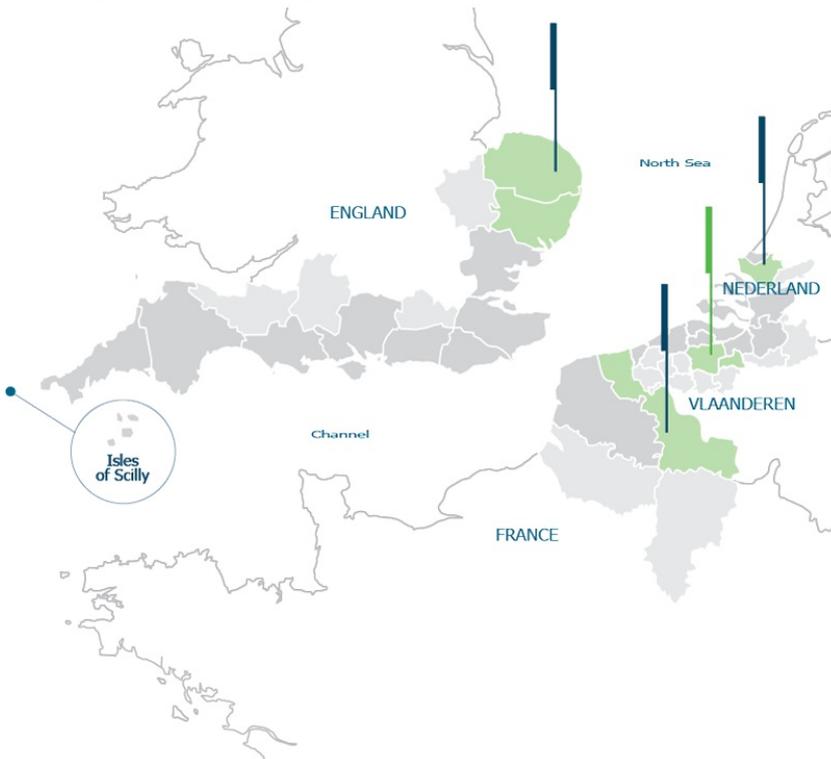


# PRISMA



## Promoting Integrated Sediment Management

### ■ Project summary



Waterways in the 2 Seas area provide us with the basis for social and economic activities, but at the same time, they face environmental threats. The PRISMA (Promoting Integrated Sediment Management) project aims to develop improved methods for the processing, treatment and reuse of sediment in estuaries and coastal waterways from dredging to recycling. The partnership consists of waterway managers and experts in Flanders, the UK, the Netherlands and researchers from France. The aims of PRISMA are: - to develop new dredging methods. - to share and improve methods for the processing and/or treatment of sediment and dredging. - to find new methods of

recycling and reusing sediment in varying applications such as dykes, riverbanks, roads and agriculture. - to communicate with stakeholders - people and business - in order to increase participation and involvement in issues concerning waterways.

### ■ Activities

#### What was the project trying to achieve?

The main aim of the PRISMA project is to decrease the transport volume of sediment, decrease the environmental harmful effects of dredging operations and to increase the economically and ecologically responsible re-use of sediment (thus reducing the volume in deposit). This main aim is specified in 5 operational objectives, namely 1. to jointly develop and test adapted dredging methods in which reducing volume is the central element; 2. to jointly develop and to test improved methods of sediment treatment; 3. to jointly work out and to test different re-use possibilities of sediment; 4. to realize several pilot projects together with knowledge institutes and with a good communication to inhabitants and involved organizations in the project area, 5. to jointly review the legal regulations on sediment management in all 4 countries, to compare the interpretation and to give some recommendations to improve consistent application in

relation to the EU Directives. Furthermore PRISMA aims at establishing better management and a better use of the waterways in the 2 Seas area. A diminished quality of waterways will immediately result in a diminished environmental quality of the seas, which will have major negative socio-economic consequences for tourism, fishing and the living environment. Consequently cleaner waterways will result in better development opportunities for several functions. Furthermore this project focuses on reuse, fewer nuisances for inhabitants, involving companies and organizations by joint action to create a strong transnational added value.

