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October 23, 2014

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St. Paul District, United States Army Corps of Engineers
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Tinka Hyde, Water Division Director (hyde.tinka@epa.gov)
Region 5, United States Environmental Protection Agency
77 W. Jackson Blvd.
Chicago, IL 60604

RE: **Northshore Mining Expansion Clean Water Act Section 404 Permit 2014-01685-DWW**

Dear Ms. Cameron, Ms. Hyde:

The comments below are submitted on behalf of WaterLegacy, a non-profit organization formed to protect Minnesota's water resources and the communities that rely on them. We have approximately 10,000 members and supporters throughout the State of Minnesota.

WaterLegacy requests that an environmental impact statement (EIS) be prepared for the proposed 108-acre Northshore Mining expansion into Type II Virginia Formation (VF) rock (expansion project). This expansion project is a major federal action, the direct and cumulative effects of which will or may have a significant affect the quality of the natural and physical environment and the relationship of people with that environment. *See* 42 U.S.C.§ 4332(2)(C), NEPA Section 102(2)(C), 40 C.F.R. §1502.3, 40 C.F.R.§1508.1 *et seq*. The EIS should extend to the full scope of the Northshore Mining expansion project upon which the Section 404 permit depends, and the activity's overall purpose from a public perspective should be considered. 33 C.F.R. §325, Appendix B, 9(c)(4).

On the current state of the record, WaterLegacy requests denial of the Clean Water Act Section 404 permit for Northshore Mining's expansion project. The expansion project would have unacceptable adverse effects on wild rice beds that support wildlife, fisheries, including a designated spawning and breeding area, and municipal water supplies. 33 U.S.C. §1344(c). Clean Water Act (CWA) Section 404(c).

We would further request denial of the Section 404 under regulations promulgated pursuant to the Clean Water Act. 33 U.S.C. §1344(b)(1), CWA Section 404(b)(1). It has not been demonstrated that discharge under the proposed Northshore Mining expansion project Section

404 permit would not have unacceptable adverse impacts on aquatic ecosystems of concern, including wetlands, individually and in combination with known and probable impacts of other activities. 40 C.F.R. §230.1(c). The permit also may not be issued because project discharge would cause or contribute to violation of applicable State water quality standards and degradation of waters of the United States. 40 C.F.R. §230.10(b)(1) and (c). Practicable alternatives to the proposed expansion project discharge have not been examined, and Northshore Mining cannot demonstrate that its expansion into high-sulfur rock is the least environmentally damaging practicable alternative (LEDPA). 40 C.F.R. §§ 230.5(a) and (c), 230.10(a).

WaterLegacy also requests a public hearing before the U.S. Army Corps of Engineers (Army Corps) on the Section 404 permit application to address the factual questions and concerns reflected in our comments below.

The following facts support the need for a federal environmental impact statement prior to considering a permit for the Northshore Mine expansion into high-sulfur Type II Virginia Formation rock and justify denial of the Section 404 permit for this proposed expansion.

1. Acid mine drainage, sulfates, and metal leachates from the Northshore Mine expansion project would significantly affect wildlife and fisheries and cause or contribute to violation of State water quality standards.

2. Adverse environmental effects from acid mine drainage, sulfates, metal leachates and other pollutants from the Northshore Mine expansion project on water quality and wetlands have been inadequately characterized in the current record.

3. Pollutants seeping from the Northshore Mine expansion project to groundwater would significantly affect fish, wildlife, and municipal water supplies and cause or contribute to violation of State water quality standards, particularly at mine closure.

4. No alternatives have been considered, and it has not been demonstrated that the Northshore Mine expansion project is the least environmentally damaging practicable alternative (LEDPA).

5. The Northshore Mine expansion project, in combination with known and probable impacts of other mining activities, would have significant adverse effects on surface and drinking water quality; these cumulative impacts have not been adequately analyzed.

6. Northshore Mining's National Pollutant Discharge Elimination System (NPDES) permit does not control or mitigate adverse impacts of the expansion project on water quality and does not militate against the need for an EIS.

Northshore Mining Expansion Project Summary

Northshore Mining's Peter Mitchell mine pit straddles two major watershed divides. The southwest half of the mine area originally drained to the Lake Superior Basin, and the northeast

half drained to the Rainy River Basin. The watershed pillar that historically separated the two watersheds has been removed, and the division between the watersheds is currently maintained by the placement and operations of the pit sumps. (Northshore Mining Environmental Assessment Worksheet, hereinafter "EAW," p. 8)[1] At closure, Northshore Mining proposes that the entire mine will form a single pit lake with an outfall discharging to the Dunka River watershed in the Rainy River Basin. (*Id*., pp. 9, 18).

Northshore Mining plans to expand the Peter Mitchell mine pit by 108 acres south beyond its current permit. (*Id*., p. 4) In this expansion, Northshore Mining will encounter Type II Virginia Formation (VF) rock, which the Minnesota Department of Natural Resources (MDNR) has defined as VF rock with a sulfur content of between 0.2% and 1.0% by weight percent. (*Id*., p. 3) This is the first time Northshore Mining would be permitted to excavate Type II Virginia Formation rock with the capacity to generate acid mine drainage (AMD). (*Id.,* p. 3)

The Northshore Mine expansion project will excavate and directly affect 62.83 acres of wetlands. (*Id*., p. 11). The Army Corps previously authorized Northshore Mining to impact approximately 51 acres of wetlands under a permit issued in 2006 and modified in 2007. (See Army Corps Public Notice, hereinafter "PN," 2014-01685-DWW, p. 1). The current Section 404 permit would result in the discharge of dredged and fill material in 12.09 acres of wetlands adjacent to Langley Creek. (*Id*.) The proposed expansion into high-sulfur Type II VF rock on the southern edge of the existing pit limit is directly dependent both on the requested Section 404 permit and on the prior federal action permitting Northshore Mining to destroy approximately 51 acres of wetlands. (PN 2014-01685-DWW, Drawing 9 of 10).

The Northshore Mine expansion project will include 94 million long tons of stripping, including overburden, Virginia Formation (VF) and Biwabik Iron Formation (BIF) rock. (*Id.*, p. 4). It is expected that 16,297,000 long tons of Type II VF materials will be mined, including 6,571,000 long tons from VF sills and 9,727,000 long tons from VF metasediments. (*Id*., p. 17, Golder 2013, p. 33)

Northshore Mining would dispose of the Type II VF waste rock on a 153-acre stockpile pile on the north side of the pit at 1,600 feet above mean sea level (amsl), approximately 100 feet above the predicted pit lake level at mine closure. (*EAW*, p. 5). No liner or collection system is proposed for this permanent Type II VF waste rock stockpile. The EAW proposes that a 5-foot layer of other blasted rock, including BIF and Type I VF rock will be placed under the Type II VF rock and on the pile's outer slopes. (*Id.*, p. 6) A final cover, with a membrane-backed geosynthetic clay liner, will be progressively placed on stockpile areas at the final elevation. (*Id*.)

