

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Participant: David Mayhood

Organization (if applicable): FWR Freshwater Research Limited on behalf of Timberwolf Wilderness Society

General Comments:

The proponent's counsel, Osler, Hoskin & Harcourt LLP (Osler), in a 31 January 2019 letter to Tracy Utting of CEAA (file 126671E.pdf), has made the following claims about Timberwolf Wilderness Society (Timberwolf), which we wish to address here.

"...this Society has not previously engaged with Benga regarding the proposed Project. It has not previously expressed any interest in the Project or requested information from Benga, despite the fact the Project has been in the regulatory process for years already" (126671E.pdf, p. 21).

"...we note that the Society is opposed to all development in the region" citing Timberwolf's web page in footnote 28 as evidence (126671E.pdf, p. 23).

Our response: From Timberwolf's articles of incorporation under the Societies Act, the Society's purposes are as follows.

- *To foster, promote and engage in advocacy for the conservation of the natural environment.*
- *To participate in regulatory proceedings, & advance claims, if necessary, to prevent & preempt ecological degradation & to protect endangered species.*

There is nothing in these purposes, or indeed on Timberwolf's web page, that supports Osler's claim that Timberwolf "is opposed to all development in the region." Timberwolf makes representations on development projects based on the merits of each proposal as it affects Timberwolf's purposes listed above, and on the Society's ability to make a useful contribution.

Regarding Osler's objections about Timberwolf's supposed lack of interest in, and concerns about the Grassy Mountain Mine proposal, Timberwolf has a demonstrated active interest and relevant expertise in the Grassy Mountain mine area, and the issues that will arise from the mine, that includes and far pre-dates Benga's application, as follows.

1. I, through my company, FWR Freshwater Research Limited, act on behalf of Timberwolf in the matter of the Grassy Mountain mine proposal.

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

2. I participated in a Benga guided tour of the proposed minesite in September 2015, at which time I engaged in active discussions with Benga's environmental manager and other company representatives about numerous concerns about the mine proposal. Timberwolf has, and continues to review the project documents as they are made available on the CEAA/IAAC website. Timberwolf proposed numerous information requests concerning the proponent's documents in its submission of 19 January 2019.
3. I and my company have a long history of professional interest and experience in the area of the mine, including, among other activities, conducting research on nearly a century of cumulative land-use effects on more than 90 regional watersheds and their fishes, including those of Blairmore and Gold creeks and the Crowsnest River (Sawyer et al. 1997; Sawyer and Mayhood 1998; Mayhood et al. 1998a, 2004).
4. For Timberwolf, Alberta and federal government agencies and others, I have reported extensively on the conservation biology, management, and habitat problems of SARA-listed threatened westslope cutthroat trout (e.g., Mayhood 1991, 1995, 2000, 2007, 2013, 2014, 2017; Cleator et al. 2009; Erdle and Mayhood 2014; Gifford and Mayhood 2014; Mayhood et al. 1998b; Mayhood and Taylor 2011). This is a matter of crucial interest in the Grassy Mountain mine application due to legally-protected designated populations and critical habitat for the species in the Gold and Blairmore creek watersheds that will be damaged or destroyed by the mine.
5. Since 2015, Timberwolf has been instrumental, through demand letters and applications for judicial review, in forcing the Minister of Fisheries to meet his statutory obligations with regard to SARA-listed Alberta westslope cutthroat trout to
 - declare critical habitat,
 - release an action plan summary,
 - release a proposed revised recovery strategy and action plan, and,
 - release a final revised recovery strategy and action plan that at present is delayed indefinitely, contrary to law (in progress).

Again, these actions directly affect legally-protected, SARA-designated populations and critical habitat for the species in the Gold and Blairmore creek watersheds that will be damaged or destroyed by the mine. Some of these issues are raised in the table below.

Our submission on proposed information requests of 19 January 2019 has been found useful by the panel in formulating its own information requests (IR 4.12 129561E.pdf p. 20, IR 5.5 129667E.pdf p. 7, IR 5.29 129667E.pdf p. 43, IR 5.38 129667E.pdf p. 54). The responses to these requests were not sufficient in some cases, so are dealt with in the table below.

