

Information Request 20

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IR 20 – Baseline Riparian Characteristics Calculations

References:

EIS, Sections 2.6.1.5 and 2.7.2.5

Related Comments:

CEAR #277 (Fisheries and Ocean Canada)

Rationale:

The EIS calculated the baseline riparian habitat by methods described in the Riparian Management Area Guidebook (MOF, 1995) and Riparian Areas Regulations (RAR, 2004) which estimated riparian habitat at approximately 1.92 M m², most of which (93%) is associated with streams (Table 2.6.1.5-2).

The EIS (p. 290) also states that within British Columbia, there are two pieces of legislation that address riparian buffers: the *Forest and Range Practices Act* (FRPA) and Riparian Areas Regulation (RAR) of the *Fish Protection Act*. Each piece of legislation has a different focus with FRPA governing the activities of forest and range licenses in British Columbia and setting the requirements harvesting, road building and grazing, while the RAR is focused on development near aquatic habitats.

Although the RAR is not routinely applied in the Cariboo Region, the Proponent considered it an appropriate means of determining riparian buffer widths for those reaches that otherwise would have no buffer under FRPA.

Table 2.7.2.5-6 (p. 844) illustrates the widths of the “zone of sensitivity” (ZOS) for large woody debris and bank stability as specified under the RAR of the *Fish Protection Act*, which range from 5 m to 30 m depending on the channel type and nature of woody debris.

As part of their submission during the 2009 panel hearings, Fisheries and Oceans Canada utilized a standard 30 m setback to calculate riparian loss effects.

Information Requested:

The Panel requests that Taseko:

- a. Provide a rationale for why the standard 30 m setback used to calculate riparian loss effects has not been used in the assessment.

Information Request #20a

Provide a rationale for why the standard 30 m setback used to calculate riparian loss effects has not been used in the assessment.

Response Summary

The determination of the riparian loss effects is based upon British Columbia Provincial legislation under the Forest and Ranges Practices Act and the Riparian Areas Regulations. These are the provincially accepted standards for determining riparian set-back. The setback being proposed by DFO is based upon a research paper that supports the use of a 30 metre buffer area for fisheries management and reserve zones in urban / suburban settlement areas of coastal British Columbia. The Fish Creek water shed is not being affected by urban settlement and is not a coastal area. The use of the BC Riparian Areas Regulations are appropriate for the style of streams and vegetation found in the Fish Creek watershed. Examples are provided in the following section.

Discussion

For the New Prosperity (NP) Project (the Project), the Fish and Fish Habitat effects assessment includes a quantification of riparian effects in addition to in-stream effects. In order to quantify the riparian effects, a buffer was applied to both sides of the affected section of stream (termed “reach”). The width of buffer applied to each reach was derived from two pieces of Provincial Legislation:

1. Forest and Ranges Practices Act (FRPA); and
2. Riparian Areas Regulations (RAR).

The FRPA and its regulations govern the activities of forest and range licensees in BC and specifically set the requirements for planning, road building, logging, and grazing in the Province. Under the FRPA, the Riparian Management Area (RMA) for streams is based on fish presence and stream width. The RMA consists of a Riparian Reserve Zone (RRZ) immediately adjacent to both sides of the stream and a Riparian Management Zone (RMZ) beyond the RRZ. In general, harvesting within the RRZ is not permitted while there would be constraints to harvesting within the RMZ. For the purposes of the Project, the RRZ width was applied to all fish-bearing reaches and lakes directly affected by the Project.

Since the RRZ for non-fish-bearing reaches is zero, and since it is recognized that there is still some inherent value of that riparian vegetation to downstream fish habitat, the RAR was used to determine a suitable buffer for those streams. The result was a 5 or 10 m buffer applied to both sides of the stream based on vegetation composition (shrub = 5 m, tree = 10 m).

In reaches where there will be flow reductions but no physical habitat disturbance, no riparian effects were predicted. The rationale is that while flow reductions (predicted to be 76%) will prevent fish use, it will still be sufficient to ensure riparian function. A stream is considered a stream and fish habitat considered functional even if there is water for only 1 day a year. The same argument should apply to riparian function – even if there is flow for only 1 day the riparian should still be considered functional. The application of the FRPA and RAR buffer widths to the predicted effects on streams and lakes within the NP study area resulted in a total riparian effect of **394,570 m²**.

