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POPULATION ECOLOGY OF WOLVES IN GATES OF THE ARCTIC NATIONAL PARK AND PRESERVE,
ALASKA-1988 PROGRESS REPORT

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BACKGROUND

In 1986, the National Park Service (NPS) and Alaska Department of Fish and Game (ADF&G) initiated a study to determine the demography and distribution of wolves in and adjacent to Gates of the Arctic National Park and Preserve (GAAR), Alaska and to assess the harvest of wolves from this population. Wolves are harvested within the park by subsistence users primarily from the villages of Anaktuvuk Pass, Bettles, and Wiseman. In preserve areas and adjacent to the park, GAAR wolves are harvested by subsistence users as well as sport hunters. Prior to this study, little information existed to determine wolf abundance or to enumerate the harvest.

In addition to the major thrust of the project described above, wolf food habits and prey relationships are being evaluated. The relationships between wolves in GAAR and the migratory Western Arctic and Central Arctic caribou herds, which utilize GAAR seasonally, are of primary interest. Increased understanding of these relationships will allow managers to evaluate the importance of migratory caribou to the GAAR wolf population and assess the influences that changes in caribou population size and/or distribution may have on the resident wolf population. During 1988, a study plan was developed describing the research that will begin in 1989 (Dale et al. 1989).

Results of study efforts during 1986 and 1987 have been reported by Adams and Stephenson (1986,1988). This report details work completed during 1988.

OBJECTIVES

1. Estimate population size and distribution of wolves.
2. Determine present wolf harvest levels and characteristics (such as age and sex composition, method and season of take, etc.) in and adjacent to GAAR.
3. Determine pack sizes, litter sizes, mortality rates, causes of mortality and dispersal characteristics for several study packs.
4. Determine pack territories, den sites, and rendezvous sites for several study packs.
5. Assess seasonal food habits of wolves and evaluate predator/prey relationships.

METHODS

WOLF CAPTURE

Fourteen additional wolves were instrumented during 3-11 April 1988. Due to poor snow-tracking conditions in early April, most of the capture effort focussed on placing additional radio-collars in previously instrumented packs. However, 2 wolves were radio-collared in the lower North Fork of the Koyukuk River, and 1 wolf was captured south of the park boundary in Upper Mettenphery Creek, where wolves had not been captured previously.

Wolves were captured using standard helicopter darting techniques. Five mL of a ketamine/xylazine mixture (160 mg ketamine and 25 mg xylazine/mL in a 20% propylene glycol solution)/dart was used for all captures. Wolves that began to recover their mobility during handling were given 200-400mg of additional ketamine. Once immobilized, wolves were radio-collared and eartagged. Each wolf was weighed and physical measurements were taken. Wolves were examined to determine overall body condition and the presence of injuries. Their teeth were examined to determine the extent of wear and breakage and to estimate their age. A 30 mL blood sample was drawn from the cephalic vein of each wolf for hematology and serology analyses. Each animal was administered 5-7 mL of penicillin (300,000 IU/mL) to prevent or minimize capture related infections. Once the processing was completed, each wolf received 0.15 mg yohimbine hydrochloride/kg of body weight to antagonize the xylazine effects (Kreeger et al. 1987).

RADIOTELEMETRY

Instrumented wolves were located during approximately 1 week/month during the year, except that 2 1-week long radio-tracking trips were conducted in the beginning and end of September, and no radio-tracking was conducted during October and December. We attempted to locate wolves several times during each week of radio-tracking. When instrumented wolves were located, we recorded the age/color composition of wolves observed, location and habitat characteristics, wolf activity, and the presence/species of kills. During May-August, we also attempted to locate active dens. All locations were plotted on 1:250,000 U.S.G.S topographic maps.

HARVEST EVALUATION

ADF&G pelt sealing records were analyzed to determine the harvest in and adjacent to GAAR and provided information primarily on harvest of subsistence users south of the Brooks Range and sport hunters. In Anaktuvuk Pass, a village elder recorded wolf harvest by village residents and purchased carcasses. A few carcasses were also purchased from southside hunters/trappers. Carcasses were analyzed to evaluate age/sex composition of the harvest and the physical and reproductive condition of the wolf population.

FOOD HABITS DETERMINATION

Once dens and rendezvous sites were abandoned in the late summer, scats were collected and prey remains inspected at those sites. Kills that radio-collared wolves were located at were recorded throughout the year. In addition, muscle samples from wolf carcasses purchased from hunters/trappers were analyzed for radiocesium burdens to evaluate the importance of caribou in the winter diet of these wolves.

RESULTS AND DISCUSSION

1988 CAPTURES

During 3-11 April 1988, 14 wolves were instrumented within the study area (Fig. 1), for a total of 44 during the course of the study (Table 1). The standard dose of 800 mg ketamine and 125 mg xylazine per dart worked well and 13 of the 14 wolves were immobilized with 1 dart. Induction times averaged 7.4 minutes

for wolves immobilized with 1 dart in 1988 (Table 1). The wolf that was darted twice showed no response to the first dart but was rapidly induced following the second dart.

Physical characteristics of all wolves captured during the study are summarized in Table 2.

RADIO-COLLARED WOLVES

During 1988, radio-locations were obtained on 61 days during 10 radiotracking bouts ranging from 5 to 15 days in length ($\bar{x} = 6.9$ days). A total of 539 radio-locations were accumulated for the 38 instrumented wolves monitored during the year. Of the 30 wolves radio-collared in April 1987, 24 were present in the study area at the beginning of 1988 (Table 3). Eighteen of these wolves survived and remained within the study area throughout 1988 and were located an average of 18 times (range: 13-23 locations). Eleven of the 14 wolves captured in early April 1988 remained in the study area throughout the year and were located an average of 15 times (range: 11-20 locations).

During 1987-88, we have monitored 17 pairs or packs arising from the wolves radio-collared in 1987 and have located each of these associations an average of 43 times (range: 17-76 locations). Nine packs have been monitored during the entire study, averaging 54 locations (range: 36-76 locations).

At the end of 1987, 25 instrumented wolves, organized in 20 associations (individuals, pairs or packs) comprising 114 wolves total, could be accounted for in the study area (Table 4, Fig. 2, Adams and Stephenson 1988). By 11 November 1988, the last day we radio-tracked, after capturing an additional 14 wolves, we still had 25 instrumented wolves in the study area (Table 5). These wolves were organized into 18 associations comprising 112 wolves.

Instrumented Wolf Association Summaries (Refer to Table 4, Fig. 2)

Iniakuk Pack: Wolf 301, his black mate, and 4 black pups continued to inhabit the Alatna drainage, from Takahula Lake to nearly the mouth of the Malamute Fork, during early 1988 (Fig. 3). On 5 April, the black alpha female (335) was captured and radio-collared. The radio-collared alpha pair were seen with

another black wolf into August. Pups were observed at a rendezvous site in the vicinity of Island Lake in July and August. Subsequently, 6 black pups were observed with 301 on 22 September. Seven wolves (1 grey, 6 blacks) were observed in this pack during mid-November.

Hunt Fork Male: The Hunt Fork Male (302), who was originally captured with 301 near Pamichtuk Lake, was located in the Upper Karupa River in November 1987 with another grey wolf. This pair, renamed the Karupa Lake Pair continued to inhabit the area around Karupa Lake throughout the year (Fig. 4). No pups were observed.

Tinayguk Pack: Six wolves (2 greys, 4 blacks) were observed in this pack throughout the fall-early winter 1987. In January 1988, only 3 wolves (1 grey, 2 blacks), including a radio-collared yearling female (304), could be accounted for. The other radioed wolf from the pack (303), a young adult male, has not been located since November 1987. During February to early April, Wolf 304 was located alone on all 5 occasions. From May to September, 304 was seen with a grey wolf on 4 occasions, and a black wolf on 1 occasion. In early September, 1 grey pup was observed with 2 of the adults on one occasion. Since then, 1 grey and 2 blacks have been regularly observed. During 1988, Wolf 304 and her associates have inhabited primarily the Tinayguk River drainage, with occasional radio-locations on the John and Anaktuvuk Rivers (Fig. 5).

Agiak Pack: This pack was composed of 5 grey and 5 black wolves in November 1987, including 305, a grey yearling male, and 316, the black alpha female. By mid-January, only 5 wolves (4 greys, 1 black) including the 2 radio-collared wolves, could be accounted for. Four wolves were harvested within the range of this pack in the intervening period. On 4 April, a grey female pup (333) was radio-collared in this pack. The pack denned in the Hunt Fork drainage and 8 pups (7 greys, 1 black) were observed on 8 August. Twelve wolves (10 greys, 2 blacks) made up the pack throughout the fall and early winter. On 28 November, 3 wolves (2 greys, 1 black) including 316 were trapped near Masu Creek. Throughout the year, the Agiak Pack inhabited the upper John River and Hunt Fork drainages (Fig. 6).

Wolf 305, the Agiak Yearling, was not seen with the rest of the pack after January. He maintained an adjacent, but overlapping territory to the southeast, in the Crag Peak-Pamichtuk Lake area (Fig. 6) and bounded by the territories of the Tinayguk and Allen River Packs, and was accompanied by another grey wolf throughout the year. The companion, a yearling female (339), was captured and radio-collared on 4 April. They were joined by a black wolf in mid-summer and have been referred to as the Agiak Trio since. They apparently did not produce pups.

Sixtymile Pack: Seven grey wolves, including 1 radio-collared yearling male (323) made up the Sixtymile Pack in late 1987. In January and February 1988, 6 greys could be accounted for. Wolf 323 was last located in the study area on 25 February 1988. He was subsequently harvested on the Okpilak River on the Arctic National Willife Refuge by a hunter from Kaktovik on 26 April 1988. The remaining pack members were located by snow-tracking in early April, and on 9 April, a female pup (342) and adult female (343) were captured and instrumented. These wolves were not observed with other wolves until 2 September when 7 grey pups were seen with them. The pack totalled 9 grey wolves in mid-November 1988. Radio-locations of these wolves were within the 1987 range of the Sixtymile Pack, primarily in the Sixtymile Creek, Wolverine Creek, and Upper Iniakuk River Drainages (Fig. 7).

Sixtymile Female: Wolf 306 disappeared from the Sixtymile Pack in August 1987 and was relocated alone in November 1987 in the Alatna Hills in the headwaters of Henshaw Creek. In January, her collar was transmitting a mortality signal in the vicinity of the south end of Iniakuk Lake. Her death was not investigated until February when it was determined that she had been snared.

Okomilat Pack: Wolf 307 and 6 other grey wolves comprised this pack in late 1987. During the late winter, Wolf 307 was located with 2 to 4 associates and they continued to inhabit the Upper Okimilat drainage (Fig. 8). On 9 April, a male pup (341) was radio-collared in this pack. He was last located on 3 June and has apparently dispersed. The pack produced 4 grey pups at a den in the

Okmilat River drainage. During fall and early winter, the pack has consisted of 7 wolves.

Killik Pack: Nine grey wolves, including 2 radio-collared females (308,318) comprised this pack in November 1987. During January-March 1988, 5 to 7 wolves were accounted for. They continued to inhabit the southwestern branches of the Upper Killik River (Fig. 9). Wolf 318 slipped her collar in mid-summer. Although no den was located for the pack, 5 grey pups were seen in early September. Since then, the pack has been comprised of 11 greys.

Wild River Pack: The Wild River Pack, 6 greys including Wolf 309, inhabited the most of the Wild River drainage during 1987 and the beginning of 1988 (Fig. 10). Four members of this pack were shot by a land-and-shoot wolf hunter on 26 February 1988. Wolf 309 survived and continued to occupy the previous pack territory. She was observed with another grey wolf on 5 July 1988. She was last observed alive on 9 July 1988. By the next radio-tracking trip, in early August, she had died near the outlet stream from Wild Lake. When investigated, the carcass was decomposed and the cause of death could not be determined.

Clear River Male: Since October 1987, Wolf 310, a grey male, has been accompanied by another grey wolf and has inhabited the Upper Clear River (Fig. 11). On 7 April 1988, the other wolf, an adult female (338) was captured and instrumented. Although four grey pups were seen in July, this pack, renamed the Chimney Pass Pack, totalled only 3 wolves during the remainder of the year.

Clear River Female: Wolf 311 was alone during the last half of 1987, but accompanied by 2 black wolves during early 1988. After February, only 1 of the black wolves remained with 311. She was observed with 2 grey pups in early September. Since then, what is now called the Eroded Mountain Pack, has included 311, her black mate, and 1 additional grey, apparently the only surviving pup. They have inhabited the area around the confluence of the North Fork, Tinayguk, and Clear Rivers (Fig. 12).

Tulilik Pack: The Tulilik Pack contained 13 grey wolves in November 1987, including 2 radio-collared wolves (312-male pup, 322-adult female). Wolf 312 was last observed in the study area on 17 January 1988. He was subsequently located on the Ribdon River, Arctic National Wildlife Refuge, on 25 March 1988. During February through April 1988, 9 wolves remained in this pack. On 6 April 1988, a yearling male (335) was radio-collared. Five grey pups were observed on 9 August 1988, accompanied by 7 adults. Wolf 335 was last located on 1 September 1988. The pack totalled 12 wolves during early winter 1988 and inhabited the Killik River and the Easter Creek drainages throughout the year (Fig. 13).

Akmalik Pack: In January 1988, the Akmalik Pack included 3 greys and 5 blacks, including 2 radio-collared wolves (313-black adult male, 314-grey adult female). Four pups, 2 grey and 2 black, were observed on 5 August 1988. Wolf 314's radio-collar was last heard on 3 September 1988. She was subsequently observed in the pack with the non-functional radio-collar. In mid-November the pack was made up of 9 wolves including 4 greys and 5 blacks. Throughout the year, the pack inhabited the Killik River drainage near the northern boundary of GAAR (Fig. 14).

Nahtuk Male: In November 1987, Wolf 317 was found in the Upper Kobuk River drainage above Walker Lake, accompanied by a black wolf. They continued to inhabit the area around Walker Lake throughout the year (Fig. 15) and in September were observed with 1 grey and 4 black pups. The Walker Lake Pack was composed of 2 greys and 4 blacks in mid-November 1988.

Unakserak Pack: Wolf 326 (grey yearling male) and 15 greys made up the Unakserak Pack during winter 1987-88. On 6 April 1988, two adult females (336 and 337) were captured and radio-collared. Until late summer, 12 adults could be accounted for and 5 grey pups were observed in August 1988. Wolf 326 was last located on 3 September 1988 with 11 adults, including the other radio-collared wolves, and 5 pups. Since then, 13 wolves were the most accounted for at one time. The pack has inhabited the Alatna River and Unakserak River drainages throughout 1988 (Fig. 16).

