



Effective ICZM strategy identified for harbour dredging

Removing sediment from harbour beds to allow ships to enter can significantly accelerate coastal erosion, the gradual wearing away of land by the sea. A new study highlights this damage and identifies a compensation strategy used in an Italian harbour to mitigate coastal erosion as a good example of effective Integrated Coastal Zone Management (ICZM).

Many natural harbours have large amounts of sediment removed by regular dredging operations from their seabed in order to allow safe navigation of ships. Often the dredged material is removed from the coastal environment by dumping it far offshore.

This study focussed on the Italian harbour of Marina di Carrara as a case study, where sediment is frequently removed to increase its natural depth (around 7m) to 10-12m, causing a net loss of thousands of tonnes of sediment per year. The dredging accelerates the rate of coastal erosion in the region, exposing inhabitants to a higher risk of flooding and risking severe damage to natural habitats, such as sand dunes. It is expected that the risk of flooding in vulnerable coastal areas will increase with climate change.

Legislative recommendations under the Barcelona Convention¹ and proposals recently submitted by the Beachmed² project take into account the competing interests of the harbour facilities, coastal environment conservation, tourism and local infrastructure. However, there is no specific European legal framework in place to regulate marine sediment management. The concern is that short-term measures taken by local authorities are often made without a long-term management strategy. Using dredging data from between 1993-2008, the research estimated average volumes of dredged sediment per year in the Marina di Carrara harbour and evaluated the different management approaches implemented by the local authority.

During the 15-year time period, 850,000 m³ of sediment was dredged from the harbour. Only 320,000 m³ was deposited in shallow water and used for "beach nourishment", which replenishes coastal areas already damaged by erosion. The majority of the sediment (530,000 m³) was disposed of in ways that removed it from the harbour permanently. 305,000 m³ was dumped far offshore, 215,000 m³ was dumped in Confined Disposal Facilities (CDFs) for further use and 10,000 m³ of sediment was lost from the harbour to landfill sites. Regulations state that sediment that may be contaminated, for example, through the build-up of chemical toxins, must be put into an onshore landfill site, not dumped directly at sea. This means it cannot be used in beach nourishment.

As the Italian Ministry of Environment began to recognise the impact of dredging in the Marina di Carrara Harbour, a compensation strategy was put in place in 2007. For every 25,000 m³ of sediment dredged at the harbour inlet, the same volume (or higher) must now be compensated by sediment nourishment. However, the compensation criteria will need to improve significantly to balance the sediment deficit accumulated since 1993.

The researchers are confident that the strategy based on scientific results used by the Marina di Carrara harbour represents a valuable case study on which clear laws on Integrated Coastal Zone Management in Europe can be built. Other proposals for mitigation made by the study involve changing the current layout of the harbour to minimise the dredging required and extending the breakwaters offshore, which has been successful in some Danish Harbours.

1. See: <http://ec.europa.eu/environment/iczm/barcelona.htm>
2. See: EU Beachmed Project www.beachmed.it/Default.aspx?tabid=130

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