SURVEY OF ALEUTIAN CANADA GOOSE NESTS AT CHAGULAK AND AMUKTA ISLANDS, ALASKA IN 1990

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ABSTRACT

The first ever Aleutian Canada goose (Branta canadensis leucopareia) nesting pair survey was conducted at Chagulak Island June 7 to 13, 1990. Eighteen nests were found and there was strong evidence indicating three others were present. The majority of nests were found in the vicinity of Southeast Point, one of four locations with goose nesting habitat on Chagulak.

Observations of non-breeding geese indicated at least 51 geese were present at Chagulak. Three of the non-breeders were birds that had been translocated from Buldir Island to sites in the western Aleutians, and another probably had been banded in northwestern California.

A single Aleutian Canada goose nest was found at Amukta Island near the site of the active nest in 1989. A flock of 7 geese, probably including the pair from the nest, was observed in the vicinity of the nest in 1990.

INTRODUCTION

A remnant population of Aleutian Canada geese (Branta canadensis leucopareia) was found nesting on Chagulak Island in the eastern Aleutian Islands in 1982 (Bailey and Trapp 1984). Two years later, in 1984, nests were censused in one area (the plateau on Southwest Point) (Deines and Hatch 1984), and 20 geese were banded (Deines et al. 1984). Bailey and Trapp (1984, p. 285) subjectively estimated that less than 50 pairs of geese nested at Chagulak in 1982, based upon "little more than subjective impressions".

The U.S. Fish and Wildlife Service removed introduced arctic fox (Alopex lagopus) from Amukta Island, adjacent to Chagulak, in 1983 anticipating that geese might naturally expand to that island after the exotic predator was gone (Ambroz et al. 1983, Ambroz and Deines 1984). A survey of Amukta in 1989 revealed that a single pair of Aleutian Canada geese had pioneered to Amukta (Blomstrom and Byrd 1989).

The need to know more about the size of the remnant population of geese on Chagulak, prompted the Aleutian Canada Goose Recovery Team to recommend that a survey of nesting pairs be accomplished there in 1990. This report summarizes the results of that survey.

STUDY AREAS

Chagulak

Lying at about 52°34'N, 171°08'W, Chagulak is situated at the edge of Amukta Pass in the eastern Aleutian Islands (Fig. 1). Volcanic in origin, Chagulak has an area of about 850 ha, is roughly circular with an average diameter of 3 km, and rises to over 1,100 m in elevation. Steep slopes, most over 45°, extend seaward from the central peak. The island's surface is composed mostly of bare rock and earthen slides alternating with slightly more stable steep slopes covered by short plants. Five areas, where slopes are more gentle than about 40°, comprise the available nesting habitat for Aleutian Canada geese (Fig. 2). There are no lakes on Chagulak, and melt-water streams probably are dry by mid summer most years.

