Wild Lands Advocate 12(5): 18 - 21, October 2004

Wildlife Monitoring at Chinchaga

Jessica Ernst and Jonathan Wright

In 1997, in order to address knowledge gaps, Pioneer Natural Resources Canada Inc. (Pioneer) retained Ernst Environmental Services (EES) – a non-government environmental organization – to monitor furbearers in the Pioneer Chinchaga gas field. EES also anticipated the opportunity to make contributions to the knowledge base available on woodland caribou (*Rangifer tarandus caribou)*, grey wolves (*Canus lupis*) and a host of other boreal species.

The Chinchaga monitoring study has been conducted annually over the past seven winter seasons (Nov/Dec to mid/late March), with EES and Pioneer currently preparing for the eighth winter. The study at Chinchaga is of a non-reductionist (essential for cumulative effects assessment completion), descriptive and quantitative science nature and has been conducted utilizing new and traditional low invasion and conservation research technologies.

EES makes it a priority to select only limited invasion technologies especially when monitoring listed species such as the vulnerable wolverine (*Gulo gulo*) and threatened woodland caribou. The work to date has involved the following:

- ongoing literature review;
- consultations with other authorities world wide;
- snow-tracking methods;
- random sampling in the field over time;
- photo documentation;
- remote-camera monitoring of wolverine, fisher (*Martes pennanti*), marten (*Martes americana*) and other wildlife; and
- analysis of glucocorticoid (stress hormone) levels in caribou, moose (*Alces alces*) and wolf faeces, with initial samples of wolverine faeces collected in the seventh winter currently being analyzed.

This article briefly outlines a sample of key findings for some species monitored at Chinchaga with added context derived from related literature.

The study takes place in the wilderness area known as Chinchaga (after the Chinchaga River) and straddles the provincial border in Alberta's northwest. The area includes approximately 1,100 sq km of contiguous lands on both sides of the provincial boundary. It is an area that has not been host to industry other than oil and gas extraction; commercial fur-trapping had not occurred at Chinchaga since prior to 1996. Chinchaga has been a very good environment in which to monitor forest carnivores in relation to a single disturbance type. As of 2003, the resumption of fur-trapping, while detrimental to the mark-recapture type database being compiled through remote photography, provided the opportunity to begin to compare the effects of fur extraction with those of oil and gas extraction.

Remote cameras have proven to be an excellent method of data collection at Chinchaga since the technology was initiated there in the fourth year (2000/2001). The applicability of photographic data to capture-recapture models has been tested successfully in numerous parts of the world on a host of species ranging from felids to whales. At Chinchaga, EES has effectively demonstrated that identification of individual marten, fisher and wolverine can be performed using the cameras to document unique features – especially the markings of the throat, chest and groin area. Recaptures, recognizable from previously documented photos, have been catalogued from year to year for each of these species.

Alberta Wilderness Association
Box 6398, Station D,
Calgary, AB T2P 2E1
Phone: (403) 283-2025 Fax:(403) 270-2743

Remote photo monitoring by EES at Chinchaga has concluded that mustelids can be non-invasively identified to the individual, with the following number of individuals identified so far:

- 26 marten;
- 4 fisher; and
- 5 wolverine (a listed species provincially, federally and globally).

Considering that wolverine is a challenging species to study, and that no pursuit, capture or handling was required to obtain the above results, these findings are significant.

Wolverine

There are concerns in Alberta that there may be declines in wolverine populations. It is not known whether the wolverine population of boreal-forest Alberta is reproducing or whether it consists primarily of dispersers from better habitat in British Columbia. Camera station evidence from the monitoring at Chinchaga suggests that the latter may be more likely. Trends emerging from the snow-tracking data are beginning to lend support to this idea.

An analysis of the snow-tracking data from years one through six reveal that of twenty-two documented wolverine trails (this does not include trails of what was likely the same individual elsewhere in its travels), 77 per cent of the wolverines involved were traveling from British Columbia eastwards into Alberta. These observations, supported by the camera station results, might be attributed to the following:

- wolverines at Chinchaga are dispersers from cordilleran British Columbia and are for the most part not successful at setting up territories and reproducing in Alberta;
- reproduction of wolverines in boreal Alberta is much lower than in British Columbia;
- Alberta is a population sink for dispersing British Columbia wolverines due to fur-trapping.

Extensive snow tracking of wolverine at Chinchaga has lead EES to theorize that during midwinter conditions of powder snow, continuous climax conifer cover is very important to this wide-ranging species. We believe this is because the buffering effect on snow-depth of this type of cover helps the wolverine to avoid entering into a condition of energetic stress. Areas of clearcuts where no linkages of climax conifer cover are preserved are likely detrimental to the dispersal and winter survival of wolverine.

Woodland Caribou

Woodland caribou have never been considered abundant in the boreal forest. In Canada, it is believed that during the three decades prior to 1950, more caribou were hunted (100,000 to 200,000 annually) than the animal's natural increase, thus decades of over-hunting may have resulted in extensive detrimental effects from which Alberta populations are still recovering. Non-traditional hunting of woodland caribou in Alberta flirtatiously opened and closed from 1948 until 1980, when finally it stayed closed.

