# Results of the 1982 Raptor Survey within the National Petroleum Reserve - Alaska

by
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## INTRODUCTION

The 1982 peregrine falcon (Falco peregrinus tundrius) nesting survey was an extensive effort to visit active and historic peregrine nesting sites within the National Petroleum Reserve-Alaska (NPR-A). The breeding success was recorded and compared to previous years.

The emphasis on banding of nestlings continued in 1982 in an attempt to accrue a more complete picture of the life cycle and demographics of this population. Interest also continued in 1982 for the surveying and banding of other cliff nesting raptors in NPR-A: gyrfalcons (Falcon rusticolus) and rough-legged hawks (Buteo lagopus).

The results of the nesting surveys including clutch locations (see maps - Appendix II) and success of nests for raptors in NPR-A are included in this report.

## OBJECTIVES

--To locate and document peregrine falcons and other raptors present on 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.

--To affect behavior of birds as little as possible.

--To photo catalog all cliffs along the Colville River, from the Etivluk River to Ocean Point.

## METHODS AND STUDY AREAS

There were three different methods employed to survey areas within NPR-A for raptor reproductivity. The differences reflect the relative remoteness of the areas surveyed.

1. Floating - The most effective technique has proven to be floating the river. 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.

2. Helicopter - Remote areas were surveyed by flying a helicopter to within 1/2 to 1 km. of a bluff and landing. Observers then hiked to the bluff to check it for nesting birds.

3. Hiking - Areas with inadequate water for floating, and with bluffs fairly close together were surveyed on the ground by hiking between bluffs.

Colville River

Two float trips were made down the Colville River from the Etivluk River to Ocean Point (see Figure 1). The first, from June 15th to the 27th, was made to document the presence of adult raptors and raptor nests on bluffs. The second, between July 17th and 29th, was designed to check nesting success and band the young.

Approximately 25 km. of the upper Colville were floated on July 14th and 15th. The area covered was between about 5 km. upriver from the confluence of the Nuka River to about 3 km. upriver from the Kaligwa River.

Two bluffs, representing one historic peregrine eyrie, near the confluence of the Ipnavik and Colville Rivers were checked for occupancy.

Grayling Creek

One bluff on Grayling Creek was checked by helicopter. It was located in Section 23, T4S, R27W, Umiat Meridian.

Etivluk River

Approximately 30 km. of the lower Etivluk River were checked for raptors by raft on June 15th (see Figure 2). Sixteen km. of the downstream portion were floated again on July 17th to document nest success and band the young in nests found on the first trip.

Otuk Creek

The bluff where Ivotuk Hills intersects Otuk Creek (Section 20, T11S, R14E, Umiat Meridian) was checked for nesting raptors.

Kogosukruk River

Most of the Kogosukruk River was hiked (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. There were two bluffs which appeared suitable from the air but were overlooked on the ground. Therefore, they were not checked. Their 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.

Kikiakrorak River

The entire river was examined by a helicopter surveillance. Five bluffs on the river were considered suitable for peregrine nesting and were checked. Two were in the upper section and three were near the confluence with the Colville. The location of the five bluffs follows:

