The Condor 86:345–346

RESPONSES OF NESTING RAVENS TO PEOPLE IN AREAS OF DIFFERENT HUMAN DENSITIES

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Adult Common Ravens (*Corvus corax*) respond in at least two ways to human beings at their nests (Hooper, Wilson Bull. 89:233–242, 1977; Stiehl, Aspects of the ecology of the Common Raven in Harney Basin, Oregon, Ph.D. diss., Portland State Univ., Portland, OR, 1978). Some birds leave the nest immediately and remain at a distance, soaring and calling (a timid response), whereas others closely approach the intruder, diving frequently and calling rapidly (an aggressive response). To determine whether different responses were related to human density and accompanying persecution,,I measured responses of nesting ravens toward me in a moderately populated agricultural area and in a sparsely populated rangeland area.

I conducted my study in Franklin, Adams, and Grant counties in eastern Washington, during spring and summer 1978 to 1981. Lands in the study area were either farmland with nonirrigated crops, or extensive shrub and grass rangeland where domestic cattle and sheep grazed. The farmland area was mostly level with few natural nesting sites. Rolling hills in the rangeland were interspersed with extensive basalt cliffs providing suitable nesting sites (Knight and Smith, Northwest Sci. 56:303–309, 1982). I located active nests each year by systematically searching all portions of each area. Of the 43 active nests used in this study, all of the nests in farmland (26 nests, 10 territories) were on man-made strucures (e.g., grain-storage elevators, highway bridges, abandoned barns) while in rangeland, all of the nests (17 nests, 8 territories) were situated on basalt cliffs.

From current U.S. Geological Survey maps, I randomly picked 20 sections from each area (1 section = 2.5 sq. km) and counted the number of occupied human dwellings and roads. The farmland had more dwellings ($t = 4.84$; $P < 0.0005$) and roads ($t = 7.39$; $P < 0.0005$) than the rangeland. Raven nests in rangeland were significantly farther from the nearest highway ($t = 4.62$; $P < 0.0025$) and the nearest dwelling ($t = 2.87$; $P < 0.025$) than nests in farmland (Table 1). I noticed that there were unused cliffs near highways and buildings in rangeland, which suggested that ravens were attempting to avoid human contact by nesting on cliffs farther away. Farmland-nesting ravens usually lacked this choice, as nest sites were man-made structures and therefore situated close to roads, but not necessarily close to occupied homes. Apart from highway traffic, there was much more human activity in farmland than in rangeland. During 164 days spent in both areas, I saw people daily in farmland (usually associated with farming activities), whereas in rangeland I saw people only twice.

Responses of adults were measured each year when the young were between two and three weeks old and when both adults were present. Accompanied by an assistant, I approached each nest at distances that exceeded adult flushing distances and from a direction with a clear line of sight to the nest. At each nest we recorded (1) the distance between us and the nest when each raven initially flew, (2) how closely each raven approached us while we stood at the base of the nest structure (i.e., cliff or man-made structure) during a 3-min period, (3) how closely each raven approached me while I climbed to the nest, (4) the number of calls given during my timed ascent to the nest, and (5) the number of times the birds dived at me during the ascent to the nest. Distances were measured using a rangefinder except when ravens were very close (less than approx. 20 m), in which case distances were estimated. Responses 1 and 2 were measured at nests between 1978 and 1981 while responses 3, 4, and 5 were measured at nests in 1981. In all cases, one adult stayed farther from us than the other; therefore, in these analyses, I used the responses of the closer raven in each visit.

Ravens nesting in farmland flew sooner (i.e., at significantly greater distances; $t = 18.95$; $P < 0.0005$) as we approached the nests than those nesting in rangeland (Table 2). Likewise, farmland ravens stayed significantly ($t = 9.64$; $P < 0.0005$) farther away from intruders at the base of the nest structure than did rangeland ravens. Ravens in rangeland approached significantly closer ($t = 5.51$; $P < 0.0005$) to a person climbing to the nest than farmland ravens. Lastly, ravens in rangeland called significantly more often ($t = 5.11$; $P < 0.0005$) and dived significantly more often ($t = 5.47$; $P < 0.0005$) at a person climbing to a nest than ravens in farmland.

The timid response of farmland ravens may be a response to persecution. Humans destroyed 11 of 26 (42%) of the nesting attempts in farmland between 1978 and 1981, whereas none of the 17 nesting attempts in rangeland were destroyed during the same period. Raven nests in farmland were easily accessible and took significantly less time to climb to ($t = 4.02$; $P < 0.005$) than nests in rangeland (Table 1). Where persecution lowers the reproductive success of ravens, as in the farmland, timid responses might be beneficial. Since ravens cannot successfully defend a nest against human beings, aggressive behavior and shorter flushing distances may alert human intruders to the presence of a nest, thus increasing the chances of the birds being shot or their nest being discovered and destroyed. Ravens nesting in rangeland responded aggressively to human intruders, much as they did to any other nest predator (Knight and Call, U.S. Bur. Land Manage. Tech. Note No. 344, Denver, 1980).

TABLE 1. Comparison of isolation and accessibility between Common Raven nests in rangeland and farmland.

	Mean ± 1 SD (*n*) in indicated areas[c]	
	Rangeland	Farmland
Distance to nearest highway (m)	1,372.5 ± 806.2 (8)	52.5 ± 50.0 (10)
Distance to nearest occupied dwelling (m)[a]	2,404.4 ± 826.2 (8)	1,561.7 ± 65.8 (10)
Time to climb to nest (s)[b]	812.5 ± 541.0 (8)	42.5 ± 19.9 (10)

[a] Dwellings in all cases were farmhouses.
[b] Rangeland nests required rock-climbing skills, whereas farmland nests were on man-made structures that had ladders or required no special ability to reach.
[c] If more than one nest was used in a territory between 1978 and 1981, a mean distance and time were calculated and used for that territory.

