

**Information Request 32**

Information Request 32

32-1

**Response to Information Request 32**

Response to Information Requests 32a

32-2

## **IR 32 – Habitat Compensation Plan**

### **References:**

**EIS Guidelines, Section 2.7.1.3**  
**EIS, Section 2.7**

### **Related Comments:**

CEAR # 292 (Environment Canada)

### **Rationale:**

In Section 2.7.1.3 (p. 34), the EIS Guidelines require the Proponent to “include a draft habitat compensation plan which will serve to ensure long-term protection of wildlife habitats, functions, and population. The Proponent should consult with Environment Canada during the preparation of the habitat compensation plan.”

In the EIS (Section 2.7, p. 1117), the Proponent states that “a draft *Habitat Compensation Reference Document* was developed in 2010” and indicates that it will be revisited in 2012. The Guidelines notes that Taseko should consult with the provincial and federal regulators and other interested parties on the further development of this document”

The Panel has determined that the framework document, while helpful, does not meet the expectations of the EIS Guidelines; it is a framework but not a draft plan. Environment Canada also noted that the EIS does not include a draft habitat compensation plan as required by the Guidelines and stated that in order to complete a habitat compensation plan, a wetland functions assessment that considers all Project-specific interactions would be required. The Panel has requested the wetland functions assessment in IR 31 of this document.

### **Information Requested:**

The Panel requests that Taseko:

- a. Provide a draft habitat compensation plan.

**Taseko Mines Limited**  
**Draft Habitat Compensation Plan**

**February 28, 2013 Draft**

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## ABBREVIATIONS

|              |  |
|--------------|--|
| BBOP .....   | Business and Biodiversity Offsets Programme                  |
| BC .....     | British Columbia   |
| CEAA.....    | Canadian Environmental Assessment Act                        |
| COSEWIC..... | Committee on the Status of Endangered Wildlife in Canada     |
| CWS .....    | Canadian Wildlife Service                                    |
| EA .....     | environmental assessment                                     |
| EIS.....     | Environmental Impact Statement                               |
| HCP.....     | Habitat Compensation Plan                                    |
| MDP .....    | Mine Development Plan  |
| MFLNRO.....  | BC Ministry of Forests Lands and Natural Resource Operations |
| MOE.....     | BC Ministry of Environment                                   |
| MOF.....     | BC Ministry of Forests                                       |
| SARA .....   | Federal <i>Species at Risk Act</i>                           |
| Taseko.....  | Taseko Mines Ltd.  |
| TSF.....     | Tailings Storage Facility                                    |

## 1 – EXECUTIVE SUMMARY

This document summarizes the goals and objectives that drive Taseko's commitment to developing and implementing a Habitat Compensation Plan. It summarizes the proposed project, regulations and policies that govern the development of the plan. Taseko is committed to avoiding permanent effects on wildlife habitat, and when avoidance is not possible, reducing effects to a minimum. For that reason, this document also summarizes how Taseko is implementing the mitigation hierarchy and the permanent residual effects anticipated after all efforts to avoid or minimize effects on natural habitats. The mitigation hierarchy outlines the order of priority in which measures are applied:

- Avoid impacts
- Minimize impacts
- Restore on-site the environmental values that have been affected.
- Compensate residual effects

Taseko is committed to support, in coordination with stakeholders and First Nations, concrete actions to:

- Maintain regional and local wildlife populations, including migratory birds and species at risk
- Achieve a no net loss of wetland functions
- Ensure the long-term protection of wildlife habitats, functions, and populations

More specifically, this habitat compensation plan's focus is on:

- **Wetland loss.** Taseko will seek to achieve a no-net-loss of wetland habitat functions associated with federal regulatory jurisdiction (migratory birds and species at risk) compensating for (258 ha) of permanent loss. This will provide, among other benefits, breeding habitat for western toad; breeding, foraging and staging habitat for migratory birds; foraging habitat for grizzly bear; and foraging habitat for species of importance to First Nations.
- **Riparian Habitat.** Taseko will seek to achieve a no-net-loss of riparian habitat functions associated with federal regulatory jurisdiction (migratory birds and species at risk) compensating for any permanent loss of the riparian habitat supporting these species.
- **Grizzly Bear Mortality Risk.** In collaboration with others, Taseko will support efforts to reduce grizzly bear mortality risk in core habitat.

- Species at Risk. Taseko will take steps to both prevent wildlife species reliant on wetlands from becoming extirpated as a result of the Project and to support the recovery of species at risk. Compensation measures will contribute to the recovery of: western toad, olive-sided flycatcher, little brown myotis, grizzly bear, and wolverine.
- Species Important to the Tsilhqot'in First Nation. Taseko is open to discussing with the Tsilhqot'in additional mitigation measures, as part of the New Prosperity Habitat Compensation Plan, that enhance wildlife and waterfowl habitat, which improves abundance and diversity of wildlife species that are of interest to Aboriginal people

Taseko believes that to be effective, the final Habitat Compensation Plan must be developed in collaboration with federal and provincial regulatory agencies, the First Nations, and stakeholders. This draft Plan therefore provides a set of conceptual compensation measures and approach for engaging stakeholders to develop the details of implementation.



## 2 – INTRODUCTION

### 2.1 PROJECT DESCRIPTION

Taseko Mines Limited (Taseko) proposes to develop the New Prosperity Gold-Copper Project (Project) 125 km to the southwest of Williams Lake, British Columbia. The main Project components include the mine site, with an open pit mine, onsite concentrator, and tailings storage facility (TSF), a 125 km transmission line, , and 2.8 km of new access road. The Project would take two years to build and would operate for 20 years. The post-closure reclamation period is estimated to be 25 years.

### 2.2 REQUIREMENTS FOR HABITAT COMPENSATION

This habitat compensation plan is intended to meet the requirements identified by federal and provincial regulatory agencies during the current federal review panel under the Canadian Environmental Assessment Act (CEAA) and existing commitments associated with the Environmental Assessment Certificate issued for the Project in accordance with the British Columbia's Environmental Assessment Act (BCEAA).

The Province of British Columbia approved the 2009 Prosperity project, granting an Environmental Assessment Certificate in January 2010 under British Columbia's Environmental Assessment Act (BCEAA). Commitment #11.1 in the proponent's Table of Commitments for the 2010 Environmental Assessment (EA) Certificate commits Taseko to develop and implement a habitat compensation plan for adverse impacts to "wetland habitat, the productive capacity of the lake, recreation values, wildlife, wildlife habitat, and the critical habitat of species at risk". These objectives were developed in regard to the 2009 Prosperity Project and since direct effects to Fish Lake due to tailings deposits have been avoided in the 2012 New Prosperity Project, the objectives pertaining to the productive capacity of the lake and recreation values (of the lake) are no longer key issues in the context of compensation.

The mine development plan (MDP) in the 2012 New Prosperity Project has been revised compared to the 2009 Prosperity Project; however, other major Project components (transmission line and access road) remain the same. The EIS for the New Prosperity Project was submitted to a federal review panel established under the Canadian Environmental Assessment Act in September 2012. The 2012 EIS Guidelines for the Project describe the need for a draft habitat compensation plan to address Project effects to wetlands that support migratory birds and species at risk in order to ensure long-term protection of wildlife habitats, functions, and populations.

As per Commitment # 11.2, a draft Habitat Compensation Reference Document was developed for the Prosperity Project (October, 2010) in preparation for permitting. This draft plan builds upon the principles in the Reference Document and reflects the MDP for New Prosperity.

Environment Canada issued comments to the federal review panel in November 2012, which included a set of technical points to help guide the development of a draft habitat compensation plan. Among these comments, Environment Canada's clarified how the *Federal Policy on Wetland Conservation* (Wetland Policy) applies to this Project, including the particular goal of 'no-net-loss of wetland functions'. With respect to the Wetland Policy, Environment Canada emphasized their responsibilities for migratory bird populations under the *Migratory Bird Convention Act, 1994*, and protection of species at risk under the *Species at Risk Act, 2002*.

### 2.3 OBJECTIVES

The main objectives of this habitat compensation plan are to:

- describe the impact-mitigation measures to avoid and minimize adverse effects to wetlands, riparian areas, and wildlife (species at risk, migratory birds and species of importance to First Nations);
- identify residual effects for which compensation will be targeted; and,
- provide a set of conceptual habitat compensation measures to be further developed in coordination with federal and provincial regulatory agencies, First Nations, and potential partnerships from the private or non-profit sectors.

Through planning and implementation of this habitat compensation plan, Taseko aims to fully mitigate Project-related residual adverse effects to regional and local wildlife populations of migratory birds, species at risk, and species of importance to First Nations, and to achieve no net loss of wetland/riparian functions pertaining to these same faunal groups.

