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Survey of Nesting Raptors in Harding County, South Dakota

Sioux Ranger District, Custer National Forest, 22 May – 3 July 1996

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Introduction and Overview of Methods

The purpose of this project was to locate nesting raptors within the Harding County portion of the Sioux Ranger District, Custer National Forest. Historic information in the form of nest-site locations plotted on USGS maps was available for three target species: Golden Eagle (*Aquila chrysaetos*), Merlin (*Falco columbarius*), and Prairie Falcon (*F. mexicanus*). Jeff Marks and Mike Edwards arrived at Camp Crook on 22 May 1996 and spent the night at Picnic Springs in the North Cave Hills. Field surveys began the next day, with Marks and Edwards working together through 30 May. Marks departed South Dakota on 31 May, and Edwards left on 3 July, the same day that he completed the survey. Approximately 13 cm (>5 inches) of rain fell during that first week. Weather conditions improved in mid-June, which allowed Edwards to access many of the historical sites by vehicle instead of on foot.

All but two historic nesting sites (see below) of the three target species were visited at least once, and all potential cliff-nesting habitat was inspected thoroughly in the North Cave Hills, South Cave Hills, Slim Buttes, East Short Pine Hills, and West Short Pine Hills. The latter two areas were difficult to access in wet weather and had a low density of historic nesting sites. Therefore, these areas were not visited until later in the survey. Nests of Merlins and Prairie Falcons that failed early would have been undetected by us. However, we strived to locate all Golden Eagle nests in the study area, both old and new, and to determine whether the nests had been decorated recently (indicating an occupied territory but not necessarily a nesting attempt). Our survey of eagles was complete such that the number of nests we found reflects the number of nesting pairs in the area. The Merlin and Prairie Falcon nests that we found represent minimum estimates of breeding pairs for the reason stated above. In addition, Merlin nests are difficult to locate because the adults are not as defensive as are Prairie Falcons, and potential nests (old stick nests in pines) are difficult to locate. Moreover, a few Merlins probably nest in areas we did not visit (i.e., away from cliffs).

Our basic method entailed walking above and below the cliffs, scanning for raptors and their nests and clapping our hands loudly. Hand-clapping is a very effective means of flushing nesting Prairie Falcons from cliffs (J. Marks, pers. obs.) and proved to be effective in locating Merlins as well. We scrutinized as many ponderosa pines (*Pinus ponderosa*) as possible and investigated every Black-billed Magpie (*Pica pica*) nest we found for the presence of Merlins. Whenever possible, we looked into eagle nests from above and walked below the nests, searching for evidence of occupancy (i.e., nest decoration; presence of well-formed nest cup, fresh prey items, down, and whitewash in and around nest). We climbed into several Merlin nests to determine

stage of nesting and estimated the age of all raptor chicks that we saw. When we flushed Prairie Falcons from an obvious nest site, we walked below the cliff and hid at a distance until the incubating or brooding bird returned to the nest site proper. In this way we determined the exact location of each nest. Locations of occupied nesting sites were plotted on USGS topographic maps with the aid of color aerial photographs. We found that it was not necessary to plot nest locations directly on the aerial photos. Edwards took photographs of nearly all of the Prairie Falcon and Golden Eagle nests that we found.

Species Accounts

We located occupied nests (we define an "occupied" nest as one in which at least 1 egg was laid) of 10 Golden Eagles, 11 Red-tailed Hawks (*Buteo jamaicensis*), 1 Northern Harrier (*Circus cyaneus*), 1 Cooper's Hawk (*Accipiter cooperii*), 16 Prairie Falcons, 22 Merlins, 3 Great Horned Owls (*Bubo virginianus*), and 1 Long-eared Owl (*Asio otus*)(see Appendices 1-4). The totals above include 1 Golden Eagle nest, 2 Red-tailed Hawk nests, and 1 Prairie Falcon nest that had failed before we located the nests. We also found and plotted 25 vacant Golden Eagle nests that had not been plotted previously (i.e., new "old" sites).

Information on nesting raptors in the South Dakota portion of the Sioux District largely has been incomplete within any one nesting season. Most of raptor work has focused on sites in Montana (e.g., Long Pine Hills), and much of the historical information on nest locations in the South Dakota portion of the Custer Forest concerns nests that were inactive when discovered (e.g., Golden Eagles) or were found late in the nesting season (e.g., Prairie Falcons).

