

BLM/AK/OF-83/07

BLM-Alaska Open File Report 7

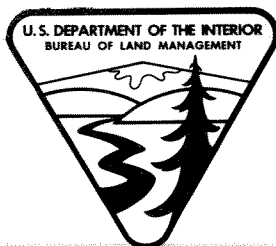
June 1983

***The 1982 Peregrine Falcon/Raptor
Survey in the Central Arctic, Alaska***

by Ted Swem

Bob Dittrich

Jim Silva



Bureau of Land Management

Alaska

OPEN FILE REPORTS

The category of "Open File Report" is used by BLM-Alaska to identify the results of inventories or other investigations that are made available to the public outside the formal BLM-Alaska technical publication series. These reports include preliminary or incomplete data that are not published and distributed in quantity but that are available for public inspection at BLM offices in Alaska, the USDI Resources Library in Anchorage, and the various libraries of the University of Alaska.

Copies of open file reports are also available for inspection at the USDI Natural Resources Library in Washington, D.C. and the BLM Denver Service Center library.

TABLE OF CONTENTS

	Page
Introduction.....	1
Objectives.....	1
Methods and Study Areas	1
Figure 1-Index map of Alaska showing location of National Petroleum Reserve in Alaska.....	2
Figure 2-Areas surveyed within the National Petroleum Reserve in Alaska - 1982	3
Figure 3-Location of cliffs on the Colville River where Peregrine Falcons were present.....	5
Results.....	7
Discussion.....	9
Figure 4-Numbers of adult Peregrine Falcons seen on the Colville River.....	11
Recommendations.....	13
Bibliography.....	14
Appendix I.....	16
Tables 1-5	
Appendix II.....	26
Banding Data	
Appendix III.....	30
Maps	

INTRODUCTION

The 1982 Bureau of Land Management (BLM) peregrine falcon (Falco peregrinus tundrius) nesting survey was a continuing effort to visit active and historic peregrine falcon nesting sites within the National Petroleum Reserve-Alaska (NPR-A) (see Figures 1 and 2). Raptor surveys within NPR-A have been conducted periodically since the early 1950s, with yearly surveys being conducted since 1978. The 1982 survey was a continuation of previous efforts to locate and document peregrine falcon and other raptor species within NPR-A. The 1982 nesting success of peregrine falcons along the Colville River from the mouth of the Etivluk River to Ocean Point was recorded and compared to data from previous surveys (see Table 1).

An emphasis on banding of peregrine falcon nestlings continued in 1982 in an attempt to accrue a more complete picture of the life cycle and demographics of the NPR-A population. Interest also continued in 1982 for surveying and banding other cliff nesting raptors in NPR-A: gyrfalcons (Falco rusticolus) and rough-legged hawks (Buteo lagopus). Banding, to help identify migration routes and wintering areas of peregrine falcons and other raptor species within NPR-A, has been a major objective in many of the previous surveys over the past decade.

The results of the nesting survey including cliff locations, banding data, and raptor nesting success are included in this report.

OBJECTIVES

- To locate and document peregrine falcon and other raptor use of the Colville River and other selected areas within NPR-A.
- To locate nests and band young of all raptors when possible.
- To collect addled eggs, shell fragments and prey remains from peregrine falcon nests for pesticide residue analysis.
- To minimize raptor disturbance during the 1982 survey.
- To photograph all cliffs or bluffs along the Colville River, from the mouth of the Etivluk River to Ocean Point to help document nesting locations.

METHODS AND STUDY AREAS

Three different methods were used to survey areas within NPR-A for raptor reproduction. The differences reflect the relative remoteness of the areas surveyed.

1. Floating - Floating the rivers in inflatable rafts has proven to be the most effective survey technique. This allows a relatively unobtrusive approach to each bluff creating minimal disturbance to the birds' routine. An Avon raft equipped with a 7.5 horsepower motor was used as the vehicle for the survey whenever practical.

