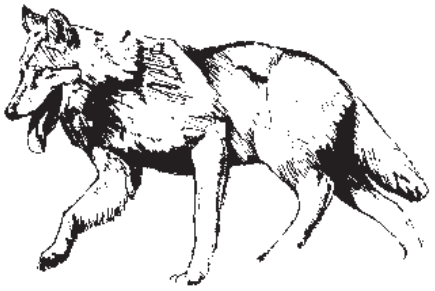
NORTHWEST TERRITORIES

WOLF NOTES



No. 8

Northwest Territories Environment and Natural Resources

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A Newsletter on Wolf Studies in the Central Arctic, NWT, Canada

WOLF NUMBERS DOWN

Detecting change in a wolf population is difficult to do in the north because of the huge area involved and costs associated with surveying it. While it may not be practical to detect differences from one year to the next, monitoring trends should be possible, such as whether wolf numbers are stable, low, high, increasing, or decreasing.

Given that Bathurst caribou numbers have declined recently, we might expect wolves in the area to decline as well. To detect change in the Bathurst wolf population, the North Slave Region conducts an annual aerial survey for wolves at dens in spring, followed by a pup survey at the active sites in late summer.

A curious wolf passes by Daring Lake on the tundra in April 2004.

Few active dens and low counts of pups and adults at dens in 2006 suggest that wolf numbers are down. This trend is supported by examining wolf carcasses collected from hunters. We looked at reproductive tracts of harvested female wolves for evidence of changes in litter size. Reduced litter size in wolves would suggest a decrease in their nutritional condition which would likely be related to caribou abundance. Wolf carcasses we examined this year indicate a decrease in reproduction from a decade ago. Furthermore, some hunters have observed fewer pups this past winter compared to previous years. We might just be at the start of a decline in wolf numbers and it will be interesting how long this trend continues.