Shivering Mountain Pack: In November 1987, the Shivering Mountain Pack included Wolf 320 (adult black female), another black wolf and 3 grey wolves. At that time, one of the greys was limping badly and could not keep up with the remainder of the pack. In January 1988, only 2 blacks and 2 greys remained. These 4 wolves were observed together through the end of February. After that, Wolf 320 was observed alone until early May when she was accompanied by a grey wolf. Her locations during 1988 were in Upper Easter Creek primarily (Fig. 17). Wolf 320 was dead by 31 May 1988, when next monitored. The cause of her death could not be determined.

Publituk Male: Wolf 324, an old grey male, initially captured from a pack of 10 wolves, was alone on all radio-locations from 16 April 1987. He inhabited the upper Allen River and Wild Lake area for the most part. He was last located alive on 27 February 1988. He was dead by 25 March 1988, when next monitored, and had been killed by other wolves.

Allen River Pack: The Allen River Pack was composed of 3 grey wolves, including Wolf 325, a radio-collared grey yearling female, during winter 1987-88 until 25 February 1988, when only 2 greys were observed. This pair was observed together regularly throughout the year and in September were accompanied by 2 grey pups. These 4 greys were located together in mid-November 1988, and the pack inhabited the Allen River and adjacent Tinayguk River-Wolf Creek area throughout the year (Fig. 18).

Redstar Female: Wolf 327, a grey adult female, was originally captured from a pack of 4 in the vicinity of Tobin Mountain. After mid-April 1987, she was observed alone throughout the Wild Lake-John River area and was located as far south as the South Fork of the Koyukuk River. She was observed in early 1988 on the Koyukuk River near the mouth of the North Fork. She died between 18 January and 25 February 1988 near the mouth of Michigan and had been killed by wolves, within the territory of the Wild River Pack.

Hanging Glacier Pack: Seven wolves (3 greys, 4 blacks), including Wolf 330, a black adult female, constituted the Hanging Glacier Pack in November 1987. During January through March 1988, only 2 greys and 3 blacks could be accounted

for. On 3 April 1988, Wolf 331, a grey adult male, was captured and radio-collared. The radio-collared wolves were located with an additional grey adult throughout the summer, and on 10 July 1988, 5 pups (4 grey, 1 black) were observed. By mid-November 1988, 5 greys and 4 blacks made up the pack. The Hanging Glacier pack ranged throughout the upper North Fork-Ernie Creek area during the year (Fig. 19).

Malamute Fork Female: Wolf 340, a dark brown female pup, was captured south of Deadman Mountain, on 8 April 1988. She was alone at the time but in the same vicinity where 4 wolves had been killed by land-and-shoot hunters. She remained by herself until 8 July 1988, when she was accompanied by a black wolf. They were observed together in the Malamute Fork of John River-Deadman Mountain area throughout the remainder of the summer (Fig. 20), but 340 was alone in November 1988.

Koyukuk Pack: On 3 April 1988, a grey female pup (332) was captured from a pack of 4 greys near Alder Creek on the lower North Fork of the Koyukuk River. A week later, a grey adult male (344) was captured from a pack of 5 greys in the same area. At the time, we assumed that these wolves were from the same pack. Wolf 332 was last located in the area on 11 April 1988. Wolf 344 was located alone throughout most of the year in the lower North Fork drainage (Fig. 21) although he was seen with another grey wolf in August 1988, and was observed with a single black pup on 3 occasions in September. He was alone on 2 observations in mid-November.

PUP PRODUCTION

Of the 19 pairs or packs expected to have litters, we know that 15 produced a total of 64 pups (Table 4). No pups were found for the Karupa Lake Pair, Agiak Trio, remnant Wild River Pack, or Malamute Fork Pair. For the remaining packs, late summer minimum litter size averaged 4.3 pups/litter (range: 1-8 pups) which was similar to the 3.9 pups/litter in 1987. Eleven packs produced ≥ 4 pups. The 4 associations producing small litters of 1 or 2 pups were all pairs (Tinayguk, Eroded Mountain, Allen River, and Koyukuk).

MORTALITIES/DISPERSALS OF RADIO-COLLARED WOLVES

Of the 44 wolves radio-collared to date, 25 were known to be alive and in the study area as of the end of 1988 (Tables 3 and 5). One wolf slipped its radio-collar in mid-summer 1988. Of the remaining 18, 8 have died, including 4 that were harvested and 4 that died of natural causes. Four wolves that were missing have subsequently been located elsewhere, and are therefore known to have dispersed from the study area. Two of these wolves were found within the Arctic National Wildlife Refuge and the remaining 2 were located in northern Yukon Territories of Canada, all to the east of the study area. Six wolves are missing and their fate is unknown. These wolves have probably dispersed, but could represent radio failures and/or mortalities.

WOLF HARVEST

During the 1987-88 winter, 38 wolves were harvested by residents of Anaktuvuk Pass (Table 6) including 25 that were taken within the boundaries of GAAR. The harvest was less than that determined for the 2 previous winters (57 in 1985-86, and 42 in 1986-87, Tables 7 and 8) and has averaged 46 wolves over the 3 winters. Harvest within GAAR has averaged 23 wolves/winter.

Harvest reported by hunters/trappers not from Anaktuvuk Pass, totalled 28 wolves for minor drainages within 32 km (20 mi) of GAAR (Table 9). Only 1 of these wolves was reported taken in a minor drainage unit for which more than 50% of the unit was within GAAR. Most of this harvest occurred during March, south of GAAR in the general vicinity of Bettles, and was reported by land-and-shoot hunters. The harvest reported during winter 1987-88 was greater than that of each of the 3 previous winters (Tables 10,11,12).

CARCASS ANALYSES

During winter 1987-88, carcasses of 27 of the 38 wolves harvested by Anaktuvuk Pass residents were purchased and analyzed (Table 13). Pups accounted for 52% of the carcasses purchased, lower than that reported during the previous winters (1985-86 75%, 1986-87 66%, Adams and Stephenson 1988). At the beginning of the winter, the population was about 40% pups and therefore, pups were overrepresented in the harvest by 30%.

FOOD HABITS

In late summer 1987 and 1988, 2,056 scats were collected at dens and other homesites. Those scats were analyzed and a preliminary summary of results provided here (Table 14). Ungulate remains occurred in 73% of the scats analyzed, including caribou (25%), moose (23%), Dall's sheep (18%), and unidentified ungulate (7%). Caribou and sheep were major components for both north and south side homesites, but composed a greater proportion of diets of north side packs. Moose were most important for south side packs and were a relatively small component of the diet for north side packs. Important small prey were beaver (5%) and snowshoe hare (4%). The appearance of bear (grizzly and black) and wolf remains (< 1% for each) in the scats were of interest. Remains of a 5-10 week-old wolf pup were found in scats from 1987 for the Tinayguk Pack, and other wolf remains were noted in scats from 4 other homesite collections.

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Table 1. Immobilization results for wolves captured by helicopter darting during spring 1987 and 1988 in and adjacent to Gates of the Arctic National Park and Preserve, Alaska.

Ear Tag Number	Capture Date	Air Temp. (°C)	Sex	Age ¹	Weight (kg)	Darts	Ketamine (mg)	Xylazine (mg)	M99 (mg)	Time to 1st Effect (min)	Induction Time (min)	Drug Effect ²	Muscle Relaxation ³
301	03/28/87	-6	M	PA	50.9	1	647	95	-	-	-	5	1
302	03/28/87	-6	M	YA	51.8	1	647	95	-	-	4.00	5	1
303	03/28/87	-4	M	YA	50.9	1	647	95	-	5.98	7.86	5	1
304	03/28/87	-4	F	P	34.5	1	647	95	-	-	4.72	5	1
305	03/29/87	-4	M	P	45.5	1	745	95	-	-	2.27	5	1
306	03/30/87	-9	F	PA	47.3	1	745	95	-	3.10	8.67	3	3
307	03/30/87	-12	M	PA	45.5	1	745	95	-	-	-	5	1
308	03/30/87	-12	F	PA	44.5	1	745	95	-	2.62	-	5	1
309	04/01/87	-7	F	OA	40.0	1	745	95	-	4.15	12.15	5	1
310	04/01/87	-12	M	PA	52.3	1	745	95	-	-	3.05	5	1
311	04/01/87	-12	F	Y	37.3	1	745	95	-	-	-	5	1
312	04/01/87	-8	M	P	40.9	1	745	95	-	1.18	7.65	3	1
313	04/01/87	-8	M	PA	48.2	1	745	95	-	14.57	-	5	1
314	04/01/87	-8	F	PA	38.2	2	1490	190	-	-	-	-	-
315	04/02/87	-9	M	YA	42.7	1	730	130	-	7.62	-	3	3
316	04/02/87	-	F	YA	41.8	1	730	130	-	-	7.32	5	1
317	04/02/87	-	M	Y	43.6	1	730	130	-	-	5.05	3	1
318	04/03/87	-28	F	YA	40.9	1	730	130	-	-	-	3	-
319	04/04/87	-26	F	Y	34.1	3 ⁴	-	50	2.0	-	-	1	3
320	04/04/87	-26	F	YA	38.6	1	584	104	-	-	3.22	-	-
321	04/04/87	-29	M	P	45.5	1	584	104	-	-	-	1	3
322	04/06/87	-6	F	PA	42.7	1	730	130	-	-	5.23	1	3
323	04/06/87	-7	M	P	45.5	1	730	130	-	1.10	5.85	2	3
324	04/06/87	-	M	OA	50.9	1	730	130	-	-	2.60	5	1
325	04/06/87	-15	F	P	27.3	1	584	104	-	-	-	4	2
326	04/07/87	-4	M	P	37.7	1	-	50	2.0	-	4.32	5	1
327	04/07/87	-	F	PA	33.6	2	-	100	4.0	-	32.08	5	1

Table 1 continued.

Ear Tag Number	Capture Date	Air Temp. (°C)	Sex	Age ¹	Weight (kg)	Darts	Ketamine (mg)	Xylazine (mg)	M99 (mg)	Time to 1st Effect (min)	Induction Time (min)	Drug Effect ²	Muscle Relaxation ³
328	04/07/87	-	M	Y	42.7	2	-	100	4.0	-	24.45	4	1
329	04/08/87	-	M	Y	41.8	1	-	50	2.5	1.25	7.75	4	1
330	04/08/87	-8	F	OA	37.3	1	-	-	2.5	-	6.33	4	2
331	04/03/88	-34	M	PA	46.4	1	800	125	-	7.67	11.50	1	3
332	04/03/88	-23	F	P	37.3	1	800	125	-	3.32	6.65	5	1
333	04/04/88	-32	F	P	32.7	1	800	125	-	2.75	3.83	5	1
334	04/05/88	-	F	PA	43.6	2	1600	250	-	-	26.83	5	1
335	04/06/88	-29	M	Y	37.3	1	800	125	-	1.67	3.00	5	1
336	04/06/88	-21	F	PA	42.3	1	800	125	-	-	4.58	4	1
337	04/06/88	-21	F	PA	40.9	1	800	125	-	-	-	4	1
338	04/07/88	-21	F	PA	40.0	1	800	125	-	2.67	5.08	4	1
339	04/08/88	-21	F	Y	39.1	1	800	125	-	1.42	4.67	5	1
340	04/08/88	-15	F	P	33.6	1	800	125	-	5.25	25.25	2	2
341	04/09/88	-22	M	P	35.0	1	800	125	-	3.67	4.58	4	1
342	04/09/88	-	F	P	27.3	1	800	125	-	-	4.92	3	2
343	04/09/88	-	F	PA	36.4	1	800	125	-	-	-	5	1
344	04/11/88	-	M	PA	44.5	1	800	125	-	3.50	-	3	1

¹ Age: P = pup; Y = yearling; YA = young adult; PA = prime adult; OA = old adult.

² Drug Effect: 1 = light - 5 = heavy.

³ Muscle Relaxation: 1 = very good - 4 = very poor.

⁴ Two darts did not inject due to freezing.

Table 2. Physical characteristics of wolves captured during Spring 1987 and 1988 in and adjacent to Gates of the Arctic National Park and Preserve, Alaska.

Ear Tag Number	Capture Date	Sex	Age ¹	Color	Weight (kg)	Body Length (cm)	Chest Girth (cm)	Tail Length (cm)	Canine		
									Length (mm)	Depth ² (mm)	Width ³ (mm)
301	03/87	M	PA	grey	50.9	149	78	48	31.5	16.8	12.3
302	03/87	M	YA	grey	51.8	138	77	54	29.7	16.4	13.1
303	03/87	M	YA	black	50.9	143	77	50	30.9	15.8	10.8
304	03/87	F	P	black	34.5	134	69	51	23.2	12.2	9.3
305	03/87	M	P	grey	45.5	140	69	50	27.1	14.5	10.5
306	03/87	F	PA	grey	47.3	132	75	49	27.2	14.7	9.5
307	03/87	M	PA	grey	45.5	131	76	49	29.6	15.4	9.9
308	03/87	F	PA	grey	44.5	128	74	47	34.4	16.6	13.5
309	04/87	F	OA	grey	40.0	133	74	43	23.0	14.2	10.7
310	04/87	M	PA	grey	52.3	144	-	46	32.5	17.3	12.3
311	04/87	F	Y	grey	37.3	135	81	50	27.5	14.2	10.2
312	04/87	M	P	grey	40.9	127	77	51	27.2	14.5	10.0
313	04/87	M	PA	black	48.2	139	81	41	30.0	15.0	9.0
314	04/87	F	PA	grey	38.2	125	77	47	27.6	14.0	9.2
315	04/87	M	YA	black	42.7	132	78	52	30.8	15.5	11.4
316	04/87	F	YA	black	41.8	133	72	46	28.7	14.4	9.7
317	04/87	M	Y	grey	43.6	133	76	56	32.6	16.5	11.8
318	04/87	F	YA	grey	40.9	-	-	-	-	-	-
319	04/87	F	Y	grey	34.1	131	75	45	24.8	12.2	8.5
320	04/87	F	YA	black	38.6	122	72	45	27.5	14.6	10.2
321	04/87	M	P	grey	45.5	144	76	54	26.2	14.5	11.6
322	04/87	F	PA	grey	42.7	132	71	45	26.6	15.7	10.8
323	04/87	M	P	grey	45.5	146	78	49	28.5	13.5	10.5
324	04/87	M	OA	grey	50.9	140	87	47	-	-	-
325	04/87	F	P	grey	27.3	127	68	39	23.6	11.7	8.1
326	04/87	M	P	grey	37.7	142	74	47	27.0	14.0	11.1
327	04/87	F	PA	grey	33.6	135	69	47	26.7	13.7	10.8
328	04/87	M	Y	grey	42.7	141	77	47	29.6	16.6	10.6
329	04/87	M	Y	grey	41.8	137	72	53	32.7	16.2	11.7
330	04/87	F	OA	black	37.3	140	69	46	8.9	6.2	11.7
331	04/88	M	PA	grey	46.4	125	80	39	32.3	17.1	11.8
332	04/88	F	P	grey	37.3	145	70	49	25.0	14.0	8.5
333	04/88	F	P	grey	32.7	113	66	47	23.9	11.9	7.4
334	04/88	F	PA	black	43.6	126	75	41	28.7	13.8	8.4
335	04/88	M	Y	grey	37.3	131	73	47	26.7	13.9	10.3
336	04/88	F	PA	grey	42.3	138	74	45	30.2	14.3	10.7
337	04/88	F	PA	grey	40.9	134	69	47	27.9	14.4	9.8
338	04/88	F	PA	grey	40.0	118	75	43	28.8	14.2	10.2
339	04/88	F	Y	grey	39.1	137	72	49	26.3	14.6	9.1
340	04/88	F	P	black	33.6	127	77	48	28.2	13.4	10.7
341	04/88	M	P	grey	35.0	134	70	47	24.1	11.9	9.6
342	04/88	F	P	grey	27.3	101	64	43	24.6	12.3	9.5
343	04/88	F	PA	grey	36.4	138	66	44	26.3	14.0	9.9
344	04/88	M	PA	black	44.5	141	77	51	26.3	14.6	10.0

¹ P = pup, Y = yearling, YA = young adult, PA = prime adult, OA = old adult.

