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FINAL REPORT (RESEARCH)

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Project No.: SE-2-3 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 1988-28 February 1989

SUMMARY

The coast of western Alaska from southern Norton Sound to Cape Prince of Wales was surveyed for nesting peregrine falcons (Falco peregrinus) in June and July 1988. Twenty sites were occupied by peregrines. The average straight-line distance between occupied sites was 17.8 ± 15.9 (SD) miles (28.7 ± 25.6 [SD] km). Breeding attempts occurred at 14 of 19 sites where pairs were observed. These results confirm that there is a considerable and previously undocumented breeding population of peregrines in the coastal region of Norton Sound.

An average of 2.6 young were counted in the 13 successful nests. Two viable eggs were present in an additional nest. Twenty-nine young were banded with USFWS bands. A nestling peregrine falcon that had been banded during the 1987 Norton Sound survey was captured and released during spring migration in April 1988 at Padre Island, Texas, on the coast of the Gulf of Mexico, supporting the visual assessment that the peregrines nesting in the Norton Sound area belong to the endangered F. p. anatum or F. p. tundrius subtaxa.

TABLE OF CONTENTS

SUMMARY i
BACKGROUND 1
OBJECTIVES 2
STUDY AREA AND METHODS 2
RESULTS AND DISCUSSION 4
Survey Coverage 4
Nesting Territories 4
Productivity, Banding, and Nesting Phenology. 6
Prey Remains. 6
Other Raptors 9
RECOMMENDATIONS. 9
ACKNOWLEDGMENTS. 11
LITERATURE CITED 11
Personal Communications 13

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). Three subtaxa of peregrine falcon occur in Alaska. 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 (P. 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, which 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 to nonendangered levels, 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 recent information on the status of nesting peregrines on the western coast of Alaska was needed (Hughes 1986). A preliminary survey of the

area found a surprising number of peregrine falcons (Wright 1987). This follow-up survey was conducted so that a more accurate assessment of the abundance of nesting peregrines in coastal western Alaska could be made.

OBJECTIVES

To locate nesting territories occupied by peregrine falcons along the coast of western Alaska, determine productivity, band nestlings, and collect prey remains.

STUDY AREA AND METHODS

In June and July 1988 we surveyed potential peregrine falcon nesting habitat along the coast of western Alaska from southern Norton Sound, south of Unalakleet, to Cape Prince of Wales at Bering Straits (Fig. 1). Two visits were made to the study area.

The purpose of the 1st survey (3 to 7 June) was to determine the presence or absence of peregrines at likely nesting sites. Using a Bell Jet Ranger 206 helicopter, a pilot and 3 observers flew along the coast. When a cliff or bluff was encountered, we decreased airspeed so that we could closely scrutinize the 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 behind the cliffs and searched for peregrines on foot to minimize disturbance to the seabirds. In some areas with low, flat shorelines, we flew parallel to the coast at distances of 5 or 6 miles inland to investigate potential nesting habitat on hills. Observations of falcons and other birds were recorded on this survey, but no concerted attempt was made to pinpoint nest sites.

The 2nd survey was conducted from 6 to 11 July. As in the 1st survey, a pilot and 3 observers in a Bell helicopter flew along the coast searching potential nesting habitat; however, we landed when peregrines were observed as well as at the locations where peregrines had been seen in June so that the exact location of nests could be determined. When a nest was located, we climbed to the site to count and, when possible, band nestlings. Young were banded with USFWS lock-on aluminum leg bands and, in some cases, with an additional color band (i.e., rivet-on, blue anodized aluminum with alpha-numeric

