Biodiversity and Dumped Material Series

An Overall Assessment of the Dumping of Wastes at Sea from the mid-1980's to 2001 in the OSPAR Area

OSPAR Commission

2003

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l'Espagne.

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INTRODUCTION

Assessments of the OSPAR Reports on Dumping of Wastes at Sea aim at identifying issues of concern related to data and information reported by Contracting Parties. Initially, the assessments were also intended to provide reliable data on contaminant inputs through dredged material to the OSPAR maritime area, however, it was recognised that the contaminant loads reported are much larger than the actual inputs. This Overall Assessment considers trends in wastes dumped at sea in the period from the mid-1980's to 2001 and in particular examines trends in the amounts of dredged material dumped and the associated contaminant loads. Evidence of downward trends in contaminant inputs or concentrations enable judgements to be made about the effectiveness of measures taken to reduce inputs of contaminants from both direct and indirect sources to estuaries and coastal waters.

AMOUNTS OF WASTES OTHER THAN DREDGED MATERIAL DUMPED

Although several types of wastes are still dumped, since 1998 more than 99 % of the overall amount licensed for disposal at sea refer to dredged material. The sea disposal of industrial wastes and sewage sludge stopped on schedule by the end of 1995 and 1998, respectively. Disposal of vessels which will be phased out in 2004, decreased from 86 in 1990 to 35 vessels in 1999 and 2000, each year, with minima of 8 and 7 vessels in 1994 and in 1998, respectively.

Disposal of fish waste, inert material, and bulky wastes continues. Disposal of inert material, including e.g. rock, colliery, mining wastes, decreased significantly from several million tonnes per annum in the early nineties to a maximum of a few 100 000 tonnes per annum in the late nineties. The amounts of bulky wastes (for example steel wire and concrete) and fish waste disposed of at sea are comparatively small: quantities of bulky wastes disposed of varied from less than 100 tonnes in most years to more than 1000 tonnes in 1991 and 1997, and disposal of fish waste amounted to less than 1000 tonnes/year except in 1992 and 1993.

AMOUNTS OF DREDGED MATERIAL DUMPED

Since disposal of dredged material may have physical impacts on the marine environment, total amounts of material disposed of at sea are included in the assessment.

The overall amounts of material disposed of at sea vary significantly from approx 80 - 100 Million tonnes (dry weight) in 1990 to 130 Million tonnes (dry weight) in 1999, and 110 Million tonnes (dry weight) in 2000, but no trends can be observed. As the amounts of material to be dredged are strongly influenced by natural conditions, dumping strategies, and episodic capital dredging activities which occasionally contribute huge amounts to the total amount of dredged material disposed of at sea, trends in the amounts dumped are not expected to be seen in future.

DREDGED MATERIAL CONTAMINATION

Trend assessment of total contaminant loads is not regarded as an appropriate means to evaluate the effectiveness of measures for the reduction of contaminant inputs resulting from the disposal of dredged material at sea since:

- Contaminant loads are significantly influenced by the varying amounts of dredged material disposed of at sea.

- It is recognised that the actual contaminant inputs from dredged material disposal operations are likely to be much lower than the total contaminant loads reported resulting from the continual return of sediments from disposal sites to dredging sites due to natural currents.
- The bulk of dredged material disposed of will not add new contaminants from anthropogenic sources to the sea, provided all input paths, such as direct discharge, riverine and atmospheric inputs or diffuse sources are taken into account in the overall estimation of contaminant inputs to the sea.
- Loads of naturally-occurring contaminants include a substantial proportion derived from the background content of the contaminants in the mineral matrices.

Therefore, trends in contaminant concentrations were examined. In order to reduce variability due to differences in analytical approaches applied by Contracting Parties and due to inconsistent data sets, evaluations were carried out for a number of Contracting Parties separately. The assessment includes average concentrations for all dredged material disposed of at sea in Belgium and the United Kingdom, as well as data from Germany for the Elbe Estuary and the Netherlands for Rotterdam Harbour.

As reports on trace metals were complete, trends in trace metal concentrations could be examined. However, with regard to organic contaminants and Tributyl tin compounds (TBT), sufficient data were only available for Polychlorinated Biphenyls (PCB) from the Netherlands.

