

DISPERSAL AND MIGRATION OF SOUTHWESTERN IDAHO RAPTORS

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Effective management of bird populations is based on an understanding of their requirements and limiting factors throughout the year. Identification of migratory patterns and wintering areas is an important step in achieving this understanding. The Snake River Birds of Prey Area in southwestern Idaho is known for its unusually high density of nesting raptors and has been the focus of intensive ecological studies (USDI 1979). Little is known, however, about the migratory habits of the raptors that nest in the area.

Golden Eagle (*Aquila chrysaetos*), Prairie Falcon (*Falco mexicanus*), and Red-tailed Hawk (*Buteo jamaicensis*) populations vary in their migratory habits. Some populations of each species are resident on or near their nesting areas year-round (Webster 1944, Carnie 1954, Haugh 1972, Mead 1973, Johnsgard 1980), while others move considerable distances during the non-nesting season (Lincoln 1936, Bond 1939, Enderson 1964, Houston 1967, Kuyt 1967). Golden Eagles that nest at high latitudes migrate longer distances than eagles nesting farther south (McGahan 1966, Mead 1973). Distances moved by individual birds of prey may also be influenced by age class (Snow 1968, Stewart 1969, 1977), food supply at the nesting area (Adamcik and Keith 1978, Houston 1978), and early experience and/or genetics (Newton and Marquiss 1983). In most raptors studied, both migratory and non-migratory individuals breed in the vicinity of their natal areas (Newton 1979, Newton and Marquiss 1983), but few data have been collected on site fidelity of raptors in western North America. This paper summarizes information on movements of Golden Eagles, Prairie Falcons, and Red-tailed Hawks marked as nestlings in the Snake River Birds of Prey Area. Objectives of the analyses were to: (1) identify migratory patterns and wintering areas; (2) evaluate factors that may influence distances moved; and (3) determine whether birds are likely to return to nest near their natal areas.

METHODS

Golden Eagle, Prairie Falcon, and Red-tailed Hawk nestlings were banded throughout southwestern Idaho, primarily along the Snake River Canyon between Marsing and Bliss. From 1966 to 1982, 512 eagles, 939 falcons, and 306 hawks were banded with aluminum U.S. Fish and Wildlife Service leg bands. Of the 1757 nestlings banded, 661 (256 eagles, 259 falcons, and 146 hawks) were also marked with patagial tags (Kochert et al. 1983) on 1 or both wings.

We published announcements in 6 technical publications and distrib-

uted circulars throughout the western United States requesting information on sightings of color-marked birds. When we received information about a sighting or a band recovery, we tried to contact the observer for more detailed information about the location, circumstances, and condition of the bird.

Distances moved were calculated from Universal Transverse Mercator (UTM) coordinates that were assigned to both marking and recovery/sighting locations. As indicated by Kochert *et al.* (1983), not all wing-marker sightings provided complete information. When the exact marking location could not be deduced from the sighting (146 of 173 sightings), we considered the marking location to be the centroid of all nests where birds were marked with a particular color combination. Sightings in which the year that the bird was marked could not be determined were excluded from some summaries. Recoveries were excluded from the seasonal analysis if birds were extremely decomposed. Only birds that moved a measurable distance (> 100 km) were included in analyses. Young-of-year birds that moved less than 2 km were excluded because they probably had not left their natal territories. Resightings of individual birds in the same year and same general area were not considered.

RESULTS

We received 140 band recoveries and 621 sightings of the 3 species studied. We could not use 434 of the recoveries and sightings because they were of young birds that had not left their natal territories; 71 were resightings. The majority of usable recoveries and sightings were of eagles (53 and 147, respectively). We received 14 band recoveries and 7 sightings of falcons, and 16 recoveries and 19 sightings of hawks.

