

RESULTS OF A CANADA GOOSE TRANSPLANT IN SOUTH CENTRAL ALASKA

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ABSTRACT

The dusky Canada goose (*Branta canadensis occidentalis*), which nests primarily on the Copper River Delta in Alaska and winters in the Willamette Valley of Oregon and southwestern Washington, is numerically one of the smallest populations of Canada geese. Numbers have ranged from 28,000 in 1960 to 7,500-8,000 in 1953 and 1985. Due to changes in habitat after the nesting grounds was uplifted by the 1964 Good Friday earthquake, heavy nest predation, and poor production, the population declined precipitously between 1979-1985 (Cornely et al. 1985). Consequently, the Alaska Department of Fish and Game identified a number of possible management options to increase the population (Campbell and Griese, unpublished report, Alaska Dept. Fish and Game, Anchorage, 1987). One of these was establishment or augmentation of breeding populations in other areas by transplant.

Middleton Island was selected as the initial transplant site because of abundant favorable habitat, likelihood of low predation, and presence of a small, naturally pioneering population of dusky Canada geese. This island supports several square miles of fresh to brackish water marsh, similar to that reported preferred by nesting geese on the Copper River Delta prior to 1964 (Trainer 1959), and upland grasslands. Additionally, it lacks mammalian predators and supports relatively low numbers of avian predators. While falcons (*Falco* sp.), snowy owls (*Nyctea scandiaca*), and parasitic jaegers (*Stercorarius parasiticus*) are transient to the island (Rausch 1958, M. Isleib, unpub. rep., Univ. Alaska Museum, Fairbanks, 1986), only glaucous-winged gulls (*Larus glaucescens*) and a pair of bald eagles (*Haliaeetus leucocephalus*) nest on the island. The abundance of ground nesting seabirds such as black-legged kittiwakes (*Rissa tridactyla*), common and thick-billed murres (*Uria aalge* and *U. lomvia*), pelagic cormorants (*Phalacrocorax pelagicus*), and tufted puffins (*Lunda cirrhata*) suggests that predation on ground nesting birds is not severe. This may be due to the abundance of rabbits (*Oryctolagus cuniculus*) on the island.

The presence of a pioneering population of dusky Canada geese also contributed to Middleton Islands selection. While records of migrating geese on the island date back to the early 1800's (Rausch 1959), summer residents were not documented until the mid-1970's (S. Hatch, U.S. Fish and Wildl. Ser., per. comm.). Canada geese were nesting on the Island in 1981 (Gould and Zabloudil, unpub. rep. U.S. Fish and Wildl. Ser., Anchorage, 1981) and by 1987 the population appeared to be well established, exceeding 100 birds (Campbell, unpub. rep., Alaska Dep. Fish and Game, Anchorage, 1987). Augmentation of this population by transplanting geese from the Copper River Delta would further ensure its establishment and growth. This report is an evaluation of that transplant.

STUDY AREA

Middleton Island is an approximately 6.5 km² island in the Gulf of Alaska about 120 km south of the Copper River Delta (Fig. 1). The predominate topographic features of the island have been described by Miller (1953) and Rausch (1958). It is relatively flat with the only relief being a series of "terraces" ascending from east to west along the islands long axis to a maximum elevation of 45 m. The Climate is maritime with an average annual temperature of 5.5°C, ranging from a average maximum of 8°C to average minimum of 4°C. Average annual precipitation is 147 cm with an average 7 days with >2.5 cm of snowfall. Winds are a major climactic factor, prevailing from the E.S.E. or S.W. at an average velocity of 12 knots. During winter storms winds in excess of 68 knots are common (Searby 1978).

