has beneficial effects on the landscape and natural conditions. The different pool types distinguish Olantis from other leisure activity pools. Swimming in unchlorinated water fosters a feeling of good health which attracts nature lovers and families. Olantis is a recreational centre for guests of all ages, promising a variety of leisure activities in all weather conditions.

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Environmentally Sound Canoeing on the River Hunte



Germany, region: Weser/Ems, location: river Hunte from Wildeshausen to Oldenburg

category	scale	duration
<input type="checkbox"/> activity	<input checked="" type="checkbox"/> local	from: 2004
<input checked="" type="checkbox"/> measure	<input checked="" type="checkbox"/> regional	to: 2007
<input type="checkbox"/> tool	<input type="checkbox"/> national	duration: 4 years

background

Recent years have seen the growth of unlicensed canoeing and boating activities on the river Hunte between the towns of Wildeshausen and Oldenburg. These unregulated activities have had strong impacts on the aquatic habitat through litter and damaged banks. The wildlife and adjacent local residents have been greatly disturbed. A solution had to be found that was suitable for all parties.



The river Hunte

objectives

- relocate canoeing activities into less environmentally sensitive areas
- reduce the level of disturbance to areas suffering from high visitor pressure
- protect local flora and fauna from noise and disturbance

requirements:

- construction of an adequate number of strategically placed landing stages
- restrictions on tourist access to sensitive areas, limitation of number of participants allowed on guided tours
- a marketing strategy to promote the new offers
- display boards to offer information on how to best protect the natural environment

key players

- neighbouring cities and municipalities between Wildeshausen and Oldenburg
- Nature Park Wildeshauser Geest
- tourism organisations from the adjacent cities and municipalities
- local community representatives from Lower Saxony - Bremen
- Department for Nature Conservation of the county
- NLWKN (State Agency for Water Management, Coastal Defence and Nature Conservation of Lower Saxony)
- Hunte-Wasseracht (Water and Soil Board)
- Confederation of Canoe Tourism
- Rural Adult Education
- other interested associations



Canoeing on the river Hunte



Landing stage

implementation

A plan needed to be developed to find suitable locations on which to build landing stages with easy access to good resting places. The principal difficulties were having to avoid paying charges to agricultural landowners and accumulating too many tourists in one area along the River Hunte. Maps of water routes were developed for guided tours. Information boards on canoeing and the on-site wildlife were installed.

Informations and contact adresses were made available on a website. A 43 km canoe route from Wildeshausen to Oldenburg was marked out. The canoe trip takes around 14 hours, spread over two or three days. The average travelling time is

anticipated at 20 minutes per km. The offer is likely to be available from May to September and could accommodate roughly 12 000 tourists.

financing

The preparation of touring maps had associated costs for graphics, design and printing, as did the information materials. There were also costs for designing the logo, website and information boards as well as training for the guides. In total, this added up to around 28 500 Euro. Infrastructure costs were financed by individual municipalities rather than the project budget. The initiative was partially funded by Bingo-Lotto, the Nature Lottery, Nature Park Fund Lower Saxony and capital resources from the respective municipalities, cities and the NLWKN.

challenges

Difficulties included keeping the project within the relevant legislation and regulations covering Natura 2000 sites and nature conservation areas. A great deal of time and patience was required to communicate the initiative to residents and stakeholders and to gain the acceptance of all those involved. The timescales for getting plans approved for implementation were also lengthy.

benefits

- environmentally sound tourism along the river Hunte will be established
- organised tours and information boards will reduce conflicts between canoe tourism and residents
- guided tours will provide a source of income
- guided tours and the dissemination of information material will help protecting flora and fauna along the Hunte
- knowledge about nature conservation will improve
- protection of valuable habitats will allow rare species of plants and animals to emerge and flourish

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11 Findings

This chapter delivers findings of the ENMaR project. These result on either issues discussed or presentations given in the workshops, experiences made or lessons learned from the inter-regional exchange, the comparison of regions or the previous case studies. The responsible project partners have been in charge of writing the following key conclusions and recommendations for the respective core areas.

11.1 Stakeholder engagement

11.1.1 Key conclusions

Stakeholder engagement is a key part of the WFD. There are numerous variations on how to engage, and different methods are appropriate to different situations. For municipalities the following points have emerged:

- Municipalities, being public bodies themselves, are serving the general public. Although few of them have been involved in working groups that consider implementation of the WFD, the municipalities are nevertheless closest to the public and that includes water users.
- It has been difficult to engage municipalities, for various reasons:
 - the concerns of the municipalities are not obvious at first sight
 - water management is only one of many issues the mayors and their administration have to deal with
 - there is resistance against politics coming from Brussels, and Directives are mostly considered as burdens.
- For a municipality, water management/development is an investigation into the softer factors of a location such as quality of life. These are often difficult to measure, especially in monetary terms.
- The WFD requires the bringing together of stakeholders from different disciplines and policies. The river basin approach requires the bringing together of stakeholders across administrative borders.
- The need for close co-operation among stakeholders has been approved many times in various political statements, studies, publications, etc. at the European, national, regional as well as the local level. But the reality looks very different. Often it does not happen at all. When it does, the amount and level of engage-

ment is often not very high. When a high level of good quality engagement does take place, for example to address a pressing issue, it requires a considerable amount of effort to organise.

- Stakeholder engagement works best when:
 - engagement is early
 - the correct stakeholders are identified first
 - there is an appropriate amount and level of communication, this requires a commitment of resources.

The benefits of engaging stakeholders in water management can be long lasting. Engagement can mitigate the negative effects of a decision as well as helping to bring about an acceptable decision. A sense of ownership can result, which can lead to future advantages in the field of water management, or even in other fields.

