

4 Wildlife

Table 4-1 provides a summary of the reviewer comments and the location of the response.

Table 4-1 Wildlife Table of Conformance

Reviewer	EAR Section	Reviewer Comment	Response Report Section Where Addressed
4 Wildlife			
YTG - Environment Yukon	Section 7.10.1	Regional & Local Study Areas The LSA road assessments should include the stretch of the Robert Campbell Hwy. from the haul road staging area to about Money Creek bridge.	Section 4.1
YTG - Environment Yukon	Section 7.10.2	Baseline Conditions The fundamental reason for the population decline and calf recruitment data (the result of the trend surveys tracking calf recruitment) were not presented in this work.	Section 4.2.2
YTG - Environment Yukon	Section 7.10.4	Mapping of Caribou Data The data utilized for Figure.10-6 should have been mapped to depict caribou location and movement information as it will show that caribou make heavy use of the area.	Section 4.2.2
YTG - Environment Yukon	Section 7.10	Lack of Information on Caribou Calving There is nothing known about caribou calving in the area and this is a baseline data shortfall that should be acknowledged.	Section 4.2.2
YTG - Environment Yukon	Section 7.10; Figures 7.10-10 and 7.10-11	Caribou Mapping The mapped outputs (7.10-10 & 7.10-11) from this exercise were not readable digitally. Secondly this habitat suitability analysis fails to take into account the importance of snow in winter habitat selection and other vegetation components required by caribou. Thirdly the assessment fails to recognize the importance of other physical landscape attributes to caribou (i.e. lakes, travel routes, cover, space to escape predators, etc.).	Section 4.2.2; Figure 3-1
YTG - Environment Yukon	Section 7.10	Lakes within the Wildlife Movement Corridor The assessment does not take into account the importance of the Money Creek, Dollar Creek; Little Jimmy Lake, Little Wolverine Lake valley as a wildlife movement corridor. Particularly for caribou during late fall & early winter.	Section 4.2.1
YTG - Environment Yukon	Section 7.10	Project Effects Assessment The report doesn't provide a map of the range of the herd relative to the project area.	Section 4.2.2; Figure 3-1
YTG - Environment Yukon	Section 7.10	Road Issues The project road is a significant increase to the cumulative affects from a considerable road & trail network in the area and should be evaluated empirically.	Section 4.4.2

Reviewer	EAR Section	Reviewer Comment	Response Report Section Where Addressed
YTG - Environment Yukon	Section 7.10	Road Issues A road decommission plan should be submitted as part of the mine reclamation plan & this should include effective obstruction points that would require heavy road construction equipment to make passable. It should also state who will control road access management after project closure.	Section 4.4.2
YTG - Environment Yukon	Section 7.10	Moose Stratification It is noted that the results from Environment's caribou stratification survey of the Wolverine Lake area in 1996 are not referred to in the EAR.	Section 4.3.1
YTG - Environment Yukon	Section 7.10.4.2	Moose The report fails to make note of significant moose rut and post rut habitat areas that occur along and adjacent to the LSA. Any important spring and early summer wetland habitats should also be identified.	Section 4.3.2; Section 4.2.1
YTG - Environment Yukon	Section 7.10	First Nation Hunting Unregulated First Nation hunting patterns have been completely ignored in this assessment (for caribou and moose). In the hunter harvest section it should be specified that the current discussion relates only to the licensed, non-first nations harvest. It should also explain in this section that a substantial First Nation subsistence harvest occurs in the RSA for which data are either limited or not available.	Section 4.5
YTG - Environment Yukon	Section 7.10.2	Reclamation As the tailings facility will be reclaimed as a permanent pond" (pg. 7-286), given the Viceroy incident earlier this fall, some mention should be given to fencing the pond and/or at least thought to how the slopes of this tailing pond is contoured to insure that wildlife do not become trapped and die in the facility.	Section 4.4.1
YTG - Environment Yukon	Section 7.10	Project Effects Project effects/impacts on post rut and spring/early summer moose habitat availability should also be considered and evaluated.	Section 4.3
Environment Canada	Section 7.10	Migratory Birds Tailings Facility Access In regards to the maintenance of the tailings facility water balance during operation and closure, and the potential for the creation of beaches, which could subsequently provide an attraction to migrating shorebirds and waterfowl, there is a need to provide permanent water cover to prevent migratory birds access to contaminated tailings.	Section 4.4.1; Sections 7.6 and 7.10

