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## BREEDING BIOLOGY OF MOUNTAIN PLOVERS (*CHARADRIUS MONTANUS*) IN THE UINTA BASIN

Ann E. Ellison Manning<sup>1,2</sup> and Clayton M. White<sup>1,3</sup>

**ABSTRACT.**—The known Mountain Plover population breeding on the Myton Bench, Duchesne County, Utah, is small, composed roughly of 30 adults and young after each breeding season. Currently, its location is peripheral to the species' main range. This shrub-steppe breeding habitat differs from the shortgrass prairie habitat with which this bird is historically associated. Between 1996 and 1998 we made observations at nesting sites located consistently in 2 concentrated areas surrounded by large tracts of similar habitat. Activity may be focused in these specific areas because of breeding-site fidelity; this behavior is common among most shorebirds and has been documented for the Mountain Plover in Colorado. Also, Mountain Plovers are social and tend to choose nest sites near others. Most nests in Utah were located within close proximity of mounds of white-tailed prairie dogs (*Cynomys leucurus*), and all were situated near roadways or oil well pads. Mountain Plovers were often observed with broods on these bare areas at night. We conclude that Mountain Plovers on the Myton Bench are distributed in clumped breeding colonies within large areas of apparently favorable habitat.

*Key words:* Mountain Plover, *Charadrius montanus*, nesting distribution, Uinta Basin.

The Mountain Plover (*Charadrius montanus*) is typically associated with shortgrass prairie habitat, composed primarily of blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*; Graul 1975). The Mountain Plover has been considered endemic to the Great Plains and has coexisted with grazing herbivores including the black-tailed prairie dog (*Cynomys ludovicianus*), pronghorn (*Antilocarpa americana*), and bison (*Bison bison*; Knopf 1996b). Currently, the Mountain Plover's breeding range primarily includes portions of Colorado, Montana, and Wyoming, but there are peripheral populations in Oklahoma, Texas, and Utah (Knopf 1996a). In 1993 surveys conducted by the Bureau of Land Management (BLM) confirmed a Mountain Plover population of unknown size breeding in Utah on the Myton Bench, Duchesne County, Uinta Basin (Day 1994). Prior to 1992, *C. montanus* had been recorded in Utah only as a casual migrant in Box Elder, Weber, Salt Lake, Daggett, Davis, Iron, Tooele, Wasatch and Washington counties (Woodbury et al. 1949, USFWS 1996). There were 6 historical sightings in the Uinta Basin (White et al. 1983). In addition to these, Dan Gardner, BLM, photographed 1 adult and a nearby nest with 3 eggs in 1978 at Crow

Knolls (Utah Division of Wildlife Resources [UDWR] 1994). A pair of Mountain Plovers was also observed 11 April 1989 on a sagebrush bench about 1.5 km east of Pelican Lake, Uintah County (D.A. Boyce, U.S. Forest Service, personal communication). In our current study, 1993–1998, recorded population numbers have been small but fairly consistent (UDWR 1997). The objectives of this study were to describe the density and distribution of the Mountain Plover on the Myton Bench, Utah. Structure and composition of the Utah habitat, a departure from the characteristic plover habitat, will be described elsewhere.

### STUDY AREA

We conducted surveys from Castle Peak and Wells Draws east to the border of Pariette Wetlands Wildlife Habitat Management Area, approximately 20 km southwest of Myton, Duchesne County, Utah. The study area generally encompasses N38°00' to N40°07', and W109°02' to W110°10'. This region has a highly variable, broken topography ranging from approximately 1500 m to 1920 m elevation. Climate and habitats of the Uinta Basin represented within the study area are typical

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of the shrub-steppe habitat type found in the Great Basin (Goodrich and Neese 1986). Vegetative complexes vary from essentially bare sand and/or gravel to low-growing black sagebrush (*Artemisia nova*). Greasewood (*Sarcobatus vermiculatus*), shadscale (*Atriplex* spp.), and occasional big sagebrush (*Artemisia tridentata*) stands are sporadically present in deeper draws and throughout the area. Mountain Plover surveys have been conducted in this same area since 1993 (UDWR 1995).

#### METHODS

Fieldwork was conducted May to mid-August 1996–1998. Approximately 15,028 ha were surveyed, including the documented Mountain Plover use and sighting areas that occupy about 1625 ha. Although surveys were done at varying times throughout the day, we spent more time and emphasis in May before Mountain Plovers began nesting, as courtship behavior made them more visible. To find as many Mountain Plovers as possible, surveys were conducted by truck (roadways only), on ATVs (off road), and on foot. Call playbacks were used early in the breeding season to find Mountain Plovers by soliciting a response from courting adults. Locations in which Mountain Plovers had been observed in the past were searched largely on foot in a grid pattern so that the entire area was visible without the aid of binoculars. To cover more ground, we also searched adjacent areas on foot, though transects were not as close together as locations of previous Mountain Plover use. Regions beyond these locations were surveyed using binoculars from roadways in a truck. As there is no reliable way to assess large tracts of land to determine appropriate Mountain Plover nesting areas (because habitat is so uniform and plovers are clumped), based on our experience, knowledge of the terrain, and appearance of the landscape, we used 7.5-minute topographic maps and judged the habitat to determine where to focus search efforts.

