

STATUS OF MIDDLETON ISLAND CANADA GEESE - 1997
Alaska Department of Fish and Game

Dave Crowley, Dan Rosenberg, Mike Petrula, Tom Rothe
Alaska Department of Fish and Game
Division of Wildlife Conservation
333 Raspberry Road
Anchorage, Alaska 99518

INTRODUCTION

Migrating Canada geese have been stopping at Middleton Island for at least a 2 centuries, but were apparently not resident during summer until the late 1970's (Campbell 1987). The first broods were observed around 1981 (Campbell 1987). Judging by their large size, dark color, and the proximity of Middleton Island to the Copper River Delta, the geese were identified as dusky Canada geese (*Branta canadensis occidentalis*). In 1987 and 1988, the Alaska Department of Fish and Game (ADFG) translocated a total of 193 duskies (158 marked with collars) from the Copper River Delta to supplement the Middleton breeding population. Periodic monitoring indicated that the population surged from about 100 to 2000 geese in 10 years. However, observers identified (by collar) only 5 transplanted geese from 1988 to 1992 on Middleton (Rosenberg et. al. 1996), indicating that the transplant probably contributed little to population growth. Resightings (Marty Drut, pers. comm.) and recaptures of geese transplanted to Middleton indicated that most adults and young probably returned to the Copper River Delta. They continue to winter in traditional dusky habitat in Oregon and Washington.

Although scheduled for a third year (1989), the goose transplant project was discontinued for several reasons: 1) the low return rate of transplanted geese, 2) the ongoing, natural expansion of the island population, and 3) the potential for severe predation on goslings by the rapidly growing glaucous-wing gull colony (Campbell 1991). The Middleton goose population continued to grow through 1996 and expand around the entire circumference of the island despite the large gull population and up to 3 pairs of nesting bald eagles. We continued our investigation of Middleton geese in 1997 with another survey of the island.

STUDY AREA AND METHODS

Middleton Island is located in the Gulf of Alaska, about 140 km southwest of Cordova. The island is approximately 8 km long and 1.6 km wide. Miller (1953) and Rausch (1958) described topography and vegetation of the island. In general, the Middleton Island rises in a series of step-like terraces to an elevation of about 50 m. The terraces provide communities of vegetation ranging from brackish and freshwater marshes to upland meadow and high shrub. The upper intertidal area is typically bordered by a large berm of driftwood and jetsam. The intertidal and subtidal areas extend up to several km offshore, with characteristic reefs and emergent rocks awash in the surf.

Four biologists and 1 volunteer surveyed Middleton Island from June 23 to 25, 1997 to determine numbers and productivity of Canada geese present during summer. Three observers systematically searched along the top of the bluff while 2 observers searched the toe of the bluff, marshes, and intertidal areas. We surveyed offshore and nearshore areas using spotting scopes. Each observer used a hand-held radio for communication to avoid double-counting geese and coordinate search patterns.

Vegetation at the top and toe of bluff was often near or at 100% cover, making brood observations difficult. We reported broods as "suspected" when an adult goose (or pair) flushed at close range (within about 10 m) of an observer but no brood could be found in heavy cover. When possible, goslings were classified by age using plumage characteristics. We noted known-sized broods (when we were confident of counting all goslings) to determine average brood size.

We conducted 2 capture drives to assess the feasibility of this technique as means to 1) capture and band a relatively large number of goslings and molting adults and 2) intensively search a subsample of habitat types to derive an estimate of goose density and population size. We distributed 8 observers along the top and toe of bluff, and out toward the intertidal area. Geese were driven into a net trap made of netting 1 m in height by 100 m in length.

RESULTS AND DISCUSSION

Population

The number of geese we observed in 1997 was similar to that of 1996 (Table 1). Better communication in 1997, and standardization among observers for counting flying geese probably resulted in fewer being double-counted than in 1996. Our survey coverage and effort was similar to that of last year, except that we covered all high density areas of the island including about 1 km not surveyed in 1996 (Rosenberg et al. 1996). As in previous years, we did not cover the center, low-density region of the island.