In This Issue

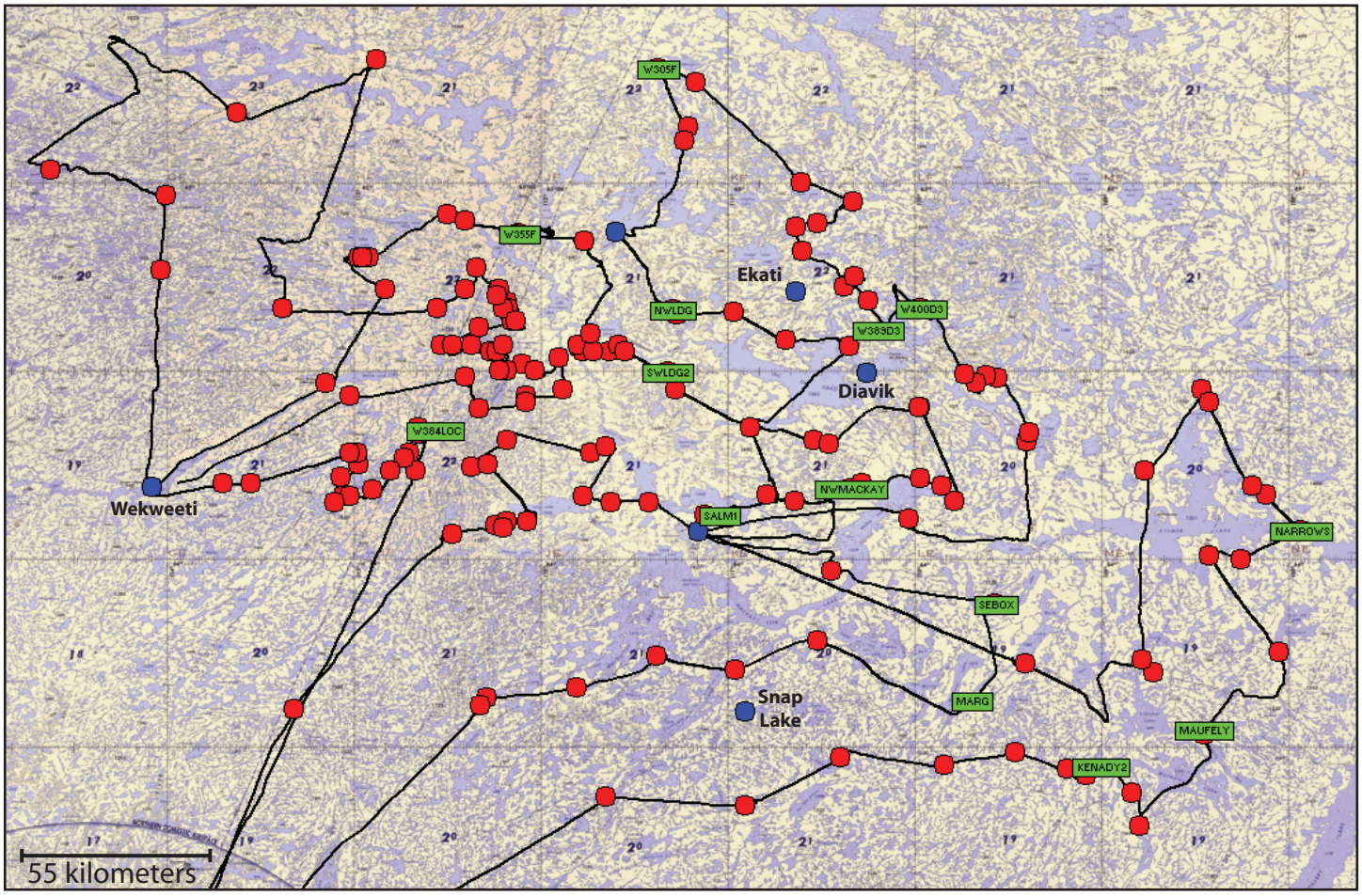
Wolf Den Surveys

Wolves are easily monitored during denning because mated pairs often return to the same site each year. The treeless tundra and long daylight hours provide an opportunity for observing wolves not often available in forested areas further south. Determining occupancy annually over a large set of known wolf den sites offers a way to monitor the status of wolves in the Bathurst caribou range.

Actual numbers of wolves in a population, while desirable, may not be absolutely required. Instead, an indication of trend in numbers of wolves may be all that is needed. Such a technique should show whether a wolf population is low, high, increasing, decreasing, or stable.

The tundra is a huge area and is costly to survey. However, we know of many wolf den sites that have been active over the years and we can revisit them each spring to see which ones are active. An annual aerial survey has been established that follows a fixed route of known wolf den sites (about 60-70 dens) to monitor trends in wolf numbers.

The survey is conducted in early to mid-June when wolves typically rest at the den site during the day and are therefore visible. Each den site is assessed for activity from the air, using a small fixed-wing airplane. We consider a den active if wolves are observed. We also look for signs such as tracks or fresh digging. If we see fresh signs but not wolves, we return at another time.



A map of flight paths flown in June 2006 to visit previously known wolf dens to see which ones are active. Red dots are previous den sites and green labels indicate den sites with wolves in 2006.

Counting Wolf Pups

We count pups at dens to estimate annual production of young and their recruitment into the population. In general, an abundant food source for wolves would suggest pup survival would be high. Also, demonstrating that wolves can successfully raise pups near industrial sites would suggest that any immediate impacts to reproduction in wolves associated with these operations are likely negligible.

Detecting trends in pup survival is difficult because pup counts tend to vary considerably within years. Litter size typically ranges from one pup to eight and therefore many den sites must be surveyed.

Keep in mind that aerial counts of pups from an airplane are conservative because not all pups may be seen. Ground observations can overcome this problem, but doing so takes time, and counts at all sites might take several weeks to complete.

Wolf Pup Counts 2006

Pack	Date	Type[1]	#Adults	#Pups
Ajax Lake N	11 Aug	A	2	2
C-C Narrows	12 Jun	A	1	0
	16 Aug	G	4	1
Eda Lake S	14 Jun	A	1	0
	11 Aug	A	4	4
Lac de Gras NW	13 Jun	A	2	0
	11-12 Aug	A	2	2
Misery esker	13 Jun	A	1+	0
	30 Jul[2]	G	2	5
Sauvage esker	13 Jun	A	2	0
	11 Aug	A	1	2

1 A = Aerial observation; G = Ground observation
2 data from BHP-Billiton

A wolf pup ventures from its den near Hilltop Lake, NWT.

In June 2004, we knew of 24 active wolf dens on the tundra. We believe wolves were still relatively abundant then because 75 wolves were associated with these dens (on average, about 3 adult wolves per den site). The average pup count in August was low at 2.3 pups/den for 18 sites.

