

Cadmium

Cadmium occurs naturally in geological ores and is found at background levels in the marine environment. Cadmium for industrial or commercial use is derived from mining, smelting and refining of zinc. Its main use in batteries has almost ceased in Europe. It is still used as intermediate and catalyst for electroplating, in pigment in paint, in stabilizer for plastic, in photographic processes and in dyes.

What is the problem?

Cadmium is toxic and liable to bioaccumulate and thus is a contaminant of concern both for the marine environment and for human consumption of fish and other seafood. The main sources of cadmium to the environment are emissions from combustion processes primarily in power plants and industry, but also other commercial and domestic sources. Other relevant sources are releases to water and air including from the metallurgical industry, road transport and waste streams. The main pathway of cadmium to the sea is via air by which it can be carried long distances from its source. With the closure of cadmium refineries in Europe in response to marketing and use restriction regulations, diffuse sources, especially waste streams, are gaining relative importance.

What has been done?

OSPAR measures and subsequent EU measures regulate the main industrial sources for cadmium releases to the environment. Specific marketing and use restrictions in the EU framework restrict the use of cadmium in batteries and in a variety of uses, applications and consumer products, including for example fertilisers, sewage sludge, metal plating, toys and packaging and packaging waste.

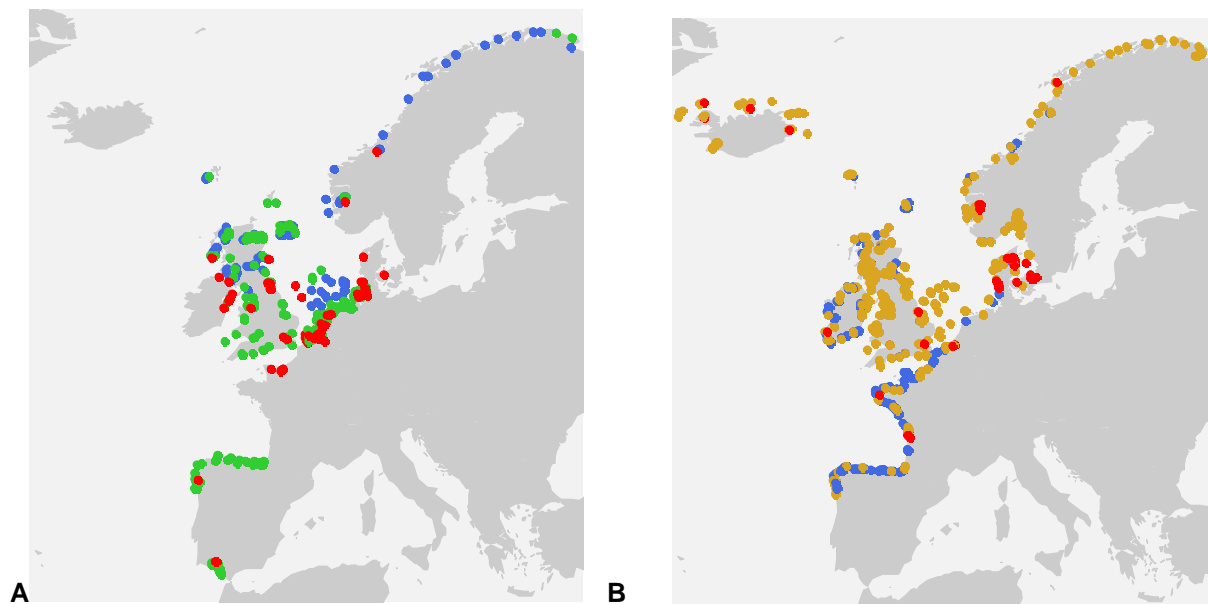
Did it work?

Since 1998, there has been a general reduction in air emissions from OSPAR Contracting Parties. In the period 1998 – 2006, measured atmospheric concentrations of cadmium have decreased in the North Sea area and have also decreased at stations in the Arctic Region and Spain. There have been small reductions in atmospheric deposition of cadmium to the North-East Atlantic over the period 1998 – 2006. Loads of cadmium entering the sea through riverine inputs and direct discharges have also decreased. In Region II (Greater North Sea) and Region III (Celtic Seas) waterborne inputs exceed those from atmospheric deposition. This may also be the case for Region IV (Bay of Biscay/Iberian Coast). Atmospheric inputs remain the most significant input route to Region I (Arctic Waters).