In addition to the Type II VF waste rock stockpile, the project expansion will permanently expose approximately 10.9 acres of Type II VF rock formations running the length -- approximately 8,600 feet or 1.6 miles -- of the pit's southern high wall. (*Id*., p. 16). This exposed high-sulfur rock would include the wetland areas destroyed under federal Section 404 permits.

[1] The Northshore EAW and other documents from Minnesota Department of Natural Resources (MDNR) files cited in these comments have been provided to the U.S. Army Corps of Engineers (Army Corps) and the U. S. Environmental Protection Agency (EPA) on a DVD.

1. Acid mine drainage, sulfates, and metal leachates from the Northshore Mine expansion project would significantly affect wildlife and fisheries and cause or contribute to violation of State water quality standards.

A. Acid Mine Drainage

Both the Type II VF waste rock pile and the exposure of 1.6 miles of Type II VF rock running the length of the southern pit wall have the potential to result in acid mine drainage. "Similar to the materials in the stockpile, the pit wall materials may contribute metals and/or low pH as water flows over the face of the exposure or seeps through the pit wall." (Golder 2013, p. 40)

Of the humidity cell tests performed on Northshore Mine VF rock sampled through 2004,[2] 13 tests resulted in acidic conditions, with an effluent pH below 5.5. These humidity cell samples had sulfur content from 0.06% to 0.42%, and only 11 were Type II VF rock, with 0.2% or more average sulfur by weight. Thus, *all* of the expansion project humidity cells containing Type II VF resulted in acidic effluent and at least two samples that were *Type I VF rock* also resulted in acid drainage. (Golder 2013, pp. 31- 32)

The acidity results from the humidity cells are even more striking when reviewed in detail. Above just 0.25% sulfur, all Type VF samples, whether from sills or metasediments, produced *highly acidic effluent*, with a pH ranging from 3.1 to 3.4. (Golder 2013, Table 3-14).

Although the expansion project is characterized as Type II VF rock, which by definition has an average sulfur content between 0.2% and 1.0% by weight, actual sulfur content in the Virginia Formation metasediments sampled in 2004 ranged as high as 6.10% sulfur. (Northshore 2004, p. 5). Heterogeneous rock with pockets of highly reactive sulfides would seed chemical reactions resulting in acid mine drainage and metals leaching at even higher rates than predicted based on the average sulfur concentration test results described above.

B. Sulfates and Impairment of Wild Rice

Sulfide reactions in the Type II VF waste rock stockpile and in the exposed Type II VF rock on the southern pit wall will also increase concentrations of sulfates at in-pit sumps and discharge points. The Northshore Mining EAW predicts that maximum in-pit sump sulfate concentrations will increase by 5% as a result of the expansion project. Maximum sulfate concentrations at surface discharge SD005, thus, increase to 157 milligrams per liter (mg/L). (EAW, pp. 25-26).

This predicted discharge is more than 15 times the wild rice sulfate standard of 10 mg/L applicable in waters used for the production of wild rice. Minn. R. 7050.0224, Subp. 2. The EAW states, "Because wild rice has not been found to be present during recent wild rice surveys, the surface water quality sulfate standard for wild rice is not applied." (EAW, p. 17)

[2] Inadequacies of humidity cell tests to characterize expansion project rock are explained in Section 2, *infra*.

However, documents in the MDNR files demonstrate that waters downstream of project discharge location SD005 are wild rice waters, and that additional discharge of Northshore Mine wastewater with elevated sulfates from the expansion project would cause or contribute to violation of State numeric and narrative water quality standards pertaining to wild rice.

Birch Lake is a water used for the production of wild rice; MDNR has repeatedly reported the presence of wild rice in Birch Lake. (Barr 2013, pp. 2, 4-5) Dunka Bay, where the Dunka River flows into Birch Lake is also a water used for the production of wild rice. (*Id*., pp. 8-9) The Dunka River should also be considered a water used for the production of wild rice, since the Treaty Authority has listed the River as a wild rice resource as recently as 2013. (*Id*., p. 5).

Sulfate levels where the Dunka River flows into Birch Lake are already elevated, with recent sampling of 21 mg/L and 23.6 mg/L. (*Id*., p. 14 and Figure 2). Past and present mining activities, including discharge from the Northshore Mine have contributed to elevated sulfate levels downstream in these waters.

Maximum sulfate discharge of 157 mg/L at SD005 and average sulfate discharge of 92.6 mg/L predicted to result from the Northshore Mine facility and expansion project (EAW, p. 26) have the potential to cause or contribute to an exceedance of the 10 mg/L wild rice sulfate standard when the discharge reaches these downstream wild rice waters. This discharge, along with the cumulative impacts of sulfate releases from the Northshore Mine facility, will also violate Minnesota's narrative standard protecting wild rice, which states with respect to wild rice waters, "The quality of these waters and the aquatic habitat necessary to support the propagation and maintenance of wild rice plant species must not be materially impaired or degraded." Minn. R. 7050.0224, Subp. 1.

Pursuant to Minnesota Rule 7050.0224, Subpart 1, the numeric and narrative water quality standards to protect wild rice prescribe the qualities or properties of the waters of the state that are necessary for "wildlife designated public uses and benefits" as well as agriculture. Violation of numeric or narrative standards protecting wild rice in downstream waters constitutes an unacceptable adverse effect on wildlife, prohibited by the Clean Water Act Section 404 as well as the Army Corps' implementing regulations.

C. Metals Leachate and Discharge

Increased metals leaching from the Northshore Mine expansion project would have an adverse and unacceptable effect on ecosystems and fisheries, including a designated spawning area.

Increased metals leaching from the Northshore Mine expansion project would violate Minnesota numeric and/or narrative standards, thus violating the Clean Water Act and implementing regulations. In addition to providing numeric standards for metals that will be discharged in increasing concentrations as a result of the expansion into high-sulfur rock, Minnesota rules also include narrative standards to protect aquatic life precluding, for all Class 2 waters, any significant increase in residues in the waters, sediments and aquatic flora and fauna, stating,

> [T]he normal fishery and lower aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters. Minn. R. 7050.0150, Subp. 3.

Even excluding an initial rinsing period of 10 weeks, maximum weekly effluent concentrations from the humidity cell tests done with expansion project rock showed that several metals of concern were far above Minnesota chronic water quality standards (WQS). Nickel concentrations in the humidity cell tests for the expansion project reached 510 micrograms per liter (µg/L), more than three times the 158 µg/L chronic WQS;[3] copper concentrations reached 54 µg/L, five-and-a-half times the 9.8 µg/L chronic WQS; aluminum concentrations reached 2,500 µg/L, 20 times the chronic WQS of 125 µg/L; and zinc concentrations reached 2,800 µg/L, more than 26 times the 106 µg/L chronic WQS. Manganese also reached 290 µg/L, nearly three times the groundwater health risk limit of 100 µg/L. (Golder 2013, p. 32).

