Alaska Department of Fish and Game
Division of Wildlife Conservation
Section 6
Endangered Species Act
Annual Report

John Wright
Project SE-2-4
May 1990

FINAL REPORT (RESEARCH)

State: Alaska

Cooperator: U.S. Fish and Wildlife Service

Project No.: SE-2-4 Project Title: Documentation of Peregrine Falcon Nest Sites in Relation to State Land Use Proposals

Study Title: Documentation of Active Peregrine Nest Sites

Period Covered: 1 June 1989-30 April 1990

SUMMARY

For the 3rd consecutive year, the coast of western Alaska from southern Norton Sound to Cape Prince of Wales was surveyed for nesting peregrine falcons (Falco peregrinus). Twenty-five sites were occupied by peregrines in 1989. The average straight-line distance between occupied sites was 13.0 ± 15.5 (SD) miles (20.9 ± 25.0 km). Breeding attempts occurred at a minimum of 16 of 23 sites where pairs were observed. An average of 2.5 young were counted in 14 successful nests.

Twenty-five young were banded with U.S. Fish and Wildlife Service bands. No band returns were reported during the past year.

Larids, shorebirds, passerines, and seabirds were most commonly found in prey remains collected near peregrine nest sites. More large prey, such as larids, seabirds, and large shorebirds, were found in 1989 than in previous years.

Feather and egg samples were collected to determine levels of trace minerals and chemical contaminants, and blood samples were taken for genetic analysis. Results from analyses of these samples are not yet available.

Key Words: Falco peregrinus, nesting, Norton Sound, peregrine falcon, productivity, prey, Seward Peninsula.

CONTENTS

BACKGROUND

The peregrine falcon (Falco peregrinus) is a cosmopolitan species that attracted international concern in the 1960's when drastic declines were reported in breeding populations in Europe and North America (Hickey 1969). Peregrines in Alaska are currently split into 3 subtaxa (White 1968). The American peregrine falcon (F. p. anatum) inhabits the boreal forests and is classified as endangered by both the federal and state governments. The Arctic peregrine falcon (F. p. tundrius) occurs in northern tundra regions. Although it is listed as endangered by the state of Alaska, it was reclassified from endangered to threatened by federal authorities in 1984. Peale's peregrine falcon (F. p. pealei), the 3rd subtaxa, is found in coastal regions of the state from the Aleutians south through the Gulf of Alaska and Southeastern Alaska. Unlike the 1st two that are long-distance migrants wintering as far south as Argentina, Peale's falcons are year-round residents of Alaska or short-distance migrants along the west coast of North America and are not classified as threatened or endangered.

As part of a national program to restore peregrine falcon populations, the U.S. Fish and Wildlife Service (USFWS) established the Alaska Peregrine Falcon Recovery Team to develop a recovery plan for F. p. anatum and F. p. tundrius (USFWS 1982). The plan recognized the importance of identifying nesting habitats and prey species, monitoring population trends, and protecting nesting areas from incompatible human activities.

An interagency committee determined that current information was needed on the status of nesting peregrines on the western coast of Alaska (Hughes 1986). Surveys of the area found a surprisingly large number of peregrines (Wright 1987, 1989). In

addition to providing basic distribution and abundance information on an endangered species, this past season's study was conducted to determine the exposure of nesting peregrines in coastal western Alaska to toxic trace metals and to gather information on the genetic relationship of this population that inhabits an area on the boundary separating the ranges of 2 listed subtaxa.

OBJECTIVES

To locate nesting territories occupied by peregrine falcons along the coast of western Alaska; determine productivity; band nestlings; and collect prey remains, feather samples from nestlings for toxic trace metal analysis, eggs to measure organochlorine pesticide and other chemical contaminant levels, and blood samples from nestlings for genetic analysis.

