

A Review of the 2008 Diavik Diamond Mine Wildlife Monitoring Report

Prepared for

Environmental Monitoring Advisory Board

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Prepared by



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Executive Summary

Summary and Recommendations

Having reviewed the Wildlife Monitoring Report 2008 produced by the Diavik Diamond Mine Inc. (DDMI), in light of all current and past information presented to us to date, we provide the following highlights that EMAB may need to take note of:

1. The conclusions regarding the zones of influence for several monitoring components (vegetation, caribou, grizzly bears) are confusing and in some cases seem to be swept under the carpet when relating the effects to the predictions made in the EER of 1998.
2. The reduced lichen cover near the mine appears to indicate that a disturbance zone around the mine might exist where food resources for caribou are diminished.
3. For caribou, neither the 3-7 km nor the 25 km zone of influence have yet been adequately tested.
4. The repercussions of rejecting the 3-7 km zone of influence, if indeed it is “falsified” as DDMI claims, are not acknowledged, let alone dealt with. One would expect that if such a major prediction is found to be wrong, then adaptive management actions should at least be discussed, if not implemented.
5. If a zone of influence on bears exists, as last years’ analyses have suggested, it is not dealt with in the 2008 WMR. As noted for caribou above, adaptive management actions should be implemented.
6. The management of waste in the waste transfer area shows some major set backs compared to previous years. In response to this finding, DDMI committed to a better training of temporary workers, but we note that this commitment has been made before, apparently without compelling results.
7. There may or may not be mine effects on the distribution of wolverine, falcons, and waterfowl. If there are effects, the data suggest that the effects would be slight indeed.

We recommend that the following issues and concerns be clarified by DDMI:

1. Please define what success means in terms of vegetation composition, vigour, and percent cover. Please relate these targets to pre-disturbance conditions; that is, note how the targets relate to the composition, vigour, and percent cover of natural vegetation types.
2. There is a higher lichen cover on reference (undisturbed) plots than on plots near the mine in heath tundra. Please elaborate on this finding. Please focus future measurements and analyses on

such differences as they may be important in our understanding of the zones of influence on wildlife, particularly on caribou (see below).

3. Please elaborate on the potential habitat loss for caribou incurred through reduced lichen cover in heath communities. Was this effect predicted in DDMI's Environmental Effects Report? We cannot find this prediction in the 2008 WMR. If there is indirect habitat loss in terms of vegetation change (particularly reduced lichen cover) near the mine, should that be a consideration in evaluating the effects within a zone of influence (ZOI) of 3 km from the mine?
4. Given that the 2008 WMR presents the testing of the 3-7 km ZOI, does this mean that DDMI does not believe the "falsification" of its prediction, or does DDMI not adapt its practices for other reasons? Please elaborate.
5. The objective quoted by DDMI on p. 23 ("the objective... is to determine the ZOI...") has not yet been met. Please elaborate on how DDMI intends to meet that objective, in light of the paucity of past data and in light of the possibility that lichen cover near the mine is reduced.
6. If DDMI truly falsified the 3-7 km ZOI then there should be no concern that "...reduced use of habitat around the mine... (expressed by the department of Environment and Natural Resources)" may in fact occur. DDMI would not need to take the mitigation actions it lists on p. 39. We are confused: either the small ZOI is falsified, or it is not. Please explain.
7. Please elaborate on what action DDMI intends to take in reducing the effects that may cause the newly proposed large ZOI of +/-25km, if indeed DDMI believes that this ZOI is a true effect.
8. Given that no caribou were sighted near the mine, please explain why the roads near the mine are surveyed for the use of caribou.
9. Given that a zone of influence on grizzly bears appears to exist (see Appendix I of WMR 2007), please explain how habitat loss is accounted for as a combination of direct footprint plus avoidance of the mine. Would it be fair to conclude that grizzly bear lost more than the predicted amount of habitat? If so, would there be cumulative regional effects that ENR should be concerned about?
10. For the upcoming monitoring reports regarding wolverine, please include raw data or at least tables with specifics for each year such as the distance of each transect from the mine and the number of tracks that have been observed on each transect.
11. DDMI concludes that the mitigation measures surrounding the waste transfer area (WTA) "require improvement" (p. 73). This is imperative. Please elaborate on how that will be done. Explain how the temporary workforce will be better educated and how the waste management protocols will be enforced.