Without identifying whether the outcrops in question were Type I or Type II VF rock, the EAW admits that weathering of several Northshore Mine VF outcrops in 2002 and 2003 resulted in exceedances of water quality standards for total aluminum and total copper. The EAW characterizes these exceedances as "isolated, discrete events" (EAW, p. 17), but no information is provided to demonstrate that these exceedances would not become representative and result in water quality violations on a more routine basis if expansion project Type II VF rock along the southern pit wall were exposed to weathering.

EAW predictions of increased metals discharge from SD005 are based on the Golder 2013 report, after modeling water quality based on various sampling, scale up, infiltration and dilution assumptions. Even if all of these assumptions were reasonable (which cannot be determined by reviewing the EAW), the expansion project will result in significant increases in metal concentrations in effluent discharged to Langley Creek in the Dunka River headwaters. Maximum concentrations in wastewater discharge would increase 80% for copper, 120% for zinc, 194% for cobalt and 314% for nickel. (EAW, pp. 25-26, Table 11-6).

Increased concentrations of copper, zinc, cobalt and nickel on Unnamed Creek, Langley Creek, and the Dunka River have the potential to seriously impair water quality, species composition, and the propagation of fish and other biota due to the sheer volume of wastewater that will be discharged containing these contaminants.

For Langley Creek, the majority of existing flow already originates from Northshore Mine pit dewatering. (EAW, p. 29) During operations, mine water from the expansion project would flow into sumps and be discharged at SD004 and SD005 (*Id*., p. 21, Figure 11-2). The increased annual average flow at these sumps would be 200 gallons per minute or more than 105 million gallons per year. (*Id*., p. 22). This 8% increase in pumping rates would be added to the current

[3] Chronic WQS above follow the calculations in the EAW for nickel, zinc and copper at a hardness of 100 milligrams per liter. Minn. R. 7050.0220. If the natural background concentrations of receiving waters were applied, the applicable WQS for nickel, copper, and zinc would be substantially lower.

Northshore Peter Mitchell pit discharge, for a total average annual wastewater discharge to Unnamed Creek of 2,700 gallons per minute, or more than 1.4 billion gallons per year. (*Id*.)

The EAW does not discuss what the lowest 7-day average flow expected to occur once every 10 years (7Q10) is for any of these discharge waters. If Unnamed Creek, Langley Creek or the Dunka River have a 7Q10 of zero excluding mining discharge, there is no allowable dilution and impacts to aquatic life must be calculated on the basis that organisms in the aquatic ecosystem will be growing, swimming and reproducing in Northshore Mine effluent.

The effects of the expansion project on fisheries and lower aquatic biota are particularly significant since waters downstream of Northshore Mining discharge were recently designated in MDNR rulemaking for their special qualities and unique ecological significance. In 2011, the Birch Lake Reservoir, including the lower 300 yards of Dunka River and Dunka Bay, were designated as spawning beds and fish preserves. Minn. R. 6264.0125(H).

Recommendations:
The Section 404 permit should be denied due to adverse effects on wildlife and fisheries, including potential violation of Minnesota numeric and narrative water quality standards.

A federal EIS is needed to analyze the potential for significant environmental effects resulting from acid mine drainage from both the Type II VF waste rock stockpile and the 1.6 miles of Type II VF southern pit wall that would be exposed through excavation, considering both the portion of the wall that would be under water and the portion that would permanently remain exposed to weathering. The EIS must also analyze whether the expansion project would cause or contribute to violation of wild rice numeric and/or narrative standards in downstream waters, including the Dunka River, Dunka Bay and Birch Lake.

A federal EIS must evaluate the effects of increased copper, zinc, cobalt, nickel and other metal concentrations in discharge from SD004 and SD005, analyzing the potential for degradation and violation of narrative or numeric water quality standards in Unnamed Creek, Langley Creek, the Dunka River and the Birch Lake Reservoir. This analysis of potential impacts should determine what percentage of each water body's flow will be Northshore Mine discharge during operations and closure and how the concentration of metals in that discharge compares with metal concentrations in regional streams unimpacted by mining.

2. Adverse environmental effects from acid mine drainage, sulfates, metal leachates and other pollutants from the Northshore Mine expansion project on water quality and wetlands have been inadequately characterized in the current record.

Documents pertaining to the Northshore Mine project expansion provide inadequate characterization, analysis or predictions to demonstrate, as required under Army Corps regulations, that discharge from the activities allowed under Section 404 permitting would not have unacceptable adverse ecosystem impacts or violate State water quality standards.

A. Water Quality Predictions

First, MDNR documents predicting changes in water quality as a result of the Northshore Mine expansion project fail to consider impacts from exposed Type II VF rock on the southern pit wall. Although Table 11-6 in the EAW appears to predict water quality at in-pit sump locations "with and without the proposed project," the predictions only consider drainage from the Type II VF waste rock stockpile, and not from 1.6 miles of exposed Type II VF pit wall rock remaining after excavation and wetlands destruction is completed. (EAW, p. 26, fn to Table 11-6).

The EAW also provides no analysis of the chemical composition of overflow to the Dunka River post-closure as a result of the expansion project. Post-closure, as a result of discharge of untreated pit overflow from the Peter Mitchell Pit lake, average annual flow in the Dunka River would increase by 30 percent as compared to existing conditions. (*Id.*, p. 29). Changes in the chemical composition of nearly one third of the Dunka River flow as a result of expansion into high-sulfur Type II VF rock have the potential for significant environmental effects on Dunka River water quality.

The EAW also provides no predictions of pH in leachate from either the Type II VF waste rock pile or the exposed Type II VF wall. The EAW seems to assume that dilution of acid mine drainage with existing slightly alkaline Northshore Mine wastewater will diminish acidity. (*Id*., p. 5). However, predictions of acid mine drainage from the project expansion must be disclosed to allow evaluation of potential environmental effects if drainage propagates through fractures and to ensure that assumptions in modeling metals leachate are sufficiently conservative.

WaterLegacy is not confident that parameters regarding input pH, groundwater flow dilution and infiltration through the Type II VF waste rock pile used by Northshore Mining's consultants to model concentrations of pollutants in discharge are reasonable. Each of these input parameters have a significant effect on modeled concentrations, particularly cobalt, chromium, copper, nickel and zinc. (Golder 2013, p. 44). In one scenario that utilized conservative input parameters, aluminum was predicted at maximum concentrations (0.14 mg/L) greater than Minnesota's chronic water quality standard (0.125 mg/L). (*Id*., p. 46) A federal EIS must not only fill the gaps in water quality analysis described above, but also provide predictions based on a transparent analysis including a range of conservative input parameters.

B. Sampling and Humidity Cell Testing

Predictions of water quality provided in MDNR files rely on humidity cell tests that inadequately represent the areas into which the expansion is planned and the scale of the expansion. First, somewhat surprisingly, the humidity cell tests do not represent the entire area into which the Northshore Mine expansion project is planned.

The EAW is imprecise about the sampling used to predict water quality, stating that its numeric water quality predictions are "not directly representative" since the samples were collected "do not precisely match all constituent concentrations from the most recent surface water quality data set." (EAW, p. 24) The actual discrepancies are striking.