We observed 20 active den sites and 58 adult wolves in June 2005 (2.7 adults/site). That August however, we saw pups at only 4 of the 20 sites and this count totalled 12 pups (5, 4, 2, and 1). We don't know what may have happened at the other 16 sites, which can range from total litter loss to simply moving elsewhere.

In June 2006, we observed 14 active dens and 17 adult wolves (1.2 adults/site). In August, we only observed pups at 6 of them with an overall total of 16 adults and 16 pups. Consequently, we have seen a recent decrease in the average number of adult wolves associated with a den, but changes in pup survival is less certain because few sites were found in August 2005 and 2006.

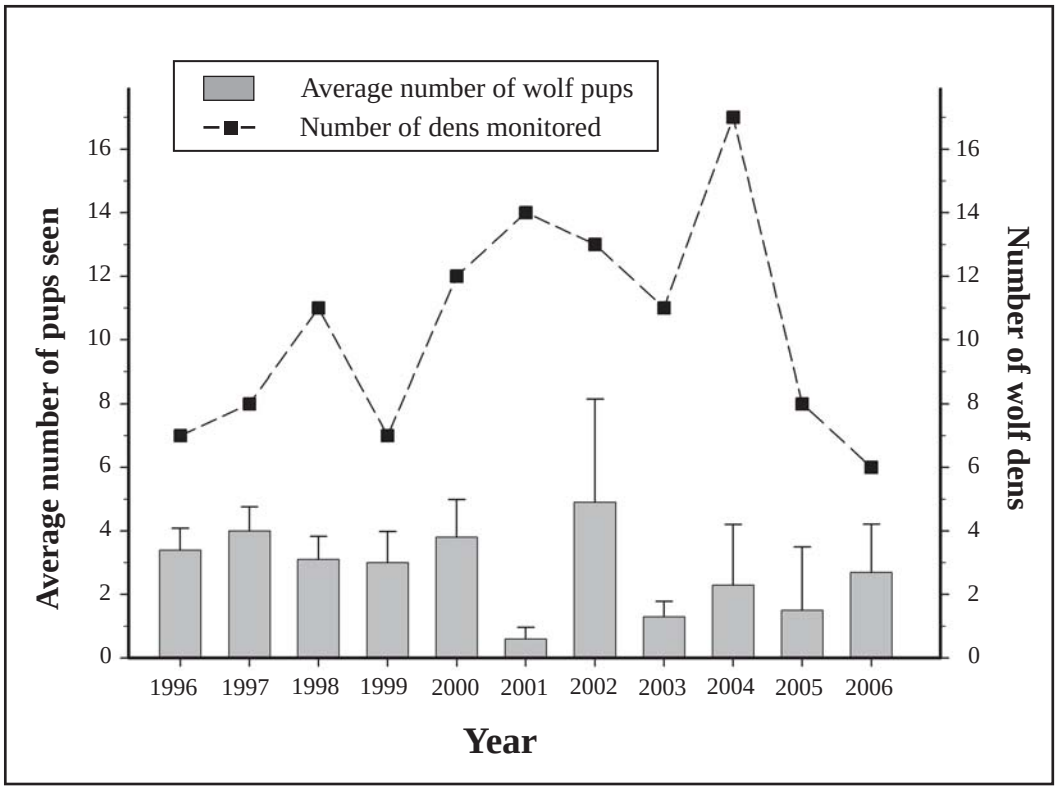
Wolf Den and Pup Activity Trends

Although we return in August to all the active den sites we found earlier in June, some become inactive if wolves relocate their pups to another home site (den site or rendezvous site) as the summer progresses. Consequently, we may not find the new site unless additional monitoring was conducted.

Also noteworthy is that the maximum range of pups doesn't change much over the years because we often find at least some dens with 5 or 6 pups, even when litter loss is widespread. Large litters of pups and multiple litters per site are more common when caribou are abundant. Therefore, it is important to count pups at many sites each year to allow for a meaningful comparison over time and avoid having a few large litter sizes in otherwise low pup survival years mask any trend.

Four wolf pups at a den near Hilltop Lake, NWT.

Two noticeable dips in pup counts occurred in 2001 and 2003. However, parvovirus could be a contributing factor rather than just fewer caribou. A decline in caribou availability can cause parvovirus infection in pups to be more severe by putting pups in a weakened state. Many pups can die from the intestinal parasite by three months of age. Blood serum collected from wolves we captured during this time showed exposure to canine parvovirus in the adults. However, a better indicator of the impact of parvovirus is finding and testing dead pups.



