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WINTER SURVEY OF RAPTORS WITH NOTES ON AVIAN
SCAVENGERS IN NORTHWESTERN COLORADO

Donald L. Beaver¹ and Jan J. Roth²

ABSTRACT.—Winter populations of raptors and scavengers were surveyed along 175 km of rural roads in Moffat County, northwestern Colorado. The survey began in 1988 and is currently continuing. Over the 7 yr of the survey reported here, we found Golden Eagles in high abundance ($\bar{x} = 5.8$ km/eagle) compared to most studies in similar habitat. Bald Eagles were less abundant, but increasing compared to 20 yr earlier. American Rough-legged Hawks were in low abundance, probably due to the predominance of sagebrush habitat along the route. Northern Ravens were seen in low numbers in 4 yr. American Crows were seen in 2 yr. Black-billed Magpies were nearly as abundant ($\bar{x} = 6.5$ km/magpie) as Golden Eagles and often scavenged with them. Magpie and Golden Eagle numbers were significantly correlated over the years of study. We conclude that northwestern Colorado is a significant overwintering area for Golden Eagles.

Key words: Golden Eagle, Bald Eagle, Black-billed Magpie, winter population, sagebrush, northwestern Colorado.

In the mid 1980s we noticed increased numbers of wintering Golden Eagle (Aquila chrysaetos) and Bald Eagle (Haliaeetus leucocephalus) in Moffat County, north and west of Craig, Colorado. In 1988 we initiated a long-term road survey to count raptors and other scavengers. The survey is currently ongoing. We report here the results of the first 7 yr of surveys.

STUDY AREA AND METHODS

The study area includes the northeast corner of Moffat County, which is located in the northwest corner of Colorado. Elevation ranges from 1860 to 2130 m, and the landform consists of rolling hills and gullies. Predominant vegetation is big sagebrush (Artemisia tridentata). The survey route is about 175 km in length, consisting of 3 adjoining segments that form an inverted triangle. The easternmost segment (55 km) follows the course of Fortification Creek to near its headwaters on Colorado Highway 13 north from Craig. The 2nd segment (45 km) follows the Little Snake River west on Moffat County Road 4. The westernmost segment (75 km) traverses the Great Divide area on Moffat County Road 7, ending just west of Craig. Utility poles and ledges are abundant along the route and serve as perch sites for raptors.

The survey was conducted from a van with 2 observers seated in the front and 1 or more in the back. Binoculars and a 20–30X spotting scope were used to identify and, in the case of Golden Eagles, age sighted birds. Golden Eagles were considered to be immatures if any white was seen in the wings or tail when flying. Birds could be seen on either side of the road a distance of about 0.5 km on the Colorado 13 and Moffat County 7 segments, and 1.0 km on the route along Moffat County 4, yielding an area of coverage approximately 220 km². We drove at a constant speed of 40–45 km/h over the route. Counts began between 0800 and 0900 MST and lasted 4–5 h. Surveys were conducted in the last week of December or the first 2 wk of January, which is midwinter in this area. The starting location of the route was alternated each year. All counts were made on calm days with no precipitation. The study began in the winter of 1988–89 and continued from 1990 through 1996.

RESULTS

Population Size

The Golden Eagle was the most abundant raptor in all years of the survey (Table 1). Their numbers peaked in 1991–92 and in 1993–94. The average distance traveled per Golden Eagle sighted was 5.8 km, with a range of 3.9–8.75 km/bird. Mean density was 0.23 eagles per km², or about 1 eagle per 4 km².

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TABLE 1. Total numbers of eagles, other large raptors, and scavengers seen on annual roadside surveys conducted at the end of December or early January in northwestern Colorado. Total length of the survey route was 175 km, and the area surveyed about 220 km².

<table>
<thead>
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<tbody>
<tr>
<td>Golden Eagle</td>
<td>20</td>
<td>35</td>
<td>22</td>
<td>22</td>
<td>45</td>
<td>38</td>
<td>29</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>American Rough-legged Hawk</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Prairie Falcon</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Northern Raven</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Black-billed Magpie</td>
<td>15</td>
<td>41</td>
<td>35</td>
<td>25</td>
<td>45</td>
<td>33</td>
<td>24</td>
</tr>
<tr>
<td>American Crow</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

We saw Bald Eagles in 4 of the 7 yr of the survey (Table 1). They occurred in low numbers and were seen primarily along the Little Snake River and upper reaches of Fortification Creek. The average sighting frequency was 53 km/Bald Eagle. Although Bald Eagle sightings have become more common in Moffat County during the last 10 yr compared with the previous 20 (personal observation), they are still found in low numbers.

