PolyMet Mining, Inc.'s NorthMet Mine Project:

Adverse Impacts to Wetlands & Other Aquatic Resources, Especially on the FDL Reservation

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Introduce myself—Who am I:

- Nearly 33 years with EPA, 5 ½ with HQ and 27 with New England Region, as Senior Wetland Ecologist for the Wetlands Protection Program, last 8 as Chief of the Regional Wetlands Program
- Also, last 4 years as EPA's rep on the IJC St.Croix River (Maine) Watershed Council
- I worked on over 30 hazardous waste sites throughout New England regarding wetland impacts, appropriate remedial actions
- Along with a small cadre of EPA Regional scientists who served as type of SWAT team for controversial projects, I also did special projects for EPA throughout the country, including Yahoo Backwater Area Pumps in MS, Big River Water Supply Impoundment in RI, and Bayou aux Carpes Site in LA; and since I retired from EPA, in particular, the Pebble Mine in AK

Key Points

The proposed NorthMet Mine project would result in the discharge of waters containing inorganic mercury, methylmercury, sulfides and sulfates, and dissolved organic matter to tributaries of the Embarrass and Partridge Rivers.

The Embarrass and Partridge Rivers are direct tributaries of the Saint Louis River, which forms the northern and eastern boundaries of the Fond du Lac Band ("FDL" or "Band") Reservation, which is about 70 miles downstream of the mine site.

There are extensive riparian (floodplain) wetlands along the Saint Louis River that contain organic-rich soils, i.e., mucks and peats. Fluctuating water levels in these riparian muck and peat wetlands would create ideal conditions (drying out and re-wetting—i.e., oxidation and reduction) for enhancing the methylation of mercury.

There is a direct and permanent surface water connection between the Mine and Plant sites and the riparian wetlands along the FDL Reservation, and the contaminated discharges from the NorthMet Mine would be transported to these riparian wetlands.

Among other evidence, the specific conductance levels that Nancy Schuldt spoke to are clear evidence of that connection.

Key Points

Late fall, winter, and spring flooding on the Saint Louis River will back up waters into at least the three major streams on the Reservation—Fond du Lac Creek, Stony Brook, and Simian Creek—and the wetlands adjacent to those streams. As such, the contaminated discharges from the Mine and Plant may easily reach and contaminate these three streams and their adjacent wetlands within the Reservation.

Fish and wildlife resources that use the Saint Louis River, its riparian wetlands, the three Reservation streams, and their adjacent wetlands, would be exposed to mercury and methylmercury, would consume plant and animal foods containing elevated levels of methylmercury, and in turn be available to higher trophic levels including humans that catch and consume fish from the Saint Louis River and Reservation streams. **Biomagnification in the food chain is a major concern. Among other species, the Band's restoration efforts for lake sturgeon may be compromised.**

