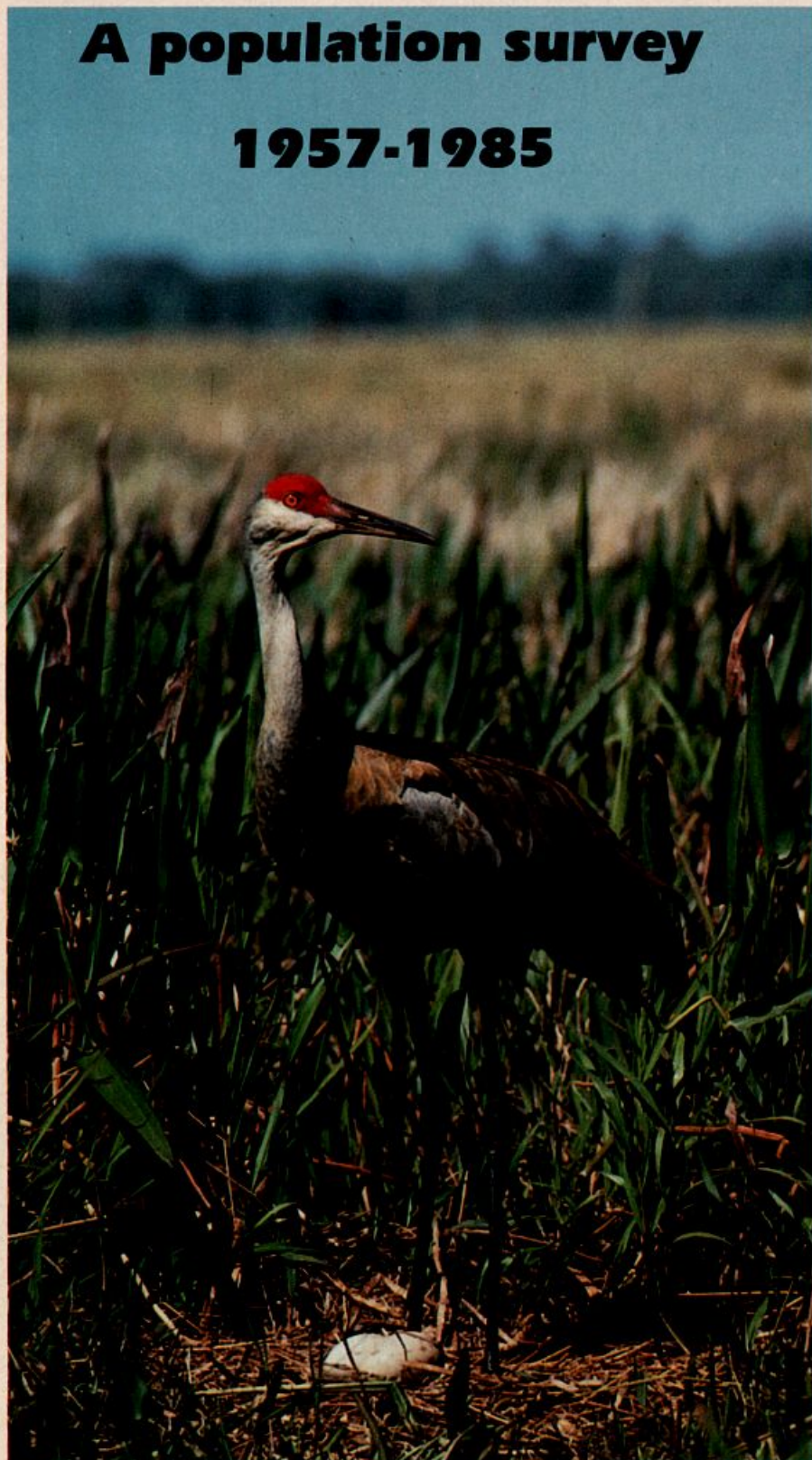


Sandhill Cranes in Alaska

A population survey

1957-1985



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SANDHILL CRANES (*Grus canadensis*) have been recorded during standard aerial waterfowl breeding population surveys in Alaska since 1957. These surveys have established a reliable long-term index of the summering crane population on a major portion of its breeding range. The data collected in this 29-year period show an increase, despite limited hunting, in the Alaska Sandhill Crane breeding population.