Plant communities on Middleton have been described by Thomas (1957), Rausch (1959), and more recently by ADFG biologists (Campbell, unpublished Alaska Dept. Fish and Game preliminary project report, Anchorage, 1987). Upland meadows are dominated by bunch grasses (*Calamagrostis* sp.) and sedges (*Carex* sp.). Stands of willow (*Salix barclayi*) and salmon berry (*Rubus spectabilis*) or nettles (*Urtica lyallii*) and cow parsnip (*Heracleum maximum*) are common along the edges and at the base of terraces. A fresh to brackish water marsh occurs between the lowest terrace and beach fringe on all but the northwest side of the island. Common plants in this marsh include sedges (*Carex lyngbyei* and *C. pluriflora*), horse tail (*Equisetum* sp.), rushes (*Juncus* sp.), water smartweed (*Polygonum amphibium*), marsh fivefinger (*Potentilla palustris*), and sphagnum mosses (*Sphagnum* sp.).

METHODS

Geese for the transplants were captured during annual banding on the Copper River Delta in 1987 and 1988. Flocks of molting adults and brooding young were driven into capture nets using a Hughes 500 helicopter and techniques described by Timm and Bromley (1976). Emphasis was placed on capturing >7 week old goslings and adult guide birds. Flocks containing goslings less than 6 weeks old were avoided when possible. Birds were placed in cardboard cartons (2 adults or 4 young per box) and transported by helicopter to the U. S. Coast Guard facility at the Cordova airport. There they were loaded onto a Coast Guard H3 helicopter and transport to Middleton Island. On the island, geese were held in a large pen constructed of nylon netting while they were banded with U. S. Fish and Wildlife Service metal leg bands and neck-collared. All geese were released together after banding.

The transplant was evaluated by analysis of survival and return rates for transplanted geese based on collar observations from Middleton Island, Copper River Delta, and wintering grounds; recapture information obtained during banding on the Copper River Delta, 1988-1991; and analysis of band returns. Survival rates between release on Middleton Island and arrival on the wintering grounds and annually there after were estimated for each transplant cohort. To identify where most of the mortality occurred, annual survival was subdivided into 2 periods; winter or the period between arrival on the wintering grounds and January 15, and "summer" or the period between January 15 and arrival on the wintering grounds the following fall. These subdivisions represent possible major sources of mortality including hunting on the wintering grounds and

migration and predation on the summering grounds. In addition, Middleton Island was surveyed annually between 1988-1992 to estimate production and size of the summer resident goose population.

RESULTS

A total of 188 geese were transplanted to Middleton Island in 1987 and 1988 (Table 1). Ninety goslings, of which all but 7 were >6 weeks old, and 11 adults (9 females, 1 male, and 1 unknown sex) were transplanted in 1987. All geese were leg banded plus 87 goslings and all of the adults were collared. In 1988 few >6 weeks old goslings were available for transplant due to a late hatch and poor nesting success. Of the 84 goslings transplanted, 8 were <2 weeks old and 20 were <6 weeks old. Only 48 geese (46 young and 2 of the 3 transplanted adults) out of the total of 87 transplanted were marked adequately to facilitate analysis of the transplant. Due to small size, 8 goslings were not leg banded or collared and 20 goslings were not collared. In addition, 10 goslings were marked with collars that carried codes duplicated on adult geese on the Copper River Delta, rendering them unusable for analysis.

Rates of survival for relocated goslings varied between transplant cohorts and sexes (Table 2). Fourteen percent and 34% of the female and male goslings, respectively, transplanted in 1987 were lost between release and arrival on the wintering grounds compared to 45% and 53% for female and male goslings, respectively, released in 1988. While not significant ($t = 1.02$, $df = 3$) for the 1988 cohort, the imbalance in survival between the sexes continued throughout the evaluation period with females generally having a higher survival rate than males. Females in the 1987 cohort survived 20%-30% better than their male counterparts. This precluded averaging survival rates for the 1987 cohort in order to compare inter-cohort survival rates but, birds transplanted in 1987 typically had survival rates higher than those relocated in 1988 throughout the evaluation period.

The period of highest loss also differed between sexes, although, similar to annual survival rates, the difference was not pronounced for the 1988 cohort (Table 2). Male goslings transplanted in 1987 had a significantly ($t = 2.42$, $df = 7$) higher mortality during the "summer" while females had elevated but insignificant ($t = 0.79$, $df = 7$) mortality rates during the winter. While limited by small sample size ($n = 8$), it appears that the period of highest annual mortality for males relocated in 1988 was similar to that of 1987 males. No clear pattern could be determined for female goslings transplanted in 1988.