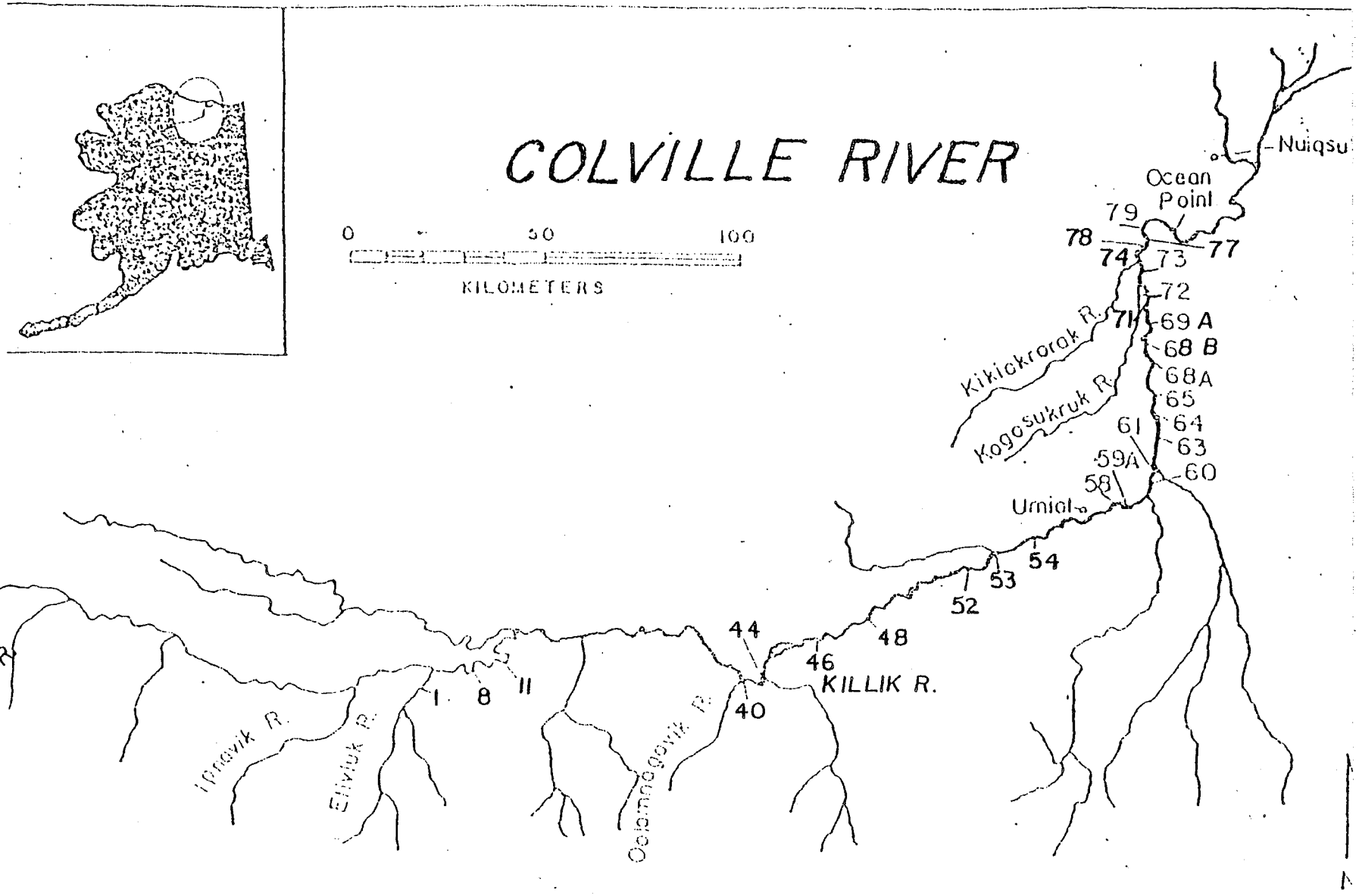


FIGURE 1. LOCATION OF CLIFFS ALONG THE COLVILLE RIVER, ALASKA AT WHICH PEREGRINE FALCONS WERE PRESENT IN 1982.[1]

