Alaska Department of Fish and Game
Division of Wildlife Conservation

Endangered Species
Research Final Report

Documentation of Peregrine Falcon Nest Sites in Relation to State Land Use Proposals

by
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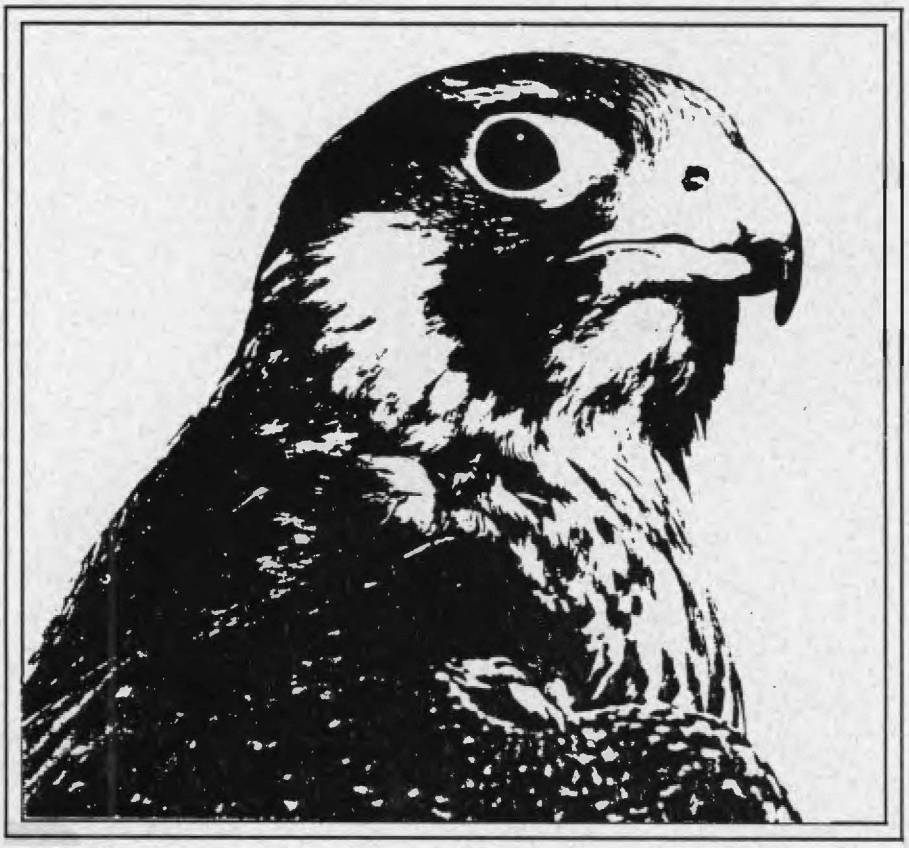
and
John M. Wright



Project SE-2-6
December 1992

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FINAL REPORT (RESEARCH)

State: Alaska

Cooperator: USDI Fish and Wildlife Service

Project No.: SE-2-6 Project Title: Documentation of Peregrine Falcon Nest Sites in Relation to State Land Use Proposals

Study Title: Documentation of Active Peregrine Falcon Nest Sites

Period Covered: 15 June 1991 - 30 June 1992

SUMMARY

In 1991, we conducted surveys of endangered and threatened peregrine falcons (*Falco peregrinus*) in three locations: the Norton Sound coast in western Alaska, the Sagavanirktok River in northern Alaska, and the Tanana River in Interior Alaska. This year we began the transition to shift our study emphasis from surveys of seldom-visited areas at the periphery of the peregrine's range, to monitoring numbers and productivity on index study areas that have a relatively long record of information on peregrines.

The Norton Sound/southern Seward Peninsula coast in western Alaska, where significant numbers of peregrines were first noted in our 1987 survey, was visited for the fifth, and last, year in 1991. During a single helicopter survey of the area in July 1991, we located 27 sites occupied by pairs of peregrines and we saw lone adults at an additional 10 sites. We observed 54 young and banded 49. An average of 2.45 young were counted in 22 successful nests.

On the Sagavanirktok River, we observed 14 pairs and 5 lone adults and counted and banded 22 young. An average of 2.00 young were seen in 11 successful nests.

On the Tanana River, we observed 19 pairs and 1 lone adult. We observed 38 young and banded 29. An average of 2.53 young were found in 15 successful nests.

In 1992, no surveys are planned for western Alaska. The Alaska Department of Fish and Game will assume full responsibility for monitoring peregrines on the Sagavanirktok River (from the Bureau of Land Management) and the Tanana River (from the U.S. Fish and Wildlife Service).

Key Words: *Falco peregrinus*, nesting, Norton Sound, peregrine falcon, productivity, Sagavanirktok River, Tanana River, Western Alaska.

CONTENTS

BACKGROUND

The peregrine falcon (*Falco peregrinus*) is a cosmopolitan species that attracted international concern in the 1960s when drastic declines were reported in breeding populations in Europe and North America (Hickey 1969). Two of the three subtaxa recognized in Alaska (White 1968) are included on endangered species lists. 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 third subtaxa in Alaska, is found in coastal regions of the state from the Aleutians south through the Gulf of Alaska and southeastern Alaska. Unlike the first two populations 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 American and arctic peregrine falcons (U.S. Fish and Wildlife Service 1982). The plan recognized the importance of monitoring population trends, identifying nesting habitats and prey species, and protecting nesting areas from incompatible human activities. The recovery plan established four index study areas (two areas for each subtaxa) to monitor the status and recovery of the peregrine falcon in Alaska. The index areas for the threatened arctic peregrine falcon are the Colville River and Sagavanirktok River. The index areas for the endangered American peregrine falcon are the Tanana River and upper Yukon River. The USFWS and the Bureau of Land Management (BLM) assumed responsibility for surveying the index areas from 1979 to 1990.

