

Birds

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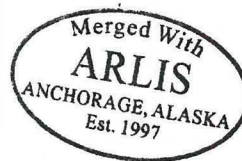
A PRELIMINARY ANALYSIS OF WATERFOWL BANDING ON ALASKA'S ARCTIC SLOPE

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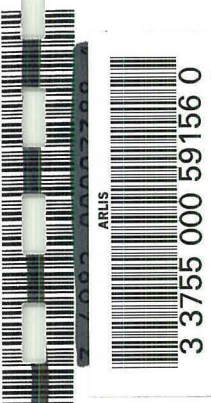
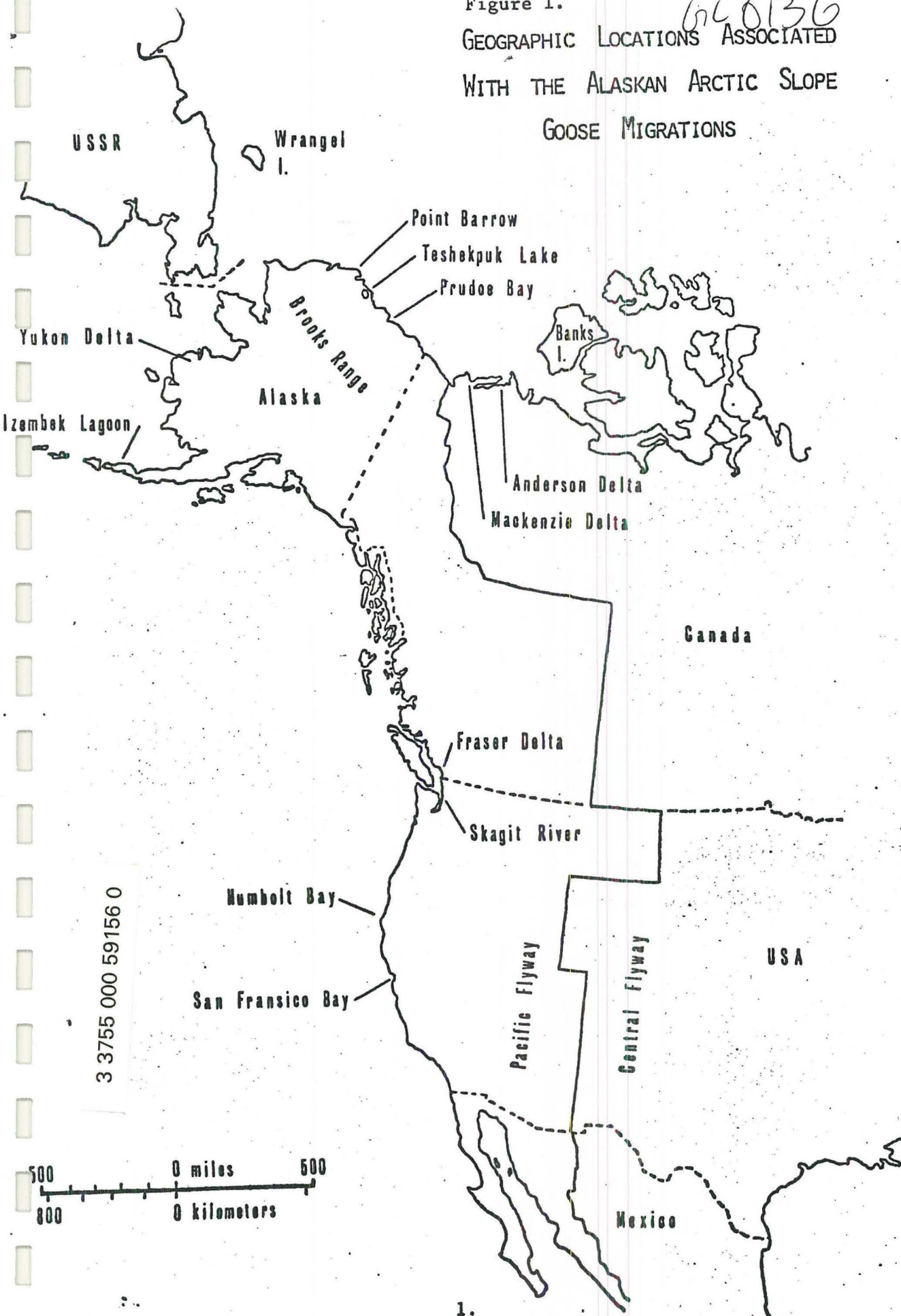


Figure 1.

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GEOGRAPHIC LOCATIONS ASSOCIATED
WITH THE ALASKAN ARCTIC SLOPE
GOOSE MIGRATIONS



INTRODUCTION

A study of waterfowl utilizing Alaska's North Slope has been largely cursory. Naturalists and biologists have reported observations at certain locations and short term studies have resulted in some information. This paper is a preliminary summary of banding data on several waterfowl species and an attempt to place it in some context with the continental waterfowl picture. Waterfowl bands are continuing to be returned and until the information must be considered preliminary.

The North Slope lies just south of the northern zone of near biological sterility known as the "high Arctic". Some open water is present May through September but the average temperature for this period measured at Point Barrow is 32 degrees F. The July mean is only 40 degrees F. The rolling hills north of the Brooks Range blend into an uneven upland and finally a flat plain along the coast. Water areas increase as the terrain flattens until some areas near the coast are more than 50 percent water. There are some 23,000 square miles of habitat utilized by waterfowl in the area. Fog and snow showers are a regular summer feature along the coast but a few miles south skies tend to be somewhat clearer and summer temperatures are slightly more moderate.

METHODS

Population Surveys

Information on population size and structure is basic to any attempt at wildlife management. Several experimental attempts have been made to

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count waterfowl numbers on parts of the North Slope from light aircraft. The best attempt was by Haddock and Evens, 1970 - 1972, using airplane, helicopter and ground observations. Duck population figures in Table 1 were derived largely from their work (Haddock and Evans, 1974). Geese and swans have a less random distribution and thus cannot be surveyed in the same fashion as ducks ordinarily. The figures for those species in Table 1 were derived by King in 1966 from a series of exploratory flights (King, 1970). Bartonek (1969) has summarized attempts to determine waterfowl use on the North Slope since 1948.

The figures in Table 1 are based on very slim data and should be used with caution. They are from one year only which could have been an atypical year. The duck figures were gathered by a method that has been highly refined in the prairie States and Provinces but has not been well tested in the Arctic. The goose and swan figures depend heavily on the estimates and impressions of only one observer. Other observers have estimated waterfowl numbers on the Arctic Slope and although the figures vary somewhat they are all in this range (Bartonek, 1969, Timm, 1976). Nevertheless these figures do serve as a point from which to make some general conclusions.

