BEAR TRACKS

No. 4 **Editors: Dean Cluff and Ray Case** Fall/Winter 1997/98

A Newsletter on Grizzly Bear Studies in the Central Arctic, NWT, Canada

EVALUATING NET-GUNS TO CATCH BEARS

This year we evaluated the use of net-guns for capturing grizzly bears. Previously we have captured grizzly bears by shooting them with a tranquilizer dart from a helicopter. This year we tried netting the bears from the helicopter before shooting them with the tranquilizer dart. We wanted to see whether netting would help reduce the movements of tranquilized bears making capture safer and cheaper. See Page 2 for the complete story.

A 2-yr old grizzly bear cub is captured in a net near Aylmer Lake. Both adults and cubs were netted prior to immobilizing by darting during the fall capture session this year.

WKSS WEB SITE

Be sure to visit the West Kitikmeot/Slave Study Society's (WKSS) web site at *www.wkss.nt.ca* for new updates on all its projects. The 1996 annual report for the Grizzly Bear Project entitled "The spatial characteristics and nutritional ecology of barren-ground grizzly bear (*Ursus arctos*) in the central Northwest Territories", has just been added. Many other annual reports from WKSS sponsored research project are also posted there.

NET-GUNNING GRIZZLY BEARS...

In 1997, we captured 57 grizzly bears (39 adults, 16 cubs, 2 subadults) during spring, summer and fall capture efforts. Net-gunning from a helicopter was first tried in the spring for cubs only, using a skid-mounted net-gun. Effectiveness was limited because if a cub was not netted properly after the first shot, the helicopter had to land to reload the net-gun. Net-gunning was not available for our summer session. In the fall, we netted bears of all ages using a hand-held net-gun and a skid-mounted net-gun as a backup. All but two bears were netted before being tranquilized.

Once netted, most bears were shot with a tranquilizer dart from the helicopter. Cubs-of-the-year and occasionally yearlings were injected by hand once we were on the ground.

1997 Grizzly Bear Capture Summary

Spring 1997

Bear	Age Class	Status
G661	ad M	new collar
G657	ad M	removed collar
G662	ad M	new collar
G663	ad F	new collar
G636	ad M	new collar
G612	ad M	removed collar
G664	ad M	new collar
G665	sub M	no collar
G543	ad F	removed collar
G666	ylg F	G543 cub
G677	ylg F	G543 cub
G541	ad F	removed collar
G678	ylg M	G541 cub
G679	ylg F	G541 cub
G505	ad F	removed collar
G674	coy F	G505 cub
G675	coy F	G505 cub
G676	coy F	G505 cub
G680	ad M	new collar
G681	ad F	new collar
G682	ad M	new collar

Legend

ad	adult bear (5+ years old)
sub	subadult bear (3-4 years old)
2yr	2 year old cub
ylg	yearling cub
coy	cub-of-the-year

Summer 1997

Bear	Age Class	Status
G683	ad F	new collar
G684	ad F	new collar
G680	ad M	malfunctioning collar replaced with new collar
G685	sub F	no collar
G686	ad F	new collar
G687	coy F	G686 cub
G688	coy M	G686 cub
G689	ad M	new collar
G690	ad M	new collar

Fall 1997

Bear	Age Class	Status
G691	ad M	new collar
G640	ad F	replaced old collar with new collar
G692	2yr M	G640 cub
G643	ad F	removed collar
G639	ad F	replaced old collar with new collar
G652	ad F	removed collar & fitted VHF collar
G667	2yr F	G652 cub
G668	2yr M	G652 cub

Fall 1997 (continued)

Bear	Age Class	Status
G654	ad M	removed collar & fitted VHF collar
G638	ad F	removed collar & fitted VHF collar
G642	ad F	removed collar & fitted VHF collar
G655	ad M	removed collar & fitted VHF collar
G644	ad M	replaced old collar with new collar
G660	ad F	replaced old collar with new collar
G646	ad F	replaced old collar with new collar
G633	ylg F	G646 cub
G653	ad M	replaced old collar with new collar
G647	ad M	removed collar & fitted VHF collar
G649	ad M	removed collar
G522	ad F	removed collar
G650	ad F	removed collar
G670	ylg M	G650 cub
G671	ylg F	G650 cub
G672	ylg F	G650 cub
G631	ad M	removed collar
G648	ad F	removed collar
G530	ad M	removed collar

