



Canadian Environmental
Assessment Agency

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d'évaluation environnementale

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February 16, 2018

File no.: 005533

Michael McPhie
Executive Chairman
IDM Mining Ltd.
Suite 1500 - 409 Granville St.
Vancouver BC V6C 1T2

Dear Mr. McPhie:

Re: Supplementary Information Requirement #1 for the Red Mountain Underground Gold Project

On December 22, 2018, the Canadian Environmental Assessment Agency (the Agency) issued an initial Information Request (IR) to IDM Mining Ltd. in relation to the Red Mountain Underground Gold Project. Based on our ongoing review of the Environmental Impact Statement and comments received from Environment and Climate Change Canada, the Agency has identified a supplementary IR.

Annex 1 outlines the information that IDM Mining Ltd. must provide in support of the ongoing environmental assessment. The Agency requires this information in order to assess the potential environmental effects of the Project pursuant to subsection 5(1) of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and to inform the Agency's Environmental Assessment Report under subsection 23(2) of CEAA 2012. The Agency requests that IDM Mining Ltd. provide its responses to this IR in a technical memorandum.

While you are preparing responses to the IR, the Agency and federal authorities will continue to work on the environmental assessment to improve the Agency's understanding of the environmental effects of the Project.

In accordance with subsection 27(6) of CEAA 2012, time taken by IDM Mining Ltd. to provide the requested information is not included in the legal timeframe within which the Minister of Environment and Climate Change must make her environmental assessment decision.

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The federal timeline for the environmental assessment remains paused at day 122 of 365. Upon receipt of a response from you to address these deficiencies, the Agency may take up to 15 days that is not counted against the federal timeline for the environmental assessment to form an opinion about whether the requested information has been provided. If the Agency has not come to a conclusion regarding the sufficiency of the IR responses during this period, the federal timeline will resume on the following day.

In the development of the IR, the Agency considered advice from federal authorities. Comments received from Environment and Climate Change Canada are provided for your consideration in **Annex 2**. Comments in Annex 2 are not part of the IR.

Please do not hesitate to contact me with any questions at 604-666-9162 or *andrea.raska@ceaa-acee.gc.ca*.

Sincerely,
<Original signed by>

Andrea Raska
Project Manager, Pacific and Yukon Region

Attachments: Annex 1 – Supplementary Information Request #1
Annex 2 – Technical review comments

c.c.: Max Brownhill, Falkirk Resource Consultants Ltd.
Jasmin Flores, Falkirk Resource Consultants Ltd.
Claire Backus, Catana Consulting Ltd.
Lindsay Luke, British Columbia Environmental Assessment Office
Ian Bergsma, Fisheries and Oceans Canada
Jennifer Dorr, Natural Resources Canada
Nadine Parker, Environment and Climate Change Canada
Paula Smith, Health Canada
Yota Hatziantoniou, Health Canada
Sabrina Lachance, Major Projects Management Office
Collier Azak, Nisga'a Lisims Government
Mansell Griffin, Nisga'a Lisims Government

Annex 1
Supplementary Information Requirement #1 for the Red Mountain
Underground Gold Project

IR1-16: Tailings Management Facility (TMF) discharge location

Rationale: *The EIS Guidelines (section 3.1) state that the EIS must describe tailings management including discharge as well as predicted changes to surface water quality (section 6.2.2) and fish and fish habitat (section 6.3.1).*

In section 13.5.3.2 of the EIS, the location of the discharge point from the TMF into Bitter Creek is unclear. At the November 21, 2017 working group meeting, IDM Mining Ltd. (the proponent) confirmed that the effluent from the TMF will be discharged between the TMF and modelling node BC-06, however, a precise location was not provided. The Agency notes that the lower part of Bitter Creek between the TMF and modelling node BC06 is fish bearing, and that the precise TMF discharge location may have implications for effects to fish and fish habitat.

Requested Information: Provide a map and description of the location of the TMF discharge, or the locations under consideration.

IR1-17: Quarries and borrows mitigation measures

Rationale: The EIS Guidelines state that the EIS “will consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project.” Section 13.5.3.3 describes that quarries and borrow areas have the potential to transport metals and suspended sediments into nearby watercourses, as well as having the potential for metal leaching under acidic pH conditions. However, Table 13.6-3 does not describe any mitigation options for addressing metals, total suspended solids (TSS) and metal leaching / acid rock drainage (ML/ARD) from quarries and borrow areas and section 13.7.3 does not describe associated residual effects, including those potentially affecting fish and fish habitat .

Requested Information: Identify and describe mitigation measures to address the transportation of metals, TSS and ML/ARD from quarries and borrow areas, or provide a rationale as to why such measures are not needed. In addition, describe any predicted residual effects to fish and fish habitat.

IR1-18: Uncertainty in fraction of unrecoverable seepage

Rationale: There is uncertainty in the results of the fish and fish habitat effects assessment due to uncertainty in the effectiveness of seepage collection. Key areas of uncertainty include:

- The upper bound seepage loss through the TMF liner during operations was reported as 1 L/sec (section 29.18.5.3 of Appendix 1-H), but a sensitivity analysis or description of performance in similar environments was not provided;
- Faults and fractures have been identified in geotechnical drill holes (BH16-009 and DT-282- Appendix 1-A) near the seepage collection and recycle ponds. These areas may act as pathways for discharge of seepage into the receiving environment;
- Limited site investigation and no monitoring well data for the area downgradient of the northwest and south area of Bromley Humps; and
- While seepage modelling was conducted, fate and transport modelling for seepage was not completed.

Requested information:

- a) Describe why the upper bound seepage loss of 1 L/sec is appropriately conservative using information from similar environments;
- b) Discuss each of the above areas of uncertainty, and describe how these uncertainties influence the conclusions of the surface water quality and fish and fish habitat effects assessments; and
- c) Describe corrective actions that would be taken in the event that measured seepage flow rate and chemistry differ from model predictions and pose a risk to water quality of Bitter Creek and Bear River.

IR1-19: Water and load balance model

Rationale: *The EIS Guidelines (section 4.2) state that “all data, models and studies will be documented such that the analyses are transparent and reproducible. All data collection methods will be specified. The uncertainty, reliability, sensitivity and confidence of assumptions and models used to reach conclusions must be indicated.”*

Appendix 14-C indicates that the water and load balance model accounted for the potential seepage from the seepage collection pond, recycling pond, and the

TMF, but supporting data is not provided. It is not clear if and how the proponent considered seepage entering Bitter Creek through high permeability fractured bedrock. This information is needed to properly characterize the potential effects of water quality changes from seepage on fish and fish habitat.

Requested Information: *Provide a summary of model inputs to the water and load balance model, including seepage chemistry and geochemical source terms for the south and northwest area of Bromley Humps.*

IR1-20: Recharge rates

Rationale: *The EIS Guidelines (section 4.2) state that the assumptions of the methodology used in the EIS will be clearly identified and justified. The uncertainty, reliability, sensitivity and confidence of assumptions and models used to reach conclusions must be indicated.*

One of the assumptions of the groundwater model is that recharge to the groundwater system mainly takes place in the form of snowmelt or rain filtration (Appendix 10-A section 6.3). The groundwater model assumed a spatially constant recharge throughout the model boundary. The groundwater level fluctuations in the areas of existing declines are indications of varying recharge rates.

Requested Information: Describe the sensitivity of the groundwater model to varying recharge rates. Specifically, discuss how varying recharge rates would affect the conclusions of the fish and fish habitat effects assessment.

IR1-21: Project interactions with wildlife

Rationale: *The EIS Guidelines (section 6.1) state that the EIS will present baseline information in sufficient detail to enable the identification of how the project, including all components within the scope (section 3), could affect the VCs and an analysis of those effects. This information is intended to assist the Agency in meeting subsection 79(2) of the *Species At Risk Act* which requires the Agency to identify the adverse effects of the Project on the listed wildlife species and its critical habitat.*

The “Project Interactions” tables throughout the wildlife chapters identify interactions between wildlife VCs and Project components. A number of interactions were omitted, even though species may occur in the area.

The Agency identified the following examples where no interactions were identified or discussed:

- Interactions between water management infrastructure in the construction phase and bats, migratory breeding birds, migratory bird species at risk, and western toad;
- Interactions between explosives magazine or mine site ancillary buildings in the construction phase and bats, migratory birds, or migratory bird species at risk;
- Interactions between water discharge in the construction and operation phases, and bats, migratory breeding birds, or migratory bird species at risk;
- Interactions between temporary stockpiling of ore at the mine site and migratory breeding birds;
- Interactions between sensory disturbance from construction of the TMF and bats;
- Interactions between access and haul roads in the operation phase, and migratory birds and migratory bird species at risk; and
- Interactions between habitat alteration, direct mortality, disruption to movements, sensory disturbance, during the closure spillway construction, and migratory breeding birds, migratory bird species at risk, raptors, or western toad.

Requested Information: Describe the interactions between the project components and species identified above. Alternatively, provide a rationale for why there is no interaction between these species and project infrastructure.

IR1-22: Wildlife habitat in non-breeding seasons

Rationale: The EIS Guidelines (section 6.1.6) state that the EIS must provide an assessment of the year-round migratory bird use of the area (e.g. winter, spring migration, breeding season, fall migration), and potential effects to species at risk (section 6.3.3). This information is intended to assist the Agency in meeting subsection 79(2) of the *Species At Risk Act* which requires the Agency to identify the adverse effects of the project on the listed wildlife species and its critical habitat.

Table 16.4-1 of the EIS details baseline data for bats, migratory breeding birds, migratory bird species at risk, western screech-owl and northern goshawk, non-migratory game birds, and western toad; however, information was not collected for non-breeding seasons.

This information is needed to accurately assess year-round migratory bird use of the area, and seasonal movements of species at risk potentially affected by the Project.

Requested Information: For bats, migratory breeding birds, migratory bird species at risk, western screech-owl and northern goshawk, non-migratory game birds, and western toad, provide:

- a) A summary of baseline data collected during non-breeding seasons and any data used to inform the effects assessment for this period; and
- b) A discussion of how inter-seasonal variation was assessed.

