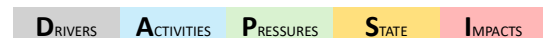


# Cadmium and its compounds

(CAS numbers: e.g. 7440-43-9, EC numbers: e.g. 231-152-8  
/ Entry number in HELCOM list of priority substances: 6)

General sectors: *Industry and commercial products, off-shore (shipping, dredged material deposition)*



## Why a HELCOM priority?

### Main evidence

**S** Concentrations of Cadmium exceed the applied threshold value in **36** of the 41 examined areas (assessment units) of the Baltic Sea. The threshold is exceeded in both coastal and off-shore areas (**16/16** assessed off-shore areas). In these 36 areas, on average **75%** of the assessable samples in **sediment and/or biota** exceed the threshold value. This is based on regular monitoring data gathered by HELCOM Contracting Parties and reported to the HELCOM COMBINE database for the period 2016-2021, in the context of the Cadmium indicator<sup>1</sup>.

By further considering how much above or below the threshold each concentration is, and how often the substance is detected, Cadmium scores **8.0/10** (confidence range: **8.0 – 8.0**) 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 Cadmium were as agreed for the HELCOM indicator for HOLAS 3.

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

### Supporting evidence

**P** Approximately **24 – 60 tonnes of Cadmium and its compounds** are estimated to enter the Baltic Sea every year, mainly via rivers and secondly depositing of dredged material and atmospheric deposition<sup>3</sup>. Given that the substance is **very persistent (metals do not degrade) and toxic<sup>4</sup>** (according to the EU WFD and its update proposal, it also tends to accumulate in sediment and/or biota<sup>5</sup>), 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 historical inputs. Increased inputs in the near future are possible, due to its use and occurrence in emerging sectors, such as mining and metal processing industry.

**I** Cadmium is considered to have an **especially concerning mode of toxicity**: it is carcinogenic<sup>6</sup> (beyond its aquatic toxicity), thus posing high long-term risk to populations (at least for human health via consumption of seafood), and has also a relationship to brittle skeletons.

### Overall assessment

When assessing current levels in the Baltic Sea, current inputs, and the severity of the relevant toxicity mechanism, Cadmium scores **80-82/100** 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** Cadmium and its compounds are manufactured (processed) / imported in the EU in quantities >5,330 – 53,370 tonne/year (not including registered substances only used as intermediates, for which registered volume is confidential)<sup>7</sup>. The **REACH registered uses** include mainly batteries, but also brazing, coatings, and some other sectors<sup>8</sup>. Main sectors which officially reported releases to the Baltic Sea catchment in the context of E-PRTR<sup>9</sup> and the respective shares for the reported emissions are as following:

Releases to water/soil (reported releases 1-12 t/y, in the period 2018-2022): **Mining and related operations** (70%), Pulp production (9%), Thermal power / combustion (5%). Releases to air (reported releases 1-4 t/y, in the period 2018-2022): mainly **Thermal power / combustion** (64%). Further E-PRTR-reporting sectors, with smaller contributions, include for example metal processing industry and landfills.

Emissions from P-Cd fertilizers, as well as from biosolids from WWTPs are also expected.

**P** Based on available estimations, Cadmium appears to enter the Baltic Sea mainly via **rivers** (17-49 t/y, PLC<sup>3</sup>) and secondly via depositing of dredged material (3-6t/y, HELCOM BSEFS<sup>10</sup>) and atmospheric deposition (3-4 t/y, PLC). Direct emissions from land-based activities are lower (0.4-0.6 t/y, PLC). Shipping emissions seem to be negligible (<1 kg/y, EMERGE<sup>11</sup>).

### Relevant policies (existing or planned measures)

**M (on A/P/I)** • **Some activities are restricted under EU REACH** (use in paints, plastics, cadmium-plated metallic articles in certain applications (e.g. furniture, agriculture, food production, household goods, certain equipment and machinery, etc.), brazing fillers, metal components for jewellery making, hair accessories) and some under EU RoHS (electrical and electronic devices). **Some Cadmium substances are listed as SVHC** (Substances of Very High Concern) **under EU REACH** (e.g. on the basis of CMR properties). ECHA has also developed an **Assessment of Regulatory needs (ARN) for complex inorganic substances**, including several substances containing cadmium (ECHA<sup>12</sup>). Further relevant ARNs for Cadmium substances may exist (to be confirmed).

• Cadmium and its compounds are listed as a priority hazardous substances under the **EU WFD** and its update proposal. Cadmium is also a **HELCOM indicator**.

• Cadmium is listed among contaminants with maximum levels in **EU Regulation 2023/915, including seafood**.

## 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]