We hoped that netting bears before tranquilizing them would reduce the cost of bear research by decreasing the amount of helicopter time needed to capture a bear. Our study showed that it is possible to successfully net grizzly bears from a helicopter and it can reduce chase times. In our study there were some misses with the net, but they were not common. Once netted, about one-third of the adult bears (7 of 19) needed a second net to stop them from escaping, increasing the amount of helicopter time slightly. Cubs-of-the-year sometimes slipped underneath the net if netted over uneven ground, and one bear escaped from the net but was darted thereafter. One other bear appeared so fat that a net was not used and it was just darted.

Given these problems, we believe that helicopter net-gunning is not necessary for safe, effective captures of grizzly bears and may not necessarily be better or cheaper than darting alone. Darting bears from a helicopter without the aid of nets is an effective technique if the pilot is experienced in wildlife capture. We suggest that helicopter darting with an experienced pilot be the main method of capture for barren-ground grizzly bears with a skid-mounted net-gun available for back-up support.

-- Dean Cluff and Robert Mulders

DIAVIK'S ACTIVITIES

Diavik Diamond Mines Inc. completed its wildlife baseline studies and began their monitoring program in 1997. Wildlife impact assessments and consultations with stakeholders are currently being conducted to support the regulatory requirements to construct a diamond mine at Lac de Gras.

Biologists from Penner and Associates Ltd. and northern technicians Bobby Drybones from Rae and David Giroux from Dettah investigated grizzly bear dens, habitat use and food habits during the spring caribou migration season and early summer of 1997. Six collared bears were monitored when they were in the Lac de Gras area, and 106 visual locations were obtained of collared and uncollared adult bears. Investigations of five bear dens that were occupied in the previous winter showed that most dens were located in fine-textured soils, on well-drained slopes not associated with eskers, and with a consistent presence of crowberry-dominated bedding material. Site investigations showed that caribou was the main food item in May and early June, and that most were apparently killed by bears. Scat analysis and site assessments showed that bears primarily ate plants (horsetail, grasses, and sedges) in the early summer diet until caribou returned in mid-July.

Diavik has contracted AXYS Environmental Consulting Ltd. to conduct the terrestrial cumulative effects assessment for the project. AXYS' work on grizzly bears has been focused on habitat suitability modeling, core security area analysis, assessment of zones of influence and disturbance factors of human activities. In support of this assessment, Phil McLoughlin, University of Saskatchewan, was hired by Diavik in conjunction with AXYS, to estimate what kinds of habitat in the region grizzly bears prefer during the different seasons. This analysis is based on what habitat types were actually used compared to what habitats were available. Included in the analysis was the WKSS grizzly bear project satellite collar relocation data and Diavik's LANDSAT land cover classification.

-- David Penner

WOLF-BEAR INTERACTIONS

There have been several observations of bears and wolves interacting with each other. Diavik's consultants and GNWT biologists have documented four aggressive encounters between grizzly bears and wolves at wolf denning sites. They have also recorded two cases where wolves and grizzlies were both found at a recent caribou kill (pictured) and one instance of two wolves attacking a mother bear and her cub-of-the-year. All encounters ended a few minutes after discovery with no fatalities or significant injuries.

If anyone has witnessed similar encounters while in the field, we would appreciate hearing about it. Contact Dean Cluff in Yellowknife, NWT or David Penner in Sherwood Park, Alberta. Dean can be reached at (867) 873-7783 or emailed at dean_cluff@gov.nt.ca**. David Penner is at (403) 922-2893 or** dpenner@connect.ab.ca**.**

A grizzly bear family group encounters three wolves (one pictured) at a caribou kill site in the Lac de Gras area in May 1997.

Photo courtesy of Sue Cotterill, Penner and Associates Ltd. on Diavik Diamond Mines Inc. Wildlife Baseline Project.

-- David Penner and Dean Cluff

ROB GAU, M.Sc.