12. For falcons, data on environmental variables such as weather, food base or other confounding factors are not presented in the WMR 2008. Please elaborate on how or if such environmental data were collected and whether the data sets are comparable for the two study areas.

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1.0 Introduction

The Environmental Monitoring Advisory Board (EMAB) for the Diavik Diamond Mine Inc. (DDMI) Project requested that Management and Solutions in Environmental Science Inc (MSES) review and assess the procedures and results of the 2008 Wildlife Monitoring Report (WMR). The WMR communicates the findings of surveys conducted during 2008 as well as the detailed analyses of the data and the interpretation of the results.

MSES' review of the past WMRs covered a comprehensive analysis of the data collected up to 2007 in addition to the yearly wildlife reports. Numerous recommendations have been submitted in the past for EMAB and DDMI to consider. Here, we review the responses to the recommendations and how they were considered by DDMI in the 2008 WMR.

We also comment on the contribution of current data collection, the analysis of data, and the measurement of mitigation effectiveness. We have assumed that numerous mitigation measures were implemented to alleviate potential impacts of the mine. The predictions that have been put forth in the 1998 Environmental Effects Report are based on the assumption that mitigation measures are successful; hence, if the predictions are not supported by the results of the monitoring program, then mitigation measures may need to be adjusted.

If applicable, we also provide specific recommendations to adapt the data collection in light of current information and the objectives of the Wildlife Monitoring Program (WMP) developed in 2002. In our review below, for the ease of identifying our recommendations and requests, we highlight the **text in bold** where we specifically request actions from DDMI.

2.0 General Observations

2.1 Objectives of the Wildlife Monitoring Program

The objectives of the WMP v.2 were developed in 2002. DDMI has anchored its' monitoring reports on these objectives, recently quoting these objectives in the NWT Wildlife Monitoring Permit Application for the 2008 Wildlife Monitoring Program:

“The objectives of the wildlife monitoring program are to:

- a. Verify the accuracy of the predicted effects determined in the Environmental Effects Report (Wildlife 1998) and the Comprehensive Study Report (June 1998); and*
- b. Ensure that management and mitigation measures for wildlife and wildlife habitat are effective in preventing significant adverse impacts to wildlife.”*

The objectives guide our review of the monitoring report. These objectives are the foundation and focus of our review, relating the methods and results in the 2008 WMP, as in past reviews, to what we believe is the ultimate goal of monitoring, namely the understanding and alleviating of effects of the project.

2.2 The State of Current Information

Our overarching observation is that the 2008 WMR is useful because the measurements taken usually address the predictions at hand. We understand that the 2008 WMR is a necessary continuation of the yearly monitoring effort and that, on its own, it does not contribute a great deal of new information, at least not until it will become a part of a new detailed analysis. We have learned a great deal from the analysis that was conducted last year and we shall not repeat the learning here. However, we find that the data collected in the 2008 WMR will, in general, provide an improved understanding of the effectiveness of the mitigation implemented by DDMI. Overall, we recommend that EMAB accepts the 2008 WMR. The recommendations submitted by DDMI in the 2008 WMR are mostly acceptable.

There are, however, some highlights that EMAB may need to take note of:

1. The conclusions of the zones of influence for several monitoring components (vegetation, caribou, grizzly bears) are confusing and in some cases seem to be swept under the carpet when relating the effects to the predictions made in the EER of 1998.
2. The reduced lichen cover near the mine appears to indicate that a disturbance zone around the mine might exist where food resources for caribou are diminished.
3. Neither the 3-7 km nor the 25 km zone of influence have yet been adequately tested.
4. The repercussions of rejecting the 3-7 km zone of influence, if indeed it is “falsified” as DDMI claims, are not acknowledged, let alone dealt with.
5. If a zone of influence on bears exists, as last years’ analyses have suggested, it is not dealt with in the 2008 WMR.
6. The management of waste in the waste transfer area shows some major set backs compared to previous years. In response to this finding, DDMI committed to a better training of temporary workers, but we note that this commitment has been made before, apparently without compelling results.
7. There may or may not be mine effects on the distribution of wolverine, falcons, and waterfowl. If there are effects, the data suggest that the effects would be slight indeed.

3.0 Specific Observations

3.1 Vegetation and Wildlife Habitat

The amount of vegetation clearing is at or below the predicted effects. Those vegetation types that reached the predicted amounts of clearing one or two years ago, appear to remain in a constant state of disturbance, indicating that, to date, DDMI has not surpassed the anticipated amount of disturbance.