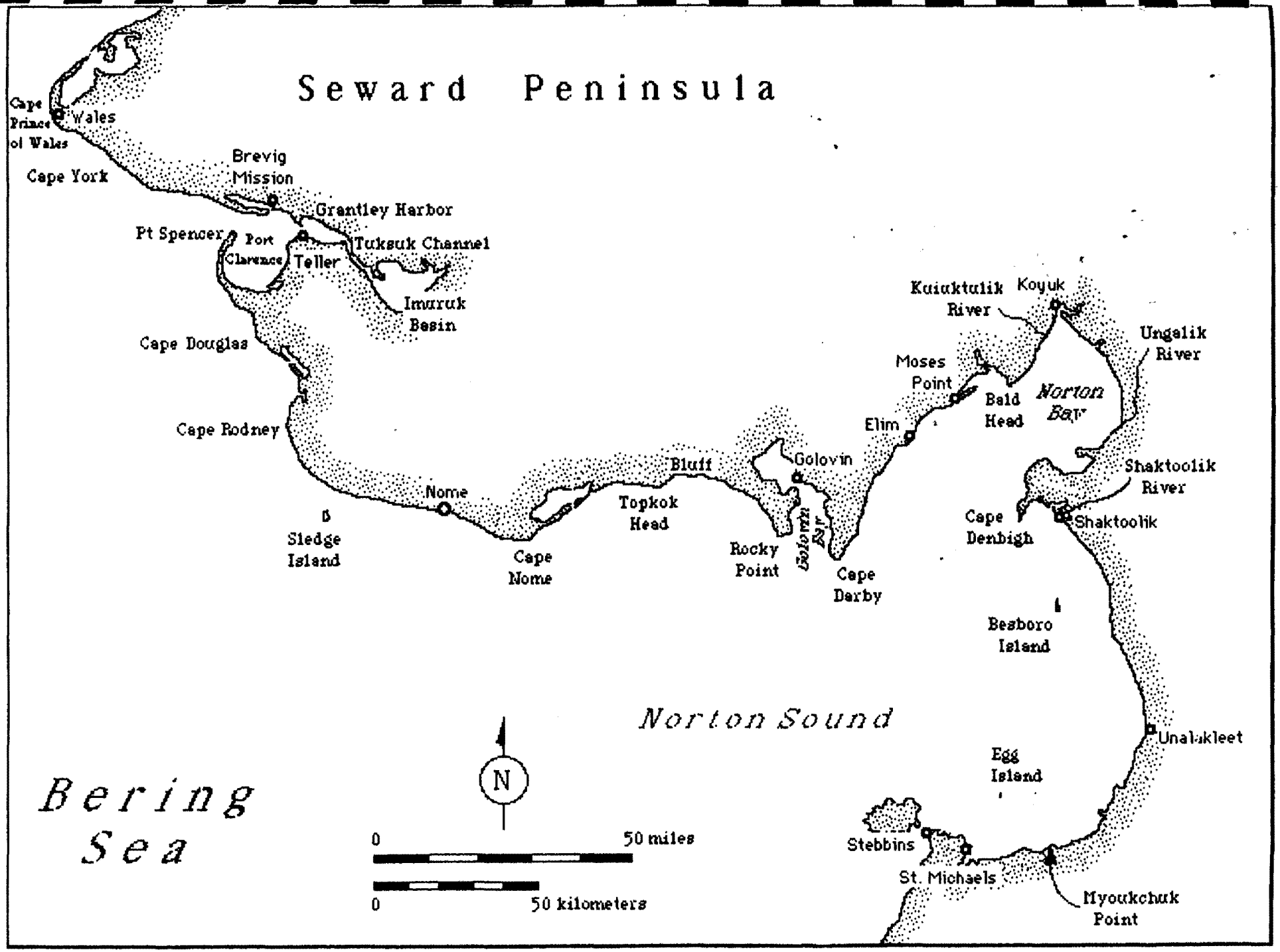

Figure 1. Areas surveyed for peregrine falcons along coastal western Alaska, 1988.

code). 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 micro-computer. The maps, banding data, and compiled information on peregrine falcons at potential nesting habitats in coastal western Alaska were deposited with the USFWS Endangered Species Branch, Northern Alaska Ecological Services office in Fairbanks.

RESULTS AND DISCUSSION

Survey Coverage

We surveyed approximately 493 miles (788 km) of Bering Sea coastline between Myoukchuk Point and Wales (Fig. 1). In addition to the outer coast of the mainland, the study area included (1) the shorelines of Egg, Besboro, and Sledge Islands; (2) Norton Bay, except for the low coast around Koyuk from the Ungalik River to the Kuiuktulik River; (3) Golovin Bay; (4) Port Clarence, except for the low spit leading to Pt. Spencer; and (5) Grantley Harbor and Tuksuk Channel. We also flew 27 river miles (44 km) up the Shaktoolik River from the coast.