Management guidelines for industry were put into place in 1996. Extensive telemetry research has been and continues to be conducted in Alberta. Management guidelines have been expanded on with implementation in 2001. Additional mitigative measures are being considered by some, including predator and moose control. Many things have been and continue to be done to conserve caribou in Alberta. But, currently, are the right things being attempted and the optimal things being planned for? From the time hunting season was closed, have woodland caribou populations continued to decline? And if so, to what extent are populations declining because of the oil and gas industry? Alberta's estimated caribou population almost tripled from 1986 to 1996, perhaps responding positively to the cessation of non-traditional hunting as listed:

1986 - 1324 to 1868;
1991 - 3300;
1992 - 3000 to 3500;

Alberta Wilderness Association
Box 6398, Station D,
Calgary, AB T2P 2E1
Phone: (403) 283-2025 Fax:(403) 270-2743

1996 - 3600 to 6700.

Caribou populations are difficult to quantify and behaviours difficult to determine because

- they occur in naturally low numbers;
- they are often dispersed in small groups often over wide ranges;
- they are an elusive, almost ghost-like species, difficult for many researchers to detect because they blend in so well with their habitat and move in and out of forested areas; and
- surveys can encompass many miles before groups are or are not encountered.

Some researchers state that because of these reasons the only way to study caribou is by telemetry. More than 450 caribou have been collared in Alberta and more continue to be captured and collared annually. In spite of the increasing population estimates listed above and without analyzing effects from study activities or past over-hunting, Alberta telemetry researchers have recently concluded that woodland caribou are in decline and that the declines are largely because of the oil and gas industry. These recent conclusions are based on telemetry data and modeling using telemetry data.

There is a growing concern worldwide that many conservation studies using telemetry are not investigating or reporting study effects. Globally, many researchers are reporting negative capture and handling effects, especially on ungulate species; however, in Alberta telemetry studies on caribou to date, study effects, including mortality, are ignored or likely hidden in attribution to other factors. Ethical considerations when using wild animals in studies include assessing the impact of the research on study populations. Already twenty years ago the Canadian Council of Animal Care (CCAC), whose Animal Welfare Protocol Alberta researchers are to follow, emphasized that improper restraint, especially of frightened animals, can lead to major physiological disturbances that can result in any one of a series of deleterious or even fatal consequences.

In 2000, EES speculated that non-invasive monitoring of stress hormone (glucocorticoid) levels in woodland caribou scat collected at Chinchaga, relating to industrial disturbances and infrastructure, would be useful to assess conservation needs of this sensitive species without complicating the data with the harmful effects that come with telemetry activities. EES speculated that scat stress hormone evaluations of telemetry activities on caribou may provide some vital baseline information that is missing in Alberta telemetry studies. Many caribou have been and continue to be collared in Alberta without *a priori* or *a posteriori* efforts to determine possible study effects, including fatalities. EES has requested cooperation, with no success to date, with the Alberta Boreal Caribou Research Program and British Columbia caribou telemetry researchers to collect scat from recently chased, captured, handled and collared caribou. Telemetry activities may cause increased stress levels detrimental to caribou survival and reproduction. EES speculates that these stress responses would be reflected in the stress hormone levels analyzed in scat collected 24 hours post collaring.

Recent faecal stress hormone studies have indicated that some human activities can result in elevated stress hormone concentrations, for example in

- spotted owl due to deforestation of habitat;
- cheetah due to immobilization;
- a male spotted hyena due to its translocation to a new enclosure which resulted in a five-fold increase compared to baseline concentrations;
- moose due to increased recreational snowmobile activities; and
- elk and wolf due to increased recreational snowmobile activities.

Some faecal stress hormone studies have shown possible habituation to human activities where stress hormone levels were found to remain unchanged in animals studied in areas of increased human activity. Mean stress hormone levels in Chinchaga moose scat collected by EES distally from oil and gas activities

Alberta Wilderness Association
Box 6398, Station D,
Calgary, AB T2P 2E1
Phone: (403) 283-2025 Fax:(403) 270-2743

and pre-activity were surprisingly higher than the mean stress levels in moose scat collected proximally to and during activities. This suggests a decreased stress response due to possibly experiencing increased protection from predators alongside oil and gas activities – perhaps a similar learned behaviour as observed with ungulates in the 1996 Banff–Bow Valley study. Continued scat collections at Chinchaga will provide further understanding of habituation in ungulates, and possibly other species, to petroleum activities.

Levels of stress hormones in caribou scats collected by EES over three seasons at Chinchaga (the fourth season's samples are currently being analyzed), including samples collected proximally and distally to the gamut of oil and gas activities, have been found to fall within a fairly narrow, consistent range. ANOVA tests have revealed no significant difference in stress hormone levels between caribou scat samples collected proximally and distally to oil and gas activities or infrastructure. Caribou scat samples collected at Chinchaga have shown no elevated levels of stress hormone in caribou over time during the activity season or annually.

