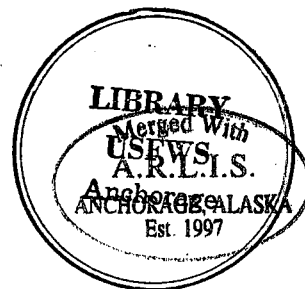


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DISTRIBUTION, ABUNDANCE, AND PRODUCTIVITY OF
TUNDRA SWANS IN THE COASTAL WETLANDS OF
THE ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, 1983.

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Key words: Tundra Swans, Anatidae, Abundance, Age Composition,
reproduction, Arctic-Beaufort

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Distribution, abundance, and productivity of tundra swans in the coastal wetlands of the Arctic National Wildlife Refuge, Alaska, 1983

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Abstract:

Two aerial surveys of tundra swans utilizing coastal wetlands of Arctic National Wildlife Refuge were conducted in 1983. The first survey, a breeding pair/nesting survey, was conducted on 2-3 June; a second survey to determine productivity, was conducted on 21 August. These surveys are used to describe the distribution, abundance, and productivity of the tundra swan population. Survey methods were those described by Bartels et al. (1983). The nesting population was estimated to be a minimum of 105 pairs. Total swan numbers in 1983 increased 13% and 67% over 1981 and 1982, respectively. Adults in 1983 declined 2% over 1981, and increased 31% over 1982. Cygnet production in 1983 increased 70% and 316% respectively over 1981 and 1982. Swans on 1 concentration area were stable over 3 years. A second area had an increase in 1983 over 1982, with 1981 numbers comparable to 1983. The third major area in 1983 had numbers exceeding both previous years. Swans in the fourth area declined over 1981, but increased over 1982. Since air traffic and human disturbance was equally high in 1982 and 1983, the milder weather of 1983 probably contributed to greater production.

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Distribution, abundance, and productivity of tundra swans in the coastal wetlands of the Arctic National Wildlife Refuge, Alaska, 1983.

The Congressionally mandated seismic exploration program on the coastal plain of the Arctic National Wildlife Refuge (ANWR), as well as the proposed federal leasing of nearby offshore tracts and state leasing of nearshore areas will place industrial activity within or close to tundra swan nesting and molting habitats. Coupled with the actual exploration, there will be an increase in air traffic along the coast to support such operations.

Tundra swans are particularly sensitive to such disturbances. Barry and Spencer (1976) stated that molting and breeding swans avoided actual drill sites in the Mackenzie Delta by at least 8km, although swans had previously utilized these areas. Hanson et al. (1956) reported exploitation induced desertion of nesting areas in the Perry River region of Canada. Aircraft disturbance was the probable cause of the desertion of a swan nest at Nuvagapak Point on the ANWR (Anderson 1973). Schmidt (1970) discussed the desertion of a swan nest at Beaufort Lagoon (Arctic NWR) due to helicopter traffic.

Since swans are sensitive to disturbance, highly visible, and have traditionally nested and molted on selected coastal wetlands of ANWR, they were selected for inclusion into the Baseline study program. Tundra swans are an excellent indicator species for the overall well being of all waterfowl in a given habitat (King 1973).

Limited aerial surveys of tundra swans on the Arctic National Wildlife Refuge coastal plain were initiated in 1977 and included 1 wetland area. In 1978, an additional wetland area was added. Then, a portion of the entire coastal wetland area was sampled in 1979. These initial tundra swan surveys were summarized by Jacobsen (1979). Spindler (1981) reported on an expanded coastal aerial survey conducted in 1981. The 1982 and 1983 surveys included identical areas as covered in 1981.

Materials and Methods

The 4 major swan concentration areas were described in the 1982 Update to Baseline Report (Bartels et al. 1983). The survey methods for tundra swans were described in the 1982 Update to the Baseline Study (Bartels et al. 1983). In 1983, a Helio-courier aircraft was used instead of a Cessna 185. Also in 1983, 2 complete aerial surveys of swans were conducted. The first survey (new in 1983) was conducted in mid-June. This survey was a breeding pair/nesting survey. The second survey, conducted in mid-August, during molt, was a production survey.

One change in the methods described for 1982 was initiated. Swan locations were plotted on USGS 1:63,360 scale maps instead of 1:250,000 scale previously used. This refinement in the mapping effort better delineated wetlands utilized. A second benefit was that survey data collection was compatible with other statewide swan surveys.

Results and Discussion

Nesting Distribution

The distribution of nesting swans observed on the coastal concentration areas is illustrated in Fig. 1. The number of nests observed plus the number of pairs observed without nests was assumed to be the breeding population. It is possible that some of the single birds could have been members of a nesting pair, of which the nest was missed. However, due to this uncertainty, they will not be considered as breeding birds.