This long-term survey indicates a healthy Sandhill Crane population summering in Alaska

Six subspecies of the Sandhill Crane have been described in North America. The smallest, the Lesser Sandhill Crane (*G. c. canadensis*) is found in summer from northeastern Siberia, through Alaska and northern Canada to Hudson Bay. It winters in southern California in the Pacific flyway and in New Mexico, Texas, and northern Mexico in the Central flyway (Walkinshaw, 1973).

Aerial surveys provided mean expanded indexes of 2,600 cranes for spruce-muskeg habitat and 29,700 for tundra habitat, a total of 32,300. Preliminary visibility correction factors for these habitats gave mean populations of 27,400 cranes for spruce-muskeg and 109,700 for tundra, a total of 137,100.

Designed to monitor the major waterfowl breeding habitat, this survey does not include all areas containing cranes. Left: Adult male and female plumage is the same, with rusty highlights, particularly in the summer months. Photo/L. Walkinshaw/VIREO.

Methods

The Alaska unit of the continental waterfowl breeding ground survey program is subdivided into 11 strata (Bellrose 1976). Currently 10 strata (stratum 7 is not flown consistently) contain 92 transects with 214 segments (Fig. 1). Each 16 mile segment, was flown annually. The 10 strata sample 79,400 square miles of the major high-quality waterfowl production habitat in Alaska. Vast areas of low density waterfowl production habitat have not been regularly sampled.

The Alaska waterfowl aerial survey program was established in 1955. Surveys have been flown consistently each year from mid-May to mid-June, with occasional minor delays due to late ice breakup. One of the authors was pilot/observer in each of these years. The crew recorded observations from fixed wing aircraft that varied in the early days from a Grumman Widgeon and a Piper Pacer on floats, to the current specially-modified turbo Beaver on amphibious floats. Cranes were recorded as singles, pairs, and flocks of three or more. In 1964 the transect and segment system in Alaska was changed to conform to the new continental computerized system, but expanded population figures are comparable. Indices for Alaska Sandhill Cranes were calculated by converting observations in each stratum to birds per square mile, then expanding to total square miles in the stratum (Tables 1 and 2a). These indices were then multiplied by a visibility expansion factor to give a corrected population estimate (Table 2b).