STUDY AREA AND METHODS

In June and July 1989, potential peregrine falcon nesting habitat was surveyed along the coast of western Alaska from southern Norton Sound (i.e., south of Unalakleet) to Cape Prince of Wales at Bering Straits (Fig. 1). Two visits were planned to the study area, but three were ultimately made because of an extended period of inclement weather in July.

The purpose of the 1st survey (5 to 14 June) was to determine the presence or absence of peregrines at likely nesting sites and to collect eggs for measuring organochlorine pesticide levels. Using a Bell Jet Ranger 206 helicopter, a pilot and 3 observers flew along the coast. Particular attention was paid to known nesting sites, but whenever a cliff or bluff was encountered we slowed down to closely scrutinize potential nesting habitat. To adequately cover some tall cliffs, we made repeated passes or occasionally landed and observed the area with binoculars and spotting scopes. Where large concentrations of cliff-nesting seabirds were present, we landed the helicopter inland and approached the cliffs on foot to minimize disturbance to the seabirds. Observations of falcons and other birds were recorded on this 1st survey, but no concerted attempt was made to pinpoint nest sites. Three nests were visited to collect eggs for chemical contaminant analyses. Prey remains were collected from these nests and from perch sites near nests whenever possible.

The 2nd survey was conducted during 2 periods (i.e., 7-12 and 24-29 July). As in the first survey, a pilot and 2 or 3 observers in a helicopter (a Hughes 500D) flew along the coast searching potential nesting habitat; however, on this survey we landed when peregrines were observed so that the exact location of nests could be determined. When a nest was found or suspected, we climbed to the site to count and, when possible, band nestlings. Young were banded with USFWS lock-on aluminum leg bands and an