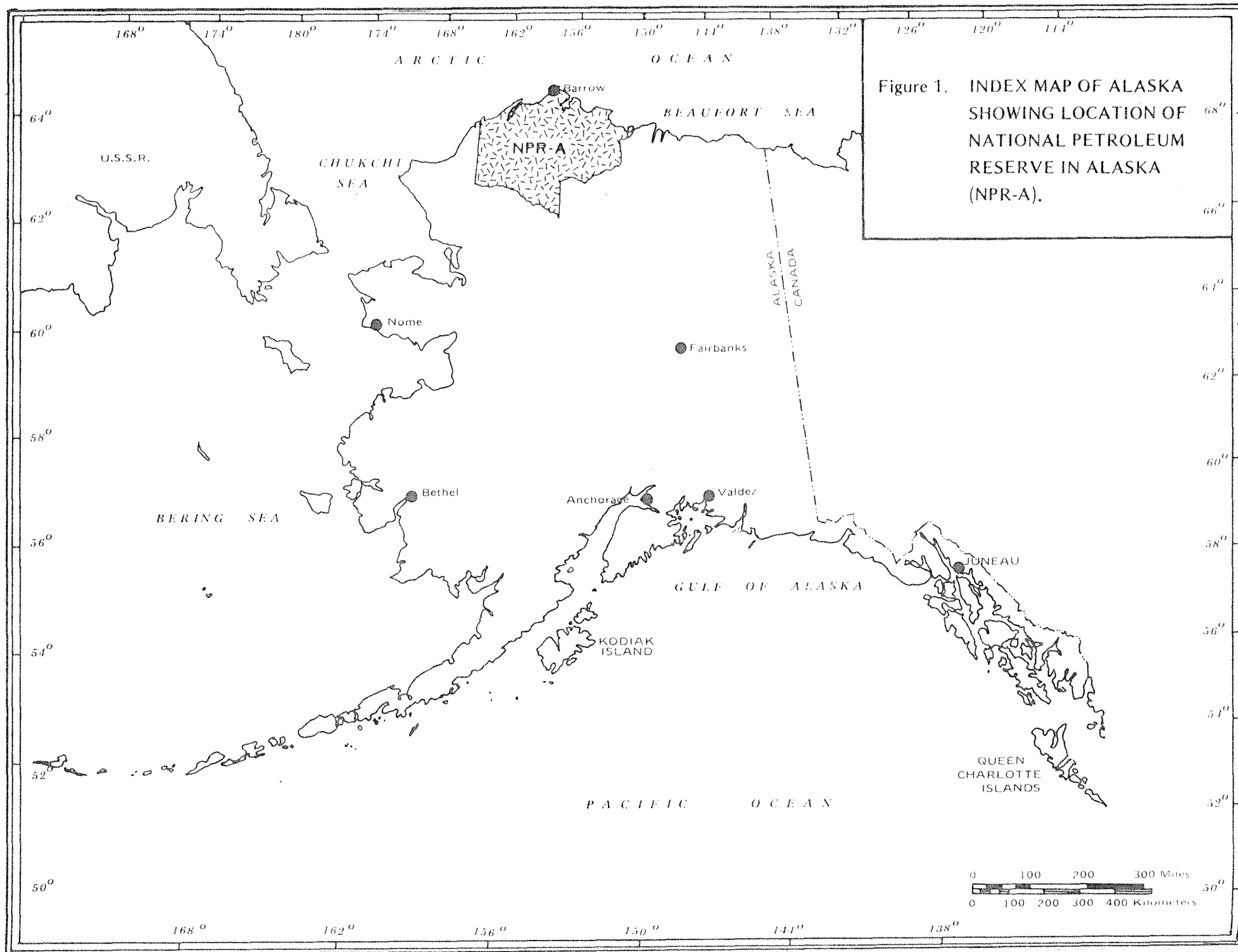




Figure 2. AREAS SURVEYED WITHIN THE NATIONAL PETROLEUM RESERVE - ALASKA, 1982.

2. Helicopter - Remote areas were surveyed by landing a helicopter within 1/2 to 1 km. of a bluff. Observers then hiked to the bluff to survey for nesting birds.
3. Auxiliary hiking - Hiking was used in areas with inadequate water depth adjacent to areas floated, and in areas with closely spaced bluffs adjacent to helicopter landing sites.

The methods and techniques used to survey the Colville River from the mouth of the Etivluk River to Ocean Point were very comparable to those used in previous surveys, while the methods and techniques used to survey other areas within NPR-A may have varied greatly from those of previous years. Because of the methods and techniques used, and the additional areas surveyed during 1982, only data from the Colville River was compared to previous years' data (see Table 1).

Nests for all raptors were located and when possible, the young birds were banded with standard U.S. Fish and Wildlife Service bands.

Attempts were made to locate failed nests of peregrine falcons and to collect any eggs or shell fragments present. Addled eggs, shell fragments, and prey remains, were also collected when possible at active peregrine falcon nests.

Colville River

Three float trips, and one helicopter flight were conducted along the Colville River during the 1982 survey. Two of the three float trips were made down the Colville River from the mouth of the Etivluk River to Ocean Point (see Figure 3). The first trip from June 15th-27th, documented the presence of adult raptors and raptor nests on cliffs. The second trip, between July 17th-29th, was designed to check nesting success and band the young. The third float trip was made down the upper Colville River on July 14th and 15th. The stretch surveyed began about 5 km. upriver from the confluence of the Nuka River and ended 3 km. upriver from the confluence of the Kaligwa River. A helicopter flight was conducted on July 13, to check two historic peregrine falcon nest sites near the confluence of the Ipnarik and Colville Rivers. Peregrine falcons, gyrfalcons, rough-legged hawks, and ravens were observed at 114 locations along the Colville River (see results section for details).

Grayling Creek

No birds were seen at one bluff on Grayling Creek (Section 23, T4S, R27W, Umiat Meridian) which was surveyed with the use of a helicopter on July 13th.

Etivluk River

Approximately 30 km. of the lower Etivluk River were surveyed for raptors using a raft on June 15th. Sixteen km. of the downstream portion were floated again on July 17th to document nesting success and band the young in nests found on the first trip.

