Common Nighthawk Use of Transmission Lines in the Waneta Expansion Project Area

Prepared For:
Waneta Terrestrial Compensation Program (WTCP)

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1.0. Introduction

The Common Nighthawk (*Chordeiles minor*) is a neotropical migrant, wintering in South America and breeding in Canada and the United States (Poulin et al. 1996). The species was assessed federally as threatened due to dramatic population declines (COSEWIC 2007) and is considered a species of conservation concern in British Columbia. In Nakusp, the average number of sightings has declined from 6.3 (1976-1985) to 4.0 (1988-1994) to 2.3 (1997-2005) (Campbell 2006). A decline in insect abundance across their range has been hypothesised as the main limiting factor (Campbell 2006). Habitat fragmentation and alteration, mortality due to terrestrial predators and vehicles, and climatic fluctuation during the breeding period may be additive factors in the decline (Poulin et al. 1996, COSEWIC 2007).

A pilot project conducted in the region in 2008 confirmed the presence of territorial males and resulted in the discovery of a nest site (Hausleitner and Dulisse 2009). Additional nest observations have been documented in the region (Biodiversity Center for Wildlife Studies, M. Machmer 2012, pers. comm.). Common Nighthawks nest on the ground in open areas and exhibit fidelity to nest sites (Brigham 1989). Many nighthawk detections during inventory (Hausleitner and Dulisse 2009) were above power lines and one nest was found incidentally within a power line corridor in Fort Shepherd in 2007 (M. Machmer 2012, pers. com.), however it is unknown how extensively this habitat is used for nesting. Moreover, no studies have been conducted for the species on reproductive habitat and success (Poulin et al. 1996). An increased knowledge of Common Nighthawk reproduction and the use of power line corridors for breeding can facilitate associated management activities and assist in the creation of a best management practices guideline for power line corridors in the region (Hausleitner and Dulisse 2009).

The objectives of this study were to:

1. Compare reproductive effort (nest density, clutch size, nest success and habitat) on transmission corridors and natural areas in the Fort Shepherd Conservancy Area.

2. Provide recommendations for best management practices for rights of way/transmission lines for Common Nighthawk.

2.0. Methods

We limited our search effort to the Fort Shepherd Conservancy Area, located on the west side of the Columbia River, six kilometers south of Trail in southeastern B.C. At 964 ha, it is the largest continuous parcel of land in B.C. within the very dry, warm Interior Cedar Hemlock (ICHxw) biogeoclimatic subzone (Machmer 2008). We searched for Common Nighthawk nests during the breeding period in two ways. First we conducted diurnal surveys by walking transects with two observers in parallel using a “sweeping stick” in disturbed habitat patches and power line corridors in an attempt to flush nesting or ground roosting birds (Winter et al. 2003). Secondly, we visited suitable nesting areas at dawn and dusk and attempted to pinpoint territories through territorial booming of pairs. We recorded date, wind, temperature, rain, cloud cover, disturbance type, start and end times and length of transect. If a Common Nighthawk was detected, we

recorded its location, whether or not we flushed the individual, number of eggs or nestlings, reproductive status, and took a photo of the nest site.

Vegetation sampling occurred using an 11.28 m radius (400 m^2) plot centred on the nest or roost site after the site was no-longer being used. Macro-habitat characteristics recorded were elevation, slope and aspect. Structural stage was described using the following categories: shrub; pole/sapling; young forest; mature forest; and old forest (Anonymous 1998).

The overall percent tree cover (>10m) was measured within the plot (Anonymous 1998). Two, 10-m line intercepts were placed over the plot center (one north-south, the other east-west) to measure percent cover in the shrub, herbaceous and substrate layers. The substrate was recorded into percent cover (byroid, aquatic, cobbles, organic matter, bare soil and dead wood). The dominant and co-dominant species in each layer in the plot were recorded.

Tree and stand structural characteristics were measured within the plot. Tree species, diameter at breast height (DBH; cm) and tree height (m) were determined for all trees > 10 cm DBH within the plot (Anonymous 1998). The maximum height of the shrub and herbaceous layers were determined along the intercept.

We compared the nest/ roost sites used by a Common Nighthawk to random sites within the same forest cover type. We used a minimum distance of 25 m so that we were far enough from nest/roost site to ensure independent measurements of vegetation and a maximum value of 50 m to ensure that we stayed within the same cover type. The structural characteristics within a 400 m^2 plot at randomly selected sites were measured in the same way as at nest/roost sites.

We documented all wildlife species incidentally observed while conducting our field work in the project area.