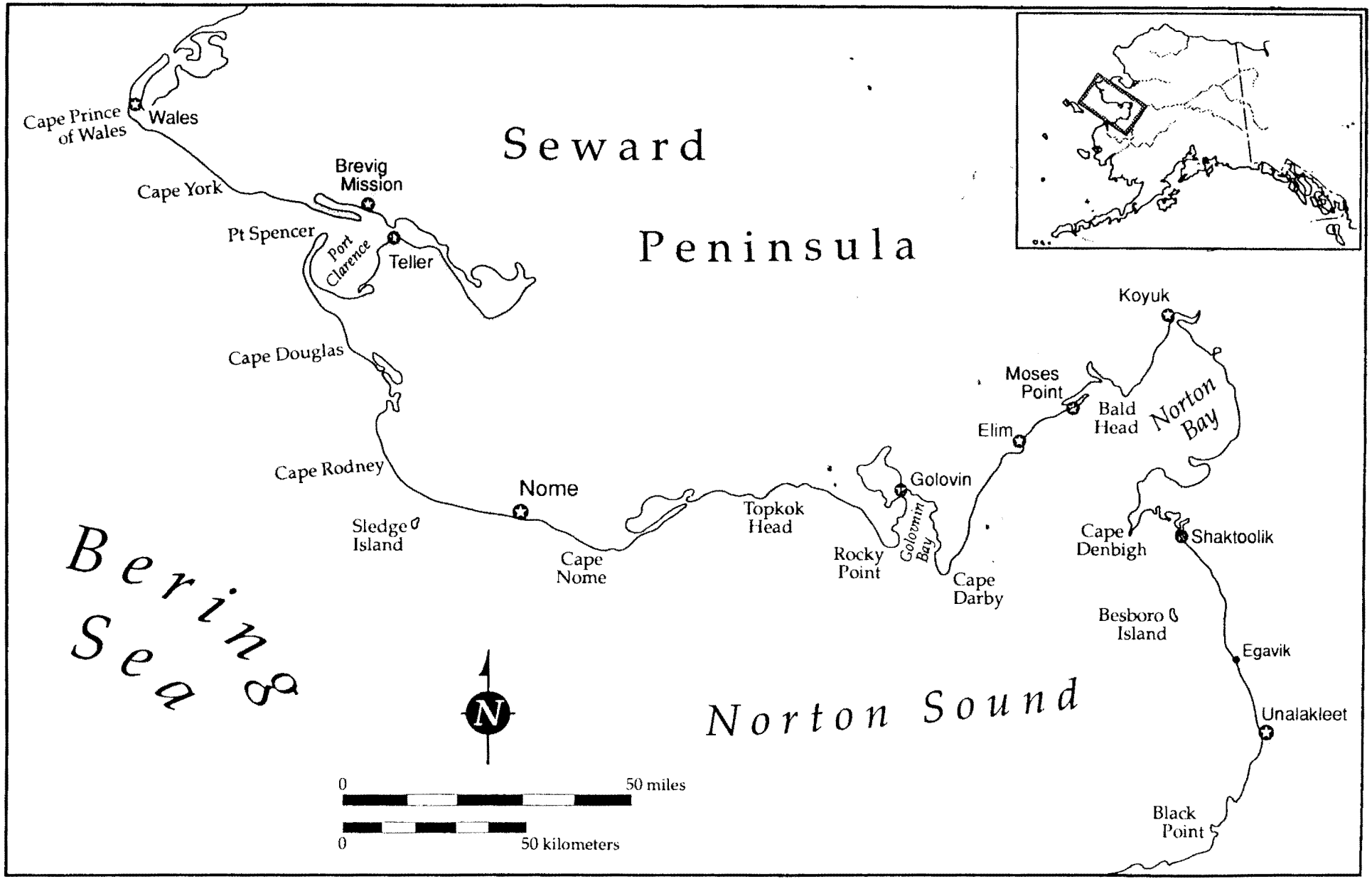

Figure 1. Coastal Norton Sound and southern Seward Peninsula area surveyed for nesting peregrine falcons, 1989.

additional color band (rivet-on, blue anodized aluminum with alpha-numeric code). If the secondary wing feathers of nestlings were sufficiently developed, 1.0-1.5 cm of a feather tip was taken for trace-metal analysis, and a 0.1-0.2 ml blood sample was drawn from selected nestlings for genetic analysis. Prey remains were collected in the vicinity of the nests.

Observations were recorded on 1:63,360- and 1:250,000-scale U.S. Geological Survey maps. Distances were measured from these maps using a digitizing table and microcomputer. Activity, productivity, and nest site characteristics were recorded on Raptor Observation Record Cards. The maps, cards, banding data, and feather and blood samples for chemical contaminant testing were deposited with the U.S. Fish and Wildlife Service Endangered Species Branch, Northern Alaska Ecological Services office in Fairbanks.

RESULTS AND DISCUSSION

Survey Coverage

Approximately 475 miles (765 km) of Bering Sea coastline were surveyed between Black Point and Wales (Fig. 1). In addition to the outer coast of the mainland, the study area included Norton Bay, except for the low coast around the head of the bay near Koyuk, Golovin Bay, Sledge Island, and Port Clarence, except for the low spit leading to Point Spencer.

Because of incessant rain during early July, the 2nd survey was postponed to the end of the month; therefore, the 1989 July survey occurred during a later stage in the peregrine's nesting cycle than the previous years' surveys (i.e., on the average, young were 5-7 days older than those observed in 1987 and 1988). Young at several nests were close to fledging. This difference in timing of surveys may have affected our ability to find nest sites because of (1) the increased foraging (and reduced brooding) activity of both adults and (2) reduced attendance or desertion of territories by adults at unsuccessful nests. Both factors lowered the likelihood of an adult being present at the nest at the time of the survey.

Nesting Territories

Peregrine falcons occupied 25 nesting terrritories; nondefensive single birds were seen at 4 additional locations (Table 1). The average straight-line distance between occupied territories was 13.0 $\pm$ 15.5 (SD) miles (20.9 $\pm$ 25.0 km). The shortest and greatest distances between 2 sites were 0.9 (1.4 km) and 51.3 miles (82.5 km), respectively.

