Local Expert Assessment of Large Mammal Mortality and Movement Along Highway 3

June 2009

Prepared by Tracy Lee
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INTRODUCTION

The Canadian Rocky Mountain region represents a large intact ecosystem supporting the full complement of large mammals. The region is considered strategically important for maintaining carnivore diversity within the western mountains of North America. The Highway 3 Transportation and Development Corridor represent a fracture zone within this larger region of natural connectivity, threatening population and habitat connectivity within the Canadian Rocky Mountain region (Apps et al. 2007).

The Highway 3 Transportation Corridor occurs in a low lying east west valley in southeastern British Columbia and southwestern Alberta. In British Columbia it consists of a two lane highway, a railway line and a number of principle towns, Sparwood, Fernie and Elko. The full complement of Rocky Mountain large mammals occur in the area and are impacted by the transportation corridor through collisions with vehicles or disruptions to movement due to increasing traffic volumes and development activity along Highway 3 (Apps et al. 2007). Information on wildlife spatial and temporal movement patterns through the region is essential for the development of effective mitigation strategies to facilitate movement and reduce collisions with vehicles. (Alexander et al. 2004; Clevenger and Waltho 2000; Farrell et al. 2002; Ng et al. 2004).

Land use planning processes in the region have identified information on wildlife movement in association with the transportation corridor, particularly ungulate species, as a data gap for the BC section of Highway 3 (Ament et al. 2008). In 2009, Miistakis received funds from TransWild Alliance to host a workshop with wildlife experts to address this data gap. The objectives of the workshop were to document wildlife movement (with a focus on large mammals) across Highway 3 and identify high collision zones from the provincial border to Elko, through documentation of knowledge provided by local wildlife experts.

The intent of this report is to provide the communities of southeastern BC with a better understanding of the wildlife and transportation issues along Highway 3 from the provincial border to Elko through the documentation of local knowledge and analysis of mortality data collected by British Columbia Ministry of Transportation (BCMOT). This report highlights key sections along the highway where movement and collisions are common and hence pose both a human safety and conservation concern. It is our hope that this report will become a community resource to promote mitigation measures that will reduce wildlife and transportation conflicts.

METHODOLOGY

A local expert workshop was held in Fernie, BC in May 2009. Local experts were identified by British Columbia Ministry of Environment (BCM0E) staff and a snowball sampling methodology was employed, whereby local experts identify other individuals deemed valuable to the process. Six local experts attended the workshop, others who were not able to attend reviewed and edited the report during the draft phase.

To provide context for workshop discussions, a series of maps were developed for each species. The following spatial layers were portrayed on maps;
The mortality data for elk, deer, bighorn sheep, moose and bears was provided by BCMOT from 1998-2007 (10 year period). The highway was divided into 1000m segments and mortality observations for each species were assigned to the nearest segment. To adjust for spatial error in reporting and segment placement a nearest neighbor calculation was employed (adding the neighboring values (number of mortalities) to each segment). The data was then categorized into a series of percentiles, classifying each of the 1000 m units as one of the following mortality ranks: “very low” (>0-20%), “low” (20-40%), “medium” (40-60%), “high” (60-80%), and “very high” (80-100%). Segments with zero values were excluded from the percentile classification. Zones classified as medium, high and very high were considered high collision zones. This methodology was adopted from Huijser et al. (2008) from a high collision mortality assessment along Highway 93 in Kootenay National Park.

During the workshop broad movement zones were drawn on the maps for each species by participants to indicate where species commonly move across the transportation corridor. Participants were asked to focus on areas where critical habitat crosses the highway, such as ungulate winter range or linkage areas where ungulates are moving back and forth to key habitat patches.

Within the broad zones identified for each species, local experts were asked to address the following:
- the accuracy of mortality zones depicted on the map;
- factors associated with movement areas and high collision zones; and
- prioritization of movement areas and high collision zones across Highway 3.

In addition workshop participants were asked to:
- Identify datasets that were missed in this process; and
- Identify other species to be considered.