Golden Eagle.--We found 10 occupied Golden Eagle nests (see Appendices 1-4). One nest had failed before we found it (GE-9605), and the other 9 were active at the close of the field season. We also plotted 25 old "new" nests, that is, vacant Golden Eagle nests that were not plotted on our maps as historic sites (see Appendix 5). Many of these nests undoubtedly were alternate nest sites within historically known territories. One historic Golden Eagle site (35GE44 near the north end of the Slim Buttes) was not visited because on the master map of historic sites the plot appeared to be outside of the forest boundary. Upon Edwards' return to Missoula, however, we discovered that the site actually was within the forest.

The available historical information indicated that no more than 6 Golden Eagle nests were occupied between the years 1974 and 1989. Indeed, many of the old nests were inactive when found in the late 1970s, and these nests still are easily visible today. During 1979, the year that appears to have the most complete data, no more than 4 Golden Eagle nests were occupied (Table 1). This would indicate that nesting Golden Eagles have increased in the area. We note, however, that raptor nesting surveys in the South Dakota portion of the Sioux District tended to occur later in the season than in Montana. Consequently, early nesting failures may have been undetected such that the true number of nesting eagle pairs was higher than the data indicated. In any event, the large number of old, unoccupied sites suggests that Golden Eagles historically nested in much higher numbers than they do today.

Clearly, there is no shortage of suitable nesting sites in the area. One possible explanation for the abundance of vacant sites is reduced prey availability. In much of the western United States, Golden Eagles feed mainly on jackrabbits (*Lepus* spp.), ground squirrels (*Spermophilus* spp.), and prairie dogs (*Cynomys* spp.). Jackrabbit populations typically cycle, and we saw only one jackrabbit—a roadkill White-tailed (*Lepus townsendi*)—during our field work. Colonial ground squirrels were virtually nonexistent in Harding County, and the 2 Black-tailed Prairie Dog (*Cynomys ludovicianus*) colonies that we found were small. It is noteworthy that 5 of the eagle nests contained remains of Striped Skunks (*Mephitis mephitis*), a species common in the Snake River Birds of Prey Area in Idaho but rarely eaten by nesting Golden Eagles there (J. S. Marks, pers. obs.) Our guess is that prey availability was much higher in the past (perhaps especially for prairie dogs), which would explain the large number of unoccupied Golden Eagle sites.

Red-tailed Hawk.--Seven of the 11 occupied Red-tailed Hawk nests that we found occurred in the North Cave Hills (Appendix 1). Two of the nests had failed before we located them. One tree nest (RT-9605) contained 2 abandoned eggs, and we found a dead adult in one of the cliff nests (RT-9601). In neither case could we determine the cause of nesting failure. Historical information on nesting Red-tailed Hawks was not available to us, so we have no basis for comparison of numbers across years.

Broad-winged Hawk (*Buteo platypterus*).--On 27 May we saw a single adult seen flying toward the northwest as we were searching Timber and Peterson canyons in the South Cave Hills. The bird probably was migrating toward the nesting grounds in Canada.

Northern Harrier.--We observed Northern Harriers sporadically throughout our stay in the study area but made no attempt to locate nests. On the morning of 31 May, we located a nest in a snowberry patch at the Reva Gap campground when the male flew into the area and vocalized within earshot of our campground. The nest contained 5 eggs, but we did not revisit it to determine whether it was successful.

Cooper's Hawk.--We saw a single adult Cooper's Hawk carrying prey near Red Butte south of the South Cave Hills on 27 May. On 29 May, we flushed a Cooper's Hawk from a nest west of Travers Spring No. 2 in the North Cave Hills. The nest was more than 12 m above ground, and we could not climb to it to determine contents. Mike Edwards revisited the site on 13 June and found the nest to be vacant. No other Cooper's Hawks were observed in the study area.

Northern Goshawk (*Accipiter gentilis*).--On 27 May, Jeff Marks flushed an immature goshawk from a pine grove near the junction of Peterson and Timber canyons in the South Cave Hills. No other goshawks were seen during our visit.