Using a helicopter we were able to rapidly scout for potential nesting habitat and search cliff faces. Compared with the 1987 survey, when we attempted to cover this large expanse of exposed coast line in an outboard-powered inflatable skiff, the 1988 survey in the helicopter was much more efficient.

Nesting Territories

Peregrine falcons were observed at 20 sites. Pairs were seen at 19 locations. At the 20th site, 2 adults were seen flying approximately 1 mile apart in June, and a lone adult was seen in July (Table 1). The average straight-line distance between occupied sites was 17.8 ± 15.9 (SD) miles (28.7 ± 25.6 [SD] km). The shortest and greatest distances between 2 sites were 0.8 (1.3 km) and 50.5 miles (81.2 km), respectively.

In July nests were located at 13 sites and a pair with 1 fledged young was later seen at another site. Three other pairs were present at apparently suitable nesting habitat, but no nests were found.

We observed a minimum of 46 areas along the coast that provided suitable nesting habitat. Some of these were several miles long and, therefore, could potentially harbor more than

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

	1987	1988	
Site	July	June	July
1	nv [a]	1 ad [f]	pair, 3 yng
2	nv	2 ad	1 ad
3	nv	pair	2-3 ad
4	none	pair	none
5	pair, 4 yng [b]	pair	pair, 2 yng
6	pair, ?yng [c]	pair	pair, 3 yng
7	pair, 4 yng	1 ad	pair, 2 yng
8	none	1 ad	pair, 3 yng
9	nv	1 ad	pair, 4 yng
10	nv	pair	pair, ? [g]
11	pair? [d]	1 ad	pair, ? [g]
12	none	1 ad	pair, 3 yng
13	pair, 4 fldg [e]	1 ad	pair, 1 fldg [e]
14	none	pair	pair, 2 eggs [h]
15	nv	nv	pair, 1 yng [i]
16	pair, 1 yng	1 ad	pair, 1 yng
17	pair, 3 yng	pair	pair, 4 yng
18	none	1 ad	pair, 3 yng
19	nv	1 ad	pair, 4 yng
20	nv	1 ad	pair, ? [g]

[a] nv = not visited
[b] yng = young
[c] young likely present but couldn't see into nest
[d] probable sighting
[e] fledged young seen in early August (J.Schauer, pers.comm.)
[f] ad = adult
[g] pair frequented site but not overtly defensive
[h] eggs pipping on 11 July 1988
[i] reported by Tony Booth, pers. comm.

1 nesting pair; however, other areas were broken up and counted as more than one, because more than 1 pair of peregrines had been present.

In July 1987 peregrines were observed at 6 or 7 of 18 sites. In July 1988 peregrines were found at 11 of these same 18 sites, including all of the sites that were occupied in 1987. The larger number of peregrines observed in 1988 is more probably due to increased survey effectiveness, rather than a dramatic increase in nesting peregrines. During the 1987 survey, rough seas and onshore winds frequently prevented us from approaching shore close enough to search thoroughly.

Productivity, Banding, and Nesting Phenology

Thirteen pairs produced at least 34 young, and an additional nest held 2 eggs that were pipping when last visited on 11 July. Productivity for successful nests averaged 2.6 young (n = 13); when the nest with 2 eggs was included in calculations, productivity averaged 2.6 young/successful nest (n = 14)]. Calculated on the basis of young per total pairs observed (n = 19), productivity averaged 1.8 young/pair, or 1.9 young/pair if nest with 2 eggs is counted as 2 young. The productivity for 1987 and 1988 is summarized in Table 2.

Twenty-nine nestlings from 10 nests were banded with USFWS bands; 16 of these were also fitted with color bands. One of the nestlings that had been banded in July 1987 was trapped and released during spring migration on Padre Island, Texas, on 26 April 1988, supporting our visual assessment that this coastal population consists of birds belonging to F. p. anatum or F. p. tundrius, rather than the F. p. pealei subtaxa.

Nestlings observed between 6 and 11 July were estimated to be from 16 to 21 days old. Calculated dates for initiation of laying, hatching, and fledgling were 9-17 May, 18-24 June, and 28 July-2 August, respectively. These dates are essentially the same as those observed in 1987. The one nest with eggs pipping on 11 July was unusually late; laying probably occurred on 6 or 7 June, 3 weeks later than the other nests. These calculations are based on the following parameters: (1) 7 days for laying a complete clutch of 4 eggs, (2) 34 days for incubation beginning 4 days after laying, and (3) 40 days from hatching to fledging.