An interagency committee determined that current information was needed on the status of nesting peregrine falcons on the western coast of Alaska

(Hughes 1986). The Alaska Department of Fish and Game (ADF&G) began participating in peregrine falcon surveys by surveying several rivers in northwest Alaska in 1986. Initial surveys of portions of the Norton Sound coast began in 1987, and a surprisingly large number of peregrine falcons were located (Wright 1987). In addition to providing basic distribution and abundance information on an endangered species, this study was conducted to determine the exposure of nesting peregrine falcons in coastal western Alaska to toxic trace metals and to gather information on the genetic relationship of this population which inhabits an area on the boundary separating the ranges of two endangered subtaxa.

OBJECTIVES

The field study objectives for peregrine falcons in 1991 were to:

1. locate nesting territories,
2. determine productivity,
3. band nestlings,
4. collect prey remains,
5. collect feather samples from nestlings for toxic trace metal analysis, and
6. collect blood samples from nestlings for genetic analysis.

The study areas were along the Norton Sound coast of western Alaska, the Sagavanirktok River in northern Alaska, and the Tanana River in Interior Alaska.

STUDY AREA AND METHODS

Surveys of peregrine falcons are based on exacting observations by experienced observers who look for birds or nest sites in suitable habitat along river front or coastal bluffs and cliffs. The widely different areas used for nesting by peregrine falcons and the differences in the study areas in this report require different methods of access to make an initial inspection of the potential nesting area. However, once in an area, the methods used to document the presence of peregrine falcons are similar, regardless of the area being surveyed or the method of transportation being used.

Whenever possible, we try to conduct two surveys in the study area. The first survey is conducted during the early nesting period (late May and early June) to determine the number of birds that are attempting to breed in the area. The second survey occurs during the mid- to late-nesting period (mid-July to early August) to determine the number of pairs that are successful in rearing young. We visit nest sites during the second survey to band young and collect samples. If only one survey is possible, we try to conduct it at the time of the second survey described above.

In general, peregrines nest on steep soil banks, gravel exposures, and rock cliffs, and any habitat that meets these characteristics is checked for signs of occupancy by peregrine falcons. Whenever possible we try to check the area from the ground using a frontal view of the habitat. In many circumstances ground observations are not possible, especially during aerial and boat surveys. In these situations we make several passes and try to get the best vantage point for finding the birds or their nests.

When on the ground, we look for perched or flying birds or evidence of nest sites by carefully checking the bluff or cliff with binoculars or spotting scopes. Because peregrines respond vocally to intruders in their nesting areas, listening for defensive calls or courtship calls is an important survey technique if conditions are suitable for hearing their calls. Wind, rain, river noise, or other loud noises many times obscure faint or distant calls of the birds. Climbing the area is often necessary to help locate

birds or their nest sites. If birds are present, our activities are performed quickly to minimize disturbance to nesting pairs. If birds are not located, we remain in the area as long as possible to hear or see birds in their normal activities. USFWS recommends 4 hours of observation to determine occupancy and nesting status; however, this is often not achieved because of the large amount of area to be surveyed in a short period of time.

When peregrine falcons are observed, the exact location is plotted on photographs or maps of the area. When a nest is found or suspected, we climb to the nest site using standard rock climbing techniques and count the number of nestlings. If conditions (e.g., weather, age of nestlings) and timing permit, we band nestlings with USFWS lock-on aluminum leg bands on one leg and a color band on the other leg, and collect prey remains, addled eggs, and other samples from the vicinity of the nest site. The color band is an anodized aluminum riveted leg band that has an engraved alpha-numeric code. Two colors are used following the protocol developed by the USFWS: arctic peregrine falcons are banded with blue bands and American peregrine falcons are banded with black bands. The engraved code on the color band is large enough to be read with a powerful spotting scope. We use a Questar scope with a 24-mm eyepiece (90X magnification) to read the color band codes.

Observations are recorded on 1:63,360- and 1:250,000-scale U.S. Geological Survey maps. Numbers, productivity, nesting status, activities, and nest site characteristics are recorded on Raptor Observation Record Cards developed for the Alaska Raptor Database used by USFWS. The maps, cards, banding data, and samples are filed with USFWS Endangered Species Branch, Ecological Services, Fairbanks, Alaska.

Norton Sound

In July 1991, we flew a single helicopter survey to locate peregrine falcons along the coast of Norton Sound in western Alaska. This area covers the mainland coast from Stuart Island, at the southern edge of Norton Sound, to Cape Prince of Wales, at the western tip of the Seward Peninsula. In addition to the outer coast of the mainland, the survey included Stuart, St. Michael, and Whale Islands; Norton Bay, except for the low coast around the head of the bay near the village of Koyuk; Golovnin Bay; Sledge Island; Port Clarence, except for the low spit leading to Pt. Spencer; Grantley Harbor; and Tuksuk Channel. Portions of this area were first surveyed in 1987 (Wright 1987), and the majority of this coast, from just south of Unalakleet to Wales, has been surveyed each year since 1988 (Wright 1989, 1990, 1991).

The presence of peregrine falcons was determined by having the pilot and two or three experienced raptor observers search for birds during low-level flights along the coast. Particular attention was made to carefully check previous nesting areas and other areas of suitable habitat by slowing down and scrutinizing the nesting habitat closely. We searched the cliff or bluff for perched, flushed, or flying adult peregrines, and we also looked for nest sites with nestlings. Repeated passes and, occasionally, landing and observing with binoculars and spotting scopes were required to adequately cover some high cliffs. Where large concentrations of cliff-nesting seabirds were present, we landed the helicopter inland and approached the cliffs on foot to minimize disturbances to the seabirds.

