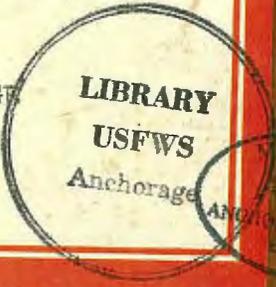




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NARRATIVE REPORT
OF
ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE
AND
IZEMBEK NATIONAL WILDLIFE RANGE
APRIL - AUGUST 1961



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REFUGE NARRATIVE REPORT

April - August, 1961

ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE

and

IZEMBEK NATIONAL WILDLIFE RANGE

Cold Bay

Alaska

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U. S. DEPT. of the INTERIOR
Bureau of Sport Fisheries and Wildlife
Fish and Wildlife Service
Cold Bay, Alaska

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ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE
and
IZEMBEK NATIONAL WILDLIFE RANGE

NARRATIVE REPORT

April - August, 1961

I. GENERAL

A. Introduction.

As in the summer of 1960 the Refuge staff, consisting of its two permanent and two temporary members closed the headquarters at Cold Bay and moved into the field at Amchitka Island for the whole of the period. As in the 1960 report, the nature of our work and the manner in which we handle it is not readily susceptible to being fitted into the usual refuge narrative form. The activities of the period are essentially all applied research or field investigations, and to dismember the compiled results to comply with the usual form would be misleading and cumbersome. Thus the writers have departed somewhat from this form.

This was the second of a three year project to study the ecology of Amchitka with emphasis on the waterfowl. As we resume our narrative the reader may wish to refer to the 1960 report. One change in personnel took place: Uncle Millie Zahn did not rejoin us and in his stead we welcomed William F. (Bill) Suss, a resident of Fife, Washington a part of the Seattle-Tacoma metropolitan area. Bill had spent nearly two years at Cold Bay as a member of the Alaska Communications System, Signal Corps, U. S. Army and is now a mathematics major in Olympic Junior College, Bremerton, Washington.

B. Weather Conditions.

Jack McCann recorded such weather conditions at Amchitka as circumstances and equipment would permit. However, the Refuge does not maintain an official weather station so the following table is compiled from the records of the Navy Weather Service, U.S. Naval Station, Adak, Alaska, 180 (nautical) miles east of Amchitka and still within the Refuge.

	<u>Snow fall</u>	<u>Precipitation</u>		<u>Temperatures</u>	
		This month	Average	Maximum	Minimum
April	1.1	2.18	4.14	53.0	27.0
May	0.0	2.82	4.77	54.0	29.0
June	0.0	2.98	3.26	57.0	35.0
July	0.0	4.56	3.07	65.0	38.0
August	0.0	2.14	4.12	58.0	42.0

Aleutian Weather is widely heralded for its winter storms and summer fog but it can on occasion boast the finest conditions. Such an occasion occurred on the 2nd and 3rd of July and it was attended by such remarkable conditions of visibility that the writer deems it worthy of note. We observed first that Gareloi Island, 70 nautical miles away, was visible. Under these conditions Semisopchnoi Island, only 35 miles away, was clearly visible in every detail. We took advantage of the fine weather and travelled to Vista, an offshore islet 18 miles north west of our base in Constantine Harbor. Arriving there where the mountains of Amchitka no longer masked the other islands in the group we found that all the Rat Island group was visible. This included Kiska 60 miles to the west, while at the same time Gareloi, now 80 miles distant to the east was still clearly visible.

C. Habitat Conditions.

These observations are recorded in the specific studies that follow.

II. WILDLIFE

A. Jack McCann's report, "A Summary of Biological Field Work Conducted on Amchitka in 1961", is included at this point.

A SUMMARY OF BIOLOGICAL FIELD WORK CONDUCTED
ON AMCHITKA IN 1961

By John McCann

Early in April, 1961, four United States Fish and Wildlife Service personnel arrived at Adak, Alaska, to make final preparations for a four month stay on Amchitka Island. These four: Bob Jones, Refuge Manager; Vern Berns; Bill Suss and Jack McCann were to continue the ecological study initiated on Amchitka Island the previous year. On April 12, a chartered Reeve Aleutian Airlines DC-4 landed them on the Island. Thanks to the efforts of the research personnel from the previous year and to the labors of the Western Electric Company crew stationed on the island during the winter, little work was required to set up camp. It was possible to get into the field almost immediately to study waterfowl density and distribution. Rat traps were set in key areas to determine rat densities, particularly in the poisoned area at Constantine Point Beach described in last summer's (1960) report.

For ease in presentation, the information collected will be divided according to the various phases of the project. Not all

the data collected are summarized since further library research is required.

Waterfowl Study

Upon arrival on the Island, we surveyed the waterfowl to determine their distribution and density. All waterfowl were noted in either the coastal waters or in large, deep ponds. We saw from 300-400 emperor geese on the beaches. Puddle ducks were seen along the beaches; while, diving ducks such as scaup, bufflehead, mergansers, and goldeneyes were found in four large lakes. A raft of approximately 40 old squaws was observed in Constantine Harbor. Two of the ponds containing diving ducks were close to the beach (Constantine Point Pond and Duck Lake) and two were in the interior of the Island (Jones Lake and Teal Pond).

With the exception of one bird, all of the 32 scaup observed were in the two inland ponds mentioned above. Twenty-nine pairs of buffleheads were located on the four larger ponds. The percent composition, by species, of the 237 birds on these ponds on the south end of the Island in April was as follows: greater scaup, 13; bufflehead, 24; red-breasted merganser, 10; common teal, 26; common goldeneye, 8; pintail, 4; and mallards, 15. The density of diving ducks on the ponds did not appear to change during April, whereas the puddle ducks were not seen on the large, fresh water ponds before April 18. The later group was not abundant on the ponds near salt water until the last week in April. After a short time on these ponds, most of the puddle ducks paired and proceeded to the

smaller nesting ponds. By the middle of May, buffleheads were a rare sight on Amchitka; the last pair was seen July 20, on Jones Lake. Several goldeneyes were seen throughout the summer. We were unable to find either goldeneyes or buffleheads nesting on the Island. By the end of June, the scaup had moved into the smaller, deeper nesting ponds. Later in the summer we were able to locate 16 nesting female scaup, the same number counted in the April census.

The bulk of the old squaws left Constantine Harbor in mass prior to April 15; the number of emperor geese dwindled daily, until May 19, when none could be found. On June 15, a pair of geese, apparently moulting, were seen in Chapel Cove. It is not believed that they nested on the Island.

The percent composition of the waterfowl on Amchitka (excluding common eiders and harlequin because of the nature of the census strips) during late May and early June, as determined from data collected on the two established census strips are listed in Table 1.

Table 1. Relative abundance of waterfowl on Amchitka in late May.

<u>Species</u>	<u>Northern route</u>	<u>Southern route</u>	<u>Total</u>
Common teal	40.5 (15 pair)	39.0 (23 pair)	40.0 (38 pair)
Mallard	19.0 (7 pair)	15.3 (9 pair)	17.0 (16 pair)
Red-breasted merganser	13.5 (5 pair)	5.0 (3 pair)	8.0 (8 pair)
European widgeon	-----	15.3 (9 pair)	9.0 (9 pair)
Greater scaup	8.0 (3 pair)	15.3 (9 pair)	13.0 (12 pair)
Pintail	11.0 (4 pair)	8.5 (5 pair)	9.0 (9 pair)
Red-throated loon	8.0 (3 pair)	1.6 (1 pair)	4.0 (4 pair)

The density of waterfowl computed for the Northern census route (37 pair) and the Southern route (59 pair) was one pair per 16 acres and one pair per 19 acres, respectively. Waterfowl were seldom seen

(two or three pair of birds in 2 hours of inland walking) when observations were made in either the lake region or the southeastern tip of the Island, where ponds are numerous but nesting cover is poor.

Harlequins, difficult to census because of their secretive nature, were found almost exclusively in salt water. Their abundance on the Island during the summer is probably between that of the mallards and the teal. One raft of 45 birds was seen during the summer. The Pacific eider is apparently the most abundant duck on the Island. Over 100 hen eiders were known to nest on four small, offshore islands.

The nine European widgeons observed on the Southern route were considered to represent the entire widgeon population this summer. They were seen most often on the ponds at the end of Fox Runway. With the exception of one female and her brood, they were not observed after June 1.

It was impossible to obtain reliable breeding population counts after the middle of June because the females were either with their nests or with broods, the males had begun to congregate and moult, and the vegetation was becoming too dense. After the first of June, the census routes were traveled frequently in an attempt to locate as many nests as possible to obtain brood success data and to band as many ducklings as could be caught.

During the summer, 40 duck nests were found; 17 teal, 8 scaup, 4 mallard, 2 pintail, 4 merganser and 5 loon (Table 2). Eider nests

will be considered separately. Only 14 of the teal nests hatched. A ground fire and human interference were believed to be the causes for the abandonment of two nests. Rats destroyed one nest. All but three teal nests were found in the coarse grass on top of mounds left by the military. Two nests were found in tall beach grass on kitchen middens. One was found in undisturbed coarse pond vegetation. With the exception of one, all teal nests were found within 20 yards of a small pond.

Table 2. Summary by species of nests observed during 1961.

<u>Species</u>	<u>Nests Found</u>	<u>No. Eggs Per Nest</u>	<u>Nests Hatched</u>	<u>Date Found</u>	<u>1st Date Hatched</u>	<u>Average No. Eggs Hatched</u>	<u>Last Date Hatched</u>
Common teal	17	7.4	14	5/16	6/15	7.3	6/28
Mallard	4	9.8	4	5/16	6/11	9.8	7/21
Pintail	2	9.5	2	5/16	6/15	9.0	--
Red-breasted merg.	4	10.3	4	5/31	6/17	8.5	7/20
Greater scaup	8	7.8	6	6/10	7/6	7.2	7/21
Red-throated loon	5	2.0	5	5/27	6/19	2.0	7/7

Two of the mallard's nests were located in the tall grass along the headlands at Rifle Range Point. All mallard's nests observed hatched successfully. The first mallard and pintail broods were seen May 25. Severe storms prevented making observations 1 week prior to this date. The two pintail nests found in tall, coarse grass, were next to small ponds.

The merganser, scaup and loon nests were found within a few feet of the water's edge. The loon nests all contained two eggs and were made in a depression in the moss at the water's edge with no protective overhead cover. The scaup nests were within 3 feet of the water, and

were found only in water drainages that had one or more large ponds in them. These ponds were used exclusively by scaup ducklings.

Several scaup nests were built over water on mud and/or grass platforms constructed by the adult birds. Both types of nests suffered egg losses.

High water appeared to destroy one nest by washing the eggs from it.