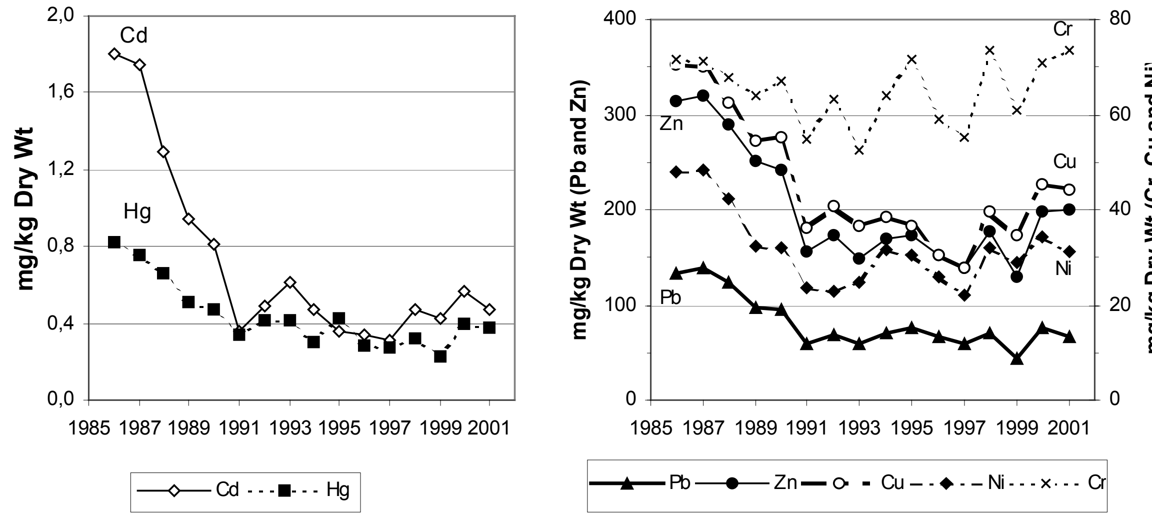
Data from Belgium, the UK, the Elbe Estuary and Rotterdam Harbour demonstrated that there was a rapid decline for Mercury (Hg) and Cadmium (Cd) concentrations with a reduction of approx 60 - 80 % from 1986/1987 to 1991 (Fig. 1a and b). In addition, data from Belgium, the Netherlands, and the UK showed a steady decline in concentrations of Copper (Cu), Nickel (Ni), Lead (Pb) and Zinc (Zn) with a reduction of approx. 40 - 60 % in the same period while concentrations of these trace metals in the Elbe Estuary showed only little or no decrease. A similar decrease of about 50 % was reported for PCB in Rotterdam Harbour (Fig. 2). In addition, in dredged material from Belgium and Rotterdam Harbour, Chromium (Cr) concentrations decreased by about 50 - 60 %, however in Germany and the United Kingdom little or no decline could be observed, as concentrations were probably already close to background concentrations. From 1991 to 2000, a considerably smaller or even no further decrease in contaminant concentrations was discernible.

In future, a further steady downward trend in some trace metal and PCB inputs may be expected as a result of reduction measures such as better control on contaminant sources and on land-based disposal. However, as these contaminants are widely accumulated in coastal sediments, an improvement in contaminant concentrations at dredging sites with strong exchange with coastal sediments will only take place on a long time-scale of probably more than 10 years. In addition, as contaminant concentrations in dredged material approach background levels, the rate of decline will inevitably slow down. This is already evident in at least some of the trace metal data referred to above.

Although no definitive conclusions can be drawn with regard to the contaminant input to the sea via dredged material disposal, the figures on trends in contaminant concentrations in dredged material provided here indicate that most of those contaminants are much closer to background levels than they were 10-15 years ago.

Such a decrease of contaminant concentrations in dredged material should have resulted in a smaller risk from these contaminants for marine species and habitats at disposal sites and receiving areas.