### 2.4 HABITAT COMPENSATION TARGETS

Compensation targets include:

- Wetland/riparian functions pertaining to the provision of habitat for migratory birds and species at risk
- Species at risk reliant on wetlands including wildlife species listed on Schedule 1 of the *Species at Risk Act, 2002* plus COSEWIC-listed species, and provincially red-listed species
- Migratory birds as defined within the *Migratory Bird Convention Act, 1994*, that rely on wetlands and/or riparian habitats for nesting, breeding, rearing, foraging, and/or staging
- Grizzly Bear core habitat, in order to reduce grizzly bear mortality risk, recognizing implementation of these measures benefit other upland species.

- Species of importance to First Nations based on those species listed in the *William Case*

Compensation will focus on the permanent loss of habitat key to sustaining the groups listed above. The data provided in the 2009 EIS/Application and 2012 EIS served as the basis for determining potential for permanent or long-term habitat loss for these identified species and wetland/riparian areas.

#### 2.4.1 Wetlands

The mine site includes 8 wetland ecosystems belonging to 5 wetland classes that could prospectively be affected by the Project (Appendix D).

Although 20 wetland ecosystems belonging to 6 wetland classes are located within the transmission line right of way (RoW), due to the nature of construction and operations within such a RoW, it is expected that only the swamp wetlands may experience some change in vegetation structure (i.e. tree removal or pruning), whereas all the shrub and graminoid-dominated wetlands would persist in the RoW.

Taseko will:

- Avoid wetlands along the access road and transmission line during detailed design of both linear features (and for this reason the emphasis of this habitat compensation plan is on wetlands in the mine site)
- Conduct pre-construction surveys based on detailed designs to determine actual effects to wetlands within both linear features
- Compensate for permanent residual loss to wetlands

#### 2.4.2 Riparian Habitat

Riparian ecosystems within the 2009 EIS/Application and 2012 EIS include floodplain site associations and a 30 metre (m) buffer applied to all TRIM watercourses and wetlands.

Permanent effects to riparian ecosystems are estimated to be 317 ha within the mine site. Compensation for some of these riparian losses and functions is achieved through the Fish Compensation Plan.

Among the 124 ha of riparian ecosystems within the transmission line RoW, only the cottonwood-dominated floodplain association may experience some change in vegetation structure (i.e. tree removal or pruning), whereas the shrub-dominated riparian ecosystems would persist in the RoW and riparian buffers around watercourses would be retained. By concentrating the final alignment of the transmission line to existing clearings where possible, and avoiding wetted areas, effects on riparian ecosystems can be minimized.

According to the 2009 EIS/Application, less than 10 ha of riparian ecosystems could potentially be affected by the access road. Actual loss will be quantified during pre-construction surveys.

Taseko will:

- Avoid riparian ecosystems during detailed design of both linear features and observing a 30 m buffer around riparian ecosystems during detailed design and construction (therefore, the emphasis of this habitat compensation plan is on riparian areas in the mine site)
- Conduct pre-construction surveys based on detailed design alignments to determine more-accurate areas of riparian ecosystems within all Project study areas
- Compensate for permanent residual loss of riparian habitat functions associated with federal regulatory jurisdiction (migratory birds and species at risk)

#### 2.4.3 Species at Risk

Eight (8) species meet the criteria for consideration based on their distribution and regulatory listing (SARA Schedule, COSEWIC, or provincially red-listed). Of these, 6 species were detected in the vicinity of the mine site during various field sessions conducted between 1992 and 2006. These 8 species could potentially be affected by long-term or permanent loss of essential habitat associated with the Project (Appendix A). All of the species are associated with wetlands to varying extents:

- Western toad
- Olive-sided Flycatcher
- Short-eared Owl
- Common Nighthawk
- Rusty Blackbird
- Little brown myotis
- Grizzly bear
- Wolverine

Currently no critical habitat has been legally-defined for any of these species that may interact with the Project. By focusing compensation on wetlands, recovery of species at risk will be supported.

#### 2.4.4 Species Important to First Nations

The William Case was used to identify species important to First Nations. Of the 32 species listed as important, 24 have some potential to interact with the Project, as determined by range boundaries and habitats present within the project RSAs (Appendix B). Three of these species are associated with wetland habitats:

- American beaver
- Common muskrat
- North American river otter

Six of these species are associated with both upland and wetland habitats:

- Moose
- Grizzly bear
- Black bear
- Wolverine
- American mink
- Fisher

The remaining 12 species are primarily associated with upland habitats:

- Mule deer
- Wolf
- Cougar
- Canada lynx
- Bobcat
- American marten
- Short-tailed weasel (ermine)
- Long-tailed weasel
- Snowshoe hare
- Red squirrel

- Northern flying squirrel
- Mice and voles

Taseko will:

- Be open to discussing additional mitigation measures, as part of this Habitat Compensation Plan, that enhance wildlife and waterfowl habitat, thereby improving the abundance and diversity of wildlife species that are of interest to Aboriginal people.
- Support the Crown during their consultation with First Nations to review proposed mitigation and compensation measures.

### 3 – MITIGATION MEASURES

#### 3.1 MITIGATION HEIRARCHY

Taseko is committed to following the mitigation hierarchy in which measures are applied in the following order of priority:

- Avoid impacts
- Minimize impacts
- Restore on-site the environmental values that have been affected.
- Compensate residual effects

he following sections summarize how Taseko will apply the mitigation hierarchy to avoid impacts, minimize impacts and restore on-site environmental values affected by the Project.

#### 3.2 MEASURES TO AVOID IMPACTS

The mine site footprint for the 2012 New Prosperity MDP is considerably reduced relative to the 2009 Prosperity MDP. Project-related permanent loss to upland, wetland, riparian and short-eared owl habitat in the mine site has been avoided within the 2012 New Prosperity MDP (Table 3-1).

The mine plan for 2012 New Prosperity avoids 252 ha of impacts to wetlands during operations and avoids 93 ha of impacts to wetlands at post-closure relative to the 2009 Prosperity mine plan.

**Table 3.1. Loss of Wildlife Habitat Avoided through Re-design of the MDP**

| Habitat                | Species  | 2009<br>Prosperity<br>Project<br>(ha) | 2012<br>New<br>Prosperity<br>Project<br>(ha) | Avoided<br>Habitat<br>Loss       |
|------------------------|--|---------------------------------------|--|----------------------------------|
| Wetland<br>Ecosystems  | Moose, grizzly bear, black bear,<br>American beaver, common muskrat,<br>North American river otter, American<br>mink, little brown myotis, Common<br>Nighthawk, Rusty Blackbird, western<br>toad.  | 404                                   | 258  | 93 ha<br><br>(23%<br>reduction)  |
| Riparian<br>Ecosystems | Moose, grizzly bear, black bear,<br>American beaver, common muskrat,<br>North American river otter, American<br>mink, little brown Myotis, Common<br>Nighthawk, Rusty Blackbird, western<br>toad.  | 353                                   | 317  | 36 ha<br><br>(10%<br>reduction)  |
| Upland<br>Ecosystems   | Grizzly bear, black bear, wolf, cougar,<br>Canada lynx, bobcat, wolverine,<br>American marten, short-tailed weasel,<br>long-tailed weasel, American mink,<br>moose, mule Deer, snowshoe hare, red<br>squirrel, northern flying squirrel, little<br>brown myotis, mice and voles, Olive-<br>side Flycatcher, Common Nighthawk,<br>western toad. | 845                                   | 469  | 376 ha<br><br>(44%<br>reduction) |
|                        | Short-eared Owl Feeding Habitat <sup>1</sup>   | 146                                   | 111  | 35<br><br>(24%<br>reduction)     |

NOTES: 1 – Short-eared owl feeding habitat is a component of both wetland and upland ecosystems; habitat suitability for short-eared owl is low to moderate on the proposed mine site. Habitat suitability is rated as moderate to high along the transmission line, with higher values noted near the Fraser River.

Residual habitat losses reported in the 2009 and 2012 EIS/Assessments are an overestimate since they are inclusive of all mapped areas within the maximum disturbance boundary. The Maximum Disturbance Scenario estimates potential impacts to wetlands where all wetlands



within the MDA are lost, regardless of whether a project feature will actually impact the area. Actual losses are expected to be lower due to detailed site planning that avoids impacts, for example:

- As part of the Construction Environmental Management Plan (EMP), clear delineation of the boundaries of mapped and unmapped wetlands and riparian ecosystems in proximity to planned disturbance/activities for project features will be conducted to facilitate avoidance during construction and operations
- The Construction EMP identifies the reserving riparian areas within 30 m of watercourses in the transmission line RoW (2009 EIS). In most instances, this will ensure impacts to riparian areas within this portion of the Project are avoided.
- The detailed alignment of the access road and associated features (i.e. pull-outs, etc.) will avoid wetlands and riparian areas to the greatest extent possible.
- The final alignment of the transmission line and pole placement sites will avoid wetlands and specific wildlife features such as dens sites and nesting habitats, to the greatest extent possible, based on pre-construction surveys.

