SkeenaWild CONSERVATION TRUST

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Sept 25 2025

Attn: Eskay Creek Project Assessment Team

Environmental Assessment Office
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Victoria BC V8W 9V1
eao.EskayCreekRevitalization@gov.bc.ca

Re: Eskay Creek Revitalization Project Effects Assessment and Recommendations Phase

To whom it may concern,

SkeenaWild Conservation Trust works throughout northwestern BC to conserve freshwater systems, salmon populations, and the human and animal communities that depend on these resources. Please accept our submissions regarding the Revised Application, draft Assessment Report, draft Environmental Assessment Certificate and associated draft provincial and federal certificate conditions for the Eskay Creek Revitalization Project (ECRP). Please also find attached an external review by Downstream Consulting, which forms the basis for some of our comments.

Overall, the critical gaps and weaknesses we identified in our comments on the proponent's original Application remain largely unresolved. The Revised Application and draft Assessment Report predict significant residual impacts to water quantity and quality, even after mitigations are applied, and there is currently an unacceptably high level of uncertainty regarding how project effects may impact downstream resident and migratory fish. The Revised Application and draft Assessment Report also overlook essential considerations in rationalizing the need for and benefits of the ECRP, such as the project's contribution (or lack thereof) to the renewable energy transition and uncertainties associated with promised economic benefits. Despite the high degree of uncertainty contained in the Revised Application, the EAO inappropriately determines the effects of the ECRP to be "not significant" and concludes the project will make a net-positive contribution to sustainability. The proposed draft certificate conditions defer addressing uncertainties about the ECRP's environmental impacts to post-approval - and in some cases, post-operational - monitoring and evaluation, which is contrary to the Precautionary Principle on which both provincial and federal Environmental Assessment legislations are built.

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Precious metals mining should be evaluated differently from transition minerals mining

The ECRP will produce primarily gold and silver, neither of which are listed by Canada or BC as minerals needed for the renewable energy transition. The ECRP will increase emissions, thereby hindering BC's and Canada's abilities to meet climate commitments, while producing largely unnecessary commodities for the purposes of luxury consumer goods and investment. The Environmental Assessment (EA) of the ECRP and other precious metals projects in BC fail to acknowledge trade-offs between risks posed to current and future generations from climate change in exchange for producing such non-essential commodities. The relative contribution a proposed mining project makes to the renewable energy transition is an important consideration in terms of benefits provided and the need for the project, and should be evaluated by BC and Canada decision-makers through the implementation of product-specific assessments. A regulation or policy should be incorporated into the EA process that weighs the benefits and risks of mining for transition minerals vs. non-transition minerals and that encourages mining project designs that prioritize transition mineral extraction over other products.

Economic benefits often do not materialize and should be tracked

Throughout the draft Assessment Report, the EAO weighs the anticipated economic benefits of the ECRP, including employment, business opportunities, and tax revenue, against the likely permanent and irreversible project impacts to water, fish, and other aquatic resources. In particular, economic benefits are foundational to the EAO's interpretation of the ECRP's net-positive contribution to sustainability (draft Assessment Report section 24.8). However, economic benefits from mines often do not materialize to the extent they are promised during Environmental Assessments (Collard et al. 2023). This uncertainty related to economic benefits is not acknowledged or evaluated in the Revised Application or the draft Assessment Report, and should be. Additionally, conditions for monitoring economic impacts and comparing them to what was initially promised should be applied to the ECRP and all other mine projects in BC.

The Revised EA Application and draft Assessment Report overlook potential vulnerabilities due to pre-existing elevated baseline metal concentrations

Baseline data collection indicates that the receiving environment of the ECRP is already elevated in certain parameters. The Revised Application proposes the release of contaminated mine water, elevated in heavy metals and selenium, into the receiving environment and largely relies on dilution by Ketchum Creek and the larger Unuk River to mitigate the effects of these inputs. Notwithstanding that dilution is not an acceptable solution to pollution and should only be relied on as a last resort, the ECRP's discharge management strategy also relies on an implicit argument that elevated baseline concentrations mean the ecosystem has a pre-existing resilience to metal loads. However, scientific and regulatory literature recognizes that

watersheds with high baseline concentrations generally have *reduced* capacity to accommodate additional contaminant loadings without risk of ecological impacts (Chapra & Reckhow 1983; CCME 2003). In such systems, even small project-related inputs could result in long-term adverse effects *despite* compliance with Water Quality Guidelines (WQG); therefore, these already-stressed ecosystems with limited assimilative capacity should be subject to *more* stringent controls on new, human-caused pollution, not less. Adding another long-term, irreversible source of pollution from the project, even if diluted, will further compromise the ecological integrity of the Unuk, a critical transboundary salmon river. The Revised Application does not explicitly acknowledge this reduced capacity to assimilate contamination or apply a precautionary principle to assure ecological protection. Instead, it tends to minimize risk, dismissing cumulative and residual effects as negligible despite elevated baseline levels of contaminants. The Application predicts high-magnitude, irreversible water quality degradation in Tom MacKay Creek, and moderate to high magnitude residual effects in Eskay Creek, indicating that the proposed mitigation and treatment plans are insufficient to protect the aquatic environment.

