

763

Annual Report on Sea Otter Research
in Prince William Sound, Alaska, for 1985.

TO: USFW Permit Office
Washington, D.C.

FROM: C. Monnett and D. B. Siniff

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31 January 1986

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I. Introduction

This is the second annual report for sea otter research activities conducted in Prince William Sound, Alaska, under permit PRT 2-678319 (Appendix A). It is intended to provide complete and current information about sea otters that were tagged and/or implanted with radio transmitters during 1984 and 1985. Additional observations were also made on sea otters implanted in 1982.

The stated goals of this research are to clarify the long-term effects of implanted transmitters, estimate population parameters, and further develop radiotelemetry instrumentation. These studies are needed to develop a model of the California sea otter population to fulfill a contract with the Minerals Management Service (MMS). The Alaskan work provides important information that will be useful for comparison with California data and provide baseline estimates for the model of the California population. For example, it is unlikely that survival of newly independent young is higher in California than in Alaska. Thus, if we observed that 60% of newly independent young in Alaska survive until the end of the first year of life, this figure would set a probable upper bound to the range of survival rates for, this age-class, that should be incorporated into a model of the California population. Similarly, if we observe a reproductive rate of, say, 0.8 for adult females in Alaska, it is unlikely that the reproductive rate in California exceeds this value. Comparison of data gathered in the two areas on sea otter movements, activity, foraging and pup development will provide insight into relative resource availability and the role of density dependent factors.

II. Summary of Tagging Activities Under this Permit.

Table 1 gives a summary of the animals captured during 1984 and 1985 tallied by age and sex. One hundred and fifty sea otters were captured: 85 during 1984 and 65 during 1985. Of these 150, 48 were implanted with radio transmitters, 27 and 21 during 1984 and 1985, respectively. Thirty-eight pups were recaptured: 17 during 1984 and 21 during 1985 (Appendix B). The 27 otters implanted during 1984 consisted of: 3 adult males, 5 adult females without pups, 3 females with pups and 16 pups. Twenty-one dependent pups were implanted during August and September of 1985. Table 2 lists the current status of each of these otters.

During 1985, a total of 23 otters were anesthetized. Twenty one of these were implanted and two were released without operations when surgical depth anesthesia was not achieved with standard drug dosages. Up to 20 ml of blood was collected from 50 otters. Blood was frozen in liquid nitrogen and is being used for genetic analyses. No teeth were extracted during 1985.

Sixty-four of the captured otters were tagged with plastic, button flipper tags. One pup was tagged with only a monel ear tag. A list of tag color and position combinations and ear tag numbers is given for otters tagged during this study (Appendix C).

III. Histories of Animals Captured and Instrumented.

A. Animals instrumented in September 1982

The histories of animals that were implanted during 1982 are represented in the upper portion of Figure 1. Fifteen animals were instrumented in September 1982 under an earlier permit. Two of these otters, numbers 802, and 807, were resighted during the summer of 1984. A third, number 810, was observed in 1985. Although their transmitters were no longer functional, the otters were recognized by their colored

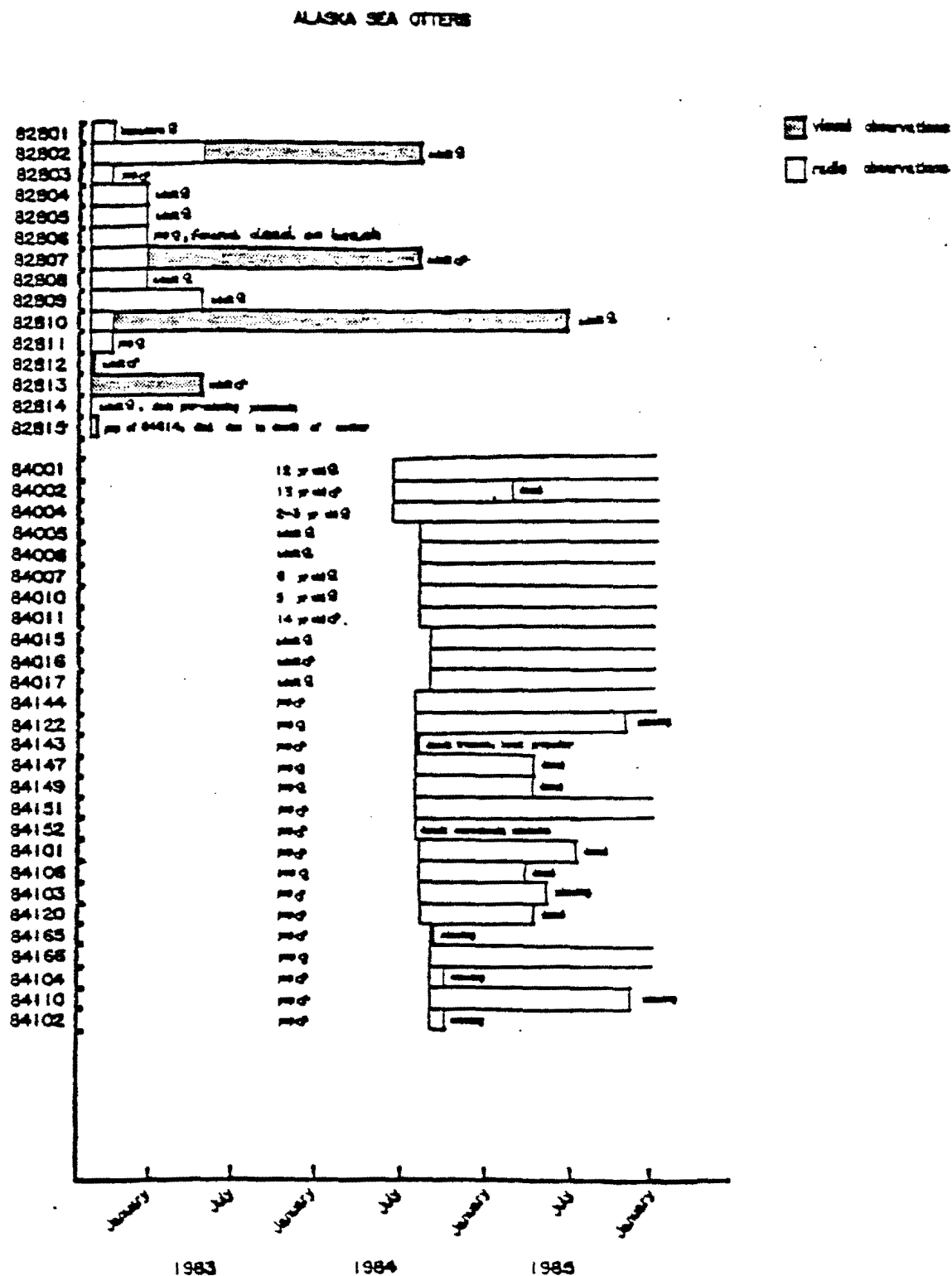
Table 1. Summary of Sea Otters Tagged in Alaska (1984 & 1985)

	Implanted					
	With Radios		Without Radios		Total	
	1984	1985	1984	1985	1984	1985
Adult Males	3	0	0	0	3	0
Adult Females Without Pups	5	0	0	0	5	0
Adult Females With Pups	3	0	4	0	7	0
Male Pups	10	11	24	27	34	38
Female Pups	6	10	30	17	36	27
Total	27	21	58	44	85	86
Total Both Years	48		102		150	

Table 2. Status of dependent pups instrumented in August and September 1985, in Prince William Sound, Alaska.

	<u>1985 Capture Date</u>	<u>Location</u>	<u>Wt</u>	<u>Sex</u>	<u>Current or Last Location</u>	<u>Status</u>
85201	8/31	Simp. B.	21.5	M	Orca Inlet Near Cordova	Weaned Late Oct.
85202	8/31	Alice Cove	24	M	Port Valdez: Oil Terminus	Weaned Early Nov.
85203	8/31	Simp. B.	25	M	Port Valdez: Shoup Bay	Weaned Early Nov.
85204	9/01	Sheep B.	20	F	Port Gravina: Olsen Bay	Weaned Late Nov.; Died Early Dec.
85205	9/02	Simp. B.	25	M	Orca Inlet Near Cordova	Weaned Mid Sept.
85206	9/03	Simp. B.	17.5	F	Port Gravina: Olsen Bay	Weaned Late Oct.
85207	9/03	Simp. B.	24.5	M	Port Gravina: Hell's Hole	Weaned Late Oct.; Died Mid Nov.
85208	9/04	Simp. B.	21	F	Sheep Bay: Gravina Pt.	Weaned Early Nov.
85209	9/04	Sheep B.	21	F	Simpson Bay	Weaned Late Sept.
85210	9/05	Sheep B.	22.5	M	Port Gravina: Hell's Hole	Weaned Mid Nov.
85211	9/05	Sheep B.	23.5	M	Orca Bay: Canoe Passage	Weaned Mid Nov.
85212	9/05	Sheep B.	23	M	Copper River Delta: Whitedshed Pt.	Dependent
85213	9/10	Sheep B.	18	F	Head of Sheep Bay	Dependent
85214	9/10	Sheep B.	31	F	Orca Bay: Hawkins Cutoff	Weaned Mid Sept.; Died Mid Oct.
85215	9/11	Sheep Pt.	19.5	M	Orca Inlet: Mummy Island	Weaned Late Sept.
85216	9/11	Sheep Pt.	29	F	Sheep Bay: Sheep Pt.	Weaned Early Nov.
85217	9/12	Sheep Pt.	43	M	Port Fidalgo: Goose Island	Weaned Mid Sept.
85218	9/12	Sheep B.	32	M	Orca Inlet: Mummy Island	Weaned Late Nov.
85219	9/12	Sheep B.	17.5	F	East Simpson Bay	Dependent
85220	9/13	Gravina Pt.	30	F	Port Gravina: Olsen Bay	Weaned Mid Sept.
85221	9/13	Sheep B.	31	F	Hinchenbrook Is. Entrance: Johnston Pt.	Weaned Early Nov.

Figure 1. Histories of radio-implanted sea otters.



flipper tags. Number 802 was a female that was instrumented with an intraperitoneal implant on 31 September 1982 and was seen with a newborn pup on 20 May 1983. She was seen several times in Simpson Bay during the summer of 1985, beginning in early July. She was not accompanied by a pup, but since many of the young of the year were already independent by early July, it was not possible to determine whether or not she had a pup in 1985.

Number 807, an adult male, was instrumented with a subcutaneous implant on 1 September 1982 and observed maintaining a territory in Olson Bay in May 1983. He was seen in Simpson Bay in August 1984 but we are uncertain as to whether he established a new territory there, since he was only resighted once.

Number 810, a female, was instrumented with a subcutaneous implant on September 2, 1982. She was seen in Sheep Bay in May and June of 1985. At those times, she was not accompanied by a pup.

B. Animals instrumented in June 1984.

The histories of animals that were implanted during 1984 are represented in the lower portion of Figure 1.

1. Adult males.—Two adult males have continuously occupied territories in Simpson Bay for the past 15 months and their radios are functioning normally.

The third male, number 84002, an 81 pound territorial male, was found dead on the beach about 4 km. north of Cordova in late March by Julius Reynolds of the Alaska Department of Fish and Game. Reynolds noticed no obvious cause of death. He removed and froze the head, which is now in our possession. In mid April, we recovered the animal's radio from among boulders on the beach, where it was broadcasting normally. Necropsy reports are not available for this male, or for most of the

other animals that have died in Alaska. Carcasses have to be located within a few days, and in some cases hours, of death for necropsies to provide useful information. In Alaska, bald eagles, coyotes and other scavengers quickly find and consume the remains and hence necropsies are seldom possible.

2. Adult females.— All 8 of the adult females that were implanted during 1984 are still alive and their radios are broadcasting normally. Three produced pups during 1985.