Rob Gau successfully defended his Master's thesis, *Food habits, body condition, and habitat of the barren-ground grizzly bear*, on October 27th at the University of Saskatchewan at Saskatoon. Rob began his work in May 1995 when the NWT Grizzly Bear Project got underway and the first capture effort began.

Rob Gau collects a fecal sample from a captured bear.

Rob also documented that caribou are an important food source for barren-ground grizzly bears and the most common food item eaten. Stable nitrogen isotope signatures, nitrogen content of the food items sampled, high number of caribou kill sites recorded, and the high frequency and volume of caribou found in the fecal remains provided consistent evidence that barren-ground grizzly bears are adept at killing and consuming large numbers of caribou to meet their dietary protein requirements.

However, the most important food item for these bears are berries such as crowberry, blueberry, cranberry, and bearberry. In fact, berries are critically important to the grizzly bear diet as the they are essential for bears to gain weight. Putting on fat during their hyperphagia phase in late summer and fall is necessary for bears to store enough energy to survive winter hibernation and ensure the reproductive success of pregnant females. Given the importance of berries to bears, Rob maintains that the distribution of these plants may be a factor limiting the distribution of grizzly bears across the central Arctic.

Rob examined the body composition of bears by bioelectrical impulse analysis to determine if periods of nutritional stress existed. This technique measures bioelectrical impedance along the bear's body which, when used with the bear's weight, is used to estimate the amount of body fat. Rob also wanted to determine if blood parameters reflected stressful nutritional periods.

Albumin was the only blood parameter that significantly reflected the total body fat levels in both adult male and lone female grizzly bears. Hemoglobin was also correlated to total body fat levels but only for lone females. All other parameters did not show a significant relationship with total bofy fat levels that were free from the effects of activity, stress, or dietary changes (see table below). Given these results, Rob believes that interpreting the nutritional condition of these grizzly bears using the blood parameters he examined would be inconclusive.

Spearman rank correlation co-efficients between blood parameters and the percentage of total body fat as determined by bioelectrical impulse analysis for adult and lone female grizzly bears in 1995 and 1996. Note that albumin was the only blood parameter that significantly reflected total body fat levels for both sexes.

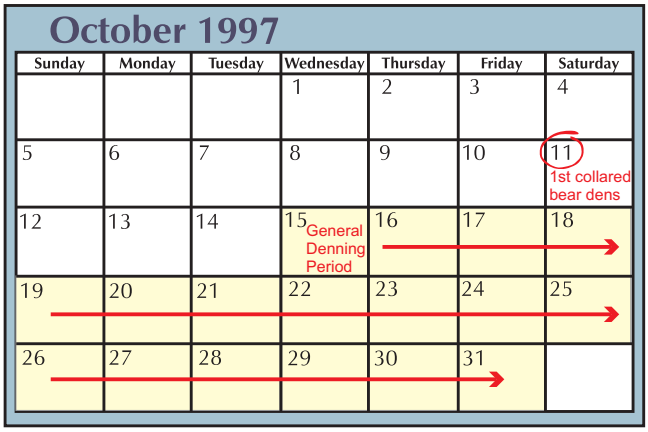
Blood parameter	n	r_s	Prob.
albumin	36	0.51	< 0.01
hemoglobin (female)	23	0.48	0.02
hemoglobin (male)	18	0.22	0.37
hematocrit	41	0.18	0.26
erythrocyte count (female)	23	0.33	0.12
erythrocyte count (male)	17	- 0.16	0.54
total protein	36	0.23	0.17
inorganic phosphorus	36	- 0.21	0.21
albumin: globulin	36	0.17	0.32
bilirubin (female)	20	0.14	0.57
bilirubin (male)	16	0.28	0.29
creatinine	36	- 0.13	0.45
calcium	36	- 0.13	0.46
sodium	36	0.07	0.69

-- Rob Gau and Dean Cluff

DENNING UPDATE

Previous studies have suggested that large glacio-fluvial deposits such as eskers were extremely important as denning habitat for barren-land grizzly bears. However, this conclusion has been challenged based on data obtained from radio-collared bears.