Reviewer	EAR Section	Reviewer Comment	Response Report Section Where Addressed
Yukon Dept. of Tourism & Culture; Frances Lake Wilderness Lodge and Tours	Section 7.10	Wilderness Experience Impact of increase in flights to and from the mine should be acknowledged and mitigation to minimize impacts should be identified.	Section 4.4
Frances Lake Wilderness Lodge and Tours	Section 7.10	Highway Safety Hwy needs improvements to make it a safe route for all users. Weight restrictions and driving speeds should be enforced.	Section 4.4.2
Teslin Outfitters Ltd.	Section 6 and 7.10	Hunting Company Inclusion Where is the consideration for the wildlife and the outfitter that operates his business in the area?	EAR Section 6; EAR Figure 7.11-6; Section 4.4
Teslin Outfitters Ltd.	Section 7.10	Adverse Impacts Degraded outdoor experience; it isn't clear what will happen to the road at the end of the Project.	Section 4.4
Teslin Outfitters Ltd.	Section 7.10	Cumulative Impacts We failed to see where any of these adverse affects (True North Gems, Cominco exploration, regional exploration) have been appreciated, studied or contemplated in any mitigation measures.	EAR Section 6; Section 4.4

4.1 Wildlife Study Area

The wildlife LSA was defined as follows:

- The mine area disturbance footprint (conservatively defined as the total of YZCs claim areas potentially affected by industrial complex facilities) is buffered by 2 km to represent a potential zone of influence from industrial complex activities on sensitive wildlife species in the project area.
- The access road disturbance footprint (conservatively defined as the total of YZC's claim areas traversed or immediately adjacent to the proposed access route) is buffered by 1.5 km to represent a potential zone of influence from access and haul road activities on sensitive wildlife species in the project area.
- These buffer zones also provide a buffer for the airstrip of a minimum of 1 km on each side and 6-7 km at each end.

The buffer distances are based on documented zones of influence for two of the more sensitive and wide ranging VECCs in the project area, caribou and grizzly bear. The buffer distances, taken from AXYS 2001, are presented in Table 4-2.

Table 4-2 Wildlife Buffer Distances

Disturbance Source	Zone of Influence - Caribou	Zone of Influence - Grizzly Bear
Mine Footprint	2-3 km	0.8 – 1 km
All Weather Road	1 km	1.6 km
Airstrip	7 km off ends and 1 km from sides	Unknown

The wildlife LSA did not include the Robert Campbell Highway (RCH) for the following reasons:

- To assess potential changes to wildlife habitat, spatial habitat modeling was conducted. The current gravel highway is an existing habitat disturbance for wildlife and additional habitat along the RCH will not be disturbed as a result of this project. As such, using spatial habitat modeling, no change in wildlife habitat availability will occur beyond that already affected from this existing road. Therefore, as the project will not change the existing road, it was not included in the LSA for habitat modeling purposes.
- To assess potential changes in movement patterns or mortality risk, traffic volumes were analyzed. This is a non-spatial analysis, and therefore did not need to be included in the LSA.

The Regional Study Area (RSA) dimensions were based on approximate annual home range areas for the widest ranging VECCs in the project area, caribou and grizzly bear. The derivation of representative home range areas is as follows:

Caribou: Most studies for caribou have not detailed animal movements on an individual level and are based on aerial telemetry studies with minimal relocations per year. Previous work conducted on GPS collared caribou from the Liard/Rancheria caribou herd and the Atlin Caribou Herd (northern mountain caribou ecotypes similar to the Finlayson

Caribou Herd) indicate annual home ranges have varied in area between 700 – 4300 km² (95 Kernel probabilities).