There are some areas of revegetation efforts that appear to show signs of success in some test plots. It is now becoming urgent that the “vegetation assessment of the plots” (p. 12) is conducted in light of targets and benchmarks. As revegetation (reclamation) is entering into an important form of mitigation, we need to know how success of revegetation is defined. For future reporting on revegetation success, **please define what success means in terms of vegetation composition, vigour, and percent cover. Please relate these targets to pre-disturbance conditions; that is, note how the targets relate to the composition, vigour, and percent cover of natural vegetation types.** We are awaiting the 2009 (Phase II) report summarizing the revegetation study, which would be a useful tool to have. That report should address the requests above.

The statistical analysis of the permanent vegetation plots (PVP) is useful. There is a higher lichen cover on reference (undisturbed) plots than on plots near the mine in heath tundra. **Please elaborate on this finding. Please focus future measurements and analyses on such differences as they may be important in our understanding of the zones of influence on wildlife, particularly on caribou (see below).**

We concur with the recommendation (p.19) put forth by DDMI regarding vegetation monitoring.

3.2 Barren-Ground Caribou

As in previous years, and following from the vegetation monitoring above, direct caribou habitat loss is at or below the predicted amounts. However, indirect habitat loss may be an issue that appears to be overlooked. Heath communities represent some of the most suitable habitat for caribou. The vegetation monitoring found that heath communities have significantly fewer lichen near the mine than farther away (see p. 18). **Please elaborate on this potential habitat loss for caribou. Was this effect predicted in DDMI’s Environmental Effects Report? We cannot find this prediction in the 2008 WMR. If there is indirect habitat loss in terms of vegetation change (particularly reduced lichen cover) near the mine, should that be a consideration in evaluating the effects within a zone of influence (ZOI) of 3 km from the mine?**

Further to the prediction of a 3-7 km ZOI, it is stated on p. 23 that “the objective... is to determine the ZOI...”. DDMI noted last year in several communications that this ZOI is “falsified”, which is even repeated on p. 24 of the 2008 WMR. We think that this assertion is increasingly contentious because:

1. If it was truly falsified, then DDMI should adapt its monitoring practices (see Standard Operating Procedures in the Appendices) and its mitigation measures to this new finding. For a start, the monitoring procedure and results should not be part of the 2008 WMR. **Given that the 2008 WMR presents the testing of this ZOI, does this mean that DDMI does not believe the “falsification” of its prediction, or does DDMI not adapt its practices for other reasons? Please elaborate.**
2. As in our reviews of earlier WMRs, we remain unconvinced that the ZOI has ever been adequately tested. We have commented on this point in earlier communications in the past year, particularly in the context of upcoming statistical analyses and DDMI’s changes to the caribou surveys where the transect intervals will be increased to 8 km, thereby making it even less likely that the 3-7 km ZOI will be tested. In our view, **the objective quoted by DDMI on p. 23 has not yet been met. Please elaborate on how DDMI intends to meet that objective, in light of the paucity of past data and in light of the possibility that lichen cover near the mine is reduced.**

Our second point above is that much more critical, given that DDMI recognizes the concern of the department of Environment and Natural Resources (ENR) that “...reduced use of habitat around the mine...” may in fact occur (P. 39). **If DDMI truly falsified the small ZOI then there should be no such concern and DDMI would not need to take the actions it lists on p. 39. We are confused: either the small ZOI is falsified, or it is not. Please explain.**

We note that Figures 3-3 and 3-6 are suggestive of a ZOI that is substantially smaller than the newly proposed ZOI of +/-25 km. The water bodies around DDMI may well drive this pattern. We look forward to further in-depth analyses on caribou distribution as a function of distance from the mine.