Figures 1–3 illustrate the recovery and sighting locations of individuals that moved more than 100 km. Golden Eagles dispersed from the area in almost all directions (Fig. 1). Fifteen of the 45 birds that moved 100 km or more were still in southern Idaho. Most eagles did not move beyond the boundaries of adjacent states. Nine birds were found in Oregon, 7 in Nevada, 5 in Utah, 3 in Washington, and 1 in Wyoming. The eagle that travelled farthest was sighted near Fort Sumner, New Mexico. This bird and 3 that were sighted in Montana were the only 4 eagles that crossed the Continental Divide. Most sightings and recoveries of eagles were in Great Basin shrub-steppe habitats; eagles apparently avoided the coniferous region of northern Idaho. Thus, dispersal from southwestern Idaho was not completely random as Beecham and Kochert (1975) suggested.

As in Enderson's (1964) study and Cooke's (1950) report, Prairie Falcons tended to move east of their marking locations (Fig. 2). Falcons banded in southwestern Idaho were recovered in Kansas, Mexico, Arizona, Utah, Montana, and eastern Idaho. More than 50% of recoveries and sightings > 100 km from the marking locations were east of the Continental Divide. Two falcons were sighted almost directly north of



FIGURE 1. Sighting and recovery locations of Golden Eagles that moved >100 km from the marking location. Open circles represent sightings; solid circles represent band recoveries. Solid lines represent sightings and recoveries in the first year. Dashed lines show sightings and recoveries after the first year.

the study area near Moscow, Idaho and Ronan, Montana. Recoveries and sightings were mainly in prairie or shrub-steppe habitats.

Red-tailed Hawk movements showed the strongest directional bias of the 3 species, with 9 of 12 long distance recoveries southeast of the study area (Fig. 3). Six wintering hawks died in coastal lowland habitat south of the U.S.; 3 were found in Michoacán, Mexico, 2 in Sinaloa, Mexico, and 1 in Guatemala. The only hawks found east of the Continental Divide were recovered in southeastern New Mexico near the town of Jal and in southcentral Colorado near Monte Vista. A hawk recovered near Guasti, California was the only one found west of the study area.

Distances moved.—Red-tailed Hawks moved the farthest distances, with 1 recovery 4205 km from the banding location. Prairie Falcons travelled



FIGURE 2. Sighting and recovery locations of Prairie Falcons that moved E > 100 km from the marking location. Open circles represent sightings; solid circles represent band recoveries. Solid lines represent sightings and recoveries in the first year. Dashed lines show sightings and recoveries after the first year.

up to 2170 km, and the maximum distance moved by a Golden Eagle was 1405 km. Of all sightings and recoveries, 78% of eagles were within 100 km of the marking location (Table 1). In contrast, only 38% of falcons and 66% of hawks were found within 100 km of the marking location. These figures may be slightly biased because the relative frequency of wing-marker sightings decreases with distance from the study area and observer unfamiliarity with the marking program (Kochert *et al.* 1983). Nevertheless, distributions of band recoveries alone show similar patterns (Table 1).

First-year raptors from the Snake River did not move significantly farther than older birds (Mann-Whitney $U = 407, 17, \text{ and } 14$ for eagles, falcons, and hawks, respectively; $P > .05$). However, 8 of the 9 most distant (>500 km) eagle recoveries and sightings were of birds more than 1 year old.



FIGURE 3. Sighting and recovery locations of Red-tailed Hawks that moved >100 km from the marking location. Open circles represent sightings; solid circles represent band recoveries. Solid lines represent sightings and recoveries in the first year. Dashed lines show sightings and recoveries after the first year.

To assess whether prey abundance influenced distances moved by eagles, we divided the 25 winter sightings and recoveries of first-year birds into 2 groups: years with low black-tailed jack rabbit (*Lepus californicus*) populations (1973–1978), and years with high rabbit numbers (1970–1972, 1979–1982; BLM, unpublished data). A Mann-Whitney U test showed no significant difference in distance moved ($U = 70$; $P > .05$) between the 2 year types. Similar results were obtained when we contrasted 16 sightings and recoveries from only the best (1970–1971) and worst (1973–1975) prey years ($U = 12$; $P > .05$).

