

## **Draft Habitat Compensation Reference Document – October 28, 2010**

The Habitat Compensation Framework included in this appendix was developed during 2010 for the original Prosperity project. This is not a Habitat Compensation Plan (HCP) for New Prosperity; rather, it is provided in order to illustrate what the concepts and theories behind a Habitat Compensation Plan (HCP) are and how such a plan would be developed after the project is approved through the Environmental Assessment process.

The original Prosperity Project underwent both a federal and a provincial environmental assessment. The provincial environmental assessment was completed and Environmental Assessment Certificate #M09-02 was issued on January 14, 2010. As detailed in Section 11.0 of the Table of Commitments attached to the Environmental Assessment Certificate, if the Project proceeded, Taseko was required to develop and implement a plan, hereafter referred to as a Habitat Compensation Plan (HCP), for achieving compensation for 'adverse impacts' to wetland habitat, the productive capacity of Fish Lake, recreation values, wildlife, wildlife habitat and the critical habitat of species at risk. In their July 2010 report, the previous Federal Panel, amongst other things, concluded that provided a wildlife habitat compensation plan is developed and implemented, the Project would not result in a significant adverse effect on migratory birds and their habitat.

Section 11.0 outlines a number of principles to guide the development and implementation of the HCP. As a first step in the development of a HCP, as stated in section 11.2, "Taseko will work with MOE officials in a timely manner to develop a "Reference Document" in which roles and responsibilities, timing and strategies for implementation of the plan.." will be detailed.

Taseko developed the attached October 2010 Draft Habitat Compensation Reference Document and was preparing to refine and finalize the document in consultation with BC MOE when the federal government decision on the proposed Prosperity Project was announced. To-date, no further work has been done on the document.

If the proposed New Prosperity Project receives federal approval and proceeds to development, it is Taseko's expectation that the document will be refined and finalized in consultation with BC MOE and others, after which a Habitat Compensation Plan (HCP) will be developed and implemented. The final "Reference Document" will amongst other things, outline a transparent process by which a determination of impact is reached, readily understood and undertaken in consultation with MOE, CWS and First Nations as required by and outlined in section 11.1 of the Table of Commitments. It will need to be updated to reflect the proposed New Prosperity Project and changes, if any, to the predicted environmental effects on the productive capacity of Fish Lake, recreation values, wildlife species and habitats and critical habitat of species at risk.

It is anticipated that after adjusting the timeframe, the next steps outlined in Table 6 of the October 2010 Draft Habitat Compensation Reference Document will need to be followed in order to develop and implement a Habitat Compensation Plan.

# **TASEKO PROSPERITY GOLD-COPPER PROJECT**

## **HABITAT COMPENSATION REFERENCE DOCUMENT**

***DRAFT***

**October 28, 2010**

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## Abbreviations

BBOP .....	Business and Biodiversity Offsets Programme
BC.....	British Columbia
CDC.....	Conservation Data Centre
COSEWIC.....	Committee on the Status of Endangered Wildlife in Canada
CWS .....	Canadian Wildlife Service
EA.....	environmental assessment
EAO.....	Environmental Assessment Office
EIS .....	Environmental Impact Statement
HCP .....	Habitat Compensation Plan
KI.....	key indicator
MOE.....	Ministry of Environment
MOF .....	Ministry of Forests
MS .....	Montane Spruce
MSRM.....	Ministry of Sustainable Resource Management
SARA .....	<i>Species at Risk Act</i>
SBPS.....	Sub-Boreal Pine-Spruce
Taseko .....	Taseko Mines Ltd.
TSF .....	Tailings Storage Facility
WADM.....	Wildlife Abundance and Diversity Matrix

## Habitat Compensation Glossary

Many of the terms used in this Reference Document either have multiple definitions and applications, or are relatively new terms that are used by practitioners of habitat compensation, but are not yet established in the context of terrestrial habitat compensation in British Columbia. In the interest of clarity, this glossary of terms provides definitions pertinent to the goals and objectives of the Reference Document. Many of the definitions are based on the current usage of these terms in the fields of ecology and conservation biology. Terms and definitions specific to habitat compensation have been adopted from international standards (i.e., Business and Biodiversity Offsets Programme [BBOP]); several of these are expected to be included in the BC Ministry of Environment's (BC MOE's) upcoming habitat compensation policy document.

- Additionality:*** A property of a biodiversity offset. It is the conservation outcomes that deliver a demonstrably new and additional benefit that would not have resulted without the offset (BBOP 2009a).
- Benchmark:*** A reference point against which losses of biodiversity due to a project, and gains through compensation or offset, can be quantified and compared consistently and transparently (BBOP 2009a).
- Biodiversity:*** The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. This definition, developed in 1992 at the United Nations Earth Summit in Rio de Janeiro, is now the international standard and is used by the United Nations Convention on Biodiversity.
- Biodiversity Offset:*** Measures taken to compensate for important adverse residual effects that cannot be avoided, minimized and / or rehabilitated or restored, in order to achieve no net loss or a net gain of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risk, or protecting areas where there is imminent or projected loss of biodiversity. The goal of biodiversity offsets is to achieve no net loss, and preferably a net gain, of biodiversity with respect to species composition, habitat structure and ecosystem services, including livelihood aspects (BBOP 2009a).
- Compensation:*** Measures to restore, create, enhance, or avoid loss or degradation of a community or habitat type that arose through residual effects on biodiversity or habitat (BBOP 2009a). It is important to recognize subtle differences between compensation and offsetting; namely, that compensation is a component of offsetting rather than an alternative.
- Key Indicator:*** An element (e.g., species, habitat type) representative of the broader environmental component of interest (e.g., wildlife) for which a detailed qualitative or quantitative assessment of project effects is meaningful and practical. In the Taseko EIS, 21 species<sup>1</sup> and 7 vegetation components were selected as KIs.

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<sup>1</sup> In addition, a number of wildlife species and species groups were assessed more generally (i.e., amphibians, mice and voles, weasels). Thus, the total number of species addressed in the EIS is 36

- No Net Loss:*** A target in which the impacts on biodiversity caused by a development are balanced or outweighed by measures taken to avoid, minimize, or compensate for the project's impacts so that no loss remains. No net loss (or net gain) of biodiversity is a goal of voluntary biodiversity offsets (BBOP 2009a).
- Relative Abundance:*** The number of organisms in one category compared to another (e.g., number of one species compared to another species), usually expressed as a proportion or percentage.
- Residual Effect (loss):*** A residual effect is the effect (e.g., loss of habitat) that remains after implementation of all identified mitigation measures. It is residual effects that are reported in the Prosperity Gold-Copper Project Environmental Impact Statement (Taseko 2009a, hereafter the EIS), the Supplemental Report to Taseko Mines Ltd. Prosperity Gold-Copper Project Environmental Impact Statement: Local and Regional Environmental Effects on Wildlife and Vegetation Resources of Importance to the Tshilhqot'in National Government at the Proposed Mine Site (Taseko 2009b, hereafter the Supplemental Report) and this document.
- Shannon-Weiner Diversity Index:*** A widely accepted index for evaluating the relative diversity of wildlife among habitat types. The index includes both the number of species in a habitat type, as well as the relative abundance of each species in that habitat type (Krebs 1999).
- Significant Effect:*** An effect that causes a resource (such as wildlife) to undergo an unacceptable change or reaches an unacceptable level. In other words, an effect is significant when it passes a key threshold. For many effects on wildlife, clear regulatory standards (e.g., maximum permitted road density) or ecological thresholds are not available. In the Taseko EIS, the context for the determination of significance is the sustainability of the key indicator population (or sub-population, herd, management unit, etc., as applicable).
- Species Diversity:*** The variety of different species within genera, families, orders, classes and phyla represented and the relative abundance of each within an ecological community, assemblage or ecosystem. Species diversity indices describe the relationship of the number of taxa (richness) to the number of individuals per taxon (abundance) for a given community (e.g., Shannon-Weiner Diversity Index; see above).
- Species Richness:*** A count of the number of species in a community, habitat, or other defined area. For example, a habitat with 5 species has low richness compared to a habitat with 20 species. Species richness is commonly used as a measure of diversity, and also as a component of other diversity measures (e.g., the Shannon-Weiner Index is a function of abundance and species richness; see above).

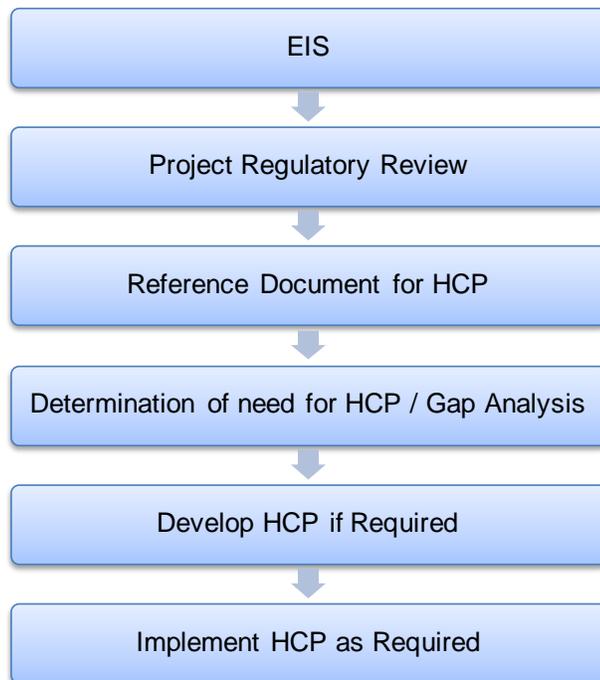
# 1 Introduction

Taseko Mines Limited (Taseko) proposes to develop a gold-copper mine (the Prosperity Project). The deposit and mine site area is located 125 km southwest of Williams Lake. The Prosperity Project has several components:

- The mine site located within the Fish Creek watershed 10 km northeast of Lower Taseko Lake
- A haul route, primarily using existing resource roads
- An existing concentrate load-out facility near Macalister, BC
- A 125-km 230 kV transmission line from the mine site east to a substation to be constructed near Dog Creek (on the east side of the Fraser River)
- Fish compensation measures

The Prosperity Project has undergone both a federal and a provincial environmental assessment. The provincial environmental assessment was completed and Environmental Assessment Certificate #M09-02 was issued on January 14, 2010. As detailed in Section 11.0 of the Table of Commitments attached to the Environmental Assessment Certificate (Appendix A), Taseko is required to develop and implement a plan, hereafter referred to as a Habitat Compensation Plan (HCP), for achieving compensation for ‘adverse impacts’ to wetland habitat, the productive capacity of Fish Lake, recreation values, wildlife, wildlife habitat and the critical habitat of species at risk. More recently, BC MOE requested that Taseko evaluate any residual effects on wildlife abundance and diversity using a landscape unit level scale of assessment, propose a framework for terrestrial habitat compensation, and if needed, develop and implement wildlife compensation measures.

There are a number of steps that are required as part of a HCP (Figure 1). As a first step, Taseko will work with BC MOE to develop a Reference Document in which the roles and responsibilities, timing, and strategies for implementation of a compensation plan are described. Taseko has developed this “Draft” document that provides a strategy for identifying and prioritizing habitat compensation that may be required for the Prosperity Project. It is anticipated that this document will be refined and finalized in consultation with BC MOE.



**Figure 1 Project Flow for Habitat Compensation**

This draft Reference Document draws from and builds upon the Environmental Impact Statement (EIS) prepared for the Prosperity Project (Taseko 2009a) and integrates guidance provided by BC MOE. The key driver is the Environmental Assessment Certificate # M09-02 Table of Commitments (Appendix A). Additional guidance is based on previous communications between Taseko and BC provincial agencies (Appendix B). Table 1 highlights the key correspondence and the respective contribution to shaping the approach and content of the Reference Document.

**Table 1 Guidance for the Development of this Reference Document**

Key Direction	Where Addressed in this Document	Reference
Potential for compensation of wildlife and wildlife values affected by the loss of Fish Lake from mining activities	Throughout	May 19, 2006 Letter. Chris Trumpy, DM Ministry of Environment to Larry Murray, Deputy Minister, Fisheries and Oceans Canada
Outline of an “alternative construct” with respect to a wildlife habitat compensation commitment	Section 6	Email exchange—including correspondence on Nov 29, 2009, Dec. 4, 6, 8 and 9, 2009 and June 7, 2010 from Rodger Stewart to Taseko and the EAO
Need to compensate for adverse effects to the abundance and diversity of wildlife resulting from the Project. Requirements for a transparent approach to HCP and development of a reference document that addresses impacts or loss of	Throughout	Jun 29, 2010 letter from Doug Konkin, DM Ministry of Environment to Brian Battison, Vice President of Corporate Affairs, Taseko

Key Direction	Where Addressed in this Document	Reference
environmental values		
The Reference Document should include, with appropriate explanations:		
<ul style="list-style-type: none"> <li>A complete listing of the wildlife species and habitats that were subject to examination for potential habitat compensation</li> </ul>	Section 3.1.1 (habitats) and Section 3.3 (comparison of species affected), Appendices C, E, and F	Aug 16, 2010 e-mail from Rodger Stewart to Taseko regarding Habitat Compensation (Offsetting) for the Prosperity Project
<ul style="list-style-type: none"> <li>Identification of those species for which habitat loss will not result in an impact on wildlife abundance and distribution</li> </ul>	Section 3.2.1	
<ul style="list-style-type: none"> <li>Identification of those species for which habitat loss will result in an impact on wildlife abundance and distribution that cannot be mitigated</li> </ul>	Section 6	
<ul style="list-style-type: none"> <li>A menu of the measures that would be considered for habitat compensation (offsetting) for each species</li> </ul>	Sections 2, 3, 4, and 5	
<ul style="list-style-type: none"> <li>Explanations as to why compensation is not proposed for affected species</li> </ul>	Sections 3.11, 3.3	

The objectives of this draft Reference Document are to:

- 1) Initiate implementation of Taseko's obligation to develop and implement a habitat compensation plan
- 2) Develop concepts, approaches, and next steps in response to the guidance provided by BC MOE. Accordingly, this draft Reference Document:
  - a) Defines relevant terms related to habitat compensation and offsetting
  - b) Describes applicable habitat compensation background information and guiding principles
  - c) Identifies the residual effects of the Project on wildlife habitat
  - d) Analyzes the relationship between habitat loss and the abundance and diversity of wildlife
  - e) Provides examples of potential compensation targets for selected habitats or species of importance (i.e., species identified in the EIS, by First Nations, by Canadian Wildlife Service [CWS], and according to their conservation status)
  - f) Identifies gaps in existing information that need to be addressed in order to facilitate the identification of compensation targets
  - g) Proposes next steps in considering the need for habitat compensation to address any reductions in wildlife abundance and diversity resulting from residual project effects
  - h) Propose potential roles and responsibilities for each of the phases in the habitat compensation process, including determining whether habitat compensation is required and planning and implementing any required habitat compensation measures

## 2 Background and Guiding Principles

The EIS and the Environmental Assessment Office (EAO) Assessment Report independently concluded that the Prosperity Project would have no significant effects on wildlife. The federal Panel also concluded that the Project would have no significant “stand-alone” effects on wildlife, but that the Project would add incrementally to potentially significant cumulative effects on the regional grizzly bear population.

