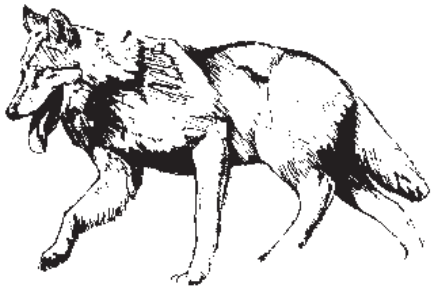
Resources, Wildlife and Economic Development
NORTHWEST TERRITORIES

WOLF NOTES



No. 7 by: Dean Cluff, Marco Musiani, Paul Frame, Paul Paquet and Cormack Gates Winter 2002/03

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

MULTIPLE LITTERS AT DEN SITES

Typically, a wolf pack is thought to have just one breeding pair, often called the alpha pair. However, there is growing evidence that this may not always be the case. Since 1997, we have documented some den sites in the Northwest Territories that had more than one female nursing pups. We don't know how common these multiple litters are for wolves, but we suspect this behavior is not new. We may be seeing this only now because of increased wolf den monitoring.

Of special note is a sighting this past summer by University of Alberta graduate student Paul Frame. Paul observed three female wolves caring for pups at each of two separate den sites north of the tree-line and east of Snap Lake. Three litters in one pack is very rare, but not unheard of. Triple litters at one den site have been reported for wolves in both Yellowstone and Denali National Parks in the United States.

These observations are of interest because they help us understand and predict the population dynamics of wolves. If more than one litter is produced at a den site and occurs regularly throughout the north, then this could influence how wolves respond to changes in their environment.

Wolves are known for their high reproductive potential and this may be one of the contributing factors. We will look for multiple litters again when we observe dens next summer.

Nursing females are identified by evidence of pups suckling, as seen above.

In This Issue

A Question of Disturbance

Wolves do not necessarily remain at one den or rendezvous site for an entire season. At any time wolves may relocate their den unexpectedly, but doing so can be a significant undertaking, especially if the pups are small and cannot travel on their own. If relocating a site affects the survival of pups, then doing so can have an impact on wolf numbers.

There are a range of disturbances wolves may be exposed to and these in turn can lead to a variety of responses. Individual wolves may also respond differently to the same stimulus. Often, relocating a home site is a response to a disturbance. However, when the disturbance is human-caused, the impact may be viewed differently than a non-human disturbance.

Perhaps then, it is not surprising to find conflicting results or differing opinions about the impacts of disturbance to wolves. Seldom are there sets of controlled experiments that can definitively determine what disturbance is significant and what is not. A research design that considers all these factors may still be affected by small sample size. Wolf dens in most areas are difficult to find and access for study.

Wolves denning on the tundra provide a unique opportunity to study disturbance. The treeless tundra allows an unobscured view of a wolf den from a distance. Remote observation can determine the various roles of the adults at the den and the number of pups present.

A pup solicits food from an adult.

While the vastness of the tundra landscape imposes logistic hurdles, the number of known active wolf den sites is relatively high and reasonable sample sizes can be achieved.

Disturbance studies are highly relevant to the north. Human activity on the tundra has increased significantly since the discovery of diamonds over a decade ago. Gold and base metal discoveries also contribute to exploration and development. Other activities such as outfitting and ecotourism put additional people on the land. The presence of people, their specific activities, and the infrastructure they require, all contribute to potential disturbances to denning wolves.

To help us address wolf den site disturbance, we enlisted the help of Paul Frame, a graduate (M.Sc.) student at the University of Alberta, and his supervisor, Dr. David Hik. Paul has considerable experience with wolves already, beginning with his B.Sc. at the University of Minnesota where he was involved in live-trapping wolves for a wolf/deer study. Paul gained further experience on the Mexican Wolf Recovery Project in Arizona and as a seasonal biologist for the Northern Rockies Wolf Recovery Project in Montana. Welcome aboard Paul!

Study Objectives

We are using den site observations and low intensity experimental disturbance to meet the following objectives:

1. Describe the behavioral responses of wolves to humans near the den.
2. Describe and measure changes in wolf behavior after disturbance.
3. Investigate whether packs respond differently as pups grow.

First Year Results

This summer we observed eight wolf dens and conducted a low intensity disturbance treatment at six of them. The field season started on June 6th and ended August 24th. Paul Frame and his assistants, Lorna Ruechel and Gudrun Pfluger, spent 52 nights in the field. A field camp was set up as temporary accommodations. On average, the distance of these field camps from the den was 2.7 km. An observation point was established a little closer to the den to watch wolves, but still remain hidden from view.