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
	Selenium contamination from the Teck coal mines in the Elk River watershed, BC, has spread downstream as far as the Koocanusa Reservoir in Montana. A project is now underway to determine if Se contamination from that source is continuing downstream below Libby Dam into Idaho, and potentially across the ID-BC border back into Canada (Mebane and Schmidt 2019).	Validate the selenium model used for the proposed Grassy Mountain mine against the observed Se data for the Fording, Elk & Kootenay rivers BC, and Koocanusa Reservoir and Kootenai River, Montana & Idaho
<i>file 115611E.pdf, Fig. 6, pp. 95-96</i>	<p><i>Median sulphate concentrations are used in the selenium model to help to predict future Se concentrations (Figure 7, p. 96), so it is critical that it be accurately and precisely measured.</i></p> <ol style="list-style-type: none"> <i>1. Sulphate concentrations in this dataset are extremely variable, leaving large room for error if only one point (e.g., median) is taken to characterize that constituent for any one time period.</i> <i>2. Concentrations of sulphate are given as the maximum, minimum, quartile, 75%ile, and median estimate for each year. Yearly minima and maxima often differ from each other by ~300mg L⁻¹, over a concentration range of 200-800 mg L⁻¹, and over that same range from the median by ±150 L⁻¹, and often much more.</i> <i>3. Duration of exposure is likely to be important to direct toxicity from high sulphate and selenium concentrations, but your analysis does not incorporate a duration of exposure factor that covers durations of many months to one year.</i> <i>4. Average (median) conditions are exceeded half the time. We are concerned with extremes and how they will affect environmental conditions and biota in the receiving environment.</i> 	<p>In the Se model, sulphate reduces predicted Se concentrations. Also, only annual median conditions are reported in the current data.</p> <p>Re-run the selenium model using the minimum predicted sulphate concentrations. Do so for monthly periods, at a minimum. Account for longterm (months) duration of exposure of biota to these contaminants in the impact assessment.</p> <p>In general, follow a similar approach in assessing other contaminants.</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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<i>file 115611E.pdf, p. 89</i>	<p><i>“The LSA water quality model predicts that up to 95% of the influent nitrate and nitrite loading also will be removed from water routed through saturated backfill zones. These applied attenuation factors assume that a carbon source will be added if required to enhance anaerobic reduction and meet the post-treatment concentrations predicted by the water quality model.”</i></p> <p><i>The wording implies that removal of nitrate and nitrite will generally be lower, even with the addition of a carbon source, if required.</i></p>	<p>Please comment: Will the eutrophying effect of nitrate on periphyton & biofilms facilitate more Se incorporation into foodwebs by increasing primary productivity?</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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<p>IR 4.12 129561E.pdf p. 20; response 132601E.pdf p. 96</p> <p><i>This rationale and proposed information request should be read with my comments on IR 5.29, below.</i></p>	<p><i>The response to part (a) of the request included the assertion that the Oldman Reservoir is located outside of the RSA and LSA, and that “[p]redicted exposures and subsequent risk for receptors located beyond the RSA would be lower than those locations assessed within the RSA. It is not necessary to conduct a detailed exposure and risk assessment for more distant receptors, such as the Oldman Reservoir, as receptor locations in closer proximity to the Project have a greater potential for exposure - the absence of a predicted risk at locations with a higher exposure potential is inherently predictive of an absence of risk at locations further away where potential for exposure is less.”</i></p> <p><i>Most of the aquatic habitat in the RSA as presently defined, and the LSA, is flowing water (lotic habitat), not standing water (lentic habitat). As noted in the rationale for this information request, “long-term selenium loading of low water concentrations of selenium entering lentic systems can result in increased bioaccumulation in aquatic food chains” (see also, e.g., Krahn 2014). The reasonable concern is that selenium could bioaccumulate in the lentic Oldman Reservoir (Lemly 2019), having been delivered there from the minesite by the Crowsnest River via Blairmore and Gold creeks and their tributaries. Other routes into the local ecosystem to expanded regional ecosystem could well be via movements of fish, birds, amphibians, reptiles, mammals and flying insects, from whence the contamination can spread throughout the aquatic and terrestrial food web, even beyond the country’s borders, in the case of flying and long-distance migratory animals such as birds and wolves. As experience with the mines on the Elk River system shows, long-distance distribution of selenium contamination into lentic habitats, where it will bioaccumulate, is likely.