Memorandum

Date:	July 7, 2016
To:	Kevin Inouye (CEAA), Andrea Raska (CEAA)
From:	Leslie Bol (ERM) and Jason Rempel (ERM) on behalf of KGHM
Cc:	Nicola Banton (KGHM), Kate Parsons (KGHM)
Subject:	**Responses to a subset of Environment and Climate Change Canada's comments regarding migratory birds and raptors**

This memorandum provides responses to a number of comments raised by Environment and Climate Change Canada (ECCC) as part of the review of the Ajax Project Environmental Impact Statement (Application/EIS). Other responses to related comments have been provided in a standard Federal Review Team (FRT) tracking table. These responses are provided in memo format as they required more text than is practical within Excel. In specific, this memo addresses the following comment IDs: ECCC-055, ECCC-056, ECCC-057, ECCC-058, ECCC-059, ECCC-064, ECCC-065, ECCC-104, ECCC-105, and ECCC-106.

1. ECCC-056

1.1 ECCC-056 (Calculation of Migratory Bird Habitat Loss)

The Main Report states that "The amount of suitable habitat lost for migratory birds was calculated by determining the maximum and minimum potential effects. The maximum effect was calculated by overlaying the IDA footprint on the habitat suitability mapping or habitat associations for the indicator species (Appendix 6.8-A), while the minimum effect was determined by overlying the Project IF" (Main Report, pdf page 751).

ECCC notes that habitat suitability mapping or habitat associations were developed only for Lewis's Woodpecker and Williamson's Sapsucker. In addition, no targeted surveys were conducted for some indicator species (for example, Barn Swallow and Long-billed Curlew). While Figure 6.14-12 shows the IF and IDAS overlap with various types of habitats (e.g., forests, cultivated fields, grasslands, etc.), it is unclear which habitats were included in the definition of "suitable habitat" for each indicator species. For example, it is unclear whether cultivated fields were considered suitable habitat for Long-billed Curlew and Common Nighthawk.

In addition, the Main Report states that "The potential effect of wetland habitat loss for waterfowl and cranes ranges from 25 to 61% and is also expected to be moderate. Great Blue Herons will also use cultivated fields so the effect of habitat loss on this indicator species is moderate" (Main Report, pdf page 752). The range of potential habitat loss for Great Blue Heron is 25-47%. Given that Great Blue Heron uses wetlands as preferred habitats, in addition to cultivated fields (and potentially uncultivated fields as well), it is unclear how it was determined that the maximum habitat loss would be 47%, especially since this was estimated as a maximum of 61% for other wetland species such as waterfowl and cranes.

Provide further details as to how habitat loss was quantified for each indicator species. In particular, indicate which habitat types were considered suitable for which indicator species, and provide a breakdown of how habitat loss was quantified for each type of habitat for each indicator species.

1.2 Proponent Response

The TEM map units used for mapping habitat associations for long-billed curlew, common nighthawk, great blue heron, olive-sided flycatcher, sandhill crane, and waterfowl are provided in Table 6.14-5 (page 6-14-20 of the Application/EIS). The total amount of suitable habitat in the Local Study Area for these species are summarized in Table 6.14-8 and are further broken down in Table 1 provided below. As shown in Table 6.14-5 in the assessment and Table 5.2-1 below, cultivated fields were included for long-billed curlew and great blue heron but not included for common nighthawk or waterfowl. The difference in the percentage of habitat lost between Great Blue Heron and Waterfowl and Cranes is due to the difference in estimation of the total hectares of suitable habitat available in the LSA (Table 5.2-1).

Table 1. High Value Habitat Loss in the LSA due to the Project based on Terrestrial Ecosystem Mapping Data used for Species Specific Habitat Suitability Modelling.

Species/Habitat	LSA	IDA	Max Effect	IF	Min Effect
Long-billed Curlew	3,564.4	1,859	52%	1,064.5	30%
Grassland - 81	816.8	329.8	40%	184.5	23%
Grassland - 82	910.4	453.6	50%	256.4	28%
Grassland - 83	1,577.2	991.5	63%	561.5	36%
Grassland - 84	18	2.6	14%	0	0%
Cultivated Fields	242	81.6	34%	62.2	26%
Species/Habitat	LSA	IDA	Max Effect	IF	Min Effect
Common Nighthawk	256.7	108.6	42%	68.6	27%
Cutbank - CB	1.3	0	0%	0	0
Exposed Soil - ES	3.6	0	0%	0	0
Mine - MI, MZ	184.4	50.8	28%	35.7	19%
Gravel Pit - GP	3.7	3.7	100%	0	0
Rock Outcrops - RO, 73	63.8	54.1	85%	32.9	52%
Species/Habitat	LSA	IDA	Max Effect	IF	Min Effect
Great Blue Heron	462.7	216.5	47%	116.5	25%
Saline meadow - Gs	21.2	3.6	17%	2.4	11%
Marsh - Wm	47	33.2	71%	22.3	47%
Swamp - Ws	18.4	11.5	63%	2.1	11%
Alkaline Lake - AK	16.5	0.8	5%	0.3	2%
Lake - LA	73	63.9	88%	12.1	17%

Open Water - OW	20.4	12.3	60%	8	39%
Pond - PD	24.1	9.7	40%	7	29%
Cultivated Field - CF	242	81.5	34%	62.2	26%
Species/Habitat	LSA	IDA	Max Effect	IF	Min Effect
Olive-sided Flycatcher	1,424.6	658.3	46%	326.9	23%
Pole Sapling - 4	566.6	214.7	38%	113.4	20%
Young - 5	603.4	354.2	59%	176.4	29%
Mature - 6	234.9	86.2	37%	37.1	16%
Old - 7	19.8	3.2	16%	0	0%
Species/Habitat	LSA	IDA	Max Effect	IF	Min Effect
Waterfowl and Sandhill Crane	220.6	135	61%	54.3	25%
Saline meadow - Gs	21.2	3.6	17%	2.4	11%
Marsh - Wm	47	33.2	71%	22.3	47%
Swamp - Ws	18.4	11.5	63%	2.1	11%
Alkaline Lake - AK	16.5	0.8	5%	0.3	2%
Lake - LA	73	63.9	88%	12.1	17%
Open Water - OW	20.4	12.3	60%	8	39%
Pond - PD	24.1	9.7	40%	7	29%

2. ECCC-055, ECCC-057, AND ECCC-105

2.1 ECCC-055 (Long-billed Curlew and other Shorebirds)

Long-billed Curlew was identified as an indicator species for Migratory Birds; however, no targeted surveys for Long-billed Curlew during the breeding season were conducted. While waterfowl surveys following Inventory Methods for Waterfowl and Allied Species were conducted that detected shorebirds, these methods are not designed to maximize detection of Long-billed Curlew and other ground-nesting shorebirds in grasslands (for example Killdeer). In particular, Standardized Inventory Methodologies for Components of British Columbia's Biodiversity: Shorebirds (Resource Inventory Standard Committee, 1997) recommends roadside transect surveys for Long-billed Curlew and ground transects for Killdeer during the breeding season.

Conduct shorebird surveys following Standardized Inventory Methodologies for Components of British Columbia's Biodiversity: Shorebirds (Resource Inventory Standard Committee, 1997):

1. within the LSA, including the waterline and powerline LSAs; and

2. for more than one year per survey station, unless 2 different stations overlapped or were located in a close enough proximity to sample the same area over at least 2 years.

2.2 ECCC-057 (Swallows and Swifts)

Although Barn Swallow and Bank Swallow were observed in the project area, surveys targeting swallows and swifts were not conducted. While breeding bird surveys following Inventory Methods for Forest and Grassland Songbirds (Resources Inventory Committee 1999) can detect swallows and swifts, these methods are not specific to these species and as a result are not appropriate to "[…] collect data on the location and timing of use of the LSA by target species […]" (Main Report, pdf page 728). Swallows and swifts may have a much larger foraging area, sing for solicitation or defense of mates before rather than after dawn, begin foraging about four hours after sunrise, and exhibit clumped rather than regularly distributed foraging.