11.1.2 Recommendations

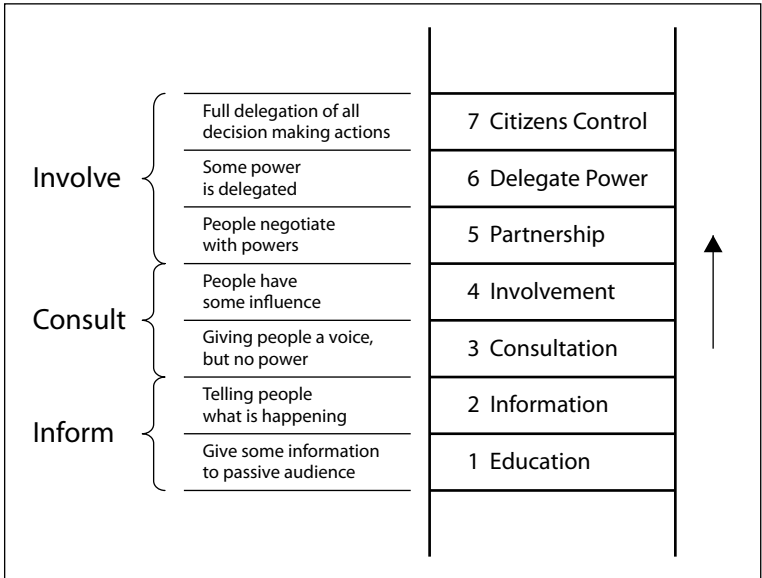
The following section proposes a range of recommendations that would facilitate the implementation of the WFD.

Public participation is a key element of the WFD. The aim of the ENMaR project has been to engage certain stakeholder groups in water issues, focusing on municipalities and their needs. The municipalities are well placed to engage the public on various issues, which could include water issues, and they have experience of doing so.

- **Benefits and opportunities:** Public participation can gain a greater acceptance for measures being planned. It can bring together people with differing interests from groups such as farmers, water authorities, rural development planners, anglers, boating groups and local residents and help them develop an understanding of each other's concerns. During the planning of measures, this can mitigate potential conflicts and bring about a common understanding. Local knowledge is a form of expert knowledge, which can be very helpful and can be accessed through public participation. The public will benefit from the measures to be taken and so they should be involved in the planning. Bringing groups together with different interests, experience and needs can lead to their co-operating on other issues too.
- **Success factors:** Early engagement is essential. People need to be consulted before decisions are made. Also, an early discussion of conflicts may facilitate and accelerate the legal and administrative process. This requires early planning.

Successful public participation requires targeting groups, good management skills, providing appropriate information and sufficient time. It should provide opportunities for people to take part in decisions (that really do matter) so that they feel part of the decisions and take ownership of the issues. The process of public participation should be seen as an opportunity to actively involve the citizens, to raise their awareness of and improve their environment and therefore improve the quality of life. Politicians and their administrators should therefore support this process, especially as it provides an opportunity to bring politicians, administrators and citizens closer together.

- Identifying stakeholders: Identifying stakeholder groups and the appropriate people within them is an important first step. Stakeholder mapping is a tool that can be used to identify the correct people (see case study on page 184) and categorise them according to their interests. This can help with engaging the correct people for the issue or locality concerned.
- Level of involvement: Public participation should be more than providing information, but should get people actively involved. When they are fully involved, people can feel responsible or even take over responsibility for the watercourse in their backyard.
 - Awareness raising: This is essential. People are not always aware of water issues, their causes and implications. Organising site visits and providing examples of good and bad practice can help people understand.
 - Information: This should be easy to access and appropriate to needs and level of understanding. Information provision is only the first, although important step in engagement.
 - Consultation: This is seeking the opinions and views of the stakeholders.
 - Active Involvement: This is a higher level of public participation in which the stakeholders are given some empowerment. The WFD intends this level of active involvement to be encouraged.
- Networks: Bringing together the various stakeholder groups involved in an issue is beneficial to resolving the issue. These stakeholders may not normally meet, and an especially created network could be fulfilling a need (see recommendations spatial planning). Where networks already exist, they should be used. Examples are Local Agenda 21 groups and the various groups organised by the Emåförbundet and the Mersey Basin Campaign.



Levels of Participation (source: Arnstein's Ladder of Citizens Participation, 1969, modified by C. Riley, 2007 (Arnstein, Sherry R., A Ladder of Citizen Participation, Journal of the American Planning Association, Vol. 35, No. 4, July 1969, pp. 216-224))

11.2 Spatial planning

11.2.1 Key conclusions

Water provides a range of environmental, social and economic services that are crucial to the long-term survival of human societies and ecosystems. However, water is a finite resource and there are limits to which it can meet the demands placed on it. Existing water resources are under threat from human activities including pollution, over abstraction and inefficient use. The WFD recognises the role of water and the pressures that are being placed upon it, and provides a framework to encourage the sustainable use of water resources over the long term. Significantly, there is increasing recognition that spatial planning has an important role to play (amongst a range of other strategies and techniques) in helping to resolve water resource problems and in aiding the achievement of the WFD's goals.

A key element of the ENMaR project was to explore the relationship between spatial planning, water and the WFD in England, Germany, Latvia, Spain and Sweden.

Each of these countries has an established spatial planning system, and also has a history (in some countries dating back further than others) of utilising spatial planning policies and approaches to address water issues such as pollution, flooding and groundwater protection. However, due to the relative youthfulness of the WFD, national spatial planning policies have yet to catch up, and apart from in Latvia where spatial plans must take into account river basin management plans, the role of planning in addressing the Directive's requirements has not been formalised in national legislation. Nevertheless, in England the important connection between the WFD and spatial planning has been recognized by the government and agencies with responsibility for environment issues. This provides a platform from which to develop practical spatial planning solutions to assisting the achievement of the WFD's requirements. Indeed, in the spatial plan for the Northwest region of England a policy now exists that requires municipal level spatial plans to assist in the delivery of the WFD. Similarly, in Lower Saxony (Germany) steps are being taken to formally link spatial planning and the WFD.

