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**AERIAL SURVEY OF SEA OTTERS
EASTERN ALEUTIAN ISLANDS**

3-5 March 1960,

by

Karl W. Kenyon

**U. S. Fish and Wildlife Service
Branch of Wildlife Research
Sand Point Naval Air Station
Seattle 15, Washington**

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CONTENTS

	Page
Introduction	1
Purpose and scope	1
Itinerary	1
Personnel	2
Methods	2
Survey time	3
The Survey	3
Islands of Four Mountains	3
Unimak and associated islands	4
Unalaska and associated islands	5
Krenitzin Islands	6
Unimak and Arnak Islands	7
Sanak Island-Sandman Reef areas	7
Sea Otter Distribution and Dispersal in the Aleutian Islands	12
Distribution	12
Natural dispersal	13
Historical review of dispersal	14
Transplanting of sea otters	16
Recapitulation of population figures	17
Summary and Conclusions	18
References Cited	21
Figure 1	22
Figure 2	23
Figure 3	24
Appendix	25

INTRODUCTION

Purpose and Scope

The purpose of the 1960 aerial survey was to obtain information on the population and distribution of sea otters in the eastern Aleutian Islands. The 1960 survey began where the 1959 survey terminated, at the Islands of Four Mountains. The shoreline of each island in the Aleutians, east of (and including) Herbert Island, was surveyed between 3 and 5 March. Included in the 1960 survey were also Amak Island, 15 miles north of Cold Bay, and parts of the Sanak Island and Sandman Reefs areas. An effort to include the Shumagin Islands was prevented by a northeasterly wind of about 55 knots on 5 March.

In most areas, few sea otters were seen (see figs. 1, 2, and 3). Counts and estimates of Emperor geese, harbor seals and sea lions were recorded (see Appendix).

Itinerary

- | | |
|---------|---|
| 2 March | 1820 arrive Cold Bay, Alaska |
| 3 " | Aerial survey - Islands of Four Mountains, Unimak Island, parts of the Krenitzin group and north shore of Unimak Island. |
| 4 " | Aerial survey - Unalaska Island, complete Krenitzin group and Unimak and incomplete survey of Sanak and Sandman Reef areas. |

- 5 March Aerial survey - Amak Island, and Sea Lion Rocks.
Unsuccessful attempt to survey additional areas.
Arrive Anchorage 1755.
- 7 March Juneau, conference with Regional Director Urban
C. Nelson.
- 8 1710 arrive Seattle.

Personnel

Theron A. Smith, pilot, Aircraft Supervisor, BSWF,
Anchorage, Alaska; David L. Spencer, copilot, Refuge Supervisor,
BSFW, Kenai, Alaska; Karl W. Kenyon, Biologist, BSWF, Seattle,
Washington; Roy Lindsley, Western Area Supervisor of Fishery
Management, BCF, Anchorage, Alaska; and Dale W. Rice, Biologist,
BCF, Seattle, Washington. Mr. Robert D. Jones, Aleutian Wildlife
Refuge Manager, gave his full cooperation. He furnished automobile
transportation, and obtained accommodations for our party at Cold
Bay.

Methods

This subject is discussed in detail in a previous report
(Kenyon, 1959a). Briefly, two observers standing behind the pilot
and copilot surveyed an area ranging in width from one-half to
three-quarters of a mile along the coast line of each island and in

other areas offshore believed to be favorable sea otter habitat. The flight altitude was maintained at 200 to 300 feet except when island terrain required a higher altitude for safety. The flight speed was maintained at 120 knots.

Nautical miles are used throughout this report.

Survey Time

<u>Time required for sea otter survey 3-5 March 1960</u>	<u>Hrs.</u>	<u>Min.</u>
R4D (DC3) flight time on otter survey	18	09
" " " " transportation to Anchorage	<u>8</u>	<u>22</u>
Total charter time	26	31

THE SURVEY 1960

Islands of Four Mountains

Survey date: 3 March 1960

" time: 40 minutes

Observation conditions: Good to excellent (calm to light winds, broken overcast, unlimited visibility).