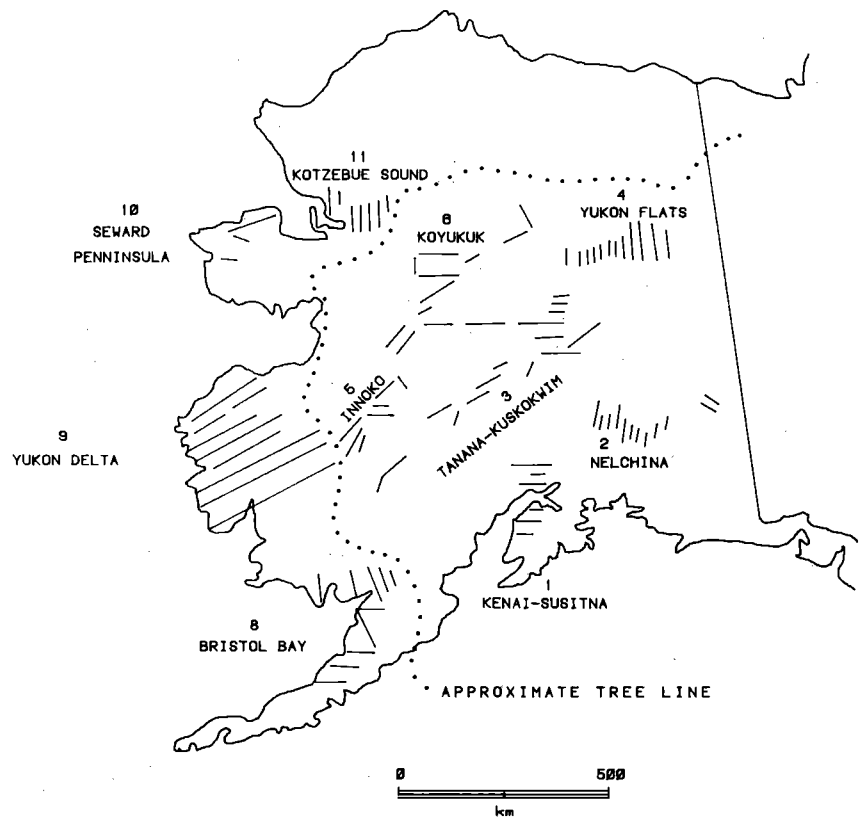


Figure 1. Transects and strata flown in the Alaska waterfowl breeding population survey.

Results

Alaska index subtotals for spruce-muskeg interior habitat (strata 1-6) and treeless coastal tundra habitat (strata 8-11) are presented by stratum in Table 1.

Visibility correction factors, to account for birds present but not observed from the air, have not been definitively

determined for Sandhill Cranes, but there are some indications of the magnitude of correction needed. The United States Fish and Wildlife Service conducted bird studies on the Yukon Flats (stratum 4) in 1961 and 1962. Crane densities of 1.53 and 0.71 per square mile were determined on the ground with air to ground expansion factors for special air surveys

Table 1. Alaska^a Sandhill Crane breeding population index (actual Sandhill Crane observations expanded for area only), 1957-1985 (estimates in thousands of birds).

Stratum	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1 Kenai-Susitna	0	0	0	0	0	.1	0	0	0	.1	0	.2	.2	2
2 Nelchina	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Tanana-Kuskokwin	0	.6	.3	.5	0	.5	0	.2	.1	.1	.9	1.1	.8	1.1
4 Yukon Flats	.7	1.2	.9	.1	.5	.1	0	0	1.1	.7	.4	.9	.3	1.5
5 Innoko	.1	2.0	.3	.4	.3	.6	0	.3	.1	.6	.6	.8	.6	6
6 Koyukuk	—	.2	.2	0	0	.4	.2	.1	0	.1	.3	.2	.3	9
Subtotal-Interior	.8	4.0	1.7	1.0	.8	1.7	.2	.6	1.3	1.6	2.2	3.2	2.2	4.3
8 Bristol Bay	5.9	1.7	.8	3.1	2.5	0	.7	1.3	1.5	.3	3.0	1.9	2.9	4.7
9 Yukon Delta	11.3	13.6	15.0	7.2	19.0	17.3	17.0	20.6	14.6	13.2	20.3	19.3	30.8	29.4
10 Seward Peninsula	1.9	.8	3.1	3.5	2.1	1.4	1.2	.3	1.4	1.0	.2	2.4	2.1	1.0
11 Kotzebue Sound	2.5	.3	.7	.9	1.2	.2	1.0	.8	1.2	2.3	.8	2.0	.9	9
Subtotal-Tundra	21.6	16.4	19.6	14.7	24.8	18.9	19.9	23.0	18.7	16.8	24.3	25.6	36.7	36.0
Total-Alaska	22.4	20.4	21.3	15.7	25.6	20.6	20.1	23.6	20.0	18.4	26.5	28.8	38.9	40.3

^a = Current survey coverage

of 9.8 and 10.0 (C.J. Lensink, *pers. comm.*). An estimated 8000 cranes were present on the Yukon Flats within stratum 4 boundaries. When divided by the average aerial crane index of 687 for stratum 4, this yields an expansion factor of 11.6 for spruce-muskeg habitat. Ground plot work on the Clarence Rhode National Wildlife Range, in stratum 9 during June 1967 and 1968, showed 9.54 and 9.26 cranes per square mile (C.J. Lensink, *pers. comm.*). Coupling these ground densities with comparable air survey data yields expansion factors of 3.5 and 3.9 for tundra habitat. Averaging the above gave a correction factor of 10.5 for spruce-muskeg and 3.7 for tundra habitat. Crane indices (Table 1) adjusted by these visibility expansion factors are presented in Table 2, and suggest a mean crane breeding population of 137,100 (range 64,900-277,300) for the 79,400 square miles that are consistently surveyed in Alaska.