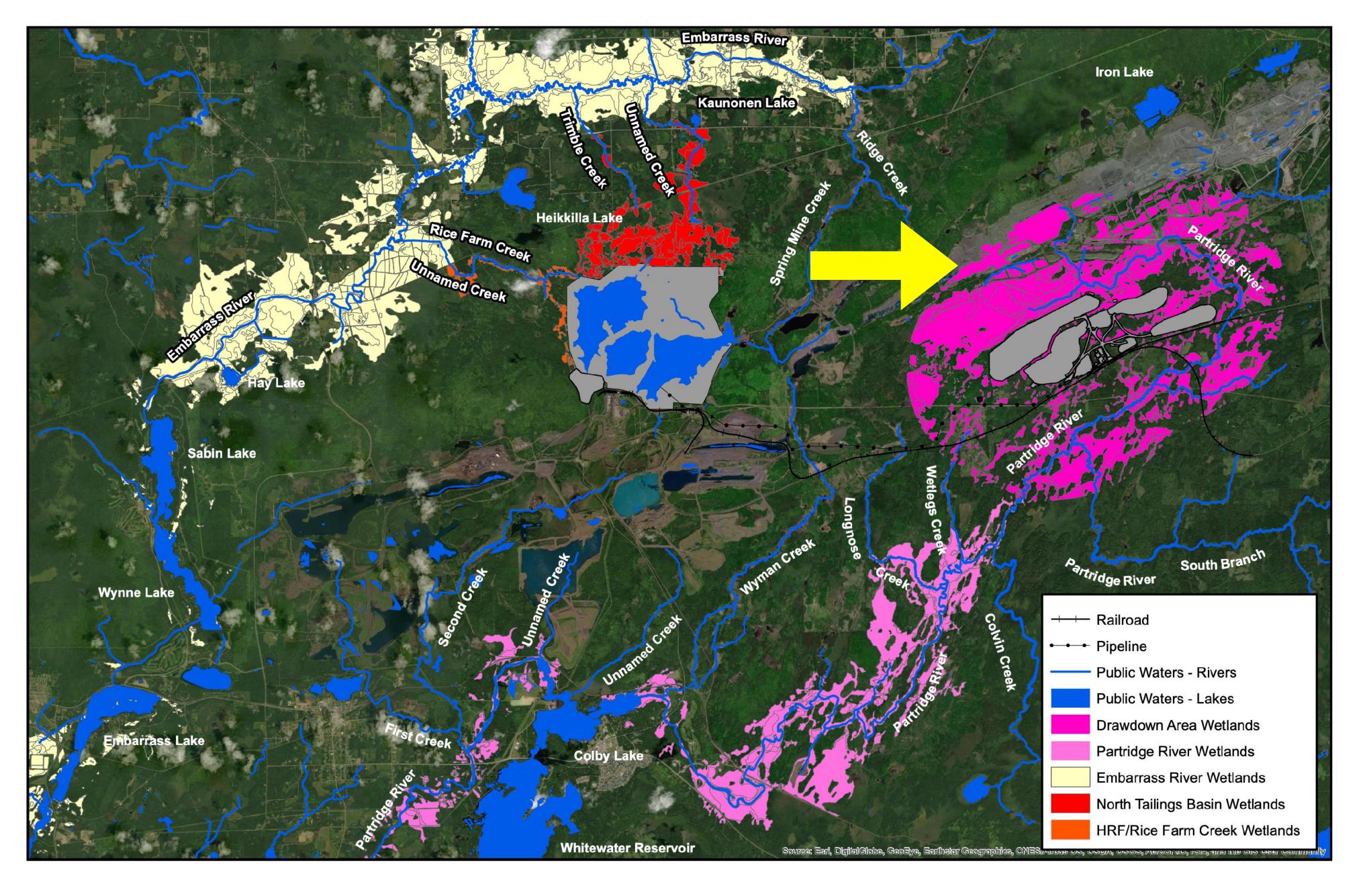
The consumption of methylmercury contaminated foods by fish and wildlife and by humans would impair Designated Uses for the Saint Louis River and the three streams on the Reservation as well as wetlands adjacent to those areas. — baseflow discharge, cultural opportunities, flood flow attenuation, groundwater recharge, *indigenous floral and faunal diversity and abundance*, nutrient cycling, organic carbon export/cycling, protection of downstream water quality, recreation, resilience against climatic effects, sediment/shoreline stabilization, surface water storage, *wild rice*, and *water dependent wildlife* to the extent that such uses, functions, and values occur as represented by reference wetlands

The degradation of Reservation waters and wetlands will result in non-compliance with the Designated Uses and Antidegradation standards of the FDL Water Quality Standards.

The filling and disturbance of wetlands and other waters will result in non-compliance with the CWA Section 404(b)(1) Guidelines.

Ecological Setting and Background

Wetland Areas, Rivers, and Creeks in the Watershed Basin



Regional Aquatic Resources

- At the Mine site, there are numerous small creeks and streams surrounded by an expansive diverse landscape where the dominant feature is wetland.
- The Embarrass and Partridge Rivers provide a direct flow path via the St. Louis River to the Reservation.
- There are extensive riparian (floodplain) wetlands along the Embarrass, Partridge and St. Louis River that contain organic-rich soils, i.e., mucks and peats. These rivers regularly flood during spring from snowmelt and frequent rains.
- The Saint Louis River forms the northern and eastern boundaries of the Reservation. Riparian wetlands that exist along those two boundaries (i.e., the river shoreline) total approximately 9,400 acres. Of these wetlands, the USFWS-National Wetland Inventory classification indicates that approximately 2,400 acres (~25%) are seasonally flooded basin or flat. These wetland types have extensive organic soils (e.g., Giese muck, Bowstring). Seasonally flooded wetlands experience fluctuating water levels; flooded in mid to late winter and spring, then drying out when water levels recede in summer and early fall.

Regional Aquatic Resources

- The **fluctuating water levels** in these organic rich riparian wetlands are known sites where mercury methylation occurs.
- Along the boundaries of the FDL Reservation, there also are numerous streams and creeks (e.g., Fond du Lac Creek, Stony Brook, Simian Creek) that connect more interior Reservation wetlands, including some wild rice areas, to the St. Louis River.
- These wetlands are predominantly forested, shrub, and emergent types. Many of these wetland areas flood periodically (often backwater flooding from the Saint Louis River) and contain organic soils (mucks and peats).
 - Many of these wetlands are bogs and fens (more mineral rich than a bog).
- Nearly all of these interior wetlands drain to the St. Louis River, which drains to Lake Superior at Duluth

Regional Wildlife

A diverse array, including,

- Large and small mammals, e.g., black bear, timber wolf, pine marten, badger, moose, white-tailed deer, bobcat, Canada lynx, fisher, gray and red fox, beaver, muskrat, porcupine, river otter, hares and rabbits, squirrels, voles, and several voles
- Birds, e.g, waterfowl (ducks, geese, swans); wading birds (herons, egrets); birds of prey (hawks, falcons, eagles); owls; grouse; sandhill crane; woodcock; song birds
- Reptiles, e.g., snakes (e.g., brown, bull, eastern hognose, milk, northern water, red belly, ring neck); turtles (e.g., map, snapping, wood, Blanding's, spiny soft-shell)
- Amphibians, e.g., frogs (e.g., gray tree, mink, bull, green, wood, pickerel, northern leopard); toads (e.g., American toad, Canadian toad)
- Many of these wildlife species, and the fish species on the next slide, are culturally significant for the Band and needed for the exercise of their treaty rights—hunt, fish and gather.