All of the samples used in the humidity cell tests upon which the EAW relied were taken in 2003 and 2004. (Golder 2013, pp. 31-32 and Table 3-9). This drill sampling did not extend to the southern and eastern portions of the proposed project's expansion into Type II VF rock. At the time these samples were taken, Northshore Mining explicitly recognized that additional drilling sites were needed to "complete the Virginia Formation characterization." (Northshore 2004, p. 10). The scope of drilling by 2004 and the fact that a significant area of the expansion project was not sampled for humidity testing is shown in Exhibit 1, which reproduces drilling maps from Northshore reports prepared in 2004 and 2008.

Rather than require humidity cell tests with a representative sample of the entire area where Northshore Mining's expansion was proposed, the EAW relied on 11 humidity cell tests selected through a *post hoc* determination that any of the humidity cells from 2003 and 2004 with Type II VF rock (defined as an average of 0.2% to 1.0% sulfur by weight) could be used to characterize the entire project expansion rock, including areas south and east of the actual 2003 to 2004 sampling. (Golder 2013, p. 32).[4]

Although some effort was made to verify that drilling conducted in 2008 did, in fact, have sulfur content consistent with Type II VF rock (Northshore 2008, Appendix B), there is no data on the composition of metals or salts in the rock south and east of the 2004 drill holes. Northshore Mining, thus, cannot demonstrate that metals leaching from this area of high-sulfur VF rock under acidic conditions would not violate water quality standards.

In addition to the fact that humidity cell tests fail to represent a significant area of the expansion, WaterLegacy is concerned that the number of samples actually tested is insufficient to characterize more than 16 million long tons of high-sulfur VF rock that Northshore Mining proposes to excavate in the expansion project. In particular, the few samples tested and the averaging of sulfur percentages are likely to understate the impacts of more reactive sulfides on water quality.

The EAW acknowledges that a variety of Virginia Formation rock referred to as "bedded pyrrhotite" has significantly higher sulfur content than other VF rock units. (EAW, p. 14) The EAW then claims, "No occurrences of bedded pyrrhotite have been identified by exploratory drilling in the project area." (*Id*.) Northshore Mining has explained that continuous sulfide layers of bedded pyrrhotite provide a corridor for oxidation of a large portion of the available sulfide (Northshore 2004, p. 8), that bedded pyrrhotite had been identified in three drill holes on the eastern end of the Northshore Mine site (*Id*., p. 3), and that first blast scheduled for the VF rock formation most likely to contain bedded pyrrhotite was planned for 2009. (*Id*., p. 13).

The EAW cites no documentation that drilling and sampling at any time were sufficient to rule out bedded pyrrhotite in the Northshore Mining expansion project area. In addition, sampling for

[4] The report seems to admit that the sampling process for humidity cells is not demonstrably representative. The humidity cells are described to contain metasediments or sills "*that are expected to be representative of the Type II VF materials slated for the stockpile based on geologic description and sulfur content*." (Golder 2013, p. 31, emphasis added).

the expansion project has demonstrated that pyrrhotite is "by far the dominant sulfide" and that sulfides may range from less than 1% to more than 15% in discrete samples. (Golder 2012, p. 14).

The record provides inadequate data to demonstrate that pyrrhotites and the heterogeneity of sulfides in the expansion project area would not result both in higher sulfates and higher metals leachates, violating water quality standards.

C. No Specific Conductance Data or Analysis

There are no data or predictions pertaining to the Northshore Mine expansion project demonstrating that specific conductance in discharge won't violate both Minnesota's numeric and narrative water quality standards, having an unacceptable adverse effect on aquatic life.

After extensive peer-reviewed research, the United States Environmental Protection Agency (EPA) recently set the chronic aquatic life benchmark value for conductivity at 300 micro Siemens per centimeter (µS/cm) for West Virginia and Kentucky, stating that this standard is also expected to be applicable to ecoregions extending into Ohio, Pennsylvania, Tennessee, Virginia, Alabama, and Maryland. EPA noted that this benchmark is likely to apply whenever dissolved ions are dominated by salts of Ca^{2+}, Mg^{2+}, $SO4^{2-}$ and $HCO3^{-}$, particularly where natural background levels are lower. EPA explained, "the salt mixture dominated by salts of $SO4^{2-}$ and $HCO3^{-}$ is believed to be an insurmountable physiological challenge for some species."[5]

EPA's web site states that studies of inland fresh waters indicate that streams supporting good mixed fisheries have a range between 150 and 500 µS/cm. Conductivity outside this range "could indicate that the water is not suitable for certain species of fish or macroinvertebrates."[6]

Recent research in the St. Louis River watershed of the Lake Superior Basin suggests that specific conductance from mine pit discharge is a stressor contributing to impaired streams in Minnesota. For example, in the Embarrass River watershed zone, two impaired streams -- Spring Mine Creek and the Embarrass River -- receive water originating from mine pits. Sampling results from these streams show elevated specific conductance and sulfate concentrations. (Exhibit 2 MPCA, *St. Louis River Stressor Identification Report* (2013), pdf p. 16). In the St. Louis River watershed, streams relatively unaffected by mining, urbanization or agriculture have conductivity values from 36 to 380 (µS/cm) and are generally below 230 µS/cm. Streams with conductivity values above 500 µS/cm are limited to areas with mining or urban land-uses. (*Id*., pdf p. 41)

Experience with Dunka Mine discharge suggests that specific conductance may exceed even Minnesota's numeric Class 4 standard water quality standard of 1,000 µmhos/cm (equivalent to

[5] EPA, *A Field-Based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams*, Final Report, EPA/600/R-10/023F, March 2011, p. xv. Available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=233809#Download

[6] EPA, *What is conductivity and why is it important*? http://water.epa.gov/type/rsl/monitoring/vms59.cfm

1,000 µS/cm). Minn. R. 7050.0224, Subp. 2. Based on Minnesota sampling and stressor identification research as well as EPA guidance, dissolved salts that elevate conductivity from the Northshore Mine project expansion are likely to degrade water quality and impair fisheries, lower aquatic biota and species composition in violation of Minn. R. 7050.0150, Subp. 3. The potential impairment of aquatic life in the Dunka River is of particular concern since the lower portion of the River and Dunka Bay are designated as spawning beds and fish preserves. Minn. R. 6264.0125(H).

D. No Analysis of Indirect Impacts on Wetlands

The Public Notice and MDNR documents describe the excavation and direct destruction of 63 acres of wetlands as a result of the Northshore Mine expansion project. However, neither the MDNR environmental assessment worksheet (EAW), the Army Corps Public Notice for the expansion project, nor any reference cited in these primary documents analyzes the indirect impacts on wetlands that would be authorized as a result of issuance of a Section 404 permit for the Northshore Mine expansion project.