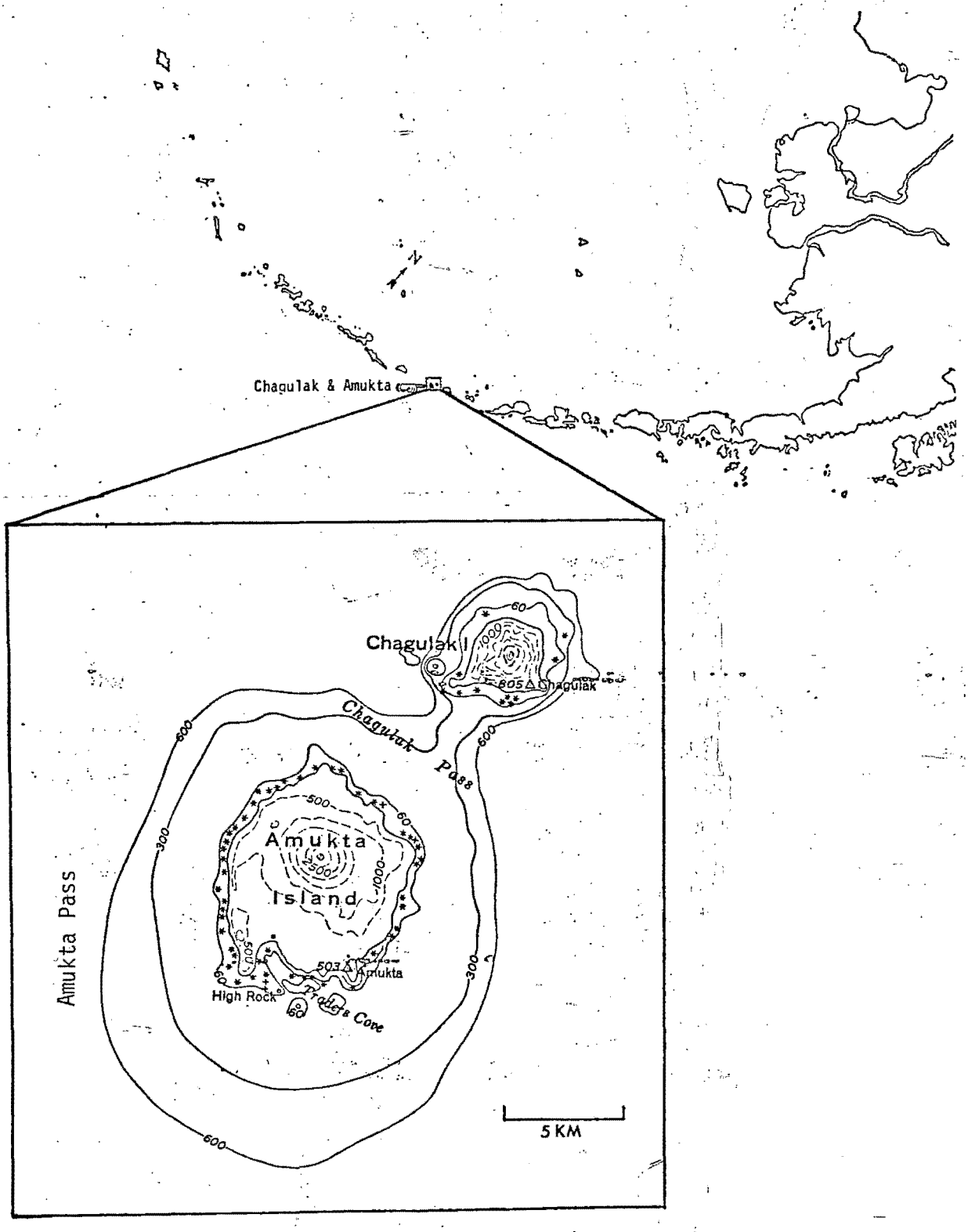

Figure 1. Location map of Chagulak and Amukta islands, E. Aleutian Islands, Alaska.