Regional Fish

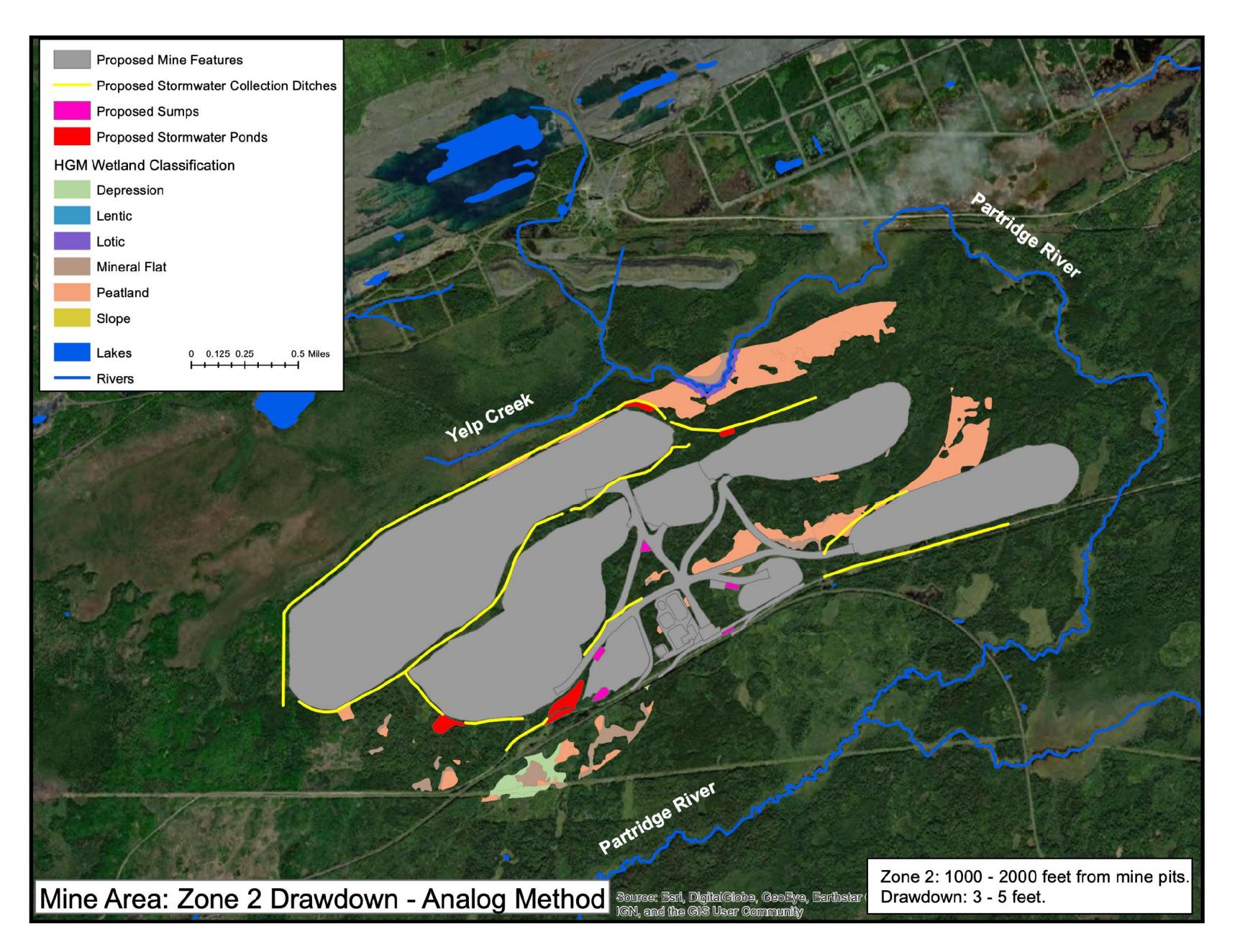
A diverse array in the Saint Louis River and Reservation streams, including, but not limited to —