When peregrine falcons were observed, we followed the generalized methods to locate the nest site, band young, and collect samples.

Sagavanirktok River

The Sagavanirktok River is a glacial river that flows northward from the Brooks Range to the Arctic Ocean in the central North Slope of Alaska. The study area includes a 200-km section of the main river from the foothills near Slope Mountain in the southern portion of the drainage to the north end of Franklin Bluffs near the river delta at Prudhoe Bay. The river creates numerous soil and gravel cutbanks and a few large cliff exposures which are

suitable for nesting by peregrine falcons.

The Sagavanirktok River was surveyed using three methods during two survey periods. We surveyed the area in June to detect as many peregrine falcons as possible and in July to revisit all confirmed locations to determine nesting success, band nestlings, and collect samples. The survey methods included a foot survey along the river south of Sagwon Bluffs to approximately 5 miles south of the Slope Mountain Department of Transportation Maintenance Camp, a raft survey of the portion of river from Sagwon Bluffs to the southern Franklin Bluffs, and a helicopter survey along the northern portion of Franklin Bluffs.

To maximize the efficiency of the foot survey in the southern area, we interpreted aerial photographs to help locate areas of suitable nesting habitat along the river. Then, we used a highway vehicle to drive the Dalton Highway (which parallels the river on the west) to the closest access point, and from there we walked to the river bluff or cliff to check for peregrine falcons. Searches for birds were made with binoculars, spotting scopes, and climbing the areas on the west side of the river. In July, we crossed to the east side of the river with a small backpack raft to band young at several nests located during the June survey. Staff from USFWS and ADF&G conducted this portion of the survey.

The raft survey from Sagwon Bluffs to the southern portion of Franklin Bluffs was conducted by two or three observers. This survey was completed in 1 day by starting at a pipeline access road immediately south of Sagwon Bluffs and by ending at a pipeline access road at Pump Station 2 or opposite the southern end of Franklin Bluffs. Staff from BLM and ADF&G conducted this survey.

The northern portion of Franklin Bluffs was not readily accessible by raft or by foot, and we surveyed this area by helicopter. Known nesting areas were checked by landing 1 mile away and walking closer to confirm the presence of peregrine falcons. Other areas of suitable nesting habitat were checked by low-level flight with the pilot and one observer looking for birds. Staff from ADF&G conducted this survey.

When peregrine falcons were observed, we followed the generalized methods to locate the nest site, band young, and collect samples.

Tanana River

The Tanana River is a glacial river that flows westward through the Tanana Uplands of Interior Alaska. The study area includes 500 km of river from the Tetlin Bridge, approximately 10 miles east of Tok, to the confluence with the Salcha River, which is located approximately 20 miles east of Fairbanks. Also, a short section of river between Fairbanks and Nenana is surveyed to check several historical nesting locations used by peregrine falcons. The river creates numerous soil and gravel cutbanks and many large rock cliff exposures that are suitable for nesting by peregrine falcons.

We surveyed the Tanana River twice by boat, once during late May and early June to determine all the locations where peregrine falcons were attempting to breed, and again in July to determine nesting success and productivity and to band nestlings and collect samples. Both surveys were conducted using a 20-foot outboard jet-powered riverboat that allowed boating along the shallow channels common in this braided, glacial river.

When peregrine falcons were observed, we followed the generalized methods to locate the nest site, band young, and collect samples.

RESULTS AND DISCUSSION

Survey Coverage

Approximately 1,030 km of coastline were surveyed in Norton Sound (Table 1). This was more than the 850 km surveyed in 1990. In northern Alaska, 170 km of the Sagavanirktok River were surveyed. This was more than the previous area surveyed by BLM (approximately 50 km). In Interior Alaska, 480 km were surveyed on the Tanana River. This was similar to the previous survey coverage by USFWS.

Nesting Territories

In the Norton Sound study area, 27 sites were occupied by pairs of peregrine falcons (Table 1). Lone adults were seen at 10 other locations. The average straight-line distance between pairs was approximately 38 km. Table 2 lists the nesting locations observed in 1991.

In the Sagavanirktok River study area, 14 sites were occupied by pairs of peregrine falcons (Table 1). Lone adults were seen at five other locations. The straight-line distance between pairs was approximately 12 km. Table 3 lists the nesting locations observed in 1991.

In the Tanana River study area, 18 sites were occupied by pairs of peregrine falcons (Table 1). Lone adults were seen at one other location. The straight-line distance between pairs was approximately 27 km. Table 4 lists the nesting locations observed in 1991.

Productivity, Banding, and Nesting Phenology

In the Norton Sound study area, 22 pairs produced a minimum of 54 nestlings. The remaining five pairs failed to produce young to banding age. The number of young is considered a minimum value because we were unable to get an unobstructed view of two nest sites and there may have been more young present. Productivity averaged 2.45 young per successful nest and 2.00 young per total nest.

Data from 1992 are compared with numbers and productivity information from previous years in Table 5. Caution should be used in making comparisons because of differing survey coverage and timing of surveys in the different years. These and other factors make inter-year comparisons for this study area difficult. However, the trend of increasing numbers of pairs and lone adults probably reflects an increasing population of peregrine falcons along the Norton Sound coast.