Regardless of the predicted significance of Project effects on wildlife, it can be reasonably concluded that any mine footprint developed in natural ecological communities will locally reduce habitat availability for wildlife occupying the mine area. For most species, this will result in negligible to small, measurable changes in regional species abundance and a displacement of wildlife from the immediate vicinity of the mine footprint for the life of the mine. Both effects have been quantified in the EIS and supplemental information filings. Through the approval process, the mine has been deemed to be an acceptable land use activity, and consistent with the multiple resource land use practices supported in the area. Consequently, predicted localized effects on wildlife from the mine are to be expected, and it is unreasonable to assume that habitat compensation is a requirement for the full suite of species that might be marginally affected by the Project in the area. Taseko is supportive of strategic compensation initiatives as part of mitigation planning for the project, but believes that:

- Compensation initiatives should be strategic, reflecting the ecological and wildlife management priorities for the region, such as recovery initiatives for species at risk
- Compensation initiatives should focus on those ecological and wildlife resources most likely to be measurably affected by the Project
- Compensation initiatives cannot be effectively undertaken for a suite of wildlife resources, as alteration of habitat for some species can result in a decline in habitat values for other species. Consequently, it is not possible to address all habitat changes for all species as a result of the project or regional effects

Taseko also acknowledges that Project effects on wildlife can operate at different ecological scales, and that compensation strategies should be developed to reflect the scale of effect as appropriate. Ecological scales for consideration include the following:

**Landscape Scale:** New linear features associated with the Project such as the transmission line RoW can result in landscape fragmentation with an associated reduction in core security habitat for landscape level species such as grizzly bear.

**Ecosystem Unit Scale:** The Project footprint will locally reduce the area of a number of ecosystem units such as forest communities and wetlands which provide seasonal or year-round habitats for a number of wildlife species. Units supporting high species richness may be of particular concern.

**Species-Specific Habitat Scale:** Within ecosystem units, the Project footprint may reduce the availability of specific habitat features of seasonal importance to species of management concern (e.g., spring bear foraging sites such as Equisetum stands; future defined critical habitats for SARA-listed migratory birds, etc.).

Terrestrial habitat compensation is a relatively new consideration for proponents of resource development projects in British Columbia and there are few precedents available for reference. Consequently, this document relies on international experience where appropriate. One of the key sources of information used is the Business and Biodiversity Offsets Programme (BBOP), which BC MOE is expected to draw from during development of a provincial habitat compensation policy currently in preparation. BBOP is a partnership between the private sector (including mining firms), government agencies, donor organizations, and environmental organizations that work collaboratively to develop effective biodiversity offsets<sup>2</sup>. The conceptual basis and guiding principles of the BBOP have been applied to develop, test and implement habitat compensation projects in the United States, New Zealand, South Africa, Ghana, and Madagascar. This program has been used to provide a foundation for development of this Reference Document. While the specific practices will vary from country to country, many of the guiding principles are likely transferable to British Columbia.

Habitat compensation is a broad subject area and there are a variety of approaches that are used by practitioners. In order to ensure a clear basis for this Reference Document, a set of principles to guide the approach to assessing the need for habitat compensation are outlined in Table 2.

International practice with habitat compensation (or biodiversity offsets) is to seek out approaches that result in no net loss of biodiversity. As suggested by the Deputy Minister this document focuses on the project effects as they relate to the abundance and diversity of wildlife, which are the key components of biodiversity.

**Table 2 Guiding Principles for Habitat Compensation**

Principle	Source
<b>Project.</b> Taseko is legally obligated to build the project as described in the EIS and to implement the mitigation measures and commitments as detailed in the EA Certificate and associated documents. Taseko takes these obligations seriously and will build the project and implement the mitigation measures as described	Taseko 2009a
<b>Compensation Prioritization.</b> Habitat compensation prioritization will be guided by the following: <ul style="list-style-type: none"> <li>• Compensation initiatives should be strategic, and should reflect the ecological and wildlife management priorities for the region, such as recovery initiatives for species at risk</li> <li>• Compensation initiatives should focus on those ecological and wildlife resources most likely to be measurably affected by the project</li> <li>• Compensation initiatives cannot be effectively undertaken for a suite of wildlife resources, as alteration of habitat for some species can result in a decline in habitat values for other species. Consequently, it is not possible to address all habitat changes for all species as a result of the project or regional effects</li> </ul> The process of determining whether and to what degree habitat compensation measures are warranted will be transparent and collaborative, involving Taseko as well as BC MOE, CWS and affected First Nations	Konkin 2010
<b>Mitigation.</b> The first priority is to avoid or minimize effects on wildlife, and to that end, Taseko has developed a suite of mitigation measures (included in the EIS) to address project effects	Taseko 2009a
<b>Residual effects.</b> Residual effects in the EIS refer to habitat losses, whereas residual effects in the context of the Reference Document will refer to any residual losses or reductions of	See Table of Commitments;

<sup>2</sup> BBOP's Advisory Group includes Rio Tinto, Inmet Mining, AngloGold Ashanti, the International Finance Corporation, and others.

Principle	Source
wildlife abundance or diversity after consideration of prescribed mitigation and environmental management measures	Appendix A
<b>Scale.</b> Potential reductions in wildlife abundance or diversity will be considered at the landscape, ecosystem unit and species-specific habitat scale. The selection of compensation measures will be commensurate with the importance of habitat values that are subject to loss or impact, considering the number and conservation status of species that depend upon that habitat and the extent of the associated habitat loss.	Konkin 2010
<b>Participation.</b> BC MOE, First Nations, and stakeholders should participate in the development, implementation and monitoring of a HCP. The criteria used to determine the importance of habitat values and the severity and magnitude of residual effects should be established in collaboration with BC MOE.	BBOP 2010 Konkin 2010
<b>Transparency.</b> The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner	BBOP 2010

Taseko believes that the principles described above are transferable and likely enjoy broad support. But as is often the case, important details such as which habitats or species merit compensation will require more discussion. This document therefore illustrates some approaches to habitat compensation with the understanding that these could be more fully developed once habitat compensation requirements are better defined. It would be premature to pick any one objective or approach until discussing alternatives with BC MOE. Therefore, the document attempts to illustrate some of the choices and their implications.

### 3 Analysis of Habitat Compensation Priorities

This section describes a roadmap for assessing the need for habitat compensation. The suggested process for making a determination as to whether, and to what degree, habitat compensation measures are required with respect to the Prosperity Project includes the following steps:

- Identification of the residual effect of the Project on habitat based on the EIS (See Section 3.1)
- Refinement of the predicted residual loss of habitat (from the EIS) based on the actual residual loss of habitat resulting from actual project development and operation (based on final mine layout and detailed reclamation planning)
- Analysis of the relationship between habitat loss and the abundance and diversity of wildlife (see Section 3.2)
- Evaluation of potential compensation targets. This step includes an evaluation of the effects of habitat loss on wildlife abundance and diversity illustrated by examples that use species groups to focus compensation options (See Section 3.3)
- Identification of thresholds for compensation. A solid understanding of the residual effects of the Project on wildlife abundance and diversity forms the basis for determining whether or not the predicted effect of the Project on wildlife abundance and diversity warrants compensation. The approach to determining the need for compensation is described in detail in Section 4

## 3.1 Residual Habitat Loss

Habitat compensation is, by definition, intended to make up for the loss of a specified resource (e.g., wildlife habitat). A key step in developing a habitat compensation strategy is to determine a benchmark against which losses of a resource can be measured. For environmental assessments of mine projects, this is often accomplished by calculating the net loss of habitat area between baseline (without the project) and post-closure (after reclamation has taken effect). The analysis focuses on those effects that remain after the suite of mitigation measures (listed in Appendix D) are applied. It is important to recognize that the estimate of residual habitat loss in an environmental assessment is often based on conservative (precautionary) assumptions associated with a preliminary mine design. Actual losses may well be smaller and occur more gradually as the mine footprint expands. With this in mind, Section 3.1.1 briefly reviews the predicted residual loss of habitat (based on the EIS) and Section 3.1.2 describes the process by which the actual residual loss of habitat will be determined as a first step in implementation of this HCP.

### 3.1.1 EIS Predicted Residual Loss of Habitat

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. There will be relatively small short- to long-term residual direct and indirect<sup>3</sup> losses of habitat along the transmission line as a result of clearing, construction activities, and operations and maintenance. Whereas some animals may avoid the right-of-way during operations, other animals may forage or travel along the right-of-way once it is established.

This document focuses on habitat compensation in the context of the mine, given there is a relatively small non-permanent residual loss of habitat associated with the transmission line. Moreover, the primary adverse effect associated with the transmission line is increased mortality risk due to (a) increased human access and its effects on grizzly bears and (b) bird strikes with the line. Taseko is committed to minimizing both of these effects and will develop a detailed post-certification plan to minimize bird mortality risk along the transmission line (Appendix D). Further, in addition to the mitigation measures designed to minimize motorized human use of the right-of-way presented in the EIS (Appendix D), Taseko will also evaluate, in consultation with other parties, approaches to reducing the overall density of linear features in the region.

For the mine site the analysis of residual loss was done in the context of six broad habitat types and two specific micro-habitats (cliffs and ledges, rocky slopes). In the EIS, the loss of habitat was predicted to be greatest for coniferous forest (573.8 ha), followed by wetlands (403.5 ha), riparian (352.7 ha), mixedwood (261.7), grasslands (7.5 ha) and “other” habitats (5.6 ha). The total predicted residual loss is 1,605 ha. All of these residual losses were considered to start in the construction phase (as a result of site clearing and grubbing) and were predicted to be permanent (Table 3), primarily as a result of the inundation of upland habitats and wetland areas from the creation of the Tailings Storage Facility (TSF), Prosperity Lake, and Pit Lake.

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<sup>3</sup> Indirect loss of habitat occurs when animals avoid or under-use habitat adjacent to human activities, primarily because of sensory (noise) disturbance

**Table 3 Summary of Habitat Types, Residual Loss, and Start and Duration of Project Effects**

Habitat Type	Predicted Residual Loss (ha)	Comment
Coniferous forest	573.8	Permanent loss of this habitat type is due to inundation of upland areas
Wetlands	403.5	Permanent loss of this habitat type is due to inundation and conversion of wetland areas to upland areas at post-closure (assumes no reclamation of wetland types as per the EIS; however, some wetland reclamation will be implemented as part of the final reclamation plan)
Riparian	352.7	Permanent loss of this habitat type is due to inundation and conversion of riparian areas to upland areas at post-closure (assumes some development of riparian areas post-closure)
Mixedwood	261.7	Permanent loss of this habitat type is due to inundation of upland areas; only mixedwood in younger stands
Grasslands	7.5	Permanent loss of this habitat type is due to inundation and conversion of grassland/shrubland areas to forested areas at post-closure
Other	5.6	Permanent loss of this habitat type (road surfaces and sparsely vegetated units) is due to inundation of upland areas
Cliffs and Ledges	0.0	There is no residual loss of this habitat type
Rocky Slopes	0.0	There is no residual loss of this habitat type
<b>Total</b>	<b>1,604.8</b>	

In terms of determining where habitat compensation could be focused, a number of habitat types can be ruled out based on the following:

- There is no permanent residual loss of cliffs, ledges, or rocky slopes. No compensation is therefore required for these habitat types.
- The residual loss of grasslands and “other” habitat types is small (7.5 and 5.6 ha respectively). Grassland habitat loss associated with the mine site is unlikely to have a meaningful effect on grassland dependent wildlife species. Compensation for this loss is therefore not considered to be warranted. The same is true for “other” habitat, including roads and sparsely vegetated ecosystem units.

By excluding habitat types that sustain little or no residual effects, it is suggested that discussion/consideration of compensation be focused on coniferous, mixedwood, riparian, and wetland habitat types in the mine site area.

Along the Transmission line, the area affected during construction and operations will be small, with limited periods of concentrated activity during the construction phase. The localized effects of clearing are not expected to result in reductions in wildlife abundance or diversity. However, portions of the ROW developed through forested areas may provide new access opportunities for motorized vehicles and may reduce core security habitat for some wildlife species. Compensation initiatives to restore habitat security in offsite areas during the life of the mine may be appropriate.

### **3.1.2 Actual Residual Loss of Habitat**

The analysis above is based on residual project effects estimated as part of the EIS. Because conservative (precautionary) assumptions were made in the EIS, the actual residual effects may be less than these estimates. This residual loss may therefore be refined as the Project is designed and then constructed in accordance with EIS and MAPA terms and conditions.

Habitat compensation is not required in cases where residual effects are avoided through mitigation measures and project design features. A suite of mitigation measures have been identified for the Prosperity Project (Appendix D). A key mitigation measure intended to minimize terrestrial habitat loss associated with the Prosperity Project is reclamation after mine closure. In the EIS, a conceptual final reclamation plan was presented and used as a basis for predicting residual project effects. It is understood and expected that as part of the MAPA permitting process, reclamation planning and implementation will proceed and change as the project develops and operates. It will be important to take this process and the changes that it will create into consideration when reaching conclusions concerning actual residual project effects. It may turn out that reclamation measures themselves will not fully mitigate any permanent loss of upland and wetlands ecosystems that result from inundation associated with the creation of the TSF, Prosperity and Pit lakes.

The HCP will need to be based on the most accurate estimates of actual residual losses across time and develop a timetable of not only what requires compensation and how, but also when in the development of the Project. Just as reclamation can be progressive, a similar strategy merits consideration in terms of habitat compensation.

As presented in the EIS the conceptual final reclamation plan does not include any wetlands reclamation. However, Taseko has recognized opportunities for the reclamation efforts directed specifically at wetlands creation that would be implemented operationally (e.g., creation of littoral zones and plantings of wetland species along the shoreline of Prosperity Lake). The effectiveness of these measures in creating wetlands that are used by wildlife would be monitored according to parameters developed in collaboration between Taseko and other parties (see Section 5).

## **3.2 Effects of Habitat Loss on Wildlife Abundance and Diversity**

### **3.2.1 Relationship between Habitat Loss and Abundance and Diversity of Wildlife**

As previously discussed, project-related changes in habitat availability will result in negligible to small measurable changes in regional abundance for many species in the mine area. Therefore, habitat compensation initiatives should focus on those species most vulnerable to habitat changes. This section provides a suggested framework for predicting the potential for reductions in wildlife abundance or diversity as a result of any residual project effects on habitat. As discussed earlier in this document, this is one of the key determinants of whether habitat compensation is warranted.

Habitat loss via fragmentation, conversion, contamination, or patch size reduction is the major cause of decline in wildlife populations (Forsythe and Gard 1980; Frederickson 1980; Groombridge 1992; Bibby 1995; Ehrlich 1995; Fahrig 1999). The degree to which habitat loss can result in reductions in the abundance and diversity of wildlife is strongly influenced by the amount of existing usable habitat in a landscape (McGarigal and

McComb 1995; Fahrig 1999). When habitats are pristine and intact, localized losses of habitat have a relatively small effect on the abundance and diversity of wildlife, especially for species that are generalists with large home ranges and high movement or dispersal capability. As habitat loss increases, the remaining habitat eventually reaches some critical minima, and the rate of population decline becomes disproportionately higher than the rate of habitat loss (Mönkkönen and Reunanen 1999). This sudden change in the rate of population decline in relation to habitat loss is a habitat threshold—the point at which the risk of extirpation increases. These are discussed in greater detail in Section 4.

