Uranium and its compounds

(CAS numbers: e.g. 7440-61-1, EC numbers: e.g. 231-170-6 / Entry number in HELCOM list of priority substances: 22)

General sectors: Nuclear, munitions

DRIVERS | ACTIVITIES | PRESSURES | STATE | IMPACTS

Why a HELCOM concern?

Main evidence

S Concentrations of Uranium exceed the applied threshold value in **5** of the 6 examined areas (assessment units) of the Baltic Sea. The threshold is exceeded in both coastal and off-shore areas (**4**/4 assessed off-shore areas). In these 5 areas, on average **89%** of the assessible samples in **water** exceed the threshold value. This is based on monitoring data for the period 2015-2024 available in national and international databases[1]. A total number of 43 data points were possible to evaluate for Uranium.

By further considering how much above or below the threshold each concentration is, and how often the substance is detected, Uranium scores **8.1/10** (confidence range: **4.7 – 8.5**) 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 value for Uranium, in water, was acquired from national EU WFD assessments[2]. **Uncertainties exist regarding large variation in toxicity across different Uranium chemical forms** (see section about uncertainties below). Uranium also has a CLP harmonized classification as Aquatic Chronic 4.

P The amount of Uranium estimated to enter the Baltic Sea every year via rivers is approximately **249 tonnes** (WATERBASE[3]). Additional inputs are expected from atmospheric deposition and potentially direct emissions from land-based sources. Given that Uranium is **persistent and toxic**[4], 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. The riverine data used for the estimation concerns only measurements in the proximity of river mouths, and the period 2015-2022. The 36 subcatchment areas for which there was such riverine data reflected 37 % of the total riverine flow to the Baltic Sea, to which inputs have been extrapolated. The data in WATERBASE included approximately 2 countries and 2918 samples. Increased inputs in the near future are also possible with increases in mining and stone extraction.

I Current inputs and levels in the Baltic Sea indicate potential negative impacts on pelagic biota.

Overall assessment

When assessing current levels in the Baltic Sea, current inputs, and the severity of the relevant toxicity mechanism, Uranium scores **54-85/100** 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 Uranuim is a likely naturally ocurring element, whereas there are historic sources from past mining and the Chernobyl event[5]. A possible new source is depleted munitions[6].

S ? *In order to further improve the evaluation of risk, one aspect that could be investigated in the future is a review of the water toxicity threshold (including whether background levels taken into account; and speciation, as athere is a large variation across different Uranium chemical forms). Furthermore, it is relevant to assess the relative relevance of anthropogenic emissions, taking into account possible future emissions from depleted munitions.*

Relevant policies (existing or planned measures)

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References:

1. 2. 3. 4. 5. 6.

[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]