² Depth = measurement of canine from front to back at the gumline.

³ Width = measurement of canine from the labial face to the lingual face at the gum line.

Table 3. Status of wolves radio-collared during Spring 1987 and 1988 in and adjacent to Gates of the Arctic National Park and Preserve, Alaska.

Number	Capture Date	Status
301	03/28/87	Active-Iniakuk Pack
302	03/28/87	Active-Karupa Lake Pair
303	03/28/87	Missing since 11/24/87
304	03/28/87	Active-Tinayguk Pack
305	03/29/87	Active-Agiak Trio
306	03/30/87	Dead-Snared during 11/24/87 - 1/14/88
307	03/30/87	Active-Okomilat Pack
308	03/30/87	Active-Killik Pack
309	04/01/87	Dead-Unknown causes during 7/09 - 8/03/88
310	04/01/87	Active-Chimney Pass Pack
311	04/01/87	Active-Eroded Mountain Pack
312	04/01/87	Dispersed-Found on Ribdon River, Arctic National Wildlife Refuge on 3/25/88
313	04/01/87	Active-Akmalik Pack
314	04/01/87	Failed collar-last heard 9/3/88
315	04/02/87	Dead-Shot on 4/07/87
316	04/02/87	Dead-Trapped on 11/28/88
317	04/02/87	Active-Walker Lake Pack
318	04/03/87	Dropped collar during 7/08 - 8/05/88
319	04/04/87	Missing since 8/23/87
320	04/04/87	Dead-Unknown causes during 5/04 - 5/31/88
321	04/04/87	Dispersed-Found in northern Yukon Territories, Canada on 10/02/87
322	04/06/87	Active-Tulilik Pack
323	04/06/87	Dispersed-Harvested on Okpilak River, Arctic National Wildlife Refuge, 4/26/88
324	04/06/87	Dead-Intraspecific strife during 2/27 - 3/25/88
325	04/06/87	Active-Allen River Pack
326	04/07/87	Missing since 9/03/88
327	04/07/87	Dead-Intraspecific strife during 1/18 - 2/25/88
328	04/07/87	Dispersed-Found in northern Yukon Territories, Canada on 10/04/87
329	04/08/87	Dead-Trapped-late 11/87
330	04/08/87	Active-Hanging Glacier Pack
331	04/03/88	Active-Hanging Glacier Pack
332	04/03/88	Missing since 4/11/88
333	04/04/88	Active-Agiak Pack
334	04/05/88	Active-Iniakuk Pack
335	04/06/88	Missing since 9/01/88
336	04/06/88	Active-Unakserak Pack
337	04/06/88	Active-Unakserak Pack
338	04/07/88	Active-Chimney Pass Pack
339	04/08/88	Active-Agiak Trio
340	04/08/88	Active-Malamute Fork Female
341	04/09/88	Missing since 6/03/88
342	04/09/88	Active-Sixtymile Pack
343	04/09/88	Active-Sixtymile Pack
344	04/11/88	Active-Koyukuk Pack

Table 4. Pack designations and sizes during late 1987 to November 1988 for wolves radio-collared in and adjacent to Gates of the Arctic National Park and Preserve, Alaska.

Early Winter (as of 11/87) Pack Name	Total	Late Winter (1-5/88) Pack Name	Total	Summer (6-8/88) Pack Name	Adult Total	Pup Total	Early Winter (9-11/88) Pack Name	Total
Iniakuk Pack (301)	6	 (301,334)	6	 (301,334)	3	6	 (301,334)	8
Hurt Fork Male (302)	2	Karupa Lake Pair (302)	2	 (302)	2	0	 (302)	2
Tinayguk Pack (303 ¹ ,304)	6	 (304)	3	 (304)	2	1	 (304)	3
Agiak Pack (305,316)	10	 (316,333)	4	 (316,333)	3	8	 (316 ² ,333)	12
Sixtymile Pack (323)	7	Agiak Yearling (305 ³ ,339)	2	Agiak Trio (305,339)	3	0	 (305,339)	3
Sixtymile Female (306 ⁵)	1	 (323 ⁴ ,342,343)	6	 (342,343)	2	7	 (342,343)	9
Okmilat Pack (307)	7	 (307,341)	5	 (307,341 ⁶)	2	4	 (307)	7
Killik Pack (308,318)	9	 (308,318)	7	 (308,318 ⁷)	3	5	 (308)	11
Wild River Pack (309)	6	 (309)	3 ⁸	 (309 ⁹)	2	0		
Clear River Male (310)	2	 (310,338)	2	Chimney Pass Pack (310,338)	2	4	 (310,338)	3

Table 4 continued.

Early Winter (as of 11/87) Pack Name	Total	Late Winter (1-5/88) Pack Name	Total	Summer (6-8/88) Pack Name	Adult Total	Pup Total	Early Winter (9-11/88) Pack Name	Total
Clear River Female (311)	1	 (311)	3	Eroded Mountain Pack (311)	2	2	 (311)	3
Tulilik Pack (312,322)	13	 (312,322,335)	13	 (322,335)	7	5	 (322,335 ¹¹)	12
Akmalik Pack (313,314)	9	 (313,314)	8	 (313,314)	6	4	 (313,314 ¹²)	9
Nautuk Male (317)	2	 (317)	2	Walker Lake Pack (317)	2	5	 (317)	7
Unakserak Pack (326)	16	 (326,336,337)	16	 (326,336,337)	12	5	 (326 ¹³ ,336,337)	17
Shivering Mtn. Pack (320)	5	 (320 ¹⁴)	4					
Publituk Male (324)	1	 (324 ¹⁵)	1					
Allen River Pack (325)	3	 (325)	3	 (325)	2	2	 (325)	4
Redstar Female (327)	1	 (327 ¹⁶)	1					

Table 4 continued.

Early Winter (as of 11/87) Pack Name	Total	Late Winter (1-5/88) Pack Name	Total	Summer (6-8/88) Pack Name	Adult Total	Pup Total	Early Winter (9-11/88) Pack Name	Total
Hanging Glacier Pack 7 (330)		 (330, 331)	5	 (330, 331)	3	5	 (330, 331)	9
		Malamute Fork Female 1 (340)	1	 (340)	2	0	 (340)	2
		Koyukuk Pack (332, 17, 344)	5	 (344)	2	1	 (344)	2

1 303 last located 11/24/87.

2 316 trapped on 11/28/88.

3 305 maintained an adjacent territory to the Agiak Pack after 1/17/88.

4 323 last seen with pack on 2/25/88 and harvested on the Okpilak River, Arctic National Wildlife Refuge, by a Kaktovik hunter on 4/26/88.

5 306 was snared near the Malamute Fork of the Alatna River between 11/24/87 and 1/14/88.

6 341 last located 6/03/88.

7 318 dropped collar between 7/08/88 and 8/05/88.

8 Four members of Wild Lake Pack were harvested on 2/26/88.

9 309 died between 7/09/88 and 8/03/88. Cause of death unknown.

10 312 last located in the area 1/17/88. Subsequently located on Ribdon River near Elusive Lake in the Arctic National Wildlife Refuge on 3/25/88.

11 335 last located 9/01/88.

12 Radio-failure between 9/03/88 and 9/22/88.

13 326 last located 9/03/88.

14 320 died between 5/04/88 and 5/31/88. Cause of death unknown.

15 324 died between 2/27/88 and 3/25/88. Killed by wolves.

16 327 died between 1/18/88 and 2/25/88. Killed by wolves.

17 332 radio-collared on 4/03/88 and last located 4/11/88.

Table 5. Status of radio-collared wolves and their associates in and adjacent to Gates of the Arctic National Park and Preserve, Alaska, as of 11 November 1988.

	Greys	Blacks	Total	Comments
Iniakuk Pack (301,334)	1	6	7	
Karupa Lake Pair (302)	2		2	
Tinayguk Pack (304)	1	2	3	
Agiak Pack (316,333)	8	1	9	
Agiak Trio (305,339)	2	1	3	
Okomilat Pack (307)	7		7	
Killik Pack (308)	11		11	
Chimney Pass Pack (310,338)	3		3	
Eroded Mountain Pack (311)	3		3	
Tulilik Pack (322)	12		12	
Akmalik Pack (313)	4	5	9	
Walker Lake Pack (317)	2	4	6	
Sixtymile Pack (342,343)	9		9	
Allen River Pack (325)	4		4	
Unakserak Pack (336,337)	13		13	17 greys seen in September
Hanging Glacier Pack (330,331)	5	4	9	
Malamute Fork Female (340)		1	1	additional black seen in September
Koyukuk Pack (344)	1		1	
Total	88	24	112	

Table 6. Wolf harvest reported by residents of Anaktuvuk Pass, Alaska during winter 1987-88, in and adjacent to Gates of the Arctic National Park and Preserve (GAAR).

Date	GMU	Location	In GAAR?	Sex	Color	Method of Take
??/??	24	Publituk Ck.	Y	M	grey	trap
??/??		Unknown		M	black	trap
10/87	26	Ben Creek	Y	-	grey	shot
10/87	26	Ben Creek	Y	F	grey	trap
11/87	24	Kollutyak	Y	M	black	trap
11/87	24	Kollutyak	Y	M	grey	trap
12/87	24	Allen River	Y	M	grey	trap
12/87	26	Anaktuvuk R./Tulugak Ck.		M	grey	shot
12/87	24	John River	Y	M	black	trap
12/87	24	Ernie Creek/Tributary Ck.	Y	F	black	trap
12/87	24	Ernie Creek/Tributary Ck.	Y	M	black	trap
12/87	24	Ernie Creek/Tributary Ck.	Y	M	grey	trap
01/88	26	Anaktuvuk R./Natvakruak		M	grey	shot
01/88	26	Anaktuvuk R./Kayak Ck.	Y	M	grey	shot
01/88	26	Kayak/Anaktiktoak	Y	F	white	shot
01/88	26	S. Chandler Lk.	Y	F	grey	trap
02/88	26	Kiruktagiak		M	grey	trap
02/88	26	Chandler Lake	Y	F	grey	shot
02/88	26	Nanushuk R.		F	grey	shot
02/88	26	Nanushuk R.		F	grey	shot
02/88	26	Anaktuvuk R./Kayak Ck.	Y	F	grey	shot
02/88	24	Kachwona Pass	Y	M	grey	trap
02/88	26	Wolf Ck/Tinayguk	Y	F	grey	trap
02/88	26	Okomilat	Y	M	---	trap
03/88	26	Chandler Lake	Y	M	grey	shot
03/88	26	Chandler Lake	Y	M	grey	shot
03/88	26	Antler Valley		M	grey	shot
03/88	26	Upper Suluak Ck.	Y	-	grey	trap
03/88	23	Papik Mt.	Y	F	grey	shot
03/88	26	Nukatpiat Mt.		F	grey	shot
03/88	26	Nukatpiat Mt.		M	grey	shot
03/88	26	Itilyiargiok R.	Y	M	grey	shot
03/88	26	Anaktuvuk R./Tiglupuk Ck.		F	grey	shot
03/88	26	Anaktuvuk R./Tiglupuk Ck.		F	grey	shot
03/88	26	Agiak Lk./S. Chandler Lk.		F	grey	trap
03/88	26	Nukatpiat Mt.		M	grey	shot
03/88	24	Mouth Kachwona Creek	Y	F	grey	trap
04/88	26	Anaktuvuk R./Kayak Ck.	Y	F	grey	trap

Table 7. Wolf harvest reported by residents of Anaktuvuk Pass, Alaska during winter 1985-86, in and adjacent to Gates of the Arctic National Park and Preserve (GAAR).

Date	GMU	Location	In GAAR?	Sex	Color	Method of Take
??/??	26	Unknown	Y	-	---	trap
11/85	24	Yenituk Creek	Y	M	black	trap
11/85	24	Yenituk Creek	Y	F	black	trap
11/85	26	Okomilat River	Y	-	---	trap
11/85	26	North of mountains		-	grey	shot
11/85	26	North of mountains		-	grey	shot
11/85	26	North of mountains		-	grey	shot
11/85	26	Upper Killik	Y	F	grey	trap
12/85	26	Anaktuvuk River		-	grey	shot
12/85	26	Anivik	Y	M	grey	trap
12/85	26	Ben Creek	Y	M	black	trap
12/85	26	Upper Killik	Y	F	grey	trap
12/85	26	Anivik	Y	M	grey	trap
12/85	26	Nigu River		-	---	trap
12/85	26	Ben Creek	Y	F	grey	trap
01/86	26	Chandler Lake	Y	M	grey	trap
01/86	26	North of mountains		-	---	shot
01/86	26	North of mountains		-	grey	shot
01/86	26	North of mountains		-	---	shot
01/86	26	North of mountains		-	---	shot
01/86	26	North of mountains		-	---	shot
01/86	26	North of mountains		-	---	shot
02/86	26	Shainin Lake		M	grey	shot
02/86	26	Upper Killik River	Y	F	grey	trap
02/86	26	Shainin Lake		F	grey	shot
02/86	26	Shainin Lake		-	grey	shot
02/86	26	Shainin Lake		F	grey	shot
02/86	26	Ahaliorak		M	grey	shot
02/86	26	Ahaliorak		F	grey	shot
02/86	26	North of mountains		-	---	shot
02/86	26	North of mountains		-	---	shot
02/86	26	North of mountains		-	---	shot
02/86	26	North of mountains		-	---	shot
03/86	23	Noatak River	Y	-	---	trap
03/86	24	N.F. Koyukuk River	Y	M	black	trap
03/86	26	Nigu River		-	---	trap
03/86	26	Nigu River		-	---	trap
03/86	26	Nigu River		-	---	trap
03/86	26	Tabletop Mountain		F	grey	shot
03/86	26	Nanashuk River		-	grey	shot
03/86	26	Nanashuk River		-	grey	shot
03/86	26	Itkillik River		F	grey	shot
03/86	26	Chandler Lake		-	---	---
03/86	26	Nigu River		-	---	trap
03/86	26	Nanashuk River		-	grey	shot

[illegible]

Table 8. Wolf harvest reported by residents of Anaktuvuk Pass, Alaska during winter 1986-87, in and adjacent to Gates of the Arctic National Park and Preserve (GAAR).