Directly north of Teshekpuk Lake is an area with some 30 elongated lakes that is attractive as a moulting resort for geese not occupied with rearing young. These birds are seen in tight flocks of up to several thousand individuals. Estimating their numbers depends on observer ability and under the best of circumstances is arbitrary. Table 2 gives

Table 1.

ESTIMATED TOTAL FALL POPULATION OF NORTH SLOPE WATERFOWL

<u>Species</u>	<u>Average Numbers</u>
Whistling Swan	1,000
Canada Goose	30,000
Black Brant	20,000
White-fronted Goose	50,000
Snow Goose	2,000
<hr/>	
Total Geese	103,000
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Mallard	1,000
Widgeon	25,000
Green-winged Teal	9,000
Pintail	240,000
Scaup Sp.	30,000
Old Squaw	250,000
Eider Sp.	95,000
Scoter Sp.	42,000
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Total Ducks	692,000
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Total All Species	795,000

able 2.

MOLTING GEESE TESHEKPUK AREA

	<u>1957</u>	<u>1966</u>	<u>1970</u>	<u>1975</u>	<u>1976</u>
Canada Goose	-	10,278	-	17,305	12,079
Black Brant	10,000+	18,365	-	2,240	14,243
White-fronted Goose	-	3,000	-	1,570	4,872
Lesser Snow Goose	1,300	343	-	115	718

Total	11,300	31,986	30,000 to 50,000	21,230	31,912
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1957 Hansen (Canadas and white-fronts not counted).

1966 King

1970 Tremblay

1975 Timm (brant still arriving at time of count).

1976 King

various recorded figures for goose numbers there, some more complete than others. Probably the 1971 observation of merely 30 to 50 thousand geese is most nearly true as a general figure for the area.

Future studies will have to be directed toward developing a long term aerial sampling system for ducks before we can have any real confidence about their population numbers. Aerial photography may offer a means to get a better figure for the moulting flocks north of Teshekpuk.

Banding

Except for five Canada geese banded in 1949, the Fish and Wildlife Service did the first goose banding on the North Slope in 1970 and continued in 1971, 1975 and 1976. Two or three light aircraft were used each year to carry a crew of five or six men and their equipment. In 1970, the crew stayed at Helmerick's camp on the Colville Delta and banded 1,150 white-fronts near there. The rest of the banding (Table 3, last column) was done north of Teshekpuk Lake except for 130 white-fronts banded on the Colville in 1975. The Lonely Dewline Station provided quarters since 1970. The daily operation, weather permitting, was to fly out, locate a suitable flock on a suitable lake, land, build a trap using 180 aluminum rods and a thousand foot long herring type net, drive the birds in with the planes and an inflatable boat and band. All birds were sexed and all but the Canadas aged by plumage as either second year birds or after second year birds. A six man crew can catch and process about 600 geese in an eight hour day by this method. A sample of white-fronted geese were measured the first three years, giving a positive indication that no Tule geese were present. In 1976, blue, numbered neck collars

Table 3. AGE & SEX COMPOSITION OF GEESE BANDED BY YEAR

Species	Year Banded	<u>Second Year Birds</u>		<u>After Second Year Birds</u>		Percent Second Year Birds in Total Catch	Percent Males in Total Catch	Total Birds
		Number of Birds	Percent Males	Number of Birds	Percent Males			
Lesser Snow	1971	350	50.6%	221	46.2%	61.3%	48.9%	571
	1976	267	48.7	56	46.4	82.7	48.3	323
Lesser Canada	1971	-	-	-	-	-	47.6	750
	1975	-	-	-	-	-	53.5	86
	1976	-	-	-	-	-	51.1	312
Black Brant	1971	379	55.7	397	70.0	48.8	63.0	776
	1976	238	53.4	446	51.1	34.8	51.9	684
Whitefronted	1970	435	49.4	723	56.2	37.6	53.6	1158
	1971	222	36.9	1306	52.5	14.5	50.2	1528
	1975	144	61.1	618	60.5	18.9	60.6	762
	1976	430	45.1	677	55.1	38.8	51.2	1107
Ross' Goose	1976	-	-	-	-	-	100	1
Blue Goose	1976	-	-	1	0	100	0	1

were placed on 100 snow geese.

July weather on the North Slope is not optimum for this type work. In each year some days were lost due to high winds or persistent fog. Winds in excess of 15 MPH make it difficult to brace up the net, to drive the birds and to operate the airplanes on the water. Likewise in each year, some flocks of flightless geese had to be bypassed because of ice in the lakes or shallow water depths. Some ice was present at the conclusion of banding each year. Warm winter clothing, gloves, hip boots and complete camping gear are essentials for survival here. The weather can change so fast that the crew must be prepared to stay out at any time.

RESULTS

Moult Sequence

Catching moulting geese depends on their being unable to fly. In 1970, the crew arriving on July 4 described the season as late with lots of ice present and 60 percent of the white-fronts still flying. Banding continued to July 17. In 1971, banding was successfully carried out on four species from July 5 to July 19. The season was described as early in 1971 with two thirds of the white-fronts flightless on the 5th and many ready to fly by the 19th. In 1975, the crew arriving on July 6 found 50 percent of Canada geese, 30 percent of white-fronts and 75 percent of brant still flying and brant were still arriving from elsewhere. The banding continued through July 17. In 1976, all geese appeared to be flightless on July 9 with Canadas about a week ahead of the others in wing feather growth. Banding continued to July 17

with still no birds on the wing. The first young white-fronts were seen on the 17th. A flight over the area on July 23 disclosed 25 percent of Canada geese and a few brant able to fly. Young brant and white-fronts were observed at several locations. On July 30, half the Canadas could fly and 10 percent of snows and brants. King eiders and old squaw were still hatching at this time. The last three weeks of July appear to offer optimum conditions for catching flightless, nonbreeding geese. It would doubtless be necessary to wait until the last half of August to band young geese.

Age of Catch

All the birds caught in this area have been in flocks that were not involved with nesting. One would expect that such flocks would be mostly composed of prebreeders with a scattering of older, unmated or senile birds and some birds whose nesting attempt failed. The second year age class, which can be identified in brant, white-fronted geese and snow geese, should be most numerous except in cases where an extensive nest failure occurred the preceeding year. Table 3 shows the percent of second year birds in the catch for three species. In most cases entire flocks are captured but sometimes a portion escapes. We don't know whether certain age classes or sexes are more apt to escape than others. Because of the general confusion of the birds and the inconsistent circumstances that allow them to escape, we assume the catch to be representative of the birds in the area. For snow geese the sample is small and the origin of these birds is not well known.

