

Chapter 5

Comment Number	Agency	Section	Page Number/ Figure Number	Specific guidance to where the comment relates (paragraph, column, etc)	Comment
1	DNR LAM	5.2.2	pg 5.2.2-1	end of 4th paragraph	Note that near neutral pH water can also increase metal mobility for certain metals (e.g. nickel).
2	DNR LAM	5.2.2	pg 5.2.2-2	2nd paragraph	Is it the case that the "successful demonstrations" are described as part of the project in the document? If not, please included text to describe that (From the text here, that is not clear).
3	DNR FAW/Fisheries	5.2.2	pg 5.2.2-7	clarification on choice of flowpaths	Where does Hydrometallurgical Residue Facility fit in here? If there was a failure in the integrity of the double liner, where would seepage flow? Towards Embarrass R or Second Cr? HRF also missing on Fig. 5.2.2-6
4	DNR FAW/Fisheries	5.2.2	pg 5.2.2-40; table 5.2.2-12 or 13	additional data line	if there are calculation for SD-026 (Second Creek), they should be included here.
5	DNR FAW/Fisheries	5.2.2	pg 5.2.2-45;Fig 5.2.2-10	FTBRO arrow to Mud Lake Cr	Is this non-contact surface run-off from Tailings basin (outside slope)? Need to clarify for layperson.
6	DNR FAW/Fisheries	5.2.2	pg 5.2.2-45;Fig 5.2.2-10	HydroMet residue facility	Zero seepage forever?
7	DNR FAW/Fisheries	5.2.2	pg 5.2.2-46	last para.	Not sure of the relevance of this. The environmental concern is in how much total sulfur is available due to <u>total volume</u> of waste rock left on site. If more waste is produced per ton of metal extracted relative to other mines, the total amount of sulfur sitting on site (relative to ore produced) could be greater. How does this compare to other mines?
8	DNR FAW/Fisheries	5.2.2	pg 5.2.2-74	top paragraph. 1st sentence	What is the expected lifetime of the cover system?
9	DNR FAW/Fisheries	5.2.2	pg 5.2.2-74	top paragraph. Last sentence	What level of repair is anticipated? What leakage would be expected (of what and how much volume), if a repair was needed?
10	DNR FAW/Fisheries	5.2.2	pg 5.2.2-74	4th para. Last sentence	What sort of water quality is expected from these outlet control structures?

