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A Note on the Characteristics of the Baltic Sea

Submitted by the Government of Finland

With reference to Regulation 12 of Annex I of the draft Convention, attached is a copy of "A Note on the Characteristics of the Baltic Sea". This Note was prepared by an ad hoc Working Group established during a meeting of Governmental Experts from Denmark, Finland, the German Democratic Republic, the Federal Republic of Germany, Poland and the Union of Soviet Socialist Republics which was held in Helsinki from 28 May to 1 June 1973 in preparation for the Baltic Sea Conference on the Marine Environment. This document has been submitted by the Government of Finland on behalf of other Governments concerned.

A NOTE ON THE CHARACTERISTICS OF THE BALTIC SEA

The largest brackish water area in the world, the Baltic Sea is separated from the North Sea by very shallow sills. The excess of fresh water is contributed by some 200 rivers discharging annually about 450 cubic kilometres of water, i.e., about 1/50 of the total water volume of the Baltic Sea, while precipitation and evaporation balance each other. On the other hand, the inflow of saline water, the amount of which is usually estimated to be about equal to the amount of the fresh water discharge, penetrates into the deep basins of the Baltic Proper to a less regular extent. A number of meteorological and hydrographical processes which today are still poorly understood, regulate the inflow of the saline water masses. The mixing of the fresh and saline water results in brackish water, the salinity of the surface water of the Baltic Sea being only 1/5 of that of the oceans.

The Baltic Sea area is divided into different parts, i.e. the Belt Sea, the Western Baltic, consisting of the Kiel Bight and the Arkona Basin, the Bornholm Sea, the Central Baltic, consisting of the Gdansk Deep, the Western and Eastern Gotland Basins, the Northern Baltic and the Gulf of Finland. While the areas mentioned above are often considered as one hydrographic unit, the Bothnian Sea and the Bothnian Bay are separate basins.

The average depth of the Baltic Sea is only some 55 metres. However, the basins mentioned above are morphologically separated by relatively shallow sills. The entrances of the Baltic are narrow and the maximum sill depth in the Danish Sounds is only some 18 meters. The maximum depth in the basins range from 50 to 250 metres, with the exception of the narrow Landsort Deep (455 m).

The hydrographical and hydrochemical conditions in the deep water of the different basins are markedly affected by the sill between them. Thus each basin has to a certain extent its own hydrographical regime.

In the Baltic Sea proper a less saline water layer extends from the surface to a depth of about 50-70 metres. At this depth there is a sharp salinity discontinuity layer which exists the whole year around. In addition, one or more thermoclines develop during the summer period in the surface water and less marked haloclines often appear above and below the major discontinuity layer.

The multi-layer structure of the Baltic Sea is an important factor resulting in several special features of this Sea. The vertical exchange of matter is highly prevented by the great vertical stability caused by the multi-layer structure. These properties also result in a depletion of oxygen, especially below the halocline, and in accumulation of degradation products from natural and man-induced organic material. During recent decades the oxygen content of the Baltic deep water has decreased apart from interruptions in this trend. Occasionally the oxygen content of the deepest water has been reduced to zero within recent decades, together with the development of hydrogen sulphide. This anaerobic zone might rise up to about 125 metres.

Certain evidence has been given that these changes are caused by natural long-term fluctuations of the climatic conditions. However, it is generally assumed that the whole process is accelerated and intensified by man.

The fauna and flora are unique, and include, in addition to some true brackish water organisms, marine and fresh water organisms living under considerable ecological stress.

The relatively low nutrient contents of the Baltic Sea surface water, the climate and the bottom topography result in peculiarities of the hydrography. Together with these exceptional properties the stress condition of the organisms makes the Baltic Sea sensitive to even small changes in its natural state.

The relatively dense population in the countries surrounding the Baltic Sea, the high and still increasing industrialisation of the coastal zones especially, special meteorological conditions which favour the fallout of airborne pollutants, together with the hydrological conditions as outlined above, result in an accumulation of persistent pollutants, in the food chain, to a greater extent than in the open oceans.

There are reasons to believe that the cold climate, resulting in low average water temperatures, together with the ice cover appearing regularly over large parts of the Northern Baltic region during winter time, decrease the natural degradation processes of many harmful substances. In addition, the activity of the micro-flora is furthermore reduced by the oxygen depletion and the developing anaerobic conditions in the deep water.

The numerous islands which extend to the center of the Baltic Sea region are from an ecological and social, as well as scientific aspect, a remarkable environmental asset.

A list of reference documents is attached.

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