The effect of the loss of a unit of wildlife habitat therefore depends on several things. From a landscape perspective, the amount and quality of remaining habitat in the landscape is key. In the context of the Prosperity Mine the effect of the Project on wildlife habitat depends not only on the amount and kind of residual loss, but also the context in which this occurs. This context includes the relative proportion of natural habitat in the landscape, the degree of fragmentation, and the quality of the habitat (all of which is affected both by other anthropogenic uses such as forestry and natural processes such as the mountain pine beetle).

### **3.2.2 Project-related Habitat Loss and the Abundance and Diversity of Wildlife**

The EIS provides a synopsis of Project effects on selected species and habitat KIs but not on the abundance and diversity of wildlife as a whole. The latter is the question posed in the Konkin letter (see Appendix B). To that end, here we present an analysis based on a Wildlife Abundance and Diversity Matrix (WADM) (Appendix E) developed with two intended purposes:

1. To provide measures of species richness and relative abundance among broad habitat types as a means for evaluating potential compensation targets (i.e., which habitats or species may require compensation)
2. To relate species and habitats addressed in the EIS to the broader representation of species richness and relative abundance among broad habitat types

The WADM integrates information for 300 terrestrial vertebrates known to occur in the Cariboo and Chilcotin Forest Districts, a greater tally of species than was assessed in the EIS. The foundation for the matrix is the British Columbia Conservation Framework (BC MOE 2010). Additional information on species' occurrence, relative abundance, and breeding status was integrated into the analysis, and guided by principles listed in Table 2. Details on how the matrix was developed, and an explanation of its various components, are provided in Appendix D.

As a cursory analysis of the WADM, Table 4 relates the abundance and diversity (species richness) of wildlife among broad habitat types. At first glance it is easy to see that wetlands have the highest species richness, and when accounting for the relative abundance of those species, wetlands also support the highest diversity index. Species richness and diversity is lower in the mixedwood, coniferous and riparian habitat types in that order.

This analysis offers one potential framework for prioritizing compensation needs. If local and regional abundance and diversity are the targets, then compensating for lost wetland habitat becomes the highest priority.

**Table 4 Index of Abundance and Diversity of Wildlife in the Project Area**

Abundance Class	Species Richness			
	Coniferous	Wetlands	Riparian	Mixedwood
1 (casual, rare)	15	14	4	11
2 (uncommon)	14	16	6	19
3 (fairly common)	15	28	10	28
4 (common)	12	25	6	14
<b>Total Species (species richness)</b>	<b>56</b>	<b>83</b>	<b>26</b>	<b>72</b>
<b>Diversity Index*</b>	<b>5.601</b>	<b>6.258</b>	<b>4.593</b>	<b>6.064</b>
<b>NOTE:</b>				
* Shannon-Weiner index of diversity				

An important consideration, however, is that this approach does not explicitly include other value-based systems; Section 3.3 provides additional examples for evaluating compensation options by using species that are value-based.

### 3.3 Evaluating Compensation Targets: Value Systems, Habitat Types, and Wildlife Species

Determining under what conditions compensation is required, and what compensation targets should be, depends on the value system being used. Different stakeholder groups may have different value systems. Evaluating these choices will require discussion between Taseko, BC MOE and other stakeholders (see Section 6).

This section provides several alternative examples of wildlife values held by different groups and illustrates some of the implications of these values for habitat compensation. One of these implications is that different priorities for habitat compensation can lead to different outcomes, including the types of habitat targeted and the species benefitting. To illustrate this, wildlife species are associated with their preferred broad habitat and a tally of species in each is used to illustrate potential compensation priorities, which fall into one or more of the following groups:

- Species assessed in the Environmental Impact Statement. This includes 36 species assessed (Appendix E), of which 25 are associated with the four broad habitat types for which Taseko anticipates a permanent residual loss.
- Conservation Priority Species. This list includes 127 species identified by BC MOE's Conservation Framework, BC Conservation Data Centre (CDC), Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and *Species at Risk Act* (SARA); 96 occur in the four broad habitat types with a permanent residual loss.
- Breeding Waterfowl. Twenty waterfowl species are priorities for CWS; all occur in two of the four broad habitat types with a permanent residual loss.
- Priority Species for First Nations. Thirty-two species have been identified by First Nations; 28 occur in the four broad habitat types with a permanent residual loss.

The four value-based groups are not mutually exclusive because some groups share species with another group. Nonetheless, the different value systems produce different outcomes as to where compensation effort could be focused. Table 5 summarizes the

number of species from each example by primary habitat preference; a summary of results for each example is provided below.

**Table 5 Number of Species in Each Habitat Type using Value-based Examples for Evaluating Possible Compensation Targets**

Value-based Examples	Number of Species in Each Habitat Type				Cumulative Total
	Coniferous	Mixedwood	Riparian	Wetlands	
Environmental Impact Statement*	4	7	5	9	25
Conservation Priorities	21	17	11	47	96
Breeding Waterfowl (CWS priority)	0	0	1	19	20
First Nations Priorities (William Case*)	10	7	7	4	28
<b>Cumulative Summary</b>	<b>28</b>	<b>22</b>	<b>19</b>	<b>62</b>	<b>131</b>
<b>NOTE:</b>					
* excludes species restricted to the transmission corridor for which there is no residual habitat loss					

### 3.3.1 Species Assessed in the Environmental Impact Statement

The EIS assessed the effects of mine activities for 34 wildlife species, of which 25 are associated with the four broad habitat types defined in Section 3.1.1. Four of these wildlife species are associated with coniferous forest, seven are associated with mixedwood, five are associated with riparian, and nine are associated with wetlands (Table 5). For this group of species, priorities for compensation would be weighted toward wetlands, followed by mixedwood, riparian and coniferous habitat types (in that order).

### 3.3.2 Conservation Priority Species

Priority species for conservation meet one or more of the following criteria:

- Red- or blue-listed by the BC Conservation Data Center
- Endangered, Threatened, or of Special Concern by COSEWIC
- Included on Schedule 1, 2 or 3 of the *Species at Risk Act*
- Ranked as 1, 2, or 3 in the BC Conservation Framework. This species ranking approach considers global and provincial status, trend, threats, stewardship responsibility, and feasibility of recovery

A total of 96 species met one or more of the above criteria. Among them, 47 occurred in wetlands, 21 in coniferous, 17 in mixedwood, and 11 in riparian (Table 5). In terms of the habitat preferences of species at risk, priorities for compensation would favor wetlands, followed by coniferous, mixedwood and riparian habitat types (in that order).

### 3.3.3 Breeding Waterfowl (a CWS Priority)

The CWS expressed concern about Project effects on breeding waterfowl. The species represented by the breeding waterfowl group provide a fourth example for assessing compensation options. All but one of the 20 species in this group occurs in wetland

habitats (Table 5); the exception being the Common Merganser which uses riparian habitats. Based on this assessment, the priority for compensation would be almost exclusively wetlands.

### **3.3.4 Species Important to First Nations**

The William Case was used to identify species important to First Nations. Of the 32 species, 28 are associated with the 4 broad habitat types of interest (Table 5). Ten species occur in coniferous habitats, seven occur in each of mixedwood and riparian habitats, and four occur in wetland habitats (Table 5). In terms of the habitat requirements for species important to First Nations, compensation priorities would be weighted toward coniferous forest, followed by equal attention to mixedwood and riparian habitats. Wetlands represent a lower priority with respect to wildlife values identified by First Nations for this Project.

### **3.3.5 Summary of Possible Compensation Targets**

The examples above illustrate that priorities for habitat compensation can vary with the priorities of different groups; these examples are not exhaustive. Another approach would be to include a measure of “threat” or “risk” of exceeding a species’ threshold for a given area. Similarly, a third alternative would be based on the magnitude of economic or subsistence loss of hunted species as a result of Project effects.

In the absence of certain information necessary to further evaluate compensation targets, the examples provided in Section 3.3 do provide a general result as to where compensation may occur. Based on the examples provided, 22 species (58%) contained in the EIS and Supplemental Report are represented by the coniferous and wetland habitat types. Compare this with only eight species in each of the mixedwood and riparian habitat types and there is reasonable evidence (in terms of species representation) to suggest that compensation should be directed toward coniferous and wetland habitat types. When results from the conservation rank and CWS waterfowl examples are considered, there is even greater support to suggest that compensation should be directed toward coniferous and wetland habitat types. Cumulatively, the four examples represent 131 species, with 62 associated with wetlands, 28 in coniferous, 22 in mixedwood, and 19 in riparian habitat types.

One conclusion from this analysis is that given the different value systems, any compensation efforts will require discussions between Taseko, regulators, First Nations, and potentially other stakeholders.

A second conclusion is that establishing targets is only the beginning. The targets do not indicate the specific elements that should be compensated for (i.e., hectares of habitat or number of individuals to compensate for), what the triggers for compensation are (i.e., thresholds, benchmarks, local or regional population size), reference conditions compensation will be measured against (i.e., spatial and temporal scales), or what approaches are likely to be most effective. Collectively these elements must be defined and require further discussion (see Section 6).

## 4 Compensation Thresholds

A key criterion is under what conditions habitat compensation is warranted. This document proposes compensation is appropriate when the abundance of one or more wildlife species, or the diversity of wildlife as a whole, is at risk of experiencing a meaningful decline as a result of the Project. Consequently, there is the need for establishing thresholds (or triggers) to determine when and how much compensation is required.

One option is to development thresholds of acceptable change. Experience suggests that different groups may differ not only in compensation targets (discussed in the previous section) but also thresholds for compensation. This reinforces the need for dialog and an orderly decision-making process. The following section highlights considerations that could contribute to a discussion of thresholds.

### 4.1 Scale

BC MOE has stated that, “impact or loss that requires habitat compensation will be determined at the scale of the landscape units within which the project’s footprint is located” (Konkin 2010; Appendix B). In the Province landscape units are defined as “areas of land and water for long-term planning of resource management activities with an initial priority on biodiversity conservation” (BCMOF and BCMOELP 1999). The Project overlaps several landscape units as defined by the Cariboo Chilcotin Land Use Plan Biodiversity Conservation Strategy (BCMSRM 1996). These are Dog Creek, Big Creek, Bambrick, Farwell, Tête Angela, Beece Creek, Haines, Minton, and Anahim.

As the reference document deals specifically with the mine footprint, these Project effects are located almost exclusively (>99%) within the Tête Angela landscape unit, which covers an area of 57,502 ha<sup>4</sup>.

It is important to recognize the inverse relationship between residual project effects and the scale against which they are compared. For example, for the EIS the 18,267 ha Regional Study Area was delineated in collaboration with BC Ministry of Environment, Lands and Parks for the express purpose of assessing the effects of the Project on terrestrial values. Both the Tête Angela landscape unit and the mine site regional study area are ecologically similar, with large areas of Sub-Boreal Pine-Spruce (SBPS) and Montane Spruce (MS) biogeoclimatic zones. Both areas can therefore be used to provide relevant regional context for the evaluation of Project effects.

Because the Tête Angela landscape unit is more than three times larger than the mine site regional study area, a re-assessment of effects at that landscape unit level would not be expected to change the conclusions of the EIS (i.e., no significant project effects for terrestrial disciplines). In fact, when viewed from this larger scale, the relative effects of the mine would be much smaller (only 1/3 the relative value) than reported in the EIS. The same relationship would apply to effects associated with the transmission line and access road.

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<sup>4</sup> It is generally defined by the height of land delineating the Tête Angela drainage and the Taseko River drainage between the Lower Taseko Lake and a point just north of the confluence with Elkin Creek. From Elkin Creek north, the western boundary is the Taseko River (BCMSRM 1996).

Taseko believes that differing scales can be useful for developing thresholds, triggering compensation and analyzing alternatives for implementation. In this sense, the following three levels of scale can be useful:

- Landscape (to assess needs and implement activities at a scale where habitat fragmentation can be important for species such as grizzly bear)
- Ecosystem Unit (a level where vegetation and wildlife communities provide habitat and where units supporting high species richness may be priority)
- Species-Specific (within ecosystem units if a Project reduces the availability of specific habitat features important to species of management concern)

## 4.2 Legal Thresholds

Triggers for compensation could flow directly from legislation or policy. For example, if critical habitat had been identified for a SARA-listed species, then any residual effects to that habitat would require compensation. While no critically-identified habitat currently exists, Taseko would consider this if it were identified over the course of the Project. Other policies may also have implications for compensation, including federal and provincial policies on wetlands.

## 4.3 Resource Management Objectives

Compensation triggers may vary with the management objectives of a landscape unit. Some areas emphasize conservation values and objectives (e.g. protected areas, intact landscapes, critical habitat) while others emphasize multiple use. In the context of this Project, the Tête Angela landscape unit has been assigned a low biodiversity emphasis (ILMB 2007), meaning that the landscape unit has high social and economic demands which form the primary management objectives for the landscape unit. The low biodiversity emphasis also means that “the pattern of natural biodiversity will be significantly altered [as a result of the social and economic focus], and the risk of some native species being unable to survive in the area will be relatively high” (BCMOF 1995).

## 4.4 Ecological Thresholds

Compensation triggers may reflect the habitat values of a given landscape. There are currently no established habitat thresholds relevant to this Project. As a result, the discussion below is based on ecological research that may provide one perspective linking management objectives, habitat at a landscape scale, and potential triggers for habitat compensation.

Habitat thresholds discussed here refer to the proportion of natural habitat remaining in a landscape. Most empirical studies suggest that below certain thresholds, the effects of habitat loss and fragmentation are greater than expected from habitat loss alone (Swift and Hannon 2010). Below a threshold, populations may decline more rapidly, increasing the risk of regional extirpation if population sizes become too small.

Depending on the taxa and landscape, habitat thresholds may range from 10% to as high as 60% (Bennett and Ford 1997; Villard et al. 1999; Swift and Hannon 2002). Generally, when the habitat in a region is reduced to 10 to 30% of the original, species’ abundance declines more rapidly (Andrén 1994; Fahrig 1997; Swift and Hannon 2010), but

populations are not necessarily at risk of regional extirpation. Typical habitat thresholds for birds based on empirical studies range from 10 to 30% (Andrén 1994; Swift and Hannon 2010), and occasionally below 10% (Radford et al. 2005). Amongst mammals, residual habitat thresholds typically range from 10 to 30%, but may be as high as 40 to 60% as shown in one study on ungulates (Komers 2000). For amphibians there is even greater variation, with habitat thresholds ranging from 10 to 88% (Gibbs 1998; Homan et al. 2004). The very high habitat threshold of 88% is based on small, local-scale (patch) effects (Homan et al. 2004).

These thresholds should be treated with caution. First, thresholds vary with the species, landscape, and spatial scale (Swift and Hannon, 2010; and Andrén 1999). Thus, caution is warranted when applying general figures to make management decisions. In addition, as noted by Mönkkönen and Reunanen (1999) and Andrén (1999), some species will be at risk of extirpation before habitat loss reaches a critical threshold. The species most likely to be lost are often the most threatened ones, so to maintain viable populations of all species, it may be necessary for habitat cover to be maintained above these thresholds. Because sensitive species will disappear before generalists (Mönkkönen and Reunanen 1999; Radford et al. 2005), management should focus on viable populations of sensitive species.