Barn Swallow and Bank Swallow have been assessed as Threatened by COSEWIC. Swallows and swifts are protected under the Migratory Birds Convention Act, 1994. ECCC recommends that sufficient survey effort be conducted to characterize the location of occurrences and timing of habitat use within the LSA, including the waterline and powerline LSAs. Effort should include multiple years of survey to characterize natural inter-annual variation and maximize detectability.

Conduct surveys for Swallows and Swifts:

a) Revisiting the same transects/station over at least 2 years;

b) following Inventory Methods for Swallows and Swifts (Resource Inventory Committee, 1998);

c) in the entire LSA, including the waterline and powerline LSAs; and

d) in suitable breeding and foraging habitats.

2.3 ECCC-105 (Long-billed Curlew, Swallows, Common Nighthawk, American Bittern)

Bird surveys should be conducted over multiple years throughout the LSA to account for natural inter-annual variation and maximize detectability within the LSA. In addition, specific, targeted surveys are best able to maximize the detection of bird species.

Breeding bird surveys for forest and grassland songbirds, as well as waterfowl surveys, were conducted over multiple years but only in some sections of the LSA. Migration surveys for forest and grassland songbirds, as well as Common Nighthawk and American Bittern surveys were conducted only in 2014. In addition, surveys were incompletely conducted in the powerline and waterline LSA, despite construction and operation activities being proposed in these areas.

Long-billed Curlew was identified as an indicator species for Migratory Birds but no targeted surveys for Long-billed Curlew were conducted during the breeding season. While waterfowl surveys following Inventory Methods for Waterfowl and Allied Species can detect shorebirds, these methods are not specific to these species and may not provide valid results.

Barn Swallow and Bank Swallows were observed in the project area, but surveys targeting swallows and swifts were not conducted. While breeding bird surveys following Inventory Methods for Forest and Grassland Songbirds (Resources Inventory Committee 1999) can detect swallows and swifts, these methods are not specific to these species and may not provide valid results.

IR: Conduct additional bird surveys to ensure all areas of the LSA have been sampled for multiple years, and specific targeted surveys have been conducted where possible to maximize detection of target bird species and adequately characterize location and timing of habitat use within the LSA. Update relevant effects assessments and compensation plans to include any additional survey work conducted.

Alternatively, provide a rationale for why additional surveys of each migratory bird are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.

2.4 Proponent Response

2.4.1 Introduction

Barn swallow (blue-listed in BC, and designated as Threatened by COSEWIC) and long-billed curlew (blue-listed in BC, and federally-listed as Special Concern on Schedule 1 of the *Species at Risk Act* (SARA)) were selected as two of the indicator species to represent migratory birds (Section 6.14.1.2). Indicator species were selected based on the presence of suitable/capable habitat, the availability of sufficient species knowledge to produce a meaningful assessment, feedback from stakeholders and likely geographical and ecological interactions with the Project (p. 6.14-4). In addition, both of these species are species of interest to local First Nations. Barn swallow is a species of First Nations concern likely due to the provincial status of this species (Appendix 7 of Appendix 6.8-A; Ignace et al. 2014). Shorebirds such as long-billed curlew, as well as ducks and geese and their eggs are traditional food sources for Aboriginal peoples (First Nations Health Council no date). See Section 4 for a response specific to common nighthawk and American bittern.

2.4.2 Baseline Information

Surveys for migratory birds were conducted in the LSA following Inventory Methods for Forest and Grassland Songbirds (RIC 1999) and detailed in Appendix 6.8-A. Breeding bird point counts were completed throughout the LSA in multiple years including between May 22 to 23 and June 6 to 7 in 2007, June 7 to 10 in 2008, May 14 to 17 in 2010, and May 10 to 23 in 2014 to account for inter-annual variation in species presence within the LSA. Six point count transects for breeding birds were completed in 2007, four in 2008, four in 2010 and seven in 2014 for a total of 361 point counts conducted. In 2014, an additional 199 migratory bird point count surveys were conducted during the spring (April 22 to 26) and fall (August 25 to 27) migratory periods to account for species that might have been missed during the breeding season.

Waterfowl surveys also occurred at temporary and permanent waterbodies. Survey effort included a total of 151 survey stations sampled in 2007, 2010, 2013, and 2014. Effort included 12 stations sampled in 2007, 11 in 2010, 35 in 2013 and 93 in 2014 (Figure 11-2 of Appendix 6.8-A). Forty species of waterfowl, shorebirds, and waterbirds were detected.

During point count surveys conducted during the breeding period, a total of 85 species were detected including barn swallow and four additional species designated as Threatened by COSEWIC: bank swallow, common nighthawk, Lewis's woodpecker, and olive-sided flycatcher (Appendix 6.8-A). A total of 49 species were detected during point count surveys conducted during the migratory periods, three of which were not detected during the point count surveys conducted during the breeding period (American pipit, Lincoln's sparrow, Nashville warbler; Appendix 6.8-A). Of the indicator species selected for the Project during development of the AIR/EIS Guidelines, baseline surveys confirmed the presence of barn swallow, common nighthawk, great blue heron, Lewis's woodpecker, sandhill crane, olive-sided flycatcher, Williamson's sapsucker, and waterfowl in the LSA.

Long-billed curlew is believed to be present in the LSA. While long-billed curlew were not detected during point count surveys, unconfirmed observations of the long-billed curlew were noted during waterfowl surveys. Single calls of a long-billed curlew were heard on two occasions, though the bird itself could not be visually confirmed and its call was not repeated (Appendix 6.8-A). Habitat associations for long-billed curlew include large contiguous areas of grassland habitat (BC MWLAP 2004). Due to the presence of large amounts of grassland habitat in the LSA, a conservative approach was taken and it was assumed that long-billed curlew are present.

In addition to being detected during point count surveys, barn swallows were also detected incidentally during other baseline studies conducted for the Project. They were observed occasionally flying near the historic Ajax pits, and a barn swallow nest with an unhatched egg was found in a crevice on a rock outcrop near the edge of the proposed South Mined Rock Storage Facility in August 2008 (Appendix 6.8-A). Habitat associations for barn swallow nesting primarily include anthropogenic structures such as barns, bridges, and outbuildings (Campbell et al. 1997). Anthropogenic structures within the LSA that could support nesting habitat for barn swallow were not targeted for survey, but as the species was observed breeding in the LSA, it was assumed that available anthropogenic structures could also be used by this species.

Baseline studies and incidental observations confirmed the presence of barn swallow in the LSA during the breeding season, and the presence of long-billed curlew in the LSA was also assumed based on a conservative approach and the availability of suitable habitats for this species. As such, additional surveys to quantify the distribution of these species were not deemed necessary, as it was assumed that these species would occupy available suitable habitats as identified in the Environmental Assessment Application (EA).

