

THE IMPORTANCE OF SHADE TO BREEDING MOUNTAIN PLOVERS

BY JOHN S. SHACKFORD

The primary purposes of this paper are to illustrate the importance of shade to the selection of breeding habitat by Mountain Plovers (*Charadrius montanus*) and to discuss the necessity of incorporating shade as a habitat parameter into any conservation effort for the species.

In his study of the Mountain Plover on the Pawnee National Grassland of northeastern Colorado, Graul (1975) discussed the importance of shade to both the young and adults. He reported two occasions in which a total of six chicks younger than five days old died within 15 minutes in the absence of shade on a hot day (27° C). He also noted that in the heat of the day, adults, apparently to cool themselves, would usually either (1) stand on cattle droppings, where wind velocity was higher and substrate temperature lower than at ground level, or (2) take refuge behind vertical structures that provided shade, such as forbs, fence posts and cattle droppings.

In 1986 and 1992-95, I found Mountain Plovers engaged in breeding behavior on cultivated land in six states: Oklahoma, Colorado, Kansas, Montana, Nebraska, and Wyoming (Shackford 1991, 1992 unpubl. data; Shackford and Leslie 1995, 1996). I have recorded the following totals for Mountain Plovers during the breeding season (6 April-18 August) : 2208 birds on 416 fields (avg. = 5.3 birds/field); 52 nests on 42 fields (avg. = 1.2 nests/field), where young were often subsequently seen; 32 additional fields with unfledged young (Shackford and Leslie 1996) ; and many other fields with fledged young.

Because cultivated fields differ so markedly from native prairie, it was formerly believed that only prairies would suffice as breeding sites. Previous researchers, including Laun (1957), Graul (1973, 1975), Knowles and Knowles (1984), Olson

TYPICAL MOUNTAIN PLOVER BREEDING HABITAT



Fig. 1. Cultivated field in Kiowa County, Colorado, with sparse vegetation used for shade by adults and young on 24 and 25 July 1993.



Fig. 2. An adult settles on a nest with three eggs in a cultivated field in Cimarron County, Oklahoma, 20 May 1992. Photos by the author.

and Edge (1985), and Knopf and Miller (1994), worked on prairies where the amount of shade varied. On cultivated fields, I could compare those with adequate upright vegetation providing some shade to others that were cleanly plowed and without shade.

Early in my studies, it became clear that most breeding and feeding activity occurred during the cooler morning and evening hours. During the middle of the day, especially when temperatures were high and heat waves interfered, I rarely saw plovers on cultivated fields. On those rare occasions when I did see them, they usually stood on dirt clods, apparently to better catch the wind, as Graul (1975) has noted. When I failed to find them on clumps of earth, I had assumed that they were simply crouched down, blending with the landscape.

Subsequent field observations, however, not only rendered my original supposition invalid, but also strongly suggested that the relationship between Mountain Plovers and shade is crucial. To illustrate: at 1838 (MDT) on 24 July 1993, I counted 25 plovers (apparently a premigratory flock) in a cultivated field in Kiowa County, eastcentral Colorado. I was, however, unable to locate a single bird there the following day at 1800. As the evening progressed, plovers began to appear from behind the sparse vegetation. (Fig. 1). By the time I left at 1900, I had counted 43 adult and fledged young plovers and two very late chicks one or two weeks of age. These observations did not effectively rule out the possibility that the plovers were hiding from predators, but the next day, an event farther southwest in the same county, did.

That day (26 July), as I was driving on a farm equipment trail between two cultivated fields, a Mountain Plover near the roadway caught my attention. It was mid-afternoon (1330) and the day was hot. As I began to search for other plovers, I found first one, then another, until I had counted 14 of them. To my surprise, however, virtually every one was in the limited shade of scattered weeds growing near the roadway, one plover per forb. There were about 15 scattered forbs, which averaged ca. 0.3-0.5 m in height, but the remainder of the field was virtually bare of vegetation. After the birds became accustomed to my presence, any that were in full sun soon tried to displace one that was in shade. Their active competition for the scant shade was unmistakable. Had those birds not been so close, I would never have noticed them crouching inconspicuously in the shade of their particular plant. As I watched, it occurred to me that during mid-day, most plovers were probably hidden behind shady vegetation, thus explaining why I had so seldom detected them.

