

## **Critical Raw materials (Li, Co, REE, Be, F, W) in Swedish groundwater**

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The EU is striving for a higher domestic production of Critical Raw Materials (CRM) to secure that the European Green Deal is reached by 2050. To reach sustainable mining of CRM, the environmental standards must be high, minimizing the adverse effects in the vicinity of the mine sites. Inadequate processing, mine waste storage and mine closure can result in negative consequences for ecosystems and human health, and generate expensive remediation costs. Several CRM are classified as emerging contaminants of concern. However, the geochemical knowledge regarding most CRM is too limited to determine which precautions that should be taken to avoid metals leaching. CRM are traditionally not included in standard analysis in monitoring programs, background levels of most CRM in the terrestrial environment are limited, and guideline values are missing. Previously, research has mainly focused on metals in acid mine drainage and tailings from sulfidic deposits. Recent studies of skarn tailings revealed that several CRM (Be, Bi, F, W) were mobile in neutral mine drainage and transported several km with the surface water downstream the mine site [1]. These results raised a concern that CRM-polluted groundwaters have been overlooked in Sweden. In this study, we created a map, combining CRM data from the Swedish Geological Survey in 1) 600 groundwater wells, 2) 23 historical tailings, 3) the bedrock, and 4) the geochemical atlas. Layers of groundwater reservoirs and protected areas (e.g. Natura2000) were also added. The aim was to get a better understanding of CRM in the terrestrial environment in Sweden and to locate areas potentially polluted by CRM (Li, Co, REE, Be, F, W). Identified areas at risk will be studied in detail to understand the source, mobility and fate of CRM and the results will be used to reach sustainable mine waste and water management in future CRM mining projects.

[1] Hällström (2022), *Mine Water and the Environment* 41(3), 731-747.