Otters counted: 0

During the survey the water was glassy calm except in limited areas where light breezes rippled the surface. Under these

conditions otters on the surface are easily detected. Lensink failed to find otters here on a survey in 1957 which he considered inadequate (1958). No other visitor or observer of recent years in the Islands of Four Mountains area has reported sea otters there. It appears safe to conclude that sea otters are absent from this area.

Habitat appears as favorable for sea otters here as that found in other populated areas. In general the area appears similar to Semisopochnoi.

Umnak and Associated Islands

Survey date: 3 March 1960

time: 2 hours, 10 minutes

Observation conditions: Good to excellent (calm to light winds, broken overcast).

Sea otters counted: 8 adults, plus one pup

The southwest tip of Umnak, including Samalga Island, appears to offer ideal sea otter habitat. All otters seen were in this area. Other areas of apparently favorable habitat were noted along most of the north shore of Umnak and along the western one-third of the island on its south side.

In 1956 Fred and Antone Benzekeff, natives of Nikolai

Village near the western end of Umnak, told me that a sea otter was believed seen near Samalga recently but that none had been seen there for many years before that. In December of 1959, Fred wrote me that "There are all ages of sea otters around the south end [of Umnak]."

On 30 September 1957, Lensink (1958) recorded three otters near Breadleaf Island, in the same location where five were seen on the 1960 survey (fig. 1). In consideration of all information now available from the Umnak area it appears that the small group of sea otters at Samalga and the southwest tip of Umnak became established there during the 1950's and is now slowly increasing. This will be an ideal area in which to study population growth.

Bogoslof Island, 25 miles north of Umnak was surveyed on 3 March. No otters were seen there.

Unalaska and Associated Islands

Survey date: 4 March 1960

" time: 4 hours, 22 minutes

Observation conditions: Fair to excellent

Otters counted: 0

Unalaska is one of the large islands of the Aleutian chain and because of its numerous long and narrow bays it has the longest

coastline. A northerly wind of about 15 to 20 knots causing choppy water hampered observations in areas having a north exposure. The wind was particularly gusty around Unalga Island. The waters within bays along the north shore, where apparently favorable sea otter habitat was seen, were all sheltered from the wind as was the entire south shore. Since sea otters tend to move to sheltered areas we considered that our survey was adequate except for parts of the Unalga area. Lensink (1958) reported one sea otter seen at Egg Island near the east end of Unalaska. Other than this single observation there are no reports of otters from the Unalaska area in recent years. All available information indicates, therefore, that if there are any otters in the Unalaska area they are probably wanderers and their number is at present so small as to be insignificant.

Krenitzin Islands

Survey date: 3 and 4 March 1960

" time: 2 hours

Observation conditions: Fair to excellent

Otters counted: 9

In order to have sufficient time for the survey of large islands in the western survey area the Krenitzin Islands survey was done

in part on two days. Conditions were calm and visibility unlimited on 3 March but a north wind causing gusty conditions near the islands prevented an entirely satisfactory survey on 4 March. Since most of the area was covered on 3 March, however, we consider that the survey was adequate. Otters were seen only on the north shore of Tsigalda Island (Fig. 2), which, significantly, is the only place they were seen by Lensink on his aerial survey of 30 September 1957. Lensink (1958) estimates, on the basis of the five otters he saw at Tsigalda, that the total population in the Krentzia Islands numbered 50 to 100 animals. Natives of Akwaa Village have reported seeing small numbers of otters during fishing trips (see Lensink, 1958). Considering the information now available, it might be concluded that there is a small resident sea otter population at Tsigalda Island and that wandering individuals from there and possibly Ulnak may reach the Krentzia group seasonally. Our survey indicates that the Krentzia group is still in an early stage of repopulation and that Lensink's population estimate is too high.

Ulnak and Amak Islands

Survey date: 3, 4 and 5 March 1960

" time: 1 hour, 57 minutes

Observation conditions: Poor to excellent

Otters counted: 90

The survey of Unimak Island was done under good to excellent wind and visibility conditions and the survey is considered adequate. Only eight otters were seen, however (fig. 3). Six of these were scattered near the shore of Cape Sarichef and two were off Unimak's north coast east of Cape Mordvinof in the Urella Bay area.