The Canning-Tamayariak delta area and the Aichilik-Egaksrak-Kongakut delta respectively held the highest number of nests. These 2 areas contained 69% of nests found during the survey (Table 1). Successive years' data from this new survey should yield information on temporal changes in nesting attempts, distribution of nests, and nesting success.

Table 1. Tundra swan population statistics for 1983 nesting survey, 21 June 1983.

Area	Total Adults	No. Nests	No. Pairs w/o nests	Breeding Population (# pairs)	Singles	No. birds in
grps 3						
Canning/ Tamayariak Delta	98	25	11	36	16	10
Hulahula Delta	36	11	3	14	4	4
Jago Delta & Wetlands	13	5	1	6	1	-
Aichilik/Egaksrak/ Kongakut Delta	74	29	6	35	4	-
Demarcation Bay	16	2	1	3	2	8
Other areas	27	6	5	11	5	-
Totals	264	78	27	105	32	22

Distribution

The Canning-Tamayariak delta accounted for 186 swans (34% of total) during the post-breeding survey. This was a 250% increase over 1982, and the 1983 number was almost identical to numbers observed in 1981. (Table 2). The Aichilik-Egaksrak-Kongakut delta accounted for 164 swans (30% of total) in 1983. This area has exhibited a remarkable consistency in total numbers

Fig. 1. Tundra swan survey area and routes
Nesting survey - 23 June 1983




-  SWAN CONCENTRATION AREA
-  SWAN PAIR AND/OR NEST
-  SURVEY ROUTE



Table 2. Tundra swan population statistics for Arctic National Wildlife Refuge coastal areas during production surveys, 1981, 1982, and 1983.

Area	Number						Swans in flocks	%			Number Broods	Mean Brood Size	Cygnet/ Adults	Swans KM ²
	Total	Adults	Cygnets	Pairs	Singles	Flocks		Paired	Prs. w Yng	Yng				
Canning/Tamayariak Delta: (490) ^a														
1981	186	140	46	30	3	10	77	43	57	25	17	2.7	1:3.0	0.38
1982	75	63	12	21	3	4	18	67	29	16	6	2.0	1:5.3	0.15
1983	188	125	63	48	7	4	22	77	52	50	25	2.5	1:2.0	0.38
Hulahula/Okpilak Delta: (168) ^a														
1981	80	67	13	9	0	8	49	27	44	16	4	0.3	1:5.2	0.48
1982	39	35	4	10	1	3	14	57	20	10	2	2.0	1:88	0.23
1983	94	62	32	20	5	3	17	65	45	52	9	3.5	1:2.1	0.56
Aichilik/Egaksrak/ Kongakut Delta (259) ^a														
1981	171	139	32	17	2	11	101	24	76	19	14	2.3	1:4.3	0.66
1982	171	157	14	19	2	7	97	37	21	8	6	2.3	1:11.2	0.66
1983	164	112	52	36	6	7	34	64	50	46	18	2.9	1:2.2	0.63
Jago Delta and Wetlands (357) ^a														
1981	12	8	4	2	1	1	3	50	50	33	1	4.0	1:2.0	0.03
1982	4	4	0	2	0	0	0	100	0	0	0	0	0	0.01
1983	37	29	8	10	1	2	8	69	30	28	3	2.7	1:3.6	0.10
Demarcation Bay (158) ^a														
1981	24	18	6	6	0	1	6	67	33	25	2	3.0	1:3.0	0.15
1982	16	9	7	1	3	1	4	22	100	44	3	2.3	1:1.3	0.10
1983	20	14	6	6	2	0	0	86	33	43	2	3.0	1:2.3	0.13
Other Areas: (171) ^a														
1981	15	13	2	3	2	1	5	46	33	13	2	1.0	1:6.5	0.09
1982	25	20	5	3	1	3	15	20	100	20	2	2.5	1:5.0	0.15
1983	49	35	14	12	5	2	6	69	50	40	6	2.3	1:2.5	0.29
Total Coastal area sampled: (1603) ^a														
1981	488	385	103	67	8	32	241	35	57	21	40	2.6	1:3.7	0.30
1982	330	288	42	65	10	18	148	45	29	13	19	2.2	1:6.9	0.21
1983	552	377	175	132	26	18	87	70	48	46	63	2.8	1:2.2	0.34

^aarea surveyed (km²) within each survey area.

observed over the 3 year period (Table 2). However, the composition of the numbers observed changed. There were fewer adults and more cygnets present in 1983 than observed in both 1981 and 1982. The 1983 survey showed more paired birds in the area than previous years. However, the number of paired birds located on the nesting survey (Table 1, 35 pairs) is almost identical to pairs present during the post-breeding survey (Table 2, 36 pairs). It is likely that unsuccessful pairs were still in the area; however, it is not possible to identify these pairs as the same pairs observed in the nesting survey, or explain why other unsuccessful pairs did not move into this preferred area.