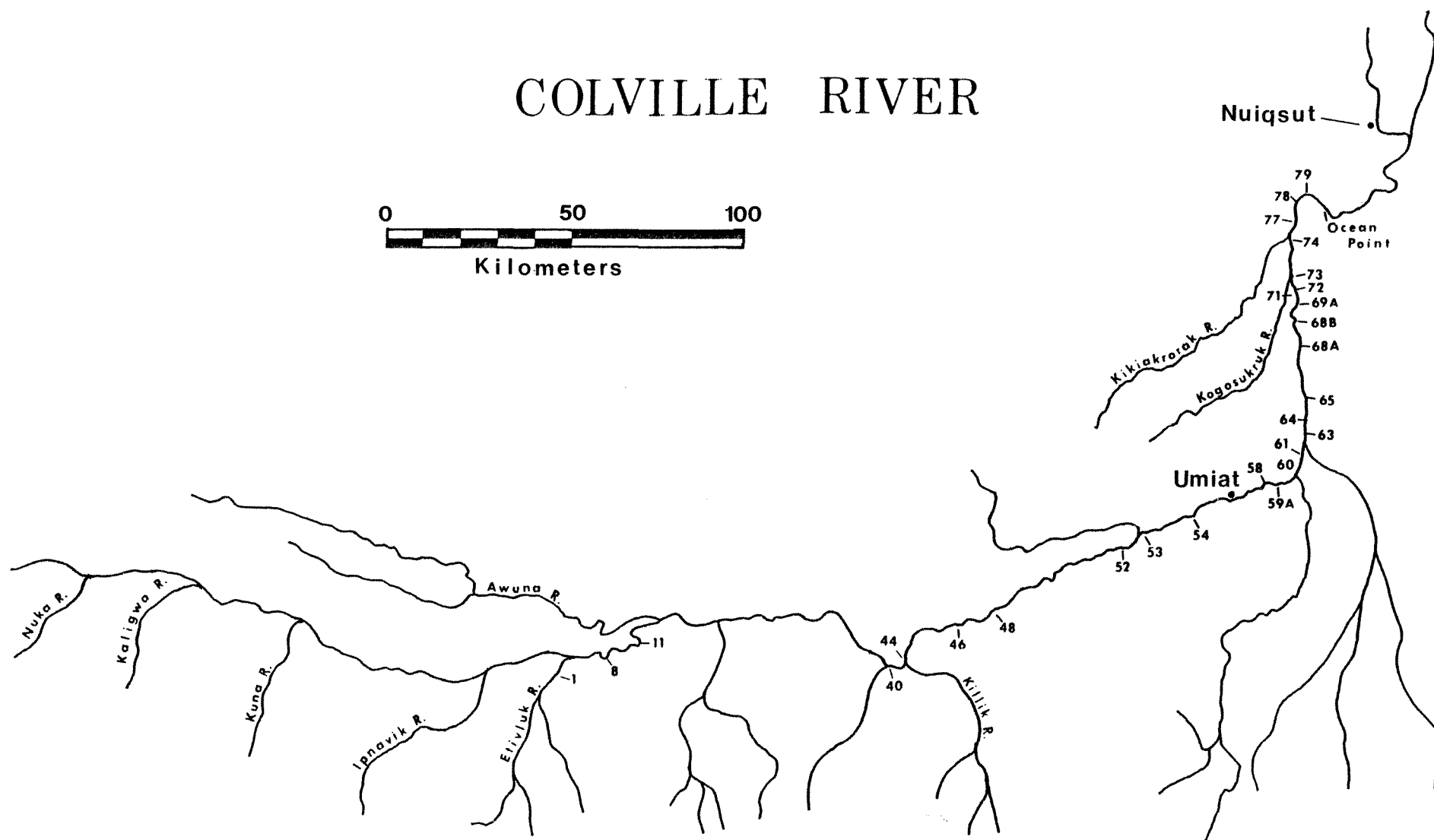


Figure 3. LOCATION OF CLIFFS ALONG THE COLVILLE RIVER, ALASKA AT WHICH PEREGRINE FALCONS WERE PRESENT IN 1982.¹

¹CLIFF NUMBERS TAKEN FROM WHITE AND CADE (1971).

Peregrine falcons and rough-legged hawks were found at eight locations along this stretch of the Etivluk River (see results section for details).

Otuk Creek

A single rough-legged hawk was observed on the bluffs along Otuk Creek (Section 20, T11S, R14E, Umiat Meridian) which was surveyed by hiking on July 14th.

Kogosukruk River

Most of the Kogosukruk River was surveyed by hiking approximately 76 km., beginning 9 km. up the "Branch of the Kogosukruk River" (Sec. 24, T2N, R2W, Umiat Meridian) and continuing to the confluence of the Kogosukruk and Colville Rivers. Two bluffs which appeared to have suitable nesting habitat from the air, had been overlooked during the ground survey. The bluff locations were:

- (1) Section 3, T5N, R2E, Umiat Meridian or approximately 8 km. northwest of Kogo bench mark VABM 264.
- (2) Section 9, T5N, R3E, Umiat meridian or approximately 6.5 km. northwest of Kogo bench mark VABM 264.

Three species of raptors were observed at 15 locations along the Kogosukruk River (see results section for details).

Kigiakrorak River

The entire river was examined by a helicopter overflight. Five bluffs on the river were considered suitable for peregrine nesting and were surveyed by landing and hiking to the bluff. Two were in the upper sections of the river and three were near the confluence with the Colville. The location of the five bluffs follows:

- (1) Section 25, T3N, R4W, Umiat Meridian.
- (2) Section 17, T3N, R4W, Umiat Meridian.
- (3) Section 18, T7N, R2E, Umiat Meridian, or approximately 6 km. up river from its confluence with the Colville River.
- (4) Section 9, T7N, R2E, or 5 km. up river from its confluence with the Colville River.
- (5) Section 9, T7N, R2E, or 4 km. up river from its confluence with the Colville River.

One pair of peregrine falcons and a single rough-legged hawk were found on the Kigiakrorak River (see results section for details).

Utukok River

Three historic peregrine eyries were surveyed with the use of a helicopter. These bluffs were located in:

- (1) Section 31, T2S, R34W, Umat Meridian, or approximately 19 km. up river from the confluence of Disappointment Creek.
- (2) Section 32, T2S, R34W, Umat Meridian, or approximately 18 km. up river from the confluence of Disappointment Creek.
- (3) Section 20, T3S, R36W, Umat Meridian, or the intersection of Archimedes Ridge and the Utukok River.

No peregrine falcons were observed at any of the historical sites surveyed.

Carbon Creek

Two bluffs on Carbon Creek were surveyed with the use of a helicopter. These bluffs were located in:

- (1) Section 1, T2S, R32N, Umat Meridian.
- (2) Section 31, T1S, R31W, Umat Meridian. Both these sites are located approximately 9 km. upstream from its confluence with the Utukok River.

One pair of gyrfalcons and one pair of rough-legged hawks were observed on Carbon Creek (see results section for details).

Fossil Creek

No raptors were observed along the lower reaches of Fossil Creek (10 km.) which was surveyed by hiking, with ingress and egress provided by a helicopter.

Iteriak Creek

Bluffs along Iteriak Creek (Sections 21, 22, T10S, R13E, U.M.) were surveyed for nesting raptors by hiking, with ingress and egress provided by a helicopter.

One pair of rough-legged hawks and a single gyrfalcon were observed along Iteriak Creek (see results section for details).

RESULTS

Peregrine Falcons

The location and nesting success of all peregrine falcons observed are shown on Table 2. Of the 60 peregrine falcon young observed in NPR-A only 55 were old enough to be banded at the time of the survey. (See Appendix II.)

In 1982 peregrine falcons were present at 36 locations in NPR-A. Thirty-two locations had pairs, with singles present at the remaining four locations. The majority of peregrine falcons observed, 26 pairs and 3

singles, occurred along the Colville River between the mouth of the Etivluk River and Ocean Point. Eighteen of the 26 pairs were successful in producing young. These 18 pairs produced 48 young, an average of 1.85 young per total number of pairs. The remaining eight pairs (30%) failed to produce young.

No peregrine falcons were found on any of the historical nest locations that were checked on the Utukok River, the upper Colville River (above the Etivluk River), and Carbon Creek.

At the time of the writing of this report, four peregrine falcons banded during this project have been recovered. Three were trapped and released by Dr. Kenton Riddle at Padre Island, Texas. The fourth was found alive, but in an emaciated condition at Grays Harbor, Washington. The locations and dates of banding and recovery data of these four peregrines are shown on Table 3.

Gyrfalcons

The locations of all observed gyrfalcons in NPR-A are listed in Table 4. One of the three nestling gyrfalcons observed during 1982 was banded. (See Appendix II.)

Gyrfalcons were present at 16 locations in NPR-A. Twelve locations had pairs with singles present at the remaining four locations. Eight of the twelve pairs were known to have attempted nesting, with all eight occurring on the Colville River between the mouth of the Etivluk River and Ocean Point. Three of the eight nesting attempts were successful, producing one young per nest. The production for all gyrfalcons observed was .25 young per total number of pairs.

Rough-legged Hawks

The locations of all rough-legged hawks observed in NPR-A are included in Table 4. A total of thirty-four nestlings were banded (see Appendix II).

Rough-legged hawks were observed at 54 locations on the Colville River between the mouth of the Etivluk River and Ocean Point. There were 44 known nesting attempts of which 22 were successful. The 22 successful nests produced at least 39 young.

Of the 75 pairs observed in NPR-A (including the Colville River), 37 pairs were successful in producing at least 61 young. The fecundity of rough-legged hawks was .8 young per total number of pairs.