Seasonal distributions.—In all species, distance moved varied with sea-

TABLE 1. Band recoveries and wing marker sightings of 3 raptor species in relation to distance. Totals and percentages are based on sightings and recoveries combined. Band recoveries alone are shown in parentheses.

	<100 km	100-300 km	300-1000 km	> 1000 km
Golden Eagle	155 (41) 78%	28 (10) 14%	16 (2) 8%	1 (0) <1%
Prairie Falcon	8 (4) 38%	2 (2) 10%	7 (4) 33%	4 (4) 19%
Red-tailed Hawk	23 (5) 66%	1 (0) 3%	2 (2) 6%	9 (9) 26%

son (Fig. 4). The fewest recoveries and sightings of birds that had left their natal territory were reported for the post-nesting period from 15 July to 15 October. Eagles showed the strongest tendency to stay near the nesting area during this period with only 7 of 31 birds (23%) more than 100 km from their marking locations (Fig. 4). This percentage would have been only 14% if we had included the 19 young eagles that were still on their natal territories after 15 July.

In contrast, only 4 wing-marked falcons were seen in their natal territories after 15 July; the latest sighting on territory was on 28 July. No marked Prairie Falcons that had left their natal territory were found within 100 km of the area between 15 July and 15 October (Fig. 4). Townsend ground squirrels (*Spermophilus townsendii*), the principal prey of falcons, estivate by mid-July (BLM, unpublished data) and are therefore unavailable to avian predators in late summer and early fall. Most transmitter-equipped falcons dispersed from the study area in late June and early July and headed generally northeast (Dunstan et al. 1976). All summer recoveries and sightings of falcons were 300 to 500 km from the study area. Two falcons were found northeast of the study area during July in Montana, and one was found in Utah during August. In mid-September, a first-year Prairie Falcon was recovered in Coahuila, Mexico.

Unlike Prairie Falcons, Red-tailed Hawks apparently did not begin their long-range migration until late fall. All hawks sighted from July to October were within 200 km of their marking locations. Marked Red-tailed Hawk young-of-year were sighted on their natal territories as late as 9 August and in the study area as late as 26 September. However, 1 young Red-tailed Hawk was seen on 1 August in a mountainous area 163 km northeast of the canyon study area.

Golden Eagles continued to show an affinity for their natal region between October and March, with 75% of the recoveries and sightings within 100 km of the marking locations (Fig. 4). Prairie Falcons, in contrast, were widely distributed during the winter months (Fig. 4). Although falcons were found in Idaho throughout the winter, some

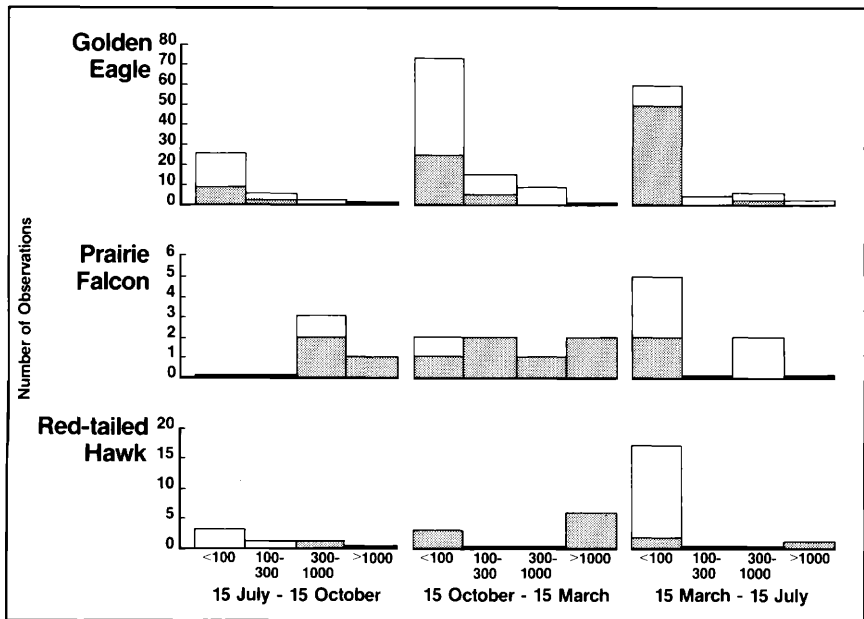


FIGURE 4. Distances moved (km) by marked raptors in relation to season. Shaded areas represent band recoveries; open areas represent wing marker sightings (includes only those birds that had left their natal territory).