</i></p> <p><i>As a result of this misunderstanding of the ecology of selenium contamination, this Information Request was not fully answered.</i></p>	<p>Expand the Regional Study Area to include the whole of the Oldman Reservoir, at a minimum. Expand it if necessary, based on the results of the following work.</p> <p>Assess the seasonal baseline selenium concentrations in water, sediment, zooplankton, benthic invertebrates, fish, seasonally resident water birds, frogs, garter snakes, bats, and aquatic or semi-aquatic mammals such as muskrats, beaver, mink, semiaquatic small mammals such as shrews and voles, and otter, from the mine area as far downstream, and including, the Oldman Reservoir. If tissue selenium levels are elevated above pristine conditions already, extend the survey below the Oldman dam, and upstream in the Castle and Oldman rivers above the reservoir, and in the Crowsnest River above its confluence with Blairmore Creek, to better define the extent of existing contamination. Incorporate all results into limits on selenium in the cumulative effects analysis.</p> <p>Evaluate the expected food web dynamics of the settling ponds and endpit lake as sites for selenium bioaccumulation, and the potential for selenium to invade the terrestrial food web from those sources.</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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<p>IR 5.29 129667E.pdf p. 43; answer 132600E.pdf pp. 144-148 This rationale and proposed information request should be read with my comments on IR 4.12, above</p>	<p><i>The Crowsnest Valley above the Oldman Reservoir has been subjected to more than 100 years of extensive coal mining, over that time resulting in increasingly large amounts of untreated mine waste stored on the surface of the watershed, often immediately adjacent to the river and its tributaries. The opportunity for bioaccumulation of selenium in lentic areas along the river, and in the Oldman Reservoir (built in the early 1990s) is significant and increasing, especially if the Grassy Mountain mine is built. Any current bioaccumulation of selenium must be taken into account in assessing and limiting cumulative effects. The general response (p, 147) and specific responses to the various points in IR 5.29 have not considered this history of contamination risk, so have not adequately accounted for the potential for existing, widespread bioaccumulation in aquatic and terrestrial food webs associated with the reservoir.</i></p>	<p>As suggested above</p> <p>Expand the Regional Study Area to include the whole of the Oldman Reservoir, at a minimum. Expand it if necessary, based on the results of the following work.</p> <p>Assess the seasonal baseline selenium concentrations in water, sediment, zooplankton, benthic invertebrates, fish, seasonally resident water birds, frogs, garter snakes, bats, and aquatic or semi-aquatic mammals such as muskrats, beaver, mink, semiaquatic small mammals such as shrews and voles, and otter, from the mine area as far downstream, and including, the Oldman Reservoir. If tissue selenium levels are elevated above pristine conditions already, extend the survey below the Oldman dam, and upstream in the Castle and Oldman rivers above the reservoir, and in the Crowsnest River above its confluence with Blairmore Creek, to better define the extent of existing contamination. Incorporate all results into limits on selenium in the cumulative effects analysis.</p> <p>Evaluate the expected food web dynamics of the settling ponds and endpoint lake as sites for selenium bioaccumulation, and the potential for selenium to invade the terrestrial food web from those sources.</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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<p>IR 5.5 129667E.pdf p. 7; answer 132600E.pdf p. 21</p>	<p><i>My apologies if I'm missing something here, but I have been unable to verify some of the claims in this response; hence this request.</i></p> <p>Re: saturated backfill zones and selenium removal from seepage water and runoff: <i>"...this approach has been implemented and is providing excellent results at the Teck Elk Valley facility where an SBZ has been in operation since 2017" (132600E.pdf p. 30). No supporting evidence is cited. Most non-peer-reviewed papers on the Teck mine situation provided in appendices do not indicate when the research was done. The Elk Valley Water Quality Plan 2019 Implementation Plan Adjustment - Summary does not support the claim. We know that previous removal methods there have been inadequate.