

STATUS OF PEREGRINE FALCON POPULATIONS IN ALASKA, 1985

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ABSTRACT.--Prior to the 1965 Peregrine conference, little work had been done on Peregrine Falcons (Falco peregrinus) in Alaska. One exception was research on the peregrine population along the Colville River in northern Alaska which was studied intensively by T. Cade during the 1950s (Cade 1960). Following the 1965 conference, the Colville River population, as well as the upper Yukon River population, was examined closely to determine status and pesticide contamination levels. Studies in the late 1960s reported populations which apparently were reproducing normally although pesticide levels were considered high. It now appears, based on productivity during recent years, that the surveys during the 1960s were observing declining populations. Declines of both F. p. tundrius in northern Alaska and F. p. anatum in interior Alaska continued through the early 1970s, declining to approximately 35% and 45%

respectively of their historical levels. Intensive surveys since 1979 covering over 2000 river miles per year recorded increases of both populations to near normal levels along the major rivers. Surveys of small, isolated populations during the same period also recorded increases but to a lesser degree. Furthermore, surveys in the Aleutian Islands and southeast Alaska showed that Alaska's third peregrine subspecies, F. p. pealei, apparently is a healthy population reproducing at normal levels.

THREE subspecies of Peregrine Falcon (Falco peregrinus) occur in Alaska: F. p. tundrius inhabits the northern tundra region of the state; F. p. anatum occurs in the forested interior; and F. p. pealei occurs in the coastal regions of the Aleutian Islands, Gulf of Alaska, and southeast Alaska (Figure 1). Both F. p. tundrius and F. p. anatum are highly migratory and winter as far south as northern Argentina. F. p. pealei is for the most part resident in its range year round but some movement along the west coast of Canada and the United States may occur.

All three subspecies have been studied in Alaska; the threatened and endangered populations (F. p. tundrius and F. p. anatum) were the subject of most of the work. Results of statewide surveys in Alaska were summarized in 1970 (Cade and Fyfe 1970) and again in 1975 (Fyfe et. al. 1976). Since then an intensive survey and banding program in interior and northern Alaska, and extensive surveys in the range of F. p. pealei, have occurred. The purpose of this paper is to present the results of these surveys between 1979 and 1985,

with emphasis on areas for which historical data are available, and compare our results with those of earlier surveys. Different survey methods, different site numbering systems, and slightly different study area boundaries made the results of some surveys difficult to interpret and compare with each other and with recent surveys. For this reason, this paper does not address specific site occupancy, but focuses on the number of birds present and the number of young produced within specific study areas since 1965.

STUDY AREAS AND METHODS

In northern Alaska, work concentrated on the Colville and Sagavanirktok rivers, and in the interior, on the upper Yukon and Tanana rivers (Figure 1). The Colville River study area was that portion between the Etivluk River and Ocean Point, a distance of 295 km. The Sagavanirktok River was studied between Slope Mountain and Franklin Bluffs, a distance of 180 km. The upper Yukon study area was between the Alaska-Yukon Territory border and Circle, Alaska, a distance of 265 km., and the Tanana River study area was between Tanacross and Fairbanks, Alaska, a distance of 375 km. In both northern and interior Alaska, other areas were surveyed but to a lesser extent than the principal study areas. In the range of F. p. pealei, surveys have been limited to a few islands in the Aleutian chain and to the outer coast in southeast and southcentral Alaska.

Riverboats or inflatable rafts were used most often for surveys in northern and interior Alaska. In most cases two trips were made through each study area each year: an early survey during incubation to determine the

number of birds present and attempting to breed, and a second survey when young were 2 to 3 weeks old to determine productivity and to band the young. Surveys in the Aleutian Islands relied on boat, foot, and helicopter transportation, whereas those in southeast and southcentral used only boats. Visits to study areas in the range of F. p. pealei generally were limited to one per year.