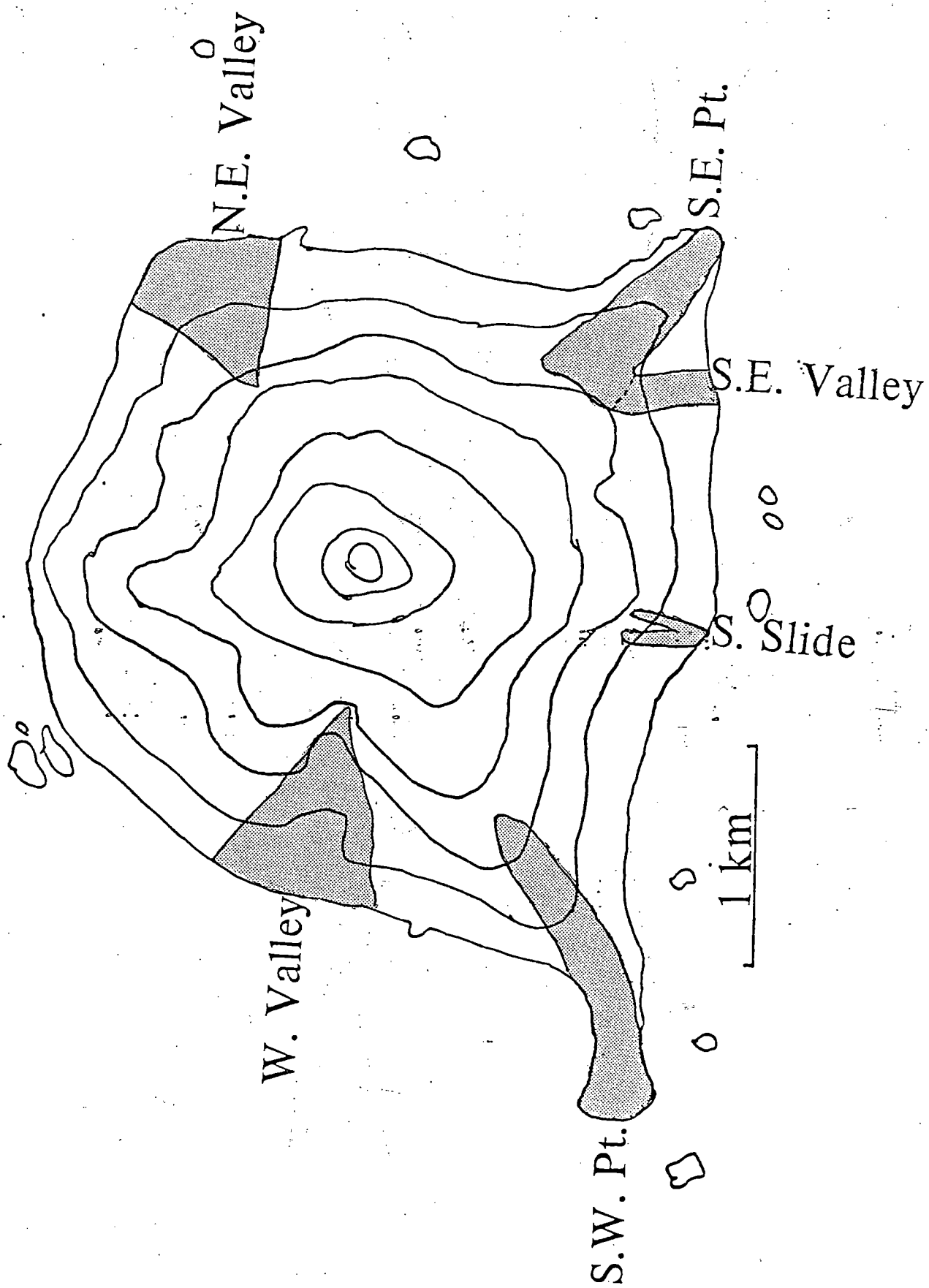

Figure 2. Map of Chagulak Island, Alaska showing location of Aleutian Canada goose nesting areas in 1990.

Amukta

Amukta lies about 6 km southwest of Chagulak (Fig. 1). The nearly 5,000 ha island is roughly circular, and its recently active volcano rises to over 1,000 m in the islands center. Most of the interior of the island is covered by unvegetated or very sparsely vegetated lava. Lush vegetation is confined to a coastal fringe, and this is the area that provides potential goose nesting habitat. Four geographic areas of goose nesting habitat were described at Amukta by Blomstrom and Byrd (1989). Like Chagulak, there is little surface water on Amukta.

METHODS

From June 7-13, 1990 a refuge crew (unless otherwise noted) comprised of Brian Anderson (U.S. Fish and Wildlife Service, Anchorage), Bob Bruff, Vernon Byrd, Bill Hall, Hugh Knechtel, and Dan Rosenberg (Alaska Dept. of Fish and Game, Anchorage) conducted goose nest surveys on Chagulak. Amukta was visited on June 13. There is no suitable place to camp on Chagulak so the crew worked from the M/V Tiglax. The following vessel crew members assisted with one or more surveys: Robert Angell, Marsha Maccone, and Greg Snedgen.