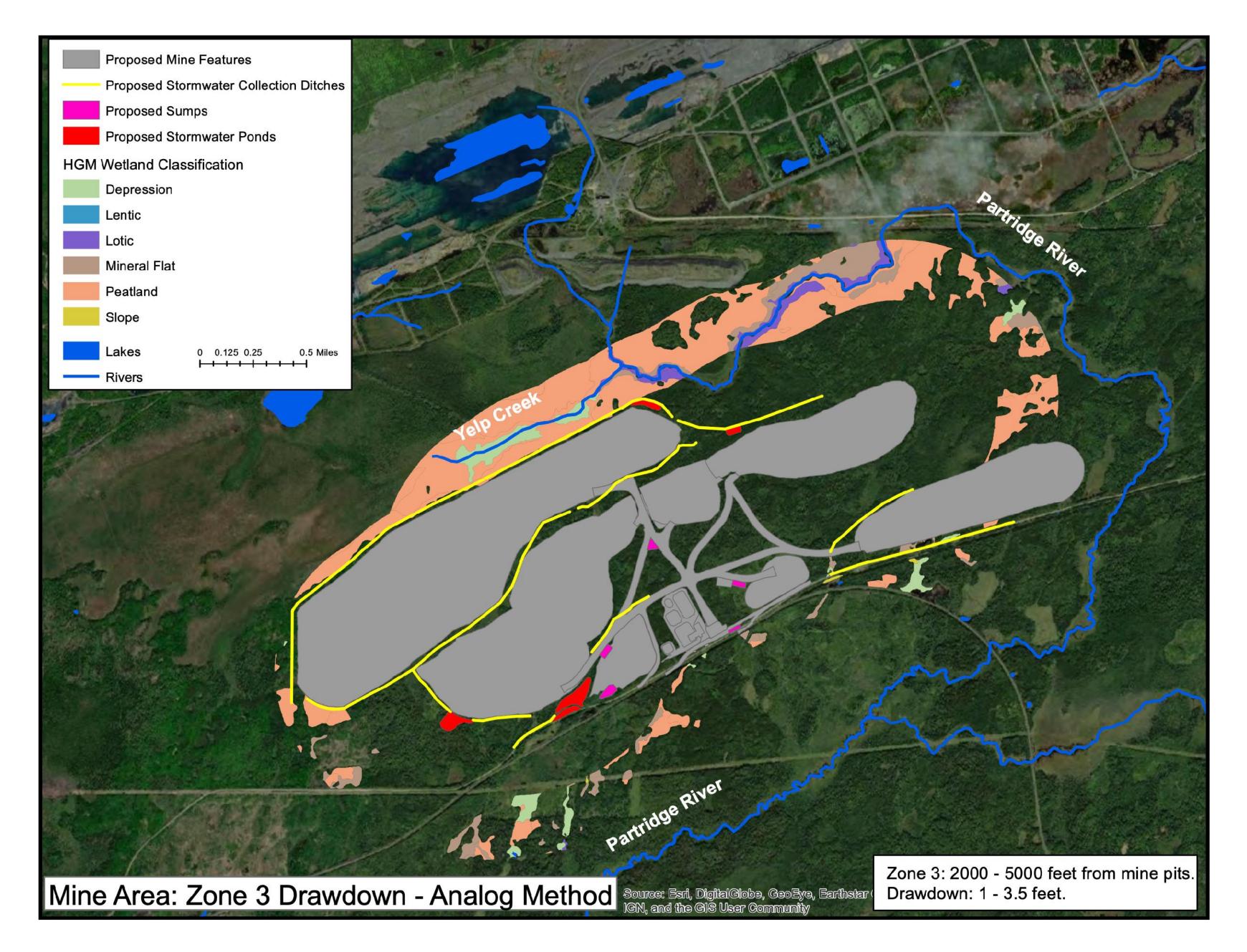
- Lake sturgeon (rare species) Band's re-establishment effort for St. Louis River is vitally important
- Bigmouth buffalo
- Crappie
- Bass
- Long-nose gar
- Muskellunge
- Northern pike
- Sunfish
- Trout

