ANWR Progress Report Number FY85-5

WOLVES OF THE ARCTIC NATIONAL WILDLIFE REFUGE: THEIR SEASONAL MOVEMENTS AND PREY RELATIONSHIPS.

Gregory J. Weiler
Gerald W. Garner
Larry D. Martin
Wayne Regelin

Key words: Wolf, movements, northeastern Brooks Range, Arctic National Wildlife Refuge, food habits, reproduction.

Arctic National Wildlife Refuge
U.S. Fish and Wildlife Service
101 12th Avenue, Box 20
Fairbanks, Alaska 99701

and

Alaska Department of Fish and Game
1300 College Road
Fairbanks, Alaska 99701

27 February 1985

Wolves of the Arctic National Wildlife Refuge: their seasonal movements and prey realtionships.

Gregory J. Weiler, Gerald W. Garner, Larry D. Martin, and Wayne Regelin. U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge and Alaska Department of Fish and Game, Fairbanks, Alaska.

Abstract: Five wolf (Canis lupus) packs were located on the northern portion of the Arctic National Wildlife Refuge (ANWR) in 1984. Eleven wolves were captured and radio-collared. Collared wolves included members of three packs along and six lone wolves. The two animals of the Old Man Creek pack were killed prior to denning and no members of the Canning River pack were collared. All four packs denned in 1984 and three of the den sites were located. Three packs reared a total of seven pups and an unknown number was raised by the Canning River pack. Minimum estimate of wolves using he northern portion of ANWR in late summer was 27 adults and 7 pups.

Wolves of the Arctic National Wildlife Refuge: their seasonal movements and prey relationships.

The gray wolf (Canis lupus) has the greatest natural range of any living mammal other than man (Nowak 1983). Wolves are found throughout those portions of the remote regions of the northern hemisphere which remain relatively undeveloped by humans (Mech 1970). In North America wolves once occupied nearly the entire continent. Today their range is restricted to most of Canada and Alaska, parts of northern Minnesota and Montana (Mech 1970), northern Wisconsin (Mech 1981), and certain regions of Mexico (Brown 1983). Most taxonomists recognize 32 subspecies of wolves, of which 24 occur in North America (Mech 1970). Wolves inhabiting the northern portion of the Arctic National Wildlife Refuge (ANWR) and the northeastern Brooks Range have been classified as C. l. tundarum, the Alaska tundra wolf (Nowak 1981). This subspecies classification has been challenged by Raush (1953 as cited by Nowak 1983) and Pedersen (1978), who contend that the differences between C. l. tundarum and C. l. pambasileus (the interior Alaskan wolf) are not defined well enough to warrant C. l. tundarum's classification as a separate subspecies.

Wolves are the largest wild members of the dog family (Canidae). Adult males from most areas average 43-45 kg, while adult females average 36-39 kg (Mech 1970). Their pelage ranges in color from white to gray, brown, tawny, and black.

Wolves are gregarious animals with a highly developed social behavior which is primarily manifested in the social unit or pack. Wolf packs are loosely associated groups of animals, often family members (Mech 1970). A hierachy system usually limits breeding activity to only the dominant male and female of the pack. However, multiple litters per pack have been recorded in Alaska (Packard et al. 1983, Stephenson pers comm). Breeding in Alaska occurs in late winter from late February through March (Rausch 1967). Dens are prepared or visited by the parturient female as much as 4-5 weeks prior to parturition (Chapman 1977). In arctic areas, pups are usually born in mid-May to early June (Chapman 1977). The average litter size is 4.0 to 6.5, but varies due to many factors (Mech 1970). Within 11 to 15 days of birth the pups' eyes open and at about three weeks of age they begin to emerge from the den opening (Chapman 1977). Whelping dens are used for varying lengths of time. In arctic areas, dens are usually abandoned in July; however, some may be occupied at late as August (Chapman 1977, Stephenson pers. comm). The pups are left at rendezvous sites while the adults are hunting during the summer. Both parents, as well as other members of the pack, hunt and care for the young.

Numerous naturally occurring processes influence mortality and population numbers of wolves. In utero mortality has been reported by Rausch (1967), but the causes of such mortality were undetermined. Post-parturition mortality factors such as canine distemper, rabies, malnutrition, parasites, cannibalism, predation (golden eagles Aquila chrysaetos, grizzly bears Ursus arctos), porcupine quill infection, and accidents (Murie 1944, Kuyt 1972, Stephenson and Johnson 1972, Chapman 1977 and 1978) influence wolf populations. In 1977 all known members of a wolf pack on the Hulahula River died of rabies (Chapman 1978). Data from 22 wolf litters in a variety of

locations in North America, indicate an average summer survival rate of 85% for wolf pups (Chapman 1977). High mortality rates in wolf litters has been reported in cases where food supply was limited, or declined (Kuyt 1972, Mech 1977). It is believed that certain social mechanisms such as stress, competition, and subordination may also function to control wolf populations (Mech 1970).

Large ungulates are the predominant food items in summer scats of wolves in the north-central and north-eastern Brooks Range (Stephenson 1975, James 1983, Haugen 1984). However, significant quantities of microtine rodents, ground squirrels (Spermophilus parryi), birds, eggs, and insects are also utilized during summer by wolves in arctic Alaska (Stephenson and Johnson 1973). During the remainder of the year, large ungulates are utilized even more exclusively. In the Northwest Territories of Canada (Kuyt 1972) and northwestern Alaska (Stephenson 1979, James 1983), wolves tend to shift their ranges in correspondence with seasonal migration of caribou (Rangifer tarandus) migrations. Similar shifts may not be as prevalent in the northcentral and northeastern Brooks Range due to a greater abundance of resident prey such as Dall sheep (Ovis dalli) and moose (Alces alces).

In the past, human activity has often had negative consequences for wolves. The extirpation of wolves from extensive areas of North America and Eurasia has been directly associated with human settlement activities. Predator control and bounty programs using guns, traps, and poison effectively removed wolves from major agricultural areas of the U.S. and Canada. Government sponsored aerial hunting and poisoning of wolves during the 1940's and 1950's greatly reduced wolf populations in some areas of Alaska (Rausch and Hinman 1977). Wolf populations in many of these areas have since recovered. Wolves were relatively abundant prior to aerial wolf hunting and predator contral activities which became intensive on the north slope of Alaska in the early-mid 1950's (Stephenson per. comm.). Between 1952 and 1958 more than 1500 wolves were killed on the north slope of the Brooks Range (Harbo and Dean 1983). In 1962 it was recognized that wolf numbers on the north slope were depressed and an annual bag limit of two wolves was imposed. The Alaska Department of Fish and Game abolished bounties on wolves except for a few areas in southwest Alaska in 1968. Aerial hunting of wolves on the north slope was banned in 1970; however, wolf populations on the north slope have remained low due in part to continued illegal aerial hunting and persistent local harvest with the use of snowmobiles (Stephenson, per comm.).

Wolf population density estimates for the north-central Brooks Range in 1971-1972 ranged from 1/320 km^2 to 1/194 km^2 (Stephenson 1975). Following surveys and studies of wolves in the National Petroleum Reserve - Alaska (NPR-A), estimated wolf densities were 1/520 km^2 (coastal plain) and 1/130 km^2 (foothills and mountains) (Stepheson 1974). In the Canning River area Quimby (1974) reported a density of 1/596 km^2 in spring 1973 and 1/181 km^2 in the fall. The determination of carrying capacity of wolf habitat is a complex question and is poorly understood. Apparently the density of wolves in a given range is influenced by factors such as prey abundance, social dynamics of packs, human disturbance and harvest levels, diseases, and other ecological factors (Mech 1970, Van Ballenberghe et al. 1975, Chapman 1977, Packard et al. 1983).

Examination of recent reported sightings of wolves on or adjacent to the ANWR coastal plain (Table 1) indicate that wolves have been sighted more often in the foothills and mountain valleys to the south of the coastal plain. Biological consultants working for Arctic Gas Limited in 1972 recorded 56 wolf sightings north of the continental divide in northeastern Alaska, only six of which were on the coastal plain (Quimby and Smarski 1974). In 1973, Quimby (1974) identified four wolf packs and their corresponding home ranges in the Canning River drainage south of the coastal plain. Wolf tracks and trail systems observed in the snow indicate that members of a wolf pack in the Cache-Eagle creeks area may occasionally travel across southern portions of the coastal plain in the vicinity of the Sadlerochit mountains (Thayer pers comm.).

Wolves are probably more abundant and range primarily in the arctic foothills and mountains of the Brooks Range because prey species such as Dall sheep and moose are also more abundant in these areas all year (Thayer pers comm., Stephenson, pers comm.). Wolves tend to be less abundant on the coastal plain of the refuge because prey is less abundant on a year-round basis and because terrain renders them more vunerable to harvest (Stephenson pers comm.). When caribou are abundant on the ANWR coastal plain (May and June), most wolves are occupied with denning activities in the mountains to the south. The hunting range of denning wolves is usually limited to about 32 km radius from the den site (Stepehson pers. comm.). Thus, wolf predation on caribou on the coastal plain during calving and post-calving is probably low. The locations of reported sightings indicate that wolves roam throughout the northeastern Brooks Range and probably utilize most habitats of the area. Information is insufficient to determine habitat or area preferences.

Den sites of wolves in arctic Alaska usually are found on moderately steep southern exposures where the soil is well drained and unfrozen during summer (Stephenson 1974). Land forms such as cut banks, escarpments, dunes, kames, and moraines are often associated with wolf dens (Stephenson 1974). During the past 10 years, active wolf dens were found in mountainous terrain of the Canning, Hulahula, and Kongakut River drainages. Although wolves are known to den on the coastal plain to the west of ANWR (Stephenson 1975), no dens were found on the ANWR coastal plain even though the basic habitat requirements for denning apparently were present.

The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 opened portions of ANWR coastal plain to oil and gas exploration with seismic work starting in winter of 1983-84. Potential impacts of oil and gas development include displacement of parturient female caribou from traditional areas, increased calf mortality, displacement of muskoxen from traditional use and calving areas, scavenging by wolves at dump sites (Murie 1944, Grace 1976) and shifts of territories used by wolves in response to movements of prey species. Development of oil and gas resources on ANWR may directly and indirectly affect wolves and their prey base.