Soon after our arrival at Chagulak on June 7, a circuit of the island was made by the M/V Tiglax so that the survey crew could assess and photograph potential goose nesting areas. In subsequent days all substantial areas where we thought geese could nest were searched by the crew walking abreast about 10 m apart, or farther if the vegetation was short, until the entire

surface of a study area was covered. When nests were discovered, data were recorded about the clutch size, stage of incubation (from floating eggs in a float jar), physical characteristics of the nest site, and vegetation surrounding the nest. Furthermore, the surface areas of potential goose nesting habitat were estimated by pacing.

We kept track of all goose observations and tried to document the presence of color markers (i.e., neck collars or leg bands). Furthermore, we recorded the type of habitat being used by geese.

Safe ascents to plateaus at Southwest Pt. and Southeast Pt. were made without using technical climbing paraphernalia, however, we used ropes for safety in several areas that were particularly steep.

RESULTS

Nests

Chagulak.-- At least 18-21 nests were present at Chagulak in 1990 (Table 1). Over half the nests were on the peninsula on Southeast Point and Southeast Valley (Fig. 2). Only 3-4 nests were found on the peninsula at Southwest Point (Fig. 2, Appendix A), an area where 8 nests were found in 1984 (Appendix B).

Clutches ranged from 2 to 6 eggs (Table 2) with an average of 4.4 (s = 1.2). Judging from float angles, hatching peaked during the first 10 days of July (Fig. 3). Nevertheless, the range was from June 12 (we found a clutch in the process of hatching) to after July 21, assuming that the very late clutch

Table 1. Aleutian Canada goose nests found at Chagulak Island, Alaska in 1990.

Site[a]	Area[b]	Survey Effort[c]	Date	Nests	Territories[d]	Total
W. Valley	32	36	Jun 8	2	1	3
N.E. Valley	50	36	Jun 10	0[e]	1	1
S.W. Point	60	44	Jun 11	3	1	4
S.E. Point	30	28	Jun 12	6	0	6
S.E. Valley	5	14	Jun 12	7	0	7
S. Slide	2	6	Jun 13	0	0	0
Totals	179	164		18	3	21

[a] see Fig. 1 for locations

[b] estimated area in hectares of habitat searched (determined by pacing)

[c] total observers X total hours of survey; expressed in person/hours

[d] areas with defensive pairs and scattered droppings indicating the likelihood of a nest we failed to find

[e] traces of down indicated the presence of a nest, even though we failed to find the structure

Table 2. Reproductive data and nest site characteristics for Aleutian Canada geese on Chagulak and Amukta islands, Alaska

Location	Clutch	Hatch Date[a]	Nest Site Habitat[b]	Previous Nest Cup	Aspect	Slope( )	Elev(m)
Chagulak							
W. Valley	4	6/28	E/U	Y	W	30	195
W. Valley	6	7/3	F/U	N	W	30	256
W. Valley	UNK	UNK	E/U	UNK	SW	30	300
E. Valley	UNK	UNK	M/W	UNK	E	30	274
SW Point	6	7/2	E/U	N	SW	10	125
SW Point	UNK	UNK	E/U	UNK	W	30	304
SW Point	5	7/2	M/W	N	W	30	384
SW Point	3	7/9	E/U	N	S	30	268
SE Valley	3	7/3	E/U	Y	SE	35	104
SE Valley	5	6/12	E/U	N	SE	35	128
SE Valley	6	7/7	E/U	N	SE	30	207
SE Valley	4	7/3	E/U	N	SE	35	219
SE Valley	4	7/3	E/U	N	SE	35	262
SE Valley	5	7/3	E/U	N	SE	35	260
SE Point	2	6/23	E/U	N	SE	25	304
SE Point	4	7/10	E/U	N	SE	35	320
SE Point	5	7/23	E/U	Y	SE	25	299
SE Point	6	7/3	E/U	Y	SW	10	293
SE Point	UNK	UNK	E/U	UNK	SE	35	287
SE Point	3	7/7	E/U	Y	SE	25	250
SE Point	4	7/7	E/U	N	SE	25	238
Amukta							
1	3	7/11	E/U	N	W	25	150