Of the 54 nestlings observed at 21 nests, 49 were banded with leg bands. In the past 5 years a total of 140 nestlings have been banded in the study area. We observed three banded adult birds during the survey (Tables 6 and 7). One bird had a blue color leg band and may have been raised as a nestling in the study area in one of the previous years of study (1987-90). We are aware of only one confirmed band return. A peregrine falcon banded as a nestling in Norton Sound in July 1987 was trapped and released at Padre Island, Texas in April 1988.

The age of nestlings at banding shows an approximate 24-day span in hatch dates. The youngest nestlings were approximately 10 days old and the oldest nestlings were approximately 34 days old during the survey in mid-July. By using the observed age of nestlings to calculate the range in nesting phenology, initiation of egg laying occurred during 7-31 May, hatching occurred during 14 June-7 July, and fledging occurred during 25 July-17 August. Nesting phenology dates are based on 7 days for laying a complete clutch of four eggs, 34 days incubation beginning 4 days after laying the first egg, and 40 days from hatching to fledging.

In the Sagavanirktok River study area, 11 pairs produced a minimum of 22 nestlings. The remaining three pairs failed to produce young to banding age. The number of young is considered a minimum value because we were unable to get an unobstructed view of one nest site and there may have been more young present. Productivity averaged 2.00 young per successful nest and 1.57 young per total nest.

Data from 1992 are compared with numbers and productivity information from previous years in Table 8. Caution should be used in making comparisons because of major differences in survey coverage in this year. In 1991, considerable effort was directed to check habitat along the entire river drainage, whereas in previous years only the habitat at Sagwon Bluffs and Franklin Bluffs was surveyed. This makes inter-year comparisons for this study area nearly impossible. However, the trend of increasing numbers of pairs and lone adults probably reflects an increasing population of peregrine falcons along the Sagavanirktok River.

All 22 nestlings observed were banded with leg bands. Since 1979, a total of 123 nestlings have been banded in the study area. Table 9 lists observations of previously banded birds during this survey. We observed three banded adult birds and nine adults were confirmed to be unbanded during this survey. One bird had a legible blue color leg band and was raised as a nestling at Sagwon Bluffs in 1987. This bird returned to nest approximately 45 km south of its natal area. In late August, one fledgling was killed on the Dalton Highway in the vicinity of the nest where it was reared.

The age of nestlings at banding shows an approximate 21-day span in hatch dates. The youngest nestlings were approximately 10 days old and the oldest nestlings were approximately 31 days old during the survey at the end of July. By using the observed age of nestlings to calculate the range in nesting phenology, initiation of egg laying occurred during 23 May-11 June, hatching occurred during 29 June-20 July, and fledging occurred during 8-29 August.

In the Tanana River study area, 15 pairs produced a minimum of 36 nestlings. The remaining three pairs failed to produce young to banding age. The number of young is considered a minimum value because we were unable to get an unobstructed view of one nest site and there may have been more young present. Productivity averaged 2.53 young per successful nest and 2.00 young per total nest.

Data from 1992 are compared with numbers and productivity information from previous years in Table 10. Since survey coverage has been relatively consistent among years, the increase in numbers and productivity reflects the trend of an increasing population of peregrine falcons along the Tanana River.

Of the 36 nestlings observed, 29 were banded. Since 1979, a total of 111 nestlings have been banded in the study area. Table 11 lists observations of previously banded birds during this survey. We observed 13 banded adult birds and 11 unbanded adults during this survey. Five birds had legible black color leg band codes: two birds had been banded as adults breeding in the study area, and three were raised as nestlings in the study area.

The age of nestlings at banding shows an approximate 20-day span in hatch dates. The youngest nestlings were 12 days old and the oldest 32 days old during the survey in mid-July. By using the observed age of nestlings to calculate the range in nesting phenology, initiation of egg laying occurred during 5-24 May, hatching occurred during 10-30 June, and fledging occurred during 20 July-9 August.

Samples Collected

We collected prey remains from each nesting pair that produced young, but they have not been analyzed. Feather samples were collected from five

nestlings at two nest sites in the Sagavanirktok River study area and from 34 nestlings at 14 nest sites in the Norton Sound study area for use in studying toxic trace metals. The contaminant analyses are being conducted by USFWS and the results are not available. Blood samples were taken from 10 nestlings from 10 separate nests in Norton Sound for use in studying taxonomic relationships of peregrine falcons in western Alaska. Results from genetic studies are not yet available.

Six eggs were collected during nest visits; one egg was collected at a nest site on the Sagavanirktok River and five eggs were collected in the Norton Sound study area. The eggs have been submitted for analysis by USFWS, but the results are not available.

CONCLUSIONS AND RECOMMENDATIONS

Peregrine falcons are widely distributed and locally common in the Norton Sound, Sagavanirktok River, and Tanana River study areas. Although differences in survey coverage in two areas make yearly comparisons difficult, the general trend is an increasing population in the Norton Sound and Sagavanirktok River study areas. The Tanana River has a more consistent history of survey coverage and shows an increase in numbers and productivity in recent years.

Results from collections of prey remains, addled eggs, feather samples to determine trace metal contaminants, and blood samples for genetic analyses are not available. These analyses are being coordinated by USFWS and results will be reviewed in future reports.

ACKNOWLEDGMENTS

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Table 1. Survey coverage, numbers, and productivity of peregrine falcons, Norton Sound, Sagavanirktok River, and Tanana River, Alaska, 1991.

	Norton Sound[a]	Sagavanirktok River[b]	Tanana River[b]
km surveyed	1,030	170	480
Number of surveys	1	2	2
Lone adults	10	5	1
Pairs - total	27	14	19
Failed pairs	5	3	4
Successful pairs	22	11	15
Young - total	54	22	38
Young/total pair	2.00	1.57	2.00
Young/successful pair	2.45	2.00	2.53
Young banded	49	22	29
Percent banded	89	100	82

[a] Single survey in July.
[b] Standard two survey procedure: late May-June and July-early August.