RESULTS AND DISCUSSION

Falco peregrinus tundrius. Peregrine Falcons nesting along the Colville River have been studied since the 1950s (Cade 1960, White and Cade 1971, Cade and White 1976, unpubl. USFWS reports 1979, 1980, unpubl. BLM reports 1981, 1982, 1985) and those along the Sagavanirktok River since 1970 (unpubl. USFWS reports 1970, 1972, 1982, Roseneau et al. 1976, unpubl. Northwest Alaska Pipeline Co. reports 1981, unpubl. BLM report 1985). Also, other drainages were surveyed, although to a lesser degree: Utokok (Fyfe et al. 1976, White and Boyce 1978, unpubl. BLM report 1985), tributaries of the Colville and other northwestern Alaska drainages (Roseneau and Springer 1976, White and Boyce 1978) and rivers in northeastern Alaska (Roseneau et al. 1976, unpubl. USFWS reports 1985). Although some changes in numbers are artifacts of sampling procedures and a few records are suspect because of possible confusion with gyrfalcons, the results of these surveys offer a good picture of the status of Peregrine Falcons in northern Alaska.

The Colville River was the only area in the state in which intensive studies were undertaken prior to the mid-1960s. On surveys in 1952 and 1959,

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Cade (1960) observed 32 pairs and 44 young and 36 pairs and 50 young respectively. A severe decline in the number of young produced and an increase in nesting failures was evident on the Colville River between 1969 and 1971. Surveys in 1973 revealed a drastic decline in occupancy and productivity with 14 pairs producing only nine young that year (Cade and White 1976). By 1980, the number of pairs on the Colville had increased to 21 and productivity exceeded 1.0 young/starting pair for the first time since 1968. Increases have continued through 1985 (Table 1). In 1985, 29 pairs and five lone adults occupied cliffs along the Colville and 18 of these pairs produced 50 young. This compared with 26 to 31 pairs in the previous three years (1982-1984); the number of young produced during this period ranged from 47 to 52.

From 1982 through 1985, an average of 62% of the pairs were successful in producing young and averaged 2.85 young per successful pair. In 1952 and 1959, 68% of the pairs were successful and produced 2.04 young per successful pair. In comparison, on the upper Yukon between 1981 and 1985, 77% of the pairs were successful and produced an average of 2.62 young per successful pair. In Greenland between 1972 and 1982, an average of 84% of the pairs were successful and produced an average of 2.8 young per successful pair (Burnham and Mattox 1984). Thus it appears that productivity along the Colville may have been below normal even during the 1950s. Three eggs collected on the Colville by J.W. Bee in 1952 had shell indices of 1.45 to 1.50 (Cade et al. 1971), values generally associated with decreased productivity (Anderson and Hickey 1972).

Although we do not have as complete a history for the Sagavanirktok River

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as the Colville, there were probably five to eight sites occupied in the pre-pesticide era (USFWS 1982). The number of pairs and productivity had declined by the early 1970s, but at least three pairs regularly occurred there through 1980. Increases were first observed in 1981 and have continued through 1985. In 1985, at least seven pairs were present on the Sagavanirktok and six of these produced 21 young. Although the apparent rate of increase may be attributed partially to differences between surveys, an increase in productivity and a high occupancy rate both indicate a measure of stability not recorded during any survey between 1970 and 1980.

Sections of nine other rivers in northern Alaska (Canning, Aichillik, Toolik, Chandler, Anaktuvuk, Utokok, Kavik, Etivluk and Nigu) historically used by peregrines were surveyed in 1985. Ten occupied sites were observed (seven pairs and three lone adults) (Table 2). This is a conservative value because aerial surveys on four rivers were opportunistic and covered less than 60% of the traditionally used habitat. Furthermore, recent sightings of peregrines on other rivers that probably hosted nesting pairs regularly in the past attest to the increasing population in northern Alaska. These sightings include records of peregrines on the Ikpikpuk River (three adults at three locations, June 1982, Bendock pers. comm. 1985), upper Colville River (two pairs, June 1984, Silva pers. comm.), Kogosukruk River (two pairs, 1981) and Killik River (one pair, 1985).

The Alaska Peregrine Falcon Recovery Team estimated an historical population of 150 pairs for Alaska's tundra regions (USFWS 1982). The recovery of the F. p. tundrius population in Alaska has been underway since 1980, and we are now seeing the reoccupation of some drainages that had been

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unoccupied or had severely reduced populations in the 1970s. However, this population has yet to reach what might be considered normal or historical levels of occupancy and productivity. In 1985, 44 pairs were recorded in an area where at least 66 pairs may have occurred in the 1950s.