wintered as far east as Kansas and as far south as Arizona. Two falcons were recovered in eastern Idaho in November. Winter recoveries and sightings within 100 km of the study area were just prior to the breeding season. Prairie Falcons are commonly seen near the study area in February (Bammann and Doremus 1982). One bird trapped as a nesting adult had been banded by C. J. Henny in January of the previous year within 4.5 km of the nest (BLM, unpublished data). Red-tailed Hawks from southwestern Idaho apparently use distant wintering areas (Fig. 4). The few sightings and recoveries of marked hawks near the study area during this period were probably of birds that returned to the breeding grounds early. All 3 hawks recovered within 100 km during the winter period were found after 15 January.

During the breeding season (15 March–15 July), proportionately more raptors were recovered and sighted within 100 km of the natal area than during the other seasons ($\chi^2 = 9.99$; $P < .01$). Results were probably influenced by an increased number of observers in the field during the breeding season. Of all breeding season recoveries and sightings, 86% of the eagles, 71% of the Prairie Falcons, and 94% of the Red-tailed Hawks were within 100 km of their natal areas (Fig. 4).

The birds found more than 100 km from the area during the breeding

season may not have been nesting where they were sighted. Both Prairie Falcons were first-year birds found north of the study area, and not all Prairie Falcons attempt to breed in their first year (Enderson 1964, Denton 1975, Platt 1977, 1981). Similarly, a Red-tailed Hawk shot in Mexico in April was in its first year. Three of the 6 eagles that were more than 300 km from the study area during the breeding season were first-year birds and presumably not nesting. A 9-year-old eagle was sighted in eastern New Mexico in March. Although Golden Eagles regularly nest in New Mexico, Boeker and Ray (1971) reported that a large group wintering in eastern New Mexico does not depart for northern summer ranges until late March. The only other birds sighted outside the study area that may have been breeding were 2 eagles in their 4th to 6th year. They were seen in May near Dillon, Montana and Yakima, Washington, 350 and 520 km from the study area.

Breeding activity of marked birds.—Six Golden Eagles, 3 Prairie Falcons, and 6 Red-tailed Hawks marked as nestlings were later found as mated birds on territories in the study area (Table 2). Marked eagles first appeared on territories in their 4th to 7th year. Red-tailed Hawks usually appeared in their 2nd or 3rd year. One hawk occupied a territory in its first year but did not initiate a nesting attempt until the following year. Age at first breeding for Prairie Falcons could not be assessed from these data because 2 of the 3 returning falcons were trapped at their nest sites as 4-year-olds, and it is not known whether they had bred in previous years. One wing-marked falcon observed as a mated bird on territory in its first year did not initiate a nesting attempt.

Known distances between hatching site and breeding area ranged from 7 to 65 km (1 to 12 territory widths) for eagles ($n = 3$), and 5 to 6 km (approximately 10 territory widths) for Prairie Falcons ($n = 2$); a Red-tailed Hawk nested in a territory 6 km (< 2 territory widths) from its natal nest (Table 2). Because some sighted birds could not be identified individually, exact distances could not always be obtained. For these birds, ranges of possible distances based on all possible marking locations are shown in brackets in Table 2. One Prairie Falcon moved a minimum of 41 km, and a Red-tailed Hawk dispersed at least 54 km. Sightings of eagles that could not be identified individually did not yield additional information on distance between hatching and breeding locations.