Risks from metal mixture inputs remain unaddressed

The ECRP is predicted to increase inputs of a combination of heavy metals and other contaminants, some of which may act synergistically to increase impacts to the aquatic ecosystem beyond what would be expected from each contaminant individually. The Revised Application evaluates potential effects of the contaminant mixtures qualitatively, rather than through a formal calculation. Because this method relies on professional judgement instead of adding up toxic units or modelling interactions, it does not fully capture the possibility that contaminants could act together in combinative or synergistic ways. From a conservation standpoint, this reduces confidence that mixture risks have been thoroughly addressed.

The Revised EA Application & draft Assessment Report present an unacceptable level of uncertainty related to impacts to resident and migratory fish

The Revised Application lacks sufficient baseline data on resident and migratory fish presence and use in the lower 200 m of Ketchum Creek. Without this information, understanding the impacts of reduced water flows, increased water temperatures, elevated heavy metals, and bioaccumulation of selenium, all of which are predicted to occur in the Tom Mackay Creek, Ketchum Creek, and Unuk River drainage, is limited. For example, reduced flows in Ketchum Creek could reduce habitat availability for resident fish and anadromous salmon, which may be further compounded by water temperature warming due to project effects and/or climate change; however, due to the current lack of understanding of fish use in the lower 200 m of Ketchum Creek, potential impacts are difficult to predict. The DFO has mandated additional hydrometric monitoring and multi-year fish use studies for coho and chinook in lower Ketchum Creek, reinforcing that this data gap in the Revised Application is real and significant. The DFO

also instructed the proponent to adopt a precautionary stance that assumes salmon and Dolly Varden use the 200 m reach in lower Ketchum Creek until proven otherwise. The Revised Application and draft Assessment Report may require re-evaluation, assuming resident and migratory fish use in lower Ketchum Creek.

The Revised Application also lacks a site-specific trophic transfer model for selenium (Se) bioaccumulation, without which the proponent acknowledges impacts of increased Se inputs from the mine may be *underpredicted*. Selenium is expected to accumulate in benthic invertebrates, which may result in accumulated Se in downstream fish tissues in Ketchum Creek and Unuk River via food web interactions. In the Revised Application, the proponent appropriately identifies resident Dolly Varden (DV) as the most vulnerable to potential Se bioaccumulation and uses DV as an indicator species for assessing potential Se contamination; however, their assessment applies the least protective species-specific threshold available as a benchmark for identifying effects. This approach may further underestimate potential Se bioaccumulation effects by overlooking effects on sensitive life stages of DV, particularly eggs and juveniles, which may not tolerate elevated Se to the same extent as adults. By selecting the most lenient threshold as the operative benchmark, the proponent's assessment shifts risk characterization from 'potential concern' under provincial or federal guidance to 'acceptable' with the elevated threshold. This approach reduces conservatism and leaves even less margin for error, given the uncertainties already stemming from the lack of a site-specific bioaccumulation model. Effects of Se bioaccumulation are predicted to be moderate and long-term, even with the current, *potentially underpredicted*, models. We note also that though the Revised Application states transboundary effects are not anticipated, if elevated Se concentrations are translated into fish tissue, they may affect fish species with larger home ranges and/or species that migrate to the ocean and back. Overall, we find that long-term risks with respect to Se bioaccumulation in the mainstem Unuk River are not adequately addressed, and long-term uncertainties related to selenium build-up in resident fish downstream of the mine are downplayed in both the Revised Application and the draft Assessment Report.

Conclusions about cumulative effects are misleading

The Revised Application identifies Se to be carried forward for cumulative effects assessment, and concludes effects will not be significant because modelled Se concentrations are below the BC Water Quality Guideline (WQG) in the Unuk River. This conclusion is misleading because it assumes WQGs are fully protective, when in fact the primary risk pathway for selenium is not through water, but by trophic transfer through bioaccumulation, which can result in reproductive toxicity at concentrations well below WQGs (Lemly 2002; Presser and Luoma 2010). The Revised Application does not evaluate the potential for fish-mediated transport of Se into the Unuk River, thereby overlooking a key pathway by which cumulative effects in the form of Se toxicity may arise.

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The Revised Application also provides only high-level quantification of cumulative effects from aquatic habitat loss and does not address how multiple projects in the watershed may interact to compound flow alterations across tributaries, which may be a concern for resident or rearing fish populations.