### 3.3 MEASURES TO MINIMIZE POTENTIAL ADVERSE EFFECTS

Taseko will implement a wide variety of measures to minimize potential adverse effects to wildlife habitat. This section highlights several elements of this approach. For a full inventory of mitigation measures, please see Appendix C: Taseko Commitments to Mitigation.

Mitigation measures for wetlands and riparian areas will minimize disturbance, maintain natural drainage patterns, and protect forest health. Naturally, these measures will benefit wetland/riparian-dependent species at risk and the nine species associated with wetlands and riparian ecosystems that are also considered important to First Nations.

Taseko will implement additional measures targeted at priority species. For example, Taseko has committed to 21 measures that will benefit grizzly bear by reducing mortality risk that associated with vehicle traffic along the access road, avoiding human-bear interactions at the mine site, and eliminating some of the existing access along the transmission line route (Appendix C). In addition, Taseko has committed to 12 measures to minimize potential adverse effects to other species at risk in the Project study areas (Appendix C).

To further minimize cumulative effects on the South Chilcotin Ranges GBPU, the final reclamation plan will be designed to restore prime grizzly bear habitat on the mine site post-closure. Prime value grizzly bear habitat includes open areas for feeding with adjacent forested areas for cover (Parametrix 2005). Forested areas provide security cover and a lack of adequate cover can lead to increased grizzly bear mortality (Munro 1999). Security cover provides refuge from other bears (e.g. females with cubs need spatial separation from aggressive males) and from

human induced disturbances. The predicted effectiveness of this mitigation measure is moderate to high, because use of these habitats depends on maintaining adjacent undisturbed forest patches and implementing appropriate access management controls (Cristescu 2013, Cristescu et al. 2012), both of which are only partially under the control of Taseko.

### 3.4 MEASURES TO RESTORE HABITAT ON-SITE

The primary means by which ecosystems and wildlife habitat values will be restored on-site will be through reclamation to meet requirements of the *Health, Safety and Reclamation Code for Mines in BC* (Section 2.8.2 of the 2012 EIS Application). Progressive reclamation will occur up to Year 20 of the mine life, when operations ceases, and will be completed within five years of closure (Year 25) (see Figure 2.2.3-4 Operation and Decommissioning Phase Schedule, Section 2.2.3 of the 2012 EIS Application). Final reclamation of potential wetland habitat on the Tailings Storage TSF is expected to occur in approximately Year 45, when the final post-closure water level in the TSF is expected to be reached.

Since restoration of ecosystem functions on reclaimed areas will likely take several years and in some instances, decades, reclamation activities are not considered a measure to reduce the residual Project impacts on wetlands or wildlife habitat. On-site restoration measures that can be implemented and begin providing ecosystem functions prior to or immediately after disturbance will be considered compensation measures.

#### 3.4.1 Wetland Habitat

Enhanced reclamation measures include incorporating fine sediments into the TSF beach in designated areas to facilitate the creation of mudflat or shallow marsh habitat when the water level reaches equilibrium near the end of operations. The TSF beach will have a shallow grade of approximately 1 percent, extending out below the waterline, creating a wide littoral zone. An area of shallow water (<30 cm) will likely extend approximately 30 m from the shore. This area will be allowed to re-vegetate naturally with emergent vegetation, enhanced as necessary with native species. Other shoreline enhancements for wildlife that will be implemented when water quality allows include:

- Placement of coarse woody debris along some of the shoreline to provide habitat for amphibians, and placement of submerged and floating logs in the TSF to provide surface area for aquatic bacteria and algae to establish when water quality allows.
- Inoculation of the TSF with surface substrate from nearby suitable water bodies (e.g. Wasp Lake, Fish Lake).
- Transplant native aquatic plants from nearby water bodies.
- Fertilizing the TSF water with macro and micro nutrients to stimulate algal development

- If the final shoreline attributes (i.e., TSF water depth and water quality) are suitable, the TSF may also be stocked with fish.

Opportunities to create new wetland habitat outside the footprint of Project components but within the MDA may exist. During operations predicted zones of increased groundwater elevation around the TSF will be monitored and wetland habitat could be created within areas with increasing moisture. Breeding habitat for amphibians and waterfowl could feasibly be constructed if wetland hydrology supports marsh creation.

#### 3.4.2 Riparian Habitat

Consistent with reclamation efforts of the TSF beach mentioned above, re-vegetation of the riparian portion of the TSF flanking the pond will be directed towards providing habitat for waterfowl and small mammals, as well as providing forage and browse for larger mammals. Species selected for shrub plantings will consider target species' requirements, with consideration given to those species of Aboriginal interest for trapping.

#### 3.4.3 Upland Habitat

Seeding for interim reclamation and the early years of progressive final reclamation will provide grazing and foraging opportunities prior to closure for all species that require open grassland habitats for any life requisites, including summer forage for bears, moose and mule deer. Deciduous and coniferous trees and shrubs will be planted in variable densities and clumps to create habitat patches and forest openings to provide a mosaic of open and closed woodland habitats as they mature. Other habitat attributes that will be restored include:

- Adding large logs, rock piles, stumps, and other coarse woody debris to planted areas to provide micro-habitats for small mammals and perching habitat for raptors; these piles will also provide micro-habitats for furbearers in later structural stages.
- Planting artificial snags 5 m high on reclaimed areas along forest edges (for olive-sided flycatcher).

#### 4 – PERMANENT HABITAT LOSS

This section describes the permanent loss of wetland and riparian habitat after all the measures to avoid (Section 3.1), minimize (Section 3.2 and Appendix C), and restore (Section 3.4) adverse effects to wildlife habitat. Compensation targets are described, as per Section 2.4..

For the purposes of this plan, the amount of permanent loss is defined as the difference between the habitat area between baseline (without the project) and post-closure (after mitigation measures listed in Appendix C have been applied and reclamation has taken effect). A summary of residual habitat loss is provided in Table 4.1.

**Table 4.1. Permanent Residual Habitat Loss (ha)**

| Habitat                          | Mine | Transmission Line <sup>2</sup> | Access Road <sup>2</sup> | Total |
|----------------------------------|------|--------------------------------|--------------------------|-------|
| Wetland Ecosystems               | 258  | 0                              | 10                       | 258   |
| Riparian Ecosystems <sup>2</sup> | 317  | 0                              | 10                       | 317   |

**NOTES:**

<sup>2</sup> – Actual residual losses will be determined by pre-construction surveys and will be based on detailed design and alignment

Permanent loss is described in greater detail below.

#### 4.1 MINE SITE

##### 4.1.1 Wetlands

##### 4.1.1.1 Direct Loss of Wetlands

The 2012 EIS predicted that the Project will result in the permanent loss of 258 ha of wetlands in the mine site due to the locations of permanent project features (Table 4-1). None of the prospectively affected wetlands in the mine site are provincially-listed ecological communities of conservation concern (i.e. red or blue listed). With respect to the loss of wetland functions that are also within federal regulatory jurisdiction (i.e. species at risk and migratory birds), the loss of this area of wetland ecosystems will be accompanied by the loss of the following wetland functions:

- Loss of 211 ha of wetlands with moderate to high potential to provide amphibian breeding habitat (for western toad), principally the two fen wetland ecosystems plus the open water wetland class. Field surveys indicated that amphibian breeding habitat was

particularly associated with these classes. Other shrub /tree dominated wetlands were not found to be productive amphibian habitat due to the dryness of the units (refer to the 2009 EIS, Volume 5, Appendix 5-6-A Wildlife Data Report 1997 – 1999).

- Loss of 258 ha of wetlands with moderate to high potential to support migratory bird habitat. Since the category, ‘migratory birds’ includes a number of guilds that collectively utilize various habitats for different life stages; all 258 ha of wetlands are included.
- 258 ha of wetlands with moderate to high potential to support wetland-associated mammal habitat. Field data indicate that the following wetland-dependent mammal species have been observed within the mine site: moose, grizzly bear, black bear, muskrat, otter, long-tailed weasel, mink, and beaver (Section 6:Wildlife and Appendix 5-6-E in 2009 EIS). Grizzly bear may potentially use the 210 ha of prospectively-affected sedge fens as a food source. In addition, bat species typically feed on flying insects, which tend to be abundant over open water and wetlands. Four little brown myotis were detected in 2006 and this species has recently been listed as endangered by COSEWIC.

For additional detail on residual loss to wetlands, see Appendix D: Residual Effects on Wetlands.