Date	GMU	Location	In GAAR?	Sex	Color	Method of Take
11/86	26	Okomilat River	Y	F	grey	shot
11/86	26	Okomilat River	Y	F	grey	shot
11/86	26	Ben Creek	Y	F	black	trap
11/86	26	Upper Chandler River	Y	M	grey	shot
11/86	26	Upper Chandler River	Y	M	grey	shot
11/86	26	Chandler Lake	Y	F	grey	shot
12/86	26	Chandler Lake	Y	M	grey	trap
12/86	24	Hunt Fork John River	Y	F	black	trap
12/86	24	Hunt Fork John River	Y	F	black	trap
12/86	24	Hunt Fork John River	Y	F	black	trap
12/86	24	Loon Lake	Y	M	black	shot
01/87	24	Hunt Fork John River	Y	F	grey	trap
01/87	24	Hunt Fork John River	Y	F	grey	trap
01/87	24	Hunt Fork John River	Y	F	grey	trap
01/87	26	Chandler Lake	Y	F	grey	trap
01/87	24	Allen River	Y	M	grey	trap
02/87	26	Okomilat River	Y	M	grey	shot
02/87	24	North Fork Koyukuk River	Y	F	grey	trap
02/87	24	Yenituk Creek	Y	M	grey	trap
02/87	24	Yenituk Creek	Y	M	grey	trap
02/87	24	Hunt Fork John River	Y	M	grey	trap
03/87	??	Unknown	?	?	black	trap
03/87	26	Upper Chandler River		M	grey	trap
03/87	26	Upper Chandler River	Y	M	grey	trap
03/87	24	North Fork Koyukuk River	Y	M	grey	trap
03/87	24	Hunt Fork John River	Y	M	grey	shot
03/87	24	Hunt Fork John River	Y	M	grey	trap
03/87	26	Killik River, Agaak Creek	Y	F	grey	trap
03/87	26	Castle Mountain		M	grey	shot
03/87	26	Castle Mountain		M	grey	shot
03/87	26	Castle Mountain		F	grey	shot
03/87	26	Castle Mountain		F	grey	shot
03/87	24	Wolverine Creek	Y	M	grey	trap
03/87	26	Chandler Lake	Y	M	black	trap
03/87	26	Chandler River/Gunsight Mtn.		M	grey	trap
03/87	26	Anaktuvuk River	Y	M	black	shot
03/87	26	Gunsight Mountain		M	grey	--
03/87	26	Sukuk		M	grey	shot
03/87	26	Sukuk		F	grey	shot
04/87	24	Kollutarak Creek	Y	M	black	shot
04/87	26	Giant Creek	Y	M	black	shot
04/87	26	Upper Chandler River		F	grey	shot

Table 9. Reported wolf harvest for winter 1987-88, from Alaska Department of Fish and Game (ADF&G) pelt sealing records, for minor drainage units with any portion in or within 20 miles of Gates of the Arctic National Park and Preserve (GAAR), Alaska.

Date	GMU	Minor Drainage ¹	Location	In GAAR? ²	Sex	Color	Method of Take
09/87	23	2101	Shungnak R.	4	F	black	shot
09/87	25A	0402	N.F. Chandalar R. W	4	F	black	shot
11/87	24	1508	Dietrich R. E	4	M	grey	trap
01/88	23	1901	Ambler R.	4	F	grey	shot
01/88	23	1901	Ambler R.	4	M	grey	shot
01/88	23	2401	Lower Kogoluktuk R.	4	F	grey	shot
01/88	23	2401	Lower Kogoluktuk R.	4	F	grey	shot
01/88	23	2401	Lower Kogoluktuk R.	4	M	grey	shot
01/88	23	2401	Lower Kogoluktuk R.	4	F	grey	shot
01/88	23	2701	Lake Selby-Kobuk R.	2	M	black	shot
02/88	24	0904	Malemute F. Alatna R. S	4	F	grey	trap
03/88	24	0503	Klikhtentotzna Cr.	3	M	black	shot
03/88	24	0503	Klikhtentotzna Cr.	3	F	grey	shot
03/88	24	0503	Klikhtentotzna Cr.	3	M	black	shot
03/88	24	0503	Klikhtentotzna Cr.	3	F	white	shot
03/88	24	0503	Klikhtentotzna Cr.	3	F	black	shot
03/88	24	0503	Klikhtentotzna Cr.	3	M	grey	shot
03/88	24	0902	Siruk Cr.	4	F	black	shot
03/88	24	1101	Lower S.F. Koyukuk R.	4	F	grey	shot
03/88	24	1201	Lower John R.	4	M	grey	shot
03/88	24	1201	Lower John R.	4	F	grey	shot
03/88	24	1201	Lower John R.	4	F	grey	shot
03/88	24	1301	Lower Wild R.	4	F	grey	shot
03/88	24	1301	Lower Wild R.	4	F	grey	shot
03/88	24	1301	Lower Wild R.	4	M	grey	shot
03/88	24	1301	Lower Wild R.	4	M	grey	shot
04/88	23	4102	Noatak R.-Douglas Cr.	3	M	grey	shot
04/88	26B	0309	Atigun R.-Galbraith L.	4	M	black	shot

¹ Minor drainage numbers as designated by ADF&G.

² 1 = > 90% of minor drainage is in GAAR.

2 = 50-90% of minor drainage is in GAAR.

3 = 10-50% of minor drainage is in GAAR.

4 = < 10% of minor drainage is in GAAR.

Table 10. Reported wolf harvest for winter 1984-85, from Alaska Department of Fish and Game (ADF&G) pelt sealing records, for minor drainage units with any portion in or within 20 miles of Gates of the Arctic National Park and Preserve (GAAR), Alaska.

Date	GMU	Minor Drainage ¹	Location	In GAAR? ²	Sex	Color	Method of Take
09/84	26A	1303	Wild Lake SE	2	F	grey	shot
11/84	23	3001	Nutuvukti L.-Kobuk R.	2	F	grey	trap
11/84	24	1514	Dietrich R. W	2	M	grey	shot
12/84	24	1501	Lower M.F. Koyukuk R.	3	F	grey	shot
03/85	23	2701	Lake Selby-Kobuk R.	2	F	grey	shot
03/85	23	2701	Lake Selby-Kobuk R.	2	M	grey	shot
03/85	23	2701	Lake Selby-Kobuk R.	2	M	grey	shot
03/85	23	2701	Lake Selby-Kobuk R.	2	M	grey	shot
03/85	23	2701	Lake Selby-Kobuk R.	2	F	grey	shot
03/85	23	2701	Lake Selby-Kobuk R.	2	M	grey	shot
03/85	24	0802	Bettles NE	3	M	grey	shot
03/85	24	1101	Lower S.F. Koyukuk R.	4	F	grey	shot
03/85	25A	0403	Atigun Pass SE	4	M	black	shot
03/85	26A	0703	Shainin Lake S	2	F	black	shot
03/85	26A	0703	Shainin Lake S	2	M	grey	shot

¹ Minor drainage numbers as designated by ADF&G.

² 1 = > 90% of minor drainage is in GAAR.

2 = 50-90% of minor drainage is in GAAR.

3 = 10-50% of minor drainage is in GAAR.

4 = < 10% of minor drainage is in GAAR.

Table 11. Reported wolf harvest for winter 1985-86, from Alaska Department of Fish and Game (ADF&G) pelt sealing records, for minor drainages with any portion in or within 20 miles of Gates of the Arctic National Park and Preserve (GAAR), Alaska.

Date	GMU	Minor Drainage ¹	Location	In GAAR? ²	Sex	Color	Method of Take
11/85	24	1304	Wild Lake W	4	F	grey	shot
11/85	24	1504	Wiseman-M.F. Koyukuk R.	3	M	grey	trap
11/85	26B	0309	Atigun R.-Galbraith L.	4	M	grey	shot
11/85	26B	0309	Atigun R.-Galbraith L.	4	M	grey	shot
02/86	24	1503	Wiseman SE	4	M	black	trap
02/86	24	1508	Dietrich R. E	4	M	grey	trap

¹ Minor drainage numbers as designated by ADF&G.

² 1 = > 90% of minor drainage is in GAAR.

2 = 50-90% of minor drainage is in GAAR.

3 = 10-50% of minor drainage is in GAAR.

4 = < 10% of minor drainage is in GAAR.

Table 12. Reported wolf harvest for winter 1986-87, from Alaska Department of Fish and Game (ADF&G) pelt sealing records, for minor drainage units with any portion in or within 20 miles of Gates of the Arctic National Park and Preserve (GAAR), Alaska.

Date	GMU	Minor Drainage ¹	Location	In GAAR? ²	Sex	Color	Method of Take
11/86	24	1503	Wiseman SE	4	F	grey	trap
11/86	24	1503	Wiseman SE	4	M	grey	trap
12/86	24	1202	Malemute F. John R.	4	M	grey	shot
12/86	24	1202	Malemute F. John R.	4	F	grey	trap
12/86	24	1503	Wiseman SE	4	F	grey	trap
12/86	24	1503	Wiseman SE	4	F	grey	trap
12/86	24	1503	Wiseman SE	4	M	grey	trap
01/87	24	1105	Jim R.	4	M	grey	trap
01/87	24	1501	Lower M.F. Koyukuk R.	3	M	black	shot
02/87	24	0802	Bettles NE	3	F	black	trap
02/87	24	1101	Lower S.F. Koyukuk R.	4	M	grey	shot
02/87	24	1101	Lower S.F. Koyukuk R.	4	M	grey	shot
02/87	24	1101	Lower S.F. Koyukuk R.	4	M	grey	shot
02/87	24	1101	Lower S.F. Koyukuk R.	4	M	grey	shot
02/87	24	1504	Wiseman-M.F. Koyukuk R.	3	M	grey	trap
02/87	24	1504	Wiseman-M.F. Koyukuk R.	3	M	black	trap
03/87	24	0905	Mettenpherg Cr. E	4	M	black	shot
03/87	24	0905	Mettenpherg Cr. E	4	M	black	shot
03/87	24	0905	Mettenpherg Cr. E	4	M	black	shot
03/87	24	0905	Mettenpherg Cr. E	4	F	black	shot
03/87	24	0905	Mettenpherg Cr. E	4	F	black	shot
03/87	24	1101	Lower S.F. Koyukuk R.	4	F	grey	trap
03/87	24	1101	Lower S.F. Koyukuk R.	4	M	grey	trap
03/87	24	1504	Wiseman-M.F. Koyukuk R.	3	M	grey	trap
04/87	24	1501	Lower M.F. Koyukuk R.	3	M	grey	trap

¹ Minor drainage numbers as designated by ADF&G.

² 1 = > 90% of minor drainage is in GAAR.

2 = 50-90% of minor drainage is in GAAR.

3 = 10-50% of minor drainage is in GAAR.

4 = < 10% of minor drainage is in GAAR.

Table 13 continued.

Acc.#	Location	Harvest Date	Age	Sex	Color	¹ Est. Wt. Nutritional		Stomach Contents	Radiocesium picocuries /kg	Reproductive Condition	Comments
						(kg)	Condition				
Collected at Bettles											
61343	Wild River	880226	Ad	M	Gy	50	Excellent	Moose	539	----	Wild River pack
61344	Wild River	880226	Pup	F	Gy	32	Excellent	Moose	223	Inactive	Wild River pack
61345	Wild River	880226	Pup	F	Gy	34	Excellent	Moose	286	Inactive	Wild River pack
61346	Wild River	880226	Pup	M	Gy	36	Excellent	Moose	295	----	Wild River pack
Radio-collared Wolf mortalities											
61341	Wolf 327	880225	Ad	F	Gy	34	Poor	N/A	455	----	Killed by Wild R. pack
61342	Wolf 306	8801??	Ad	F	Gy	39	Poor	Empty	10122	Inactive 3 old P.S. No 1987 litter	Shared
	Wolf 324	880325	Ad	M	Gy				4133	----	Killed by Wild R. pack

¹ Gy = gray, Bk = black.

Table 14. Frequencies of occurrence of food remains (expressed as percent of whole scat equivalents) in 2,056 wolf scats collected at 28 homesites in and adjacent to Gates of the Arctic National Park and Preserve, Alaska during summer 1987 and 1988.

Food Item	South Slope (n=1,174 scats)		North Slope (n=882 scats)		Total (n=2,056 scats)	
	No.	%	No.	%	No.	%
Moose, Adult	156.4	13.3	33.5	3.8	189.9	9.2
Moose, Calf	229.9	19.6	57.3	6.5	287.3	13.9
Caribou, Adult	194.4	16.7	278.3	31.6	473.0	23.0
Caribou, Calf	14.7	1.3	22.8	2.6	37.5	1.8
Sheep, Adult	155.4	13.2	197.3	22.4	352.7	17.2
Sheep, Lamb	5.8	0.5	3.4	0.4	9.2	0.5
Unid. Ungulate	70.9	6.0	75.1	8.5	146.0	7.1
Beaver	107.3	9.1	3.2	0.4	110.5	5.4
Snowshoe Hare	47.8	4.1	29.5	3.3	77.3	3.8
Ground Squirrel	22.3	1.9	11.3	1.3	33.6	1.6
Marmot	1.0	0.1	3.0	0.3	4.0	0.2
Porcupine	-	-	5.0	0.6	5.0	0.2
Microtine Rodent	12.2	1.0	9.2	1.1	21.4	1.0
Unid. Small Mammal	54.1	4.6	57.5	6.5	111.6	5.4
Wolf	4.5	0.4	4.2	0.5	8.7	0.4
Bear	8.3	0.7	6.1	0.7	14.4	0.7
Fox	1.0	0.1	-	-	1.0	0.1
Unid. Bird	15.7	1.3	11.4	1.3	27.1	1.3
Unid. Fish	-	-	0.7	0.0	0.7	0.0
Vegetation	10.9	0.9	2.0	0.2	12.9	0.6
Unid. Material	34.0	2.9	29.5	3.3	63.5	3.1

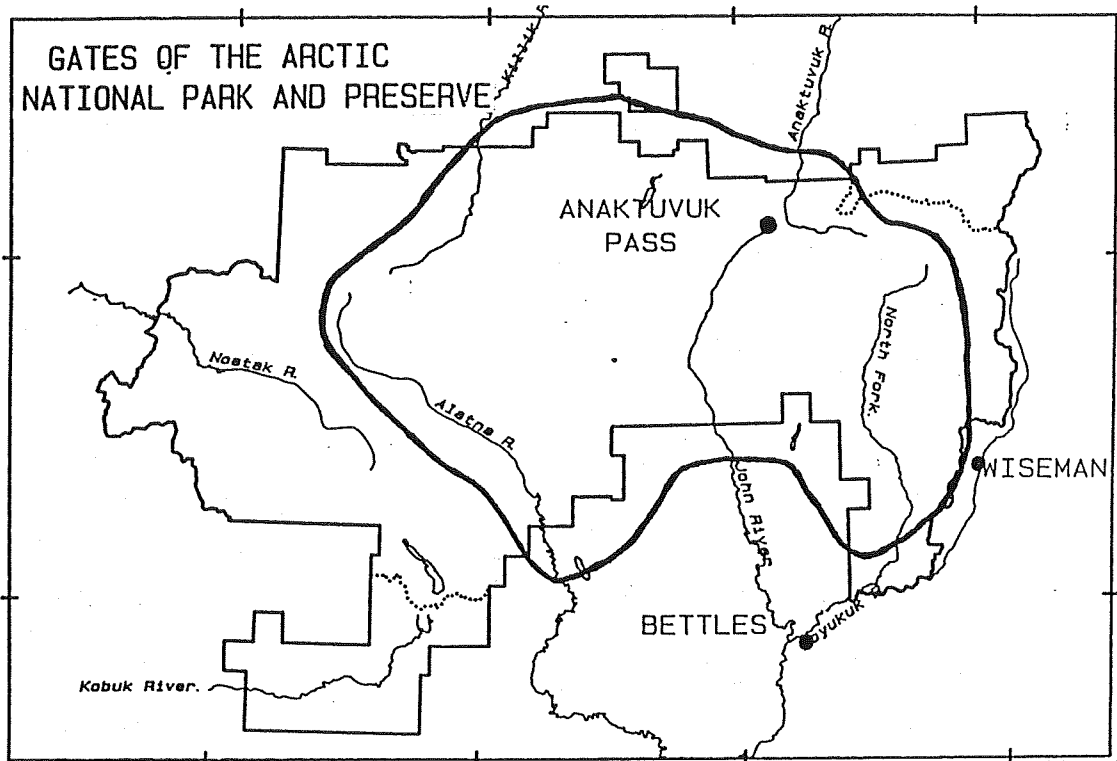


Fig. 1. Study area for wolf research in Gates of the Arctic National Park and Preserve, Alaska.