Ravens

Ravens, although not classified as a raptor, use very similar nesting habitat and prey species within NPR-A. During this survey, in addition to collecting data on all raptors observed, data was also collected on all ravens observed (see Table 4).

Four pairs of ravens were seen at bluffs on the Colville River between the mouth of the Etivluk River and Ocean Point. Two pairs had nests and produced a total of eight young. There was one additional pair observed on the Kogosukruk River but no nest was found. The fecundity of Ravens was 1.6 young per total number of pairs.

Other Data

A major objective of the 1982 raptor survey was to identify and photograph all cliffs along the main Colville River from the mouth of the Etivluk River to Ocean Point. In 1971 all cliffs along this stretch of the main Colville River were given a numerical designation #1 through #80 by C. M. White and T. J. Cade.

All cliffs #1 through #80 with the exception of #4, which could not be located, were photographed and plotted on maps during the first float trip June 15th-27th (see Appendix III). These maps and photographs are now cataloged and available for review at the Bureau of Land Management, Fairbanks District Office, Arctic Resource Area.

During the 1982 survey, all cliffs along the upper Colville River, between the Etivluk River upstream to the Nuka River, were assigned alphabetical designations (see Appendix III). These cliff designations, in conjunction with designations established by White and Cade in 1971, will help in identifying each specific cliff along the majority of the Colville River for future raptor surveys.

DISCUSSION

Peregrine Falcons

The productivity of peregrine falcons continued to show encouraging trends in 1982 (see Table 1). Although the population along the Colville River has still not recovered from its decline, several indicators showed a continuation towards recovery. There was a dramatic increase in the number of young produced per total pair from 1.29 in 1981 to 1.85 in 1982 (see Table 1). The number of young produced on the Colville increased from 31 in 1981 to 48 in 1982. There was an increase in the number of successful nests in 1982 over 1981 from 12 to 18, and a drop in the percentage of pairs which did not produce young from 50% in 1981 to 30% in 1982. For the purposes of discussion the nest at cliff 73 was considered a failure. This nest still contained eggs on July 28, which was several weeks behind the phenology at all other nests observed.

Any comparison of results of young produced to fledgling success for the 1982 survey should be viewed with the following considerations. Vegetation, mosquito emergence, and snow melt during 1982 occurred at least two weeks later than in 1981. The peregrine nesting cycle was behind the 1981 timetable (see Table 5). The larger broods were found upstream of Umiat with an average of 2.8 young per nest. Downstream from Umiat the average brood size was considerably less at 1.25 young per nest. Therefore, the nests with larger broods were checked earlier when the chicks were younger. Counting the chicks at an earlier age leaves longer periods of time before the counted birds fledged, thereby increasing the chances of mortality before fledging.

Although not investigated, the 1982 delayed phenology may have had a negative affect on the amount of prey available to recently fledged peregrines. A larger percentage of individuals of some prey species may not have bred during the late spring, and species which were on schedule may have migrated out of the area before the peregrines fledged.

The ratio of 1.85 young per pair in 1982 was the highest ever recorded on the Colville and was a large increase over last year. This productivity index was substantially higher than the 1.4 ratio considered normal for a healthy population of tundra peregrines according to the Alaska Peregrine Falcon Recovery Team. However, until a trend can be shown over the next several years, it should not be assumed that this high level of fecundity will continue.

Although the productivity within this peregrine population along the Colville River between the mouth of the Etivluk River and Nuiqsut has been increasing in recent years, there are indications that this population has not yet completely recovered. The number of adult peregrines present at nesting bluffs is still below historic numbers (see Figure 4). There was little increase in the number of adults from 1981 to 1982. In 1981 there were 24 pairs and 5 singles present at bluffs, and in 1982 there were 26 pairs and 3 singles, for a total of 53 adults in 1981 and 55 in 1982.

The gain of one pair and the increased percentage of successful nests among pairs present in 1982 are encouraging but 55 adults is well below the 80 adults (40 pairs) recorded in 1959.

In addition, it is discouraging that there was not a higher number of single birds present at bluffs in 1982. In an expanding population the number of single birds can be an encouraging sign. Two bluffs which had singles present in 1981 had pairs in 1982 and produced six young. Unfortunately the Colville River population with only three singles present between the mouth of the Etivluk River and Nuiqsut leaves little optimism for a dramatic increase in nesting pairs next year.

The portion of the Colville River upstream from the confluence of the Oolamnagavik River contained a low number of adult peregrines. Between the Etivluk River and Oolamnagavik River only three pairs and no singles were present. This was well below the eight pairs which were present in 1952 and represents no increase from 1981. The portion of the upper Colville River between 5 km. upstream from the confluence of the Nuka River and 3 km. upstream from the confluence of the Kaligwa River was surveyed in 1982 and found to have two adult females at one location and no pairs, although this stretch of river contained three historic nests.

Two historic nest sites near the confluence of the Ipnarik River and the Colville River which were last known active in 1977 were vacant in 1981 and 82. It is clear that the number of peregrines over much of the Colville River (between the Nuka and Oolamnagavik Rivers) is still well below previous numbers.

The trends seen on the upper Colville River may be indicative of the northwestern arctic in general. Three bluffs, on which historical