The two year average of 72 percent second year birds seems high. It could mean that two or more poor years followed by a very good year preceeded the catch in each case. The brant average 41.8 percent second year birds for the two years possibly indicating a more even rate of production where they came from. White-front age ratios may be more informative. The four year average is 27.5 percent second year birds with two years markedly higher than the other two. The distribution of recoveries indicate that probably the white-fronts in these flocks are from nearby nesting populations. The banding crew indicated that 1970 was a late, cold season perhaps confirmed by the low number of second year birds in the 1971 catch. A long series of this kind of age data gathered from adequate size samples might be useful in developing a system for evaluating and predicting production success. At present the phenomena that make the difference between years of high production and years of low production are not well understood. There has been a basic assumption that Arctic weather conditions dictate nesting success ratios but there is no definition of what constitutes a good or bad year. Cursory review of weather data from Point Barrow does not disclose any dramatic difference between 1970 and 1971.

Sex Ratios of the Catch

Table 3 also shows the sex of birds in the catch by the two age categories. No glaring discovery emerges from these figures but they are rather interesting in their inconsistency. For the snow geese the sex ratio of second year birds is nearly equal in 1971 and has a slight preponderance of females in 1976. The after second year birds have a higher

ratio of females indicating possible higher survival rate for females. With the brant the reverse is true and males predominate. The sex ratios for second year white-fronts are even more erratic with 13 percent more females in 1971 and 11 percent more males in 1975. The after second year white-fronts have a consistent preponderance of males. The sex ratio of all age Canada geese varied year to year with a slight excess of males in two years and females in one year.

Band Recovery Rates

The band recovery rates are shown in Table 4. As bands are still coming, the direct recovery rate is more informative than the combined recovery rate. For snow geese we see a fairly consistent recovery rate for males and second year females with after second year females substantially higher or perhaps more vulnerable to hunting mortality. The lesser Canadas show a slightly reduced vulnerability for older birds and slightly reduced vulnerability for females in each age category. Brant show a much lower direct recovery rate with slightly higher vulnerability for females in both age groups. With white-fronts, older birds are less vulnerable but older females are more vulnerable than older males. Just why female Canadas and white-fronts are less vulnerable than female snow geese and brant is not clear.

The direct recovery rate of 5 percent for white-fronts is slightly less than the 6 percent recorded for some four thousand adults banded in Saskatchewan from 1961 to 1964 (Miller et. al., 1968).

Table 4. RECOVERY RATES FOR GEESE Banded IN 1970 OR 1971

	Lesser Snow	Lesser Canada	Black Brant	Whitefronted
Second Year Males				
Number Banded	177	46	211	297
Number Recovered	27	7	10	65
Percent Recovery Rate	15.3 %	15.2 %	4.7 %	21.9 %
Percent Direct Recovery Rate	6.2 %	6.5 %	0.9 %	6.7 %
Second Year Females				
Number Banded	173	166	168	360
Number Recovered	30	20	12	71
Percent Recovery Rate	17.3	12.0	7.1	19.7
Percent Direct Recovery Rate	6.9	5.4	1.2	6.4
After Second Year Males				
Number Banded	102	311	278	1091
Number Recovered	14	52	17	177
Percent Recovery Rate	13.7	16.7	6.1	16.2
Percent Direct Recovery Rate	6.9	4.8	0.7	3.7
After Second Year Females				
Number Banded	119	227	119	938
Number Recovered	31	25	10	157
Percent Recovery Rate	26.1	11.0	8.4	16.7
Percent Direct Recovery Rate	9.2	2.6	1.7	5.3
TOTAL				
Number Banded	571	750	776	2686
Number Recovered	102	104	49	470
Percent Recovery Rate	17.5	13.9	6.3	17.5
Percent Direct Recovery Rate	7.2	4.4	1.0	5.0

Brood Patches

In 1976, the presence of brood patches on female brant was recorded. Of 218 after second year females caught, 167 or 77 percent had an obvious brood patch indicating an attempt to nest. Of the total catch, then, 24 percent were brood patch females. If this ratio holds true for the entire molting brant population of the area, then 3,418 unsuccessful females would be expected. Ten years of brant catch records on the Yukon Delta, 1967 to 1976, show 6,479 adults included 30 percent brood patch females ranging from one percent to 50 percent in 1974 and 1969 respectively. These catches were made in an area of high brant nesting density (Dau, 1976). No such abundant nesting is located near Teshekpuk Lake although a few dozens of broods have been recorded in that area. There is no evidence that brant ever pluck down except for a nest with eggs. No second year females with brood patches occur. It seems probable that these brood patch females must have moved into the molt area from considerable distances.

A few white-fronts with brood patches have been noted in previous catches here but nothing on the order of the brant. Unfortunately, recording of brood patches, except for brant in 1976, has been inconsistent.

Harvest Areas

The band recovery data shows where North Slope birds are utilized (Table 5). The snow geese are most valuable to Californians, 65 percent, with Albertans next getting 11 percent. Washington is the big beneficiary of the Canada geese, 75 percent, with Oregon next getting 15 percent.

Table 5.

RECOVERY DISTRIBUTION BY STATE AND FLYWAY OF GEESE Banded
DURING 1970 AND 1971 ON THE ALASKAN ARCTIC SLOPE

	<u>Lesser Snow</u>		<u>Lesser Canada</u>		<u>Black Brant</u>		<u>White-fronted</u>		Total Recoveries
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Pacific Flyway									
Banding Site			2	2%			83	17.7%	85
Russia	2	2%			1	2%			3
Alaska			2	2	2	4	1	.2	5
Yukon Territory					1	2			1
British Columbia	3	3	4	4	4	8			11
Alberta	11	11	2	2			42	8.9	55
Washington	2	2	78	75	6	13			86
Oregon	2	2	16	15					18
Montana	2	2							2
Nevada	1	1							1
Utah									
California	67	65			18	38			85
Mexico, West Coast	4	4			10	21			14
Central Flyway									
N.W. Territory	6	6			6	13	2	.4	14
Saskatchewan	1	1					121	25.7	122
North Dakota							4	.9	4
South Dakota							1	.2	1
Nebraska							20	4.3	20
Iowa							1	.2	1
Kansas							16	3.4	16
Missouri							1	.2	1
Oklahoma							1	.2	1
Texas							147	31.3	147
Louisiana							9	1.9	9
Mexico	1	1					21	4.5	22
TOTAL	102	100	104	100	48	101	470	100	724

Brant are important in California, 38 percent, Mexico, 21 percent and Washington, 13 percent. The white-fronts are largely confined to the central flyway, Texas getting 31 percent, Saskatchewan 26 percent and nine percent from Alberta. We have no data on reporting rates for Mexico and Russia so possibly these birds are more important there than indicated. ?