Aside from these legislative developments, it is apparent that positive steps are being taken in practice (as reported in the ENMaR spatial planning case studies) that provide clear evidence of the success of spatial planning in improving the water environment. The case studies provide evidence of planning being used to improve water quality, to protect aquatic habitats, to re-naturalise rivers, to reduce flood risk and to address urban diffuse pollution problems. It is also significant that spatial planning is a relatively low cost option to addressing challenges associated with the water environment in comparison to large infrastructure projects such as wastewater treatment plants or structural flood defences. For example, the principal costs concerning the water development plan for the Leine river and the designation of water protection belts in the city of Valmiera was the time and salaries of the individuals involved in these procedures. Although the WFD was not the driving force behind the initiatives explored within the ENMaR case studies, the associated benefits to water and aquatic ecosystems will aid Member States in achieving good water status by 2015. It can be concluded from the ENMaR case studies and the review of the spatial planning systems that spatial plans and associated planning approaches can assist in meeting the goals of the WFD.

Despite the evident linkages between spatial planning, water management and the WFD, there are a range of barriers that constrain the potential effectiveness and impact of planning in this respect. Some of these barriers are generic; that is they apply across most if not all spatial planning systems in the countries studied during

the ENMaR project. Other barriers are specific to individual countries and even to particular regions. For example, in the Galician region of Spain spatial planning legislation has not been fully implemented by the municipalities. This clearly limits the ability of planners to address water issues. Further, in Galicia planning tends to be focused on urban development although much of the region is rural which is where key water management challenges (linked to agriculture) are focused. Similarly, although diffuse pollution from agriculture is one of the most significant causes of water pollution in England, spatial planning has little influence over agriculture. However, the majority of barriers are generic and include:

- National legislative frameworks linking spatial planning and the WFD are not adequately developed. Municipalities and organisations that support them are therefore lacking a solid framework to build upon and to act as an incentive to stimulate activity in this area.
- In several countries, including England and Germany, national and regional guidance and legislation forms the basis of spatial planning systems. Consequently, there is little autonomy for municipalities to act independently to address water management challenges specific to their particular local area. However, in Sweden, where the municipalities have greater power and influence, this barrier is not so evident.
- There is a lack of knowledge and experience amongst planners concerning the water environment and of measures to address challenges such as flooding and groundwater protection. For example, in Galicia a complete inventory of water bodies in the region does not exist. There is also a lack of understanding amongst municipalities concerning the nature of the relationship between spatial plans and RBMPs. Limited guidance in some countries acts to compound these knowledge gaps.
- There is a lack of resources (including time, money and staff) available to municipalities to undertake their spatial planning duties. Faced with this situation, concern for the water environment may sometimes be marginalised in favour of issues such as economic development and housing.
- There is a lack of co-ordination between municipalities (and higher level planning authorities at the sub-regional and regional level) in terms of the management of water issues. Planning authorities sometimes act in isolation in shared river basins. This approach is not conducive to effectively dealing with challenges concerning the water environment which do not fall neatly within administrative boundaries.

- With the preparation of both spatial plans and RBMPs, there is a threat that without sufficient integration two parallel systems of water management will emerge. Spatial plans prepared by municipalities at the local level are based around municipal boundaries, whereas RBMPs prepared by designated competent authorities are based around river basin catchments which can cover entire regions. Alongside this spatial disparity, there is also the mismatch of timing concerning the preparation of these two documents (see below). As both spatial plans and RBMPs have an obligation to address water issues, there is a danger that water management will become unco-ordinated. In Sweden (as is the case in other countries), it is as yet uncertain as to how spatial plans and RBMPs will relate to each other. Prior to the WFD's requirement to prepare RBMPs, the management of land and water took place in an integrated manner in Sweden as local municipalities had responsibility for both issues. Without careful planning, benefits associated with integrated approaches such as this could be lost.
- The need for integration between spatial plans and RBMPs is important if one is to influence the other; that is if spatial plans are to aid the achievement of the goals of RBMPs and vice versa. However, timescales concerning the preparation of these two key documents are mismatched. Spatial plans are currently being prepared across Europe without the benefit of looking at the RBMPs (which will be published in 2009) that it is hoped they will help to implement. This mismatch will jeopardize (in the short-term at least) the movement towards integrated approaches to the management of land and water which are ultimately necessary if water is to be managed in a more sustainable way.
- Spatial planning must work to balance the broad range of environmental, economic and social demands that are placed on land. These demands can sometimes conflict with the goals of the WFD, for example housing provision can increase pressure on water supplies and can pollute water bodies via contaminated rainwater runoff. The reality of the nature of spatial planning systems, which can often be politically motivated, can work against the use of planning to address water management challenges.

Despite the existence of these barriers, spatial planning has an important role to play in the achievement of the WFD in the future and should be promoted as such. Indeed, the ENMaR case studies demonstrate that across Europe spatial planning already is having a beneficial effect on the water environment in practice, which bodes well for the future.

11.2.2 Recommendations

The ENMaR project has demonstrated that spatial planning has the potential to play an important role in meeting the requirements of the WFD in the future. Indeed, the case studies indicate that steps are being taken in practice to utilise spatial planning approaches to help manage the water environment (although not in direct response to the WFD). Nevertheless, there are a number of barriers to overcome before the contribution of spatial planning can become more effective and widespread. The recommendations presented below point towards ways in which the linkages between spatial planning, water management and the WFD could be strengthened.