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

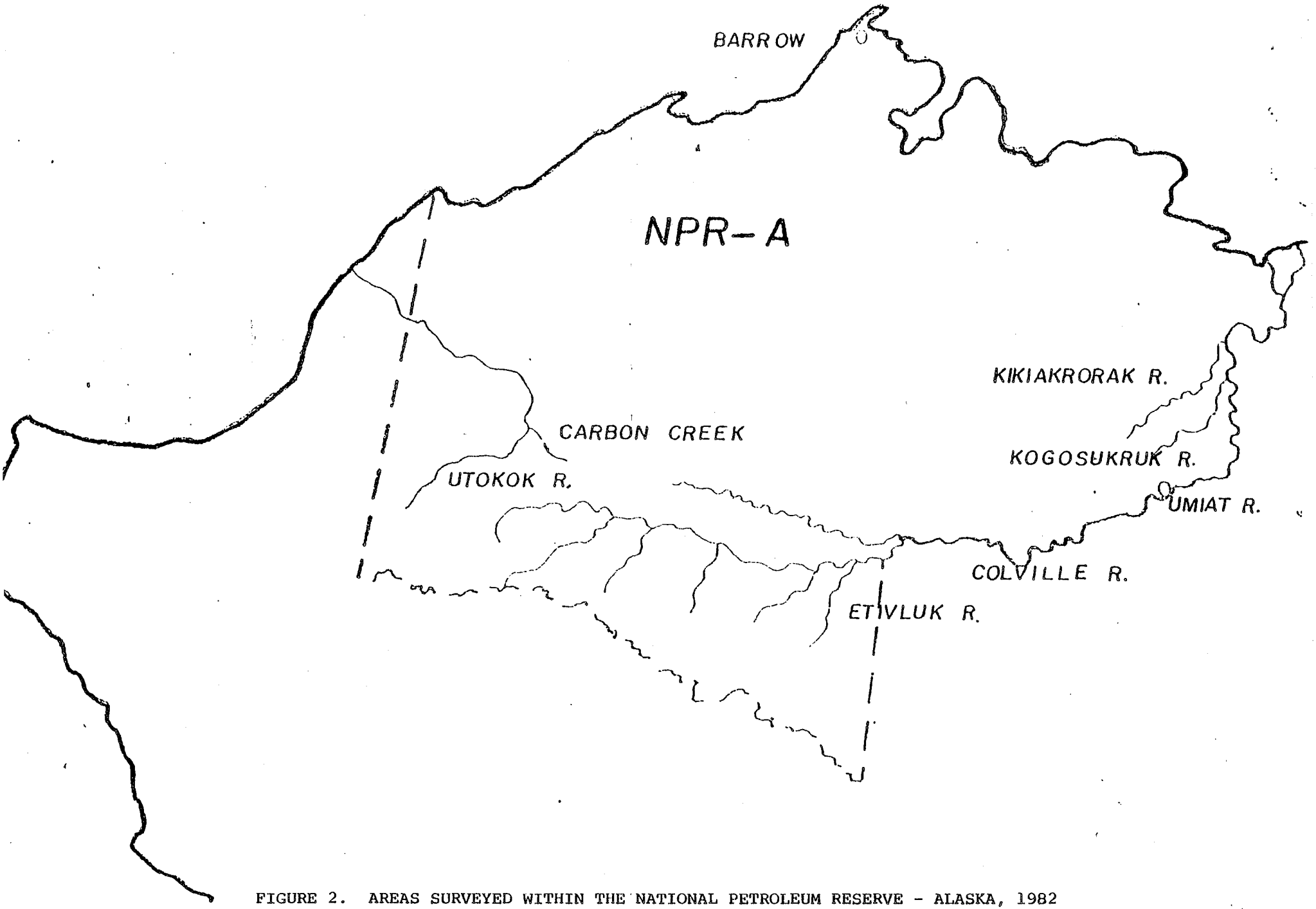


FIGURE 2. AREAS SURVEYED WITHIN THE NATIONAL PETROLEUM RESERVE - ALASKA, 1982

(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.

(4) Section 9, T7N, R2E, or 5 km. up river from its confluence with the Colville.

(5) Section 9, T7N, R2E, or 4 km. up river from its confluence with the Colville.

Utukok River

Three historic peregrine eyries were checked by helicopter. These bluffs were located in:

(1) Section 31, T2S, R34W, Umiat Meridian, or approximately 19 km. up river from the confluence of Disappointment Creek.

(2) Section 32, T2S, R34W, Umiat Meridian, or approximately 18 km. up river from the confluence of Disappointment Creek.

(3) Section 20, T3S, R36W, Umiat Meridian, or the intersection of Archimedes Ridge and the Utukok River.

Carbon Creek

Two bluffs on Carbon Creek were checked by helicopter. These bluffs were located in:

(1) Section 1, T2S, R32N, Umiat Meridian.

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

Fossil Creek

The lower reaches of Fossil Creek (10 km.) was surveyed for nesting raptors.

Iteriak Creek

Bluffs along Iteriak Creek (Sections 21, 22, T10S, R13E, U.M.) were checked for nesting raptors.

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

Attempts were made to locate the failed nest of any peregrine falcon and to collect any eggs or shell fragments present. Eggs, shell fragments and prey remains were collected when possible at active peregrine nests as well.