3. Pups.—Seven of the 16 pups that were implanted in 1984 are known to be dead, as of mid-December 1985 (see figure 1). Two pups died shortly after their release, as discussed in the 1984 annual report. Of the remaining 9, 3 are known to be alive, with operating radios, and 6 are now missing. Four pups died during their first winter and another died during July 1985. Of the 6 that are missing 5 are males and 1 is a female. Three of the males were not seen after October 1984. The fourth male was last seen in late May near the Copper River delta, southeast of Cordova. This pup's disappearance was coincident with the opening of an intensive salmon fishery in that area and may have resulted from incidental take. The remaining missing individuals, a male and a female, were both last seen during October, 1985, at which time they were about 17 months old.

At this time, it is impossible to know the fates of the 6 missing animals. There is, however, a good chance that most of these animals are still alive and have traveled to areas outside the area that we monitor.

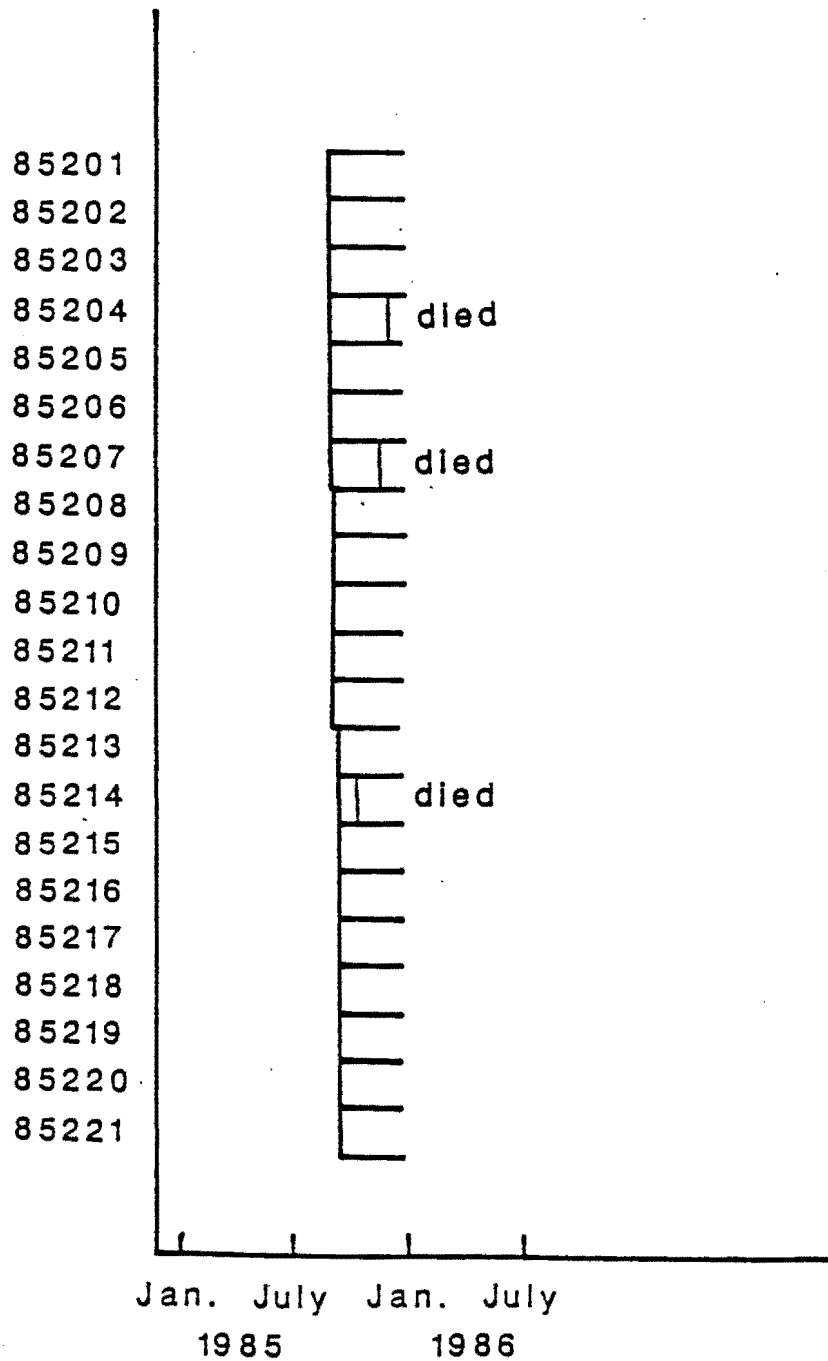
C. Animals instrumented in 1985.

Information on the 21 dependent pups that we implanted during the

fall is given in Table 2 and Figure 2. The surgeries on these otters were performed by Kenneth Hill DVM who practices out of Cordova, Ak. Dr. Hill consulted with Dr. Thomas Williams for two days in the field in late August (Appendix D). There were no deaths resulting from the surgeries during 1985. However, one pup, a 31 pound female, was weaned as a result of being separated from mother for 45 minutes for surgery. She showed no ill effects due to her premature weaning and behaved in a manner that is typical of newly weaned females.

1. Post-weaning mortality in 1985 cohort.--Three of the 21 pups died within 1-5 weeks following weaning during the fall of 1985. Figure 3 gives histories of these pups. The prematurely weaned pup (discussed above) died about 5 weeks following weaning. She had grown an inch in length but lost 8 pounds by the time of death. There was no trauma associated with the transmitter, which was floating freely, posterior and lateral to her left kidney. At the time of death her stomach was packed with carapaces, legs, and other hard parts of small dungeness crabs. Her lungs were extremely congested and foamed profusely when incised. This pup apparently starved to death in spite of the fact that she was able to fill her stomach with small crabs. Other researchers have observed similar starvation of otters that fed on mussels at Green Island. Otters may not be able to process foods such as these, that contain high ratios of undigestable to digestable matter, fast enough to fulfill metabolic needs. Starvation was probably not linked with premature weaning. At 31 pounds, she was considerably larger than other pups that were weaned normally and survived during both 1984 and 1985. Further results of her necropsy are pending.

Figure 2. Histories of pups implanted with radios during 1985.



Two other pups died within 2 weeks of weaning. We know that both were either killed by predators or scavenged almost immediately after death, since we had seen both within about a week of death. One pup died during early December. This pup was weaned in Sheep Bay on about December 1st, traveled to Olsen Bay, and apparently died shortly before we discovered the remains on December 6th. The only remains found were the radio and a puddle of bright red blood under a layer of fresh snow. The site had been recently visited by coyotes that had disturbed the fresh snow over the blood and marked several spots with urine. The remains were found high on the beach at the head of the bay; a site where adjacent tidelands are completely dry at lower tide levels. The volume and color of the blood (bright red indicating that the blood was well oxygenated and unclotted) suggest that the pup may have been killed at the site, possibly by coyotes. We reported previously that another pup had died at Hell's Hole in November. In this case also, only the radio was recovered, despite a careful search of the surroundings. It is possible that coyotes killed that pup as well since it had been hauling out at the site of the radio recovery. Pups may be more vulnerable to this type of predation in eastern Prince William Sound than previously recognized. We have noticed that for a few months following weaning, pups are often found in protected coves or heads of bays. Some of these sites are very shallow, or even dry, at low tides. These pups may sleep soundly in such shallows and may easily be approached and surprised by human observers. Thus, it is possible that coyotes could effectively surprise, attack and kill them.

IV. Sea Otter Movements.

A. Introduction.—Sea otter movement patterns are not well understood but they appear to be related to social organization. For example, adult males have been observed to be territorial, particularly during the breeding season. However, territorial males have been known to abandon their territories during the winter and move to non-breeding areas where they join other males that may be excluded from the breeding areas. While adult females have previously been described as being relatively sedentary, they have been observed to move among the territories of more than one male.

B. Results of radio-telemetry study.—Our telemetry project is yielding interesting insights into the movement patterns of sea otters in eastern Prince William Sound. We have found that adult females are much less sedentary than previously supposed. Their within-season movements are extensive; probably even more so than those of males. They also appear to move systematically long distances between summer pupping areas and wintering areas. We have found that newly weaned pups are capable of moving long distances (over 100 km.) and that male pups travel more than female pups.

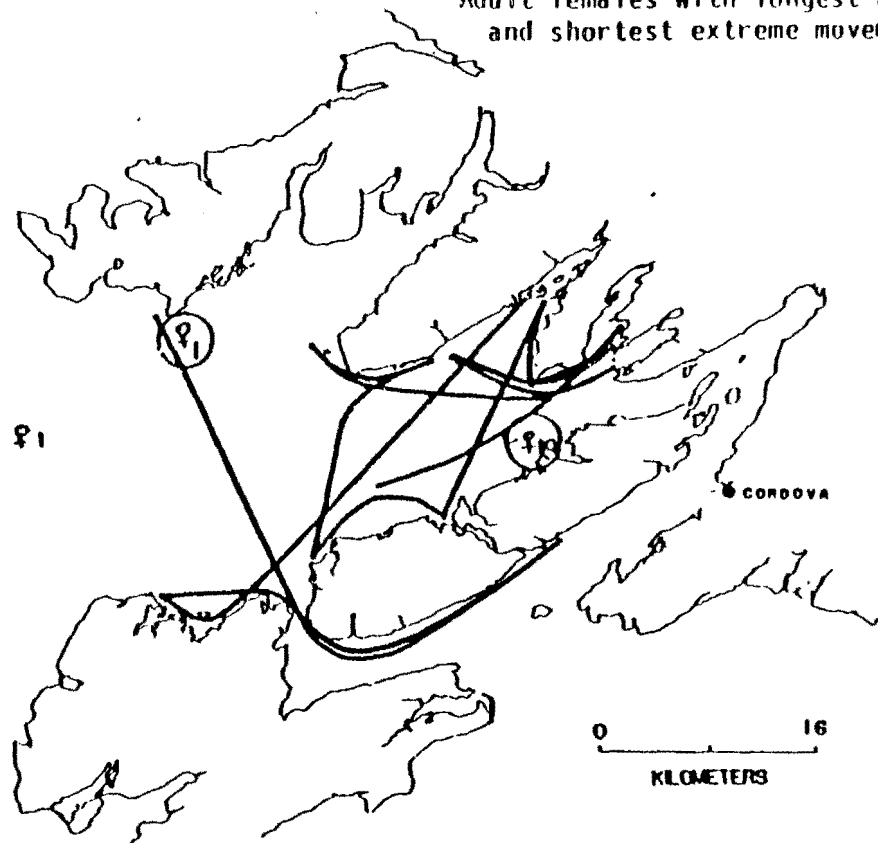
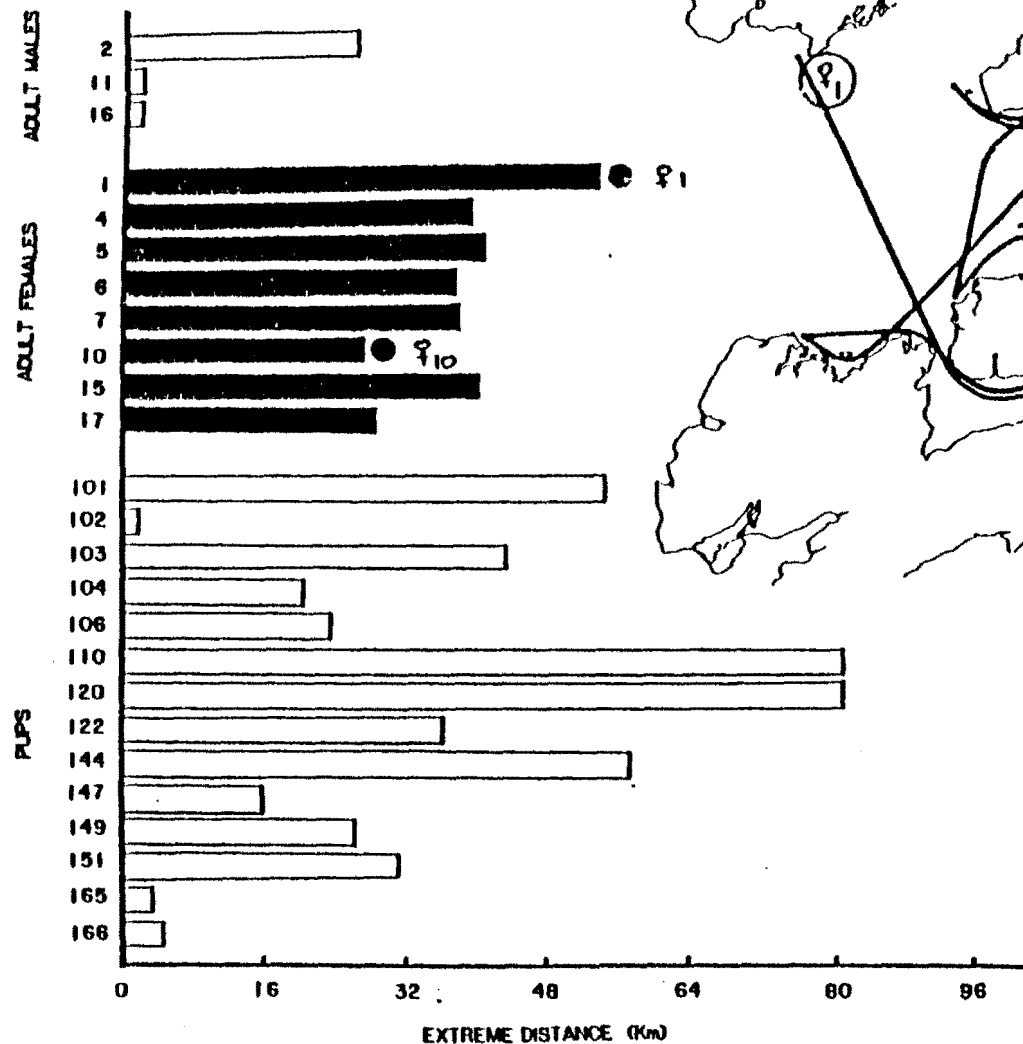
Radioed adult otter movements are summarized on Figure 3. This figure shows the distances otters would have to travel between the most extreme locations that have been recorded for each animal.