On our 1st skiff survey in this area (July 1987), peregrines were seen at six or seven of 18 sites considered suitable nesting

Table 1. Peregrine falcon observations along the coasts of Norton Sound and southern Seward Peninsula, 1987-88

	1987	1988		1989	
Site	July	June	July	June	July
1	(a)	1 ad	pair,3 yng	none	
2		none	none	none	1ad,4yng
3		2 ad	1 ad	pair	1 ad
4		none	none	none	pair
5		none	none	none	pair,2yng
6		pair	2-3 ad		
7	none	pair	none	1 ad	1 ad
8	pair,4 yng (b)	pair	pair,2 yng	pair	1ad,2yng
9	none	none	none	1 ad	pair
10	pair	pair	pair,3 yng	1 ad	1ad,2yng
11	none	none	none	none	1ad
12	pair,4 yng	1 ad	pair,2 yng	none	pair,2yng
13	none	1 ad	pair,3 yng	1 ad	1ad,2yng
14		1 ad	pair,4 yng	none	none
15		pair	pair	1 ad	pair
16		none	none	none	pair
17	pair (c)	1 ad	pair	pair	1ad,2yng
18	none	none	none	1 ad	none
19	none	1 ad	pair,3 yng	pair,4 eggs	pair,2yng
20	none	none	none	none	pair,2yng
21	1 ad, def	none	none	pair	pair
22	pair,4 yng	1 ad	pair,1 yng	1 ad	pair,2yng
23	none	none	none	pair,3 eggs	abandoned
24	none	pair	pair,2 eggs	none	1 imm. ad
25			pair,1 yng	pair	pair
26	pair,1 yng	1 ad	pair,1 yng	pair, 4 eggs	1ad,0yng
27	pair,3 yng	pair	pair,4 yng	pair, 4 eggs	pair,4yng
28	none	1 ad	pair,3 yng	pair	1ad,4yng
29		1 ad	pair,4 yng	none	pair,3yng
30		none	none	1 ad	none
31		1 ad	pair	pair,2 eggs	pair,2yng
32		none	none	1 ad	none

(a) blank = not visited
(b) yng = young; ad = adult
(c) probable sighting

habitat. By comparison, in June and July 1988, when the area was first surveyed from a helicopter, peregrines were found at 12 of these same 18 sites. In 1989, again using a helicopter during 2 visits, 15 of these sites were occupied and single peregrines were seen in either June or July at each of the remaining 3 sites. This increase in occupancy is probably due to an increase in survey effectiveness (observers becoming more familiar with the study area and survey methods) as well as an actual increase in the number of sites occupied by peregrines.

Surveys of this long, exposed coast are not practical by skiff, because sea conditions and winds frequently make it dangerous to travel near the shore. Also, calm seas are required to survey cliffs from the water. Helicopters have proved to be a much more effective and efficient mode of transportation.

Productivity, Banding, and Nesting Phenology

Fourteen occupied territories were located in July. Two additional territories where eggs were noted in June were no longer active. One of these nests was empty; however, an adult was seen flying in the vicinity. The 2nd nest held 2 addled eggs, and no adults seen nearby. At another site where a pair of adults had been regularly seen for more than a week in early June, only a scrape in the wet soil on a ledge was found as evidence of a nesting attempt. Apparently, the late-spring breakup (coming on the heels of a record snowfall) prohibited nesting at that site.

Thirty-five young were observed at the 14 occupied territories, including 1 nest where an egg had been removed in June for analysis of chemical contaminants. Productivity for these 14 successful pairs averaged 2.5 young per pair. Calculated on the basis of young per total pairs observed (n = 23), productivity averaged 1.5 young per pair. If the 3 nests where eggs had been removed in June are excluded, the comparable values are 33 young at 13 sites, 2.5 young per successful pair (n = 13), and 1.6 young per total pairs (n = 20).