After increasing in numbers for 9 years, the population apparently leveled out in 1997 (Figure 1). The rapid rate of increase in the early 1990's was similar to that of lesser Canada geese (*B. c. parvipes*) in Cook Inlet, Alaska (Figure 2) and for lessers in Anchorage, Alaska (Figure 3), suggesting a more wide-spread phenomena. Band returns and collar observations indicate that Cook Inlet and Anchorage geese winter in the same areas as duskies (Timm et al. 1979, Crowley et al. 1997). Consequently, harvest restrictions initiated in the mid-1980's to protect dusky geese may have contributed to the growth of these populations. The wintering grounds for Middleton Island geese has not been conclusively determined, but they have also benefited from reduced harvest pressure in the Pacific Flyway.

An increase in available habitat resulting from the 1964 earthquake may have also contributed to goose population growth. Middleton Island was uplifted in the 1964 earthquake, adding an extensive area of previously submerged land (much of it now marshes) and intertidal zones that may have attracted breeding geese. Arctic foxes introduced to Middleton in 1895 and persisting until around 1940 (Rausch 1958), likely precluded earlier colonization by geese (and possibly eliminated an existing population). There were very few geese breeding in Cook Inlet before the

earthquake (Timm et al. 1979, King and Lensink 1971). Unlike Middleton Island, the earthquake caused land subsidence in tidal marshes of Cook Inlet (Shepherd 1965). Quimby (1972) suggested that Canada geese using Chickaloon Flats in northeastern Cook Inlet benefited from the earthquake because it promoted early successional growth, which was heavily used by geese. A small number of Cook Inlet geese pioneered Anchorage in the early 70's, taking advantage of hundreds of hectares of lawns and man-made lakes in a predator-reduced environment.

Productivity

In 1997, we made a greater effort to verify presence or absence of broods in heavy cover. Two observers hurried to flush sites and quickly began a search pattern in the vicinity until goslings were either seen or heard peeping. Consequently, we decreased the number of suspected broods and increased the number of unknown-sized broods observed compared to 1996 (Table 1). It became apparent that adult geese sometimes stashed broods in the heaviest available cover and flushed some distance away. We logged 27 known-sized broods for an average brood size of 3.9 ± 1.62 SD. We used average brood size to estimate the number of goslings in unknown-sized broods and suspected broods. These were added to goslings in known-sized broods for estimates of total young and total geese (Table 1). Age composition of goslings is indicated in Figure 4.

We located 3 nests in 1997: 1 abandoned with 5 eggs present, 1 hatched with 1 addled egg and 5 membranes, and 1 nest with 6 eggs pipping. Considering brood age classes, peak nest initiation was similar to 1996 (Rosenberg et al. 1996). However, nesting apparently occurred over a longer period of time. In 1996, we did not observe goslings over the age of 20 days whereas in 1997 we saw 21 broods in older age classes (Figure 4).

We observed several occasions where, having been driven out of heavy vegetation into open beach habitat, goslings were attacked by glaucous-wing gulls. Most attacks failed because goslings were either too large or able to escape back into heavy cover, but it seems likely that broods under a couple weeks of age are vulnerable to predation by gulls.

Drive-trapping

Drive-trapping broods was an ineffective way to catch goslings and to subsample a section of habitat for determining density. We conducted 2 capture drives in an area of medium to high density of geese. Drives were approximately 300 m and 450 m in length, running parallel to the bluff. We captured 3 goslings of 3 different age classes in the first drive and 1 gosling in the second. Goslings were more likely to move a short distance and hide in heavy cover than to move the remaining length of the drive and into the trap. We therefore kept a tally of the number of geese flushed and of goslings that we passed by during the drive. The number of adults and goslings observed during the drives were similar to the number we counted during our survey of the same area the day before (10 goslings each method, and 7 versus 12 adults). In 1996 we captured 36 goslings by simply running them down in heavy vegetation (Rosenberg et al. 1996).