Wolves have not been intensively studied in the northeastern Brooks Range and adjacent coastal plain of Alaska. Although Chapman (1978) and Haugen (1984, 1985) conducted den site studies, data specific to numbers, movement

Table 1. Recent wolf sightings from the northeastern Brooks Range and adjacent coastal plain.

Date	Location	Number/color	Activity	Source
30 Mar. 1969	coastal plain S. Barter Island	2/gray	--------	Griffin 1969
9 Apr. 1970	Snow Cr.	1/gray	standing	Thayer 1970
10 Apr. 1970	Canning R. W. of Mt. Capleston	1/gray 2/black	feeding on moose	Thayer 1970
10 Apr. 1970	Hulahula R. S. of Kikitak Mtns.	2/gray	running	Thayer 1970
29 May 1972	Aichilik R. (foothills)	2/N.A.	moving north	Blackhall 1972
14 July 1972	Aichilik R. (foothills)	1/gray 1/black	running	Doll et al. 1972
1972	lower Aichilik R. (10 mi. from coast)	1/black		Quimby and Snarski 1974
1972	10 mi. SE Barter Island	1/black		Quimby and Snarki 1974
1972	15 mi. S. Barter Island	1/black 1/gray		Quimby and Snarski 1974
1972	Itkilyariak Cr. near Sadlerochit Mtns.	1/black		Quimby and Snarski 1974
1972	Jago R. (foothills)	1/gray		Quimby and Snarski 1974
1972	Canning R. (10 mi. N. of Ignek Cr.	1/black		Quimby and Snarski 1974
1972	Sadlerochit Mtns. (5 mi. E. of Katakturuk R.)	2/black		Quimby and Snarski 1974
1972	Upper Sadlerochit R.	2/black 1/gray		Quimby and Snarski 1974
1972	Canning R. (Cache and Eagle Cr.)	Numerous sightings		Quimby and Snarski 1974 Magoun 1976
25 June 1977	Marsh Cr. (12 mi. from coast)	3/N.A.	resting	Magoun and Robus 1977
July 1980	Jago R.(25 mi. from coast)	1/black	scavenging	Weiler, ANWR
July 1981	Jago R. (coastal plain)	1/gray		Ross, ANWR
July 1982	Kongakut R. (5 mi.S. of caribou pass)	1 gray	harassment of bear	Weiler, ANWR
March 1982	Canning R. (near Eagle Cr.)	2/gray 5/black	feeding on kill	Ross, ANWR
6 July 1982	Kongakut R.	1 Blk		Phillips,ANWR
9 July 1982	Caribou Pass Area	1 Gray		Phillips,ANWR
9-14 July 1982	Caribou Pass Area	1 Gray	on caribou carcass	Phillips,ANWR

Table 1. (Continued)

Date	Location	Number/color	Activity	Source
18 July 1982	Caribou Pass Area	1 Gray		Phillips,ANWR
22 July 1982	Caribou Pass Area	1 Gray		Phillips,ANWR
9 July 1982	Caribou Pass Area	1 Gray		Phillips,ANWR
25 May 1983	Kongakut R Caribou Pass Area	1 Blk		Phillips,ANWR
28 May 1983	Kongakut R. Caribou Pass Area	2 Blk/Gray		Phillips,ANWR
3 June 1983	Kongakut R. Caribou Pass Area	1 Blk		Phillips,ANWR
22 June 1983	Kongakut R. near VABM	4 Blk/3 Gray		Phillips,ANWR
28 June 1983	Kongakut R. Caribou Pass Area	1 Blk		Phillips,ANWR
30 June 1983	Whale Mtn. Kongakut	2 Blk/Gray	howling	Haugen 1984
1 July 1983	Whale Mtn. Kongakut	1 Blk		Haugen, 1984
1 July 1983	Den Cr. Kongakut	2 Gray	resting	Haugen, 1984
2 July 1983	Kongakut R. Caribou Pass Area	1 Blk		Phillips,ANWR
17 July 1983	Hulahula	1 White	traveling	Haugen 1984
20 July 1983	Kongakut R. Caribou Pass Area	1 Gray		Phillips,ANWR
23 July 1983	Kongakut R. Caribou Pass Area	1 Blk		Phillips,ANWR
25 July 1983	Moose Cr. Canning R.	1 pup		Haugen, 1984
5 Aug 1983	Kongakut R. Caribou Pass Area	1 silver		Phillips,ANWR
6 Mar. 1984	Kekiktuk R.	7/black 1/gray	hunting caribou	Weiler, ANWR

patterns, and requirements of wolves using the area is lacking. Therefore, a study was initiated during spring 1984 with the following objectives:

1. Define the seasonal ranges of individual wolves and associated packs that use the north slope of the Brooks Range and the coastal plain in the Arctic National Wildlife Refuge.

2. Determine seasonal availability of potential prey within the ranges of study wolves.

3. Determine the seasonal diets of study wolves and relate foods consumed to prey availability.

4. Document predatory behavior and social interactions of selected study wolves during the denning season. (This objective is being addressed in a secondary study being conducted by H. Haugen as part of a M.S. program through the University of Alaska).

Methods and Materials

The study area included the coastal plain, adjacent foothills and mountains of the Arctic National Wildlife Refuge and extended south of the continental divide in the Brooks Range, east into Canada and west past the Canning River as necessary to follow movement of collared wolves. A detailed description of the area was presented in the Initial Report - Baseline Study of the ANWR coastal plain (USFWS 1982).

Field work was based at Barter Island and extended from 28 April to 8 November 1984. Wolves were captured between 19 May and 5 July using a Bell 206B Jetranger helicopter. Fixed-wing aircraft were used to help locate wolves and direct the helicopter with the capture crew to the site.

M 99 (Etorphine, 1mg/ml, D-M Pharmaceuticals) was injected using a Cap-Chur Rifle, 3cc syringes, and low power charges (Palmer Chemical and Equipment Co., Douglasville, GA). All animals recovered after the antidote (M 50-50, Diprenorphine, 0.2 mg/ml, D-M Pharmaceuticals) was administered at 1.5 the dosage of M-99. Two-thirds of the M 50-50 dosage was administered intravenously through the brachial artery in the front leg with the remaining one-third intramuscularly in the rump to offset potential recycling effect of etorphine. Captured animals were measured, weighed, ear-tagged, and fitted with a collar containing a radio transmitter (Telonics, Inc. Mesa, Az). Rectal temperatures were taken using a digital thermometer at the time of immobilization and at periodic intervals during processing. Photographs were taken of the animal with close ups of the teeth to be used at a later date in confirming age estimates. In addition, blood was drawn from the brachial artery using vacutainers (Bectian-Dickinson, Rutherford, NJ) for seriological study by Alaska Department of Fish and Game personnel.

Preliminary activity areas used by denning wolves were determined by plotting radio locations for the individual pack or wolf and subjectively encircling the locations based upon wolf movement patterns. This polygon represents a subjective interpretation of the area used by the wolves based on radio locations, tracks in the snow, and likely travel routes. Due to the limited

number of observations of wolves at this stage of the project, these areas are used for discussion purposes and are not considered a measurement of territory size.

Active wolf dens were inspected on the ground following abandonment by the pack. The area surrounding each den was searched and all scats and bones were collected. Scats and food items will be analyzed to determine prey species utilized by the wolves. Scat analysis are partially complete for the Kongakut River den and Canning River den (see Haugen 1985). Scats collected at the Aichilik den sites are currently being analyzed.

Results and Discussion

Capture

Eleven wolves were captured and radio collared in the northern portion of ANWR between 19 May and 5 July 1984 (Table 2). Collared wolves included members of three different wolf packs and six lone wolves. In addition, two other wolf packs were located but no known members of these packs were captured. Four of the five packs denned in 1984 and three den sites were located. The fifth pack consisted of two wolves which were killed by local hunters prior to denning.

The first attempt to capture wolves occurred between 28 April-4 May. During the previous two weeks, there were seven reported sightings of wolves in drainages on the north slope portion of the ANWR by the Alaska Department of Fish and Game and USFWS personnel. Several sightings were of wolves digging at apparent den sites. Although searches were conducted using a helicopter and a fixed-wing spotter plane, wolves were only located twice, indicating that the wolves were still wandering and had not taken up residence at a den site. Inclement weather also hampered search efforts. Both times wolves were located, capture efforts were unsuccessful. On one attempt, the tracks of two wolves that had been sighted several times previously were being followed. However, local hunters killed both wolves before the capture crew could locate them. (see Old Man Creek pack history).

During the second effort, four wolves were located but inclement weather (snow storm) obscured the wolves before they could be darted. Subsequent capture efforts were opportunistic from May through July. Wolves were located during survey or capture efforts on other projects; most of the wolves captured were located during surveys for caribou.

Dark colored wolves were more readily located than gray colored wolves. This was true not only for initial sightings but also while radio-tracking wolves and maintaining visual contact with wolves until capture. Differential detectability of dark and gray wolves was not expected and contrasted with reports by Ballard et al. (1981).

Wolves were initially captured using 2.5 cc of M-99, but this dosage was increased to 2.75 cc and again to 3.0 cc after several wolves were not fully immobilized or attempted to escape when approached. No problems were

Table 2. Comparison of physical measurments of wolves captured between 19 May and 5 July 1984 on the Arctic National Wildlife Refuge, Alaska.

Wolf No.	Date of Capture	Sex	Color	Estimated age	Weight lbs/kgs	Body length(cm)	Tail length(cm)	Heart girth(cm)	Upper canine (mm)	Lower canine (mm)	Reproductive condition
1	19 May	M	Dark brown	1 yr	84/38.1	128	46	76	26.1	26.1	Testes withdrawn
2	2 June	F	Tawny	3 yrs	85/38.6	121	43	70	25.5	22.5	No evidence of breeding or suckling
3	5 June	M	Gray	1-2 yrs	87/39.5	131	45	75	27.8	25.6	
4	25 June	M	Black	2-3 yrs	100/45.4	137	46	71	28.5	27.9	Not fully distended
5	25 June	M	Gray	3-4 yrs	94/42.7	121	46	79	31.8	26.9	
6	26 June	F	Dark brown	2 yrs	72/32.7	114	40	68	28.8	25.4	No evidence of breeding or suckling
7	27 June	M	Brown	3 yrs	99/44.9	140	46	78	28.5	25.8	
8	27 June	F	Brown	2-3 yrs	88/39.9	117	42	77	27	25.5	No evidence of breeding or suckling
9	30 June	F	Gray	2-3 yrs	88/39.9	134	48	83	24.3	23.5	No evidence of breeding or suckling
10	5 July	M	Gray	4 yrs	115/52.2	142	49	80	32.6	27.7	Testes - left L-41mm W-22.2 mm
11	5 July	F	Dark brown	6-8 yrs	65/29.5	117	45	59	R - 18.4 L - 26.4	R - 23.8 L - 24.2	Has been suckling; L 11.4 W 8.3; Lactating

encountered with wolves that were injected with 3.0 cc of M-99 initially. Recovery of wolves after the antagonist M 50-50 was administered intravenously averaged 61 sec with times ranging from 35 sec to 94 sec. Two wolves had M 50-50 injected intramuscularly and recovered in 10 min and 21 min respectively.