## RESULTS

### Peregrine Falcons

Peregrines were present at 29 locations on the Colville River between the Etivluk River and Nuiqsut in 1982. Twenty-six locations had pairs present, and single adults were present at the remaining three locations. Eighteen of the 26 pairs were successful in producing young. These 18 pairs produced 48 young, an average of 1.85 young per total pair. The remaining eight pairs (30%) failed to produce young.

There were two peregrine present on the surveyed portion of the upper Colville River. They were located approximately 8 km. up river from the mouth of the Kaligwa River and both were females.

No peregrines were found at the three historic nest sites on the Utukok River, or at the two suitable bluffs on Carbon Creek which were checked.

A pair of peregrine nested between 1 and 2 km. up the Killik River from the Colville. In addition peregrines were found at three locations on the Kogosukruk River. All three locations had pairs of which two were successful in producing five young. The Kikiagrorak River had a pair of peregrines at one location but they failed to produce young.

The location and productivity of all peregrines observed comprises Table 1. Of the 60 peregrine young observed in NPR-A, 55 were banded. (See Appendix I.)

### Gyrfalcons

Gyrfalcons were found at 12 locations on the Colville River between the Etivluk River and Nuiqsut. Ten locations had pairs present with singles present at the other two. These ten pairs had three successful nests which produced a total of three young.

The totals for gyrfalcons observed in NPR-A in 1982, including the Colville River, are 12 pairs and 4 singles. Eight of the 12 pairs were known to attempt nesting. All eight known nesting attempts and the three successful nests occurred on the Colville River. The productivity for all gyrfalcons seen was .25 young per total pair.

The locations of all observed gyrfalcons on NPR-A are listed in Table 2. One of the three nestling gyrfalcons observed was banded. (See Appendix I.)

### Rough-legged Hawks

The Colville River between the Etivluk River and Nuiqsut had rough-legged hawks at 54 locations. There were 44 known nesting attempts of

Table 1. Peregrine Falcons (Falco peregrinus tundrius) observed along the Colville, and other selected rivers within NPR-A, 1982.

| Cliff #[1] | Adults | Nest Attempt | Young | Remarks |
|---|---|---|---|---|
| Upper Colville T.5S. R.28W. | 2 | ? | 0 | Both birds were female |
| Colville | | | | |
| 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 1. - Continued

| Cliff #[1] | 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 Etivluk R. from confluence with Colville R. |
| Killik River | 2 | Yes | 3 | First bluff up Killik R. from confluence with 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 numbers taken from White and Cade (1971).

Table 2. Raptors, except Peregrine Falcons, observed along the Colville, and other selected rivers within NPR-A, 1982.

| Cliff #[1] Locations | Species[2] | Adults[3] | Nesting[4] Attempt | Young[5] | Young Banded |
|---|---|---|---|---|---|
| Upper Colville River | | | | | |
| T.5S. R.30W. U.M. | | | | | |
| Sec. 2 | RL | 2 | Yes | 2 | No |
| Sec. 3 | RL | 2 | Yes | 3 | Yes |
| Sec. 11 | RL | 2 | Yes | 1 | Yes |
| T.5S. R.29W. U.M. | | | | | |
| Sec. 11 | RL | 2 | Yes | Yes | No |
| Sec. 11 | G | 1 | ? | 0 | |
| Sec. 17 | RL | 2 | Yes | ?(Yes) | |
| Sec. 20 | RL | 2 | Yes | ?(Yes) | |
| Sec. 23 | RL | 2 | Yes | 1 | Yes |
| T.5S. R.28W. U.M. | | | | | |
| Sec. 1-2 | RL | 1(2) | Yes | ?(Yes) | |
| Sec. 3 | RL | 2 | Yes | Yes | No |
| T.5S. R.27W. U.M. | | | | | |
| Sec. 6 | RL | 2 | ? | | |
| Sec. 9 | RL | 2 | Yes | 2 | Yes |
| T.6S. R.19W. U.M. | | | | | |
| Sec. 30 | RL | 1(2) | Yes | ?(Yes) | |
| Main Colville River[6] – ? | | | | | |
| Etivluk 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 2. - Continued