Another nest was partly damaged with the loss of a few eggs when roosting, moulting birds ruined the stability of the hummock it was on. Another scaup nest was abandoned probably as a result of human interference in the area.

Three of the four active merganser nests found were on the banks of large lakes. Two nests were in dense rank grasses on the banks of Teal Lake. One of these nests was within a few feet of a merganser nest of the previous year. Another one was on an island in Wecco Island Pond. Two other nests, one of last year's and one of this year's, were found on the bank of a pond under sheets of galvanized roofing material. All of the merganser nests found were well hidden.

Most of the common eider nests were located on the offshore islands. All told, 95 eider nests were found on four offshore islands; 25 on the closest Constantine Island, 30 on the larger Constantine Island, 10 on the high Kirilof Point Islands and 30 on Loran Island. Some of the other islands not visited during the summer probably had nests on them. At Ivakin and Rifle Range Points, limited eider nesting occurs in the coarse grass on the headlands.

Some eider nests were found on the larger ponds in the interior of the Island. Thirteen active eider nests were found in the vicinity of Wecco Island Pond. Ducklings were not raised on the pond, but traveled

down the outlet stream for 1/4 of a mile to salt water. In July, two eider hens were flushed from some small ponds near East Cape, approximately one mile from salt water. They became quite excited and flew around nervously for about five minutes. Examination of nearby ponds revealed no signs of active eider nests. It is believed that nesting does occur in the area.

Brood Census Information

Although adult and juvenile teal are much more abundant than mallards and pintails, we found five to six times more dead mallard and pintail ducklings than teal ducklings. Teal ducklings are smaller, more secretive and could be more easily missed, but probably not to the extent indicated by these findings. Complete consumption by predators of the smaller birds is not the total answer. Only five of the dead ducklings found appeared to have been touched by either mammalian or avian predators. Considerable effort was expended around several teal brood ponds; however, no dead teal ducklings were found.

Our meager brood counts substantiate our observations of fewer dead teal ducklings. The average number of eggs hatched per teal nest was 7.4 eggs. Observation of 7 class Ia and Ib broods revealed an average of six young in each. Two class Ic broods had an average of five young per brood. Four class IIa broods had 4.5 young each. Despite the gradual decline in the size of the many teal broods, few dead young were found.

The highest mortality of mallard and pintail ducklings came in the younger age classes. In the four mallard and two pintail nests observed, 9.8 and 9.0 eggs, respectively, hatched. Class Ia mallard

broods averaged 9 ducklings (3 broods); class Ib, 5.4 in 5 broods; class Ic, 4.0 in 4 broods; and class IIc, 4 in 1 brood. An insufficient number of complete pintail broods were seen to determine the rate of mortality occurring for that species.

The highest mortality in scaup broods occurred in class Ia and Ib. An average of 7.8 eggs hatched in the scaup nests. The six class Ia broods contained 7 ducklings. Class Ib broods observed had 4.8 ducklings. Avian predators and adverse weather conditions, cold temperatures and driving rain, killed many of the young scaup. Most of the brood data came from six broods on Island Pond and two on Jones Lake. After the ducklings reached the class Ib size, they were capable of eluding even the most persistent predators.

The average number of eggs hatching in merganser nests was high, 8.5. These birds showed very little juvenile mortality, maintaining an average brood size of 7.5 ducklings up to the class IIa. During a survey of the ponds in mid August, the largest juvenile diving duck seen was class IIb.

Rat Study

During the summer of 1961, an effort was made to determine the population density and distribution of rats on Amchitka Island. Approximately 5,764 rat trap nights were conducted; one half of these were on the beaches and the rest in the interior.

Seven beaches were trapped for a total of 2,800 trap nights (Table 3). When the beach was trapped, 100 traps were tended for three nights. One trap night is one trap set for one night. One third of the traps were placed at the edge of the beach vegetation,

one third at the base of the headlands, and the remaining at the top of the headlands. Since the traps in one line were placed out at 25 foot intervals, the section of beach used had to be about 300 yards long. Thus, many of the smaller lengths of beach were not suitable for a trap line.

The number of rats caught varied as to the type of beach trapped, the accumulation of kelp and debris on it, and the time of year. In late April, from 7 to 12 rats, all adults, were caught on the beaches in 300 trap nights. In late June the number caught per census period ranged from 3 to 39. The area in which only three rats were caught had very little kelp deposited on it and was of a fine gravel texture. The other beach at St. Makarius Bay on which 39 rats were caught had a rich deposition of debris plus sand for fly larva pupation. The traps on this section of beach were left for an additional six nights. An additional 15 rats on the beach, ten on the midland and two on the headland were caught. No rats were caught on the last night although fresh sign was still present. The set at the Garbage Chute only produced four rats. The sand in this area is continually shifting, covering everything in its path including the traps.

Trapping done on Rifle Range Point and St. Makarius Beach in late July yielded catches of 22 and 19 rats, respectively. Food available to rats on the beach at this time was excessive. Indications were that the rats were feeding on fly larvae and larval worms in the sand. The Rifle Range set was a retrap of the April census area. Not only were more rats caught in the retrap, but some were juveniles.

In mid August, two census areas were retrapped for two nights.

Table 3. Summary of success of rat traps set along the beaches on Amchitka Island during the summer of 1961.

Location	Dates	Number of Rats			Trap nights	Total
		Headland	Midland	Beach		
Constantine Point (Control)	Apr. 22-24	0	10	2	300	12
Constantine Point (Beach)	Apr. 22-24	1	6	-	300	7
Rifle Range Point	Apr. 23-25	4	2	-	300	6
St. Markarius Beach	Jun. 20-23	3	14	22	300	39
Rifle Range Point	Jun. 25-27	1	2	-	300	3
Garbage Chute	Jul. 22-24	0	4	-	300	4
Rifle Range Point	Jul. 22-24	4	11	8	300	23
St. Makarius Beach	Jul. 24-26	3	10	6	300	19
Constantine Point (Control)	Aug. 22-23	3	5	4	200	12
St. Makarius Beach	Aug. 22-23	<u>2</u>	<u>6</u>	<u>10</u>	<u>200</u>	<u>18</u>
Totals		21	70	52	2800	143
Relative success		14.7	49.0	36.3		
Trap success		2.3	7.6	5.3		

Twelve rats were removed from Constantine Point Beach and 18 from St. Makarius Bay Beach. Both juveniles and adults were present in the catch.

An increase in the rat population along the beaches occurred in late May and early June. It is hoped that further analysis, this winter, of the measurements taken from collected animals will indicate the sex ratio, reproduction and the condition of the population.

The relative success of trapping on the beaches, midlands and headlands was not surprising. The rats were only active on the actual beach during periods of low visibility. Rats, when moving from the edge of the vegetation across several feet of open sand and gravel to the debris washed up by the tides apparently by-passed the traps. On the basis of observed runways and general observations, rats were active along the base of the headlands during the day. This set of traps would therefore be more effective during the day. Generally speaking the rats on the headlands were most active in the saddles between the beaches and the ponds in the interior. The traps set in these saddles were probably as effective as beach sets.

Trap success of 2.3, 7.6, and 5.5 per cent for the headlands, midlands and beach areas, respectively, is probably indicative of rat activity in these areas. Total population for the beach habitat can not be determined from the trap catches because it is known from observations, rat sign and subsequent trapping that some apparently avoid or at any rate were not caught in the traps.

A total of 988 traps were set in ten inland locations for three

nights in an attempt to determine the relative abundance of rats in the interior (Table 4). Of the 21 rats caught in 2,964 trap nights, 18 were taken around the Western Electric Site buildings and dump. Only three were taken in relatively remote inland areas. Each of the three areas in which a rat was taken was associated with a stream that led directly to salt water. No animals were caught in five locations. This does not mean that there are no rats in the interior; however, very little sign was found. It was also noted that old rat sign was not soon destroyed by either growing vegetation or weathering.

During the two years of observation only two teal nests were known to have been destroyed by rats. In one case, a rat came up beside a nest while extending his burrow thereby destroying the nest. Some eider and gull nests were destroyed on the offshore islands but this was believed to be due primarily to the large population of young gulls there.

Last summer five ducklings found showed signs of rat predation. I doubt that rats were the cause of death in each case. In one instance two class Ic ducklings, a mallard and a teal, were released from a duck trap in good condition one evening, then found the next morning on the bank 30 yards away freshly killed by rats. The other ducklings were found around Island Pond and were unidentifiable as to species or to cause of death.

Tentatively assuming that rats over 110 mm. long and 260 grams in weight are adults, 81 juveniles and 63 adult rats were caught during the summer. Additional research at Southern Illinois University will

Table 4. Summary of success of rat traps set in the interior of Anchitka Island during the summer of 1961.

Location	Dates	Rats Caught	Trap Nights
Western Electric Site	Apr. 28-30	5 juv.	300
Birch Hanger	May 11-13	none	300
Y Area	May 11-13	none	300
Teal Pond	May 11-13	none	300
Western Electric Creek	May 13-15	1 adult	300
Western Electric Site	May 13-15	13	264*
Kirillof Point Area A	June 1-3	none	300
Three Towers Valley	June 20-22	none	300
Rifle Range Interior	June 20-22	1 rat	300
Area B	July 21-23	<u>1</u>	<u>300</u>
Total		21	2964
Trap Success		0.70	

* 88 traps were set out in a grid in and around the Western Electric Site dump.

probably indicate rats 110 mm. long are not mature, thus increasing the number of immatures taken. No juvenile rats were caught during the first two months except at the Western Electric dump. The largest rat caught, a male, weighed 547 grams and was 543 mm. long.

Fox Study

Foxes were not observed on Amchitka in 1961. The only fresh fox tracks observed were followed over an extended period of time in an area of 1.6 square miles from the head of Constantine Harbor to St. Makarius Bay. None of the tracks were near the beaches. No dens or fresh kills were found. A grass fire in July around St. Makarius Bay may have forced a fox in the area to extend its range northward as tracks were observed further north than usual. During investigations conducted near East Cape, Burr House, Chapel Cove, Bird Cape, Fox Cove and down the center of the island no other signs of recent fox activity were discovered.

Vegetation

Considerable effort was expended to make a collection of unknown species of plants on the island and to determine the extent and distribution of the basic vegetational types. The plant specimens collected were either sent to the University of Alaska or taken to Southern Illinois University for identification. Little progress has been made in their identification to date.

Between Banjo Point on the north, to East Cape on the south, five major cover types were studied. These include:

1. The fringe of Elymus and various Umbeliferae along the coast bordering the beaches.

2. The coarse bunch grasses, sedges and other herbaceous plants that predominate the areas disturbed by the military, particularly the road banks and the mounds put up around the buildings. These areas were used almost exclusively by nesting waterfowl.