Data from this year are compared with productivity information from 1987 and 1988 in Table 2. Direct comparison with previous years is not possible, because this year's July survey was delayed 2-3 weeks (i.e., about 1 week later in the peregrine's nesting cycle), affording increased opportunity for nestling mortality.

Twenty-five nestlings from 10 nests were banded with USFWS bands and auxiliary color bands. In the past 3 years a total of 62 nestling peregrines have been banded in the study area. No band returns have come to our attention in the past year. In late April 1988, a peregrine that had been banded as a nestling in Norton Sound in July 1987 was trapped and released at Padre Island, Texas.

Table 2. Territory occupancy and productivity of peregrine falcons along the coast of western Alaska, 1987-89.

	Occupancy		Nestling Productivity				
Year	No. of Pairs	No. of Singles	No. of pairs w/ young	% pairs w/ young	No. of young	Young/ pair	Young/ succ. pair
1987	6	0	4	67%	12	2.0	3.0
1988	19	1 or 2	13	68%	34	1.8	2.6
1989*	23	2	14	61%	35	1.5	2.5
1989†	20	2	13	65%	33	1.6	2.5

* includes 3 nests where eggs were removed in June for analysis of chemical contaminants
† excluding 3 nests where eggs were removed

Nestlings observed between 27 and 29 July were estimated to be from 18 to 34 days old. Calculated dates for initiation of laying, hatching, and fledging were 17 May-4 June, 23 June-11 July, and 2-20 August, respectively. Calculations were based on (1) 7 days for laying a complete clutch of 4 eggs, (2) 34 days for incubation beginning 4 days after laying 1st egg, and (3) 40 days from hatching to fledging.

In 1989 laying was delayed an average of 10 to 11 days and was not as synchronous as those in previous years; initial laying dates were spread over a 19-day period in 1989 vs. 6- to 8-day periods in 1988 and 1987 (Fig. 2). The "late nest" on 6 June 1988 (Fig. 2) was probably a renesting attempt, and it was not included in calculation of averages or length of laying period.

The National Weather Service in Nome recorded more snow in the winter of 1988-89 than in any winter since 1951-52. April 1989 had the second-highest snowfall on record, and 16 inches of snow was measured on the ground on 3 May 1989. May 1989 temperatures were 4°F below normal, and a storm on 20 May dropped snow equivalent to 0.75 inches of rain (Rick Tolman, pers. commun.). The late spring breakup and deep snow pack forced the delay in peregrine nesting in 1989. The wide range of nest initiation dates indicates the variable effect a late spring has on individual nest sites.

Prey Remains

Prey remains were collected from 13 nesting territories. Twenty-three types of prey were identified, including 1 waterfowl, 8 shorebirds, 3 larids (gull family), 3 seabirds (alcids), and 13 passerines (Table 3). Remains of black-legged kittiwakes were found most frequently (9 sites), followed by whimbrels (6 sites), and bar-tailed godwits, common snipe, small shorebirds, long-tailed jaegers, auklets, Catharus thrushes, and American robins (4 sites).

Relatively more larids and seabirds and fewer passerines were found in prey remains in 1989, compared with 1987 and 1988 (Fig. 3). Although shorebirds as a group were observed as frequently in 1989 as in 1988, larger species such as whimbrels and godwits were more common in 1989 than they had been previously. The trend toward larger prey in the 1989 sample may be an indication that female peregrines had been hunting more actively than in previous years because of the later date of the July survey. In 1989 most prey remains were collected 5 to 7 days later in the nestling period (young averaged 25 vs. 18-20 days old), when both adults were bringing food to the nest. A change in prey availability may also be a factor in the shift in prey recorded. In 1989 most prey remains were collected in the last week of July, rather than in the 2nd week of July (6-14), as occurred in the 1987 and 1988 surveys.