3.0. Results

Search Effort

We searched for nest sites on seven days between 26 June and 15 July 2012. Two surveyors spent a total time of 18.5 hours searching on 52.6 km of transects (Figure 1, 2). Eleven kilometers of these transects occurred on power line corridors (Figure 1, 2). We spent 3.7 hours over three evening surveys and two dawn surveys trying to pinpoint nest sites of territorial birds.

Figure 1. Search transects for Common Nighthawk at the north end of Fort Shepherd, June-July 2012.

Figure 2. Search transects for Common Nighthawk at the south end of Fort Shepherd, June-July 2012.

We found two nest sites and a roost site through transect surveys and an additional roost site through a combination of night territorial behaviour and transect surveys (Figure 3). All sites occurred in natural openings (flood plains, ridges). All birds found were flushed by observers. Both nests had clutches of two eggs. One nest fledged their young while the other was depredated.

Hatch date occurred between 5 and 11 July for the first nest. Upon monitoring the nest on 11 July we did not flush the mother and two juveniles; however the nestling had been moved 2.2 m from the nest site. The eggs in the second nest were depredated between 8 and 11 July. Two roost sites were found incidentally while doing transect surveys. One was in proximity of the nest sites and may have been the male of one of the nesting females. The other was found in a territory delineated through night behaviour.

Habitat Summary

We sampled habitat at all nest (n =2) and roost sites (n =2) and an equal number of random locations within a similar cover type. The sample sizes are not large enough at this stage to look at habitat selection so descriptive statistics are provided here. Both nest sites were on a flat flood plain at an elevation of 401 m immediately adjacent to the Columbia River. Nests were located on bare ground and organic material. Nest sites had low tree cover ($\mu = 3.0 \pm 4.2$) but relatively high shrub cover (B1= 26.6 $\pm$ 0.2, B2= 16.9 $\pm$ 4.1) in the immediate nest area (Figure 4). Tall shrub cover at nest sites was greater than that of random sites (Figure 4). Dominant tree species in the plots were Douglas fir (*Pseudotsuga menziesii*) and black cottonwood (*Populus trichocarpa*). Dominant plants in the shrub layers were black cottonwood and lodgepole pine

(*Pinus contorta*). Dominant herbaceous plants were kinnikinnick (*Arctostaphylos uva-ursi*) and grasses. Nest sites were characterized by less bare soil and more organic matter than at random locations (Figure 5).

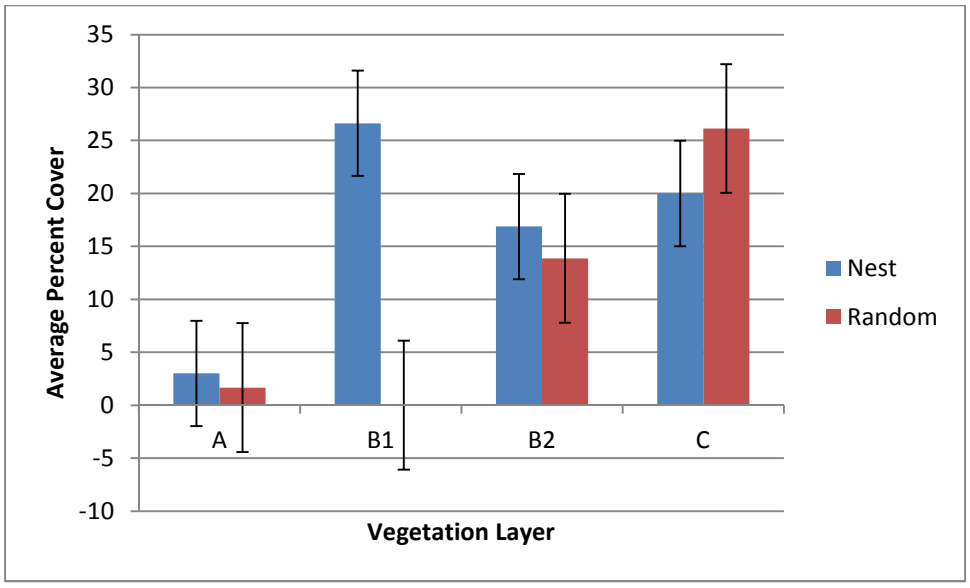

Figure 4. Average percent cover (SE) of Common Nighthawk nests (n = 2) and random nest sites (n = 2)) at Fort Shepherd Conservancy, 2012.