3. The sedge, lichen and moss complex, the most extensive cover type, extends from the Western Electric Site to East Cape. Except in local areas the sedges and flowering plants were sparse consisting of about 8 per cent of the total vegetative cover. In wet habitats sedges and mosses were the most numerous. In the better drained areas mosses and lichens were abundant.

4. North of the Western Electric Site in the well drained locations extends another cover type of small clumps of short sedges and lichens separated by extensive areas of exposed soil and rock, either cleared by the military or denuded of its flora by the winds.

5. Around each of the 1800 plus ponds counted between the site and East Cape there was a variety of local cover types. The ponds can be divided into five basic types.

- a. Large lakes with rock bottom and wind swept shores
- b. Large lakes with steep banks covered with dense stands of sedges, ferns and grasses
- c. Small ponds or potholes with no protective cover and either muddy or rocky bottoms
- d. Small ponds with steep banks and dense vegetation around them. In the shallow water sedges are abundant.
- e. Shallow ponds with dense stands of vegetation in and around them

There are many variations in these ponds depending on their exposure to the wind, bank characteristics and drainage patterns. The ponds most frequently utilized by waterfowl were either the steep sided, deep ponds with some emergent vegetation or the extensive marshy ponds.

Preliminary examination of the ponds and streams with dip nets and plankton trawls indicates the presence of large populations of aquatic insects and microscopic animal life.

Banding Data

The majority of the 645 birds banded were caught in the nine duck traps set either on ponds or in natural waterfowl travel lines. Only by constant attendance of traps and considerable field effort by all concerned, were so many birds banded.

The following birds were banded:

Pigeon Guillemot	2
Glaucous-winged Gull	228
Red-breasted Merganser	17
Mallard	19
Common Teal	203
Pintail	7
Greater Scaup	26
Common Eider	19
Bald Eagle	24
Lapland Longspur	100

Little effort other than affixing bands was expended on the longspurs. They congregated in large numbers around the wire traps. When one curious bird was caught, others followed. While transporting equipment to a trapping site, several duck traps left by the truck caught six longspurs in one-half hour. They would also get into the duck traps and frighten ducks away, so they were banded, too.

The young in 12 of the 16 eagle nests found along the Amchitka shores were banded. In two cases the birds had apparently matured and left the nest by the time we got there. Foul weather was believed to have destroyed one nest before hatching occurred. Further comment on eagle banding and nest content will be made by the Refuge Manager.

Bird Observations

Over 66 different species of birds were seen by the research crew. The offshore sea birds were generally observed by Bob Jones and his passengers, while dorying around the Island. Other relatively rare birds for the area were seen and/or collected by Berns, Suss or McCann while traveling on the Island. Berns and McCann started the season by observing a Steller's sea eagle at the Garbage Chute at a relatively close range for a 20 power scope. On the same date, April 15, McCann and Suss observed a short-eared owl near the Loran Site. Other rare birds collected by either Suss or McCann with the assistance of Berns or Jones were the brambling, 5/26; dusky thrush, 5/26; blacktail godwit, 5/31; gray wagtail, 6/4; a giant song sparrow, 7/3; and possibly a water pipit, 6/4.



Figure 1. Brambling collected at Amchitka
Photo by McCann

Several of the crew were surprised during the summer to see from one to three little brown cranes fly up from beside the road. We doubt that they nested on Amchitka. The most excitement was created when four Aleutian Canada geese made their appearance in Constantine Harbor on the morning of June 27th. At a later date a lone goose was seen and photographed on Loran Island.



Figure 2. Aleutian Canada Goose with Common Eiders
Photo by McCann

Late last spring large numbers of sea lions moved onto Loran Island. On June 27 over 1000 sea lions were counted there. They had destroyed a large per cent of the cover used by gulls and common eiders for nesting.

B. Birds

Below is the list of birds recorded in this period together with the date of first observation.

Common loon 8/21
Red-throated loon 5/4
Laysan albatross 5/27
Slender-billed shearwater 5/27
Fulmar 5/27
Forked-tailed petrel 6/17
Leach's petrel 7/22

Birds (continued)

Pelagic cormorant 4/15
Red-faced cormorant 6/15
Emperor goose 4/15
Aleutian Canada goose 6/27
Mallard 4/15
Pintail 4/15
Common teal (Aleutian) 4/15
Green-winged teal 5/19
European widgeon 5/17
Greater scaup 4/15
Common golden-eye 4/15
Bufflehead 4/15
Oldsquaw 4/15
Harlequin 4/15
Common eider 4/15
Red-breasted merganser 4/15
Bald eagle 4/15
Steller's sea eagle 4/15
Gyr Falcon 4/26
Peregrine falcon 5/4
Rock ptarmigan 4/15
Little brown crane 5/23
Black oystercatcher 4/15
Black-bellied plover 5/14
Ruddy turnstone 5/23
Wandering tattler 5/17
Lesser yellow legs 5/26
Rock sandpiper (Aleutian) 4/15
Least sandpiper 5/26
Bar-tailed godwit 5/19
Black-tailed godwit 5/31
Northern phalarope 5/26
Parasitic jaeger 5/5
Long-tailed jaeger 7/22
Glaucous-winged gull 4/15
Bonaparte's gull 5/19
Black-legged kittiwake 5/27
Sabine's gull 5/27
Arctic tern 5/26
Common murre 5/5
Pigeon guillemot 4/15
Ancient murrelet 5/5
Crested auklet 5/27
Least auklet 5/5
Whiskered auklet 5/5
Horned puffin 5/25
Tufted puffin 5/5
Snowy owl 6/24
Short-eared owl 4/15

Birds (continued)

Common raven 4/15
Winter wren 6/24
Dusky thrush 5/26
Gray wagtail 6/4
Water pipit 6/4
Brambling 5/26
Gray-crowned rosy finch 5/15
Song sparrow (Aleutian) 7/3
Lapland longspur 5/4
Snow bunting 4/15

Total 66

The morning of May 20th heavy easterly winds struck Amchitka. This was the leading edge of a storm that raged around us three days, with winds that backed to the southwest as the pressure system moved east. In the days following its passage a greatly altered bird population made it clear that a substantial migration had utilized the winds of this storm. Since some of the species are rare in North America, and two are new records it seems probable the storm carried them off their course. An examination of Turner (1886, Contributions to the Natural History of Alaska) and Kenyon (1961, Birds of Amchitka Island, Alaska) suggests that this is a frequent occurrence. We have secured from the Navy Weather Service, U.S. Naval Station, Adak, the weather charts of the North Pacific area for that period and are including them. We have not as yet secured the services of a research forecaster to plot the precise air flow in this system, but even without such expert advice the winds blowing from Kamchatka to Amchitka seem clear.

Listed below are the species appearing after the passage of the storm. This is extracted from the list above and does not include

the strictly pelagic birds.

Little brown crane 5/23
Ruddy turnstone 5/23
Lesser yellow-legs 5/26
Least sandpiper 5/26
Black-tailed godwit 5/31
Northern phalarope 5/26
Arctic tern 5/26
Dusky thrush 5/26
Gray wagtail 6/4
Water pipit 6/4
Brambling 5/26

As an example of the ptarmigan population on Amchitka we observed on April 17 while enroute to the Western Electric site (1 1/2 miles west of our headquarters) 15 birds and 23 on the return trip. The increase of this population since the effective destruction of the foxes has been marked.



Figure 3. Rock Ptarmigan at Amchitka
Photo by McGann

Red-faced cormorants were observed nesting with pelagic cormorants on the Constantine Islands. We had overlooked this small population in previous years.

In early June, while making successive freight trips between Bird Cape on Amchitka Island and Gunner's Cove on Rat Island we

repeatedly watched a Peale's falcon driving a bald eagle out of its territory near Gunner's Cove.

In addition to repeated observations of little brown cranes on Amchitka, Vern Berns observed two on Rat Island the 16th of June and again on the 21st. We have no less than 8 sightings of two little brown cranes on Adak this summer. Two birds were present in the Davis Lake area apparently for a prolonged period and startled drivers who observed them walking across one of the main roads of the Base.

On Rat Island Vern Berns observed two nests of Peale's falcons with young in them. He recorded winter wrens twice on Rat Island and observed numerous Aleutian sandpipers apparently in nesting activities. One nest was located.

July 27th while flying over the Izembek National Wildlife Range a flock of approximately 150 greater scaup were noted in the large lake tributary to Middle Lagoon in Morzhovoi Bay.

July 28th at Cold Bay four gyrfalcons were observed on the rim of Frosty Canyon. It appeared that these were two adults and two young that had nested in the vicinity.

August 12th a single specimen of lesser yellow-legs was observed on the dock in Kiska Harbor. During our stay of ten days at Kiska Peale's falcons were repeatedly observed in the Kiska Harbor area. At the same time on Little Kiska a heavy population of both song sparrows and winter wrens was observed. These birds were so abundant that they could be seen scurrying among the rocks of a cobblestone beach from an approaching boat.

Two common eider hens with six ducklings were observed in Kiska Harbor August 7th. While returning by way of Rat Island to Constantine Harbor, very large numbers of least auklets were observed in both Krysi and Oglalla Passes on August 16th. This suggests that in the islands north of these passes is a large nesting colony of auklets. On the same date, i.e., the 16th, a black-footed albatross was observed in Oglalla Pass.



Figure 4. Common eider drake, Amchitka
Photo by McCann

Three common loons were observed in Constantine Harbor August 21st. This constitutes our first record of these big divers on Amchitka. Dall (1873) reports them as abundant there. Our own experience is that in the Aleutians they are most abundant on Adak and this is in agreement with Murie's view (1959).

August 25th while enroute Shenya from Amchitka we were fortunate to find Baldir Island in the clear and the pilot of the airliner acceded to our request that we fly close to the Island.

We passed down the north side and noted very large numbers of birds. Evidently it is an important pelagic bird nesting colony. From Buldir all the way to Shemya we noted pelagic birds that appeared to be petrels. Two Laysan albatrosses were also noted.

C. Big Game Animals

July 27th while flying over Unimak Island the following observations of Alaska brown bears were recorded.

7 bears on the creek above Swanson's Lagoon.

1 female with 1 cub just west of above creek.

10 bears in marsh above Uruilia Bay.

On the same date, i.e., the 27th, while flying over the Izembek National Wildlife Range the following observations of Alaska brown bears were recorded.

6 bears around the perimeter of Izembek Bay.

2 single bears and one female with two cubs in left-hand valley.

3 bears in Right-hand valley.

In Right-hand valley 5 caribou were observed.