Table 2. Peregrine falcon locations, Norton Sound Coast, Western Alaska, 1991.

TERR[a]	OTHERNUM[b]	DESCRIPTION	ADS[c]	YNG[d]	NOTES
1	STUA37.1	STUART ISLAND SOUTH	2	3	July - pair PEFA[e] w/ 3 yng, 2 yng banded, 1 yng too small to band.
2	STUA7.0	STUART ISLAND NORTH	2	1	July - pair PEFA w/ 1 yng, yng banded, 2 addled eggs (collected).
3	NORT118.0	WHALE ISLAND	2	4	July - pair PEFA w/ 4 yng, yng banded.
4	NORT220.4	BLACK POINT	1	0	July - single PEFA.
5	NORT281.4	BLUEBERRY POINT	1	0	July - single PEFA.
6	NORT297.0	JUNCTION CREEK SOUTH	1	0	July - single PEFA.
7	NORT299.5	JUNCTION CREEK NORTH	2	1	July - pair PEFA w/ 1 yng, yng banded.
8	NORT306.3	BEESON SLOUGH SOUTH	2	1	July - pair PEFA w/ 1 yng, yng banded, 3 addled eggs (collected).
9	NORT356.0	CAPE DENBEIGH SE	2	3	July - pair PEFA w/ 3 yng, yng banded, 1 addled egg (collected).
10	NORT357.8	CAPE DENBEIGH TIP	2	3	July - pair PEFA w/ 3 yng, 2 yng banded, 1 yng too small to band.
11	NORT360.8	CAPE DENBEIGH W MIDDLE	2	0	July - pair PEFA, no yng, 4 addled eggs.
12	NORT362.2	CAPE DENBEIGH N (HILL 600)	1	0	July - single PEFA.
13	NORT365.5	REINDEER HILLS S (HILL 414)	1	0	July - single PEFA.
14	NORT369.1	REINDEER HILLS (HILL 585)	2	3	July - pair PEFA w/ 3 yng, yng banded.
15	NORT372.0	REINDEER HILLS (HILL 425)	1	0	July - single PEFA.
16	NORT378.0	POINT DEXTER MID (HILL 626)	1	0	July - single PEFA.
17	NORT408.8	ISLAND POINT/LITTLE MTN	2	3	July - pair PEFA w/ 3 yng, 2 yng banded, 1 yng too small to band.
18	NORT497.0	BALD HEAD EAST	2	?	July - pair PEFA, no nest found.
19	NORT500.7	BALD HEAD MID	2	2	July - pair PEFA w/ 2 yng, yng banded, adult female w/ white wing coverts.
20	NORT550.0	ELIM EAST/IRON CREEK	1	0	July - single PEFA.
21	NORT600.0	CAPE DARBY NE (VUARNET)	2	3	July - pair PEFA w/ 3 yng, yng banded.
22	NORT 603.8	CAPE DARBY EAST	2	2	July - pair PEFA w/ 2 yng, yng banded.
23	NORT613.8	CAPE DARBY W - NORTH	2	0	July - pair PEFA, no yng, 3 addled eggs (collected).
24	NORT711.2	BUNSHEFOOT CREEK	2	4	July - pair PEFA w/ 4 yng, yng banded.
25	NORT718.1	ROCKY PT LIGHT	1	0	July - single PEFA.
26	NORT728.6	INUTAK MTN NW	2	1	July - pair PEFA w/ 1 yng, yng banded.
27	NORT735.9	CHIUKAK	2	3	July - pair PEFA w/ 3 yng, yng banded.
28	NORT751.6	SQUARE ROCK	2	3	July - pair PEFA w/ 3 yng, yng banded.

Table 2. Continued.

TERR[a]	OTHERNUM[b]	DESCRIPTION	ADS[c]	YNG[d]	NOTES
29	NORT752.5	GRIZZLY CREEK EAST	1	0	July - single PEFA.
30	NORT755.5	KOYANNA CRK BLUFF	2	2	July - pair PEFA w/ 2 yng, yng banded.
31	NORT774.1	TOPKOK HEAD WEST	2	2	July - pair PEFA w/ 2 yng, yng not banded.
32	NORT826.8	CAPE NOME	2	0	July - pair PEFA, no yng.
33	SLED3.5	SLEDGE ISLAND SW	2	2	July - pair PEFA w/ 2 yng, yng banded.
34	NORT981.5	CAPE RILEY SOUTH	2	2	July - pair PEFA w/ 2 yng, yng banded.
35	NORT983.0	CAPE RILEY NORTH	2	3	July - pair PEFA w/ 3 yng, yng banded.
36	NORT1076.5	CAPE YORK E KOTZ CRK	2	3	July - pair PEFA w/ 3 yng, yng banded.
37	NORT1089.0	CAPE YORK WEST	2	?	July - pair PEFA, no nest found.

[a] TERR = Nest Territory Number assigned by U.S. Fish and Wildlife Service (USFWS).
[b] OTHERNUM = 'Other Number' indicating coast milepost location (in kilometers) used by USFWS.
[c] ADS = Adults.
[d] YNG = Young.
[e] PEFA = Peregrine falcon.

Table 3. Peregrine falcon locations, Sagavanirktok River, Alaska, 1991.