Grizzly Bear: Interior home ranges for GPS collared grizzly bears near Teslin have ranged from 50 km² for an alpine dwelling sow with cub to 1200 km² for a mid-aged boar (Minimum Convex Polygon home ranges). Other studies of grizzly bears in west and northern Yukon provide maximum home range estimates for grizzly bears of 1600 km² for young boars (~180 days/annual home range).

The RSA for the Wolverine Project is approximately 3002 km² centered on the industrial complex area and defined by watershed boundaries. The RSA includes a segment of the Robert Campbell Highway, running approximately 30 km north and 30 km south of the intersection with the proposed mine access road (Figure 4-1). In terms of wildlife habitat, this area captures about one annual caribou home range (minimum) or about 2 grizzly bear annual home ranges (minimum). Watershed boundaries may provide some topographic constraint to animal movement and a rationale boundary for changing ecological variants that are used by wildlife.

Figure 4-1 Finlayson Caribou Herd, Surveys 1982-2004 (Figures Section)

4.2 Caribou

4.2.1 Wildlife Movement Corridors

Finlayson caribou herd (FCH) locations as documented by Environment Yukon from 1982 to 2004, and LSA and RSA boundaries, are provided in Figure 4-1. The known range of the FCH is approximately 29,100 km²; the RSA overlaps approximately 10% and the LSA overlaps approximately 3.5% of this known range. EAR Figure 7.10-6 (EAR Section 7.10.2.2) provides the number of caribou observations (number of caribou counted during telemetry and aerial surveys, and not the number of locations) that occurred within the LSA, the RSA, and outside of these project areas.

From a caribou movement perspective, it was not possible to determine animal movements or movement corridors from the data provided by Environment Yukon given the following:

- aerial telemetry data on the FCH were collected at intervals too coarse to measure animal movements and/or assess movement corridors
- mapped animal movement corridors for caribou were unavailable from Environment Yukon

Caribou movement corridors are acknowledged as a limitation to the information provided by Environment Yukon and in this assessment. In EAR Section 7.10.4.1, the following sentence acknowledges this limitation:

“a monitoring program to specifically assess caribou movements would allow managers to monitor the effects of the project on caribou movement patterns and may also provide alternative management options”.

EAR Section 7.10.4.1 also stated that “*The project is likely to have unavoidable and adverse impacts on movement patterns by caribou in the area*”, and that the project effect is likely to be low in magnitude given the mitigation strategies proposed.

4.2.2 Baseline Data

The habitat models are tools to assist in assessing potential impacts and have recognized limitations (model approaches described in EAR Appendix 7-10.1). As such, the winter caribou habitat model did not include a specific parameter for snow (e.g., snow depth, cover, crust, etc.). However, the model does include a surrogate for snow by incorporating winter range polygons as Key Wildlife Habitat Areas for the FCH. It was assumed that the known winter range for the FCH included areas with favourable snow conditions.

Similarly, vegetation communities and other landscape attributes factors that are important for caribou (e.g., lakes, cover, and space to escape predators) were also not specifically included in the models. However, over 90% of the winter caribou survey locations and 80% of fall caribou survey locations occur within 100 m of modeled habitats (EAR Appendix 7-10.1). This correlation suggests that relevant parameters were likely integrated in the habitat information used to develop the models. Incorporation of additional parameters in the habitat models are not expected to change the results of the assessment.

Although the calf recruitment data was not presented in the baseline conditions for the FCH, several points surrounding population decline and calf recruitment were acknowledged in EAR Section 7.10.2.2. The following sentence acknowledged the concern for the FCH population decline:

“recent annual rut surveys (since 2000) appear to be indicating a potential declining trend in the FCH population (Farnell and Florkewicz, 2005 pers. comm.).”

The following sentence provided in the EAR Section 7.10-4 recognizes wolf predation and harsh late-spring weather conditions as possible reasons for a decline in calf recruitment that may be contributing to the declining FCH population:

“The effects of wolves, likely in concert with several years of harsh late-spring weather conditions are thought to have impeded calf survival in the FCH and may have had subsequent impacts on the herd population (Farnell pers. comm. 2005).”