Total crane indices and expanded population estimates from Table 2 are presented graphically in Figure 2.

Annual breeding ground surveys offer a supplemental method for monitoring Sandhill Crane populations. The value of the breeding ground survey could be increased with additional effort. Reliable standard visibility correction factors are needed for both tundra and spruce-muskeg habitats to convert Sandhill Crane indices into reliable summering population estimates for Alaska. These need to be determined concurrently with standard waterfowl breeding population surveys in Alaska for best results.

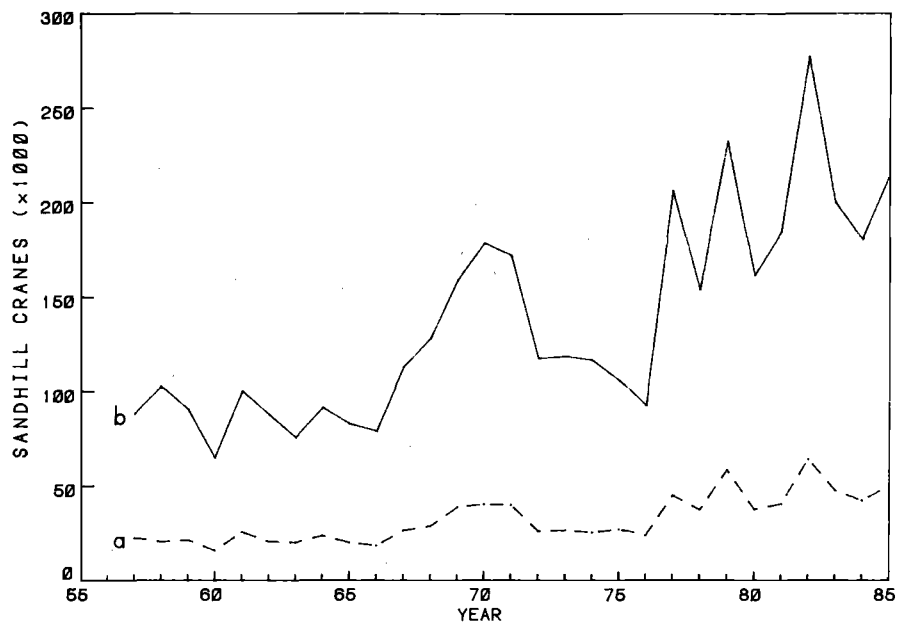


Figure 2. Alaska breeding ground Sandhill Crane survey results, 1957-1985.

Cranes are recorded as singles, pairs or flocks of 3 or more, as are waterfowl. Field studies are needed to determine how these observations relate to the breeding population.

Alaska cranes migrate to both Pacific and Central flyway wintering areas. If units of breeding and wintering areas could be precisely associated, crane subpopulations could be better monitored. This is particularly important in the Central flyway where annual hunting seasons are allowed.

All Sandhill Crane breeding habitat in Alaska is not surveyed with the annual

waterfowl breeding population survey. The survey was designed to monitor major waterfowl breeding habitat and omits some areas containing cranes. For example, cranes were recorded annually 1957-1961 in the Noatak Valley, revealing an index of up to 500 cranes for this relatively small area (500 square miles). Cranes also inhabit peripheral, low density waterfowl areas outside the boundaries of the surveyed strata.

Original strata boundaries were determined from small scale maps early in the Alaska survey program; however, now that more accurate large scale maps are

Table 1 continued. Alaska^a Sandhill Crane breeding population index (actual Sandhill Crane observations expanded for area only), 1957-1985 (estimates in thousands of birds).