UK - Trace Metal Concentrations
(in sediment fraction < 2mm)



Rotterdam Harbour – Trace Metal Concentrations
(in sediment fraction < 2 mm)

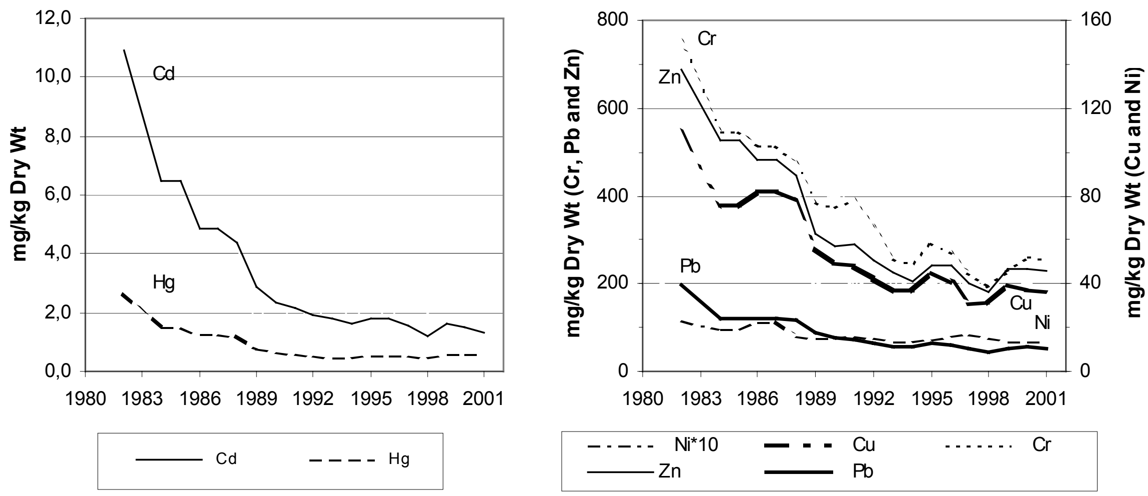
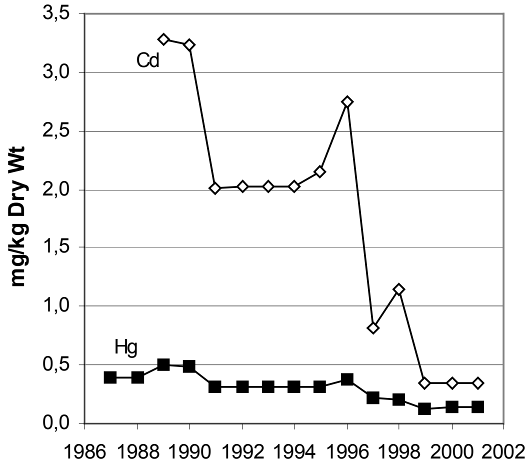
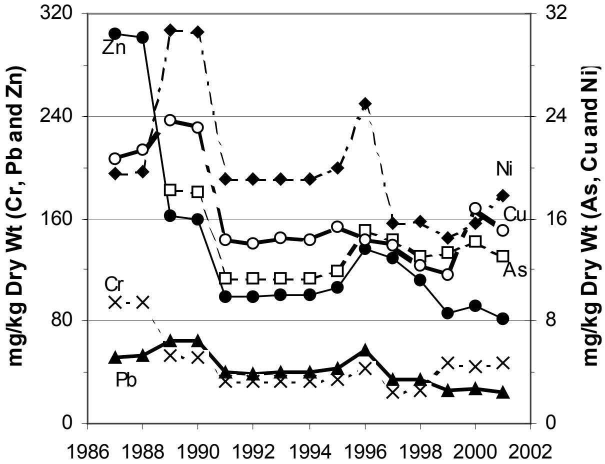