[a] Based on egg float angles

[b] E/U=*Elymus*/umbel, F/U=fescue/umbel, M/W=Moss/willow upland

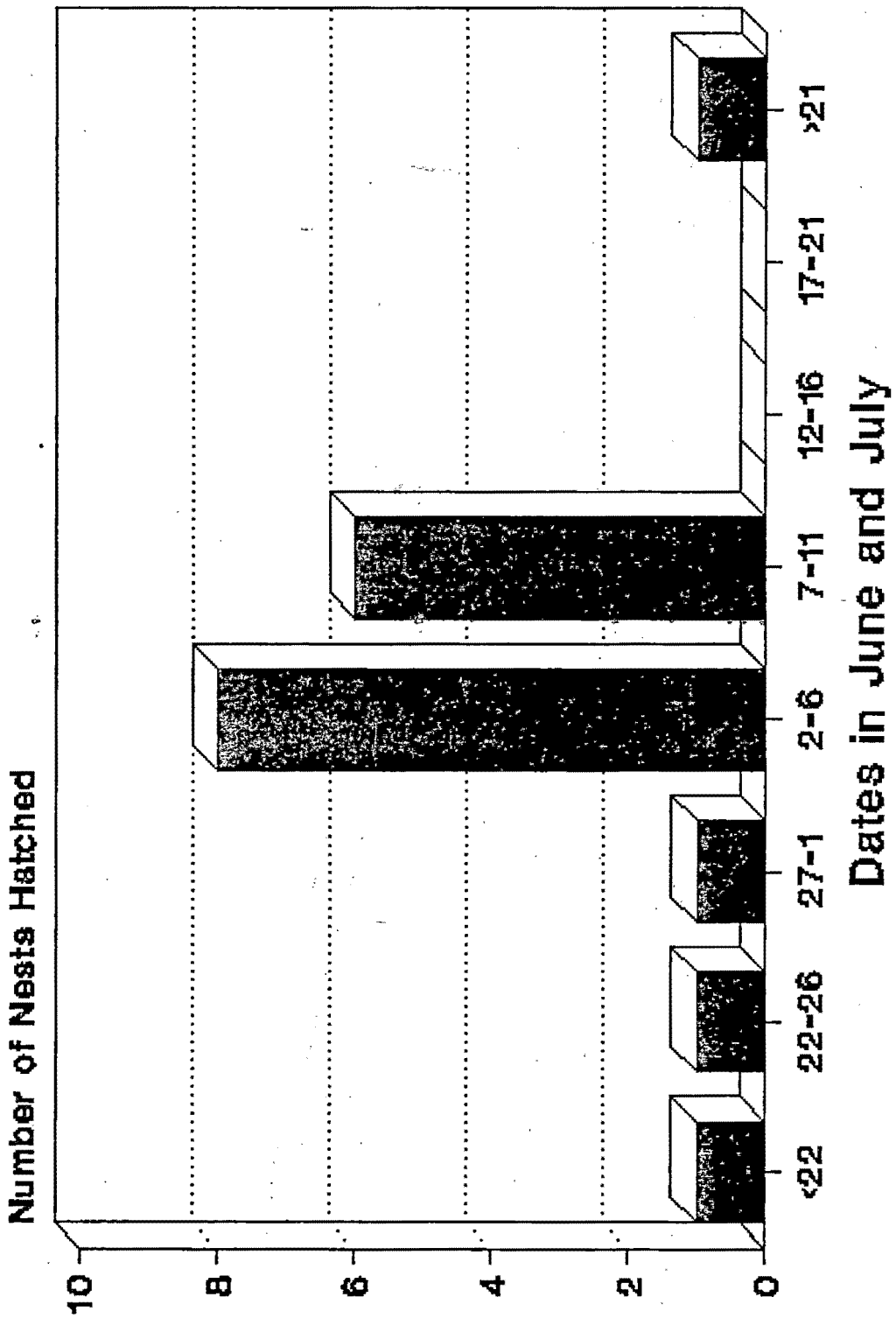

Figure 3. Distribution of estimated hatch dates for Aleutian Canada goose nests at Chagulak and Amukta islands in 1990.

hatched. At least 28% of the nests had been used in at least one prior year.