Greenwood (1980) predicted that male birds are more likely to breed near their natal areas than are females. This prediction held true for eagles, with 4 of 5 identified returns being males. In Prairie Falcons, however, both mated individuals of known sex were females that moved relatively short distances from their hatching locations. A third falcon that moved at least 41 km from its natal area was thought to be a male because of its small size. None of the Red-tailed Hawks could be sexed with certainty, but behavior patterns suggested at least 4 of the 6 hawk returns were of females.

Data on birds marked as nestlings indicate that individual Golden

TABLE 2. Birds marked as nestlings that were later found as mated birds on territory.

Species	Sex	Type of return	Year marked	Years on territory	Distance (km) from hatching site to breeding territory
Golden Eagle	♂	Sighting/trapped	71	75-84	7
Golden Eagle	♀	Sighting	70	77, 78, 80	44
Golden Eagle	♂	Sighting	71	75, 76	65
Golden Eagle	♂	Sighting	70 or 71	76-80	(0-110)
Golden Eagle	♂	Sighting	70, 71 or 74	78	(0-118)
Golden Eagle	?	Sighting	70, 71, 75 or 76	80, 81	(0-130)
Prairie Falcon	♀	Trapped	72	76	6
Prairie Falcon	♀	Trapped	72	76	5
Prairie Falcon	♀?	Sighting	76	77	(41-116)
Red-tailed Hawk	♀?	Sighting/found dead	77	80, 82	6
Red-tailed Hawk	♀?	Sighting	75	76, 77	(54-101)
Red-tailed Hawk	♀?	Sighting	77	80-82	(8-37)
Red-tailed Hawk	♀?	Sighting	77	79	(4-40)
Red-tailed Hawk	?	Sighting	78	80, 81	(2-115)
Red-tailed Hawk	?	Sighting	78	80	(2-95)

Eagles hold territories for the longest period (up to 9 years), followed by Red-tailed Hawks (3 years). Prairie Falcons marked as nestlings were not known to occupy the same breeding territory for more than 1 year, but at least 4 Prairie Falcons trapped and marked as adults on territory have been resighted or retrapped in up to 2 subsequent breeding seasons on the same territory. Red-tailed Hawks marked as adults have occupied the same territories for at least 1, 3, and 10 consecutive years. Individuals of all species may have lost markers (see Kochert et al. 1983) and could have retained territories for longer periods.

DISCUSSION

The 3 raptor species studied in southwestern Idaho exhibited distinct migration strategies. Golden Eagles were generally resident in southwestern Idaho, with a few individuals moving in all directions to adjacent shrub-steppe habitats. Unlike other raptors that depend on cyclic prey (Haukioja and Haukioja 1970), Golden Eagles from southwestern Idaho did not exhibit "irruptive" movement patterns during prey shortages.

Prairie Falcons left the breeding area soon after young fledged and probably used widely separated post-nesting and wintering areas where prey were temporarily abundant. In summer, Prairie Falcons may use ground squirrel species that occur at higher elevations or more northern latitudes. Two marked falcons found in July were northeast of their marking locations in high sagebrush valleys (elevation >1900 m) where Richardson's ground squirrels (*Spermophilus richardsonii*) were abundant.

Enderson (1964) observed a summer concentration of Prairie Falcons of unknown origin in high elevation plains near Laramie, Wyoming where prey was abundant and vulnerable, and Marti and Braun (1977) reported that Prairie Falcons were common in Colorado alpine tundra during summer. In fall and winter, the distribution of Prairie Falcons shifts to the south. According to Enderson (1964), falcons become associated with concentrations of Horned Larks (*Eremophila alpestris*) in Great Plains winter-wheat fields. Two recoveries from central Kansas fit this pattern, but some falcons appear to spend at least part of the winter in Idaho.