Fisheries and Oceans Canada (DFO) provided comments on the proposed effects assessment in a letter dated April 23, 2012. In their response DFO stated “It is not appropriate to consider RAR or FRPA setbacks alone as a metric for complete riparian function on a project of this scale”. Instead they state that “One mature tree height measured horizontally from the top of bank or high water mark” is more appropriate. Further, 30 m can typically be used as a surrogate for a mature tree height and that buffer should be applied to both sides of all affected streams regardless of channel width, fish bearing status, or whether the effect is a physical disturbance or flow reduction only. DFO’s position appears to be based on differentiating between temporary disturbances such as would occur from logging or road building and for which setbacks are appropriate, and permanent loss of riparian from a pit or tailings pond. For the latter, they feel the forestry setbacks are not appropriate to quantify the full value of the riparian that is being lost permanently and therefore recommend the 30 m buffer. However they have arbitrarily applied that buffer to the entire watershed whether fish-bearing/non-fish bearing, temporary disturbance, permanent disturbance, or flow reduction. Applying the 30 m buffer to all affected reaches (including those with flow reduction only) would result in a total of **2,100,150 m²** of riparian effects.

The purpose of the following is to review the recent precedents that have been set through other development projects to quantify and compensate for riparian effects. The primary source of reference material for this review was publically available documents through the Canadian Environmental Assessment Agency (CEAA) project registry and from the internet.

Legislation, Regulations and Guidelines

Regulations and Legislation relating to riparian buffers in BC include:

1. Forest and Ranges Practices Act (FRPA) – Provincial
2. Riparian Areas Regulations (RAR) – Provincial

These are discussed above and form the basis for the effects assessment for the Project. They represent the provincially accepted **standard for defining riparian buffers**. However, DFO is of the opinion that buffers (or setbacks) as defined in the FRPA and RAR are not a surrogate for defining riparian effects for Projects where complete riparian removal is required.

DFO provided the reference *Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2351* (Establishing Fisheries Management and Reserve Zones in Settlement Areas of Coastal British Columbia, Millar et. al., 1997) to support application of the 30 m buffer. It should be noted that this document is a research paper and not established legislation, regulation or guideline. It should also be noted that the purpose of this document is to

“re-examine the nature and extent of the interaction between aquatic and riparian areas and to present an approach for designating fisheries management and reserve zones in urban / suburban settlement areas of coastal British Columbia.”

Firstly, this reference document is for designating fisheries management zones for urban/suburban settlement areas and not rural, undeveloped areas such as Fish Creek watershed. As such DFO’s argument that RAR methodology is not appropriate for use in the Fish Creek watershed as it deals with urban and sub-urban riparian development is contradictory as the reference document they provided is also directed specifically at urban/suburban developments.

Secondly, it should be noted that Fish Creek watershed is in interior, not coastal BC. A 30 m tree height as a standard riparian management width may be applicable to coastal watersheds which are typically dominated by Spruce, Douglas Fir, Western Cedar and Western Hemlock, compared to the much smaller, Lodgepole Pine and Willow common throughout Fish Creek watershed.

Thirdly, the *Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2351* (Establishing Fisheries Management and Reserve Zones in Settlement Areas of Coastal British Columbia, Millar et. al., 1997) is simply a reference document. Taseko’s riparian area calculation was based on a provincially legislated Act (*FRPA*), and as such has legal justification for its use in the determination of a riparian management area (RMA).

The Land Development Guidelines for the Protection of Aquatic Habitat (DFO, 1993) identify a 15 m buffer (referred to as “leave-strips”) as appropriate. Further, the guidelines stipulate that “leave strips should be provided on all watercourses that flow into or contain fish or fish habitat”. Based on this it could be argued that for non-fish bearing reaches, only those that are direct tributaries to fish-bearing reaches would require a leave-strip. Applying the 15 m leave strip to all reaches (fish bearing and non-fish bearing) directly affected by the Project (i.e. not including reaches that experience flow reductions only) would result in a total of **616,425 m²** of riparian effects. However, this would be reduced substantially if it were only applied to fish bearing and non-fish bearing streams that are direct tributaries to fish bearing streams.