IR1-23: Habitat suitability models

Rationale: *The EIS Guidelines (section 6.1.7 and 6.3.3) state that the EIS must describe the key habitat areas of species at risk that may occur in the project area to assess the potential effects of the project on federally listed species at risk. This information is intended to assist the Agency in meeting subsection 79(2) of the Species At Risk Act which requires the Agency to identify the adverse effects of the project on the listed wildlife species and its critical habitat.*

Appendix 16-A of the EIS describes survey locations and habitat suitability for migratory birds and species at risk. There is a lack of survey locations in high to moderate habitat for certain species, making it difficult to effectively assess potential effects of the Project on the species.

The Agency identified the following examples where there is uncertainty in the potential effects of the Project on the species and their habitat:

- Common nighthawk: Appendix 16-A, figure 3-7 shows baseline survey route locations and automated recording unit (ARU) locations for common nighthawk, and figure 4-38 shows common nighthawk habitat suitability. There does not appear to be much overlap between ARU locations and high habitat suitability within the project area.
- Western screech-owl: Appendix 16-A, figure 3-7 shows locations where silent listening surveys were used to assess western screech-owl presence, and figure 4-49 shows western screech-owl habitat suitability. Only three survey locations (1237-CONI 14, 1238-CONI 15, and 1293-CONI 9) are near high suitability habitat.
- Black swift: Appendix 16-A states that two black swifts were incidentally detected during point count surveys for breeding birds. However, it is unclear at which point count station these birds were detected, nor if these

detections were located near or in high suitability black swift habitat (as identified in the Supplemental Memo and figure 16.7-21 of the EIS).

Requested Information: *For common nighthawk, western screech-owl, and black swift:*

- a) *Provide a map overlaying the location of baseline surveys and/or incidental observations with habitat suitability and project infrastructure. If there are areas where survey locations do not overlap with moderate and high quality habitat, describe why the survey location was selected over higher quality habitat locations.*
- b) *Provide specific mitigation measures for the potential effects in the areas where habitat and project infrastructure overlaps.*

IR1-24: Habitat suitability maps

Rationale: *The EIS Guidelines (section 6.1.6) state that the EIS must describe the various ecosystems related to migratory bird habitat found in the project area likely to be affected, and the movement corridors, habitat requirements, and key habitat areas of species at risk that may occur in the project area (section 6.1.7). This information is intended to assist the Agency in meeting subsection 79(2) of the Species At Risk Act which requires the Agency to identify the adverse effects of the project on the listed wildlife species and its critical habitat.*

Chapter 16 and Appendix 16-A of the EIS describe the habitat suitability models for bats, western toad, and black swift. The Agency identified the following species or species groups where additional information is required:

- *Bats: Chapter 16, table 16.4-8 identifies a two-class summer habitat rating scheme, i.e. “useable” or “not useable” habitat, which is not helpful to effectively assess potential effects on bats from the Project. Habitat suitability for bats should consider more than two suitability classes, and should be guided by existing habitat suitability models developed in similar geographical areas and published literature.*
- *Little brown myotis: Appendix 16-A, table 4-55 suggests that little brown myotis are present in the project area year-round, however no models are provided for winter habitat.*
- *Western toad: Appendix 16-A, table 4-120 provides habitat attributes for living, reproducing (eggs) and hibernating life requisites. However, the habitat suitability model only considered reproduction (eggs). Additional information on potential movement corridors and non-reproducing habitat requirements are needed.*

Requested Information:

- a) *Describe habitat suitability for bats which considers more than two suitability classes, including foraging and maternal roosting in growing and living seasons and winter life requisites.*
- b) *Provide a map overlaying the location of habitat suitability with survey locations for bats with project infrastructure.*
- c) *Describe habitat suitability for movement corridors and non-reproducing life states for western toad.*

IR1-25: Black swift survey protocol

Rationale: *The EIS Guidelines (section 6.1.6) state that the EIS must describe the various ecosystems related to migratory bird habitat found in the project area likely to be affected, and the movement corridors, habitat requirements, and key habitat areas of species at risk that may occur in the project area (section 6.1.7). This information is intended to assist the Agency in meeting subsection 79(2) of the Species At Risk Act which requires the Agency to identify the adverse effects of the project on the listed wildlife species and its critical habitat.*

The Agency has identified the following areas where there is uncertainty in the effects assessment for black swift:

- *In November 2015 (see provincial Application Information Requirements tracking table dated 2016_11_04, comment 309), Canadian Wildlife Service (CWS) recommended that black swift surveys be conducted in accordance with the following CWS Black Swift Protocol (ECCC-CWS_Memo04_BlackSwiftProtocol_20150727). It is unclear whether this survey protocol was followed.*
- *Detailed information on the parameters of the habitat suitability model for black swift is not provided in the Chapter 16, Appendix 16-A, or in the black swift supplemental memo, as it is for other species. This makes it difficult to assess the habitat values provided in Chapter 16, table 16.7-12 (Summary of Change in Habitat Availability) and figure 16.7-21 (Overlap of the Project with Black Swift Effective Habitat – Nesting)*

Requested Information:

- a) *Describe if and how the CWS Black Swift Protocol was incorporated into baseline survey methodology.*

- b) Describe the parameters of the habitat suitability model for black swift.

IR1-26: Marbled murrelet critical habitat

Rationale: *The EIS Guidelines (section 6.1.7 and 6.3.3) state that the EIS provide the key habitat areas of species at risk that may occur in the project area to assess the potential effects of the project on federally listed species at risk. This information is intended to assist the Agency in meeting subsection 79(2) of the Species At Risk Act which requires the Agency to identify the adverse effects of the project on the listed wildlife species and its critical habitat.*

The Agency has identified the following areas where there is uncertainty in the effects assessment for marbled murrelet:

- *Appendix 16-A and figure 4-63 identifies nesting habitat suitability. Map 2 in the supplemental memo provides updated habitat ratings. There appears to be contradictory habitat suitability ratings in the EIS and the memo.*
- Chapter 16 and figure 16.7-23 provides an overlap of the Project footprint with habitat suitability models for marbled murrelet, and Appendix 16-A and figure 4-63 identifies critical habitat mapped as suitable nesting habitat. However, no figure was provided depicting the influence from the Project to marbled murrelet nesting habitat.

Requested Information:

- a) *Explain the differences between the nesting habitat described in Appendix 16-A and figure 4-63, as compared to map 2 in the supplemental memo.*
- b) *Provide a map overlaying the critical habitat provided in Appendix 16-A and figure 4-56 with the Project footprint and zone of influence.*

IR1-27: Nest phenology of marbled murrelet

Rationale: *The EIS Guidelines (section 6.1.7) state that the EIS must provide the general life history of species at risk that may occur in the project area, or be affected by the project. This information is intended to assist the Agency in meeting subsection 79(2) of the Species At Risk Act which requires the Agency to identify the adverse effects of the project on the listed wildlife species and its critical habitat.*

Section 3.2.14 and 4.16 of Appendix 16-A state that detailed systematic searches for marbled murrelet were conducted in July 2016 around suitable nest

trees identified during ground surveys to identify any egg shell fragments, and that no egg shells were found during searches around the 25 nest trees. However, the locations of these nest trees were not provided in the EIS.

Egg laying has been documented to occur between mid-May and late July in BC, with birds in northern latitudes sometimes initiating egg-laying later in that period (Nelson, K., 1997). As only one round of searches for egg shell fragments was performed in early July, and the EIS does not provide phenology information on the nesting period for marbled murrelet in the project area, there is a high level of uncertainty for nest confirmation.

Reference: Nelson, S. Kim. 1997. Marbled Murrelet (*Brachyramphus marmoratus*), version 2.0. In *The Birds of North America* (P. G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York, USA.
<https://doi.org/10.2173/bna.276>

Requested Information:

- a) Provide a map overlaying the locations of the potentially suitable nest trees where eggshells searches were conducted, and the corrected habitat suitability maps.
- b) Provide available nest phenology information for the project area, and a description of the confidence in the egg shell surveys conducted in early July to detect nests in the project area.

Annex 2
**Supplementary Environment and Climate Change Canada Technical
Review Comments #1 for the Red Mountain Underground Gold Project**

Comment number: WQ-01

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C Water and Load Balance Model Report 1 (p.9)

Context: The EIS states the underground mine will be backfilled with waste rock and the Lower Portal sealed with an engineered bulkhead at closure. The underground mine will then re-flood over a period of 20 to 40 years.

At the November 21, 2017 Working Group meeting, the proponent described the onset of acid rock drainage (ARD) for waste rock as having a lag time of 18 years. ECCC is concerned that waste rock that will be backfilled in the underground mine could begin generating ARD before the mine has the opportunity to flood completely.

Additionally, once the mine has flooded completely, the water table will fluctuate seasonally with winter low flows, potentially exposing the backfilled waste rock to oxygen for part of the year, in perpetuity. This could also be a source of ARD.

It is not clear whether the full potential for ARD in the underground mine workings has been taken into account in the water quality model and in the water quality effects assessment.

Comment: Describe how the potential ARD from backfilled waste rock has been addressed in both the water quality model and water quality effects assessment.

Include consideration of any potential onset of ARD prior to complete re-flooding of the mine, as well as the ARD potential from water table fluctuations, in perpetuity, once the mine is re-flooded.

Update both the effects assessment and the description of residual effects, as appropriate.

Comment number: WQ-02

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Section 13.5.3.2

Context: The location of the discharge point from the TMF into Bitter Creek is unclear, limiting ECCC's ability to comment on the effects of the discharge.

At the November 21, 2017 Working Group Meeting, the proponent confirmed that the effluent from the TMF will be discharged upstream of modeling node BC06 (i.e. closer to the TMF facility); however a precise location has not been provided.

Comment: Provide an updated map that indicates a precise location where treatment effluent from the TMF will be discharged into Bitter Creek, or provide a detailed description of the locations being considered.