11	DNR FAW/Fisheries	5.2.2	pg 5.2.2-77	3rd paragraph	Same as comment 9 for p. 3-59
12	DNR FAW/Fisheries	5.2.2	pg 5.2.2-85; table 5.2.2-18	Source area	Why is Cat 4 rock not listed?
13	DNR FAW/Fisheries	5.2.2	pg 5.2.2-88 and 5.2.2-89	88: 3rd para. 1st sentence; 89: 4th para	What is the percentage leak in the model?
14	DNR LAM	5.2.2.3.2	pg 5.2.2-89	3rd line from top	Replace "...were of high enough quality..." with "...met discharge standards..."
15	DNR LAM	5.2.2.3.2	pg 5.2.2-94, Fig. 5.2.2-20	Title	Define term Surficial Groundwater in Glossary.
16	DNR FAW/Fisheries	5.2.2	pg 5.2.2-105	5th para. 2nd sentence	What was average , or min/max withdrawal in past?
17	DNR FAW/Fisheries	5.2.2	pg 5.2.2-106	top paragraph: last sentence	What is effect on Second Cr hydrology?
18	DNR FAW/Fisheries	5.2.2	pg 5.2.2-106	figures are missing	refers to figs 3.1-14,3.1-15, 3.1-16 which can't be found anywhere.
19	DNR FAW/Fisheries	5.2.2	pg 5.2.2-107	1st paragraph	Discussion should include Hydrometallurgical Residue Facility (HRF) which is to have a "permanent" liner system. Leakage from the HRF has potential to impact the Partridge R watershed.
20	DNR FAW/Fisheries	5.2.2	pg 5.2.2-107	3rd paragraph	How long do these liners last? Leakage from the HRF has potential to impact the Partridge R watershed.
21	DNR FAW/Fisheries	5.2.2	pg 5.2.2-107	2nd to last sentence on page	"up to 173 years" and continue for how long?
22	DNR LAM	5.2.2.3.2	pg 5.2.2-109	1st paragraph , 3rd sentence	Replace "Sit" with "Site".
23	DNR FAW/Fisheries	5.2.2	pg 5.2.2-138	3rd para. Lower Partridge river	No effects on Second Cr from Plant Site to include here?
24	DNR FAW/Fisheries	5.2.2	pg 5.2.2-143	top paragraph; 2nd sentence	Since the Hydrometallurgical Facility is to be exempted from this effects discussion: should provide technical details to support that the Hydrometallurgical Residue Facility will never leak- or that any faults will be detected before any leakage contaminates ground water, and that such failures can be remediated without effects.
25	DNR LAM	5.2.2.3.3	pg 5.2.2-143	4th paragraph, 1st sentence	Reference what document has the detail for the liner decision for the Tailings Basin. Believe that there were more than geotechnical concerns for decision and if so, those should be mentioned.
26	DNR LAM	5.2.2.3.3	pg 5.2.2-147	1st paragraph , 2nd to last sentence	The word augmentation is written twice, remove one.
27	DNR LAM	5.2.2.3.3	pg 5.2.2-151	Last paragraph, last sentence	Need to split sentence into three parts - 1st is for cobalt, 2nd is for lead, and 3rd is for lead modeled...
28	DNR LAM	5.2.2.3.3	pg 5.2.2-176	4th paragraph, 1st sentence	Missing a period at end of sentence
29	DNR LAM	5.2.2.3.3	pg 5.2.2-178	1st line	Replace "the" with "The".

30	DNR FAW/Fisheries	5.2.2	pg 5.2.2-195	3rd paragraph; summary	The NorthMet Project will alter the hydrological regime with the potential for altering stream geomorphology and consequently reducing fish habitat. Stream aggradation is a concern if reduction in groundwater flow and watershed area results in loss of channel-forming bankfull flow events (2-yr flood events). Averaged water models do not give enough seasonal detail to ascertain if there will be no impacts even with supplemental flow from WWTP and WWTF discharge. Reduced flows, especially in the spring time, have the potential to alter spawning habitat access and availability for fish. For example, spring flooding is important for gamefish such as northern pike, both to travel upstream and to find suitable spawning areas in flooded vegetation.
31	DNR LAM	5.2.2.4	pg 5.2.2-205	1st and 2nd paragraphs	The PSDEIS needs to be consistent and clear throughout on what is being "included/ addressed" as part of the No Action Alternative - it is confusing and not clear. Last sentence in 2nd paragraph does not agree with 1st paragraph.
32	DNR LAM	5.2.2.4	pg 5.2.2-205	1st paragraph, 6th line	Remove "necessarily." It is not static.
33	DNR LAM	5.2.3.3.2	pg 5.2.3-82	2nd paragraph, last sentence	Replace "...require a performance bond..." with "...require a performance bond or other instrument that meets criteria in rule..."
34	DNR LAM	5.2.3.3.2	pg 5.2.3-85	3rd paragraph, last sentence	Replace "...require a performance bond..." with "...require a performance bond or other instrument that meets criteria in rule..."
35	DNR FAW/Fisheries	5.2.6	pg 5.2.6-2	top para.	Comments above (#20, 21, 25, 26) contradict this conclusion of "no impacts". The Project will impact three components of fish habitat: hydrology, geomorphology, and water quality. This statement should be inclusive of the Partridge R watershed also.
36	DNR FAW/Fisheries	5.2.6	pg 5.2.6-2	under sec. 5.2.6.1 3rd bullet	IBI analysis was available for this but not used
37	DNR FAW/Fisheries	5.2.6	pg 5.2.6-2	1st para under "physical habitat effects"; 2nd sentence	Although baseflow is important, the seasonal hydrological regime is equally important. Loss of channel forming flood flow results in changed geomorphology, typically resulting in more homogeneous habitat and lower quality fish habitat. 2ndly, seasonal flow is important component that allows spawning fish access to habitat for spawning at the right time of year. This report fails to address this.