Site investigations of 18 dens of radio-collared bears were conducted this summer. Dens were located from satellite telemetry prior to hibernation and aerial telemetry during winter. Based on these dens and those from 1995 and 1996, grizzly bears have not only denned in eskers or esker-like materials but they have also used other well-drained tundra soils, such as glacial till, often with a south-facing slope.



The previous studies that assumed the importance of eskers for grizzly bear denning relied heavily on aerial survey data. This method is likely biased because dens in eskers are much more visible from the air (and the ground too) than are dens elsewhere. These studies also concentrated their search effort around eskers more than other tundra habitats.

This year, radio-collared grizzly bears generally denned during the last two weeks of October although the first bear to enter a den did so on October 11th. There were two adult male bears that were still active as of mid-November.

-- Phil McLoughlin

A Forum on wildlife telemetry was held in Snowmass, Colorado from 21-23 September 1997. It provided an opportunity for biologists, engineers, and interested individuals to discuss new telemetry technologies and methods, field evaluations of equipment and techniques, and directions for future technological development. Phil McLoughlin and Dean Cluff attended the Forum and The Wildlife Society's Annual Conference which followed.

At the Forum, Phil and Dean (with co-author Vivian Banci) presented a poster summary entitled, *Accuracy and precision of satellite radio-collars deployed on free-ranging barren-ground grizzly bears in the central Northwest Territories*. **In the paper, we compared locations of bears seen from the air while the signals from their collars were sent to the satellite. Most of these bears were at sites such as kills, dens, or day beds. The accuracy of the satellite location system has been tested using collars placed on the ground, but we wanted to test the system when a collar is actually on an animal, as the signal can be affected by a bear's body mass. Our sample size continues to grow, but our preliminary results indicate that error associated with each location estimate is similar to that reported by the satellite tracking company.**

-- Dean Cluff

THE NWT GRIZZLY BEAR PROJECT

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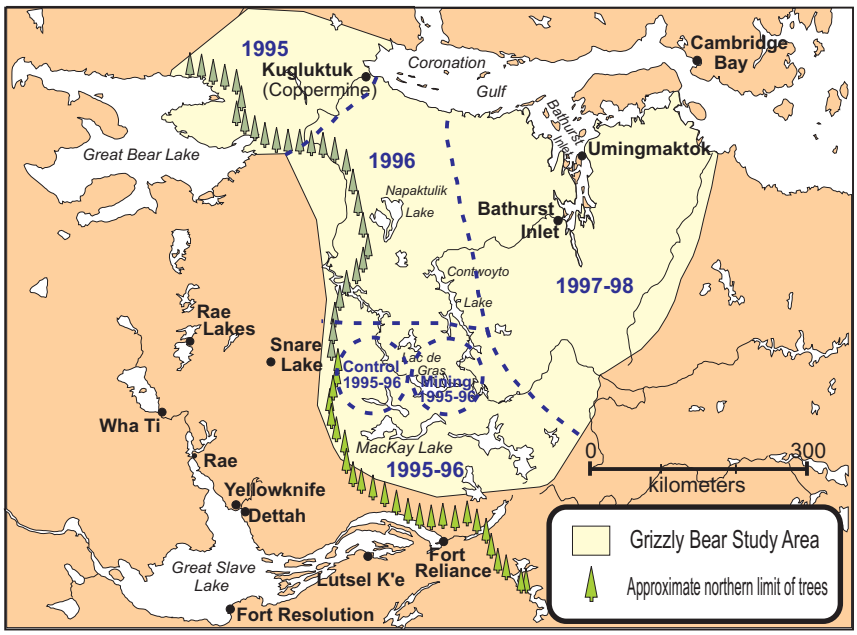

The Study Area

Description of the search zones for capturing barren-ground grizzly bears in the Slave and Bear Geological Provinces, 1995-1998. Also depicted are the control and mining sites used to assess potential impacts of mining activities on bear movements.

Acknowledgments

We gratefully acknowledge the financial support and contributions-in-kind from all our project sponsors. We thank Lynda Yonge for her comments and editing efforts.

PROJECT SPONSORS (1996 & 1997)

Northwest Territories Resources, Wildlife, and Economic Development

Indian and Northern Affairs Canada

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