Update the effects assessment and the conclusions thereof, for any of the location(s) identified above that were not part of the effects assessment that has already been completed.

Please note that this comment informed IR-16.

Comment number: WQ-03

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Section 13.5.3.2 (p.37)

Context: Describe how and why discharge of water from the decommissioned TMF to Bitter Creek may continue in Post-Closure, and clarify whether this discharge has been taken into account in the water quality model for Post-Closure. Update the effects assessment accordingly.

Comment: Describe how and why discharge of water from the decommissioned TMF to Bitter Creek may continue in Post-Closure, and clarify whether this discharge has been taken into account in the water quality model for Post-Closure. Update the effects assessment accordingly.

Comment number: WQ-04

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS Reference: Table 13.4-3

Context: Otter Creek (monitoring station OC07) is described in Table 13.4-3 as being a control station, however, ECCC notes that this location has the potential to be a receiving watershed. Otter Creek runs between the Water Treatment Plant and one of the quarry borrow areas at the Bromley Humps site. The site

topography could allow Otter Creek to receive some runoff from the Bromley Humps site.

Comment: Provide additional rationale to explain why OC07 on Otter Creek should be considered a control station instead of a receiving watershed given the potential for runoff from Bromley Humps reaching the site. Alternately, update the effects assessment to no longer include OC07 as a control station.

Comment Number: WQ-05

Project effects link to CEEA 2012: 5(1)(a)(i) Fish and fish habitat

EIS Reference: Appendix 14-C 3.7.1

Context: Modelling node BC06 is a key water quality modelling node downstream of the project, however the associated baseline water quality monitoring station BC06 did not come online until June 2016. In-situ BC06 baseline water quality data is therefore limited and not considered an adequate input dataset for the water quality model to predict concentrations at node BC06. For the purposes of the water quality model, monthly baseline data for BC06 was therefore extrapolated from 2 adjacent baseline monitoring stations, BC04 and BC08.

Comment: Provide additional rationale to demonstrate that the extrapolated baseline dataset for BC06 (constructed using data from BC04 and BC08) is truly representative of the site-specific conditions at BC06.

Comment number: WQ-06

Project effects link to CEEA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C

Context: There is no mention in Appendix 14-C or Chapter 13 of the water quality model being validated in order to demonstrate its ability to accurately model real world conditions (e.g., baseline monitoring data). Without model validation, it is not clear whether water quality predictions generated by the model are reliable or accurately represent the site-specific conditions of the Project Area and receiving environment.

Comment: Provide a validation of the water quality model.

Comment number: WQ-07

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C 3.7.1

Context: Section 3.7.1 of Appendix 14-C states that "The P50, P75 and P90 seasonal summary statistics were used in the model for baseline surface water quality". However Appendix C states that monthly P50, P75 and P90 background water quality data is presented as the model input. The EIS does not clearly describe the baseline water quality data that was used as an input to the model. It is not clear whether seasonal or monthly baseline water quality data was used to calculate monthly water quality predictions.

Comment: Clarify whether seasonal and/or monthly baseline data were used as inputs to the water quality model to generate monthly water quality predictions; comment on how the accuracy of this information could affect the reliability of model outputs.

Comment number: WQ-08

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-B 2.2

Context: The Upper Case P90 Mine Discharge Effects Assessment describes most parameters as having a low to moderate magnitude effect, but acknowledges that cadmium and zinc can be characterized as a high magnitude effect. However, because most of the parameters were low to moderate, the overall magnitude rating for Upper Case P90 Mine Discharge was rated as moderate magnitude. This approach discounts the high magnitude effects of cadmium and zinc, and may not accurately characterize environmental effects.

For reference, cadmium is predicted to be roughly 16-20 times water quality guidelines and 25 times background concentrations in Goldslide Creek for the P90 Upper case Scenario during Operations. During Post-Closure, guidelines will be exceeded by roughly 2-5 times. Zinc in Goldslide Creek is predicted to be roughly 3.2-14.1 times water quality guidelines and 18 times background concentrations in Goldslide Creek for the P90 Upper case Scenario during Operations.

Comment: Provide additional rationale to justify the overall moderate magnitude characterization for the Upper Case P90 Mine Discharge Effects Assessment in light of the predicted guideline exceedances for cadmium and zinc.

Alternatively, revise the overall magnitude classification and explain any potential implications of the revision on the determination of significance for this residual effect.

Comment number: ECCC-WQ-09

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C Figure 4.2-4

Context: P50 predictions for some parameters in Goldslide Creek (e.g., cadmium) seem to indicate three distinct time periods for changes in water quality during the Post-Closure period, when the mine is re-flooded: 1. Years 22-28; 2. Years 28-40; and 3. Year 40 onwards. The changes in water quality over these distinct time periods have not been adequately described or explained in the EIS.

Comment: Provide an explanation for the changes in water quality in Goldslide Creek that occur during the Post-Closure period.

Comment number: WQ-10

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 13.7.3.2.2

Context: The Base Case P50 Mine Discharge Effects Assessment describes the majority of the parameters as having a negligible to low magnitude characterization, with up to 20% of the parameters in Bitter Creek having a moderate magnitude for certain months at the predicted maximum concentrations in the P50 case.

The EIS states that the majority of these parameters had a moderate rating in only certain months and in many cases the moderate rating was due to parameters that already exceeded guidelines at background concentrations.

The EIS indicates that the magnitude of the effect for P50 TMF discharge should be classified as "moderate". If the moderate effect only occurs for certain months of the year, then this should be considered under the Frequency classification and not under magnitude.

Also, more information is needed to explain the assertion that "the moderate rating was due to parameters that already exceeded guidelines at background concentrations". The EIS states that screening of Contaminants of Potential Concern (COPC) was completed by comparing water quality predictions to water

quality guidelines, and then to P90 baseline concentrations. According to this methodology, water quality predictions that remained within the range of natural background variability should not have been carried through to the residual effects assessment; discounting the moderate rating for certain parameters because the "parameters already exceed guidelines at background concentrations" does not seem a valid method for characterizing residual effects.

Comment: Provide additional rationale to justify the magnitude characterization for the Base Case P50 Mine Discharge Effects Assessment in light of the exceedances of guidelines and uncertainty regarding background levels. Alternatively, revise the magnitude classification and explain any potential implications of the revision on the determination of significance for this residual effect.

Comment number: WQ-11

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference:

13.7.3.1.2;

13.7.3.2.2;

Appendix 14-B 2.2;

Appendix 14-B 3.2

Context: An effects assessment was not conducted for the Post-Closure phase of the mine. Appendix 14-B 2.1.1 and Chapter 13 p. 54 "Parameters in Post-Closure" notes that several parameters exceed BC and CCME WQGs in the Post-Closure phase, but that these parameters have not been carried forward for assessment (the effects assessment only considers the Operations phase of the Project at this time). The exceedances in Post-Closure are due to mine contact ground water that results in a contaminant plume that daylights in the surface water environment decades after the underground mine has re-flooded. The lack of an effects assessment for the Post-Closure phase of the mine leaves a substantial information gap, limiting ECCC's capacity to advise on the long-term impacts of the project on water quality.

Also, the lack of reliable Post-Closure predictions calls into question the proponent's assessment of Reversibility for both the Base Case and Upper Case predictions for TMF Discharge and Mine Discharge effects. Chapter 13 of the EIS states that the proponent is currently considering additional mitigation options for backfilled materials in the upper part of the underground workings to address the groundwater contaminant plume from the flooding of the underground mine. The proposed mitigation measures have not yet been included in the current version of the water and load balance model.

Until these additional mitigation options are included, the classification of "Reversible": Once closure and reclamation is complete, the Surface Water Quality is expected to revert back to within baseline levels after a number of years" seems unsupported. Based on the current water quality predictions provided in the EIS (where parameters such as cadmium and zinc are predicted to peak in Post-Closure and remain elevated), it seems that Reversibility of residual effects to water quality should be classified as "Irreversible" until additional data or quantitative analyses are provided to demonstrate otherwise.

Comment: Provide updated water quality predictions for the Post-Closure phase of the mine that take into account the planned additional mitigation options for backfilled materials in the upper part of the underground workings.

Provide an effects assessment for the Post-Closure phase of the mine.

Provide additional rationale to justify the assessment of Reversibility for both the Base Case and Upper Case predictions for TMF discharge and Mine discharge effects during Operations as being Reversible. Alternatively, revise the classification of Reversibility to better reflect the water quality predictions data.

Comment number: WQ-12

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C 4.2.1

Context: For the P90 Upper Case Predictions for the Portal Collection Pond (PCP), zinc is predicted to exceed MMER limits for 11 out of 12 months of the year during Operations. The current water management strategy does not include any water treatment at the PCP, except for settling of TSS within the pond. The residence time for water in the PCP is approximately 1 day, so there is little capacity to hold water should monitoring indicate that MMER limits (or other thresholds) are exceeded.

The EIS does describe a contingency plan to include water treatment at the PCP should monitoring indicate it is necessary. However, it is unclear how water quality will be managed between the time at which exceedances are detected and the time at which water treatment is able come online.

At the November 21, 2017 working group meeting, the consultant for the proponent mentioned that multiple in-line water treatment options would be available to address potential exceedances in PCP discharge. More information is required to understand the effectiveness of these options.

Comment: Provide a strategy for the long-term monitoring of effluent from the Portal Collection Pond. Describe what mitigation measures would be technically and economically feasible should MMER limits (or other thresholds) be exceeded. Describe the expected effectiveness and readiness of such measures. Include the in-line water treatment options mentioned at the November 21, 2017 Working Group Meeting.

Comment number: WQ-13

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-A Executive Summary & Summary 13.8.6.1

Context: The EIS states that site-specific water quality objectives (WQOs) or Science-Based Environmental Benchmarks (SBEBs) based on dissolved concentrations should be considered for the project, however they have not been included in the current version of the EIS.

Comment: Clarify whether site-specific WQOs or SBEBs will be developed for this project.