Once nests containing eggs were located, adults were subsequently trapped. After adult birds left the eggs, we placed a small wire cage with an open door over the nest. As adults returned to incubate, the door was tripped and adults captured. Mountain Plovers were fitted with a U.S. Fish and Wildlife Service (USFWS)

band and a red color band above the left knee. A 3-g Trans-Astable (Advanced Telemetry Systems) standard radio transmitter was affixed to each adult bird on the back below the neck with a light coating of waterproof epoxy adhesive, a method used in other study areas in California and Colorado (Knopf and Rupert 1995, 1996, F. Knopf personal communications). Mountain Plovers that lost their transmitters were retrapped if they were still nesting. Birds with transmitters were monitored from the ground while still attending the nest. Once chicks hatched and adults and broods moved away from nest sites, surveys were conducted from a fixed-wing aircraft to obtain better coverage of a large area with a limited transmitter signal.

After chicks had hatched, surveys were also done in a vehicle on roadways at night with a spotlight. Pre-fledged young were caught by hand and banded with USFWS and red color bands.

#### RESULTS

The first dates that we observed Mountain Plovers in the study area were 3 May 1996, 11 April 1997, and 9 April 1998. Exact dates of their arrival on the Myton Bench are not known. The total number of Mountain Plovers (adults and young) observed in 1996 was 16; there were 29 in 1997 and 30 in 1998 (Table 1). For all 3 years most observations occurred in areas where sightings had been made in previous years, or adjacent to those areas. Typical habitat for Mountain Plovers in the Uinta Basin Myton Bench area is characterized by black sagebrush and shadscale vegetation in the 8–25 cm height range (UDWR 1995).

Three nests were found in 1996, the first on 5 June. No nests were located in 1997. In 1998 the first of 5 nests was found on May 29, and eggs were hatching that day. The latest 2 of 5 nests found in 1998 were abandoned. At one of those nests an adult was trapped, banded, and fitted with a transmitter. Thirteen days later another adult was trapped at the same nest. We assume that the 2nd adult trapped was the male of the breeding pair. Nests of nearest neighbors were located about 240–370 m apart. Four of the five 1998 nest sites were located an average of 8.5 m (range, 3 to >100 m) from a white-tailed prairie dog

TABLE 1. Mountain Plover counts, reproductive success, and temporal occurrence on the Myton Bench, 1992–1998.

	1992	1993	1994	1995	1996	1997	1998
Total observed	7	31	24–28	29	16	29	30
Number of clutches	—	3	2	2	3	0	5
Number of broods	—	8	6	4	2	7	6
Number of young	—	15	9	9	6	16	14
Young per adult	—	0.94	0.47	0.45	0.60	1.23	0.88
Date of 1st observation	—	4/28	5/8	4/6	5/3	4/11	4/9
Date of last observation	—	7/26	8/15	8/1	8/13	8/13	8/14

mound. No prairie dog activity was noted at the 5th nest. The five 1998 nest sites were located an average of 68.6 m (range, 3–182 m) from surface disturbance, usually roads.

In 1996, of 3 transmitters fitted to Mountain Plovers, 2 came off after 2–3 days. The 3rd bird left the area, and we were unable to locate the signal with the receiver. No adults were trapped in 1997. In 1998 five transmitters were attached to Mountain Plovers; 2 transmitters came off and were recovered. One adult left the nest area soon after it was trapped, and the radio signal was not picked up until 2 months later, approximately 1 km from the nest site. It is not known if the transmitter was still attached to the bird at that time. The remaining 2 adults with transmitters were monitored for 2–3 weeks while at the nest site and shortly after the eggs hatched, but no substantial movement patterns were observed before we were unable to locate transmitter signals again.

#### DISCUSSION

Although documentation of this small but somewhat consistently stable population has been recent, its occurrence on the Myton Bench, Utah, probably had ancient origins. The historical distribution of bison included the Uinta Basin near the periphery of its range (Hornaday 1889); it is likely the Mountain Plover followed bison herds westward as they provided suitable habitat for breeding. And, like the bison, they too are on the periphery of their breeding range in this geographically isolated location.

The distribution of known nesting populations of Mountain Plovers in the Uinta Basin is essentially concentrated in 2 nesting areas of 585 and 1040 ha amidst 15,034 ha of seemingly favorable habitat. The breeding area

accounts for about 10% of the area surveyed. Based on our experience, we estimate that perhaps 70% of the entire area has appropriate nesting characteristics. Yearly totals of about 30 Mountain Plovers reported for the Myton Bench are probably conservative estimates considering the amount of potential habitat. Although much search time was spent outside areas where Mountain Plovers are concentrated, most observations were made in areas known to support nesting Mountain Plovers. For example, although much of Eightmile Flat was surveyed in earlier years for prairie dogs, and Mountain Plovers were recorded on 5 occasions, no nests or young were seen. Surveying this area would double the area of concentrated searches; however, access by automobile is restricted because of lack of road systems. It is important to note that the Mountain Plover is drably marked and often squats motionless in response to disturbance, making it difficult to find (Knopf 1996).