The plants I saw most often used as shade were firebush (*Kochia scoparia*), bindweed (*Convolvulus* sp.), pigweeds and carelessnessweed, (*Amaranthus* spp.) and milo (*Sorghum* sp.). If shade was unavailable on cultivated fields otherwise appearing suitable for plovers, I often found them on the shady side of vegetation located either at roadside or in an adjacent field. For instance, at a field near Richfield, in Morton County, southwestern Kansas, I observed two adults and an unfledged chick in 15-cm-high milo on 13 June 1994. When I returned on 13 July, the milo had grown to about 40 cm. At 1635 (CDT) I could see no plovers, but suspected that they were hidden by the milo plants, and would move out onto the bare fields after temperatures had ameliorated. At 1650, the edge of a large thunderhead crossed in front of the sun; almost simultaneously, five Mountain Plovers emerged from the milo into an adjacent bare field. They soon flew across the road to the bare field where I had suspected they would go to feed after the heat of the day had passed. Thus, the cooling effect created by the shadow of the thundercloud appeared to have elicited feeding behavior.

I soon became adept at spotting fields likely to contain plovers. Such fields usually presented (1) a broad expanse of "shorelike" habitat and (2) adequate, if often sparse, shade. (Fig. 1). Olson and Edge (1985) found an average of 27% bare ground at nests in Montana, while Knopf and Miller (1994) found an average of 32% on the Pawnee National Grassland in Colorado. Shackford (1991) noted that cultivated fields selected for breeding activity in Cimarron County, Oklahoma, were typically devoid of vegetation during part of the breeding season. The attraction of bare ground may be related to the relative ease with which insectivorous food can be seen or caught there. For a species that runs, navigating a flat, bare surface rather than a vegetated one would also require less expenditure of energy (Fig. 2). On one occasion, I did observe an incubating plover that remained at a nest surrounded by dense wheat 30 cm (12 in.) high. But this situation, created by the rapidly growing hybrid wheat, was probably atypical.

Plovers, when given the choice between native prairie and adjacent cultivated fields, almost invariably chose the cultivated fields, assuming minimal shade was present. In four such cases, I compared populations on both habitats, visiting each at least five times during the breeding season. Perhaps the best example of the plovers' preference was at a site near Sheridan Lake, in Kiowa County, Colorado, that I visited several times in 1993 (21 April-25 July) and 1994 (24 April-30 July). Here, a small, usually dry, playa lake bottom, which was planted with wheat, sprouted a sparse stand both years. Taller semi-aquatic vegetation surrounded the edges, densest toward the south end. Westward, and within 2 m, lay native pastureland. Cultivated fields stretched to the north and east, separated from the playa by about 50 m of hydrophilic vegetation.

On 11 May 1993, I saw a single Mountain Plover fly from the playa and land on the adjacent prairie, making one courtship flight and call above this rangeland. It almost immediately left this pasture and flew into a plowed field north of the playa. This was the only Mountain Plover that I observed the entire season to visit, even briefly, the native prairie. Conversely, I found five adult plovers and six unfledged young in three broods at the playa field on 1 June. On 15 June, just days after the playa field had been cleanly plowed, I found only two adults there, the following day, only three. On 1 July, however, I observed 10 adults and four chicks which, judging from their estimated age, apparently were survivors of the first three broods. I found all the young in the shade of young sunflowers (*Helianthus* sp.).

Where these young plovers spent their time after the playa had been plowed is conjectural, but I did not see them on the open rangeland, where visibility was good. They probably survived, at least during the heat of the day, in the tall (30-35 cm), dense, semi-aquatic vegetation around the playa.

On this same playa in 1994, I discovered four plover nests and several adults, but did not observe a single bird visit the nearby rangeland. At three other locations where both prairie and cultivated fields were adjacent, I almost always saw the plovers only on the cultivated fields, assuming some shade was present.

My studies of cultivated fields indicate that Mountain Plover nests are frequently located near growing vegetation. At the time of egg deposition, I often found local plant cover to be quite short (< 8 cm), but the plovers may instinctively time the growth of vegetation (and shade) near nests to coincide progressively with the breeding cycle. In the selection of nesting sites, plovers seemed especially to favor the presence of nearby bindweed (*Convolvulus* sp.). Such vegetation might help shade the eggs on occasion or provide shade for the newborn chicks, which are especially vulnerable to heat. Unfortunately, plowing sometimes interrupts this sequence of events by destroying both vegetation and nests, as well as unfledged young.

Perhaps the primary reason that Mountain Plovers choose cultivated fields over native prairies for nesting is that most prairies in the southern Great Plains, including most of the rangelands discussed above, are managed to eliminate all vegetation except short grasses. These grasses (usually buffalograss, *Buchloë dactyloides*) are normally too short to provide adequate shade for the plovers. One notable exception is the Pawnee National Grassland. Here, prickly pear cactus (*Opuntia* spp.) scattered among the other native vegetation appears to offer sufficient shade, and here the plovers occur regularly.