### **What were the activities implemented?**

PRISMA Activities - Trialing different types of dredging methods (suction dredger, cutter suction dredger, bespoke and long-reach excavator, grab crane) - Monitoring of dredging activities - Trialing different types of transport methods (concrete pump, submersible pump, Smith crane, lona barge) - Trialing different methods of treatment, especially dewatering (geotextile bags, geo-tunnel, stabilizers) - Trialing different techniques of beneficial reuse of sediment - Construction of embankment in a tidal river system - Construction of solidification plant - Evaluation of alternative procurement procedure - Bibliographic study on sediments - Global characterization of sediments - Testing of the Mobile Lab (in situ) and validation- Laboratory tests - Study of the kinetics of dehydration - Design of the PRISMA-decision model - Validation of components and application in decision model - Visit of pilots on site W&Z designed an embankment in a tidal river system using geotechnical inferior sediments. After being dredged, the sediments were transported over water by barge and over land by pipeline to the solidification plant and re-used as construction material without intermediate storage. The dike slopes are strengthened with a mixture of grasses (hydro-seeding). Laboratory testing followed by full scale field trial demonstrated that the requirements in terms of stability and permeability could be achieved. The dredging process was monitored and the possibility of maximum re-use of dredged sediments has been investigated. The post construction quality control measurement results were made. The Broads Authority has carried out activities in all 3 activity packages. This is achieved by trialing many different types of dredging methods, transport methods, methods of treatment such as dewatering and ways for beneficial reuse of sediment. The BA carried out 6 pilot projects and several trials. In total 68,000m<sup>3</sup> sediment was dredged, treated and reused.

## **■ Results**

### **What were the key results of the project?**

Key results by Activity Package AP1: - overview of techniques in the field of dredging, including applicability in various areas and identify improvements for trialing - description of adapted dredging and treatment (dewatering) methods and techniques that were tested in The Broads and by AEMD, results of W&Z and HHSK included - reports of workshops, master class, evaluations, designs and technical elaboration of dredging and dewatering methods, economic valuation new methods. - completion of pilots resulting in improved local water quality, and the legacy of adapted equipment which can be reused in future works - pilot reports and evaluation report AP2: - developed and tested mobile laboratory for on-site examination of sediment quality - description of (new) treatment methods and techniques, tested at W&Z, BA and HHSK - developed and tested decision-making model - reports of workshops, peer review meetings, ' -

designs and technical elaboration of mobile laboratory, treatment methods, economic valuation new methods -pilot reports and evaluation report AP3: - comparison of legislation on dredging and reuse in partner countries - assessing new techniques for the reuse of sediment in the construction of islands for new habitat creation, adapting farmland and river defenses in The Broads - designed dyke embankment using engineered sediment, execution, monitoring and evaluation of such a dyke - the construction of a section of road by means of treated sediment, including testing - description of the possibilities of reusing sediment for site preparation - reports of workshops, peer reviews, evaluations, designs and technical elaboration. -pilot reports and evaluation report

### **Did all partners and territories benefit from the results?**

Target groups which experienced a direct, positive effect at objective level are: - waterway management organizations such as: Waterways and Sea canal, The Broads Authority, Waterboard of Schieland and The Krimpenerwaard, Essex and Suffolk Water, Association on Inland Navigation Authorities, - municipalities, local and regional authorities : Norwich, Zuidplas, provinces of East Flanders, Norfolk, Suffolk and South-Holland - the participating knowledge and research institutes: Ecole des Mines (Fr), Armines (Fr) - legislative and regulatory authorities: EU, OVAM (BE) -The target groups have benefit directly from the implemented PRISMA activities because waterways became cleaner and better accessible with lower costs, improved ecological quality, a strong decrease of sediment to be stored in a deposit site and more public-private co-operation in the re-use of sediments. End beneficiaries of the PRISMA project are: - the inhabitants and neighbors of the four partner areas (The Broads, Lille Metropole, Groot Rijnmond and Scheldt area) - visitors and users of waterways: water-based sports enthusiasts, fishermen, landowners and users (like Norfolk Wildlife Trust, Broads Angling Strategy Group, Norfolk and Suffolk Boating Association) - companies: recreational, agricultural, fishery and supplier companies; sediment using companies, civil-technical companies, navigation - law and regulators: national bodies, EU, OVAM (BI) - Municipalities and locations that wish to avoid the storage of dredging spoil These groups have benefit from the activities carried out and the investments made because nature has been better protected, pollution of waterways and environment has been reduced, nuisance has been avoided (minor transport by road), activities like recreation, fishery and agriculture) are maintained in a sustainable way and waterways became better navigable.