The draft Assessment Report fails to highlight these shortcomings in the proponent's assessment of the ECRP's potential cumulative effects.

Risks related to the proposed water treatment plans have not been fully considered

The Revised Application's long-term plan for active water treatment following mine closure introduces significant technical and operational risks that are not fully considered and that present a substantial risk to the ECRP's overall viability and effective environmental protection. First, proposed water treatment plans are insufficient to prevent exceedances of WQGs in the receiving environment; of particular concern is selenium, which is expected to bioaccumulate in the food web. Second, the proposed perpetual active water treatment technology may be effective in the near term, but is inherently vulnerable to operational interruptions, supply chain limitations, the site's remoteness, energy requirements, and long-term organizational responsibility and commitment. Over the long term, the risk of relying on active treatment equates to the potential for ongoing ecological harm. Long-term uncertainties related to perpetual active water treatment are downplayed both in the Revised Application and in the EAO's draft Assessment Report. The EAO does not propose any certificate conditions to address this long-term vulnerability or present contingency strategies for water treatment in perpetuity.

Data gaps and uncertainties must be addressed <u>prior</u> to approval

Given the high levels of uncertainty associated with the Revised Application's predictions of residual and cumulative effects and the viability of key mitigations (i.e., perpetual active water treatment), it is unreasonable for the EAO in its draft Assessment Report to conclude adverse effects of the ECRP will be "not significant" to water resources or fish and fish habitat. Instead of resolving current uncertainties prior to approval and establishing a project design that addresses potential impacts upfront, the proponent's strategy, supported by the EAO's draft certificate conditions, is to defer these issues to post-approval - and in some cases, post-operation - monitoring, validation reports, and adaptive management plans. In doing so, the EAO is effectively accepting the risk of significant environmental effects, allowing the project to begin construction and operations while attempting to manage significant effects later. This is contrary to the Precautionary Principle on which both provincial and federal Environmental Assessment legislations are built. Overall, the Application proceeds with a high degree of uncertainty, predicting significant residual effects and relying on future management to address data gaps

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that we argue should be filled now and inform a project design that addresses these impacts *before* any approval is granted.

We thank you for reviewing this submission and we look forward to an improved Environmental Assessment of the ECRP.

Sincerely,

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September 21, 2025

Re: Review of Skeena Resources Ltd. Revised Application for Environmental Assessment Certificate (EAC) for Eskay Creek Revitalization Project

On behalf of SkeenaWild Conservation Trust (SWCT), this document evaluates Chapter 15: Surface Water Effects Assessment, and Chapter 16: Fish and Fish Habitat Effects Assessment of Skeena Resources Ltd.'s ('the proponent') application for an Environmental Assessment Certificate (EAC) for the proposed Eskay Creek Revitalization Project ('ECRP' or 'the project') (Skeena Resources Ltd., 2025). SWCT submitted technical comments on the proponent's original EA application in the fall of 2024, focusing primarily on potential impacts to water quality and fish and fish habitat. The proponent submitted a revised EA application in April 2025 (Skeena Resources Ltd., 2025), which was accepted by the BC Environmental Assessment Office (EAO) in May 2025. The EAO recently (August 2025) released a Draft Assessment Report, and Environmental Assessment Certificate (EAC) with proposed conditions for the project to proceed. This review focuses on whether SWCT's comments have been adequately addressed in the revised chapters and associated regulatory documents and draft approval(s).

Executive Summary

SkeenaWild Conservation Trust (SWCT) highlighted critical gaps and weaknesses in the proponent's original EA application and key concerns remain unresolved following recent document revisions. Chapter 15 predicts substantial, long-term impacts on local water bodies, forecasting significant residual effects on both water quantity and quality, even after mitigation measures are applied. Tom Mackay Creek is most affected in this regard; this tributary receives the highest concentration of pollutants, is subject to the greatest flow alterations and is the primary conduit that transfers these impacts downstream into Ketchum Creek and the mainstem Unuk River. The assessment models show that local creeks will carry concentrations of contaminants like copper, zinc, and selenium exceeding provincial and federal water quality guidelines (collectively 'WQGs'). This includes lower Ketchum Creek, the only potential fish-bearing tributary impacted; however, baseline information for this site is currently insufficient to characterize fish use or predict potential impacts to resident fish or anadromous salmon.

The proponent's strategy for managing contaminant levels hinges on the principle of dilution from Ketchum Creek and the much larger Unuk River. The sheer volume of the Unuk River is expected to dilute contaminated inputs to a point where, for most parameters, they fall below regulatory thresholds by the time the water reaches the Canada-US. border. This approach is rationalized by the argument that the Unuk River system has high baseline levels of certain metals due to regional geology and legacy contamination. The implicit argument is that the ecosystem has a degree of pre-existing resilience to

elevated metals, and the project's additional load, once diluted, will not represent a significant departure from this stressed baseline.