The importance of shade to the Mountain Plover cannot be overestimated. As mentioned above, Graul (1975) reported the death of unshaded young chicks within 15 minutes on a hot day. Lack of shade is clearly not lethal to adults, for I have observed them in full sun on hot midsummer days as they stood over eggs to shade them. For non-incubating adult plovers seeking an acceptable comfort level during the heat of the day, however, shade may be vital.

These findings may have significant implications for management of this species, already threatened over much of its range, especially if concerted efforts become necessary to save it. Knowing the importance of shade may present an opportunity to manipulate habitat in the plover's favor on both cultivated fields and native prairie. It is conceivable that in both habitats, a majority of daylight hours is spent in less than one percent of the available habitat, i.e., the shady side of vegetation. I believe that bareness and at least a few erect plants for shade are necessary habitat parameters to which the plovers most readily gravitate. The type of habitat that most often fulfills these two requisites is not native (over-grazed) prairie, but cultivated land.

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429 OAK CLIFF DRIVE, EDMOND, OKLAHOMA 73034-8626, 8 FEBRUARY 1996.

GENERAL NOTES

Recent records for Harris' Hawks in Oklahoma. -- At 1000 on 11 November 1994, I noticed a large dark hawk on a fencepost along Memorial Road between Portland and MacArthur avenues in the northwestern part of Oklahoma City, Oklahoma County, central Oklahoma. It was mostly black with white on the tip and base of its tail. With my binoculars, I could see a chestnut patch on its shoulder. Based on pictures in my field guide and on prior observations of the species at the King Ranch near Kingsville in Kleberg County, Texas, I tentatively identified this bird as a Harris' Hawk (*Parabuteo unicinctus*).

Within an hour, John G. Newell and I returned to find the hawk on another fencepost about a quarter-mile to the east. Newell confirmed my identification. Because of its relatively large size, he believed that this bird was a female. There was no band on either leg and the bird's plumage appeared to be in good condition. Several falconers in Oklahoma and adjacent states were contacted, but none was missing a Harris' Hawk. These facts indicate that this bird was probably a free-ranging, rather than an escaped, individual.

It remained in the same general area throughout the winter and was observed by many persons. Numerous Red-tailed Hawks (*Buteo jamaicensis*) also inhabited this section of the city, where oak woodlands predominate to the south and open pastures northward.

Subsequently, two Harris' Hawks were found together, one somewhat smaller. This twosome was studied by John S. Shackford on 20 February 1995. The last date that either bird was seen was apparently on 18 March 1995, when David Evans saw both (See *Natl. Aud. Soc. Field Notes* 49 (1): 65, (2):163, (3): 270, (4): 684, 1995).

Between 1993 and early 1996, there were several other sightings of this species at widespread Oklahoma localities. For example, during the winters of 1993-94 and 1994-95, Jim W. Tinsley several times noticed a Harris Hawk that remained at a place 1 1/2 miles south of Eldorado in Jackson County, southwestern Oklahoma (pers. comm., J.D. Tyler).

In Tulsa County, a Harris' Hawk was observed repeatedly in Tulsa near 36th Street North and Mingo Road, first by Mark Rugg on 15 June 1994 and subsequently by Rugg, Patricia Seibert, and others until at least 2 May 1996 and photographed by Seibert on 6 November 1994 (Seibert letter of 9/26/96 to J.D. Tyler; See *Natl. Aud. Soc. Field Notes* 49 (1): 65, (2):163, (3): 270, (4): 687, 1995; 50 (1): 75, 1996).

Jack D. Tyler and his mammalogy class from Cameron University drove to within 20 m of a Harris' Hawk in an active prairie dog colony 9 1/2 miles west and 2 1/2 north of Altus, Jackson County, on 26 November 1994 (*Natl. Aud. Soc. Field Notes* 49 (2): 163, 1995). It was on the ground near a Ferruginous Hawk (*B. regalis*), from which it was defending a prairie dog carcass.

In the southcentral part of the state, John O. Sterling discovered a Harris Hawk on 7 January and saw it again on 4 February 1995, in Garvin County. The bird was at Lake Longmire (old Pauls Valley City Lake), 7 miles east of Pauls Valley (*Natl. Aud. Soc. Field Notes* 49(2): 163, 1995).