2.4.3 Environmental Assessment

The AIR/EIS Guidelines identified potential effects of the Project as habitat alteration and loss, disturbance and displacement and mortality. After the implementation of mitigation measures listed in Section 6.14.4.3 and detailed in the revised Wildlife Management and Monitoring Plan (WMMP) (included as an appendix to the memo for FLNRO regarding the mitigation hierarchy), residual effects are anticipated for habitat loss, particularly for grassland and wetland associated species, and for exposure to chemical hazards to waterfowl. Habitat associations suitable for the indicator species were used for habitat loss calculations (Section 1 above). Habitat that was

identified as suitable was assumed to be occupied by the species even if they were not observed using it during baseline studies. The potential effect of habitat loss for migratory birds, including long-billed curlew, is anticipated to be Not Significant (moderate); potential loss of suitable habitat for long-billed curlew totalled 32% (due to the Project IF) of available habitat in the LSA. However, long-billed curlews are also associated with agricultural areas indicating they may tolerate invasive species and have some resiliency due to habitat alteration from invasive plants. The loss of potential suitable swallow foraging habitats, including open grasslands and wetlands near human settlements, has been captured under the assessments of habitat loss for other migratory bird indicator species (long-billed curlew, waterfowl, sandhill crane, and great blue heron). The amount of habitat loss for migratory birds, as noted above, was expected to be Not Significant (moderate) residual effect. Loss of potentially suitable nesting habitat in anthropogenic structures is anticipated to occur during Project development, as some buildings associated with early homesteading and settlement within the LSA may be lost. Heritage baseline studies were conducted within the LSA, and there were eight homestead sites that were of suitable structure to be used for nesting by barn swallow (still contain roofs for protection of nest sites from weather) located within the IF and none located outside the IF (Appendix 9.2-A). Prior to disturbance of these identified built heritage sites that will be directly impacted by the Project (in or within 50 metres of the Project footprint) consultation with community stakeholders will take place. The consultation will determine the relative significance of the sites and whether additional mitigation measures to record and/or preserve the sites are desired (p. 9.2-22). Thus, at this time, it cannot be assumed that all of these eight potential nesting sites will be completely lost. There are numerous other modern buildings located within the RSA in open habitats (Figure 4.2-1 in Appendix 9.2-A) and likely other buildings associated with early homesteading and settlement outside of the LSA (heritage baseline studies for the Project were limited to the LSA). Therefore, it is expected that some potential nesting habitat may be lost during Project development but other nesting areas outside of the influence of the Project will remain (i.e., are not a limiting feature on the landscape).

The probability of habitat loss for migratory birds was ranked high. Probability was ranked high as suitable habitat within the Project footprints will be cleared and grubbed (i.e., complete vegetation removal), and all suitable habitat within these areas will be lost. Confidence was ranked medium because detailed TEM and extensive field truthing resulted in a high degree of certainty associated with the location of suitable habitats, however the dependence on these habitats by waterfowl is uncertain. The EA assessment was based on availability of suitable habitat with the assumption that all suitable habitat is used by the indicator species. As such, the confidence in the assessment conclusions is high since the assessment was not limited to only areas where species were observed during baseline surveys.

2.4.4 Mitigation and Management Support

Mitigation measures for the Project listed in Section 6.14.4.3 and detailed in the revised WMMP consider loss of grassland habitat and focus on recovery and protection of grassland and wetland habitats in the Project area, which may benefit both long-billed curlew and barn swallow. Several shrub/grassland habitats may be created on mine rock or stockpile areas that will provide feeding and nesting habitat for long-billed curlew and common nighthawk. In addition, reclamation and revegetation of areas during Operation, Decommissioning and Closure, and

Post-Closure will include native plant seeds in the seed mix. Key areas for grassland dependent species will be identified and fenced off to avoid disturbance (particularly livestock grazing) during sensitive times (April 1 to July 31). A habitat compensation plan will be initiated during Project Construction with the aim to conserve and enhance wetland and grassland function within the RSA. Additional details of grassland restoration opportunities on KAM owned land are presented in the mitigation hierarchy memo prepared for FLNRO. This plan will target KAM owned lands. KAM will collaborate with government, landowners, forest industry, farmers, and First Nations to mitigate additional threats to migratory bird habitat. Awareness and education programs for common nighthawk, long-billed curlew, and olive-sided flycatcher will help maintain existing population of these species. Development and implementation of the invasive plant species plan and other measures identified in the Wildlife and Vegetation Monitoring Plan (Section 11.27) is integral to reducing the introduction and spread of invasive species. In addition, a pre-demolition survey for barn swallow nesting activity will be employed prior to removal of any anthropogenic structures (such as heritage sites mentioned above, or more modern buildings) to avoid destruction of active nesting sites.

Pre-construction surveys will occur along the operations powerline in order to identify and avoid any sensitive habitat features such as wetlands that swallows and swifts may use as foraging habitats. Habitat loss in the waterline will be negligible as it is will follow existing pipelines or right-of-ways. Additional baseline surveys will occur at wetlands anticipated to be lost to Project infrastructure footprints (IF) and at potential compensation wetlands within the Local Study Area. These will include point counts and waterfowl/shorebirds surveys for migratory birds and will follow appropriate RIC guidelines. These surveys will be conducted in order to further develop the wetland compensation plan.

2.4.5 Available Recovery Strategies

A recovery strategy has not yet been prepared for long-billed curlew, although a management plan has been produced. There is no Management Plan or Recovery Strategy for barn swallow, as this species had yet to be listed under the *Species at Risk Act* (2002).

The objectives of the Management Plan for the long-billed curlew in Canada (Environment Canada 2013b) are to maintain or increase the recent (since 2004) breeding distribution. The above mitigation strategies, particularly those in relation to limiting disturbance to suitable grassland habitats, enhancement of grasslands on KAM owned lands, and restoration of grassland habitats post closure may benefit long-billed curlew.

2.4.6 Conclusions

In conclusion, considering that both long-billed curlew and barn swallow are assumed present and using suitable habitats in the Project area and that the effects to these species are considered to be of Not Significant (moderate), and the mitigation to limit the effects of wildlife at the Project, it is determined that no additional survey work is required and the conclusions of the assessment are valid.

3. ECCC-104

3.1 ECCC-104 (Rusty Blackbird, Sage Thrasher, Band-tailed Pigeon, Western Screech-Owl)

Under Section 79(2) of the Species at Risk Act (SARA), a responsible authority must "identify the adverse effects of a project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plans".

Species that are listed as Special Concern, Threatened or Endangered under Schedule 1 of the SARA, and that have the potential to be present in the project area should be considered as indicators in the effects assessment.

Relevant federal recovery planning documents (posted and/or provided in draft to the proponent) should be used to guide the environmental assessment for the following species:

- *Management Plan for Rusty Blackbird (posted)*
- *Recovery Strategy for Sage Thrasher (posted)*
- *Management Plan for Band-tailed Pigeon (draft)*
- *Critical Habitat for the Western Screech-owl subspecies macfarlanei (draft).*

IR: For those SARA-listed migratory bird species (Rusty Blackbird, Sage Thrasher, Band-tailed Pigeon, and Western Screech Owl subspecies macfarlanei) and their critical habitat, which have the potential to be present in the project area, provide an updated assessment of the Project's effects using quantitative methods where applicable.

Provide maps showing draft critical habitat for Western Screech Owl subspecies macfarlanei in relation to Project components. As these maps would contain sensitive information, provide maps solely to Agathe.Lebeau@canada.ca with the Canadian Wildlife Service.

If effects are predicted, propose technically and economically feasible mitigation measures to avoid these impacts, including a description of their predicted effectiveness.

Alternatively, provide an explanation of how the currently presented effects assessment and mitigation measures would be effective for SARA-listed, migratory bird species and their critical habitat. Or, provide a rationale for why the request is not relevant for habitat at the project site.

3.2 Proponent Response

3.2.1 Introduction

The following response is specific to rusty blackbird, sage thrasher, and band-tailed pigeon. For information on western screech-owl, macfarlanei subspecies, please refer to the critical habitat memo (0707_KAM_Critical Habitat).

