

Hexachlorobenzene

(CAS number: e.g. 118-74-1, EC number: 204-273-9
/ Entry number in HELCOM list of priority substances: 20)

General sectors: Process
byproduct, off-shore (dredged
material deposition), legacy
pesticide

DRIVERS

ACTIVITIES

PRESSURES

STATE

IMPACTS

Why a HELCOM priority?

Main evidence

S Concentrations of Hexachlorobenzene exceed the applied threshold value in **22** of the 42 examined areas (assessment units) of the Baltic Sea. The threshold is exceeded in both coastal and off-shore areas (**12/14** assessed off-shore areas). In these 22 areas, on average **72%** of the assessable samples in **sediment and/or biota** exceed the threshold value. This is based on monitoring data for the period 2015-2024 available in national/international databases¹ and scientific articles/reports², as well as in target screening data from the project LifeAPEX³. A total number of 1583 data points were possible to evaluate for Hexachlorobenzene.

By further considering how much above or below the threshold each concentration is, and how often the substance is detected, Hexachlorobenzene scores **7.5/10** (confidence range: **7.3 – 7.6**) in the scale established when assessing the criticality/significance of current levels in the Baltic Sea pose, where 5 indicates concern and 10 extreme risk, and the range reflects the level of reliability and representativeness of concentrations and the thresholds.

The threshold values for this substance, for sediment and biota, were acquired respectively from the national EU MSFD assessments⁴ and the EC proposed Directive amending WFD and EQSD⁵.

I Current levels in the Baltic Sea indicate potential negative impacts on sediment dwelling biota, pelagic biota, top predators such as mammals and birds, and humans via consumption of seafood.

Supporting evidence

P Approximately **380 kg of Hexachlorobenzene** are estimated to enter the Baltic Sea every year, mainly via atmospheric deposition, which has been modelled by EMEP⁶ (2019) using officially reported emission data. Historical inputs have been higher. Given that the substance is **very persistent, bioaccumulative, and very toxic**⁷, even current inputs are considered as likely significant, in terms of risk they pose for the Baltic Sea and its ecosystem services. As mentioned above, levels in Baltic Sea have already exceeded thresholds, due not only to current but also the historical inputs.

S According to expert information provided, there are **increasing trends in monitoring in two Swedish stations** (likely related to e.g. foodwebs and not increased releases from sediments).

I Hexachlorobenzene is considered to have an especially **concerning mode of toxicity**, as for example it is carcinogenic⁸ (beyond its aquatic toxicity), thus posing high long-term risk to populations (at least for human health via consumption of seafood).

Overall assessment

When assessing current levels in the Baltic Sea, current inputs, and the severity of the relevant toxicity mechanism, Hexachlorobenzene scores **77-79/100** in the scale established for assessing the overall risk for impacts/threat for the Baltic Sea, where 50 indicates concern, 100 extreme risk, and the width of the span outlines the uncertainty in the assessment.

Facts relevant for management considerations

Causal chain and pathways

A Although manufacture and use has been eliminated for signees of the Stockholm Convention (all HELCOM Contracting Parties), it is generated as a byproduct during the manufacture of certain industrial chemicals and also exists as an impurity in several pesticide formulations. The main sector with officially reported releases to the Baltic Sea catchment is **chemical installations for the production on an industrial scale of basic inorganic chemicals** (18 kg/y to air reported to E-PRTR⁹, 2018-2022). On country basis and based on the inventories of unintended emissions reported to Stockholm Convention¹⁰ (also quite incomplete), further relevant sectors in HELCOM Contracting Parties include **ferrous and non-ferrous metal production** (>8kg/y), **heat and power generation** (>5kg/y), and other sectors (>3kg/y) including transportation, open burning processes, and waste incineration. Reported emissions to water/soil mainly from production of basic plant health products and of biocides, and to lesser degree from landfills are in the order of 2kg/y (E-PRTR).

P Based on available estimations, **atmospheric deposition** seems by far the predominant route of direct inputs to Baltic Sea (370 kg/y), followed by riverine inputs (1-15 kg/y based on river mouth data from WATERBASE¹¹) and negligible inputs from deposition of dredged material¹² (~150g/y). Further emissions e.g. from sediment disturbing activities are possible.

Relevant policies (existing or planned measures)

M (on A/P) • Listed under **Stockholm Convention** on POPs (signed by all HELCOM Contracting Parties) – Annexes A (elimination of manufacture and use), C (minimize unintentional releases) – accordingly **EU POPs Regulation** – including respective **national Action Plans** for these.

- Listed as a priority hazardous substance under the **EU WFD** (and its update proposal) – including respective national **Programmes of Measures for this**. The EQSD update proposal also includes an EQS for total of active substances in pesticides, including their relevant metabolites, degradation and reaction products.

References:

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.

[Note: Listing of detailed references will be provided in an upcoming update of the fact sheet – for a listing of the most common references among the different substances see the section at the end of the consolidated document which includes all the fact sheets]