DISTRIBUTION

White-fronted Geese

White-fronted geese were banded on the Arctic Slope in 1970 (1,158 birds), 1971 (1,528 birds), 1975 (762 birds) and 1976 (1,107 birds). Band recoveries indicate all ages and sexes follow a tight spring and fall migration route (Figure 2) across the Alaskan arctic coast, southward through N. W. Territory, Alberta, southwest Saskatchewan, North Dakota, South Dakota, Nebraska, Kansas and Oklahoma to their winter grounds on the gulf coast of Texas, Louisiana and Mexico (Miller et. al., 1968). As much as ten percent of the population winters in interior Mexico.

The recoveries indicate there is little if any overlap between this population and the other populations in Alaska and Canada. This is probably due to the fact that family ties of white-fronted geese persist longer than in other geese and the young return to the nesting area with their parents (Barry, 1966).

The migration pattern of these geese is so tight we believe it indicates movements of a local nesting population even though no known breeders or young have been banded within the area. No interchange is indicated

between this population and the eastern subpopulation or the Pacific population described by Miller (1968).

Lesser Snow Goose

Of the 571 snow geese banded in 1971, 102 bands have been recovered through 1975. Barry (1966) noted that none of the geese banded as young on the Anderson River Delta were recaptured as second year birds on the nesting grounds indicating a molt migration.

The fall migration route is through interior western Canada to southern Alberta. From here some of the geese separate from the main migration route and possibly follow the Frazier River to its delta and to the Skagit River area as evidenced by two direct recoveries. The majority of the birds, as described by Bellrose (1976) continue south through Montana to northern California and north central Mexico (Chihuahua).

A close association between the Alaskan Arctic Slope geese and the USSR breeding populations is apparent because three of the eight recoveries at the banding site were from Russia while the remaining five were from wintering areas in the United States. One of the Russian birds, an adult female, was rebanded on the Alaskan Arctic Slope and recaptured again at Wrangell Island. The recovery of two females at breeding sites on the McKenzie River Delta indicates this area is perhaps the origin of most of the Teshekpuk flock.

Some interchange between the Hudson Bay lesser snow geese and the Arctic Slope geese is suggested by Palmer (1976) and supported here by the

recovery of a female at Tamaulipas (Mexico) and the recovery on the Arctic Slope of a female banded in South Dakota, both traditional areas along the migration route of the Hudson Bay lesser snow geese.

Lesser Canada Goose

Of the 750 birds banded in 1971, 104 recoveries through 1975 indicate they are using traditional winter areas in southeast Washington, northeast Oregon and the mouth of the Columbia River (Bellrose, 1976). All of the fall recoveries are situated along the migration corridor through British Columbia and western Alberta to interior Alaska which Bellrose (1976) has described exclusively as a spring migration route. Three birds banded in central British Columbia in April were recaptured on the Arctic Slope indicating a spring migration by the same route. Although none of the Arctic Slope banded birds deviated from this pattern, some Alaskan birds must use the short grass prairie route (Palmer, 1976) as a male and a female banded in New Mexico were recaptured on the Arctic Slope.

Sufficient nesting to support the known nonbreeding population does not seem to exist on the North Slope. As this race breeds over much of interior Alaska and on the south side of the Brooks Range, it seems likely there is movement of nonbreeders due north from the nesting habitat. Irving (1960) reports them as commonly seen at Anaktuvuk Pass in spring migration north.

Black Brant

Of the 49 recoveries through 1975 from the 776 birds banded in 1971,

eight have been from nesting locations during May or June. Three of these were from the McKenzie River delta, one from north coastal Yukon Territory, two from the Anderson River delta, one from south Bank Island and one from mainland Siberia opposite Wrangell Island. The brant apparently follow the coastal migration routes detailed by Bellrose (1976). The three major hunting areas are Baja California, north coastal California and Puget Sound.

The recovery rate of the black brant is less than one half that of the other species of geese (Table 4). Therefore there is either a high percentage of natural mortality or most mortality is occurring in locations with low band reporting rates.

Recoveries north of 68 degrees latitude from birds banded on the nesting grounds in the Yukon Delta show that males are much more likely to end up on the Arctic nesting grounds. The proportion of males in these returns is 67 percent (n=15) in the Siberian Arctic, 89 percent (n=35) in the Canadian Arctic and 40 percent (n=20) in the Alaskan Arctic. The high values in Siberia and Canada suggest that males are pairing on the wintering grounds with females that are nesting in these Arctic locations. The larger number of female recoveries on the Alaskan Arctic Slope is probably due to females from Canadian nesting areas which have joined nonbreeding flocks although some Yukon Delta birds are present. Pre-breeders banded as locals on the Yukon Delta were recaptured as second year birds in the Siberian Arctic (one bird), the Canadian Arctic (three birds) and the Alaskan Arctic (four birds) while none have been recaptured as second year birds at the banding site (Dau, personal communication).

Other Waterfowl

Few ducks have been banded on the Alaskan Arctic Slope. Twenty-five pintails were banded in 1949 on the Colville River delta with four of the five recoveries occurring in California (Figure 6). Arctic Slope recoveries of pintails banded elsewhere also show wintering areas in coastal Texas and Louisiana. A number of observers have noted that pintails move north and west in years of drought in the prairie States and Provinces and thus the Arctic Slope population may vary accordingly. There does seem to be a significant population there every year.

Whistling swans banded on the Arctic Slope demonstrate the close association with wintering areas on the east coast (Figure 7) documented by Sladen (1975). One male was recovered in California during January, five months after it was banded, representing the smaller segment of the population wintering in the west (Bellrose, 1976).

In 1976, one blue goose was captured and banded and a group of three others was seen. Oddly, the blue geese were in flocks of white-fronts and there were no blue geese with the snow geese. There are only two or three other records of blue geese in Alaska.

One Ross goose was captured in 1976 with a flock of snow geese. This is the first positive record since the one published by Gabrielsen and Lincoln (1959) thought to have been killed in southeast Alaska in 1907.