Peregrine Falcon (*Falco peregrinus*).--On 30 May we observed an immature peregrine soaring toward the north near The Castles in the vicinity of Battleship Rock, Slim Buttes. This bird, which appeared to be migrating, was the only peregrine we observed during our visit.

Prairie Falcon.--We found 16 occupied Prairie Falcon nests. Site PF-058 failed (based on information from falconer Mike Erickson, who found a dead adult in the nest cavity), and the outcome of the other 15 was unknown. We did not climb to any of the sites and thus were unable to determine the contents of more than a handful of nests. Compared with the 1979 survey, the number of nesting Prairie Falcons declined substantially in the South Cave Hills and increased slightly in the North Cave Hills and the Slim Buttes (Table 1). We have no explanation for this difference. One historic site (35PF27) was not visited because a falconer showed up as Mike Edwards was preparing to search the nesting area. Mike did not want to reveal the location of the site in the presence of the falconer, and inadvertently failed to check the site at a later date. Large sections of cliff in the Slim Buttes did not contain suitable nesting cavities for falcons. However, the large number of vacant historic sites suggests that Prairie Falcons are not nest-site limited in Harding County.

Merlin.--All 22 Merlin nests that we found were in old magpie nests, 21 in ponderosa pines and one in a green ash (*Fraxinus pennsylvanica*). All but one of the nests were on slopes or flats below cliffs, and one was on a flat above a cliff. In contrast to the other two focal raptor species, the Merlin is the only species whose numbers could be limited by nest-site availability. The study area is near the eastern edge of the range of the Black-billed Magpie, which were relatively scarce (we saw an average of 1.39 magpies per day of full field work; $n = 36$ days, range = 0-8 magpies per day). Artificial provisioning of nests, and any action that would increase the number of magpies in the area, almost surely would result in increased numbers of nesting Merlins.

Table 1. Number of active nests of the three focal raptor species in the South Dakota portion of the Sioux District, Custer National Forest, 1979 versus 1996.

Year	Golden Eagle	Merlin	Prairie Falcon
North Cave Hills			
1979	1	1	6
1996	3	9	9
South Cave Hills			
1979	2	5	6
1996	2	6	1
Slim Buttes			
1979	1	4	2
1996	5	5	5
East and West Short Pine Hills			
1979	0	0	0
1996	0	2	1

Appendix 1. List of occupied raptor nests found in the North Cave Hills, 1996.

Species	Nest number	USGS quad.	Date found
Merlin	ME9601	Ladner NE	24 May
Merlin	ME9611	Ladner NE	6 June
Prairie Falcon	PF9608	Ladner NE	6 June
Merlin	ME9607	Ladner SE	29 May
Merlin	ME9614	Ladner SE	13 June
Merlin	ME9622	Ladner SE	3 July
Prairie Falcon	PF9604	Ladner SE	29 May
Prairie Falcon	PF9605	Ladner SE	29 May
Golden Eagle	GE9601	Ladner SE	24 May
Cooper's Hawk	CH9601	Ladner SE	29 May
Merlin	ME9602	Eagles Nest Butte	25 May
Prairie Falcon	PF9601	Eagles Nest Butte	23 May
Prairie Falcon	PF9602	Eagles Nest Butte	25 May
Prairie Falcon	PF35PF04	Eagles Nest Butte	25 May
Red-tailed Hawk	RT9601	Eagles Nest Butte	24 May
Red-tailed Hawk	RT9602	Eagles Nest Butte	25 May
Red-tailed Hawk	RT9603	Eagles Nest Butte	25 May
Red-tailed Hawk	RT9604	Eagles Nest Butte	25 May
Great Horned Owl	GHO9601	Eagles Nest Butte	25 May
Merlin	ME9609	Ludlow	4 June
Merlin	ME9612	Ludlow	12 June
Merlin	ME9613	Ludlow	12 June
Prairie Falcon	PF9607	Ludlow	4 June
Prairie Falcon	PF052	Ludlow	8 June
Appendix 1. Continued			
Species	Nest number	USGS quad.	Date found
Prairie Falcon	PF058	Ludlow	4 June
Golden Eagle	GE9604	Ludlow	4 June
Golden Eagle	GE35GE55	Ludlow	8 June
Red-tailed Hawk	RT9606	Ludlow	4 June
Red-tailed Hawk	RT9608	Ludlow	8 June
Red-tailed Hawk	RT9609	Ludlow	8 June
Great Horned Owl	GHO9603	Ludlow	4 June
Long-eared Owl	LEO9601	Ludlow	2 June

Appendix 2. List of occupied raptor nests found in the South Cave Hills, 1996.

