Ministry of the Environment, Conservation and Parks

Species at Risk Branch

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VIA EMAIL

April 7, 2022

Ms. Debra Sikora
Panel Chair
Marathon Joint Review Panel
marathonminereview-examenminemarathon@iaac-aeic.gc.ca

Dear Ms. Sikora,

Thank you and the other Joint Review Panel (Panel) members for the opportunity for the Ministry of the Environment, Conservation and Parks (MECP) to present its expert advice and recommendations on species at risk during the Topic-Specific: Terrestrial Environment Session on March 23, 2022. On March 24, 2022, the Panel provided views on recommendations made by Environment and Climate Change Canada that Generation PGM (GenPGM) provide further information by way of undertakings (#18-21) with respect to the Marathon Palladium Project's (Project) effects on Boreal Caribou, a listed species under the federal *Species at Risk Act*.

In Ontario, Boreal Caribou are designated as threatened under the *Endangered Species Act, 2007* (ESA) and receive species and habitat protection. Given these protections afforded under the ESA and the commitment to continue to support the Environmental Assessment process for the proposed Project, MECP has reviewed the documents provided by GenPGM on March 31, 2022, in response to those undertakings (i.e., CIAR #s 1209, 1210, 1211 and 1212). These include:

Undertaking 18: GenPGM will provide further information which clarifies and explains the methods and conclusions in its connectivity analysis. To the extent possible, this additional information will address potential impacts during operations and post-closure to connectivity and viable corridors within and between the caribou ranges.

MECP Response: MECP previously expressed concerns (CIAR#1081) regarding GenPGM's connectivity analysis (CIAR#950 and #976). These concerns focused

on (1) the semi-quantitative methods employed in GenPGM's analysis assess only landscape structure, with no attempt to quantitatively model caribou movement through the landscape; (2) linear features were not sufficiently addressed; and (3) the choice of thematic categories and their relative cost weights was not sufficiently explained or supported by evidence. Given these points, MECP was of the opinion that potential impacts of the project on range habitat connectivity could not be reliably discerned with the provided information.

GenPGM has responded to Undertaking #18 (CIAR#1209) in an effort to further explain the validity of their connectivity analysis. MECP has reviewed the response and is of the opinion that concerns described above in our CIAR #1081 were not sufficiently addressed. MECP recommends the use of quantitative movement models for the connectivity analysis which would allow formal tests of sensitivity to model inputs. Please see Appendix for further details on MECP's perspectives of GenPGM's response to Undertaking #18 (CIAR#1209).

Undertaking 19: With regard to onsite rehabilitation and the post-closure landscape, GenPGM will provide more detail and clarity to the Panel and the Agencies with respect to specific onsite rehabilitation and post-closure strategies that would mitigate effects on, and potentially provide benefits to, the Lake Superior Boreal Caribou.

MECP Response: MECP has previously expressed that it remains unclear what proportion of the Project footprint will be restored to caribou habitat post-mine closure (CIAR#1081). Material provided by GenPGM in response to Undertaking #19 (CIAR #1210) did not explicitly describe how much of the project footprint will be restored to suitable caribou habitat upon closure. It was noted in text from GenPGM's response to Undertaking #20 (CIAR #1211) that "at least 40%" of the project footprint would be "restored… to even-aged conifer forest". It was also expanded upon in GenPGM's response to Undertaking #21 (CIAR #1212).

With consideration to the information provided from these three responses, MECP is seeking confirmation from GenPGM that at least 40% of the project footprint (CIAR #1211) will be restored to a condition described in Table 1 of CIAR #1210 as "Forested (Even-Aged Conifer)" and will be guided by Ontario's *Best Management Practices for Mineral Exploration and Development Activities and Woodland Caribou in Ontario*.