The survey of Amak Island was conducted during a 20 knot north wind and the water was choppy, making the observation of otters difficult. In the area east of Amak, however, where water depths are 8 to 15 fathoms, 82 otters were counted.

Lensink (1958) speculated that the group of 786 otters counted in waters 2 to 4 miles off the north shore of Unimak on 27 July 1957 might belong to a large offshore population. When Jones again surveyed the area on 6 October, only one otter was seen where the large group had been found in the summer.

In spite of the fact that our 1960 survey of the Amak Island area was conducted under poor conditions for otter observation, our count of 82 animals is significant. All were seen directly in the flight path of the aircraft. Undoubtedly we saw only a small percentage of the animals in this area. It therefore seems reasonable that the large assemblage of otters inhabiting offshore waters north of Unimak Island in summer months may move to the Amak Island area in winter. The fact that we observed only nine otters in the Krenitsin

Islands and none in the Unalaska area indicates that no significant number of the offshore Unimak summer population moves westward into the Aleutian area. That there is a truly pelagic population, as Lensink (1958) suggests is yet to be shown. It is obvious, however, that otters in the Unimak-Amak Island areas have chosen a habitat different from those typically chosen by other otter populations. Available observations from this area indicate that the otters remain within the 20 fathom curve and are most abundant in depths of less than 15 fathoms.

Among the 32 otters seen near Amak on 5 March only one appeared to be a mother with a pup, supporting the possibility that most of the animals in this area are males. A collection of otters to give an indication of food habits, sex and age composition of this population of otters will be of interest. Such a collection will be made in July of 1960 from the pelagic sealing charter vessel "Windward" if weather conditions permit.

Lensink's 1958 population estimates for otters in this area are considered valid (table 2).

Sanak Island-Sandman Reef Area

Survey date: 4 and 5 March 1960

" time: 1 hour, 18 minutes

Observation conditions: Fair to poor

Otters counted: 73

The Sanak Island area was only partially surveyed. The late afternoon sun on choppy water caused by a 10 to 15 knot northerly breeze during the survey made observation difficult. Therefore, coverage of considerable favorable habitat was not attempted. In the area that was surveyed, 70 otters were seen (fig. 3). Probably only a small percentage of the otters present in the areas surveyed were seen.

Two trips were made through the Sandman Reefs. The first at sunset on 4 March and the second about noon on 5 March. Wind and rough water both days, in addition to the approaching darkness on 4 March, made the survey of this area inadequate. Twenty-three otters, however, were counted.

Lenzink (1955) made a thorough survey of this area and recorded 759 otters in the Sanak-Sandman Reefs area and estimated a total population of 300 to 1,300 otters in the area. Judging from what we were able to see during the 1960 survey we feel that Lenzink's counts and total estimates for this area are adequate (table 2).

Table 1. --Field counts and population estimates-1960

Area ^{1/}	Count	Estimated total	
		(if 75% seen)	(if 50% seen)
Islands of Four Mountains	0	0	0
Unimak and associated islets	6	8	12
Unalaska " " "	0	0	0
Akutan, Akun, Rostok, Avalanuk, Ugarnak	0	0	0
Tigalda	9	12	18
Unimak	2	11	16
Amak	82	No 1960 estimate ^{2/}	
Sanak	70	"	"
Sandman Reef	<u>23</u>	"	"
Total	198		

^{1/} See Appendix for complete listing of islands surveyed.

^{2/} Observation conditions were poor with winds and rough waters. Population estimates are in table 2.

Sea Otter Distribution and Dispersal in the Aleutian Islands

Distribution

One of the most important results of the May 1959 and March 1960 aerial surveys of the Aleutian Chain is that we now have a nearly complete and up-to-date record of sea otter distribution and population magnitude in that area. One of the immediately apparent points of interest is the discontinuity of otter populations throughout much of the chain. The 240-mile long area of otter abundance, from Kiska to Adak, yielded an aerial count of 9,376 otters. The entire remaining 540 miles yielded a total count of only 732 and most of these (78%) are in the Unimak-Arnak Island area. From Kagulaska Island to Unimak Pass (440 miles) the count is 145 otters. The areas of localized occurrence are very limited and are listed: (1) Atka, 33; (2) Arnika, 83; (3) Sequam, 14; (4) Unmak-Semalga, 6; and (5) Tigalda, 9. That there are substantially more otters in the area between Adak and Unimak Pass than indicated by the above counts is doubtful. Each small colony had been reported prior to our count. Our surveys were equally complete in all areas. No special effort was made to find otters in areas where they had been previously reported. Therefore our distribution data is not biased. In fact, it was after our survey was completed that it became apparent that the otters we saw were in the exact geographical locations where other observers

had reported them.