D. Fur animals, predators, rodents, and other mammals.

One tagged sea otter, number 12995 of unidentifiable sex but probably female, was found dead at Rifle Range Point, west May 17th. The carcass was 49" long with left hind paw (tagged) 8" long. The skull and tagged portion of the paw were forwarded to Karl W. Kenyon.

On Amchitka, as Jack McCann has recorded, no foxes were found although the track of what we believe to be a single animal was

repeatedly observed in the area around the old fighter runway (Fox Runway) and north toward Kirilof Bay. West of this no fox sign was found, although this is not regarded as conclusive. Due to prolonged wet weather, traversing the road down the Island beyond the Western Electric site was not deemed advisable. Bird Cape was repeatedly visited, as were Burr House Cove and Chapel Cove. At none of these places were tracks of foxes observed this season although they had been a year ago at Bird Cape. Fox Cove on the south side of the Island was once visited and here we found no sign of foxes.

Foxes were observed on Kiska and Rat Islands, and on the latter Vern Berns conducted some studies of foxes. His report is a part of this narrative. It is interesting to note that he captured and tagged 115 blue foxes on 6.86 square mile Rat Island. His frequency of observations of tagged and untagged foxes suggests that this is less than 50% of the animals present on the Island. Amchitka and Rat Island are so very much alike in terms of fox habitat that an extrapolation of these figures to the 114.1 square miles of the former is suggested as shedding some light on the effectiveness of this predator population on Amchitka.

Very much to our surprise, in all of our ten day visit on Kiska Island in August no sign of rats was found. This is remarkable as the opportunity for their introduction there seems much better than at either Adak or Amchitka on both of which a rat population flourishes. Moreover, a ship's captain has assured us that he has seen them there during the days of the military occupation.

Jack McCann has recorded the feeding of rats on fly larvae. On the sand and gravel beaches of the Aleutians, where conditions exist such that large quantities of kelp are washed ashore, the numbers of these flies in the various metamorphic stages is unbelievable. The larvae apparently feed on the kelp and then drop to the sand where they pupate and the adults emerge in mid to late summer. This tremendous food resource is utilized not only by the rats but by the dickey birds and the foxes.



Figure 5. Fly pupae on a Kiska beach
Photo by Jones

June 18th while working around the east end of Rat Island in the dory we ran in company with six killer whales. These were all cows and calves. They permitted us to approach to within 50 yards but would sound if we came closer. We were bound for an offshore rock to collect some sea lion pups and the whales were running the same course, so we ran together for several hundred yards, the big

mammals alternately sounding and surfacing. Around the rock and a nearby islet several hundred sea otters and sea lions were in the water and the whales swam amongst them. At one time when the dory was hove-to the whales came within 25 yards of her and an excellent opportunity was afforded for observation. We could not detect any evidence of feeding on the part of the whales and both the otters and sea lions seemed unconcerned about their presence.



Figure 6. Killer whales off Rat Island
Photo by Berns

E. Bald eagles

June 3rd, while weather bound in Burr House Cove near the northwest corner of Amchitka Island, Vern Berns and the writer were watching a pair of adult bald eagles, trying to verify the location of what we thought was their nest. To quote my notes written at the time, "One (adult eagle) was sitting on top the island in the Cove. Presently it left the perch and flew out to sea, immediately picking up an object and returning to the island. The object hung rather limply from the talons and showed

no flapping wings or such. This was a quarter mile off and even with binoculars we couldn't make an identification. We started around the Cove to see if we could learn anything and presently observed the eagle fly to the site we had suspected as a nest. It was carrying the object above. It was a scalable pinnacle so we climbed it and found three young eagles and a live female sea otter pup. There had been no doubt, however, what we would find for we heard the pup crying from above. The pup was lacerated on its back and we dispatched it. Its umbilical cord was being sloughed and the navel was healing (estimate $4\frac{1}{2}$ lbs, at most 5). There were two birds (the young eagles) markedly larger than the third. In addition there were remains of two fish and several shearwaters. The top of a sea otter pup's skull was also present."

Jack McCann and Bill Suss had earlier observed an eagle carrying what appeared to be a sea otter pup but no verification could be secured.



Figure 7. Triangulation point "Lem". Site of an eagle's nest.
Photo by Jones

Since every eagle's nest at Amchitka in which young birds have matured, yielded upon investigation at least one pelt or other identifiable sea otter pup remains we are of the opinion that the predation above recorded is the rule rather than the exception. We have formed the opinion that the eagle is an opportunist and that any prey it can capture and overcome will be utilized. In this respect it is interesting to note that in the one eagle's nest examined at Rat Island (where fox pups are available) there were four fox pup pelts in addition to other items, among which were two sea otter pup pelts.



Figure 8. Climbing "Lem"
Photo by Jones

Our study of eagles has never been accorded primary status so we have not devoted the necessary time to carefully dismantle the nests and gather all remains beneath and around them. During the period of its occupancy continual additions are made to the nest,

using chiefly sphagnum moss and dried kelp, usually Laminaria. Thus all but the most recent objects of prey are covered. As we have usually visited the nests while young birds were present we have not done much rummaging for specimens, having been content to note the top layer, band the birds and depart.

In this way, we have found in the nests remains of every pelagic bird that inhabits the Anchitka area except an albatross, but the two that comprise the largest proportion are the fulmars and shearwaters. Gulls, particularly the immature glaucous-winged gulls are present. A curious affinity for one species seems evident in the individual nests. Perhaps the eagles develop a technique for taking a particular species or more likely hunt in an area frequented most abundantly by one species. Thus we find in one nest three or four fulmars and in the next a similar number of shearwaters or gulls. All of them contain fish, and almost always this is the fringed greenling (Hexagrammus superciliosus). Cod are occasionally found and in one case a fresh Dolly Varden trout was noted. Rats are found in all the nests. The only duck we have ever found in the nests is the common eider and this is frequently present. There can be no mistaking the bones of this duck because they are, like the sea otter's, stained purple with echinochrome from sea urchins. The eider ducklings are severely harassed by eagles from the time they hatch and take to the water, but the remains of these young birds have never appeared in the nests. As noted earlier, all the nests in which birds were reared contained sea otter pup pelts.

This was true of 15 nests at Amchitka and 1 at Rat Island.

Both in 1960 and again in 1961 we have observed eagles harassing the ducklings on Island Pond, but we do not know if they succeeded in taking any of them.

Eagle nests, as we find them at Amchitka are usually in locations such that the young birds and or eggs are fully exposed to the weather. As Jack McCann has recorded we are convinced that one nest failed to hatch due to the influence of the storm described earlier in this report. It may be that this influences survival of fledglings as well. In 12 nests observed at Amchitka, 1 at Adak, and 1 at Rat Island there were 1.87 birds that reached maturity. The average for Amchitka was 1.83.

A total of 24 fledglings were banded, 2 of these at Adak through the efforts of a cooperator. A chart is included showing the location of the Amchitka nests observed, at 12 of which birds were banded. These are numbered consecutively and marked in black ink. The number outside the circle represents the number of birds banded. There are three nests, marked in red, where no birds were banded. Of these, the birds in numbers 1 and 2 are believed to have matured and left the nest before we had expected; and the eggs in number 3 did not hatch. Some of these nests were in the same sites as the year before and some were not. Eight were newly recorded by us, hence we do not know if they are in formerly used sites.

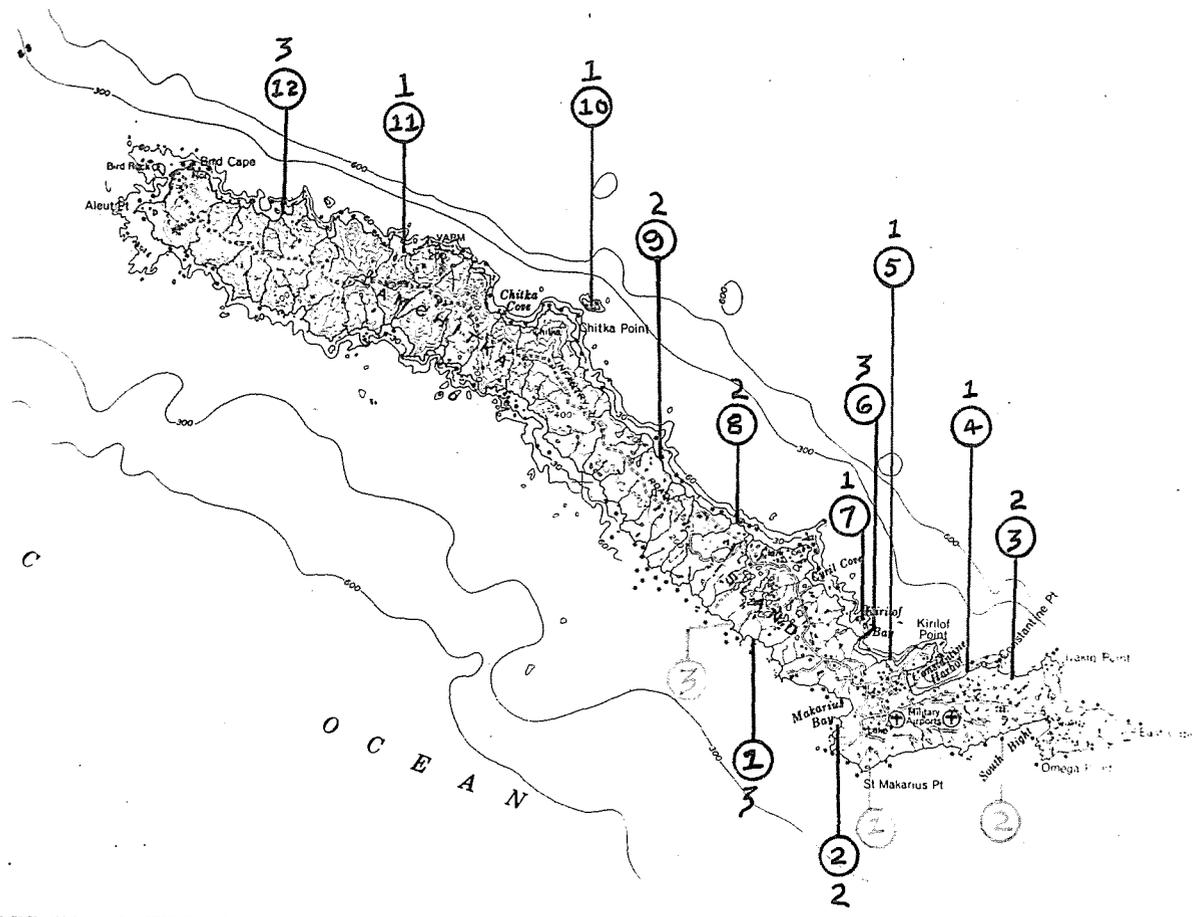


Figure 9. Distribution of eagle nests
Amchitka, 1961

III. REFUGE DEVELOPMENT AND MAINTENANCE

Other than routine maintenance of equipment and installations at the Amchitka station there is nothing to report.