### **What were the effects / outcomes for the territories involved?**

In the Scheldt area W&Z carried out the Vlassenbroek pilot. As the Upper Scheldt needs to be dredged W&Z choose to reuse this sediment in a compartment dyke at Vlassenbroek controlled floodplan. The sediment was transported by barge and pipeline, also other deliveries were done by barge, no transport by road was used. The setup of the project foresaw an alignment of the dredging and the treatment without intermediate storage. By turning geotechnical unsuitable sediments into viable construction material no storage in a deposit site was needed. This implementation effected the well-being (less nuisance) and progress of the inhabitants in the area (protection against flood). In the Broads techniques and methods for steps in a dredging process are applied. Small scale excavators, barges, etc. are used to minimize the hinder for people who live, recreate or sport in the Broads. All sediment is used in near the dredging area itself and therefore did not lead to hinder for the inhabitants. With the reuse of sediment for reconstruction of banks and islands the sustainability of the area has been

improved. In the community of Zuidplas the inhabitants are confronted with the dredging of sediment, some of it contaminated. The sediment was treated in geo-bags added with flocculants. Most of the sediment could be used to raise the agricultural land, to reinforce slopes of the embankments or in the construction of a ramp of a highway. Even the contamination of part of the sediment decreased, so that less sediment as expected had to be transported to a deposit site. Due to the project the transit of water and the conditions for shipping are improved. The joint activities regarding the mobile lab and the decision model, led by AEMD, had the positive effects that with knowing the characteristics of the sediment and the possibilities for reuse almost directly on site, there is no time and money lost in deciding what to do with the sediment.

### ■ Distinctiveness

#### **What was the real added-value of doing this cross-border project?**

In the PRISMA project several joint activities took place. The added value is mainly the product of cross-border cooperation. Joint actions were established for improving existing dredging techniques and reducing the negative environmental impacts. This was tested in different pilots, at different sites in different regions. The partners developed together a mobile laboratory enabling a quick analysis of the quality of the sediment on site and developed a decision framework model enabling immediate decision on what to do with the dredged sediment. Within this framework a comparison has been made between the interpretation of present regulations in the four countries and in what way these could be harmonized. Together the partners tested various forms of treatment (geo-textiles) and reuse (dykes, banks, roads). By dissemination of the results in various international events also other European organizations and authorities benefitted from the studies and experiences of PRISMA.

#### **Have any synergies been developed with other projects or networks?**

For the decision model we interacted with GeDSeT, an Interreg IV ERDF project of French and Belgian partners on Sustainable Management of Transboundary Sediments. Ecole des Mines de Douai (EDM) is one of the partners and they could use the knowledge of GeDSeT for building the PRISMA decision model. PRISMA interacted with the EU project DredgDikes, which is a South Baltic Cross-border Co-operation project, dealing with the implementation of dredged materials in dike construction. Field testing, a pilot dike and a best-practice guideline are the three main components. These items are also objects of the PRISMA project, especially in the Vlassenbroek pilot (compartment dyke based on treated sediment). We have visited each other's locations and exchanged our knowledge. Besides this we held also presentations about the PRISMA results at the conferences of Dredgdikes in Rostock and Gdansk. Furthermore PRISMA partners presented the PRISMA outcomes also in other international settings.

#### **What are the key messages , key lessons learned you would like to share?**

At the start of a project it has to be clear what every partner has to do and when it has to be ready. The PRISMA project manager and coordinator have to monitor the progress of the project and communication activities and have to be able to act subsequently and each partner have to be informed about the progress of the project. To establish good results and sufficient development of expertise and experience organize interaction between partners and with other



projects and organizations in and outside the project for instance organization of technical meetings, conferences, workshops and excursions. The interaction between partners is very important to come to a good result. With good monitoring and frequent feedback between all partners the partnership gets more opportunities to establish good results and to respond to unexpected changes or setbacks. Working together in a joint activity can lead to benefits in experience and knowledge.

## ■ Project Information

<b>Title</b>	Promoting Integrated Sediment Management
<b>Total project budget</b>	€ 6 408 452
<b>ERDF</b>	€ 3 204 226
<b>Priority &amp; objective</b>	Priority 2 e. Improve and enhance good practices in water, waste and resources management, and sustainable use of resources
<b>Timeframe</b>	2009-08-01 - 2014-06-30
<b>Lead partner</b>	Waterwegen en Zeekanaal NV
<b>Project Coordinator</b>	Els SERBRUYNS(els.serbruyns@wenz.be)