G.S. LeBaron (*Natl. Aud. Soc. Field Notes* 49 (4): 327 & 329, 1994) noted the incursion of this species into the Great Plains (and Mississippi Valley) during the summer and fall of 1994. He speculated that this represented a general dispersal of individuals from the population in northern Mexico. The Oklahoma records summarized above reflect and help to document this extraordinary northward movement.

The Harris' Hawk is a rare to uncommon winter visitor to Oklahoma. First recorded in 1956, it had been previously documented in the state on at least 11 other occasions, most recently in Cleveland County in 1989 (Troutt, R.C., 1991, *Bull. Oklahoma Ornithol. Soc.* 24: 30-31). Earlier records have been summarized by Banta and McMahon (1987, *Bull. Oklahoma Ornithol. Soc.* 20: 29-31). -- Karen Barker, 6500 N. Grand Blvd., Unit 169, Oklahoma City, Oklahoma 73116, 15 June 1995.

Recent records for the Barn Owl in northcentral Oklahoma. -- Barn Owl (*Tyto alba*) populations have drastically declined in midwestern and Great Lakes states during the past 50 years (Marti, C.D., 1992, Barn Owl, pp. 1-15 *In* The birds of North America, No. 1 [A. Poole, P. Stettenheim, and F. Gill, eds.], Acad. Nat. Sci., Philadelphia & Amer. Ornithol. Union, Wash., D.C.). Once the most abundant raptor in northcentral Oklahoma, its numbers have fallen precipitously there as well; e.g., from April to December 1939, 78 Barn Owls were trapped in the vicinity of Lake Carl Blackwell in Payne County (Baumgartner, F.M., and A.M. Baumgartner, 1944, *Wilson Bull.* 56:209-215). Today, this species is rare in most areas of the state and is classified as a "sensitive species" in Oklahoma. Its decline has coincided with the advent of modern barns, new hay storage techniques, and a decrease in the number of abandoned buildings. Considering that populations of small mammals and other prey generally have been abundant from year to year in northcentral Oklahoma (pers. observ.), the limiting factor for this species appears to have been a paucity of nesting and roosting sites. The decline has been most noticeable in urban and suburban areas, where development has been more rapid and where old buildings are less common than in rural regions. This note reports recent sightings of the Barn Owl in Noble County, Oklahoma, as well as the successful breeding by two pairs and the reintroduction of an orphaned family.

While conducting the third annual North American Migratory Bird Count in Noble County, Oklahoma, on 14 May 1994, I found two adult Barn Owls in a large metal garage inside the OG&E power plant at Sooner Lake in the eastern part of the county. Accompanying me were Sue and Carly Sheffield and Carl Wisk. The garage contained bales of hay and farm equipment, and the owls were roosting on top of the open garage doors, approximately 4.5 m high. The contents of numerous pellets collected from the garage contained remains of many cotton rats (*Sigmodon hispidus*). Whether or not the owls nested there in 1994 is unknown.

On 7 July 1994, six Barn Owl nestlings were brought to the Oklahoma State University (OSU) School of Veterinary Medicine in Stillwater. They had been

taken from a nest in a grain elevator at Billings in northwestern Noble County. Evidently, the parent owls were chased off and the nest destroyed by the grain elevator operator. Because of a fractured leg, one of the young owls was subsequently euthanized. The remaining five young (three males and two females) were shipped to the Kansas State University raptor facility in Manhattan where they were raised to fledging age. They were then returned to OSU, weighed, and banded. On 8 August 1995, I released the five young owls, all in first basic plumage and capable of flight, at two remote locations west of Sooner Lake. With me were Sue and Carly Sheffield, Brian and Paulette Faulkner, and Todd Greenman. All five owls flew immediately to old buildings nearby.

On 13 August 1994, Sue and Carly Sheffield, Carl Wisk and I investigated a report of Barn Owls inside an old barn along Black Bear Creek near Morrison in southeastern Noble County. Our search of the loft yielded many Barn Owl feathers, pellets, and whitewash (some fresh), but no owls. The property owner told us that the owls had inhabited his barn for many years, often year-round if winters were mild enough. This suggests that Barn Owls are facultative migrators in this area, heading southward only if climatic conditions become severe.

During subsequent trips to Sooner Lake in October 1994, one of the owls released earlier was seen on a telephone pole in front of the release site. On 17 December 1994, while participating in the fifth annual Sooner Lake Christmas Bird Count, I saw an adult Barn Owl inside the metal garage at the OG&E plant, thereby adding that species to the count list.

