CAPTURE AND RADIO-TRANSMITTER COLLARING OF BROWN BEARS ON BECHAROF LAKE, BECHAROF NATIONAL WILDLIFE REFUGE, ALASKA 28 JULY-3 AUGUST 1986

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INTRODUCTION

The information summarized in this report is part of a study initiated in 1983, concerning brown bear use of Becharof National Wildlife Refuge (BNWR), Alaska, and outlying areas. Between 1984 and 1986, 47 bears were immobilized and fitted with radio collars in partial fulfillment of the original objectives of study project number 74515-83-01 (FY 83 AWPA No. 1220 j. 750) (1986 AWPA WR 80 j. 2.). To date, at least 38 bears are believed to be wearing active collars. Specific study objectives stated in the study proposal are:

1. Determine the extent and characteristics of island denning brown bear on the refuge.
2. Determine the seasonal movement of brown bear within, into and out of the refuge.
3. Increase knowledge of brown bear refuge use and establish a data base.

Since the original study was designed, it has become increasingly apparent that the island denning objectives would be difficult to accomplish, insofar that we are learning that island denning rarely occurs on Becharof Lake. Only during the winter 1983-1984 have we observed a den site on the Island Arm, Becharof Lake (Wilk 1985). These results are in contrast to the 14 dens that Troyer (1974) located in early 1974. Troyer's observations were significant, since published studies have shown that coastal Alaska brown bears den primarily in the mountains of Kodiak Island (Lentfer et al. 1972; Berns et al. 1980) and the Alaska Peninsula (Glenn and Miller 1980). That information, coupled with the establishment of BNWR (U. S. Congress 1980), provided the stimulus for this study. I have recently discussed island denning of brown bears on Becharof Lake with W. A. Troyer, and he believes that his 1974 observations may have been the result of late salmon runs in Island Arm tributaries, which kept the bears on the streams feeding late into the year, resulting in bears opportunistically denning low (island dens) into winter (W. A. Troyer pers. comm.).

METHODS

Bears were immobilized and collared using a Bell 206 Jet Ranger III helicopter, pilot and 2-3 capture team members. R. E. Hood, E. J. Savery, C. R. Arment, J. F. Payne, D. D. Mumma, and the author all participated in various aspects of the field activities. Craig Lofstedt, Kenai Air Alaska, again expertly piloted the aircraft for the third straight year of the study. A capture syringe with 5-7cc of M-99 (Etorpine HCl, Lemon Co., Sellersville, Penn.) fired from the right rear seat of the helicopter in a Cap-chur PAL 3 projector (Cap-chur gun) (Palmer Chemical and Equipment Co., Inc., Douglasville, Georg.) served as the dart delivery system. Another team member sat in the left front seat, and recorded capture data. When a third team member was present in the aircraft, he assisted in any way possible, while seated in the left, rear position.

The field team worked out of a field cabin base camp in the Island Arm, Becharof Lake (Fig. 1). The tributaries to this area are major salmon nurseries where bears converge annually between late June and October to feed