1. Adult males.--The three males, as a group, were the most sedentary of the otters studied. Only one traveled as far as 25 km. The other males never left their small territories during 15 months of observation. In an earlier study in Prince William Sound, the Garshelis's found that adult males made long-distance movements between Green Island breeding territories and all male areas near Cordova. These males are believed to have been seeking higher quality feeding grounds.

Movements of female sea otters in P W S, Alaska.

Adult females with longest and shortest extreme movements.

Figure 3. Extreme distances moved by telemetry animals in Prince William Sound, Alaska. These distances represent the greatest distance recorded between telemetry locations, measured as an animal would have to swim. Adult females are highlighted in this figure. Otter 1 traveled the shortest distance, and otter 10 the longest.



The males that we radioed were in newly colonized areas that had abundant food, so long-distance movements would probably not have been beneficial in that regard. Thus, the results of the two studies seem consistent.

2. Adult females.--In our study, adult females traveled farther than the few males that we had radioed: all females had extreme distances over 25 km (Figure 3). One old female (13 yrs) traveled between the Green Island area and the male area near Cordova. Her travels between June, 1984 and December, 1985 are represented on Figure 4. This trip is similar to the longest trips ever observed for adult males in Prince William Sound.

As a group, adult females seem to favor different areas in the spring, when many of them are pupping, than they do in the winter when most are independent. The result of this preference is represented on several figures. In December 1984 (Figure 5), the eight radioed females were found in the most eastern portion of the P.W.S. None traveled west of Sheep Bay. By the following May (Figure 6), seven of the eight had moved to areas west of Sheep Bay, where they were often members of large rafts. These rafts often contained over 100 females. Many females (53 of 87 in one raft) were accompanied by small pups. In December 1985, all eight females were again located in, or east of, Sheep Bay (Figure 7). A count of the otters in various rafts, from an aerial survey, is shown in Figure 8. Closer inspection, by boat, confirmed that these herds were composed mostly of females. In contrast, we saw no concentrations of otters in areas north of Hawkins and Hinchbrook Islands when making similar aerial surveys during December 1985.

It is not clear why females make these long-distance seasonal movements. There is a strong correlation between the timing of the occupation of the more western areas and the peak of pupping in the

Figure 4. Movements of 13-yr.-old female (84001)

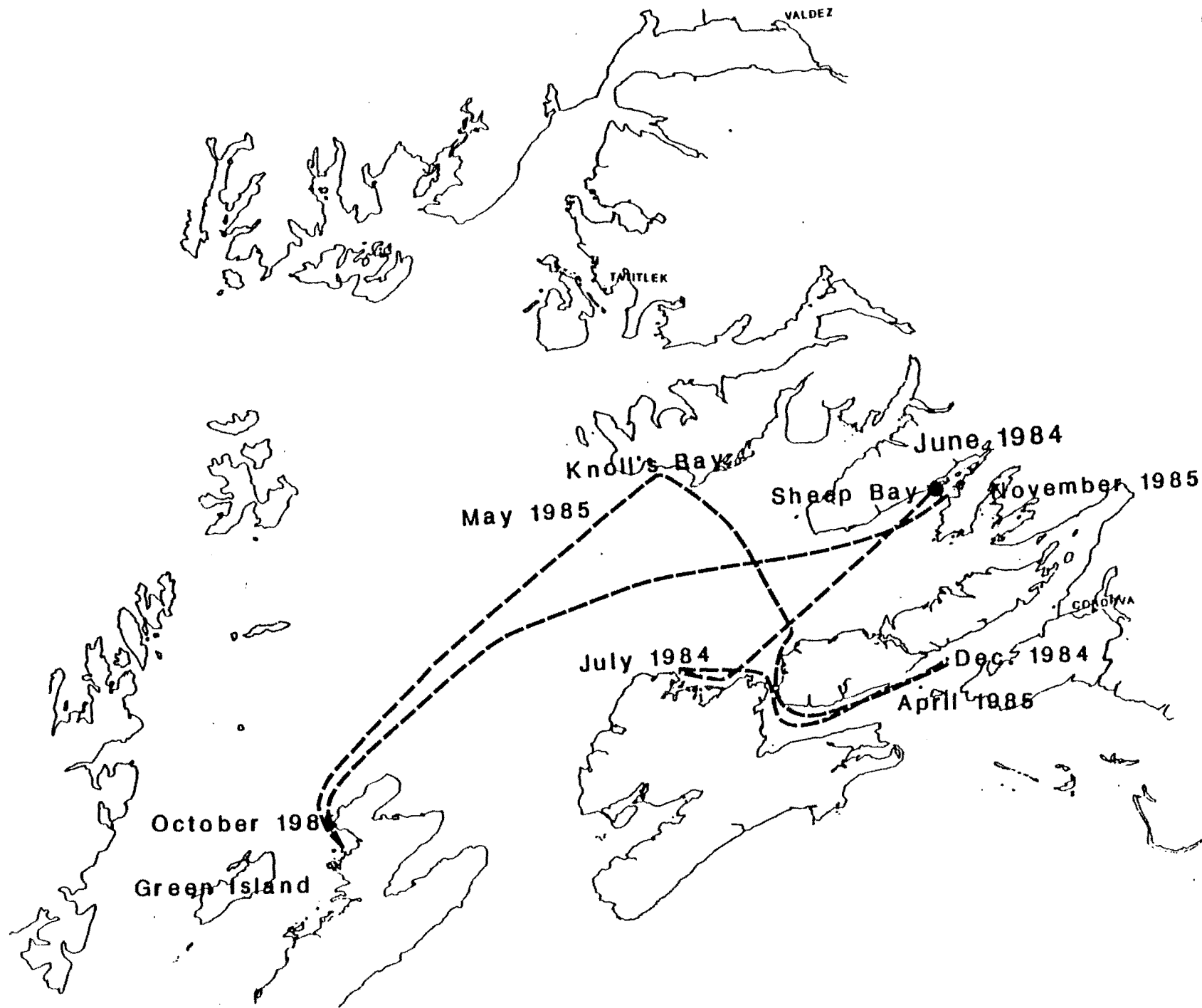


Figure 5. Locations of 8 adult female sea otters, December 1984.

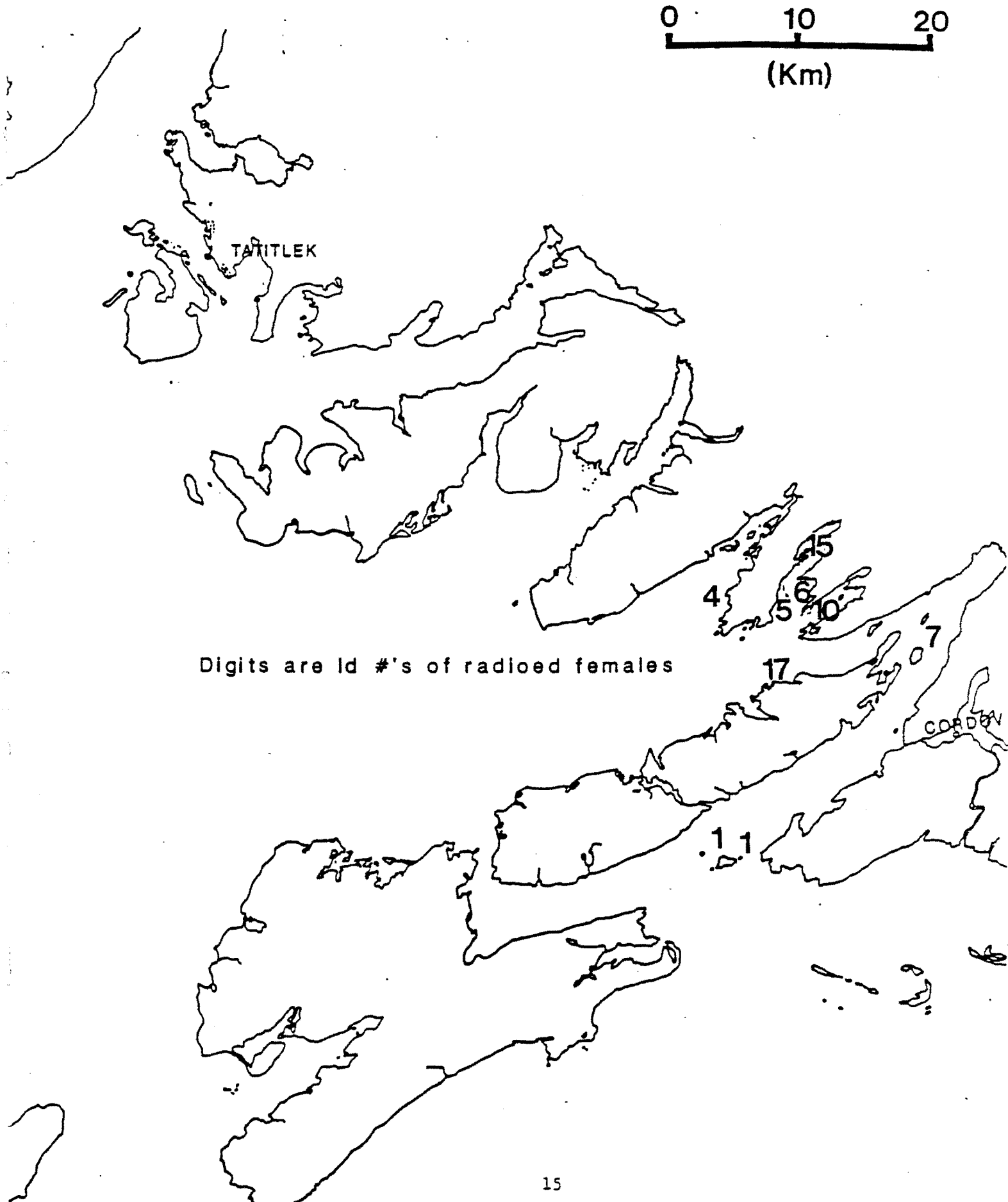


Figure 6. Locations of 8 adult female sea otters, May 1985.