DISCUSSION

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The Teshekpuk Lake goose molting area is extremely interesting because no other such resort for nonbreeding geese is known to exist on the Arctic Coast of either Alaska, Canada or Siberia. Snow goose numbers are small and perhaps insignificant. White-fronted geese are more concentrated here than elsewhere on the North Slope but the bulk of nonbreeders of the region are scattered through dozens of lakes in smaller flocks. The Arctic white-front range is continuous from Point Lay on the west to Anderson River, Northwest Territories, on the east but it appears Teshekpuk birds only use the central part of this area. Significant numbers of Canada geese probably from the Interior nesting population moult here but moulting flocks also occur on the islands of the Yukon River and perhaps elsewhere. For brant the area appears to be most significant. In 1966, the winter inventory showed a total population of 166,900 brant. In 1976, the winter figure was 122,045 (Chattin, 1977); thus six months later in each year, 11 percent and 11.3 percent of the indicated total population appeared to be at Teshekpuk Lake. The only other location where nonbreeding black brant are known to congregate is on the Yukon Delta far to the south and in the center of a large breeding colony. It would seem possible that the entire nonbreeding segment of brant from nesting areas north of Bering Strait, including subadults and pairs that lost nests, from Canada, Alaska and Siberia, seek this one area for molting. Some birds from the Yukon Delta nesting population also come here to molt. We don't know what peculiarities attract brant to this area or what affect

being forced out of it might have on their well being. It is clear that damage to the molting subadults in this area would affect future nesting potential of both the Canadian and Siberian colonies.

The banding operation at Teshekpuk has resulted in some positive information. The wintering areas and southern portion of the migration routes for four species of geese is pretty well defined. Some information on the northern portion of the migration route is evident. There is an indication of where each species nests. The possibility of Tule geese using this area has been rejected. We have learned where and to what extent these birds are harvested.