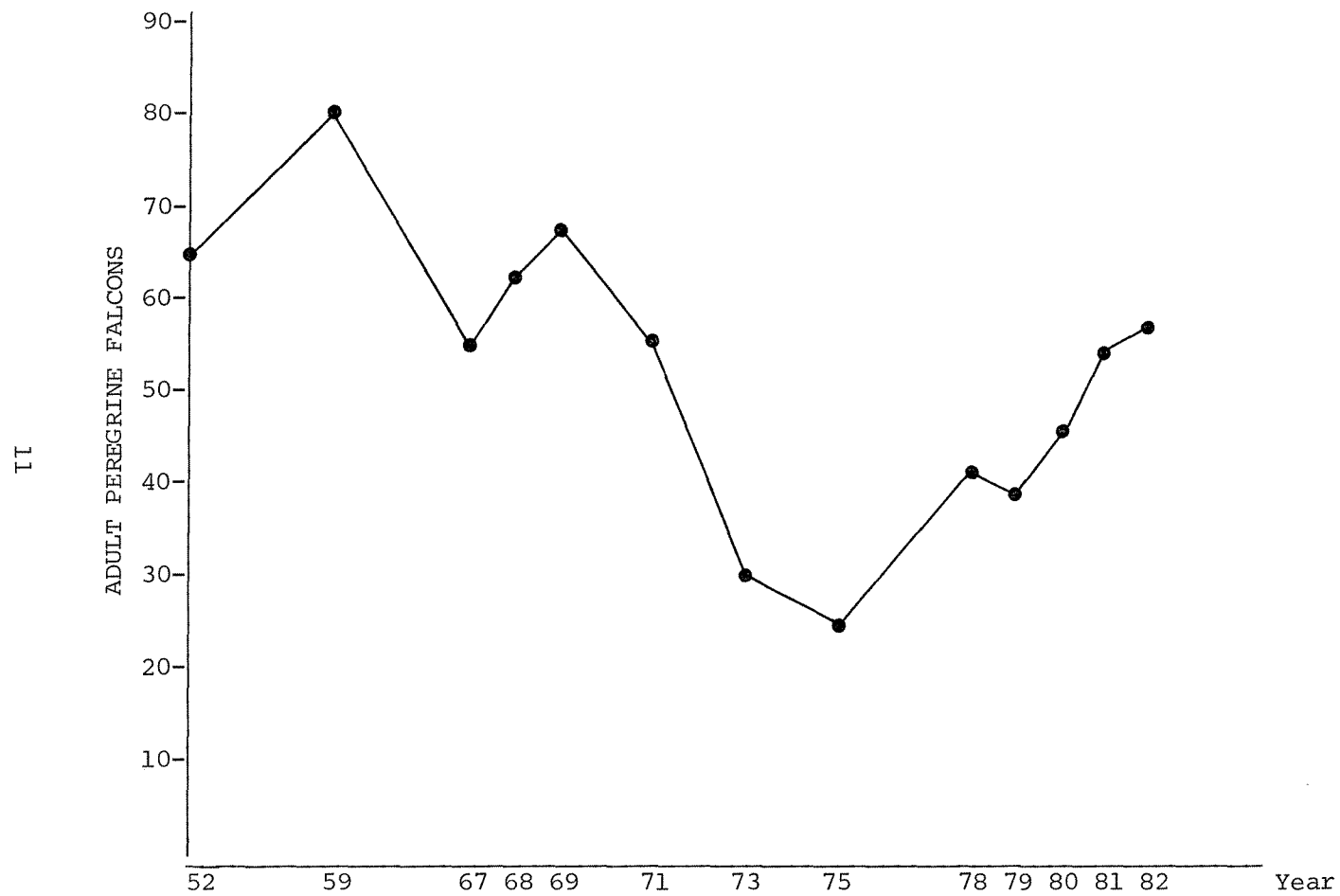


Figure 4. THE NUMBER OF ADULT PEREGRINE FALCONS SEEN ON THE COLVILLE RIVER

peregrine falcon nest sites occurred were surveyed on the Utukok River. No peregrines were present on any of these bluffs. However, the Etivluk and Kogosukruk Rivers seem to have retained populations of nesting peregrines. About 30 km. of the lower Etivluk River were surveyed, and one peregrine nest with four young was found. This bluff had a pair in 1977 (White and Boyce, 1978).

Five separate sites on the Kogosukruk River were occupied by peregrines in 1981 and 1982, though no more than three were known occupied in either year. Two were occupied in 1981 that were vacant in 1982. It is possible that all five sites could have been occupied in 1981 but two were not checked.

On three occasions during this survey the investigators unknowingly approached peregrine falcon nests which were being incubated by the male. On all three occasions, the male abandoned the nest while the investigators were still a considerable distance away. The female was perched nearby each time, and appeared to be bothered by her mate's abandoning of the nest. At two of three nests, the female immediately went to the nest and began incubating, even though the male was engaged in nest defense behaviors. At the third nest, the female called and chased the male, displacing him off of three consecutive perches. She quieted down only after the male resumed incubation.

It appeared as though these three males had abandoned incubation for nest defense in response to a much less severe intrusion than that which would be required to get the female off the nest. In each case the female was present and made sure the nest was cared for. Do these observations imply that the male is less competent than the female at deciding when to incubate and when to defend the nest? That is still unknown. But, if so, nest disturbances when the female has left the vicinity of the nest may adversely affect success. As recreational use of the Colville River increases, the chance of disturbances during the female's absence will also increase.

Other Raptors and Ravens

Reproduction by gyrfalcons, rough-legged hawks, and ravens in NPR-A in 1982 showed reductions from levels seen in 1981. Gyrfalcon and rough-legged hawk nesting success is variable from year to year, and is correlated to abundance of preferred prey items. Gyrfalcon reproduction varies with ptarmigan population variations, and rough-legged hawk success is tied to microtine population cycles (White and Cade, 1971). Year to year weather fluctuations may also play a role in yearly variations in nesting success.

Production of gyrfalcon young along the Colville River between the mouth of the Etivluk River and Ocean Point was drastically lower in 1982 than it was in 1981. Sixteen pairs produced 10 successful nests containing 19 young in 1981, a ratio of 1.19 young per total number of pairs (Dittrick and Swem, 1981). In 1982, only 10 pairs were present on bluffs, and only 3 pairs succeeded in producing a total of 3 young.

This equates to .3 young per total pair. It can be seen that fewer adult gyrfalcons were present this year, fewer pairs successfully nested, and those with successful nests raised fewer young per nest.

Cade (1960) reported variations in the number of gyrfalcon young in successful nests ranging from 1.3 to 3.0 young per nest. The Colville River had approximately 1.9 young per nest in 1981 but only 1.0 in 1982.

Of the 10 pairs of gyrfalcons seen on bluffs on the Colville, five attempted nesting and failed. One nest contained at least one chick on June 16 that was (were) dead on July 19. Another nest had at least two live young on June 22, but by July 26 the nest was empty. The bluff and nest lacked the signs of recent use that are characteristic of a successful gyrfalcon eyrie and no gyrfalcons were present, indicating the young had perished rather than fledged.

Cade (1960) suggested that starvation is the "principal killing factor for gyrfalcons" and implied that it may cause young to weaken and/or die while still in the nest. Ptarmigan, the principal prey item of gyrfalcons, tend to vary in numbers from year to year. Low ptarmigan populations result in reduced gyrfalcon reproduction (White and Cade, 1971) and it could be theorized that the high failure rate and overall poor reproductive performance seen in 1982 was a result of reduced ptarmigan numbers. This is further substantiated by the fact that only four ptarmigan were seen along the Colville River in over four weeks of observations. Single gyrfalcons were seen on the Utukok River, the upper Colville River and Iteriak Creek. A pair was observed on both Carbon Creek and the Kogosukruk River. There were no active nest sites located.