Natural Dispersal

That individual otters wander to considerable distances is indicated by several reports of sightings in various areas. For example, by the report of Lensink of one otter near the eastern end of Unalaska Island in 1957 and by local residents' reports of an occasional otter near Akutan. Our rather complete survey of the Akutan-Unalaska area indicates that only one small resident colony of otters is found in the Fox Islands (including the Krenitzin group) at Tigalda Island.

It is unknown whether or not the sea otter can exist for any considerable period far at sea. Reports by 19th century sea otter hunters that otters were found 50 miles at sea might indicate that they can. I believe it is reasonable to assume that otters were exterminated before 1911 from relatively small, isolated islands such as Semisopochnoi and Sequam and that repopulation took place by immigration across open water, 25 miles from Amchitka to Semisopochnoi and 15 miles from Amliia to Sequam.

As has been pointed out (Kenny, 1959a) a massive immigration of sea otters from Kanaga to Adak took place during the 1950's. The open water distance between Kanaga and Adak is 6 miles at the nearest points. In 1959 little evidence of

further eastward dispersal across the 1-mile Kagalaska Strait (between Adak and Kagalaska) was evident. Only one otter was seen on the Kagalaska side. Small isolated populations at Atka, Amia and Sequam apparently became established during the late 1940's and 1950's. East of Sequam (where 14 otters were counted in 1959) Amukta Pass is about 36 miles wide and the next small colony of otters to the east is 115 miles distant at the southwest tip of Umnak Island.

It therefore appears that population dispersal may take place in two ways (1) individuals wander considerable distances, then establish themselves in a highly favorable habitat forming small isolated colonies that grow slowly in size. (2) Large numbers of otters move from a heavily populated area to a neighboring island and quickly establish a large local population.

Historical Review of Dispersal

On the basis of information now available the following brief reconstruction of the history of sea otter repopulation in Alaska after 1911 is attempted.

By 1911 the sea otter was extinct in most island and coastal areas. Population fragments consisting of a few individuals remained in the Rat Islands, Western Andreanofs and in the Shumagins. It

may be assumed that these individuals wandered to and accumulated in the most favorable habitat areas, creating small local colonies. The populations at certain islands increased to several hundred animals without any appreciable spread to other areas. When an island population reached or surpassed equilibrium with its environment, a substantial movement to the nearest island occurred. In this way, the Rat Islands became repopulated within a period of 25 to 40 years. The western Andreanof-DeLoreaf group repopulated and spread as far east as Kruzof by the late 1940's, then massive movement to Adak took place during the 1950's.

From the Shumagin Islands, much of the Alaska Peninsula was repopulated. Movement was apparently eastward to the Prince William Sound area and westward to the Sanak-Sandman Rocks area in the late 1940's and early 1950's. During the 1950's, numbers of others invaded the north shore of Umnak and the Amak area. At the same time, a few wanderers accumulated at Tigaida and at the southwest tip of Umnak.

Southeastern Alaska, being most distant from a surviving population center, has not yet been repopulated. Reports of occasional otter sightings there suggest the possibility that small colonies in highly favorable habitat areas may now be present in that area. No such report has yet been confirmed. Judging from present and past repopulation rates, however, it will be a number of years before the vast Southeastern Alaska area will have a substantial otter population.

Transplanting of Sea Otters

The transplanting of sea otters has already been reviewed (Kenyon, 1959b). Now that our population survey of the Aleutian Islands is complete the indicated conclusion concerning further transplants remains unchanged, i.e. the only areas to which transplant may be considered practical are the Near Islands and the Pribilofs.