More banding on a consistent annual basis would resolve some unanswered questions. The relationship of molting birds at Teshekpuk to various nesting colonies could be much better documented. A long term series of age ratios and sex ratios would provide means from which to measure annual departures. A possible method of analysing productivity for the previous year might result. Annual banding samples for a number of years would pin down mortality rates in a way that can not be done from one year's records. A lot more data on hunting vulnerability rates by age and sex would be useful. A series of annual records on the occurrence of brood patch females would be valuable. The banding of a few local brant and white-fronts is needed. Some banding of Canada geese in the Interior of Alaska is needed.

To realize the full value from banding efforts on the North Slope, scrutiny of banding data from other areas is needed. Age and sex ratio figures from catches in other areas are needed. We need a complete

analysis of all brant and white-front bandings on the continent.

CONCLUSION

We believe the Teshekpuk banding should be continued for, say, a ten year period. Particular attention should be given to the following items:

1. Band 1,000 white-fronts, 2,000 brant, 2,000 Canada geese and up to 1,000 snow geese on an annual basis from the nonbreeding flocks.

2. Continue to carefully record age, sex and brood patch data. A record of the number of birds escaping from each catch should be reported.

3. Band a few hundred local brant and white-fronts in at least one year.

4. Do an annual census of the nonbreeders. Photography should be tried as a means of improving accuracy of this census.

5. Analyse data for brant and white-fronts from other areas.

6. Do a ground study to determine what characteristics attract geese here.

7. Develop a consistent survey system to determine waterfowl breeding population levels and run it long enough to get a reasonable average.

ALASKAN ARCTIC SLOPE BANDING
RECOVERIES 1970 TO 1976
WHITE-FRONTED GOOSE

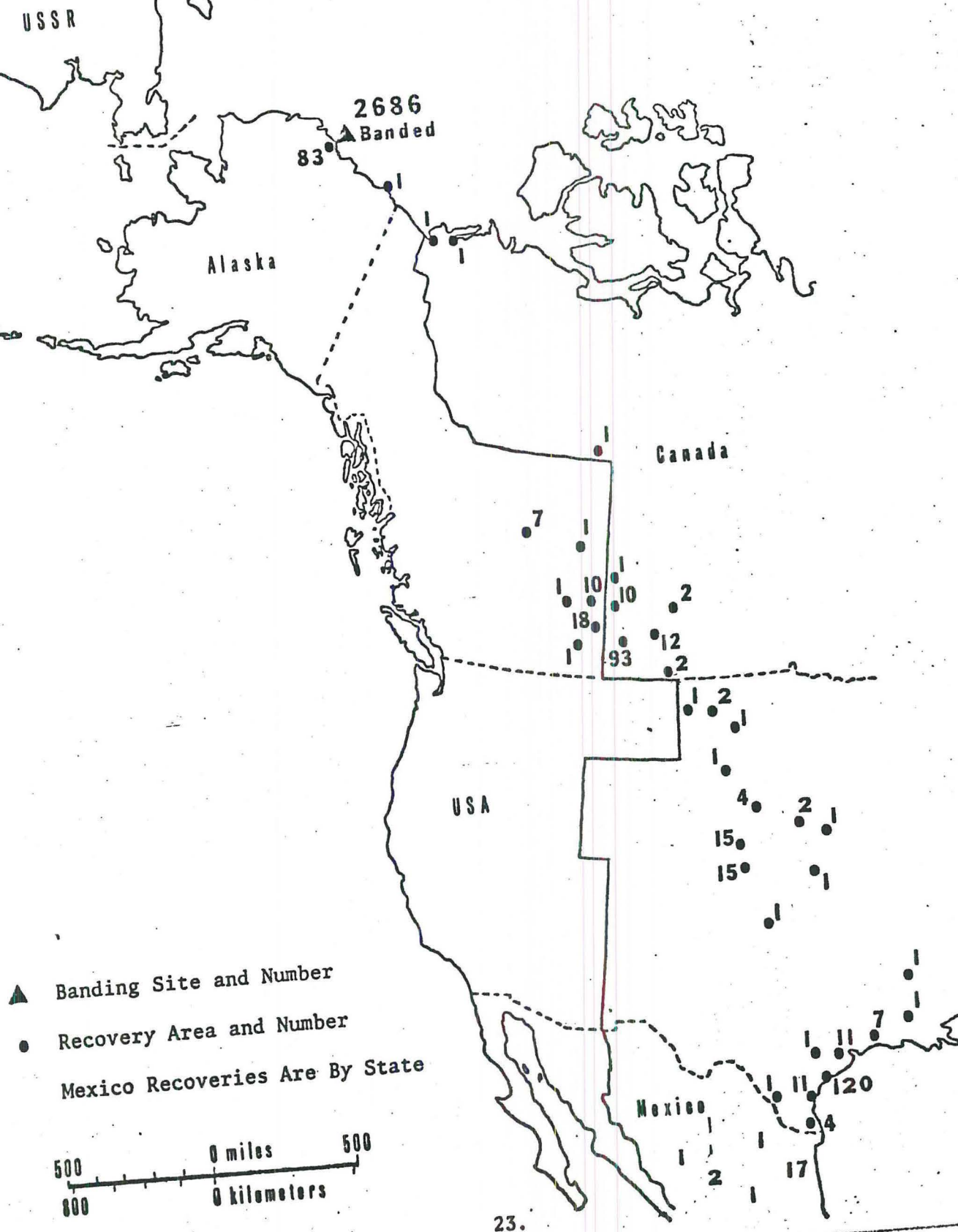
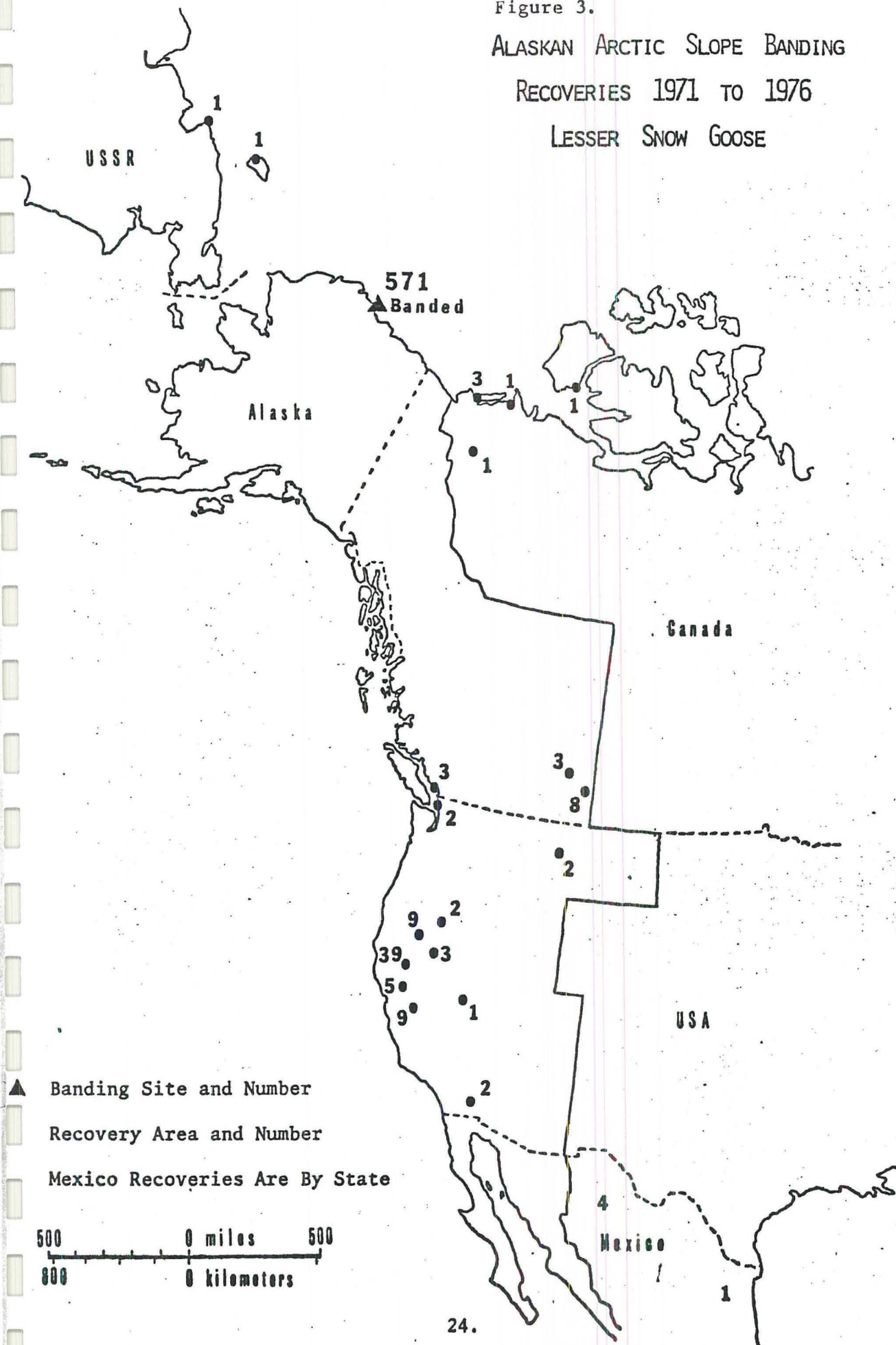