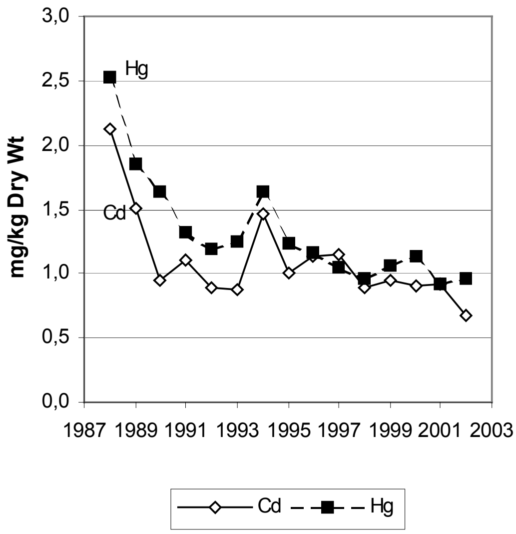
Fig. 1a: Trends in trace metal concentrations in dredged material disposed of at sea in the United Kingdom (average concentrations) and The Netherlands / Rotterdam Harbour (trend lines)

Belgium – Trace Metal Concentrations
(in sediment fraction < 2 mm)





Elbe Estuary/Germany – Trace Metal Concentrations
(in sediment fraction < 20 µm)



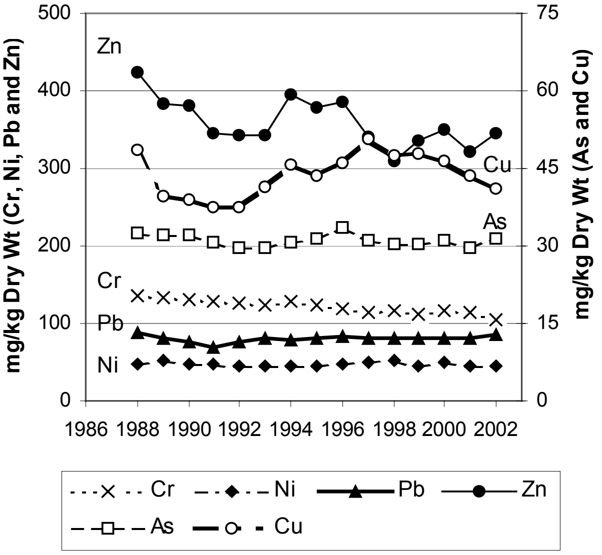


Fig. 1b: Trends in trace metal concentrations in dredged material disposed of at sea in Belgium and Germany / Elbe Estuary (average concentrations)

Rotterdam Harbour/The Netherlands - PCB Concentrations
(in sediment fraction < 2 mm)

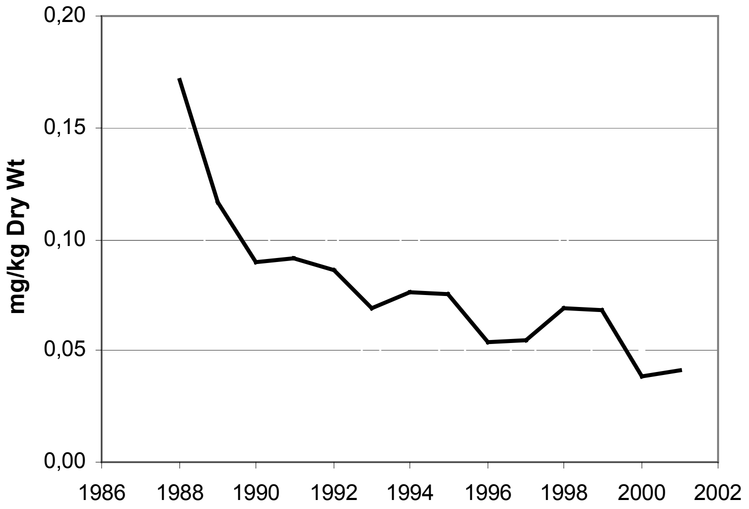


Fig. 2: Trends in PCB concentrations in dredged material disposed of at sea in Rotterdam Harbour / The Netherlands (trend line)

FURTHER PROGRESS

Further progress will inevitably focus on dredged material as the dominant waste material dumped at sea. Reporting on organic contaminants requires improvement, and future reports also should include data on biocides with an affinity for sediments used in antifouling treatments, including TBT and booster biocides. Furthermore, techniques, particularly biological ones, for an integrated assessment of effects of sediment associated contaminants need to be developed or improved. Finally, improved information on monitoring of disposal sites and the development of new and improved monitoring techniques is required.