Falco peregrinus anatum. As early as 1898, biological surveys noted the occurrence of peregrines along the Yukon River (Bishop 1900), and in the 1920s along the Porcupine and Tanana rivers (O. Murie, unpubl. field notes, Univ. Alaska, Rasmuson Library). In the 1950s Cade (1960) surveyed the upper Yukon River and also worked there during the 1960s and 1970s (Fyfe et. al. 1976). When the USFWS initiated a survey and banding program in 1979, the upper Yukon and Tanana Rivers were selected for study because of the historical data available. Since then several other rivers also were surveyed: the middle and lower Yukon, the Porcupine and the Black (unpubl. USFWS reports 1979-1985), the Charley and the Kandik (unpubl. NPS reports 1980-1985), the Fortymile, the Dulbi, the Melozinta, the Gisasa, Beaver Creek and Birch Creek (unpubl. BLM reports 1979-1985), the Kuskokwim (Ritchie and Ambrose 1980, Mindell 1983), and the Kisaralik (Wier 1982, Mindell pers. comm.).

Surveys along the upper Yukon in 1898 (Bishop 1900) and in 1952 (Cade 1960) recorded 16 pairs in the study area. These surveys were done in late July and early August and could have missed unsuccessful pairs or adults and young away from the cliff after young had fledged. Consequently, when intensive surveys were done in this area in 1966 (Cade et al. 1968) and 16 pairs were recorded, researchers thought that the population was healthy. Surveys on the upper Yukon during the past three years however recorded an

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average of 26 pairs per year, and it is likely that at least this many pairs were present prior to the 1950s. As already mentioned, the low number of pairs observed by Cade in 1952 may have been the result of the late survey, but it is possible that the population was already declining.

The population on the upper Yukon declined through 1973, stabilized during 1974-1977 (Cade et al. 1976), and increased from 1978-1983. The population has remained stable since 1983. The upper Yukon has averaged 26 pairs and 50 young produced since 1983 (Table 3). For the past five years productivity for peregrines along the upper Yukon averaged 2.02 young per starting pair and 2.62 young per successful pair. Also, during the past five years, 77 percent of the pairs were successful in producing young.

Surveys on the upper Tanana River prior to 1970 covered only portions of the study area so the total number of sites occupied in any one year is not easily determined. In 1968, there may have been as many as 12 pairs and 23 young and in 1970 there were six pairs and 16 young (Haugh 1976). This population declined through the mid-1970's, reached its lowest level of apparently two pairs in 1974 (Haugh 1976), and began to increase in 1977. The Tanana population has remained at four to five pairs producing 4 to 12 young per year since 1978. Development along the Tanana River (extensive clearing for agriculture, home construction near Delta and Fairbanks) may prevent this population from ever fully recovering.

Occupancy and productivity trends of the peregrines along the upper Yukon are likely representative of the peregrine population in interior Alaska (with the exception of the Tanana River). Although other areas in interior Alaska lack good historical data, surveys since 1979 recorded increases in these

areas paralleling the upper Yukon. Some of the fluctuations in numbers may reflect differences in surveys. Including the observations on the upper Yukon and Tanana, the number of pairs and number of young observed in interior Alaska since 1979 are as follows: 1979, 62 pairs and 113 young; 1980, 76 pairs and 156 young; 1981, 83 pairs and 197 young; 1982, 87 pairs and 159 young; 1983, 103 pairs and 202 young; 1984, 94 pairs and 189 young; and 1985, 106 pairs and 191 young.

Cade (1960) estimated that there may have been 250 pairs of peregrines in the forested interior of Alaska. Surveys during the past four years located nearly 100 pairs per year, and it is likely that once the population is recovered fully at least this many pairs could nest in areas outside those of our study areas. The situation in the interior is similar to that of the north slope: the numbers of pairs have been increasing since the late 1970s and are now apparently at or near historical levels in most areas; surveys of smaller drainages in recent years indicated that those areas are being reoccupied as well.

Falco peregrinus pealei. Compared with information on intensively surveyed populations of F. p. anatum and F. p. tundrius in Alaska, our information on F. p. pealei is limited (Table 4). Although the presence of peregrines in coastal areas of southern Alaska was documented in the late 19th century (e.g., Dall 1873, Turner 1886) their distribution and density remained largely undetermined until recently. Data on reproduction are too scant to warrant discussion here.

