

# Sediment Management Plan in Port of Taranto

**Francesca Giaime<sup>1</sup>, Serena Geraldini<sup>1</sup>, Gaetano Internò<sup>2</sup>, Massimo Gabellini<sup>1</sup>**

<sup>1</sup>ISPRA, Via di Casalotti 300, 00166 Roma, Italia

Phone: +39-06-61570510

<sup>2</sup>Taranto Port Authority, Via Porto Mercantile 1, 74123 Taranto, Italia

E-mail:

francesca.giaime@isprambiente.it

**Introduction:** The Port of Taranto have an international relevance as commercial harbour, because of the steady increase traffic, becoming in 2006 the second Italian port with 49.434.294 tons of goods. Because of the international crisis, goods traffic has decreased, reducing to 27.174.687 tons in 2009 and 17.117.338 tons in the first half 2010.

The Port has a strategic location in the Mediterranean Sea, halfway between east and west and far only 172 nautical miles from the main shipping route connecting Gibraltar to Suez Canal.

The harbour serves also an important industrial area, containing a steel production industry (ILVA), a refinery (ENI), a concrete factory (CEMENTIR), and small and medium sized factories.

Moreover, in the area of Taranto there are also landfills for municipal waste and large military settlements facing the western marine area; many sectors in the eastern marina area, instead, are used for mussels farming activities.

Taranto harbour to be competitive, need to realize several activities, planned in a specific Port Development Plan (PDP), which consist of dredging operations, for about 19 mln m<sup>3</sup> of sediments, and the construction of piers, used also as Confined Disposal Facilities (CDFs).

In 2000 Ministry of Environment included Taranto harbour in "National Relevance Contaminated Sites", (Law 426/98). In this context, is requested a preliminary characterization and, on the basis of the sediment quality, a specific management plan; in accordance with environmental legislation is necessary to schedule any infrastructure realization or dredging activity in the area.

Because of the huge volumes of sediment involved, the complexity of environmental context and of PDP's operations, the Port Authority, in cooperation with ISPRA, characterized many marine areas finalized to a correct sediment management plan.

**Regulations:** In National Relevance Contaminated Sites, dredging activities and sediment management are regulated by specific laws (art.1, par. 996 of Law 296/2006 and its implementing decree). They included the sediment characterization criteria, according a chemical, physical, microbiological and ecotoxicological approach. As management options are considered the filling of CDFs on coastal area, the beach nourishment and, eventually, a controlled spilling into sea.

In addition, a national technical document concerning the characterization of dredging sediments according to national remediation law (D. Lgs. 152/06) "Manual for the handling of marine sediments" was used to identify different quality degrees of the sediments and to select the correct management options.

**Sediment quality:** The environmental characterization highlighted the following aspects: sediments grain size is mainly medium-fine; sediments are contaminated by organic compounds (PAHs and heavy hydrocarbons), metals and trace elements (Hg, Pb, Cu, As and Zn). The pollution reaches, in some cases, 3 meters deep.

Moreover, the stratigraphic and chemical speciation analysis locate the presence of a clay bed (Plio-Pleistocene age), which is not influenced by anthropogenic pollution.

Analytical results have been processed by means of geostatistical methods and sediment quality has been represented using different colors (Fig. 1).



**Fig. 1:** Results of geostatistical analysis. Sediment quality

**Sediment management:** the results allowed estimating the different contamination volumes of sediment need to be removed. So, several management cases were considered, according to the terms and timing of implementation of the PDP and relative costs.

The volume of characterized sediment is about 9.5 mln m<sup>3</sup>, of which: about 6 mln m<sup>3</sup> are clayed and good quality sediments, which may be spilled into the sea or otherwise used, also after treatment; about 2,4 mln m<sup>3</sup> are sediments with concentrations exceeding law limits but not hazardous, which can be put in CDFs; about 3.000 m<sup>3</sup> of sediments are classified as hazardous and must be taken to landfill.