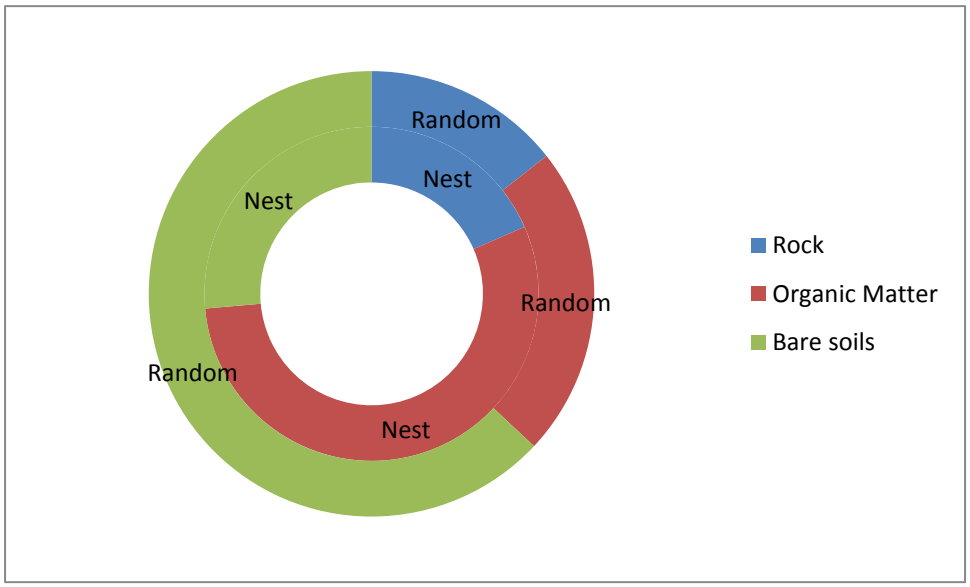

Figure 5. Average percent ground cover of Common Nighthawk nests (n = 2; inner circle) and random sites (n = 2; outer circle) at Fort Shepherd Conservancy, 2012.

Two Common Nighthawks were detected roosting on the ground; one with a southeast aspect and slope of 22° and one on flat ground. Roosts had greater tree cover (μ = 15.0 $\pm$ 7.0, n =2) than nest sites (μ = 3.0 $\pm$ 4.2, n = 2). Tall shrubs were higher at roost sites (μ = 41.8 $\pm$ 1.1, n = 2) than at random sites (Figure 6). Dominant tree species in the plots were Ponderosa pine (*Pinus ponderosa*) and lodgepole pine. Dominant plants in the shrub layers were lodgepole pine, black cottonwood and Saskatoon (*Amelanchier alnifolia*). Dominant herbaceous plants were spreading dogbane (*Apocynum androsaemifolium*), and kinnikinnick.

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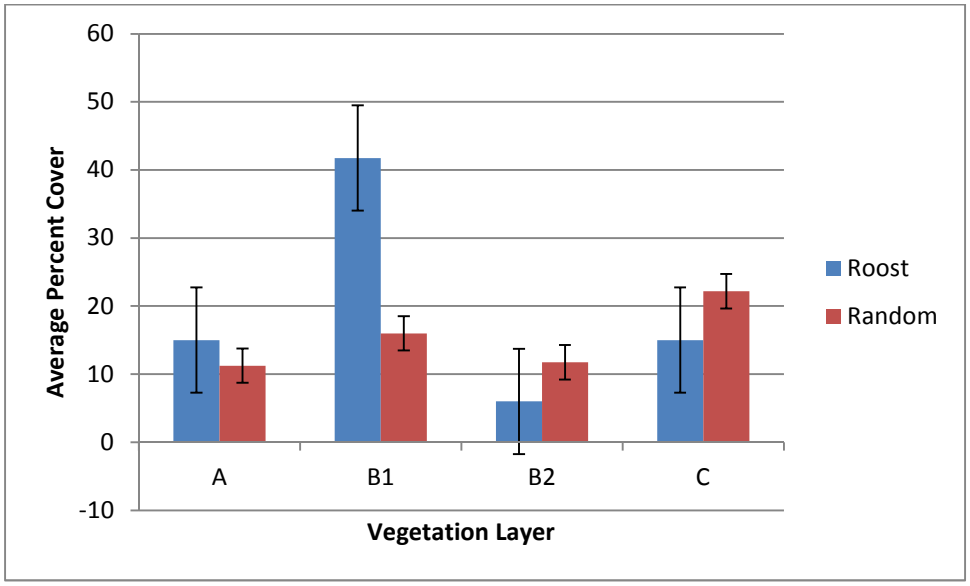

Figure 6. Average percent cover (SE) of Common Nighthawk roost (n = 2) and random sites (n = 2) at Fort Shepherd Conservancy, 2012.

Incidental Wildlife Observations

We observed a number of other wildlife species incidentally during our field work (Table 1). These included sightings of blue-listed reptiles such as a western skink (*Plestiodon skiltonianus*) and five western yellow bellied racers (*Coluber constrictor mormon*), Notably, while conducting transect surveys along transmission lines, we incidentally found two other active ground nests, one of a Spotted Sandpiper (*Actitis macularius*) and one of an unidentified sparrow.