3.2.2 Baseline Information

Existing distribution information for rusty blackbird, sage thrasher and band-tailed pigeon according to recovery strategies or management plans indicate that only the known breeding range of rusty blackbird may overlap with the Project (Environment Canada 2013a). The known breeding range of sage thrasher in British Columbia is restricted to the Okanagan region (Environment Canada 2014), and other sources of information (BC Breeding Bird Atlas) also confirm that no extralimital observations have been recorded in the province (Davidson et al. 2015). The breeding range of band-tailed pigeon is mainly disturbed along the coasts of British Columbia (Environment and Climate Change Canada 2016b) and no breeding attempts have been confirmed outside of South Coast Region (Davidson et al. 2015). However, this species is known to occur in small numbers in the interior of British Columbia as far north as Hazleton and eastward into the Kootenays, but no breeding activity has been positively recorded associated with these observations (Campbell et al. 1990; Environment and Climate Change Canada 2016b). Hence, the only species with a higher likelihood of occurring and breeding in the Project area is rusty blackbird, with the potential (but likely non-breeding) presence of band-tailed pigeon, and rare occurrence of sage thrasher.

Rusty blackbird, sage thrasher, and band-tailed pigeon have not been detected in the Project area, despite the extensive baseline surveys for wildlife that have been conducted for the Project over several years (2007 – 2014). Surveys were carried out in potentially suitable habitats for these three species, as described below.

For rusty blackbird, breeding habitat is closely associated with boreal forest and taiga ecozones and occurs in wetlands associated with conifers (COSEWIC 2006a). Surveys for waterfowl were conducted in wetland areas and several surveys for migratory birds were conducted in and near wetland areas; these surveys would be suitable to record rusty blackbird either during formal surveys (i.e., point count surveys or waterfowl counts) or incidentally as surveyors were in appropriate habitats. Survey effort for waterfowl and migratory birds can be found in the response to ECCC-055, ECCC-057, and ECCC-105 (above). However, it was noted that additional surveys will be conducted at wetlands for the purposes of improving the design and objectives of the wetland compensation plan. These surveys, when conducted, will be aimed at suitable habitats and present an additional opportunity to record the presence of rusty blackbird.

Breeding habitat for sage thrasher is represented by dry grassland habitats; in BC, the species predominately nests in sagebrush habitats consisting of big sage (*Artemisia tridentata*; COSEWIC 2010). Several surveys were carried out in sagebrush habitats, including surveys for migratory birds (as per described in Section 2.4.2 above). Surveys for great basin pocket mouse (live trapping) were also conducted in 2008, with six straight-line transects with 20 capture stations were conducted in potentially suitable habitat for the great basin pocket mouse, which is dry grassland with fine-textured soils and big sage (i.e., very similar to sage thrasher breeding habitat). Potentially suitable habitats were generally restricted to the northwestern portions of the LSA (and areas outside; Figure 14-1 in Appendix 6.8-A). Live trapping surveys were carried out over two nights, where traps were left open during the day, set (closed) at night, and checked the following morning. Hence, there has been survey effort in suitable habitats for sage thrasher during which the species might have detected incidentally.

Band-tailed pigeon breed in natural and human-made habitats, including edges and openings in mature forests, city yards and parks, wooded groves, open bushland, orchards and golf courses (Campbell et al. 1990). In the interior of BC (including the Project area), the species is known to occur in montane forests. Surveys for migratory birds were conducted in forested habitats; survey effort is described in Section 2.4.2 above) and depicted on Figure 16.4-4. In addition, stand-watch surveys for Lewis's woodpecker conducted in 2007 and 2008 also targeted areas of mature and old forest (p. 147 of Appendix 6.8-A). Hence, there has been survey effort in suitable habitats for band-tailed pigeon.

3.2.3 Environmental Assessment

It is expected that the currently presented effects assessment would be effective for the three aforementioned SARA-listed birds. As noted above, these species have not been recorded despite survey effort in potentially suitable habitat areas, which may suggest that the habitat in the area does not currently support these species. In addition, the assessment of effects for other species can act as surrogates for these three species, as detailed below.

Foraging and breeding habitat potentially used by rusty blackbird was included in the Migratory Birds chapter, specifically that for the indicator species waterfowl, which would breed in similar areas to rusty blackbird (i.e., wetlands and waterbodies). After the implementation of mitigation measures listed in Section 6.14.4.3 and detailed in the revised WMMP, residual effects are anticipated for migratory birds for habitat loss and for exposure to chemical hazards. The Application/EIS indicated that the effects of habitat loss on migratory birds, including waterfowl; were Not Significant (moderate); potential loss of suitable habitat for waterfowl totalled 25% (due to the Project IF) of available wetland habitat.

Breeding habitat for sage thrasher is represented by living habitat for the great basin pocket mouse. No highly suitable habitat for great basin pocket mouse was recorded in the LSA, and a small pocket of moderately suitable habitat (8%) was mapped, predominately in the northwestern areas of the LSA (Figure 16.7-7). It was concluded that Project would not interact with great basin pocket mouse, given that there was a very low amount of suitable habitat (moderate only) and baseline surveys did not detect any pocket mouse, and thus an assessment was not conducted for this species (p. 6.17-36). While not assessed, the loss of moderate rated habitat for great basin pocket mouse, and by extension, potentially suitable habitat for sage thrasher, would be limited to the eastern portion of the LSA, where small area of moderately suitable habitat was mapped along the south side of Peterson Creek (Figure 16.7-7), of which a small portion will overlap proposed infrastructure. Therefore, it is also expected that very little potential sagebrush breeding habitat for sage thrasher will be lost to the Project, and larger areas of this habitat occur outside of the influence of the Project. Considering this, negligible effects to sage thrasher are anticipated.

Habitats potentially used by used by band-tailed pigeon was included in the Migratory Birds chapter, specifically that for the indicator species olive-sided flycatcher. Habitats for olive-sided flycatcher are represented by forests of structural stages 4 – 7 (young to old growth forests); these would be similar to habitats where band-tailed pigeon have been recorded in the interior of British Columbia. Residual effects for migratory bird indicator species following the application

of mitigation were habitat loss and chemical hazards for waterfowl. The Application/EIS indicated that the effects of habitat loss on migratory birds, including olive-sided flycatcher, were Not Significant (moderate); potential loss of suitable habitat for olive-sided flycatcher totalled 23% (due to the Project IF) of available young to old growth forest.

3.2.4 Mitigation and Management Support

Mitigation measures for the Project detailed in the revised WMMP contain measures to ensure that effects to wildlife are mitigated and will be applicable to rusty blackbird, sage thrasher, and band-tailed pigeon. These include avoidance of clearing during sensitive periods for migratory birds (April 1 to August 15). Point count surveys will be conducted if work proceeds during sensitive period. Nest sites will be protected by species specific buffers using guidance from Environment and Climate Change Canada (2016a), with a minimum of a 30 m buffer. In addition, a wetland compensation plan will be initiated during Project Construction with the aim to conserve and enhance wetland within the RSA, which may benefit rusty blackbird (see Appendix 11.27-A; and (0713_KAM_Mitigation Hierarchy and Offsetting).

3.2.5 Conclusions

In conclusion, considering that effort has been placed on surveying appropriate habitats for rusty blackbird, sage thrasher, and band-tailed pigeon at the Project, the applicability of the existing assessment for evaluating the effects to these species, and the mitigation to limit the effects of wildlife at the Project, it is determined that no additional survey work is required for these three species.

4. ECCC-058 AND ECCC-059

4.1 ECCC-058 (Common Nighthawk and American Bittern)

While waterfowl surveys were conducted over multiple years, many sections of the LSA have not been surveyed for more than one year. In addition, surveys have not been conducted in all areas of the waterline LSA and have not been conducted at all in the powerline LSA; however, construction and operation activities are proposed in these areas. Surveys transects should be conducted over multiple years to account for natural inter-annual variation and maximize detectability within the LSA.

In addition, while it appears that spring migration was captured in the 2014 surveys, no surveys appear to have been conducted during fall migration.

Conduct additional Common Nighthawk surveys and American Bittern surveys following appropriate RISC standards:

1. within the LSA, including the waterline and powerline LSAs; and

2. for more than one year per survey station.