The transplant to St. Paul Island of seven young adult otters in May of 1959 appears to have been successful. Mr. Bert Johnson, who spent the winter of 1959-1960 on St. Paul Island, informs me that sighting of the otters was reported by local hunters on several occasions throughout the winter. The most recent report he received was in the last week of February, shortly before he returned to Seattle.

Mr. Robert D. Jones has, during the past several months, constructed an otter-holding pool at Adak. Transplants of otters from there to the Near Islands (either Shemya or Attu) by air will be practical and I believe Jones plans to do this. Transplants to the Near Islands should be undertaken because these islands, like the Pribilofs, are at such a distance (approximately 125 miles) from existing otter populations that natural dispersal to them in a reasonable period is most unlikely.

A transplant to the Islands of Four Mountains is not considered advisable for two reasons: (1) The area is only 15 miles from

Gamaga Island where there is a small resident colony of otters.

Repopulation will probably take place naturally in a reasonable time.

(2) The transplant would have to be done by ship--a very costly undertaking. Considering the length of time necessary for a small transplant to repopulate the islands, such an expenditure does not appear justified.

Transplants to Southeastern Alaska are considered impractical as discussed previously (Kosyon, 1959b).

Recapitulation of Sea Otter Population Data

When the sea otter surveys in the eastern Aleutian Islands were completed on 5 March 1960 all significant sea otter populations in Alaska had been surveyed at least once since the survey program began in 1957. Following is a listing of field counts and estimates of total populations based on the survey:

Table 2. -- Summary of most recent field counts and estimates of sea otter populations in Alaska

Survey date	Area	Field counts and estimates of sea otters	Estimates of total
6 May-28 Sept. 1957^{1/}	Prince William Sound	495-530	1000-2000
	Kodiak-Afognak	583	750-1500
	Alaska Peninsula	3624	3900-4950
	Unimak-Amak	795	1100-1500

^{1/} Surveys by Spencer, Lensink, Jones, Wilke and Troyer (see Lensink, 1960).

Table 2 (con.). --Summary of most recent field counts and estimates of sea otter populations in Alaska

Survey date	Area	Field counts and estimates of sea otters	Estimates of total
19-27 May 1959^{2/}	Western Aleutian Islands-Atka Island to Islands of Four Mountains	9507	12665-19014
3-5 March 1960^{2/}	Eastern Aleutians Islands of Four Mountains to Krenitzin Islands	15	20-30
Total		14919-14954	19435-28994
Rounded estimate		15,000	20,000-30,000

2/ Surveys by Spencer and Kenyon.

SUMMARY AND CONCLUSIONS

- 1. Sea otter habitat, primarily in the eastern Aleutians, was surveyed 3 to 5 March 1960 using an R4D aircraft. The area surveyed is 330 miles in length from the Islands of Four Mountains to the Sandman Reef. Thirty-five large islands plus a number of islets and offshore rocks were included. Flight time was 26.5 hours.**
- 2. Otters were not found in the Islands of Four Mountains; they are scarce in Fox Islands west of Unimak Pass. The Unimak-Amak area supports a considerable population. Surveys in the Sanak Island-**

Sandman Reefs area were inadequate.

3. Two small colonies have become established in the Fox and Krenitzin Island groups. These are at (1) the southwest tip of Unimak, including Samalga, 6 otters counted; and (2) the north side of Tigaida, 9 otters counted.

4. Repopulation of the western Aleutian Islands (except the Near Islands) has taken place much more rapidly than in the eastern Aleutians. Kiska to Adak (240 miles) count: 9,376 otters (1959); Kagulaska to Unimak Pass (440 miles) count: 146 (1959 and 1960). The Unimak-Amak Island area, near the eastern center of population, has been repopulated, count: 786 otters (1957).

5. Repopulation occurs in two ways (1) by individual wanderers which accumulate in highly favorable habitat areas forming small, isolated, slow-growing colonies; and (2) by movements of large numbers of animals from an island of high population to a neighboring island, repopulating it in a relatively short period.

6. By 1911 the sea otter was probably exterminated in all of Alaska except for a few individuals that remained in the Rat Islands, the western Andreanofs and the Shumagin Islands.