The spotter plane in combination with a helicopter for capture worked very well for wolf capture. Wolves on open tundra and in treeless valleys and were highly manuverable and were often pursued using the helicopter until they tired before being shot. The spotter plane maintained visual contact with the darted wolf and the helicopter landed some distance from the animal. This method allowed the wolves an opportunity to stop running and calm down before the drug took effect.

There was concern about the animals becoming overheated due to the warm summer temperatures and the length of the chase. Several wolves had elevated temperatures of 41.1°C. When temperatures were elevated, the animal was monitored until temperatures fell to 39.4°C before being processed. One wolf was immobilized on aufeis and her temperature dropped from 39.9°C to 35.9°C in 16 min. The wolf's body temperature returned to normal much faster than expected based on experience with brown bears in the same area.

Age Structure of Captured Wolves

Only two wolves (#10 and #11) were captured that were more that three years of age (Table 2). Wolf #11 was the only female that had previously bred and was lactating at the time of capture. Wolf #10 was the only male which, based upon testicular development, could have been a breeding male. Young, non-breeders comprised 82% of the wolves captured.

The age structure of captured wolves probably does not reflect the age structure of the population; however, several biases of the capture effort likely skewed the age structure of captured wolves towards young age animals. Young animals of the 2- to 3-year old age group may have been dispersing from established packs on both the north and south sides of the Brooks Range. Dispersing animals may center their activities around major concentrations of caribou and the lone wolves captured on the coastal plain of ANWR in 1984 may have been dispersing wolves. All lone wolves captured (#2, 3, 4, 5) were in the 1- to 4-year old age class (Table 2). Also, older wolves may have been more adept at avoiding aircraft. Avoidance reactions to aircraft could be the result of the wolves having experience with aerial hunting in the past. Another source of bias was the intentional avoidance of capturing wolves at or near a den site. Therefore, older animals active in rearing pups near the den site would not have been captured.

Movements and Activity Areas of Radio-collared Wolves

Sadlerochit Pack. The Sadlerochit pack consisted of three wolves. The den was not located, but the pack reared one pup in 1984. This pack was first observed on 6 March 1984 as they were hunting caribou. At

this time the pack contained eight wolves, seven dark and one gray. Several days later three wolves from this pack were shot by local hunters.

On 26 June a brown 2-year old female (#6) was captured and a brown 6 to 8 year old female (#11) was captured on 5 July (Fig. 1). Wolf #11 was lactating at the time of capture. The third wolf, a large gray male, eluded capture twice. The pack utilized the area on and near the Sadlerochit River until late July. In late July and early August the pack expanded their range to include the Canning River and Cache and Eagle Creeks area. On 7 August a lone wolf pup was observed following an adult caribou in Ignek Valley. The pup was first observed with the pack on 29 August.

In mid-October a black wolf had joined the pack while the young female (#6) appeared to disperse east to the Okpilak River (Fig. 1). Wolf #6 was located five times between 15 October and 6 November. All sightings were on the Okpilak River with the exception of the 3 November location when the wolf was east of the Jago River near a caribou carcass. The remainder of the pack continued to use the same area as before. The last sighting of the pack was on 8 November.

Aichilik Pack. The Aichilik pack consisted of seven wolves - three gray, three dark brown, one black. The den site was located on 12 June (Fig 2). This pack reared four pups in 1984. The breeding female was a gray. Both collared wolves (a 1-year old and a 2- to 3-year old female) used the coastal plain in the vicinity of the Aichilik River extensively during the month of June. Wolf #1 dispersed east into Canada between 4-17 July and then returned to the vicinity of the Aichilik River. Wolf #8 dispersed east as far as the Kongakut River on 23 July and then returned to the Aichilik River area. Both of these dispersals were probably due to the wolves searching for caribou. The caribou migration had reached the mountains near the Upper Firth and Kongakut Rivers by the time these wolves dispersed, and few caribou remained on the coastal plain area. This probably explains the wolves' rapid return to the Aichilik River area. Both wolves were usually alone when they were radio tracked. Only twice after the pack left the den site was either collared animal found with the pack. Limited tracking data during August-November (mainly due to poor flying conditions) suggests that the wolves (and probably the pack) moved south as far as Double Mountain on the Sheenjek River (Fig. 2). They then moved north and crossed the divide into the Drain Creek upper Aichilik River area. These wolves seem to be hunting in the mountains and may cross back and forth across the continental divide area on a regular basis.

Canning River Pack. On 15 March, 1984 five gray wolves were found on the Canning river several km north of the Marsh Fork of the Canning River. This was likely the same pack that denned on the Canning River. Observations were difficult to obtain due to the location of the den site. Although no pups were seen, scats from pups were picked up after the wolves left the den area in late June-early July (See Haugen 1985).

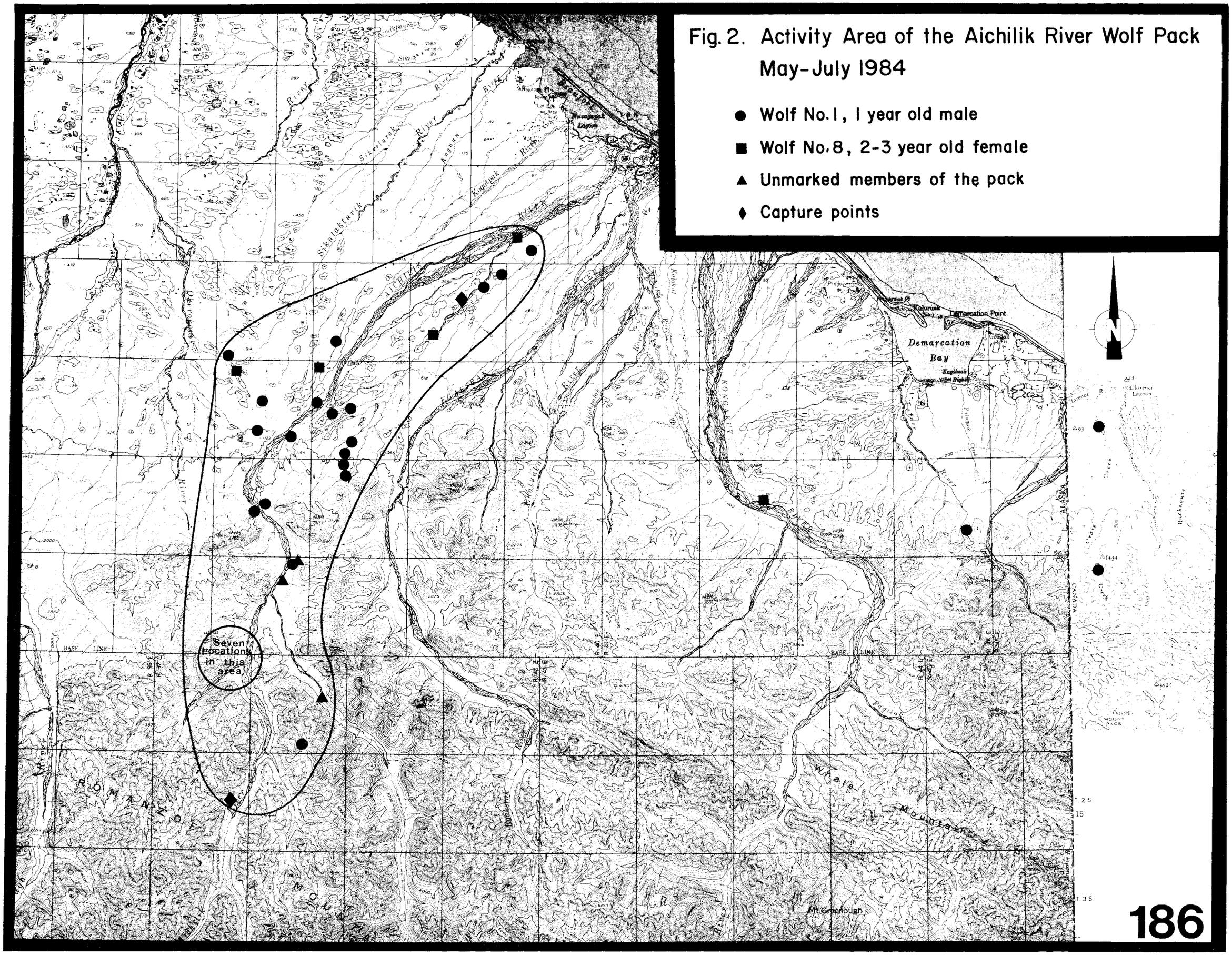
On 26 June a small light brown wolf was found on the Canning River six to eight km north of the den site. This wolf eluded capture when it ran into a

Fig. 1. Activity Area of the Sadlerochit Wolf Pack

- ● Wolf No. 6, 2 year old female, June 26 - Sept. 17
- ■ Wolf No. 11, 6-8 year old female, July 5 - Nov. 8
- ▲ Unmarked wolves belonging to the pack
- ---- Midsummer center of activity
- ♦ Capture point

Fig. 2. Activity Area of the Aichilik River Wolf Pack May-July 1984

- ● Wolf No. 1, 1 year old male
- ■ Wolf No. 8, 2-3 year old female
- ▲ Unmarked members of the pack
- ♦ Capture points



stream bottom with a heavy growth of high willows and could not be found. On July 5 a large gray wolf (#10, 4-year old male) was found at the same location that the light brown wolf was found. The gray was captured and was thought to have been a member of the Canning pack. This wolf was radio tracked three times between 7 July and 7 August. Each time the wolf was on the Marsh Fork and was alone. This wolf was not located after 7 August and the Canning pack was never found after it left the den. It was unknown whether wolf #10 was a member of this pack.