Conduct additional waterfowl surveys following appropriate RISC standards:

a) For a minimum of 2 years per survey transect and per lifecycle period (breeding, spring and fall migration, and wintering); and

b) in the entire LSA (including additional locations in the mine site LSA where suitable habitat exists), and including the waterline and powerline LSAs.

4.2 ECCC-059 (Common Nighthawk and American Bittern)

Common Nighthawk surveys and American Bittern Surveys were conducted over a single year (2014). In addition, surveys have not been conducted in the waterline LSA or the powerline LSA; however, construction and operation activities are proposed in these areas. Surveys should be conducted over multiple years to account for natural inter-annual variation and maximize detectability within the LSA.

Conduct additional Common Nighthawk surveys and American Bittern surveys following appropriate RISC standards:

1. within the LSA, including the waterline and powerline LSAs; and

2. for more than one year per survey station.

4.3 Proponent Response

4.3.1 Introduction

Additional surveys for common nighthawk and American bittern are not necessary, as additional surveys are not anticipated to change the conclusions of EA (as discussed in the following sections).

For waterfowl, the need for additional mitigation has been identified through the technical comment process and will be implemented prior to construction of the Project. This additional mitigation consists of:

- additional surveys to be conducted at all wetlands that may be lost to the IF, to support wetland offsetting planning; and
- pre-construction surveys to be conducted along the powerline,

These measures will provide additional information on waterfowl species, and potentially American bittern, inhabiting suitable habitats in these areas.

A negligible amount of habitat will be lost due to the construction of the water supply pipeline, as this feature will follow existing pipelines or right-of-ways. Considering the limited amount of construction activities along the waterline corridor, additional surveys for migratory birds, including common nighthawk, American bittern, and waterfowl are not warranted and are not discussed further.

4.3.2 Baseline Information

Common nighthawk call-playback surveys were conducted over the course of two days in late June 2014 (June 25 and 26) at 29 stations following *Inventory Methods for Nighthawks and Poorwills*

(RIC 1998b). Male territorial activity (male booming calls) were recorded at 12 stations surveyed (Table 13-7 of Appendix 6.8-A), and the species was confirmed to be breeding within the LSA through incidental detections (p. 6.14-32). Hence, this species was presumed to be occupying suitable habitats within the LSA throughout the breeding season, including those that were not surveyed.

American bittern call-playback surveys were conducted at 17 stations on June 11 and 12 of 2014 following *Inventory Methods for Marsh Birds: Bitterns and Rails* (RIC 1998a); all but one survey station was resurveyed on June 25 (p. 150 of Appendix 6.8-A). No bitterns were recorded during these surveys; however, it was assumed that the species is likely present in the RSA (p. 6.14-32).

Baseline information for waterfowl are described in Section 2.4.2 in Proponent Response to ECCC-55, ECCC-057 and ECCC-105.

4.3.3 Environmental Assessment

Additional surveys for common nighthawk and American bittern are not anticipated to change the conclusions of the EA. Effects to common nighthawk, which is confirmed to be breeding in the LSA, were included in the EA, and one residual effects will remain following mitigation: habitat loss. The effects of habitat loss to migratory birds, including common nighthawk, was anticipated to be Not Significant (moderate); potential habitat loss for common nighthawk totalled 27% (due to the Project IF) of available habitat in the LSA. An additional residual effect was anticipated for the VC migratory birds due to chemical hazards, but this residual effect was expected to affect only waterfowl (p. 6.14-73 and 6.14-74).

There was no interaction predicted between American bittern and the Project due to the lack of detections recorded on targeted surveys in the LSA (p. 6.14-32). However, it was assumed that the species was likely present in the RSA and that effects to the species, should they move into the LSA, would be considered under a surrogate species with similar habitat requirements such as great blue heron (p. 6.14-32). However, habitat associations for great blue heron used to evaluate the potential effects to this species resulting from the Project (Table 6.14-5) included both wetlands and upland cultivated fields where great blue heron may hunt for more terrestrial prey (e.g., small mammals). Given that American bittern are strongly associated with wetlands, particularly marshes with tall vegetation, use of great blue heron as a surrogate species for American bittern likely overestimates the potential effects to individuals that may move into the LSA. Habitat associations for two other indicator species, sandhill crane and waterfowl, include only wetlands, and may provide a more accurate representation of the potential effects to American bittern. The effect of habitat loss on migratory birds, including great blue heron, waterfowl, and sandhill crane, was anticipated to be Not Significant (moderate); potential habitat loss for great blue heron totalled 25% (due to the Project IF) of available wetland and upland cultivated field habitat in the LSA, and potential habitat loss for sandhill crane and waterfowl (which shared the same habitat associations for wetlands) totalled 25% (due to the Project IF) of available wetland habitat. The effects of chemical hazards was anticipated to be Not Significant (minor) for migratory birds, specifically waterfowl.

The conclusions of the EA for waterfowl are described in Section 2.4.2 in Proponent Response to ECCC-55, ECCC-057 and ECCC-105.

4.3.4 Mitigation and Management Support

Mitigation measures for the Project listed in Section 6.14.4.3 and further detailed in the revised WMMP contain measures to ensure that effects to migratory birds are mitigated. These include avoidance of clearing during sensitive periods for migratory birds (April 1 to August 15). Point count surveys will be conducted if work proceeds during sensitive period. Nest sites will be protected by species specific buffers using guidance from Environment and Climate Change Canada (2016a), with a minimum of a 30 m buffer. In addition, a wetland compensation plan will be initiated during Project Construction with the aim to conserve and enhance wetland within the RSA, which may benefit waterfowl and American bittern that move into the LSA.

Furthermore, additional mitigation will be implemented for waterfowl in advance of Project construction. All wetland habitats anticipated to be lost in the Project IF will be surveyed for migratory birds, and pre-construction clearing surveys will be conducted along the powerline. These results of these surveys will be reported and will provide additional information of migratory birds, including waterfowl, in wetland habitats of the Project IF and those that occur along the powerline.

4.3.5 Conclusions

In conclusion, considering that effects to common nighthawk and waterfowl have been considered in the EA and the applicability of the existing assessment for evaluating the effects to American bittern, in addition to the mitigation to limit the effects of wildlife at the Project, it is determined that additional surveys as suggested by ECCC for common nighthawk, American bittern, and waterfowl are not required and that additional baseline data would not change the conclusions of the EA.

5. ECCC-064, ECCC-065, AND ECCC-106

5.1 ECCC-064 (Burrowing Owl, Flammulated Owl, Peregrine Falcon anatum, Short-eared Owl, and Western Screech Owl macfarlanei)

The Proponent conducted raptor encounter transects (roadside surveys) and Flammulated Owl call-playback surveys to collect baseline information for raptors.

The RISC Inventory Methods for Owl Surveys standard indicates that call playback surveys are the most appropriate survey for the Western Screech-owl macfarlanei. The RISC Inventory Methods for Raptors standard indicates that aerial surveys are the most appropriate survey type for the Peregrine Falcon.

Raptor roadside surveys were conducted in June 2010; February and March 2012; and February and June 2014. However, it appears that each survey transect was surveyed only once during the period between 2007 and 2014. RISC standards indicate that the Western Screech Owl should be surveyed at least 3 times annually and the Peregrine Falcon should be surveyed twice annually (April-May and late May to July).

Call-playback surveys for Flammulated Owls were conducted in June and/or July in 2007, 2008, 2010, and 2014; however, it appears that many survey locations were surveyed only in one year during the period between 2007 and 2014. The RISC standard indicates that surveys for Flammulated owls "must be repeated seasonally over multiple years."

