UNDERTAKING 50: WITH RESPECT TO A THRESHOLD THAT SHOULD NOT BE EXCEEDED IN ORDER TO GIVE THE BEST EFFECT TO MITIGATION MEASURES, TO LOOK AT CANADA'S RESPONSE THAT WAS GIVEN IN THE TOTAL PROCEEDING AND ADVISE WHAT THAT RESPONSE WAS. ADDITIONALLY, TO ADVISE WHETHER CANADA STILL AGREES WITH THAT RESPONSE

Response:

Previous advice given by EC for the Total Joslyn North Mine Project regarding noise thresholds was based on recent research conducted by Habib et al. (2007) and Bayne et al. (2008). EC's position is unchanged and reflects an average noise disturbance threshold of 48 dB(A) (SD 6) in forested habitats in Alberta.

Bayne et al. (2008) reported that the density of songbirds in boreal forest habitat in Alberta was significantly lower at point counts located within 300 m of compressor stations than further away (400 – 700 m) from compressor stations and other sites with low noise (well pads). In addition, one third of the bird species studied had reduced abundance in areas both close to and far from compressor stations when compared to quieter sites (well pads), indicating that noise levels from compressor stations may be sufficiently loud to affect birds 700 m into the forest. Habib et al. (2007) also reported reduced pairing success of ovenbirds near compressor stations compared to noiseless well pads. In addition, significantly more inexperienced birds (i.e., young first-time breeders) were found near compressor stations than noiseless well pads, indicating lower habitat quality near compressor stations.

The above studies indicate that habitat quality for some songbirds may be reduced near compressor stations when compared to more distant sites or sites adjacent to relatively quiet well pads. These effects are pronounced within 300 m of compressor stations but for some species may extend 700 m into adjacent forests. Bayne et al. (2008) reported that the mean noise level at point counts located within 300 m (average distance of 242 m, SD 86) of compressor stations (i.e., where overall bird density was significantly reduced) was 48 db(A) (SD 6). This noise threshold is similar to that reported in studies examining the effects of roads on bird density in wooded habitats (e.g., 42 to 52 dB(A); Reijnen et al. 1997).

References:

Bayne, E. M., L. Habib, and S. Boutin. 2008. Impacts of chronic anthropogenic noise from energy-sector activity on abundance of songbirds in the boreal forest. Conservation Biology 22(5): 1186-1193.

Habib, L. D., E. M. Bayne and S. Boutin. 2007. Chronic industrial noise affects pairing success and age structure of Ovenbirds *Seiurus aurocapilla*. Journal of Applied Ecology 44:176–184.

Reijnen, R. R. Foppen, and G. Veenbaas. 1997. Disturbance by traffic of breeding birds: evaluation of the effect and considerations in planning and managing road corridors. Biodiversity and Conservation 6: 567-581.

UNDERTAKING 53: PROVIDE INFORMATION RELATING TO THE MODELLING OF POPULATION VIABILITY OF WHOOPING CRANES

Response:

Population viability modeling indicates that the minimum viable population size of Whooping Cranes over a span of 100 years is estimated to be 40 breeding pairs (Tischendorf 2003). In 2012, 66 nesting pairs were recorded in Wood Buffalo National Park (M. Bidwell, pers. comm.). This number is lower than that reported in 2011 (75 nesting pairs).

References:

M. Bidwell. Personal Communication. Species at Risk Biologist, Canadian Wildlife Service.

Tischendorf, L. 2003. The Whooping Crane. Population viability and critical habitat in the Wood Buffalo National Park Area, NT/AB Canada. Prepared for Parks Canada and the Canadian Wildlife Service, Environment Canada.

UNDERTAKING 55: CONFIRM THAT THE 100-METRE BUFFER PROPOSED BY SHELL IS ENOUGH TO MAINTAIN NESTING HABITAT FOR LISTED RIPARIAN SPECIES LIKE THE CANADA WARBLER OR THE RUSTY BLACKBIRD

Response:

Although data are limited for Canada Warbler and Rusty Blackbird, a 100 m buffer may be sufficient to maintain movement of forest songbirds in general, thereby maintaining landscape connectivity, but may not be sufficient to maintain the overall pre-disturbance songbird community. Although additional research is required, buffer widths up to 200 m may be required to maintain the pre-disturbance songbird community.