The relationship between Canada geese of Middleton Island, Prince William Sound and Copper River Delta remains unclear. Recent, preliminary analyses of Pacific Flyway Canada geese indicate that Middleton geese are genetically more similar to the large, dark,

geese of Prince William Sound islands, then to duskies of the Copper River Delta (John Pearce, pers. comm.). However, collar observations indicates that there is at least limited exchange between dusky geese of the delta and Middleton Island Canada geese. Of 11 red-collared geese observed from 1988 - 1997 on Middleton, 6 were identified as transplanted birds (4 in 1988 alone); the other 5 had been banded on the delta. We saw 2 red-collared geese, 1 each in 1996 and 1997, both of which had been banded on the delta. Both geese were observed leading broods on Middleton Island.

1998 MONITORING

ADFG will continue to monitor the Middleton Island goose population in 1998. We will conduct the survey in July to coincide with the summer molt of adult geese. Approximately 10 geese will be captured and marked with a red neck collar and programmable radio transmitter for tracking on the wintering grounds. We will also capture other geese opportunistically and mark with neck collars only.

ACKNOWLEDGMENTS

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Table 1. Numbers of Canada geese observed on Middleton Island, Alaska during 1996 and 1997, and estimation of productivity from brood observations multiplied by a correction factor (average and SD of known-sized broods observed each year).

Year	Dates	Adults	Known-sized broods (young)	Unknown-sized broods (young)	Suspected broods ^a	Estimated young	Total	
							geese observed ^b	geese estimated ^c
1996	Jun 20-22	1456	28 (111)	118 (420)	38	752±246 ^d	1987	2208±246
1997	Jun 23-25	1168	27 (106)	156 (490)	18	789±282 ^e	1764	1957±282

^a Single or paired adult geese that flushed close, landed nearby and behaved as though a brood were present, although no goslings were observed in heavy vegetation.

^b Adults + all observed young.

^c Adults + Estimated young.

