

Methodological approach aimed at evaluating the sanitary-environmental risks in a marine area used as a dumping ground of material deriving from lagoon dredging

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This research aims at identifying a series of "guide parameters" to assess the impact produced on the marine ecosystem by the dumping of lagoon muds with a high concentration of nitrogen, phosphorus, mercury and indicators of fecal pollution in an area in front of S. Andrea Island, comprised between Porto Buso and Lignano Sabbiadoro (Northern Adriatic).

The relative proximity of the Lignano tourist resort and the continuous harvesting of edible lamellibranch mollusks from natural colonies advised to extend the investigations in order to quantify any hygienic-sanitary and toxicologic aspects related to dumping operations (1).

In the period between December 1991 and February 1992, about 60,000 c.m. of lagoon muds were dumped in a limited section of an area authorized by the Italian Ministry on Environment.

In September 1991, before these operations began, by using a modified Van Veen grab, a series of samplings were carried out on the sediments of the stretch of the Marano Lagoon that had been subjected to dredging and in the marine area chosen to receive the dredged material, with the aim to characterize the sediments and highlighting any possible differences.

Investigations were confined to the following standard regarded as the most significant: granulometric profile in order to follow sediment redistribution; total nitrogen and total phosphorus with the aim to characterize the risk of a release of "eutrophication" agents; mercury, to evaluate the risk itself and as a more general indicator of contamination from bio-cumulative stable micropolluting agents; total microbic load to evaluate the general process of microbic contamination; total coliforms to assess the infectivologic risk related to the consumption of edible mollusks and bathing activities.

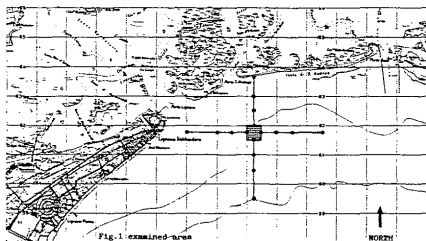
16 sampling sites were identified as indicated in the annexed figure: the first four located along the perimetric sides of the area affected by the dump (400 m wide); the following four about 500m away from the former, arranged along the orthogonal directrices to the sides; another four at another 500 m., and the last ones at 2000 m. from the first group of four.

A second series of samplings was carried out at the end of the dredging operations, in February 1992, evaluating at the same time any release phenomena into the body of water by means of a series of water samplings taken at the surface and at 1 metre from the sea-floor.

The monitoring model used allowed to underline a significant previous contamination of marine sediments with regard to microbiological parameters (sometimes of the same level) and mercury (up to 10 times more abundant than in the lagoon) in addition to underlining the great differences in the grain-size distribution of the marine sediment which, seaward, showed marked analogies with lagoon sediments. It also made possible to clearly identify the various concentrations of total nitrogen in marine sediments, 3 to 5 times lower than lagoon sediments.

The first series of inspections carried out after the dumping operations identified a considerable modification of the sediment only confined to the area affected by dumping, whereas transfer phenomena from sediments to water were not observed.

The fine fraction of lagoon sediments, resuspended by dumping operations and by the action of the waves, appears to be responsible for the transfer of pollutants.



REFERENCES

MAJORI L., DARIS F., MEDOCLAN G., MODONUTTI G.B. and MATTASSI G., 1991. - Metal distribution (Cd, Cr, Cu, Hg, Ni, Pb, Zn) in Northern Adriatic lagoon sediments and interrelationships with the concentration found in bioindicators (*Mytilus galloprovincialis* Lmk). Rev. Intern. Océan. Méd. 101-104, 221- 224.