38	DNR FAW/Fisheries	5.2.6	pg 5.2.6-2	2nd para under "physical habitat effects"	This analysis is flawed. The analyzed site should have been SW-004 NOT SW-004a. Per the report p. 4.1-100, 2nd paragraph: "Location SW-004 is the location where the maximum impact on flow occurs..., SW-004a...(is) immediately downstream of the confluence with the unaffected South Branch, which ameliorates the impact."
39	DNR FAW/Fisheries	5.2.6	pg 5.2.6-2	2nd para under "physical habitat effects"	SW-002 may have significant impacts to fisheries as flow is reduced up to 20%- not analyzed in this report. This is why all sites upstream of SW-004 should have been analyzed for potential aquatic biota impacts
40	DNR FAW/Fisheries	5.2.6	pg 5.2.6-7		New analysis (since this is flawed), should address timing of seasonal flows.
41	DNR FAW/Fisheries	5.2.6	pg 5.2.6-7; Table 5.2.6-1	flawed data	New analysis should be done for site SW-004
42	DNR FAW/Fisheries	5.2.6	pg 5.2.6-7	1st paragraph	Likely there will be impacts when the correct data is analyzed.
43	DNR FAW/Fisheries	5.2.6	pg 5.2.6-7	2nd paragraph	This analysis needs more description of seasonal timing of flow to evaluate impacts to fisheries.
44	DNR FAW/Fisheries	5.2.6	pg 5.2.6-8	3rd para.	Should include discussion of TALU standards (biological indicators, MPCA)
45	DNR FAW/Fisheries	5.2.6	pg 5.2.6-8	4th para. 2nd sentence	Needs to be rewritten once correct data is used and table 5.2.6-2 updated.
46	DNR FAW/Fisheries	5.2.6	pg 5.2.6-9; TABLE 5.2.6-2	choice of data	Should be SW-004 NOT SW-004a (see comment 31 for p. 5.2.6-2)
47	DNR FAW/Fisheries	5.2.6	pg 5.2.6-11	3rd para. last sentence	Average of flows is not representative of hydrological regime and stream function in terms of aquatic habitat. There is too little information here to conclude no impacts.
48	DNR FAW/Fisheries	5.2.6	pg 5.2.6-13; fig. 5.2.6-2	data	Numbers don't jibe with discussion (p. 5.2.6-11, 3rd para. 3rd sentence) clarify. Embarrass R 2.5% reduction at PM-13
49	DNR FAW/Fisheries	5.2.6	pg 5.2.6-15	1st para.	General increase in solutes should be recognized. see comment #25 for p. 5.2.6-1.
50	DNR FAW/Fisheries	5.2.6	pg 5.2.6-15	3rd para.	Lead impacts possible. see comment #26 for p. 5.2.6-1.
51	DNR FAW/Fisheries	5.2.6	pg 5.2.6-18	section 5.2.6.3	Under No Action, heavy metals and other solutes would remain 2 to 30 times lower. Hydrological regime changes would be minimal therefore habitat would be expected to remain relatively stable. No risk of water chemistry changes and Class 2 exceedances due to holding facilities where water requires perpetual treatment for heavy metals and other processing by-products.
52	DNR LAM	5.2.14.2.1	pg 5.2.14-12	1st paragraph, last sentence	This appears to be West Pit backfill, which contradicts the analysis done for this alternative?