Amukta.--A single nest was found in the small valley on West Ridge, Amukta in 1990. The site was within 75 m of the active nest in 1989 (Blomstrom and Byrd 1989). The nest contained only 3 eggs and incubation had just begun on June 13. The small clutch and relatively late clutch initiation date suggest a young female may have been involved.

Nesting Habitat

Most nests (18 of 21) found on Chagulak and Amukta were in a tall-plant community dominated by Elymus arenarius and several species of umbelliferous plants (Table 2). The other nests were near large boulders in the upland where short plants dominated, particularly moss and procumbent willows (Salix spp.). Interestingly, extremely dense stands of Elymus which covered the relatively flat plateaus above Southeast and Southwest points contained few goose nests, perhaps because high stem density made movement difficult and restricted visibility from nest sites.

Most nests were on steep slopes (average approximately 30^{o}, range 10^{o}-35^{o}; Table 2). About 85% of the nests were found on slopes facing southeast or west, and nests ranged in elevation from 104m to 384m (average 250m). We estimated that there was about 150-180 ha of potential goose nesting habitat on Chagulak.

Goose Observations

We saw a flock of 14 geese, apparently non-breeders, on June 10 flying over Northeast Valley and perhaps the same flock in the upland above Southeast Point on June 12 (Table 3). Also on June

Table 3. Observations of Aleutian Canada geese at Chagulak and Amukta islands in 1990.

Location[a]	Date	Flock Size	Comments
Chagulak			
W. Valley	06/08	2	Near nest, (no band)
W. Valley	06/08	2	Near nest, (no band)
N.E. Valley	06/10	2	Near nest, (no band)
N.E. Valley	06/10	14	Flying over, (unknown)
S.W. Point	06/11	2	Near nest, (no band)
S.W. Point	06/11	2	Flying over, (unknown)
S.W. Point	06/11	1	Alone in upland, (no band)
S.W. Point	06/11	1	Alone in upland, (no band)
S.W. Point	06/11	2	Near nest, (no band)
S.W. Point	06/11	1	Alone, (unknown)
S.W. Point	06/11	2	Dead, 250m apart, (no band)
S.E. Point	06/12	35	Flying toward Amukta, (unknown)
S.E. Point	06/12	14	In upland, (yellow, right, C08)
S.E. Point	06/12	2	Dead, 75m apart (no band)
S.E. Valley	06/12	2	Near nest, (red, right, ?27, no collar)
S. Slide	06/13	34	Feeding on Fescue, (blue, right, B1?), (yellow, left, E??)
Amukta			
Goose Valley	06/13	7	Near nest, (no band)

[a] See Fig. 2

[b] if banded, color and code are for plastic leg band (left or right specifies tarsus with color band)

12 a flock of about 35 geese were seen flying toward Amukta from Chagulak (Kevin Bell, pers. comm.). Perhaps this same flock was seen on South Slide, Chagulak on June 13 (Table 3). It is not possible to be sure that the flocks of 14 were the same, or that the flocks of 34 and 35 geese were identical, but this seems reasonable given the similarity in numbers. Clearly the flocks of 14 and 35 on June 12 were different from each other, since they were observed in different areas at about the same time of day. In addition to the flocks, at least 3 single geese, apparently not associated with nests, were seen in the upland above Southwest Point (Table 3).

A flock of 7 geese, probably including the pair from the nest, was observed on Amukta on June 13. No geese were seen during an afternoon ashore on the northern portion of Amukta on June 10.

Four geese with plastic leg bands were observed at Chagulak (Table 3). We were unable to read the entire code on 3 of the 4, but knowledge of partial codes allowed us to determine the banding location in most cases. The goose with yellow band "C08" was a 2-year-old male that had been translocated from Buldir to Little Kiska on August 4, 1988. The goose with a yellow band starting with "E" was a 1-year-old female that had been translocated from Buldir to Little Kiska on August 4, 1989. The bird with the blue band, "B1?", was a yearling male that had been moved to Nizki-Alaid on August 1, 1989. The goose with the red leg band was probably banded in California. Most geese we could see well were unbanded (Table 3).