Selenium (Se) is identified by Skeena Resources as the only contaminant carried forward into the cumulative effects assessment for the Unuk River. The revised EA application concludes this cumulative effect is '*not significant*' because modelled concentrations in the Unuk mainstem, including at the Canada–US border, remain below the BC WQG. This conclusion is misleading in two ways. First, it overlooks tributary hotspots such as Tom MacKay Creek, where selenium is predicted to exceed the WQGs frequently and persistently well beyond end of life for the mine. Second, it assumes that WQGs are fully protective, when in fact the primary risk pathway for selenium is not through water, but by trophic transfer through bioaccumulation.

As articulated in the public engagement comments on the original application, the proponent's approach that '*the solution to pollution is dilution*' represents a fundamental flaw in their mitigation strategy. Using a river's assimilative capacity is not a form of treatment or a valid solution, but rather a way to disperse contaminants over a wider geographic area, potentially impacting the entire downstream food web and creating long-term bioaccumulation. Furthermore, the argument that high baseline levels justify additional inputs is backwards; from this viewpoint, an already-stressed ecosystem with limited assimilative capacity should be subject to more stringent controls on new, human-caused pollution, not less. The Unuk River is already burdened by legacy contaminants and cumulative pressures from other regional mines. Adding another long-term, irreversible source of pollution from the project, even if diluted, further compromises the ecological integrity of this critical transboundary salmon river. In addition, although regulatory guidelines provide the benchmark by which potential impacts are assessed, they may not be fully protective of aquatic ecosystems.

Finally, the proponent's long-term plan for active water treatment following mine closure introduces significant technical and operational risks that are not fully considered. Despite these shortcomings, a Draft Environmental Assessment Certificate has been issued for the project by the EAO, with conditions for future monitoring and mitigation. The EAO frames its decision around legal thresholds and concludes that the project is '*not likely to cause significant adverse effects'* if conditions are followed.

Review of Revised Application

This review focuses specifically on topics of concern raised by SWCT during the initial application review, which *remain unresolved or inadequately addressed in the revised application*. These include:

1. Synergistic and Cumulative Effects of Multiple Stressors on Aquatic Life
2. Selenium Bioaccumulation and Modeling Uncertainty
3. Insufficient Baseline Data Collection
4. Water Quality, Elevated Baseline Levels and Treatment

For each topic, the following sections outline: (i) SWCT's original concern (ii) how the concern is addressed in the revised application and/or EAC conditions, and, (iii) a summary statement concluding why the concern remains unresolved.

1. SWCT Concern: Synergistic and Cumulative Effects of Multiple Stressors on Aquatic Life

SWCT noted that the original application does not adequately assess the combined (synergistic) effects of multiple stressors (e.g., various metals, altered flow, temperature changes) on aquatic life. They also note that the results of the EA have clearly shown a cumulative effect to water quality and uncertainty associated with that effect on fish and aquatic resources. SWCT contends that the proponent should be required to improve upon water treatment procedures to reduce contaminated outputs, until more clarity on effects to fish and aquatic resources is provided.

Reviewer's Comments

In terms of addressing synergistic effects, the proponent evaluates contaminant mixtures qualitatively rather than through a formal calculation. This approach assigned a 'low' rating if each individual contaminant is negligible or low, and a 'moderate' rating if several contaminants are elevated at the same time. A 'high' rating was not used. Because this method relies on professional judgement instead of adding up toxic units or modelling interactions, it does not fully capture the possibility that contaminants could act together in additive or synergistic ways. From a conservation standpoint, this reduces confidence that mixture risks have been thoroughly addressed.

In addressing cumulative effects, Chapter 16 carries forward two cumulative effects:

1. Selenium (Se) bioaccumulation.
2. Aquatic habitat loss due to flow changes.

For Se, cumulative water concentrations are predicted to remain below the 2 µg/L BC guideline for aquatic life at the Canada-US border. The conclusion is that no transboundary water-quality effects occur. However, fish-mediated transport of Se across the border is not evaluated. With respect to Se bioaccumulation, the absence of a site-specific trophic transfer model is acknowledged as a key uncertainty in the assessment. Skeena Resources characterizes confidence in water quality predictions as 'medium' because they rely on professional judgement and have not been validated for this site. To address this, Skeena Resources commits to:

- Developing a site-specific selenium trophic transfer model early in operations.
- Updating the *Aquatic Effects Monitoring Program* (AEMP) to include selenium, with fish tissue as the primary endpoint consistent with provincial guidance.
- Expanding monitoring to tributaries such as Tom MacKay Creek and upper Ketchum Creek, where elevated invertebrate exposures are predicted; however, details of the monitoring program are not provided.