The EAW summarily states, "Potential indirect impacts, if any, will be evaluated as part of the permitting process. However, there are no indirect impacts anticipated." (EAW, p. 32) The Army Corps Public Notice seems to defer consideration of wetlands to some indefinite future, once the expansion project has already taken place, "Any indirect wetland impacts, for example hydrologic impacts, which are associated with a regulated discharge of dredged and/or fill material into waters of the U.S., would be evaluated and may also require wetland mitigation." (PN 2014-01685-DWW, p. 3).

The Clean Water Act and regulations promulgated under the CWA require that determinations of the potential short-term or long-term effects of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment be made prior to permit issuance. 40 C.F.R. §230.11. Regulations explicitly require that indirect or "secondary" effects on aquatic systems be considered prior to permit issuance:

> Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. *Information about secondary effects on aquatic ecosystems shall be considered prior to the time final section 404 action is taken by permitting authorities*. 40 C.F.R. §230.11(h)(emphasis added).

The Northshore Mine Section 404 permit cannot be issued until analysis is done and factual determinations made of the nature and extent of indirect wetlands impacts from the expansion project's excavation of high-sulfur rock.

Recommendations:
The Northshore Mine expansion project Section 404 permit should be denied because sampling, testing and modeling are inadequate to demonstrate that discharge will not violate Minnesota numeric and narrative water quality standards and have unacceptable effects on fisheries; in

addition, secondary effects on wetlands have not been considered.

A federal EIS is required to evaluate the potential for acid mine drainage both at the Type II VF waste rock stockpile and from the exposed Type II VF rock on the southern pit wall. The EIS must require characterization of rock in the southern and eastern portion of the expansion project area that has not yet been analyzed in any humidity cell tests, and must ensure that sampling is sufficient and representative of metals concentrations and areas of highly concentrated sulfides.

The EIS must also evaluate and disclose predicted water quality in the outfall to the Dunka River watershed proposed post-closure as well as surface water discharge locations during operations, comparing the loading of all contaminants with and without the expansion project. In its predictions of water quality, the EIS must make its assumptions transparent and show the effects of more and less conservative assumptions on water quality.

The EIS must also include data pertaining to dissolved salts and specific conductance and evaluate the effects of elevated specific conductance from Northshore Mine discharge on surface water quality and aquatic life, considering EPA and Minnesota research on impairment of fish and macroinvertebrate communities downstream of mining discharge.

Finally, an EIS is needed to evaluate indirect secondary effects of the Northshore Mine expansion project on aquatic systems, including wetlands, prior to permit issuance.

3. Pollutants seeping from the Northshore Mine expansion project to groundwater would significantly affect fish, wildlife, and municipal water supplies and cause or contribute to violation of State water quality standards, particularly at mine closure.

Pollutants seeping from the Northshore Mine expansion project to groundwater would significantly affect water quality, particularly at mine closure. The concentrations of drinking water contaminants in rock that will be excavated by the project have not been analyzed. No assessment has been done of the potential for propagation of pollutants through surficial groundwater, faults and fractures. The Northshore Mine expansion into Type II VF rock places drinking water as well as aquatic ecosystems at risk, requiring a federal EIS and precluding issuance of the Section 404 permit.

Sampling of rock from the expansion project by Northshore Mining's consultants identified several trace metals that can contaminate drinking water and adversely affect human health occurring at concentrations well above the cut-off of 1 milligram per kilogram. These included barium, chromium, strontium and vanadium. (Golder 2012, p. 13).[7] Minnesota sets Health Risk Limits (HRL) for barium, chromium and vanadium to protect human life and health, pursuant to Minnesota Rule 4717.7500. Although Minnesota does not have an HRL for strontium, the Center

[7] Sampling from the balance of the expansion project may identify other metals exceeding this cut-off.

for Disease Control has concluded that bone growth may be impaired in children drinking high levels of strontium.[8]

MDNR environmental assessment files contain no humidity cell testing to predict concentrations of barium, chromium, strontium, and vanadium in seepage if the Northshore Mine expansion is permitted. In addition, no predictions have been made of concentrations in releases to groundwater of these metals or of other drinking water contaminants from the expansion project, including manganese, arsenic and lead.

Second, there is evidence demonstrating that the Northshore Mine expansion project would have unacceptable adverse effects on aquatic ecosystems that support fish, wild rice and wildlife as a result of seepage from the Type II waste rock stockpile and contaminated pit water, particularly at mine closure. Although it is likely that pumping during mine operations will create a pressure gradient that minimizes seepage through the surficial aquifer and bedrock fractures, filling of the pit at closure will alter this hydrological profile.

At closure, the pit in the expansion project area of the Northshore Mine will be connected with pit lakes to the west, forming an entire, connected "extensive pit lake" across both the Lake Superior and Rainy River Basins. (Golder 2013, pp. 16-17) The expected final pit lake surface elevation will be 1,500 feet amsl, with a ponded area of approximately 400 acres, a maximum depth of approximately 300 feet, a volume of 60,000 acre-feet, and a total of 19,550,000,000 gallons storage. (Golder 2013, p. 18 and Table 3-7).

The change in water pressure gradient as this extensive pit lake forms has the potential to result in propagation of pollutants through bedrock faults and fractures as well as through surficial groundwater. The expansion project, including the Type II VF waste rock pile and Type II VF exposed pit wall, would increase pollutants seeping through groundwater from the huge Northshore Mine pit lake to both the Lake Superior and Rainy River Basins. The EAW cites no predictions of pollutant concentrations in the Northshore "extensive pit lake" over time. In addition, it is acknowledged that stratification may occur within the eventual pit lake. (Golder 2103, p. 49). A meromictic pit lake may result in higher concentrations of sulfates and metals seeping into fractures than the concentrations of these parameters at pit lake outfalls.

MDNR's EAW recognizes that fractures carry water in the bedrock at the Northshore Mine. (EAW, p. 15). Ground water movement in the BIF is generally through fractures, faults and joints. (Barr 2008, p. 7)

The existing Northshore Mine area and the area of proposed excavation into and storage of high-sulfur VF rock include highly fractured and faulted areas. Exhibit 3, *Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion Map 1*, provides an overview of fractures and faults at the mine site. Exhibit 4, *Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion Map 2*, shows faults in a broader context that identifies some of the area waters from Birch Lake to Colby Lake. Some of

[8] ATSDR, Public Health Statement for Strontium, http://www.atsdr.cdc.gov/phs/phs.asp?id=654&tid=120

the mapped faults extend to the location of surface waters, including Yelp Creek, the Partridge River, Langley Creek, the Dunka River and Birch Lake. Both of these maps are derived from Minnesota Geological Survey data.

The EAW assumes that all seepage from Type II VF waste rock will drain to the pit sumps and be discharged through NPDES discharge points during operations (EAW, p. 5); that pit water from the entire Northshore Mine will flow only through an outfall to the Dunka River via Unnamed Creek even after mine closure (*Id*., p. 9); and that the expansion project will have "no impact" on the Partridge River. (*Id*., p. 18).