As late as 1960 about 100 pairs were thought to inhabit the Aleutian

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Islands (Cade 1960), based largely on the work of Murie (1959) in the 1920s and 1930s. To date, only the Rat Islands group and a few other locations have been adequately surveyed. Based on surveys in the Rat Islands, Agattu, and Buldir where density averaged about one pair every 20 km of coastline, White (1977) estimated a population of over 300 pairs for the Aleutians, more or less uniformly dispersed throughout with local clumping near seabird colonies (e.g. Buldir).

During 1977-1980, USFWS personnel conducted raptor surveys in conjunction with seabird work and found that densities were similar in eastern and western Aleutians (Early 1982). Early projected an estimate of 260 pairs for the Aleutians based on a density value of one pair every 25 km of coastline (Early 1982) but stated that his estimate could be too low because his surveys were done in July after the young had fledged. Thus, an estimate of 300 pairs for the Aleutians appears to be about the right order of magnitude.

The area east of the Aleutians, the Alaska Peninsula-Kodiak Island region, has not been adequately surveyed for peregrines. White et al. (1976) reviewed available literature and reported a total of 49 known sites for the area.

The Kenai Peninsula coastline (720 km) was surveyed in 1985 and 25 cliffs were occupied by peregrines (unpubl. USFWS report 1985). In 1983, the Gulf of Alaska and Prince William Sound area (800 km of coastline) was surveyed and 10 cliffs were occupied (unpubl. USFWS report 1983). Surveys in southeast Alaska (south of Yakutat) in 1981 covered 1720 km of coastline and located 36 cliffs occupied (unpubl. USFWS report 1981). These recent surveys by USFWS personnel located 71 occupied sites on the outer coast, but did not extend inland into such places as Glacier Bay, the Juneau-Admiralty Island area, the

Petersburg-Kupreanof Island area, or the Ketchikan area. These areas contained at least eight sites listed by White et al. (1976). Additionally, Van Horn et al. (1982) found eight nests in trees and perhaps three or four others not accounted for by White et al. (1976). Judging from current information, there are probably more than 140 eyries within the region from the Kenai Peninsula to southeast Alaska.

SUMMARY

The population decline of peregrines in northern and interior Alaska was likely underway during the mid-1960s; when this decline began is unknown, but it may have been as early as the 1950s when Cade (1960) first surveyed the Colville and Yukon rivers. Surveys between the late 1960s and 1985 recorded declines to approximately 35% of the estimated historical level of F. p. tundrius and to 45% of F. p. anatum. Both populations reached their lowest levels in the early 1970s, stabilized in the mid-1970s, and started to increase in the late 1970s. This pattern of decline, stabilization, and recovery closely parallels that observed in Scotland: populations declined through 1962, at which time that country restricted the use of DDT; the populations remained stable until 1968; and then began to increase (Newton 1976). Populations in Alaska declined through 1972, at which time the United States restricted the use of DDT. The populations stabilized and began to increase six years later (1978), and continue to do so.

Detailed historical data are lacking for F. p. pealei in Alaska, and its current status relative to previous population levels cannot be projected.

