

# Implementing the Water Framework Directive, the Odense river system - DK

## 1. Policy Objective & Theme

- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space

## 2. Key Approaches

- Integration
- Participation
- Knowledge-based
- Ecosystems based approach
- Socio-economic

## 3. Experiences that can be exchanged

The development of a river basin management plan in accordance with the objectives of the Water Framework Directive (WFD) to achieve good water quality status by 2015.

## 4. Overview of the case

In the Odense River Basin (island of Fyn, Denmark), the implementation of the WFD has been developed and tested. Reference conditions and ecological status classifications for the whole basin were defined. An economically feasible programme of measures to obtain 'good' status in all surface water and groundwater bodies in the Odense River Basin has been drawn up as part of a pilot river basin management plan.

## 5. Context and Objectives

### a) Context

Odense Fjord, including the inner fjord Seden Strand, is a shallow fjord with a water surface of 65 km<sup>2</sup>. Since 1780 the area of water surface has been reduced by approximately one third, primarily due to land reclamation for agricultural purposes. Water exchange between the fjord and the sea takes place through a narrow opening bordering onto the northern Belt Sea. Odense River Basin covers an area of approx. 1,050 km<sup>2</sup>; there are just over 1,000 km of watercourse in the river basin, including the largest river, the River Odense, which is about 60 km long and drains a catchment of 625 km<sup>2</sup>. There are approx. 2,600 lakes larger than 100 m<sup>2</sup>.

Land use in the Odense River Basin is dominated by agriculture. Farmland accounts for 68% of the basin. Of the remainder, approx. 16% is urban areas, 10% woodland, and 6% natural/semi natural areas (meadows, bogs/fens/swamp forests, dry grasslands, lakes and wetlands, which are protected by the Protection of Nature Act). Many of the watercourses in the river basin are presently culverted, and a large proportion of the remaining open watercourses are physically regulated through channelisation and watercourse maintenance, etc. It is estimated that drainage has been established on at least 55% of the arable land in Odense River Basin over the past 50–100 years. The population of the river basin is ca. 246,000, of which ca. 182,000 inhabit Odense, Denmark's third largest city.

### b) Objectives

The main aims were to develop a cost-effective programme of measures to reduce nitrogen and phosphorus losses from agricultural activities to ensure that all water bodies meet the WFD environmental objectives, and to draw up a pilot river basin management plan.

## 6. Implementation of the ICZM Approach (i.e. management, tools, resources)

### a) Management

The Odense Pilot River Basin is organized around a Steering Group, two external groups and a number of internal working groups. The external groups consist of a political regional advisory board (political and technical representatives from municipalities, trades and brands, local NGOs, etc.) and a national advisory board (national authorities, national research institutions and consultants). The internal working groups are accompanied by external professionals as partners. The daily administration of the project is conducted by a secretariat

### b) ICZM tools

The development of an agriculturally focused programme of measures and integration of this in the pilot river basin management plan for the Odense Pilot River Basin, included:

- A baseline study of agricultural development.
- An assessment of nutrient (nitrogen and phosphorus) pressure from agriculture on surface waters and groundwater and on vulnerable terrestrial natural habitats.
- The establishment of WFD quality objectives for inland surface and marine waters at the operational level as regards nutrient pressure from agriculture and other sources.
- The investigation of activities under the Common Agricultural Policy reform and other EU policies to determine to what extent these activities could facilitate attainment of the WFD environmental objectives.
- The development of scenarios for measures to reduce nutrient pressure from agricultural activities and analysis of their cost-effectiveness.
- The utilization of EU research results and catchment modelling tools for performing pressure analysis and developing the programme of measures.
- The development of an appropriate monitoring programme.

The quality elements employed were: Lakes: phosphorus concentration; Watercourses: a physical index and a fauna class index; Odense Fjord: the depth distribution of eelgrass.

The baseline characterization of the river basin included an assessment of the risk that the individual surface water bodies and groundwater bodies will fail to achieve "Good status" by the year 2015 with the environmental measures already adopted. The risk assessment took into account the expected effects of the measures already adopted but not yet fully implemented. The risk assessment revealed that a very large proportion of all water bodies in the basin are at risk of failing to fulfil the WFD environmental objective of "Good status" by 2015. It will therefore be necessary to implement further measures to ensure "Good status" is achieved within the timeframe. These supplementary measures are specified in a programme of measures which is a key part of the river basin management plan.