The EAW claims that there will be no post-closure effects on groundwater because regional surface water features surrounding the pit are all at elevations higher than its 1,500 feet above sea level (amsl). (EAW, p. 29) However, uncollected seepage from the Type II VF waste rock pile would drain from 1,600 amsl, not 1,500 feet amsl. (*Id*., p. 5) Birch Lake is 1,417 feet above sea level and Colby Lake is 1,440 feet amsl. The elevation of faults and fractures is not discussed in the EAW.

These assumptions are arbitrary and provide no reasonable demonstration that pollutants won't propagate to surface waters, since groundwater releases and transport have not been analyzed.

The potential effects of the Northshore Mine expansion project on the Biwabik Iron Formation also require denial of the Section 404 permit on the existing record and support the need for a federal EIS. The Mine's expansion into high-sulfur rock would have significant adverse effects on this critical aquifer, which supplies municipal as well as residential drinking water.

The Northshore Peter Mitchell mine pit is excavated into the Biwabik Iron Formation (BIF), and the Northshore expansion project would excavate several hundred additional feet into BIF rock. (EAW, Figure 10-1) Maps attached to the EAW and to the Barr 2008 Hydrology Study illustrate the excavation of BIF rock proposed in the expansion project and the significant change in depth of the pit, as compared with both pre-mining bedrock elevation and the current ground surface. (Barr 2008, Map 1, attached as Exhibit 5). Although the PolyMet NorthMet SDEIS highlighted plans to retain a 130-foot separation between its final mine pit and the Biwabik Formation (PolyMet SDEIS, p. 4-43), the Northshore EAW doesn't even discuss potential impacts of the high-sulfur expansion project on this important aquifer.

The Biwabik Iron Formation serves as a drinking water aquifer for Northeastern Minnesota, and more than 55,000 people rely on public water systems drawing their water from the BIF.[9] Numerous public water supply and residential drinking wells are located in the vicinity of the Northshore Mine and the expansion project. (Barr 2008, Map 9, attached as Exhibit 6).

Groundwater sampling for the PolyMet NorthMet project has demonstrated the propagation of pollutants from the existing Northshore Peter Mitchell Mine to groundwater in the Partridge

[9] James F. Walsh, Minnesota Department of Health, *Isotopic and Chemical Characterization of Water From Mine Pits and Wells on the Mesabi Iron Range, Northeastern Minnesota, as a Tool for Drinking Water Protection*, available at http://info.ngwa.org/gwol/pdf/042180533.pdf

River watershed. As noted in the tribal Cumulative Effects Assessment (PolyMet NorthMet SDEIS, Appx. C, pdf pp. 2072-2073), deep groundwater borehole samples for the PolyMet project found elevated ammonia nitrogen, the most likely source of which was the blasting compound used at the Northshore Mine one mile north of the site. This tribal analysis, as well as WaterLegacy's comments (WaterLegacy 2014, pp. 50-51) cited underlying technical reports indicating that tritium, a post-1952 pollutant, was found deep in groundwater on the PolyMet site, confirming a connection between Partridge River watershed groundwater and pollutant sources at the Northshore Mining Peter Mitchell Mine.

Despite the evidence of faults in BIF bedrock and at the Northshore Mine site and the depth of excavation into the BIF bedrock proposed in the expansion project, no analysis has been provided of the potential impacts of the expansion project on the BIF aquifer or municipal and residential drinking water either during operations or at mine closure, after formation of the immense Northshore Mine pit lake.

Recommendations:
The Northshore Mine expansion project Section 404 permit should be denied due to adverse effects on surface water, aquatic life and municipal water supplies as a result of propagation of contaminants from mining in high-sulfur rock through groundwater, particularly at mine closure.

A federal EIS is needed to assess the potential significant effects of the Northshore Mine expansion project resulting from groundwater seepage during operations and post-closure. The EIS must evaluate whether contaminated seepage from pit water affected by the expansion project will propagate through surficial groundwater or bedrock fractures and daylight in surface waters in either the Rainy River or Lake Superior Basin.

The EIS must evaluate impacts on the Biwabik Iron Formation aquifer and both public and domestic well drinking water, including potential increases in water contaminants such as manganese, arsenic lead, barium, strontium, chromium and vanadium. Analysis of the impacts of post-closure groundwater seepage must consider potential pit lake stratification and concentration of toxic metals at various levels of the pit lake as well as the pressure conditions that may contribute to propagation of contaminated pit water.

4. No alternatives have been considered, and it has not been demonstrated that the Northshore Mine expansion project is the least environmentally damaging practicable alternative (LEDPA).

Pursuant to the Clean Water Act Section 404(b)(1) and regulations adopted by the Army Corps, no discharge of dredged or fill material into the waters of the United States may be permitted if there is a practicable alternative that would have less adverse environmental impacts. 40 C.F.R. §230.10(a). Since no analysis has been provided by Northshore Mining or in MDNR files of alternatives to prevent, minimize or mitigate the adverse impacts of the expansion project, the Section 404 permit must be denied on this record.

In order for the Army Corps to consider Northshore Mining's Section 404 permit application, a federal EIS is required to consider specific alternatives that can be reasonably expected to minimize the adverse environmental effects of the expansion project.

Alternative locations for mining excavation should be analyzed to minimize contact with high-sulfur rock and the need to excavate and destroy wetlands. Although Northshore Mining has decades of iron ore reserves available for continued mining, (EAW, p. 3), the EAW does not consider any alternative locations for the Northshore Mine expansion project that would require less wetlands destruction or less excavation and permanent exposure of high sulfur Type II VF rock. The record does not demonstrate that efforts have been made to identify and avoid pyrrhotites or other highly reactive sulfide formations.

Northshore Mining has not evaluated alternatives that contain, collect or treat polluted seepage from the expansion project. The EAW admits that "direct seepage from the Type II stockpile will not be collected or monitored." (*Id*., p. 27) Placing crushed BIF or Type I VF rock under the Type II VF waste rock stockpile, as Northshore currently proposes, will not prevent seepage of leachates. In fact, Type I Virginia Formation rock itself may generate acid mine drainage. (Golder 2013, p. 32, see discussion in Section 1(A), *supra*).

Neither MDNR's EAW nor underlying reports from Northshore's consultants evaluate any seepage collection system or water quality treatment to reduce pollutant loads from Type II VF waste rock stockpile seepage or the exposed Type II VF pit wall either during operations or at closure. No water quality treatment has been analyzed to reduce pollutant loads from intentional surface discharge to Unnamed Creek, Langley Creek and the Dunka River watershed or to reduce pollutants that may seep from the extensive pit formed at mine closure.