Rough-legged hawk reproduction was lower in 1982 than in 1981. Fifty-four pairs were present on the Colville River between the mouth of the Etivluk River and Ocean Point. Twenty-two of these pairs successfully nested, with thirty-nine young produced. This represents a large reduction from 1981, when 79 pairs had 46 successful nests containing at least 91 young. Production fell from 1.15 young per total number of pairs in 1981 to .75 young per total number of pairs in 1982 which is a drop of 32%.

Ravens were less abundant in 1982. Five pairs nested on the Colville River between the mouth of the Etivluk River and Ocean Point in 1981, but only two pairs nested in the same stretch in 1982. Two pairs were observed in flight near cliffs which had raven nests in 1981, but there were no active nests found on these two bluffs in 1982.

RECOMMENDATIONS

Because oil and gas exploration and development activities are on the increase over much of NPR-A, surveys to identify new raptor nest sites and monitor existing sites should be continued.

Due to the size of NPR-A (23 million acres), and the limited field season (June 1 to August 1) only a portion of the area can be surveyed

during anyone year. However, knowledge of the areas used historically and potentially available habitat narrows the size of the area requiring survey.

The Colville River is the core area for the peregrine falcon population within NPR-A, and should be monitored each year. Due to funding and time constraints many of the other rivers can only be surveyed periodically to determine their nesting population.

The following areas in order of priority should be surveyed during 1983 field season.

1. Main Colville River (Etivluk River to Ocean Point).
2. Utukok River (Driftwood to coast).
3. Carbon Creek (T2S, R30W, U.M. to Utukok River).
4. Upper Colville River (Nuka River to Etivluk River).

During future years (1984 and 1985), in addition to the monitoring of the main Colville River, the following rivers should be surveyed to the greatest extent possible.

1984

1. Etivluk River
2. Ipnalik River
3. Kuna River

1985

1. Kiligwa River
2. Nuka River
3. Colville (above Nuka River)

All surveys can use fixed-wing access, with rafts and hiking as the mode of ground transportation.

BIBLIOGRAPHY

- Ambrose, R. E., 1980. Results of the 1980 Peregrine Falcon Surveys on the Upper Yukon, Charley, and Colville Rivers, Alaska. U.S. Fish and Wildlife Service, Anchorage, Alaska. 54 p.
- Cade, T. J., 1960. Ecology of the Peregrine and Gyrfalcon Populations in Alaska, University of California. Pub. in Zoology, Vol. 63, No. 3, p. 151-290.
- Dittrick, B. and T. Swem, 1981. Productivity and Status of Cliff Nesting Raptors along the Colville River and Selected Areas within the National Petroleum Reserve-Alaska. Report to U.S. Fish and Wildlife Service, Anchorage, Alaska. 45 p.
- Springer, A.M., D. G. Rosenneau, P. J. Bente, W. Walker, II, and R. G. Clarke, 1979. Numbers and status of Peregrine falcons on the Colville River, Middle Yukon River and Lower Yukon River, Alaska, Contract No. 14-16-0007-79-0015.
- Todd, C. T. 1978. Surveillance of the Colville River, 1978. U.S. Fish and Wildlife Service, Fairbanks, Alaska. 17 p.

- White, C. M. and D. A. Boyce, Jr., 1978. A Profile of Various Rivers and Their Raptor Populations in Western Alaska, 1977. BLM/AK/TR-78/01. Bureau of Land Management, Anchorage, Alaska. 77 p.
- White, C. M., and T. J. Cade, 1971. Cliff nesting raptors and ravens along the Colville in Arctic Alaska, The Living Bird. 10:107-150 Cornell Lab. of Ornithology.
- White, C. M. and T. J. Cade, 1975. Long Term Trends of Peregrine Populations in Alaska. World Conference on Birds of Prey, Vienna, 1975, p. 63-71.

APPENDIX I

TABLES 1-5

Table 1. Comparison of Peregrine Falcon (*Falco peregrinus tundrius*) productivity along the Colville River, Alaska (Etivluk River to Ocean Point, 1982).

Year	1952 ¹	1959 ¹	1967 ¹	1968 ¹	1969 ¹	1971 ¹	1973 ¹	1975 ¹	1978 ²	1979 ³	1980 ⁴	1981 ⁵	1982
Total # of Pairs	32	40	27	31	33	25	14	10	15	16	21	24	26
Lone Adults				1		6	1	3	9	5	2	5	3
# of Pairs with Young			18	16	13	9	4		8	6	12	12	18
# of Young Observed			34	34	26	14	9		14	15	29	31	48
Young per Total Pair			1.26	1.10	0.79	0.56	0.64		0.93	0.94	1.38	1.29	1.85

¹White and Cade (1975)

²Todd (1978)

³Springer, et al, (1979)

⁴Ambrose (1980)

⁵Dittrick and Swem (1981)

Table 2. Peregrine Falcons (Falco peregrinus tundrius) observed along the Colville, and other selected rivers within NPR-A, 1982.

Cliff #	Adults	Nest Attempt	Young	Remarks
Upper Colville ¹				
M	2	?	0	Both birds were female
Main Colville ²				
1	Located 3 miles up the Etivluk River-included in the Etivluk River data.			
8	2	Yes	3	
11	2	Yes	2	
40	2	Yes	4	
44	2	Yes	4	
46	2	yes	3	
48	2	yes	3	
52	2	Yes	2	
53	1(2)	Yes	0	
54	2	Yes	4	
58	2	Yes	2	
59A	2	?	0	
59A	2	?	0	
60	2	Yes	0	
61	2	Yes	1	
63	1	No	-	
63	2	?	0	
64	2	Yes	2	
65	2	?	0	
68A	2	Yes	4	
68B	2	Yes	1	
69A	2	Yes	2	
71	2	Yes	2	
73	2	Yes	?	3 eggs 28 July.
74	1	No	-	

Continued

Table 2. - Continued

Cliff #	Adults	Nest Attempt	Young	Remarks
74	1(2)	Yes	0	
77	1	No	-	
78	2	Yes	3	
79	2	Yes	3	
Etivluk River T.7S. R.18W. U.M.	2	Yes	4	
Etivluk River Cliff #1	2	Yes	3	3 miles up the Etivluk R. from the confluence with the Colville R.
Killik River	2	Yes	3	First bluff up the Killik R. from the confluence with the Colville R.
Kogosukruk River T.5N. R.2E. U.M. Sec. 30	2	Yes	4	
Kogosukruk River T.6N. R.2E. U.M. Sec. 10	2	?	0	Adults not defensive
Kogosukruk River T.6N. R.2E. Sec. 3	2	Yes	1	
Kikiakrorak River T.7N. R.2E. U.M. Sec. 18	2	?	0	

¹ Cliff designations (Alphabetical) on the upper Colville River (Nuka River to the Etivluk River) established during the 1982 survey.