The Hulahula-Okpilak delta, Jago delta and wetlands, Demarcation Bay, and other areas all had increases in swans over those observed in 1982. With the exception of Demarcation Bay, the numbers of swans in these areas, also, exceeded the 1981 totals. Demarcation Bay showed an increase in swans over 1982, but a decline over that observed in 1981. However, the proportion of swans using the Demarcation Bay area in any given year is low and does not exhibit a great deal of variation between years.

Total adult swans observed during the production survey (Table 2) is increased 124 birds over total adults observed during the nesting survey (Table 1). Of this increase, 56% was in the form of paired birds (35 pairs). These swans are presumably, unsuccessful breeders moving to the refuge. It can be speculated that these pairs came from unsuccessful nests west of the refuge. Bellrose (1976) and Salter et al. (1980) indicated that swans arrive on the Alaskan coast from the east and depart to the east.




Productivity.

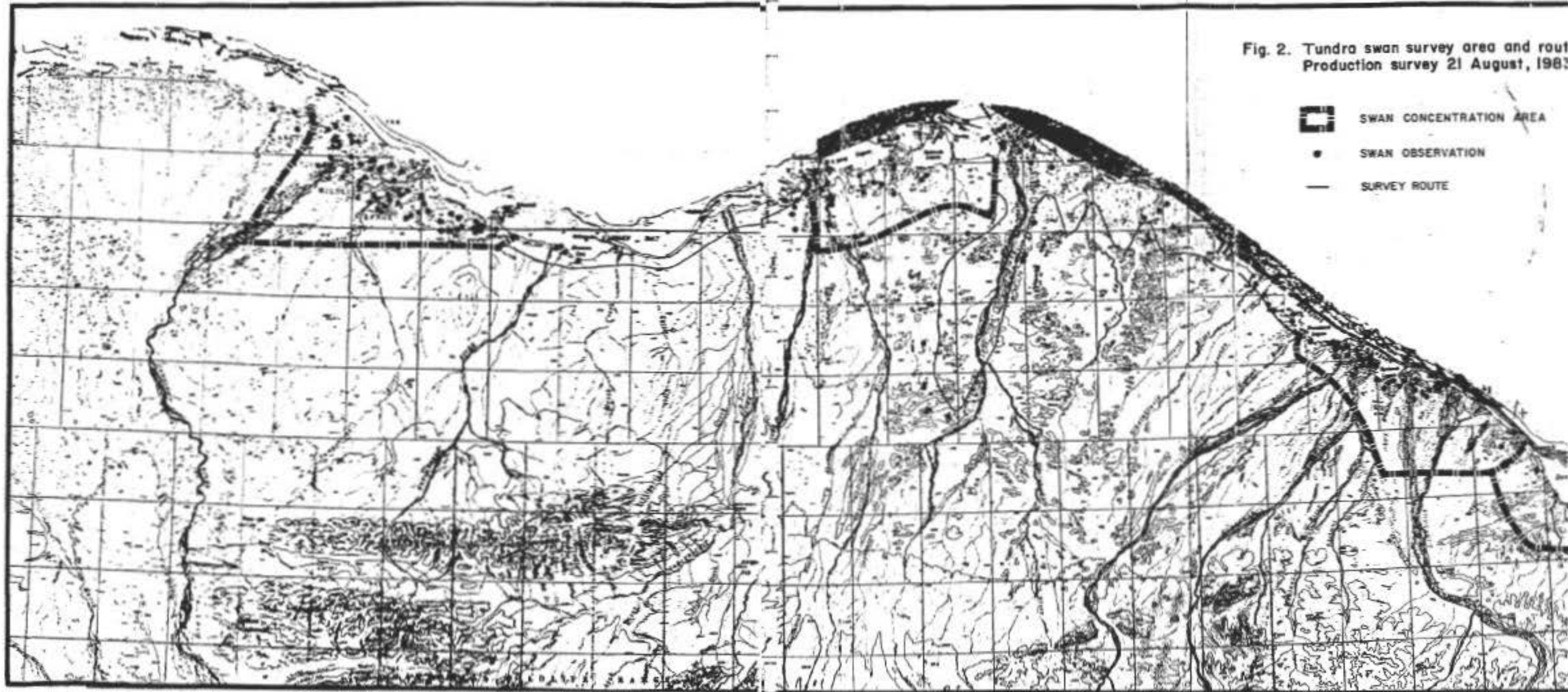
Tundra swan productivity for 1983 was the highest recorded in the 3 years of the present study (Table 2). Total broods, mean brood size, total young, and proportion (%) young in the population all increased over both 1981 and 1982. The percent pairs with young in 1983 exceeded that of 1982, but was lower than 1981. The total number of pairs observed in 1983 (132) was approximately twice the number of pairs observed in 1981 (67) or 1982 (65). However, as discussed previously, it is likely that up to 35 pairs of swans may have been unsuccessful pairs moving to ANWR to molt. Nevertheless, the total pairs nesting in the area (Table 1) is still greater than 1981 or 1982.