Top left: Adult male watches over the Box Lake den area. Above: Adult female and pups at Hilltop Lake den.

The average distance of the observation points from the den was 695 meters. Wolves were observed at dens near DeBeers Snap Lake Diamond Project (4 dens), BHP-Billiton Ekati™ Diamond Mine (2 dens) and Aylmer Lake Lodge (2 dens). We watched a total of 28 adults and 40 pups at these 8 dens.

The disturbance treatment was designed to mimic an event that may happen on the tundra such as someone accidentally walking up to an active wolf den. This person may be a tourist, sportsman, or a surveyor.

After initial observations, Paul would walk up to the den while the adults were present and record their responses in a tape recorder. A handheld Global Positioning System (GPS) receiver recorded Paul's location. Knowing Paul's location and that of the den allowed us to measure the distance that Paul was from the den when wolves responded to his presence.

Dens were always approached upwind of the den so the wolves could easily get Paul's scent. When wolves left the den site, Paul used a laser range finder to measure distances that wolves were from him when they stopped running, or when they first vocalized. Paul's assistants videotaped the response of wolves from the hidden observation point.

Results of the disturbance experiment are still being analyzed, but preliminary results indicate wolves are more likely to move pups later in the year when the pups are more mobile. Variability among packs is high so it will be important to visit several dens this coming summer.

One change we are considering for next year is to use remote, automatic video cameras to document when wolves return to the den after the disturbance treatment. At some dens this past year, wolves took several hours before they returned to the den site. A remote video camera would document when the wolves return with potentionally less intrusion by observers.

GPS Radio-Collars & Wolf Movements

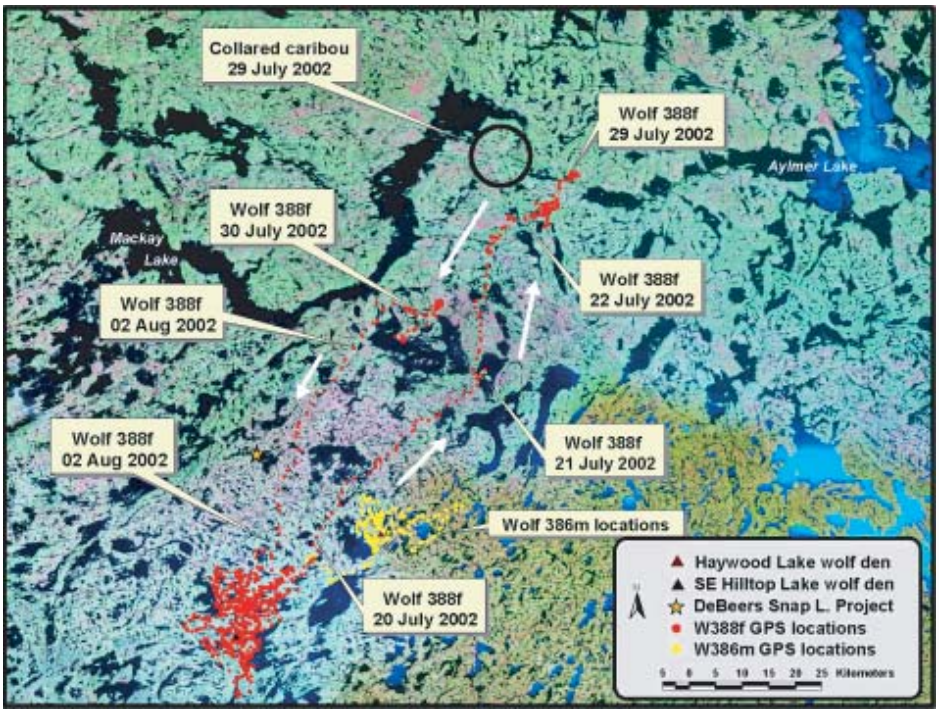
We deployed two conventional VHF radio-collars and three GPS radio-collars on wolves in June 2002. We have used VHF collars to monitor active wolf den sites each year but the GPS collars are a test effort to collect detailed locations from wolves during denning. The frequency and precision of locations from GPS collars allows detailed monitoring of wolf movements in areas having potential impacts from development.

The two VHF collars added to our existing sample of about 30 collared wolves. One VHF collar was deployed on a breeding female at a den site on the Snare River system northwest of Jolly Lake. The second VHF collar was fitted to a breeding female southeast of the Snap Lake area. This female was with a large male wolf, presumably her mate, and we collared him with one of the GPS radio-collars.

