COAST BEST Project

CO-ordinated Approach for Sediment Treatment and BEneficial reuse in Small harbours neTworks

Compost | waste management | recovery of waste | organic waste | dradged sediments

PROJECT DESCRIPTION

Preserving the quality of the marine environment and coastal areas through the integrated management of the sediments generated by the dredging activities of small ports. The **COAST BEST** project focused on testing actions to be taken to promote the use of sediment fractions generated by dredging through an integrated system that includes beach nourishment, reconstruction of morphological profiles as well as other industrial applications.

OBJECTIVES

The project was aimed at creating a system that involves combination of dredging needs with environmental protection in a view of gaining economic, social and environmental benefits. Port and channel dredging activities can have very negative impacts due to the generation of large quantities of pollutants that need adequate treatments to avoid contamination of marine environments and coasts. Among the project objectives there was also the reduction of the consumption of natural resources through an increase in knowledge on dredged and treated sediments as an alternative to raw materials. COAST-BEST was inspired by the principles of Integrated Coastal Zone Management (ICZM) aimed at integrating policies that affect coastal areas and promoting the economic and social well-being of the concerned territories.

PROJECT PHASES

The study area consisted of 9 small harbours positioned along 130 km of the Romagna coast characterized by shallow water at risk of silting that need to be constantly dredged to allow navigability. These are Goro, Porto Garibaldi, Cervia, Cesenatico, Bellaria Igea Marina, Rimini, Riccione, Porto Verde, Cattolica, all belonging to the category of harbours with channels built on river mouths or along artificial channels. Given their characteristics related to the position, length of the docks, and direction of the currents carrying sediments, all harbours are subject to silting problems. The materials that accumulate in the mouths of the harbours consist of sediments that move along the coasts driven by coastal currents. In a stretch of coast like the one analyzed, the excavation of a channel to facilitate the access of the boats to the harbour entails a change in the morphology of the seabed which however has a short duration; the wave motion moves the sediments, filling the marine channel and restoring the initial conditions of the seabed. Harbours located in the final stretch of waterways are also subject to silting due to the sediments

transported by them.

The project was divided into 7 actions, among which the main ones were:

- collection, processing and organization in ***database*** of existing information for the assessment of the territorial context and of eventual current constraints for the management of dredging activities in case studies. The database was developed using the "Visio and ArcGIS Diagrammer" database design software. This database is compatible with all Access versions (starting from version 2000) so it can interact with all the most common GIS softwares compatible with the ESRI database file.
- **characterization of dredged sediments**: according to the ISPRA sampling and analysis protocols, an in-depth chemical, physical and toxicological characterization campaign of sediments was carried out in the area of interest. In order to optimize the analysis 4 ports were selected among the 9 harbours of the Emilia Romagna coast, where to conduct the characterization campaign. The characterization of the sediments allowed to highlight the main physical and chemical characteristics of the dredged sediments in the ports. The analyzes showed that some samples could be directly used for beach nourishment as the contents of fine substances (<0.063 mm) were less than 10% and contaminants were below the limit foreseen for residential sites. A particular concentration of metals and PAHs was noted in the fraction > 500 mm, therefore a treatment could be conceived for the purposes of:

- separate the fraction > 500 mm, thus reducing the content of PAHs and metals, as well as of organic material in general;
- separate the fraction < 63 mm, thus further reducing Zn content.

- **Design and implementation of a pilot plant** for carrying out separation tests on sediments dredged in the study area. This plant was installed in a warehouse in the port of Livorno. The plant was designed based on the results of the laboratory-scale separation tests, and is composed of the following treatment units:

- wet sieving floor,
- separating screw,
- attrition cell,
- hydrocyclone,
- settling tank,
- thickening tank.

- implementation of an **integrated sediment management system** related to the different phases of the process, i.e dredging, separation, reuse and final disposal of sediments with the involvement of local authorities and potential users of the sediments. The performed analysis concerned:

- best alternatives for managing fractions deriving from the granulometric separation of sediments;
- main rules related to the different aspects of sediment management;
- different urban and environmental constraints;
- different management alternatives according to their feasibility;
- different relocation options in the dredged sediment market;
- integrated management system options.

- **development of the plan and experimentation of sediments reuse**. This action included experimental studies to evaluate the possible use of dredged and treated sediments in the field of reconstruction and restoration of key morphological elements of brackish and marine environments and of beach nourishment.

