Reduce levels of hazardous substances in seabird eggs



North Sea EcoQO

Mercury: The average concentrations of mercury in the fresh mass of ten eggs from separate clutches of the common tern (*Sterna hirundo*) and Eurasian oystercatcher (*Haematopus* ostralegus) breeding adjacent to certain estuaries should not significantly exceed concentrations in the fresh mass of ten eggs from separate clutches of the same species breeding in similar, but not industrial, habitats.

Organochlorines: For each site, the average concentrations in fresh mass of the eggs of the common tern (*Sterna hirundo*) and Eurasian oystercatcher (*Haematopus ostralegus*) should not exceed: 20 ng/g of PCBs; 10 ng/g of DDT and metabolites; and 2 ng/g of HCB (hexachlorobenzene) and of HCH (hexa-

What is the problem?

Input of mercury and organochlorines into the marine environment. Mercury is a naturally occurring highly toxic metal that has been dispersed widely in the environment by human activities. Organochlorines are man-made chemicals that are persistent in the environment. Both mercury and organochlorines tend to accumulate in the marine environment.

What is the Ecological Quality Objective (EcoQO)?

Many coastal areas are important habitats for seabirds and are protected under the EC Birds and Habitats Directive. These areas are at the same time under pressure from pollution due to environmental chemicals. This contamination affects the coastal food web and accumulates in species at higher trophic level, including birds. Several studies have shown seabird eggs, including those of migrating species like terns, to be good indicators of local contamination with hazardous substances since concentrations in eggs tend to reflect contaminant uptake by the female foraging close to the colony in the days prior to egg-laying. The seabird egg has also been proven to be a favourable matrix for analysing environmental chemicals. The removal of eggs has only a minor impact on the breeding success of the studied population.

Has the EcoQO been met?

Monitoring results are available from a pilot study along the continental coast of the North Sea (Belgium, Netherlands, Germany, Denmark) and the coasts of southern Norway and Sweden. In Norway and Denmark, Arctic tern eggs were sampled instead of common tern eggs. Similar contaminant levels are thought to occur in the eggs of both species. The EcoQO for mercury is slightly exceeded at most sites, being met at one site in the Ems estuary (Netherlands) and sites in Norway and Sweden. The EcoQO for organochlorines was not met at any of the monitored sites. This was because concentrations of PCBs and DDT exceeded the level of the EcoQO at all sites, approaching concentrations close to the EcoQO only in Norway and Sweden. In contrast, concentrations of HCB and HCHs were below or close to the level of the EcoQO at most sites, but are substantially elevated at sites in the outer Elbe estuary and to a lesser degree in the Ems estuary. A similar spatial pattern can be seen in DDT concentrations, but most sites were above the level of the EcoQO.

Concentrations in common tern eggs were generally higher than in eggs of Eurasian oystercatchers, reflecting their higher position in the food chain and consequent bioaccumulation.

Long-term data from the Wadden Sea (since 1981) show a general decline of concentrations of all substances monitored in eggs of common term and oystercatcher at estuarine and coastal sites.



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How does this affect the quality status?

Persistent chemicals that are also toxic, such as organochlorines and mercury, may affect many aspects of an ecosystem. For instance, the reproduction of seabirds may be affected by eggshell thinning, which in turn makes eggs vulnerable to damage or results in death of embryos. Since mercury and organochlorines accumulate in the food chain, top predators and humans run the risk of exposure to high levels, leading to serious health problems.

What happens next?

Regulatory action to reduce the main discharges, emissions and losses of mercury and organochlorines to the environment has been taken. However, the persistent nature of these chemicals, combined with their possible remobilisation within the environment, accounts for the chemical burden in seabird eggs which exceeds the EcoQO value in a number of cases. Continued assessment of this EcoQO in the North Sea is required in order to decide on further management measures or approaches.