Because of limited sample size little could be determined about the survival of adult birds released to Middleton Island as guide birds. The lone male released in 1987 disappeared 1 year after relocation while 4 of the 10 females and unknown sex birds were still alive after the 1991-92 hunting season (Table 2). None of the 3 females transplanted in 1988 have been seen since their release.

Return rates to Middleton Island have been very low. Nine collared geese have been observed on the island since 1988; 4 in 1988 (M12, M20, M79, M ?), 1 in 1989 (M12), 1 in 1990 (M12), 1 in 1991 (M ?), and 2 in 1992 (CAA, M12). Birds seen in 1990-1992 were paired and in 1991

and 1992 with broods. One of the geese (CAA), a male, observed in 1992 was originally collared as an after hatching year bird on the Copper River Delta in 1991. In contrast, 43 observations of transplanted geese have been made on the Copper River Delta between 1988-1991. These observations were all casual and made during other field projects; there has been no concentrated effort to read collars on the delta.

The Canada goose population on Middleton Island grew substantially during the evaluation period. Population estimates in 1987 and 1988, prior to transplants, exceeded 100 geese both years (Table 3). Limited observations of broods suggested that production was good both years. High production and rapid population growth have been observed between 1989 and 1992. During this period numbers increased from 150 to <700 geese.

DISCUSSION

The natural dispersal of Canada geese into uninhabited is generally very slow. Transplants of juveniles are a common method of artificially establishing breeding populations in these areas. The success of this technique has varied, with apparent failures or marginal success reported in the southeastern and southwestern United States (Hankla 1968, Sows and Smith 1990), mixed success in the north central states (Nelson 1963), and good success in other locations (Pirnie 1938, Williams and Kalmbach 1943, Bishop and Howing 1982, Lee et. al. 1984, Byrd 1991).

Based on this evaluation, it appears that the transplant of geese to Middleton Island did little to enhance establishment of a new breeding population of dusky Canada geese there.

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Table 1. Age and sex of dusky Canada geese transplanted from the Copper River Delta to Middleton Island, Alaska, 1987-1988.

Year	Adult			Goslings		
	female	male	unknown	female	male	unknown
1987	9	1	1	43	47	0
1988	3	0	0	48	35	1
Total	12	1	1	91	82	1

Table 2. Survival rates for dusky Canada geese transplanted to Middleton Island, Alaska in 1987 & 1988.

Cohort	Transplant to winter 1	Survival rates								
		Late winter 1	Early winter 2	Late winter 2	Early winter 3	Late winter 3	Early winter 4	Late winter 4	Early winter 5	Late winter 5
1987										
<i>Goslings</i>										
Male	66.0	66.0	55.3	48.9	44.7	40.4	21.3	17.0	14.9	8.5
Female	86.0	86.0	76.7	62.8	58.1	46.5	41.9	37.2	32.6	25.6
<i>Adults</i>										
Male	100.0	100.0	0	0	0	0	0	0	0	0
Female	100.0	100.0	77.7	66.6	55.5	55.5	44.4	33.3	33.3	33.3
Unknown	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1988										
<i>Goslings</i>										
Male	47.0	47.0	47.0	47.0	23.5	23.5	23.5	17.6		
Female	55.1	51.7	44.8	34.4	27.5	20.6	20.6	17.2		
Average	52.1	50.0	45.6	39.1	26.0	21.7	21.7	17.3		
<i>Adult</i>										
Female	0	0	0	0	0	0	0	0		

Table 3. Summer Canada goose population and production estimates for Middleton Island, 1987-1992.

Year	Population	% Young
1987	105 ¹	13.6 ²
1988	100 ²	40.0 ²
1989	150	56.0
1990	335	72.2
1991	355 ²	29.5 ²
1992	770	38.6

¹ Prior to transplant in July.

² Incomplete survey.