Finally, it should be noted that Taseko’s Compensation Plan to date does not include riparian habitat gains associated with the creation of the Pit Lake and TSF. Regardless of whether these waterbodies become fish bearing or not, the area of lake-side vegetation, roughly estimated at closure to be 330,000 m² (Pit Lake circumference: 4 km; TSF perimeter: 7 km) using a 30 m riparian width, would have to be considered a gain in riparian habitat.

The riparian habitat gain associated with the creation of these new waterbodies (330,000 m²) was not considered in the current EIS because riparian losses, calculated using FRPA and RAR standards (394,570 m²) would be fully offset (balanced) through implementation of the Compensation Plan (e.g., Taseko Lake Off-Channel Habitat). Therefore, riparian habitat gains associated with the creation of these waterbodies were considered superfluous for habitat balance purposes.

Outlined below are examples of recent major projects in Canada along with a summary of the associated fish habitat compensation plans that are currently being recommended by project proponents or are actually being applied to offset the loss of fish and fish habitat due to the Harmful Alteration, Disruption or Destruction of productive fish habitat (HADD).

Mining Projects

- **Tulsequah Chief** – Location: Northwestern BC; Status: Certificate Issued by EAO. Fisheries Act authorization 00-HPAC-PA1-00237-A (February 24, 2011).
 - The Project resulted in the HADD of 4,867 m² to wetted channels and 26,007 m² of flood plain substrates as well as 15,863 m² of riparian vegetation associated with the Tulsequah River (Gartner Lee Ltd. 2008).
 - Riparian effects and credits were calculated using a 30 m setback
 - Riparian compensation included a 30 m buffer around a newly created borrow pit lake and rearing pools and channels. The proposed compensation credit was 17,200 m² and 21,700 m², respectively. This would result in a 2.4:1 compensation ratio.

(Gartner Lee Limited 2008)
- **Mt. Milligan Copper/Gold** – Location: Northern BC; Status: Approved Dec. 2009
 - Project effects include 95,627 m² of habitat permanently lost in King Richard Creek; 10,522 m² of lost or altered (flow reduction) habitat in Alpine Creek; 20,802 m² of lost or altered habitat in Meadow creek.
 - There is no reference to riparian effects or specific compensation in the effects assessment.
 - Personal Communication: B. Horne, AMEC Email to Cheryl Williston, Taseko, January 17, 2012. “[Mt. Milligan] did not specifically compensate for riparian losses. Our calculations were strictly based on instream habitat due to direct footprint effects and losses of flow.”

(AMEC Earth and Environmental 2008)

- **Kemess North Copper/Gold** –Location: Northern BC; Status: Rejected March 2008
 - Instream effects only although proposed components would likely have resulted in riparian effects as well. No specific calculation or compensation presented for riparian effects.

(Klohn Crippen Berger Ltd. 2005)

- **Galore Creek Copper/Gold/Silver** – Location: Northern BC; Status: Approved Feb 2007
 - Comprehensive Study Report (CEAA, 2007) notes riparian disturbance associated with access corridor only. There is reference to non-fish-bearing streams being lost due to project components but no associated riparian effects.
 - Riparian effects of project not quantified or discussed.

(Rescan Environmental Services Ltd. 2006)

- **Raven Coal** – Location: Vancouver Island, BC; Status: Review Ongoing
 - Project effects notes that mine infrastructure will be built on fish-bearing streams.
 - No reference in available documents to riparian effects or specific riparian compensation.
- **Detour Lake Gold Mine** – Location: Northern Ontario; Status: Approved Jan 2012
 - Comprehensive Study Report (CEAA, 2011) notes losses of pond, stream and wetlands due to mine infrastructure as well as flow reductions but no reference to riparian effects.
 - The Draft Fish Habitat Compensation Plan (AMEC July 2011) identifies 23,844 m² of confirmed HADD effects all of which is instream with no riparian component noted. Area of habitat compensation estimated at 49,625m² (2:1 ratio).
 - No riparian compensation noted.