Table 1. Incidental wildlife sightings observed at Fort Shepherd Conservancy, 2012.

Species	Count	B.C. Conservation Status
Bald Eagle (*Haliaeetus leucophalus*)	2	yellow-listed
Merlin (*Falco columbarius*)	1	yellow-listed
Spotted Sandpiper (*Actitis macularius*)	4	yellow-listed
Mammals		
black bear (*Ursus americanus*)	1	yellow-listed
coyote (*Canis latrans*)	1	yellow-listed
elk (*Cervus canadensis*)	2	yellow-listed
mule deer (*Odocoileus hemionus*)	4	yellow-listed
Reptiles		
western skink (*Plestiodon skiltonianus*)	1	blue-listed
western yellow bellied racer (*Coluber constrictor mormon*)	5	blue-listed

4.0. Discussion

To the best of our knowledge, detailed nest vegetation analysis does not exist for this species. Nest sites have been described as occurring in open country with eggs being laid on various substrates on the ground or on gravel roof tops (Brigham 1989, Campbell 2006, COSEWIC 2007). Our nest sites were found on flat ground in a flood plain. Eggs were laid on organic matter and bare soils. Our clutch size of two is the most common reported (Campbell 2006). As the literature suggested, we searched for nest sites in openings. Although we found our nest sites within open habitat patches, the nest sites themselves were characterized by higher percent tree and shrub cover and less bare ground than available. Greater sample sizes are needed to test this hypothesis. These sites are exposed to the sun at the hottest times of the year, and this vertical cover may serve two purposes; one concealment and secondly temperature control.

Our sample size describing roost locations is also too small to make any large inferences. However, roost sites were on the ground and may also be characterized by greater vertical structure than at random. Roost sites described by Fisher et al. (2004) in Saskatchewan were in trees on north facing slopes surrounded by trees with lower canopy height and in open forest patches (n = 14).

Average rainfall for Castlegar in June is 65.7 mm (Environment Canada 2012), yet in June 2012 the region saw 228 mm of precipitation, more than three and a half times the normal amount. As a result, access to Fort Shepherd was restricted to bicycles as Casino Creek was washed out making it logistically difficult to concentrate search effort at the southern end of Fort Shepherd. This area has had higher density of Common Nighthawks in the past (Hausleitner and Dulisse 2009). Additionally, the rainfall likely resulted in decreased nest success and territorial behaviour and thus, detectability of Common Nighthawks in the 2012 field season. The objectives of this research have not been fully met due to the restraints of small sample sizes.

However, the field season was productive in that we found and sampled habitat at nest and roost sites and fine-tuned our search locations and methods.

5.0. Recommendations

Nest searches

We recommend that nest habitat be delineated using the territorial behaviour of the Common Nighthawk displayed at dawn and dusk. Daytime sweeps of the habitat should be conducted following these displays to pinpoint nesting locations. These searches should be conducted with multiple repetitions to account for imperfect detectability. This species also displays territorial behaviour when defending its food resources (Roth and Jones 2000), so searches should be constrained to nesting season (mid-June to mid-July). There should be a continued focus searching and describing nest sites in transmission corridors.

This field season taught us a lot about habitat associations of Common Nighthawks. We have refined our nest searches to include this data. This includes searching in areas with greater shrub and tree cover than originally anticipated.

Habitat descriptions

No formal habitat measurements have occurred at Common Nighthawk nest sites though long-term declines have generated interest in species monitoring and management (Martin and Geupel 1993). Measurement of nest vegetation can be used to identify influences on breeding productivity and guide land management practices. At the same time, estimates of productivity provide insights on species vulnerability (Martin and Geupel 1993). Thus, we recommend that nest searches and habitat descriptions continue in the Waneta Expansion area, Fort Shepherd Conservancy and adjacent TECK properties so that an adequate sample size is obtained to describe reproductive parameters and habitat selection of the Common Nighthawk.

Fire suppression and forest ingrowth has been identified as a constraint on the natural processes occurring at Fort Shepherd (Polster 2012). These ecosystem changes have reduced the amount of open areas in forested regions and are believed to be responsible for the decline of open-habitat species such as the nighthawk (COSEWIC 2007). Mimicking this natural disturbance regime will likely benefit this species.

6.0. Literature Cited

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7.0. Appendices

Jenny Wallace conducting nest searches for Common Nighthawk along a bare ridge-top at the Fort Shepherd Conservancy, 2012.

Nest site containing two Common Nighthawk eggs at the Fort Shepherd Conservancy, 2012.

Vegetation at Common Nighthawk Nest site at the Fort Shepherd Conservancy, 2012.

Press Release:

http://www.columbiapower.org/news.asp?ID=210