The chapter acknowledges aquatic habitat loss as a cumulative effect but provides only high-level quantification and proposes mitigation largely through habitat offsetting and monitoring. It does not explicitly address how multiple projects in the watershed may interact to compound flow alterations across tributaries, which may be a concern for resident or rearing fish populations.

Related EAC Conditions

Contaminant Mixtures:

- No EAC condition requires quantitative mixture toxicity assessment. Monitoring plans (water, fish, human health) may provide data, but the gap identified in the review (qualitative-only treatment of mixtures) remains.

- An *Aquatic Effects Monitoring Plan* (AEMP) is required to track project effects on aquatic resources and report deviations from EA predictions.

Cumulative Effects

- A specific *Regional Cumulative Effects Initiatives* condition obligates participation in cumulative health, traffic, and marine shipping assessments. It is expected that Se bioaccumulation and flow-related aquatic effects will be considered, which responds partially to concerns about narrow cumulative effects analysis in the EA.

Summary

SWCT noted that the original application fails to adequately assess the combined (synergistic) effects of multiple stressors and cumulative effects. The proponent directly states that a quantitative assessment of these complex interactions is "*beyond the scope of the current environmental assessment requirements*" and limited by current scientific understanding. This dismisses a core concern rather than addressing it; however, Skeena Resources can reasonably argue that site-specific modelling of synergistic or combined effects of contaminants is not technically feasible with current tools. Moreover, unless specifically directed to do so by regulators, it is unlikely that this issue will be addressed. Cumulative effects are addressed through requirements for future monitoring and evaluation, rather than via changes to operations or outputs from the project.

2. SWCT Concern: Selenium Bioaccumulation and Modeling Uncertainty

There are significant uncertainties in the models used to predict selenium bioaccumulation in fish. SWCT argues that the models may underpredict future concentrations, use an inappropriate indicator species (Dolly Varden instead of the more sensitive coho salmon), and that these issues must be resolved before project approval.

Reviewer Comments

Selenium (Se) is the only cumulative effect on water quality carried forward by Skeena Resources. The revised assessment concludes that predicted concentrations in the Unuk River remain below WQGs and are therefore not significant. This conclusion does not reflect current scientific understanding. The primary risk pathway for Se is through bioaccumulation in fish tissue, which can result in reproductive toxicity at concentrations well below WQGs (Lemly 2002; Presser and Luoma 2010). Selenium is most problematic in resident fish, during egg and larval development because maternal transfer of Se into eggs can cause reproductive failure (spinal deformities, edema, reduced survival). Toxicity is strongly influenced by dietary exposure, particularly through invertebrates, rather than just water concentrations. Risk is therefore a function of: (i) how long fish are exposed before spawning, and (ii) how much Se accumulates in their tissues for transfer to eggs. Even if the water itself is within approved limits, Se can build up in periphyton, then invertebrates and finally fish, causing impacts to offspring.

For anadromous species, like coho salmon (*Oncorhynchus kisutch*), the risk from elevated Se in water is lower than for resident Dolly Varden (*Salvelinus malma*) (DV). Adult coho returning from the ocean carry relatively low Se body burdens from marine diets; therefore, maternal transfer of Se to eggs is limited. If coho did spawn in the lower reach of Ketchum Creek (TBD), their eggs will incubate in local substrate, but Se transfer to eggs would likely be low due to low residence time of eggs and juvenile salmon and low potential for maternal transfer. Although coho fry and parr rear in freshwater for one to two years, this exposure period is relatively short compared to the lifetime residency of DV, and tissue accumulation in coho is unlikely to reach levels of concern within that timeframe. On this basis, DV remain the proper indicator species for assessing Se contamination.

Between 2020 and 2023, a total of 49 DV tissue samples were collected from the Unuk River system. Of these, two samples exceeded the BC Ministry of Environment's interim guideline of 4 mg/kg dry weight (dwt) for Se, and all were well below the species-specific threshold of 44 mg/kg dwt proposed by Skeena Resources (McDonald et al., 2010). The US Environmental Protection Agency (US EPA) (2021) has established tissue-based criteria of 8.5 mg/kg dwt for whole-body and 11.3 mg/kg dwt for muscle in DV. Skeena Resources discusses a range of available thresholds and chose the 44 mg/kg dwt Dolly Varden-specific value as the benchmark for assessment, indicating it as '*the most realistic basis'* for evaluating risk to this species. From a conservation standpoint, the application of the least protective threshold for DV raises concern. This approach may also underestimate potential effects on sensitive life stages of DV, particularly eggs and juveniles, which may not tolerate elevated Se to the same extent as adults. By selecting the most lenient threshold as the operative benchmark, the assessment shifts risk characterization from 'potential concern' under provincial or federal guidance to 'acceptable' with the elevated threshold. This approach reduces conservatism and leaves less margin for error given the uncertainties in modelling.