We had planned to deploy the three GPS collars on wolves denning on the Ekati™ claim block in support of our wolf observations there. The caribou survey that BHP Billiton conducts each year would also provide important information on caribou presence to relate to wolf activity. However, wolves were only at one den at the time of capture so we could only deploy one GPS collar at Ekati™. We did not find other wolves nearby, so we deployed the other two remaining GPS collars in the Snap Lake area to address our study questions there.

Wolf W385f captured and fitted with a GPS radio-collar.

Unfortunately, one of the two Snap Lake GPS collars (on wolf W386m) automatically released two weeks after it was put on, instead of the expected three months. Still, we recorded some interested movements in that time (see the map below).



Mapped GPS locations of wolf W386m (yellow dots) and wolf W388f (red dots) from two separate den sites south of the Snap Lake area. Note the trip - monitored for two weeks - that wolf W388f took in late July, likely to find caribou.

The second GPS collar collected 2,190 locations from 22 June through 20 August, including details of a trip more than 100 km from the home-site over 14 days (see the map above).

The GPS collar deployed near Ekati did not release in September and we were unable to retrieve it then. The collar was programmed to release once the power supply expired. This spring we hope to retrieve the collar when we re-visit the den site.

2002 Pup Counts

Rationale

We counted pups at dens to estimate the annual production of young and their recruitment into the population. In general, wolf pup survival can indicate a healthy food source for wolves. Demonstrating that wolves can successfully raise pups near mining activity would also suggest that any impacts to wolves associated with mine operations are likely negligible. However, the difficulty is that pup counts at dens tend to be extremely variable and typically range from no pups to eight. We even had one den with 15 pups in summer 2000! Perhaps the most telling situation, then, would be the scenario where pups failed to survive at a den several years in a row. While this scenario has not been observed, only annual routine monitoring could detect its occurrence.

We visited 13 active den sites in 2002 and counted 44 adult wolves and 64 pups. Therefore, we calculated an average of 3.4 adults and 4.9 pups per den this year. Keep in mind that these counts are conservative because they are often done from an airplane and occasionally some pups may not be seen. Good ground observations tend to overcome this problem, but doing so takes time, and counts at all sites might take two months to complete. At right is the list of active wolf dens where we looked for pups.

An adult brings food back to the den.

Pups at the Hilltop Lake den in late June.

Pack	Date	Type[1]	# Adults	# Pups
Haywood Lake	08 Jun	G	2	0
	23 Aug	A	2	0
Box Lake	19 Jun	G	6	6
Lockhart Lake	25 Jun	G	3	5
Hilltop Lake	02 Jul	G	4	11
	25 Sep	A	3	3
Lac de Gras North	14 Jul	G	3	1
	25 Sep	A	3	1
N Shore Lac de Gras[2]	10 Jul	G	2	3
	17 Jul	G	2	6
Rocky Lake	27 Jul	G	2	6
	22 Aug	A	3	4
Aylmer Lake West	10 Aug	G	5	9
Aylmer Lake South	22 Aug	G	3	2
N Thonokeid Lake	22 Aug	A	6	8
S Credit Lake	22 Aug	A	2	3
NE Mackay Lake	23 Aug	A	3	5

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

Wolf Migration Patterns & Caribou

Documenting and protecting important wildlife routes have long been goals of wildlife conservation and protected area strategies. Tundra wolves are important in the tundra ecosystem because they are strongly linked with barren-ground caribou, their main food source. Wolves follow these migratory caribou from the tundra in the summer to the forested areas south of the tree-line in winter.

Although people are aware that tundra wolves migrate with caribou, we currently have not documented critical migration routes of wolves or caribou. This is partly because of the huge area that these animals use and the logistics required to monitor them. Furthermore, the precise areas where caribou and wolves winter varies annually and migration routes or corridors, should they exist, could also vary.

Wolves are often considered "umbrella" species in conservation biology because their large ranges include many other animals and their own specific habitat needs. The NWT Protected Areas Strategy includes conserving biodiversity among its goals in setting aside protected areas. Therefore, preserving the integrity of caribou-wolf dynamics in the north will benefit other species too.

Indeed, the annual migration of caribou and wolves is a critical part of the northern caribou-wolf system. By association, wolf locations and their travel routes could also add to our interpretation of caribou movements.

So far, satellite radio-collars deployed on Bathurst caribou since 1996 have helped map seasonal movements, although the number of caribou monitored remains low (about 10/year).