Four dead geese were found during field work on Chagulak (Table 3). Two each were on the peninsulas above Southwest and Southeast points. It appeared that the geese may have been preyed upon by bald eagles (Haliaeetus leucocephalus), but we could not be certain what caused their death. They have been sent to the National Health Lab for necropsy.

DISCUSSION

The lack of systematic surveys in past years at Chagulak makes it difficult to infer whether the breeding population of geese has changed. Only at Southwest Point had a prior census been conducted (Appendix B). In 1984, 8 nests were discovered in this area, most in upland habitat with a prevalence of large boulders which provided protection for the nests (Deines and Hatch 1984). We found evidence of only 4 nests in 1990, only one which was in the habitat favored in 1984. Nevertheless, we found two additional old goose nests in upland areas that had been active in prior years, but the sites were being used by glaucous-winged gulls (Larus glaucescens) in 1990.

There may have been more pairs of geese nesting in Northeast and West valleys in 1984 than in 1990, for goslings from at least 3 different broods were banded in each area in 1984 (Deines et al. 1984). Nevertheless, there is a possibility that pairs nesting elsewhere brought broods to these valleys for rearing in 1984.

The highest nesting densities for geese in 1990 were found on south and southeastern facing slopes, those first free of snow

in spring. The Elymus-umbel plant community was favored for nest sites, but apparently areas of especially high stem density were not used.

The average clutch size in 1990 was lower than that recorded in 1984 (4.4 vs 5.8) for unknown reasons. We found four dead geese, perhaps killed by eagles. Bald eagles were noted at Chagulak daily during our survey in 1990. Eagle-killed geese were also found at Amukta in 1989 (Blomstrom and Byrd 1989). Glaucous-winged gulls were abundant at Chagulak and may also have preyed on goose eggs (we found at least 3 eggs that probably had been broken by gulls).

It is possible that a few additional small areas of goose nesting habitat were present on Chagulak that we did not search, but our survey covered all the areas we could see that appeared to be adequate for nesting. In qualitatively assessing habitat quality for geese at Chagulak, we failed to find stands of Empetrum nigrum, an important fall food for geese elsewhere in the Aleutians, and Chagulak also seemed to have relatively few areas of major food plants, Fetuca rubra and Carex spp.

Chagulak probably contained less than 25 breeding pairs of geese in 1990, and we could account for at least 51 non-breeders (flocks of 34 and 14 and 3 singles). Based upon our observations, it seems likely to conclude that the summering population of geese on Chagulak was slightly over 100 geese in 1990. The largest flocks seen in prior years were 62 in June 1982, 30 in June 1983, and 16 in June 1984 (Appendix B).

Bailey and Trapp (1984) first documented the presence of a

California banded goose at Chagulak in 1982, and geese banded at Chagulak in 1984 were subsequently observed at several locations in California and Oregon (D. Yparriguarre, pers. comm.). Our observations at Chagulak of non-breeders translocated to sites in the western Aleutians, further suggest that the western Aleutian and Chagulak populations mix in winter. The two yearling females seen at Chagulak will probably return to their release sites when they nest as 2- or 3-year-olds, but the 2-year-old male may have paired with a Chagulak female and may nest next year there.

LITERATURE CITED

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APPENDICES

Appendix A. Annotated list of potential goose nesting areas on Chagulak Island, Alaska (see Fig. 1 for location-photographs of habitats are archived at the USFWS office on Adak).

West Valley This steep sided basin extended from near sea level to over 500m. The basin floor was strewn with boulders that had fallen from basin walls. Approximately 31 ha of the floor was mostly covered with a tall plant association dominated by Elymus arenarius and several species of umbelliferous plants (e.g., Angelica lucida). This community gave way to an ecotone dominated by Angelica and Festuca rubra. Higher elevations were bare or had very short vegetation. Two goose nests were found; one in the upper edge of the Elymus-umbel and the other in the ecotone. A third nest was probably also present based upon the pattern of droppings and other signs. We saw no other geese than these associated with nests, but a single area was found in the northern part of the basin at over 350m elevation where a flock of non-breeders apparently had fed (lots of droppings, extensive area of cropped plants).