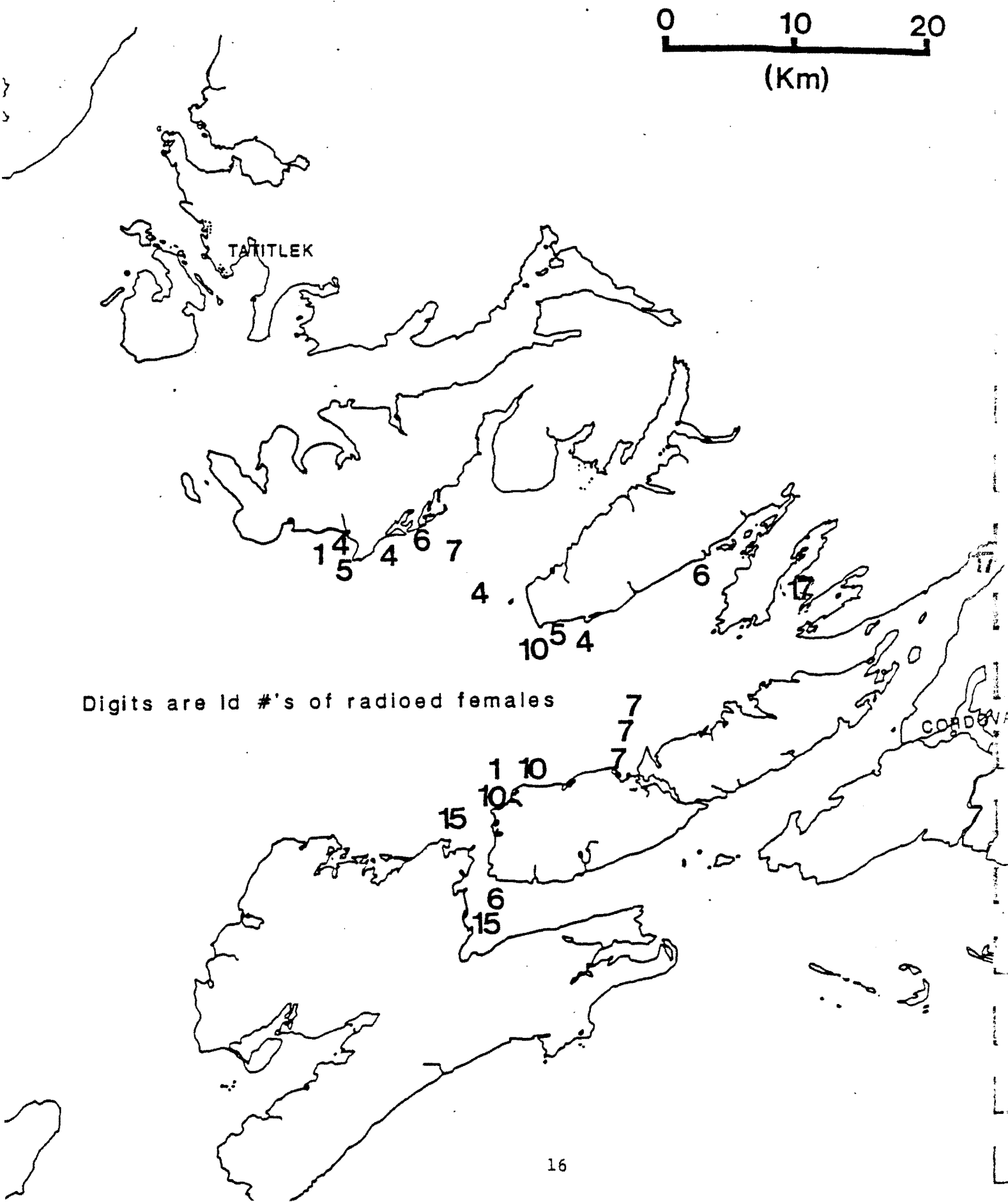


Figure 7. Locations of 8 adult female sea otters, December 1985.

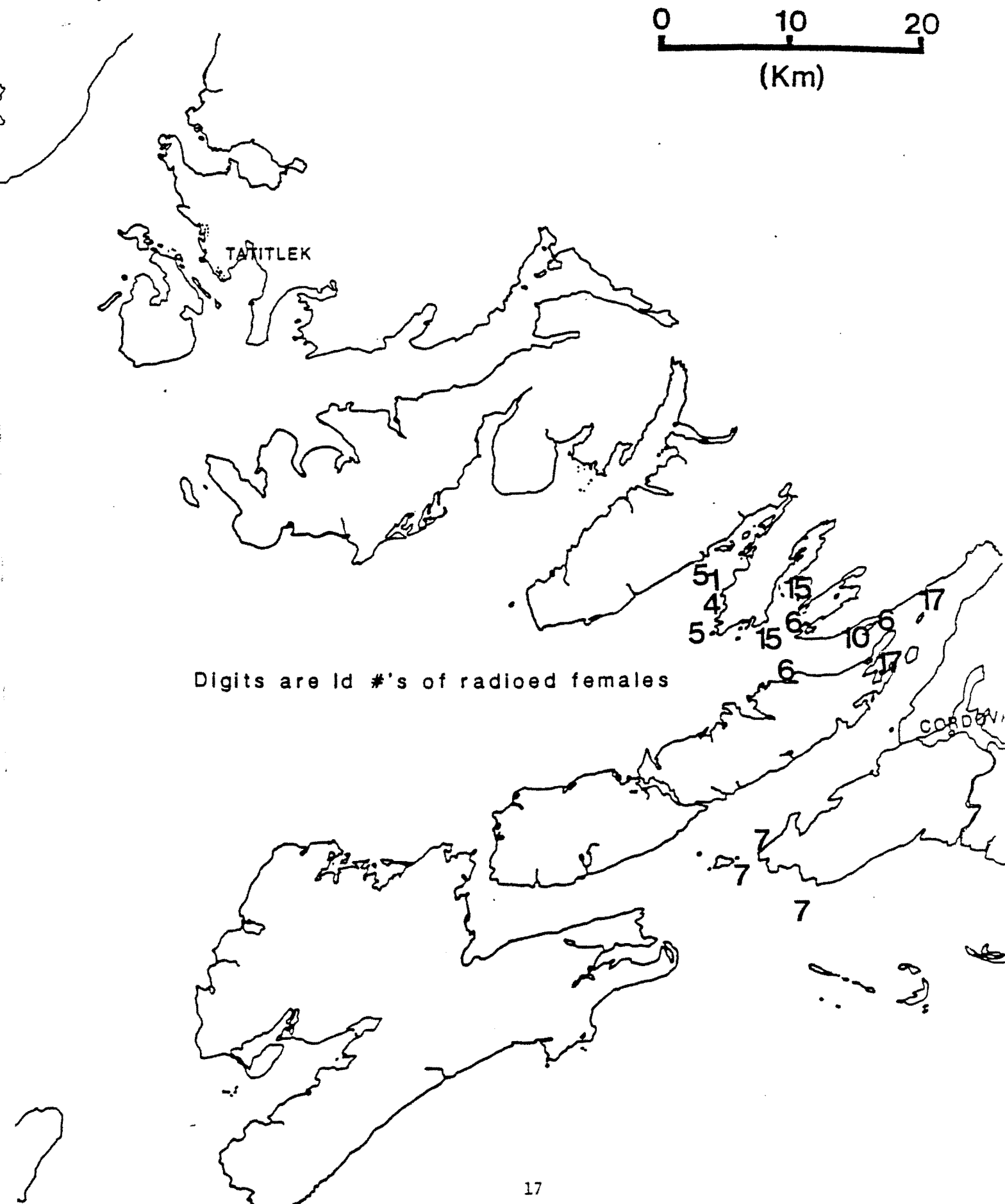
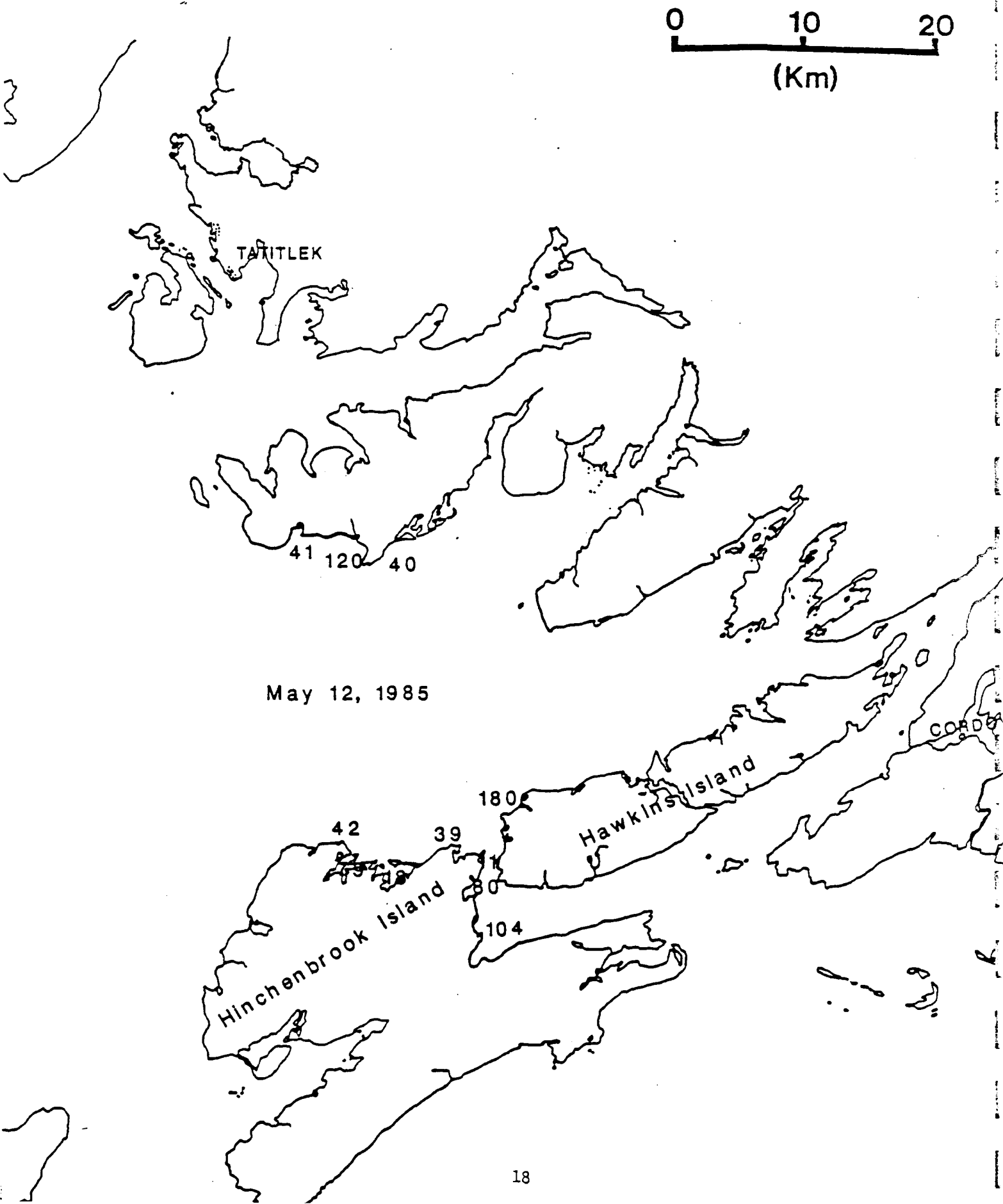


Figure 8. Concentrations of Females

(Rough counts during aerial surveys)



late-spring. Of our study area, the most western portion that is used, by otters, can be characterized as broad shallow shoals. This type of habitat would seem well suited for females that are attempting to forage when heavily pregnant. Such shoals also seem ideal for females that must leave small, helpless pups alone on the surface as they dive for food. Pups should be less vulnerable to land based predators such as eagles or less likely to be carried off by strong currents that are common in the narrower bays and passages. However, shallow protected areas are abundant in many parts of the eastern half of the sound. Furthermore, females give birth to and tend small pups both in other areas and during the winter, when most otters are in the extreme east.