Comment number: WQ-14

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 13.8.6.1

Context: The proponent has not provided sufficient information to support their Cumulative Effects Assessment. The EIS states that flow reductions in the diversion reach of the Bitter Creek Hydroelectric Project have the potential to exacerbate changes in water quality in Bitter Creek from mine and TMF discharge, because there will be lower dilution through that reach.

No quantitative information is provided regarding the amount of flow reduction, location of flow reduction, or expected loss of dilution in Bitter Creek; yet the cumulative effects have been assessed as low magnitude, discrete extent, long-term duration, sporadic/regular frequency, reversible and high context = Not significant.

Comment: Provide a more fulsome description of how the cumulative effects to water quality in Bitter Creek could be exacerbated by flow reductions from the Bitter Creek Hydroelectric Project, including consideration of amount of flow reduction, location of flow reduction, seasonality of flow reduction, and expected loss of dilution in Bitter Creek.

Provide a detailed explanation for each criterion of the residual cumulative effects assessment for the Bitter Creek Hydro Project (magnitude, duration, frequency, reversibility and context).

Comment number: WQ-15

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 13.5.3.3; Table 13.6-3

Context: Quarries and borrow areas are described in the EIS (Changes in Surface Water Quality from Road Runoff) as having the potential to transport metals and suspended sediments into nearby watercourses, as well as having the potential for metal leaching under acidic pH conditions. However, Table 13.6-3 (Mitigation Measures for Road Runoff) does not describe any mitigation options for addressing metals, TSS and ML/ARD from quarries and borrow areas.

Comment: Describe mitigation measures to address the transportation of metals, TSS and ML/ARD from quarries and borrow areas, or provide a rationale as to why such measures are not needed. In all cases, describe any residual effects that are expected.

Please note that this comment informed IR-17.

Comment number: WQ-16

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 13.5.3.2

Context: Seepage from a TMF is considered "effluent" under the MMER and therefore subject to the same effluent discharge limits as other types of effluent (e.g., discharge from the TMF).

The EIS indicates that TMF supernatant water does not meet MMER limits for TSS, dissolved copper, or ammonia, and therefore will be treated to MMER limits before discharge into Bitter Creek.

However, it seems that seepage from the TMF would also escape to the receiving environment without water treatment, at concentrations that exceed MMER limits.

Comment: Describe how seepage from the TMF will be managed to comply with the effluent discharge limits in the MMER.

Comment number: HG-17

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 10.4.4.2

Context: Generally speaking, an assessment of potential effects of dewatering and underground excavations on the receiving environment requires measurements of groundwater level and water quality data from appropriately constructed wells and piezometers.

For this project, the proponent made use of open exploration boreholes and piezometers around the proposed underground mine to collect current and historical water levels and water quality data. ECCC is concerned that use of open exploration boreholes and piezometers may compromise confidence in water level and chemistry data collected (i.e., greater uncertainty in predicted effects to water quality).

Comment: Advise as to whether all hydrogeologic and groundwater parameter measurements followed suggested baseline assessment standards described in BC MOE's (2012) Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators.

If not, please describe what kind of uncertainty this introduces into the water quality effects assessment overall.

Comment number: HG-18

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 10-A Executive Summary and 5.2.1

Context: The proponent provided baseline groundwater monitoring plans, which described water level and quality measurements for the underground mine area. Groundwater level fluctuations reaching up to 50 m were described in the Cirque, where the underground mine is located.

However, the implications of high groundwater fluctuations to water quality in Goldslide Creek, Bitter Creek, and Rio Blanco Creek or any associated effect of fluctuating water levels on the potential oxidation of sulphide minerals in the ore zones are unclear.

Comment: Provide an assessment of the effect of fluctuating groundwater on the quality of groundwater discharge to Goldslide Creek, Rio Blanco Creek, and

Bitter Creek, including the implications to water quality in the receiving environment.

Comment number: HG-19

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 10.4.4.3

Context: ECCC is concerned that the subsurface geology and hydrogeology in the northwest section of the Bromley Humps and the TMF may not have been sufficiently characterized to adequately inform effects to water quality. Limited site investigation information and no monitoring well data are available for the area downgradient of Bromley Humps and the TMF.

ECCC understands that seepage modelling was completed, but fate and transport modelling for seepage leaving the TMF and possibly discharging to Bitter Creek was not completed. ECCC is concerned that the water quality modelling for Bitter Creek has a high uncertainty, because of the limited subsurface information downgradient of the TMF. In addition, fate and transport of COPCs are unknown for the area between the TMF and seepage/recycling ponds and Bitter Creek.

Comment: Provide additional site investigation information for the area downgradient of the northwest and south Bromley Humps and the TMF (i.e. hydrostratigraphy, groundwater flow directions and gradients), or an adequate rationale as to why such information is not relevant to inform effects to water quality.

Discuss how any new information or rationale influence the water quality modelling for Bitter Creek and the related water quality effects assessment.

Consider the inclusion of groundwater quality monitoring wells in the follow up monitoring program to ground-truth the water quality predictions and water quality effects assessment for Bitter Creek.

Please note that this comment has been grouped with HG-19, HG-26 and HG-30 to inform IR-18.

Comment number: HG-20

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 10.5.3

Context: ECCC is concerned about the impacts to water quality and Bitter Creek resulting from the potential failure of the TMF geomembrane liner. Long-term studies on geomembrane liners used at mine sites indicate that these types of liners have limited life spans, and are assumed to not be 100% effective due to small tears and holes that result from standard operational use. In rare instances, geomembrane liners can fail.

In case of membrane failure large amounts of tailings leachates could enter the environment via groundwater preferential flow paths.

Comment:

Describe the life expectancy of the TMF geomembrane liner, and plans to manage the risk of failure in perpetuity.

Describe monitoring and contingency plans to address potential failures of the TMF geomembrane liner and associated changes to water quality.

Comment number: HG-21

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C, Executive Summary, 3.8.2, and 6.2

Context: The proponent stated that their water and chemical load balance model accounted for the potential seepage from the Seepage Collection Pond, Recycling Pond, and the TMF, but did not provide supporting data in the appendices. It is not clear if and how the proponent considered contaminant transport to Bitter Creek through high permeability fractured bedrock.

Comment: With respect to seepage flow rate, and chemistry used as input to the chemical load balance model, provide a summary of model input parameters, assumptions, model outcomes, sensitivity analyses, and uncertainties for the geochemical source terms for the south and northwest of the Bromley Humps and the TMF area.

Include an assessment of the effects of the fractured bedrocks as preferential flow paths on Bitter Creek water quality, as well as the travel time through the subsurface, to conservatively estimate the effect on water quality (including a discussion on the limitations of the approach and on the possible need for a more complex transport model and /or investigation).

Please note that this comment informed IR-19.

Comment number: HG-22

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C, Executive Summary and 4.1.3

Context: The proponent indicated that water from the underground mine will be discharged into a collection pond and then released into Goldslide Creek at a constant rate throughout the year. The increase in discharge to Goldslide Creek is up to 300-400% during winter and 10 to 30% in summer. During winter low flow conditions, the base flow in Goldslide Creek comes mainly from groundwater discharge. The increase in discharge to Bitter Creek reaches 7% of its flow. The combined effect of increased discharge (mainly contact water) and groundwater seepage will likely impact the water quality in Bitter Creek.

Comment: Provide an assessment of the predicted changes to water chemistry due to the combined effects of baseflow reduction and discharge from the underground mine, including impact on Bitter Creek water quality.

Describe the effects of contact water and groundwater seepage flows bypassing the collection ponds, infiltration from the collection ponds, and discharge from the underground mine on water quality predictions in Bitter Creek.

Comment number: HG-23

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 14-C, Executive Summary, Appendix 4-A, 4.1

Context: The proponent indicated that hydraulic conductivities in JW mineralized zone, the Marc mineralized zone or the DC fault, and the Rick fault are higher than in the surrounding area. Seepage from the mineralized zones via preferential flow paths could therefore be the main route for movement of contact water to Goldslide Creek and Bitter Creek. Seepage from the mineralized zones is also likely to be higher in COPC concentrations than seepage from the non-mineralized surrounding area. The current water quality model predicts concentrations above water quality guidelines for nitrite, antimony, arsenic, cadmium, copper, mercury, zinc, and selenium in Goldslide Creek, Rio Blanco Creek, Bitter Creek, and Bear River during operations. The current water quality does not take into account the mineralized source area and the non-mineralized surrounding areas have different hydrogeological properties. ECCC is concerned that seepage from the mineralized zones could affect the water quality in Goldslide Creek and Bitter Creek to a larger extent than predicted in the current modelling.

Comment: Describe how the groundwater numerical model and/or the chemical load balance has accounted for the different geochemistry in the mineralized zone compared to the surrounding area and how this impacts the water quality effects assessment in the receiving environment.

Comment number: HG-24

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 10.5.2, Table 10.5-1, and 10.10

Context: Flooding the underground during closure and reclamation phase will likely cause reduction of groundwater flow to Goldslide Creek and Rio Blanco Creek, reducing the creek's baseflow. This means that water in the creek may be comprised of a larger portion of contaminated groundwater compared to flow prior to flooding the underground workings. It is not clear if and how the water quality predictions for the receiving environment take into account the changed groundwater regime after flooding of the underground.

Comment: Describe how the predicted reduction in groundwater/baseflow during the closure and reclamation phase is reflected in the numerical groundwater model, water and chemical load balance.

Provide an assessment of water quality effects that takes into account seepage from the flooded underground workings and groundwater/baseflow reductions on receiving environments.

Comment number: HG-25

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 10.5.2, Table 10.5-1, and 10.10

Context: Groundwater quality could be impacted by infiltration and mounding of the water table underneath waste rock stockpiles. The proponent is planning to move both the legacy waste rock pile and the temporary new waste rock pile into the underground workings for final storage as soon as feasible. The water quality model does not appear to account for impacts to groundwater from the waste rock piles prior to their relocation. Groundwater impacted by seepage from the waste rock piles could transport COPC via preferential flow paths to the receiving environment.