7. Otters moved across at least 6 miles of open water to repopulate Adak. It is presumed that they also repopulated Semisopochnoi by crossing 25 miles of open water from Amchitka and across 15 miles from Anlia to Sequam. Eventually the Islands of Four Mountains will be repopulated from Samalga across 15 miles of open water.

8. Transplants of sea otters to the Near Islands should be undertaken. The 1959 transplant to St. Paul Island appears to be successful. Transplants to areas other than the two mentioned would be impractical.

9. The total of counts and field estimates of sea otters in Alaska is 15,000 adults. The total estimated population is 20,000-30,000 adults.

REFERENCES CITED

Kayson, K. W.

1959a Aerial survey of certain Aleutian sea otter populations 19-27 May 1959 and estimates of the total sea otter populations in Alaska. U. S. Fish and Wildlife Service, 25 pp. and 18 maps. (Manuscript report in FWS files)

Kayson, K. W.

1959b Sea otter transplant, Amchitka Island to the Pribilofs in 1959. 14 pp. (Manuscript report in FWS files)

Lewis, C. J.

1958 Report on sea otter surveys, 6 May to 28 September 1957. U. S. Dept. of Interior, Fish and Wildlife Service, 61 pp.

The numbers and locations of sea otters observed are indicated. The survey track is not shown. The shoreline of each island and rock was inspected.