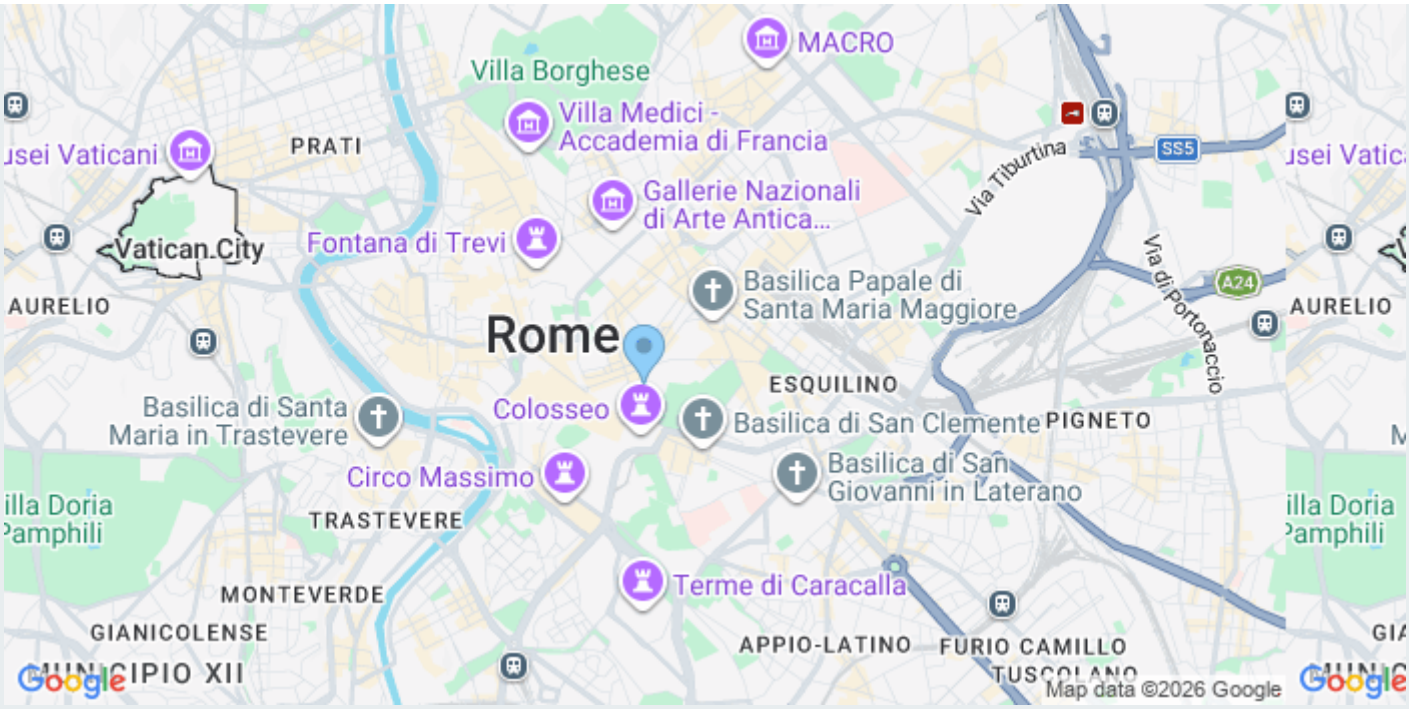
For dissemination purposes various communication channels were activated between partners, potential users, industries and public as well as private academic institutions, both to foster cooperation between partners and to promote project activities to the external audience (industries and public and private academic institutions).

PROJECT RESULTS

Main result of the project, above all, was the identification of possible **management options** of dredging sediments and of the recovery of some isolated fractions. With regard to beach nourishment, potential environmental impacts deriving from transport, storage, treatment, final disposal and/ or use of dredged sediments were identified. At the same time mitigation actions were defined for cases when the caused impact can negatively affect the environmental quality, and criteria were identified for the preliminary, in-progress, and after-intervention environmental monitoring. According to the project result, the benefits deriving from the removal of polluted materials from the harbours would manifest in terms of improvement of the quality of coastal and

marine ecosystems reducing the exposure of ecosystems to polluted materials, and decrease in the disposal of sediments in landfills reducing the impact of landfill emissions. This would also result in savings in land use and a reduction in the consumption of raw materials.

Furthermore, reducing dredging costs through the creation of a local sediment market would lead to the creation of new jobs. The integrated management model for the dredging of small harbours proposed by COAST-BEST could be replicated in contexts similar to the one in Emilia-Romagna. Following the implementation of the tested integrated system, the criteria and methodologies for sampling, preservation and analysis of marine and port sediment samples to be adopted for the characterization of small harbours in the Emilia-Romagna region were defined and illustrated in a **report**. The project has shown that through appropriate treatment of dredged sediments, it is possible to obtain fractions of selected materials with characteristics suitable for reuse. The implementation of technical regulations and the standardization of the conditions required for the use of sediments should be a follow-up action of the project, both at local and national level.



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Acronym
COAST BEST

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Reference Programme
LIFE

Beneficiary Coordinator
Dipartimento di Ingegneria civile, Edile, Ambientale(DICEA) - Università degli Studi di Roma “La Sapienza”

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812.465,00

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2010

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2013

Beneficiary headquarters

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Region
Emilia-Romagna

Description

Emilia Romagna, Lazio, Sardegna, Toscana