Comment: Provide characterization of potential flow of seepage from the waste rock piles to Goldslide Creek and Bitter Creek, including its effect on water quality.

Comment number: HG-26

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 10.5.3

Context: The proponent indicated that upper bound seepage losses through the TMF geomembrane liner during operations were calculated to be < 0.2 L/s (Appendix 10-B). It is not clear how this estimate was calculated and how defects (rips/tears) of the geomembrane liner would affect this estimate.

Any seepage from the TMF will be collected in two Seepage Collection and Recycle Ponds and pumped back to the TMF. ECCC noted that faults and fractures have been identified in the geotechnical drill holes (BH16-009 and DT-282- Appendix 1-A) near these two collection ponds. ECCC is concerned that some of the seepage could escape through the faults and fractures and discharge to Bitter Creek instead of being pumped back into the TMF.

Comment: ECCC requests that the proponent provide:

Supporting rationale for how seepage loss through the geomembrane liner was calculated and what the associated uncertainty with this estimate is.

Explanation of how possible seepage loss through faults and fractures could affect the effectiveness of the seepage collection ponds.

Discussion on how changes to seepage flow through the liner or increased flow through the preferential pathways towards Bitter Creek would affect the water quality effects assessment.

A description of corrective actions that would be taken in the event that measured seepage flow rate and chemistry differ from model predictions and pose a risk to water quality of Bitter Creek and Bear River.

Please note that this comment has been grouped with HG-19, HG-26 and HG-30 to inform IR-18.

Comment number: HG-27

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: 10.6.1

Context: The proponent proposed to install hydraulic plugs at the three portal locations to limit effects on hydrogeology. The underground workings will be flooded to re-establish the pre-mining conditions and be filled with current and legacy waste rocks. ECCC noted that the proponent hasn't segregated the current waste rock from the historical waste rock. Acid generation and metal leaching potentials of the legacy waste rock piles and the current waste rock stock piles likely vary. Therefore, volume and quality of seepage generated from the two waste rock stock piles will likely vary as well. ECCC is not clear on what geochemical source terms were used in the water quality model to predict water chemistry of seepage from the underground backfill.

Comment: Provide an assessment of the predicted water chemistry of seepage from the underground backfill, including assumptions in the geochemical source term.

Describe the effect of using the current and legacy waste rocks as backfills on the flooded underground water quality, seepage flow rate, and chemistry, including the impact on Bitter Creek water quality.

Identify any material handling and waste management plans that accounted the varying ML/ARD potentials of the legacy waste rock stock piles and the mine waste rock stock piles.

Comment number: HG-28

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 10-A, 6.3

Context: One of the assumptions of the groundwater model is that recharge to the groundwater system mainly takes place in the form of snowmelt or rain filtration. The proponent assumed a spatially constant recharge throughout the model boundary and overlooked the expected variations in recharge rates. By assigning a spatially constant recharge over the model domain, the predicted groundwater head values will not be representative of the field water levels. The groundwater level fluctuations in the areas of existing declines are indications of varying recharge rates. The proponent's assumption of spatially constant recharge is not consistent with existing data for the site.

ECCC understands that recharge to groundwater likely vary over the entire model domain (TSA). This will have implications on the groundwater model predictions with respect water levels, flow path analyses and related water quality

assumptions. A better understanding of variability of groundwater recharge is required to assess the quantity and therefore the quality of groundwater discharge from the underground workings and its potential impact on receiving environment.

Comment: Discuss how the groundwater model predictions account for varying recharge rates reflective of the model boundary area, and clarify how this may affect the associated water quality effects assessment.

Please note that this comment informed IR-20.

Comment number: HG-29

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 10-A, 6.9

Context: There is uncertainty of model outputs due mainly to:

- 1) characterization of the hydraulic conductivity field
- 2) the seasonal recharge rate (R), and
- 3) characterization of geological structures acting as major conduits.

The proponent should take additional steps to characterize the uncertainty with respect to these three aspects.

Comment: ECCC requests that the proponent:

- Discuss the appropriate range of potential values for hydraulic conductivity, seasonal recharge and the characterization of geological structures as major conduits for the project based on site-specific conditions;
- Provide a rationale for the values selected to represent hydraulic conductivity and seasonal recharge for the EIS; and

Describe the implications for the water quality effects assessment should a different value have been selected (i.e., one on the low end of the range and one on the high end of the range, for each parameter).

Comment number: HG-30

Project effects link to CEAA 2012: 5(1)(a)(i) Fish and fish habitat

EIS reference: Appendix 10-B, 3.3.5

Context: The proponent did not carry out sensitivity analyses on leakage from the TMF. The leakage estimates are considered upper bound rates since the

reduction in seepage from the overlying tailings and underlying ground conditions are not taken into consideration (KP, 2017b). In order to understand the potential effects of leakage from the TMF on water quality in Bitter Creek, ECCC requires assurances that the leakage estimates provided in the EIS are reliable.

Comment: Provide supporting data from similar geographic regions that demonstrates the estimated leakage through defects in the liner during mine operations is unlikely to exceed upper bound estimates.

Please note that this comment has been grouped with HG-19, HG-26 and HG-30 to inform IR-18.

Comment number: AQ-31

Project effects link to CEAA 2012: 5(1)(b) Federal lands /transboundary
5(1)(c)(i) Aboriginal people's health/ socio-economic conditions

EIS reference:

Appendix 7A, 2.1.4 and Appendix A – Section A5
Appendix 7A, 3, Tables 3-2 and 3-3.

Context: Emissions estimates for on-road vehicles and freight vehicles that were derived using information in Appendix 7A (Section 2.1.4) and Appendix A (Section A5) do not match the emissions estimates listed in Appendix 7A (Section 3, Tables 3-2 and 3-3). Based on the information provided, the emissions could be underestimated by up to 50%.

Comment: Provide sample calculations for on-road vehicles and freight vehicles. Clarify which numbers were used in the description of residual effects and to form conclusions. Update the emission estimates and the conclusions as needed.

For example, (# km for on-road vehicles identified in table 2-5 of appendix 7A) multiplied by (emissions factors (g/VkmT) in Table A-5) yield much higher emissions estimates than those listed in Tables 3-2 and 3-3.

Comment number: CWS-32

Project effects link to CEAA 2012: *Species at Risk Act* section 79 (2)

EIS reference: 16.3.3, Table 16.3-2 and
Appendix 16-A: 2.0 Background Review Table 2-1 (pdf g 30)

Context: Table 16.3-2 lists Western Screech-Owl (*kennicottii* subsp.) as Special Concern on Schedule 1 of SARA.

Table 2-1 lists Barn Swallow as COSEWIC assessed Threatened (not listed on Schedule 1 of SARA), and Western Screech-Owl (*kennicottii* subsp.) as Special Concern/Endangered on Schedule 1 of SARA.

ECCC advises that Barn Swallow is now listed on Schedule 1 of SARA as Threatened.

The COSEWIC status of Western Screech-owl was upgraded in 2012 from Special Concern to Threatened, and the species was added to Schedule 1 of SARA in 2017.

The proponent should be aware that Recovery Strategies and critical habitat identification will follow for each of these species.

Comment: Provide a description on if/and how these updates influence the wildlife effects assessment and conclusions.

Comment number: CWS-33

Project effects link to CEEA 2012:

5(1)(a)(iii) Migratory birds

Species at Risk Act section 79 (2)

EIS reference: 16.5.2 Project Interactions - Table 16.5-1

Context: No interactions were reported for Bats, Migratory Breeding Birds, Migratory Bird Species at Risk, or Western Toad in Construction Phase: Construct Mine Site water management infrastructure including talus quarries and the portal collection pond, dewatering systems, and water diversion, collection and discharge ditches and swales. However, these species were reported or may occur in the area of the mine site water management infrastructure.

Comment: Considering mine site water management infrastructure construction, provide rationale to indicate how the VCs of Bats, Migratory Breeding Birds, Migratory Bird Species at Risk, and Western Toad will not be affected. Alternatively, complete an assessment of the effects of the noted mine infrastructure on each VC, including the potential for habitat alteration, sensory disturbance, direct mortality, indirect mortality, and attractants.

Please note that this comment has been grouped with CWS-33, CWS-34, CWS-35, CWS-36, CWS-37, CWS-38, and CWS-39 to inform IR-21.

Comment number: CWS-34

Project effects link to CEAA 2012:

5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference: 16.5.2 Project Interactions - Table 16.5-1

Context: No interactions were reported for Bats, Migratory Breeding Birds, or Migratory Bird Species at Risk in Construction Phase: Construct Explosives Magazine or Construct other Mine Site ancillary buildings and facilities. However, these species were reported or may occur in the area of the explosives magazine or mine site ancillary buildings construction.

Comment:

Considering explosives magazine or mine site ancillary buildings construction, provide rationale for how the VCs of Bats, Migratory Breeding Birds, and Migratory Bird Species at Risk will not be affected.

Alternatively, complete an assessment of the effects of the noted mine infrastructure on each VC, including the potential for habitat alteration, sensory disturbance, direct mortality, chemical hazards, attractants.

Please note that this comment has been grouped with CWS-33, CWS-34, CWS-35, CWS-36, CWS-37, CWS-38, and CWS-39 to inform IR-21.

Comment number: CWS-35

Project effects link to CEAA 2012:

5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference: 16.5.2 Project Interactions - Table 16.5-1

Context: No interactions were reported for Bats, Migratory Breeding Birds, or Migratory Bird Species at Risk in Construction and Operation Phases: Discharge of water from underground workings at the Mine Site. However, these species were reported or may occur in the area of the discharge.

It is unclear how this activity does not have the potential effects/pathway of interactions reported in this table (Potential for effects to wetland or open water habitat depending on location of discharge) nor the specific effects this discharge may have (e.g. habitat alteration, chemical hazards, attractants).

Comment: Provide rationale for how the VCs of Bats, Migratory Breeding Birds, and Migratory Bird Species at Risk will not be affected by, or have the pathways of interaction reported in Table 16.5-1 for:

1. Water discharge, and
2. The specific effects this discharge may have in Construction and Operation Phases of the Project.