TABLE 2. Comparison of responses of Common Ravens to human intruders at nests in rangeland and farmland.

Responses of ravens to intruders	Mean ± 1 SD (*n*) in indicated areas	
	Rangeland	Farmland
Distance to intruder when raven flew from nest (m)	91.3 ± 32.0 (15)	455.8 ± 73.7 (18)
Closest approach of raven to intruder at base of structure containing the nest (m)	73.7 ± 25.5 (15)	315.3 ± 102.6 (18)
Closest approach of raven to intruder climbing to nest (m)	4.1 ± 1.7 (8)	120.0 ± 66.5 (10)
Rate of calling by raven at intruder climbing to nest (calls/min)	106.5 ± 25.4 (8)	47.3 ± 23.1 (10)
Rate of diving by raven at intruder climbing to nest (dives/min)	7.7 ± 3.8 (8)	0.2 ± 0.6 (10)

These differences support my hypothesis that the level of human densities, and the frequency and nature of human activities in the nesting area, affect responses of ravens towards human intruders. In this case, ravens nesting in an area of moderate human density and high persecution (i.e., farmland) were more timid and showed stronger avoidance behavior and lower nest defense than ravens in an area of low human density and low persecution (i.e., rangeland). These results agree well with Goodwin's (Crows of the world, Cornell Univ. Press, Ithaca, NY 1976:57) qualitative observations for corvids in general.

I gratefully acknowledge the criticisms of this manuscript by Jack P. Hailman, Susan K. Knight, and Stanley A. Temple. Comments from reviewers Peter J. Blancher, Michael N. Kochert, Richard B. Stiehl, and Nicolaas A. M. Verbeek improved the manuscript. Lory Anderson, Susan K. Knight, Phillip Randolph, and Leonard Steiner assisted in the field. Herb Camp and owners of the H-U Ranch kindly allowed access to their lands.

Department of Wildlife Ecology, University of Wisconsin, Madison, Wisconsin 53706. Received 28 October 1983. Final acceptance 2 March 1984.

The Condor 86:346–348

THREE RECORDS OF CALLIOPE HUMMINGBIRD FROM LOUISIANA

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On 6 December 1982 Ronald Stein observed an unfamiliar hummingbird performing a wide, shallow U-shaped display flight at his residence in Reserve (St. John the Baptist Parish), Louisiana. The bird was silent during display but repeatedly gave a single, faint *Selasphorus*-like chip note as it fed at a large stand of introduced Turk's cap (*Malvaviscus grandiflora*). The next day Stein and I studied the bird for several hours. On the basis of its small size, short bill, three magenta gorget feathers, clear green back, short tail, and rufous edgings on the inner rectrices, we identified the bird as an immature male Calliope Hummingbird (*Stellula calliope*), a species previously unrecorded in Louisiana. On 8 December, S. W. Cardiff obtained the specimen (Louisiana State University Museum of Zoology #107915). The identification was confirmed by J. V. Remsen, Jr.

This represents the first winter specimen of Calliope Hummingbird taken north of Mexico and is the easternmost record of that western montane species. Specimen data are as follows: exposed culmen 14.3 mm; wing chord 42.2 mm; tail 19.8 mm; weight 2.6 g; testes 0.5 mm; light fat; no molt.

Nearly one year later, on 25 November 1983, at the same location, Stein noted another Calliope Hummingbird feeding in his garden. The following day, I captured the bird using a fine monofilament mist net, determined it to be an immature female, and banded it (USFWS #X30920, modified by filing away the X). Identification of the bird was based on rufous-edged subspatulate inner rectrices, and on three gorget feathers that had a central spot of magenta. Stein observed that the bird had difficulty feeding because of strong competition from larger species (Buff-bellied Hummingbird, *Amazilia yucatanensis*; Rufous Hummingbird, *Selasphorus rufus*) and was last seen on 27 November 1983. Measurements of this Calliope Hummingbird are as follows: exposed culmen 14.7 mm; wing chord 43.3 mm; tail 22.5 mm; weight 2.5 g. Rectrix #2 (left) and one colored gorget feather were retained to permit independent verification. These feathers have been deposited in the collection of Louisiana State University Museum of Zoology (LSUMZ #113137).

Also on 25 November 1983, in Baton Rouge (East Baton Rouge Parish), Louisiana, Paul McKenzie noticed a small unfamiliar hummingbird feeding in his garden. He noted the following characteristics: small size, short bill, three magenta gorget feathers, clear green back, and short tail. As it fed in the garden and at a feeder, McKenzie (pers. comm.) heard it give a faint *Selasphorus*-like chip note on numerous occasions. He also noted that it frequently fed on minute flying insects. McKenzie collected the bird on 21 December 1983, and J. V. Remsen, Jr. identified the specimen (LSUMZ #112917) as an immature male Calliope Hummingbird. Specimen data are as follows: exposed culmen 14.4 mm; wing chord 41.2 mm; tail 20.8 mm; weight 3.4 g; extremely heavy fat; testes 0.5 × 0.5 mm; light molt on head; insects in stomach.

The 1982 Calliope Hummingbird appeared after the passage of a strong western front that followed several weeks of strong, upper-level steering currents from the southwest and from Mexico. Interestingly, Stein (pers.