Furthermore, it remains unclear in GenPGM's response to Undertaking #19 (CIAR #1210) whether the other proposed terrestrial post-closure landscape types described in Table 1 (i.e., "rocks with vegetation", "vegetated", "barren rock") and the features "Process Solids Management Facility" (PSMF) and "Mine Rock Storage Area" (MRSA) illustrated on the map figure of response #19 (CIAR #1210) will support caribou or will continue to act as barriers to movement and

connectivity within the Lake Superior Coast Range over the longer-term, whether it be due to unfavourable habitat conditions or physical barriers. This concern is even more apparent given GenPGM's response to undertaking #20 (CIAR #1212, page 2) in which GenGPM describes "an approximately 1 km wide even-aged, treed conifer corridor across the site between the reclaimed PSMF and open pits to improve potential connectivity in the post-closure landscape". Given that the LSCR is only 10 km wide and that the project footprint is fully within the LSCR boundaries and is itself 4-6km wide with only 1km of the footprint described by GenPGM as being restored to a movement corridor through the post-mine closure landscape, this indicates to MECP that connectivity within this portion of the LSCR has the potential to be permanently attenuated by remnant mine site features with how the project layout, design, and post mine-closure strategies are currently proposed.

Overall, MECP is of the opinion that GenPGM's response to Undertaking #19 (CIAR #1210) does not contain enough detail on the proposed onsite post-closure landscape in the context of mitigating effects to caribou and their habitat; or provide sufficient information to support a conclusion that the post-closure landscape may provide a benefit to caribou.

Undertaking 20: With regard to offsets, GenPGM will provide additional information detailing the offset measures currently under consideration based on, among other things, discussions GenPGM has had with Indigenous communities, stakeholders and government agencies.

MECP Response: MECP has previously expressed lack of confidence in the current proposed caribou off-site mitigation plan and that it is largely insufficient to minimize residual impacts on caribou from the Project. GenPGM's response to Undertaking #20 (CIAR #1211) attempts to identify additional measures for mitigation and overall benefit to caribou in the LSCR.
In response to undertaking #20 (CIAR #1211), GenPGM has suggested the following options for mitigation, beneficial actions, and/or offsetting including road decommissioning and enhanced silviculture, translocations, maternal penning, enhanced monitoring, research, community-based projects, and alternative predator-prey control.

Mitigation measures are actions taken to minimize adverse effects of the project on a species. In contrast, beneficial actions are actions taken to contribute to improving the circumstances for the species, as specified in an ESA authorization. Based on the information provided by GenPGM, MECP is of the opinion that the response lacks clarity and distinction on which actions are proposed for mitigation and which are proposed as beneficial actions.

Furthermore, MECP notes a lack of proposed mitigative actions to minimize adverse effects that the project may have on caribou connectivity within the LSCR in the short, medium, and long term as well as proposed mitigative actions to minimize adverse sensory effects of the project on the adjacent Category 1 High Use Area during the sensitive time periods of May 1-Sept 15 and December 1 to March 31.

Overall, MECP is of the opinion that the mitigative and beneficial options presented by GenPGM lack sufficient supporting material to demonstrate that they are meaningful actions for caribou in the LSCR and that they are feasible or implementable.

Undertaking 21: To the extent not covered in its responses to Undertakings 18-20, GenPGM will provide the Panel with a written response to the ECCC recommendation that it submit an updated connectivity analysis, on-site rehabilitation and post-closure restoration plan, and offset plan prior to the conclusion of the environmental assessment process.

MECP Response: In GenPGM's response to Undertaking #21 (CIAR #1212), GenPGM's position is that sufficient information is available to the Panel to demonstrate that there will be no significant adverse effects of the Project on Caribou, consistent with their conclusion of the EIS Addendum, Section 6.2.8 (CIAR #727), and that appropriate mechanisms exist beyond the current environmental assessment process to confirm further details, ensure compliance, and confirm effects predictions for this species.

Despite the additional information provided by GenPGM in response to Undertakings 18-20 (CIAR#1209 - 1211) and the position established by GenPGM in their response to Undertaking #21 (CIAR#1212), MECP remains of the opinion that GenPGM has not provided sufficient information to the Panel to demonstrate that the Project will have no significant adverse effects on caribou.

In addition to the responses regarding caribou-related undertakings, MECP would like to inform the Panel that it remains unclear of GenPGM's commitment to the recommended species at risk bat sensitive roosting timing window. On March 22, 2022, GenPGM stated during the Topic-Specific: Terrestrial Environment Session (Wildlife, including migratory birds, caribou, and species at risk), that they "do not anticipate clearing in the window…there may be extremely limited circumstances for health and safety of minor logistical circumstances". MECP reiterates that all tree clearing activities take place outside the species at risk bat sensitive roosting timing window from May 1 – August 31, in any given year. If GenPGM is unable to commit to this mitigative action, an ESA authorization is likely required.