These findings could be incorporated into guidelines for habitat compensation. Two major review articles conclude that the majority of the evidence supports a 30% residual habitat threshold at a landscape level to avoid rapid declines that may lead to regional extirpation (Andrén 1994; Zuckerberg and Porter 2010). But a precautionary approach is often warranted both because local, species and landscape-specific information is also missing and because sensitive species may experience declines before habitat loss reaches these thresholds. For critical habitats for SARA-listed species, more stringent “no net loss” thresholds would be more appropriate.

## 5 Key Options for Habitat Compensation Approaches

The previous sections describe some considerations in defining when compensation should occur and what targets should be. This section proposes some decisions that would be required in cases where compensation is required:

- **In kind or out of kind.** Most habitat compensation (also known as biodiversity offsets) are “in-kind”, which means conserving the same types of habitat that are affected by the project, usually with an objective of “like for like or better” (BBOP 2009b). In some instances, the priority may be to conserve habitat different from what is being lost. For example, if conserving a specific species or group of species was a priority, then it may be preferable to compensate for residual Project effects by conserving the best possible habitat for these species, even if it is different from what is lost as a result of the project.
- **Types of actions supported.** There are two broad alternatives: (a) habitat enhancement or restoration and (b) measures focused on averting risk to high value areas. The latter option involves taking steps to conserve valuable habitat that is under threat and would otherwise be degraded or lost.

- **Consideration of compensation ratios (multipliers).** Multipliers are used to address any uncertainties associated with the compensation process as well as the potential time lag between when compensation measures are initiated and when the loss is considered to have been offset.
- **Candidate locations and their feasibility.** Locations would be assessed in terms of their value as habitat (size, area, quality, connectivity) and feasibility (political and local support, cost).
- **Means for demonstrating additionality.** In order for the compensation plan to deliver gains above those that would be achieved without (the status quo), cost effective means must be developed to define and measure the additional contribution of the compensation plan.
- **Participation.** Transparent and participatory processes are generally considered good practice.

While there are several key options for selecting and guiding a habitat compensation approach, there still remains a number of information gaps that need to be addressed. Some of these gaps relate to assessing the need for compensation (i.e., identification of triggers), whereas others relate to the design and implementation of a compensation approach and measuring its subsequent effectiveness. For those reasons, a single approach cannot yet be selected. Instead, a process for filling the information gaps is outlined in the following section. Section 6 identifies next steps, roles and responsibilities, and a timeframe for completion.

## 6 Next Steps, Roles and Responsibilities, and Timing

Terrestrial habitat compensation is relatively new in British Columbia. Given the limited experience, this document attempts to contribute to the Province's efforts to develop both policy and practice. Taseko appreciates that it is the role of regulatory agencies to drive this process, while also believing that it will be most effective if done in close collaboration with the proponents of development projects.

A proposal for next steps, responsibilities, and a timeframe is summarized in Table 6. Given the importance of dialog and collaboration, Taseko looks forward to discussing this Reference Document with BCMOE.

**Table 6 Next Steps, Responsibilities, and Timeframe**

Timeframe		Next Steps (Tasks)	Responsibility				
			Taseko	BC MOE	EC/CWS	Stakeholders	First Nations
2010	October	Present draft Habitat Compensation Reference Document to provincial government (BCMOE, MEMPR and ILMB).	L				
2010	November	Review and discuss the draft Habitat Compensation Reference Document. Reach agreement on key principles and next steps.	L	L			
2010 to 2011	November to March	Refine criteria for evaluating the need for habitat compensation. This may include considerations of both scale and thresholds for compensation: <ul style="list-style-type: none"> <li>Identify triggers, targets, and benchmarks for compensation</li> <li>Define temporal reference point for which the current need for compensation can be assessed against (e.g., pre-development)</li> <li>Define and discuss 'alternate constructs' for wildlife habitat compensation as per correspondence from BC MOE (see Table 1)</li> <li>Consult with EC/CWS, Stakeholders, and First Nations as appropriate</li> </ul> Finalize the Habitat Compensation Reference Document.	L	L	S	S	S
2011	April to August	Once Project construction begins, develop a draft Conceptual Habitat Compensation Plan based on the agreements reached above. This conceptual plan will cover priorities for implementation, the approaches, the amount of compensation required, and a timeframe.	L	L			
2011	July to October	Consult with regulators, stakeholders, and First Nations, revising the Conceptual Habitat Plan as appropriate, and producing a final version	L	L	S	S	S
2011-13	April 2011–March 2013	Project construction and application of mitigation measures	L				
2011-13	2011–March 2013	Quantify actual habitat loss associated with the Project	L				
2013	January–April	Develop a detailed Habitat Compensation Plan	L	L	S	S	S
2013	Ongoing from 2013	Implement the detailed Habitat Compensation Plan, including a monitoring program	L	L	S	S	S
<b>Notes:</b> L = Lead S = Supporting							

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## **8 Appendices**

## **Appendix A Table of Commitments**

## SCHEDULE B

### PROPONENT'S TABLE OF COMMITMENTS

#### Governance

##### 1.0 Policies

1.1 Develop and implement corporate policies (Policies) that will be made available on the Taseko website for reference during all phases of the Project. Current policies in place or under development comprise the Prosperity Sustainability framework and include:

- a) Environment Policy (in place);
- b) Health and Safety Policy (in place);
- c) Code of Ethics and Trading Restrictions (in place);
- d) First Nations Long-term strategy for consultation and engagement (in place);
- e) Emergency Preparedness (under development); and,
- f) Responsible Resource Development (on-going development)

Taseko's goal is to develop the mineral resource while making certain that the construction, operations and closure of Prosperity are handled in a sustainable manner, including the primary responsibility of contributing towards the maintenance of healthy lands, communities, resources and ecosystems for present and future generations. Moreover, Taseko is committed to ensuring the entire Project makes a net positive contribution to sustainability of lands, communities, resources and ecosystems over the long term.

1.2 Implement Prosperity's Sustainability Framework through the life of the Project.

1.3 Ensure that responsible site management, employees and contractors are familiar with these Policies, and their actions at all times comply with them and relevant acts, regulations, permits, licenses, authorizations and approvals.

##### 2.0 Consultation/First Nations

2.1 Maintain early, open, and full communication with First Nations on Taseko projects and programs in their asserted traditional territories.

2.2 Recognize and take into consideration the value and significance First Nations place on traditional, cultural and heritage knowledge and interest.

2.3 Promote the development of mutually beneficial partnerships with our First Nation neighbours.

2.4 Work with First Nation Governments to encourage the formation and development of locally owned businesses.

2.5 Provide opportunities for employment.

2.6 Provide opportunities for training and career advancement for employees.

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2.7 Continual improvement in the protection of human health and responsible stewardship of the natural environment.

2.8 Prior to or during the construction of the transmission line, should information become available from First Nations identifying habitat, vegetation, or features of importance not previously considered in the constraints analysis undertaken to select the centre-line, Taseko will make reasonable efforts to avoid or mitigate impacts to these features.

### 3.0 Consultation/Communities

3.1 Maintain early, open, and full communication with local communities.

3.2 Promote the development of mutually beneficial partnerships with local communities.

3.3 Work with local communities to encourage the formation and development of locally owned businesses.

3.4 Provide opportunities for employment.

3.5 Provide opportunities for training and career advancement for employees.

3.6 Continual improvement in the protection of human health and responsible stewardship of the natural environment.

### 4.0 Sustainability Management Plan

4.1 Develop and implement an Environmental Management System (EMS) the Project to encompass continual improvement in sustainability and the protection of human health and stewardship of the natural environment.

4.2 Establish measureable sustainability goals and targets through the EMS which would include commitments agreed to with First Nations, local communities and regulatory agency representatives.

### 5.0 Contractors/External Forces

5.1 Require that Prosperity's contractors or consultants comply with Taseko Policies related to sustainability, environment, health and safety, training, local employment, and procurement.

## **Environmental Stewardship**

### 6.0 Environmental Management System

6.1 Establish an EMS which will include Environmental Management Plans (EMPs) as an integral part of the Project and provide guidance on all environmental aspects during all phases of the Project. These EMPs convert the environmental assessment mitigation measures and best management practices (BMPs) as identified throughout the Application, as well as future permit or panel commitments, into actions that are intended to minimize or eliminate negative environmental effects associated with the Project. The EMPs presented in Volume 3 of the

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Application will be further developed and finalized prior to construction, where relevant, and prior to operations in all cases. Standard Operating Procedures (SOPs) will be used to implement the EMPs.

6.2 Maintain a proactive working relationship with appropriate Regulatory authorities in the development of EMPs.

6.3 Qualified Environmental and Engineering staff must be on site during all phases of mine development (i.e. construction, operation, closure and post-closure) and:

- a) Will ensure that all Prosperity employees, contractors and their employees are fully aware of environmental requirements.
- b) Will monitor compliance with EMPs and specific operating procedures.
- c) Will report any incidents of non-compliance in accordance with the compliance reporting required by the EA Certificate and as required by regulation.

#### 7.0 Acid Rock Drainage Prevention and Metal Leaching Control (ARD/ML)

7.1 Implement the Mine Materials Handling Plan described in the Application, Volume 3, Section number 9.2.3.

7.2 Ensure that potentially acid generating waste rock (PAG), overburden, tertiary basalt and tailings with criteria described in Table 9.3 of the Application is segregated and deposited in subaqueous disposal in the PAG waste rock disposal facility (tailings impoundment).

7.3 Submerge PAG waste rock before onset of ARD/ML.

#### 8.0 Water Management

8.1 Finalize and implement the construction water management plan as described in Volume 3, Section number 9.2.1 of the Application to ensure, at a minimum, that procedures and policies are followed with respect to site access, geotechnical stability, soils salvage, erosion control, vegetation, wildlife, cultural and heritage resources, and emergency response.

- a) Develop and implement an erosion and sediment control plan (ESCP) consistent with industry BMPs to mitigate environmental effects attributed to sediment as detailed in Volume 3, 9.2.11 of the Application.
  - i) Designate at least one Qualified Environmental staff person on-site during active construction to ensure the ESCP is properly implemented. The qualified staff person will report to the senior engineer on-site.
- b) Ensure all necessary sediment and erosion control mitigation measures will be in place and operational prior to construction.

8.2 Operate a closed system that contains all mine waters on the Project site until approximately 27 years after the cessation of pit operations when the pit is flooded. Direct any surface drainage, sewage treatment plant, sediment or metal-laden water to the tailings storage facility (TSF) during operations.

8.3 Implement the Tailings Impoundment Operation EMP elements as described in Volume 3, Section 9.2.4 of the Application. This plan will include but is not limited to:

- a) Ensuring seepage reduction provisions are in place to minimize seepage losses from the TSF;
- b) Installing surveillance instrumentation in the tailings embankment and foundation during construction and over the life of the Project and monitoring on a consistent basis;
- c) In the event of premature mine closure, the PAG waste would be excavated to a level below the natural flood elevation of the TSF or otherwise submerged; and,
- d) In the event of a temporary closure, the actions outlined in the July 31, 2009 Temporary Closure Reclamation and Decommissioning Plan (IR 2.2) would be implemented.

8.4 Develop and implement the Tailings Dam Operation, Maintenance and Surveillance (OMS) Plan and ensure an annual Dam Safety Review is conducted as required by the Mines Act HSRC, and Dam Safety Reviews are conducted as set out by the Canadian Dam Association (CDA) Guidelines.

8.5 Continue to identify areas of high risk for erosion and sedimentation throughout the life of the Project (planning and design, construction, operation, decommissioning and reclamation) and implement general mitigation measures detailed in Volume 3, Section 9.2.11.1 of the Application.

8.6 Develop and implement a hydrologic and hydrogeological data collection and monitoring program appropriate to:

- a) Meet compliance monitoring requirements; and,
- b) Increase confidence in interpreted hydrogeological conditions assumed for the Project area.

In particular with respect to the west embankment, development and implementation of this program will be consistent with the mitigation measures and technical considerations outlined in Taseko's July 9, 2009 memorandum to the BC Ministry of Environment (MOE) on the subject. Taseko commits to collecting the additional information to further assess seepage issues and that this information will be available and incorporated into the detailed designs for seepage control and interception measures. Timing of the provision of this additional information will be determined at the *Mines Act* permitting stage but will be prior to the detailed design stage.

8.7 Meet generic and any site-specific Water Quality Guidelines (WQG) in Fish Creek that may be developed during permitting through treatment, if required, as detailed in Volume 5, Section 2 of the Application. The water quality objectives for Taseko River stipulate no change from upstream to downstream of mine operations.

## 9.0 Fish Compensation

9.1 Develop and implement a Fish and Fish Habitat Compensation Plan that supports provincial fisheries management objectives and the application of federal policy respecting the protection of fish and fish habitat. The Fish and Fish Habitat Compensation Plan will be designed and implemented to achieve the following objectives:

- a) Maintenance of the genetic line exhibited in the trout population in the Fish Lake system;
- b) Development and maintenance of lake and stream environments of similar or better productive capacity for trout as provided by the Fish Lake system;
- c) A healthy, self sustaining trout population; and,

- d) A trout fishery for First Nations and the public of at least similar character to what is supported by Fish Lake under current conditions.

The performance measures outlined in Taseko's December 4, 2009 memorandum will be used to assess whether the Fish and Fish Habitat Compensation Plan meets each of the objectives. These measures will need to be effective for the period of time defined in the December 4<sup>th</sup> memorandum.

9.2 Develop and implement a monitoring program to verify the proper implementation of all performance measures and a follow-up program to determine the accuracy of conclusions and the efficacy of the required measures as described in Volume 3, Section 8.4 of the Application. This program is to be developed and implemented in consultation with MOE and DFO.

9.3 Use an adaptive management process to incorporate contingency planning, management objectives, ongoing monitoring, and commitment for achieving benchmark goals within specified timelines with regard to fish and fish habitat compensation plans.

## 10.0 Wildlife

10.1 Implement the mitigation measures for wildlife for all aspects of the Project as described in Volume 5, Section 6.4.1 and Table 6-67 (Mine), 6-68 (Transmission Line), and 6-69 (Access road) of the Application.

10.2 Implement additional wildlife protection measures to apply to Project personnel travelling to and from the Project on workdays. These provisions will include but are not limited to:

- a) Firearms are prohibited at all times except when specifically authorized (e.g., wildlife monitor);
- b) No littering;
- c) No feeding or harassment of wildlife;
- d) No hunting and fishing on the Project site; and,
- e) Project-related traffic is restricted to designated access roads and trails (including all-terrain vehicles and snowmobiles).

10.3 Commit to the strict and rigorous implementation of mitigation measures, in concert with MOE and with other agencies as appropriate, to eliminate or severely minimize the risk of direct mortality to grizzly bear (from all sources, see also Sections 6.1.2.1 and 6.3.4.8 of the Application). Taseko will work with the BC Ministry of Transportation and Infrastructure (MOT) to control mine related traffic speed along the section of Taseko Lake Road that is within known grizzly bear range.

10.4 Record all Project-related wildlife-vehicle collisions or near misses as described in Volume 5 in Section 6.4.3.1 of the Application. Wildlife vehicle collisions will be reviewed regularly by Qualified Environmental staff person who will take appropriate action. If a problem area is identified appropriate actions will be taken (e.g., warning signs, site-specific speed limits). In addition, Taseko Mines Ltd. will report any wildlife mortalities resulting from Project vehicles to the MOE regional office and MOT.