TERR[a]	OTHERNUM[b]	DESCRIPTION	ADS[c]	YNG[d]	NOTES
0	SAGA72.4	JCT RIBDON RIVER AND SAG	1	0	June - one adult flush from gravel bar. July - none seen.
1759	SAGA89.1	OIL SPILL HILL SOUTH	2	0	June - male ASY[e] PEFA[f] fly along bluff, female flushed from nest with 4 eggs. July - no PEFA seen, nest empty with crushed shell fragments.
1760	SAGA95.2	ICE CUT S, GRAVEL MOUND	2	3	June - pair PEFA, mild defense. July - pair PEFA w/3 yng, yng banded.
1768	SAGA101.8	ICE CUT NORTH	2	1	June - pair PEFA, 4 eggs in RLHA[g] nest. July - pair PEFA w/1 yng, yng banded, 1 dead yng (collected), 1 addled egg (collected).
1769	SAGA110.0	JCT LUPINE RIVER AND SAG	2	4	June - single ASY PEFA (male) perched. July - pair PEFA w/4 yng, yng banded, 5th secondary feather sample.
1772	SAGA116.0	HAPPY VALLEY SOUTH	2	1	June - pair ASY PEFA, defensive, nest with 4 eggs. July - pair ASY PEFA w/1 yng, yng banded, 5th secondary feather sample.
1775	SAGA123.5	HAPPY VALLEY NORTH	2	0	June - single ASY PEFA fly along bluff, mate not seen. July - pair PEFA, no defense, no nest seen.
0	SAGA126.5	OPPOSITE DALTON 340	1	0	June - none seen. July - single ASY PEFA perched on bluff, no nest seen.
1780	SAGA137.0	6 MILES S SAGWON STRIP	1	0	June - none seen. July - single ASY PEFA perched on bluff, no nest seen.
1785	SAGA143.3	SAGWON STRIP SOUTH	2	1	June - pair PEFA, defensive, adult incubating. July - pair PEFA w/1 yng, yng banded.
0	SAGA146.5	OPPOSITE SAGWON STRIP	2	2	June - single ASY PEFA, no mate seen. July - pair PEFA w/2 yng, yng banded.
1789	SAGA147.0	SAGWON STREAM CUT	1	0	June - single PEFA, mate not seen. July - single PEFA, mate not seen.
0	SAGA150.2	0.6 MILE SOUTH VABM GARD	1	0	June - single PEFA, mate not seen. July - none seen.
209	SAGA157.9	HEAD OF BLUFF S PUMP 2	2	1	June - pair PEFA, defensive, adult in ledge. July - pair PEFA w/1 yng, yng banded.
1795	SAGA158.6	TAIL OF BLUFF S PUMP 2	2	3	June - pair PEFA, adult in nest. July - pair PEFA w/3 yng, yng banded.
1803	SAGA199.5	14 'FACES' N 'BRUCE CRK'	2	2	June - none seen. July - pair PEFA w/2 yng, yng banded, 1 dead young (collected).

Table 3. Continued.

TERR[a]	OTHERNUM[b]	DESCRIPTION	ADS[c]	YNG[d]	NOTES
213	SAGA203.5	ALLUVIAL FAN S RED COLOR	2	3	June - single PEFA perched, no mate seen. July - pair PEFA w/3 yng, yng banded.
214	SAGA208.3	'GRETA CREEK' FACES EAST	2	1	June - single PEFA, mate not seen. July - pair PEFA w/1 yng, yng banded.
1813	SAGA218.0	NORTH END FRANKLIN BLUFF	2	0	June - pair PEFA, adult in nest w/3 eggs. July - none seen.

[a] TERR = Nest Territory Number assigned by U.S. Fish and Wildlife Service (USFWS).
[b] OTHERNUM = 'Other Number' indicating river milepost location (in kilometers) used by USFWS.
[c] ADS = Adults.
[d] YNG = Young.
[e] ASY = After second year age class.
[f] PEFA = Peregrine falcon.
[g] RLHA = Rough-legged hawk.

Table 4. Peregrine falcon locations, Tanana River, Alaska, 1991.

TERR[a]	OTHERNUM[b]	DESCRIPTION	ADS[c]	YNG[d]	NOTES
227	TANA103.0	TOK RIVER	2	3	June - single PEFA[e], mate not seen. July - pair PEFA w/ 3 yng, 1 yng banded (others too small).
228	TANA135.0	VABM SAMO	2	2	June - pair PEFA fly and perch. July - pair PEFA w/ 2 yng, yng banded.
1206	TANA183.0	CATHEDRAL -3 MI	2	1	June - pair PEFA. July - pair PEFA w/ 1 yng, yng banded.
230	TANA205.0	ROBERTSON RIVER	2	1	June - pair PEFA. July - pair PEFA w/ 1 yng, yng banded.
231	TANA221.5	ROUND LAKE	2	3	June - three ASY[f] PEFA. July - pair PEFA w/ 3 yng, yng banded.
1271	TANA243.0	BILLY CREEK +2	2	3	June - pair PEFA. July - pair PEFA w/ 3 yng, yng banded.
174	TANA258.5	HEAD OF JOHNSON SLOUGH	2	2	June - pair PEFA. July - pair PEFA w/ 2 yng, yng banded.
175	TANA273.0	JOHNSON RIVER	2	0	June - pair PEFA. July - pair PEFA, no nest seen.
76	TANA280.5	GEORGE LAKE -2	2	2	June - pair PEFA. July - pair PEFA w/ 2 yng, yng banded.
177	TANA288.5	LITTLE GERSTLE +2	2	0	June - pair PEFA. July - pair PEFA, no nest seen.
178	TANA299.0	SAWMILL	2	0	June - pair PEFA. July - none seen.
58	TANA337.0	VOLKMAR [also GERSTLE R]	2	1	June - pair PEFA. July - pair PEFA w/ 1 yng, yng not banded (too old).
59	TANA376.0	INDIAN CREEK	2	2	June - pair PEFA. July - pair PEFA w/ 2 yng, yng banded.
60	TANA386.0	BIG DELTA BRIDGE	2	0	May - single PEFA flying. July - pair PEFA, no nest seen.
0	TANA408.0	SHAW CREEK +3	1	0	May - single PEFA. July - none seen.
61	TANA414.5	RICHARDSON ROADHOUSE	2	4	June - pair PEFA. July - pair PEFA w/ 4 yng, yng banded.
0	TANA432.0	3.5 MI BELOW CANYON CREEK	2	3	June - pair PEFA. July - pair PEFA w/ 3 yng, yng banded.
62	TANA436.0	BIRCH LAKE	2	3	June - single PEFA. July - pair PEFA w/ 3 yng, yng banded.
63	TANA443.0	VABM HILL	2	3	June - pair PEFA. July - pair PEFA w/ 3 yng, yng banded.