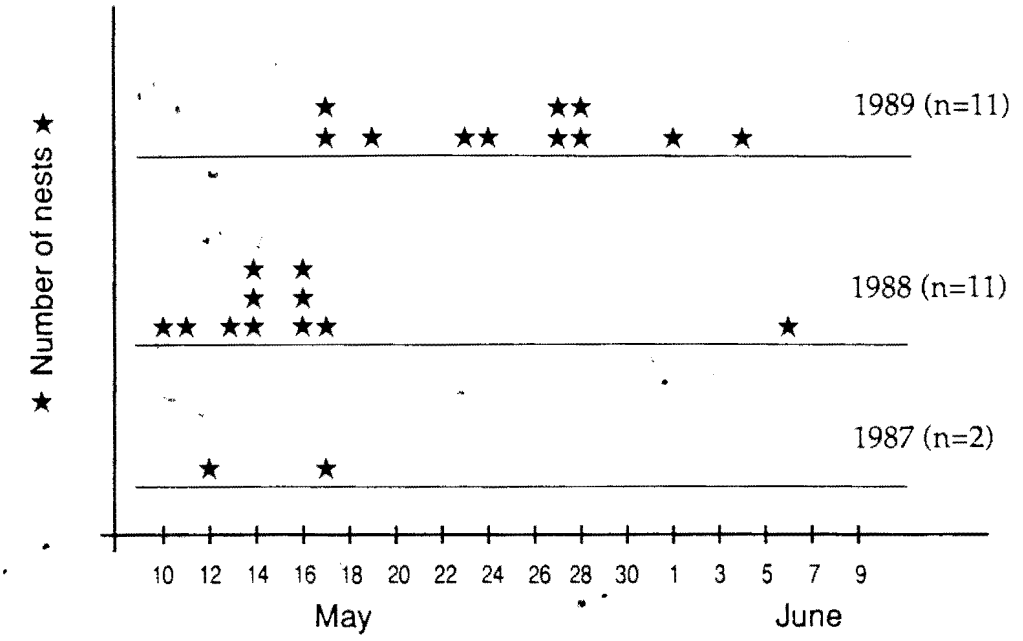

Figure 2. Estimated dates of laying of first egg in peregrine falcon nests along coasts of Norton Sound and southern Seward Peninsula.

Table 3. Prey identified from remains found near peregrine falcon nests, Norton Sound and southern Seward Peninsula coasts, 1989

Species	Site (collection date †)																Total
	3(a)	5(c)	12(c)	13(c)	17(c)	19(a)	19(c)	20(b)	20(c)	21(a)	25(a)	27(c)	28(a)	28(c)	29(c)	31(c)	# sites
Waterfowl (Anatidae)																	
Unknown duck		X				X											2
Shorebirds (Charadridae & Scolopacidae)																	
Golden Plover											X			X	X		3
Pluvialis sp.																	
Bar-tailed Godwit				X						X			X	X			4
Limosa lapponica																	
Whimbrel		X*	X*	X*			X	X			X						6
Numenius phaeopus																	
Red-necked phalarope					X				X								2
Phalaropus lobatus																	
Long-billed Dowitcher	X										X		X				3
Limnodromus scolopaceus																	
Common snipe		X				X		X			X*						4
Gallinago gallinago																	
Unknown med-sized shorebird												X					1
Unknown small shorebird								X				X	X	X*			4
Calidris (prob. mauri or pusilla)																	
Larids (Laridae)																	
Long-tailed jaeger		X*											X	X	X*		4
Stercorarius longicaudus																	
Black-legged Kittiwake		X*	X	X	X*		X		X*			X		X*	X*		9
Rissa tridactyla																	
Arctic tern	X	X															2
Sterna paradisea																	
Seabirds (Alcidae)																	
Guillemot												X					1
Cepphus sp.																	
Auklet (Crested or Parakeet)											X*			X	X	X*	4
Aethia or Cyclorrhynchus sp.																	
Horned Puffin															X		1
Fratercula corniculata																	
Passerines (Passeriformes)																	
Unknown Catharus thrush					X	X	X		X								4
Catharus sp.																	
Varied Thrush		X				X							X				3
Ixoreus naevius																	
American Robin					X	X	X							X			4
Turdus migratorius																	
White-crowned sparrow												X					1
Zonotrichia leucophrys																	
Fox sparrow						X											1
Passerella iliaca																	
Unknown sparrow sp.												X		X*			2
Lapland longspur					X							X					2
Calcarius lapponica																	
Redpoll							X						X				2
Carduelis flammea																	
Total No. types of prey	2	7	2	3	5	6	5	3	3	1	5	7	6	8	5	1	