The Proponent indicated that the roadside survey is recommended specifically for diurnally active raptors; however, the short-eared owl is crepuscular. Therefore, the RISC standard for raptors indicates that surveys for short-eared owls should be conducted "0.5 hours prior to sunset until dark, and from the first light to 0.5 hours after sunrise". It is unclear whether roadside surveys were conducted at the appropriate time for the Short-eared Owl.

ECCC advises that to reduce the probability of not detecting a species due to natural inter-annual variation, repeating the same survey transects over multiple years is recommended.

Conduct baseline surveys following the appropriate RISC standard for Western Screech-owl macfarlanei and Peregrine Falcon.

For all raptors that are species at risk (i.e. Burrowing Owl, Flammulated Owl, Peregrine Falcon anatum, Short-eared Owl, and Western Screech Owl macfarlanei) conduct additional surveys to provide baseline data:

- For at least 2 years for each transect/station; and

- At different times of the year (e.g. breeding, migration, etc.).

Clarify whether roadside surveys were conducted at the appropriate time of day for the Short-eared Owl, following the raptor RISC standard for the species.

5.2 ECCC-065 (Burrowing Owl, Flammulated Owl, Peregrine Falcon anatum, Short-eared Owl, and Western Screech Owl macfarlanei)

The Proponent indicated that Project effects on Flammulated Owl, Peregrine Falcon, Burrowing Owl and Western Screech-owl macfarlanei are not anticipated. An effects assessment was, therefore, not conducted for these species.

As noted in comment [CWS-43] additional baseline surveys are recommended for these species, as well as for Short-eared Owl. Without an adequate characterization of baseline for these species, ECCC is of the opinion that a conclusion that effects are not anticipated is not well supported.

EC advises that effects on wildlife can be indirect, can occur outside of the breeding season, and can occur in habitats used for other purposes than breeding (e.g., foraging).

IR: Based on the results of additional baseline surveys (as recommended in comment [CWS-43 = ECCC-066), provide a species-specific effects assessment for Burrowing Owl, Flammulated Owl, Peregrine Falcon anatum, Short-eared Owl, and Western Screech Owl macfarlanei that assesses both direct and indirect effects, and assesses the effects to all habitats (breeding, foraging, etc.) at various times of year (breeding, migration, etc.).

5.3 ECCC-106 (Burrowing Owl, Flammulated Owl, Short-eared Owl, and Peregrine Falcon)

Raptor surveys should be conducted over multiple years for each transect, and at different times of year (e.g. breeding, migration, etc.).

Raptor encounter transects (roadside surveys) and Flammulated Owl call-playback surveys were conducted. The Resource Information Standards Committee Inventory Methods for Owl Surveys standard indicates that call playback surveys are the most appropriate survey for the Western Screech-owl subspecies macfarlanei. The RISC Inventory Methods for Raptors standard indicates that aerial surveys are the most appropriate survey type for the Peregrine Falcon.

Raptor survey transects appear to have been surveyed only once during the period between 2007 and 2014. RISC standards indicate that the Western Screech-owl subspecies macfarlanei should be surveyed at least 3 times annually and the Peregrine Falcon should be surveyed twice annually.

Call-playback surveys for Flammulated Owls were conducted in June and/or July in 2007, 2008, 2010, and 2014; however, it appears that many survey locations were surveyed only in one year during the period between 2007 and 2014. The RISC standard indicates that surveys for Flammulated Owls must be repeated seasonally over multiple years.

IR:Conduct additional surveys following the appropriate RISC standard for Burrowing Owl, Flammulated Owl, Short-eared Owl, and Peregrine Falcon to ensure all areas of the LSA have been sampled for multiple years, and specific targeted surveys have been conducted where required to maximize detection of target bird species and adequately characterize location and timing of habitat use within the LSA. Update relevant effects assessments and compensation plans to include any additional survey work conducted.

Alternatively, provide a rationale for why additional surveys of each raptor are not warranted. Should you proceed with providing a rationale, the rationale will need to take into account: the surveys conducted to date, the species' SARA status, any available recovery strategies or critical habitat mapping, and the importance of the species or its ecosystem value to Indigenous groups. The rationale should clearly and defensibly explain how the survey work conducted to date is able to provide an appropriate level of confidence in the conclusions reached.

5.4 Proponent Response

5.4.1 Introduction

There have been a number of targeted surveys for raptor species conducted over multiple years between 2007 and 2014, in addition to surveys for other wildlife groups (e.g., migratory birds, non-migratory gamebirds, mammals) across the same timeframe that have focused in different habitat areas of the Project and would be suitable for incidental detections of various raptor species. Burrowing owl and short-eared owl are considered to be of importance to local First Nations. In particular, a small owl, interpreted to be burrowing owl, is of particular importance to the SSN, and the extirpation of burrowing owls from the region is seen as a loss to SSN culture (Ignace et al. 2014).

5.4.2 Baseline Information

Call-playback surveys were conducted for flammulated owl (Schedule 1, Special Concern) across five separate years (2007, 2008, 2010, 2011, and 2014) using techniques outlined in RIC (2001), and totaled over 21 hours of effort. Surveys were targeted within areas of potentially suitable habitat as identified through habitat suitability mapping, although some areas of lower suitability were also surveyed (see Figure 6.15-4, p 6.15-21). Surveys were repeated seasonally over multiple years as per RISC standards for flammulated owl. For example, in 2007, surveys were conducted on June 6 and two weeks later on June 26 and 27, and roughly three of the sites sampled in 2007 were resampled (within 200 m) in 2008 (p. 163 and 164 of Appendix 6.8-A, Table 12-1 and Figure 12-1 of Appendix 6.8-A). In 2014, stations were also repeated seasonally across the year with a total of 13 stations sampled. All stations were sampled from June 25 to 27, repeated roughly two weeks later on July 11 and 12, and all but one station was resampled again on July 22 and 23 (p. 163 and 164 of Appendix 6.8-A, Table 12-1 and Figure 12-1 of Appendix 6.8-A).

Encounter surveys were conducted for raptors across three years, including 2010, 2012, and 2014; encounter surveys were conducted either by vehicle or by foot following procedures in RIC (2001). According to RIC (2001), roadside surveys during the breeding season, such as roadside surveys conducted in June of 2010 and 2014, are appropriate measures for recording both burrowing owl (Schedule 1, Endangered) and short-eared owl (Schedule 1, Special Concern). Roadside surveys were conducted between 10:30 am and 5:30 pm across all years, and thus were focussed mainly on diurnally active raptors. It is acknowledged that short-eared owl are crepuscular and RIC (2001) recommends that roadside surveys for this species be carried out 0.5 hours prior to sunset until dark, and from the first light to 0.5 hours after sunrise.

In addition to the these roadside surveys for raptors, numerous point count surveys for migratory birds and non-migratory gamebirds were conducted in the Project area in 2007, 2008, 2010, 2011, and 2014 (p. 6.14-21, Figure 6.14 4; p. 6.14-21, p. 6.16-17, Figure 6.16-4), surveys which covered large areas of the LSA. Field crews conducting point count surveys and surveys for non-migratory game birds (lek surveys for sharp-tailed grouse) occurred in suitable habitat for both species (e.g., upland grassland and shrub), thereby increasing the chances that these species would be detected incidentally if present. Field crews also noted active American badger digging activity during all wildlife field surveys, and a number of these dig sites were further investigated for use in 2011 (p. 6.17-21). Burrowing owls do not dig their own burrows, often relying on excavations made by other mammals, such as American badger and ground squirrels (COSEWIC 2006b). No burrowing owls were detected during surveys or incidentally, while short-eared owl were recorded incidentally in late April, 2011 during sharp-tailed grouse surveys (p 168 of Appendix 6.8-A).