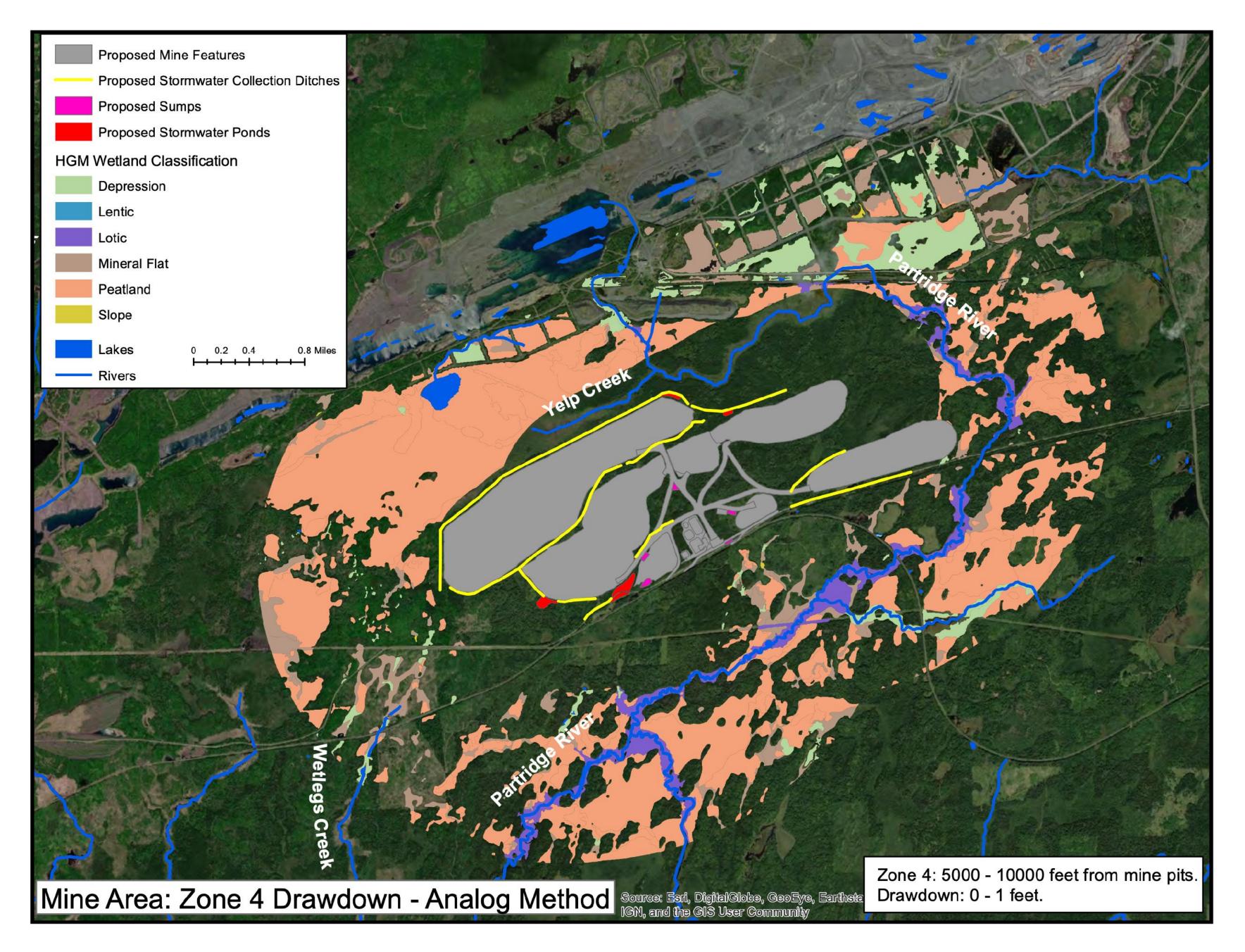
Adverse Impacts

- PolyMet says the proposed project would fill or alter approximately 900 acres of wetlands
- BUT, PolyMet and the Corps did not completely evaluate indirect adverse impacts in compliance with NEPA, Corps, or EPA regulations (404(b)(1) Guidelines), especially downstream of the Mine and its facilities (especially, FDL Reservation)
- In the EIS documents and CWA application, PolyMet claims minimal impacts to wetlands and other waters. Corps ROD appears to take that claim at mostly face value
- Our analysis shows that the project would *fill and alter at least 6,000 acres* of wetlands and other waters
- A glaring omission—Neither PolyMet nor the Corps accurately evaluated the adverse impacts to wetlands and other waters from the mine—particularly from GW drawdown and downstream effects of the Mine Site, especially on the FDL Reservation

- See GLIFWC maps that follow depicting areal effects of groundwater drawdown from mine operation
- Wetland hydrology is defined technically as an area with saturated soils at 12 inches or less below the surface for a period of two weeks or longer during the growing season.
- In areas with organic soils, i.e., peat and muck, the water table may be lower (e.g., 13 to 16 inches) and the area still retain wetland hydrology due to the capillary fringe rise (like water rising on a paper towel dipped in water)
- The FEIS and PolyMet's submissions describe the wetlands as perched, that is, hydrologically separated from the regional water table. NOT ACCURATE. Few are truly hydro separated. Vertical transmission may be slower at times—Nevertheless, the wetlands are connected to the regional water table. So ...
- The GLIFWC (Esteban) modeling shows a much greater drawdown of the water table. See GLIFWC maps. That modeling and outcome has been further supported by the recent USGS model which shows even greater drawdown impacts.