In 1997 and 1998, 23 satellite radio-collars were collectively deployed on tundra wolves as part of a den ecology study initiated by the West Kitikmeot/Slave Study Society.

This wolf collaring effort effectively doubled the annual sample size for mapping the distribution of the Bathurst caribou herd for those years because these wolves were captured on the Bathurst range. However, these satellite radio-collars previously deployed on wolves had a lifespan of only one year, were imprecise, and were optimized for summer data collection during denning. Therefore, data collected during winter were sparse.

Caribou-wolf dynamics have a major impact on northern ecosystems.

This strong association between predator and prey needs further study because understanding its mechanisms would allow us to predict potential changes in caribou and wolf availability resulting from economic development or climate change in the north.

Quantifying the role of the wolf in influencing caribou movements and population dynamics is a long term goal that must be considered when managing the caribou resource. Mitigating landscape changes and adapting wolf and caribou management for commercial, recreational, and subsistence hunts also depend on this information.

Movement Studies Results

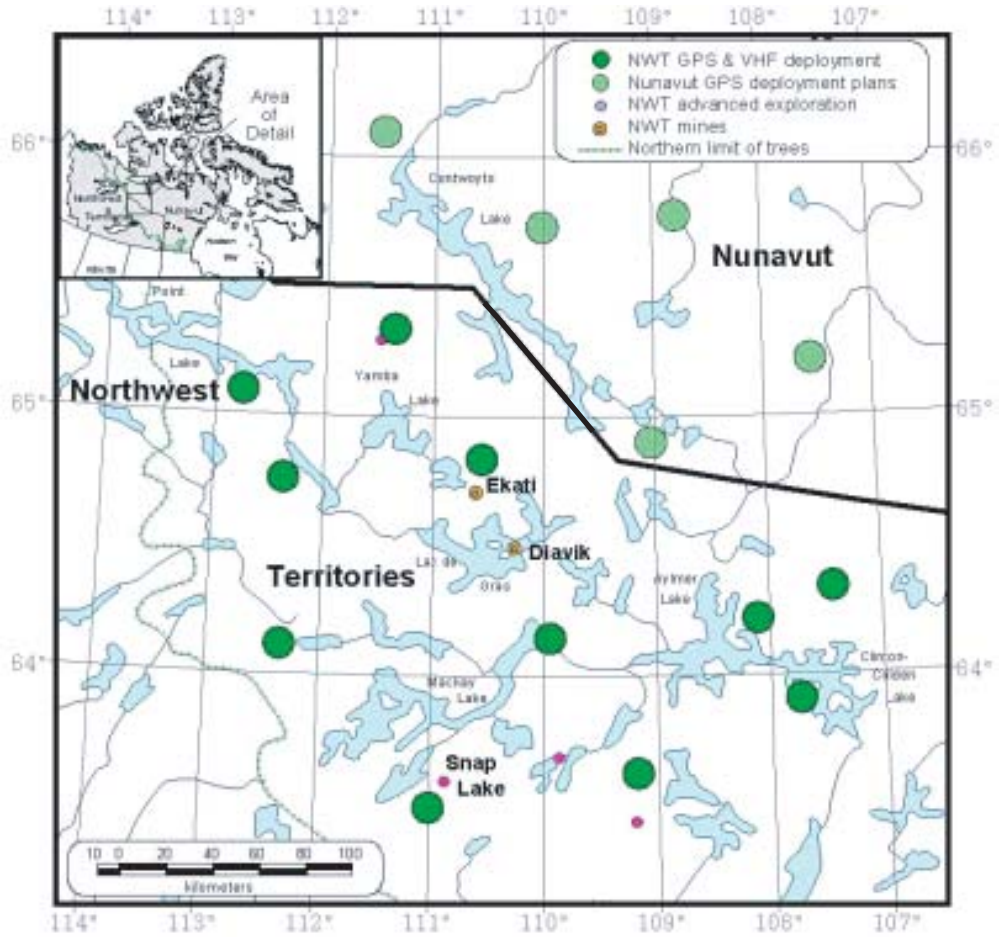
Wolves radio-collared in the late 1990s have revealed some wintering areas of the Bathurst caribou that were not indicated by the collared caribou. The satellite collars on wolves have since been removed and replaced by conventional VHF radio-collars. However, the signal range for VHF collars is limited to less than 50 kilometers and locations must be gathered using aircraft at high cost. Weather limitations and reduced daylight in winter further reduce tracking opportunities. Despite the limited number of locations that we obtained, wolf movement data are effectively assisting in mapping wolf and caribou winter distribution.