RESULTS AND DISCUSSION
For ungulate species (elk, bighorn sheep, moose and deer) and for two carnivore species, (black bear and grizzly bear) workshop participants identified movement zones and high collision zones. Results for each species are graphically presented below, and include maps depicting zones of concern (outlined in white) as well as a description of possible wildlife attractants. In addition, a summary map depicting high collision zones based on total mortality (all species) is presented to highlight areas where human safety is a concern. The priority zones for each species are summarized and two key areas were identified as a priority for the implementation of mitigation measures.

Elk (Cervus canadensis)
A number of local elk herds occur in the area with key elk winter range occurring along the valley bottom bisected by Highway 3. A total of 202 elk mortalities were reported over a ten year period from 1998-2007.
from the provincial border to Elko. Eighty Seven percent of Elk kills occur in high collision zones representing 41 km (46 %) of Highway 3 (Map 1). Workshop participants felt the mortality data under-represents the true mortality occurring on Highway 3. Literature supports this notion suggesting a variety of factors attributed to under-representation of carcass counts by highway service crews, such animals dying away from the highway, carcasses obscured by vegetation and other structures and removal of carcasses by motorists and/or by predators (Taylor and Goldingay 2004).
Map 1: Elk mortality and movement zones along Highway 3.
Eight movement zones (outlined in white) were identified by workshop participants along Highway 3 for elk;

1. Zone 1, from Crowsnest Pass Provincial Park to a section of Highway 3 east of the weight scales represents a high collision zone for elk (medium to high mortality level) and is an important linkage area in the spring.

2. Zone 2, from the Corbin Loop Bridge (aka Michel Creek Bridge) to Sparwood represents a high collision for elk (high to very high mortality) and represents one of the best winter ranges in the elk valley. A mortality hotspot occurs near the town of Sparwood at the slide, possibly enhanced by road characteristics, considered a blind corner.

3. Zone 3, from Sparwood to Hosmer is a high collision zone for elk (very high mortality levels) from the highway pull-out widening near Sparwood to East Hosmer. The presence of elk in this zone can be attributed partly to the attractant of grassy clearings resulting from reclaimed highway right-of-ways and gravel pits.

4. Zone 4, located at the Hosmer Bridge was identified as an important linkage and a high collision zone for elk (medium mortality level).

5. Zone 5, from Dicken Road (Hartley Creek) to Fernie is a high collision zone or elk (high mortality levels) and surrounding lands are important range habitat in the spring, summer and fall. Cultivated fields neighboring the highway are also frequented by Elk during calving.

6. Zone 6, from Lizard Creek Bridge to Fernie Ski Hill is a high collision zone for elk (medium to high mortality levels) and is a crossing point on the highway, as elk traveling on the east side if the highway come into contact with development and cross the highway to the ski hill.

7. Zone 7, from Kubinec Road to the pullout area past Morrissey Road is a high collision zone for elk (medium to high mortality levels).

8. Zone 8, from the Rock Cut to Elko represents an important linkage over the highway as elk move back and forth between spring and fall habitat to the south of Highway 3. Mortality is low along this stretch of highway for elk.

High collision zones, identified using mortality data for elk fall within one of the eight zones identified as important movement areas for elk by workshop participants. Two key priority zones for elk, represented by red circles on the map, are **Zone 3 between Sparwood to Hosmer East**, and **Zone 2, the section between Michel and Sparwood**.

