

STD effects on vulnerable fjord species

Background

Did you know that Norway is one of few countries that still permits submarine tailings disposals (STD)? This practice involves releasing mining waste directly onto the seafloor in fjord systems, which can disrupt marine ecosystem functions.

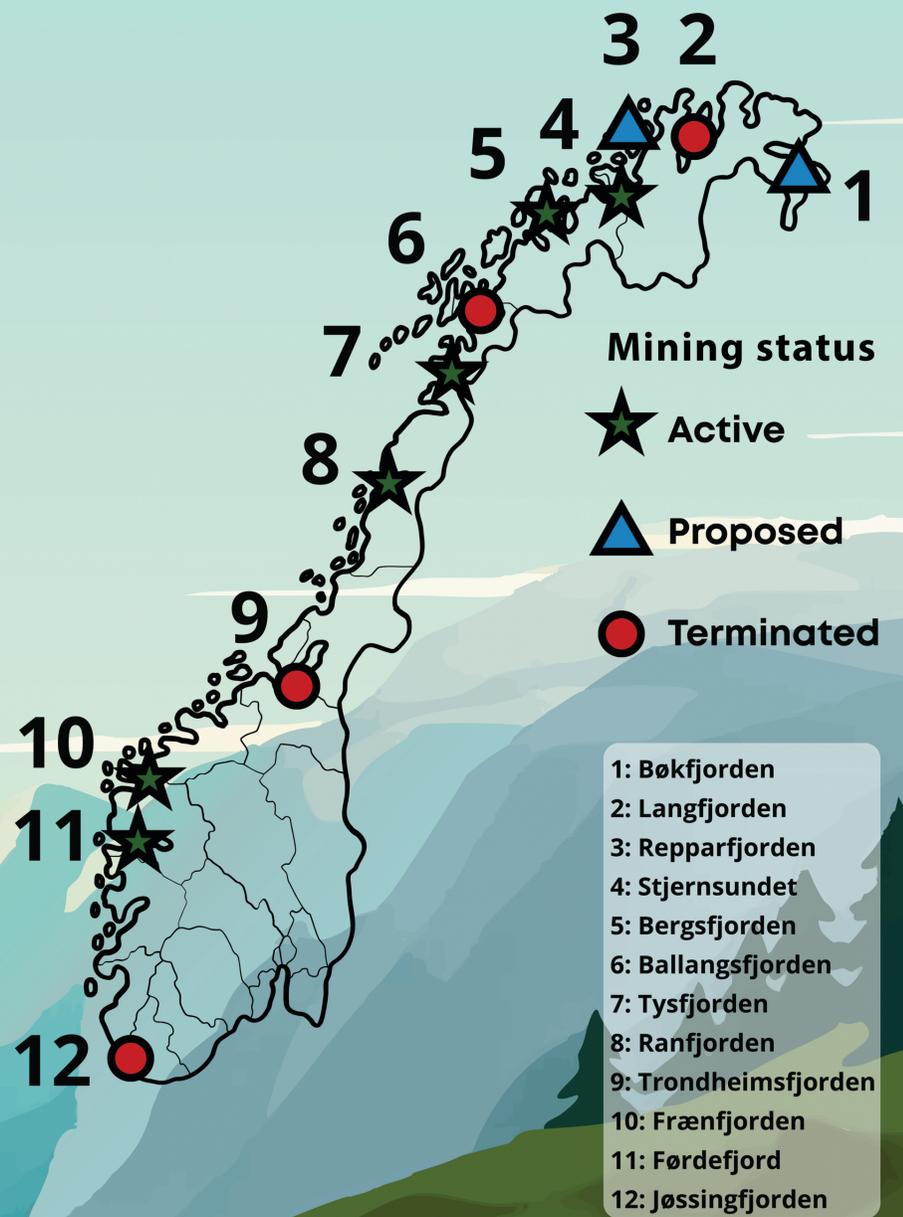
The tailings may increase the concentration of fine particles and dissolved toxic metals in the water column, altering the physical and chemical environment. These impacts may be especially harmful to vulnerable species that rely on fjord habitats for critical stages of their life cycle. As a consequence, the practice is controversial both for its environmental and social implications.

Scientific question

What are the possible effects of STD and associated metal-containing waste on red-listed species in Norwegian fjords?

Methods

- Data about six observed, red-listed species and the STD composition for twelve deposit sites (active/terminated/proposed) were gathered from Miljødirektoratet (2025), Artsdatabanken and secondary sources.
- Both the **Norwegian*** and **IUCN#** red list classification was included when assessing the vulnerability for each species.
- Metals present in STDs were categorized into "High" and "Medium" risk levels based on their bioavailability, toxicity and how severely they affect fish (Kögel et al., 2021)



Salmon
(*Salmo salar*)
Red-list classification:
NT* | NT#
Sites: 2, 3, 7, 8, 9, 11, 12 (1, 4, 5, 6, 10)



Blue ling
(*Molva dypterygia*)
Red-list classification:
EN* | VU#
Site: 11 (10)



Norwegian skate
(*Dipturus nidarosiensis*)
Red-list classification:
VU* | EN#
Site: 9 (6, 7, 8, 10, 11)



European eel
(*Anguilla anguilla*)
Red-list classification:
EN* | CR#
Site: 9, 11 (1, 2, 3, 4, 5, 6, 7, 8, 10, 12)



Atlantic Red fish
(*Sebastes norvegicus*)
Red-list classification:
EN* | LC#
Site: 3, 4, 6, 7, 9, 11 (1, 2, 5, 8, 10, 12)



Spiny Dogfish
(*Squalus acanthias*)
Red-list classification:
VU* | VU#
Site: 5, 9, 11 (1, 2, 3, 4, 6, 7, 8, 10, 12)

Toxic metals associated with STD in different sites



Lead: 6, 7, 8, 12
Mercury: 7, 12
Cadmium: 6, 7, 8, 12
Nickel: 6, 7, 12



Copper: 6, 7, 8, 12
Chromium: 7
Zinc: 6, 7, 8, 12
Arsenic: 7, 12

Main findings

- 10 out of 12 fjords** contained at minimum one of the selected red-listed species.
- There are more observations of red-listed species in **active sites**, compared to proposed and terminated sites
- Site 7 and 12 had the **greatest number of toxic metals** from STDs, including all the metals rated as "High" in toxicity, and only **2 red listed species** were observed at these sites.
- There is a **lack of accessible data**, despite the importance of proper risk assessment.
- 4 out of 10** (active/previously active) sites reported which metals were disposed in the fjords

Take home message

The lack of accessible documentation regarding STD in Norwegian fjords makes it difficult to perform accurate risk assessments regarding the long-term effects on red-listed species and overall ecosystem functions.

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References

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