- Mercury and methylmercury (MeHg) tend to persist in the environment, especially in organic soils (peats and mucks), and when you add sulfate, become prolific incubators of MeHg.
- Mercury is one of the most toxic elements for fish and wildlife, and humans, especially for vulnerable and minority populations like the Fond du Lac Band
 - MeHg disrupts and causes severe harm to the neurological and reproductive systems in both fish and wildlife, and humans

- PolyMet's analysis of the groundwater drawdown effect upon streams and wetlands in the watershed subbasin is inaccurate and vastly underestimates extent. See GLIFWC maps.
- The FEIS states that over 900 acres of diverse and ecologically valuable wetlands that would be directly filled and altered by construction of the Project, including the Mine site and operation of the Mine
- However, we determined that, when combined with the construction and dewatering of the open pit that will lower groundwater and surface water levels around the mine, the actual adverse impacts will directly and indirectly affect an area that contains over 6,000 acres of wetlands and streams
- That acreage figure <u>DOES NOT</u> include indirect impacts downstream of the Mine facilities, e.g., riparian wetlands along the St. Louis River, <u>especially to streams and wetlands along and within the FDL Reservation.</u>

Adverse Impacts to Aquatic Resources - FDL Reservation

- Fish and wildlife resources that use the St. Louis River, its riparian wetlands, and the streams and wetlands of the Reservation will be exposed to elevated levels of methylmercury (MeHg), the form of mercury that biomagnifies in predatory species—resulting in the highest levels of exposure in predatory organisms, including
 - · wildlife such as fish-eating birds and mammals, and
 - humans (Band members) that catch and consume fish, and that catch and consume wildlife that eat fish.
- MeHg exposure is a grave concern for fish and wetland dependent wildlife from the St. Louis River, the three principal streams on the FDL Reservation, and their adjacent wetlands. Among other species, the Band's restoration efforts for lake sturgeon would likely be jeopardized.
- Project discharges will affect biogeochemical functions of these wetlands, which in turn will substantially affect their ecological functions. The discharges (in addition to seepage that will not be contained by the proposed and wholly unproven seepage capture system) will result in an increase in MeHg production in headwater wetlands that provide water and solutes to downstream reaches, especially the St. Louis River and its riparian wetlands.
- Late fall, winter, and spring flooding on the St. Louis River will back up waters into at least the three major streams on the Fond du Lac Reservation—Fond du Lac Creek, Stony Brook, and Simian Creek—and the wetlands adjacent to those streams. The contaminated discharges from the Project will reach and contaminate at least these three streams and their adjacent wetlands within the Reservation.

- Section 701 **Designated Uses:** For all wetlands, as defined by the Cowardin classification scheme, the uses to be protected include, but are not limited to—baseflow discharge, *cultural opportunities*, flood flow attenuation, groundwater recharge, *indigenous floral and faunal diversity and abundance*, nutrient cycling, organic carbon export/cycling, *protection of downstream water quality*, recreation, resilience against climatic effects, sediment/shoreline stabilization, surface water storage, *wild rice*, and *water dependent wildlife* to the extent that such uses, functions, and values occur as represented by reference wetlands. (emphasis added)
- Discharged waters from the Mine and Plant sites containing elevated levels of mercury and sulfates will interact with dissolved organic matter to generate MeHg that will be transported downriver to Reservation waters and wetlands, especially in the event of higher flows and floods.
- MeHg will bioaccumulate and biomagnify in fish and other aquatic life (e.g., otter, mink) in the River, streams and wetlands, and impair designated uses such as subsistence fishing, warm water fish, wildlife (especially piscivorous birds and mammals such as herons and river otter), and, potentially, wild rice areas.
- · You heard Nancy Schult speak to the adverse effects on the Band's Designated Uses.

Section 703 Antidegredation:

Tier I: For all wetlands, using the Cowardin classification scheme, there shall be no degradation of existing uses.

Tier II: Using the Cowardin classification scheme: there shall be no net loss to the water quality, functions, area, or ecological integrity of high quality lacustrine, lacustrine fringe, palustrine, riverine, and slope wetlands, unless, after satisfying applicable antidegradation provisions including avoidance, minimization, and mitigation/replacement requirements, the authorized tribe determines that allowing degradation is necessary to accommodate important social or economic development in the area in which the wetlands are located. (emphasis added)

You heard Nancy Schult speak to the adverse effects that violate Anti-Deg

- The direct effect of loading water, sulfate and (inorganic) mercury to headwater wetlands and surface waters from mine operations will be to raise MeHg concentrations and result in increases in exposure of fish and wildlife, as well as Band member consumers.
- Changes in regional wetland hydrology in the area of groundwater impact in the vicinity of the project site will have indirect effects that will enhance mercury, sulfate and MeHg release in an area that data clearly indicate are already exceeding WQS.
- Project-related changes in hydrology and the release of excess sulfate will stimulate the process of mercury methylation and enhance production of MeHg both adjacent to the Project as well as more distal locations in the St. Louis River watershed (e.g., the FDL Reservation) and contribute to the load of MeHg in surface waters. This MeHg will bioaccumulate in biota, increasing exposures of fish-consuming wildlife and Band member consumers.
- The consumption of MeHg contaminated foods by fish and wildlife and by Band members will impair the Band's Designated Uses for the St. Louis River and the three principal streams on the Reservation as well as wetlands adjacent to those areas. The degradation of Fond du Lac Reservation waters and wetlands will result in non-compliance with the Band's Designated Uses and Antidegradation Water Quality Standards.