Red-tailed Hawks remained in the Idaho nesting area for up to 2 months after young fledged, but moved southward as far as 4000 km in winter. The coastal lowlands of Mexico and Central America appear to be important wintering grounds for Red-tailed Hawks from southwestern Idaho. Clusters of recoveries at 2 areas in Mexico may reflect either preferred habitat or heavy shooting pressure. Red-tailed Hawks banded as nestlings in eastern Idaho (Trost pers. comm.) and western Wyoming (Lincoln 1936) have also been recovered in Mexico, and Mexico appears to be an important wintering area for breeding populations throughout the western states. Bird Banding Laboratory records show that all 42 Red-tailed Hawks banded as nestlings and recovered in Mexico came from 9 western states. Except for a recovery from Guatemala, all recoveries and sightings of hawks from this study area were west of the recoveries of Red-tailed Hawks from Saskatchewan (Houston 1967).

The migration strategies of the raptors reflect their feeding ecology. Golden Eagles feed on black-tailed jack rabbits, which are available in southwestern Idaho through the year. Prairie Falcons, however, exploit prey that are only seasonally abundant and therefore must move to areas where suitable prey are available at other times of the year. The Red-tailed Hawk, a generalist, can shift to alternate prey when ground squirrels estivate. Red-tailed Hawks, however, use poikilothermic prey more than either Prairie Falcons or Golden Eagles (Knight and Erickson 1976; Stinson 1980; BLM, unpublished data). By late fall, this prey resource also becomes unavailable, and hawks are forced to migrate. Raptors that feed on insects or poikilotherms typically migrate longer distances than bird- or mammal-feeders (Newton 1979).

All 3 species showed a tendency to return to breed in the general area where they were hatched, and their differing behaviors present a challenge to individuals interested in managing southwestern Idaho's raptor populations. Eagle management would be the simplest, involving year-round habitat protection on nesting grounds and adjacent shrub-steppe habitat. Red-tailed Hawk management must consider the species' needs on both its Idaho nesting grounds and its wintering grounds in Mexico and Central America. Prairie Falcon management should involve maintenance of habitat in at least 3 widely separated areas (nesting, post-nesting, and wintering).

SUMMARY

Recoveries and sightings of raptors that had left their natal territories in southwestern Idaho indicate 3 distinct migration strategies. With few exceptions, Golden Eagles are year-round residents in southwestern Idaho. Prairie Falcons leave southwestern Idaho immediately after the nesting season, and apparently use widely separated nesting, post-nesting, and wintering areas. Red-tailed Hawks remain in Idaho during the post-nesting period, but travel south as far as Mexico and Guatemala in late fall and winter. All 3 species show a tendency to return to breed in the general area where they were hatched. Management of the southwestern Idaho nesting populations should consider possible limiting factors in areas that are used in the non-nesting season.

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LITERATURE CITED

- ADAMCIK, R. S., AND L. B. KEITH. 1978. Regional movements and mortality of Great Horned Owls in relation to snowshoe hare fluctuations. *Can. Field-Nat.* 92:228-234.
- BAMMANN, A. R., AND J. H. DOREMUS. 1982. The Snake River Birds of Prey Study Area bird list. Dept. of the Interior, Bur. Land Manage., Boise, Idaho.
- BEECHAM, J. J., AND M. N. KOCHERT. 1975. Breeding biology of the Golden Eagle in southwestern Idaho. *Wilson Bull.* 87:506-513.
- BOEKER, E. L., AND T. D. RAY. 1971. Golden Eagle population studies in the southwest. *Condor* 73:463-467.
- BOND, R. M. 1939. Observations on raptorial birds in the Lava Beds-Tule Lake region of northern California. *Condor* 41:54-61.
- CARNIE, S. K. 1954. Food habits of nesting Golden Eagles in the coast ranges of California. *Condor* 56:3-12.
- COOKE, M. T. 1950. Returns from banded birds. *Bird-Banding* 21:11-18.
- DENTON, S. J. 1975. Status of Prairie Falcons breeding in Oregon. M.S. thesis, Oregon State University, Corvallis.