Several studies conducted in Alberta (Machtans et al. 1996, Lambert and Hannon 2000, Hannon et al. 2002) provide insight into the effectiveness of 100 m boreal forest buffers in maintaining bird movement and habitat. Although studies examining riparian buffer-strips have been conducted elsewhere in North America, because of differences in landscape structure, disturbance patterns and potential bird responses, this review focuses on studies conducted in the boreal forest of Alberta.

Machtans et al. (1996) concluded that forest bird species moved more frequently through 100 m-wide riparian buffer strips than clearcuts, and that buffer strips could maintain the movement rates observed in undisturbed (i.e., intact) sites. Machtans et al. (1996) also reported dispersal of juvenile forest birds through 100 m wide corridors.

Lambert and Hannon (2000) examined the abundance, territory characteristics and pairing success of Ovenbirds in riparian buffer strips shortly after timber harvest. No Ovenbirds were found in <80 m wide riparian buffers, but bird density and pairing success were unaffected in 100 and 200 m buffers. Lambert and Hannon (2000) cautioned that, although changes were not detected in >100 m wide buffer strips shortly after timber harvest, the long-term response of Ovenbirds to buffer strips was not known as vegetation composition along the clearcut edge could change over time.

Hannon et al. (2002) concluded that 20 to 100 m riparian forest buffers would not function as reserves for forest songbirds in managed landscapes, and that 200 m wide buffers conserved the pre-harvest songbird community. Hannon et al. (2002) reported a shift in the bird community in 100 m wide buffers. Although no species were lost from the 100- or 200-m buffer strips, the percentage of forest birds decreased significantly as buffer width decreased from 200 to 100 m, and the proportion of generalist and open-edge species increased. Canada Warblers were detected in both 100 m and 200 m wide buffers, although no evidence of breeding was recorded.

The above results indicate that 100 m wide riparian buffer strips may maintain movement and landscape connectivity for forest songbirds in general, but may not be of sufficient size to maintain the pre-disturbance songbird community. Shifts in the bird community have been noted in 100 m wide buffers, although no species were lost after harvest. Canada Warblers have been found in 100 m buffers, but no evidence of breeding was reported. Using a precautionary approach, buffer areas at least 200 m wide may be required to maintain pre-disturbance forest bird communities.

UNDERTAKING 56: WITH RESPECT TO TABLE 22-2 IN THE EXHIBIT WITH THE SUFFIX 051E, ADVISE WHETHER ENVIRONMENT CANADA IS SATISFIED WITH THE LIST OF MITIGATION MEASURES LISTED THERE IN ORDER TO MITIGATE DISTURBANCE EFFECTS OF RESIDUAL HABITAT DURING CONSTRUCTION AND OPERATIONS. AND IF THE LIST IS NOT COMPLETE, COULD ENVIRONMENT CANADA PLEASE PROVIDE ITS RECOMMENDATIONS

Response:

Use of residual habitats can be affected by both visual and auditory disturbances. In Table 22-2, Shell discusses several measures to mitigate visual (light) disturbances on residual habitat use (as well as bird mortality) but, other than reducing traffic volumes, does not discuss or provide mitigation to reduce the effects of auditory (noise) disturbance on use of residual habitat.

Visual Disturbance

In addition to the lighting techniques identified by Shell to reduce indirect habitat loss (e.g., shielded lighting, directing spotlights away from wildlife corridors) as well as mortality of birds, EC recommends that Shell consider use of motion-sensitive lighting in appropriate areas (i.e., where safety considerations allow) to reduce overall light disturbance. EC also recommends that Shell evaluate and consider the use of green lighting to reduce disturbance effects on birds, particularly near tailings ponds, to reduce the potential for bird mortality. Recent research (e.g., Poot et al. 2008) suggests that birds may be disoriented by and attracted to white light during migration and that green lighting may reduce attraction and subsequent mortality of birds. This may have important implications for mortality of birds at tailings ponds (Cassady St. Clair et al. 2011).

Auditory Disturbance

A number of studies have indicated that noise disturbance can affect a wide variety of wildlife. For example, in Alberta, Bayne et al. (2008) reported that the density of songbirds was significantly lower within 300 m of compressor stations than further away (400 – 700 m) from compressor stations and other sites with low noise (well pads). In addition, one third of the species studied had reduced abundance in areas both close to and far from compressor stations when compared to quieter sites (well pads), indicating that noise levels from compressor stations may be sufficiently loud to affect birds 700 m into the forest. At point count stations near compressor stations (average distance from compressor centroid = 242 m, SD 86), the average noise level was 48 dB(A) (SD 6). This noise threshold is similar to that reported in studies examining the effects of roads on bird density in wooded habitats (e.g., 42 to 52 dB(A); Reijnen et al. 1997).