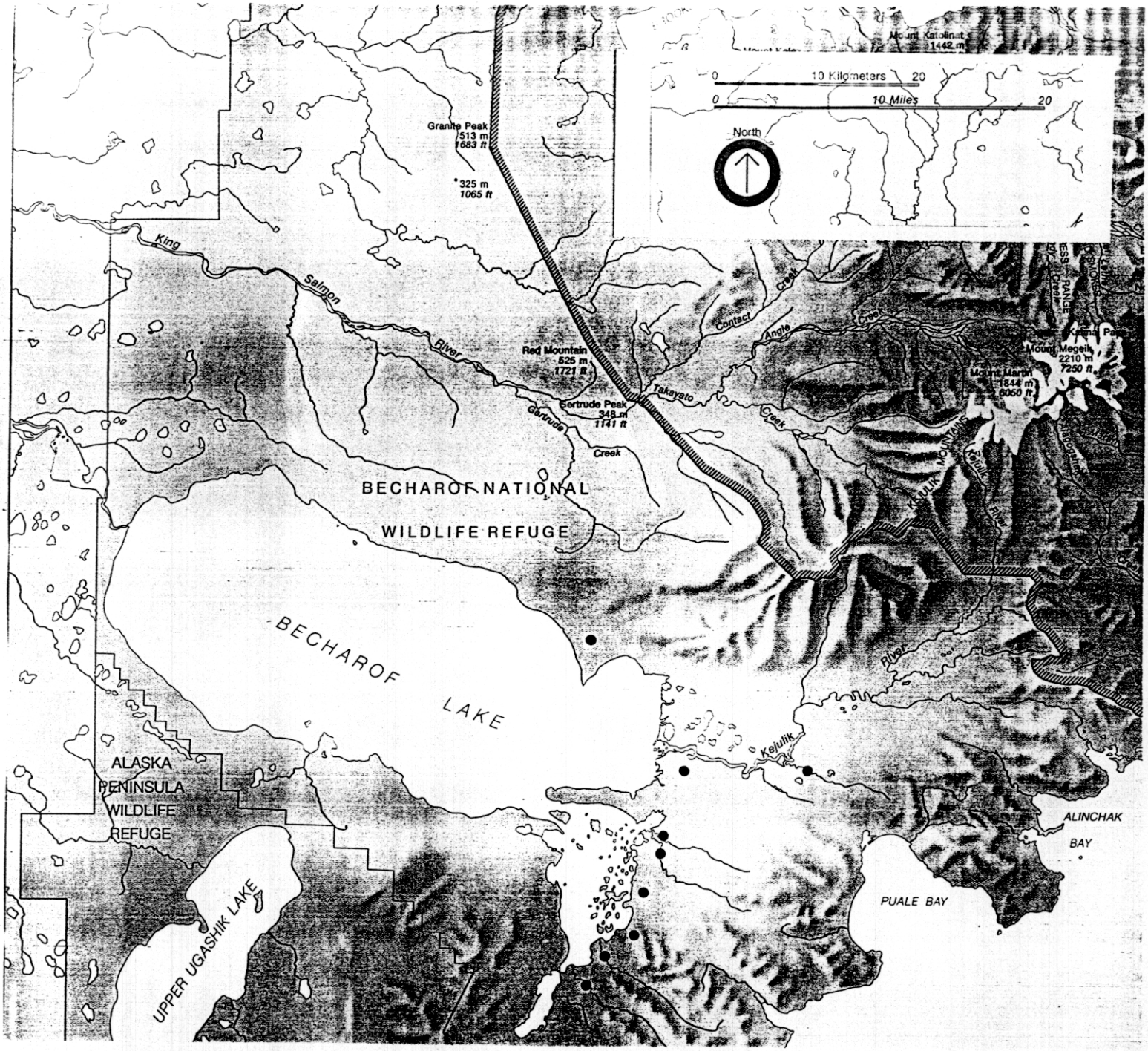

FIGURE 1. General study area and approximate capture locations of brown bears radio-collared between 31 July and 3 August 1986. Some dots represent general vicinities where more than one bear was captured.

on spawning salmon. In 1986, our goal was to capture 3 or 4 adult males and 13-14 adult females (preferably with young). A radio-transmitter/collar assembly (Telonics, Mesa, Ariz.) was fitted to each immobilized new bear. One first premolar tooth was excised (for ageing) and one numbered DuFlex 2-piece ear tag (Nasco West, Modesto, Calif.) along with one colored 7.6cm (3 in.) X 10.2cm (4 in.) ear "flag" made of Herculite fabric (Vaughan Brothers, Inc., Portland, Oreg.) was affixed to each ear. We used various color combinations unique to individual bears, for visual identification. We also tattooed anidentifying number on the upper inside lip of each new bear. Various measurements were obtained (Appendix 1) including respiration rate, capture/immobilization time interval, head and body measurements, and other data from various aspects of capture. Blood samples were taken from the femoral artery.