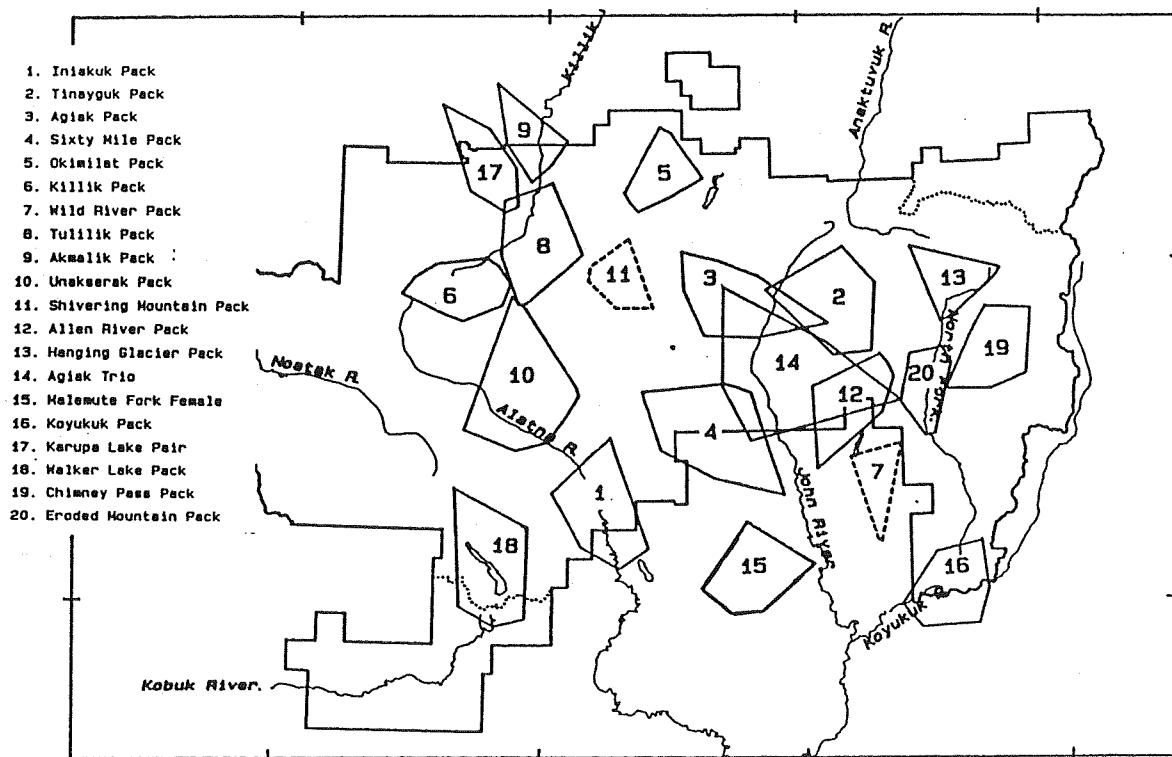


Fig. 2. Minimum home ranges of instrumented wolf packs, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed lines represent minimum home ranges of packs that did not survive the entire year.

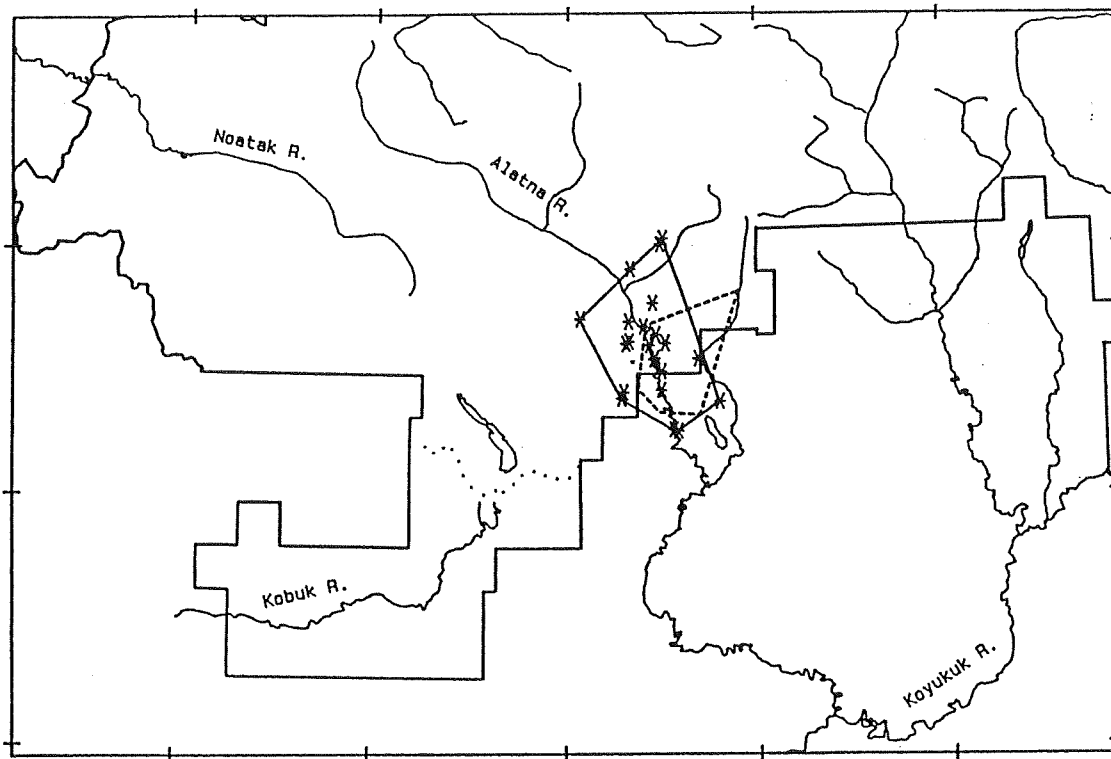


Fig. 3. Radio-locations and minimum home range of the Iniakuk Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

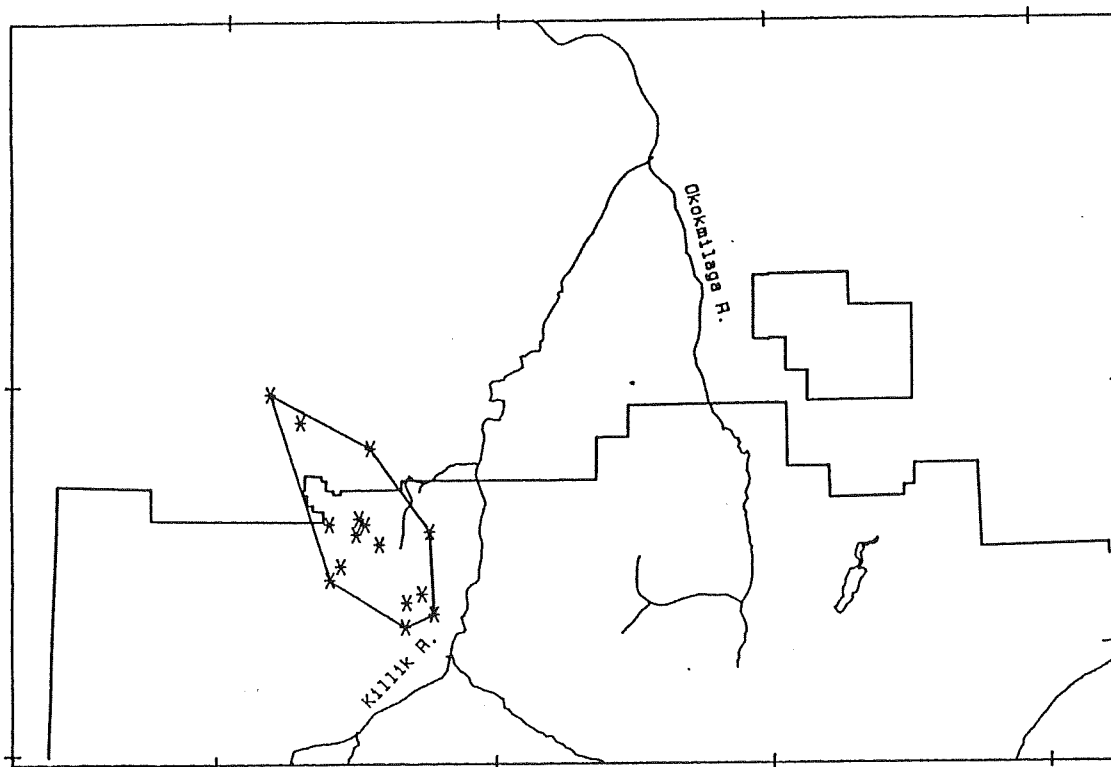


Fig. 4. Radio-locations and minimum home range of the Karupa Lake Pair, Gates of the Arctic National Park and Preserve, Alaska, during 1988.

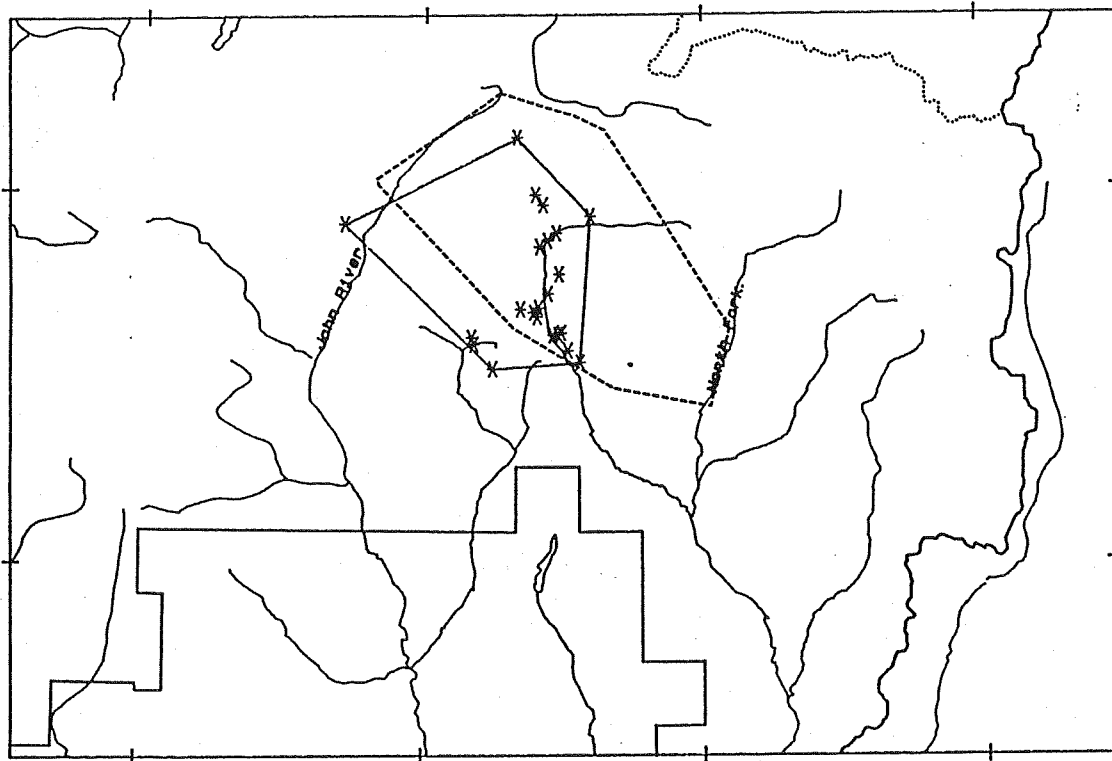


Fig. 5. Radio-locations and minimum home range of the Tinayguk Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

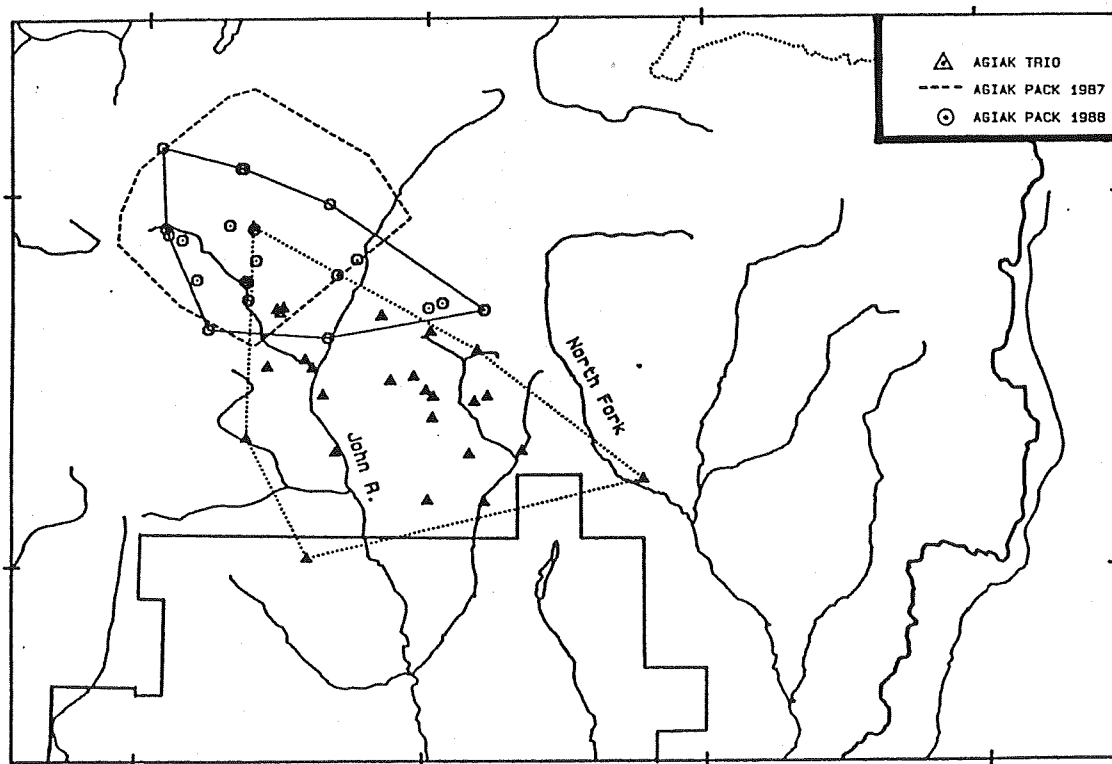


Fig. 6. Radio-locations and minimum home ranges of the Agiak Pack and the Agiak Trio, Gates of the Arctic National Park and Preserve, Alaska, during 1988.