^d $111 + (118 + 38) * 4.11 \pm 1.58$

^e $106 + (156 + 18) * 3.93 \pm 1.62$

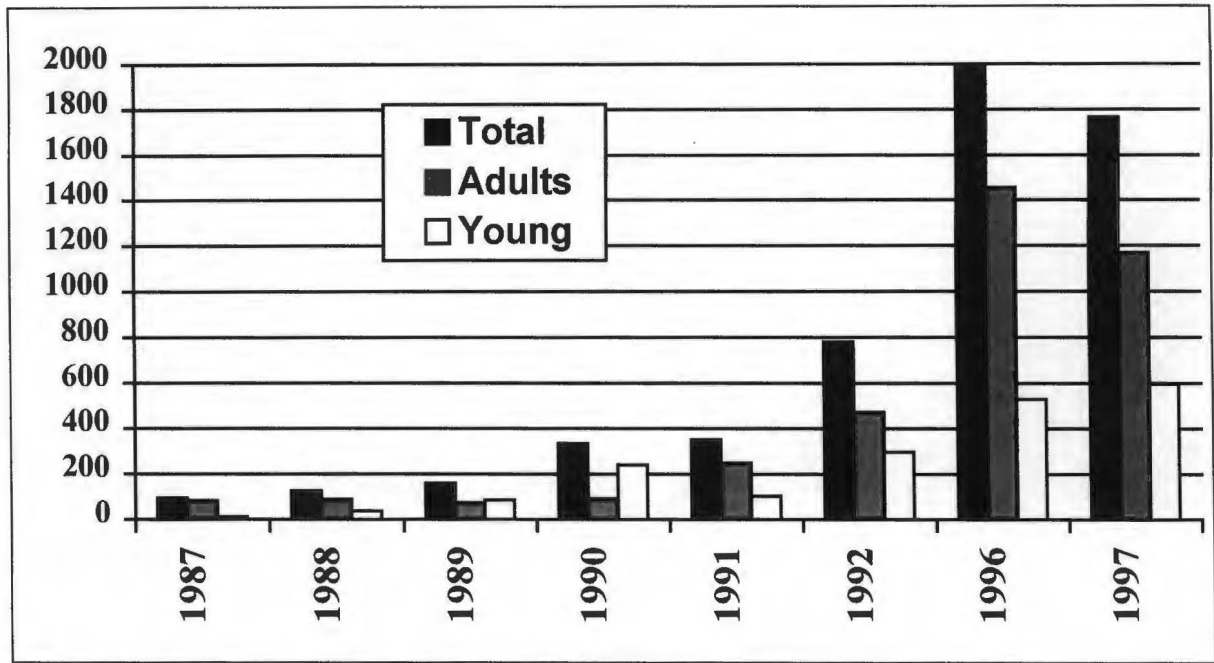


Figure 1. Numbers of Canada geese observed on surveys of Middleton Island, Alaska, 1987 - 1997. Survey coverage 1991 was incomplete.

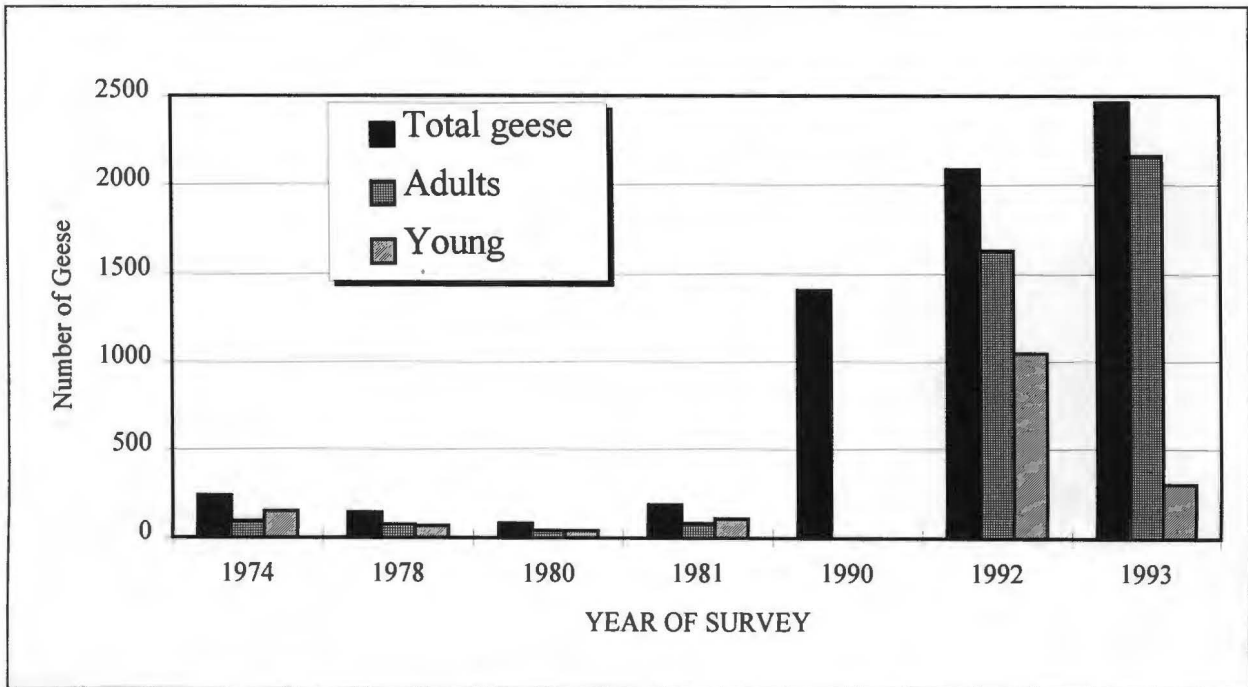


Figure 2. Numbers of Canada geese observed during summer surveys of Upper Cook Inlet, Alaska excluding the Anchorage urban area.