Species	Nest number	USGS quad.	Date found
Merlin	ME9603	Ladner SE	26 May
Merlin	ME9604	Ladner SE	27 May
Merlin	ME9605	Ladner SE	27 May
Merlin	ME9606	Ladner SE	27 May
Merlin	ME9615	Ladner SE	14 June
Prairie Falcon	PF9603	Ladner SE	26 May
Golden Eagle	GE9602	Ladner SE	26 May
Red-tailed Hawk	RT9605	Ladner SE	28 May
Merlin	ME9610	McKenzie Butte	5 June
Golden Eagle	GE9603	McKenzie Butte	28 May
Red-tailed Hawk	RT9607	McKenzie Butte	5 June
Great Horned Owl	GHO9602	McKenzie Butte	28 May

Appendix 3. List of occupied raptor nests found in the Slim Buttes, 1996.

Species	Nest number	USGS quad.	Date found
Merlin	ME9608	Battleship Rock	30 May
Prairie Falcon	PF9606	Battleship Rock	30 May
Prairie Falcon	PF9612	Battleship Rock	29 June
Golden Eagle	GE058	Battleship Rock	31 May
Golden Eagle	GE061	Battleship Rock	30 May
Golden Eagle	GE088	Battleship Rock	7 June
Northern Harrier	NH9601	Battleship Rock	31 May
Prairie Falcon	PF9609	JB Hill	18 June
Prairie Falcon	PF9610	JB Hill	19 June
Golden Eagle	GE067	JB Hill	17 June
Red-tailed Hawk	RT9610	JB Hill	18 June
Merlin	ME 9616	Irish Butte	20 June
Merlin	ME 9620	Irish Butte	2 July
Merlin	ME 9621	Irish Butte	2 July
Golden Eagle	GE9605	Irish Butte	19 June
Merlin	ME9619	Sheep Mountain	27 June
Prairie Falcon	PF059	Sheep Mountain	21 June
Red-tailed Hawk	RT9611	Sheep Mountain	21 June

Appendix 4. List of occupied raptor nests found in East Short Pine Hills, 1996.

Species	Nest number	USGS quad.	Date found
Merlin	ME9617	Moreau Peak	24 June
Merlin	ME9618	Moreau Peak	25 June
Prairie Falcon	PF9611	Moreau Peak	25 June

Appendix 5. Previously unknown (but old) Golden Eagle nests found in Harding County, South Dakota, 1996. All nests were unoccupied when found.

Nest number	USGS quad.	Date found
GE(O)9601	Ladner NE	24 May
GE(O)9602	Eagles Nest Butte	25 May
GE(O)9603	McKenzie Butte	28 May
GE(O)9604	Ladner SE	29 May
GE(O)9605A	Ludlow	2 June
GE(O)9605B	Ludlow	2 June
GE(O)9606	Ludlow	4 June
GE(O)9607A	Ladner NE	6 June
GE(O)9607B	Ladner NE	6 June
GE(O)9608A	Ladner NE	6 June
GE(O)9608B	Ladner NE	6 June
GE(O)9609A	Battleship Rock	7 June
GE(O)9609B	Battleship Rock	7 June
GE(O)9610	Ladner SE	14 June
GE(O)9611	JK Butte	15 June
GE(O)9612	JB Hill	18 June
GE(O)9613	Irish Butte	19 June
GE(O)9614	Sheep Mountain	21 June
GE(O)9615	Sheep Mountain	21 June
GE(O)9616	Moreau Peak	24 June
GE(O)9617	Sheep Mountain	27 June
GE(O)9618	JB Hill	28 June
GE(O)9619	Irish Butte	20 June
GE(O)061A	Battleship Rock	30 May
GE(O)061B	Battleship Rock	30 May