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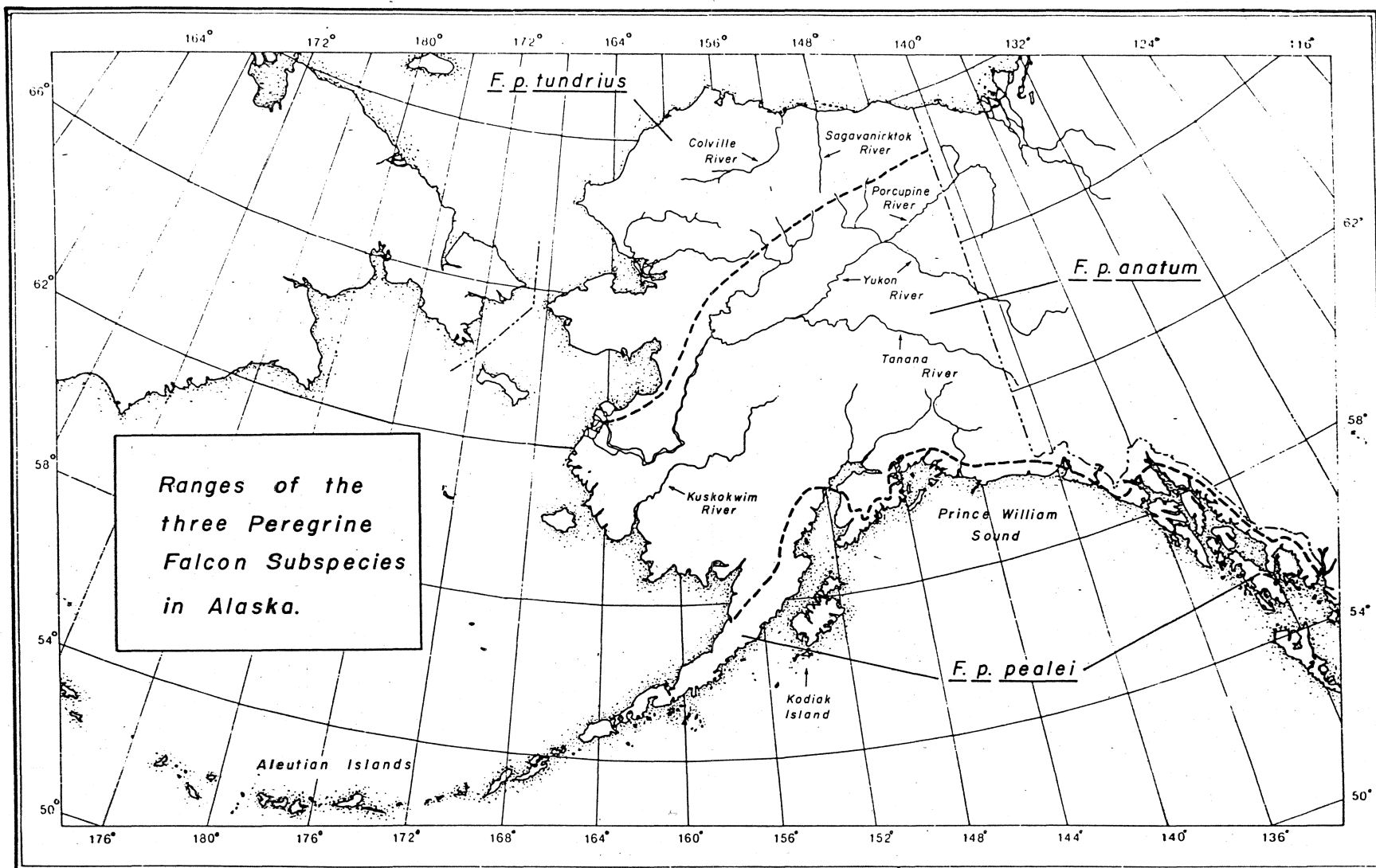


Figure 1. Ranges of the three Peregrine Falcon subspecies in Alaska and the principal survey areas.

Table 1. Occupancy and productivity of peregrine falcons along the Colville River, Alaska, 1952 to 1985.

Year	Occupancy			Productivity				
	Pairs	Lone Adults	% of Highest No. of Occupied Sites	Pairs w/young	% Pairs w/young	Young ¹	Young/total pair	Young/succ. pair
1952 ⁴	32	0	78	21	66	44	1.38	2.10
1959 ⁴	35	5	100	25	69	50	1.43	2.00
1967 ⁵	27	0	66	18	67	34 ²	1.26	1.89
1968 ⁵	31	1	78	16	52	34	1.10	2.13
1969 ⁵	33	0	80	13	39	26	0.79	2.00
1971 ⁶	25	6	76	9	36	14	0.56	1.56
1973 ⁷	14	1	37 ¹	4	29	9	0.64	2.25
1975 ⁸	10	3	33	NC	NC	NC	NC	NC
1978	15	9	59	8	53	14	0.93	1.75
1979	16	5	51	6	38	15	0.94	2.50
1980	21	2	56	12	57	29	1.38	2.42
1981	24	5	71	12	50	31	1.29	2.58
1982	26	3	71	18	69	48	1.85	2.67
1983	26	2	68	16	62	52	2.00	3.25
1984	31	4	85	18	58	47 ³	1.52	2.61
1985	29	5	83	18	62	50	1.72	2.78