10.5 Implement the Vegetation and Wildlife Management Plan (Volume 3, Section 9 of the Application) and mitigation measures (Volume 5, Section 6.4.1 of the Application) and Materials Handling and Waste Management Plan for dealing with potential human-bear conflicts.

10.6 Implementation of wildlife protection provisions as detailed in the Transportation and Access Management Plan Volume 3, Section 9.2.2 of the Application.

10.7 Design and construct a transmission line consistent with BCTC's standard practices to mitigate potential transmission line electrocution/collision impacts to migratory birds.

#### 11.0 Habitat Compensation

11.1 Develop and implement a plan for achieving compensation 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. Development and implementation of the plan will be guided by the following principles:

- a) A suite of mitigation measures designed to eliminate or minimize Project effects have been outlined in the Application. The effectiveness of these mitigation measures will be taken into account when assessing the need and justification for specific compensation measures.
- b) Compensation measures will be considered and implemented on a case-by-case basis based on the appropriateness of each proposed compensation measure in each case.
- c) There will be no need for compensation if there is a technically defensible confirmation that there is no adverse impact. The process by which a determination of impact is reached will be transparent, readily understood, and undertaken in consultation with MOE, CWS, and First Nations.

11.2 Taseko will work with MOE officials in a timely manner to develop a "Reference Document" in which roles and responsibilities, timing and strategies for implementation of the plan outlined in 11.1 will be detailed.

#### 12.0 Vegetation, Wetland and Riparian Habitats

12.1 Implement BMP and methods for constructing and upgrading the access road(s) and transmission line, and related stream crossings (Volume 3, Section 9.2.1 in the Application).

12.2 Implement mitigation measures to minimize mine related environmental effects on wetland ecosystems. These mitigation measures will be primarily directed at protecting and conserving wetlands in close proximity to the mine footprint to minimize potential for incremental disturbance. The principles of these mitigation measures will be to: Avoid vegetation loss, minimize disturbance, mitigate against invasive species, and maintain natural drainage patterns (Volume 5, Section 5.3.2 of the Application).

12.3 Implement all appropriate mitigation measures for wetland ecosystems on the transmission line including but not limited to:

- a) Timing construction to avoid activity until ground is frozen;

b) Transmission pole delivery to wetland areas completed by helicopter drop; and,

c) Minimize the area of excavation for pole foundations and area of footprint of the side cast material.

12.4 Monitor construction of the access road and transmission line to ensure that wetland ecosystems are avoided wherever possible and environmental effects to wetland ecosystems are minimized through application of prescribed mitigation measures. Taseko must follow DFO Pacific Region's *Maintenance of Riparian Vegetation in existing Rights of Way* Operational Statement and principles and practice in British Columbia Hydro's *Approved Works Practices* or *Managing Riparian Vegetation* when maintaining the transmission line right-of-way.

12.5 Replant only native species in disturbed areas associated with the transmission corridor that fall within the grassland zones.

12.6 Implement the invasive plant management plan as proposed in Volume 5, Appendix 5-5-K: and as discussed in Volume 3 section 9.2.12 of the Application. This will include a weed management strategy for maintenance of the transmission line developed in consultation with regulatory agencies, land owners, and First Nations.

12.7 Execute mitigation measures for the reduction or elimination of construction related sediment releases into fish-bearing and non fish-bearing habitats as detailed in EMP (Volume 3, Section 9 of the Application). These measures will follow the *Standards and Best Practices for In-stream Works* (MWLAP 2004) and DFO Operational Statements.

### 13.0 Reclamation and Closure

13.1 Implement Reclamation, Temporary Closure and Decommissioning Plans as described in Volume 3, Section 9.3 of the Application and Taseko's July 31, 2009 memo Temporary Closure Reclamation and Decommissioning Plan (IR 2.2).

13.2 Implement the soil salvage plan described in Volume 3, Section 9.3.3.1 of the Application.

13.3 Implement reclamation practices that are consistent with the BC Mines Act and its *Health, Safety and Reclamation Code*. The conceptual reclamation practices and decommissioning plan described in the Application provides a basis for detailed reclamation planning and bonding discussions that will be held with the BC Ministry of Energy, Mines and Petroleum Resources (MEMPR) at a later date as part of the permitting application.

13.4 Further develop reclamation and decommissioning plans, including progressive reclamation, in consultation with regulatory agencies, First Nations and local communities. At the end of mine operations, complete implementation of the approved closure plan.

13.5 Mitigate residual effects of mining with respect to recreation values, wildlife, wildlife habitat, at-risk plant communities and the habitat of species at risk through reclamation approaches as described in the decommissioning plan.

13.6 Remove the transmission line and reclaim the transmission line corridor when no longer required.

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#### 14.0 Protection of Ecological Values

14.1 Employ BMP throughout all Project phases and activities. In particular, prior to construction commencing, undertake all appropriate measures to ensure that sensitive habitat features and wildlife values are identified and all appropriate mitigative measures are implemented to avoid adverse effects.

14.2 Identification and implementation of additional measures adequate to protect aquatic life as detailed in Volume 1, Table 20-1 of the Application.

14.3 Develop policies and procedures, conduct public consultation, and conduct access planning for the transmission line ROW.

14.4 Identify and quantify Project effects on wildlife and vegetation at a local level on a scale that would enable the identification of appropriate mitigation/compensation measures.

#### 15.0 Mitigation specific to transmission line construction

15.1 Review transmission line final design details and proposed construction scheduling with MOE-ESD (Environmental Stewardship Division) before commencement of construction.

15.2 During construction, work with MOE-ESD and with other regulatory bodies as appropriate to implement all appropriate mitigation strategies as detailed in Taseko's "Transmission Line Corridor Mitigation Strategies" (IR 6.2). This will include surveying the final transmission line corridor to identify and mitigate impacts to wildlife features, rare plants, and other features of importance.

#### 16.0 Monitoring

16.1 Implement the follow-up and monitoring plan described in Volume 3, Section 9 in the Application (which includes a program for environmental effects monitoring and follow-up through construction, operation, closure, and post-closure to verify the accuracy of the environmental assessment) and determine the effectiveness of mitigation measures.

- a) Develop and implement compliance monitoring programs to meet applicable provincial and federal permits, licenses and approvals and meet any reporting requirements of these permits, licenses and approvals.

16.2 Conduct the Follow-up and Monitoring programs summarized in Table 16-1, Volume 1 of the Application in the nine specific disciplines listed through all mining phases.

16.3 Assess the suitability of reclaimed sites for wildlife use through trace element monitoring in vegetation.

16.4 Assess routine monitoring results for the various waste streams during operations to develop specific effluent treatments if needed. Investigate if monitoring results indicate effluent quality of specific waste streams is likely to contribute to exceedances post-closure.

16.5 Continue ongoing discussions with MOE-ESD and undertake additional hydrology and hydrogeology baseline sampling.

## 17.0 Air Emissions

17.1 Incorporate into Project design, Best Available Technology that is Economically Achievable (BATEA) measures to reduce Criteria Air Contaminants (CAC) and Greenhouse Gas (GHG) emissions wherever possible.

17.2 Utilize effective dust suppression methods and CAC and GHG mitigation measures, including but not limited to:

- a) Install covered conveyor belt ore transport systems and housing of the rail load-out facilities to minimize fugitive particulate emissions;
- b) Install a water suppression system at the discharge point of the coarse ore stockpile to reduce dust emissions;
- c) Install dust control measures at the primary crusher truck dump to control dust emissions;
- d) Cover trucks used to transport concentrate to prevent loss of this material and to ensure there is no tracking of any residual concentrate on route to the concentrate load-out facility;
- e) Ensure posted speed limits are followed by all mine equipment and vehicles;
- f) Ensure application of surface-binding chemicals or water on site roads and exposed surfaces as required to control dust;
- g) For vehicles, off-road construction, and mining equipment, best practices will include ensuring equipment is properly tuned and maintained, and vehicle idling times reduced to a minimum;
- h) Optimize vehicle movements to minimize emission of GHGs; and,
- i) Minimize disturbances and manage all land clearing to minimize burning.

17.3 Develop and implement an Air Quality and Dust Control Management Plan as described in Volume 3, Section 9.2.9.

17.4 Taseko will work with MOE to develop an Air Quality and Emissions Monitoring and Management Plan (AQEMMP) as outlined in the MOE submission (dated May 25, 2009 from Graham Veale to EAO). The AQEMMP will be implemented as soon as practicable after a decision to proceed with the Project has been made and will continue through the life of the Project. The AQEMMP will ensure that facility emissions are tracked and contaminants of potential concern are monitored; that all applicable federal and provincial ambient air quality, criteria, standards, objectives, and guidelines are met; and provide an umbrella document to house all related monitoring programs and management plans, including contingency plans with identified actions and triggers for implementation.

17.5 Ongoing monitoring of dust resulting from the tailings beach to verify the predicted levels and to ensure that any impacts are minimized. Design of monitoring program will allow for input from regulatory agencies.

17.6 Limit fugitive dust caused by wind erosion on the tailings by maintaining a water cover over the deposited materials as stipulated in the Operational Deposition Plan. Fugitive dust caused by wind erosion on the waste rock piles will be mitigated by progressive reclamation.

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- 17.7 Prepare and execute a burn plan for vegetative debris consistent with the Open Burning Smoke Control Regulation (BC Reg. 145/93) prior to initiation of the construction and commissioning phase.
- 17.8 Develop and maintain an annual inventory of GHGs and CACs for both internal management and potential external reporting needs.
- 17.9 PM<sub>2.5</sub> Ambient Air Quality Objectives (AAQO's) will be included in the Prosperity Ambient Air Monitoring Program.

#### 18.0 Adaptive Management

- 18.1 Incorporate adaptive management processes for this Project including contingency planning, management objectives, ongoing monitoring, and the proponent's commitment for achieving benchmark goals within specified timelines.
- 18.2 Implement corrective measures should unforeseen adverse effects arise during the life of the Project. Measures will be taken to correct these effects and prevent them from occurring in the future. The EMS is then updated and associated training programs enhanced to improve the level of environmental protection based on the results of these programs.

### **Economic Contributions**

#### 19.0 Direct Employment

- 19.1 Implement hiring practices consistent with good business decisions and underlying principles of delivering maximum economic value and social benefit—locally, regionally and provincially.
- 19.2 Give local candidates preference where all things being equal, two candidates seek employment at Prosperity, and there is only one position available. A local employment candidate shall be defined as someone who lives in the Cariboo-Chilcotin region.
- 19.3 Expand efforts to hire local First Nations candidates by ensuring employment opportunities are communicated. Undertake to inform local communities of the employment positions and opportunities available at Prosperity before expanding the search for potential employees beyond the Cariboo-Chilcotin region.
- 19.4 Establish policies to help potential candidates gain required standards and qualifications to ensure local people have the opportunity to be eligible for hiring and career advancement (see Training below).
- 19.5 Encourage Taseko suppliers, contractors, and consultants to give local candidates preference.

#### 20.0 Training

- 20.1 Promote "*Mining: Your Future*", Taseko's education and training initiative, to give individuals the opportunity for gainful employment in the mining industry.

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## 21.0 Business Opportunities

21.1 Develop policies on procurement of goods and services to build and operate the mine based on good business decisions and guided by a desire to deliver maximum economic value and social benefit—locally, regionally and provincially.

21.2 Cultivate an entrepreneurial spirit to develop lasting relationships with suppliers based on cost competitiveness, continuous innovation, service and productivity improvement, employee health and safety, and environment protection.

21.3 Encourage First Nations to form and develop locally owned businesses that provide supplies or services to Prosperity.

21.4 Ensure contractors share Taseko's commitment to investing in local community success through their respective purchasing, hiring, contracting, and logistical support practices.

## **Social Development**

### 22.0 Health and Safety

22.1 Implement a comprehensive health and safety program based on the current Taseko Policy that includes safety leadership by mine management, risk and harm reduction, safety management systems, safe work behaviour programs, and continual improvement.

22.2 Establish at the commencement of development, an Occupational Health and Safety Committee.

22.3 Meet the obligations set out in the BC Mines Act (1996, updated to 2007) Regulation and appropriate sections of the *Health, Safety and Reclamation Code*, including the provision of support to contractors and contractors' managers to comply with the Act when on-site.

22.4 Develop and implement a Transportation and Access Management Plan for the Project as described in Volume 3, Section 9.2.2 of the Application, to safely meet the needs of mine employees and contractors, local residents, and the general public. This plan will include but will not be limited to:

- a) Appointing safety and security personnel before construction;
- b) Providing transportation for workers to and from the mine site from strategic locations throughout all phases of mine life; and,
- c) Developing and implementing access control protocols to ensure employee and contractor safety and to minimize social and environmental effects such as wildlife mortality related to the Project.

22.5 Taseko will implement a plan to monitor and ensure open pit stability to protect worker safety.

### 23.0 Emergency Response

23.1 Continue to implement a risk management approach for the design, construction, operation and closure of the Project.

- a) Implement procedures and measures to address accidents, malfunctions and unplanned events. Table 17-1 in Volume 1 of the Application summarizes these measures and Volume 9 of the Application provides detailed procedures.

23.2 Develop a full Mine Emergency Response Plan specific to the Project for any material risks identified before operations start.

23.3 Follow procedures for the handling, storage and disposal of hazardous chemicals used from construction through closure as dictated by the Material Handling and Waste Management Plan.

- a) Manage all hazardous materials according to their Material Safety Data Sheet (MSDS) and provide training for employees handling these chemicals in the Workplace Hazardous Materials Information System.

23.4 Institute measures to ensure that fuel and lubricants do not escape to surrounding areas by:

- a) Equipping fuel systems with emergency fire safety valves and anti-siphon solenoid valves at tanks;
- b) Installing concrete grade slabs sloped to direct any spillage back into the containment;
- c) Any precipitation or drips which fall within the containment will pass through an oil/water separator before discharge to the environment;
- d) Implementing the Spill Prevention and Response Plan to promote the prevention of the accidental release of harmful substances into the receiving environment; and,
- e) In the event of a spill, providing adequate information to guide the response crew to safely, efficiently and effectively respond to and clean-up a spill.

#### 24.0 Cultural Heritage Resources

24.1 All Project plans and drawings to identify areas of archaeological and cultural sensitivity that require protection and/or monitoring.

24.2 Implement archaeological resource management measures throughout the Project area to avoid or mitigate adverse effects on identified resources and culturally sensitive areas as outlined in the Ministry of Tourism, Culture and the Arts' letter of 22 May 2009. The mitigation program, details of which will be specified in subsequent permit applications, will include but will not be limited to:

- a) Systematic excavation of 16 of the 79 archaeological sites identified within the mine footprint of which 6 are to be subject to intensive investigation;
- b) A survey of the lake basin after draining and the gathering and analysis of palaeo-environmental data from the lake basin; and,
- c) Lithic sourcing.

24.3 Completion of the Archaeological Impact Assessment for the transmission line and a management plan prepared to the satisfaction of the Archaeology Branch prior to commencement of construction.

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24.4 Completion of the Archaeological Impact Assessment of the proposed 2.8 kilometres of new road and to further assess the cairn-like feature at site EiRv-7.

## **Appendix B Correspondence Related to Habitat Compensation**



May 19, 2006

Reference: 87896

Larry Murray  
Deputy Minister  
Fisheries and Oceans Canada  
Ottawa Ontario K1A 0E6

Dear Larry Murray:

I am responding to your inquiry regarding the Ministry of Environment's perspective on the Prosperity Gold Mine project proposed by Taseko Mines.

