



Water Quality

The area encompassing the proposed NorthMet project (mine, transportation and utility corridor, processing plant, and tailings basin) is located in northeastern Minnesota near the Partridge and Embarrass rivers, which flow into the St. Louis River and, ultimately, Lake Superior. Models were developed to help analyze potential effects on water quality and develop measures to avoid or minimize the effects. The U.S. Environmental Protection Agency has delegated authority to issue water quality permits, such as those required for the proposed NorthMet project, to the Minnesota Pollution Control Agency.

The Boundary Waters Canoe Area Wilderness and Voyageurs National Park are located outside the Lake Superior watershed. The proposed NorthMet project's anticipated surface water and surficial groundwater flows would not affect these areas. Potential groundwater flow northward from the Mine Site to the Northshore Mine, if determined possible through monitoring, would be prevented.

How could the proposed NorthMet project affect water quality?

Natural waters contain elements that reflect the area's geologic setting, land cover, and biological activity. Left uncontrolled, the proposed NorthMet project has the potential to elevate three types of constituents:

- Sulfate could be released due to the chemical reactions involving minerals in the waste rock, exposed pit wall, and tailings.
- Metals including copper, cobalt, and nickel could be released as part of the chemical reactions of minerals in waste rock, exposed pit wall, and tailings. These metals occur naturally as a result of local geology, but elevated values could affect water-based organisms, even at relatively low concentrations.
- Mercury could be present in very small amounts in ore and waste rock.

How were the effects determined?

The potential effects of the proposed NorthMet project on water in the area were modeled using three computer models and a comparison to an existing mine pit that has historical data. Many of the water quality constituents vary naturally with seasonal flows and other conditions. The models estimated the likely effects of the proposed NorthMet project on water quality in the area, taking into account the natural variability and uncertainty around many of the model input assumptions.

What did the modeling predict would be the effect on water quality?

The water quality modeling predicts that the proposed NorthMet project (with environmental controls) would not cause significant water quality impacts because: 1) exceedances did not occur; 2) proposed NorthMet project modeled concentrations were no higher than concentrations for the Continuation of

Existing Conditions scenario; 3) the frequency or magnitude of exceedances were within an acceptable range; or 4) the effects were not attributable to proposed NorthMet project-related discharges. Sulfate and mercury concentrations would not likely increase from existing conditions as a result of the proposed NorthMet project. Both wastewater treatment facilities would meet the wild rice sulfate standard.

What would be done to avoid or minimize these effects?

During operations, PolyMet would implement a variety of measures to protect waters in the area, such as:

- Wastewater treatment to remove pollutants at the mine site and the plant site for as long as needed to meet any permit requirements.
- Liners proposed for the temporary waste rock stockpiles and the permanent hydrometallurgical residue facility to greatly reduce or prevent contamination of surface and groundwater.
- Surface water and groundwater containment systems at the permanent waste rock stockpile and tailings basin to control and direct captured water to the wastewater treatment facilities.
- Underwater disposal of the most reactive waste rock to limit reactivity.
- Treatment and reuse of process wastewater to reduce water consumption needs.
- Bentonite-amended tailings basin cover to reduce air and water infiltration into the tailings, thereby reducing tailings oxidation and basin leakage.
- Engineered geo-membrane cover system for the permanent (least reactive) waste rock stockpile.

Additionally, PolyMet would monitor water quality during operations, reclamation, and closure at water discharge points and downstream. This information would be used to understand the actual effects, improve predictions of future effects, and inform possible mitigation measures, including adaptive management, which could be used to prevent environmental impacts. Financial assurance would be set aside to ensure funding of these activities.

For more information about how water quality in the area would be affected by the NorthMet Mining Project and Land Exchange, see the Executive Summary, Sections 4.2.2 and 4.3.2 (Affected Environment, Water Resources), Sections 5.2.2 and 5.3.2 (Environmental Consequences, Water Resources), and Chapter 6 (Cumulative Effects) of the Final EIS. Also, refer to additional Fact Sheets about the NorthMet Mining Project and Land Exchange Final EIS:

- 1. Project and Land Exchange Overview**
- 2. What is the Environmental Review Process?**
- 3. What's Changed since the Draft EIS?**
- 4. What's Changed since the Supplemental Draft EIS?**
- 5. Supplemental Draft EIS Comment Response Process**
- 6. Effective Commenting on the Final EIS**
- 7. A Guide to the Final EIS Document**
- 8. Air Quality**
- 9. Water Quantity**
- 10. Wetlands**

- 11. Water Quality**
- 12. Wild Rice**
- 13. Mercury**
- 14. Threatened & Endangered Species**
- 15. Cultural Resources**
- 16. Land Exchange**
- 17. Reclamation & Financial Assurance**
- 18. Cumulative Effects**
- 19. Tailings Basin Stability**
- 20. Water Modeling**
- 21. Northward Flowpath**
- 22. Duration of Treatment & Financial Assurance**
- 23. Human Health**