- **Joslyn North Oil Sands Mine** – Location: Northern Alberta; Status – Approved Dec 2011
 - Project will include the realignment of Joslyn Creek and the development of a compensation lake.
 - Project includes 512,040 m² of instream effects but none of the documents reviewed note any riparian component.
 - Draft Conceptual Compensation Plan (Golder 2007) identifies compensation options including lake and stream habitat creation on a 2.36:1 compensation ratio but no specific reference to riparian area compensation.

(Golder 2007)
- **Horizon Oil Sands Mine**– Location: Northern Alberta; Status – Approved Jan 2004
 - Oil sands development resulted in alteration to drainages and fish habitat in particular the Tar River and Calumet River watersheds (CNRL 2002).
 - Overall habitat compensation at a ratio of 2.7:1.
 - Multiplication of the habitat quality by the habitat quantity (surface area) resulted in the derivation of Habitat Units (HUs). HU range from 0 for habitat of no value to 1 for habitat of optimal value.
 - Total estimated habitat losses include 907,249 Habitat Units (HU's).
 - Plans designed to provide habitat gains in excess of habitat losses, but no specific reference to riparian area compensation.
- **Kearl Oil Sands Mine** – Location: Northern Alberta; Status – Approved June 2008
 - Project used a habitat evaluation procedure (HEP) to calculate HUs. Habitat quality determined through the application of Habitat Suitability Index (HSI) calculations (Imperial Oil 2006).
 - For affected watercourse segments and waterbodies, habitat quantity was calculated as waterbody or stream surface area, with stream area being determined from channel length and width information.
 - Project affected a total habitat area of 1,279,398 m². Affected Habitat Units = 3,103,668 m².
 - Development of a 1,500,000 m² compensation lake.

- No reference to riparian area compensation.
- **Meadowbank Gold Project** – Location: Nunavut; Approved 2006
 - Major project activities resulted in a total HADD during construction and operation of 1,701 HU's (Cumberland Resources 2005). This cannot be replaced or recovered during mine operations.
 - Lost habitat related to impounded lakes and disturbed land area will be recovered post-closure resulting in a net gain in overall productivity of the lake.
 - No reference to riparian area compensation.
- **Kitsault Molybdenum Mine** – Location: NW British Columbia; Status – Review Ongoing
 - Construction, operation and decommissioning of previously operated molybdenum mine.
 - Construction and operation will result in alteration or destruction of 5,268 m² of Rainbow Trout habitat (Knight Piésold 2012).
 - Two types of compensation measures are being utilized; on-site compensation to specifically address losses to rainbow trout habitat, and off-site measures that focus on restoration of salmon habitat.
 - When combined, the off-site and on-site compensation potentially offer a 2.4:1 gains to losses ratio.
 - 5,269 m² or 10,809 HU of unavoidable HADD of fish habitat. Compensation would be 17,412m² (26,079 HU).
 - Assumption made that non-fish bearing habitat will not require compensation and only adverse effects to freshwater fish habitat (not marine) were considered.
 - Proponent assumed a minimum of a 1:1 ratio and that the ratio would be based on HUs and not strictly on quantity of spatial area.
 - No reference is made to specific riparian restoration.

Eleven recent projects in BC, Alberta, Nunavut and Ontario were reviewed. Only one (Tulsequah Chief) included riparian effects and specific riparian compensation. The fish habitat compensation plans for all of the other projects did not take riparian areas into account when

determining habitat compensation requirements. This was despite the fact that all of these projects had some level of instream effect that would have had a riparian component.