The VHF collars alone do not allow us to assess the areas used seasonally by Bathurst wolves and associated caribou. A larger, more rigorous sampling regime is necessary to employ recent analytical methods determining space use. Correctly modeling the use of space by wolves requires many locations that represent the full range of space use. This, in turn, requires that locations of wolves are collected throughout the range of times, seasons, and activity periods likely to affect their movements. To date, this has not been done for wolves in the Northwest Territories or Nunavut.

Recently, our existing wolf movement data has contributed to a statistical modeling effort by researchers at the University of Alberta so we can better describe the relationship between wolf locations and various features on the landscape. Results are preliminary, although it is clear that responses of wolves to vegetation and caribou do exist. Further analysis is underway to look at possible influences of human disturbance on wolf distribution.

We need to follow up on these earlier results so we plan to monitor individual wolves again but over a 2-year period. We propose to spread out geographically (in the NWT and Nunavut) our deployment of GPS satellite collars so to traverse the Bathurst caribou herd range and its overlap area with the Ahiak (formerly Queen Maud Gulf) and Beverly caribou herds.

Monitoring wolves in this manner will provide movement data to better identify migration routes or corridors for both wolves and caribou. In addition, the possibility that economic development has measurable effects on the movement of wolves can be investigated further.



Possible GPS collar deployment areas for wolves.

Acknowledgments

We thank the Government of the Northwest Territories (Resources, Wildlife and Economic Development), Indian and Northern Affairs Canada, and World Wildlife Fund (Canada) for major on-going funding and support. DeBeers Snap Lake Diamond Project, Ekati™ Diamond Mine, and Diavik Diamond Mine greatly assisted our efforts with logistic planning and field support. Dr. David Mech gratiously provided us with the three GPS radio-collars we deployed in 2002. Dave Olesen and Angus Charlo at Air Tindi Ltd. skilfully assisted us with wolf sightings, aerial radio-tracking, and pup counts. Great Slave Helicopters helped with our wolf capture. We appreciate the efforts of the wildlife officers and agency officials who continue to sample wolf pelts from hunters for genetic analysis. Robert Mulders, Ray Case, and Rob Gau provided comments and assistance throughout this study. We are grateful to these companies, agencies, and individuals, many of whom are represented by the logos below for their financial or logistical support.

Northwest Territories Resources, Wildlife and Economic Development

bhpbilliton

WWF CANADA

SNAP LAKE DIAMOND PROJECT DE BEERS

DIAVIK DIAMOND MINES INC.

AYLMER LAKE LODGE

UNIVERSITY OF CALGARY

UNIVERSITY OF ALBERTA

UNIVERSITA DEGLI STUDI DI ROMA LA SAPIENZA

International Wolf Center

bio-diversity grants

Paquet Wildlife Fund

John/Paul & Associates

NSERC CRSNG

THE KILLAMS

Alberta Conservation Association

MOUNTAIN EQUIPMENT CO-OP

Indian and Northern Affairs Canada / Affaires indiennes et du Nord Canada — Canada

Consiglio Nazionale delle Ricerche

For More Information, Contact:

THE NWT WOLF PROJECT 2002-03

Dean Cluff, Department of Resources, Wildlife, & Economic Development, GNWT, Yellowknife, NT X1A 2P9
(867) 873-7783 (tel) (867) 873-6230 (fax) email: dean_cluff@gov.nt.ca

Paul Paquet, John/Paul & Associates, Box 150, Meacham, SK S0K 2V0
(306) 376-2065 (tel) (306) 376-2015 (fax) email: ppaquet@sasktel.net

Marco Musiani, Faculty of Environmental Design, University of Calgary, Calgary, Alberta. T2N 1N4
(403) 283-6803 (tel) (403) 289-6205 (fax) email:mmusiani@ucalgary.ca

Paul Frame, Department of Biological Sciences, University of Alberta, Edmonton, AB T6G 2E9
(780) 492-1295 (tel) (780) 492-9234 (fax) email: pframe@ualberta.ca

Cormack Gates, Faculty of Environmental Design, University of Calgary, Calgary, Alberta. T2N 1N4
(403) 220-3027 (tel) (403) 284-4399 (fax) email:ccgates@nucleus.com

This newsletter is now available on the GNWT's Department of Resources, Wildlife and Economic Development main web site at: www.nwtwildlife.rwed.gov.nt.ca/ or www.nwtwildlife.com/