As pups become larger, females with pups are less likely to be found in the large tight rafts. They are dispersed throughout the bays, coves and other well protected areas, as the pups approach weaning, during the fall. Figures 9 and 10 represent the principle travels of two female pup pairs during the fall of 1985. Both pups were implanted when they weighed about 20 pounds in early September. Both stayed with their mothers throughout the fall, until the end of monitoring in mid December. Both pairs traveled extensively. The movements of the pair on Figure 10 are particularly noteworthy with respect to the expansion of the Prince William Sound population into the Copper River area. Their presence in the vicinity of Egg Island during the fall is the first significant data on the use of this area by females. Two other radioed females were found in this vicinity during the winters of 1984 and 1985 (Figure 5, otter 1 and Figure 7, otter 7). A group of females (over 100, many with pups) moved across Orca Inlet during the fall of 1985 and spent November and early-December foraging among, and hauling out on, sheets of ice that had formed in the Egg Island area.

Figure 9. Movements of female and large dependent female pup

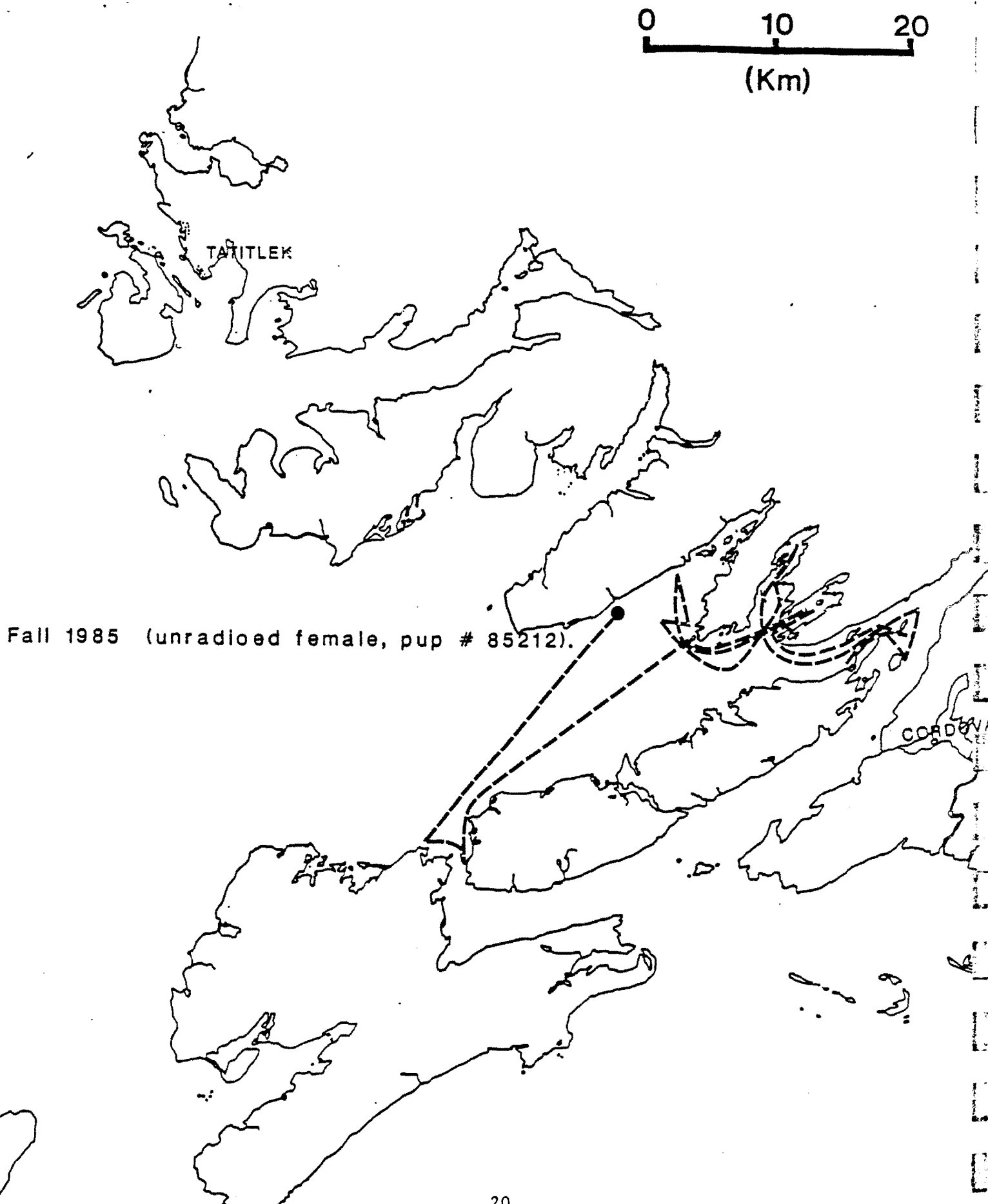
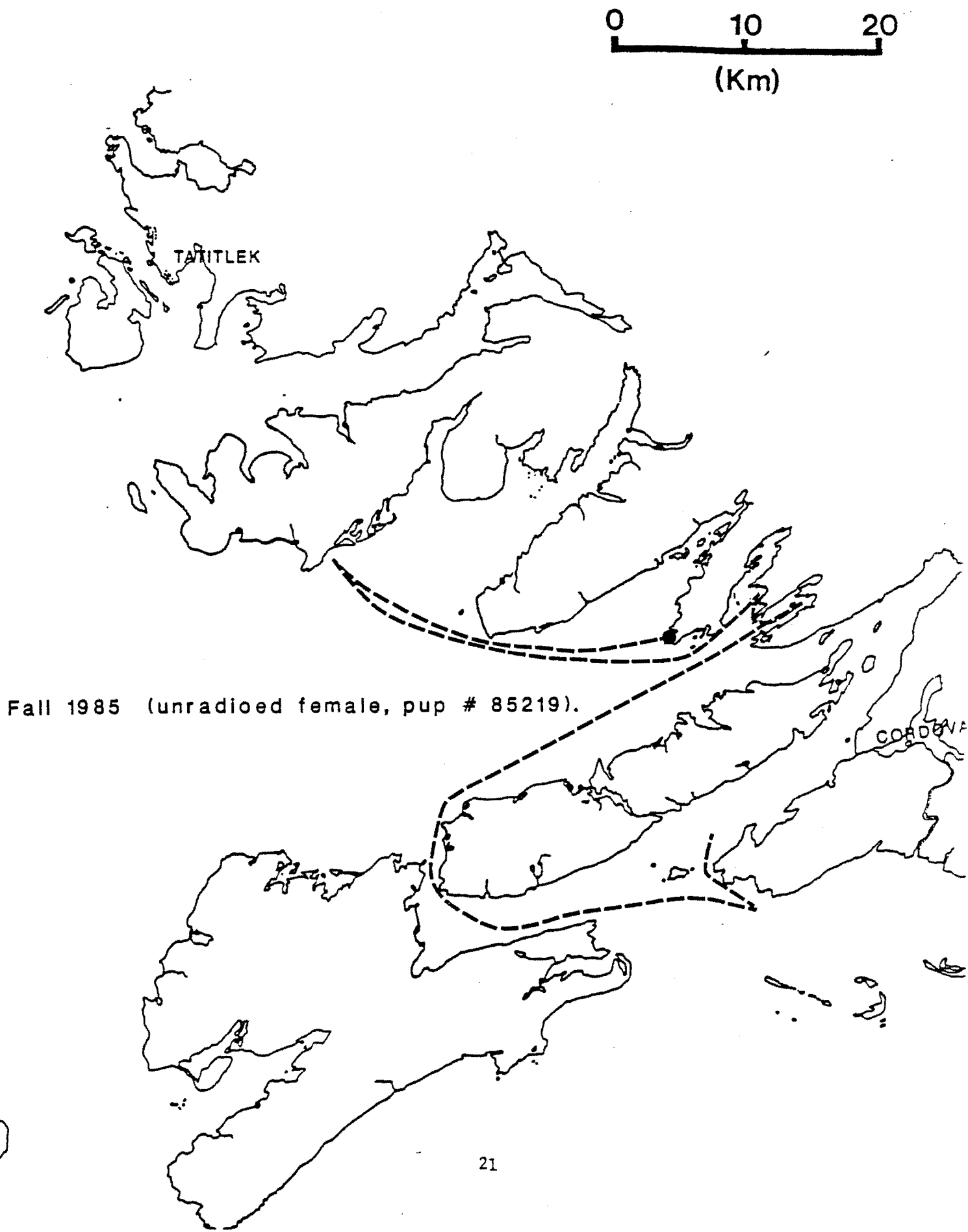


Figure 10. Movements of female and large dependent male pup



A potential conflict between otters and the Copper River gill net salmon fishery could develop if the otters continue to occupy this area until the fishery opens in May. The channels the otters are using are both fished and heavily traveled by Cordova fisherman at that time.

Radio-telemetry has permitted us to make observations on female sea otter reproductive rates. Three of the radioed females pupped during 1985 (Table 3). One female pupped during the winter, one during the spring, and the third during summer. The latter two had dependent pups when they were captured the previous fall.

3. Pups.--Newly independent pups tended to travel fairly long distances. Moreover, male pups were less conservative than were female pups (lower half of Figure 11). By summer, 1985, male pups that were born in 1984 (stippled bars) had moved 30 or more kilometers from where they were last seen with their mothers. Only one of the 5 females moved as far (solid bars). Other male pups (clear bars) were not located within our study area after October 1984. Some of these males may have moved even farther and left the bounds of the study area.

Twenty-one dependent pups were radioed in the fall of 1985. We attempted to keep close track of these pups as they matured and weaned. The peak period of weaning was late October and early November, but pups were weaned throughout the fall beginning in early September (Figure 12). When monitoring was discontinued in mid-December three pups were still unweaned. Many of these pups made long distance movements immediately following weaning. Females moved up to 50 km. (Figure 13) whereas males moved up to 120 km (figure 14). However, while most of the newly independent females stayed within 20 km. whereas, most males traveled over 20 km. Two males traveled to Port Valdez, where they remained until monitoring ceased in December. One of the 1984 pups was

Table 3. Reproduction by adult females in Alaska up to 12 December 1985.

Otter Number	Weight (lbs)	Instrumented?	Reproductive History
1	60	Yes	Unknown: Long absences from study area.
4	46	Yes	Has not pupped; copulated Fall 1985
5	approx. 55	Yes	Had 26.5# male pup when captured mid-August, 1984, no pup 85.
6	not recorded	Yes	Had 21# female pup when captured mid-August, 1984; second March 85
7	50	Yes	Pupped Jan. or Feb. 85
8	49	No	Had 24# male pup when captured mid-August 84; not seen in '85
9	51	No	Had 25# male pup when captured mid-August '84; not seen in '85
10	not recorded	Yes	Has not pupped
12	50	No	Had 17.5# female pup when captured mid-August '85; seen without pup June '85
14	not recorded	No	Had 15# male pup when captured Sept. 1984; second 17# Oct. 85
15	not recorded	Yes	Had 7# pup when captured mid-Sept. 1984; second August 85
17	48	Yes	Has not pupped

Movements of sea otter pups in P W S, Alaska.

Figure 11. Extreme distances moved by telemetry animals in Prince William Sound, Alaska. These distances represent the greatest distance recorded between telemetry locations, measured as an animal would have to swim. Pups are highlighted in this figure. The female pup that moved the farthest (122) went about 38 km. The male pup that moved the farthest (110) went about 81 km.