Wolf #2. Wolf #2 was a 3-year old, tawny colored female that was captured on 2 June 1984. This wolf was located 14 times between 2 June and 17 June, each time she was alone and on the coastal plain or in the foothills (Fig. 3). On 19 July she was located with a gray wolf. Wolf #2 was found with this gray wolf three more times and was with it on June 25 when the gray was captured. The gray wolf (#5) was a 3 to 4 year old male. The two wolves were located together five times between 26 June and 4 July, but had separated on 6 July. Between 17 July and 28 July wolf #2 traveled to the south side of the Brooks Range and was near Conglomerate Mountain which is approximately 106 km southwest of her last locations. Wolf #2 was not located again until 11 September when she was found back on the northside of the Brooks on the Kongakut River. On 29 October Wolf #2 was still in the same general area, but was with a black wolf. Wolf #2 was still with the black wolf on November 7, but had traveled east and was on the Firth River, approximately 40 km into Canada and 106 km from its last location.

Wolf #5. Wolf #5 was a 3- to 4-year old gray male. The first sighting was on 19 June when it was with wolf #2 (Fig. 4). It was observed three times between 14 June and 24 June running with wolf #2 and was captured on 25 June. Wolf #5 was located five times with wolf #2 between 26 June and 4 July. On 6 July it was separated from wolf #2. Wolf #5 remained alone and in the same general area between 6 and 9 July. After the location on 9 July it left the area and was not found again until 8 November when it was located on the Ivishak River with four other wolves, a move of approximately 217 km straight line distance southwest from the last location. The wolves with wolf #5 were very wary of the airplane and acted as if they had been exposed to aerial hunting while wolf #5 seemed unconcerned with the aircraft. This differential behavior suggested that wolf #5 may have recently joined this pack or may have previously been a member but had acclimated to aircraft during tracking flights on the coastal plain. Wolf #5 has not been found since 13 August.

Wolf #3. Wolf No. 3 was a gray 1- to 2-year old male. It was captured on 5 June 1984. It was located eighteen times between 5 June and 13 August (Fig. 5) . Wolf #3 stayed east of the Kongakut River until 9 June when it moved west. Between 6 June and 21 June it utilized the coastal plain between the Aichilik and Kongakut Rivers. On 25 June it had moved east, was located in Canada, south of Clarence Lagoon and was near the Clarence River on 27 June. These last two locations coincide with the movements of large concentrations of caribou as they started leaving the ANWR coastal plain (Whitten et al. 1985). Wolf no. 3 then moved west and was on the coastal plain near the Aichilik and Egaksruk River between 8 July and 13 August.

Wolf #4. Wolf No. 4 was a large, black, 2- to 3-year old male and was captured

on 25 June 1984. This wolf was found on the coastal plain between the Clarence River and Craig Creek from 25-28 June (Fig. 6). When located on 17 July it had moved approximately 61 km southeast to the Firth River. The wolf was still at this location on 29 July. Wolf #4 was next located on 28 August near Ammerman Mountain approximately 112 km southwest of its last location. On 22 and 27 September wolf #4 was still in the vicinity of Ammerman Mountain with a gray wolf. A radio fix on 15 November showed it was still in the general area.

Kongakut River Pack. This pack consisted of six wolves and reared two pups in 1984. They denned at a site that was used in previous years. A graduate study at the den site was conducted by H. Haugen (see Haugen 1985). On 27 June, Haugen reported seeing several wolves of the Kongakut pack traveling up one of the tributary drainages of the Kongakut River. This drainage was searched and a brown, 3-year old male (wolf #7) was located and captured. Between 27 June and 28 July this wolf was located five times (Fig. 7). In each case, the wolf was alone and on the Kongakut River. This wolf then disappeared and was not located until 20 September. At this time it was in the vicinity of the Bell River in Canada, a move of over 193 km from its last location. On 6 December it was again located in the mountain west of Aklavik, Canada, a move of approximately 64 km. The last move coincided with the movement of caribou northeast into the area around Aklavik. Haugen reported two brown wolves frequenting the Kongakut den. After wolf #7 was captured, Haugen reported that the one brown wolf never returned to the den. Haugen was able to monitor the radio collar frequencies and confirmed that wolf #7 never returned to the den. Although it is possible that #7 was not a member of the Kongakut pack, Haugen's observations suggested that it was.

On 30 June wolf #9 (gray, 2- to 3-year old female) was captured on the Kongakut River. Wolf #9 was located six times between 30 June and 13 August and was alone and on the Kongakut River each time (Fig. 7). During this time, Haugen observed this wolf visiting the den on five occasions. On 19 September, it was located on Aspen Creek in Canada and had moved back to the den site on 28 October. When next located, on 8 November, it was on a tributary of the Kongakut River approximately 19 km south of her last location. Wolf #9 was never located with the pack after they left the den.

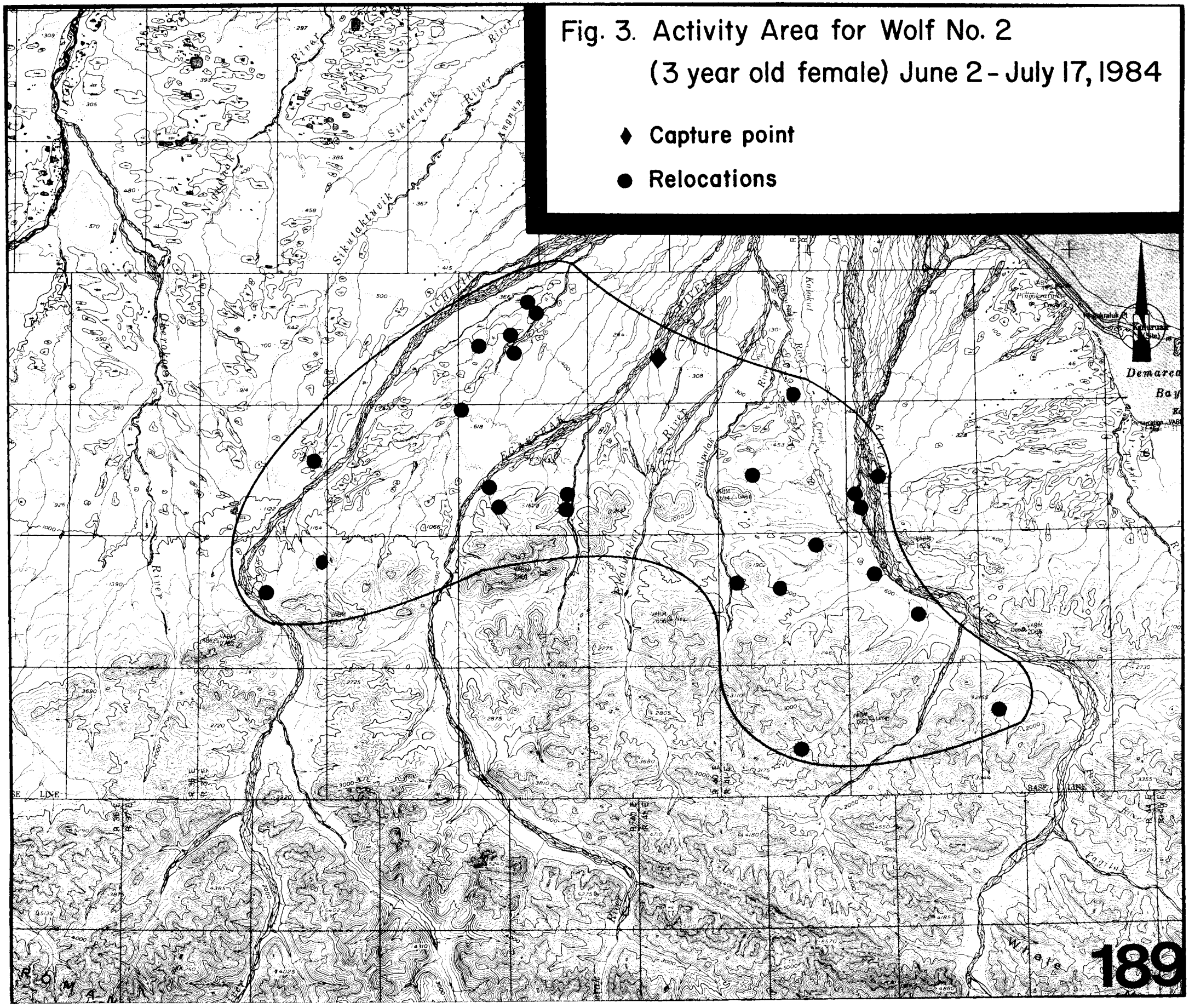
Two pups from the Kongakut pack were found 6 km north of the den on 19 July. The pups were alone and this was the first time the were observed away from the den site. During a moose survey on 31 October, a pack of wolves, consisting of three adults and two pups was found in a small drainage on the west side of the Kongakut River. These wolves probably belonged to the Kongakut Pack. This is the only sighting of the pack after it left the den site.

Old Man Creek Pack. This pack contained two wolves, a black 3 to 4-year old female and a tawny 2- to 3-year old male. These wolves were first located on Old Man Creek on 19 April. On 28 April they were found in the same area and tracks in the snow indicated that they were utilizing the Old Man Creek area between the Hulahula River and Okpilak River. These two wolves were killed on 2 May by local hunters. When the carcasses were examined, the female was carrying four pups, (two male, two female) within two to three weeks of parturition. These two wolves were probably going to den in the Old Man Creek area.