² Cliff designations (Numerical) on the main Colville River (Etivluk River to Ocean Point) taken from White and Cade (1971).

Table 3. Peregrine Falcons (Falco peregrinus tundrius) Recovery data of young birds banded during 1982.

Date	<u>Banded</u> Location	Date	<u>Recovered</u> Location
16 July	Etivluk River	11 October	Padre Island, Texas
22 July	Colville Cliff #48	29 September	Padre Island, Texas
27 July	Kogosukruk River	15 October	Padre Island, Texas
28 July	Colville Cliff #79	27 October	Grays Harbor, Wash.

Table 4. Raptors, except Peregrine Falcons, observed along the Colville and other selected rivers within NPR-A, 1982.

Cliff # Locations	Species ¹	Adults ²	Nesting ³ Attempt	Young ⁴	Young Banded
<u>Upper Colville River</u> ⁵					
Nuka R. to Etivluk R.					
A	RL	1 (2)	Yes	?(Yes)	
L	RL	2	Yes	2	Yes
M	RL	2	?		
N	RL	1 (2)	Yes	?(Yes)	
O	RL	2	Yes	Yes	No
Q	RL	2	Yes	Yes	No
	G	1	?	0	
R	RL	2	Yes	1	Yes
U	RL	2	Yes	?(Yes)	
V	RL	2	Yes	?(Yes)	
X	RL	2	Yes	1	Yes
Y	RL	2	Yes	2	No
Z	RL	2	Yes	3	Yes
<u>Main Colville River</u> ⁶					
Etivluk R. to Ocean Point					
1	Data included under Etivluk River				
5	G	1 (2)	Yes	0	
7	RL	2	Yes	?	
	G	1	?		
8	RL	2	Yes	2	Yes
	RL	2	Yes	2	Yes
9	RL	2	Yes	0	
	RL	2	Yes	?	
10	RL	2	Yes	2	Yes
11	RL	1 (2)	Yes	0	
	RL	2	Yes	0	
12	G	1 (2)	Yes	1	No
13	R	2	?	0	
14	RL	2	Yes	2	Yes
Continued					

Table 4. - Continued

Cliff # Locations	Species	Adults	Nesting Attempt	Young	Young Banded
15	RL	2	Yes	1	Yes
17	RL	1	?	0	
19	RL	1 (2)	Yes	1	No
20	G	2	Yes	0	
	RL	1 (2)	Yes	0	
26	RL	2	Yes	2	Yes
	G	2	?	?	
28	G	1 (2)	Yes	0	
29	RL	1 (2)	Yes	1	No
32	R	1	?	0	
33	RL	1	?	0	
36	RL	2	Yes	1	No
38	RL	1 (2)	Yes	0	
40	RL	1 (2)	Yes	2	Yes
41	RL	2	Yes	?(Yes)	
43	RL	2	Yes	1	Yes
44	RL	2	Yes	0	
45	RL	1	?	0	
46	RL	2	Yes	1	Yes
48	G	1 (2)	Yes	1	Yes
50	RL	1 (2)	Yes	0	
51	RL	2	Yes	3	No
52	RL	1 (2)	Yes	0	
	RL	1 (2)	Yes	0	
58	RL	2	?	0	
	RL	1	?	0	
	R	2	Yes	4	No
59A	RL	2	Yes	2	No
	RL	2	?		
	RL	2	Yes	2	No
	RL	2	Yes	0	

Continued

Table 4. - Continued

Cliff # Locations	Species	Adults	Nesting Attempt	Young	Young Banded
59B	RL	1 (2)	Yes	0	
	G	2	?	0	
	RL	2	Yes	0	
60	G	2	Yes	1	No
	RL	2	Yes	0	
61	G	2	Yes	0	
63	R	(2)	Yes	4	No
	RL	1 (2)	Yes	0	
	G	1 (2)	Yes	0	
64	RL	2	?	0	
	RL	2	?	0	
64-65	RL	2	Yes	?	
66	RL	2	?	0	
68B	G	1	?	0	
69A	RL	1 (2)	Yes	0	
69B	RL	2	Yes	2	No
73	RL	2	Yes	NC	
75	RL	2	Yes	0	
77	RL	2	Yes	1	Yes
	RL	2	?	0	
	RL	2	Yes	2	Yes
79	RL	2	Yes	0	
	RL	2	Yes	1	Yes
<u>Lower Etivluk River</u>					
T.9S. R.19W. U.M. Sec. 12	RL	2	Yes	NC	
T.7S. R.18W. U.M. Sec. 11 SW $\frac{1}{4}$	RL	1	?	0	
Sec. 11 NW $\frac{1}{4}$	RL	2	Yes	2	Yes
T.6S. R.18W. U.M. Sec. 35	RL	1 (2)	Yes	NC	
<u>Colville River cliff #1</u>	RL	2	Yes	3	Yes
	RL	2	Yes	4	3/4

Continued

Table 4. - Continued

Cliff # Locations	Species	Adults	Nesting Attempt	Young	Young Banded
<u>Fork of Kogosukruk River</u>					
T.2N. R.1W. U.M. Sec. 18	RL	2	?	0	
T.3N. R.1W. U.M. Sec. 32	RL	2	Yes	2	Yes
<u>Kogosukruk River</u>					
T.3N. R.1W. U.M. Sec. 14	RL	1	?	0	
Sec. 21	G	2	?	0	
	RL	2	?	0	
Sec. 22 NE $\frac{1}{4}$	RL	1	?	0	
Sec. 22 SW $\frac{1}{4}$	RL	2	Yes	Yes	No
Sec. 28	RL	2	?	0	
T.3N. R.1E. U.M. Sec. 8	RL	1	?	0	
T.5N. R.2E. U.M. Sec. 17	RL	1	?	0	
Sec. 21	R	2	?	0	
T.6N. R.2E. U.M. Sec. 10	RL	2	?	?	
Sec. 22	RL	1	?	0	
T.7N. R.2E. U.M. Sec. 34	RL	2	Yes	?	
<u>Kikiakrorak River</u>					
T.7N. R.2E. U.M. Sec. 9	RL	1(2)	Yes	NC	
<u>Otuk Creek</u>					
T.11S. R.16W. U.M. Sec. 20	RL	1	?	0	
<u>Carbon Creek</u>					
T.2S. R.32W. U.M. Sec. 1 NE $\frac{1}{4}$	RL	2	?	0	
Sec. 1 SW $\frac{1}{4}$	G	2	?	0	

Continued

Table 4. - Continued

Cliff # Locations	Species	Adults	Nesting Attempt	Young	Young Banded
<u>Utokok River</u>					
T.2S. R.34W. U.M. Sec. 31	G	1	?	0	
T.3S. R.36W. U.M. Sec. 20	GE	1	?	?	
<u>Iteriak Creek</u>					
T.10S. R.13E. U.M. Sec. 21-22	G	1	?	0	
	RL	2	Yes	2	No

¹Species abbreviations:RL---rough-legged hawk (Buteo lagopus)G---gyrfalcon (Falco rusticolus)R---raven (Corvus corax)GE---golden eagle (Aquila chrysaetos)

²Adults-number of adults observed. Number in paranthesis is number of adults implied, Ex.- 1(2) denotes one adult observed, but the presence of young implies that a second adult was temporarily absent at the time of observation.