- Building on and promoting existing good practice: One of the key benefits of the use of spatial planning to assist in the delivery of the WFD's goals is that it is an existing approach with a history of being applied in Europe. There is no need to reinvent the wheel. The ENMaR case studies demonstrate that across Europe spatial planning approaches are being applied to address water management issues. A framework is therefore in operation which can be built upon. The continued sharing of good practice is an important way of raising the profile of spatial planning as a tool with considerable potential to help implement the WFD.
- Encouraging the use of strategic environmental assessment (SEA): The SEA of spatial plans, which is now a legal requirement under the EU SEA Directive, is a decision aiding process with the potential to aid the achievement of the WFD's goals. The capacity of SEA to raise stakeholder awareness of water/spatial planning relationships and to provide a structured assessment of the impacts of spatial plans on water issues are crucial benefits that SEA could bring. Working in these ways, SEA can motivate changes to spatial planning policies to enhance their relationship to water. Greater stakeholder involvement during SEAs, the provision of more comprehensive baseline data on water issues to be utilised during the SEA process, and the development of associated guidance are important ways of strengthening the linkages between SEA and the WFD.
- Greater use of zoning approaches: Zoning approaches have been used successfully in several of the countries studied during the ENMaR project to protect groundwater supplies, river banks and lakes for example. It may not be feasible to protect all water bodies in this way due to past building activities and present day development pressures. However, establishing zones around sensitive

aquatic environments and including these zones in spatial plans (via associated maps and policies), provides a straightforward and relatively inexpensive way of enhancing the protection of the water environment.

- **Legislation and guidance:** Due to the relative novelty of the WFD, spatial planning legislation and guidance has yet to be updated in some countries to integrate the requirements of the Directive. Planners at the municipal level often look to regional and national authorities for direction concerning their planning activities. Indeed, it is often the passing of legislation and the preparation of new guidance and/or spatial plans that stimulates activity at the local level. It is important, therefore, that the WFD is reflected within national and regional legislation, guidance and spatial plans to cement the position of spatial planning as an approach to help deliver its requirements.
- **Improved data availability:** Effective spatial planning requires good quality data. Municipalities should ideally have ready access to comprehensive data on the water environment through organisations such as designated WFD competent authorities, national/regional environmental ministries, and non-governmental organisations. Such data is ultimately necessary to provide a platform to prepare spatial plans that link effectively to the water environment, and to adequately consider water issues when deciding on planning applications for new developments or changes in landuse. This data is not always available and in some cases it may exist although not in a form that is easily accessible by municipal planners. Better collection, storage and communication of data on the water environment will therefore be necessary in many countries and regions.
- **Networking and co-ordination between planning authorities and other stakeholders:** For several reasons, it would be beneficial to improve networking and co-ordination between planning authorities (at the municipal and regional level) and other stakeholders with an influence over spatial planning activities. The causes and impacts of issues such as flooding and diffuse pollution will often cross municipalities and regions. Co-ordinated cross-boundary spatial planning amongst municipalities and regional bodies at the catchment scale will produce responses that more accurately reflect the nature of the water environment. Developing stronger linkages between planning authorities and stakeholder groups would encourage the sharing of knowledge and experience of water related data and associated spatial planning responses. With sufficient organisation, it would be possible for different municipalities in the same catchment to specialise in issues such as groundwater protection or water efficiency technologies. This specialist experience could be shared with municipalities in the same

catchment at the point of preparing spatial plans or deciding on major planning applications for example. It will also be important for municipalities to engage with designated WFD competent authorities to encourage closer links between the management of land and water. A wide range of other stakeholders (e.g. water service providers, environmental organisations, farmers and the public) should also be involved during municipal planning activities. This can enhance spatial planning procedures through the injection of specialist and local knowledge and experience which can help to embed water issues more firmly within spatial plans.

- Gaining political commitment: Ultimately, one of the most important factors in developing spatial planning approaches to aid in the achievement of the WFD will be securing political commitment to the goal of improving water quality. Raising levels of awareness amongst politicians and other key figures within municipalities of the multifunctional benefits of a high quality water environment (for recreation, human health, biodiversity, development opportunities, tourism etc.) is an important first step. Highlighting the relatively low direct costs involved in applying spatial planning approaches to addressing water management challenges could also help to gain political support. Once this has been gained, the opportunities for linking spatial planning to the WFD should be enhanced.

The WFD is an ambitious piece of legislation. The resolution of water resource problems such as enhancing water quality across an entire river catchment will take many years. The WFD will therefore require actions and strategies stretching over several decades. The long-term and strategic nature of the spatial planning system makes it ideally suited to contributing to the achievement of the WFD's goals. The key findings of the ENMaR spatial planning theme, including the conclusions and recommendations presented above and the series of good practice case studies, have the potential to strengthen the role that spatial planning can play in meeting the requirements of the WFD.

11.3 Water management

11.3.1 Key conclusions

The demands of the WFD represent a huge challenge for all European partner regions. Problems vary due to the different conditions of water management in each region, but all partners reported the concerns of their stakeholders that they may not meet the objectives of the WFD.

The municipalities involved in the ENMaR project are, for the most part, not the key authorities involved in implementing the WFD. However, because of their extensive local responsibilities, they do have a good deal of influence on water quality and quantity. Furthermore, they face a range of challenges regarding future water management, dominated by changing climate, demographic shifts and changes in consumer behaviour, all of which are also concerns of the WFD.

One highly significant challenge in all the regions is flooding. The Mersey region in particular has huge problems with flooding. Flood Risk Management (FRM) is generally lacking in most communities. In terms of a collective responsibility, regions tend to find it difficult to fully understand the actions they can take to contribute to flood risk management. Governments tend also to send contradictory messages concerning flood risk issues. Although FRM is addressed in the design of regional development plans, communities are still being placed at the risk of floods.