Fig. 3. Activity Area for Wolf No. 2
(3 year old female) June 2 - July 17, 1984

♦ Capture point

● Relocations



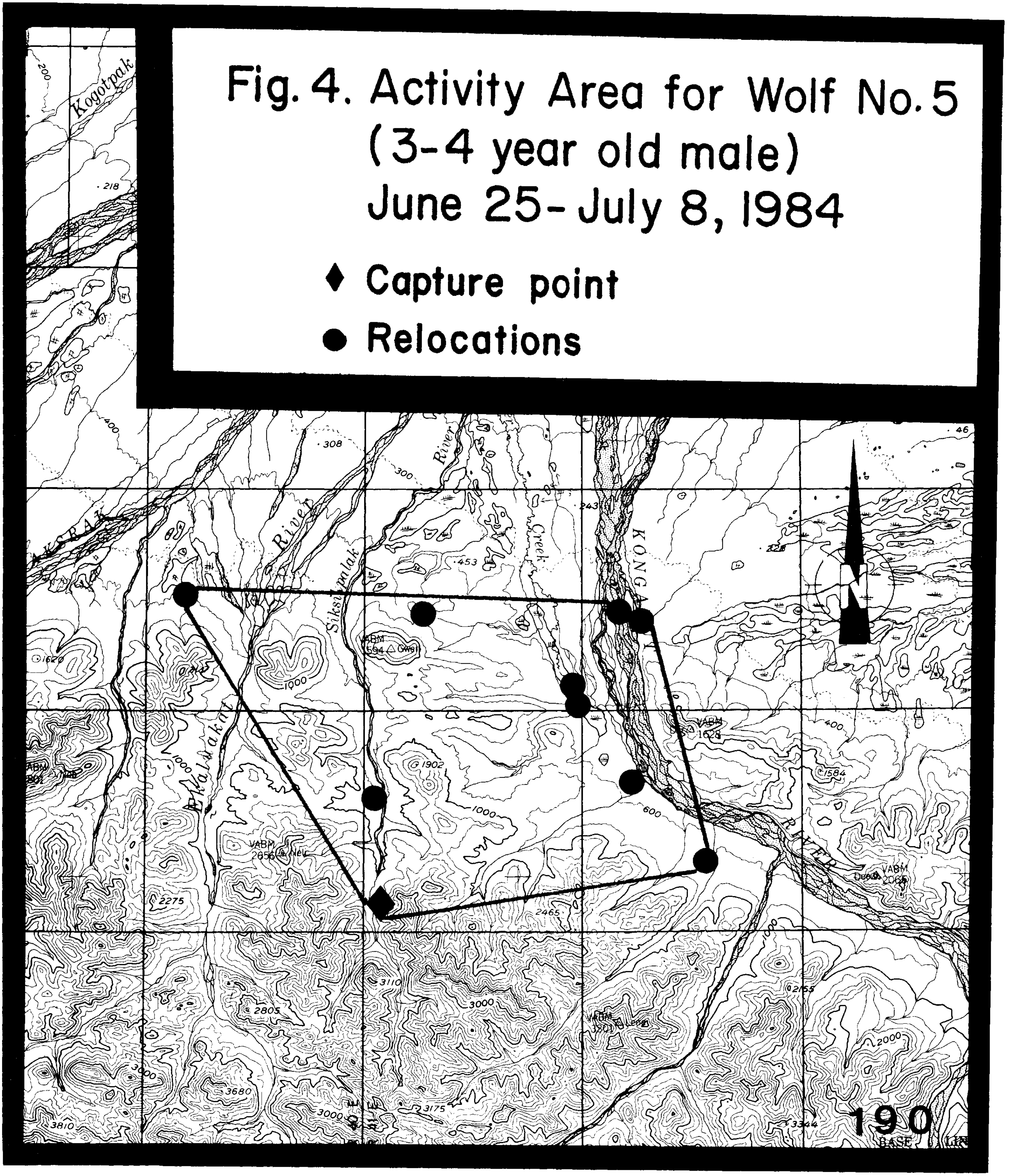


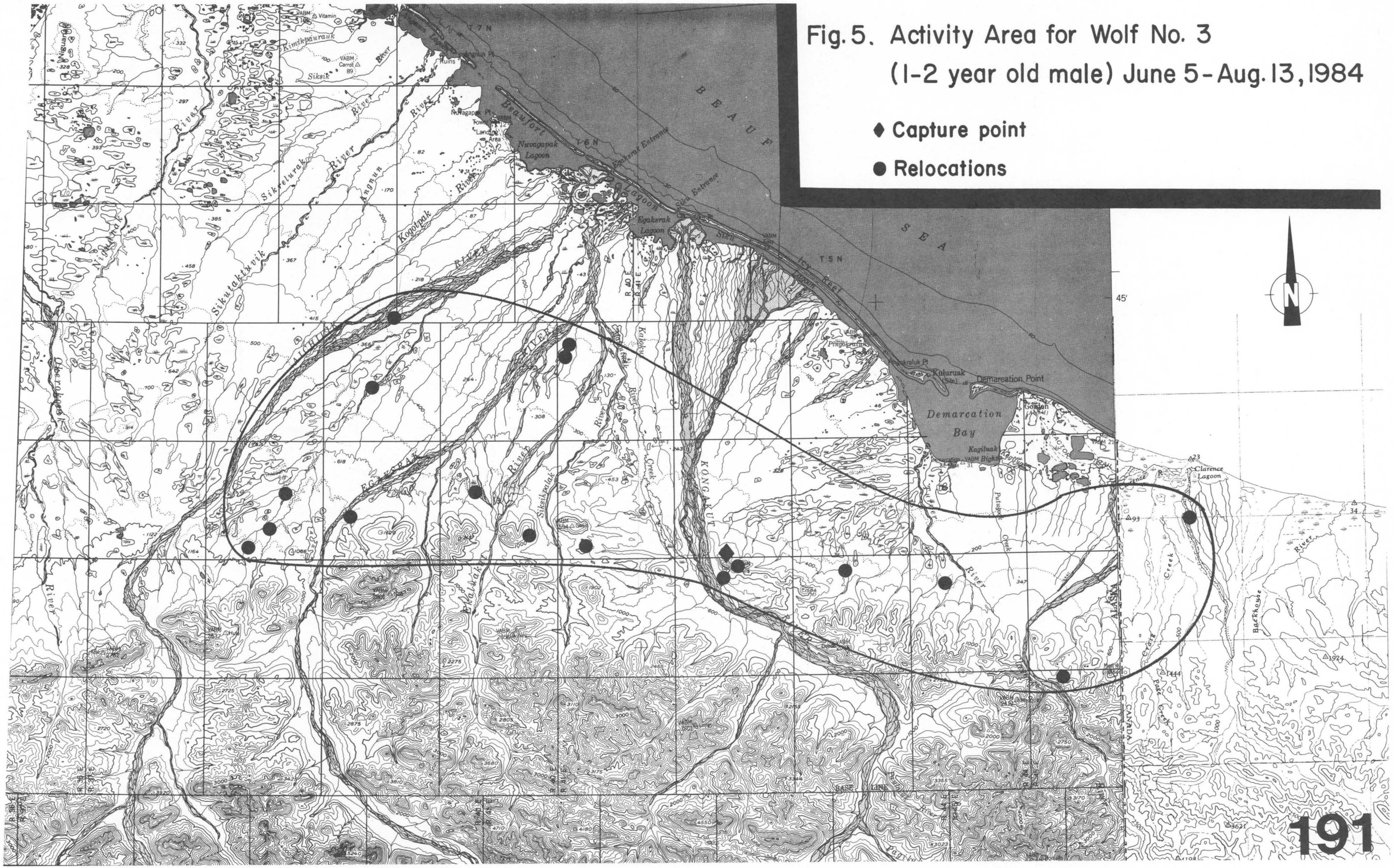
Fig. 4. Activity Area for Wolf No. 5
(3-4 year old male)
June 25- July 8, 1984