Currently, most fish sampled have tissue Se levels below regulatory thresholds, and models suggest this will continue. However, there are important uncertainties. Skeena Resources has not yet developed a site-specific model for how Se moves through the food web, so predictions for fish tissue are preliminary. While no fish are documented in Tom MacKay Creek or upper Ketchum Creek, predicted accumulation in invertebrates creates a potential pathway for downstream transfer of selenium into fish populations in the lower Ketchum Creek and Unuk system, which may have implications for resident DV populations. Although the elevated Se levels in Tom MacKay Creek do not acutely impact fish, elevated Se at the base of the food web could translate to elevated Se in downstream fish tissues over time. While Skeena Resources proposes to monitor and improve its models, it also relies on a higher safety limit for fish tissue concentrations than regulators typically accept. Due to dilution, inputs to the Unuk River appear low risk, but there are gaps in knowledge and areas of higher concern that should be monitored and verified.

Related EAC Conditions

- A *Fish Tissue Baseline Report* must be completed, including additional samples from the Unuk River and analysis of selenium and arsenic in tissues. If executed well, this may address gaps with respect to insufficient baseline fish tissue data and bioaccumulation pathways.

- The *Human Health Management and Monitoring Plan* also requires fish tissue monitoring coordinated with the *Aquatic Effects Monitoring Plan* (AEMP), reinforcing this gap coverage.

Summary

Although DV are the proper indicator species for monitoring Se accumulation in fish tissue, significant uncertainties remain in the models used to predict Se bioaccumulation. The EA itself acknowledges this

uncertainty and proposes to develop a more accurate site-specific model as a future action. While the proponent defends their methodology, the decision to defer a more robust analysis to a post-approval phase fails to address SWCT's call for up-front certainty. The EA predicts moderate, long-term residual effects from bioaccumulation even with the current, potentially underestimated, models. The EAO frames its decision around legal thresholds and concludes that the project is '*not likely to cause significant adverse effects'* if conditions are followed.

3. SWCT Concern: Insufficient Baseline Data Collection

SWCT argues that the proponent's assessment is based on insufficient baseline data, particularly regarding fish population and habitat characterization in lower Ketchum Creek, spawning surveys, and the limited duration of water quality monitoring.

Reviewer's Comments

Chapter 15 is founded on baseline monitoring data extending back to 1990; however, much of this information is historic and not specific to current project conditions. The more recent site-specific monitoring program, initiated in 2023, provides a limited dataset for key tributaries within the project area, such as Eskay, Coulter, and Harrymel Creeks. As a result, the minimum two years of monthly data required for baseline characterization have not been met at several locations, leaving gaps in terms of characterizing seasonal variability. The lack of a complete two-year baseline dataset also leaves some uncertainty with respect to how accurately the model reflects site conditions. Despite this, Skeena Resources concludes that the dataset is adequate relative to the *No Project Case*. The modelling incorporates background concentrations, loadings from mine contact water, and projected treatment performance. Results are expressed in terms of both acute and chronic hazard quotients (HQs)[1] against provincial and federal WQGs (CCME 2007, CCME 2003). Results show acute HQs are below 1 ('safe') across mainstem (Unuk River) sites, suggesting low short-term risk, while chronic HQs predict seasonal exceedances of selenium, zinc, and arsenic in the largely non-fish bearing tributary streams. Despite the absence of fish in local tributary streams, long term risks with respect to Se bioaccumulation in the mainstem Unuk River are not adequately addressed.

With respect to water quality, temperature and flow considerations, Tom MacKay Creek will experience the most dramatic changes. The assessment predicts a 'high magnitude' effect on its streamflow, with reductions of *up to* 54% compared to the baseline during critical winter low-flow months. Despite the lack of fish in Tom MacKay Creek, this dewatering, driven by the project's water management strategy for the Tom MacKay Storage Facility (TMSF), fundamentally alters physical habitat and ecological function of this creek and potentially affects downstream receiving areas (Ketchum Creek). Reduced flows in Ketchum Creek could reduce habitat availability for resident fish and anadromous salmon; however, due to current lack of understanding of fish use in the lower 200 m of Ketchum Creek, potential impacts are difficult to predict.