**Bighorn Sheep (Ovis canadensis Canadensis)**

There are two primary herds, Mt. Erickson and Elko, of bighorn sheep in the area that come into contact with Highway 3. Twenty three bighorn sheep mortalities were reported over the ten year period from 1998-2007 along Highway 3 from the provincial border to Elko. Eighty six percent of bighorn sheep kills occurred on 11 km (12 %) of Highway 3 (Map 2).
Map2: Bighorn Sheep mortality and movement zones along Highway 3.
The two zones along Highway 3 identified by workshop participants for bighorn sheep are:

1. **Zone 1**, is a small zone around the Carbon Creek Bridge where the sheep come down off Erickson Ridge to lick the salt on the highway or cross the highway to graze on spring grass found on reclaimed mine sites near Tent Mountain. Mortality for sheep is high (based on estimated local population of approximately 30-40 individuals) for this section of highway. Attractants to this area include highway salt as a leading factor and access to good spring habitat south of Highway 3. Mitigation measures, such as the placement of sheep warning signs along the highway to warn drivers were put up in 2007 and BCMOE has placed salt licks away from the highway to draw sheep away from salt on the road.

2. **Zone 2**, is a large 10km zone, from Johnny D’s corner to Elko. The sheep that access this section of the highway were transplanted to the area in 1980’s. There appears to be very little interaction with the Wigwam sheep population although they do share the flats south of the highway. Bighorn Sheep mortality is high to very high at the rock cuts, partially due to the attractant of salt gathering in the rumble stripes on the road. Bighorn sheep mortality is medium from the beginning of rock cuts to Elko in the winter and in spring due to early green up conditions.

Bighorn sheep high collision zones fall within one of the two zones identified as important movement areas for bighorn sheep by workshop participants. The priority for bighorn sheep is zone 2, the 10km zone from Johnny D’s corner to Elko, with a high collision zone occurring from the rock cuts to Elko. Although given importance of maintaining big horn sheep populations mitigation measures for both populations are desirable.

**Moose (Alces alces)**

Moose occur throughout the region and are common in many areas along Highway 3. There were 43 reported moose mortalities over the ten year period from 1998-2007 along Highway 3 from provincial border to Elko. Although mortality is generally low, 66% of moose kills occur on 16 km (18 %) of the Highway 3.
Map 3: Moose mortality and movement zones along Highway 3.
Five zones were identified by workshop participants as areas of concern for moose:
  1. Zone 1 located at Summit Creek, near the weigh scales, especially during spring.
  2. Zone 2 from the pull out rest area west of the weigh scales to the west of the Corbin Road junction.
  3. Zone 3 at the Rock slide near the town of Sparwood.
  4. Zone 4 from Olsen Pit Access to Hosmer Main road.
  5. Zone 5 from Lizard Creek Bridge to the Tunnel, but with higher mortality and movement from Lizard Creek to Fernie Ski Hill.

All moose high collision segments fall within one of the five zones identified as important movement areas for moose by workshop participants. The top 2 priority zones for moose are Zone 4 between the Olsen Pit Assess to Hosmer Road and Zone 5 between the Lizard Creek Bridge to Fernie Ski Hill.

**Deer (Odocoileus spp.)**

Deer species, both white tailed and mule deer occur throughout the region and are common in many areas along the highway. There were 516 reported deer mortalities over the ten year period from 1998-2007 along Highway 3 from provincial border to Elko. Seventy eight percent of deer kills occur on 46km (52 %) of Highway 3 (Map 4).
Map 4: Deer mortality and movement zones along Highway 3.

Large Mammal Movement and Mortality Along Highway 3
Six zones were identified by workshop participants for deer species along Highway 3:

1. Zone 1 located at the weigh scales.
2. Zone 2 between Corbin Road and the Loop Bridge.
3. Zone 3 between the old town bridge near the town of Sparwood to Hosmer main road.
4. Zone 4 from Hosmer Bridge to Fernie.
5. Zone 5 between Morrissey Road to the pull out near Johnny D’s corner.
6. Zone 6 between the end of the rock cuts to Elko BC, because it represents a very high collision zone for deer.

There were a number of areas along this stretch with very high mortality that did not fall within important linkage or movement zones. Other areas of concern include from the Lizard Creek Bridge to the Fernie Ski Hill and from Kubinec Road to Johnny D’s corner.

The priority zones for deer include zone 6, from the rock cut to Elko and Zone 3, from the Sparwood old town bridge to Douglas Fir Road, particularly to the south of the town of Sparwood.