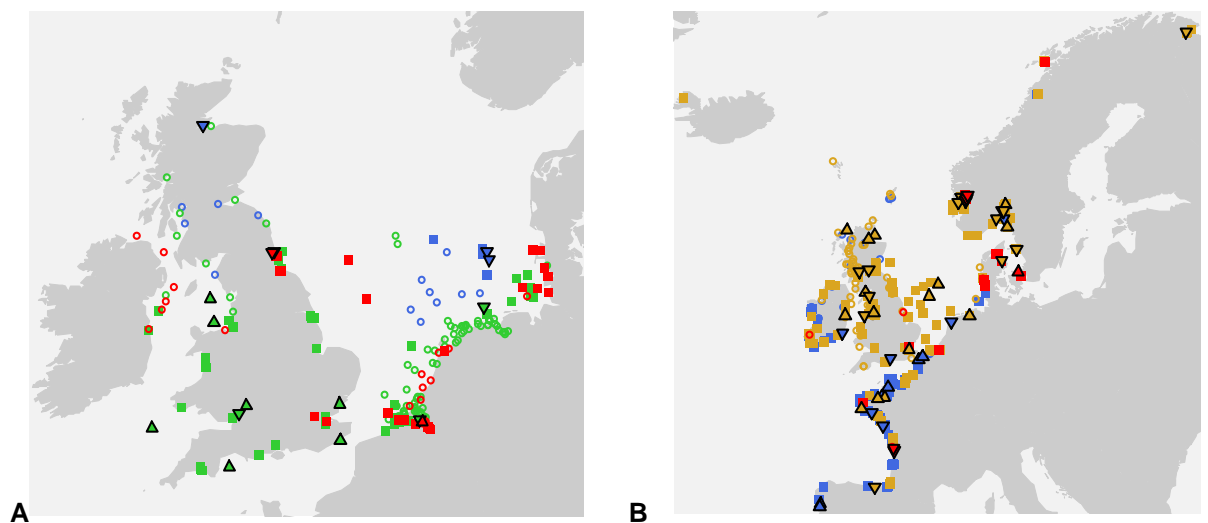
How does this affect the quality status?

Concentrations of cadmium in the marine environment have generally decreased over the period 1990 to 2007 where trends can be detected, but have not been consistently upwards or downwards over the period 1998 – 2007. However, concentrations remain above background in many areas and in some areas are still at levels where there is potential for significant adverse effects to the environment, or to human health. In sediment, concentrations of cadmium are generally near or just above background. However, concentrations in some areas, such as around the industrial estuaries of the Rhine, Seine, Tyne, Tees, Thames as well as in certain industrialised estuaries in Norway (Inner Sør fjord) and Spain (Ria de Pontevedra) and the inner German Bight are at levels which may pose a significant risk of pollution effects.

Concentrations of cadmium in fish and shellfish were above EU dietary limits in some of these areas. The high concentrations are mainly found around the coasts of Denmark, and at occasional locations in the UK, France, and also in Iceland and Norway where geological factors are likely to increase concentrations locally. Concentrations in fish and shellfish are at or below background at a good proportion of sites in Northern Spain, the Bay of Biscay, the Channel coast of France and parts of Ireland and Scotland. Elsewhere, concentrations are above background. Monitoring data from OSPAR Region V (Wider Atlantic) is scarce.



Status of cadmium concentrations in (A) sediments and (B) biota: background (blue), acceptable (green) or below EU dietary limits (amber), and unacceptable (red)



Temporal trends of cadmium concentrations in (A) sediment and (B) biota: downward ▽, upward △, insufficient data for trend assessment ○

Electronic navigator to OSPAR publication sources (publication number):

- Status and trend of marine chemical pollution (395/2009)
- Towards the cessation target (354/2008)
- Trends and concentrations in marine sediments and biota (390/2009)
- Trends in waterborne inputs (448/2009)
- Trends in atmospheric concentrations and deposition (447/2009)
- Background Document for cadmium (151/2004) (as update)