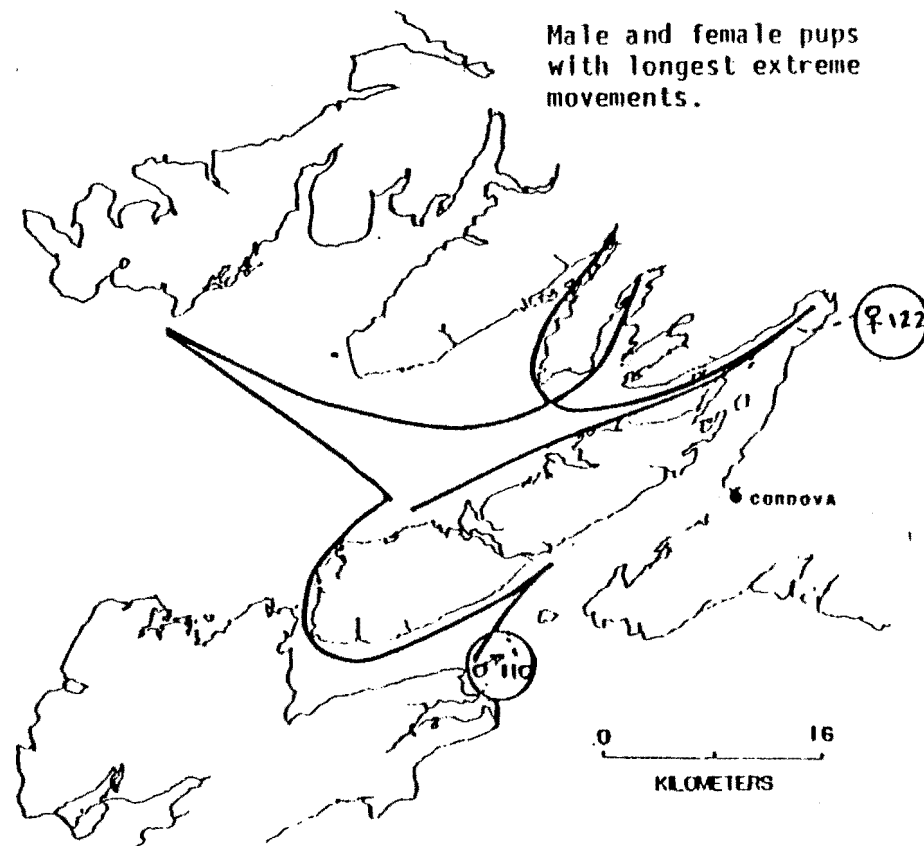
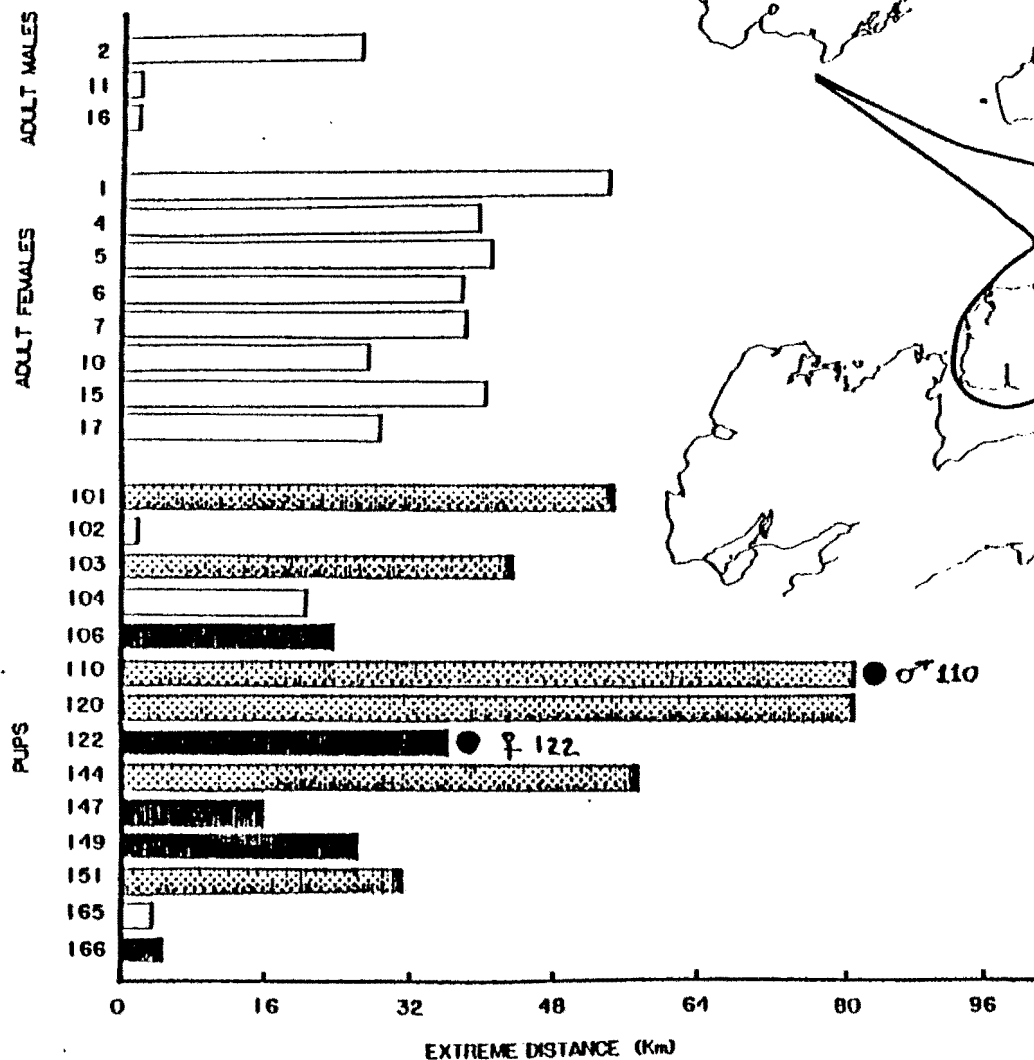


Figure 12. Weaning dates of 21 radio-implanted pups.

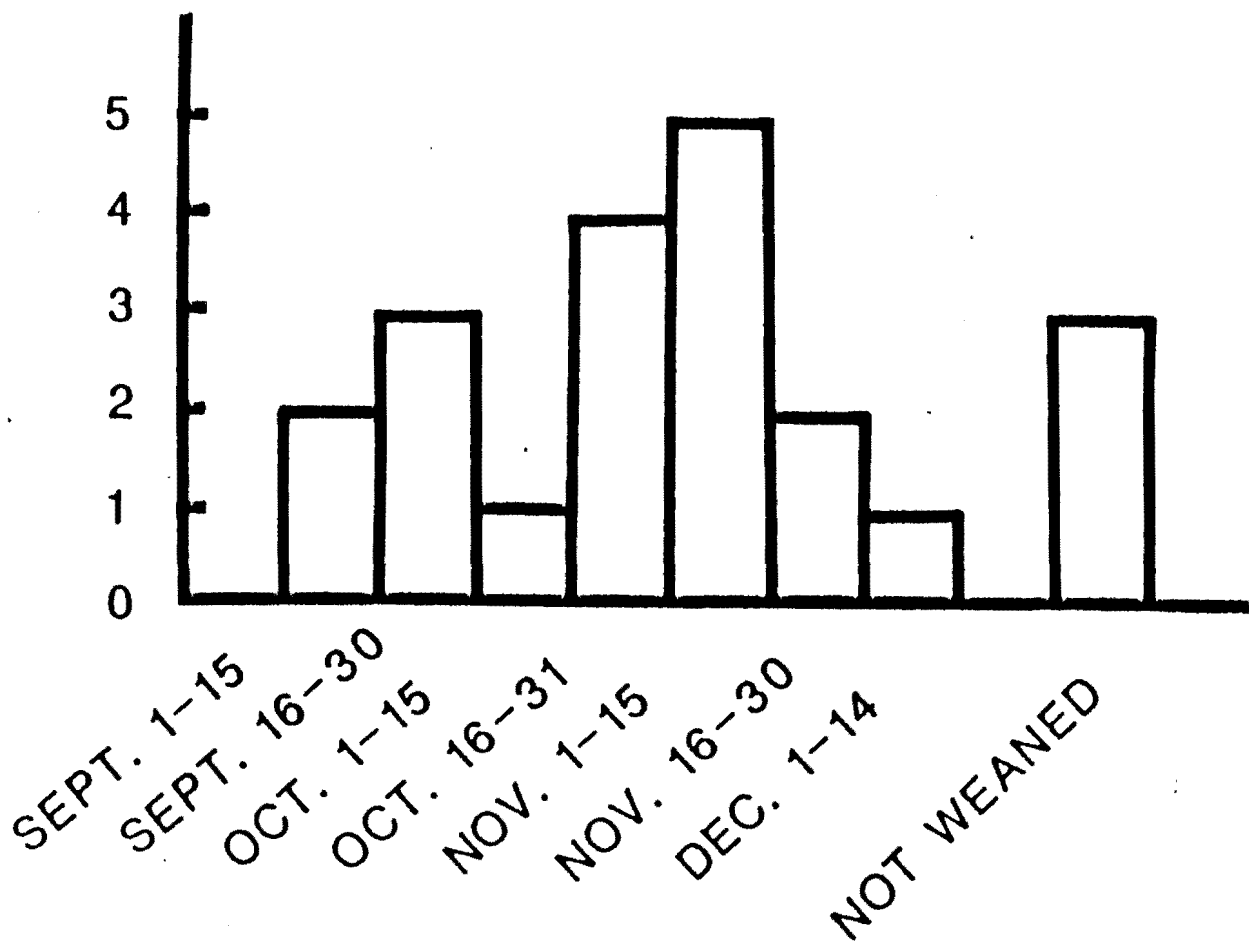


Figure 13. Post-weaning movements of 8 female pups.



Figure 14. Post-weaning movements of 10 male pups.



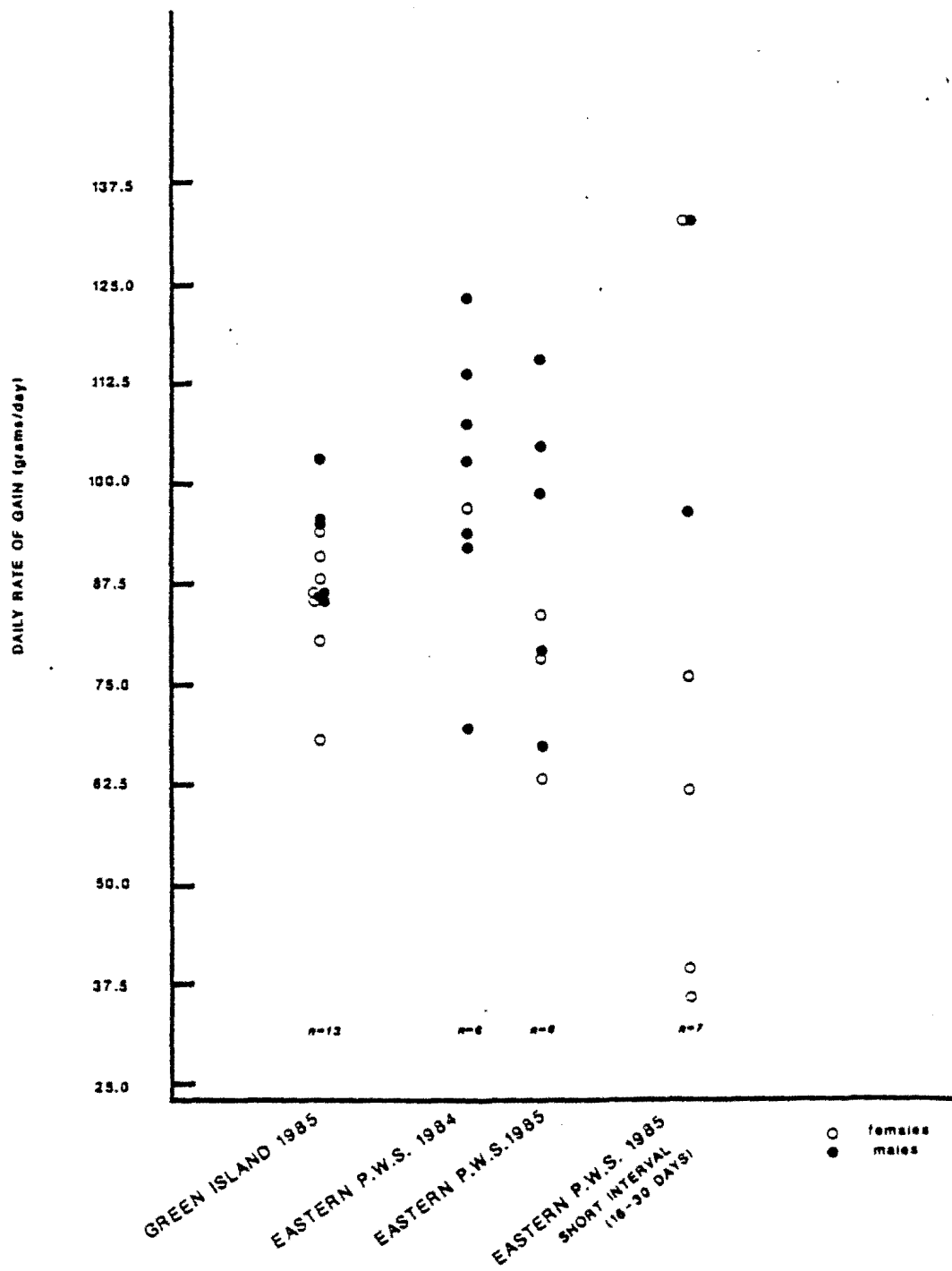
found to have died in that vicinity during the winter of 1984-85. Four of the males moved into Orca Inlet, an area that is considered a "male area". They remained disassociated with the large rafts, however.