RESULTS AND DISCUSSION

Thirteen adult females and 4 adult males were captured and radio-collared in 1986 (Table 1). Additionally, 2 1985 (5-5 and 5-9) bears with active radio collars were recaptured, and a 1984 bear (4-10) which shed its collar in the fall 1984 was also recaptured and refitted with a radio-collar. Figure 1 shows the approximate capture locations for 1986 bears. Table 2 is a summary of some basic data from field measurements.

In 1986, bear weights were estimated because the electronic scale in the helicopter was inoperative. Mean estimated weights for 15 females in 1986 was 198 kg (SE=9) compared to 304 kg (SE=58) for 4 males. The weights may be underestimated by as much as 50 kg, based on comparisons from 1984-1985 data (Wilk 1985).

We captured 6 bears on 31 July, 7 on 1 August, 3 on 2 August and 1 on 3 August. One capture myopathy (mortality from capture) occurred on 31 July in upper Bear Creek. This adult female was chased, darted, and immobilized in < 5 or 6 minutes, therefore, hyperthermia was ruled out as the cause of death. I believe the mortality was the result of psychological/physiological factors (capture trauma). When an animal is suddenly chased and captured, the induced fear or terror sets in motion many delicate and interrelated physiological processes of the body. If the physiological processes become exhausted, capture myopathy can result (Spraker 1982). Based on general appearance and tooth-wear, I judged the bear to be an older female (perhaps > 20 years old).

We observed at least 6 individual radio-collared bears from previous years' work, and made 2 visual relocations of bears marked while conducting other work. High winds and variable visibility hampered some of our efforts, especially during 1-2 August.

Table 1. Field capture data for brown bears immobilized and radio-collared in tributaries of southern and eastern Becharof Lake, Becharof National Wildlife Refuge Alaska, 13-15 August 1984, 2-3 August 1985, and 31 July-3 August 1986.

Tributary name	No. Bears captured	No. young with female			Young/ female	Adult males
		Cubs	Yearlings	2-yr. olds		
1984						
Becharof Cr.	2 (13)[a]	2	3	—[b]	2.5	
—						
Cleo Cr.	2 (13)	—	2	—	1.0	—
Bear Cr.	9 (60)	11	2	—	1.4	—
Salmon Cr.	2 (13)	3	2	—	2.5	—
Totals or means	15 (99)	16	9	0	1.7	0
1985						
Becharof Cr.	2 (13)	—	2	2[c]	2.0	—
Cleo Cr.	5 (33)	4	—	2	1.5	1
Bear Cr.	5 (33)	9	2	—	2.2	—
Salmon Cr.	3 (20)	3	5	—	2.7	—
Totals or means	15 (99)	16	9	4	2.1	1
1986[d]						
Becharof Cr.	2 (12)	—	—	—	—	1
Cleo Cr.	4 (24)	—	4	—	2.0	2
Bear Cr.	4 (24)	7[e]	3	1	2.8	—
Salmon Cr.	1 (6)	1	—	—	—	—
Bible Camp Cr.	2 (12)	—	2	—	1.0	—
Katrine Cr. (Kejulik R.)	1 (6)	—	—	—	—	1
Severson Penin. (SW Kejulik R.)	3 (18)	2	5	—	2.3	—
Totals or means	17(102)	10	14	1	1.9	4

[a] Percentages in parentheses.
[b] This category not distinguished in 1984.
[c] Distinguished based on comparative size of bears.
[d] Data include recaptured bears.
[e] Totals include a cub that was observed with female 6-17 after darted. When first observed, this female was with 2 yearlings.

Table 2. Preliminary data from field measurements obtained from captured brown bears on Becharof National Wildlife Refuge, Alaska, 31 July-3 August, 1986.