| Cliff #[1] Locations | Species[2] | Adults[3] | Nesting[4] Attempt | Young[5] | 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 2. - Continued

| Cliff #[1] Locations | Species[2] | Adults[3] | Nesting[4] Attempt | Young[5] | 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 |
| Lower Etivluk River | | | | | |
| T.9S. R.19W. U.M. Sec. 12 | RL | 2 | Yes | NC | |
| T.7S. R.18W. U.M. Sec. 11 SW¼ | RL | 1 | ? | 0 | |
| Sec. 11 NW¼ | RL | 2 | Yes | 2 | Yes |
| T.6S. R.18W. U.M. Sec. 35 | RL | 1(2) | Yes | NC | |
| Colville River cliff #1 | RL | 2 | Yes | 3 | Yes |
| | RL | 2 | Yes | 4 | 3/4 |

Continued

Table 2. - Continued

| Cliff #[1] Locations | Species[2] | Adults[3] | Nesting[4] Attempt | Young[5] | Young Banded |
|---|---|---|---|---|---|
| Fork of Kogosukruk River | | | | | |
| T.2N. R.1W. U.M. | | | | | |
| Sec. 18 | RL | 2 | ? | 0 | |
| T.3N. R.1W. U.M. | | | | | |
| Sec. 32 | RL | 2 | Yes | 2 | Yes |
| Kogosukruk River | | | | | |
| T.3N. R.1W. U.M. | | | | | |
| Sec. 14 | RL | 1 | ? | 0 | |
| Sec. 21 | G | 2 | ? | 0 | |
| | RL | 2 | ? | 0 | |
| Sec. 22 NE¼ | RL | 1 | ? | 0 | |
| Sec. 22 SW¼ | 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 | ? | |
| Kikiakrorak River | | | | | |
| T.7N. R.2E. U.M. | | | | | |
| Sec. 9 | RL | 1(2) | Yes | NC | |
| Otuk Creek | | | | | |
| T.11S. R.16W. U.M. | | | | | |
| Sec. 20 | RL | 1 | ? | 0 | |
| Carbon Creek | | | | | |
| T.2S. R.32W. U.M. | | | | | |
| Sec. 1 NE¼ | RL | 2 | ? | 0 | |
| Sec. 1 SW¼ | G | 2 | ? | 0 | |

Continued

Table 2. - Continued

| Cliff #[1] Locations | Species[2] | Adults[3] | Nesting[4] Attempt | Young[5] | Young Banded |
|---|---|---|---|---|---|
| Utokok River | | | | | |
| T.2S. R.34W. U.M. Sec. 31 | G | 1 | ? | 0 | |
| T.3S. R.36W. U.M. Sec. 20 | GE | 1 | ? | ? | |
| Iteriak Creek | | | | | |
| T.10S. R.13E. U.M. Sec. 21-22 | G | 1 | ? | 0 | |
| | RL | 2 | Yes | 2 | No |

[1]Cliff numbers on the Colville River taken from White and Cade (1971).

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

[3]Adults-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.

[4]Nesting attempt:
Yes-eggs, young, or incubating adult was seen.
?---Nesting attempt never verified.

[5]Young:
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.

which 22 were successful, and the success of three is unknown. The 22 successful nests produced at least 39 young.

There were 75 pairs observed in NPR-A as a whole (including the Colville), of which 37 were successful in producing at least 61 young. The productivity of rough-legged hawks was .8 young per total pair.

The locations of all rough-legged hawks observed is included in Table 2. There were 34 nestlings banded (see Appendix I).

Ravens

Four pairs of ravens were seen at bluffs on the Colville between the Etivluk and Nuiqsut. Two pairs had nests and produced a total of 8 young. There was one additional pair observed on the Kogosukruk but they failed to nest. See Table 2 for locations.

DISCUSSION

The productivity of peregrine falcons continued to show encouraging trends in 1982. Although this population along the Colville River is still not recovered from its decline, several indicators show 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 3). The number of young produced on the Colville increased from 31 in 1982 to 48 in 1982. There was an increase in the number of successful nests over last year from 12 to 18, and a drop in the percentage of pairs which did not produce young from 50% in 1981 to 31% in 1982. For the purposes of discussion the nest at cliff 73 is considered a failure. The nest contained eggs on July 28 which is several weeks behind other nests.