Both Chapter 15 and 16 acknowledge water temperature, but neither carries it forward as a project effect due to dilution and/or the predicted magnitude of change relative to baseline conditions. Chapter 15 notes that water discharged from the TMSF or the North Pit could be thermally altered relative to natural conditions; however, the proponent concludes that mitigation measures will prevent measurable impacts, and therefore temperature is not modelled further. Chapter 16 refers to temperature only under climate

[1] A hazard quotient (HQ) is the ratio of the predicted or measured concentration of a contaminant in water to the relevant water quality guideline, where values above 1 indicate a potential for adverse effects.

change future trends, recognizing that warmer streams can stress cold-water fish by reducing oxygen and shifting food-web structure. In response to SWCT's concerns re: temperature, the proponent noted:

> *"In a paper by Mackie et al. (1983), it was found that changes in discharge levels had little impact on thermal regimes downstream of reservoirs similar to the Tom MacKay Storage Facility (TMSF). Temperature effects are unlikely to persist to the bottom of Ketchum Creek, which is over 5 kilometres downstream of the discharge point."*

This conclusion seems reasonable; however, habitat in tributary streams may be sensitive to incremental warming due to low summer flows. While operational mitigations, distance and local dilution may reduce the risk of direct discharge warming, changes in hydrology could exacerbate effects on temperature. Considering the ecological importance of temperature in sustaining cold-water salmonid populations, this pathway may warrant closer attention than is reflected in the revised assessment, pending updated information on fish use in lower Ketchum Creek.

Related EAC Conditions

- A *Water Quality and Quantity Model Validation Report* is required within 2 years of construction. This condition ensures baseline monitoring is validated and compared with EA predictions, with triggers for remodelling and updates to management plans.

- An *Aquatic Effects Monitoring Plan* (AEMP) is required, developed with Tahltan and ENV input, to track project effects on aquatic resources and to report deviations from EA predictions.

Summary

SWCT's concerns related to insufficient baseline data collection are acknowledged but not adequately addressed in the revised EA application. These data gaps will be partially addressed via regulatory requirements and EAC conditions, through the development of an AEMP and requirement for a Fisheries Act Authorization (FAA) for lower Ketchum Creek. The proponent acknowledges the data gap but cites difficulty accessing the area. Fisheries and Oceans' (DFO) review (July 2025 letter) calls for more robust data, recommending the establishment of a hydrometric station and requiring multi-year (3-5) fish use assessments to determine salmonid and char presence in Ketchum Creek before issuing an authorization. This letter validates SWCT's concern and indicates significant further work is required.

DFO requires the FAA for proposed flow reduction(s), requesting new hydrometric monitoring, updated flow predictions, and application of BC's Environmental Flow Needs Risk Assessment Framework. This requirement responds to concerns with respect to assessing habitat alteration and loss. The letter also mandates multi-year fish use studies for coho and chinook and adopts a precautionary stance that assumes salmon and char (DV) use the 200 m reach in lower Ketchum Creek until proven otherwise.

4. SWCT Concern: Water Quality, Elevated Background Levels and Treatment

SWCT notes that the proponent's original EA appears to use naturally elevated background levels of metals not as a reason for caution, but as a justification for allowing further project inputs into an already stressed environment. Furthermore, the proposed water treatment plans are insufficient to prevent exceedances of WQGs, in particular, for selenium, which bioaccumulates in the food web.

Reviewer's Comments

Scientific and regulatory literature recognizes that watersheds with high baseline concentrations generally have reduced capacity to accommodate additional contaminant loadings without risk of ecological impacts (Chapra & Reckhow 1983; CCME 2003). In such systems, even small project-related inputs could result in long term adverse effects despite compliance with WQGs. Skeena Resources' assessment does not explicitly acknowledge this reduced capacity to assimilate contamination or apply a precautionary principle to assure ecological protection. Skeena Resources repeatedly frames WQGs as both conservative and sufficient for protection; however, the BC Environmental Assessment Office (BCEAO) and CCME both recognize that WQGs are generic values that may not be protective under specific site conditions. While the analysis appropriately evaluates compliance with regulatory criteria, it does not fully incorporate ecological risk pathways such as trophic transfer and bioaccumulation, particularly for selenium, which biomagnifies in aquatic food webs and can impact fish.

Tom MacKay Creek is the direct receiving environment for mine effluent and the first point of contact for the most concentrated pollution load, before flows continue downstream via Ketchum Creek to the Unuk River system. The assessment identifies that concentrations of several metals, including copper, nickel, zinc, cadmium, thallium, and selenium, are predicted to exceed provincial WQGs in Tom MacKay Creek. These effects are assessed as moderate in magnitude, local in extent, irreversible, and persisting into the far-future, meaning aquatic habitat in this reach will continue to experience WQG exceedances long after project closure.

The proposed long-term plan for active water treatment introduces significant technical and operational risks that are not fully considered. The Mine Water Treatment Plant (MWTP)[2] is presented as the primary mitigation measure for contact water management, including discharges from the TMSF, the North Pit, and the Main Rock Storage Area (MRSA) collection pond. Chapter 15 and 16 assert that MWTP performance is reliable long-term, and the proponent indicates that the MWTP will operate '*as long as necessary to meet applicable quality targets*.' In practice, this means indefinite operation of active treatment systems. Active water treatment using chemical precipitation and sludge management may be effective in the near-term, but is inherently vulnerable to operational interruptions, supply chain limitations, the site's remoteness, energy requirements, and long-term organizational responsibility and commitment. Over the long term, the risk of relying on active treatment equates to potential for ongoing ecological harm. Neither the EAC application or certificate conditions address this long-term vulnerability or present contingency strategies for water treatment in perpetuity.