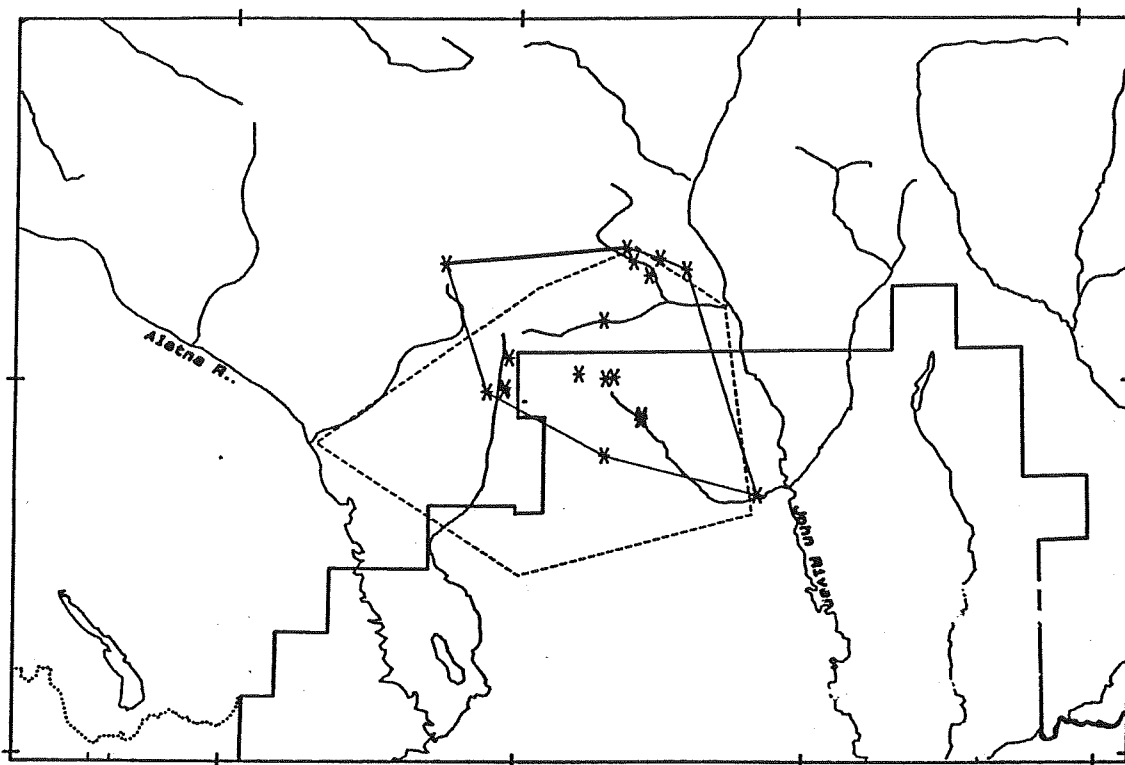


Fig. 7. Radio-locations and minimum home range of the Sixtymile Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

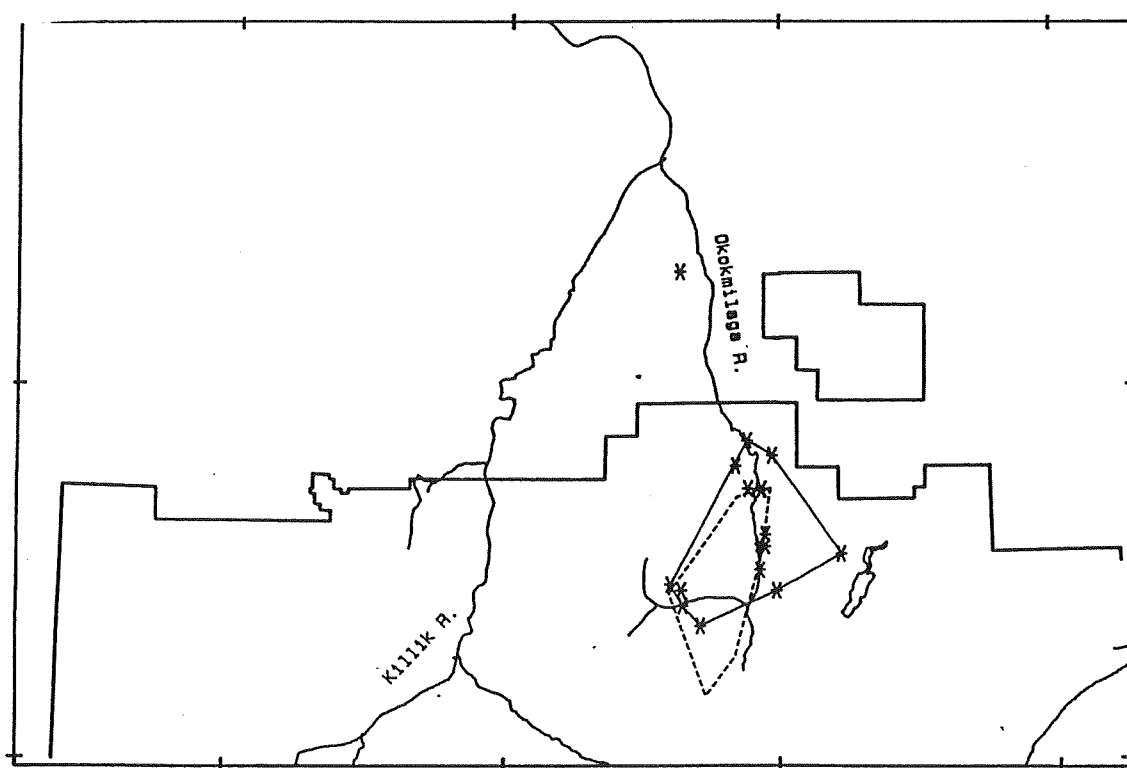


Fig. 8. Radio-locations and minimum home range of the Okomilat Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

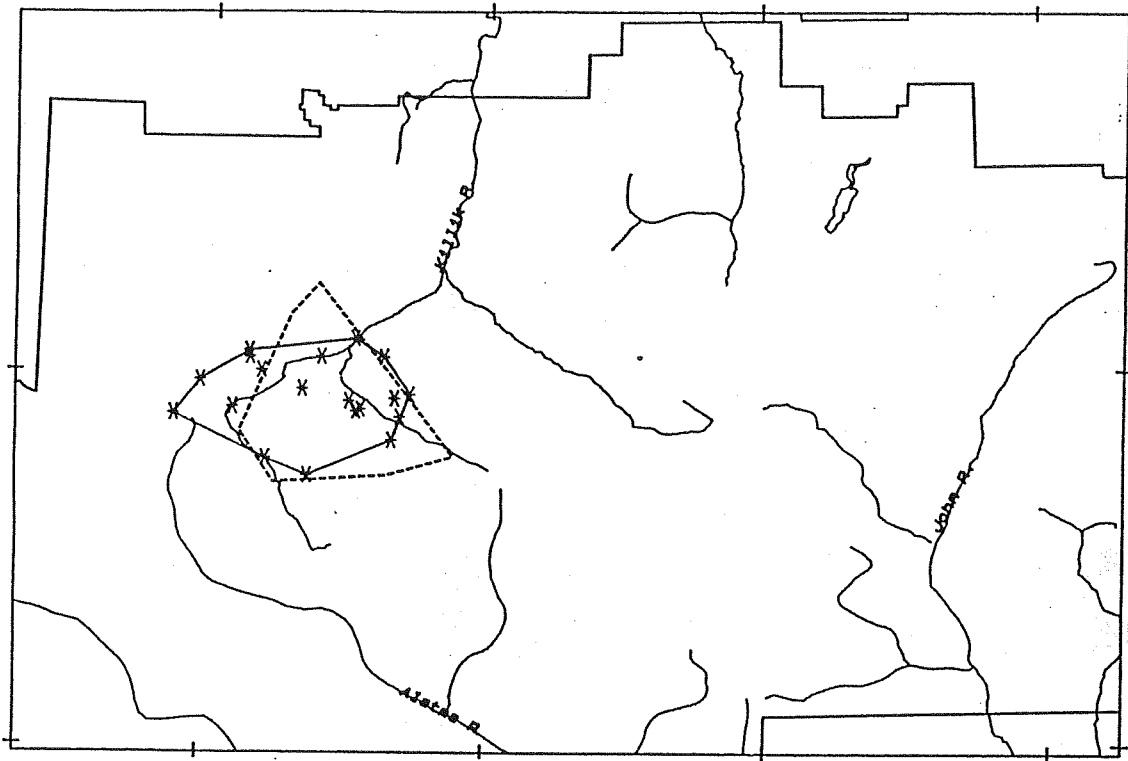


Fig. 9. Radio-locations and minimum home range of the Killik Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

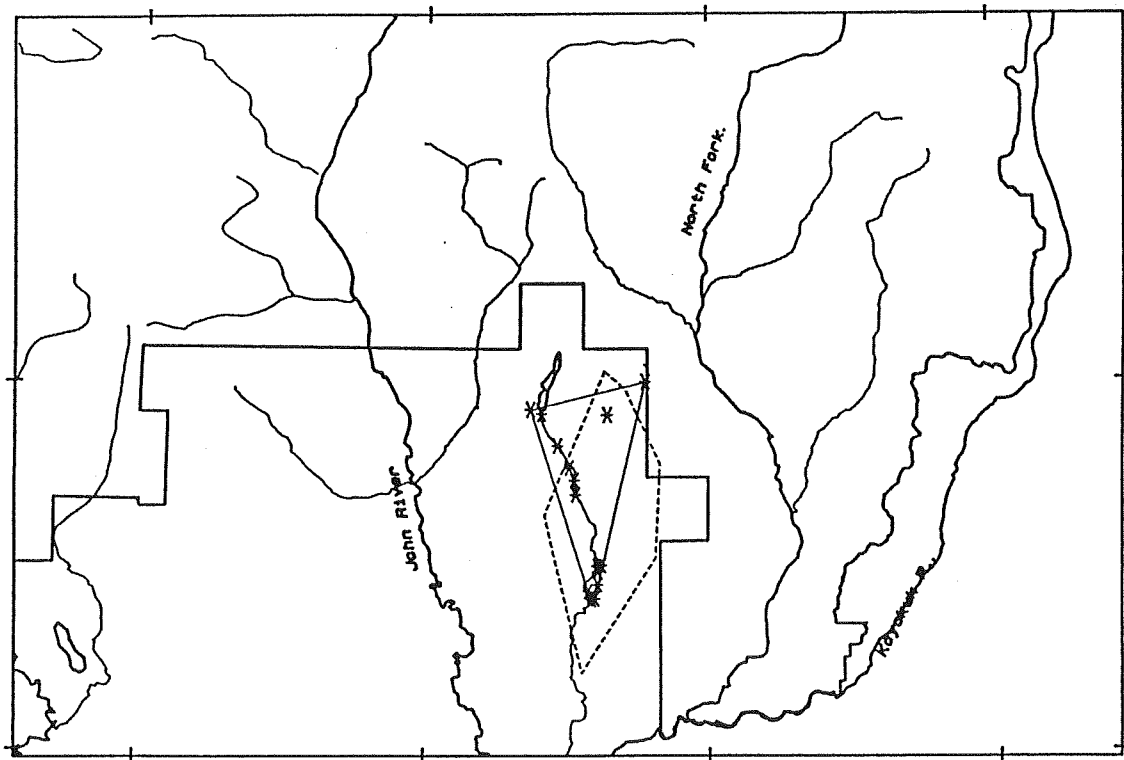


Fig. 10. Radio-locations and minimum home range of the Wild River Pack, Gates of the Arctic National Park and Preserve, Alaska, during January-July 1988. Dashed line is 1987 minimum home range.

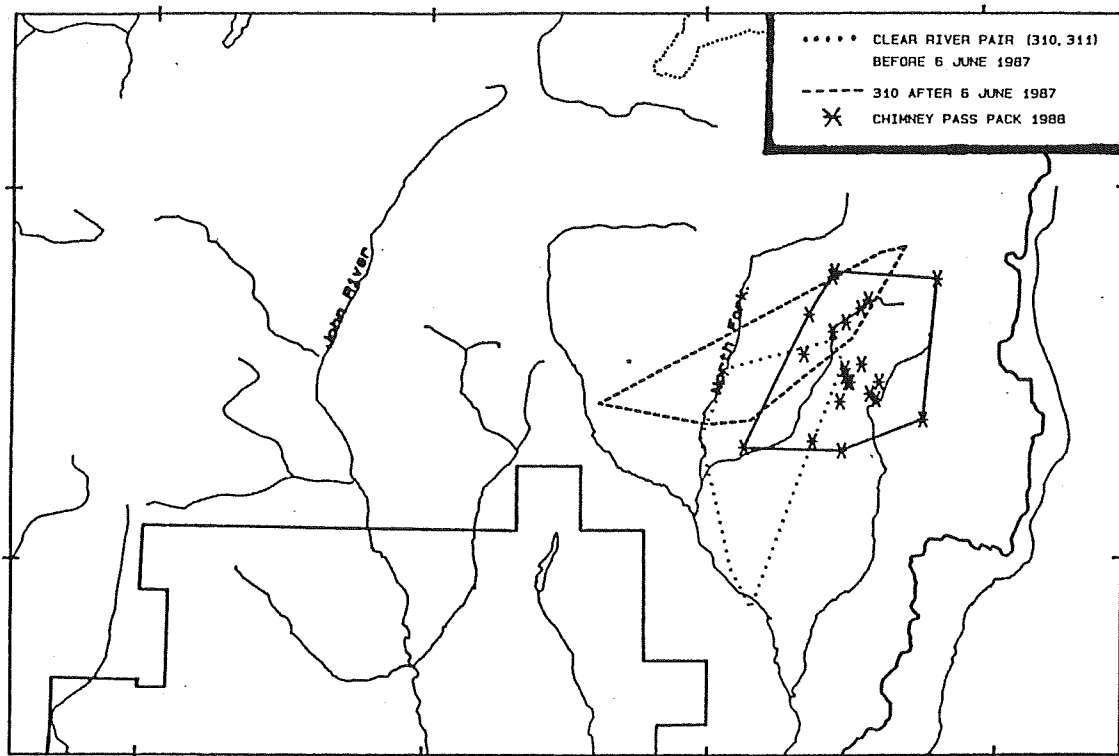


Fig. 11. Radio-locations and minimum home range of the Chimney Pass Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988.