Stratum	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	29 yr x
1 Kenai-Susitna	.1	0	0	.2	.2	0	0	0	0	0	0	0	.1	0	0	0
2 Nelchina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Tanana-Kuskokwin	1.1	.8	.6	.9	0	.4	1.1	.9	.7	.3	.4	.8	1.1	.4	.5	.5
4 Yukon Flats	.8	.9	.5	.7	.4	0	2.6	.7	.5	.9	3.1	1.2	.8	2.0	1.2	.9
5 Innoko	.8	1.0	1.4	1.1	0	.3	1.2	.3	.5	1.2	.8	1.7	.7	.3	1.5	.7
6 Koyukuk	.7	.4	.5	.4	.2	0	.9	.4	.6	.8	.7	2.2	.8	.8	1.0	.5
Subtotal-Interior	3.5	3.1	3.0	3.3	.8	.7	5.8	2.3	2.3	3.2	5.0	5.9	3.5	3.5	4.2	2.6
8 Bristol Bay	1.9	2.8	1.4	2.0	2.0	4.6	2.8	2.7	5.2	2.5	1.6	4.2	3.4	2.3	7.7	2.7
9 Yukon Delta	31.5	18.2	19.2	16.1	20.8	17.0	32.5	29.0	38.3	26.9	24.0	32.7	26.0	28.6	29.4	22.0
10 Seward Peninsula	1.3	.8	1.4	1.6	1.4	1.0	3.0	1.8	7.0	1.4	7.6	17.3	8.4	5.1	5.6	3.0
11 Kotzebue Sound	1.8	1.2	1.6	2.5	2.2	.4	1.0	1.6	5.8	3.8	2.5	4.0	6.4	2.8	3.3	2.0
Subtotal Tundra	36.5	23.0	23.6	22.2	26.4	23.0	39.3	35.1	56.3	34.6	35.7	58.2	44.2	38.8	46.0	29.7
Total-Alaska	40.0	26.1	26.6	25.5	27.2	23.7	45.1	37.4	58.6	37.8	40.7	64.1	47.7	42.3	50.2	32.3

a = Current survey coverage

x = average

Table 2. Alaska breeding ground survey Sandhill Crane population estimates, 1957-1985 (estimates in thousands)

	Year	Alaska ^a	Alaska ^b
	1957	22.4	88.3
	1958	20.4	102.7
	1959	21.3	90.4
	1960	15.7	64.9
	1961	25.6	100.2
	1962	20.6	87.8
	1963	20.1	75.7
	1964	23.6	91.4
	1965	20.0	82.9
	1966	18.4	79.0
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10 Year Average		20.8	86.3
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	1967	26.5	113.0
	1968	28.8	128.3
	1969	38.9	158.9
	1970	40.3	178.4
	1971	40.0	171.9
	1972	26.1	117.7
	1973	26.6	118.8
	1974	25.5	116.8
	1975	27.2	106.1
	1976	23.7	92.5
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10 Year Average		30.4	130.2
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	1977	45.1	206.3
	1978	37.4	154.1
	1979	58.6	232.5
	1980	37.8	161.6
	1981	40.7	184.6
	1982	64.1	277.3
	1983	47.7	200.3
	1984	42.3	180.4
	1985	50.2	214.3
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9 Year Average		47.1	201.3
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29 Year Average		32.3	137.1

^aStrata 1-6 and 8-11 (observations expanded for area only by stratum).

^bStrata 1-6 and 8-11 (observations expanded for area by stratum and by preliminary visibility correction factors).

available, boundaries should be redetermined.

Air survey crews and types of aircraft employed should be standardized to enhance the comparability of data.

Conclusion

Despite 25 years of limited hunting, it appears that the Alaska summering Sandhill Crane population has increased since

1957. Survey data from other continental and Siberian Sandhill Crane breeding areas would provide additional insight. The Alaska-Yukon survey crews continue to monitor Sandhill Cranes with the standard annual waterfowl breeding population survey and provides a 10-year trend table in the annual report (Conant and Hodges 1985).

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REFERENCES

- BELLROSE, F.C. 1976. Ducks, Geese and Swans of North America. Stackpole Books. 543 pp.
- CONANT, BRUCE and JOHN I HODGES. 1985. Alaska-Yukon Waterfowl Breeding Population Survey Pacific Flyway Report. No. 94. November 1985.
- LENSINK, C.J. Field notes, unpublished U.S. Fish and Wildlife Service, Anchorage, Alaska. 1961-62 and 1967-68.
- WALKINSHAW, L.H. 1973. Cranes of the World. Winchester Press, New York. 370 pp.

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