X = one individual identified
X* = more than one individual identified

† a = collected first half of June
b = collected first half of July
c = collected in last week of July

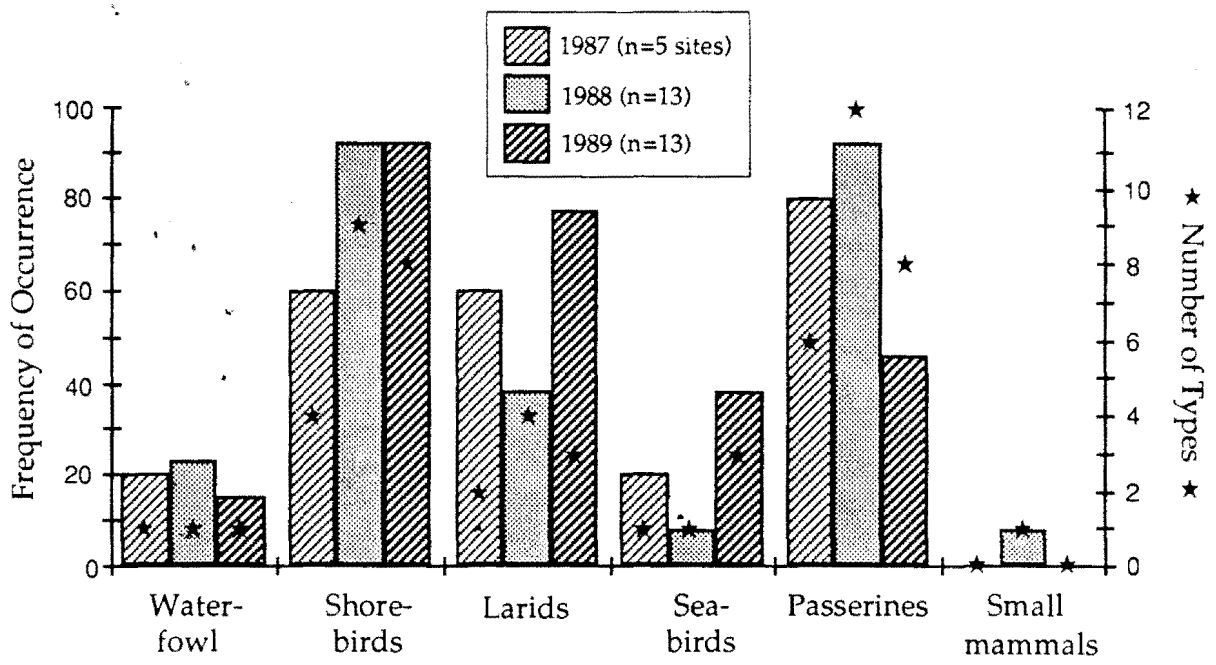

Figure 3. Distribution of prey within prey groups by year, and number of prey types noted within each group. (In 1987 and 1988, prey remains collected in first half of July. In 1989, collected in June and July, but most prey remains collected in late July.)

Trace Metal and Chemical Contaminant Analysis

Feather samples were collected from 22 nestlings at 9 nest sites to determine levels of toxic trace metals. One egg was collected from 3 nests in June as part of the scheduled statewide pesticide monitoring effort outlined in the Alaska Peregrine Falcon Recovery Plan. Two addled eggs were picked up from an abandoned nest in July.