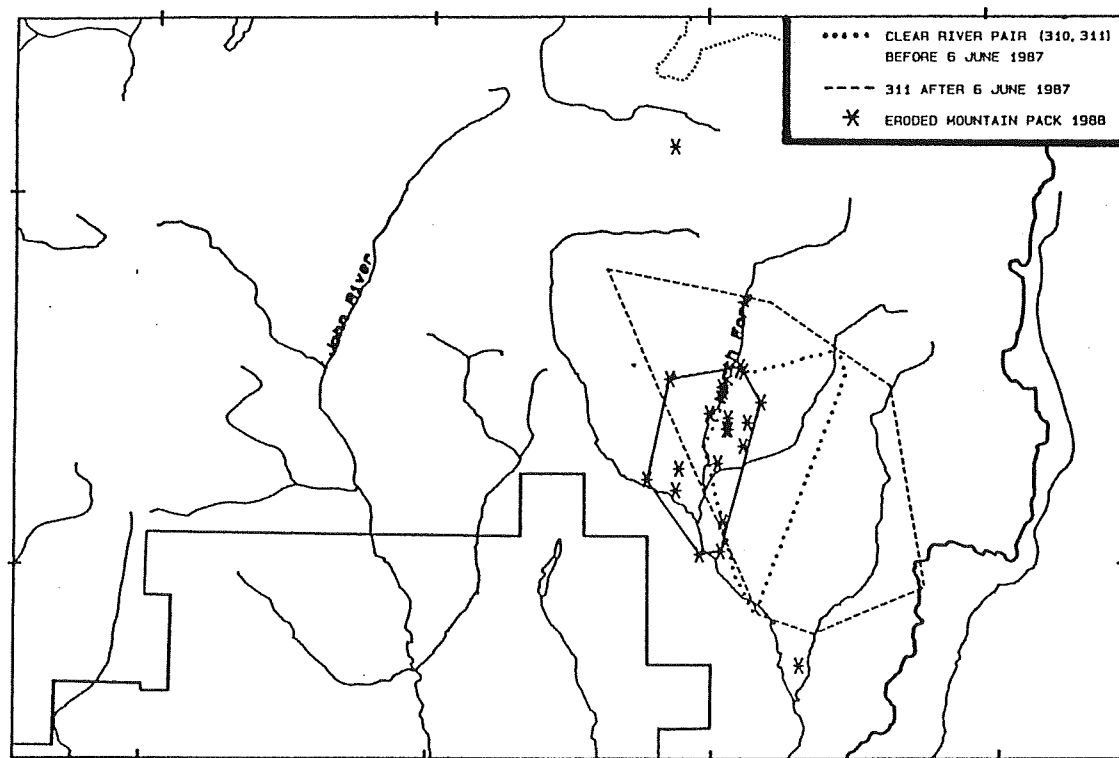


Fig. 12. Radio-locations and minimum home range of the Eroded Mountain Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988.

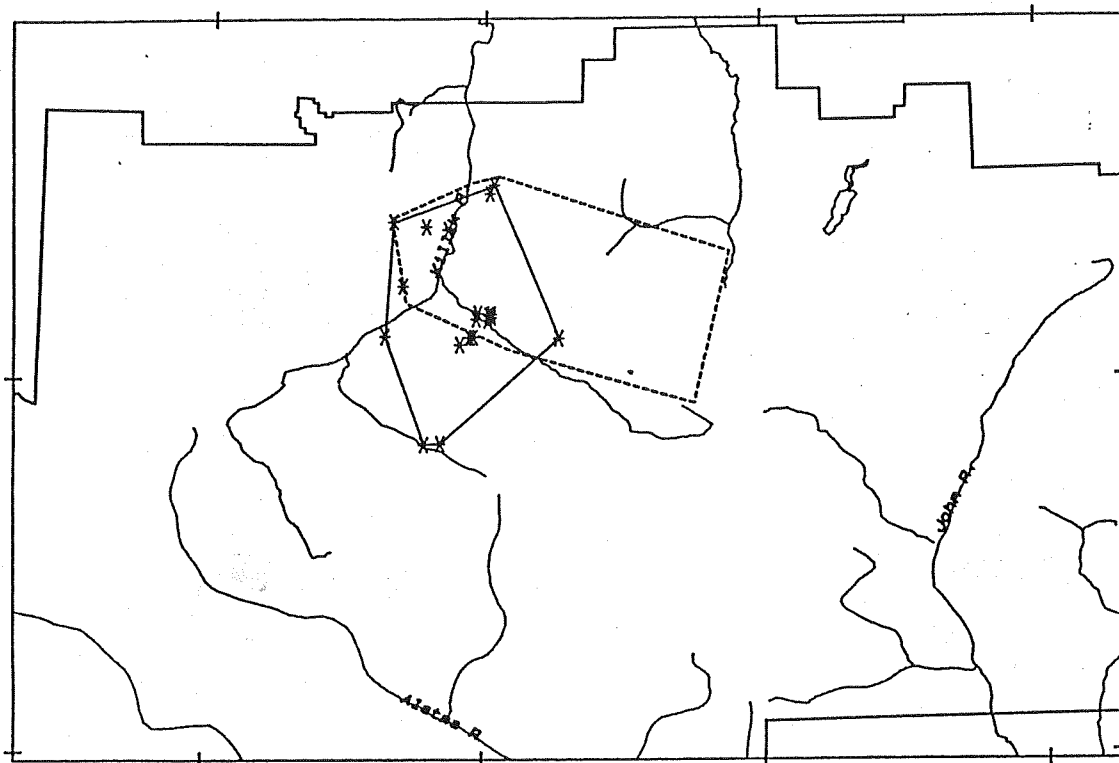


Fig. 13. Radio-locations and minimum home range of the Tulilik Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

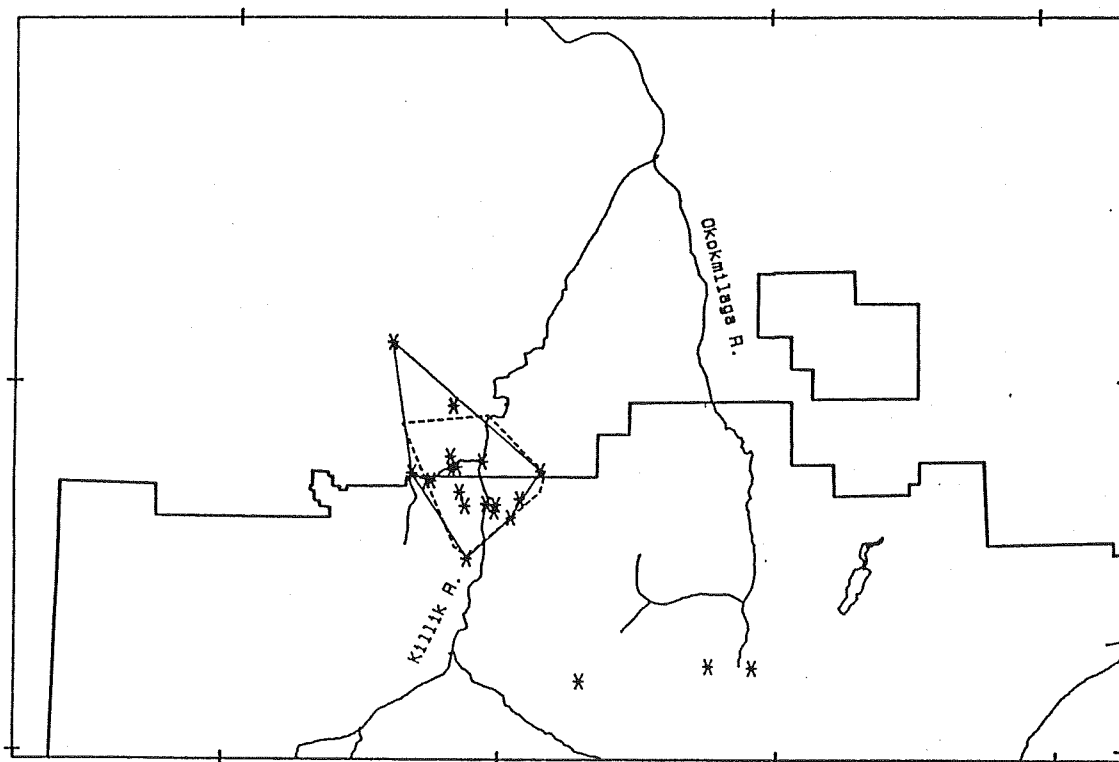


Fig. 14. Radio-locations and minimum home range of the Akmalik Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

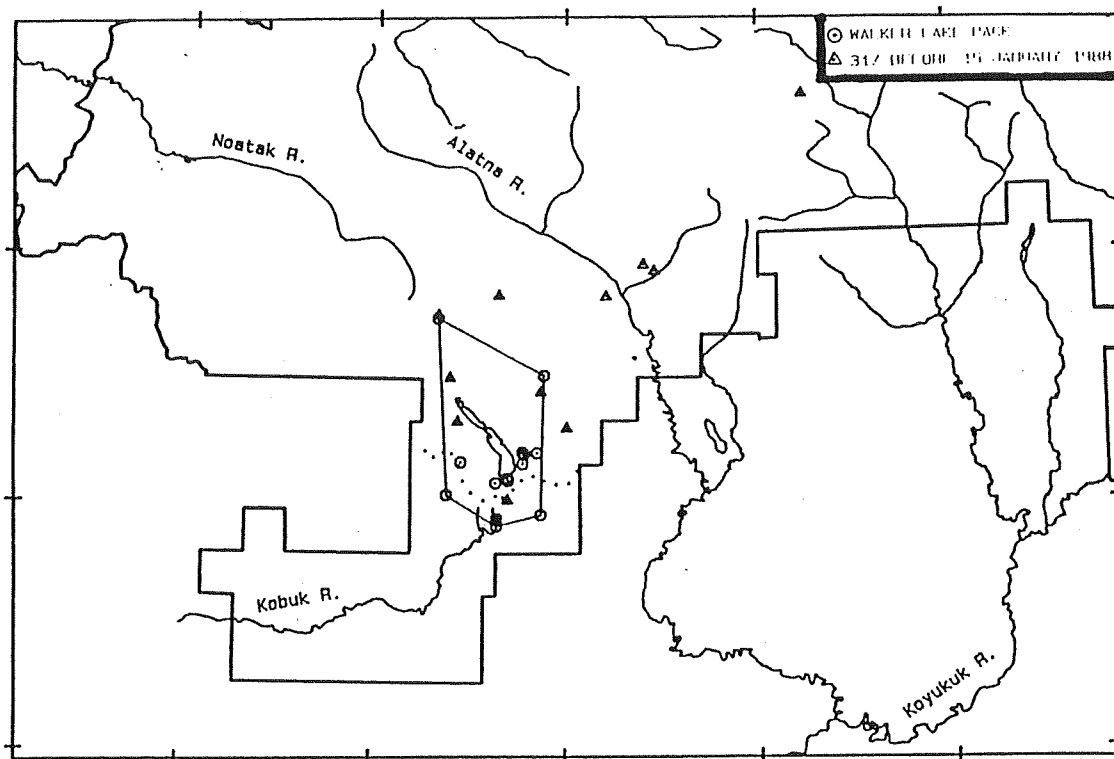


Fig. 15. Radio-locations and minimum home range of the Walker Lake Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988.

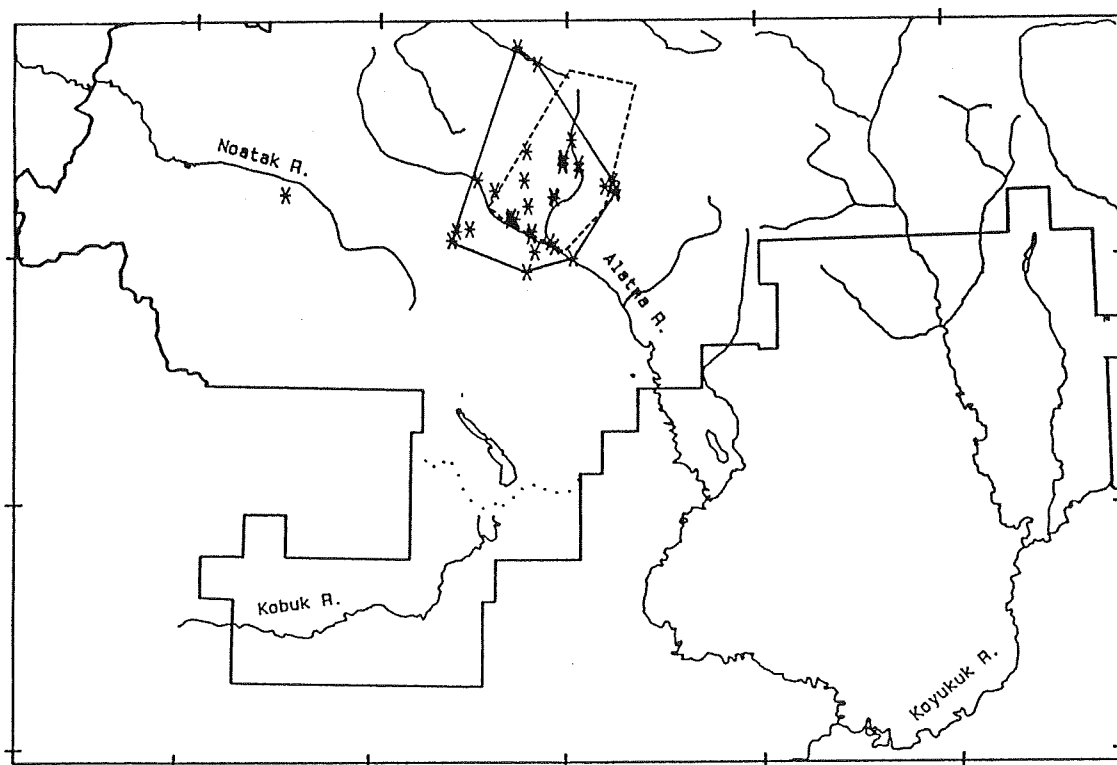


Fig. 16. Radio-locations and minimum home range of the Unakserak Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