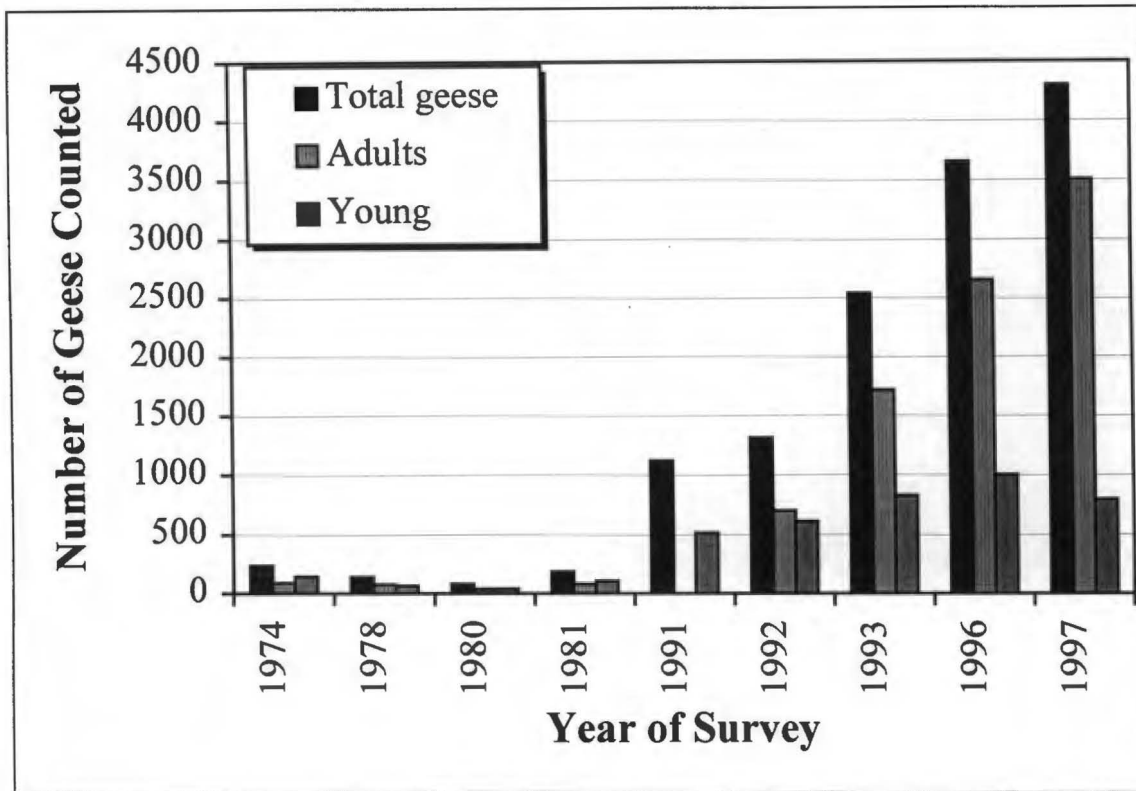


Figure 3. Number of geese observed in Anchorage, Alaska during summer surveys.