Southwest Point Southwest Point is at the end of a narrow peninsula (about 100-200m wide) which is about 1.6 km long, 150m high, relatively flat on top, and covered with a very dense tall plant association, primarily the Elymus/umbel community. At the base of the peninsula, about 200m in

elevation, a boulder-strewn slope (25°-35°) extended inland toward the interior peak. In an elevation band between about 150-200m and 350m altitude, the vegetative cover was not so lush as at lower elevations, and scattered boulders littered the surface. Above 350m Elymus/umbel patches are interspersed with moss/willow vegetation primarily an upland tundra association of mosses and willows. Scattered boulders provided the only potential cover or wind protection for geese.

Three goose nests were found and another was probably present; two in the upper edge of Elymus/umbel habitat, one was in the moss-willow upland, and one in dense Elymus at the end of the peninsula overlooking the sea. Two goose nests from former years (identified by down, egg shell, and membranes) were found at the bases of large boulders about 400m in elevation. These were occupied by gulls in 1990.

South Side This 40° slope extends alongside a bare earthen slide from near sea level to over 200m elevation. It was vegetated with sparse Elymus/umbel, and their was no sign of goose nesting. Nevertheless, the area had been heavily used, probably by non-breeders. A flock of 34 non-breeders fed on Festuca rubra during our survey.

Southeast Point Like Southwest Point, Southeast Point lies at the end of a sloping, flat-topped peninsula. The peninsula, which extended about 1 km and was about 200 m wide, had

extremely lush vegetation, mostly Elymus-umbel, near the tip (an area about 500 m long). No goose sign was seen in this area, but further inland, between about 250 m and 380 m elevation, a less densely vegetated slope, covered with Elymus-umbel, Festuca rubra and Carex spp. contained 7 goose nests. Above 380 m, upland tundra covered the steep slope as it extended inland. A flock of non-breeders fed in this area, but no nests were found in the upland.

Southeast Valley This 30^{o}-35^{o} slope led from sea level to about the 400m level of the Southeast Point plateau. The valley was a drainage mostly less than 100 m wide which had Elymus-umbel habitat interspersed with Festuca and Carex. We found 6 goose nests in about 5 hectares of habitat.

Northeast Valley This valley was roughly similar in topography to West Valley in that it had less steep walls surrounding (on 2 sides) a less steep floor. The floor was boulder strewn, and the predominant vegetation was Elymus-umbel below 200 m. Between 200 m and 350 m, upland tundra and rock slides predominated. A defensive pair, distinctive patterns of droppings, and a trace of down indicated a nest was present in a boulder strewn area of the upland, but we could not find the structure. No other evidence of nesting was discovered.

Appendix B. Brief summary of the results of all known goose surveys on Chagulak Island, Alaska.

Year	Mo/Day	Description
1982[a]		Discovery of population
	June 14	Briefly searched West Valley, no sign of geese.
	June 15	Fairly extensive search of part of NE Valley, no sign of geese.
	June 15pm	Brief search of South Slide, saw droppings and two birds.
	June 16	SW point searched (search intensity unknown), flock of 62 "nonbreeders" seen in the upland.
	July 10	Another part of NE Valley searched, One nest and possibly a pair with a brood were recorded.
1983[a]	June 10-18	Bailey searched SW Point, found $\geq$ 2 territorial pairs and 30 geese. One goose had a red legband.
1984	June 14-15[b]	Eight nests found on SW Point, a flock of 16 birds seen (1 red banded).
	Aug. 12[c]	Eleven geese banded from at least 3 broods in West Valley.
	Aug. 13[c]	Nine geese banded from at least 3 broods in NE Valley.

[a] Bailey and Trapp 1984
[b] Deines and Hatch 1984
[c] Deines et al. 1984