Average counts of wolf pups at home sites during August on surveys conducted since 1996 on the central arctic tundra, Northwest Territories.

Average pups counts were lowest in 2001 and 2003.

Carcass Examination

We sampled wolf carcasses obtained from hunters from January to April during winters 2004 to 2006. We were monitoring physical condition and reproductive rates. Most of the carcasses came from the East Arm area of Great Slave Lake and were typically wolves that migrate with the barren-ground caribou from the Bathurst herd.

Skinned wolf carcasses received from hunters in the Bathurst caribou range.

In 2006, students Jordan Balint and Thomsen D'Hont (pictured) from Sir John Franklin Secondary School in Yellowknife participated in the necropsies (animal autopsies). Both students did an excellent job. Thomsen is considering biological sciences at university next year and Jordan in enrolled in forensic science at the University of Calgary!

Of the 105 wolves we examined this year, most of the males were in excellent condition, both internally and externally, whereas the females were in fair to excellent condition. However, the majority of carcasses were middle-aged to old wolves and almost no pups in the harvested sample.

Interestingly, one of the female wolves had an abnormal femur (thigh bone) in that it was short and disfigured. It may be that it was broken and healed at some point, but she was in good condition this year and had bred.

Top:
Measuring chest circumference (girth).

Left:
Wildlife Biologist Tracy Hillis demonstrates procedures to students.

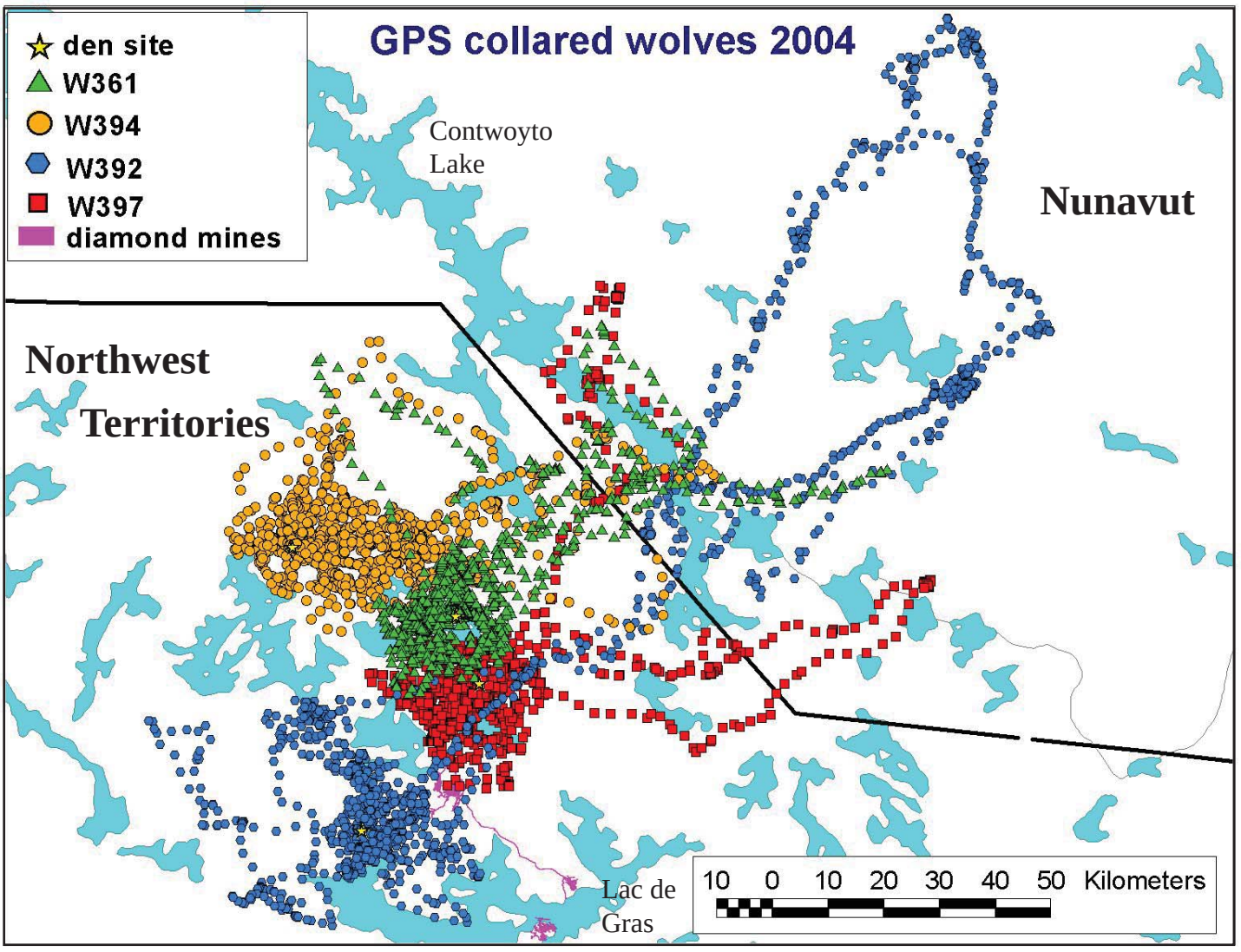
A female wolf pregnant with potentially 6 pups.