Figure 3.

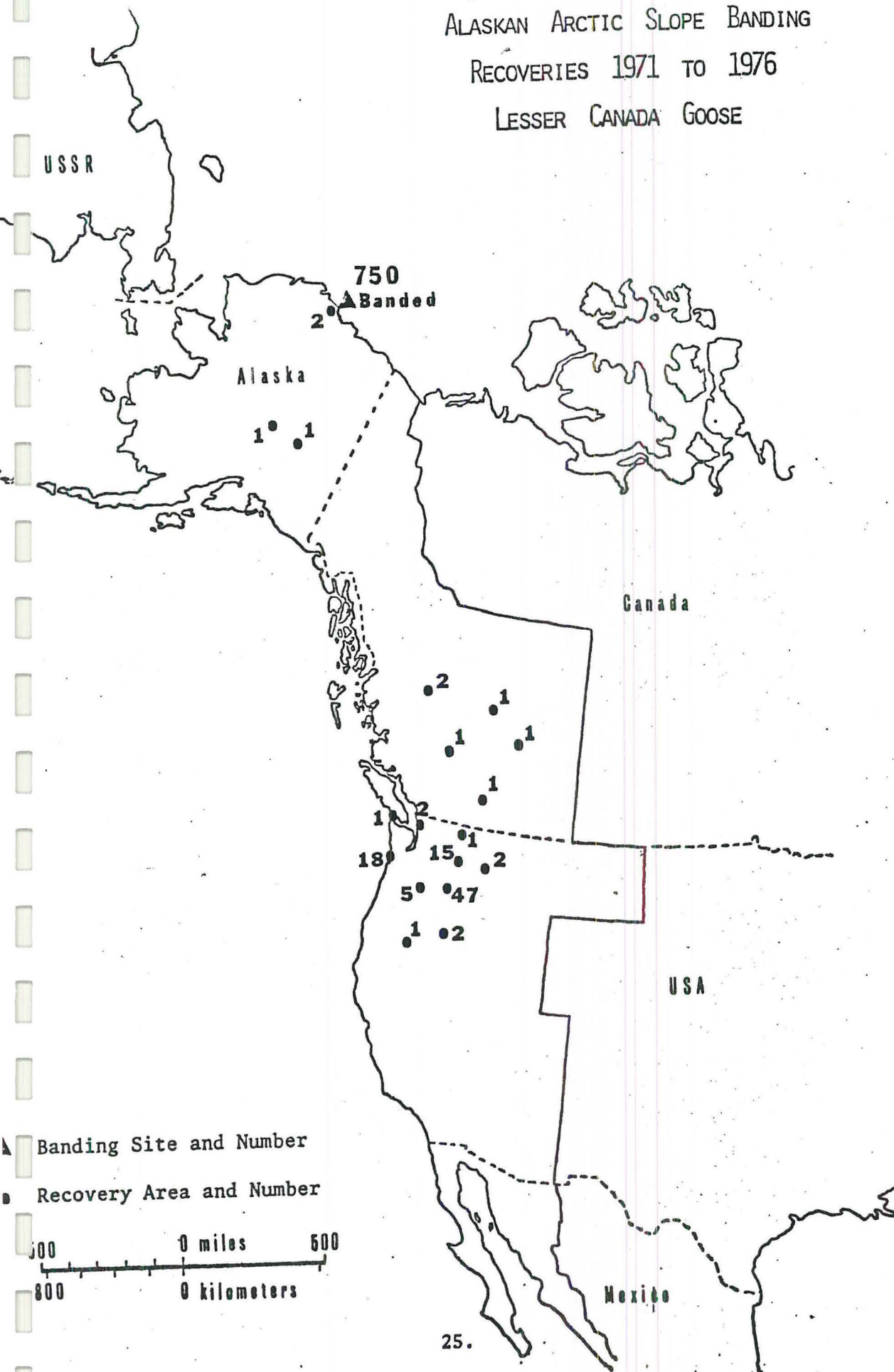
ALASKAN ARCTIC SLOPE BANDING

RECOVERIES 1971 TO 1976

LESSER SNOW GOOSE



ALASKAN ARCTIC SLOPE BANDING
RECOVERIES 1971 TO 1976
LESSER CANADA GOOSE



ALASKAN ARCTIC SLOPE BANDING RECOVERIES 1971 TO 1976 BLACK BRANT

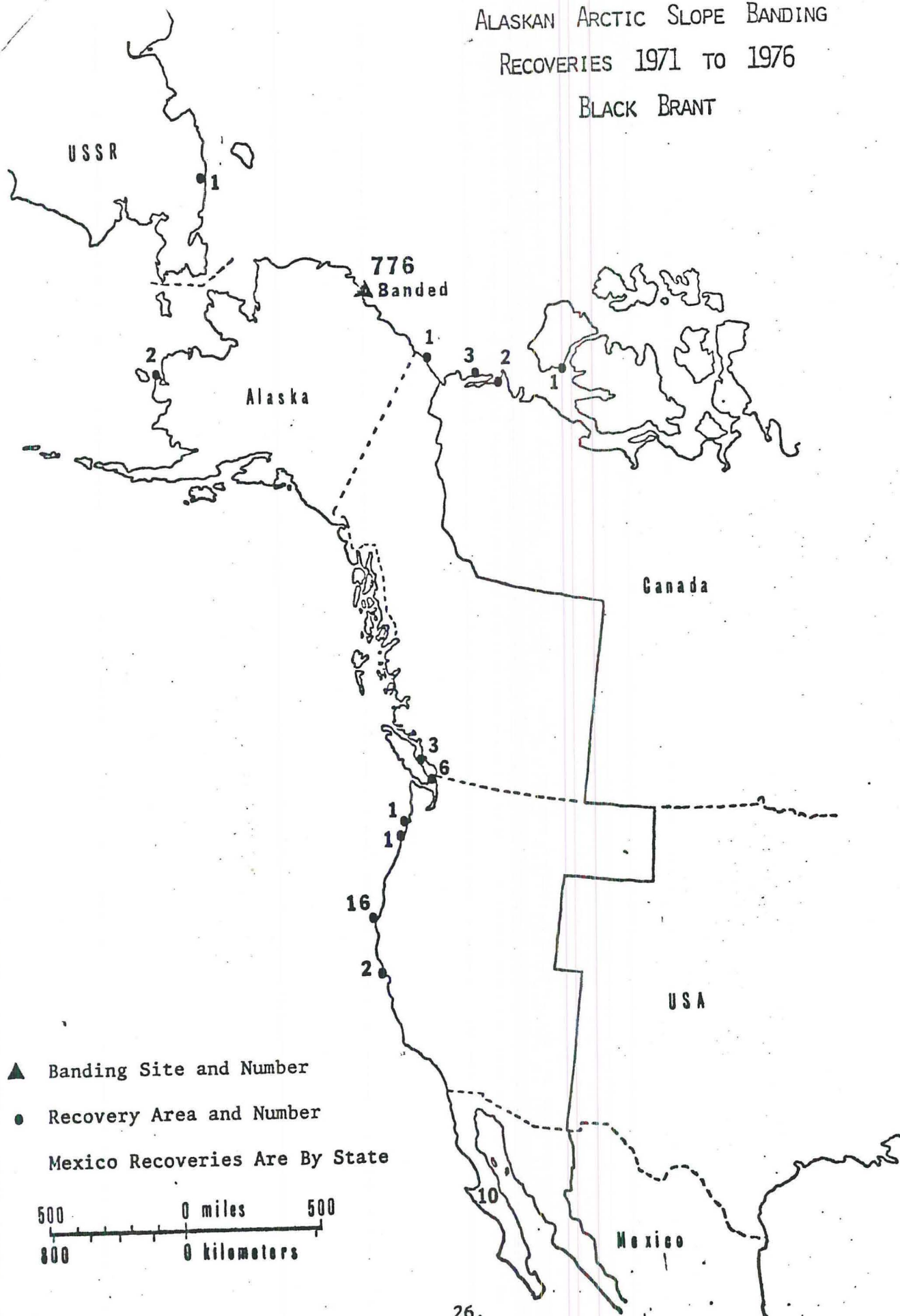
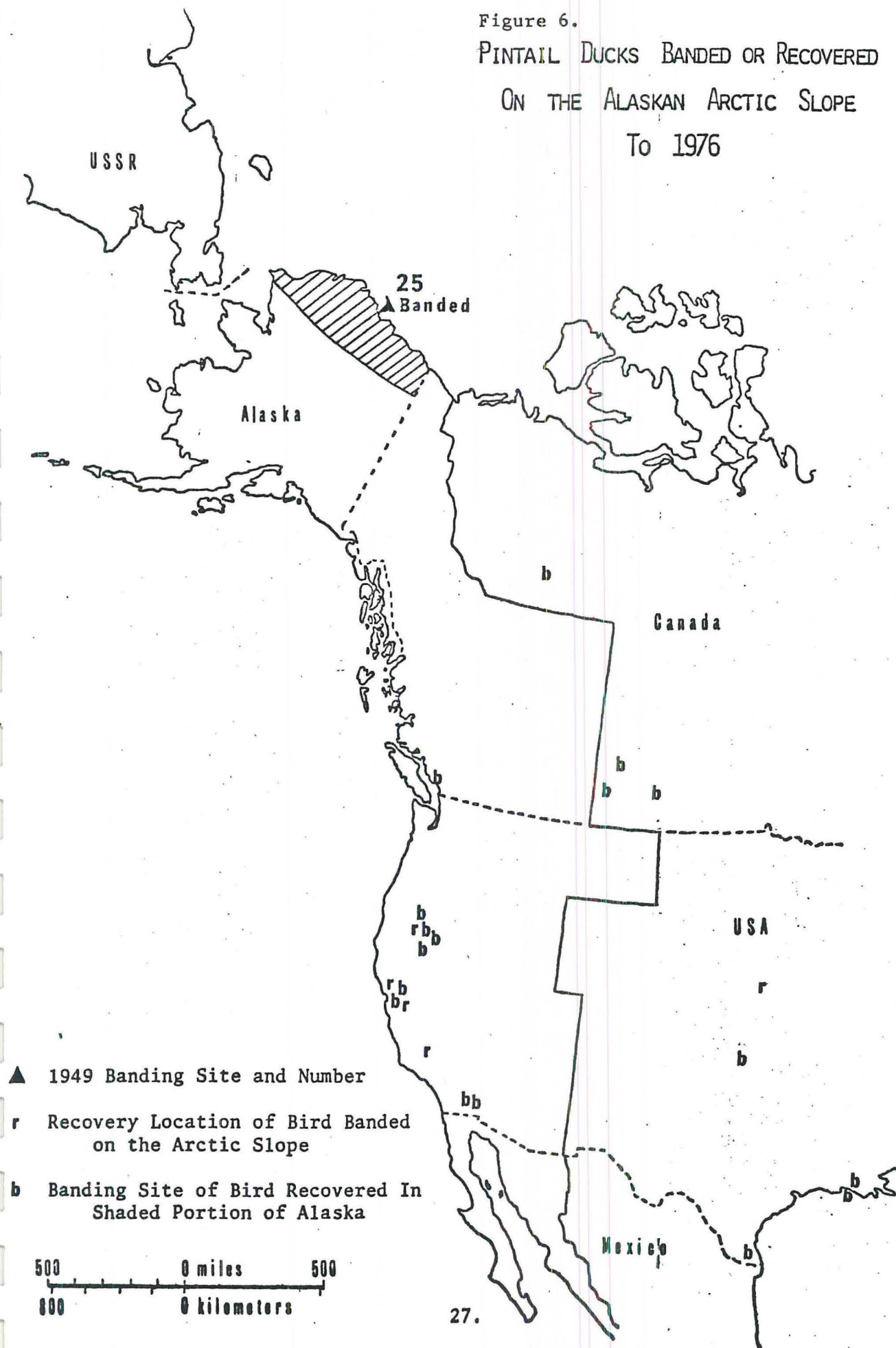