Prey Remains

Prey remains were collected from 13 sites. Twenty-nine types of prey were identified, including more than 1 waterfowl, more than 9 shorebirds, 4 larids, 1 alcid, 13 passerine species, and 1 small mammal (Table 3). Remains of common snipe were

Table 2. Territory occupancy and productivity of peregrine falcons along the coast of western Alaska, 1987-88.

	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

Table 3. Prey identified from remains found near peregrine falcon nests, Norton Sound and southern Seward Peninsula coasts, 1988

Species	Site 1	3	5	7	8	9	11	12	16	17	18	19	20	Total sites
Unknown duck *Anatidae*	X	X					X							3
Black-bellied Plover *Pluvialis squatarola*	X													1
Bar-tailed Godwit *Limosa lapponica*								X		X				2
Whimbrel *Numenius phaeopus*		X	X						X					3
Unknown yellowlegs *Tringa sp.*					X									1
Red-necked phalarope *Phalaropus lobatus*			X	X					X					3
Long-billed Dowitcher *Limnodromus scolopaceus*												X		1
Common snipe *Gallinago gallinago*	X*		X	X*	X	X*	X	X	X		X	X		10
Unknown med-sized shorebird				X			X							2
Unknown small shorebird	X		X		X				X		X			5
Unknown jaeger *Stercorarius sp.*	X													1
Glaucous gull *Larus hyperboreus*			X											1
Black-legged Kittiwake *Rissa tridactyla*									X			X		2
Arctic tern *Sterna paradisea*													X	1
Crested Auklet *Aethia cristatella*												X		1
Gray Jay *Perisoreus canadensis*						X								1
Gray-cheeked thrush *Catharus minimus*													X	1
Unknown thrush *Catharus sp.*	X			X*		X		X						4
Varied thrush *Ixoreus naevius*				X*	X	X								3
American robin *Turdus migratorius*		X			X	X*		X						4
Savannah sparrow *Passerculus sandwichensis*			X											1
American tree sparrow *Spizella arborea*			X	X		X								3
White-crowned sparrow *Zonotrichia leucophrys*				X										1
Fox sparrow *Passerella iliaca*		X	X	X		X	X							5
Unknown sparrow sp.	X			X										2
Lapland longspur *Calcarius lapponica*			X			X		X			X			4
White-winged crossbill *Loxia leucoptera*			X											1
Redpoll *Carduelis flammea*			X			X			X					3
Arctic Ground Squirrel *Spermophilus undulatus*												X*		1
No. Types of prey	7	4	11	9	5	9	4	5	6	1	3	5	2	

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

found at 10 sites; fox sparrow at 5 sites; American robin and Lapland longspur at 4 sites; and whimbrel, red-necked phalarope, tree sparrow, and redpoll at 3 sites. One pair of peregrines appeared to rely heavily on Arctic ground squirrels.

The greater number of prey types collected in 1988, compared with 1987 (29 vs. 14), is probably due to the larger number of collection sites (13 vs. 5) and larger total number of prey samples, rather than any change in feeding habits. The proportion of prey within the various prey groups is similar for both years. It should be emphasized that our sample of prey remains relied on a single collection time and may not be representative of the prey taken earlier or later in the breeding season.

Other Raptors

Six gyrfalcon (Falco rusticolus) nest sites were observed with broods of 1, 1, 1, 1, 2, and 2 or 3 young. Rough-legged hawks (Buteo lagopus) were present at 15 sites, and 10 nests were observed; clutches of 5 and 7 eggs were noted in June, and broods of 2 (from the 5 egg clutch), 4, 4, and 5 (from 7 eggs) young were observed in July. Five active golden eagle (Aquila chrysaetos) nests were found along the coast, with broods of 1, 1, 2, and 3 young observed. Common ravens (Corvus corax) were observed or suspected of nesting at 27 sites.