As supplemental information, Figure 4-2 was provided by Environment Yukon (Farnell, December 09, 2005 pers. comm.) and indicates declining calf recruitment for the FCH.

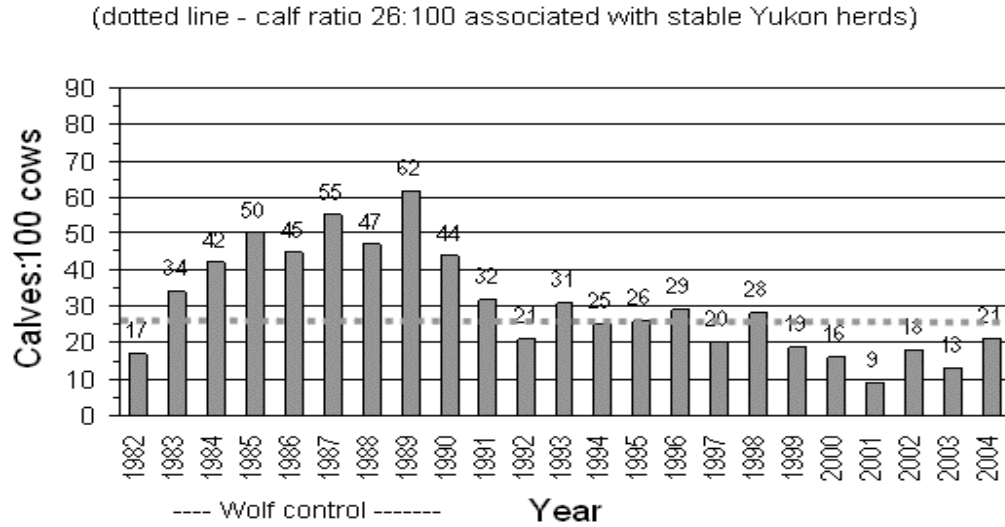


Figure 4-2 Calf Recruitment of the Finlayson Caribou Herd

It was acknowledged in the EAR that management of the FCH in response to population declines had included wolf control efforts, reductions in sport hunting, and that First Nation hunters had been encouraged to harvest male over female caribou. Wolf predation and human hunting were probably the main causes of caribou population declines in the area; since 1998 the licensed harvest of Finlayson herd caribou has ranged from 3-8 animals/year and the First Nation harvest was cut in half over this same time period by voluntary compliance with conservation concerns for the herd (Farnell, 2005b, pers. comm.).

The absence of baseline data for caribou calving in the area is acknowledged.

4.3 Moose

4.3.1 Habitat Availability

There is limited information available on moose habitat use within the project area and therefore, it is difficult to identify and compare habitat impacts on moose across numerous seasons. The following approaches for assessing seasonal moose habitats in the project study area were taken.

- Environment Yukon (R. Ward, 2005 pers. comm.) was queried for delineated moose (and other species’) habitats that occur in the project assessment area. No moose habitat areas were delineated or available within the project area for rut, post-rut, spring, or summer moose habitats.
- A discussion was provided on site specific rut and post rut habitats that are known to occur in the project area. The discussion included a concern for moose to be able to move between identified areas.
- Wetland habitats were assessed within the LSA using an aerial wetland survey for mapping beaver wetlands in the baseline assessment (EAR Section 7.10.2.2). This

assessment acknowledged a direct overlap in identification of important wetland habitats for moose in EAR Table 7.10-8.

Project effects on rut, and post rut moose habitats and seasonal movements were considered and discussed qualitatively for known site specific areas, as noted above. Inclusion of further habitat analysis and evaluations of project effects on moose habitat availability are not expected to change the results of the project assessment.

4.3.2 Moose Stratification Study

The 1996 moose stratification survey is discussed in EAR Section 7.10.2.2 and Section 7.10.4.2. The location data from the 1996 moose stratification survey are provided on a map of the study area in EAR Figure 7.10-12.