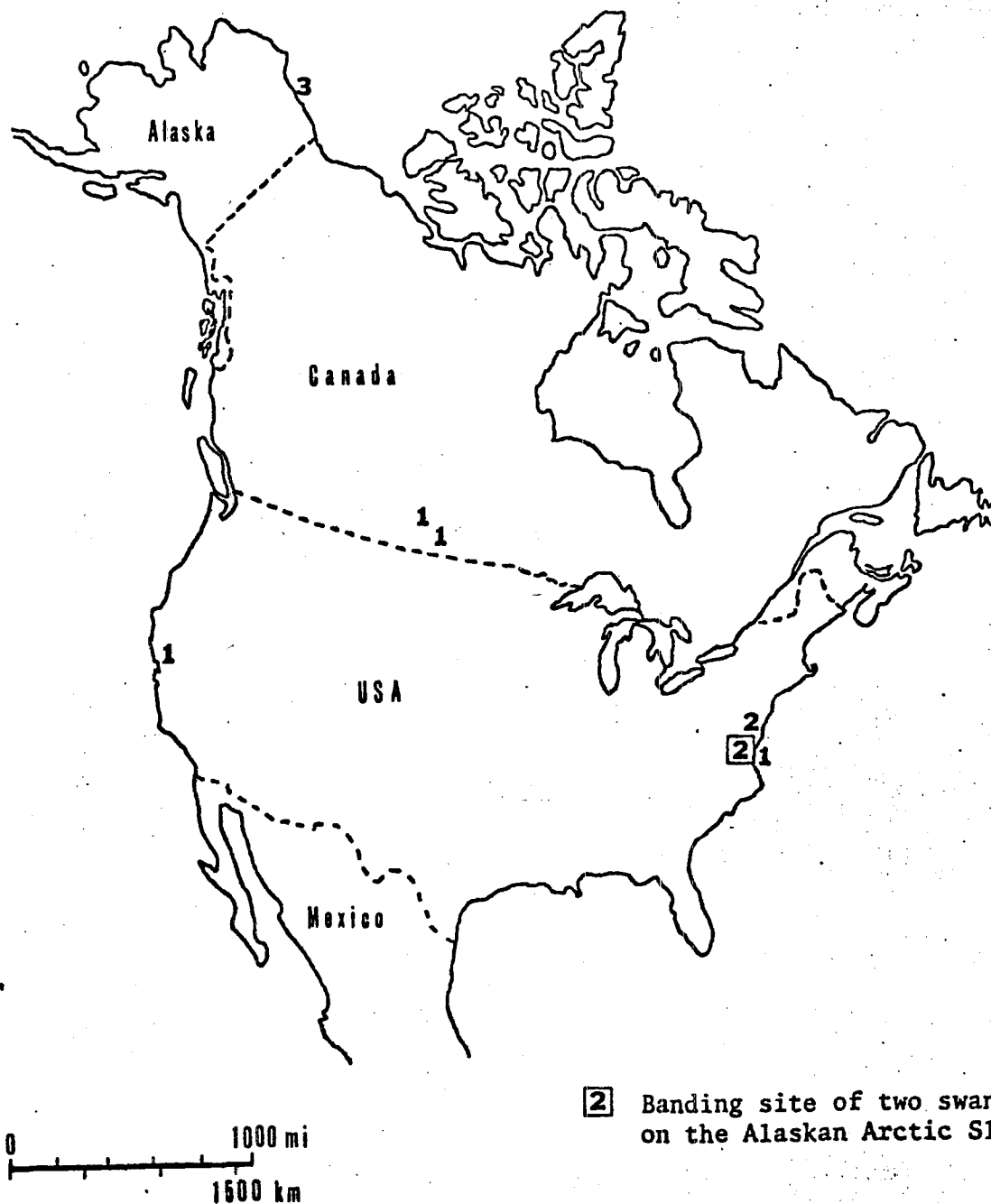


Figure 6.
PINTAIL DUCKS Banded or Recovered
ON THE ALASKAN ARCTIC SLOPE
To 1976



ALASKAN ARCTIC SLOPE BANDING
RECOVERIES 1970 TO 1976
WHISTLING SWAN



2 Banding site of two swans recovered
on the Alaskan Arctic Slope.

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