</i></p> <p><i>"An overview of the types of selenium mitigation and R&D Benga have conducted, have initiated, and are committed to develop is provided in subsequent sections" is included in the response. This is welcome, but does not provide a credible description of how selenium actually will be successfully removed successfully from runoff and seepage water.</i></p>	<p>Provide documentary evidence in the form of technical reports, publications and data to support the claim that the Teck Elk Valley facility "is providing excellent results... since 2017" in removing selenium from contaminated runoff and seepage water at the scale required by this project. Subject this evidence to expert peer review. Submit the evidence together with the review comments to the panel and interested parties for their consideration.</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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<p><i>Continued – IR 5.5 129667E.pdf p. 7; answer 132600E.pdf p. 21</i></p>	<p><i>The proponent proposes to begin construction and operation over several years while undertaking the research into how it will remove selenium from the contaminated runoff and seepage water. “In the event that short term results from the SBZ do not meet the required regulatory standards for selenium or nitrate removal, provision will be made for redirecting any off-spec water to the raw water pond and from there to recirculate through the SBZ. This will allow some time for Benga to make the necessary adjustments to the SBZ operation to achieve acceptable results.”</i></p> <p><i>I would add: if it is possible at all. It has been argued that no consistently satisfactory method of selenium removal has been developed for the scale required by this proposed mine (Lemly 2019). Considering this, and the severe consequences of failure (Krahn 2014; Lemly 2014, 2019; Mebane and Schmidt 2019), it would be unsupportable to approve mine construction and operation before an effective method of selenium removal has been developed.</i></p>	<p>If the above evidence generated by the previous IR panel supports the claim of “excellent results,” and prior to going to a hearing, design and carry out an on-site field experiment of sufficient quality and scale to test that the proposed water treatment design will work. Alternatively, the field experiment approach described in this response might be suitable provided that mine approval is conditional upon Benga finding a suitable Se removal method within an appropriate time (5 years?). Submit annual results for peer review, make any changes in response to the reviewers, then submit the revised study document(s) and data, including the review comments and a statement of how you dealt with them, for evaluation by the panel and interested parties.</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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<p><i>Project Description, file 115590E.pdf, Figures C.1.2-1, C.1.3-1 to C.1.3-26.</i></p>	<p><i>Additional SARA-listed westslope cutthroat trout critical habitat has been identified and proposed for protection (DFO 2019). It now includes the mainstem of Gold Creek upstream from the dam at or near 49.60769047680N 114.39372759600W to the watershed boundary, including all tributary watercourses and a riparian zone 30m wide on either side of each watercourse (DFO 2019, Figure 9, also pdf pp. 24, 43, 64). The threshold (limit) specified in law (SARA section 58) to protect critical habitat is 0 destruction of any part of critical habitat. The mine plan shows that some Gold Creek tributary critical habitat in the mine area will be destroyed (e.g., Project Description, file 115590E.pdf, Figures C.1.2-1, C.1.3-1 to C.1.3-26).</i></p> <p><i>Additionally, because part of their critical habitat will be destroyed, some individual westslope cutthroat trout inevitably will be killed, harmed, harassed or captured, violating SARA s.32(1), and their residence may well be damaged or destroyed, which, if it occurred, would be unlawful under SARA s.33.</i></p> <p><i>Unlawfully, the Minister of Fisheries has indefinitely delayed posting the final recovery strategy-action plan for this species. Timberwolf is currently acting to force the Minister to meet his statutory obligation under SARA.</i></p>	<p>Revise the mine plan to avoid destroying any part of westslope cutthroat trout proposed critical habitat.</p>
<p><i>Please use as many pages as necessary.</i></p>		

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

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