Alternatively, complete an assessment of the effects of the underground mine water discharge on each VC.

Include the potential for effects to wetland or open water habitat, depending on the discharge location, and the specific effects of the discharge (e.g., habitat alteration, chemical hazards, attractants) for the chosen option.

Please note that this comment has been grouped with CWS-33, CWS-34, CWS-35, CWS-36, CWS-37, CWS-38, and CWS-39 to inform IR-21.

Comment number: CWS-36

Project effects link to CEAA 2012:

5(1)(a)(iii) Migratory birds

EIS reference: 16.5.2 Project Interactions - Table 16.5-1

Context: No interactions were reported for Migratory Breeding Birds in Construction Phase: Temporarily stockpile ore at the Mine Site. However, these species were reported or may occur in the area of temporary stockpile. It is unclear how this activity does not have the potential effects/pathway of interactions reported in this table (Habitat alteration; sensory disturbance; direct mortality) for this VC

Comment:

Provide rationale for how Migratory Breeding Birds will not be affected by, or have the pathways of interaction reported in Table 16.5-1 for temporary stockpiling of ore at the Mine Site.

Alternatively, complete an assessment of the effects of the noted mine infrastructure on each species of Migratory Breeding Birds.

Please note that this comment has been grouped with CWS-33, CWS-34, CWS-35, CWS-36, CWS-37, CWS-38, and CWS-39 to inform IR-21.

Comment number: CWS-37

Project effects link to CEAA 2012:

5(1)(a)(iii) Migratory birds

Species at Risk Act section 79 (2)

EIS reference: 16.5.2 Project Interactions - Table 16.5-1

Context: Sensory disturbance is not reported for Bats in Construction Phase: Construct the TMF. However, Bats may occur in the area of the TMF and are reported as being affected as by sensory disturbance in other areas of the Project.

Similarly, habitat alteration is not considered for any of the VCs for this phase of the project.

Comment: Provide rationale for how Bats will not be affected by sensory disturbance for construction of the TMF. In addition, provide a rationale for why habitat alteration is not considered here for all VCs.

Alternatively, complete an assessment of the effects of sensory disturbance and/or habitat alteration for the noted mine infrastructure on each VC.

Please note that this comment has been grouped with CWS-33, CWS-34, CWS-35, CWS-36, CWS-37, CWS-38, and CWS-39 to inform IR-21.

Comment number: CWS-38

Project effects link to CEAA 2012:

5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference: 16.5.2 Project Interactions - Table 16.5-1

Context: No interactions were reported for Migratory Breeding Birds, or Migratory Bird Species at Risk in Operation Phase: Maintain Access Road and Haul Road, including grading and plowing as necessary. However, these species were reported or may occur in the area of the access and haul roads.

Comment: Considering maintaining access and haul roads during operations, provide rationale for how Migratory Breeding Birds and Migratory Bird Species at Risk will not be affected.

Alternatively, complete an assessment of the effects of the noted mine infrastructure on each VC, including the potential for sensory disturbance, disruption to movement, direct mortality, indirect mortality, and attractants.

Please note that this comment has been grouped with CWS-33, CWS-34, CWS-35, CWS-36, CWS-37, CWS-38, and CWS-39 to inform IR-21.

Comment number: CWS-39

Project effects link to CEAA 2012:

5(1)(a)(iii) Migratory birds

Species at Risk Act section 79 (2)

EIS reference: 16.5.2 Project Interactions - Table 16.5-1

Context: The only potential effect/pathway reported for Migratory Breeding Birds, Migratory Bird Species at Risk, and Raptors in Closure and Reclamation Phase: Construct the closure spillway is sensory disturbance. However, construction of this spillway has the potential to alter habitat, cause direct mortality, or disrupt movement. In addition, Western Toad may be impacted by spillway construction through changes to habitat, mortality, or movement disruption.

Comment: Provide rationale for how Migratory Breeding Birds, Migratory Bird Species at Risk, Raptors, and Western Toad will not be affected by habitat alteration, direct mortality or disruption to movements, in addition to sensory disturbance, during the closure spillway construction.

Alternatively, complete an assessment of the effects of the noted mine infrastructure on each VC, including the potential for habitat alteration, direct mortality or disruption to movements.

Please note that this comment has been grouped with CWS-33, CWS-34, CWS-35, CWS-36, CWS-37, CWS-38, and CWS-39 to inform IR-21.

Comment number: CWS-40

Project effects link to CEAA 2012: *5(1)(a)(iii)* Migratory birds

Species at Risk Act section 79 (2)

EIS reference: Chapter 16: Table 16.4-1 and Appendix 16-A

Context: Table 16.4-1: Summary of Baseline Investigations Conducted Between 2015 and 2017, details baseline data collection for all VCs: Bats, Migratory Breeding Birds, Migratory Bird Species at Risk, Western Screech-Owl and Northern Goshawk, Non-Migratory Game Birds, and Western Toad. However, it does not appear that data was collected during non-breeding seasons (e.g. winter, spring and fall migration) for these VCs.

Without this information, ECCC cannot accurately assess year-round migratory bird use of the area, or seasonal movements of Species at Risk potentially affected by the Project.

Comment: For the VCs, Bats, Migratory Breeding Birds, Migratory Bird Species at Risk, Western Screech-Owl and Northern Goshawk, Non-Migratory Game Birds, and Western Toad, provide:

- a) A summary of baseline data collected during non-breeding seasons and any data used to inform the effects assessment for this period
- b) A discussion of how inter-seasonal variation was assessed for these VCs, and
- c) A rationale for instances where baseline data has not been collected in non-breeding seasons, and where inter-seasonal variation has not been assessed.

Please note that this comment informed IR-22.

Comment number: CWS-41

Project effects link to CEAA 2012: 5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference: Appendix 16-A: Section 3.2.8 - Figure 3-7 and Section 4.9 - Figure 4-38

Context: Figure 3-7 shows survey station and automated recording unit (ARU) locations for Common Nighthawk (CONI) baseline data collection. Figure 4-38 shows CONI habitat suitability modeling for the LSA. Several locations of Class 1 high habitat suitability for CONI exist in areas of proposed Project infrastructure, yet were not surveyed or used in ARU locations. Thus, CONI baseline information may not exist in modeled CONI Class 1 high habitat suitability areas.

The lack of CONI information increases uncertainty about the potential effects of the Project to CONI and their habitat arising from the proposed Project.

Comment: Provide a map overlaying:

- 1) Survey stations,
- 2) ARU locations,
- 3) Habitat suitability modeling ratings for CONI, and
- 4) Project infrastructure within the LSA.

Where survey and/or ARU locations do not overlap with high or moderate habitat suitability modeling ratings for CONI, provide rationale for this lack of overlap.

For areas where high or moderate suitability model ratings overlap with Project infrastructure, provide specific mitigation measures that will avoid or minimize impacts to CONI or their habitat from the Project.

Further, provide rationale on the efficacy of the provided CONI mitigation measures.

Please note that this comment has been grouped with CWS-41, CWS-42 and part of CWS-46 to inform IR-23.

Comment number: CWS-42

Project effects link to CEAA 2012: *Species at Risk Act* section 79 (2)

EIS reference:

Appendix 16-A: Section 3.2.8 - Figure 3-7 and Section 4.4 - Figure 4-49

Context: Figure 3-7 shows survey station locations where silent listening surveys occurred for Western Screech-Owl (WESO) in the LSA. Figure 4-49, WESO habitat suitability map, shows habitat suitability for WESO in the LSA. Only three survey locations (1237-CONI 14, 1238-CONI 15, and 1293-CONI 9) are near high suitability habitat for WESO. No WESO were detected in the LSA during surveys in 2015 and 2016, however, it does not appear that surveys were conducted in high or moderate suitability habitats for WESO in the LSA.

Without appropriate sampling coverage, uncertainty is increased about the potential effects of the Project to WESO and their habitat from the Project.

Comment: Provide a map overlaying:

- 1) Survey stations;
- 2) Habitat suitability modeling ratings for WESO; and
- 3) Project infrastructure within the LSA.

Where survey locations do not overlap with high or moderate habitat suitability modeling ratings for WESO, provide rationale for this lack of overlap.

For areas where high or moderate suitability model ratings overlap with Project infrastructure and buffers, provide specific mitigation measures that will avoid or minimize effects to WESO or their habitat from the Project.

Further, provide rationale on the efficacy of the provided WESO mitigation measures.

Please note that this comment has been grouped with CWS-41, CWS-42 and part of CWS-46 to inform IR-23.

Comment number: CWS-43

Project effects link to CEAA 2012: *Species at Risk Act* section 79 (2)

EIS reference: 16.4.4.6 Bats
Appendix 16-A: 4.7 Bats

Context: Chapter 16: Figure 16.4-8 Habitat Suitability Map for Bats - identifies suitable summer habitat for bats using a two-class rating scheme: "useable or not". This rating scheme is inappropriate to effectively assess potential effects on bats from the Project.

Appendix 16-A: 4.7.2.5. Habitat model evaluation states that "Overall, the suitability model predicted useable habitat fairly well.", but does not quantify prediction strength from field verification visits.

Appendix 16-A: Table 4-55. Life Requisites of the Little Brown Myotis within the Project area rated by month and season suggests that Little Brown Myotis are present in the Project area (LSA) year-round, however no models are provided for winter habitat in the area.

Comment: Provide a habitat suitability model that contains more than two suitability classes, guided by habitat suitability models developed for bats in similar geographical areas as well as published information on the habitat needs of bat VCs.

Provide models that reflect potential habitat for:

- (a) Foraging and maternal roosting in growing and living seasons and
- (b) Winter life requisites as identified in the EIS.

Provide maps of these models overlaid with survey locations for bats within the LSA and Project infrastructure.

Provide quantified prediction strength of models.

Using the aforementioned habitat suitability models, update the effects assessment with potential effects of the project to bats and their habitat within the Project area, including measures of uncertainty.