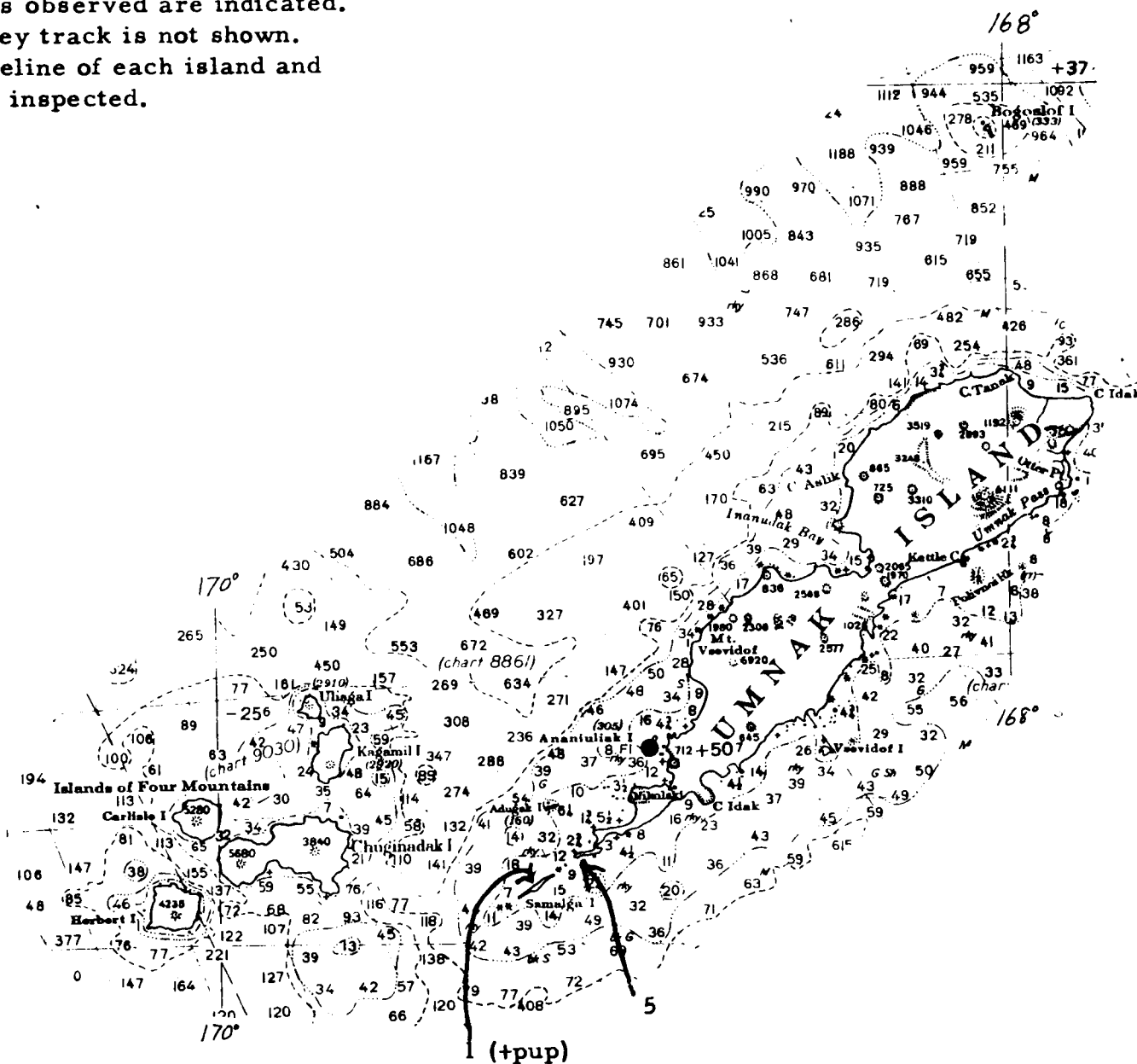


Figure 1. Aerial surveys, Islands of Four Mountains, Umnak, Bogoslof, associated islets and rocks.

The number and location of sea otters observed is indicated. The survey track is not shown. The shoreline of each island and rock was inspected.