The Ministry of Environment has been informed by Taseko Mines of their initiative to reactivate the environmental assessment process for the Prosperity project. Staff have engaged with the proponent to share information pertinent to environmental values and related stewardship issues. Review of the file history has been undertaken with Taseko Mines to confirm the status of issues at the point the environmental assessment was suspended. The ministry understands that the project will result in the complete loss of Fish Lake and the provincial assets associated with the lake ecosystem.

The ministry considers the lake ecosystem, and all environmental values associated with it, to be important provincial assets. The ministry would prefer protection of the fish population and fish habitat, the productive capacity of the lake, recreation values, wildlife, wildlife habitat, and the habitat of species at risk. However, if a decision is made to proceed with the Prosperity project, the ministry will be seeking compensation for the loss of these assets.

It is the position of the Ministry of Environment that the environmental assessment should continue even with the knowledge that the project would result in the complete destruction of the fish population and fish habitat of Fish Lake, and the loss of wildlife and wildlife habitat and recreation values associated with the lake ecosystem. The ministry believes there is considerable potential for an innovative approach to compensation for these losses. The

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Ministry of Environment

Office of the  
Deputy Minister

Mailing:  
PO Box 9339 Stn Prov Govt  
Victoria BC V8W 9M1

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Victoria

scope of possible compensation includes options that may not involve restoration of the lake ecosystem. Compensation could include provisions for direct investment by Taseko in a continuous program of enhancement and management for fish and fish habitat, recreation and wildlife and wildlife habitat, in the vicinity of the mine site. The ministry considers it appropriate that the proponent be provided an opportunity to design compensation that is adequate to fully offset the destruction of environmental assets caused by mine development.

I am prepared to share further information as Fisheries and Oceans Canada determines its position with respect to recommencement of the environmental assessment.

Yours truly,

Original signed by

Chris Trumpy  
Deputy Minister

RECEIVED  
JUL 02 2010  
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Reference: #126948

JUN 29 2010

Brian Battison  
Vice President Corporate Affairs  
Taseko Mines Limited  
#300 – 905 West Pender St  
Vancouver BC V6C 1L6

Dear Brian Battison:

**Re: Habitat compensation for the Prosperity Mine project.**

Following upon Taseko Mines being granted Environmental Assessment Certificate #M09-02, and in support of inter-agency work on provincial authorisations, I am writing to inform Taseko Mines Limited of government's expectations respecting habitat compensation. Delivery of compensation by Taseko Mines Limited is considered by the Ministry of Environment to be an important response to habitat impacts. By way of this letter, the Ministry of Environment exercises its prerogative to establish principles for determining impacts during the transparent, consultative processes Taseko Mines Limited has committed to.

Section 11.2 of the table of commitments speaks to timely development of a Reference Document in which roles and responsibilities, timing and strategies for implementation of a habitat compensation plan is to be detailed. With respect to the purpose of this commitment, the Ministry of Environment expects the Reference Document to be prepared and submitted to the Ministry of Environment without delay, as provincial agencies commence administration of authorisations required for the project. Further, the Ministry expects the Reference Document to:

- List each environmental value for which a loss or impact has been identified, with an indication of the significance of the impact or loss considering principles set out below;
- Provide an estimate of when the loss or impact commences for each impacted habitat value, and the time period the loss or impact is expected to persist;
- Provide an assessment of the expected efficacy of applied mitigation, and a description of the extent to which there are expected to be residual impacts, including temporary or permanent losses of habitat values;
- Indicate the habitat values for which compensation initiative is required; and,
- Summarise the menu of compensation measures that may be applicable to each impact or loss.

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The content of this reference document will include information critical to government's consultative engagements with First Nations regarding project authorisations. The Reference Document will serve as the basis upon which a habitat compensation plan is prepared and implemented.

Impact or loss that requires habitat compensation will be determined at the scale of the landscape units within which the project's footprint is located. The selection of compensation measures will be commensurate with the significance of habitat values that are subject to loss or impact, considering the severity and magnitude of the loss or impact at the landscape scale, and the effectiveness of applied mitigation. The Ministry of Environment expects Taseko Mines Ltd. to explain the parameters by which the significance of habitat values and the severity and magnitude of impact or loss is determined. These parameters will best be established in collaboration with ministry staff. In assessing the significance of habitat values, it will be important to reflect impacts on the abundance and diversity of wildlife resources important to First Nations and the provincial public interest, and the manner in which habitat compensation measures may address identified residual impacts. It is known that for some habitat values, loss or impact to habitat values will occur as mine development commences, and will persist until mine reclamation is complete in 3 to 5 decades. In these cases, the ministry expects that compensation measures will be applied considering the period of time that an impact or loss is evident, before mine reclamation outcomes are realized.

The habitat compensation plan is expected to describe the specific measures selected by Taseko Mines Limited to address each impact or loss of habitat values. The plan should be submitted to the ministry before the commencement of mine development considering that the environmental assessment of the project (including supplementary reports) predicts several losses or impacts that the habitat compensation plan must address as a priority. It is understood that monitoring will evaluate the extent to which mitigation is effective. However, it is known that for some habitat values, mitigation is at risk of being ineffective, or will not be effective for a considerable time after loss or impact occurs. Under these circumstances, it is important that prior to development, the habitat compensation plan sets out measures to address such circumstances.

I encourage Taseko Mines Limited to sustain engagement on habitat compensation initiatives with ministry staff based in our Williams Lake office. Please contact John Youds, Ecosystems Section Head, at 250-398-4563.

Yours truly,



Doug Konkin  
Deputy Minister

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**From:** Stewart, Rodger W ENV:EX [mailto:Rodger.Stewart@gov.bc.ca]

**Sent:** August 16, 2010 8:25 PM

**To:** Katherine Gizikoff; Roderick Bell-Irving

**Cc:** Youds, John A ENV:EX; Hoffos, Robin ILMB:EX; Vanderburgh, Ken ILMB:EX; Calof, Justin ILMB:EX

**Subject:** RE: Habitat compensation (offsetting), Prosperity project.

Katherine and Rod, a number of pressing issues have kept my focus elsewhere since our July 13 talk about habitat compensation (offsetting). As such, I am late in offering a written follow-up to our conversation in your Williams Lake offices on that day. That said, the thrust of our discussion on that day should have been sufficiently informative to support your initial deliberations on habitat compensation (offsetting). I have been reminded by staff that we have been requesting conversation with you on these matters since April 2010.

[[NOTE: the ministry is developing policy for government on mitigation and compensation. The common terminology used in other jurisdictions when compensation measures are applied to address unavoidable and unmitigated impacts is "offsetting". We will be using this term with increasing frequency.....]]

**Relationship of TML's habitat compensation measures to government's consultation obligations respecting aboriginal rights:**

It is becoming increasingly evident that government's consultative engagements with First Nations are going to be informed by particular information that should be supplied by TML to government, specifically the information required to:

- support administration of various provincial authorisations the project requires, and
- fulfill obligations respecting habitat compensation (offsetting) consistent with terms of the provincial environmental assessment certificate.

There are a number of critical vulnerabilities for government decision makers and TML if it comes to pass that government is unable to receive from TML the information that is fundamental to the authorisations process, which includes First Nations consultation. Previous Court decisions have described the proponent's responsibility to share information that would assist government decision makers in meeting their obligations to First Nations.

The inter-agency Mine Development Review Committee has set out specific information requirements for the suite of provincial authorisations required by the project. One initiative that is of particular importance is the habitat compensation (offsetting) Reference Document, not that it is directly relevant to any one of the required authorisations, but that it is required from TML to meet the specifications of the EA Certificate. Further, the reference document will be comprised of information of particular importance to government's initiatives to engage with First Nations. As we discussed on July 13<sup>th</sup>, this puts a rather fine point on the relative priority for TML's delivery of the habitat compensation (offsetting) Reference Document.

- Each government authorisation requires engagement with First Nations. The activities covered by each authorisation have differing levels of potential to impact the abundance and diversity of wildlife which as a result, could cause infringement of aboriginal rights. Taken cumulatively, government decision makers may determine that the activities are likely to be of considerable significance relative to government's obligation to protect those rights.
- The actions taken to avoid, eliminate, reduce or mitigate those impacts on the abundance and distribution of wildlife can be considered as means to:
  - protect the broad public interest in environmental values, and
  - protect aboriginal rights.

Where mitigation is not possible or is ineffective, compensation (offsetting) will be required..... or something that would address the resulting infringement of aboriginal rights.

- Offsetting (compensation) measures may be very important means to address infringements of aboriginal rights. As a result, the information that is to comprise TML's Reference Document and subsequent Habitat Compensation Plan will be very important to government's discussions with First Nations.

### **Reflections from the July 13<sup>th</sup> session:**

- The objective proposed by TML for the Reference Document and subsequent Habitat Compensation Plan: "Certainty respecting the design, scheduling and delivery of habitat compensation measures for the Prosperity Mine project." This seems reasonable.
- There is a pressing need to confirm the reference point (or the "test") which would determine a need to apply compensation measures for a particular value. With respect to the "reference point" or "test", it is important to reflect on the potential differences between the tests applied in environmental assessments by the provincial EAO and the federal panel, as compared to that applied in the William case.
  - The focus of the "test" should be on the extent of habitat loss:
    - over the short (at project commencement),
    - intermediate (during mine development and operation) and
    - long term (post reclamation), and
    - must consider the potential that such habitat loss would cause impact to the abundance and distribution of wildlife.
- The tests applied by the two environmental assessment processes probably did not specifically determine whether there would be impacts on the abundance and diversity of wildlife and habitat (per the William case). There did not seem to be a particular application of the William case test in the specific area of land affected by the project and within the land area in which the aboriginal rights (as defined by the Court) are practiced.

- The habitat offsetting (compensation) initiative probably cannot rest solely on the conclusions respecting impacts made in supplemental reports supporting the provincial assessment nor conclusions by the provincial EAO or the federal panel. There needs to be a focussed assessment of impacts on the abundance and distribution of wildlife and habitat, and specific description of the compensation (offsetting) measures to be applied if impacts cannot be avoided, reduced to an acceptable level, or fully mitigated.
- For the Reference Document, it seems logical that the reference point or “test” should be constructed around the loss of habitat and the potential impact of that loss on the abundance and diversity of wildlife.
- It will be important to respect that for some species, impacts will commence upon initial mine development. There will be a period of lost productivity until such time as mitigation or mine reclamation recover that lost productivity. The effects of reclamation might not be effective in delivering that recovery. Impact assessment will need to consider the time period for which the development causes impact on the abundance and distribution of wildlife. Relying solely on future reclamation will pose some particular vulnerabilities to the provincial public interest.
- The impact assessment should be at the geographic and ecological scale of the project footprint, and the surrounding land area that may be subject to wildlife disturbance vectors from the project.

#### **What should be the content of the reference document?**

- The reference document needs to describe the extent to which the activities associated with the project will cause an impact on the abundance and distribution of wildlife. The impacts need to be characterised for the list of species set out in the William case, and for any other species of concern identified by the province or federal government. The supplemental report for the provincial environmental assessment would be a reasonable initial reference document.
- It may be possible to group the wildlife species on ecological grounds and carry out impact assessment on that basis. Rationale for the ecological groupings would need to be explicitly described.
- Once the habitat losses and implications on wildlife populations are determined, the reference document will need to describe the extent to which specific mitigation measures will be effective in addressing the identified impacts to the abundance and distribution of wildlife. The extent of any residual impacts needs to be described – impacts against which mitigation is not effective, either temporarily or permanently.
- For each case where residual impacts are identified, it is expected that the reference document will list the suite of potential offsetting (compensation) measures that may be selected as the Habitat Compensation Plan is developed.
- Bottom line, the reference document should include, with appropriate explanations:
  - a complete listing of the wildlife species and habitats that were subject to examination for potential habitat compensation,
  - identification of those species for which habitat loss **will not** result in an impact on wildlife abundance and distribution,

- identification of those species for which habitat loss **will** result in an impact on wildlife abundance and distribution that cannot be mitigated,
- a menu of the measures that would be considered for habitat compensation (offsetting) for each species, and
- explanations as to why compensation is not proposed to be applied where compensation is not to be considered for a species that is subject to impact on abundance/distribution.

I am certain this note will lead to further conversation. I will be away from August 17<sup>th</sup> till the 25<sup>th</sup> and will look forward to discussion upon my return. Meanwhile, there is a pressing need for government to commence consultation with First Nations respecting the initial applications received from TML. It is expected that TML will respect that information on habitat compensation is needed without further delay to support those deliberations, and to inform the decisions by authorising agencies.

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## Appendix C Species Assessed in the EIS and Supplemental Report

Species*	Conservation Status			
	BC CDC	COSEWIC	SARA Schedule	BC Conservation Framework
American Badger	Red	Endangered	1	1
American Beaver				5
American Marten				2
American Mink				6
American Pygmy Shrew				6
Bald Eagle				6
Barrow's Goldeneye				1
Bighorn Sheep	Blue			3
Black Bear				6
Bobcat				4
Brewer's Sparrow				4
Canada Lynx				4
Cinereus Shrew				6
Columbia Spotted Frog				2
Common Muskrat				6
Cougar				4
Dusky Shrew				6
Feral Horse				6
Fisher	Blue			2
Flammulated Owl	Blue	Special Concern	1	2
Great Blue Heron, <i>Herodias</i> ssp.	Blue			2
Grey Wolf				3
Grizzly Bear	Blue	Special Concern	3	2
Least Weasel	Blue			4
Lewis's Woodpecker	Red	Threatened	1	2
Long-billed Curlew	Blue	Special Concern	1	2
Long-tailed Weasel				6
Mallard				5
Meadow Jumping Mouse				6
Moose				6
Mountain Goat				1
Mule Deer				6
North American Deermouse				6
Northern Bog Lemming				6

Species*	Conservation Status			
	BC CDC	COSEWIC	SARA Schedule	BC Conservation Framework
Northern Flying Squirrel				5
Northern River Otter				4
Prairie Falcon	Red			2
Red Squirrel				5
Sandhill Crane				5
Sharp-tailed Grouse, Columbianus ssp.	Blue			2
Short-eared Owl	Blue	Special Concern	3	2
Short-tailed Weasel				6
Snowshoe Hare				5
Southern Red-backed Vole				6
Townsend's Big-eared Bat	Blue			2
Western Jumping Mouse				6
Western Toad		Special Concern	1	2
Wolverine, Luscus ssp.	Blue	Special Concern	3	2
Wood Frog				2
Yellow-breasted Chat	Red	Endangered	1	1
<b>NOTE:</b>				
* mice and voles, small mammals, and amphibians were assessed in the EIS and Supplemental report as groups; the species are listed for completeness.				