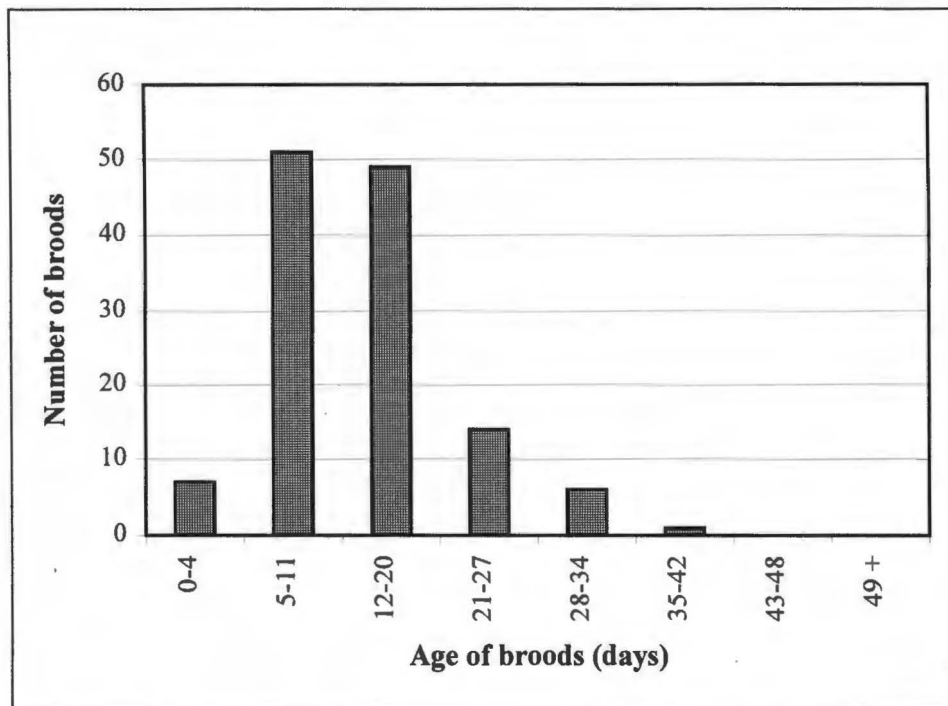


Figure 4. Age distribution of 128 Canada goose broods observed on Middleton Island, Alaska during June 23-25, 1997. Goslings were classified by age using plumage characteristics.

ADDENDUM TO 1997 STATUS REPORT

Dave Crowley
Alaska Department of Fish and Game

SUMMARY OF RECOVERIES, COLLAR OBSERVATIONS, AND RECAPTURES OF DUSKY CANADA GEESE TRANSPLANTED TO MIDDLETON ISLAND

ADF&G transplanted 192 dusky Canada geese from the Copper River Delta to Middleton Island in 1987 and 1988, combined (Table 1). Subsequent recoveries, collar observations, and recaptures of transplanted geese indicated that most geese, including those released as goslings, apparently returned to the Copper River Delta. Data is not sufficient to determine when the geese returned to the Delta, but they seem to suggest a return during the following spring migration rather than after gaining flight capability late in the same summer as transplanted.

Of 15 band recoveries, 5 occurred in British Columbia, 3 in Oregon, 3 in Washington, 2 on the Copper River Delta, and 2 on Middleton Island (Table 2, Figure 1). The bands recovered on Middleton had been placed on goslings in 1988 and recovered beneath a bald eagle's nest in 1989. The goslings had presumably been killed in 1988. There were no direct recoveries of transplanted geese from the fall hunting season on the Delta. In contrast, there were 6 direct recoveries of transplanted geese in BC and OR. The lack of direct recoveries on the Copper River Delta may reflect little hunting pressure, low reporting rates, or inadequate sample size rather than a failure of duskies to return to the Delta after molting on Middleton.

Collar observations during surveys by the USFWS indicated that most transplanted geese wintered at Sauvie Island, OR (Table 3), although no comparable surveys were conducted in BC. Campbell (1992) reported 43 collar observations during the summers 1988 - 1991 of transplanted geese that had returned to the Copper River Delta. These observations were made opportunistically while conducting other field work; there has been no concerted effort to read collars on the Delta. In contrast, we conducted goose surveys on Middleton Island from 1987 through 1992, and 1996 - 1997. Only 11 collars were observed on Middleton, 6 of which could be positively identified (Table 4). Of the 6 individuals, 3 were transplanted geese and 3 had immigrated to Middleton from the Delta. Each of the 3 immigrants were breeding on Middleton (Table 4).

Of the 184 transplanted geese that were banded, 19 individuals were subsequently recaptured on the Copper River Delta during banding operations (Table 5). Only geese from the 1987 transplant were recaptured. Geese transplanted as goslings accounted for 17 of the individuals recaptured on the Delta. Ten of the 19 individuals recaptured were first encountered during the summer following the transplant.

Data from band recoveries, collar observations, and recaptures of transplanted geese, although sparse, indicate that the transplant had little or no enhancement effect on the resident population of dark Canada geese on Middleton Island (Campbell 1992). It appears that natural immigration from the Copper River Delta does occur, but at a very low and decreasing rate considering the

rapid growth of the population during the last decade (from about 100 to 2000 geese). The apparent low rate of interchange between geese from the Copper River Delta and Middleton Island, and recent genetic evidence (John Pearce, pers. comm.) indicates that the initial assumption – that Middleton Island was colonized by dusky geese from the Delta – was incorrect. More likely, it was the Vancouver-like Prince William Sound geese that began breeding on Middleton Island. A neck-collaring and radio telemetry project scheduled for 1998 may provide evidence for these speculations.