We will further examine tissue samples of wolves and their prey for condition and to determine if wolves shift their diet to other species, such as moose, if caribou continue to decline. We do this by examining bone samples from caribou and moose carcasses and through bones found in wolf stomachs.

Movements of GPS-collared Wolves

Wolves were captured and collared at the Ekati™ mine area in June 2004 to monitor their den sites, assist in counting pups and to map movements around the mine claim block. Four males from different dens received a satellite radio collar programmed to transmit Global Positioning System (GPS) locations every 30 minutes. The collars were programmed to release on command in late August and then retrieved.

The detailed location data obtained was excellent. We could identify the 4 different denning territories with little overlap between adjacent packs. This spatial arrangement was expected for denning wolves in summer because they likely defend territories while raising pups. However, territories are not defended in winter when wolves follow migratory caribou from the tundra to the winter range.



Summer locations of 4 male wolves denning in the Lac de Gras area from June to August 2004.

Each color in the map represents the locations of 1 of the 4 male wolves. The locations about the den area clearly showed their local or daily movements and enclosed an area that ranged from 600 to 1200 km^2. However, what was striking to see were the occasional extensive trips and journeys made far beyond the normal home range area. Many of these journeys occurred over several days before the wolf returned to the den.

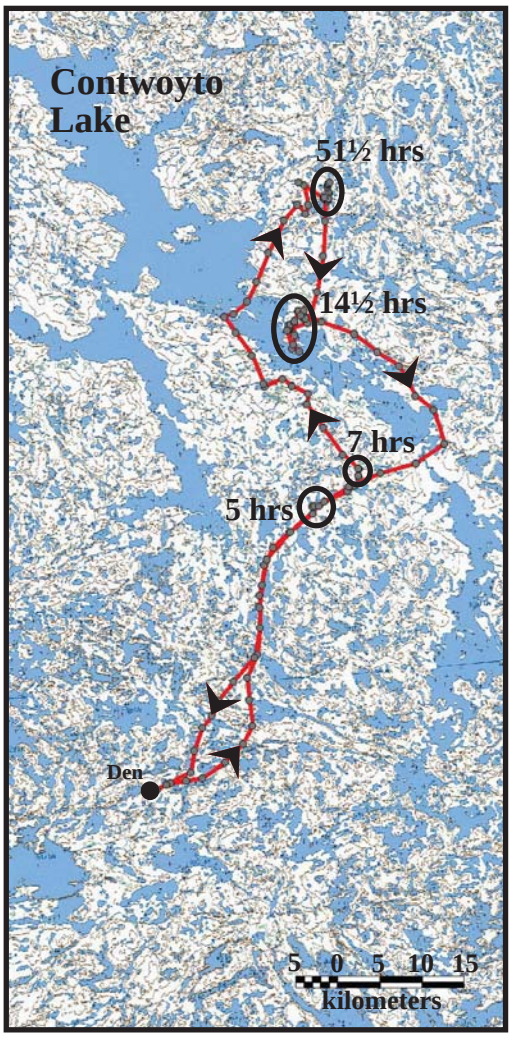
Wolf Journeys

In late June and much of July, wolves, especially males, may undertake many trips away from the den to hunt. The time away varies, depending on the availability of caribou. We define trips as more than 24 hours but less than 48 hours away from the den. Journeys are extended trips from the den more than two days long.