Conclusions and Recommendations

This survey confirms that the peregrine falcon is presently well distributed and relatively abundant in the Norton Sound and southern Seward Peninsula coastal areas. Based on studies conducted in the late 1950's and the late 1960's through the early 1970's, previous authors have speculated that peregrines in coastal western Alaska were severely limited either by competition with gyrfalcons (Cade 1960) or by the insufficient number and wide separation of suitable nesting sites (Roseneau et al. 1976). However, as as Roseneau et al. (1976) also noted, detailed historical information on peregrines in that region was lacking, and the only specific surveys for nesting peregrines had been conducted during the time when other Alaskan populations were at the bottom of a significant decline. Extensive surveys along the Seward Peninsula (including the northern side) and Norton Sound coasts between 1968 and 1972 found only 1 pair of peregrine falcons (and it was on the northern Seward Peninsula); moreover, a review of historical records revealed only 10 valid reports of nesting peregrines, ever, along the coast between Barrow and the Walrus Islands in Bristol Bay (Roseneau et al. 1976). More recent reports have suggested that the peregrine falcons were

becoming more common in the Norton Sound area during the late 1970's and early 1980's (Steele and Drury 1977; Biderman et al. 1978; Sowls et al. 1978; Ramsdell and Drury 1979; M. Jacobsen, pers. commun.; B. Kessel, pers. commun.). Therefore, while it is not possible to compare the results of this survey with a long historical record, it appears that the numbers of peregrines in the Norton Sound area may have followed the same pattern as reported in other parts of Alaska: a dramatic decline starting in the 1950's or early 60's, a bottoming out in the early 70's, the beginning of a strong upward trend in the late 70's, and its continuation through the 1980's (Ambrose et al. 1988).

The presence of a substantial number of breeding peregrines along the Norton Sound and southern Seward Peninsula coasts is now documented. Additional studies may be required if the potential impacts of human developments on peregrines are considered in this region. Surveys of peregrines should be continued in the Norton Sound to monitor nest site occupancy and productivity. A study to determine whether the local population belongs to F. p. anatum or F. p. tundrius would be necessary, if the two subtaxa continue to be treated individually by regulatory authorities. Genetic analyses based on blood samples hold some promise for field-based studies (Longmire 1988; G. Shields, pers. commun.). Levels of toxic heavy metals, particularly mercury, that are associated with existing and proposed offshore dredge-mining activities in Norton Sound should be monitored. Mercury is one of the toxins implicated in population declines of peregrine falcons and other raptors (Newton 1979). Mercury levels can be measured efficiently in birds by analyzing feathers (Kochert 1972). Feather samples from peregrine nestlings would reflect mercury levels found in the nesting environment, because the young are fed prey taken near their nest sites (and nestlings have not migrated great distances as adults have). Feather samples from peregrine nestlings from other nest sites in Norton Sound not influenced by mining activity and from other regions of the state (e.g., upper Yukon River) could serve as controls. Analysis of feathers found in prey remains would provide information on heavy metals in a variety of prey species.

The organochlorine pesticide levels in peregrines that have been exposed to the effects of offshore dredge mining should be monitored. The decline of the peregrine populations in North America from the 1950's through the early 1970's was caused by these pesticides. Since mercury may affect reproduction in peregrines, as do organochlorine pesticides, a pesticide-monitoring program would help identify which factors are involved if production declines. Collection of eggs may be necessary for pesticide analysis.

The discovery of this unsuspected number of breeding peregrine falcons suggests that other parts of coastal western Alaska may also harbor surprisingly large numbers of peregrines. A likely source of the Norton Sound birds is the lower Yukon River, where a large, growing population of peregrines (F. p. anatum) has been monitored with annual surveys (Ambrose 1987). Peregrine falcons from the lower Yukon River may have dispersed to Norton Sound as well as along the coast south of the Yukon River. A reconnaisance survey along the coast south of the present study area (i.e., from St. Michaels to northern Bristol Bay) would provide information on an area that has never been extensively surveyed for nesting peregrines.

Such surveys of potential nesting habitats should be conducted periodically in all portions of the ranges of F. p. anatum and F. p. tundrius to compliment the intensive studies annually undertaken on a few Alaskan rivers. Extensive regional surveys provide valuable information on the status of recovering populations as well as site-specific information for planning and management efforts required to minimize impacts on these endangered raptors.

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