#### 4.1.1.2 Indirect Effects on Wetlands

Indirect-effects to wetland functions can result from changes in surface or groundwater hydrology. The 2012 EIS includes a description of the potential for the water table east and west of the open pit to be lowered due to pit-dewatering during operations and during the subsequent 50 year period until near-surface groundwater elevations are restored (see Section 2.7.2.7.2.6). As such, wetland vegetation composition may shift or wetlands may dry substantially, no longer supporting hydrophytic vegetation. Indirect loss of wetlands due to this mechanism would result in the loss of attendant functions described above. The EIS estimated that as much as 69 ha of wetlands located outside the Project footprint, but within the predicted groundwater drawdown area, might be affected; however, if sufficient precipitation and surface (sheet) flows are available to sustain wetland hydrology within this area, change in wetland species composition and function may not be detected. Therefore, a monitoring program is required in order to determine the actual potential effects to wetland ecosystems and functions within the area of predicted groundwater drawdown area.

#### 4.1.2 Riparian Habitat

The 2012 EIS estimated 317 ha permanent loss of riparian ecosystems in mine site. The riparian ecosystem hectares are summarized separately to any of the identified wetland ecosystems. The areal estimate of these riparian ecosystems reported in the EIS is conservative due to the methods used to map riparian habitats (30 m buffers on all TRIM streams and water features). Actual

losses will be refined according to more-detailed pre-construction surveys to derive areas of residual loss for purposes of habitat compensation planning.

#### 4.2 TRANSMISSION LINE AND ACCESS ROAD

No permanent residual loss of habitat is anticipated along the transmission corridor, as the transmission line will be removed and the right-of-way will be decommissioned and allowed to regrow following mine closure.

The temporary loss of wetland habitat within the transmission line RoW is estimated to be 46.6 ha; however, only the swamp wetland class is likely to experience change to vegetation structure and wetland losses within this class total 10.5 ha. All other shrub or graminoid-dominated wetlands within the RoW are not apt to experience a change in vegetation structure due to RoW construction or operations. The cottonwood riparian community would likely experience some change in vegetation structure during RoW construction or operations, and an estimated 3.6 ha<sup>1</sup> may be temporarily affected. Permanent losses of wetlands and riparian ecosystems associated with the access road are anticipated to be less than 10 ha each.

Project effects from the transmission line on most wildlife species are minimal, and any residual effects are reversible with no permanent loss anticipated (Appendix E). For example, there is no permanent loss of Short-eared Owl nesting habitat, Sharp-tailed Grouse nesting or feeding habitats, or Great Blue Heron nesting habitat. Where there is residual loss of habitat associated with the transmission line, it is of low magnitude with a return to baseline conditions through natural succession expected after decommissioning.

The most important interaction between wildlife and the transmission line is with grizzly bear. For that reason, the focus for habitat compensation associated with residual effects of the transmission line will be to address the increase in linear features density through off-site access management to compensate for residual effects on grizzly bear and other species.

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<sup>1</sup> The 2009 EIS reports the total estimated loss of riparian habitat within the transmission line RoW is estimated to be 123.8 ha; however, given the stated commitment to avoid vegetation loss within 30 m of all wetlands and water courses, actual temporary loss of riparian habitat is expected to be much less. Given the low vegetation structure of the willow-dominated riparian community, these areas are not apt to experience a change in vegetation structure during RoW construction or operations.

## 5 – HABITAT COMPENSATION STRATEGY

### 5.1 GUIDING PRINCIPLES

Habitat compensation will be guided by the following principles:

- In order of priority, Taseko's will consider options to restore, enhance or create habitat. Taseko recognizes that an alternative approach that can be considered is to avert risks to high value areas.
- Habitat compensation measures (on or off-site) will be implemented before or concurrently with Project implementation rather than after Project implementation
- On-site measures will be preferred and maximized first, followed by off-site measures within MoE Region 5, followed by measures further afield in the province
- In-kind (habitat of the same type) is preferred over out-of-kind (habitat of a different type); however, the feasibility of restoring specific types may necessitate out-of-kind and sometimes out-of-kind can deliver habitat capable of supporting greater productive capacity than in-kind (i.e. emergent marsh vs. shrub carr)
- Compensation initiatives will be strategic, and should reflect the ecological and wildlife management priorities for the region, such as recovery initiatives for species at risk
- Taseko will assess candidate locations in terms of their value as habitat (size, area, quality, connectivity) and feasibility (political and local support, cost).
- Participation will be key to the development of the final Habitat Compensation Plan.

### 5.2 RIPARIAN HABITAT AND FISH HABITAT COMPENSATION

Opportunities for harmonizing benefits to a variety of species reliant on riparian habitat through the Fish and Fish Habitat Compensation Plan elements will be sought. Currently, the Fish and Fish Habitat Compensation Plan proposes to contribute approximately 100 to 200 m of new channel, or 0.3 to 0.6 ha of on-site riparian habitat restoration, through the excavation of a remnant channel through an existing wetland along Fish Lake Tributary 1 (see Figure 3.1 of Appendix 2.7.2.5-A of the 2012 EIS).

### 5.3 SPECIES AT RISK AND WETLANDS

Contributions to the recovery of species reliant on wetlands will assist with the species from becoming extirpated and support the recovery of species at risk. For species reliant on uplands, Taseko will follow the mitigation hierarchy and will avoid and minimize impacts, and restore on-site. The exception to this is for grizzly bear. Grizzly bear compensation efforts will focus on reducing grizzly bear risk of mortality in core habitat.

#### 5.4 GRIZZLY BEAR RISK MORTALITY MEASURES AND UPLAND HABITAT

Taseko is committed to the measures identified in the Grizzly Bear Risk Reduction Plan (2012 EIS Section 2.7.2.8). By working towards reducing linear density features in access management planning and road decommissioning, other species dependent on uplands benefit, including those species important to First Nations, such as moose. The 2012 EIS estimated the displacement of the following species based on the habitat lost and area used by each species on the mine site. With the exception of waterfowl which benefit from wetland compensation, effects to regional populations of these species are predicted to be small.

- 2.7 moose (winter habitat)
- 71 breeding pairs of Mallard / Barrow's goldeneye
- 0.7 mule deer
- 0.1 grizzly bear
- < 0.1 fisher

#### 5.5 ADDITIONAL HABITAT COMPENSATION MEASURES

Taseko will explore a range of opportunities with federal and provincial regulatory agencies, First Nations, stakeholders, and other potential partners in order to develop the most effective measures to achieve the objectives of this habitat compensation plan. A summary of Taseko's proposed strategy can be found in Table 4-3.



**Table 5-1. Summary of Residual Effects and Compensation Measures**

| Residual Effect  | Objective   | Compensation Measures  | Area and/or Functions Replaced  |
|--|---|--|---|
| Wetland loss<br><br>(258 ha)   | No-net-loss of wetland habitat functions associated with federal regulatory jurisdiction (migratory birds and species at risk)  | <p>Taseko will replace wetland functions using some combination of the strategies described below.</p> <p>Compensating habitat loss on the New Prosperity site would be ideal, but Taseko's analysis indicates that there are not likely to be sufficient opportunities to completely compensate for residual effects this way.</p> <p>A mix of on-site and off-site strategies is therefore proposed:</p> <p>On site:</p> <ul style="list-style-type: none"> <li>• Implement enhanced reclamation on site.</li> <li>• Create new-additional wetland habitat on lands within the MDA.</li> </ul> <p>Off site:</p> <ul style="list-style-type: none"> <li>• Compensate wetland loss on another Taseko property. Taseko is evaluating the feasibility of: (a) forgoing development of wetlands that are under imminent threat of loss and a conservation priority and/or (b) rehabilitating/creating wetlands on another Taseko property.</li> <li>• Restore, enhance or create wetlands elsewhere within the region by collaborating with partners (The Canadian Intermountain Joint Venture is one example) to plan and implement compensation projects</li> </ul> | <p>258 ha of wetland ecosystems</p> <ul style="list-style-type: none"> <li>• breeding habitat for western toad</li> <li>• breeding, foraging and staging habitat for migratory birds</li> <li>• foraging habitat for grizzly bear</li> <li>• foraging habitat for species of importance to First Nations</li> </ul> |
| Riparian Habitat<br><br>(317 ha-actual hectares to be determined following additional surveys) | No-net-loss of riparian habitat functions associated with federal regulatory jurisdiction (migratory birds and species at risk) | <p>Off-site:</p> <ul style="list-style-type: none"> <li>• Restore degraded riparian habitat within the region</li> <li>• Create riparian habitat buffers around any wetland restoration/creation projects within the region (listed above)</li> <li>• Work with stakeholders (cattleman's association/ CIJV) to manage livestock access to watercourses</li> </ul> <p>Maximize opportunities for harmonizing compensation measures with the Fish Compensation Plan</p>   | <p>317 ha riparian habitat (actual hectares to be determined following additional pre-construction surveys)</p>   |
| Grizzly Bear   | Reduce grizzly bear   | After implementing best management practices with  |   |