♦ Capture point
● Relocations

Fig. 5. Activity Area for Wolf No. 3
(1-2 year old male) June 5 - Aug. 13, 1984

♦ Capture point

● Relocations



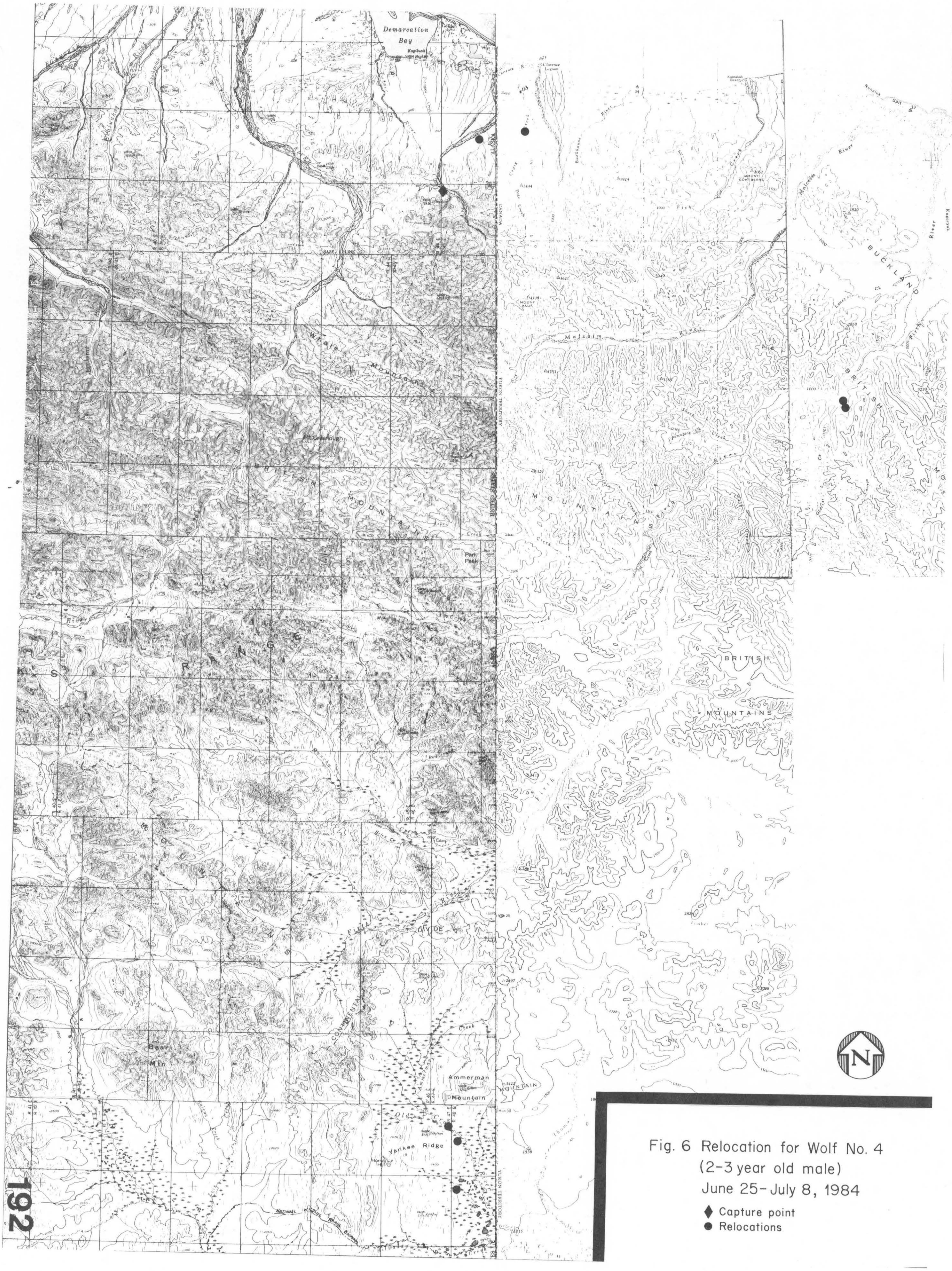
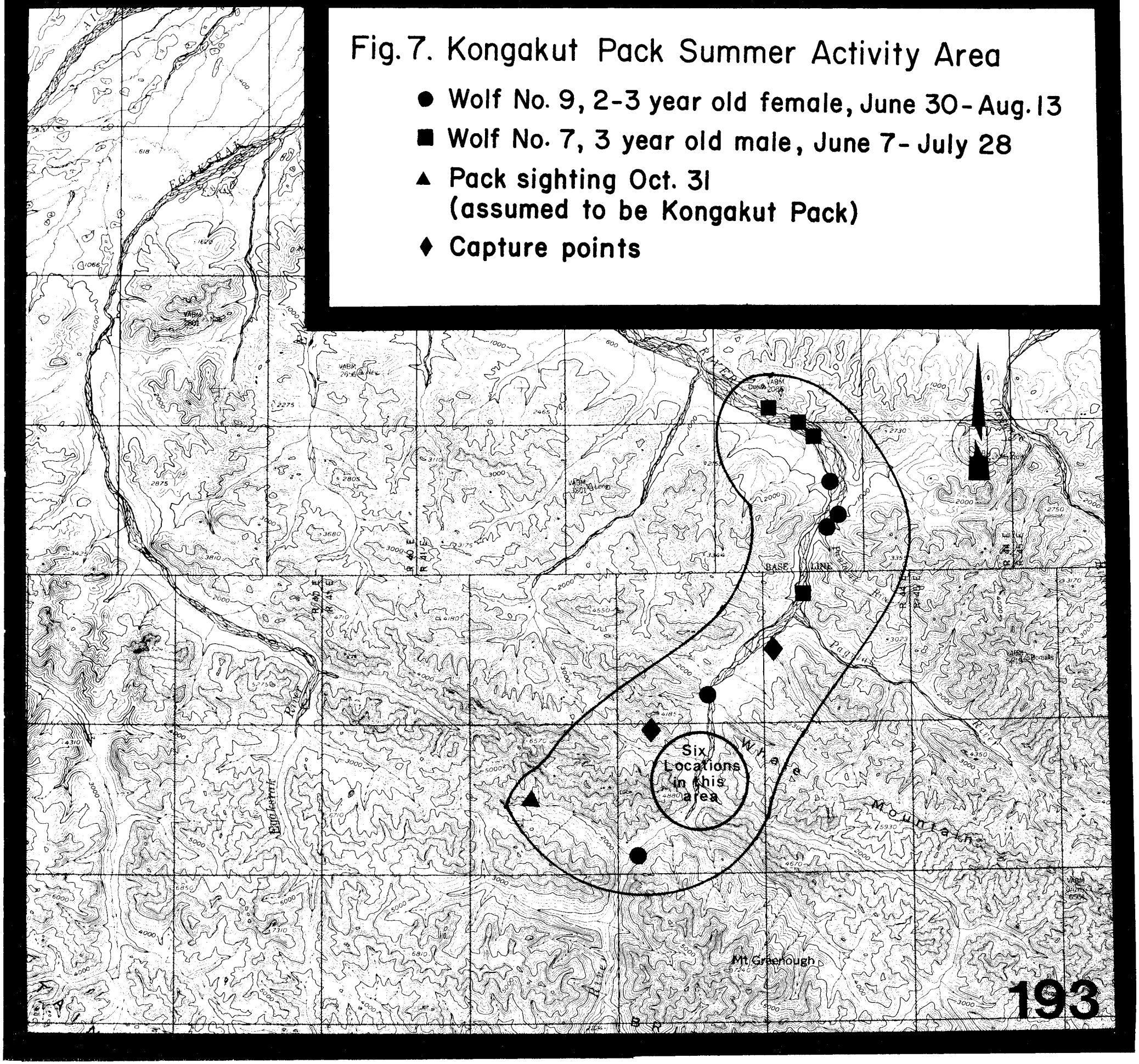


Fig. 6 Relocation for Wolf No. 4
(2-3 year old male)
June 25-July 8, 1984

Fig. 7. Kongakut Pack Summer Activity Area

- ● Wolf No. 9, 2-3 year old female, June 30 - Aug. 13
- ■ Wolf No. 7, 3 year old male, June 7 - July 28
- ▲ Pack sighting Oct. 31 (assumed to be Kongakut Pack)
- ♦ Capture points



Other Wolf Packs. In 1977, rabies killed all known members of a wolf pack using the Hulahula River drainage (Chapman 1978). Since that time there have been no reported sightings of wolves in this drainage. However, tracks of wolves along the river are not uncommon and wolves have been heard howling in the area. During 1984 capture efforts three intensive helicopter searches were flown along the Hulahula and some of its tributaries. In addition, several flights with fixed-wing aircraft were flown. No wolves were located although tracks were found several times.

The reported sightings of wolves and tracks east of the Kongakut River as well as in the Caribou Pass area (Table 3, Fig. 8) indicated that there are more wolves using this area than were documented in the Kongakut River pack. Apparently there was another pack in the area between the Kongakut and Clarence Rivers near the head waters of the Pagilak River.

Distribution

Wolves used the coastal plain east of the Aichilik River extensively. The apparent non-use of the coastal plain to the west of the Aichilik River may be due to the distribution of caribou, however, the opportunistic capture effort which concentrated in western portion of the coastal plain probably biased such results. The Porcupine caribou herd had occupied the coastal plain as far west as the Jago River. Major concentrations of caribou had moved east of the Aichilik River by 21 June (Whitten et al. 1985). Eight wolves were captured after 25 June. The majority of these wolves were located by researchers surveying caribou. The use of the coastal plain by the wolves coincided with the distribution of caribou at that time (Whitten et al. 1985). Because wolves were captured in mid-late summer no observations are available for determining use of the coastal plain by wolves during late May to mid-June.

Population

Minimum estimate of wolves using the northern portion of ANWR in late summer 1984 was 27 adults and 7 pups (Table 4). These numbers included known lone wolves, adults and pups from three packs with an estimate of adults from the Canning pack. No estimates of pups from the Canning pack were possible. Five adult wolves were known to have been killed and three additional wolves were suspected to have been killed in late winter 1984, and these animals are not included in the late summer minimum population estimates.

Table 4. Numbers of known wolves using the northern portion of ANWR in late summer 1984.

Pack	Number of adults	Number of pups
Lone wolves	5	-
Canning River	5 (est.)	unknown
Sadlerochit River	4	1
Aichilik River	7	4
Kongakut River	6	2
Totals	27	7

Table 3. Miscelaneous wolf sightings on the Arctic National Wildlife Refuge, Alaska, 1984.

Date	Reference No.[a]	No. of Wolves	Color/s
12 April	20	1	Gray
14 April	1	2	Black, Gray
15 April	3	5	Grays
19 April	5	2	Black, Tawny
20 April	18	2	Black, Gray
28 April	6	1	Black
28 April	7	2	Black, Tawny
2 May	8	2	Black, Tawny
4 May	21	2	2 Dark, Gray
4 May	26	4	3 Gray, 1 Dark
5 May	4	1	Blond
20 May	24	2	Black, Gray
5 June	*	1	Gray
16 June	14	1	Unknown
18 June	13	1	Brown
14 June	29	1	Brown
22 June	10	1	Gray
22 June	15	1	Gray
22 June	16	1	Gray
22 June	27	3	2 Gray, 1 Dark
23 June	12	1	Brown
23 June	28	1	Gray
26 June	2	1	Lt. Brown
28 June	11	2	Black, Gray
29 June	*	1	Gray
29 June	*	1	Gray
30 June	*	1	Gray
30 June	*	1	Black
1 July	*	1	Gray
1 July	*	1	Brown
1 July	*	1	Gray
2 July	*	2	Gray, Black
3 July	*	5	3 Gray, 2 Black
10 July	*	1	Black
19 July	25	2	pups
17 Sept	19	2	Gray, Brown
23 Sept	9	1	Brown
30 Oct	17	1	Gray
31 Oct	22	5	Gray, Black, White, 2 pups, tawny, gray
31 Oct	23	1	Dark

[a]Number corresponds to location number on Fig. 8.
*Located in area circled on Fig. 8.