Heavy rainfall is frequent in the Weser, Gauja and Emån river basins and results in flooding. In urban areas, drainage systems are overloaded during such extreme weather events, resulting in pollution to surface water and an overload of treatment plants. Rainfall over a long period causes both urban and rural flooding due to the absence of retention areas. This is a particular problem in the urban areas of Germany.

Optimisation of water supply and sewer networks (pipe systems, grids) is an important ongoing issue for all ENMaR regions. In addition to issues regarding repair, the systems have to be adapted to the consequences of the complex changes mentioned above. Latvia's main challenge will be the optimisation of the water supply networks and the improvement of technical conditions within the supply system. In Galicia, the networks for water supply and irrigation facilities are obsolete, inefficient and in worse condition than in most of the rest of Spain. It is observed that most of their networks are over dimensioned in terms of pipe diameters resulting in losses of up to 60%. In England too, improvement and optimisation of the

networks is required as network leakage can lead to great losses. Overcoming operational and technological problems regarding quality and storage capacity of wastewater treatment plants is another big challenge for participating regions. In Latvia a decreased volume of household and commercial water consumption has resulted in higher concentrated wastewater, which often causes operational and technological problems for treatment plants. Spain experiences problems concerning scarcity and irrigation. There is inefficient water use by households and by the food and agrarian industry due to a lack of awareness meaning water consumption is excessive. Due to the changing climate, Germany and England can experience problems with irrigation and scarcity in the hot summer months.

Every partner region has problems with diffuse pollution, mainly caused by agriculture. In England and Lower Saxony it is intensive mass animal farming, draining and fertilisation which degrades the status of ground and surface water. In Lower Saxony an average surplus of 100 kg N/ha has been detected. In Latvia untreated runoff from large roads cause diffuse pollution and wastewater treatments and industrial enterprises pollute surface water with hazardous substances. In Sweden there is awareness of the impact of diffuse pollution from agriculture and farmers in the present must address the sins of the past in this area.

Another aspect of water management to be addressed is the purification status of water in Galicia. In the Miño region especially, water quality is low in terms of purification and is found to be charged with iron and manganese.

Due to the economic situation in Latvia, water costs are not directly includable in water fees, whereas in the Weser region, the principle of cost recovery in water management is already implemented. The consumer pays for the expenses generated by diffuse pollution because a certain amount of the water fee goes towards making the necessary agriculture adjustments in water protection zones. In Sweden stakeholders are concerned about potential costs. There is uncertainty as to how the demands of the WFD will be met and who will pay for it. This is a concern in every region. The possibility of increased costs for the supply of drinking water, sewage treatment, drainage and other areas affected by the WFD is frequently discussed.

11.3.2 Recommendations

During the implementation of the WFD across all the ENMaR regions, water management systems have to not only adapt to the consequences of climate change but must also carry the burdens of the past, such as old networks of pipes, which in the long-run can generate huge costs.

The main challenges in water management were outlined in key conclusions from the regional workshops, as follows:

- flooding
- optimisation of networks
- optimisation of wastewater treatment plants
- scarcity and irrigation
- diffuse pollution
- intensification of agricultural landuse
- cost recovery

To prevent flooding, the co-operation of residents, local authorities and planners is essential. Local authorities must consult residents and stakeholders as early as possible during the preparation of flood risk strategies. Planners must consult experts to create sustainable urban drainage systems. Urban landuse planning and regional development plans need to have suitable links.

A greater involvement of organisations such as United Utilities and the Environment Agency in England or the NLWKN (Lower Saxony Water Management, Coastal Defence and Nature Conservation Agency) in Germany, operating on a larger scale is required. Governments have to send a consistent message to all stakeholders concerning flood risk so that residential areas are not established in flood risk areas and emergency plans are available to all and have been tested.

To enhance opportunities for water retention areas, landuse should be more multifunctional, for example golf courses could be utilised to absorb flood water from the Mersey. One example of a successful initiative was the relocation of a dyke in Germany (see under case studies). This illustrates what co-operation between stakeholders can achieve, and also shows that well-organised planning can prevent flooding and enhance nature conservation and recreation.

In all the ENMaR regions the optimisation of networks is a strategy that can ultimately help to handle the problems posed by climate change. The utilisation of rainwater, the use of recycled water, and the improvement of irrigation techniques can all help tackle the problem of water scarcity, particularly apparent in the south of Europe. Wastewater treatment operators and industrial enterprises need to agree on adequate procedures to protect surface water from the discharge of hazardous substances. Wastewater treatment plants are required in all urban areas.

Water boards, agricultural organisations and authorities should co-operate to control diffuse pollution from agriculture. Each location has its own approach and sustainable methods of agricultural fertilisation need to be implemented according to the soil and climate of each region. The vocational training of farmers should focus much more on environmental issues, and farmers themselves should be consulted regarding new methods of agricultural technique and fertilisation (particularly in water protection areas like in Germany) to protect ground and surface water from pesticides, nitrates and phosphorous.

Increased public awareness of the connections between food production, water and the environment is essential to impact on consumers' behaviour. The consumers can use their power to support sustainable methods of food production that avoid ground and surface water pollution.

Public awareness and public participation are crucial for implementing the measures of the WFD, not least because clean rivers and enjoyable landscapes benefit and are enjoyed by the public themselves.

The greatest obstacle to these achievements is cost recovery, which is a key concern for all ENMaR partners. A general recommendation is to check tariffs and fees for drinking water supply and wastewater treatment. To cover costs for water management issues (see above) a new calculation of costs for sustainable water services is essential. An accordant price has to be paid for good drinking water, wastewater treatment, maintenance and flood protection.

To cope with the challenges of the future, it has been seen in the past that successful water management and supply can be organised at a regional level. All other requirements also need an integrated planning approach and must be implemented on a catchment level. To reach the goals of the WFD, a reasonable division of tasks between the authorities, and efficient and successful co-operation between them, is essential.