Bear number	Sex	Estimated weight (kg)	Total length (cm)	Chest girth (cm)	Neck girth (cm)	Head length (cm)	Head width (cm)
6-1	F	159-182	207	120	70	36.8	22.0
6-2	M	250-273	205	133	79	40.5	22.6
6-3	M[a]	159	175	124	67	34.1	17.4
6-4	F	205	202	---	71	37.5	23.2
6-5	F	---	192	124	73	35.1	21.3
6-6(4-10)	F	159	182	124	63	35.2	20.3
6-7	F	250-273	203	130	79	36.2	21.1
6-8	F	182-205	192	137	75	39.0	24.4
6-9	F	159-170	200	131	66	36.2	21.3
6-10	M	409	267	169	91	41.9	27.9
6-11	F	182	194	130	80	36.1	20.9
6-12	F	250-273	216	135	86	38.8	23.2
6-13	F	205-227	165	124	72	36.7	23.6
6-14	F	205	189	126	72	36.1	23.1
6-15	F	193	183	124	72	34.5	20.5
6-16	M	364-409	236	198	94	42.0	28.1
6-17	F	170-182	175	122	69	36.0	22.5
5-5	F	227-273	197	124	72	36.2	20.7
5-9	F	159-182	189	122	62	35.1	21.7
mortality	F	159	199	128	72	35.7	21.3

[a]Probable subadult.

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Appendix 1. Field data forms used for 1986.

	DRUG	DOSAGE (cc)	BEAR FIRST OBSERVED	TIME SHOT FIRED	DART LOCATION (on body)	TIME BEAR DOWN	TIME BEAR OUT	REACTION & DRUG EFFECT (minutes)
1.								
2.								
3.								

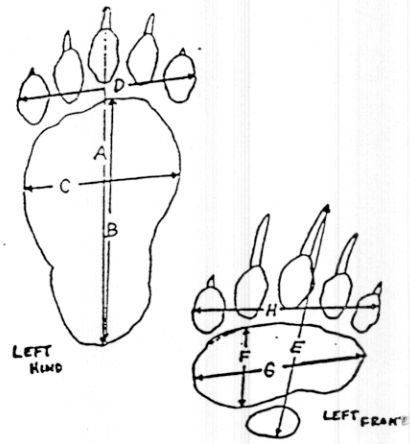
NUMBER AND AGE CLASS OF COMPANION BEARS:

LOCATION OF DOWNED TARGET BEAR:

ESTIMATED DISTANCE TRAVELED BY DOWNED BEAR BETWEEN SHOT AND DOWN:

RESPIRATION RATE:

MEASUREMENTS:



weight:

total length (nose tip to end of tail):

height at shoulder (top of hump to tip of longest claw):

left hind foot: A_____ B_____ C_____ D_____

left front foot: E_____ F_____ G_____ H_____

circumference of neck:

girth (immediately posterior to the forelimbs):

body length (head of the humerus to the base of the tail):

head length (gum line of 1st upper incisors to posterior protuberance of the parietal crest):

head width (widest part of the lateral edges of the zygomatic arches):

lower left canine (lateral side from gum line to tip of tooth):

upper left canine:

NOW PULL A FIRST PREMOLAR AND RECORD WHICH ONE:

breeding condition (size, color, lactating condition of mammae, estrus ?):

Coat color:

Unusual markings:

Injuries:

General pelage description:

(OVER)

COLLAR AND MARKING DATA

TATTOO NUMBER: REMOVE MAGNET

TATTOO LOCATION(S):

LEFT EAR TAG NUMER: LEFT EAR FLAG COLOR:

RIGHT EAR TAG NUMBER: RIGHT EAR TAG COLOR:

RADIO TRANSMITTER COLLAR SERIAL NUMBER: FREQUENCY:

	ANTAGONIST DRUG	DOSAGE (cc)	TIME GIVEN	IM	IV	TIME UP	RECOVERY TIME (min.)
1.							
2.							
3.							

general remarks about recovery, and bear movements after recovery, etc.: