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BLACK BEAR MOVEMENTS AND HOME RANGE STUDY

BY

Ronald D. Modafferi

Volume III
Project Progress Report
Project W-21-1, Job No. 17.2R

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JOB PROGRESS REPORT (RESEARCH)

State: Alaska
Cooperator: Ronald D. Modafferi
Project No.: W-21-1 Project Title: Big Game Investigations
Job No.: 17.2R Job Title: Black Bear Movements
and Home Range Study
Period Covered: July 1, 1979 through June 30, 1980

SUMMARY

In August 1979, six black bears were captured in barrel-type live-traps. A maximum of 16 traps were set along four streams in the Blackstone and Cochrane Bay area of western Prince William Sound. These six bears provided a total of 13 successful captures.

All captured bears were tagged with roto tags, weighed, measured, and a premolar tooth was extracted. The four adult bears were fitted with radio-transmitting collars. One adult female bear had been previously captured in 1976 and 1977.

Similar to 1978, there appeared to be few bears feeding on salmon along streams; and those that were captured appeared persistent in feeding on salmon, and were thus recaptured several times. Capturing at a different time of the year is recommended.

Inclement weather precluded many radio-relocation flights.

Noteworthy movements made by radio-collared bears are discussed.

BACKGROUND

Widely distributed and apparently abundant, black bears (*Ursus americanus*) provide a full spectrum of recreational opportunities for people throughout most of Alaska. Statewide hunter harvest data and personal communications indicate that the black bear is rapidly becoming an important "primary" game species, in addition to being a "secondary" species taken incidental to the harvest of other game animals. A recent increase in hunter harvest can be attributed, in part, to a greater number of hunters, a decrease in the availability of other big game species, promotional efforts of guides or air taxi operators, and perhaps the realization by many hunters that black bears provide aesthetically pleasing hunts, a respectable trophy and very flavorful meat.

Although recreational use of black bears has greatly increased in recent years, present knowledge of the biology and population ecology of this species in Alaska is still somewhat limited. Noteworthy published material on black bears in Alaska includes studies by: Rausch (1961) on dentition and growth, Erickson (1965) on general life history, Hatler (1967, 1972) on food habits, McIlroy (1970, 1972) on ecology and hunter harvest and Frame (1974) on predation of salmon. A black bear hide and skull sealing program, initiated in many Game Management Units in July 1973, provides data on characteristics of the sport harvest and the bears harvested.

There has been a general increase in hunting pressure on black bear populations throughout the state, and those in Prince William Sound, in particular, have experienced a tremendous increase in hunting pressure and harvest and presently require close scrutiny. For this reason, and because of the dearth of information on black bears in Alaska in 1974, the Department of Fish and Game initiated a research project designed to gather information on bear harvests and population status in western Prince William Sound. It was expected that this research would also provide information on black bear biology applicable to many other coastal populations. The first phase of this study necessitated selection of an appropriate study area and development of techniques for use in Alaska. Phase 1 has been completed and reported (Modafferi 1978a); previous progress reports (Modafferi 1978b, 1979) summarize work conducted through June 1979.

OBJECTIVES

To delineate populations; to determine home ranges and movement patterns; to determine population densities, sex and age composition, vulnerability to hunting and mortality by sex and age class; to determine habitat use and preference and to gather basic life history information on black bears in Prince William Sound.

PROCEDURES

Difficulties encountered in live-capturing black bears on the study area have been reported elsewhere (Modafferi 1978a, b, 1979).

Sixteen, barrel-type, "live" traps similar to those used by Rogers (1977) in Minnesota and by Schwartz and Franzmann (1980) on the Kenai Peninsula, Alaska, were constructed and transported to the study area in July 1979. These traps were set out along the same salmon streams where trapping took place in previous years and baited with rotted meat scraps and scented with liquid smoke and oil of wintergreen.

Procedures for immobilization and handling captured bears were similar to those employed by Schwartz and Franzmann (1980).

Radio collars ordered from Telonics (Mesa, AZ) did not arrive in time, therefore, transmitters with expandable type collar materials manufactured by AVM Instruments (Champaign, IL) were modified and placed on captured adult bears.

RESULTS

From 31 July to 26 August 1979, barrel-type live-traps were set at four different streamside locations in northwestern Prince William Sound. During this time a maximum of 6, 2, 6 and 2 traps were set at the Tebenkof, Blackstone, Halferty and Paulson Creek areas, respectively. A total of 349 nights (103 at Tebenkof Creek, 40 at Blackstone Creek, 150 at Halferty Creek and 56 at Paulson Creek) of trapping effort were expended (Table 1). Nineteen of the 349 set traps were found tripped, eleven of which resulted in capturing a bear.

Six different bears (4 adults and 2 cubs) were responsible for the 13 captures. One sow was captured once at Tebenkof Creek and three times at Halferty Creek. Another sow was captured twice at Blackstone Creek and once at Tebenkof Creek; one of her cubs was captured three times at Blackstone Creek; and another of her cubs was also captured at the same location. This sow was known to have another cub but it was never captured. One sow was found dead in a trap.

Data on individual bears captured and data on their radio collars are presented in Tables 2 and 3.

Inclement weather greatly reduced the number of prescribed radio relocation flights (Appendix A). Radio relocations for individual bears collared with transmitters are presented in Figs. 1 and 2.

DISCUSSION

Capture Techniques

Despite utilizing different techniques, bear capturing along salmon streams in 1979, as in 1977 and 1978, was relatively unproductive. The capture data and field observations indicated that only a few bears were feeding on salmon (few different bears captured) but those individuals were frequently using that food source (numerous repeat captures).

Had foot snares been used instead of barrel traps, trapping success and the number of bears captured would have been a great deal less. Because so few bears were utilizing streamside areas to feed on spawning salmon, well defined trails through vegetation were nonexistent. Without such definitive and recently used trails, trapping success with "trailset" (non-baited) foot snares would be poor and based mostly on luck.

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Table 1. Summary of results for trapping black bears in northwestern Prince William Sound, Alaska, from July 31 to August 26, 1979.

Location	No. days trapped	No. trap nights	No. traps tripped	
			w/o capturing a bear	with capturing a bear
Tebenkof Creek	22	103	0	2
Blackstone Creek	14	40	2	4 ^a
Halferty Creek	22	150	5	4
Paulson Creek	22	<u>56</u>	<u>1</u>	<u>1</u>
Totals		349	8	11 ^b

^a In one instance a sow and cub were caught in a trap at the same time. In another instance, two cubs were caught in a trap at the same time.

^b Represents 6 total captures; 1 sow was captured on 4 occasions, 1 sow on 3, 1 cub on 3 and 1 cub on 2.

Table 2. Date of capture, location of capture, sex, maternal status, age and weight for black bears captured in western Prince William Sound, 1979.

Date of capture	Location	No. ear tags (left/right)	Sex	Maternal status	Age ^a	Weight (lbs)
08/02/79	Blackstone Creek	106/132	F	3 cubs	12	155
08/02/79	Blackstone Creek	146/145	F	NA	cub	18
08/03/79	Tebenkof Creek	159/160	F	Barren	5	128
08/11/79	Halferty Creek	159/160	-	-	-	-
08/11/79	Blackstone Creek	146/145	-	-	-	-
08/15/79	Blackstone Creek	161/162	M	NA	cub	35
08/15/79	Blackstone Creek	146/145	-	-	-	-
08/15/79	Blackstone Creek	106/132	-	-	-	-
08/17/79	Paulson Creek	163/164	M	NA	6+ ^b	180 ^b
08/18/79	Halferty Creek	159/160	-	-	-	-
08/21/79	Tebenkof Creek	106/132	-	-	-	-
08/26/79	Halferty Creek	159/160	-	-	-	-
08/26/79	Halferty Creek	Mortality #1	F	Barren	13	195

^a Determined by counting cemental annuli in a premolar tooth.

^b Data estimated, not counted.

Table 3. Frequency and type of radio collar put on black bears captured in western Prince William Sound, 1979.

No. ear tags (left/right)	Date radio-collared	Collar type ^a	Radio frequency (MHZ)
106/132	08/02/79	AVM exapndable riveted to fixed size	149.121
159/160	08/11/79	AVM expandable	149.182
163/164	08/17/79	AVM expandable riveted to fixed size	149.105

^a Radio collars fabricated by AVM Instruments Company, Champaign, Illinois 61820.

Fig. 1. Radio locations for 3 adult female black bears; No. 157 and 106 captured and radio-collared in August of 1979 and No. 137 captured and radio-collared in 1977. (TB=Tebenkof Creek, BK=Blackstone Creek, WL=Willard Creek, HF=Halferty Creek, PL=Paulson Creek, PK=Parks Creek and RY=Rainy Creek).

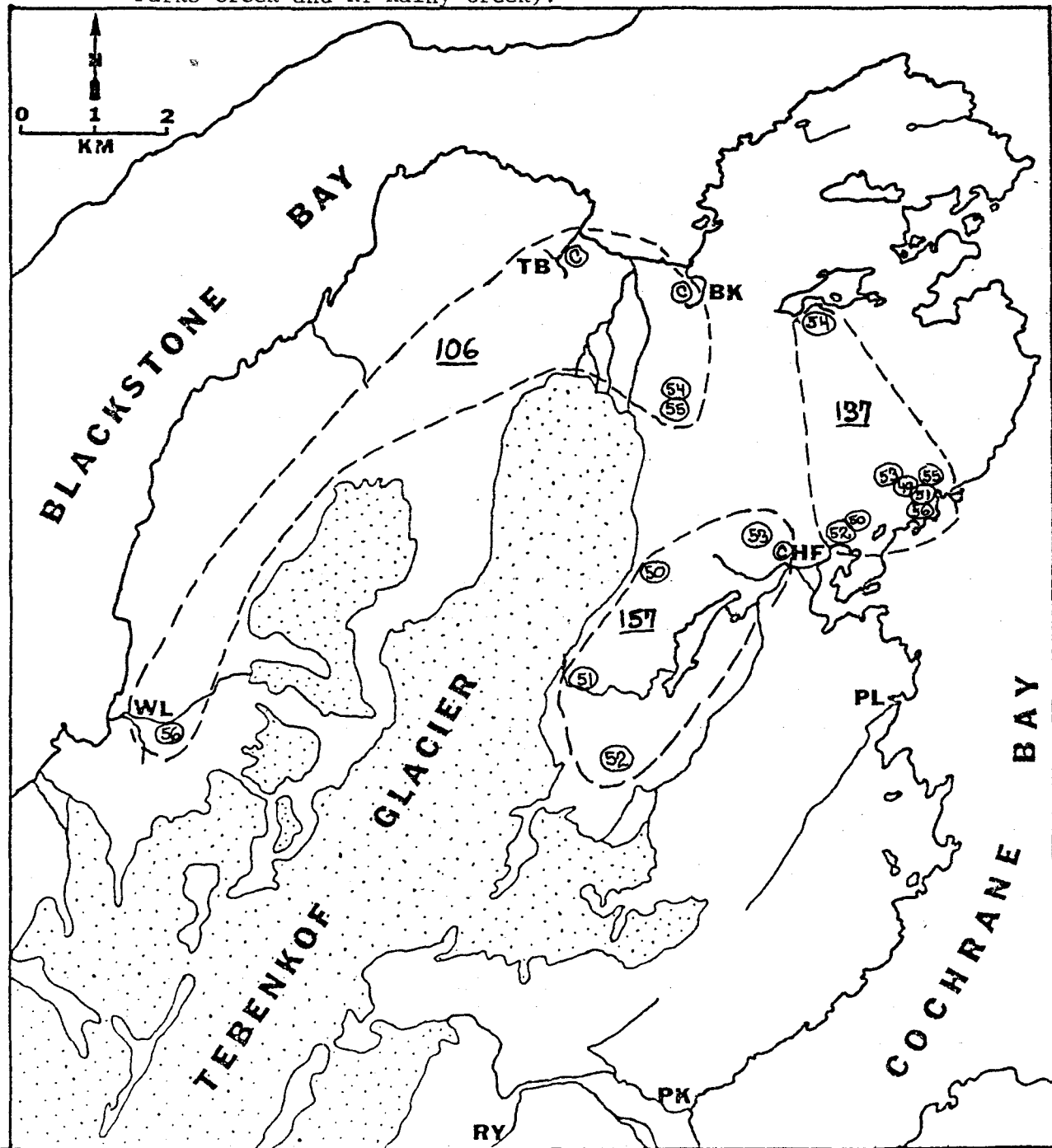
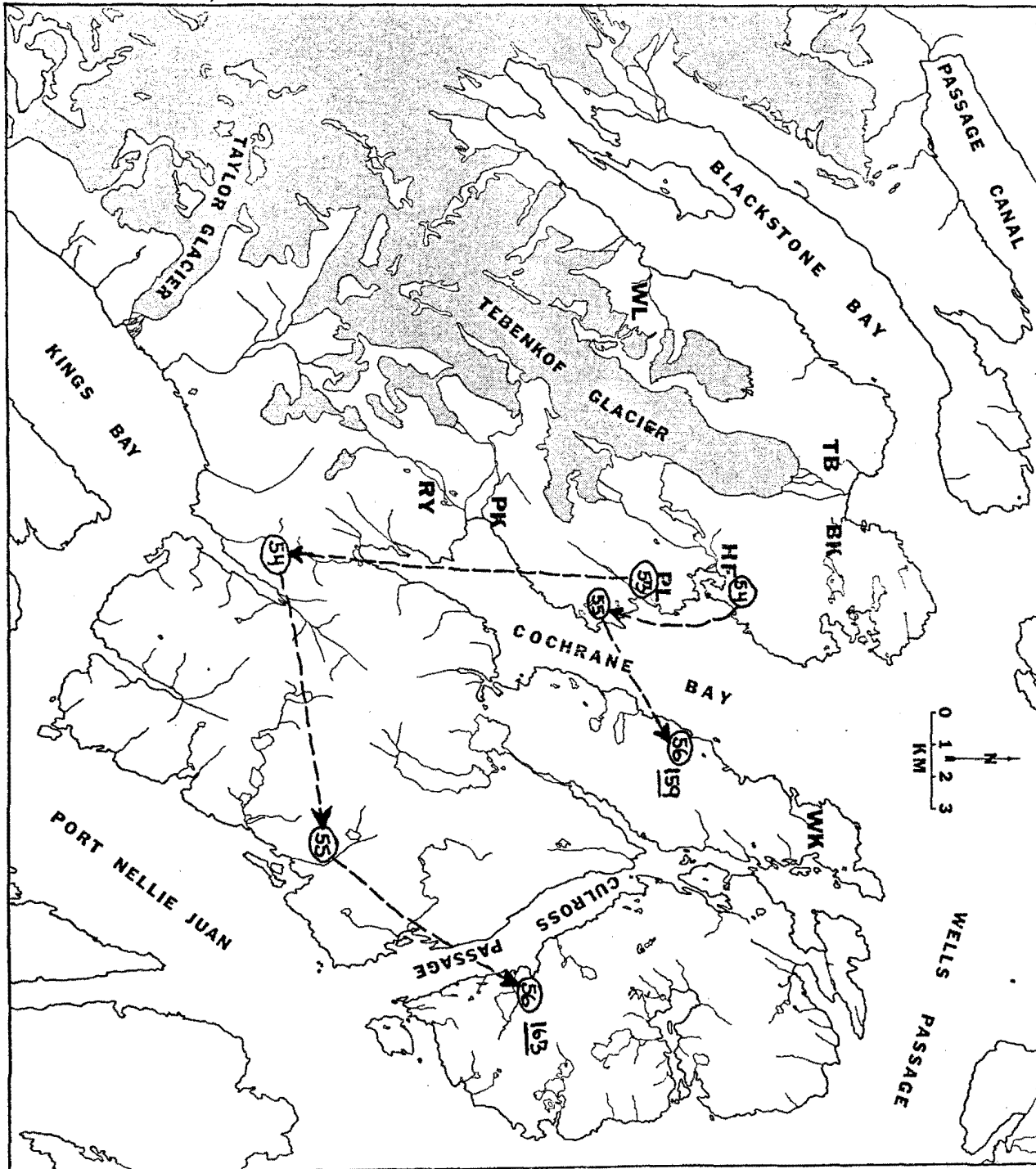


Fig. 2. Radio relocations for an adult female (159) and an adult male (163) black bear captured at Halferty Creek and Paulson Creek respectively, in August 1979. (TB=Tebenkof Creek, WL=Willard Creek, HF=Halferty Creek, PL=Paulson Creek, PK=Parks Creek, RY=Rainy Creek and WK=Wickett Creek).



However, despite good characteristics of barrel-type traps, I encountered several problems related to baiting them. Because of the amount of rainfall in this coastal area, bait (rotted meat scraps) in the bottom of the trap became so drenched that little odor was given off. During several sunny days and warm weather the bait was promptly rendered useless by numerous fly produced maggots. Perhaps bait or commercial trapping lure could be put into containers that would keep it dry and inaccessible to flies.

If this is tried in the future, one should be concerned about a captive bear's welfare should the container be placed inside the trap. One sow died in a trap when the greasy slurry created by rotted meat scraps and rain water wetted and destroyed the insulating qualities of her hair. During the night her thermoregulation was impaired and the animal died from hypothermia.

Water drainage holes had been drilled in the bottom of the trap but apparently they were not large enough and bait fragments collected in the holes impeding drainage.

In coastal areas where week-long periods of rainy weather are not uncommon, these problems should be considered.

MOVEMENTS

Because of the small number of bears (5) with functional radio transmitters during this reporting period, little time will be devoted to assessing their movements in the report. However, several of the bears did make noteworthy excursions.

Male bear No. 163, (presumed to be an adult) traveled about 20 miles from Halferty Creek where he was captured to Culross Island where he dened. Similar movements were documented for an immature male (see Modafferi 1978b and 1979). Rogers (1977) reported that in late summer adult bears may move far outside their resident ranges, that these movements usually lead to a food source and that the individuals returned to their range for denning. This may have been the case for this bear, since relocations 53, 54 and 55 are each in the vicinity of streams containing spawning salmon at those times; but it would also imply that the bear's normal range was in the vicinity where it dened, at location 56 on Culross Island. Future relocations will clarify these contentions about this particular bear.

Female bear No. 106 was captured at Blackstone Creek while accompanied by three cubs, she traveled about 6.5 miles southwest into the Blackstone Bay area where they dened. This journey is probably the largest recorded for an adult female, especially one with cubs. But Rogers (1977) has reported that the longest known movements by females, have been by two different females each of which was accompanied by cubs. He additionally reported that although they travel greater distances, females with cubs travel at a slower rate than lone females and that extraterritorial movements may minimize deleterious effects of local food shortages.

Bear No. 159 also moved extensively. This 4-year-old female traveled across, or around the western shore of Cochrane Bay to the eastern shore where she denned, a straight-line distance of 3 miles over water or a roundabout distance of over 20 miles. In either case, quite a surprising movement for an adult female. If Rogers (1977) rationale on late summer movements to feeding areas applies here; one would hypothesize that this female's normal range is in the area where she denned (relocation #56).

RECOMMENDATIONS

Trapping with barrel traps on sedge flats in the spring (mid to late May) should be to capture adult males. Previous trapping activities in late summer have produced very few adult male bears and information on movements of this sex/age category of bears is vital to a sound management program.

ACKNOWLEDGEMENTS

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LITERATURE CITED

- Erickson, A. W. 1965. The black bear in Alaska its ecology and management. Alaska Dept. of Fish and Game P-R Proj. Rept. W-6-R-5. 19pp.
- Frame, G. W. 1974. Black bear predation on salmon at Olsen Creek, Alaska. Z. Tierpsychol. 35:23-38.
- Hatler, D. F. 1967. Some aspects in the ecology of the black bear (*Ursus americanus*) in Interior Alaska. Unpubl. M.S. Thesis, Univ. of Alaska, Fairbanks. 111pp.
- _____. 1972. Food habits of black bears in Interior Alaska. Can. Field-Nat. 86:17-31.
- McIlroy, C. W. 1970. Aspects of the ecology and hunter harvest of the black bear in Prince William Sound. Unpubl. M.S. Thesis, Univ. of Alaska, Fairbanks. 69pp.
- _____. 1972. Effects of hunting on black bears in Prince William Sound. J. Wildl. Manage. 36:828-837.
- Modafferi, R. D. 1978a. Black bear management techniques development. Alaska Fed. Aid in Wildl. Rest. Proj. W-17-8 and W-17-9. 76pp.
- _____. 1978b. Black bear movements and home range study. Alaska Fed. Aid in Wildl. Rest. Proj. W-17-10. 23pp.

- _____. 1979. Black bear movements and home range study.
Alaska Fed. Aid in Wildl. Rest. Proj. W-17-11. 17pp.
- Rausch, R. L. 1961. Notes on the black bear, *Ursus americanus* Pallas, In Alaska with particular reference to dentition and growth. Zeitschrift Säugetierk, Vol. 26:65-128.
- Rogers, L. L. 1977. Social relationships, movements, and population dynamics of black bears in northeastern Minnesota. Unpubl. Ph.D. Thesis, Univ. of Minn., Minneapolis. 194pp.
- Schwartz, C. C. and A. W. Franzmann. 1980. Black bear predation on moose. Alaska Fed. Aid in Wildl. Rest. Proj. W-17-11 and W-21-1, Job No. 17.3R.

PREPARED BY:

Ronald D. Modafferi
Game Biologist III

APPROVED BY:

Donald J. Somerville
Director, Division of Game

SUBMITTED BY:

Karl B. Schneider
Regional Research
Coordinator

Donald E. McKnight
Research Chief, Division of Game

Appendix A. Dates and codes for designated radio relocations of black bears in western Prince William Sound, Alaska 1979.

<u>Code</u>	<u>Date</u>
49	June 22
50	June 30
51	July 17
52	July 27
53	July 30
54	August 24
55	August 30
56	October 5