- The unavoidable leakages and releases of process water, leachate, and stormwater containing mercury, sulfides/sulfates, and inorganic and MeHg, will almost certainly result in degrading the ecological functions and services of the affected Reservation waters and wetlands, including existing uses, as well as the loss of their ecological integrity.
- PolyMet proposes to monitor to determine if non-compliance has occurred. BUT, WQS are in effect in the first instance to prevent discharges that result in non-compliance.
- PolyMet's proposed monitoring approach would not comply with the Band's WQS because the non-compliance would already have occurred. Monitoring to detect a violation, then deciding how to address it in this case is wholly inadequate, impracticable, unrealistic, and would result in irreparable harm.
- Such an arrangement makes compliance with WQS negotiable instead of mandatory.
- Would not comply with the CWA.

I will switch now to address Compliance with the CWA Section 404(b)(1) Guidelines

- An individual permit can issue *only* if the proposed discharge complies with the environmental standards under Section 404(b)(1), also known as the 404(b)(1) Guidelines ("the Guidelines")
- The Guidelines are binding regulations
- The Guidelines prescribe four independent tests —

Compliance with the Guidelines - Avoidance/Alternatives

Section 230.10(a): ... no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. (This standard is referred to as the LEDPA, or least environmentally damaging practicable alternative.)

- The environmental review process conducted by the Army Corps of Engineers for this proposed project under Clean Water Act Section 404 was fundamentally flawed.
- A "practicable alternative" is both "available" and "capable of being done" (i.e., "feasible"). Those twin aspects are examined in terms of cost, existing technology and logistics in light of overall project purposes (emphasis added). An "available" alternative is one that the applicant can reasonably obtain, access, utilize, expand or manage.
- In this instance, the basic project purpose is mining and ore processing. As determined by the Corps in its Record of Decision (ROD, section 6), the overall project purpose is to produce base and precious metals precipitates and flotation concentrates from ore mined at the NorthMet deposit by uninterrupted operation of the former LTVSMC processing plant. (italics added)
- The Corps' overall project purpose was well-grounded up through the word "concentrates." However, the wording in italics is incorrect and inappropriate because it eliminates any other alternative site for a mine.

• In its ROD, the Corps states that,

The DNR and USACE will not evaluate alternative mine pit or processing plant sites for this project. An alternative mine site would not meet the underlying need or purpose (NEPA terminology?) of the project. The mineralization of the desired elements within a geologic deposit dictates the location of the mine (unknown absent a thorough analysis by PolyMet). An alternative processing plant site would not likely have significant environmental benefits over using existing mining industry infrastructure (Again, unknown).

These statements by the Corps are an open admission of the improper constraint it applied in its evaluation of the NorthMet Project.

- Without a thorough evaluation of potential mine locations across the world—either owned, controlled, or reasonably obtainable by PolyMet, a worldwide multinational entity—no documented and defensible determination can be made by the Corps that the PolyMet NorthMet mine site is both practicable and least environmentally damaging to the aquatic ecosystem, i.e., the LEDPA. No such evaluation was documented by PolyMet or by the Corps.
- The burden of proof is squarely on the applicant to clearly demonstrate that its proposal is the LEDPA. In the absence of such a clear showing, the Guidelines require the Corps to deny the application for a permit. PolyMet has made no such demonstration.

Section 230.10(b): No discharge of dredged or fill material shall be permitted if it [among other things],

- (1) Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State [or approved Tribal] water quality standard
- For this proposed project, it is documented clearly that the now suspended Corps permit for the purpose of constructing the NorthMet Mine and Ore Processing Facilities Project will cause or contribute to violations of the Band's WQS. The "Will Affect" analysis by Branfireun, Schweisberg, Sunderland, and the Great Lakes Indian Fish and Wildlife Commission, dated August 3, 2021, explains in great detail the activities that would occur, their effects upon the Reservation's wetlands and other waters, and concludes that, among other things,
 - The Project will result in the discharge of millions of gallons of water containing inorganic mercury, MeHg, and dissolved organic matter to tributaries of the Embarrass and Partridge Rivers that already contain elevated levels of MeHg.
 - Project discharges will result in direct and seepage discharges of sulfate and inorganic mercury to extensive headwater wetlands of the Embarrass River Watershed; and, seven direct wastewater outfalls to the headwater wetlands of Trimble Creek, increasing water loading by several million gallons per day that will supply hundreds of pounds of sulfate per year.

- As there is a direct surface water connection between the Project and the riparian wetlands along and within the FDL Reservation, it is a given that the contaminated discharges from the Project will be transported to these riparian wetlands.
- Late fall, winter, and spring flooding on the St. Louis River will back up waters into at least the three major streams on the FDL Reservation—Fond du Lac Creek, Stony Brook, and Simian Creek—and the wetlands adjacent to those streams. Contaminated Project discharges will reach and contaminate at least these three streams and their adjacent wetlands within the FDL Reservation.
- The consumption of MeHg-contaminated foods by fish and wildlife and by Band members will impair the Band's Designated Uses for the St. Louis River and the three principal streams on the Reservation as well as wetlands adjacent to those areas.