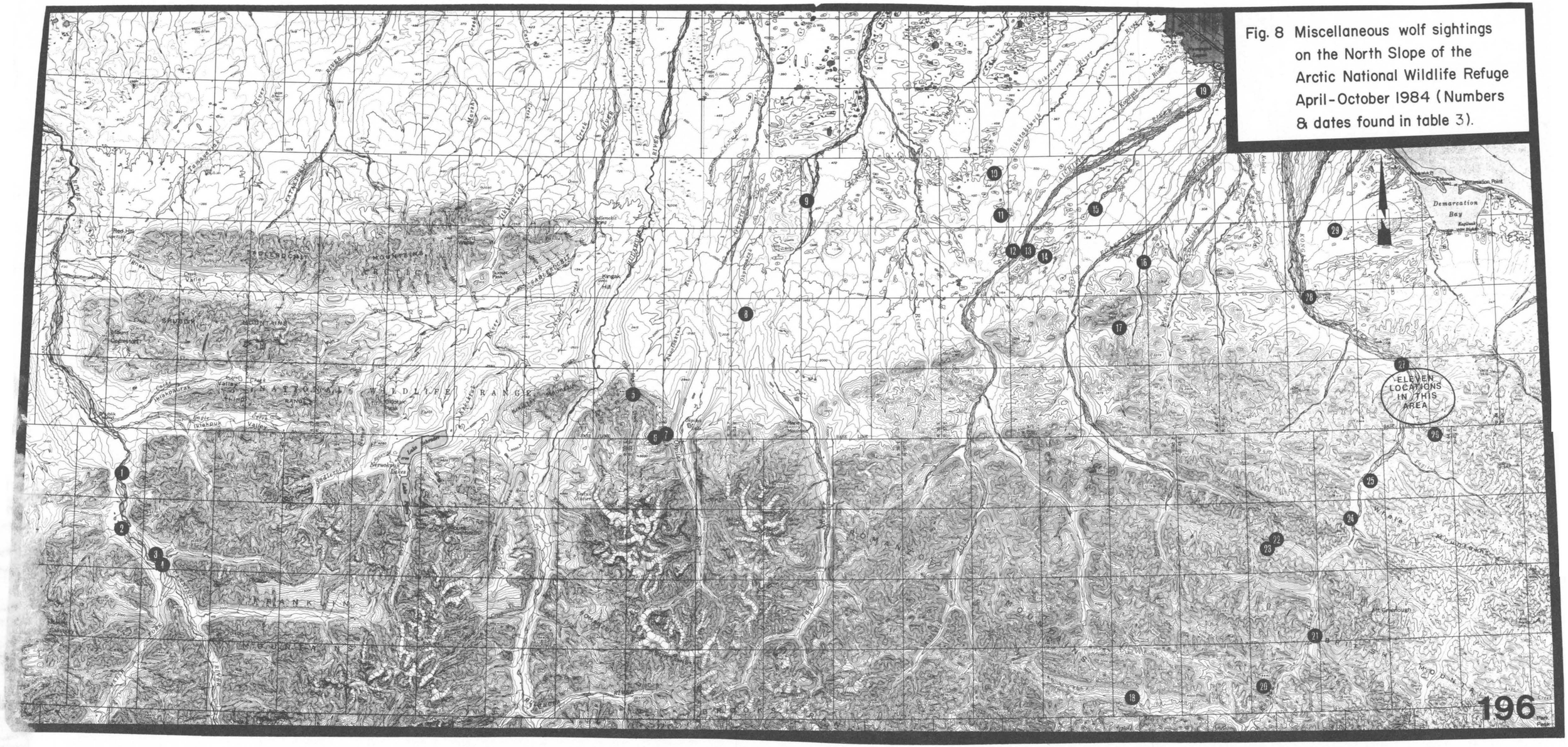


Fig. 8 Miscellaneous wolf sightings on the North Slope of the Arctic National Wildlife Refuge April-October 1984 (Numbers & dates found in table 3).

Predation

Wolves were often observed in the vicinity of caribou and frequently seen near carcasses. It was often difficult to determine if wolves were predators or scavengers in these cases. In one case a lone wolf was observed killing a caribou calf while in another instance a lone wolf was observed scavenging a caribou calf. In cases were caribou calves were examined, four mortalities were attributed to wolf predation (Whitten, et al. 1985). During fall and early winter four kill sites were found by researchers flying surveys. Three of the kills were sheep and one was a caribou. The sites were not visited and it is not known whether they were kills or scavenged carcasses.

Conclusions

Tracking data on wolves using ANWR is incomplete at this time. Several observations are presented for consideration. Wolf packs were less cohesive than expected with young animals ranging widely and often hunting alone. This phenomenon is not uncommon during the denning season with wolves hunting more as a pack in late fall and early winter. Tracking data to date have yet to document this regrouping into fall and winter packs after wolves abandon the den site in mid-summer.

Wolves unattached to packs may travel great distances to the north slope area during the summer and use the coastal plain extensively. These same wolves then leave the area after the caribou have departed and travel widely to locate the caribou again. Wolf packs denning on the north slope tend to drift south in September and October. These packs did not travel south and stay where caribou were wintering, but tended to roam more in the mountains where sheep and moose are more abundant than caribou. The Sadlerochit pack had not yet departed the territory that was used during the summer. In arctic wolf packs, shifts between summer and winter ranges were common, while a fixed territory was not documented.

Acknowledgements

Appreciation is extended to the following individuals who flew radio-relocation surveys, assisted in capturing and collaring wolves, and offered guidance on the project: R. Stephenson, P. Gipson, P. Reynolds, F. Mauer, K. Whitten, J. Morton, and J. Noll. Pilots K. Morris, E. Collins, R. Epperle, and B. Carswell flew fixed-wing aircraft. K. Butters and D. Miller piloted the helicopter and spotter plane during capture efforts.

Literature Cited

Ballard, W.B., R.O. Stephenson, and T.H. Spraker. 1981. Nelchina basin wolf studies. Alaska Dept. Fish and Game Final Report. Federal Aid in Wildlife Restoration Projects W-17-8, W-17-9, W-17-10, W-17-11. 201pp.

Brown, D.E. 1983. The wolf in the southwest. Univ. of Arizona Press, Tucson, Az. 195pp.

Cahalane, V.H. 1964. A preliminary study of distribution and numbers of cougar, grizzly and wolf in North America. N.Y. Zool. Soc. 12pp.

Chapman, R.C. 1977. The effects of human disturbance on wolves (Canus lupus L.). M.S. Thesis, University of Alaska, Fairbanks. 209pp.

Chapman, R.C. 1978. Rabies: decimation of a wolf pack in arctic Alaska. Science 201:365-367.

Floyd, T.J., L.D. Mech, and P.A. Jordan. 1978. Relating wolf scat content to prey consumed. J. Wildl. Manage. 42:528-532.

Fuller, T.K., and L.B. Keith. 1981. Immobilization of wolves in winter with Etorphine. J. Wildl. Manage. 45:271-273.

Grace, E.S. 1976. Interactions between men and wolves at an arctic outpost on Ellesmere Island. Can. Field-Nat. 90:149-156.

Harbo, S.J., and F.C. Dean. 1983. Historical and current perspectives on wolf management in Alaska. Pages 51-64 in L.N. Carbyn, ed. Wolves in Canada and Alaska: their status, biology and management. Can. Wildl. Serv. Rep. Ser. No. 45. 135pp.

Haugen, H.S. 1984. Prey utilization by wolves and a preliminary assessment of wolf and prey densities in three drainages within the Arctic National Wildlife Refuge. Pages 133-152 in G.W. Garner and P.E. Reynolds, eds. 1983 update report baseline study of the fish, wildlife, and their habitats. U.S. Fish and Wildl. Serv., Anchorage, Ak. 614pp.

Haugen, H.S. 1985. Prey utilization by wolves in two drainages within the Arctic National Wildlife Refuge, an a preliminary descritpion of wolf pack behavior around the den in the Kongakut River drainage. Pages __ in G.W. Garner and P.E. Reynolds, eds. 1984 update report baseline study of the fish, wildlife, and their habitats. U.S. Fish and Wildl. Serv., Anchorage, Ak. ___pp.

James, D.D. 1983. Seasonal movements, summer food habits, and summer predation rates of wolves in northwest Alaska. M.S. Thesis, Univ. Alaska, Fairbanks. 105pp.

Kuyt, E. 1972. Food habits and ecology of wolves on barren-ground caribou range in the Northwest Territories. Can. Wild. Serv. Ser. No. 21. 36pp.

Mech, L.D. 1970. The wolf: the ecology and behavior of an endangered species. Natural History Press, New York. 384pp.

Mech, L.D. 1977. Population trend and winter deer consumption in a Minnesota wolf pack. Pages 55-83 in P.L. Phillips and C. Jonkel, eds. Proc. of the 1975 predator symposium. Mont. For. and Cons. Exper. Sta., Univ. of Mont., Missoula. 268pp.

Mech, L.D., and R.M. Nowak. 1981. Return of the gray wolf (Canis lupus) to Wisconsin USA. Am. Mild. Nat. 105:408-409.

Murie. 1944. The wolves of Mount McKinley. Fauna National Parks U.S., Fauna Ser. No. 5. 238pp.

Nowak, R.M. 1983. A perspective on the taxonomy of wolves in North America. Pages 10-19 in L.N. Carbyn, ed. Wolves in Canada and Alaska: their status, biology and management. Can. Wildl. Serv. Rep. Ser. No. 45. 135pp.

Packard, J.M., L.D. Mech, and U.S. Seal. 1983. Social influences on reproduction in wolves. Pages 78-85 in L.N. Carbyn, ed. Wolves in Canada and Alaska: their status, biology and management. Can. Wildl. Serv. Rep. Ser. No. 45. 135pp.

Pedersen, S. 1978. Geographical variation in Alaskan wolves (Canis lupus L.) M.S. Thesis, Univ. Alaska, Fairbanks. 54pp.

Quimby, R. 1974. Wolf, wolverine and red fox, Ch. III in R.D. Jakimchuk, ed. Mammal studies in northeastern Alaska with emphasis within the Canning River drainage. Arctic Gas Biol. Rept. Ser. Vol. 24. 27pp.

Quimby, R., and D.J. Snarski. 1974. A study of furbearing mammals associated with gas pipeline routes in Alaska in R.D. Jakimchuk, ed. Distribution of moose, sheep, muskox, and furbearing mammals in northeastern Alaska. CAGSL Biol. Rept. Ser. Vol. 6, Chapter 2. 108pp.

Rausch, R.A. 1953. On the status of some arctic mammals. Arctic 6:91-148.

Rausch, R.A. 1967. Some aspects of the population ecology of wolves, Alaska. Amer. Zool. 7:253-265.

Rausch, R.A., and R.A. Hinman. 1977. Wolf management in Alaska - an exercise in futility? Pages 147-156 in R.L. Phillips and C. Jonkel, eds. Proc. of the 1975 predator symposium. Mont. For. and Cons. Exper. Sta., Univ. of Mont., Missoula. 268pp.

Stephenson, R.O. 1974. Characteristics of wolf den sites. Final Rept., Fed. Aid in Wildl. Rest. Projects W-17-2 through 6, Job 14.6R. Alaska Dept. Fish and Game, Juneau.

Stephenson, R.O. 1975. Wolf report. Fed. Aid Wildl. Rest. Projs. W-17-7, Jobs 14.3R, 14.4R, 14.5R, 14.6R; W-17-7, Jobs 14.3, 14.4, 14.5R. Alaska Dept. Fish and Game, Juneau.

Stephenson, R.O. 1979. Abundance, movements and food habits of wolves in and adjacent to NPR-A. Pages 53-87 in Studies of selected wildlife and fish and their use of habitats on and adjacent to the National Petroleum Reserve in Alaska 1977-1978. Vo. 1. U.S. Dept. of Interior, Anchorage.