Ontario

We hope a review of the information submitted by GenPGM in response to the undertakings and the comment regarding a clear commitment to avoid the sensitive timing for species at risk bats will be of assistance to you.

If you have any questions, please contact Lindsay McColm at <email address removed>.

Sincerely,
<Original signed by>

Paul Heeney
A/Director
Species at Risk Branch
Ministry of the Environment, Conservation and Parks

c: Kathleen O'Neill, Director, Environmental Assessment Branch

Comments on Undertaking # 18: GenPGM caribou connectivity analysis

Prepared by Dr. Jeff Bowman, WRMS, NDMNRF

4 April 2022

Background

In my comments submitted to MECP on 12 January 2022, I focused on 3 areas of the connectivity analysis: (1) the focus on structural, rather than functional, connectivity; (2) the approach to modelling linear features; and (3) choice of resistance values and thematic resolution. I will discuss the supplementary information provided in Undertaking #18 relevant to each of these 3 areas in turn.

Comment 1 of 12 January 2022. The semi-quantitative models consider only landscape structure and are not an analysis of connectivity.

In Undertaking #18, the proponents have explained that (1) caribou behaviour is addressed through the relative rankings of the resistance values that were employed; and (2) the movement paths were not intended to provide explicit costs for movement along paths, but were instead based on qualitative assessment of relevant GIS data layers. I interpret this to mean that movement paths were subjectively placed on the maps after some visual interpretation of the resistance inputs, and no attempt was made to sum the costs along these paths.

Relative rankings of costs is only one component of behaviour that should be modelled in a connectivity analysis. The other component is movement. I consider that a quantitative movement model is required to assess impacts of the project on connectivity. As far as I can tell, it would be impossible for another analyst to replicate the placement of the movement paths as carried out by the proponent. It seems that unknown assumptions and procedures were employed to identify these paths, and the accumulated costs along these paths is not reported. A quantitative movement model, where transparent assumptions about movement (e.g., movement follows a random walk), could be used to identify the probability of movements in a way that that is transparent and could be replicated. Furthermore, this kind of quantitative model could be used to assess movement costs (e.g., effective resistance, or accumulated cost) in a set of scenarios to optimize development and restoration plans in such a way that effects on caribou connectivity could be minimized. For example, effects on connectivity of alternative restoration scenarios could be quantitatively compared.

Comment 2 of 12 January 2022. The importance of linear features is not recognized. In my January comment, I noted that the semi-quantitative models involve accounting for the proportion of a hexagon occupied by linear features such as roads and rail lines. Linear features are also buffered by 4 to 22.5 m and this buffered area is included in the estimated proportion. This approach is analogous to estimating the density of linear features as a way to estimate their cost in a hexagon. I suggested the following thought experiment: Imagine a 10-m high chain-link fence erected through the middle of the study entire area, bisecting the eastern and western halves. This fence would be a complete barrier to caribou, but would only constitute a small proportion of any of the hexagons. A low cost would be estimated in this imaginary scenario using the proponent's 'semi-quantitative model', and low impact on connectivity would be inferred.

This comment from January was not addressed in Undertaking #18, and remains relevant. I now add the following observations. The proponents have used a multi-scale analysis, emphasizing that processes can be scale dependent. I would highlight that using their method of modelling linear features, the larger the hexagon, the less important the linear features will be to estimated connectivity. Thin, linear features are almost completely dissolved into large hexagons. Therefore, not surprisingly, there was no observed effect on estimated connectivity in the 5000 ha hexagons. This is not the same however, as their being no actual effect on connectivity. Imagine that thin fence running through a 5000-ha forest. The fence would be a small proportion of the 5000-ha area, but it would be a complete barrier nonetheless. The lack of an observed effect on connectivity at the larger scales of analysis is an artefact o the methods employed to estimate linear features.

Important linear features like roads should be over-imposed onto GIS layers (i.e., given priority in a pixel) for connectivity analyses. For this reason, connectivity analyses are generally not conducted at multiple scales. Instead, the analysis should be carried out at a high enough resolution that important landscape features (such as roads) are preserved in the landscape depiction. Linear features should be given priority in a raster and represented seamlessly in connectivity maps. Otherwise, it will appear that gaps in the linear features exist where there are none (Fig. 1).