Other wintering raptors and scavengers were less common than the Golden Eagle, with the exception of the Black-billed Magpie (Pica pica; Table 1), which was equally abundant (x = 5.9 km/bird). We counted few wintering hawks. Most numerous was the American Rough-legged Hawk (Buteo lagopus), which we saw on average every 153 km of route traveled. Other species, such as the Prairie Falcon (Falco mexicanus), Northern Raven (Corvus corax), and American Crow (Corvus brachyrhynchos), were infrequently sighted along the survey route and have not been observed during the last several years. These species are present and more numerous in other locations within the county (unpublished data).

DISCUSSION

Population Size

Population size of wintering Golden Eagles was higher than that reported by other workers in sagebrush habitat. Craig et al. (1984) reported an average of 13.4 km and 12.5 km per Golden Eagle on a 187-km roadside survey in habitats similar to ours in north central Utah, found Golden Eagles to be about 15-fold less numerous than we found (88 km versus 5.8 km per eagle in our study). In eastern New Mexico and western Texas, Boeker and Bolen (1972), studying wintering Golden Eagles by aerial techniques from 1963 through 1968, found much lower densities in Texas (average 0.006–0.008 eagles/km²) but nearly equal densities in New Mexico to what we observed (average of 0.23 eagles/km²). They did not describe the habitat of the regions they studied, so direct comparison is not possible. A roadside survey by Allan and Sime (1943) in the Panhandle of Texas yielded a very low number of wintering Golden Eagles (average of 865 km per eagle) over 4 yr of study (1938–1942). At least a portion of the habitat in the Panhandle was sagebrush. Enderson (1965), studying eagle populations in eastern Colorado during the fall and winters of 1962–63 and 1963–64, found lower numbers than we did (53.2 km per eagle) in short-grass prairie and agricultural fields. Ten years later Johnson and Enderson (1972) reported a 2.9-fold increase in abundance of wintering Golden Eagles along these same routes (29.8 km/bird).

Woffinden and Murphy (1977) found Bald Eagles to be more common than Golden Eagles, 22 km per eagle, compared to 53.3 km per eagle in our study. However, direct comparison with our study is probably unwarranted since their survey was for an entire year and included the breeding season. They did not report on winter numbers separately.

The low number of wintering hawks surprised us. Surveys along other routes in the county during the same years (unpublished data) showed Red-tailed Hawks (Buteo jamaicensis) and American Rough-legged Hawks were present in other localities. Craig et al. (1984) found
many American Rough-legged Hawks in their study area. Woffinden and Murphy (1977) also found these hawks on their survey route in greater abundance than we did (73 km versus 153 km per hawk). Perhaps the preponderance of sagebrush habitat along our survey route did not favor Buteo presence. Consistent with our findings, Fischer et al. (1984), studying habitat selection of raptors in central Utah, found Red-tailed Hawks and Rough-legged Hawks to be more frequent in grassland, whereas Golden Eagles were more frequent in sagebrush.

Black-billed Magpies were often seen scavenging on road-killed animals along with Golden Eagles. The number of sightings of each species over the 7 yr fluctuated in concert ($P < 0.05$, Spearman $r = 0.77$; see Table 1), suggesting they shared the same food base. The high abundance of Black-billed Magpies along our survey route is consistent with Christmas count data for northwestern Colorado (Bock and Lepthien 1975). Direct comparison of our measure of abundance, km/bird, with Christmas count data is precluded because the data are in birds/party hour.

Age Distribution

Golden Eagles were aged in about 32% of the sightings early in the study, but this improved to 75% in the last 2 yr of the survey (see also Woffinden and Murphy 1977). Of the 67 birds assigned to an age category (adult or immature), 32% were immature. Our data suggest that relatively few immature birds winter in the area. We noted few interactions between adults and immature birds, and we often saw them perched near each other.

The extensive sagebrush habitat in northwestern Colorado provides a winter haven of some importance for Golden Eagles. Wintering concentrations are higher than reports from other regions in similar habitat. In combination with large expanses of similar habitat in southwestern Wyoming, the region probably provides a wintering site for a significant population of Golden Eagles. The region is not heavily impacted by human activities and is remote from most development. The greatest threat appears to be conversion of sagebrush to agricultural fields. Other raptors, and Northern Ravens and American Crows, are not as abundant in winter as reported elsewhere, possibly because of the preponderance of sagebrush, which is not favored by most raptor species (Fischer et al. 1984), and is not the main habitat of the large scavengers seen in this study.

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LITERATURE CITED


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