The stress hormone data collected at Chinchaga suggests that, in the absence of direct persecution, caribou are not stressed by oil and gas development activities, including seismic shooting and related activities. Caribou field observations and photo documentation at Chinchaga over the past seven years have shown a non-displacement response to vehicular traffic, linear corrridors and petroleum infrastructure and activities there. The Chinchaga findings are contrary to those derived in telemetry studies on caribou elsewhere in Alberta.

Effects of Oil and Gas Activities and Fur-trapping on Furbearers

The return of fur-trapping to Chinchaga provided a unique opportunity to compare the immediate effects of fur-trapping with years of intensive, closely encroaching oil and gas activities on furbearers. This comparison was made possible because of the existing data-base of remote camera data collected during the previous winters when oil and gas activities were the sole anthropogenic disturbance type. The comparison can best be illustrated by comparing camera station results from the period post-trapping in the sixth study year with the results from the corresponding period of the previous two winters when there was no trapping. The following compares these results:

CHINCHAGA RESOURCE EXTRACTION

Oil and Gas Only (2001, 2002)	**Oil and Gas and Fur Trapping** (2003)
Mean # Marten Images	Mean # Marten Images
30.5	0
Mean # Fisher Images	Mean # Fisher Images
9	0

The oil and gas activities surrounding these camera stations during the three winter seasons when the cameras were actively collecting data included the following:

- surveying, construction of well sites;
- clearing, maintaining access;
- daily use of access;
- drilling of wells;
- weeks of pipelining activities involving
  - clearing of heavy climax timber growth;

Alberta Wilderness Association
Box 6398, Station D,
Calgary, AB T2P 2E1
Phone: (403) 283-2025 Fax:(403) 270-2743

  - piling and burning of timber;
  - a multitude of vehicles, construction equipment, personnel.
- helicopter overflights to service wells;
- snowmobile activity related to well-servicing;
- recreational snowmobile activity;
- reclamation of well sites;
- clearing of access to an adjacent radio-repeater station;
- clearing of site for above repeater station;
- construction of repeater station;
- annual rollback of access utilizing bulldozers for access control;
- two-to-three times weekly visitations by primary observer to service the camera stations, usually on snowmobile.

The effects of a little under two weeks of fur-trapping activities resulted in the most dramatic negative effects so far observed in the seven years of wildlife monitoring at Chinchaga.

Displacement of River Otter

Snow tracking of otters (*Lutra canadensis*) has documented the individuals at Chinchaga to develop an aversion to oil and gas related water-extraction activities on water courses, as well as the portable, "clear-span" bridges used to allow vehicle traffic to ford creeks. Water extraction activities caused the otters to abandon traditional travel routes for the duration of the extraction period, and clear span bridges caused the animals to leave the creek-beds they were traveling in to avoid going under the bridges. This latter behaviour was learned over time, as during the first year of the study otters regularly passed beneath the bridges. Avoidance of the bridges necessitated the abandoning of the creek-beds that had previously allowed for safe passage beneath the access routes. The otters would instead cross the access road some distance from the bridge – risking traffic mortality – only to regain the creek-beds once the bridges were well behind them. Nonetheless, there was no documented traffic mortality of otters over the seven winters of study.

Conclusion

A significant databank has been collected so far over the seven years of wildlife monitoring in relation to gas field development at Chinchaga. New information on a number of species has been collected. New technologies have been tried for a number of years with excellent and interesting results. Some results have led to intriguing contradictions. One of the most valuable contributions so far that has come out of the Chinchaga work is that it is due diligence and appropriate wildlife management for researchers to study a species, especially those listed (e.g., wolverine, caribou), using methods that avoid negative study effects. Negative study effects may provide distorted results with possibly meaningless conclusions as well as resulting in fatalities. EES believes that commonly used invasive methods of study have not yet been adequately studied to determine possible consequences the study effects may cause. Because there are alternate methods of study that do not require capture or direct handling of animals, there is no need to conduct studies using invasive methods. This is especially so for listed species. Low invasive methods of study have other advantages in that they are usually more economical than telemetry methods and result in less negative cumulative impacts.

EES speculates that study methodology may have something to do with why caribou at Chinchaga appear to respond differently to oil and gas activities and infrastructure than in studies in other parts of Alberta. EES also speculates that telemetry study effects may be more harmful and in some cases more fatal than some researchers are willing to admit or publish. EES has a number of ideas and thoughts on this touchy subject. We save them for another day.

Alberta Wilderness Association
Box 6398, Station D,
Calgary, AB T2P 2E1
Phone: (403) 283-2025 Fax:(403) 270-2743

ALBERTA WILDERNESS ASSOCIATION

Alberta Wilderness Association
Box 6398, Station D,
Calgary, AB T2P 2E1
Phone: (403) 283-2025 Fax:(403) 270-2743