- DUNSTAN, T. C., J. F. HARPER, AND K. B. PHIPPS. 1976. Activity, hunting patterns, territoriality, and social interactions of birds of prey in the Snake River Birds of Prey Natural Area, Idaho. Pp. 63-130 in *Snake River Birds of Prey Research Project 1976 Annual Report*. Dept. of the Interior, Bur. Land Manage., Boise, Idaho.
- ENDERSON, J. H. 1964. A study of the Prairie Falcon in the central Rocky Mountain region. *Auk* 81:332-352.
- GREENWOOD, P. J. 1980. Mating systems, philopatry and dispersal in birds and mammals. *Anim. Behav.* 28:1140-1162.
- HAUGH, J. R. 1972. A study of hawk migration in eastern North America. *Search Agric., Cornell Univ. Agric. Exp. Stn.* 2:1-60.
- HAUKIOJA, E., AND M. HAUKIOJA. 1970. Mortality rates of Finnish and Swedish Goshawks (*Accipiter gentilis*). *Finnish Game Res.* 31:13-20.
- HOUSTON, C. S. 1967. Recoveries of Red-tailed Hawks banded in Saskatchewan. *Blue Jay* 25:109-111.
- . 1978. Recoveries of Saskatchewan-banded Great Horned Owls. *Can. Field-Nat.* 92:61-66.
- JOHNSGARD, P. A. 1980. An analysis of migration schedules of non-passerine birds in Nebraska. *Nebraska Bird Rev.* 48:26-37.
- KNIGHT, R. L., AND A. W. ERICKSON. 1976. High incidence of snakes in the diet of nesting Red-tailed Hawks. *Raptor Res.* 10:108-111.
- KOCHERT, M. N., K. STEENHOF, AND M. Q. MORITSCH. 1983. An evaluation of a long term raptor and raven wing marking program. *Wildl. Soc. Bull.* 11:271-281.
- KUYT, E. 1967. Two banding returns for Golden Eagle and Peregrine Falcon. *Bird-Banding* 38:78-79.
- LINCOLN, F. C. 1936. Recoveries of banded birds of prey. *Bird-Banding* 7:38-45.
- MARTI, C. D. AND C. E. BRAUN. 1975. Use of tundra habitats by Prairie Falcons in Colorado. *Condor* 77:213-214.
- MCGAHAN, J. 1966. Ecology of the Golden Eagle. M.S. thesis, Univ. Montana, Missoula.
- MEAD, C. J. 1973. Movements of British raptors. *Bird Study* 20:259-286.
- NEWTON, I. 1979. Population ecology of raptors. Buteo Books, Vermillion, South Dakota.
- , AND M. MARQUISS. 1983. Dispersal of Sparrowhawks between birthplace and breeding place. *J. Anim. Ecol.* 52:463-477.
- PLATT, S. W. 1977. Successful breeding of juvenile Prairie Falcons in northeast Colorado. *Raptor Res.* 11:81-82.
- . 1981. Population dynamics of the Prairie Falcon in northeastern Colorado. Ph.D. diss., Brigham Young Univ., Provo, Utah.
- SNOW, D. W. 1968. Movements and mortality of British Kestrels *Falco tinnunculus*. *Bird Study* 15:65-83.
- STEWART, P. A. 1969. Movements, population fluctuations, and mortality among Great Horned Owls. *Wilson Bull.* 81:155-162.
- . 1977. Migratory movements and mortality rate of Turkey Vultures. *Bird-Banding* 48:122-124.
- STINSON, C. H. 1980. Weather-dependent foraging success and sibling aggression in Red-tailed Hawks in central Washington. *Condor* 82:76-80.
- U.S. DEPARTMENT OF THE INTERIOR. 1979. Snake River Birds of Prey Special Research Report. Bur. Land Manage., Boise, Idaho.
- WEBSTER, J. H., JR. 1944. A survey of the Prairie Falcon in Colorado. *Auk* 61:609-616.
- Snake River Birds of Prey Research Project, Bureau of Land Management, 3948 Development Avenue, Boise, Idaho 83705. Received 30 Aug. 1983; Accepted 15 Apr. 1984.*