IV. RESOURCE MANAGEMENT

A. Grazing.

Only on Caton's Island is grazing presently permitted within the Refuge. In this case the lessee, Chris Gundersen of Pauloff Harbor, has approximately 50 head of mixed breeds of cattle grazing on the Island. He is presently engaged in improving the herd that had become wild during World War II.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Rat Island blue fox study, a progress report by Vern Berns.

RAT ISLAND BLUE FOX STUDY

By Vernon Berns

A study of the blue fox (Alopex lagopus) was started in the summer of 1961 on Rat Island. The main objectives of this study are to learn the life cycle and food habits of these foxes. The following observations and data are by no means complete and are to be used primarily as a foundation for further study. As pointed out in the Refuge Project Outline, this study should be continued over a period of years. This period would commence when the first fox pups are born and tagged and would cease when they have completed their life's cycle.

A brief geographic description of Rat Island from the U. S. Coast Pilot is as follows: "Rat Island is 12 miles northwest of Amchitka Island, is 8 miles long, and has a maximum width of two miles. The island is rugged and mountainous and the shores are mostly rocky. Most of the northeast coast is precipitous and fringed with reefs".

The four areas selected on the island for live trapping were at the southeastern end (Ayugadak Point), the northwestern tip (Krysi Point), Sandy Beach on the Pacific side, and Gunner's Cove on the Bering Sea side.

Gunner's Cove was selected as the most suitable place on the island for a camp site for the following reasons: First, it offered

the most protection from the wind even though it is subject to williwaws. Second, this cove is the only one on the island that offers protection for anchoring small boats and landing supplies. Third, there are two streams close to the camp site to provide fresh water. Fourth, the cove is situated along the coast near the center of the island thus making it possible to carry out operations to all points of the island without having to construct additional camps.



Figure 10. Gunner's Cove with camp
Photo by Berns



Figure 11. Close up of camp
Photo by Jones



Figure 12. Little Sitkin Island from Gunner's Cove
Photo by Berns

TRAPS

Three different kinds of traps were used, Victor number one, Victor one and one-half, and live box traps. The number one traps proved to be the most satisfactory. They were large enough to hold the animals without inflicting severe injury. Usually the foxes were caught on or close to the pad of the foot. The number one and one-half with the wider jaws and stronger springs would catch the animals higher on the foreleg and quite often break the radius and ulna.

The box traps were used only around the camp in Gunner's Cove because they weighed so much and were too bulky for one man to handle alone. The traps were made of $3/8$ inch plywood. Below is a diagram of the trap.

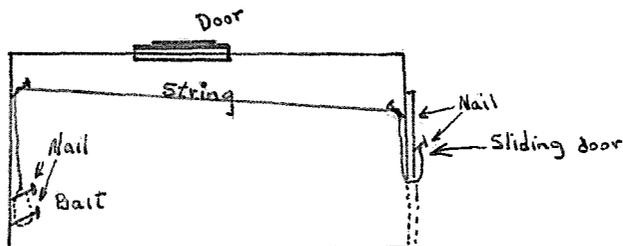


Figure 13. Open side view of live box trap



Figure 14. Box trap with a captured animal
Photo by ~~Berns~~ Jones

The sliding door is held open by a string tied to the bait which is wedged between two nails at the back of the box. When the bait is pulled the tension is released on the string, thus allowing the door to slide shut. The main advantage of using the box trap is that the animal is caught without injury. However, there are several disadvantages to this trap in addition to its weight and bulk. The animal is difficult to handle in the trap. Also, the damp weather causes the boards to swell and the door will not drop freely in the cleated slots. Another problem was created by the wind vibrating the doors of the trap. This vibration would work the bait and string loose and cause the trap to spring.

BAIT

Harbor seal, sea lion pup, rats, and canned tuna fish were used as bait for the traps. Results were recorded as to fox preference

of the various baits. It showed they preferred seal blubber chunks and tuna fish, however, no distinction could be made between these two. Their second choice was rats.

Sea lion pups placed along the beaches as bait stations were not successful in luring foxes to the traps. In June three sea lion pups were placed along the southeastern end of the island with negative trapping results. Upon return to the sets in July, the hides had been pulled off the carcasses but bird droppings indicated that bald eagles and ravens had been the main feeders at these stations.

FOOD HABITS

Since the foxes have reached the saturation point on the island, one would expect them to eat any type of flesh available. This, however, is not true, because they have been observed to pass by blubber baits lying along trails and sea lion pups without so much as stopping to investigate. The reason for their actions is not known.

Where kelp has washed up along the gravel beaches, great quantities of amphipods (a small crustacean commonly called "beach fleas") are found. Hundreds of them can be seen by turning over a rock or board which offers them a moist shelter. These little crustaceans made up the bulk of the fox's diet during the summer months. The foxes have been observed moving along gravel beaches, scooping up the gravel with their noses and lower jaws then snapping in different directions while picking up the amphipods that they had uncovered.



Figure 15. Fox traveling along cobblestone beach
Photo by Berns

In late July kelp fly pupa can be found in large masses on the sandy beaches and in the decomposing kelp. A large percent of fresh fox droppings contained the cocoons of the pupae which could not be digested.

Rats made up a small percent of the foxes' diet. Quite often rats that had been caught in the fox traps were eaten by a passing fox. On other occasions foxes have been observed to pass by a trap containing a rat without stopping.

Marie (1959) reported the following data for Rat Island. This is compared to my findings as to number of occurrences in the table.

Table 1. MATERIAL FOUND IN FOX DROPPINGS BY NUMBER OF OCCURRENCES

	Marie (87 droppings)	Berns (103 droppings)
Amphipods	53	85
Isopods	2	0
Sea urchins	8	0
Birds	10	3
Fish	11	0
Rat	38	10
Hair seal	1	5 (sea lion or whale)
Pebbles, sand and mud	7	30
Fly pupae	0	13
Kelp	0	7

A daily check was made of the nests of an Alaska longspur and an Aleutian sandpiper that were located within ten feet of heavily traversed fox trails. The eggs had hatched on the last observation without being molested by foxes. These observations indicate that eggs do not especially interest the foxes as a part of their diet.

The dens on the headlands were abandoned in early July, and fox pups were living on the beaches. The bulk of their diet was composed of amphipods and fly pupae. However, they were feeding on the viscera of two whales on the northwestern end of the island.

DENS, RANGE AND TERRITORIES

All dens found were in the headlands overlooking the beaches or on the beaches above the high waterline.

The dens in the headlands were very shallow, usually two to three feet back in the turf. A typical den consists of two to four inches of dried vegetation in the back part of the den forming the nest for the pups. Patches of shed fur could be found scattered in the nesting material and around the den. Whether the female used this intentionally for the nest or whether the fur was accidentally dropped is not known.

Dens in the rock slides and drift log piles often had several openings. One can only suppose the tunnels or runways were scattered throughout the slide or logs and the animals used all the openings that had a diameter large enough to allow them to pass through.

By mid-July the pups that had moved from the headlands sought

shelter in undercut banks and under boulders. When the adult barked a danger warning the pups would scamper to hide in the nearest available cover. If the pups had not seen the danger they would soon poke their heads out of their hiding spot to see why they were told to take shelter. Even when the pups had observed the danger, they were quite easy to find as they would yip to one another from their hiding spot.

Apparently foxes range over the complete island. A female trapped on Sandy Beach on June 12th was retrapped on June 16th in Gunner's Cove. A male caught in Gunner's Cove was later trapped near Krysi Point. A male from Ayugadak Point was trapped on Sandy Beach. A female trapped at Gunner's Cove was sighted several times at later dates on the headlands near Ayugadak Point. Sightings of animals from one end of the Island to the far end were not made this year. However, it is my belief that foxes do range the complete Island, but how far they move is a project that would have to be taken up on a larger island than this one.

Observations were made of foxes passing some of the dens with pups without being chased by the parents. At other times the parents would fight and chase the intruder some distance down the beach. The parents would return to a certain point with the intruder following but would not venture across an imaginary line which was evidently the territory established by the parent foxes.

WHELPING AND PARENTAL CARE

Palmer (1957) stated that blue foxes mate in February and have a 51 to 52 day gestation period. From one to fourteen pups are born with about five pups surviving in each litter. Both parents care for the

young and the family breaks up in the fall.

My findings on Rat Island show that female foxes whelp about the latter part of May and in June. The first den was found on June 11th along the west side of Gunner's Cove. This den contained two female pups about nine days old with their eyes not yet open. A second den with two males and one female pup was found the same day near South Bight. Eyes of these pups were just starting to open. A third den, on June 13th, had a male and female pup which could not have been over a week old. On June 24th a pup was captured in front of its den with its eyes barely open. As late as July 27th two pups were caught in traps that could not have been more than three to four weeks old by size comparison to the other pups.

A total of sixteen dens were found in 1961. The largest litter observed consisted of five pups. Three dens contained four pups while the other dens contained from one to three pups.

Observations made this summer indicate the blue fox is monogamous. The extent to which the male participates in the parental care will have to be deduced from further observations. At this time one can only postulate that the male's role is to help bring food to the den, guard the territory, and help teach the young to hunt for the food.

TRAPPING AND TAGGING

In five hundred ninety-five (595) trap night, one hundred thirteen (113) foxes were caught, forty-seven (47) of these foxes were retrapped, thirty-nine (39) rats were trapped in fox traps, and sixty-four (64) traps were snapped.

Table 2. NUMBER AND SEXES OF FOXES CAUGHT IN EACH TRAPPING AREA

Area	Adult		Pup	
	Male	Female	Male	Female
Gunner's Cove	17	21	1	0
Sandy Beach	5	5	0	0
Ayugadak Point	9	6	10	5
Krysi Point	<u>9</u>	<u>6</u>	<u>8</u>	<u>11</u>
Total	40	38	19	16

Table 3. FOXES SIGHTED WITH AND WITHOUT TAGS

Date	Tagged		Without Tags
	Male	Female	
7/20	1	1	8
7/24	2	1	6
7/25	2	3	0
7/26	0	0	8
7/27	0	1	7
7/28	2	1	5
7/29	2	1	10
7/30	0	1	0
8/1	0	1	0
8/2	<u>0</u>	<u>0</u>	<u>11</u>
Total	9	10	55

The male animals were tagged with a metal numbered tag in the left ear and a plastic colored streamer in the right ear. The reverse procedure was used for females.