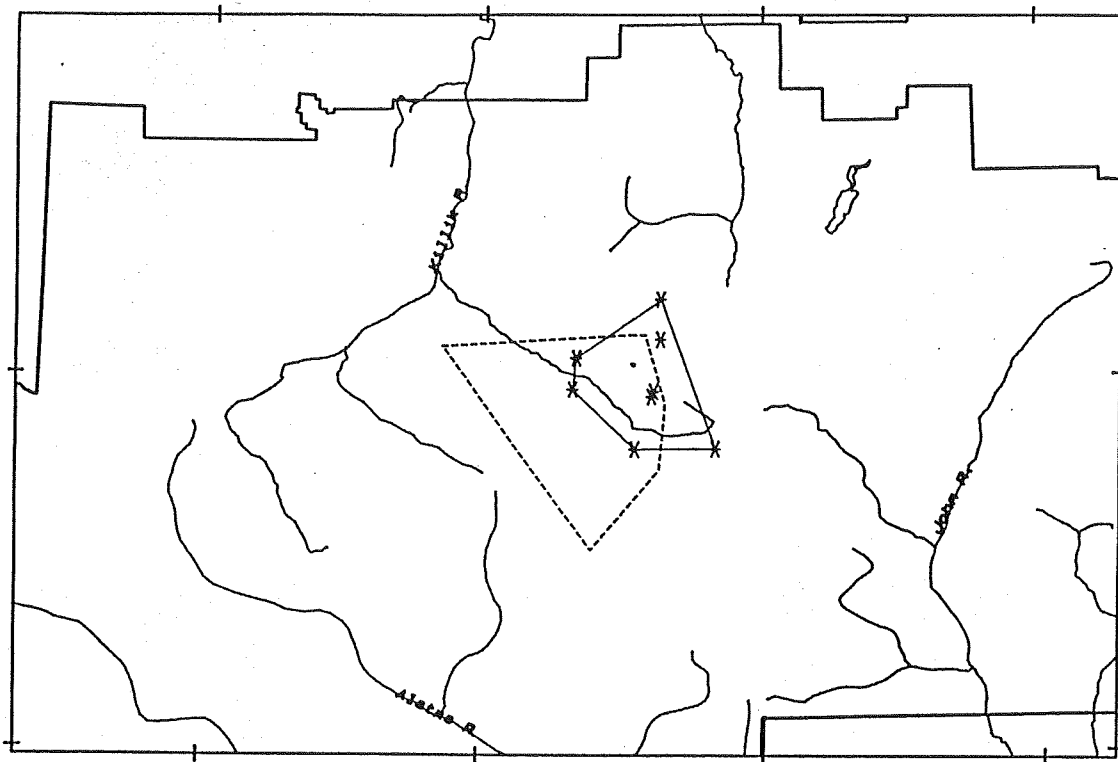


Fig. 17. Radio-locations and minimum home range of the Shivering Mountain Pack, Gates of the Arctic National Park and Preserve, Alaska, during January-May 1988. Dashed line is 1987 minimum home range.

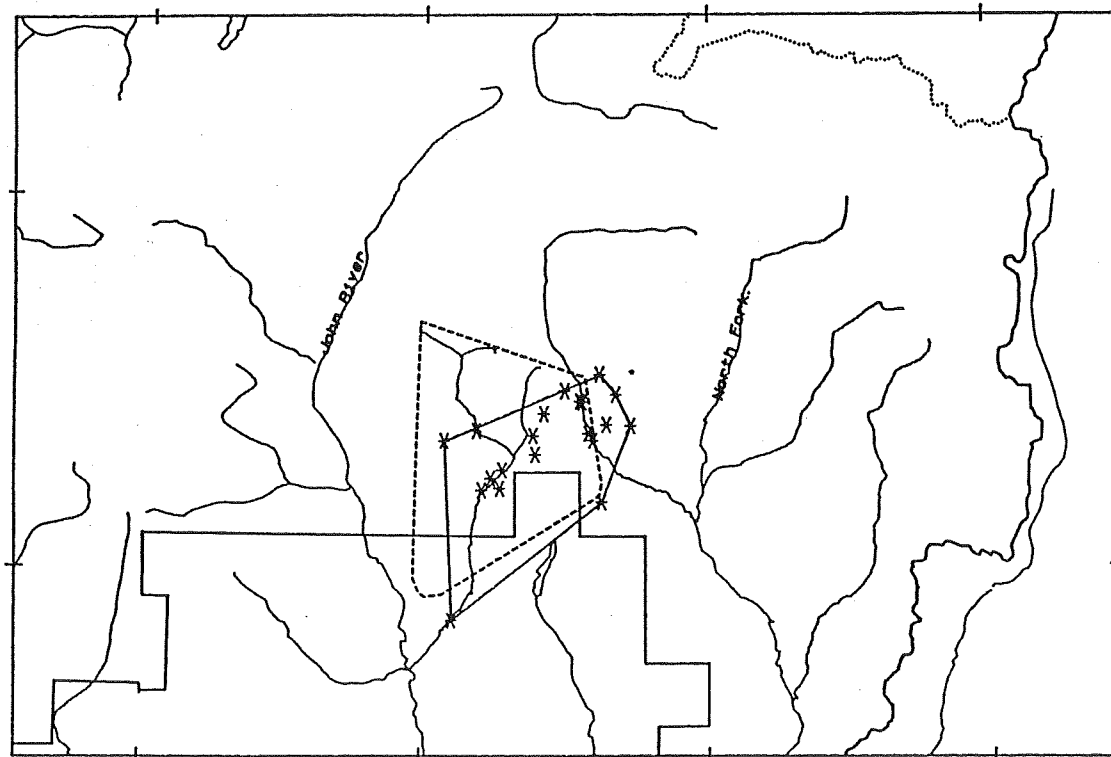


Fig. 18. Radio-locations and minimum home range of the Allen River Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

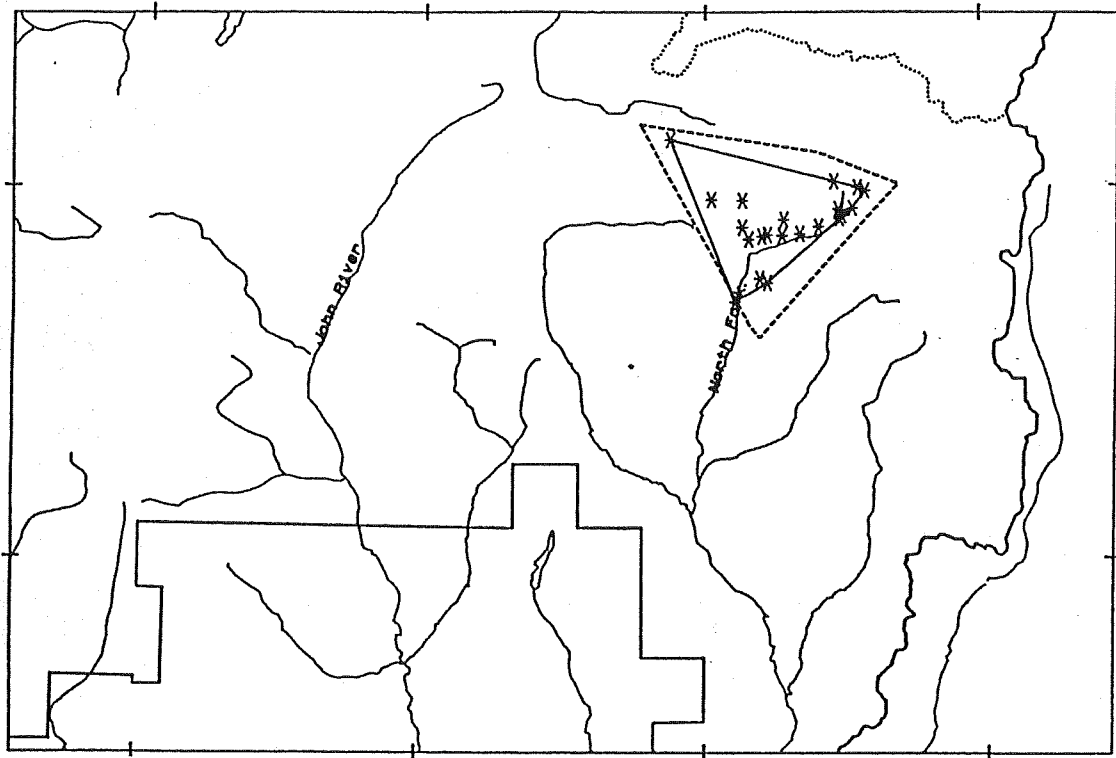


Fig. 19. Radio-locations and minimum home range of the Hanging Glacier Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988. Dashed line is 1987 minimum home range.

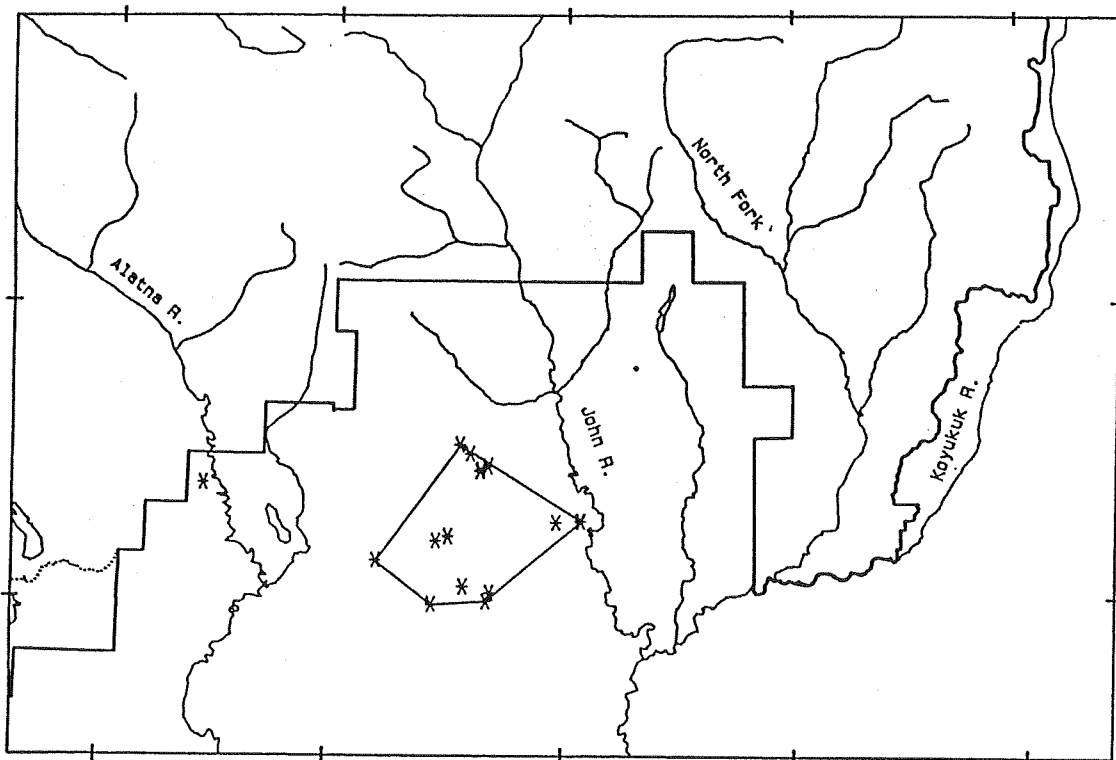


Fig. 20. Radio-locations and minimum home range of the Malamute Fork Female, Gates of the Arctic National Park and Preserve, Alaska, during 1988.

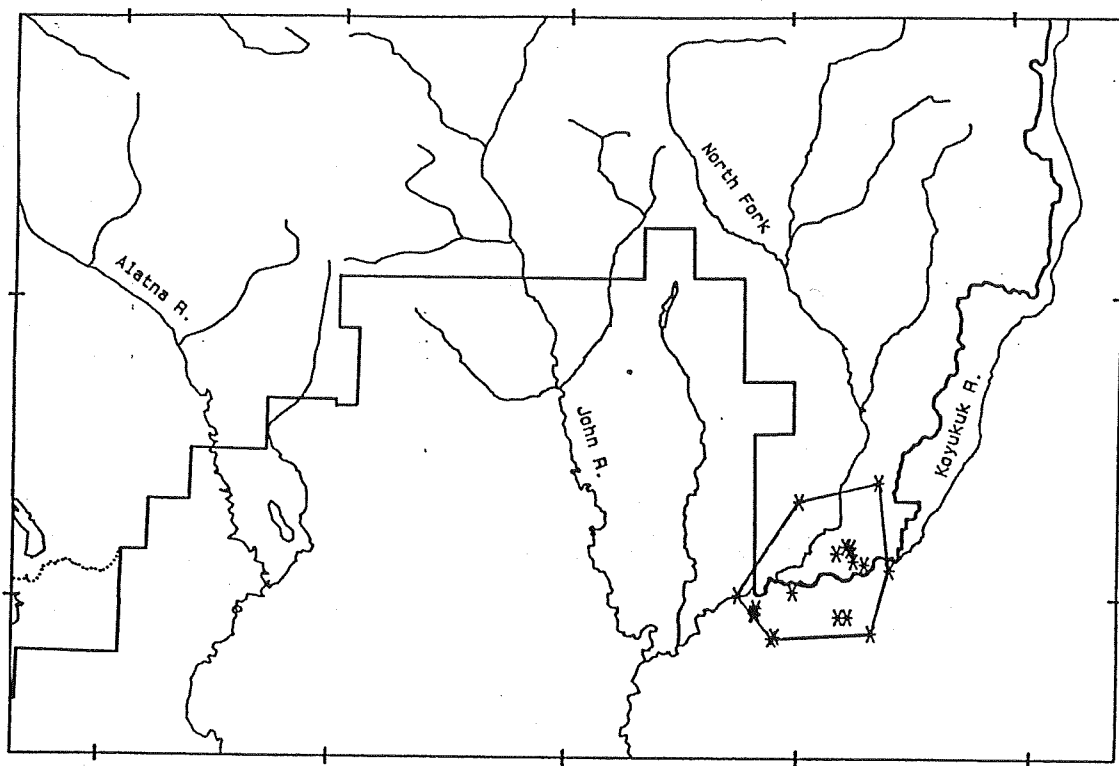


Fig. 21. Radio-locations and minimum home range of the Koyukuk Pack, Gates of the Arctic National Park and Preserve, Alaska, during 1988.