The "supplemental" monitoring and "contingency plan" proposed by Northshore Mining do not provide analysis or documentation that any mitigation would reduce the adverse effects of the expansion project. *See Kentucky Riverkeeper, Inc. v. Rowlette*, 714 F.3d 402, 412- 413 (6th Cir. 2013) Northshore Mining only proposes monitoring at planned discharge points or sumps (Golder 2013, p. 13); no monitoring of groundwater or groundwater flowpaths to surface waters is contemplated. No specific strategies are required to address contingencies. Northshore Mining merely proposes that a mine water management contingency plan "will be developed" at some indefinite future time. (EAW, p. 27) Since the sole purpose of the EAW's undefined contingency plan would be "compliance with the NPDES effluent limits" (*Id.*), and there are no effluent limits for most pollutants of concern in the Northshore Mine NPDES permit (*Id*., pp. 26-27), reliance on Northshore's assurance that a contingency plan will be developed in the future to mitigate project impacts would be arbitrary and capricious.

Recommendations:
The Section 404 permit for Northshore Mining's expansion project must be denied because there has been no demonstration either that the project is the LEDPA or that its "contingency plan" would mitigate adverse environmental effects.

In order for the Army Corps to consider granting a Section 404 permit for the Northshore Mine expansion project, a federal EIS should consider at least the following specific alternatives to avoid, minimize or mitigate environmental effects:

- Alternative location of overall expansion project to reduce excavation and exposure of Type II VF rock and direct impacts to wetlands.
- More rigorous and systematic testing to allow avoidance of pockets of VF rock with localized higher sulfides.
- Liners beneath the permanent Type II VF waste rock stockpile.
- Leachate collection and treatment of seepage from the Type II VF waste rock stockpile.
- Subaqueous in-pit disposal of Type II VF waste rock.
- Water quality treatment to reduce pollutants prior to surface water discharge to Langley Creek, Unnamed Creek and/or Dunka River watershed during operations.
- Long-term water quality treatment to reduce pollutants prior to surface water discharge to Langley Creek, Unnamed Creek and/or Dunka River watershed post-closure.
- Long-term treatment and pump back of pit water to reduce pollutants and mitigate effects of pit water seepage to groundwater post-closure.

5. The Northshore Mine expansion project, in combination with known and probable impacts of other mining activities, would have significant adverse effects on surface and drinking water quality; these cumulative impacts have not been adequately analyzed.

The Northshore Mine expansion project would have significant adverse environmental effects, particularly when viewed in conjunction with historic, existing and planned taconite and copper-mining projects in the Rainy River and Lake Superior Basins.

Cumulative effects from historic and existing taconite mine pollution from the Northshore Mine and Dunka Mine must be considered with respect to surface water discharge of sulfates into the Dunka River watershed. Wild rice surveys questioning the presence or abundance of wild rice in the Dunka River or in Birch Lake may reflect cumulative impacts of mining pollution. If historic and existing mine pollution has already impaired wild rice beneficial uses, the additional effects of the expansion project are likely to be more significant and destructive.

Cumulative effects of the expansion project with existing and planned Northshore Mine operations will not only increase discharge of metals and salts, but may effectively replace the entire flow of 7Q10 water bodies in the Dunka River watershed with mine discharge effluent. Comparison of constituent loading during operations and post-closure with metals concentrations in a stream unimpacted by mining is necessary to determine the cumulative effects of high levels of copper, nickel, cobalt, zinc, specific conductance and other parameters on surface waters. Historic, existing and future contributions from the Northshore Mine, Dunka Mine, Twin Metals exploratory drilling and Twin Metals bulk sampling must be considered in this analysis.

Future Northshore Mine expansions must also be considered in conjunction with the current expansion project. The current expansion into Type II VF rock is expected to satisfy the Main Pit mining requirements for only five to ten years, and "Part of the long-term plan for the Peter Mitchell Mine is to continue to develop the mine to the south and the west." (EAW, p. 10). The EAW presumes that there will be further pit progressions and that future expansions may also affect high sulfur rock, stating that Northshore Mining "will address separately the presence of any Type II VF materials encountered in any future pit progressions. " (*Id*., p. 11) Additional phased incursions into high-sulfur rock will compound the effects of the current Northshore expansion project on ecosystems of concern.

The environmental impacts of the expansion project must also be considered cumulatively with Northshore Mining's destruction of the in-pit dikes separating the Peter Mitchell pit into two drainage basins and Northshore's resulting diversion of water from the Lake Superior Basin to the Rainy River Basin. As a result of the huge pit lake that will be created post-closure when separation between drainage basins is destroyed, pollution from the Northshore Mine expansion project would have the potential to seep into the St. Louis River watershed as well as the Dunka River watershed.

The EAW prepared by MDNR acknowledged that the PolyMet project is reasonably foreseeable, but did not assess its cumulative impacts in conjunction with the Northshore Mine expansion project. (EAW, p. 43). However, if groundwater seepage during operations and post-closure is analyzed rather than assumed away, existing taconite mines in the St. Louis River watershed and the proposed PolyMet sulfide mine may cumulatively affect ecosystems and water quality impacted by the expansion project.

A federal EIS should also evaluate effects of post-closure reduction in flow to the Partridge River resulting from the Northshore Mine combined with PolyMet sulfide mine. The Barr hydrology study suggests that the Northshore Mine diversion may reduce flows into the Partridge River immediately downstream of the post-closure watershed boundary "by close to 100 percent relative to current conditions." (Barr 2008, p. 20). Post closure flows as far downstream as Colby Lake may be reduced by as much as 7 percent, representing a decrease of as much as 1,416,000,000 gallons per year (6 cfs) (*Id*.)

Reduction of Partridge River flow from Northshore Mine water diversion would reduce flow from precipitation that might otherwise dilute PolyMet discharge. The PolyMet project would substantially increase levels of a number of metals, including antimony, arsenic, cadmium, cobalt, copper, lead, nickel, and selenium. (PolyMet SDEIS, p. 5-113; Table 5.2.2-30, p. 5-129; Table 5.2.2-33, p. 5-156). Post-closure, the volume of PolyMet's wastewater discharge would be nearly four times existing Partridge River flow. (PolyMet SDEIS, p. 5-143). The combined effects of Northshore's diversion of groundwater from the Partridge River and the PolyMet project's pollution of the Partridge and Embarrass River watersheds has the potential for significant effects on Partridge River aquatic life and Colby Lake drinking water further downstream.

Although the Duluth Metals/Twin Metals copper-nickel mine project has not yet been submitted for environmental review, the impacts of this project should be considered "probable" under federal regulations. 40 C.F.R. §230.1(c). Duluth Metals recently filed a Technical Report on Pre-Feasibility Study (NI 43-101) with SEDAR, the electronic filing system for the disclosure documents of public companies and investment funds across Canada. This 558-page report concludes, "there is sufficient support from the Report results for progression to a feasibility study."[10] As reflected in Exhibit 7 attached, the NI 43-101 Report locates the mine site on Birch Lake, the concentrator site 1-2 miles west of the deposit, but within the Rainy River Basin, and the tailings storage facility in the St. Louis River watershed of the Lake Superior Basin, just north of the Northshore Peter Mitchell mine.[11] At this stage, WaterLegacy believes that the Army Corps and EPA should consider impacts from the Duluth Metals mining project to be probable and include these cumulative impacts in evaluating environmental effects of the Northshore Mine expansion project.