The section on caribou mitigation effectiveness is focussed on herding of caribou away from areas where they may be endangered by mine traffic. The report on these actions is adequate, showing that there were no actions required. However, mitigation of effects is more than just herding caribou away from danger zones. Mitigation is every other action that DDMI takes to reduce the effects. Some such actions are listed earlier in the WMR and include dust and noise issues. **Please elaborate on what action DDMI intends to take in reducing the effects that may cause the newly proposed large ZOI of +/-25km, if indeed DDMI believes that this ZOI is a true effect.**

The monitoring of dust deposition areas is somewhat confusing. **Given that no caribou were sighted near the mine, please explain why the roads are surveyed for the use of caribou.**

3.3 Grizzly Bears

Similar to the caribou monitoring, loss of habitat appears to be considered only as a function of direct mine foot print and vegetation clearing. Aside of the 500 m deterrent buffer around the mine from which bears are actively chased away (Figure 6-1), there appear to be consistently more bears outside of the 10 km ZOI than inside (Table 6-3). **Moreover, given that a zone of influence appears to exist (see Appendix I of WMR 2007), please explain how habitat loss is accounted for as a combination of direct footprint plus avoidance of the mine. Would it be fair to conclude that grizzly bear lost more than the predicted amount of habitat? If so, would there be cumulative regional effects that ENR should be concerned about?**

3.4 Wolverine

There was one wolverine mortality in 2008. This is a total of 2 dead wolverines in the course of eight years of monitoring (or a mortality rate of 0.22 per year). This rate appears to be within the limit of the prediction that DDMI put forth in its EER of 1998, namely that “Mining related mortalities... are not expected to alter wolverine population parameters...”.

ENR expressed concern in the past that our assessment of the monitoring report may undervalue the potentially serious cumulative effects in the region. We concur with ENR that cumulatively speaking, if each operation in the region results in a 0.22 mortality rate, the regional mortality rate may be unacceptable. If so, the regional management of wolverine needs to feed back into the operations so as to reduce the current mortality rates in all regional operations. However, DDMI operates under a permit that takes some low rate of wolverine mortality into account. The wildlife monitoring program established in 2002 is founded on the mine specific predicted effects and the program is designed to test these predictions. It is our view that DDMI’s wolverine management has been successful from the point that DDMI is at or below its predicted effects.

As for the snow tracking, we would benefit from a better understanding of the data. **For the upcoming monitoring reports, please include raw data or at least tables with specifics such as the distance of each transect from the mine and the number of tracks that have been observed on each transect for each year.** Please note that Table 7-2 does not appear in the 2008 WMR, and we have a poor understanding of the strength of the data that produce the conclusions noted on p. 62, namely that there appear to be fewer tracks within 10 km of the mine compared to farther away.

If it is decided that the DNA work will be resumed, replacing the snow tracking, as per the suggestion made in the 2008 WMR, then we urge that the grid be designed so as to enable the testing of the prediction, namely that wolverine presence will not be affected by the mine.

3.5 Waste Monitoring

Our initial reaction to the monitoring results presented in the 2008 WMR was: “What happened?” Wildlife attractants in the waste transfer area (WTA) have heavily increased since last year and the gulls are more common than ever before. Foxes also appear to be more frequent than in most years. By contrast, the attractants on the land fill area are at one of the lowest levels ever recorded. The land fill management seems to be a great success.

DDMI concludes that the mitigation measures surrounding the WTA “require improvement” (p. 73). This is imperative. Please elaborate on how that will be done. Explain how the temporary workforce will be better educated and how the waste management protocols will be enforced. We note that DDMI recommended the education of temporary workers before and has apparently failed to do so this year.

3.6 Falcons

The analyses of data provided to us last year suggest that nest success increased with distance from the mine. This indicates that falcons near the mine are less successful than farther away. This is contrary to prediction and may be a cause of concern. The 2008 WMR shows a relatively poor year of chick production, but so does the production in the Daring control area. In fact, it appears that, given the amount of variation in each data set, the differences in chick productivity between the Diavik and Daring areas are slight indeed. We are therefore uncertain as to whether the apparent distance effect is biologically meaningful.

Data on other environmental variables such as weather, food base or other confounding factors are not presented in the WMR 2008. **Please elaborate on how or if such environmental data were collected and whether the data sets are comparable for the two study areas.**

3.7 Waterfowl

The data on waterfowl and shorebirds are quite extensive and allow for some intriguing analyses. However, as in all previous years, we cannot judge how the results relate to the predictions of effects, given that there are no comparable baseline data or control sites.

4.0 Closure

The review of the 2008 WMR reported herein presents the conclusions arrived at by MSES. Given our comment herein, we hope to gain further clarification on several details of the 2008 WMR to facilitate future deliberations about monitoring design and the potential need for adjustments of both monitoring and mitigation measures. These views are submitted to EMAB for its consideration of potential recommendations and actions.