Information on movement corridors for moose was provided in EAR Section 7.10.2.2:

“There is little information available regarding moose habitat in the project area. Early-winter surveys conducted in 1996 (Yukon Renewable Resources 1996) for the area indicated that the Kudze Kayah project area and subalpine willow zones in the Wolverine, Fire and North lakes regions along Money Creek are important to moose during the post-rut period. Traditional knowledge and local anecdotal observations suggest that the Kudze Kayah site and areas between Kudze Kayah and the Wolverine project sites are an important seasonal travel corridor for moose. Moose summering in the North Lakes area (southwest of Wolverine Lake) move north through the area between the Kudze Kayah and project areas to winter in the lowlands along the Robert Campbell Highway, and return via the same route in the spring.”

Potential effects of the project on movement corridors for moose were provided in EAR Section 7.10.4.2:

“Anecdotal observations suggest that the proposed mine site and road route may interfere with an important seasonal travel corridor for moose between their winter habitats in lowland areas along the Robert Campbell Highway and upper elevation habitats occurring in spruce, willow, and birch vegetation communities during the spring summer and rutting periods (Ward 2005, pers. comm.). If mine activity interferes with moose moving to and from important rutting and calving areas, or displaces them into wintering areas of lower quality habitat, Environment Yukon suggests this could have significant impacts on moose recruitment and over-winter adult survival (Ward, 2005 pers. comm.). The project will have unavoidable and adverse effects on movement patterns by moose in the area. However, these project effects are considered low in magnitude given several mitigation measures that should be implemented during construction, operations and decommissioning phases”.

4.4 Wildlife and Project Interaction

In order to evaluate and characterize cumulative environmental effects, the effects of existing development and foreseeable future development were reviewed. A list of existing tenures and activities in the southeastern Yukon that could potentially contribute

to cumulative effects were detailed in EAR Table 6.8-1 and are summarized by general category below:

- industrial – mines, mineral exploration, major mineral deposits, oil and gas
- protected areas
- hunting, outfitting, trapping (including Teslin Outfitters Ltd. and Ross River Dena Council)
- recreation areas (including Frances Lake Wilderness Lodge)
- communities

The scope and rationale for cumulative effects assessment for each valued ecosystem and cultural component along with the categories listed above (where appropriate) were described in EAR Section 7. In addition, EAR Figures 7.11-3 to 7.11-7, respectively, provided the following location information:

- mines, mineral deposits and exploration areas
- Game Management Zones
- registered trapping concessions
- outfitter concessions
- protected areas and recreation sites

4.4.1 Tailings Facility

Trapping of wildlife within the tailings impoundment is not anticipated to be a concern during or after operations. The facility will be an active area during operations with tailings and reclaim water being pumped and waste rock (DMS float rock) being trucked on a predominantly continuous basis. The amount of activity in and around the tailings facility will deter wildlife from the immediate area.

At the end of operations a coarse layer of gravel sized material (DMS float) will be placed over the entire pond area (see Section 7.6 for additional details). This layer will not pose a concern for wildlife to exit from the pond should they enter it. Also, the adjacent topography will not prevent exit as the tailings facility is situated within a shallow bowl shaped area and the north and east edges of the facility at the end of operations will shape to the surrounding terrain. During closure, water treatment is anticipated to continue during the spring and summer months for approximately a three year period (see Section 9.3 for more information).

4.4.1.1 Birds

The risk of project operations to migratory bird populations is expected to be low in magnitude. The tailings deposited to the pond will be saturated during operations and closure to minimize the risk of oxidation and acid generation (Section 7). During operations, there is expected to be beach formation along the edges, but these beaches will be comprised of gravel sized material.