## **Appendix D Summary of Wildlife Mitigation Measures from the EIS**

**Table 6-1 Summary of Mitigation Measures to Address Potential Project Effects on Wildlife within the Mine Site**

Potential Project Effect	Project Phase	Mitigation Measures
<ul style="list-style-type: none"> <li>Loss or alteration of wildlife habitat <u>in general</u> through site clearing</li> </ul>	Construction, operations	<ul style="list-style-type: none"> <li>Site clearing area will be minimized. Minimization of the site clearing area can be achieved 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 (e.g., between the camp and the plant). Even if small, these patches will have benefits to wildlife and wildlife habitat (e.g., landscape connectivity through “stepping stones”<sup>1</sup>, seed sources for post-closure re-establishment of vegetation cover) and should be protected from further disturbance during the life of the mine</li> <li>Site clearing will avoid <u>non-pine</u> forests of any age wherever possible</li> <li>Mitigation measures for other VECs/KIs are applicable: Old forest (Section 5.4.1); Wetland ecosystems (Section 5.4.2); Riparian ecosystems (Section 5.4.3); Fish habitat (Section 3); Aquatic ecosystems (Section 2.3.3)</li> <li>Other management plans are applicable: Water Quality Management Plan (Vol. 3, Sect. 9); Fish Protection and Management Plan (Vol. 3, Sect. 9)</li> <li>Mitigation measures described for wildlife habitat features are also applicable (see below)</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of wildlife habitat features through site clearing</li> </ul>	Construction, operations	<ul style="list-style-type: none"> <li>Prior to and during site clearing for <u>mine site facilities</u> (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 <i>Wildlife Habitat Features: Summary of Management Guidelines–Northern Interior Forest Region</i> (BCMWLAP 2004q) is useful in the identification of wildlife habitat features and proposes mitigation measures that would be applicable in the Project area</li> <li>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<sup>2</sup>)</li> <li>Mitigation measures described for wildlife habitat are also applicable (see above)</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of grizzly bear habitat through site clearing</li> </ul>	Construction, operations, decommissioning, post-closure	<ul style="list-style-type: none"> <li>The general wildlife mitigation measures (e.g., minimize clearing area) listed in Section 6.4.1, and those identified for other KIs (e.g., old forest, Volume 5, Section 5.4.1) are applicable</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of black bear habitat through site clearing and/or sensory disturbance</li> </ul>	Construction, operations	<ul style="list-style-type: none"> <li>Avoid site clearing of moderate or higher quality denning habitat in mid-winter to reduce the risk of destroying or disturbing active dens<sup>3</sup></li> <li>Should clearing of moderate or higher quality denning habitat occur in the winter, conduct a pre-clearing den survey to identify bear dens within the proposed mine site. Any identified dens will be clearly marked with a 50 m setback and avoided until bears have left the area.</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of Barrow’s goldeneye nesting habitat through site clearing</li> </ul>	Construction, operations, decommissioning, post-closure	<ul style="list-style-type: none"> <li>No specific mitigation is proposed for Barrow’s Goldeneye habitat. However, , the general wildlife mitigation measures (e.g., minimize clearing area, retention of deciduous trees) listed in Section 6.4.1, and those identified for other KIs (e.g., old forest [Section 5.4.1], wetlands [Section 5.4.2]) are applicable</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of wildlife habitat <u>in general</u> and wildlife habitat features through site clearing</li> </ul>	Post-closure	<ul style="list-style-type: none"> <li>Sections of the Reclamation Plan that pertain to the reclamation of wildlife habitat (Volume 3, Section 9.4)</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to birds <u>in general</u> from destruction of active nests</li> </ul>	Construction, operations	<ul style="list-style-type: none"> <li>Best practice is adherence to region-specific breeding bird timing windows for site clearing and any subsequent vegetation management activities (BCWLAP 2004r). An alternative to this best practice is searching for and flagging off nest sites in advance of vegetation clearing (BCWLAP 2004r). Timing window dates and any alternatives to best practice should be confirmed in consultation with BC Ministry of Environment Region 5 staff.</li> </ul>
<ul style="list-style-type: none"> <li>Direct mortality risk to bears from mine site operations</li> </ul>	Construction, operations, decommissioning	<ul style="list-style-type: none"> <li>Taseko will provide Bear Aware and Bear Safety information and training for all Project personnel</li> <li>Taseko will develop a problem wildlife prevention and response plan as part of the Vegetation and Wildlife Management Plan</li> <li>Taseko will only employ non-lethal deterrent methods in the unlikely event a problem bear situation develops, unless otherwise instructed, and fully supported, by the BC Ministry of Environment</li> <li>All waste that may be an attractant to bears (e.g., food waste) will be handled in accordance with strict permit conditions (yet to be determined) that eliminate the potential for bear management concerns</li> </ul>
<ul style="list-style-type: none"> <li>Adverse health effects</li> </ul>	Construction, operations, decommissioning, post-closure	<ul style="list-style-type: none"> <li>Taseko will evaluate the feasibility of fencing, fully or partially (depending on size and accessibility), mine site water features with compromised water quality</li> <li>Mitigation measures that may minimize or eliminate adverse Project effects on wildlife health are included in the assessments for a number of other VECs, principally: Human Health and Terrestrial Ecological Risk Assessment (Volume 6, Section 6) and Water Quality and Aquatic Ecology (Volume 5, Section 2)</li> </ul>

<sup>1</sup> Stepping stones are small habitat patches or habitat features (e.g., remnant trees) within a disturbed matrix that provide connectivity among larger habitat patches.

<sup>2</sup> <http://www.for.gov.bc.ca/hfp/values/wildlife/WLT/Publications/policies/WT-Guidance-05-2006.pdf>

<sup>3</sup> Den abandonment in the mid to late winter has a higher mortality risk (particularly for cubs) than in early winter (Swenson et al. 1997; Linnell et al. 2000)

**Table 6-2 Summary of Mitigation Measures to Address Potential Project Effects on Wildlife along the Transmission Line**

Potential Project Effect	Project Phase	Mitigation Measures
<ul style="list-style-type: none"> <li>Loss or alteration of wildlife habitat in <u>general</u> through site clearing and ROW maintenance</li> </ul>	Construction, operations	<ul style="list-style-type: none"> <li>Site clearing area required for transmission line construction (i.e., access and ROW clearing) will be minimized in three ways: 1) width of the cleared ROW to average 80 m, 2) minimize new access roads; and 3) ROW will coincide with existing cleared areas, wherever possible</li> <li>Site-specific routing of the transmission line to avoid <u>non-pine</u> forests of any age will be implemented wherever possible</li> <li>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</li> <li>Taseko to work with local ranchers to prevent cattle disturbance in wetland or riparian areas that may become more accessible with the new ROW</li> <li>Mitigation measures described for wildlife habitat features are also applicable (see below)</li> <li>Mitigations measures for other VECs/KIs are applicable: Old forest (Section 5.4.1); Wetland ecosystems (Section 5.4.2); Riparian ecosystems (Section 5.4.3); Grasslands (Section 5.4.4); Fish habitat (Section 3); Aquatic ecosystems (Section 2.3.3)</li> <li>Other management plans are applicable: Fish Protection and Management Plan (Vol. 3, Sect. 9)</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of mule deer winter range through site clearing</li> </ul>	Construction	<ul style="list-style-type: none"> <li>ROW clearing within designated mule deer Ungulate Winter Range will be minimized through project design. To guide clearing ROW boundaries will be clearly marked</li> <li>ROW clearing within designated mule deer Ungulate Winter Range will be avoided during the critical winter period to the extent practical</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of flammulated owl and Lewis's woodpecker nesting habitat through site clearing</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Site-specific routing of the transmission line to avoid high value nesting habitat for Lewis's woodpecker and flammulated owl identified in this assessment (in particular along Meason Creek, see Figures 6-44 and 6-53) will be implemented where possible</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of wildlife habitat in general, through sensory disturbance</li> </ul>	Construction, operations, decommissioning	<ul style="list-style-type: none"> <li>Construction and decommissioning (removal) activities will be short duration and localized day-to-day</li> <li>Vegetation management activities will be localized, short duration, and infrequent</li> <li>Construction, decommissioning and vegetation management activities will only occur during the day</li> <li>Helicopter use will be minimized during any maintenance activities (see below)</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of California bighorn sheep habitat through sensory disturbance</li> </ul>	Construction, operations, decommissioning	<ul style="list-style-type: none"> <li>A mitigation plan for helicopter use will be developed in consultation with MOE that described specific setbacks (i.e., no fly zones) for sensitive areas such as winter escape terrain and lambing areas. This plan will be incorporated into the Project's Environmental Management Plan</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of fisher natal denning habitat through sensory disturbance</li> </ul>	Construction, decommissioning	<ul style="list-style-type: none"> <li>Moderate to high natal denning habitat will be identified on construction alignment sheets. The timing of activities will be planned so as to avoid these habitats during the denning period (March to May)</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of wildlife habitat features through site clearing and pole placement</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Prior to and during ROW clearing, any wildlife habitat features (e.g., mineral licks, dens, nest trees) that are identified will be evaluated for potential mitigation measures (e.g., avoidance). The draft <i>Wildlife Habitat Features: Summary of Management Guidelines–Northern Interior Forest Region</i> (BCMWLAP 2004q) is useful in the identification of wildlife habitat features, and it proposes mitigation measures that would be applicable in the Project area</li> <li>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<sup>4</sup>)</li> <li>Ground inspection of proposed pole placement locations will be conducted to determine whether any wildlife habitat features are present (e.g., badger dens [active or non-active], mineral licks, rock piles and outcrops, unique micro-sites [e.g., seeps]). Any identified wildlife habitat features will be avoided</li> <li>In grasslands areas, tree removal will be specifically avoided (as trees are of limited availability in these habitats and may be important as perches for birds such as raptors)</li> <li>Mitigation measures described for wildlife habitat are also applicable (see above)</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of retained wildlife trees by actions of the public (e.g., firewood cutting)</li> </ul>	Operations, decommissioning	<ul style="list-style-type: none"> <li>In cooperation with the BC Ministry of Environment, Taseko will post wildlife tree signs<sup>5</sup> on any wildlife trees/snags they have purposely retained along the ROW in effort to minimize removal/disturbance of these trees by the public</li> </ul>
<ul style="list-style-type: none"> <li>Loss or alteration of wildlife habitat in <u>general</u> through site clearing, sensory disturbance, and ROW maintenance</li> </ul>	Post-closure	<ul style="list-style-type: none"> <li>Transmission line will be decommissioned (removed), and vegetation along the ROW will be allowed to regenerate naturally</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to birds in <u>general</u> from destruction of active nests</li> </ul>	Construction, operations, decommissioning	<ul style="list-style-type: none"> <li>Best practice is adherence to region-specific breeding bird timing windows for ROW clearing and any subsequent vegetation management activities (BCWLAP 2004r). An alternative to this best practice is searching for and flagging off nest sites in advance of vegetation clearing (BCWLAP 2004r). Timing window dates and any alternatives to best practice should be confirmed in consultation with BC Ministry of Environment Region 5 staff</li> </ul>

<sup>4</sup> <http://www.for.gov.bc.ca/hfp/values/wildlife/WLT/Publications/policies/WT-Guidance-05-2006.pdf>

<sup>5</sup> For example, as described by the provincial government's Wildlife Tree Committee (<http://www.for.gov.bc.ca/hfp/publications/00037/signs.pdf>)

**Table 6-68 Summary of Mitigation Measures to Address Potential Project Effects on Wildlife along the Transmission Line (cont'd)**

Potential Project Effect	Project Phase	Mitigation Measures
<ul style="list-style-type: none"> <li>Increased direct mortality risk to birds in general from overhead and guy line collisions</li> </ul>	Operations	<ul style="list-style-type: none"> <li>Taseko will develop a detailed post-certification plan to minimize bird mortality risk along the transmission line that reflects current practice in the province. Taseko will evaluate the most up-to-date mitigation approaches available from information sources and/or existing design guidelines such as: <i>Avian Protection Plan (APP) Guidelines</i> (APLIC and USFWS 2005); <i>Mitigating Bird Collisions with Power Lines: The State of the Art in 1994</i> (APLIC 1994); <i>AltaLink Standard for Installing Bird Markers on New Transmission Lines</i> (Heck and Rasmussen 2007); and <i>Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006</i> (APLIC 2006)</li> <li>The plan will consider the following: 1) Evaluation and selection of the most appropriate bird markers (e.g., indicator balls, spiral vibration dampers, air flow spoilers, avian reflectors, flight diverters, and bird flappers); 2) Incorporation of trees and shrubs into the route design where feasible, to provide natural obstacles for birds to navigate, directing their flight over lines; 3) Identification of high collision risk areas (e.g., locations where the transmission line crosses wetlands) for avoidance or alternate designs; 4) Minimization of the use of guy and overhead static lines wherever possible; 5) Confirmation that conductor/line spacing is large enough to greatly minimize or eliminate electrocution risk; 6) Evaluation of perch deterrents (e.g., "bird spikes") for the poles (see below)</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to birds in general from overhead and guy line collisions</li> </ul>	Post-closure	<ul style="list-style-type: none"> <li>Transmission line will be decommissioned (removed)</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to wildlife related to human access along transmission line ROW</li> </ul>	Operations	<ul style="list-style-type: none"> <li>Along the ROW, 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-road vehicle travel</li> <li>Existing but deactivated roads may be temporarily activated during the construction and decommissioning phases</li> <li>At present, minimal new road access is planned. Where new road access is deemed necessary, that road access will be deactivated when not in use (i.e., during operations and following decommissioning of the transmission line)</li> </ul>
	Post-closure	<ul style="list-style-type: none"> <li>Transmission line will be decommissioned (removed), and vegetation along the ROW will be allowed to regenerate naturally</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to sharp-tailed grouse related to human access along transmission line ROW</li> </ul>	Operations, decommissioning, post-closure	<ul style="list-style-type: none"> <li>Province to consider implementing a sharp-tailed grouse hunting closure area in Management Unit 5-4, similar to what is already in place for Management Units 5-3 and 5-14. The closure area could be defined by the boundaries of the transmission line RSA</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to prey species</li> </ul>	Operations	<ul style="list-style-type: none"> <li>Where the transmission line intersects the open grasslands in the Fraser Basin there is potential for increased mortality risk to animals (e.g., small mammals, ground-nesting birds, reptiles) from predators (i.e., raptors, owls) that may use the poles as hunting perches. Taseko will review the literature (e.g., Slater and Smith 2008) and evaluate the potential use of perch deterrents in the grasslands portion of the transmission line LSA</li> </ul>
	Post-closure	<ul style="list-style-type: none"> <li>Transmission line will be decommissioned (removed)</li> </ul>
<ul style="list-style-type: none"> <li>Disruption of movement patterns due to the ROW</li> </ul>	Operations	<ul style="list-style-type: none"> <li>Slash along the ROW will not be windrowed (random piles are acceptable)</li> <li>Average width of the cleared ROW not expected to exceed 80 m</li> <li>Where fencing is required for cattle ensure that "wildlife-friendly" fence types are used (e.g., BCMAL 2006b)</li> </ul>
	Post-closure	<ul style="list-style-type: none"> <li>Transmission line will be decommissioned (removed), and vegetation along the ROW will be allowed to regenerate naturally</li> </ul>