| Residual Effect                                   | Objective  | Compensation Measures   | Area and/or Functions Replaced   |
|---|--|---|--|
| mortality risk                                    | mortality risk in core habitat for the species   | <p>regard to access on Taseko's ROW:</p> <ul style="list-style-type: none"> <li>• Commit to collaborating with the Province, Aboriginal groups, relevant tenure holders, and other stakeholders to identify access management in priority areas for grizzly bears</li> <li>• During transmission line construction, address priority areas by reducing the density of existing linear features in the region through decommissioning and re-vegetating roads and blocking vehicle/ATV access</li> <li>• Support or conduct research on regional populations</li> <li>• Plan and implement an outreach and education program to reduce conflict with stakeholders</li> </ul> | <p>South Chilcotin Ranges GBPU core habitat</p> <p>This strategy will also benefit a number of other priority species, including, but not limited to, moose, wolverine, and badger.</p>  |
| Species at Risk                                   | Prevent wildlife species from becoming extirpated as a result of Project activities and to support the recovery of species at risk | <p>Compensation measures for wetlands, riparian habitat and grizzly bear will contribute to the recovery of:</p> <ul style="list-style-type: none"> <li>• Western toad</li> <li>• Olive-sided Flycatcher</li> <li>• Common Nighthawk</li> <li>• Rusty Blackbird</li> <li>• Short-eared Owl</li> <li>• Little brown myotis</li> <li>• Grizzly bear</li> <li>• Wolverine</li> </ul>   | <p>258 ha of wetland ecosystems</p> <p>317 ha riparian habitat (actual hectares to be determined following additional surveys)</p> <ul style="list-style-type: none"> <li>• breeding habitat for western toad</li> <li>• breeding, foraging and staging habitat for migratory birds</li> <li>• foraging habitat for grizzly bear</li> <li>• foraging habitat for species of importance to First Nations</li> </ul> |
| Species Important to the Tsilhqot'in First Nation | Compensate for affects to the Project on First Nation use of wildlife <sup>2</sup>   | <p>A priority for Taseko is to establish dialog with the Tsilhqot'in First Nation regarding their use of wildlife, residual effects of the project, and opportunities for mitigation or compensation, such as installing infrastructure for managing water, cattle or horses that enhance wildlife and waterfowl habitat, and improve abundance and diversity of wildlife species that are of interest to Aboriginal people.</p>  |  |

<sup>2</sup> Provincial guidance indicates that compensation should focus on the William Case species: Moose, mule deer, fisher, California bighorn sheep, grizzly bear, black bear, mountain goat, feral horses, wolf, cougar, Canada lynx, bobcat, wolverine, American marten, short-tailed weasel (ermine), long-tailed weasel, American mink, snowshoe hare, red squirrel, northern flying squirrel, American beaver, common muskrat, northern river otter, mice and voles.

## 6 – NEXT STEPS

### 6.1 CONSULTATION AND ENGAGEMENT

Records of past consultation and engagement with federal and provincial agencies, First Nations and stakeholder groups were reviewed during the development of this draft Habitat Compensation Plan. Dialogue with stakeholders and interest groups in the region is ongoing in an attempt to seek potential projects for inclusion into the plan. The potential project list for restoration, enhancement and/or habitat creation includes specific projects or areas of environmental concern raised by local Sportsman Clubs, ranchers, Ducks Unlimited, and the Fraser Basin Council. Recommendations for environmental enhancement by individuals in the region will also be considered, which can arise in projects such as the Charleyboy Puntzi Watershed Restoration Project, initiated by Ervin Charleyboy and Taseko. Discussions have indicated that substantial opportunity exists in to enhance and restore wetlands and wetland function in the region, and riparian habitats impacted by cattle and horses in the Nemiah, Big Onion Lake, Elkin Creek and Alexis Creek areas.

A process for consulting on specific projects needs to be identified by the Crown to ensure adequate consultation with First Nations, identification of their interests and potential infringement of any proposed enhancement activities on Aboriginal rights.

### 6.2 ROLES AND RESPONSIBILITIES

Taseko believes that to be effective, the final Habitat Compensation Plan must be developed in collaboration with federal and provincial regulatory agencies, the First Nations, and stakeholders.

Taseko commits to:

- developing detailed plans for the targets specified in this document;
- actively engaging with all groups with a potential interest in the project, particularly with leadership and individuals from the Tsilhqotin and Esketemc First Nations, ranchers, and Sportsman Clubs;
- considering all projects brought forward through engagement with groups and individuals;
- consulting with federal and provincial regulators on the technical aspects of the plan and subsequent projects list;
- implementing the projects through employment of local experts and contractors, and where appropriate;
- contributing in-kind to others' projects in the region; and,

- designing reclamation and monitoring programs, including monitoring success of on-site and off-site enhancement projects.

Taseko further commits to hiring local wherever feasible, which may include experts such as biologists, contractors required for infrastructure construction or removal, environmental monitors and labourers. Opportunities will be sought to include education and training aspects in each project as demonstrated on the Charleyboy Puntzi Watershed Restoration Project.

Roles of federal and provincial regulators include:

- engaging with Taseko on the technical aspects of the draft plan and project list as it develops,
- contributing to strategies and approaches based on their expert knowledge to ensure projects' success and efficiencies, and
- identifying regulatory requirements such as permitting.

In addition, Taseko recognizes it is the Crown's role to clarify and establish a First Nations consultation process that ensures First Nations interests are considered in the development of the final plan and implementation. Taseko will support the Crown's consultation efforts, and independently be open to engagement with First Nations on potential projects for consideration, employment and contracting opportunities, and education opportunities.

### 6.3 PROPOSED SCHEDULE

Taseko proposes to develop a final habitat compensation plan, which will include an implementation schedule, based upon consultation with key stakeholders, including federal and provincial regulators, the First Nations, the public, and other resource users. A conceptual timeline for next steps and responsibilities is summarized in Table 6-1.

**Table 6-1. Next Steps, Responsibilities, and Timeframe**

| Phase                    | Next Steps  | Responsibility |        |                  |              |               |
|--------------------------|---|----------------|--------|------------------|--------------|---------------|
|                          |   | Taseko         | EC/CWS | BCM/OE/<br>FLNRO | Stakeholders | First Nations |
| Environmental Assessment | Submit draft Habitat Compensation Plan  | L              |        |                  |              |               |
|                          | Discussion and feedback on project effects, mitigation and compensation during review   | L              | L      | L                | S            | S             |
| Project Approval         | Technical consultations with regulatory agencies regarding targets, strategies, approaches, potential projects of regional interest and next steps  | L              | L      | L                |              |               |
|                          | Meetings with regulatory agencies regarding First Nations consultation process for identification of issues and concerns relative to their interests and proposed activities infringement on rights.  | S              | L      | L                |              |               |
|                          | First round of consultations with First Nations for feedback and discussion, and identification of potential projects of local and regional interest  | L              | L      | L                |              | L             |
|                          | First round consultations to for feedback and discussion, and identification of potential projects of local and regional interest: Stakeholders and tenure holders (ie. forest industry, ranchers, Sportsman Clubs); Interest groups (ie. Conservation Societies) | L              |        |                  | S            | S             |
|                          | Establish access management planning group for Transmission Line  | L              | S      | S                | S            | S             |
| Permitting               | Technical consultations with regulatory agencies regarding permitting requirements for implementation and scheduling  | L              | L      | L                |              |               |
|                          | Consultation with First Nations regarding implementation schedule to identify issues and concerns   | S              | L      | L                |              | L             |
|                          | Ground-truthing feasibility of potential projects   | L              |        |                  |              | S             |
|                          | Planning for TL final alignment and access decommissioning  | L              | S      | S                | S            | S             |
|                          | Second round consultations: Presentation of revised draft; feedback and discussion  | L              | L      | L                | S            | S             |
|                          | Initiate support for and/or conduct grizzly bear population research and monitoring   | L              |        | S                |              |               |
|                          | Final Habitat Compensation Plan with implementation plan  | L              |        |                  |              |               |
| Construction             | Implementation of the Habitat Compensation Plan   | L              |        |                  |              |               |
|                          | Initiate off-site restoration, enhancement projects   | L              |        |                  |              |               |
|                          | Initiate education and awareness / outreach program for grizzly bear  | L              |        | L                |              |               |
| Operations (yr 1-5)      | Implementation of Monitoring for indirect Project Effects, and success of mitigation measures and compensation *  | L              |        | S                |              |               |
|                          | Create additional habitat within MDA  | L              |        |                  |              |               |
|                          | Continue with off-site restoration, enhancement projects  | L              |        |                  |              |               |
| Operations (yr 5 - 20)   | Monitoring of indirect Project Effects, and success of mitigation measures and compensation   | L              |        | S                |              | S             |
|                          | Interim reclamation on-site   | L              |        |                  |              |               |
|                          | Refine habitat loss, and if required, the Habitat Compensation Plan Reclamation   | L              | S      | S                |              |               |
|                          | Continue with off-site restoration, enhancement projects  | L              |        |                  |              | S             |
| Closure                  | Reclamation and Monitoring  | L              |        | S                |              | S             |