Stephenson, R.O., and L. Johnson. 1973. Wolf report. Fed. Aid Wildl. Rest. Proj. W-17-3, Jobs 14.3R, 14.4R, 14.5R, and 14.6R. Alaska Dept. Fish and Game, Juneau.

U.S. Fish and Wildlife Service. 1982. Initial report baseline study of the fish, wildlife, and their habitats. U.S. Fish and Wild. Serv., Anchorage, Alaska. 507pp.

Van Ballenberghe, V., A.W. Erickson, and D. Bryan. 1975. Ecology of the timber wolf in the northwestern Minnesota. Wildl. Mono. 43:1-43.

Whitten, K., F. Mauer, and G. Garner. 1985. Calving distribution, initial productivity and neonatal mortality of the Porcupine Caribou herd in 1984. Pages __ in G. Garner and P. Reynolds, eds. 1984 update report baseline study of the fish, wildlife, and their habitats. U.S. Fish and Wildl. Serv., Anchorage, Ak. __pp.

Prepared by: Gerald W. Garner Date: 25 March 1985

Gregory J. Weiler, Gerald W. Garner, Wayne Reglin, and Larry D. Martin Wildlife Biologist, Arctic National Wildlife Refuge and Alaska Department of Fish and Game

Approved by: Gerald W. Garner Date: 25 March 1985

Gerald W. Garner, Supervisory Wildlife Biologist, Arctic National Wildlife Refuge

APPENDIX

ANWR Progress Report Number FY 85-5

Appendix Table 1. Park history of Sadlerochit wolf pack, summer and fall 1984.

Date	Observation
6 March	- Pack first located. Eight wolves - seven dark, one gray hunting caribou near junction of Kekiktuk River and Sadlerochit River. Unsuccessful in chase.
	- Three wolves were shot in this area in the following week and assumed to be from this pack.
26 June	- First time wolves have been located since the first sighting in March. Two wolves present - gray and brown. The brown was lying down within 100-150 ft of a bear with the gray - 300 ft away. The brown was captured. Wolf #6 - two year old female. The gray eluded us.
1 July	- Radio fix on wolf number 6. Gray wolf is near by.
5 July	- Wolf #6 located near Sadlerochit Spring - the farthest north location of the pack during 1984. - Wolf #11 (six to eight year old female) was located three miles to the south of #6 and was captured. She had been nursing.
7 July	- Gray male was located but once again eluded capture. Wolves #6 and #11 radio tracked but both were alone.
8 July	- Wolves #6 and #11 radio tracked and found by themselves
11 July	- Radio fixed on #6 and #11.
23 July	- #6 and #11 radio tracked - both alone
25 July	- #6 radio tracked - alone
29 July	- #6 radio tracked (Fix) first time that any of the members of this pack has been located outside the rolling hills area between Sadlerochit Mountains and Lake Schrader.
7 August	- Wolf #11 found in Cache Creek area. Wolf pup found near head waters of Katakturuk River. It was alone and following several yards behind an adult caribou.
29 August	- Pack was located near Canning River - four wolves- gray, #6, #11, brown pup.
14 September	- #6 located at Lake Schrader.
17 September	- Pack located near Eagle Creek #6 was back with them.
15 October	- #6 located on Okpilak River.
17 October	- #6 located on Okpilak River - Rest of pack was near Kekikut River and had been joined by a black wolf.

Appendix Table 1. (Continued).

Date	Observation
29 October	- Wolf #11, gray and black found on southside of Sadlerochit Mountains. Pup not seen. Animals around two kills that appear to be sheep.
3 November	- Wolf #6 found in foothills east of Jago River near a caribou carcass.
6 November	- Wolf #6 back at Okpilak River.
8 November	- Wolf #11 found with pack near Canning River. (Two brown, one black, one gray). #6 not located.

Appendix Table 2. Park history of Aichilik wolf pack, summer and fall 1984.

Date	Observation
19 May	- Wolf #1 (Brown, one year old male) was captured in the Aichilik River drainage.
22 May	- Wolf #1 radio tracked - alone in mountains
1 June	- Wolf #1 radio tracked - alone in foothills
2 June	- Wolf #1 found feeding on a cow caribou on the coastal plain
3 June	- Wolf #1 found alone on coastal plain
6 June	- Wolf # found within 1/2 mile of gray wolf on Aichilik River in mountains.
7 June	- Wolf #1 found alone on coastal plain
8 June	- Wolf #1 found alone on coastal plain
11 June	- Wolf #1 found alone on coastal plain
12 June	- Den site located wolf #1 there with four other wolves.
13 June	- Wolf #1 found alone on coastal plain
14 June	- Wolf #1 at den site with three other wolves.
15 June	- Wolf #1 found alone on coastal plain
17 June	- Wolf #1 found on coastal plain with two other wolves
18 June	- Radio fix in foothills
20 June	- At den site with two others and three pups - first sighting of pups.
22 June	- Start three days of den observation, #1 at den with three other wolves and three pups.
23 June	- Four adults and three pups at den site; #1 on coastal plain.
24 June	- Two adults and three pups at den - den observation ended.
25 June	- Wolf #1 alone in foothills
26 June	- Wolf #1 alone on coastal plain
27 June	- Wolf #1 feeding on caribou calf on coastal plain Wolf #8 captured on coastal plain (Brown two to three year old female).
28 June	- Wolf #1 and #8 - alone on coastal plain
4 July	- Wolf #1 disperses to east near Clarence River.

Appendix Table 2. (Continued).

Date	Observation
6 July	- Wolf #8 at den site with adult gray.
7 July	- Wolf #8 alone on coastal plain
8 July	- Wolf #8 alone on coastal plain. Wolf #1 in Canada near Clarence Lagoon.
17 July	- Wolf #1 in Canada near foothills on Craig Island.
20 July	- Wolf #8 coastal plain.
23 July	- Wolf #8 disperses east to Kongakut River.
8 August	- Wolf #1 in mountains near upper Aichilik River. Wolf #8 found approximately four miles south of den with adult gray and four pups. First sighting of fourth pup and first sighting of pups away from den.
12 September	- Wolf #1 mountains near upper Aichilik - Drain Creek area. Wolf #8 mountains to east of Aichilik within five miles of den.
18 September	- Wolf #8 with five wolves south east of den on west fork of Aichilik River.
17 October	- Wolf #1 and #8 with five other wolves in mountains between Aichilik River and Drain Creek.
8 November	- Fix wolf #8 southside of Brooks at Double Mountain.

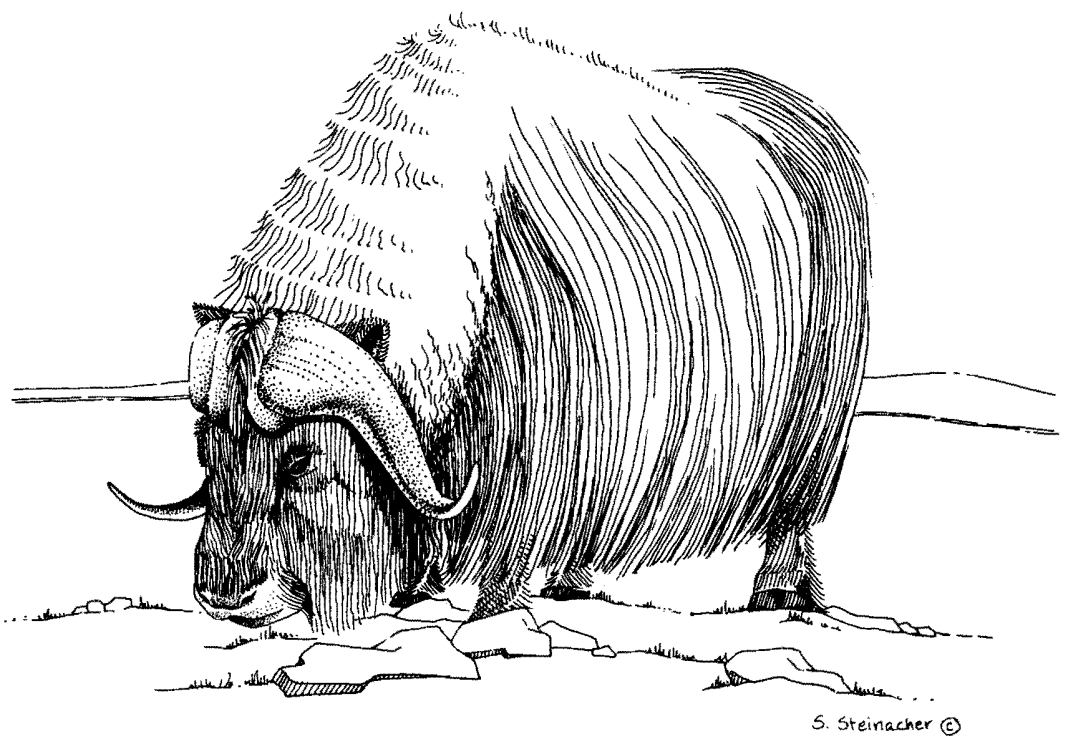
Appendix Table 3. Wolf relocations/observations on the Arctic National Wildlife Refuge, Alaska 1984.

Wolf number	Pack affiliation	Range of observation dates	Number of locations	
			individual	with pack/others
1	Aichilik	19 May - 17 Oct	24	7
2	None	8 June - 7 Nov	23	9
3	None	5 June - 13 Aug	18	-
4	None	25 June - 15 Nov	7	2
5	None	25 June - 8 Nov	4	7
6	Sadlerochit	26 June - 8 Nov	15	3
7	Unknown	27 June - 6 Dec	7	-
8	Aichilik	27 June - 17 Nov	9	3
9	Kongakut	30 June - 8 Nov	8	1
10	Unknown	5 July - 7 Aug	4	-
11	Sadlerochit	5 July - 8 Nov	6	6
	Totals		125	38
Misc.	Unknown	6 March - 31 Oct	31	27

ARCTIC NATIONAL WILDLIFE REFUGE COASTAL PLAIN
RESOURCE ASSESSMENT

1984 UPDATE REPORT BASELINE STUDY OF THE FISH, WILDLIFE, AND THEIR HABITATS

Volume I
Section 1002C
Alaska National Interest Lands Conservation Act



U.S. Department of the Interior
U.S. Fish and Wildlife Service
Region 7
Anchorage, Alaska
March 1985