53	DNR LAM	5.2.14.2.1	pg 5.2.14-12	2nd paragraph, 1st sentence	Replace "...a plan comparison..." with "...an operating plan and annual report..."
54	DNR LAM	5.2.14.2.2	pg 5.2.14-12	1st paragraph, 1st sentence	Replace "evaluation" with "elevation".
55	DNR FAW/Fisheries	5.2.6	p. 5.2.2-195	3rd paragraph; summary	The NorthMet Project will alter the hydrological regime with the potential for altering stream geomorphology and consequently reducing fish habitat. Stream aggradation is a concern if reduction in groundwater flow and watershed area results in loss of channel-forming bankfull flow events (2-yr flood events). Averaged water models do not give enough seasonal detail to ascertain if there will be no impacts even with supplemental flow from WWTP and WWTF discharge. Reduced flows, especially in the spring time, have the potential to alter spawning habitat access and availability for fish. For example, spring flooding is important for gamefish such as northern pike, both to travel upstream and to find suitable spawning areas in flooded vegetation.
	DNR	FAW/Fisheries	p. 5.2.2-195	3rd paragraph; summary	Another concern is the increases in solutes such as copper, nickel, lead, arsenic and metals and other water chemistry. Although most solute concentrations are predicted to remain below standards, there is still the effect of increasing metal solutes 2 to 30 times above existing conditions. There is uncertainty both in the models and in our understanding of impacts to invertebrates and fish species from these solutes, particularly in combination. An increase in solutes, particularly in streams that already have indication of stressors (Embarrass River), increases the possibility of negative impacts to fish populations either directly or by impacting prey sources.
56	DNR	FAW/Fisheries	p. 5.2.2-195	3rd paragraph; summary	

57	DNR FAW/Fisheries	5.2.6	p. 5.2.2-195	3rd paragraph; summary	And lastly as , there is a difference in risk to water quality and fish habitat between the No Action Alternative (status quo) versus the NorthMet Project (an engineered system that is dependent on water treatment in perpetuity). This increase in risk to water quality and fish habitat is a significant impact of the project. If systems fail to perform as projected (i.e. WWTP and WWTF fail or do not perform as planned), engineered controls fail (i.e. seepage exceeds predictions due to leakage or other issues), or modeled ground and surface water impacts are greater than expected (i.e. if the model was miscalibrated or rainfall overwhelms the storage capacity and pits release untreated water), the NorthMet Project Alternative would have very significant negative effects compared to the No Action Alternative. Some examples of conditions that contribute to risk, that can not be ruled out in perpetuity include: WWTP and WWTF fail or do not perform as planned, engineered seepage exceeds predictions due to leakage or other issues, the model was miscalibrated, or rainfall overwhelms storage capacity and pits release untreated water. These may be very small risks but the time frame is "in perpetuity".
58	DNR	FAW/Fisheries	p. 5.2.6-1	2nd para., 1st sentence	Concern about impacts is for aquatic life in general (not just special status species).
59	DNR	FAW/Fisheries	p. 5.2.6-1	3rd para., 1st sentence	See comment #20 (p.5.2.2-195) regarding potential impacts. Reduced quality of fisheries habitat due to streambed aggradation from reduced flow cannot be ruled out, particularly in the tributaries to the Embarrass R and the uppermost portion of the Partridge R.



60	DNR FAW/Fisheries	5.2.6	p. 5.2.6-1	5th para., 1st sentence	Although increased solute loadings will meet Class 2 standards there will still be increased loading of solutes relative to existing conditions (Copper, Nickel, etc) particularly at Site SW-004. Predicted increases of 17 solutes are from 2 to almost 30 times the existing levels. This should be recognized here. Fish response to heavy metals, particularly in combination with other changes in water chemistry, is little researched so impacts are possible particularly in streams where there already is indication of biological stressors (Embarrass R). There is also data that indicated that TDS would be exceeded for decades initially (5.2.2-159). There is concern that conductivity increases have negative impacts on aquatic life (MPCA- Spring Mine Cr evaluation). IBI evaluation helps address some of the shortcomings of our knowledge of solutes threshold concentrations and aquatic life impacts.
61	DNR FAW/Fisheries	5.2.6	p. 5.2.6-1	5th para., 5th sentence	The increase in lead is significant for fisheries impacts, even though this change is due to reduction in hardness: this will be the new environment created for aquatic life.
62	DNR FAW/Fisheries	5.2.6	p. 5.2.6-1	6th para., last sentence	This should be a conclusion regarding potential impacts to aquatic life, not a summary of water quality expectations. Impacts to aquatic life are possible due to changes in water chemistry, including increases in heavy metals particularly lead, although it is expected that Class 2 standards will be met in most cases.