Based on the above information, EC recommends that Shell evaluate noise levels in residual habitat and implement mitigation measures to reduce noise effects, where required. Measures that can be used to attenuate noise levels at facilities include (but are not necessarily limited to) use of external silencers, absorptive material, embankments, barrier walls or soundproof enclosures.

References:

Bayne, E. M., L. Habib, and S. Boutin. 2008. Impacts of chronic anthropogenic noise from energy-sector activity on abundance of songbirds in the boreal forest. Conservation Biology 22(5): 1186-1193.

Cassady St. Clair, C., T. Habib, and B. Shore. 2011. Spatial and temporal correlates of mass bird mortality in oil sands tailings ponds. Available online at: http://environment.gov.ab.ca/info/library/8679.pdf

Poot, H., B.J. Ens, H. de Vries, M.A.H. Donners, M. R. Wernand, and J.M. Marquenie. 2008. Green light for nocturnally migrating birds. Ecology and Society 13(2):47. Available online at: http://www.ecologyandsociety.org/vol13/iss2/art47/

UNDERTAKING 57: TO LOOK INTO THE AVAILABILITY OF POPULATION DATA FOR DUCKS AND GEESE AND OTHER WATERFOWL THAT PEOPLE LIKE TO EAT, SPECIFICALLY WITH RESPECT TO ALBERTA OR THEREABOUTS, MIGRATING THROUGH TO BREEDING, AND LOOK FOR RELIABLE DATA ON THE WAYS IN WHICH BIRDS ARE BEING KILLED, WHETHER BY HUNTING OR FERAL CATS OR RUNNING INTO BUILDINGS IN ORDER TO PROVIDE SOME PERSPECTIVE ON THE NUMBERS

Response:

a) Most of the birds reported killed in oil sands tailings ponds are ducks. The total number of ducks that migrate through Alberta each year is unknown. Estimates of ducks using the Peace-Athabasca Delta (PA Delta) provides an indication of the number of birds that may migrate over north eastern Alberta and use the PA Delta as a staging area. Fall surveys have shown a high of 338,515 ducks using the PA Delta; the total number of birds using the area over the entire fall would be considerably higher. In 2012, the total number of ducks breeding throughout Alberta was estimated at 8.2 million birds.

   Although understanding overall waterfowl population numbers in Alberta provides some useful information, EC notes that the scale of analysis can have a large effect on EA conclusions and the determination of significance of project and cumulative effects. For most species, evaluating local project effects in the context of a much larger regional study area will likely result in insignificant project effects because of the relatively small contribution of the project to regional disturbances. Similarly, evaluating cumulative effects in the regional study area relative to changes in provincial or national populations will also likely result in insignificant effects because regional effects become diluted. As discussed in the Cumulative Effects Practitioners Guide, this approach can be misleading. Therefore, as required in the provincial Terms of Reference, EC recommends evaluating the significance of effects in the context of local and regional wildlife populations. This approach allows for the identification of suitable mitigation measures that ensure that the project, if approved, is developed in a sustainable and responsible manner. Assessing effects at larger spatial scales may lead to implementation of insufficient measures to mitigate project effects.

   In addition to the above considerations, it is important to note that section 5(1) of the Migratory Bird Convention Act states that no person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. This requirement is independent of the number of birds that may be affected or may frequent a water body.

b) Tens of millions of birds die each year in Canada, many from natural causes such as predation. Recent national estimates of bird mortalities related to anthropogenic sources indicate that cats may kill more than 100 million birds in Canada each year (most are small birds in urban southern areas), > 10 million birds die annually from collisions with houses, 1-4 million birds die from collisions with mid-rise buildings, and 1.8 million ducks and geese are harvested by hunters. These effects are likely additive to habitat loss effects that have been identified as a major factor contributing to the decline of boreal bird populations (Schmiegelow and Mönkkönen 2002).

References:

Schmiegelow, F.K.A. and M. Mönkkönen. 2002. Habitat loss and fragmentation in dynamic landscapes: avian perspectives from the boreal forest. Ecological Applications 12(2): 375-389.