Compliance with the CWA Section 404(b)(1) Guidelines - Significant Impacts

Section 230.10(c): Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. ...

- The Guidelines require the analysis of all direct, secondary (indirect), and cumulative adverse impacts to the affected aquatic resources.
- Neither PolyMet nor the Corps accounted for all secondary (indirect) and cumulative adverse impacts.
 - No evaluation of downstream (indirect) impacts, most importantly on the FDL Reservation
 - Incomplete (cursory) evaluation of cumulative impacts in the contributing subwatershed

Section 230.10(d): ... no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

• From the Corps ROD: To offset unavoidable losses of wetlands associated with the proposal, the Applicant purchased mitigation credits from the Lake Superior Wetland Mitigation Bank located in the St. Louis River Watershed. These bank credits provide stormwater storage as well as high quality habitat within the St. Louis watershed. Wetlands to be impacted by the Project are located in the Embarrass and Partridge Watersheds, which are sub-watersheds of the St. Louis River Watershed; therefore impacts and compensation are located in the same major watershed. The primary wetland type to be impacted and the primary wetland type at the Lake Superior Bank is coniferous bog communities; therefore compensation is in-kind.

First, it is important to note that the adverse impacts described in the FEIS and above are potentially <u>avoidable</u>. As explained in my complete analysis of the proposed mine for compliance with the Guidelines, the applicant has not rebutted the presumption that less environmentally damaging alternatives exist and are practicable. Therefore, because they are likely avoidable, the immense adverse impacts to the aquatic ecosystem that would result from the construction and operation of the mine are significant.

- Purchasing credits in a mitigation bank is allowed under current federal regulation. However, purchasing bank credits does not adequately compensate for the full range, scope, and severity of adverse impacts to wetlands, rivers and streams described above. The bank is roughly 25 to 30 miles downstream from the mine site and also would likely be contaminated from mine discharges.
- That approach could not come close to adequately compensating for the extent, diversity, and significance of adverse impacts at the project area. The adverse impacts to water quality, in particular to the wetlands and waters of the FDL Reservation, are not and cannot be adequately compensated by this approach; in fact, those impacts are not compensated at all. In fact, there is no scheme under which those impacts could be adequately compensated.
- That approach may appear practicable, but it clearly is not appropriate for the range, scale and severity of adverse impacts in this circumstance. The impacts to this landscape involve not just pristine individual wetlands, but inextricably linked stream, river, and wetland ecosystems as well as treaty resources in the Ceded Territory and Band's Reservation.

Finally, and as described on page 60 of the Corps ROD,

... there is considerable uncertainty regarding the extent of indirect effects that may occur due to groundwater drawdown at the site. Because indirect effects cannot be determined in advance of impacts, the Applicant will monitor areas around the Project to assess the extent of changes to hydrology and vegetation that can be attributed to the project. If indirect impacts are found, adaptive management and/or compensatory mitigation would be required to offset these impacts. Additional information on compensation to offset any indirect impacts is provided in Section 11 of this document.

Here and elsewhere, the Corps relies solely on monitoring to determine if more than minimal adverse impacts may have occurred. This is an unsound, unscientific, and unsubstantiated approach, as it would address adverse impacts "after the horses have left the barn." Undoubtedly, that approach would result in additional significant and irreparable adverse impacts to the aquatic ecosystem, resulting in further non-compliance with the Guidelines

CONCLUSIONS

- Most of the justification for the project is not based upon factual information; it is conjecture and unsubstantiated.
- The proposed mine would result in a significant and unacceptable violations of the Band's WQS
- CWA § 401(a)(2) provides neighboring states and federally recognized Tribes with an opportunity to object to 404 permits if EPA determines the permitted discharge "may affect" the water quality in the State or Tribe … If the imposition of conditions cannot insure compliance with the State's or Tribe's WQS, the permitting agency shall not issue the license or permit.
 - Consequently, the Corps cannot rely on the State of Minnesota's existing 401 Certification to justify the Project because it does nothing to address the myriad adverse impacts that I and others have described on the Band's WQS.
 - The proposed mine would, fill and alter approximately 6,000 acres of valuable wetlands and other waters, and result in significant and unacceptable adverse impacts to wetlands and other waters and fish and wildlife resources, especially those of particular importance to Band, e.g., Lake Sturgeon, birds of prey, furbearers
 - Consequently, the CWA Section 404 permit must be permanently revoked and not reissued.
- I want to emphasize that there are no proven or effective Conditions that could be placed on the Section 404 Permit (or for that matter, a WQC) to avoid the adverse impacts described or compensatory mitigation that could bring this project as proposed into compliance with applicable regulations.
- This is not a question of needing more studies or data. The data is more than sufficient. **No discharges is the only remedy in his case.**
- In closing, EPA should not delay or hesitate to invoke its authority under CWA Section 404(c) and initiate a veto action.