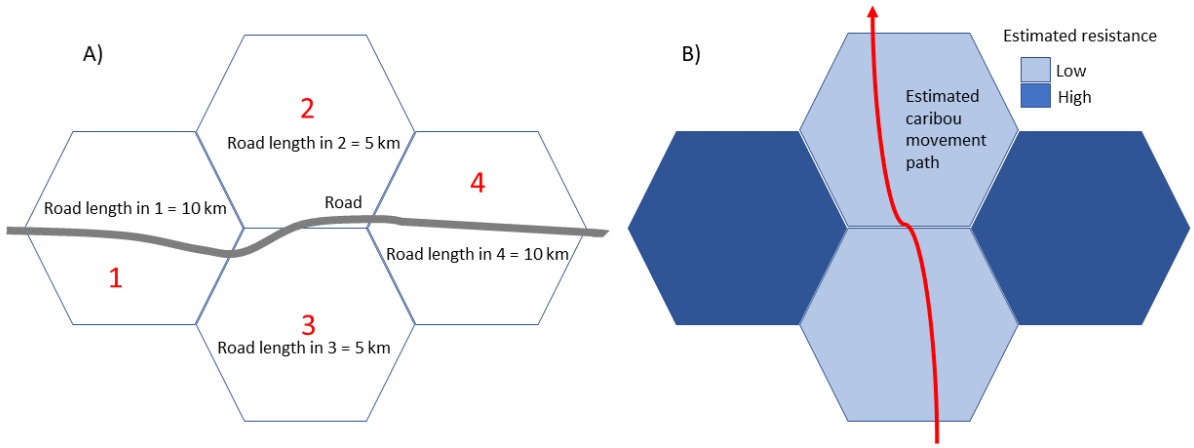

Figure 1. Scenario showing how apparent gaps emerge when linear features are not over-imposed on a raster in connectivity studies. A) A schematic example with 4 hexagons and a road (in gray). The road is an unbroken linear feature, with 10 km of road in hexagons 1 and 4, and 5 km of road in hexagons 2 and 3. Estimating road effects as a proportion of the hexagon results in the reduced amount of road in 2 and 3 leading to lower resistance values in these hexagons (i.e., the lighter blue colour in B). Consequently, it would appear that a light blue corridor exists for subjective placement of a caribou movement path (the red line with arrow in B). In fact, the light blue corridor is an artefact of not treating the road as a seamless linear feature.

Comment 3 of 12 January 2022. The resistance values appear arbitrary and not supported by evidence. In my January comment, I noted uncertainty in how the resistance values were derived. I appreciated the clarification in Undertaking #18 about the sources used to aid in identifying potential disturbances and the methods for applying these values estimate resistances. I remain unclear about some aspects of what was done. For example, the undertaking notes that hexagons “were then assigned a score using a 5-class natural break, approximating equal value classes”. This would bin the resistance values into 5 groups based on data distribution, rather than caribou perception of costs. Uncertainty arising from assigning resistance values in this way can be reduced by carrying out sensitivity analyses (Koen et al. 2012, Bowman et al. 2020).

In Undertaking #18, the proponent notes that “uncertainty remains as to the strength of potential avoidance effects and related impacts on connectivity. This would be true for least cost path, circuit theory, and other models as well”. I note however, that quantitative movement models would allow formal tests of sensitivity to model inputs. For example, given uncertainty in costs of some component of disturbance, the costs can be varied and models re-run to test for the effect on connectivity of potential values for the disturbance component. This would in turn allow a focus on the features with the greatest potential effect on connectivity. With the proponent’s semi-quantitative model, where there is no attempt to quantify effects on connectivity, such sensitivity analyses are not possible.

References

Bowman J., E. Adey, S. Y. J. Angoh, J. E. Baici, M. G. C. Brown, C. Cordes, A. E. Dupuis, S. L. Newar, L. M. Scott, and K. Solmundson. 2020. Effects of cost surface uncertainty on current density estimates from circuit theory. PeerJ 8:e9617. [Open Access]

Koen, E.L., J. Bowman, and A.A. Walpole. 2012. The effect of cost surface parameterization on landscape resistance estimates. Molecular Ecology Resources 12: 686-696.