[a] TERR = Nest Territory Number assigned by U.S. Fish and Wildlife Service (USFWS).
[b] OTHERNUM = 'Other Number' indicating river milepost location (in kilometers) used by USFWS.
[c] ADS = Adults.
[d] YNG = Young.
[e] PEFA = Peregrine falcon.
[f] ASY = After second year age class.

Table 5. Historical occupancy and productivity of peregrine falcons, Norton Sound Coast, Western Alaska, 1987-91[a].

	OCCUPANCY			PRODUCTIVITY		
YEAR	LONE ADULTS	TOTAL PAIRS	SUCCESSFUL PAIRS	NUMBER OF YOUNG	YOUNG PER TOTAL PAIR	YOUNG PER SUCCESSFUL PAIR
1987	0	6	4	12	2.00	3.00
1988	1 or 2	19	13	34	1.79	2.62
1989	2	23	14	35	1.52	2.50
1990	10	27	21	53	1.96	2.52
1991	10	27	22	54	2.00	2.45

[a] Data for 1987-90 from Wright 1987, 1989, 1990, 1991.

Table 6. Number and percentage of resightings of previously banded peregrine falcons, Norton Sound, Sagavanirktok River, Tanana River, Alaska, 1991.

Banding status	Norton Sound	Sagavanirktok River	Tanana River
Unknown banding	57 (86%)	21 (62%)	13 (28%)
Unbanded	5 (8%)	9 (26%)	11 (24%)
FWS[a]-R, No AUX[b]	1 (2%)	1 (3%)	1 (2%)
FWS-L, No AUX	0 (0%)	0 (0%)	0 (0%)
Unk FWS, No AUX	1 (2%)	1 (3%)	3 (7%)
AUX-R	0 (0%)	0 (0%)	0 (0%)
AUX-L	0 (0%)	0 (0%)	4 (9%)
AUX-known code	1 (2%)	1 (3%)	5 (11%)
Total AUX	1 (2%)	1 (3%)	9 (20%)
Total individuals	66	34	46

[a] FWS = U.S. Fish and Wildlife Service leg band on either right (R), left (L), or no (No) leg.
[b] AUX = Auxiliary marker color leg band on either right (R), left (L), or no (No) leg.

Table 7. Nest site summary of previously banded peregrine falcons, Norton Sound Coast, Western Alaska, 1991.

LOCATION	UNK[a]	UNBAND	FWS[b]-R	FWS-L	UNK-FWS	AUX[c]-R	AUX-L	AUX-CODE
STUA37.1	M[d]F[e]							
STUA7.0	M F							
NORT118.0	M F							
NORT220.4	U[f]							
NORT281.4	U							
NORT297.0	M F							
NORT299.5	M F							
NORT306.3	M F							
NORT356.0	M F							
NORT357.8	M F							
NORT360.8	M F							
NORT362.2	U							
NORT365.5	U							
NORT369.1	M F							
NORT372.0	U							
NORT378.0	U							
NORT408.8	M F							
NORT497.0	M F							
NORT500.7	M F							
NORT550.0	U							
NORT600.0	M	F						
NORT603.8	M F							
NORT613.8	M F							
NORT711.2	M F							
NORT718.1	U							
NORT728.6	M F							
NORT735.9	M F							
NORT751.6	M				F			
NORT752.5	U							
NORT755.5	M							F-C?(VVBLU)L[g]
NORT774.1	M F							
NORT826.8	M F							
SLED3.5	M F							
NORT981.5	M	F						
NORT983.0		M F						
NORT1076.5		F	M					
NORT1089.0	M F							
TOTAL	M=26 F=22 U= 9	M=1 F=4	M=1 F=0	M=0 F=0	M=0 F=1	M=0 F=0	M=0 F=0	M=0 F=1

[a] UNK = Unknown banding status.
[b] FWS = U.S Fish and Wildlife Service leg band on either right (R) or left (L) leg.
[c] AUX = Auxiliary marker color leg band on either right (R) or left (L) leg.
[d] M = Male.
[e] F = Female.
[f] U = Unsexed individual.
[g] Code was reported as either 'C3' or 'C8'.

Table 8. Historical occupancy and productivity of peregrine falcons, Sagavanirktok River, Alaska, 1958-91[a].