**Notes:**

L = Lead

S = Supporting

#### 6.4 ELEMENTS OF THE FINAL PLAN

- Refined technical analyses of the spatial and temporal scopes for compensation
- Definition of the roles and responsibilities of Taseko, regulatory agencies, and any other organizations responsible for the successful implementation of the HCP
- Negotiated commitments in support of the HCP
- Implementation Plan
- A monitoring plan to assess the effectiveness of compensation
- A reporting plan to disseminate results regarding the implementation of the Plan

## 7 – REFERENCES

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**Appendix A Species at Risk associated with the mine site**

| Species                       | Interaction with the Project    | Observed near the Project <sup>1</sup> | BC Status | COSEWIC Status  | SARA Schedule | BC Conservation Framework Priority | "William Case" Species | Key Habitats                      | Permanent Habitat Loss                                | Wildlife Key Indicator   |
|-------------------------------|---------------------------------|--|-----------|-----------------|---------------|------------------------------------|------------------------|-----------------------------------|---|--|
| Olive-sided Flycatcher        | Mine site and transmission line | yes                                    | Blue      | Threatened      | 1             | 2                                  | no                     | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats | no, inferred from effects on old forest                            |
| Common Nighthawk              | Mine site and transmission line | yes                                    | Yellow    | Threatened      | 1             | 2                                  | no                     | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats | no, inferred from effects on grasslands and long-billed curlew     |
| Western toad                  | Mine site and transmission line | yes                                    | Blue      | Special Concern | 1             | 2                                  | no                     | wetland habitats                  | 211 ha  | yes  |
| Short-eared Owl               | Mine site and transmission line | no                                     | Blue      | Special Concern | 1             | 2                                  | no                     | moderate feeding habitat          | 111 ha  | yes  |
| Rusty Blackbird               | Mine site and transmission line | no                                     | Blue      | Special Concern | 1             | 2                                  | no                     | wetland habitats                  | 258 ha  | no, inferred from effects on wetlands and mallard breeding habitat |
| Little brown myotis           | Mine site and transmission line | yes                                    | Blue      | Endangered      | -             | 3                                  | no                     | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats | no, inferred from Townsend's Big-eared Bat                         |
| Grizzly Bear                  | Mine site and transmission line | yes                                    | Blue      | Special Concern | -             | 2                                  | yes                    | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats | yes  |
| Wolverine, <i>luscus</i> ssp. | Mine site and transmission line | yes                                    | Blue      | Special Concern | -             | 2                                  | yes                    | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats | no, inferred from effects on grizzly bear                          |

**Appendix B Species Important to First Nations Assessed for the Project**

| Species                      | Interaction with the Project    | William case Species | Species at Risk | Habitat                           | Residual Loss Post-Closure                            |
|------------------------------|---------------------------------|----------------------|-----------------|-----------------------------------|---|
| Moose                        | Mine site and transmission line | yes                  | no              | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats |
| Mule deer                    | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Fisher                       | Mine site and transmission line | yes                  | yes             | upland habitats                   | 469 ha  |
| Grizzly bear                 | Mine site and transmission line | yes                  | yes             | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats |
| Black bear                   | Mine site and transmission line | yes                  | no              | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats |
| Wolf                         | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Cougar                       | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Canada lynx                  | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Bobcat                       | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Wolverine                    | Mine site and transmission line | yes                  | yes             | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats |
| American marten              | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Short-tailed weasel (ermine) | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Long-tailed weasel           | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| American mink                | Mine site and transmission line | yes                  | no              | upland habitats, wetland habitats | 469 ha of upland habitats, 258 ha of wetland habitats |
| Snowshoe hare                | Mine site and transmission line | yes                  | no              | upland habitats                   | 469 ha  |
| Red squirrel                 | Mine site and transmission      | yes                  | no              | upland habitats                   | 469 ha  |

| Species                    | Interaction with the Project        | William case Species | Species at Risk | Habitat          | Residual Loss Post-Closure           |
|----------------------------|-------------------------------------|----------------------|-----------------|------------------|--------------------------------------|
|                            | line                                |                      |                 |                  |                                      |
| Northern flying squirrel   | Mine site and transmission line     | yes                  | no              | upland habitats  | 469 ha                               |
| American beaver            | Mine site and transmission line     | yes                  | no              | wetland habitats | 258 ha                               |
| Common muskrat             | Mine site and transmission line     | yes                  | no              | wetland habitats | 258 ha                               |
| North American river Ooter | Mine site and transmission line     | yes                  | no              | wetland habitats | 258 ha                               |
| Mice and voles             | Mine site and transmission line     | yes                  | no              | upland habitats  | 469 ha                               |
| California bighorn sheep   | Transmission line - eastern portion | yes                  | yes             | n/a              | none - no interaction with mine site |
| Mountain goat              | Transmission line - eastern portion | yes                  | no              | n/a              | none - no interaction with mine site |
| Feral horses               | Transmission line - eastern portion | yes                  | no              | n/a              | none - no interaction with mine site |

## **Appendix C            Taseko Commitments to Mitigation**

### **Wetlands and Riparian Ecosystems**

Avoid vegetation loss:

- clearly delineate the boundaries of mapped and unmapped wetlands and riparian ecosystems in proximity to planned disturbance/activities to facilitate avoidance during construction and operations
- wherever practicable, avoid wetlands and riparian ecosystems and avoid vegetation loss within 30 m of wetlands or riparian ecosystems through environmentally sensitive Project design

Minimize disturbance:

- minimize the extent of grubbing, stripping and the removal of shrubs and herbaceous species, especially within wetlands and riparian areas (30 m) adjacent to streams, lakes and wetlands
- apply best management practices which may include creating buffer zones around wetland habitats, maintaining connectivity among wetlands within wetland complexes, and managing access to wetlands in the RSA beyond the access road construction
- in areas requiring clearing only, retain the humus layer and vegetation root mat whenever and wherever possible

Mitigate against invasive species:

- minimize areas of soil disturbance during construction and maintenance of roads
- re-establish vegetation on disturbed areas as soon as possible
- implement the Invasive Plant Management Plan

Maintain natural drainage patterns:

- minimize the linear extent of roads crossing or paralleling wetlands
- wherever practicable, avoid diversion of watercourses
- properly culvert all roadways
- schedule any construction in sensitive wetland and riparian areas to occur during seasonally dry or frozen ground conditions (i.e., negligible risk of ground disturbance/compaction)

- during instream construction, ensure water flow around work site is not interrupted

Reduce windthrow risk:

- wherever practicable, retain a wind firm buffer at least 20 m wide of upland forest around forested riparian areas
- where no natural wind firm features are available, consider aligning clearing boundaries at an angle to, or parallel to the prevailing storm winds
- whenever possible, feather the outer edge of cleared areas by removing trees prone to windthrow. Priority should be given to removing unsound trees

Protect forest health:

- in consultation with the BC Ministry of Forests and Range (MOFR), remove any green felled or windthrown spruce from the site as required to avoid build up of spruce bark beetle populations
- notify the MOFR as quickly as possible of any outbreaks of mountain pine beetle and do not remove “green attack” trees from site except under MOFR direction

Minimize dust deposition:

- mitigate against road dust by using a dust suppressant when conditions warrant
- ensure that loaded concentrate trucks are sealed to prevent dust escaping during transit

### **Additional Measures Targeting Species at Risk**

General mitigation measures for minimizing the potential effects of the New Prosperity Project on species at risk habitat associated with the mine site include:

- Site clearing area will be minimized by carefully considering (and clearly delineating) clearing boundaries, so that the cleared areas are practical, in that they comfortably allow for the construction and placement of facilities and Project components, but are not excessive. In practice, this may result in the retention of patches or strips of intact vegetation cover within the Project footprint.
- Site clearing will avoid non-pine forests of any age wherever possible.
- Prior to and during site clearing for mine site facilities (e.g., camp, parking lot, processing plant), any wildlife habitat features (e.g., mineral licks, dens, nest trees, snags, rock outcrops, small ponds/seepages) that are identified will be evaluated for potential mitigation measures (e.g., avoidance). Identification of these features will occur as they are encountered (either by boundary flagging crew or clearing crew). The draft *Wildlife*

*Habitat Features: Summary of Management Guidelines–Northern Interior Forest Region* will be used in the identification of wildlife habitat features and potential mitigation measures that would be applicable in the Project area.