As noted in the ECCC-106 comment, the recommended survey technique for peregrine falcon (Schedule 1, Special Concern) is to conduct aerial surveys of suitable cliff nesting habitat to document nests and record occupancy and productivity (RIC 2001). Aerial surveys were not conducted as part of the baseline program because it was determined that the Project LSA does not contain suitable nesting habitat for this species, and that the nearest area of potentially suitable habitat occurs outside the LSA on Sugarloaf Hill (roughly 6 km to the northwest of the Project; p. 6.15-31). As there were no areas of potentially suitable nesting habitat for peregrine

falcon that would be directly impacted by the Project development, aerial surveys were not deemed necessary. The occasional presence of peregrine falcon is expected in the Project area, as evidenced by an incidental detection of peregrine falcon foraging at Goose Lake in August of 2008 (p. 168 of Appendix 6.8-A).

The presence of short-eared owl in the Project area has been established during baseline studies and the species is assumed to be breeding in the area as this species is known to nest and lay eggs from late April through early June (COSEWIC 2008).

While a species cannot be confirmed absent if it is not detected during formal surveys, it is anticipated that sufficient survey effort has been devoted to suitable areas to determine that both flammulated owl and burrowing owl likely do not occur within the Project area (as indicated on p. 6.15-31). Due to the lack of suitable nesting habitat in the LSA, it is anticipated that peregrine falcon will not nest within the Project area, but that this species may occasionally forage in areas of the LSA (p. 6-15-31).

5.4.3 Environmental Assessment

Additional surveys for burrowing owl, flammulated owl, peregrine falcon, and short-eared owl are not anticipated to change the conclusions of the EA. Effects to short-eared owl, which is assumed to be breeding in the LSA, were included in the EA, and two residual effects will remain following mitigation: habitat loss and sensory disturbance. The effects of habitat loss to raptors, including short-eared owl, were anticipated to be of Not Significant (moderate); potential loss of suitable habitat for short-eared owl totalled 24% (due to the Project IF) of available grassland foraging habitat in the LSA and 14% (due to the Project IF) of available shrubland nesting habitat in the LSA. The effects of sensory disturbance were anticipated to be of Not Significant (minor) for raptors, including short-eared owl.

As noted on p. 6.15-31, the Project was not expected to interact with burrowing owl, flammulated owl, and peregrine falcon. However, the potential effects to these three species have been captured under assessments for other indicator species. The assessment of Project effects to American badger is anticipated to be a suitable surrogate for burrowing owl, given that these species share similar preferences for upland native grassland habitats with suitable soils for burrowing. The Application/EIS indicated that the effects of habitat loss on mammals, including American badger were Not Significant (moderate); potential loss of suitable habitat for American badger totalled 28% (due to the Project IF) of available grassland habitat. The effect of sensory disturbance was anticipated to be Not Significant (minor) for mammals, including American badger.

Effects of habitat loss to flammulated owl are captured under the assessments for Lewis's woodpecker, as flammulated owl often use holes excavated by woodpecker species for nesting (Linkhart and Mccallum 2013). The most suitable habitats for Lewis's woodpecker included open mature and old ponderosa pine forests with a high abundance of large snags and mature lowland cottonwood riparian forests (Appendix 6.8-A). These habitats, open mature and old ponderosa pine forests, represent potentially suitable nesting and roosting habitat for flammulated owl. No highly suitable or moderately suitable habitat was identified for Lewis's woodpecker in the

Project area; all habitats present were mapped as low suitability. Hence, the potential effect of loss of Lewis's woodpecker habitat is anticipated to be low (pg. 6.14-49) and this species is unlikely to be affected by noise disturbance associated with the Project (pg. 6.14-55). Thus, by extension, it is expected that the habitat in the LSA is of low suitability for flammulated owl and that potential effects, should flammulated owl occur, will be similar to that of Lewis's woodpecker.

As noted above, the Project will not have an interaction with suitable peregrine falcon cliff-nesting habitat, although this species may use habitat in the LSA for foraging. The assessment of the loss of potentially suitable wetland foraging habitats for peregrine falcon have been evaluated through the migratory bird indicator species, as peregrine falcon prey on a wide variety of bird species including passerines, shorebirds, and waterfowl (White et al. 2002). The EA concluded that the effects of habitat loss on migratory birds were Not Significant (moderate); potential loss of suitable habitat for grassland associated species (as represented by long-billed curlew) totalled 32% (due to the Project IF) of available grassland habitat in the LSA, and potential loss of suitable habitat for wetland associated species (as represented by waterfowl) totalled 25% (due to the Project IF) of available wetland habitat in the LSA. Grassland habitats represent habitats where peregrine may forage for passerine species, and wetland habitats supporting shorebirds and waterfowl are also important hunting habitats for the species. Thus, by extension, it is expected that potential effects of loss of suitable foraging habitats for peregrine falcon are similar to those evaluated for migratory birds. Sensory disturbance was not expected to be a residual effect for migratory birds following mitigation.

5.4.4 Mitigation and Management Support

Mitigation measures for the Project listed in Section 6.15.4.3 and further detailed in the revised WMMP contain measures to ensure that effects to raptors are mitigated and will be applicable to burrowing owl, flammulated owl, peregrine falcon, and short-eared owl. As per the revised WMMP, mature trees that may offer nesting habitat for cavity nesting birds, such as flammulated owl, will be avoided wherever possible during Project development. If avoidance is not possible, then potential effects can be minimized by avoiding construction activities during the period when wildlife is using the feature, which for raptors is the period of time from February 1 to August 15, which encompasses the breeding period for this species (early May through mid-August; Linkhart and Mccallum 2013). If Project activities occur within areas with suitable mature or old growth trees that can support cavity nesting birds during this sensitive period, then pre-construction surveys will be conducted and appropriate buffers will be set up surrounding any potential nesting trees with evidence of owl activity. Pre-clearing surveys will be a requirement should clearing activities proceed during the raptor sensitive period (February 1 to August 15), which is applicable to burrowing owl and short-eared owl as well (peregrine falcon are not expected to nest within the Project area).

In addition, a habitat reclamation plan will be initiated during Project Construction; this plan will focus on KAM owned lands (0713_KAM_Mitigation Hierarchy and Offsetting). The habitat reclamation plan contains several objectives in relation to restoration of feeding, nesting, and security habitat for raptors, as well as to conserve and enhance grassland function within the RSA which may benefit burrowing owl and short-eared owl (Aspen Park Consulting 2013). Further,

mitigation proposed for American badger may also be beneficial for burrowing owl. For example, KAM owned lands that are conducive to suitable badger habitat will be enhanced (in accordance with recommendations within the Recovery Strategy for American badger; jeffersonnii Badger Recovery Team 2008); which will also benefit burrowing owl as this species will use American badger dens for nesting. These mitigation strategies will reduce the effects of the Project on wildlife, particularly those in relation to habitat loss and mortality.

5.4.5 Available Recovery Strategies

Of the four raptor species, only one has an available recovery strategy: burrowing owl (Environment Canada 2012). However, there are management plans (proposed or final) for flammulated owl (Environment Canada 2013a), peregrine falcon (Environment Canada 2015), and short-eared owl (Environment Canada 2016).

The recovery goal for burrowing owl in British Columbia is to achieve the 2004 estimated population size of the species in the short-term (i.e., five years), with the long term recovery goal (> 30 years) to reverse the species population decline and maintain a self-perpetuating, well-distributed population (with at least 30 pairs located throughout their historical range in the Thompson/Nicola and Okanagan regions of British Columbia; Environment Canada 2012). The mitigation described above for the Project will limit the potential mortality of burrowing owl, if present, and Project reclamation objectives to enhance grassland function in the RSA may serve to enhance or create suitable habitat for burrowing owl and potentially aid in population recovery if this species uses reclaimed habitat.