This year's success of peregrine should, however, be viewed with suspicion for several reasons. The spring was much later this year than last. Vegetation, mosquitos and snow melt on the bluffs occurred at least two weeks later than 1981. The peregrine nesting cycle was behind the 1981 timetable as well (see Table 4). This may have resulted in an inaccurate assessment of young produced. 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 at a time when the chicks were younger. Counting the chicks at an earlier age would leave longer periods of time before the counted birds fledged, increasing the chances of mortality before fledging.

The late season may have had a negative affect on the amount of prey available to recently fledged peregrines. A larger percentage of individuals within some prey species may not breed during late spring, and species which are on schedule may migrate out of the area before the peregrines fledge.

Table 3. 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 |

[1]Cliff numbers taken from White and Cade (1975)

[2]Todd (1978)

[3]Springer, et al, (1979)

[4]Ambrose (1980)

[5]Dittrick and Swem (1981)

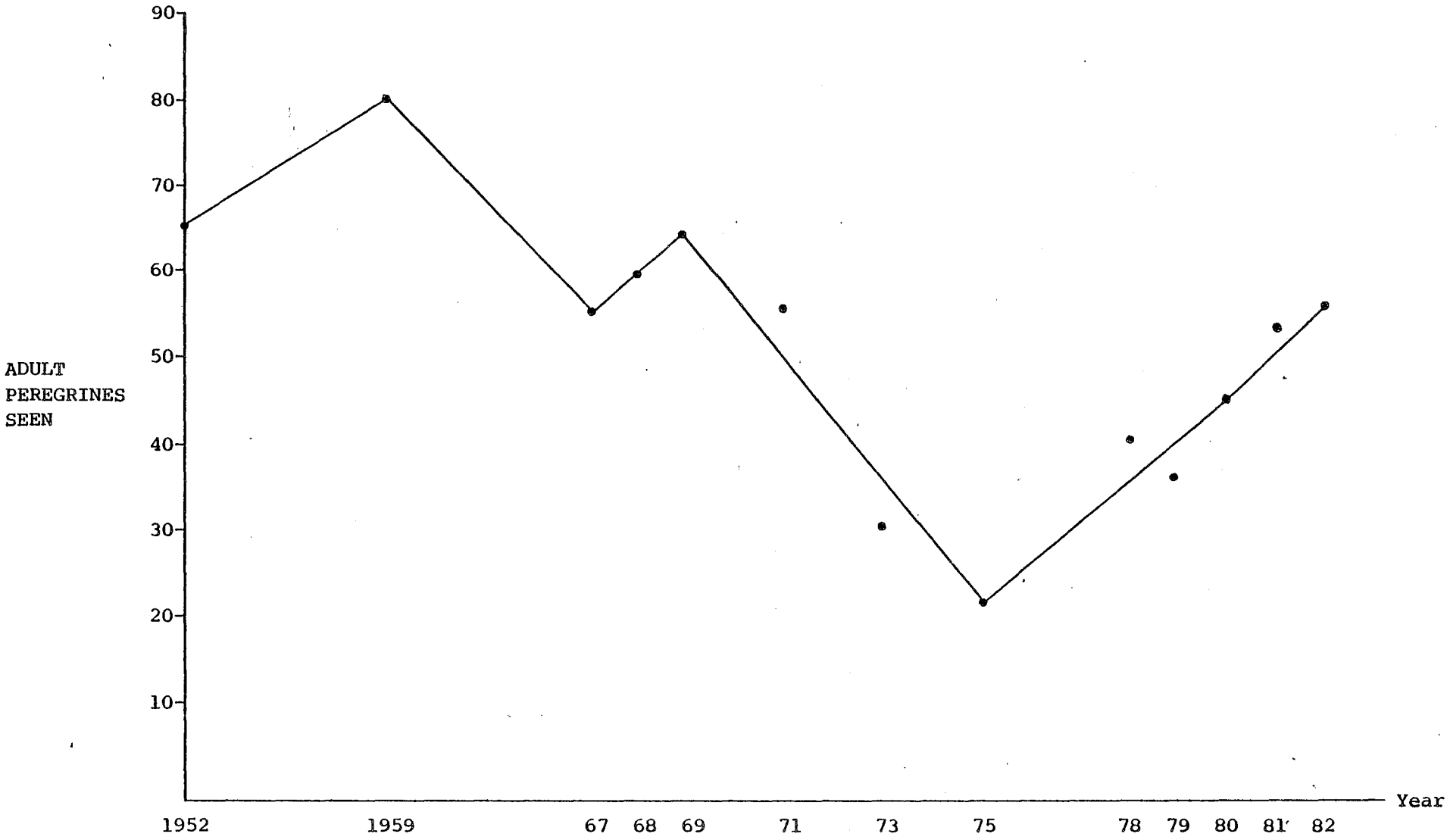


FIGURE 3. THE NUMBER OF ADULT PEREGRINES SEEN ON THE COLVILLE RIVER

Five separate sites on the Kogosukruk River were occupied by peregrines over the last two years, though all five were checked in 1982 and only three were occupied. Two were occupied in 1981 that were vacant in 1982. These vacant sites were a minimum of 15 km. away from the occupied sites found in 1982, so possibly they were separate pairs. It is possible all five sites were occupied in 1981 but two were not checked.

OTHER RAPTORS

Reproduction of gryfalcons, 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 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 was drastically lower in 1982 than it was in 1981. Sixteen pairs produced 10 successful nests containing 19 young in 1981, an average of 1.19 young per total pair (Dittrick and Swem, 1981). In 1982, only 10 pairs were present on bluffs, and only 3 pairs succeeded producing a total of 3 young. This equates to .3 young per total pair. It can be seen that less adult gyrfalcons were present this year, less pairs successfully nested, and those succeeding raised less young per nest.

Cade (1960) reported variations in 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 is a result of reduced ptarmigan numbers. This is further substantiated by the fact that only four ptarmigan were seen from the Colville in over four weeks spent with two observers present, though in some years they may be relatively abundant.

One single gyrfalcon was seen on the Utukok River, a single was seen on the upper Colville and the Iteriak Creek, and a pair was seen on both Carbon Creek and the Kogosukruk but none of these had a nest present.