Several of the 1984 males had also moved into that area the previous winter. As yearlings, they began to associate with the large herds and began to frequent the sand bars where large groups of males haul out at lower tidal periods.

V. Pup Growth Study.

We are developing a model of pup growth and development that can be used for evaluating the resource base and population status of sea otters at various locations. The sea otter is a predator whose activities are capable of substantially altering the diversity of the benthic community that supports it. Because of this it is regarded as a "keystone species". However, time is required for otter predation to effect such changes. The eastern P. W. S. has been recently colonized, so presumably resources are relatively abundant and, as yet, the sublittoral community relatively unaffected. On-the-other-hand otters have occupied habitat in the vicinity of Green Island, which is located about 80 km. to the west, for decades. The work of A. Johnson and D. and J. Garshelis suggests that otters have profoundly effected the benthic community in that area. The eastern half of P. W. S. offers otters an abundant resource with a more patchy distribution of high quality food types (e.g. crabs and large clams) whereas the west offers overall lower quality resources, higher diversity and a less patchy distribution of foods by type.

Figure 15. Growth rates of sea otter pups, Prince William Sound, Ak.



With these differences in mind, we suggested that conditions in the east should permit higher rates of weight gain in pups with greater weight to length ratios. However, the relative patchiness of the west should cause a greater variance in these measures since efficiency should be lost in searches for, and travels, between higher quality patches. Thus, the slowest as well as fastest growth should occur in the west. Furthermore, short term sampling intervals should yield greater variation.

Thirty-six pups have been captured and recaptured after a long enough interval to warrant their inclusion in our growth study (Figure 15). Seven pups were recaptured after 16-30 day intervals and 29 after longer periods. The median growth rate was about 80 grams/day for 16 females and 95 grams/day for 20 males. Nine of the ten fastest growing pups were males.

As predicted both the fastest and slowest growth rates were measured in the west: looking at just the longer intervals, eleven of the fastest twelve and six of the slowest eight. The median in the west is also slightly greater. Obviously, growth was also more variable in the west. Finally, the shorter intervals yielded greater variance and the most extreme rates (the top 2 and bottom 3) measured in the study.

Data on weight to length ratios and relevant movement patterns are still being analyzed.

APPENDIX A



DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-201
(2/76)

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

- DONALD B. SINIFF
190 ZOO. BLDG/UNIV. OF MINNESOTA
MINNEAPOLIS MN 55455

2. AUTHORITY-STATUTES

16 U.S.C. 1371(a)(1)

REGULATIONS (Attached)

50 CFR 18.31

3. NUMBER

PRT-678319

4. RENEWABLE

☒ YES
☐ NO

5. MAY COPY

☒ YES
☐ NO

6. EFFECTIVE

6/ 7/84

7. EXPIRES

11/30/87

8. NAME AND TITLE OF PRINCIPAL OFFICER (If it is a business)

9. TYPE OF PERMIT

MARINE MAMMAL - TAKE

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

PRINCE WILLIAM SOUND, ALASKA

11. CONDITIONS AND AUTHORIZATIONS:

- A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUOUS VALIDITY OR RENEWAL OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.
- B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.
- C. VALID FOR USE BY PERMITTEE NAMED ABOVE

D. Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the "Special Conditions for Marine Mammals and Native Endangered and Threatened Species" (copy attached).

E. AUTHORIZED TO TAKE UP TO 150 ALASKAN SEA OTTERS (*ENHYDRA LUTRIS*) AS DESCRIBED IN PERMITTEE'S APPLICATION FOR THE PURPOSE OF SCIENTIFIC RESEARCH. ACTIVITIES INCLUDE CAPTURE, ANESTHETIZATION, FLIPPER TAGGING, BLOOD SAMPLING AND TOOTH EXTRACTION. PERMITTEE IS ALSO AUTHORIZED TO IMPLANT UP TO 100 OTTERS WITH RADIO TRANSMITTERS (NO MORE THAN 50 IN ONE YEAR), OF WHICH 50 WILL BE TAGGED WITH TEMPLE TAG TRANSMITTERS, PROVIDED:

- (1) CAPTURE NETS ARE CHECKED WITHIN 2 HOURS DURING TRAPPING;
- (2) ANESTHETIZED ANIMALS ARE NOT RELEASED UNTIL

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ON REVERSE ALSO APPLY

12. REPORTING REQUIREMENTS

FIRST ANNUAL REPORT DUE 1/31/85
SUBMIT REPORT OF ACTIVITIES TO USFWS/WFO, P.O. BOX 3654,
ARLINGTON, VA 22203 BY 1/31 FOLLOWING EACH YEAR PERMIT IN EFFECT

ISSUED BY

CHIEF, BRANCH OF PERMITS-FWPO

DATE

6/ 7/84

ORIGINAL

COMPLETELY RECOVERED FROM THE EFFECTS OF THE DRUGS;
(3) PROCEDURES PERFORMED ON CAPTURED ANIMALS DETERMINED
TO BE IN POOR CONDITION OR IN ADVANCED STAGES OF
PREGNANCY ARE NON-INVASIVE AND MINIMIZED AS MUCH AS
POSSIBLE; AND

(4) EVERY FEASIBLE EFFORT IS MADE TO RECOVER AND TREAT
INSTRUMENTED ANIMALS THAT SHOW SIGNS OF INJURY, ABERRANT
BEHAVIOR OR STRESS, OR THAT ARE ORPHANED AS A RESULT OF
ANY OF THE AUTHORIZED ACTIVITIES.

F. IN THE EVENT OF THE DEATH OF AN OTTER DUE TO AUTHORIZED
ACTIVITIES, A NECROPSY MUST BE PERFORMED IN ORDER TO
EVALUATE THE LONG AND SHORT TERM EFFECTS OF HANDLING,
IMPLANTING, ETC. THE WILDLIFE PERMIT OFFICE (WPO) MUST
BE NOTIFIED OF DEATH AND CORRECTIVE MEASURE WITHIN
2 WEEKS.

G. ALL ACTIVITIES MUST BE COORDINATED WITH THE ALASKA
DEPARTMENT OF FISH AND GAME AND THE FWS REGIONAL OFFICE
IN ANCHORAGE, ALASKA (907-276-3800).

H. PERMITTEE MUST SUBMIT A REPORT TO WPO BY JANUARY 31,
1985, DESCRIBING AND EVALUATING THE FIRST YEAR'S WORK.
ACTIVITIES SCHEDULED FOR THE SECOND AND THIRD YEARS MAY NOT
COMMENCE UNTIL THE FIRST YEAR'S WORK IS REVIEWED AND
APPROVED BY WPO.



STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

Permit No. 85-215
Expires 12-31-85

SCIENTIFIC OR EDUCATIONAL

PERMIT
to

TAKE OR POSSESS
HOLD ALIVE
BAND OR TAG
IMPORT BIRDS OR MAMMALS
EXPORT BIRDS OR MAMMALS

BIRDS OR THEIR EGGS
MAMMALS OR THEIR FURS
FISH OR THEIR EGGS

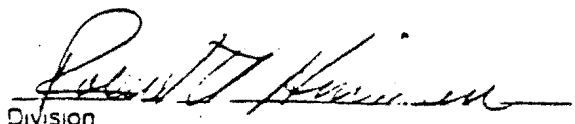
This permit authorizes Dr. Donald B. Siniff, University of Minnesota
person, agency or organization
of 190 Zoo. Bldg., Minneapolis, Minnesota 55455 to conduct the
address
following activities during May 31, 1985 to December 31, 1985 in accordance with AS 16.05.930 to:

Authority is granted to the permittee and subpermittee Chuck Monett to take up to 150 Alaskan sea otters (*Enhydra lutris*) from the Prince William Sound vicinity, for the purpose of scientific research. Activities to include capture, anesthetization, flipper tagging, blood sampling and tooth extraction. Permittee is also authorized to implant up to 100 otters with radio transmitters (no more than 50 in one year), of which 50 will be tagged with temple tag transmitters provided: (1) Capture nets are checked within two hours during trapping; (2) Anesthetized animals are not released until completely recovered from the effects of the drugs; (3) Procedures performed on captured animals determined to be in poor condition or in advanced stages of pregnancy are non-invasive and minimized as much as possible; and (4) Every feasible effort is made to recover and treat instrumented animals that show signs of injury, aberrant behavior or stress, or that are orphaned as a result of any of the authorized activities.

In the event of the death of an otter due to authorized activities, a necropsy must be performed in order to evaluate the long and short-term effects of handling, implanting, etc. The WPO and State must be notified of death and corrective measures within two weeks. All other conditions same as Federal permit.

FEDERAL PERMIT PRT-678319 AND THIS PERMIT MUST BE IN POSSESSION.

This permit must be carried by a person specified on this permit during approved activities who shall show it on request to persons authorized to enforce Alaska's fish and game laws. This permit is nontransferable, and will be revoked, or renewal denied by the Commissioner of Fish and Game if the permittee violates any of its conditions, exceptions or restrictions. No redelegation of authority may be allowed under this permit.


Division

Ms. Susan Lawrence
5 July 1984

2

Since our capture attempts were not very successful during the last two weeks of June it becomes evident that the requirement of having Dr. Tom Williams do all the implants severely impairs our operation. Therefore we need to develop procedures for when he can not be present. It seems to me that two possible routes are available to us. The first of these is to contact another veterinarian and I will begin to do this to see who might be interested in helping. The second way is for Tom to teach either myself or Charles Monnett, a Ph.D. candidate at the University of Minnesota, to perform the surgeries. I feel confident that either Chuck or I could learn the procedures after we work through a training period with Tom or another veterinarian. I have been present on most of the implants to date and thus have a good idea of what is involved. The present policy that a veterinarian be required to perform the surgery is fairly restrictive for field operations in Alaska and thus if at all possible we should move toward other alternatives. Allowing others to do the procedure in Alaska I see as having no particular bearing on the policy with respect to California work, where access is more reasonable.

I would be happy to answer any questions that you or others might have about these two requests but hope that something can be resolved by the time that we plan to move into the field in late July and/or August. The capture of large dependent and newly independent young by the dip net procedures is perhaps the most pressing decision since I am fairly certain that I can find another veterinarian to perform the surgery. I look forward to hearing from you on these matters.

Sincerely,



Donald B. Siniff
Professor

DBS:ak

APPENDIX B



UNIVERSITY OF MINNESOTA
TWIN CITIES

Department of Ecology and Behavioral Biology
107 Zoology
318 Church Street S.E.
Minneapolis, Minnesota 55455
(612) 373-5177

5 July 1984

Ms. Susan Lawrence
U.S. Fish & Wildlife Service
Wildlife Permit Office
1000 N. Glebe Road
Arlington, VA 22203

Dear Susan:

This letter is to report briefly on our recent activities in Alaska and ask advice on two major points that arose during this research period.