The Management Plan for the Flammulated Owl (*Otus flammeolus*) in Canada (Environment Canada 2013a) states that the goal for managing this species is to maintain stable or increasing populations of the flammulated owl distributed throughout the species' present range in British Columbia. The mitigation for the Project described above will limit the potential mortality of flammulated owl, if present, and Project reclamation objectives to restore feeding, nesting, and security habitat for raptors may also benefit this species.

The proposed management plan for short-eared owl states that the management objectives for the species is to stabilize or increase the population trend in this species' current area of occupancy over the short term (2015-2025), and in the long term to ensure a positive population trend beginning in 2025 and an increase in the area of occupancy (Environment Canada 2016). Proposed mitigation will serve to limit the effects of the Project on short-eared owl while the Project is in construction and operation phases (25 years) and reclamation will potentially create more suitable habitat for short-eared owl in the region, which aligns with both the short and long term goals for species management under Environment Canada (2016).

A proposed Management Plan has been written for peregrine falcon with the objective to have a self-sustaining population throughout the entire Canadian range of the species within 10 years of the publication of the final version of this management plan (final version yet to be produced; Environment Canada 2015). Since there is a very limited interaction between this species and the Project (limited to loss of potential foraging habitat), it is not anticipated that the Project will have

any effects on peregrine falcon breeding in the region, and thus should not impact population management for this species.

5.4.6 Conclusions

In conclusion, considering the level of effort conducted to establish the presence/non-detected status of burrowing owl, flammulated owl, peregrine falcon, and short-eared owl at the Project, the applicability of the existing assessment for evaluating the effects to these species, and the mitigation to limit the effects of wildlife at the Project, it is determined that no additional survey work is required and the conclusions of the assessment are valid. Furthermore, reclamation of the Project may serve to create habitat for these species post closure, which aligns with management and recovery goals outlined by existing recovery strategies and/or management plans (Environment Canada 2012, 2013a, 2015, 2016).

REFERENCES

2002. Species at Risk Act, SC. C. 29.

Aspen Park Consulting. 2013. Wildlife Habitat Objectives for Reclamation Plan. Prepared for KGHM Ajax Mine: Kamloops, BC.

BC MWLAP. 2004. Identified Wildlife Management Strategy: Accounts and Measures for Managing Identified Wildlife - Accounts V. 2004. BC Ministry of Water, Land and Air Protection. http://www.env.gov.bc.ca/wld/frpa/iwms/accounts.html (accessed January 2016).

Campbell, R. W., N. K. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, and M. C. E. McNall. 1990. The Birds of British Columbia. Vol. II: Nonpasserines. Diurnal birds of prey through woodpeckers. Victoria, BC and Delta, BC: Royal BC Museum and Canadian Wildlife Service.

Campbell, R. W., N. K. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, M. C. E. McNall, and G. E. J. Smith. 1997. The Birds of British Columbia. Volume III Passerines: Flycatchers through Vireos. . Vancouver, BC: UBC Press.

COSEWIC. 2006a. COSEWIC assessment and status report on the Rusty Blackbird Euphagus carolinus in Canada. Committee on the Status of Endangered Wildlife in Canada: Ottawa.

COSEWIC. 2006b. COSEWIC assessment and update status report on the Burrowing Owl Athene cunicularia in Canada. Committee on the Status of Endangered Wildlife in Canada: Ottawa, ON.

COSEWIC. 2008. COSEWIC assessment and update status report on the Short-eared Owl Asio flammeus in Canada. Committee on the Status of Endangered Wildlife in Canada: Ottawa, ON.

COSEWIC. 2010. COSEWIC assessment and status report on the Sage Thrasher Oreoscoptes montanus in Canada. Committee on the Status of Endangered Wildlife in Canada: Ottawa, ON.

Davidson, P. J. A., R. J. Cannings, A. R. Couturier, D. Lepage, and C. M. Di Corrado. 2015. The Atlas of the Breeding Birds of British Columbia, 2008-2012. Bird Studies Canada. http://www.birdatlas.bc.ca/ (accessed April 2016).

Environment and Climate Change Canada. 2016a. Avoidance Guidelines. http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=8D910CAC-1#_03_1_1 (accessed April 2016).

Environment and Climate Change Canada. 2016b. Management Plan for the Band-tailed Pigeon (Patagioenas fasciata) in Canada [Proposed]. Species at Risk Act Management Plan Series. Environment and Climate Change Canada: Ottawa, ON.

Environment Canada. 2012. Recovery Strategy for the Burrowing Owl (Athene cunicularia) in Canada. Species at Risk Act Recovery Strategy Series Environment Canada: Ottawa, ON.

Environment Canada. 2013a. Management Plan for the Flammulated Owl (Otus flammeolus) in Canada. Species at Risk Act Management Plan Series. Environment Canada: Ottawa, ON.

Environment Canada. 2013b. Management Plan for the Long-billed Curlew (Numenius americanus) in Canada. Species at Risk Act Management Plan Series. Environment Canada: Ottawa, ON.

Environment Canada. 2014. Recovery Strategy for the Sage Thrasher (Oreoscoptes montanus) in Canada. Species at Risk Act, Recovery Strategy Series. Environment Canada: Ottawa, ON.

Environment Canada. 2015. Management Plan for the Peregrine Falcon anatum/tundrius (Falco peregrinus anatum/tundrius) in Canada [Proposed]. Species at Risk Act Management Plan Series. Environment Canada: Ottawa, ON.

Environment Canada. 2016. Management Plan for the Short-eared Owl (Asio flammeus) in Canada [Proposed]. Species at Risk Act Management Plan Series. Environment Canada: Ottawa, ON.

First Nations Health Council. no date. Traditional Food Facts Sheets.

Ignace, M., D. Marshall, M. Anderson, and C. Nord. 2014. SSN Cultural Heritage Study - Final Report.

jeffersonnii Badger Recovery Team. 2008. Recovery Strategy for the Badger (Taxidea taxus) in British Columbia. Ministry of Environment: Victoria, BC.

Linkhart, B. D. and D. A. Mccallum. 2013. Flammulated Owl (Psiloscops flammeolus). In The Birds of North America Online. Ed. A. Poole. Ithaca, NY: Cornell Lab of Ornithology. http://bna.birds.cornell.edu/bna/species/093 (accessed April 2016).

RIC. 1998a. Inventory Methods for Marsh Birds: Bitterns and Rails. Standards for Components of British Columbia's Biodiversity No.7. Prepared by Ministry of Environment, Lands and Parks, Resources Inventory Branch for the Terrestrial Ecosystem Task Force, Resources Information Committee: Victoria, BC.

RIC. 1998b. Inventory Methods for Nighthawks and Poorwills. Standards for Components of British Columbia's Biodiversity No. 9. Prepared by Ministry of Environment, Lands and

Parks, Resources Inventory Branch for the Terrestrial Ecosystem Task Force, Resources Information Committee: Victoria, BC.

RIC. 1999. Inventory Methods for Forest and Grassland Songbirds. Standards for Components of British Columbia's Biodiversity No.15. Version 2. Prepared by Ministry of Environment, Lands and Parks, Resources Inventory Branch for Terrestrial Ecosystem Task Force, Resources Inventory Committee (RIC): Victoria, BC.

RIC. 2001. Inventory Methods for Raptors. Standards for Components of British Columbia's Biodiversity No. 11. Prepared by Ministry of Environment, Lands and Parks, Resources Inventory Branch for the Terrestrial Ecosystem Task Force, Resources Information Committee: Vicotria, BC.

White, C. M., N. J. Clum, T. J. Cade, and W. Grainger Hunt. 2002. Peregrine Falcon (Falco peregrinus). In The Birds of North America Online. Ed. A. Poole. Ithaca, NY: Cornell Lab of Ornithology. http://bna.birds.cornell.edu/bna/species/660doi:10.2173/bna.660 (accessed July 2013).