Of the 12 journeys recorded by the 4 wolves, 10 journeys were up to 6 days away from the den. The other 2 journeys were by one male wolf and time away from the den was 2 to 2 ½ weeks. Monitoring of this wolf suggested that no more than it and another wolf were present at the den. Therefore, any pups born to this pair had likely since died and they had no further need returning to the den.

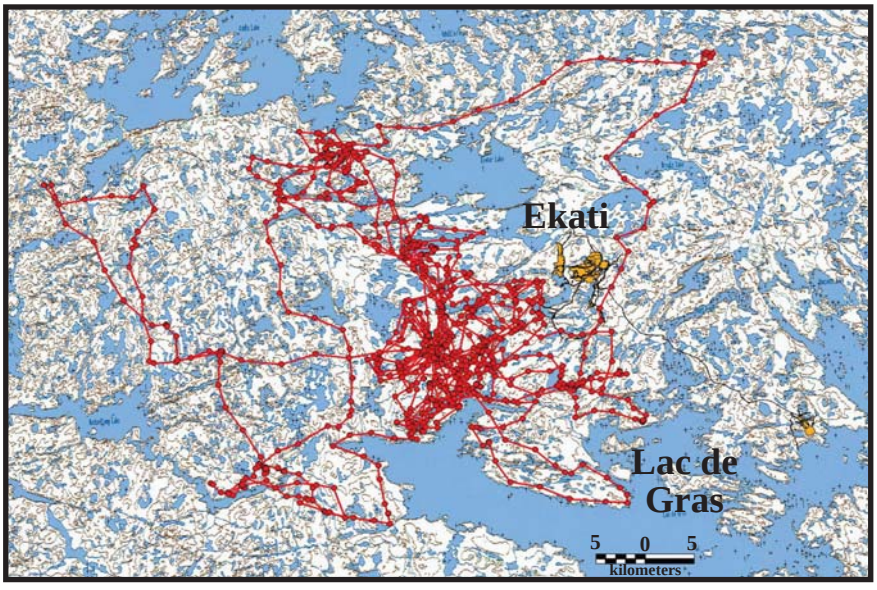
Distances traveled during journeys ranged from 120 km to 409 km, including the return. Maximum straight-line distances from the den were greatest the first trip and averaged about 75 km northeast from the den. This was in the direction where post-calving concentrations of caribou were located, which is likely the reason these journeys occurred.

An example of a journey is wolf #W397. This journey began on July 6th, 2004 and lasted five days and 7½ hours. During this time, the travel distance recorded (including return) was 226 km. Maximum straight-line distance from the den was 75 km. We recorded four distinct clusters during this movement but it is difficult to distinguish which clusters are resting sites and which could be predation sites.



Clusters on wolf #397 journey #1.

Location Clusters



Local den movements for wolf #392 west of Ekati ™ mine.

Clusters of locations also occur among the movements of wolves around the den. We use distance travelled between consecutive locations and their turning angles to distinguish between travelling, resting, and predation sites.

This technique needs some refinement, but we are confident we can separate these three different behavioral states. Identifying successful predation sites of wolves will help quantify predation rates and allow us to assess the impact of wolf predation on caribou.

Graduate Student Update

The Central Arctic Wolf Project has been fortunate to have top-notch graduate students from several universities. Lyle Walton was the first, and documented movements of wolves and their use of eskers for his Master of Science (M.Sc.) degree at the University of Saskatchewan in 2000. After a few years as a waterfowl biologist in northern Ontario, Lyle has shifted to studying wolves there.

Marco Musiani completed his Ph.D. at the University of Calgary in 2003 by studying the conservation biology and management of wolves and wolf-human conflicts in western North America. His specific research in the north analyzed the genetics of tundra and boreal wolves. Dr. Musiani went on to do his post-doctorate degree in Italy and is now an Assistant Professor at the University of Calgary.

Paul Frame undertook a challenging thesis program looking at responses of wolves to caribou migration patterns and disturbance by humans in the central arctic. Paul earned his M.Sc. at the University of Alberta in 2005 and is now a regional wolf biologist for the Department of Fish and Game in northern Idaho.

Inge-Jean Hanson is completing her M.Sc. degree at the University of Northern British Columbia. Inge-Jean is examining winter survey techniques of Bathurst caribou and the associated wolf distribution and abundance.

The next issue of Wolf Notes will feature more of the work of these outstanding students and update the Wolf Project's growing publication list.

Acknowledgments

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