	OCCUPANCY			PRODUCTIVITY		
YEAR	LONE ADULTS	TOTAL PAIRS	SUCCESSFUL PAIRS[b]	NUMBER OF YOUNG[b]	YOUNG PER TOTAL PAIR	YOUNG PER SUCCESSFUL PAIR
1958	0	5	U	U	--	--
1963	0	4	U	U	--	--
1964	0	1	U	U	--	--
1970	0	3	2	5	1.67	2.50
1972	1	4	2	5	1.25	2.50
1973	0	2	U	U	--	--
1974	1	4	2	3	0.75	1.50
1975	0	3	1	1	0.33	1.00
1976	0	1	1	1	1.00	1.00
1977	0	3	1	2	0.67	2.00
1978	0	1	U	U	--	--
1979	0	4	3	6	1.50	2.00
1980	1	3	1	2	0.67	2.00
1981	0	4	3	8	2.00	2.67
1982	0	4	2	4	0.67	2.00
1983	0	5	5	13	2.60	2.60
1984	1	6	6	15	2.50	2.50
1985	0	8	6	20	2.50	3.33
1986	0	7	6	16	2.29	2.67
1987	2	7	6	24	3.43	4.00
1988	0	10	6	14	1.40	2.33
1989	1	10	10	29	2.90	2.90
1990	2	10	7	19	1.90	2.71
1991	6	14	11	22	1.57	2.00

[a] Data for 1958-78 from a review by Roseneau et al. 1981. Data for 1979-90 from U.S. Fish and Wildlife Service, Endangered Species, Fairbanks unpublished summaries.
[b] U = Unknown

Table 9. Nest site summary of previously banded peregrine falcons, Sagavanirktok River, Alaska, 1991.

LOCATION	UNK[a]	UNBAND	FWS[b]-R	FWS-L	UNK-FWS	AUX[c]-R	AUX-L	AUX-CODE
SAGA72.4	U[d]							
SAGA89.1	M[e]	F[f]						
SAGA95.2		F						M - GD(VVBLUL)
SAGA101.8		M F						
SAGA110.0		M F						
SAGA116.0		M F						
SAGA123.5		F			M			
SAGA126.5	U							
SAGA136.9			M					
SAGA143.5	M F							
SAGA146.5	M F							
SAGA147.0	U							
SAGA150.2	U							
SAGA157.9	M F							
SAGA158.6	M F							
SAGA199.6	M F							
SAGA203.0	M F							
SAGA208.3	M F							
SAGA217.5	M F							
TOTAL	M=9 F=8 U=4	M=3 F=6	M=1 F=0	M=0 F=0	M=1 F=0	M=0 F=0	M=0 F=0	M=1 F=0

[a] UNK = Unknown banding status.
[b] FWS = U.S Fish and Wildlife Service leg band on either right (R) or left (L) leg.
[c] AUX = Auxiliary marker color leg band on either right (R) or left (L) leg.
[d] U = Unsexed individual.
[e] M = Male.
[f] F = Female.

Table 10. Historical occupancy and productivity of peregrine falcons, Tanana River, Alaska, 1968-91[a].

	OCCUPANCY			PRODUCTIVITY		
YEAR	LONE ADULTS	TOTAL PAIRS	SUCCESSFUL PAIRS[b]	NUMBER OF YOUNG[b]	YOUNG PER TOTAL PAIR	YOUNG PER SUCCESSFUL PAIR
1968	0	12	11	23	1.92	2.09
1970	0	6	6	16	2.67	2.67
1971	0	4	3	9	2.25	3.00
1972	0	4	3	7	1.75	2.33
1973	0	4	4	8	2.00	2.00
1974	0	2	1	1	0.50	1.00
1975	1	2	0	0	0	--
1976	2	0	0	--	--	--
1977	0	3	1	1	0.33	1.00
1978	0	4	3	6	1.50	2.00
1979	3	3	2	4	1.33	2.00
1980	0	4	2	5	1.25	2.50
1981	0	5	5	12	2.40	2.40
1982	0	5	3	8	1.60	2.67
1983	0	5	4	11	2.20	2.75
1984	1	4	2	4	1.00	2.00
1985	0	4	3	5	1.25	1.67
1986	2	5	4	12	2.40	3.00
1987	0	8	5	10	1.25	2.00
1988	1	12	9	16	1.33	1.78
1989	0	15	11	29	1.93	2.64
1990	3	15	19	29	1.93	3.22
1991	0	20	16	38	1.90	2.38

[a] Data for 1968-78 from a review by Roseneau et al. 1981. Data for 1979-90 from U.S. Fish and Wildlife Service, Endangered Species, Fairbanks unpublished summaries.
[b] U = Unknown

Table 11. Nest site summary of previously banded peregrine falcons, Tanana River, Alaska, 1991.

LOCATION	UNK[a]	UNBAND	FWS[b]-R	FWS-L	UNK-FWS	AUX[c]-R	AUX-L	AUX-CODE
TANA103.0	M[d]	F[e]						
TANA135.0	M F							
TANA183.0		F						M - BT(VVBLKL)
TANA205.0		M	F					
TANA221.5		M						F - 3L(VVBLKL)
TANA243.0							M F	
TANA258.5		F						M - 18(VVBLKL)
TANA273.0					M F			
TANA280.5					M			F - M2(VVBLKL)
TANA288.5	F	M						
TANA295.0		M F						
TANA336.5		F						M - 3?5(V?VBLK)L
TANA376.0	F	M						
TANA386.0	M F							
TANA408.0	U[f]							
TANA414.5	M						F	
TANA432.0		M					F	
TANA436.0	M F							
TANA443.0	M F							
TOTAL	M=6 F=6 U=1	M=6 F=5	M=0 F=1	M=0 F=0	M=2 F=1	M=0 F=0	M=1 F=3	M=3 F=2

[a] UNK = Unknown banding status.
[b] FWS = U.S Fish and Wildlife Service leg band on either right (R) or left (L) leg.
[c] AUX = Auxiliary marker color leg band on either right (R) or left (L) leg.
[d] M = Male.
[e] F = Female.
[f] U = Unsexed individual.