Feather and egg samples were submitted by staff from the U.S. Fish and Wildlife Service Endangered Species Branch in Fairbanks to the U.S. Fish and Wildlife Service Patuxent Analytical Control Facility. Analyses have not yet been completed.

Genetic Analysis

Blood samples were taken from from 14 nestlings at 9 nest sites for use in studying the taxonomic position of the Norton Sound peregrine population. Similar samples were collected from peregrines in other parts of the state by other researchers. Although samples have been submitted by staff from the U.S. Fish and Wildlife Service Endangered Species Branch in Fairbanks to J. L. Longmire of the Los Alamos National Laboratory for analyses, results are not yet available.

Other Raptors

In the course of this peregrine survey, the presence of other birds of prey was noted. The following species were seen: gyrfalcon (Falco rusticolus), 6 sites; rough-legged hawk (Buteo lagopus), 13; golden eagle (Aquila chrysaetos), 6; and common raven (Corus corax), 30.

CONCLUSIONS AND RECOMMENDATIONS

Peregrine falcons are widely distributed and fairly abundant throughout the Norton Sound and southern Seward Peninsula coastal area. More active sites were found in 1989 than in 1988 or 1987. This increase is probably due to both increased survey effectiveness and an actual increase in peregrine numbers.

Prey remains collected near nest sites in 1989 indicate more larids, seabirds, and large shorebirds are taken by peregrines than was previously noted. Most prey remains were collected later in the nesting cycle in 1989 than those collected in 1988 and 1987.

Analyses of trace metals and chemical contaminants have not been completed. Concern over mercury in nearshore waters and sediments suggests that monitoring of mercury levels in feathers of nestling peregrines be continued. This is a simple and inexpensive method of measuring trace minerals in a species foraging at the top of the marine food chain.

The coastal area south of the present study area has not been surveyed for nesting peregrines. If the Norton Sound coast was populated by peregrines dispersing from the lower Yukon River, as seems most likely, then there is a good chance that peregrines have also occupied areas along the coast south of the mouth of the Yukon River.

ACKNOWLEGMENTS

This project was funded by the U. S. Fish and Wildlife Service. Tim Sell, Lee Merrick, and Jim Frazier generously volunteered their time and skill as observers and banders. Dan Benfield, Minerals Management Service, Richard Harris, U.S. National Park Service, and Jeff Hughes, ADF&G, also helped as observers. Alaska Department of Fish and Game staff in Nome provided logistical aid. Dan Gibson, University of Alaska Museum, and Peter Bente, U.S. Fish and Wildlife Service, helped identify prey remains. Skip Ambrose, U.S. Fish and Wildlife Service, provided valuable advice throughout the project.

LITERATURE CITED

Hickey, J. J., ed. 1969. Peregrine falcon populations: their biology and decline. Univ. Wisconsin Press, Madison. 596pp.

Hughes, J. 1986. Documentation of peregrine falcon nest sites in relation to state land use proposals. Alaska Dep. Fish and Game. Final Rep. Proj. SE-2-1. Juneau. 8pp.

U.S. Fish and Wildlife Service. 1982. Recovery plan for the peregrine falcon-Alaska population. Prepared by Region 7 USFWS in cooperation with the Alaska Peregrine Falcon Recovery Team. Fish and Wildlife Reference Service, Denver, Colo. 69pp.

White, C. M. 1968. Diagnosis and relationships of the North American tundra-inhabiting peregrine falcons. The Auk 85(2):179-191.

Wright, J. 1987. Documentation of active peregrine nest sites. Alaska Dep. Fish and Game. Final Rep. Proj. SE-2-2. Juneau. 10pp.

_____. 1989. Documentation of active peregrine nest sites. Alaska Dep. Fish and Game. Final Rep. Proj. SE-2-3. Juneau. 13pp.