Please note that this comment has been grouped with CWS-43, CWS-45 and part of CWS-46 to inform IR-24.

Comment number: CWS-44

Project effects link to CEAA 2012: *Species at Risk Act* section 79 (2)

EIS reference: 16.4.5.3 Raptors: 16.4.5.3.1 Northern Goshawk

Context: Two Northern Goshawks (one adult, one juvenile) were located within the LSA during baseline data collection (page 77 of Chapter 16); however no nests were detected with these observations.

Given that Northern Goshawk *laingi* subspecies is non-migratory (Appendix 16-A: Section 4.12), it is important that the potential effects that this Project may have on Northern Goshawk individuals, their residences, and foraging habitat areas are assessed. The potential effect of this Project on Northern Goshawk nests and foraging areas is not well described in the EIS.

Comment: Provide information on the level of certainty that the Project will avoid or mitigate effects to Northern Goshawk residences and important habitats year-round in the LSA.

Comment number: CWS-45

Project effects link to CEAA 2012: *Species at Risk Act* section 79 (2)

EIS reference: Appendix 16-A: 4.17 Western Toad

Context: Section 4.17.4.2 (Table 4-120) Wildlife Habitat Ratings provides the attributes for living, reproducing (eggs), and hibernating life requisites for Western Toad. However, only habitat suitability for reproduction (eggs) was provided in Western Toad habitat suitability models.

Without information on potential movement corridors and non-reproducing habitat requirements, it is not possible for ECCC to fully identify potential Project effects on Western Toad.

Comment: For Western Toad in the LSA, provide:

- a) Habitat suitability models for non-reproducing areas;
- b) Information on Western Toad movement corridors that may have been collected during baseline data collection; and/or
- c) A rationale on how the Western Toad effects assessment and proposed mitigation measures are allow for a full understanding potential Project effects.

Please note that this comment has been grouped with CWS-43, CWS-45 and part of CWS-46 to inform IR-24.

Comment number: CWS-46

Project effects link to CEAA 2012: 5(1)(a)(iii) Migratory birds

EIS reference:

Chapter 16: 16.5.4.2 Migratory Bird Species at Risk: 16.4.5.2.1 Black Swift
Appendix 16-A

Memo dated 2017 11 08 (the Supplemental Memo): Supplemental Information –
Marbled Murrelet and Black Swift Field Studies Section 2: Methods: 2.1 Black
Swift and Section 3 Results: 3.1 Black Swift

Context:

Survey Methodology:

ECCC recommended, in comments provided on the provincial Application
Information Requirements (AIR) (see tracking table dated 2016_11_04, comment
309), that:

*“b. Further baseline surveys be conducted for Black Swift in the project area
following RISC protocols (“Inventory Methods for Swallows and Swifts (Version
2.0) and attached Annex 3 ECCC-
CWS_Memo04_BlackSwiftProtocol_20150727). These surveys may be guided
by habitat suitability modeling in the project area.”*

ECCC considers the recommendations provided in the ECCC-
CWS_Memo04_BlackSwiftProtocol_20150727 (“Black Swift - baseline survey
protocol and effects assessment for Environmental Assessment” or the CWS
Black Swift Protocol) to be a more appropriate species-specific survey protocol
for Black Swift; however, it is unclear if these protocols were implemented for the
Black Swift surveys.

In addition, the majority of the surveys were conducted at dusk (8 of 9 surveys).
ECCC notes that recent research suggests that evening surveys are not as
effective for detecting Black Swift nest attendance (Levesque and Rock 2017).
The recommendations in the CWS Black Swift Protocol were created with swift-
specific survey protocols used throughout the Pacific, and should be used in
addition to or replace the RISC standards for nest site detection, with special
consideration of the most recent research on swift nest site detection (i.e. dawn
surveys). This combination of methods will maximize the possibility of detecting
swifts and their nesting sites when compared with the use of the RISC standard
alone.

ECCC also notes that the reconnaissance survey effort for Black Swift is not
provided quantitatively in the EIS or the Supplemental Memo. Further, most
survey locations are located in the Bear River Valley in the RSA; with one at the

entrance to the Bitter Creek Valley (Station 24-June-2017-1), and another in the mid-Bitter Creek Valley area (Station 22-Jun-2017-1, Supplemental Memo).

Appendix 16-A of the EIS also states that two Black Swifts were incidentally detected during point count surveys for breeding birds, though it is not clear at which point count station these birds were detected, nor if these detections were located near or in high suitability Black Swift habitat (as identified in the Supplemental Memo and Figure 16.7-21 of the EIS).

Finally, it does not appear that surveys were repeated at survey locations, though ECCC does recommend that surveys be repeated during the breeding season (see the CWS Black Swift Protocol).

Levesque, Paul G. and Christine A. Rock. 2017. Searching for Black Swift (*Cypseloides niger*) Nests in Southern British Columbia. The Canadian Field Naturalist 131: 2 doi: <http://dx.doi.org/10.22621/cfn.v131i2.1805>

Habitat suitability models:

Detailed information on the parameters of the habitat suitability model for Black Swift is not provided in the Wildlife Chapter, Appendix 16-A of the EIS, or in the Supplemental Memo, as it is for other species. This makes it difficult to assess the values provided in Chapter 16: Table 16.7-12: *Summary of Change in Habitat Availability* and model provided in Figure 16.7-21: *Overlap of the Project with Black Swift Effective Habitat – Nesting*.

Comment:

Survey Methodology:

Demonstrate how the CWS Black Swift Protocol was incorporated into the survey methodology used for Black Swift in the RSA and LSA.

Confirm the number of visits to each survey site.

Habitat suitability models:

Provide information on the parameters used for modeling foraging and nesting habitat for swifts.

Provide quantified prediction strength of models and amount of effort to validate habitat modeling, and identify survey sites for swifts in 2015-2017.

Effects assessment:

Provide a map overlaying:

- 1) Survey stations and incidental observation locations, including survey protocol used;
- 2) Updated habitat suitability modeling ratings for Black Swift; and

3) Project infrastructure within the LSA.

Where survey locations do not overlap with high habitat suitability modeling ratings for Black Swift, provide a rationale for this lack of overlap. Additionally, comment on the probability that pre-construction surveys could be completed in high suitability areas potentially affected by Project infrastructure.

For areas where high suitability model ratings overlap with Project infrastructure and buffers, provide specific mitigation measures that will avoid or minimize effects to black swift or their habitat from the Project.

Using the information above, update the effects assessment with potential effects of the project to Black Swift and their habitat within the Project area, including measures of uncertainty.

Please note that part of this comment has been grouped with CWS-43, CWS-45 and CWS-46 to inform IR-24; and the other part informed IR-25.

Comment number: CWS-47

Project effects link to CEAA 2012: 5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference:

Chapter 16: 16.5.4.2 Migratory Bird Species at Risk: 16.4.5.2.3 Marbled Murrelet
Appendix 16-A:

3.0 Methodology: 3.2 Field Surveys: 3.2.14 Marbled Murrelet;

4.0 Results and Discussion: 4.16 Marbled Murrelet

Memo dated 2017 11 08 (the Supplemental Memo): Supplemental Information – Marbled Murrelet and Black Swift Field Studies Section 2: Methods: 2.2 Marbled Murrelet and Section 3: Results: 3.2 Marbled Murrelet

Context:

Suitable Nesting Habitat:

Appendix 16-A, Section 4.16.4 and Figure 4-56 of the EIS maps the ~1 ha patch of Critical Habitat (CH) identified in the LSA as suitable nesting habitat (SNH) for Marbled Murrelet. Chapter 16, Section 16.4.5.2.3 of the EIS then states that, for Marbled Murrelet, *“The suitable nesting habitat identified by the BC Model within the LSA was field-verified as unsuitable nesting habitat”*

Based on the above statement, it is unclear to ECCC:

a) What methodology was followed to verify the SNH, and

b) If the field verified SNH refers to the 1 ha of Critical Habitat (CH) within the LSA, or other identified SNH in the area.

Reference is made to a checklist provided by ECCC in 2017, but it is unclear if this checklist was the main source of methodology confirmation.

Comment:

Suitable Nesting Habitat:

Provide clarification on:

- a) The procedure followed to verify SNH, and
- b) If the SNH identified by the BC Model in the LSA is the same as the ~1 ha of CH within the LSA.

Comment number: CWS-48

Project effects link to CEAA 2012:

5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference:

Chapter 16: 16.5.4.2 Migratory Bird Species at Risk: 16.4.5.2.3 Marbled Murrelet
Appendix 16-A:
3.0 Methodology: 3.2 Field Surveys: 3.2.14 Marbled Murrelet;
4.0 Results and Discussion: 4.16 Marbled Murrelet
Memo dated 2017 11 08 (the Supplemental Memo): Supplemental Information –
Marbled Murrelet and Black Swift Field Studies Section 2: Methods: 2.2 Marbled
Murrelet and Section 3: Results: 3.2 Marbled Murrelet

Context:

Habitat Suitability and Mapped Critical Habitat:

With respect to habitat mapping, Appendix 16-A, Figure 4-57 of the EIS provides nesting habitat suitability for Marbled Murrelet within the LSA, Figure 4-63 of the EIS provides Marbled Murrelet aerial survey results and, Map 2 in the Supplemental Memo for Marbled Murrelet, provides updated Marbled Murrelet Habitat Ratings.

ECCC notes that Appendix 16-A and Figure 4-63 of the EIS, and Map 2 in the Supplemental Memo provide contradictory information and habitat suitability ratings within the LSA.

With respect to nesting habitat, Chapter 16 and Figure 16.7-23 of the EIS provides an overlap of the Project footprint with habitat suitability models for Marbled Murrelet within the LSA, and Appendix 16-A and Figure 4-56 of the EIS provides CH mapped as SNH.

However, no figure was provided depicting the influence from the Project to Marbled Murrelet nesting habitat, limiting ECCC's ability to comment on the conclusions presented in the EIS regarding the effects to Marbled Murrelet nesting habitat from the Project.