Campbell, B. 1992. Results of a Canada goose transplant in south central Alaska. Unpublished report. Alaska Department of Fish and Game.

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Table 1. Numbers, sex, and age (ahy = after hatch year, l = local) of Canada geese transplanted to Middleton Island.

	<u>Collared and banded</u>						<u>Banded only</u>			<u>Unmarked</u>		Total
	ahyf	ahym	lm	lf	ahyu	total	lm	lf	total	lm	lf	
1987	9	1	47	41	1	99	1	6	7	0	0	106
1988	3	0	20	36	0	59	14	5	19	1	7	86
Totals	12	1	67	77	1	158	15	11	26	1	7	192

Table 2. Band recoveries of Canada geese transplanted to Middleton Island in 1987 and 1988. Recoveries on Middleton were from predation by bald eagles in 1988.

Band Recoveries	Year				Grand Total
	1987	1988	1989	1990	
Copper River Delta	0	0	0	1	1
Hinchinbrook Is., AK	0	1	0	0	1
Middleton Is., AK	0	0	2	0	2
N. Vancouver Is., BC	0	3	0	0	3
NW Washington	0	1	0	0	1
Puget Sound, WA	0	1	0	0	1
Sauvie Is (OR & WA)	1	2	0	1	4
Vancouver, BC	0	1	0	0	1
W. Vancouver Is., BC	1	0	0	0	1
Grand Total	2	9	2	2	15

Table 3. Unique observations of Canada geese transplanted to Middleton Island, collected during winter surveys conducted by the USFWS in the Pacific Northwest.

Count of COLLAR		YEAR								Grand Total
STATE	LOCATION	1987\88	1989\90	1990\91	1991\92	1994\95	1995\96	1996\97	1997\98	
OR	Ankeny NWR	1	3	0	0	0	0	0	0	4
	Baskett Slough NWR	0	6	0	1	0	0	0	0	7
	Briedwell	0	6	1	5	0	0	0	0	12
	Carlton	0	2	0	0	0	0	0	0	2
	Brownsmead	0	1	0	0	0	0	0	0	1
	Deer Island	0	1	0	0	0	0	0	0	1
	Finley NWR	3	0	0	1	0	0	0	0	4
	Glassers	0	0	0	1	0	0	0	0	1
	Grand Island	3	0	0	0	0	0	0	0	3
	Briggitine	0	3	0	0	0	0	0	0	3
	Salem	0	0	0	6	0	0	0	0	6
	Sauvie Island	24	19	17	14	1	3	2	1	81
	(blank)	0	0	0	0	0	0	0	1	1
OR Total		31	41	18	28	1	3	2	2	126
WA	Ridgefield NWR	1	0	1	2	0	0	0	0	4
	Sauvie Island	0	0	0	0	0	0	1	0	1
	Vancouver	0	0	1	1	0	0	0	0	2
WA Total		1	0	2	3	0	0	1	0	7
Grand Total		32	41	20	31	1	3	3	2	133

Table 4. Collar observations of Canada geese on Middleton Island, Alaska, that were transplanted by ADFG (xplant) and that immigrated naturally from the Copper River Delta (CRD).

Collar	Year observed	Origin/year	Breed status	Age/sex at banding
M12	1988	xplant/1987	single	L-F
M20	1988	xplant/1987	single	L-F
M79	1988	xplant/1987	single	L-F
M?	1988	xplant	single	
M12	1989	xplant/1987	single	L-F
M12	1990	xplant/1987	pair	L-F
M?	1991	xplant	pair/brood	
M12	1992	xplant/1987	pair/brood	L-F
CAA	1992	CRD/1991	pair/brood	AHY-M
HCM	1996	CRD/1991	brood	AHY-M
CC1	1997	CRD/1988	brood	AHY-F

Table 5. Recaptures of dusky Canada geese on the Copper River Delta after transplanting to Middleton Island in 1987. None of the geese transplanted in 1988 were subsequently recaptured.