**Table 6-3 Summary of Mitigation Measures to Address Potential Project Effects on Wildlife along the Access Road**

Potential Project Effect	Project Phase	Mitigation Measures
<ul style="list-style-type: none"> <li>Increased direct mortality risk to wildlife <u>in general</u> from Project-related vehicle collisions</li> </ul>	Construction, operations, decommissioning	<ul style="list-style-type: none"> <li>Taseko will provide wildlife-related driver awareness training to all Project-related vehicle operators</li> <li>Taseko will work with the BC Ministry of Transportation, BC Ministry of Environment and other road users to ensure that all radio-equipped vehicles be required to broadcast sightings of wildlife along the access road corridor</li> <li>Project-related traffic will adhere to posted speed limits along the entire length of the access road</li> <li>The speed limit along the 4500 Road will be <u>50 km/h</u>. This is essential for minimizing the risk of grizzly-vehicle collisions, as bears have been observed in the vicinity of this road</li> <li>Taseko will work with the BC Ministry of Transportation, BC Ministry of Environment and other road users to ensure that passive wildlife warning/crossing signs are posted at potential high risk areas (e.g., riparian and wetland areas bisected by the access road). Additional signs may be added over time if other high risk areas are identified. Taseko will contribute data to assist in this identification process (see below)</li> <li>Taseko will support initiatives to install wildlife fencing, ungulate guards or active signs at potential high risk collision areas, in cooperation with the BC Ministry of Transportation, BC Ministry of Environment and other road users</li> <li>Taseko will investigate the feasibility and effectiveness of infrared night vision systems developed for commercial vehicles</li> <li>Project-related wildlife-vehicle collisions or near misses will be recorded and regularly reviewed by Taseko. If a problem area is identified appropriate actions will be taken (e.g., notification of the BC Ministry of Transportation, BC Ministry of Environment and other road users, posting of warning signs, site-specific speed limits)</li> <li>Project-related wildlife-vehicle collisions will be reported to the BC Ministry of Environment regional office in a timely manner. In some cases (e.g., bears), where the animal is injured rather than killed it may be necessary to report collisions immediately to the regional Conservation Officer</li> <li>Taseko will work with the BC Ministry of Transportation, BC Ministry of Environment and other road users to ensure prompt removal of roadside vehicle-killed or hunter-killed wildlife carcasses before animals (e.g., bears, canids, corvids) are attracted to feed on them (Munro 1999)</li> <li>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</li> <li>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 minimized or eliminated</li> <li>Road maintenance crews under the direction of Taseko will provide wildlife crossing points in the ploughed snow banks along roadways<sup>6</sup>. This recommendation, primarily directed at moose and other ungulates, allows wildlife to exit road corridors more easily</li> <li>Other management plans are applicable: Traffic Management Plan (Vol. 3, Sect. 9)</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to moose from Project-related vehicle collisions</li> </ul>	Construction, operations, decommissioning	<ul style="list-style-type: none"> <li>Taseko will suggest to the BC Ministry of Transportation, BC Ministry of Environment and other road users that roadside vegetation along the access road be managed to discourage moose foraging as per Rea (2003). That is, if vegetation must be cut, then it is recommended to cut it early in the growing season—plants cut later in the growing season have been shown to produce highly nutritional re-growth in the following years, which will encourage moose to linger along the roads (Rea 2003).</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to wildlife <u>in general</u> from Project-related vehicle collisions</li> </ul>	Post-closure	<ul style="list-style-type: none"> <li>No specific mitigation measures are required as Project-related traffic levels at post-closure will not be measurably different from baseline conditions (there will continue to be intermittent Project-related traffic related to monitoring activities (e.g., water quality sampling) during post-closure)</li> </ul>
<ul style="list-style-type: none"> <li>Increased direct mortality risk to wildlife <u>in general</u> from new road access</li> </ul>	Construction, operations, decommissioning, post-closure	<ul style="list-style-type: none"> <li>No new road access is proposed outside of the mine footprint. The new section of mine access road will have restricted (gated) access during the life of the mine and then will be decommissioned, and the service road along the headwater channel will be gated through one or more mine phases</li> </ul>
<ul style="list-style-type: none"> <li>Sensory disturbance along access road</li> </ul>	Construction, operations, decommissioning	<ul style="list-style-type: none"> <li>Road upgrades along the 4500 Road will be designed to minimize the amount of forested area cleared to preserve security cover and decrease sensory disturbance to wildlife using habitats adjacent to this segment of the access road</li> </ul>
	Post-closure	<ul style="list-style-type: none"> <li>No specific mitigation measures are required as Project-related traffic levels at post-closure will not be measurably different from baseline conditions</li> </ul>

<sup>6</sup> That is, reduce snow banks to a height of 1 m or less at intervals along the road

## Appendix E Wildlife Abundance and Diversity Matrix (WADM)

At the request of BC MOE (see Konkin 2010 letter), Taseko Mines Ltd. was asked to focus consideration of compensation on Project effects on the abundance and diversity of wildlife and wildlife habitat in the Project area. To do this, Stantec developed a Wildlife Abundance and Diversity Matrix (WADM) tool. The WADM is based upon similar tools used by BBOP for habitat compensation and offsetting. It has two main functions:

1. It allows for a broader representation of the abundance and diversity of wildlife within and among habitat types that cannot be achieved using the 50 species assessed in the EIS / Supplemental Report. It also allows for a correlation, if one exists, between the 50 assessed species and the relative abundance and diversity of other species within and among habitat classes.
2. It can be used to compare potential compensation or offset options (i.e., where, what) by producing representations of wildlife abundance and diversity under different selection criteria. For example, different compensation options will arise when the selection criteria for evaluating compensation changes (e.g., conservation status, relative abundance, stakeholder value).

WADM was developed as a spreadsheet in Microsoft Excel. Core information used in WADM comes from the British Columbia Conservation Framework (BC MOE 2010). The rows of the matrix represent 300 species of vertebrates; a 6 times increase in the number of species assessed in the EIS / Supplemental Report. The reason for including a larger number of species was to evaluate the relative abundance and diversity of wildlife among broad habitat types; something that could not be done using only the species assessed in the EIS / Supplemental Report.

The species used in WADM are a subset of more than 3,000 species provided in the BC Conservation Framework. The subset was created on the basis of potential presence in the mine footprint area (i.e., montane-spruce and sub-boreal pine spruce biogeoclimatic zones within the Central Cariboo Forest District). Where information on the occurrence of a given species was not specified in the Conservation Framework, assignment of species occurrences was based on other readily available information. The intended goal of the species list was to have reasonable representation of species within major taxa that would serve as an index of overall diversity of wildlife in the Project area. The list is not intended to be exhaustive, but rather a broader representation (via correlation) of species currently assessed.

Columns in WADM represent various metrics; they can be grouped into five major sections:

- Species Information: taxonomic group, species specialist group, scientific name, common name
- Presence: a range of criteria used to determine the occurrence, relative abundance, and breeding status of species. Occurrence/Abundance is scored categorically from 1–4 (common = 4, fairly common = 3, uncommon = 2, and casual to accidental = 1). Breeding status is based on regular, annual breeding (breeds = 1, does not breed = 0)

- Conservation Status: a scoring system based on the following status and assigned score—BC Conservation Data Centre (red = 2, blue = 1), COSEWIC (Endangered = 3, Threatened = 2, Special Concern = 3), SARA (Schedule 1 = 3, Schedule 2 = 2, Schedule 3 = 1), and Conservation Framework (score is in reverse order of ranking; e.g., CF1 = 6)
- Threats: specific categorical threats identified in the Conservation Framework that relate to the project are included (Energy Production and Mining, Mining and Quarry Activities, Utility Service Lines, Logging, Intrusion Disturbance, Natural System Modification, and Habitat Shifting Alteration). Not all species are given a score by the Conservation Framework. Subsequently, this information is provided only as a sample of identified threats for some species (e.g., birds).
- Actions: specific categorical actions identified in the Conservation Framework that relate to possible compensatory options (Inventory, Monitor Trend, Plan, Habitat Protection, Habitat Restoration, and Species Management). Not all species were given a score under this criterion by the Conservation Framework. Subsequently, this information is provided only as a sample of identified conservation actions for some species (e.g., birds). The actions are intended to represent broad objectives rather than specific compensation options or strategies.
- Additional columns were added to the WADM, unrelated to the Conservation Framework. “Habitat Type” was included so that a direct link between residual habitat loss and the abundance and diversity of wildlife could be made. The habitat types used in the WADM represent “primary” habitat dependencies for each species. Where species are known to use more than one habitat type, the type assigned was either the limiting habitat type (i.e., where a species may depend on a particular habitat for a substantial portion of its life history) or the habitat that is most commonly used, whichever was deemed most relevant with respect to the Project area and resulting residual effects.

## **Appendix F Species Included in the Evaluation of Compensation Targets**

<b>Evaluating Compensation Targets - Species Assesseed in the EIS</b>				
<b>Species</b>	<b>Coniferous</b>	<b>Mixedwood</b>	<b>Riparian</b>	<b>Wetlands</b>
<b>Amphibians</b>				
Columbia Spotted Frog				1
Western Toad				1
Wood Frog				1
<b>Birds</b>				
Barrow's Goldeneye				1
Flammulated Owl	1			
Great Blue Heron, Herodias Subspecies				1
Mallard				1
Sandhill Crane				1
<b>Mammals</b>				
American Pygmy Shrew		1		
Black Bear		1		
Cinereus Shrew				1
Dusky Shrew	1			
Fisher		1		
Grizzly Bear		1		
Least weasel			1	
Long-tailed Weasel			1	
Moose			1	
Mule Deer		1		
North American Deermouse			1	
Northern Bog Lemming	1			
Northern Flying Squirrel	1			
Short-tailed Weasel			1	
Southern Red-backed Vole		1		
Townsend's Big-eared Bat		1		
Western Jumping Mouse				1
<b>Total</b>	<b>4</b>	<b>7</b>	<b>5</b>	<b>9</b>

Evaluating Compensation Targets - Conservation Priority Species									
Species	Coniferous	Mixedwood	Riparian	Wetlands	BC CDC	COSEWIC	SARA	BC CF	
Amphibians									
Columbia Spotted Frog				1				2	a
Western Toad				1		1	1	2	a
Wood Frog				1				2	a
Birds									
American Avocet				1	1			2	b
American Bittern				1	1			2	b
American Coot				1				2	b
American Golden-Plover				1	1				b
American Goldfinch		1						2	b
American Kestrel		1						2	b
American White Pelican				1	1			1	b
Baird's Sandpiper				1				1	b
Band-tailed Pigeon	1				1	1		2	b
Barrow's Goldeneye				1				1	b
Belted Kingfisher			1					2	b
Black Scoter				1				2	b
Black Tern				1				3	b
Blue-winged Teal				1				2	b
Boreal Owl		1						3	b
Brant				1	1			2	b
Brown Creeper	1							1	b
California Gull				1	1				b
Canvasback				1				2	b
Chestnut-backed Chickadee	1							2	b
Common Goldeneye				1				3	b
Common Tern				1				2	b
Double-crested Cormorant			1		1			2	b
Dusky Flycatcher	1							2	b
Dusky Grouse	1							2	b
Eastern Kingbird		1						2	b
Evening Grosbeak		1						2	b
Flammulated Owl	1				1	1	1	2	b
Great Blue Heron, Herodias Subspecies				1	1			2	b
Greater Scaup				1				2	b
Harlequin Duck			1					1	b
Herring Gull				1				2	b
Horned Grebe				1		1			b
Hudsonian Godwit				1	1			3	b
Killdeer				1				2	b
Lesser Scaup				1				2	b
Long-tailed Duck				1	1			2	b
Marbled Godwit				1				2	b
Mourning Dove		1						2	b
Northern Goshawk	1							3	b
Northern Harrier				1				2	b
Northern Pintail				1				2	b
Northern Pygmy Owl		1						3	b
Northern Rough-winged Swallow			1					2	b
Olive-sided Flycatcher	1				1	1	1	2	b
Pacific-slope Flycatcher	1							2	b
Pied-billed Grebe				1				2	b
Pine Siskin		1						2	b
Purple Finch		1						2	b
Red Crossbill	1							2	b
Red-eyed Vireo		1						2	b
Redhead				1				2	b
Red-necked Phalarope				1	1			2	b
Ruffed Grouse		1						2	b
Rufous Hummingbird		1						2	b
Rusty Blackbird				1	1	1	1	2	b
Sanderling				1				2	b

Species	Coniferous	Mixedwood	Riparian	Wetlands	BC CDC	COSEWIC	SARA	BC CF	
Semipalmated Sandpiper				1				2	b
Short-billed Dowitcher				1	1			3	b
Surf Scoter				1	1				b
Swainson's Thrush	1							2	b
Townsend's Solitaire	1							2	b
Tree Swallow			1					2	b
Tundra Swan				1	1				b
Vaux's Swift			1					2	b
Veery			1					2	b
Violet-green Swallow				1				2	b
Virginia Rail				1				2	b
Western Grebe				1	1			1	b
Western Sandpiper				1				2	b
Western Wood-pewee	1							2	b
Willow Flycatcher				1				2	b
Wilson's Phalarope				1				2	b
Wilson's Snipe				1				2	b
Wilson's Warbler			1					2	b
Wood Duck				1				1	b
Yellow Warbler			1					2	b
Yellow-headed Blackbird				1				2	b
<b>Mammals</b>									
American Marten	1							2	m
Californian Myotis			1					2	m
Caribou (Northern Mountain Population)	1				1	1	1	2	m
Fisher		1			1			2	m
Fringed Myotis	1				1		1	3	m
Grey Wolf	1							3	m
Grizzly Bear		1			1	1	1	2	m
Hoary Bat	1							2	m
Least weasel			1		1				m
Long-eared Myotis		1						2	m
North American Porcupine		1						2	m
Silver-haired Bat	1							2	m
Townsend's Big-eared Bat		1			1			2	m
Western Small-footed Myotis	1				1			3	m
Wolverine, Luscus Subspecies	1				1	1	1	2	m
<b>Total</b>	<b>21</b>	<b>17</b>	<b>11</b>	<b>47</b>	<b>23</b>	<b>7</b>	<b>5</b>	<b>7</b>	

<b>Evaluating Compensation Targets - Breeding Waterfowl</b>				
<b>Species</b>	<b>Coniferous</b>	<b>Mixedwood</b>	<b>Riparian</b>	<b>Wetlands</b>
American Wigeon				1
Barrow's Goldeneye				1
Blue-winged Teal				1
Bufflehead				1
Canada Goose				1
Canvasback				1
Cinnamon Teal				1
Common Goldeneye				1
Common Merganser			1	
Gadwall				1
Hooded Merganser				1
Lesser Scaup				1
Mallard				1
Northern Pintail				1
Northern Shoveler				1
Redhead				1
Ring-necked Duck				1
Ruddy Duck				1
Surf Scoter				1
Wood Duck				1
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>19</b>

## Evaluating Compensation Targets - Species Important to First Nations

Species	Coniferous	Mixedwood	Riparian	Wetlands
American Beaver			1	
American Marten	1			
American Mink				1
American Pygmy Shrew		1		
Black Bear		1		
Bobcat		1		
Canada Lynx	1			
Cinereus Shrew				1
Common Muskrat				1
Cougar	1			
Dusky Shrew	1			
Fisher		1		
Grey Wolf	1			
Grizzly Bear		1		
Least weasel			1	
Long-tailed Weasel			1	
Moose			1	
Mule Deer		1		
North American Deermouse			1	
Northern Bog Lemming	1			
Northern Flying Squirrel	1			
Northern River Otter			1	
Red Squirrel	1			
Short-tailed Weasel			1	
Snowshoe Hare	1			
Southern Red-backed Vole		1		
Western Jumping Mouse				1
Wolverine, <i>Luscus</i> ssp.	1			
<b>Grand Total</b>	<b>10</b>	<b>7</b>	<b>7</b>	<b>4</b>