Related EAC Conditions

- A *Water Quality and Quantity Model Validation Report* is required within 2 years of construction. This condition ensures baseline monitoring is validated and compared with EA predictions, with triggers for remodelling and updates to management plans.

[2] The MWTP design includes metal precipitation and oxidation via lime or caustic neutralization with coagulant and flocculant addition, with targeted oxidation for arsenic and other metals. Solid–liquid separation using Geotube dewatering during early operations, transitioning to clarification and filtration characteristic of an enhanced high-density sludge (EHDS) system. Sludge handling, including return of approximately 5% of water associated with sludge to the TMSF.

- An *Aquatic Effects Monitoring Plan* (AEMP) is required, developed with Tahltan and ENV input, to track project effects on aquatic resources and to report deviations from EA predictions. This responds to concerns about lack of adaptive monitoring and underestimation of Se risks.

Summary

SWCT raises a valid concern with respect to naturally elevated background levels of contaminants, existing and future sources of contaminants, additional loading of contaminants from the project, and water treatment. The proponent denies using background levels to justify inputs; however, the EA's own models in Chapter 15 predict high-magnitude, irreversible water quality degradation in Tom MacKay Creek, and moderate to high magnitude residual effects in Eskay Creek, which supports SWCT's argument that the proposed mitigation and treatment plans are insufficient to protect the aquatic environment. The proposed solution is to rely on post-approval adaptive management plans rather than a project design that addresses these impacts upfront. In their Draft Assessment Report (August 2025) the EAO states that "*with extensive mitigation measures and conditions, the (project) would not cause significant adverse residual or cumulative effects on water resources*."

Conclusion

The proponent's revisions to Chapter 15 and 16 of the EAC application for the project fail to resolve several key issues raised by SWCT, as described above. Concerns expressed during the initial application review can ultimately be drilled down to three (3) main themes that the proponent does not adequately address:

- accurately assessing synergistic and cumulative effects;
- justify adding pollution to a system with high baseline contaminant levels; and,
- accounting for uncertainty with respect to pollutant sources, long-term treatment and the unpredictable effects of a changing climate.

Instead of resolving data gaps and modeling uncertainties prior to approval, the proponent's strategy (supported by the draft EAC conditions) is to defer these issues to post-approval monitoring, validation reports, and adaptive management plans. This approach accepts the risk of significant environmental effects and attempts to manage them later, which is contrary to SWCT's precautionary stance. Concerns about insufficient baseline data are partially validated by DFO, who are requiring extensive further study of lower Ketchum Creek before authorization can be considered.

The Chapter 15 effects assessment leans too heavily on WQGs as proof of safety, while downplaying the long-term uncertainties of active water treatment and selenium build-up in resident fish downstream. Despite its technical detail, it tends to minimize risk, dismissing cumulative and residual effects as negligible despite elevated baseline levels of contaminants. Adaptive management is mentioned, but without clear actions or thresholds. Specifically, the assessment:

- overstates the protective capacity of generic WQGs;
- relies on dilution as the main mitigation pathway;
- underplays uncertainty in selenium bioaccumulation and transboundary fish effects; and,
- frames residual and cumulative effects as negligible despite evidence of persistent WQG exceedances.

The cumulative effects analysis is limited in scope. Although it acknowledges potential interactions with KSM and legacy contamination from mining in the Unuk watershed, climate-driven changes in hydrology and geochemistry are not incorporated. Furthermore, the cumulative assessment focuses exclusively on water chemistry endpoints at the Canada-US border and does not consider that fish and other biota act as transporters of bioaccumulated contaminants. As a result, downstream and transboundary implications remain uncertain. From a conservation perspective, this is a limitation, as impacts that appear minor in isolation may collectively pose risks to the aquatic ecosystem over the long term. The requirement for long term active water treatment at the end of mine life, which could extend indefinitely, raises risks of operational and institutional failures, with implications for long term ecosystem degradation.

In conclusion, while the project's revised application provides a framework for managing environmental risk, it fails to resolve the major deficiencies identified by SWCT. The application proceeds with a high degree of uncertainty, predicting significant residual effects and relying on future management to address data gaps that conservation groups could argue should be filled before any approval is granted.

Closing

I trust this review provides adequate information to meet your requirements. Please do not hesitate to contact me if you have any questions or require further clarification on these points. I appreciate the opportunity to work with you.

Sincerely,

S Blair

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