Four colors of plastic strips measuring one half inch wide and six inches long were used in each of the trapping areas. A scalpel was used to cut a slot about one half inch deep and one half inch from the outer edge of the ear. The streamer was pulled through and a jess knot tied to secure it.

Rough outlines of tooth wear on the incisors and canines were

made for a comparison study to determine the age of the foxes. It is hoped that photographs can be made of the tooth wear and a careful record kept in the future. Several skulls of the foxes were collected this year. With animals of known age it may be possible to age the animal accurately by comparison of the tooth wear within a year of its true age.



Figure 16. Checking wear of the teeth
Photo by Jones



Figure 17. Recording fox measurements
Photo by Jones



Figure 18. Equipment used in the fox project
Photo by Berns

FOX PREDATION

Bald eagles are the only natural enemies of blue foxes on Rat Island. Four eagle nests were found on nearby pinnacles. With exception of one nest that had two young eaglets, the others contained one young bird.

One nest was close enough to the beach so the pinnacle could be reached and scaled at low tide. The refuse found in the nest included two sea otter pups and enough skins to be certain of at least four fox pups. Feathers or bird bones were not found in the nest. This cannot be considered a good sample, but may be considered an index of what might be expected in the other eagle nests.

SUMMARY

A trapping and tagging study of a blue fox population was started on Rat Island in the Aleutian Chain. The study consisted of capturing, tagging, releasing, and then observing the foxes. Food habits were observed and a number of droppings were analyzed.

Numerous observations on the tagged foxes indicate they range

the Island in search of food, although there was a supply within the area they were captured.

The blue foxes whelp in late May and early June having litters of one to five pups in shallow dens along the beaches. The pups only known enemy is the bald eagle.

REFERENCES CITED

- MURIE, OLAUS J. 1959. Fauna of the Aleutian Islands and Alaska Peninsula. U. S. Fish and Wildlife Service. Washington D. C. 406 pp.
- PALMER, E. L. 1957. Palmer's Fieldbook of Mammals. E. P. Dutton & Company, Inc. New York. 321 pp.
- COAST AND GEODETIC SURVEY. 1954. U. S. Coast Pilot Sixth (1954) Edition. Washington. D. C. p. 463

VI. PUBLIC RELATIONS

A. Recreational Uses.

1. Fishing pressure throughout both Refuges was heaviest on the ubiquitous Dolly Varden trout until numbers of salmon appeared. This year at Adak the salmon run was insignificant, hence the Dolly bore the brunt of the fishing throughout the season. At Cold Bay, however, where chums, pinks, and silvers are readily available in mid to late summer, the pressure was transferred to these salmon. At Cold Bay a certain amount of fishing for halibut and flounder is practiced and yields good rewards.
2. An unusual form of recreation has developed at Cold Bay where the residents like to comb the shores of Izembek Bay for glass fishing floats lost at sea by the Japanese.

B. Refuge Visitors

At Cold Bay we were visited by Win Banko of the Washington Office, and Dave Spencer, Regional Refuge Supervisor. At Amchitka we enjoyed the visits of the Coast Guard Cutter CLOVER, the FRI vessels RENOWN and COMMANDER, and the BCF vessel MARINE VIEW. Dr. Norman J. Willimovsky and Alex Peeden from the University of British Columbia conducted fish investigations from our Amchitka headquarters. Personnel of the Western Electric Communications site on Amchitka were regular visitors and partners in some of our undertakings. Among a number of guests from the Naval Station at Adak, Captain S. M. Shelton, the Commanding Officer, spent a week with us.

C. Refuge Participation

None to report.

D. Hunting.

Spring hunting for Alaska brown bears takes place generally in May. While some of this is done in the Izembek Bay area we have no way of compiling any effective records of it. On Unimak Island, however in the Aleutian Refuge, brown bear hunting is controlled by the issuance of a hunting permit, on a first-come-first-served basis up to a total of 25 permits per fiscal year. This makes possible compilation of records which are as follows for FY1961.

12 permits issued
6 permittees did not hunt
3 hunted, but unsuccessfully
1 hunted successfully (killing one bear, the maximum legal limit).
2 permittees did not submit reports

E. Violations.

None to report

F. Safety.

Safety meetings, as such were not convened for in this 100% field operation matters of importance were discussed as the need arose. Thus safe measures were evolved for climbing eagle pinnacles - at the pinnacles, and mechanical maladjustments of machinery were corrected on the spot. 3500 miles approximately were travelled, exclusive of B4 common carrier, in the performance of this project. Broken down, this was about 2500 statute miles by vehicle and slightly more than 1000 nautical miles by boat in the open sea. Neither accidents (in all the travel) nor failure of engines occurred in the more than 1000 miles of outboard engine propelled boat travel.

At the Amchitka station a principle hazard is the decomposing state of the necessary boardwalks. Partial replacements were constructed.

1019 accident-free days.

VII. OTHER ITEMS

A. Items of Interest.

We maintained telephonic communications with the Western Electric site 14 miles west of us, and on the occasions when the line went dead we maintained the contact by radio. In early May the line was giving us trouble and the radio link was active. A rare phenomenon was noted when on May 2nd and 3rd it proved impossible to penetrate the 14 miles that separated us with a radio signal on frequencies near 3 megacycles.

At the other end of the summer, on the date of our departure from Amchitka, after two baggage drills, we proceeded west to Attu,

thence to Shemya where we remained over night. On that flight we passed low over Alaid and part of Nitski Islands in the Semichis. The evidence of early human occupation is clear cut in the vegetative growth around the beaches. These islands must at one time have been inhabited by a large number of Aleut or pre-Aleut people.



Figure 19. Loading the dories
Photo by Berns

An unfortunate event occurred on the morning of May 20th as a result of the storm already reported. Pressed as we had been by weather that denied us the use of the dories we took a risk that proved our undoing when the storm struck. We had been given a forecast for calm, and in order to avail ourselves of a full day's travel had loaded and anchored both dories against an early morning departure. The wind developed so rapidly that before we could do anything about moving them the most heavily loaded of the two boats had filled and deposited her cargo on the bottom. As this included radio equipment, outboard engines, battery charging generators, and the like, we were set back several days in restoring the equipment to operation.

At Kiska on 7 August just as we were departing the Harbor a dense black column of smoke appeared out in the North Pacific. As we knew the MV COMMANDER was in that area we assumed she was on fire and we headed the dory seaward. We went out 19 miles at which point we deemed our fuel supply inadequate to go farther and still return. Reluctantly we turned back intending to summon assistance. As soon as the radio gear was put on the air we learned to our relief that the COMMANDER had not, after all burned, but that she too had gone on a similar rescue mission. It seems that a Japanese whale processing ship was burning unusually crude fuel and filling the sky with an alarming black smoke. Vern Berns recorded its appearance and we have made it a part of this report. The photograph was taken from $51^{\circ} 39' 30''$ N $177^{\circ} 46'$ E.



Figure 20. Smoke on the horizon
Photo by Berns

B. Photographs.



Figure 21. Capelin on the beach of Kiska Harbor.
Photo by Berns



Figure 22. Aftermath of war - Japanese guns on Kiska.
Photo by Berns



Figure 23. Greater scaup caught and ready to band.
Photo by Berns



Figure 24. Northern phalarope on Amchitka.
Photo by McCann



Figure 25. Suss and McCann band a common teal.
Photo by Berns



Figure 26. Orchid on Amchitka
Photo by Jones



Figure 27. Violet on Amchitka.
Photo by Jones



Figure 28. Primrose on Amchitka.
Photo by Jones



Figure 29. Aftermath of war - Shinto Shrine left by the
Japanese on Kiska.
Photo by Jones

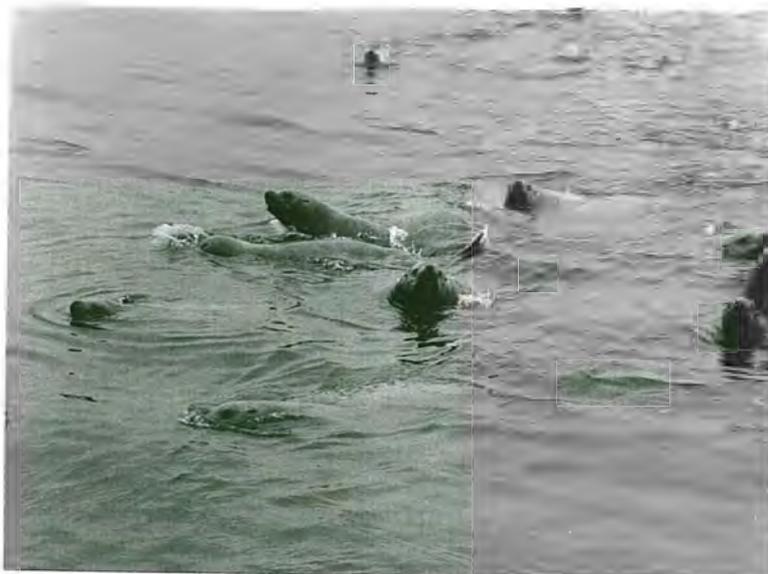
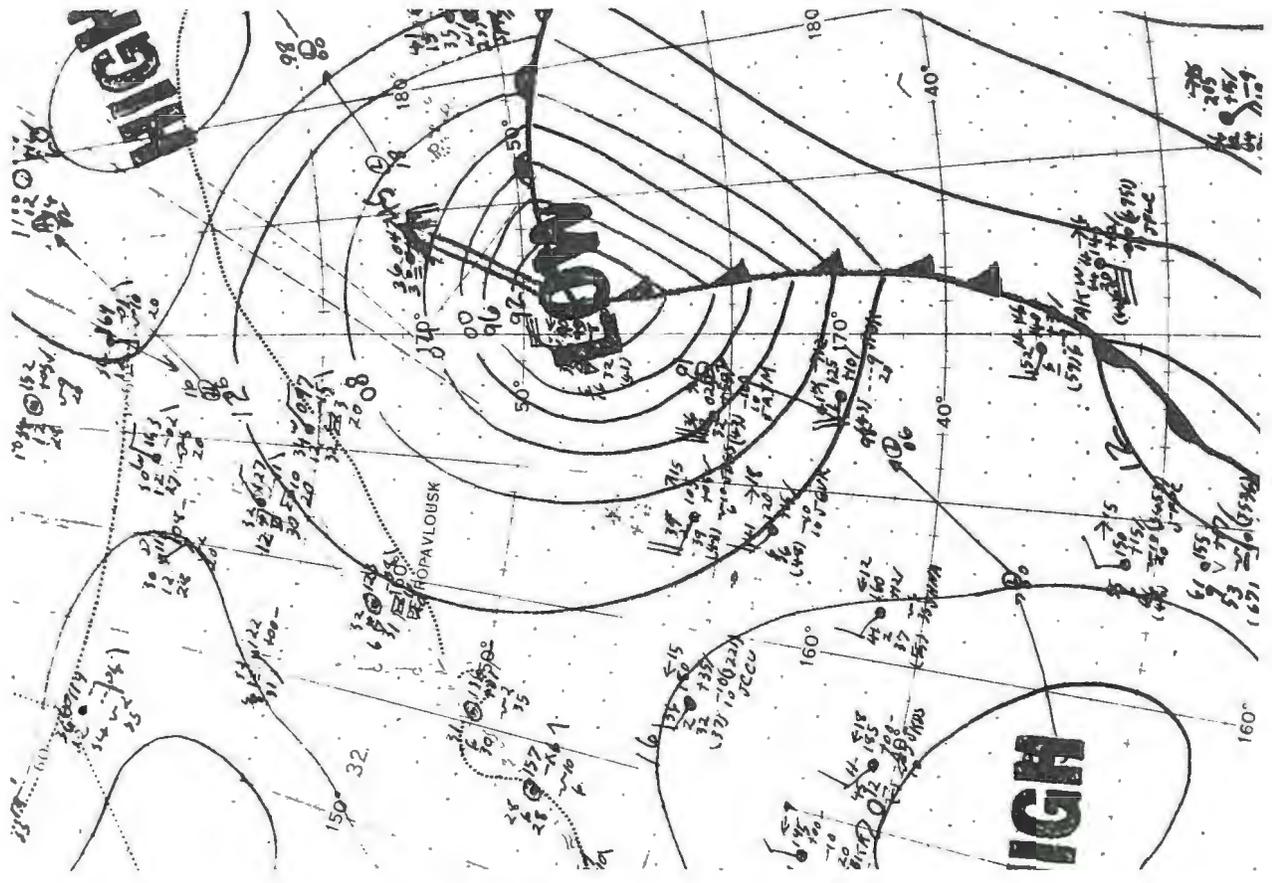