Bear (Ursus spp.)
Grizzly bears and black bear species occur throughout the region and are common in many sections along Highway 3. A total of 37 bear mortalities (includes both grizzly bear and black bears) were reported over the ten year period from 1998-2007 along Highway 3 from the provincial border to Elko. Workshop participants were asked to review the mortality zones depicted on the map, highlight attractants in the region and identify areas where they have witnessed grizzly bears crossing Highway 3. In addition, participants noted road kill carcasses where commonly left in three gravel pits or mine waste piles, close to both Highway 3 and the railway line, potentially drawing them down to the transportation corridor. Gravel pits and mine waste piles are located near the Corbin Loop Bridge, Fir Roberts Road, Olsen RR Crossing and the Tunnel Pit Access. Participants suggested if carcasses need to be put in these locations; the tunnel pit access would be less problematic for attracting bears.

Participants were asked to mark zone and/or point observations of grizzly bear sightings along Highway 3. Point observations were depicted as grizzly bear observations are rare and crossings of Highway 3 are considered significant to the conservation of the species within the Rocky Mountains. In addition to the point locations depicted on map 5, two other grizzly bear movement zones were identified, from Olsen Railway Crossing to Olsen Rest Area and from Lizard Creek Bridge to Morrissey Road.
Map 5: Bear mortality and observations along Highway 3.
Other Species of Concern

Participants were also asked to identify movement opportunities for other carnivore species. Wolves also frequent the area and are observed at the weigh scales near Michel Creek, Corbin Road, Olsen Creek, Morrissey Bridge at Kubinec Road and from the tunnel to Elko.

Badgers were also considered an important species, as they are listed as a species of concern in British Columbia. Although badgers are more common in the Rocky Mountain Trench, they occur along Highway 3 from the provincial border to Elko in areas where grasslands are common on either side of the highway. There were four areas identified as representing good badger habitat; from weigh scales to Alexander Bridge, from Olsen RR Crossing to Hosmer Road, from Dicken’s Road to Brenner Road and from Lizard Creek to Fernie Ski Hill.

SUMMARY

To better understand movement and collisions zones for multiple ungulate species, mortality data from BCMOT was displayed in 1 km segments for all species. High collision zones based on total mortality from 1998-2007 is displayed on map 6. There were a total of 824 mortality observations reported, 78% of mortalities occur in high collision zone, representing 47 km (48%) of Highway 3. It was noted throughout the process that actual mortality occurring along Highway 3 is difficult to account for; results from data provided by BCMOT likely underestimate the true rate mortality.

To assist in prioritizing areas for mitigation, priority zones for each species are summarized in Table 1. Four priority zones are identified with the Sparwood to Hosmer zone representing more of the large mammal species. Although summarizing the zones is helpful for prioritizing mitigation strategies, mitigation of transportation systems for wildlife is usually based on opportunities for implementation during highway upgrade projects.

Table 1: Species Priority Areas

<table>
<thead>
<tr>
<th>Zone</th>
<th>Elk</th>
<th>BHS</th>
<th>Moose</th>
<th>Deer</th>
<th>GB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>Michel to Sparwood</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Sparwood to Hosmer</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
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<td>Johnny D’s corner to Elko</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Lizard Creek Bridge to Tunnel</td>
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<td>0</td>
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<td>2</td>
</tr>
</tbody>
</table>

All of the priority zones listed are associated with high wildlife mortality zones, with the exception of a high mortality zone immediately north of the town of Fernie.

The intent of this report is to provide the communities of southeastern BC with a better understanding of the wildlife and transportation issues along Highway 3 from provincial border to Elko through the documentation of local knowledge and analysis of mortality data collected by BCMOT. The report highlights key sections along the highway where movement and collisions are common posing both a human safety and conservation concern. Hopefully this report will become a community resource to promote mitigation measures that will reduce wildlife and transportation conflicts.
Map 6: High Collision Zone, based on BCMOT’s total mortality observations along Highway 3.
REFERENCES