Comment:

Habitat Suitability and Mapped Critical Habitat:

Provide clarification on habitat suitability mapping differences between Appendix 16-A and Figure 4-63 of the EIS, and Map 2 in the Supplemental Memo, and indicate which map is accurate for Marbled Murrelet nesting habitat in the LSA.

Provide a map overlaying:

- 1) The polygons of Critical Habitat as provided in Appendix 16-A and Figure 4-56 of the EIS, and
- 2) The Project footprint and Zone of Influence (ZOI) to support the conclusions presented in the EIS regarding effects to Marbled Murrelet nesting habitat from the Project.

Please note that this comment informed IR-26.

Comment number: CWS-49

Project effects link to CEEA 2012:

5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference:

Chapter 16: 16.5.4.2 Migratory Bird Species at Risk: 16.4.5.2.3 Marbled Murrelet
Appendix 16-A:
3.0 Methodology: 3.2 Field Surveys: 3.2.14 Marbled Murrelet;
4.0 Results and Discussion: 4.16 Marbled Murrelet
Memo dated 2017 11 08 (the Supplemental Memo): Supplemental Information –
Marbled Murrelet and Black Swift Field Studies Section 2: Methods: 2.2 Marbled
Murrelet and Section 3: Results: 3.2 Marbled Murrelet

Context:

Nest Tree Confirmation:

Appendix 16-A, Section 3.2.14 and Section 4.16 of the EIS states that in early July, 2016:

- a) Detailed systematic searches were conducted around suitable nest trees identified during ground surveys to identify any egg shell fragments indicating potential nesting activity, and
- b) No egg shells were found during these searches around the 25 nest trees.

However, the locations of these nest trees were not provided in the EIS. In addition, no phenology information is provided regarding the nesting period for Marbled Murrelet for the Project location.

Egg laying has been documented to occur between mid-May and late July in BC, with birds in northern latitudes (e.g., the Project location) sometimes initiating egg-laying later in that period (Nelson, K., 1997). As only one round of searches for egg shell fragments was performed in early July for the Project, there is a high level of uncertainty for nest confirmation.

The lack of nest tree location and phenology information limits ECCC's capacity to assess whether searching during the first week of July was the most appropriate or effective time to look for nest shell fragments.

Nelson, S. Kim. 1997. Marbled Murrelet (*Brachyramphus marmoratus*), version 2.0. In *The Birds of North America* (P. G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York, USA. <https://doi.org/10.2173/bna.276>

Comment:

Nest Tree Confirmation:

Provide a map overlaying:

- 1) The locations of the potentially suitable nest trees where eggshells searches were conducted, and
- 2) The corrected habitat suitability maps (as requested in IR 50 above).

Provide available nest phenology information for the Project area, and a measure of the confidence in the egg shell surveys conducted in early July for this location to confirm presence of nests in the RSA/LSA.

If certainty is low, update the effects assessment to reflect any changes this might have to potential Project effects to nesting Marbled Murrelets in the area.

Please note that this comment informed IR-27.

Comment number: CWS-50

Project effects link to CEAA 2012: 5(1)(a)(iii) Migratory birds
Species at Risk Act section 79 (2)

EIS reference: Memo dated 2017 11 08 (the Supplemental Memo):
Supplemental Information – Marbled Murrelet and Black Swift Field Studies
Section 2: Methods: 2.2 Marbled Murrelet

Context: Section 2.2 of the EIS identifies that “*Other avian activity such as locally active, and/or migrating birds was also noted.*” Further, under the Incidental Observations heading in Section 2.2, surveyors noted incidental observations of birds in and around the project area, as well as while traveling to and at the radar observation locations.

However, information on this additional avian activity was not provided in the Supplemental Memo or elsewhere in the EIS. This could be useful baseline information for assessing potential Project effects.

Comment: Provide information on additional avian activity and/or migrating birds captured during radar surveys, particularly those that may fall under the valued Components (VCs) assessed in the EIS. If this information was included in assessments, please note where it was found in the EIS and how it was considered in the effects assessments.

Comment number: WQ-51

Context: The Metal Mining Effluent Regulations (MMERs) are currently undergoing a 10-year review and are scheduled to be amended. Proposed amendments to the regulations (to take effect on June 1, 2018) are posted on Canada Gazette 1, and are estimated to be posted on Canada Gazette 2 in the spring of 2018. Proposed amendments include changes to the authorized limits of deleterious substances under Schedule 4, including more stringent limits for arsenic, cyanide, zinc, copper, lead and nickel, and introduced limits for un-ionized ammonia. In addition, there are also proposed changes to the non-acutely lethal testing requirements, and Environmental Effects Monitoring (EEM) requirements.

Comment: ECCC advises the proponent that the Red Mountain Mine will be subject to these new regulations once they are in place.

Comment number: ECCC-52

EIS reference: 1.4. Regulatory Framework and the Role of Government

Context: The Environmental Code of Practice for Metal Mines (Code) published by ECCC supports the Metal Mining Effluent Regulations (MMER, 2002) under the Fisheries Act. The Code identifies and promotes recommended best practices to facilitate and encourage continual improvement in the environmental performance of mining facilities, throughout all phases of the mine life cycle. The Code also provides standard advice that can be applied to environmental assessments of mining projects at both the provincial and federal levels.

The Code has several recommendations on environmental protection practices to reduce or eliminate the potential negative environmental impacts associated with mining activities. Some of the recommendations in the Code on environmental management practices for the planning, construction, operations and mine closure phases cover aspects of waste rock and tailings management facility design, tailings and waste rock backfill, and water management including the management of chemicals.

An electronic version of the Environmental Code of Practice for Metal Mines can be found at the following website link:
<http://www.ec.gc.ca/ceparegistry/documents/code/metal/tdm-toc.cfm>

Comment: ECCC requests that the proponent consider the Code as a guidance document for the mine life cycle.

Comment number: AQ-53

Project effects link to CEEA 2012:

EIS reference: 1.4. Regulatory Framework and the Role of Government

Context: On November 3, 2017, subsequent to the submission of the EIS for the Project, the CCME established Canadian Ambient Air Quality Standards (CAAQS) for NO₂.

The CAAQS were developed for the purpose of protection of human health and the environment. They are supported by air quality management levels, which call for progressively more rigorous actions by jurisdictions as air quality approaches or exceeds the CAAQS, thereby ensuring that the CAAQS are not treated as “pollute-up-to” levels.

The Federal Government intends to formally establish the CAAQS for NO₂ through publication in the Canada Gazette, under the authority of the *Canadian Environmental Protection Act, 1999*.

Additional information on the CAAQS can be found at:
http://www.ccme.ca/en/current_priorities/air/caaqs.html

Comment: ECCC notes that the proponent used less stringent objectives/standards for NO₂ in the EIS submission. Therefore, the proponent may wish to consider additional mitigation measures.

Comment number: AQ-54

Context: Mitigation measures such as minimizing unnecessary trips, regular maintenance, anti-idling procedures, and ventilation to remove underground diesel emissions are specified within the EIS (Volume 3, Chapter 7, Table 7.6-1 and Volume 5, Chapter 29).

Mobile sources make up 96% and 94% of total predicted NO_x emissions during the assessed construction and operational assessment years according to the emissions inventory. The project is in an area with good baseline air quality, however the maximum predicted project contribution from NO_x is expected to be large. The Project + Baseline NO_x levels are 99% of the 1-hour NO_x objective and 79% of the annual NO_x objective, so if project emissions are off by even a small percentage, local air quality could be worse than the objectives.

Within the Air Quality and Dust Management plan, the proponent committed to “select and use equipment with low emissions that meet the latest applicable Canadian emissions standards and guidelines”.

Given that mobile emissions are the predominant sources of NO_x during construction and operation, further mitigation measures over and above what is proposed by the proponent may be appropriate.

The Off-Road Compression Ignition Engine Emission Regulations (CEPA, 1999) set progressively more stringent standards for air pollutant emissions from new compression ignition engines used in most mine fleet equipment such as bulldozers, excavators and hauling trucks. Tier IV are the most stringent standards and are in place for most new off-road equipment already. Tier IV emission standards phase in from 2014 through 2021, and Tier IV compliant equipment is already available for most types of mining equipment.

Comment: ECCC recommends the proponent:

- Use Tier IV compliant off-road equipment where available (older equipment would have significantly higher emissions);
- Implement a retrofit and replacement schedule demonstrating off-road equipment conversion to best available emissions technology with new engines meeting Tier IV standards for new engines under the Off-Road Compression Ignition Engine Emission Regulations (*Canadian Environmental Protection Act*, 1999);
- Not remove emission control technologies from off-road equipment; and
- Implement an emission control technology maintenance program.

Comment number: CWS-55

Project effects link to CEAA 2012:

EIS reference: Chapter 16: 16.4.5.3 Raptors: 16.4.5.3.1 Northern Goshawk

Context: On December 7, 2017, the federal recovery strategy for Northern Goshawk *laingi* subspecies, including proposed Critical Habitat, was posted on the SARA Registry.

This document provides information on threats to the species, as well as biophysical attributes and mapped critical habitat that may be applicable to the Project.

ECCC-CWS suggests that the Proponent consult the posted strategy for information to assist in assessing potential impacts of the Project to Northern Goshawk.

Comment: The Proponent should consult the posted strategy at:
http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1818

Comment number: CWS-56

EIS reference: 16.2 Regulatory and Policy Setting

Context: In "Table 16.2-3: Summary of Applicable Provincial Strategies, Guidelines, Plans, and Best Management Practices for Wildlife", the Proponent summarizes Provincial strategies, guidelines, management plans, and BMPs for wildlife. A corresponding table does not exist in the EIS for Federal Strategies, Guidelines, Plans, and BMPs. For completeness, thoroughness, and to inform mitigation and management plans, this table should be included.

Comment: ECCC suggests the proponent include a summary table of the applicable Federal strategies, guidelines, plans, and BMPs for wildlife and species at risk used in the EIS, and also include those that will inform management planning if not used or referenced in the EIS.