³Nesting attempt:

Yes-eggs, young, or incubating adult was seen.

?---Nesting attempt never verified.

⁴Young:

Yes-young seen but a count not possible.

?---young not seen but implied by incubating adult observed on the nest after 7 July.

NC---Not checked.

⁵Cliff designations on the upper Colville River (Nuka River to the Etivluk River) established during the 1982 survey.

⁶Cliff designations on the main Colville River (Etivluk River to Ocean Point) taken from White and Cade (1971).

Table 5. Nesting Phenology of Peregrine Falcons (Falco peregrinus tundrius) on the Colville, Etivluk, Killik, and Kogosukruk¹ Rivers, Alaska, 1982.

Event	Mean Date		Range	
	1981 ²	1982 ³	1981	1982
Begin egg laying ⁴	23 May	28 May	16 May-27 May	18 May-07 June
Hatching	25 June	30 June	18 June-29 June	20 June-10 July
Fledging	4 Aug.	9 Aug.	28 July-8 Aug.	31 July-19 Aug.

¹The 1982 data excludes one pair which had no nest on 26 June, but was incubating 3 eggs on 28 July. There was no way to determine egg laying date.

²Dates were determined by back-dating from observations of chicks of estimated age: n=33, x=24.6 days, s.d.=3.52 on 20 July. Mean time intervals used in these calculations are 34 days for incubation, and 40 days as nestlings. (Dittrich and Swem, 1981).

³Dates were determined by back dating from observations of chicks of estimated age: n=60, x=20.8, s.d.=5.17 on 20 July. Mean time intervals used in these calculations are 34 days for incubation and 40 days as nestlings.

⁴Incubating begins with the first egg laid in arctic populations (Ambrose, in memorandum to contractors for raptor surveys June 1, 1981).

APPENDIX II

BANDING DATA

Peregrine Falcons (Falco peregrinus tundrius) banded on the Colville River and its tributaries, Alaska, 1982.

Location	Band #	Date
<u>Etivluk River</u>	987-30539	16 July
	987-30540	16 July
	987-30541	16 July
	987-30542	16 July
<u>Colville River</u> ¹		
#1	987-30543	17 July
	987-30544	17 July
	987-30545	17 July
#11	987-30546	18 July
	987-30547	18 July
#40	987-30548	21 July
	987-30549	21 July
#44	987-30550	21 July
	987-30551	21 July
	987-30552	21 July
	987-30553	21 July
<u>Killik River</u>	987-30554	21 July
	987-30555	21 July
	987-30556	21 July
#46	987-30557	22 July
	987-30558	22 July
	987-30559	22 July
#48	987-30560	22 July
	987-30561	22 July
	987-30562	22 July
#52	987-30563	23 July
	987-30564	23 July
#54	987-30565	23 July
	987-30566	23 July
	987-30567	23 July
	816-46601	23 July
#58	987-30568	25 July
	987-30569	25 July

Continued

Peregrine Falcons. - Continued

Location	Band #	Date
#61	816-46602	26 July
#64	987-30570	26 July
	987-30571	26 July
#68A	987-30572	26 July
	987-30573	26 July
	816-46603	26 July
	816-46604	26 July
#68B	816-46605	27 July
#69A	816-46606	27 July
	987-30574	27 July
<u>Kogosukruk River</u>	987-30575	27 July
	987-30576	27 July
	987-30577	27 July
	816-46607	27 July
	987-30578	27 July
#71	987-30579	27 July
	987-30580	27 July
#78	987-30581	28 July
	987-30582	28 July
	816-46608	28 July
#79	816-46609	28 July
	987-30583	28 July
	987-30584	28 July

¹Cliff numbers taken from White and Cade (1971)

Raptors, except Peregrine falcons, banded on the Colville River and its tributaries, Alaska, 1982.

Species ¹	Location	Band #	Date
	<u>Upper Colville River</u> ²		
RL		877-77013	14 July
RL		877-77014	14 July
RL		877-77015	14 July
RL		877-77016	14 July
RL		877-77017	14 July
RL		877-77018	15 July
RL		877-77019	15 July
RL	<u>Etivluk River</u>	877-77020	17 July
RL		877-77021	17 July
	<u>Colville River</u> ³		
RL	#1	877-77022	17 July
RL		877-77023	17 July
RL		877-77024	17 July
RL		877-77025	17 July
RL		877-77026	17 July
RL		877-77027	17 July
RL	#8	877-77028	17 July
RL		877-77029	17 July
RL		877-77030	17 July
RL		877-77031	17 July
RL	#10	877-77032	18 July
RL		877-77033	18 July
RL	#14	877-77034	18 July
RL		877-77035	18 July
RL	#15	877-77036	19 July
RL	#26	877-77037	19 July
RL		877-77038	19 July
RL	#40	877-77039	22 July
RL		877-77040	22 July
RL	#43	877-77041	22 July
RL	#46	877-77042	22 July
G	#48	877-77043	22 July

Continued

Raptors, except Peregrine Falcons. - Continued

Species	Location	Band #	Date
RL	#77	877-77044	28 July
RL		877-77045	28 July
RL		877-77046	28 July
RL	#79	877-77047	28 July

¹RL - rough-legged hawk (Buteo lagopus)
 G--- gyrfalcon (Falco rusticolus)

²Cliff designations on the upper Colville River (Nuka River to the Etivluk River) established during the 1982 survey.

³Cliff designations on the main Colville River (Etivluk River to Ocean Point) taken from White and Cade (1971).

APPENDIX III

MAPS

MAP INDEX

Cliff designations (Alphabetical) on the upper Colville River (Etivluk River to the Nuka River) established during the 1982 survey.

Cliff designations (Numerical) on the main Colville River (Etivluk River to Ocean Point) taken from White and Cade (1971).