The total number of nests observed during the nesting survey plus the pairs present with no observed nests is an estimate of the total possible nesting population (Table 1). Nesting success can be estimated in 2 ways. First, using the number of actual nests observed and the number of broods observed (Table 2), the nesting success is 81%. If the number of nests plus pairs present is used, the nesting success is 60%. Assuming that some of the pair without observed nests may not have nested, the nesting success, is probably between 60% and 81%.

The all time high number of cygnets produced in 1983 is probably a function of mild weather during the nesting period. As in 1982, there was considerable air traffic along the coast. Therefore, the 1982 snowstorm (Bartels et al. 1983) may have had a greater effect on production than the aircraft disturbance. Refuge special use permit stipulations require all helicopters operating on the coastal plain to maintain 1500 feet altitude. This may be providing needed separations from nesting swans. Successive years data should confirm or reject this theory.

Fig. 2. Tundra swan survey area and route
Production survey 21 August, 1983

-  SWAN CONCENTRATION AREA
-  SWAN OBSERVATION
-  SURVEY ROUTE



Population

A total of 377 adults and 175 cygnet tundra swans were observed on the ANWR coastal plain in 1983. The adult population represents a 31% increase over 1982, with cygnets increasing 316%. However, the 1983 adult population is approximately the same as observed in 1981, while cygnets produced in 1983 represent a 70% increase over the cygnet population of 1981.

Literature Cited

- Anderson, M. 1973. Birds of Nuvagapak Point, northeastern Alaska. *Arctic* 26:186-197.
- Barry, T.W., and R. Spencer. 1976. Wildlife response to oil well drilling. *Can. Wildl. Serv. Program Notes*. 67 pp.
- Bartels, R.E., W.I. Zellhoefer, and P. Miller. 1983. Distribution, abundance, and productivity of whistling swans in the coastal wetlands of the Arctic National Wildlife Refuge, Alaska. pp.53-60. IN. G.W. Garner and P.E. Reynolds. eds. 1982 Update Report of Baseline Study. U.S. Fish and Wildlife Service, Anchorage, Alaska. 379 pp.
- Bellrose, F.C. 1976. Ducks, geese, and swans of North America. Stackpole, Harrisburg, Pa. 940 pp.
- Hanson, H.C., P. Queneau, and P. Scott. 1956. The geography, birds, and mammals of the Perry River Region. *Arct. Inst. of N. Am. Spec. Publ.* 3. 96 pp.
- Jacobson, M.J. 1979. Aerial surveys of whistling swans in the Arctic National Wildlife Refuge, 1977-79. *Arctic Nat'l. Wildl. Ref. Rep.*, U.S. Fish and Wildlife Serv., Fairbanks, Alaska. 5 pp (mimeo).
- King, J.G. 1973. The use of small airplanes to gather swan data in Alaska. *Wildfowl* (24):15-20.
- Salter, R.E., M.S. Gollop, S.R. Johnson, W.R. Koski, and C.F. Tull. 1980. Distribution and abundance of birds on the Arctic coastal plain of northern Yukon and adjacent Northwest Territories, 1971-1976. *Can. Field-Nat.* 94:219-238.
- Schmidt, W.T. 1970. A field survey of bird use at Beaufort Lagoon, June - Sept. 1970. Unpubl. report in files, U.S. Fish and Wildlife Serv., Arctic National Wildlife Refuge, Fairbanks, Alaska. 36pp. (mimeo).
- Spindler, M.S. 1981. Whistling swan populations and distribution on the coastal plain of the Arctic National Wildlife Refuge, 1981. *Arctic National Wildlife Refuge*, Fairbanks, Alaska. 9pp. (mimeo).

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