Other Mines

Red Chris Porphyry Copper-Gold Mine Project – Location: Northern BC; Status: Certificate extended by EAO

- The project will require construction of a tailings facility and dewatering which will result in the loss of all fish habitat in Trail creek. A total of 2042 m² of Rainbow Trout spawning and rearing habitat will be affected.
- The proposed compensation plan is to divert water from a tributary to Kluea-Todagin Creek and enhance the stream to create more suitable spawning and rearing habitat, including pools, riffles and shallow off-channels.
- Other compensatory measures were considered but deemed impractical with less benefit to fish.
- Compensation ratio (of proposed works) was 1:1

(AMEC Earth and Environmental 2004)

Cougar South/Main Pits and West Spoil Project – Location: Southeastern BC; Status: Certificate Issued by EAO.

- The project was expected to have little or no impact on fish of the Elk River and tributaries, however compensation options were considered in the event that mitigation measures prove ineffective.
- Compensation options included developing fish habitat in the Upper Thompson and Swift Creek, should these measures be required.

(Cougar Pit Project Committee 1997)

Marathon Platinum Group Metals and Copper Mine Project– Location: Ontario; Status –EA in progress

- This project will affect 9.3 ha of aquatic habitat, 1.85 ha are fish-bearing
- Proposed an area of 9.97 ha for compensation, which results in a gain of 8.17 ha of fish bearing habitat
- Compensation includes drainage reconnection, lake creation, stream bank stabilization, re-grading of streams and restoration of fish passage.

- Fish passage restoration involved lowering a culvert and creating a series of step pools to allow passage in low flow conditions. This will open up ~ 0.1 ha of fish habitat.
- Proposed compensation ratio= **5.5:1**

(Ecometrix Ltd. 2012)

Fish Passage

Fish Habitat Compensation on the Trans Canada Highway Project in New Brunswick.

- EA for construction of final portion of Trans Canada highway determined alteration of 27,970 m² of fish habitat requiring HADD compensation at a 3:1 ratio.
- Changes in schedule and design structure resulting in an additional 72,300 m² of HADD compensation, resulting in a total of 156,200 m² requiring compensation.
- Several compensation measures were implemented, including many that involved restoration of fish passage.
 - Restoring fish passage was generally accomplished by removal of debris (including old, abandoned dams) and removal or upgrading of culverts (hanging, too small, etc.).
 - HADD compensation factors for restoring fish passage were 0.333 for removing a partial obstruction and 0.5 for removing a full obstruction
 - i.e. 100 m² of habitat improved by removing a partial obstruction got 33 m² of HADD compensation credit.
- Total area of habitat improved was 977,500 m², which translated as 312,520 m² of HADD compensation credit.
- Photos of restoration in referenced report.

(Clowater and Phillips. 2008)

Response of Bull Trout to habitat reconnection through replacement of hanging culverts with bridges.

- Two hanging culverts were replaced with bridges over fish bearing streams.
- One culvert (stream 19: 1.15 m drop) allowed fish passage while the other (stream 26: 1.39 m drop) was a barrier for fish movement upstream.

- After culvert removal fish passage was restored in stream 19 while abundance and year-class structure was improved in stream 26.
- Photos are shown in the referenced report.

(Shrimpton et al 2008)

Linear Development

1. Northern Transmission Line – Location: Northern BC; Status – Approved

- Project results in riparian effects only. The RAR methodology was used to determine the riparian areas based on vegetation present and riparian function. A 15 m minimum was recommended.
- It was assumed that compensation would not be required along the banks of non-fish-bearing streams.
- The Habitat Evaluation Procedure (HEP) was used to convert the area of riparian effect into dimensionless habitat units based on the value of the riparian habitat (based on large woody debris (LWD) contribution, shade, stability, small organic debris contribution). The resulting units were compensated at 2:1.
- Proposed compensation for riparian effects included riparian planting and instream works (despite the fact that there were no instream effects).
- This would probably have been viewed as a non-permanent disturbance of riparian in that they cleared trees but eventually when the line is decommissioned they will grow back. This could explain why the 30 m buffer was not required.

Conclusion

The determination of the riparian loss effects is based upon British Columbia Provincial legislation under the Forest and Ranges Practices Act and the Riparian Areas Regulations. These are the provincially accepted standards for determining riparian set-back. The use of the BC Riparian Areas Regulations to determine riparian loss are more appropriate for the Fish Creek watershed than the 30 metre setback recommended for urban disturbance of coastal streams.

References

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