11.4 Agriculture

11.4.1 Key conclusions

Trends of European agriculture

- Although farmers' problems and interests, and the way these are represented, vary across Europe, farmers and farmers' lobbies have had great impact on agricultural directives and laws in the past, preventing precautionary environmental principles from being set in place. This is partly the reason why environmental issues are now demanding such urgent improvement.
- Agriculture is dependent on subsidies. Economic pressures lead to environmental pressures, mainly through intensification. In some areas though, production is closely regulated, and in parts limited, for example in milk production and sugar beets.
- As the need for renewable energy grows, the production of energy crops presents a potential new income opportunity for farmers, but could also increase pressure on ground and surface water bodies due to further intensification and the possible growth of monocultures, such as maize.

Causes of environmental problems generated by agriculture

- In many places, flood plains and buffer strips have disappeared and continue to do so as they are absorbed into agricultural use, even though they may not provide good conditions for farming.
- In all ENMaR regions, agriculture is mainly responsible for the diffuse pollution of surface and groundwater, and in some cases of point sources, too. ENMaR regional workshops have underlined that much more effort has to be made in order to improve water status. However, the possibilities for farmers to change their agricultural practice, and their willingness to do so, is limited.
- The reasons behind diffuse pollution are the inappropriate use of fertilisers and pesticides, poor organic waste management, and in some cases defective facilities and storage tanks. In addition, the relevant laws and directives do not adequately consider local circumstances. The consequences are:
 - soil compaction / erosion leading to sedimentation
 - eutrophication
 - rising nitrate concentration in surface and groundwaters
 - toxic pollution from pesticides

- bacteriological contamination
- damage to nature conservation
- loss of landscape and therefore loss of public goods

As an example, English water companies spend around 460 million Euro a year removing nitrates from water (75% of which is from agricultural sources). In Galicia it has been noticed that, while farmers are not conscious of causing serious damage to ground and surface water, they recognise that water quality in rural areas has worsened every year. This creates a curious paradox: while farmers believe their activities are not harmful to water, nevertheless they are aware of the disappearance of fish from increasingly dirty rivers, and are unwilling to drink from their own wells as they are conscious of poor water quality. Meanwhile there is no other industry that could possibly be having these effects.

Relationship between municipalities and agriculture

- Are there ways for municipalities to influence or even steer farming practice? The objective of the workshops was to raise awareness among stakeholders of one another's problems and to establish a dialogue on how to jointly improve the situation. The municipalities have no direct influence on farming itself, but may have an indirect and limited influence through landuse planning, for example being landowners, having monitoring or supervising functions, providing water supply and wastewater treatment, or being responsible for building permissions. Of course, municipalities should take care of water resources with all of its functions due to their responsibility for the health and quality of life of the public.
- Arable land is in competition with other landuses. Many landowners and stakeholders in landuse only look after their own interests.
- Local municipalities and landowners lack specific and reliable information about the impact of agriculture practices on water quality.

Other observed conclusions

- The WFD constitutes an excellent example of a legislative instrument at EU level that will need to be transposed and applied through means of national legal regulations. From the outset it is required that the implementation of measures focuses on the reduction of negative impacts from agriculture on water quality and quantity.
- While the number of farms is decreasing, this does not imply a reduction of the territorial pressure of agriculture, because the farmland remains in use.

The risk of negative impacts on surface water and groundwater is still increasing with intensification.

- In Galicia, the legislation and regulation of the Nitrate Directive (91/676/CE) has not been considered as adequately developed or implemented. This is especially true of the most peripheral regions where the relationship between agrarian activity and water condition was not appreciated as an immediate problem.

11.4.2 Recommendations

- The Common Agricultural Policy (CAP) and the WFD should work in unison. Environmental and rural development measures should be co-ordinated with the WFD's programme of measures. The funding options arising from the rural development programme with respect to environmental measures should be used to improve the water status.
- Good co-operation is required between relevant water and agricultural authorities on a local level.
- The authorities for water, environment and agriculture should share information regarding water status and protection with farmers and municipalities. The latter should also be made aware of the effects of agriculture on water environments. While information in this area should be allowed to flow freely, it is crucial that a constructive dialogue with farmers is established around this sensitive subject.
- Farmer's unions, chambers of agriculture and other relevant institutions should provide information and training on good agrarian practice and its implementation at a local level, including demonstration projects where possible. Important issues here include techniques and measures for saving water in farming, as well as fertilisation management.
- In Galicia, municipalities could give greater support and services to farmers, particularly since fees and council taxes are charged according to specific agricultural activities, such as the running of machinery and vehicles, council taxes on farm buildings, etc.
- Common indicators should be established across the whole of the EU (accounting for local soil and climate conditions) to evaluate agricultural impact on the environment, particularly on water. Parameters should be set for the level of specific pollutants permitted in water basins, for instance:
 - N contribution of animal origin per hectare of arable land in each water body
 - P contribution of arable land per hectare in each water body

- A stable balance should be maintained between livestock density and arable land, since these are mutually dependent factors. In other words the number of livestock per hectare should remain within an agreed limit. Restrictions and directives should take into account the soil and climate conditions while indicating the amounts of fertiliser permitted.
- Organic farming should be promoted with aids and subsidies, but also through the support of regional products and markets as providing an additional income for farmers.
- At the moment, water use in agriculture cannot be accurately assessed due to illegal usage and the use of water normally considered destined for domestic purposes being used for irrigation. There is a need to establish a system of evaluating water use in agrarian activities. Environmental and resource costs for irrigation water must be accurately estimated and paid.
- Land consolidation directly concerns landuse and should therefore be managed in an integrated approach with municipal planning. It can be used to remove intensive agricultural use from flood plains or to create buffer strips. Land consolidation has always been regarded as an instrument for rural development. The objective is to achieve more efficient multiple uses of rural space by balancing the various interests of agriculture, landscape, nature conservation and recreation. For example, municipalities can develop landscape planning to improve watercourses, and directly involve farmers in the formulation and delivery of these plans. Thus, farmers would be part of the decision-making process and would be directly involved in the landscape and in environmental protection. Protection zones for water abstraction, or buffer strips along watercourses, could be key elements included in such planning.
- Agriculture and its related industries should be supported for their contributions to regional development, but this should remain in line with the WFD as far as possible.