During operations, the beach area will be dynamic due to tailings discharge and DMS float rock disposal, with little or no establishment of vegetation or benthic communities that might attract bird use or increase the risk of exposure of waterfowl or shorebirds to

contaminants in the tailings. In addition there will be regular project-related activities in the vicinity of the tailings facility by operations personnel (to inspect the tailings facility and conduct water quality monitoring, etc.). Operations personnel will record presence, if any, of waterfowl and shorebirds at the tailings pond and beach area. If birds are observed to be attracted to the pond, results will be discussed with government agencies to identify the level of risk and appropriate mitigation measures.

The risk of exposure of waterfowl and shorebird to the tailings at closure is expected to be low. At closure the tailings pond will be decommissioned so as to provide a permanent water cover on a layer of DMS float rock (low acid generation potential). There will be no exposed tailings beaches at closure as a layer of DMS float rock will be used to cover the tailings and the tailings pond water quality will be monitored and treated as required until long term stability of water quality is acceptable (projected to be a three-year period).

4.4.2 Site Access

The increase in vehicular traffic and key design parameters (eg. Haul speed <60 km/hr) resulting from the project is described in the EAR Section 2.11. The Yukon Department of Highways and Public Works has and is continuing to improve the section of road between the proposed mine access road and Watson Lake. Highway restrictions with respect to weight and speed limits will be adhered to

The project road will not significantly increase cumulative effects the “considerable road and trail network” in the area. Below is a summary of linear disturbances (by feature type) within the RSA at baseline and the incremental contribution of the project to linear disturbances. These data were obtained from a combination of existing GIS mapping layers and satellite imagery interpretations and may be subject to image interpretation errors and or temporal errors given the dates of origin for the satellite imagery or other data.

A total of 232.4 km of linear features currently exist in the RSA (Table 4-3). The project will incrementally contribute 25.7 km (11%) to the cumulative linear features in the RSA. Mitigation measures during operations (e.g., gates and controlled access) and closure (i.e., road deactivation) will minimize effects of this increased access potential.

Table 4-3 Linear Disturbances in the Wolverine Regional Study Area

Feature Type	Length (km)
Baseline Linear Disturbances	
Bridge	0.52
Drill Road	1.88
Limited-use, cart track, road	2.86
Main Road	8.12
Main, ground level, loose surface, operational road	75.52
Main, hard surface, operational road	0.52
Road	23.54
Secondary, ground level, hard surface, operational road	4.29
Trail	115.18
Project Linear Disturbances	
Ridge Route Road	25.67

A road decommission plan will be submitted upon completion of detailed road engineering in spring 2006. It will include details pertaining to slope stability and surface reclamation, water management and control of road access. Following the cessation of all activities onsite, the road will be fully decommissioned, reclaimed and impassible.

4.4.3 Tourism and Wildlife Experience

YZC recognizes that there will be increased air and road traffic during the construction and operation phases. As outlined in the EAR, there will be regularly scheduled flights for employees on a two-week on, two-week off rotations. Larger planes will be used to decrease the number of required flights, which will originate from Whitehorse with stops in Ross River and Watson Lake. YZC acknowledges that flights should be minimized to accommodate other users in the area. Beside the scheduled personnel flights, the airstrip will also be used periodically for emergency supplies and in the event of a medical emergency. The majority of supplies will be mobilized to the site via the Robert Campbell highway and the access road.

4.5 Hunting

First Nations harvest and the effects of the Project on Traditional lifestyles were addressed in EAR Section 7.14.4. For caribou, the effects of hunting were considered in Section EAR 7.10.4.1 under 'Mortality Risk' and similarly for moose in EAR Section 7.10.4.2 under 'Mortality Risk'. It is recognized that data are either limited or unavailable for First Nations subsistence harvest in the RSA.

Mitigation strategies related to hunter harvest (including First Nations, legal, and illegal hunting) were considered in relation to increased access, especially following project closure. Public use of the mine access road will not be permitted during and after closure as there is a risk of increased mortality from legal and illegal hunting that could increase mortality rates. Road access will be controlled until the road is deactivated.

Mitigation options were provided in the EAR for both moose and caribou during project operations and following project closure. Beyond this, other management strategies for access control were provided in the Wildlife Protection Plan (EAR Section 9.5.2.1).