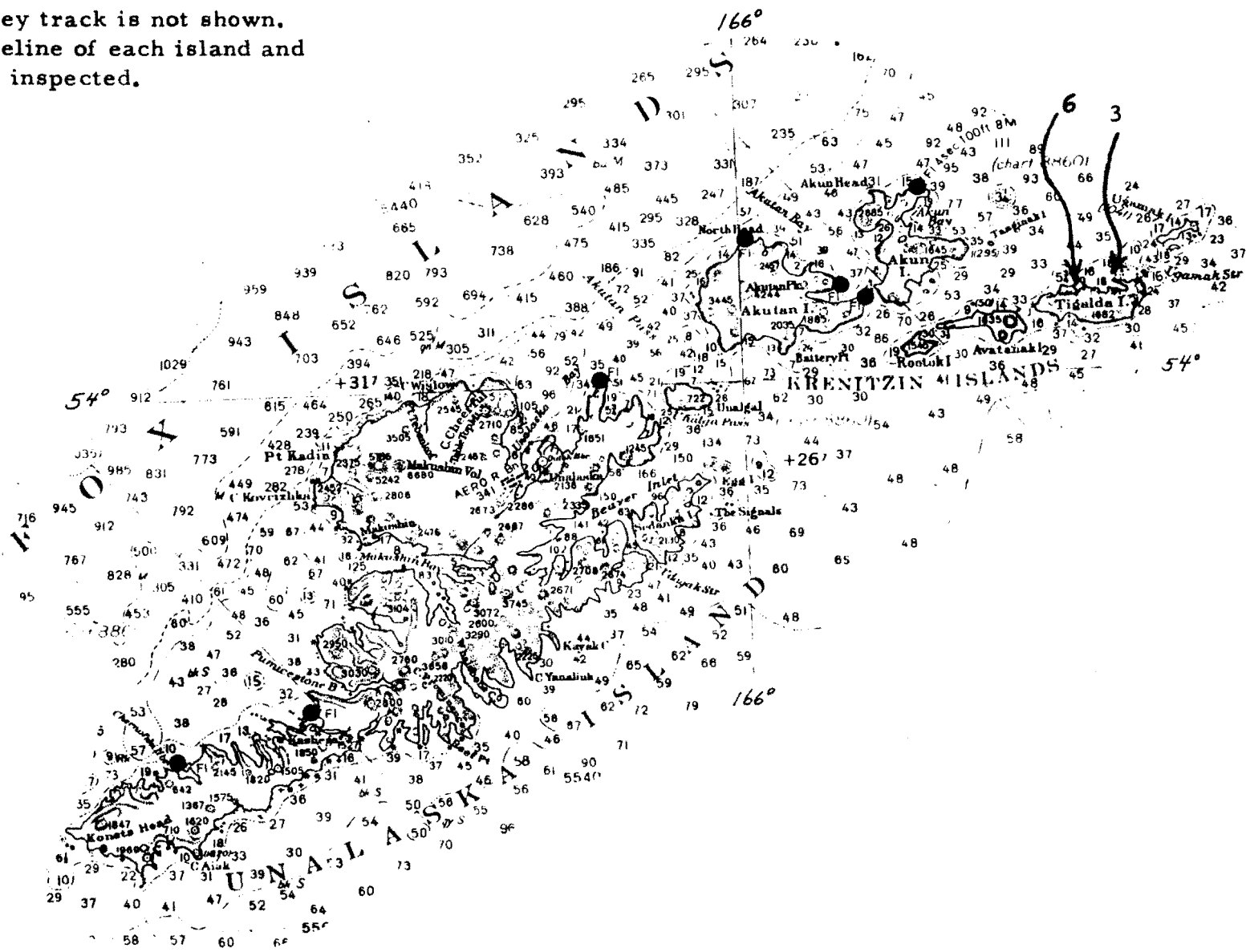


Figure 2. Sea otter survey, Unalaska and Krenitzin Islands.

APPENDIX

Census of four species,
aerial survey, eastern Aleutian Islands
3-4 March 1968

Date 1968	Location	Emperor geese	Harbor seal	Sea lions	Sea otter
<u>Islands of Four Mountains</u>					
3 March	Herbert Island	50	-	-	-
" "	Carlisle "	75	15	100	-
" "	Chuginadak "	645	125	700	-
" "	Uliaga	-	-	500	-
" "	Kagamii	250	-	75	-
	Sub-total	<u>1,020</u>	<u>140</u>	<u>1,375</u>	<u>-</u>
<u>Fox Islands</u>					
3 March	Kamalga	350	275	-	1
" "	Adagak	100	-	1,000	-
" "	Pancake Rock	-	50	-	-
" "	Anantuliak	75	-	-	-
" "	Voevidov	100	-	-	-
" "	Ogchul	-	-	2,000	-
" "	Umnak	1,750	56	1,075	5
	(All Umnak area) Sub-total	<u>2,375</u>	<u>381</u>	<u>4,075</u>	<u>6</u>
4 March	Emerald Island	300	50	-	-
" "	Unalaska	6,800	615	1,785	-
" "	Kedank	50	200	-	-
" "	Egg Island (Old Man Rks)	25	10	-	-
" "	Unalga	50	10	-	-
" "	Baby Islands	150	150	-	-
	Sub-total	<u>7,375</u>	<u>1,035</u>	<u>1,785</u>	<u>-</u>
3 March	Bogachof	-	-	1,000	-
" "	Fire Island	-	-	100	-
	Sub-total	<u>-</u>	<u>-</u>	<u>1,100</u>	<u>-</u>
<u>Krenitzin Islands</u>					
3-4 March	Akutan	7	30	15,770	-
	Akun	100	50	2,100	-
	Tanginak	-	-	600	-
	Rostok	-	55	-	-

APPENDIX (con.)

Date 1960	Location	Emperor geese	Harbor seal	Sea lions	Sea otter
3-4 March	Avatanak	200	140	-	-
	Tigalda	450	122	10	9
	Tigalda (Rk. off N. E. end)	-	-	750	-
	Kaligagan	250	150	-	-
	Ugamak	100	-	13,400	-
	Aktak	300	-	600	-
	Round	-	-	6,000	-
	Sub-total	1,400	547	39,230	9
3-4 March	Unimak	200	550	4,210	8
	Amak	-	13	350	82
	Sea Lion Rock	-	-	2,000	-
	Sub-total	200	563	6,560	90
3-4 March	Sanak	-	845	1,000	70
	Sandman Reefs	100	80	200	23
	Sub-total	100	925	1,200	93
Recapitulation					
	Islands of Four Mountains	1,020	140	1,375	-
	Fox Islands				
	Umnak Area	2,375	381	4,075	6
	Unalaska "	7,375	1,035	1,785	-
	Bogselof Area	-	-	1,100	-
	Krenitzin Islands	1,400	547	39,230	9
	Unimak-Amak area	200	563	6,560	90
	Sanak (Sandman Reef)	100	925	1,200	93
	Grand total	12,470	3,591	55,325	198

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