11.5 Forestry

11.5.1 Key conclusions

- With the exception of the Mersey river basin, forestry represents a significant use of land in all the ENMaR river basins. In the Emån and Gauja basins in particular, forestry is one of the key industries and is therefore of high economic value.
- The link between water quality and forestry has not been investigated extensively enough. A major problem is that forestry is a slow industry. In terms of generation time, planting to felling can take from forty to eighty years and so the positive effects of forestry measures can only be appreciated in the long term.
- Because of this long-term perspective it is difficult to conduct thorough research of an entire process in a single location. But it is possible to conduct large-scale landscape monitoring and planning as well as case studies in smaller catchments to look at the chemical, hydrological and biological impacts and functions of different forestry procedures. Some research in this area is currently being conducted in Sweden by the state-funded forestry research institute 'Skogforsk'.
- In Sweden it is generally known that forestry has, locally at least, a negative impact on water quality. This is due mainly to ground damage and fluctuations in groundwater levels from felling, driving and ditching adjacent to watercourses. This leads to leakage of humic acid, suspended material, methyl mercury and fertilisers in the form of N and P compounds. However, since soil structure and bedrock composition differs between the river basin regions, forestry itself can give rise to differing impacts.
- A lack of specific and reliable information as well as poor dissemination of knowledge, about the impacts of forestry (and agriculture) on water quality and biodiversity is evident across all regions.
- The most common estate structure in the ENMaR basins is private ownership, followed by the state and municipalities. If municipalities are not forest owners themselves, their potential influence on forestry is limited.
- Traditionally, state forest agencies only work within the boundaries of a private property perspective without considering adjacent properties, river basins or other natural borders. This is not conducive to a river basin based forestry approach. But in places where groundwater supplies are of great importance, as in the Weser basin, emphasis has been placed on forestry as playing a major role in protecting and improving water quality in large areas that cross

administrative borders and properties. This river basin perspective approach is likely to be crucial in terms of achieving and contributing to the objectives of the WFD and should be implemented in all European countries, especially where forestry plays a key role.

- In the Miño river basin, the implementation of forest certification (PEFC/FSC) at the regional level might make a firm contribution to the improvement of forestry there.
- In the Mersey and Weser river basins, more emphasis is placed on the social values surrounding water quality versus forestry. This is a reflection of the smaller amounts of forest there, combined with a higher population density in the urban areas. In other words, the recreational function (or social values) of forests is of greater importance than the economics in these places. Hence the creation of buffer zones and wetlands and the de-culverting in the Mersey river basin are partly to emphasise social and biological values. The aim of the same measures in e.g. Emån and Gauja basins is to a larger extent to improve or protect water quality and social benefits are secondary.
- Flood risk management is mainly an issue in the Mersey basin and to some extent in the Weser basin too, whereas in the Gauja and Emån basins more emphasis is placed on water quality, as flooding is not considered to be a major problem in these forested areas. This is a result also of different regional conditions and historical development.

11.5.2 Recommendations

- Work undertaken for the ENMaR project's forestry core area has revealed a need for better and more efficient co-operation between forestry stakeholders. A survey of the major impacts of forestry on water quality is urgently required, as are strategies to disseminate knowledge and educate the relevant parties (forest entrepreneurs, forest company staff, forest owners, etc.).
- The long generation time between planting and felling means a slow process for achieving results in both research and practical terms. This in turn might result in a loss of interest in long-term objectives. To maintain focus on forestry versus water quality, it may be necessary to create a continuous and extensive programme for river basin adapted forestry plans, monitoring programmes and information/education efforts.

- Municipalities within specific river basins and sub-basins should support and co-operate with forest agencies and entrepreneurs in the creation of forestry strategies. Public forest owners should demonstrate that their forest holdings are primary areas of public social value and nature/water protection. It is still possible to drive profitable forestry in such areas but this ought not to be the main ambition.
- The WFD should be integrated into forestry in terms of adapted plans, measures, monitoring and co-ordination of, for example, harvesting actions. This is mainly a task for the regional and national forest agencies.
- It has been demonstrated in the Emån river basin that some Natura 2000 areas, Fuseån for instance, undertake strategies that fit very well with the objectives of the WFD. Hence it is recommended that management of Natura 2000 areas generally be integrated into the implementation of the WFD. These could then be used as demonstration areas for an integrated catchment management approach.
- Landowners with forest areas adjacent to rivers and lakes are key individuals regarding the maintenance and improvement of water quality and physical habitats. Efforts should be made to inform and educate such people about basic hydrology, ecology and water chemistry. This is probably best achieved with soft measures, such as discussion meetings, water-side walks, excursions and best practice examples, together with basic theoretical exercises. This is a task for municipalities, water management and/or nature conservation organisations, perhaps undertaken together or with support from regional and national authorities.
- Research and case studies on forestry measures over different scales (from small watercourses to river basin level) are needed to further investigate the impact of forestry on water quality. It is also important to investigate the basic functions that different forests (classified by tree species, age, soils, bedrock etc.) have on hydrology, water chemistry and ecology.
- Economic studies on the costs of adapted plans, measures and monitoring are needed to make viable the recommendations mentioned above. At the same time, it is important to compare costs with what is gained in terms of improved water quality, biological values, social values and more. In the long-term these benefits will likely outweigh the loss in profits from less intensive forestry.