- Retain actual or potential wildlife trees (i.e., dead or dying trees and snags, and living or dead deciduous trees) wherever possible and safe to do so (as per provincial guidelines). This will also apply to the transmission line.
- Best practice adherence to region-specific breeding bird timing windows for site clearing and any subsequent vegetation management activities. An alternative to this best practice is searching for and flagging off nest sites in advance of vegetation clearing. Timing window dates and any alternatives to best practice will be confirmed in consultation with BC Ministry of Environment Region 5 staff. This will also apply to the transmission line.

General mitigation measures for minimizing the potential effects of the New Prosperity Project on species at risk habitat associated with the transmission line include:

- Site clearing will be minimized by keeping the width of the cleared right-of-way to an average of 80 m, minimizing the construction of new access roads, and overlapping the right-of-way with existing cleared areas, wherever possible.
- Site-specific routing of the transmission line and pole placement to avoid non-pine forests of any age will be implemented wherever possible.
- Prior to and during site clearing, any wildlife habitat features (e.g., mineral licks, dens, nest trees, snags) that are identified will be evaluated for potential mitigation measures (e.g., avoidance).
- ROW maintenance (e.g., vegetation management activities) will be minimized, that is, trimming back vegetation re-growth will be conducted as required on a site-specific basis rather than as a regularly scheduled maintenance activity.
- Taseko to work with local ranchers to prevent cattle disturbance in wetland or riparian areas that may become more accessible with the new right-of-way.
- For sections of the transmission line that are unable to avoid passing through high value wildlife areas, the right-of-way will be narrowed, fungal inoculation will be used to advance the development of cavity trees, vegetation management will be reduce sight lines along the transmission line right-of-way, and nest/den boxes will be erected.
- Mitigation of potential effects of the transmission line on species at risk is focused on avoiding and minimizing disturbance through final alignment and pole placement. For example, pre-construction surveys will be conducted for Lewis's woodpeckers and potential/suitable nest trees within the transmission line ROW will be considered during

final alignment. Moderate and highly suitable nesting habitat for flammulated owl will be identified during final alignment planning and avoided where possible, as will potential den sites for American badger and Great Basin gopher snakes.

### **Grizzly Bear**

Mitigation measures directed at reducing direct and indirect mortality risk of grizzly bears affected by the New Prosperity Project

| Adverse Effect                                  | Mitigation Measure <sup>a</sup>   | Objective   |
|---|---|---|
| Increased Vehicle Traffic along the Access Road | Taseko will provide wildlife-related driver awareness training to all Project-related vehicle operators.  | Minimizing Grizzly Bear Direct Mortality Risk by increasing driver compliance with posted speed limits and wildlife reporting procedures.   |
| Increased Vehicle Traffic along the Access Road | Taseko will work with the BC Ministry of Transportation, BC Ministry of Environment and other road users to require all radio-equipped vehicles to broadcast sightings of wildlife along the access road corridor.  | Minimizing Grizzly Bear Direct Mortality Risk by providing timely and site-specific information on the presence of wildlife. This will increase driver alertness to potential hazards and compliance with posted speed limits.  |
| Increased Vehicle Traffic along the Access Road | Project-related traffic will adhere to posted speed limits along the entire length of the access road. The speed limit along the 4500 Road will be 50 km/h.   | Minimizing Grizzly Bear Direct Mortality Risk by slowing vehicle speeds. Vehicles travelling at slower speeds will reduce the frequency of wildlife-vehicle collisions by providing more reaction time for both the animal and the vehicle to avoid a collision.                                |
| Increased Vehicle Traffic along the Access Road | Taseko will work with the BC Ministry of Transportation, BC Ministry of Environment and other road users to require that passive wildlife warning/crossing signs be posted at potential high risk areas (e.g., riparian and wetland areas bisected by the access road).   | Minimizing Grizzly Bear Direct Mortality Risk by providing signage to influence driver behaviour. Driver awareness training and radio-broadcasted wildlife sightings are essential to increase compliance with posted speed limits and alertness in high risk areas identified by this signage. |
| Increased Vehicle Traffic along the Access Road | Project-related wildlife-vehicle collisions or near misses will be recorded and regularly reviewed by Taseko. Project-related wildlife-vehicle collisions will be reported to the BC Ministry of Environment regional office in a timely manner.  | Minimizing Grizzly Bear Direct Mortality Risk by monitoring the date, time and specific location of wildlife-vehicle collisions and near hits to provide valuable feedback for improving the driver awareness and signage programs.   |
| Increased Vehicle Traffic along the Access Road | Taseko will work with the BC Ministry of Transportation, BC Ministry of Environment and other road users for prompt removal of roadside vehicle-killed or hunter-killed wildlife carcasses before animals (e.g., bears, canids, corvids) are attracted to feed on them.   | Minimizing Grizzly Bear Direct Mortality Risk by removing roadside carcasses that could attract grizzly bears. This will reduce the period of time that bears are near the access road and at risk of vehicle collisions or illegal hunting.  |
| Increased Vehicle Traffic along the Access Road | Taseko will suggest to the BC Ministry of Transportation, BC Ministry of Environment and other road users that vegetation particularly attractive to bears and ungulates (i.e., legumes such as clover) not be seeded along the access road from the junction of the 4500 and Taseko Lake roads to the mine site. | Minimizing Grizzly Bear Direct Mortality Risk by preventing the seeding of roadside vegetation that could attract grizzly bears. This will reduce the period of time that bears are near the access road and at risk of vehicle collisions or illegal hunting.                                  |
| Increased Vehicle Traffic along the Access Road | Along the section of the access road under the sole control of Taseko (i.e., within the mine footprint), the use of road salt, which can be an attractant to wildlife such as ungulates, will be  | Minimizing Grizzly Bear Direct Mortality Risk by removing salt that could attract ungulates may reduce the period of time that bears are near the access road and at risk of vehicle  |



| Adverse Effect                               | Mitigation Measure <sup>a</sup>   | Objective  |
|--|---|--|
|  | minimized or eliminated.  | collisions or illegal hunting.   |
| Increased Access along the Transmission Line | Site clearing area required for transmission line construction will be minimized by restricting the width of the cleared right-of-way to an average of 80 m.  | Minimizing Grizzly Bear Indirect Mortality Risk by minimizing the width of the right-of-way to help maintain security and foraging habitats.   |
| Increased Access along the Transmission Line | Site clearing areas required for transmission line construction will be minimized by using existing access roads as much as possible and minimizing the construction of new access roads.   | Minimizing Grizzly Bear Indirect Mortality Risk by minimizing any increase in the level of human disturbance and human-related mortality in grizzly bear habitat. A ground-truthing survey conducted in 2010 concluded that no new road construction would be required to access the transmission line right-of-way. |
| Increased Access along the Transmission Line | Along the right-of-way, modifications of terrain will be minimized (e.g., natural topographic features will be left intact) and vegetation will not be removed to the ground so as not to facilitate off highway vehicle travel.  | Minimizing Grizzly Bear Indirect Mortality Risk by reducing the potential for off highway vehicles to use the transmission line ROW. Human access is considered to have the greatest adverse effect on grizzly populations in this area.   |
| Increased Access along the Transmission Line | Roll back will be used to block roads and off highway vehicle trails that intersect the transmission line to reduce and prevent access to the transmission line ROW.  | Minimizing Grizzly Bear Indirect Mortality Risk by reducing the potential for off highway vehicles to use the transmission line ROW. Human access is considered to have the greatest adverse effect on grizzly populations in this area.   |
| Increased Access along the Transmission Line | The effectiveness of access control measures along the transmission line ROW will be monitored during the first and second year of mine operation. Additional measures aimed at preventing ATV use at strategic locations will be employed as necessary, including but not limited to, tree and shrub plantings, and construction of berms and ditches. | Minimizing Grizzly Bear Indirect Mortality Risk by monitoring the effectiveness of measures to prevent off highway vehicles using the transmission line. Data obtained through monitoring will provide valuable feedback for improving access control measures.  |
| Mortality Risk at the Mine Site              | Taseko will provide Bear Aware and Bear Safety information and training for all Project Personnel.  | Minimize Grizzly Bear Mortality Risk by increasing the awareness of potential for bear-human conflicts and methods for avoiding them to increase compliance with aspects of the Grizzly Bear Mortality Risk Reduction Plan.  |
| Mortality Risk at the Mine Site              | Taseko will develop a problem wildlife prevention and response plan as part of the Vegetation and Wildlife Management Plan.   | Minimize Grizzly Bear Mortality Risk by implementing the problem wildlife prevention and response plan as one of the key measures to avoid bear-human conflicts.   |
| Mortality Risk at the Mine Site              | Taseko will only employ non-lethal deterrent methods in the unlikely event a problem bear situation develops, unless otherwise instructed, and fully supported, by BC MOE.  | Minimize Grizzly Bear Mortality Risk by using non-lethal deterrents.   |
| Mortality Risk at the Mine                   | All waste that may be an attractant to bears (e.g., food waste) will be handled   | Minimize Grizzly Bear Mortality Risk by implementing best  |