Recommendations
The Northshore Mine expansion project Section 404 permit should be denied due to significant cumulative adverse impacts of known and probable mining at the Northshore facility, other taconite mines, and proposed copper-nickel mines.

A federal EIS should evaluate cumulative impacts of past, existing and probable future taconite and copper-nickel mining facilities in the Rainy River Basin, including known impacts on discharge of sulfates, salts and metal leachates from the Northshore Mine and Dunka Mine; discharge from Duluth Metals drilling and bulk sampling; and probable Northshore Mine phased expansions to the south and the west, including mining in high-sulfur Type II VF rock.

The EIS must also consider the cumulative effects of Northshore Mine's elimination of the divide between the Rainy River and Lake Superior Basins with the effects of the expansion project. Effects of seepage and diversion post-closure should be considered in conjunction with impacts of taconite mines and the proposed PolyMet on water quality and quantity in the St. Louis River watershed.

Finally, given the advanced stage of analysis and potentially critical impacts, the federal EIS should consider cumulative impacts of the Duluth Metals' probable copper-nickel mine, concentrator and tailings storage facility on waters of the Rainy River and Lake Superior Basins.

6. Northshore Mining's National Pollutant Discharge Elimination System (NPDES) permit does not control or mitigate adverse impacts of the expansion project on water quality and does not militate against the need for an EIS

The impacts of the Northshore Mine expansion project will not be mitigated by ongoing regulatory authority since the Mine's NPDES permit contains no effluent limits for critical pollutants.

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[10] Duluth Metals, *Twin Metals Minnesota Project, Technical Report on Pre-Feasibility Study* (NI 43-101), filed Oct. 13, 2014, p. 1-37, on SEDAR through http://www.sedar.com/search/search_form_pc_en.htm.
[11] *Id*., p. 1-24.

The Northshore NPDES contains no effluent limits for pollutants of concern, including metals such as nickel and cobalt that are predicted to increase markedly with the expansion project and pollutants, like sulfate, which may already be discharged in excess of water quality standards. (EAW pp. 26-27 Table 11-7). In fact, the existing NPDES permit contains no effluent limits for any of the following parameters: aluminum, arsenic, cadmium, cobalt, copper, hardness, lead, mercury, nickel, specific conductance, sulfate or zinc. (Northshore NPDES, pp. 13-28).

The NPDES permit does not consider potential effects of groundwater pollution from the Peter Mitchell mine, even in terms of monitoring. The NPDES permit only monitors surface water at remote locations, which are not designed to identify potential water quality impacts of mine seepage daylighting to surface water.[12] (*Id*., p. 7) The permit requires no monitoring of groundwater at any location. (*Id*., p. 12) If polluted seepage were to propagate through groundwater to nearby surface water or to contaminate drinking water, no system of monitoring would identify, let alone regulate these effects on water quality.

Despite this lack of effective controls on pollution, the EAW states that the MPCA's current NPDES permit is "sufficient" and that no additional permit issuance or amendment will be required. (EAW, p. 12) Since the applicable Northshore Mine pollution control instrument neither limits surface water effluent nor monitors impacts to groundwater, no regulatory authority can be relied upon to mitigate environmental effects of the Northshore Mine expansion project into high-sulfur Virginia Formation rock.

Conclusion

For the foregoing reasons, and based on applicable law, documents from MDNR files, and the citations and exhibits supplied with our comments, WaterLegacy respectfully makes the following recommendations to the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency:

- Northshore Mining's application for a Clean Water Act Section 404 permit for its expansion project into Type II Virginia Formation rock should be denied under CWA Section 404(b)(1), Section 404(c) and applicable regulations.

- Prior to any further consideration of Northshore Mining's application for a Section 404 permit for the expansion project, a federal environmental impact statement should be completed, analyzing project and cumulative effects on ecosystems and water quality, alternatives, and other concerns reflected in these comments.

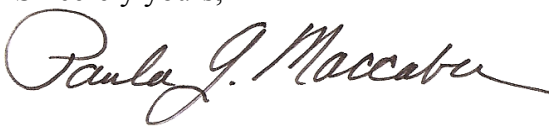
- A public hearing should be scheduled by the Army Corps to address the factual issues and concerns described in these comments and to allow public participation before

[12] Surface water is monitored at the untreated municipal water supply for city of Hoyt Lakes, the outlet of Birch Lake at the Highway 1 bridge crossing of the South Kawishiwi River and in the Partridge River at the County Road 666 bridge east of Hoyt Lakes. (Northshore NPDES, p. 12).

Northshore Mining is permitted to destroy wetlands and expand into high-sulfur Virginia Formation rock.

We appreciate the opportunity to comment on this matter and would be happy to answer any questions you may have regarding our comments.

Sincerely yours,



Paula Goodman Maccabee
Advocacy Director/Counsel for WaterLegacy

Attached Exhibits

Exhibit 1 Maps of Expansion Project (EAW, Figure 6-1) Northshore Mine Drilling from Northshore 2004 (p.10) and Northshore 2008 (p. 11)

Exhibit 2 MPCA, *St. Louis River Watershed Stressor Identification Report*, October 2013, draft from MPCA files dated December 31, 2013.

Exhibit 3 Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion, Map 1 (J.D. Lehr)

Exhibit 4 Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion Map 2 (J.D. Lehr)

Exhibit 5 Map of Current and Post-Closure Northshore Pit Stratigraphy (Barr 2008, Map 13)

Exhibit 6 Map of Wells and Public Water Supply Within 15 Miles of Northshore Mine Site (Barr 2008, Map 9)

Exhibit 7 Duluth Metals Proposed Project Infrastructure Map (NI 43-101 Technical Report on Prefeasibility Study, p. 4-11)

Primary References from MDNR Files (provided on DVD)

Barr, *Long-Range Hydrology Study*, November 2008 (Barr 2008)

Barr Technical Memorandum- Louise Segroves and Rachel Walker, *Wild Rice Literature Review and 2013 Field Survey for the Peter Mitchell Mine*, December 11, 2013 (Barr 2013)

Golder Associates, *Northshore Mining Type II Virginia Formation Laboratory Weathering Experiment*, October 2012 (Golder 2012)

Golder Associates, *Type II Virginia Formation Stockpile Plan*, May 2, 2013 (Golder 2013)

MDNR, *Northshore Mining Company Progression of the Ultimate Pit Limit Public Review Environmental Assessment Worksheet*, September 2, 2014. (EAW)

MDNR, *Environmental Assessment Figures, Northshore Mining Company Progression of the Ultimate Pit Limit Project* (EAW Figures)

Northshore Mining Co., *Northshore Mining Virginia Formation Development Plan*, June 15, 2004. (Northshore 2004)

Cliffs Natural Resources Northshore Mining, *Virginia Formation Development Plan 2008 Annual Review*. (Northshore 2008)

Northshore Mining Company – Peter Mitchell Mine, National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Permit MN0046981, Issuance Date: August 11, 2009; Modification Date August 14, 2013. (Northshore NPDES)