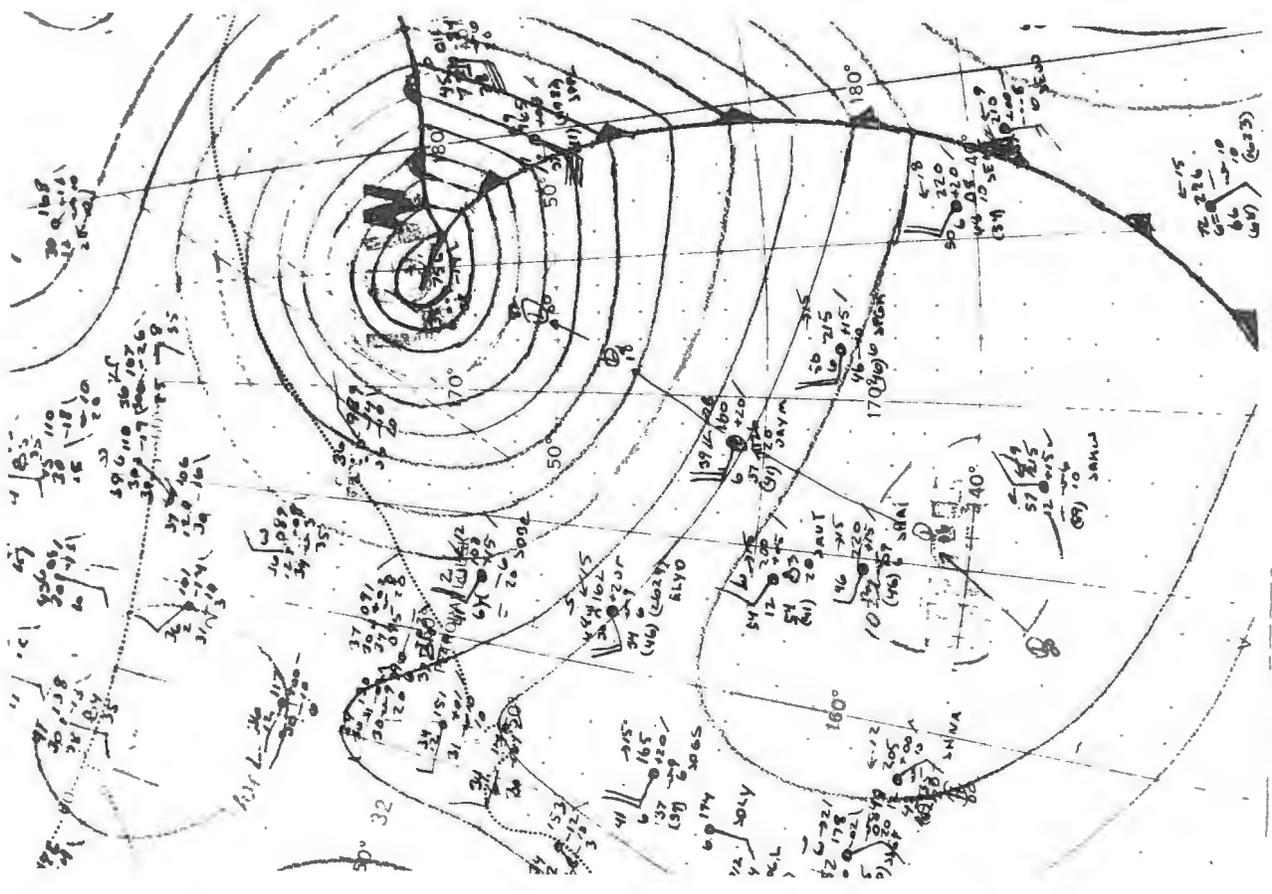
Figure 30. Steller's sea lions, Amchitka.
Photo by Jones



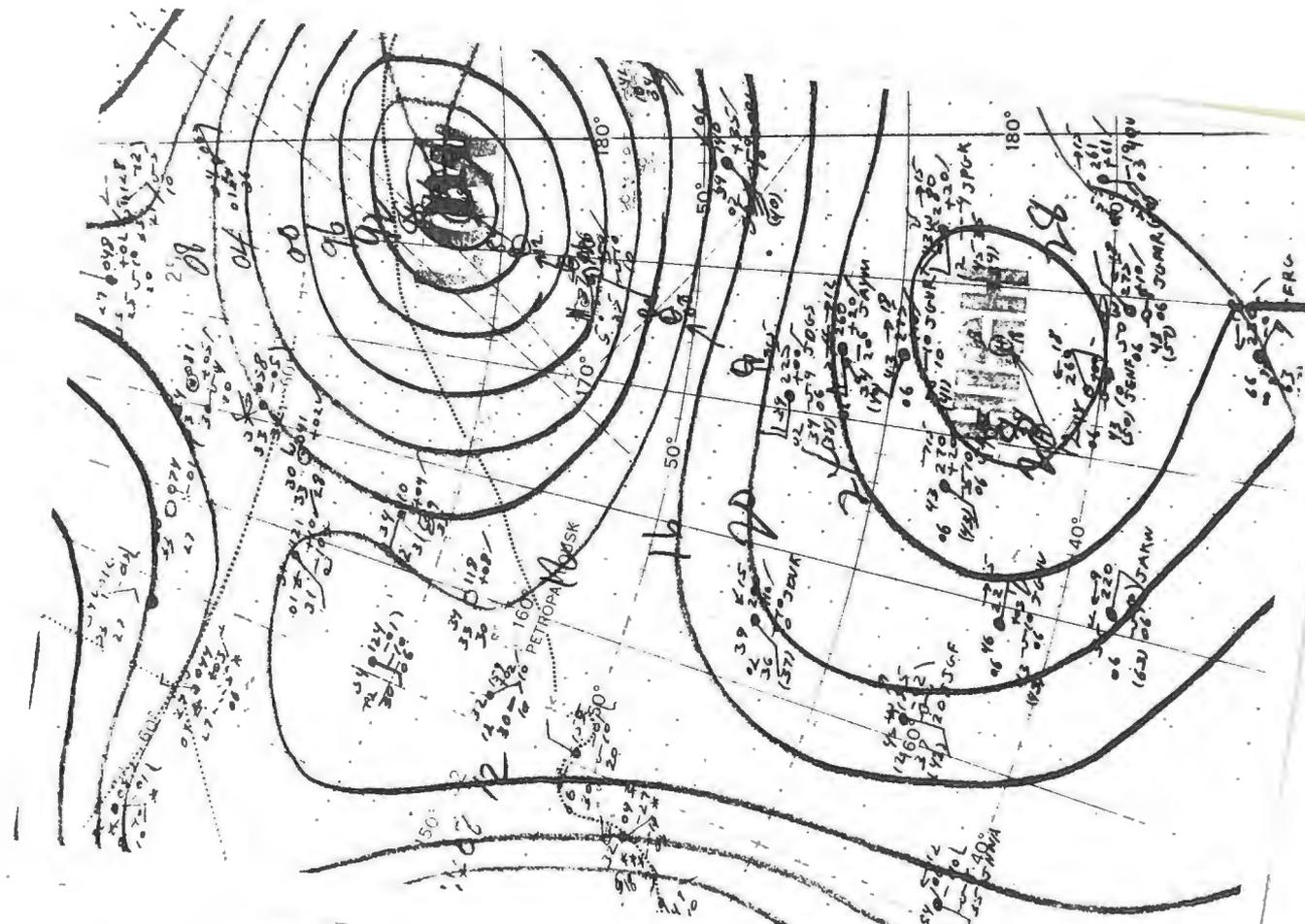
Figure 31. Steller's sea lion bull, Amchitka.
Photo by Jones