Count of recaps AGE at banding	YEAR of recapture					Grand Total
	1988	1989	1990	1991	1996	
ahy	2	0	1	0	0	3
local	8 ^a	4 ^b	4	1	2	17
Grand Total	10	4	5	1	2	22 ^c

^a Two recaptured again, 1 each in 1989 and 1991.

^b One recaptured again in 1996.

^c Nineteen individuals captured.

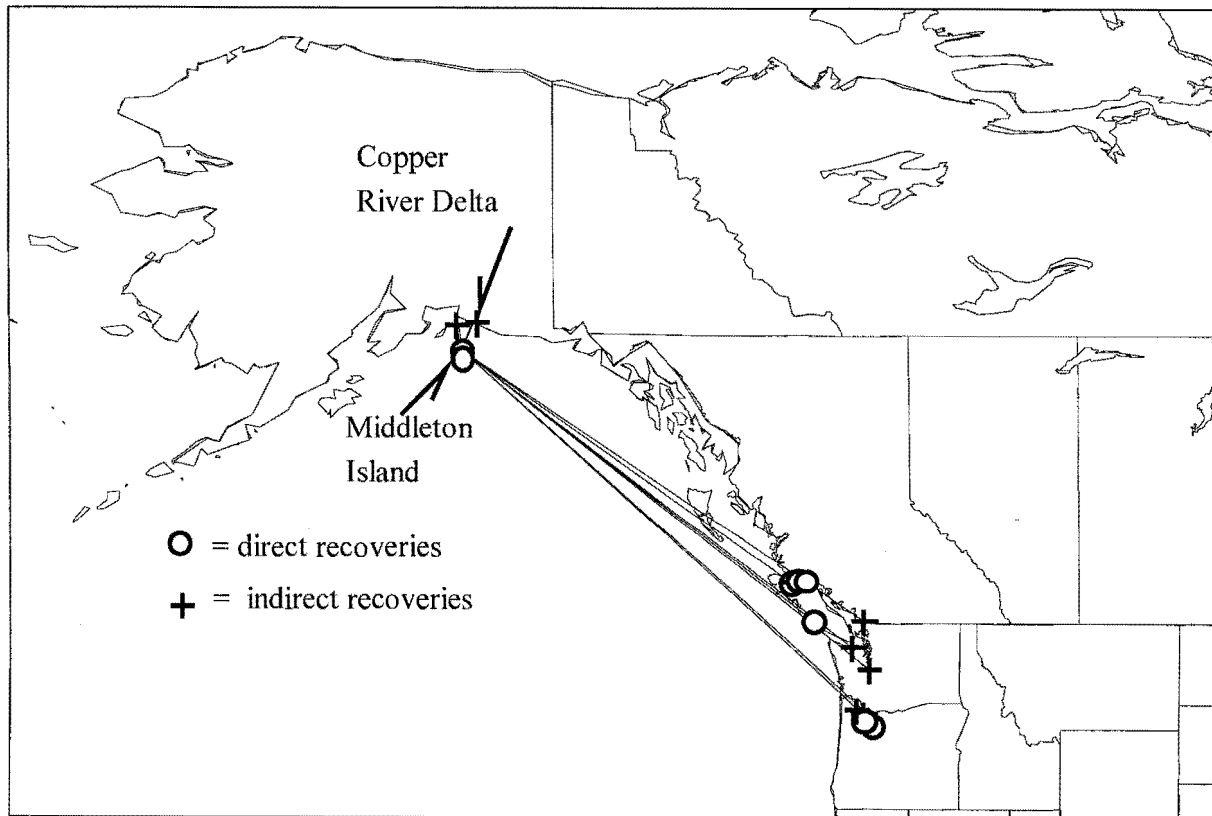


Figure 1. Band recoveries (n=15) of dusky Canada Geese transplanted to Middleton Island in 1987 and 1988 (n=184, combined years).