Finally, on 13 May 1995, during the fourth annual North American Migratory Bird Count in Noble County, I again found a pair of Barn Owls in the metal garage at the OG&E plant. This time, however, nestling owls could be heard above the open doors and we found two eggshells below the nest site. Many fresh pellets and cotton rat carcasses were scattered about the garage.

Barn Owls will probably continue to inhabit the more rural, less populated counties of Oklahoma. But if we are to maintain substantial Barn Owl populations in the state, active management techniques need to be initiated. Currently, the Barn Owl Nest Box Project is providing certain areas (primarily southwestern Oklahoma) with artificial nest boxes and these are being used. Bird students should also make a special effort to locate owls when in the field and to record pertinent information. Becoming acquainted with landowners can help, for many are aware of out-of-the-way roosts or nest sites. Pinpointing locations and numbers of Barn Owls will help to assess where and when management actions are needed. — Steven R. Sheffield, *Department of Zoology, Oklahoma State University, Stillwater, Oklahoma, 73078, 25 August 1995.*

Simultaneous harassment of a Great Horned Owl by several smaller birds. — Early on the evening of 31 May 1995, I arrived at the campground below the Optima Lake Dam in central Texas County, in the center of the Oklahoma Panhandle. After viewing the birds of the area for some time, I saw a large raptor fly toward and land atop a wooden utility pole on a hill south of the campground at about 1950. As it alighted I could tell that it was a Great Horned Owl (*Bubo virginianus*). Despite the distance of nearly 100 m, I was able to view subsequent events effectively through a 20-60X spotting scope. Almost immediately upon alighting, the owl was attacked by a female American Kestrel (*Falco sparverius*). The smaller bird repeatedly swooped down at the owl, and was presently joined in this typical mobbing behavior by a male Red-winged Blackbird (*Agelaius*

phoeniceus). After about one minute, the kestrel departed and a Northern Mockingbird (*Mimus polyglottos*) appeared on the scene; still, the owl did not fly.

The mockingbird added to my surprise as I clearly saw it dive and strike the owl on the rump, flinging its body forward with wings and tail flared and feet extended. However, I could not see well enough to determine whether or not only its feet touched the owl's back.

For a time, a second mockingbird joined in harassing the owl. First one, then the other, targeted the owl's rump, making about six more contacts among many abortive attempts. After about two minutes of seemingly ignoring this treatment, the owl began turning its head in the directions of its attackers, feinting with quick head movements to threaten them. However, the mockingbirds did not stop. After tolerating perhaps two more minutes of aggression, the owl flew to the crossbar of another pole. A Loggerhead Shrike (*Lanius ludovicianus*), one of a pair that had fledglings nearby, quickly took up the mobbing. It sometimes confronted the owl as close as 0.6 m in front, but usually remained behind and above the larger bird. When a mockingbird again joined the fray (presumably one of the original two), the shrike left. The mockingbird struck the owl's rump several more times before departing after about three minutes. When a second mockingbird appeared at 2005, the owl flew southward out of sight. Because dusk would not begin until 2035, the owl had begun its evening hunt while the sky was still quite light. One might wonder whether this was its usual habit in view of the strongly hostile responses evoked.

James L. Gulledge (*in* Campbell and Lack, 1985, A dictionary of birds, Buteo Books, Vermillion, South Dakota, pp. 357-358) says of songbirds' mobbing behavior: "Only rarely is the predator actually struck by the mobbing birds." However, he also says "mockingbirds are often extremely aggressive in defending the area around the nest, vigorously attacking and striking predators in their effort to drive them away." It is known that Northern Mockingbirds may make physical contact with animals, e.g., dogs and cats (Bent, A.C., 1948, Life histories of North American birds, Bull. U.S. Natl. Mus. No. 195, pp. 307-309), and they will sometimes attack humans who intrude into their territories. Bent (*loc. cit.*) recorded no instance of a mockingbird involved in mobbing an avian predator. However, Derrickson and Breitwisch (1992, Northern Mockingbird, *in* The birds of North America, No. 7 [A. Poole, P. Stettenheim and F. Gill, eds.], Philadelphia: Acad. Nat. Sci.; Wash., D.C.: Amer. Ornithol. Union, p. 11) indicate that in case of threats to the nest, mockingbirds may "mob and actively pursue predators, sometimes striking them." The above incident shows that the familiar high level of inter-species territorial aggressiveness shown by this mimid may be expressed even against a large raptor. Instances of actual physical contact with such large avian predators are very rarely documented in the literature (letter of 13 November 1995 to J. D. Tyler from R. Breitwisch). — W. Marvin Davis, 308 Lewis Lane, Oxford, Mississippi 38655, 14 July 1995.

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