| Adverse Effect                  | Mitigation Measure <sup>a</sup>  | Objective  |
|---------------------------------|--|--|
| Site                            | in accordance with strict permit conditions  | management practices with respect to garbage management in grizzly bear habitats. This will minimize the potential for garbage-related bear-human conflicts.                               |
| Mortality Risk at the Mine Site | Taseko will restrict project-related activities, which would be related to water management and monitoring, near the inlet to Fish Lake during the spring.   | Minimize Grizzly Bear Mortality Risk by reducing disturbance of grizzly bear using this area and minimizing the risk of bear-human encounters.   |
| Mortality Risk at the Mine Site | Pre-construction surveys will specifically search for grizzly bear den sites within the mine site footprint when clearing activities are scheduled for winter. Detected active den sites will be retained as per Best Management Practices and incorporated into adaptive management strategies whenever possible. | Minimize Grizzly Bear Mortality Risk by reducing risk of mortality of denning bears. The mine site footprint is not considered prime denning habitat.                                      |
| Mortality Risk at the Mine Site | The effectiveness of measures to avoid and minimize bear-human conflicts at the mine site will be monitored during mine operation. Mitigation measures will be evaluated and adjusted as necessary.  | Minimize Grizzly Bear Mortality Risk by adjusting mitigation measures within an adaptive management framework to improve implementation of the Grizzly Bear Mortality Risk Reduction Plan. |

<sup>a</sup>: Adapted from 2009 EIS/Application (Section 6.3.4.6 – 6.3.4.8) and from 2012 EIS/Application (see Grizzly Bear and Table 2.7.2.8-12, Section 2.7.2.8) and IR38 (Mitigation for Effects on Grizzly Bear).

**Appendix D            Residual Effects on Wetlands**

This appendix provides additional detail on the direct and indirect effects of the Project on wetlands.

Direct effects to wetland functions are due to the loss of wetlands through clearing, grading and construction of Project features in the mine site (Table D-1).

Table D-1 Direct Effects to Wetland Ecosystems

| Wetland Class               | Wetland Ecosystem              | 2012 New Prosperity                |  |   |
|-----------------------------|--------------------------------|------------------------------------|--|---|
|                             |                                | Intact Wetlands in RSA at Baseline | Change at Maximum Disturbance (relative to baseline) | Change at Post-closure (relative to baseline) |
|                             |                                | Area (ha)                          | Area (ha)  | Area (ha)                                     |
| Fen                         | Water sedge - Beaked sedge     | 743                                | -146   | -125  |
|                             | Willow - Scrub birch - Sedge   | 639                                | -128   | -85   |
|                             | <i>Fen Total</i>               | <i>1,382</i>                       | <i>-274</i>  | <i>-210</i>                                   |
| Swamp                       | Sxw - Horsetail – Crowberry    | 93                                 | -73  | -10   |
|                             | Sxw - Horsetail - Glow moss    | 25                                 | -15  | -2  |
|                             | Sxw - Horsetail - Meadowrue    | 34                                 | 0  | 0   |
|                             | Sxw - Labrador tea – Willow    | 1                                  | -3   | -1  |
|                             | Drummond's willow – Sedge      | 4                                  | -3   | -2  |
|                             | <i>Swamp Total</i>             | <i>157</i>                         | <i>-93</i>   | <i>-15</i>                                    |
| Marsh                       | Beaked sedge                   | 0                                  | 0  | 0   |
|                             | Baltic Rush                    | 0                                  | 0  | 0   |
|                             | <i>Marsh Total</i>             | <i>0</i>                           | <i>0</i>   | <i>0</i>                                      |
| Shrub-Carr                  | Grey-leaved willow - Glow moss | 173                                | -38  | -32   |
|                             | <i>Shrub-Carr Total</i>        | <i>173</i>                         | <i>-38</i>   | <i>-32</i>                                    |
| Other                       | Open Water                     | 59                                 | -1   | -1  |
|                             | TRIM Marsh                     | 9                                  | 0  | 0   |
|                             | TRIM Swamp                     | 1                                  | 0  | 0   |
|                             | <i>Other Total</i>             | <i>70</i>                          | <i>-1</i>  | <i>-1</i>                                     |
| <b><i>Wetland Total</i></b> |                                | <b><i>1,781</i></b>                | <b><i>-407</i></b>                                   | <b><i>-258</i></b>                            |

Indirect-effects to wetland functions can result from changes in surface or groundwater hydrology or water quality. Figure 2.7.2.7.2.6-12 in the 2012 EIS shows the estimated area of changes to groundwater at operations. Section 2.7.2.7.2.6 in the 2012 EIS describes the potential for the water table east and west of the open pit to be lowered during operations due to pit-dewatering and during the subsequent 50 year period of rebound until near-surface groundwater elevations are restored. During this time, indirect effects to wetlands due to lower groundwater may occur. As such, wetland vegetation composition may shift or wetlands may dry substantially, no longer supporting hydrophytic vegetation. Indirect loss of wetlands due to this mechanism would result in the loss of attendant functions described above. It is estimated that 68.8 ha of wetlands located outside the Project footprint, but within the predicted groundwater drawdown area shown in Figure 2.7.2.7.2.6-12 in the 2012 EIS, may be adversely affected by this mechanism (Table D-2).

**Table D-2 Potential Indirect Project Effects to Wetland Ecosystems at Post-Closure**

| <b>Wetland Class</b> | <b>Wetland Ecosystem</b>       | <b>Estimated Area (ha)</b> |
|----------------------|--------------------------------|----------------------------|
| Fen                  | Water sedge - Beaked sedge     | 26                         |
| Fen                  | Willow - Scrub birch - Sedge   | 21                         |
| Swamp                | Drummond's willow – Sedge      | 1                          |
| Swamp                | Sxw - Horsetail - Glow moss    | 18                         |
| Shrub-carr           | Grey-leaved willow - Glow moss | 1                          |
| Shallow open water   | Open Water                     | 1                          |
|                      | <b>Total</b>                   | <b>68</b>                  |

If sufficient precipitation and surface (sheet) flows are available to sustain wetland hydrology within this area, change in wetland species composition and function may not be detected. Therefore, a monitoring program is required in order to determine the actual effects on wetland ecosystems and functions within the area of predicted groundwater drawdown area.

## **Appendix E Residual Habitat Loss of Species at Risk Associated with the Transmission Line**

This appendix provides additional detail on the direct effects of the transmission line on species at risk.

Table E-1 summarizes the residual habitat loss for species at risk within the 500m wide transmission line LSA. Disturbance is over-estimated as the final alignment of the 50 to 80 m ROW within this 500m corridor has yet to be determined and opportunities for avoidance exist.

**Table E-1 Habitat Effects on Wildlife Species at Risk**

| <b>Species at Risk</b>                                       | <b>Maximum Disturbance along Transmission Line (ha)<sup>1</sup></b> | <b>Area Permanently Lost to Transmission Line (ha)<sup>1</sup></b> | <b>Habitat Type</b>  |
|--|---|--|--|
| Amphibians (includes western toad and Great Basin spadefoot) | 47  | nil  | Wetlands, although not all wetland ecosystems within the ROW will be directly affected |
| American badger  | nil   | nil  |  |
| California bighorn sheep                                     | 940   | nil  | Displacement from habitats due to sensory disturbance only                             |
| Fisher   | 174   | nil  | non-pine leading mature and old forest   |
| Townsend's big-ear bat                                       | 163   | nil  | non-pine leading mature and old forest   |
| Great Blue Heron   | 176   | nil  | Moderate and high nesting habitat  |
| Lewis's Woodpecker   | 12  | nil  | moderate and high nesting habitat  |
| Long-billed Curlew   | 29  | nil  | moderate and high nesting habitat  |
| Yellow-breasted Chat   | 0   | nil  | moderate and high nesting habitat  |
| Sagebrush Brewer's Sparrow                                   | 7   | nil  | moderate and high nesting habitat  |
| Sharp-tailed Grouse  | 31  | nil  | moderate and high nesting habitat  |
| Sharp-tailed Grouse  | 63  | nil  | moderate and high feeding habitat  |
| Prairie Falcon   | NA  | NA   | no overlaps with 5 buffered cliff complexes  |
| Short-eared Owl  | 37  | nil  | moderate and high feeding habitat  |
| Flammulated Owl  | 17  | nil  | moderate and high nesting habitat  |
| Bald Eagle   | 124   | nil  | Riparian ecosystems  |

NOTE: 1 – After Table 2 in Taseko Mines Limited, 2009b, Supplemental Report the Project Environment Impact Statement: Local and regional environmental effects on wildlife and vegetation resources of importance to the Tsilhqot'in National Government at the Proposed Mine Site.