These measures contain a balanced combination of different types of activities. They have been integrated with Natura 2000 planning such that they include measures that will concomitantly contribute to ensuring fulfilment of the Habitats Directive. Some measures aim to reduce a specific type of pressure e.g. reducing diffuse nutrient loading of water bodies from agriculture. Others are multi-functional e.g. setting aside farmland under crop rotation to form new wetlands to concomitantly reduce nutrient loading of surface waters, reduce physical pressure on the watercourses and recreate new terrestrial ecosystems. The new terrestrial ecosystems will eventually help ensure the necessary dispersal corridors in the cultural landscape and halt the decline in biodiversity.

An economic analysis identified the most cost-effective programme for the river basin. The calculated economic cost is approx. €12.6 m/yr. A large proportion of the cost is accounted for by measures directed at point sources (43%), while the remainder (56%) is accounted for by agriculture-related measures and nature restoration. This can be compared to the present total expenses for water use in the Odense River Basin of €82.2m. The programme of measures entails the set-aside of 12,479 ha

of farmland – corresponding to 19% of the farmland in the river basin. Of this, 2% will become woodland, 8% wetlands and 9% permanent grassland. It will reduce the area of farmland in the river basin to 56% by 2015. However, it will remain possible to utilize approx. 3/4 of the land that has been set aside for extensive agricultural production (grazing).

## 7. Cost and resources

There is no information available. The process has been long and on-going and a number of different funding sources have been used over the years.

## 8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

There has been no political assessment of whether the overall costs of the programme of measures are disproportionately expensive for society, and the river basin management plan does not consider how the programme of measures is to be financed, including whether the programme should be paid by water consumers, enterprises or in some other way. Moreover, the river basin management plan does not take into account to what extent the legislation necessary to ensure implementation of the programme is presently in force.

## 9. Success and Fail factors

Fyn County was allocated funds from LIFE ENVIRONMENT to conduct initial work. It was also one of the European Pilot River Basins included in a Common Implementation Strategy to test EU Guidance Documents and gain experience and develop methods necessary to draw up the monitoring programmes and programme of measures. The Danish monitoring programme was started in 1974 and continued nationally in 1989 thus giving a sound basis for describing the necessary means of regulating the human-made impact of the aquatic environment and thus facilitating the political decision process. Various advisory boards and expert groups have also been established with stakeholder participation and the public were invited to a series of meetings organized by the water management authority. Their comments were taken into account when drawing up the river basin management plan. A homepage for the Odense Pilot River Basin through which members of the public can further learn about the progress and nature of the project has also been established.

## 10. Unforeseen outcomes

Fyn County received the 2004 Swedish Baltic Sea Water Award because of the county's efforts to improve the water quality and environmental management in the marine waters as a result of the pilot river basin work.

## 11. Prepared by

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## 12. Verified by










It has not been possible to verify this case.

## 13. Sources

- Odense Fjord, Water Management Plan Provisional Management Plan pursuant to the EU Water Framework Directive (2006) Fyn County
- Odense Pilot River Basin. Pilot project for river basin management planning. Water Framework Directive Article 13. Layman's report. (2007). Danish Ministry of the Environment – Environment Centre Odense, 12 pp.
- Odense Pilot River Basin. Pilot project for river basin management planning. Water Framework Directive Article 5. (2003). Danish Ministry of the Environment –Environment Centre Odense, 132 pp.
- Odense Pilot River Basin. Pilot project for river basin management planning. Water Framework Directive Article 13.

(2007). Danish Ministry of the Environment –Environment Centre Odense, 126 pp.

- Pilot River Basin Outcome Report (2005) Testing of the WFD Guidance Documents. Joint Research Centre and the Directorate General Environment of the European Commission (only available as a purchased download from <http://www.odenseprb.blst.dk>)

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-  OPBR - Article 13 - 2007 (15.91 MB) 
  -  OPRB - Article 5 2003 (18.53 MB) 
  -  OPRB - Laymans report (3.57 MB) 
  -  Odense Fjord water management plan 2006 (9.05 MB) 
  -  Pilot River Basin Outcome Report (9.95 MB) 