Rough-legged hawk reproduction was also lower in 1982 than in 1981. Fifty four pairs were present on the Colville between the Etivluk River and Ocean Point, and only 22 successfully nested. Thirty-nine young were 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 pair to .75 young per total pair this year, and the number of pairs dropped by 32%.

Ravens were less abundant this year as well. Five pairs nested on the Colville between the Etivluk and Ocean Point in 1981, but only two pairs nested in the same stretch in 1982. Two pairs were seen flying near cliffs which had raven nests last year, but no active nests were present 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 in the future.

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

The peregrine falcon population along the Colville River has been on the increase since about 1975 (see figure 3). During this same period of time, the numbers of peregrines on many of the other rivers has decreased.

Because the Colville River is the core area for the peregrine falcon population within NPR-A, it should be monitored each year, while many of the other rivers need only to be surveyed periodically to determine the nesting population.

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

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

During future years (1984 and 1985) the following rivers will be surveyed to greatest extent possible.

| 1984 | 1985 |
|---|---|
| 1. Etivluk River | 1. Kiligwa River |
| 2. Ipnavik River | 2. Nuka River |
| 3. Kuna River | 3. Upper Colville (above Nuka) |

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

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# APPENDIX I

# BANDING DATA

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

| Location | Band # | Date |
|---|---|---|
| Etivluk River | 987-30539 | 16 July |
| | 987-30540 | 16 July |
| | 987-30541 | 16 July |
| | 987-30542 | 16 July |
| Colville River[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 |
| Killik River | 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 |
| Kogosukruk River | 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 |

[1]Cliff numbers taken from White and Cade (1971) and denote a location on or near the Colville River.

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

| Species[1] | Location | Band # | Date |
|---|---|---|---|
| RL | Upper Colville River | 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 | Etivluk River | 877-77020 | 17 July |
| RL | | 877-77021 | 17 July |
| | Colville River[2] | | |
| 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 |

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

[2]Cliff numbers from White and Cade, 1971.

# APPENDIX II

# MAPS