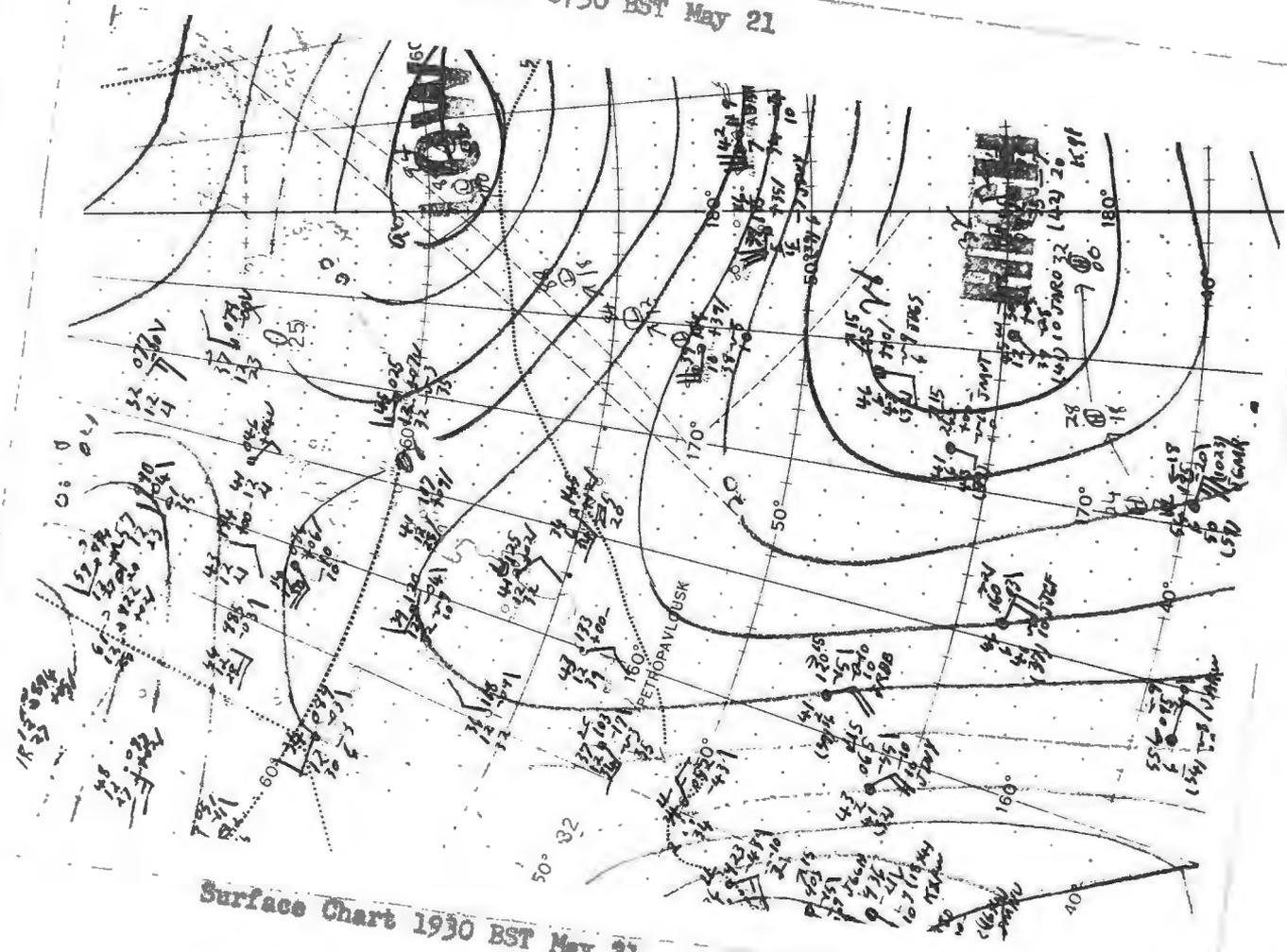
Surface Chart 0730 BST May 20



Surface chart 1930 BST May 20

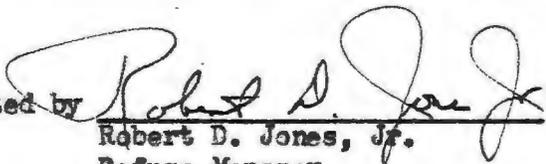


Surface Chart 0730 BST May 21

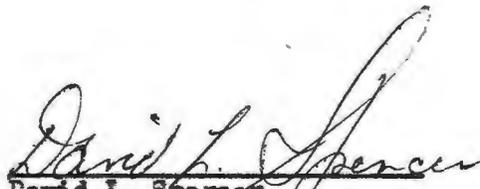


Surface Chart 1930 BST May 21

Figure 32. The evolution of a storm. Charts courtesy of Navy Weather Service, Adak. Note: Anchitka is at 51° 30' N 179° E and is marked by the number 439

Submitted by 
Robert D. Jones, Jr.
Refuge Manager

July 10, 1962

Approved: 
David L. Spenser,
Regional Refuge Supervisor

WATERFOWL

REFUGE Izembek National Wildlife Range

MONTHS OF April TO September, 1962

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling	60									
Trumpeter	0									
Geese:										
Canada Lesser	500									
Cackling	100									
Brant	100,000									
White-fronted	0									
Snow										
Blue										
Other Emperor	50,000									
Ducks:										
Mallard	1,500									
Black										
Gadwall	0									
Baldpate										
Pintail	100,000									
Green-winged teal	5,000									
Blue-winged teal										
Cinnamon teal										
Shoveler	100									
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup	5,000									
Goldeneye	0									
Bufflehead	0									
Ruddy										
Other King eider	0									
Common eider	200									
Harlequin	50									
Coot: Old Squaw	0									

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge ~~Alutian Islands National Wildlife~~ Months of ~~April~~ to ~~September~~ 195
61

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total Estimated Number
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	
<u>I. Water and Marsh Birds:</u>										
Pelagic cormorant			Common murre							
Red-faced cormorant			Thick-billed murre							
Double crested cormorant			Blender-billed shear water				We do not attempt to assign numbers to these pelagic birds.			
Tufted puffins			Sooty shear water							
Horned puffins			Fulmars							
Least auklet			Parked-tailed petrel							
Crested auklet			Leach's petrel							
Whiskered auklet			Laysan albatross							
Parakeet auklet			Black-footed albatross							
Ancient murrelet										
Pigeon guillemot										
Common loon										
Arctic loon										
Red-throated loon										
Red neck grebe										
<u>II. Shorebirds, Gulls and Terns:</u>										
Glaucous-winged gull			Bar-tailed godwit				These are the shorebirds we have encountered but we have no basis for the assignment of numbers.			
Sabine's gull			Black-tailed godwit							
Black-legged kittiwake										
Parasitic Jaeger										
Black oyster catcher										
American Golden plover										
Northern phalarope										
Least sandpiper										
Puddy turnstone										
Little brown crane										
Rock sandpiper (Aleutian)										
Wandering tattler										
Lesser yellow-leg										

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove					
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow					
Reported by.....					

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned

3-17...
 Form NR-2
 (April 1946)

UPLAND GAME BIRDS

Refuge Alutian Islands National Wildlife Months of April to September, 19 61

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total		Hunting	For Re-stocking	For Research		
Common Name					Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Rock Ptarmigan	1,800,000	Unknown	17	Unknown		Unknown		-		Except on Adchitka where the population has risen following removal of the foxes the present trend in numbers is downward
Willow Ptarmigan										There is an unknown number of these birds that move back and forth between Unimak I. and the Alaska Peninsula

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1.3
Form NR-3
(June 1945)

BIG GAME

Refuge Alutian Islands National Wildlife Calendar Year 1961

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31 1960	
Barren-ground Caribou	Tundra-like Izembek Range 415,000 acres	Unknown	-	-	-	-	Unknown	-	-	None	-	200	80	
Barren-ground Caribou	Tundra-like on Unimak 1,500 sq. mi.	Unknown	-	-	-	-	Unknown	-	-	None	-	300	300	
Barren-ground Caribou	Tundra-like on Adak 14,000 acres	7	-	-	-	-	-	2	-	None	-	29	29	45/100
Feral reindeer	All of Atka Island	250	-	-	-	-	150	100	-	None	-	2500	2500	50/50
Alaska brown bear	Tundra-like on Unimak 1,500 sq. mi.	Unknown	1	-	-	-	Unknown	-	-	None	-	75	75	-
Alaska brown bear	Tundra-like on Izembek Range 415,000 acres	Unknown	5	-	-	-	Unknown	-	-	None	-	-	-	-

Remarks:

Reported by _____

3-1.3
Form NR-3
(June 1945)

BIG GAME

Refuge ALASKAN ISLANDS NATIONAL WILDLIFE Calendar Year 1961

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31 1960	
Barren-ground Caribou	Tundra-like Izembek Range 415,000 acres	Unknown	-	-	-	-	Unknown	-	-	None	-	200	80	
Barren-ground Caribou	Tundra-like on Unimak 1,500 sq. mi.	Unknown	-	-	-	-	Unknown	-	-	None	-	300	300	
Barren-ground Caribou	Tundra-like on Adak 14,000 acres	7	-	-	-	-	-	-	2	None	-	29	29	45/100
Feral reindeer	All of Atka Island	250	-	-	-	-	150	-	100	None	-	2500	2500	50/50
Alaska brown bear	Tundra-like on Unimak 1,500 sq. mi.	Unknown	1	-	-	-	Unknown	-	-	None	-	75	75	-
Alaska brown bear	Tundra-like on Izembek Range 415,000 acres	Unknown	5	-	-	-	Unknown	-	-	None	-	-	-	-

Remarks:

Reported by _____

INSTRUCTIONS

Form NR-3 - BIG GAME

- (1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated total number of young produced on refuge.
- (4) REMOVALS: Indicate total number in each category removed during the year.
- (5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.
- (7) TOTAL REFUGE POPULATION: Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.
- (8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Alutian Islands National Wildlife Year ending April 30, 1961

(1) Species Common Name	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula- tion
	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping		Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
								Permit Number	Trappers Share	Refuge share			
Mink													
Weasel	Present on Unimak I. only												
Wolverine	Present on Unimak I. only												
Land otter	Present on Unimak I. only												
Sea otter	Present on Unimak I. only												
Ground squirrel	Present throughout the refuge except in the near islands.												
Norway rat	Present on Unimak and Kavalga Island and probably the Krenitzin group.												
Arctic Fox	Present on Atka, Adak, Anchitka, Atka, Shemya and Rat Island.												
Red fox	Present throughout the refuge except Anchitka, Buldir, Davidof and Kvostof Island.												
Arctic wolf	Present on Unimak only.												
Shrew	Present on Unimak only.												
Leasing	Present on Unimak Island and probably the Krenitzin group.												
	Present on Unimak Island and probably the Krenitzin group.												

* List removals by Predator Animal Hunter

REMARKS:

Reported by _____

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
- (2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
- (4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprime-ness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
- (5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.
- REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

HAYING AND GRAZING

Refuge ~~Alutian Islands National Wildlife~~ Year 19 61

Permittee	Permit No.	Unit or Location	Actual Acreage Utilized	Animal Use Months	Tons of Hay Harvested	Period of Use From - To	Rate	Total Income	Remarks
Gundersen, Chris		Caton I.	4000 ±	528 ±		Jan. - Dec. 1961	\$150/yr	\$150/yr	44 ± cattle on Island
Kanaga Ranching Company	36227	Kanaga I.				July, 1961 - June 1962	\$25/yr	\$25/yr	For raising blue foxes

Totals:

Acreage grazed 4000 ± Animal use months 528 ± Total income Grazing \$150.00
 Acreage cut for hay..... Tons of hay cut..... Total income Haying.....