NC=Not Checked

1 Young that reached two to three weeks of age and assumed fledged.

2 Eggs (number not reported) were collected for pesticide analysis.

3 Eight eggs were collected for pesticide analysis.

4 Cade 1960.

5 Cade et al. 1971.

6 White and Cade 1971.

7 Haugh 1976 (aircraft used on second survey; occupied sites possibly missed).

8 Cade and White 1976 (aircraft survey; occupied sites possibly missed).

Table 2. Comparisons of Peregrine Falcon use of peripheral drainages on Alaska's North Slope.

River	Greatest No. of Pairs (Year)	Mid-1970's	1985
Aichillik	2 (1966) ¹	0 (1972-1975) ¹	1 ⁵
Canning	3 (1972) ¹	0 (1974) ¹	1 ⁵
Toolik	2 (1958) ¹	1 (1973) ¹	1
Kavik	1-2(1947) ¹	?	0 ⁷
Chandler and Anaktuvuk	6 (1971) ²	1+2 ad.(1975) ²	1+2 ad. ⁷
Etivluk	?	1 (1975) ²	1+1 ad. ⁶
Nigu	?	0 (1977)	1 ⁶
Utokok	5 (1953) ³	0 (1977)	1 ⁶
Kongakut	3 (1966) ¹	0 (1972-1975) ¹	0 (1984) ⁵
Total	22-23 pairs	3 prs.+ 2 ad.	7 prs. + 3 ad.

¹ Roseneau et al. 1976.

² Cade and White 1976.

³ Fyfe et al. 1976.

⁴ White and Boyce 1977.

⁵ M. Amaral pers. comm. 1985.

⁶ J. Silva pers. comm. 1985.

⁷ Partial survey.

Table 3. Occupancy and productivity of peregrine falcons along the upper Yukon River, Alaska, 1951 to 1985.

Year	Occupancy			Productivity				
	Pairs	Lone Adults	% of Highest No. of Occupied Sites	Pairs w/young	% Pairs w/young	Young ¹	Young/total pair	Young/succ. pair
1951 ⁴	15	2	61	10(est.)	67	16(est.)	1.07	1.60
1966 ⁴	16	0	57	12(est.)	75	27	1.69	2.25
1967 ⁵	14	0	50	10	71	14	1.00	1.40
1968 ⁵	13	3	57	6	46	13	1.00	2.17
1970 ⁶	12	0	43	7	58	18	1.50	2.57
1973 ⁷	11	1	43	6	55	16	1.45	2.67
1975 ⁸	12	0	43	9	75	17	1.42	1.89
1977	12	3	54	9	75	22	1.83	2.44
1978	16	3	68	12	75	28	1.75	2.33
1979	19	0	68	15	79	39	2.05	2.60
1980	17	3	71	16	94	44	2.59	2.75
1981	18	2	71	17	94	54	3.00	3.18
1982	23	2	89	16	70	40	1.74	2.50
1983	27	0	96	21	78	56	2.07	2.67
1984	25	3	100	21	84	48 ³	1.92	2.29
1985	25	2	96	16	64	40	1.60	2.50

¹Young that reached two to three weeks of age and assumed fledged.

²Two eggs were collected for pesticide analysis.

³Eight eggs were collected for pesticide analysis.

⁴Cade et al. 1968.

⁵Cade 1971.

⁶Temple et al. 1970.

⁷Ritchie 1976.

⁸Cade et al.

Table 4. Survey data for F. p. pealei in Alaska.

	Km. of Coastline Examined	Number of Cliffs Occupied	Number of Km/Occupied Cliffs	Year of Data
Aleutians ¹				
Near Islands	398	12	33	1974-1980
Rat Islands	542	54	10	1969-1980
Dalarof Islands	147	8	18	1977-1980
Western Andreanof Is.	1042	29	36	1977-1980
Gulf of Alaska and Prince Williams Sound Area	800	10	80	1983
Kenai Peninsula	720	25	29	1985
Southeast Alaska (south of Yakutat)	1720	36	48	1981

¹ Aleutian data modified from Early's (1982) data.