- A general measure, proposed for nearly all the river basins (Weser, Mersey, Emån and Gauja), is to protect riparian zones and re-construct buffer zones along flood plains. This is probably the most crucial measure in forestry (and agriculture too) since natural riparian zones are of vital importance for water quality and biological diversity.

11.6 Tourism

11.6.1 Key conclusions

- In all the regions involved in ENMaR, as elsewhere in Europe, tourism is regarded as a fast-developing sector that stimulates the economic growth of countries, regions and local communities.
- A growing demand is recognised for tourism as a form of recreation, involving progressively wider groups of society with different needs and interests. A more extensive specialisation of tourist activities has thus arisen, in which water bodies, being among the most popular destinations for local as well as international tourism, have a significant role to play. Water bodies provide the basis for such recreational activities as bathing, canoeing, motor-boating, angling and (in Galicia) thermal tourism.
- Attaining good water quality, as determined by the WFD, is also considered an important precondition for a successful tourist sector. The quality of water and environment are essential factors determining the attractiveness of a tourist destination. A lack of, or deterioration in, water quality could therefore exclude the potential benefits from this sector of the economy.
- In relation to the WFD, tourism has been addressed from two perspectives, an assessment of significant users, and an assessment of pressure. Currently, in the ENMaR project countries, tourism is not considered to place significant pressure on water quality as compared to sectors such as agriculture or forestry. Taking into account the rapid growth of this sector however, this may change in future. The main problems are expected (and have already been observed) at the most popular tourism destinations, so-called 'hot spots'.

- Tourist activities can have negative impacts on water quality and surrounding ecosystems, for example littering, habitat destruction or disturbance of species. Besides recreational activities that take place in the direct vicinity of water, urban and rural tourism also have direct impacts on water quality due to additional water consumption and insufficient wastewater treatment. These impacts have been observed in most of the countries but are not yet sufficiently assessed or understood.
- When developing the potential of tourism at a local level, a range of stakeholders become involved. Thus it is crucial to co-ordinate the vision and goals of this development and define the responsibilities and tasks involved for a balanced tourism marketing strategy that emphasises water, nature, the cultural and traditional landscape, cuisine, etc. An important aspect of this is the education targeted at tourists, as well as at local authorities, inhabitants and service providers in the tourist sector.
- As tourism is closely linked to such climate variables as temperature and precipitation, the impact of climate change and related adaptation measures needs to be considered when planning tourism development. This important issue has been particularly realised in the Mersey river basin.

11.6.2 Recommendations

- The opportunities for tourism development that are very much connected with good water quality should be borne in mind when carrying out a cost-benefit analysis of the sector. Otherwise potential losses, in the case of deterioration of water quality, might exclude all the expected benefits.
- Recognising the growing demand for tourism as a means of recreation, a prospective tool for visitor management could be tourism development plans for particular areas, ensuring incorporation of sustainability principles and the participation of all stakeholders in tourism development.
- The impact of tourism on the environment and water quality can be regulated by various instruments. Tourism development strategies should promote a variety of tourism destinations to take the pressure off the sensitive natural environments which are usually very attractive for tourists.

- Where tourism activities do take place in vulnerable locations, visitor management techniques and appropriate infrastructure should be established. It is essential first to develop the necessary infrastructure elements before starting to advertise particular tourism objects. An important aspect is education targeted at tourists as well as local inhabitants and tourism service providers. Water quality also directly depends on the existence of appropriate wastewater treatment systems in areas with many holiday houses and hotels along the water bodies.
- Tourism development should also be regulated through spatial planning documents, which have to be based on sustainability principles. Good opportunities for promoting sustainable tourism and balancing economic, social and environmental interests can be achieved through co-operation among municipalities as well as between local authorities and tourism service providers, positive experience in this field can be observed in the case studies from the ENMaR regions.

12 Outlook

The WFD has been going for seven years now. A lot of work has already been done, besides that within the ENMaR project, and a lot of work has yet to be done in the coming years to achieve the good ecological water status that the WFD is aiming for. In many regions there are still a lot of questions to discuss such as:

What are the regional environmental objectives for the water bodies? What are the measures to be taken to achieve those? What are the financial resources needed to pay for them? Who will pay? The dialogue that has already begun among the stakeholders within a river basin and among European regions needs to be continued to answer these questions and to learn from each other in the months and years to come.

The ENMaR project has contributed to public participation by attempting to bring water issues and their importance and relevance to the attention of the municipalities. However not only this organised public which has been addressed within ENMaR, but also the general public needs to become more aware and conscious once again of the role and the importance of water resources as a basis of nature and of human life. Water is a precious resource that society needs to value more than it does.

This awareness raising has, by an unfortunate coincidence, been supported by recent “bad” news about climate change and its main impacts: floods and droughts. Such natural hazards have become more frequent lately. Their cumulative impacts lower the economic competitiveness of a region. In the future many sectors will be overwhelmed by the impacts of climate change. Therefore, an obvious step is for the successful ENMaR network to take up the challenge in a new project on the impacts of climate change on water management.

The new project might tackle issues such as demand management, effective supply, rainwater management and extreme events (floods and droughts). It would be a network of co-operation to adapt to the local impacts of future water threats.

Once again, municipalities would be the beneficiaries of the project and would be invited to join workshops and information events, but also to implement tools and methods in the regions taking part.

Therefore, we would like to be able to continue with the networks established by the ENMaR project in our regions and inter-regionally. We would like to take advantage of the experiences we have acquired and the lessons we have learned. We hope that the experience of ENMaR has been to your benefit, that you have enjoyed the workshops and reading this book and that you will keep an eye out for what is coming up and stay interested and engaged in our activities.

Thank you for your co-operation.

**yours,
ENMaR team**

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