Dear Mr. Johnson,

Re: Peace River Winter Wildlife Survey

Introduction
The following letter report documents the results of an aerial wildlife survey conducted by TERA Environmental Consultants (TERA) on behalf of Glacier Power Ltd. along the Peace River on February 21, 2002. The survey commenced from a point approximately 15 km south of the town of Peace River at Daishawa to a point approximately 191 km upstream near Many Islands. The main objectives of the assessment were the following:

• to obtain initial information on the extent to which ice cover on the Peace River was being crossed by medium to large mammals;
• to obtain a sense of the importance of ice conditions and open water as it may relate to observed patterns of wildlife crossing;
• to obtain an indication as to whether patterns of wildlife crossing were in any way related to shoreline or nearby upland habitats or human activity; and
• to obtain additional information on winter riparian habitat use by large mammals.

Methods
The survey was conducted using a Bell 206 helicopter at an altitude of approximately 100 m to 150 m above ground level at a speed of approximately 85 km/hour. Wildlife tracks and observations were recorded using a GPS receiver (8 m accuracy) interfaced with an onboard laptop computer using real-time GPS display software. Information recorded included track location, species, information on ice characteristics and areas of open water.

Figure 1 identifies areas of open water and photoplate locations and Figure 2 identifies wildlife track crossing locations and wildlife observations.

Results

Survey Conditions
Weather conditions during the survey on February 21, 2002 consisted of high cloud, with a light wind and a temperature of -8°C. High winds the previous day likely resulted in obscuring some older tracks by drifting snow.
Distribution of Open Water and Ice Conditions
Areas of open water recorded during the survey ranged from several small areas of open water (<2 ha), to larger stretches (200 m to 500 m) of open water which were commonly found along side channels as well as closer to shore within the main channel (Figure 1 and Plate 1). The river was frozen both upstream and downstream of the confluence of the Smokey River and Peace River, with the exception of a few small areas of open water at the confluence (Plates 2 and 3). The ice front terminated approximately 30 km downstream of Many Islands where the river became open for its full channel width (Plates 5 and 6).

In general, weather conditions for the winter of 2001/2002 have been unseasonably mild, with periods of cold weather causing the river ice to thaw and freeze, resulting in a fractured and broken ice surface, with occasional pressure ridges (Plate 4). Smooth ice conditions constituted only a small percentage of the ice surface.

Crossings of the River Ice by Wildlife
Wildlife crossing locations observed on February 21, 2002 are identified on Figure 2. Evidence of moose having crossed the ice on the Peace River was observed at 62 locations from approximately 10 km downstream of the town of Peace River and extending to the confluence of Fourth Creek and the Peace River, approximately 30 km upstream of Dunvegan. These observations were roughly spread along the entire length of this segment of the survey area. Areas where moose crossings appeared somewhat more intense were between Hwy. 740 and Hwy. 2 along the Peace River. Ice conditions did not appear to conspicuously correlate with the occurrence of moose crossing.

Evidence of deer crossing the ice of the Peace River was observed at 46 locations and followed a similar pattern to that observed for moose. Approximately 35 coyote crossings were noted and again these followed a more or less similar pattern to that for moose and deer.

It appears that the ice conditions on the Peace River during the time of the survey, presented little or no barrier to medium and large mammal movement across the ice. Based on these and previous field observations, it is believed that the most hazardous crossing conditions are likely during freeze-up and break-up when ice is less stable and the river channel contains numerous mobile ice pans.

Riparian and River Island Habitat Use
There appeared to be significant wildlife activity in all terrestrial habitats adjacent to the river. Indications of heavy use were most frequently observed at the confluences of small tributaries flowing into the Peace River and along the ice margins parallel to the shore. Where tributary valleys were opposite of each other (on the north and south side of the river) observations of tracks increased. These areas appeared to be important wildlife movement corridors.

The most abundant tracks observed were those of moose, deer and coyote. A total of 8 moose, including a cow and calf pair, up to 10 groups of mule deer that ranged from 2 to 9 individuals, 5 to 6 wolves and 1 coyote were observed between Daishawa and Many Islands (Figure 2). No observations of elk, or obvious elk tracks were observed during the survey. A set of lynx or cougar tracks was also noted. Of these observations, a single moose was observed on the river ice, 3 deer and 2 moose were recorded on islands, and the remainder of species observations...
were recorded within 200 m of the shoreline, with the exception of mule deer that were primarily using the mid- to upper south-facing slopes of the Peace River.

Tracks to and from the many island complexes along the Peace River were observed, though generally use of island habitats was considered to be less than use of habitats adjacent to the Peace River.

Areas of open water appeared to act as an attractant to wildlife for watering purposes.

**Predation by Wolves Along the Peace River**

Four kill sites were observed, of which only one was in a forested area approximately 50 m from the Peace River. A pack of 5 to 6 wolves were at this location, which was most likely a moose kill (Plates 7 and 8). The remaining three kill sites were on the river ice close to shore. It is possible that moose were seeking the river for protection from wolves but obtain more security when the river is not frozen.

**Closing**

Based on our observations and past experience, we believe the Peace River affords good opportunity for wildlife crossing, whether open or frozen. However, we lack sufficient observations to determine whether these movements are more or less frequent during open or frozen conditions. While we did not detect any obvious difference in frequency of wildlife crossing relative to ice conditions, the single point in time sample and relative uniformity of ice conditions precludes a definitive answer. It seems reasonable to assume that smoother ice surfaces will generally represent less hazard for wildlife movement. If you have any questions or would like to discuss the results, please do not hesitate to call.

Sincerely,

TERA ENVIRONMENTAL CONSULTANTS

Environmental Planner
Plate 1  View west along Peace River to area of open water located downstream of the Leich (Little Burnt) River.

Plate 2  View west to confluence of Smokey River and Peace River.
Plate 3  View east from Correctional Facility (left) downstream to confluence of Smokey River and Peace River.

Plate 4  View west along the Peace River showing fractured and broken ice conditions.
Plate 5  View west along Peace River showing open water immediately downstream from Many Islands.

Plate 6  View southeast showing ice conditions and open water immediately upstream of Many Islands.
Plate 7  View west to wolves at moose kill site on the Peace River.

Plate 8  Close-up of wolves, as above.