The netting conditions were poor in Alaska during late June and we were only able to capture 4 sea otters, 3 of which we implanted with transmitters. These are all doing fine and our transmitter range is much improved. I am uncertain as to the reasons for our lack of success but feel it had to do with distribution of otters at this time of year. We plan more catching probably in late July, August and early September in order to have a number of otters to observe through the Winter.

Our poor success in catching during the last two weeks of June, emphasizes the importance of new capture techniques. On page 3 and 4 of our permit application we specified floating gill nets only, as a capture method. As you may know Ron Jameson of the Fish and Wildlife service has successfully used dip nets to capture newly independent young in California. Since we have never had a problem with capture in Alaska it did not occur to me when I wrote the application, to include this capture method but now it appears that it would be extremely useful. It appears that we could use it with success on large dependent pups as well as newly independent pups. We would like to carry out such experiments in late July, August and September. For females with large dependent pups, we will dip-net the pup when the female dives. The pup would be brought on board and if sufficiently large (e.g. over 15 lbs) we would perform the implant operation. If the pup was smaller than 15 pounds, it would only be tagged. From experiences where a pup alone has been caught in a net, we know the female will remain a short distance from the vessel while the operation and/or tagging is being performed. We feel this would be an excellent way to obtain our sample of pups born and raised during the summer in order to watch them through their first winter. This technique has an advantage in that large pups still dependent on the female would be assisted by the female for at least the first week or so after instrumentation which is probably less traumatic than instrumenting a newly independent pup. This seems true because newly independent pups have the trauma of being separated from their mother and left on their own to obtain food and interact with dominant adult animals. I would be pleased to discuss details of such procedures with you or anyone else that you feel I should contact.



UNIVERSITY OF MINNESOTA
TWIN CITIES

Department of Ecology and Behavioral Biology
107 Zoology
318 Church Street S.E.
Minneapolis, Minnesota 55455
(612) 373-5177

13 June 1985

Ms. Susan Lawrence
U.S. Fish & Wildlife Service
Wildlife Permit Office
P.O. Box 3654
Arlington, VA 22203

Dear Susan:

This letter is to request a modification in our Marine Mammal permit (PRT 2-678319) for sea otter work in Alaska.

During the course of our work we have developed new capture techniques that allow acquisition of new data that we feel may be valuable in the interpretation of resource availability. This technique is using a dip-net (as explained in our annual report to your office) to capture, tag, weigh and release dependent pups. They may later be recaptured and the process repeated. Thus, we are able to obtain growth rates of dependent pups under different regimes of resource availability.

We originally asked to tag 150 sea otters in Prince William Sound over the two years of our study. This would have been a sufficient sample, but the ability to recapture and obtain growth rate data has made it necessary to ask to increase the number of times otters are handled. The handling of 150 individuals will not change, but some of the individuals will be captured perhaps as many as 3 times. Thus, we need this modification and are requesting we be allowed to capture 150 individuals, but to handle them a total of 450 times. The total number implanted with telemetry transmitters would not change.

I would be pleased to answer any questions about this request. We would like to be able to continue this work this summer so it would be extremely helpful if we could obtain permission fairly soon.

Sincerely,

Donald B. Siniff
Professor

DBS:ak



United States Department of the Interior

FISH AND WILDLIFE SERVICE

WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR,
FISH AND WILDLIFE SERVICE

In Reply Refer To:
FWS/FWPO PRT-678319

OCT 12

Dr. Donald B. Siniff
109 Zoology Building
University of Minnesota
Minneapolis, Minnesota 55455

Dear Dr. Siniff:

This responds to your July 5 letter requesting amendment of your Marine Mammal permit, PRT-678319, to tag and implant Alaskan sea otters. You requested the following two changes: (1) Authorization to use dip nets to capture otters because the method addressed in your application (floating gill nets) is proving inadequate; and (2) Authorization for another veterinarian to do the implants when Dr. Tom Williams is not available or, preferably, for Charles Monnett or yourself to be trained and perform the implants when no veterinarian is available.

Susan Lawrence of this office communicated verbally to you on July 31, 1984, that your request to use dip nets is approved.

Your second request is approved in part. Your request that Mr. Monnett or yourself be permitted to perform the surgical implants in the absence of a veterinarian is denied at this time because the implant procedure is still considered experimental. However, veterinarians other than Dr. Williams with experience in this type of operation may carry out the implants when Dr. Williams is unavailable. Further, we recommend you and/or Mr. Monnett receive training in the operation and resubmit your request after sufficient additional implants and follow-up studies have been conducted to demonstrate the safety and routine nature of the procedure. At that time, you should supply a report describing the nature and results of these additional studies, the training that you and Mr. Monnett have received, the types of routine and unexpected problems that could occur during this implant procedure and what would be done to avoid and mitigate them.

If you have any questions, please direct them to Susan Lawrence of this office: Federal Wildlife Permit Office, P.O. Box 3654, Arlington, Virginia 22203 (703/235-1903).

Sincerely,

R. K. Robinson
Chief, Branch of Permits
Federal Wildlife Permit Office



United States Department of the Interior

FISH AND WILDLIFE SERVICE

WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR.
FISH AND WILDLIFE SERVICE

In Reply Refer To:
FWS/FWP0 PRT 678319

APR 17 1985

Dr. Donald B. Siniff
109 Zoology Building
University of Minnesota
Minneapolis, Minnesota 55455

Dear Dr. Siniff:

On June 7, 1984, this office issued you a Marine Mammal permit, PRT 678319, to take Alaskan sea otters (Enhydra lutris) for scientific research. Condition H of that permit stated that activities scheduled for the second and third years could not commence until the first year's work was reviewed and approved by this office.

We have reviewed your 1984 annual report on activities conducted under this permit and hereby authorize continuation of your work. We suggest that you attach this letter to your permit.

If you have any questions, please contact Susan Lawrence of this office: Federal Wildlife Permit Office, 1000 North Glebe Road, Room 611, Arlington, Virginia 22201 (703/235-1903).

Sincerely,

R. K. Robinson
Chief, Branch of Permits
Federal Wildlife Permit Office

APPENDIX C

Ear	left		right	
Tag	outer	inner	inner	outer
R64				
R66	b107		g103	
R68	g104		r108	
R69	w101			
R70		w102		
R72	g105		y108	
R74	g106		g107	
R76	g108		b108	
R77	r109			r110
R78	r111			b109
R79	r112			g109
R80	y109			r113
R81	y110			b110
R82	y111			g110
R83	b111			r114
R84	b112			b113
R85	b114			g111
R104		y115	y116	
R106		y117	b117	
R108		y118	g118	
R110				
R112				
R114		b120	y119	
R116		b121	b122	
R117		g119	b123	
R120		g120	r122	
R119		g122	b124	
R118		g123	g124	
R121	w103			r123
R122	w104			g125
R123	w105			b125
R125	w107		y122	
R126	w109		y123	
---1985---				
R136				w189
R138				w187
				w184
				w165
				w154
				w118
				w124
				w175
				w171
				w170
				w173
				w156
				w158
				w190
				w155
				w166
				w157
				w120
				w182

---1984---

Ear	Left		Right	
	outer	inner	inner	outer
Tag	R121	R120	R119	
L1	R118	Y480	R117	
L2	B391			R115
L3	R113	B393	R112	
L8	g115			y112
R87	g114			b116
R91	g115			g116
R93	r117		w112	r116
R94	r118			y113
R96		r119	b116	
R86		r120	g117	
R101		y114	r121	
R103		g121	y120	
R124	w106		r124	
	w108		b119	
		w111	y124	
R50	g112			r115
R10	y103		y104	
R13	r78			
R14	y84			
R16	r86		y101	
R18	b37			
R17				r97
R20				y78
R21				b92
R22				g89
R23		r92		
R24		y87		
R25		b38		
R26		g79		
R28			r77	
R29			yunknown	
R31			b36	
R32			g78	
L35	r75			y89
R36	g86			
R37	b50			y98
R38	y93			y92
R40	b103		r107	
R41				
R44				
R47				
R48				
R53				
R54	r101		r102	
R55	r104		b101	
R56	r105		g101	
L59	y102		r106	
R60	y106		g102	
R61	y105		b102	
R62	b104		y107	
R63	b105		b106	

Ear Tag	Outer	Left Inner	Right Inner	Outer
				w174
				w151
				w169
				w123
				w116
				w122
				w125
				w172
				w168
				w152
				w163
			w153	
				w167
				w188
	b191	r185		
			r192	r178
			r188	b189
			y144	r186
			y129	y133
			y127	b192
			b182	r176
				w184
				w181
	w192		w191	
		w180		w198
	y121		w194	
R135				
	y146	r195		b185
	r189	b177		
	y137	y140		
	y131	b178		
	w177	r196		
			w176	y143
			w196	r177
			b195	w197
			b154	y128
	y132	r182		
			b190	b181
	r191	r179		
		b198	r198	
		y145		b197
		y141		y147
		r190		y134
		r197	r100	
		r187		b187
		y138		r184

Flipper Tag Colors:

r - red button
 y - yellow button
 g - green button
 b - blue button
 w - white button
 R - red temple

B - blue temple
 Y - yellow temple

Ear Tag Code:

L - left
 R - right

APPENDIX D

CURRICULUM VITAE - Kenneth A. Hill

PERSONAL: Born July 11, 1948; Mt. Washington, Kentucky
Social Security Number: 574-18-6997

ADDRESS: P.O. Box 1290, Cordova, Alaska 99574

TELEPHONE: (907)424-3498 Home and Office

EDUCATION: 1966-1970 University of Oregon - B.S.
Biology

1970-1975 Colorado State University -
D.V.M.

EMPLOYMENT: 1971 Alaska Department of Fish &
Game - Ugashik River Salmon
Smolt Outmigration Study -
Fisheries Technician.

1971 Alaska Department of Fish &
Game - Egegik River Salmon
Enumeration project - group
leader.

1972 Alaska Department of Fish &
Game - Biologist for Kasilof
River and Tustumena Lake
salmon studies.

1975-1976 College Village Animal Clinic
- Anchorage, Alaska - Practi-
tioner: Surgery, Dentistry,
Medicine.

1976 Relief Veterinarian - various
practices in Alaska.

1977-present Established Prince William Sound
Veterinary Clinic - Main office
in Cordova with satellite clinic
in Valdez. Also engaged in bush
practice in various towns includ-
ing Yakutat, Bethel, Kalskag,
Aniak, Adak.

1978-present For 6 weeks of each summer engaged
in commercial fishing in Bristol
Bay as owner-operator of commercial
salmon fishing vessel.

1983-1984

Engaged in commercial fishing venture Copper River and Prince William Sound as owner-operator of commercial salmon fishing vessel.

RESEARCH EXPERIENCE:

1971	Salmon smolt outmigration field studies - Ugashik Lake - Fisheries Technician
1972	3 month Salmon tagging and tag recovery field studies - Kasilof River and Tustumena Lake - Spawning stream carrying capacity - Biologist in charge

PAPERS PUBLISHED:

Madewell, B.R., V.M.D., M.S.; Nelson, D.T., D.V.M., M.S.,; and Hill, K., D.V.M. "Paroxysmal Atrial Fibrillation Associated with Trauma in a Dog." Journal of the American Veterinary Medical Association, Vol. 171:273-275.

SURGERY EXPERIENCE:

My bush practice experience has required me to frequently perform various surgeries including many abdominal surgeries under a wide range of field conditions in remote locations such as Adak, Aleutian Islands, Bethel, Yakutat, Kalskag, Aniak; etc. As a result I have modified and developed techniques so as to maximize success rates and give excellent prognoses for these patients.

PERMITS:

U.S. Fish & Wildlife permit to rehabilitate wild migratory birds including endangered species such as the bald eagle and golden eagle.
State of Alaska Department of Fish and Game Permit for the same species.

LICENSES:

Currently hold licenses to practice veterinary medicine, dentistry and surgery from the following states: Alaska, Washington, Oregon, California, Colorado.

Currently hold license to dispense and use narcotic agents and scheduled drugs from the U.S. Department of Justice, Drug Enforcement Administration.

Member of the following professional Organizations:
American Veterinary Medical Association
American Animal Hospital Association
Alaska Veterinary Medical Association.