The Myton Bench population seems to fluctuate slightly around 30 birds, with young-of-the-year accounting for half the total. It is possible that breeding adults remain in and adjacent to nesting areas during the breeding season, while nonbreeding adults go elsewhere in the region and are not included in the count. Or, nonbreeding adults may remain near nest sites of other pairs and, because individuals are not recognizable by bands, may appear to be a member of the breeding pair. Graul (1975) reported Mountain Plovers are slightly colonial and nesting territories may overlap. Nests in Colorado were found to be clumped in a given area, even where habitat was good over broad areas and population numbers were low (2 nests and 1 additional brood per 65 ha; Graul 1972). While the plover population on the Myton Bench is small, 4 of 5 nests in 1998 were clumped together, perhaps as a result of

the social nature of this species, even though they are surrounded by large areas of similar and apparently suitable habitat.

Breeding-site fidelity may also influence nesting distribution. In Colorado some adults (5 of 8 banded) returned to the same breeding area each year, and some young (2 banded as downy young) came back to breed in the area in which they hatched (Graul 1973). Our observations of Mountain Plover breeding activity have been recorded in the same areas on the Myton Bench since survey work began in 1993. It is likely that Mountain Plovers are returning to breed at the same sites year after year because of long-established traditions. Breeding-site fidelity is prevalent among most shorebird species and best documented in the Piping Plover (*Charadrius melodus*; Haig and Oring 1988) and Spotted Sandpiper (*Actitis macularia*; Reed and Oring 1993). Prior knowledge of an area may increase success in obtaining food, territories, and mates. Territory defense and predator avoidance may also be more effective (Haig and Oring 1988). Successful breeding in an area one year does not ensure success in following years; however, experience gained in an area may be an advantage in reproductive success over an individual's lifetime (Gratto et al. 1985, Haig and Oring 1988).

Mountain Plover distribution is also likely related to prairie dog activity. White-tailed prairie dogs (*Cynomys leucurus*) are common on the Myton Bench but distributed unequally across the landscape rather than highly clumped, and 4 of 5 nests located in 1998 were found near active prairie dog mounds. Also, broods in Utah do not seem to move far from the nest site, about 800–900 m (Fig. 1), and adults have been observed frequently on white-tailed prairie dog mounds. Gilbert (1980) and Terborgh (1986) designated prairie dogs an ecological keystone species, meaning they create suitable habitat conditions supporting populations of other species, including Mountain Plovers. Mountain Plovers prefer areas of short vegetation or bare ground, and prairie dogs provide such areas as a result of their grazing and mound construction. Horizontal visibility on Montana dog towns was significantly greater than visibility at adjacent areas (Knowles et al. 1982). Mountain Plovers select this habitat for nesting as well as all other activities throughout the breeding sea-

son (Olson and Edge 1985). Prairie dog towns in Wyoming are smaller and more scattered than in Montana; however, a nest and several adults and chicks were seen on a dog town, and chicks tended to remain in the general area of the nest (Parrish et al. 1993).

Nest sites in the Myton Bench area ( $n = 11$ ) were located an average of 69 m (range, 3–182 m) from well pads and/or roadways. Wells and roads were in existence before annual nest-site selection by Mountain Plovers. Mountain Plover nests in the Powder River Basin, Wyoming, were found near animal or wheel tracks, and birds were seen foraging on the tracks in the morning and evening (Parrish et al. 1993). Observations have been made on the Laramie plains, Wyoming, of adults bringing young close to roads to feed (Laun 1957). McCafferty (1930, as cited in Laun 1957) reported many young birds killed by automobiles while feeding near roadways; vehicle activity may be responsible, in part, for the decrease of Mountain Plovers on the Laramie plains. Spotlight surveys in Utah yielded many observations of adults and young on well pads and roads at night in addition to those during daylight hours. Because our night work with spotlights was of short duration when plovers were found, we do not believe we unduly exposed Mountain Plovers to predation during those times. Our observations also indicated that vehicular traffic does not appear to alter foraging or incubation behavior; and, while vehicle mortality may be of concern, no cases have been documented in Utah.

The Mountain Plover is rare in Utah and has been declining over the whole of its breeding range since the 1960s. It is a species characterized by habitat specificity (Rotenberry and Wiens 1980). The historical use of certain areas for breeding on the Myton Bench over other places indicates the relative importance of protecting these nesting grounds from further oil and gas development. Though Mountain Plovers tend to select nest sites near areas of surface disturbance (see Knopf and Miller 1994 for Colorado conditions), and additional bare ground resulting from increased development may seem beneficial to this bird, added human activity associated with oil and gas expansions in Utah may have adverse effects on this small population. Intensive surveys, perhaps using playback calls over adjacent regions and especially where other breeding

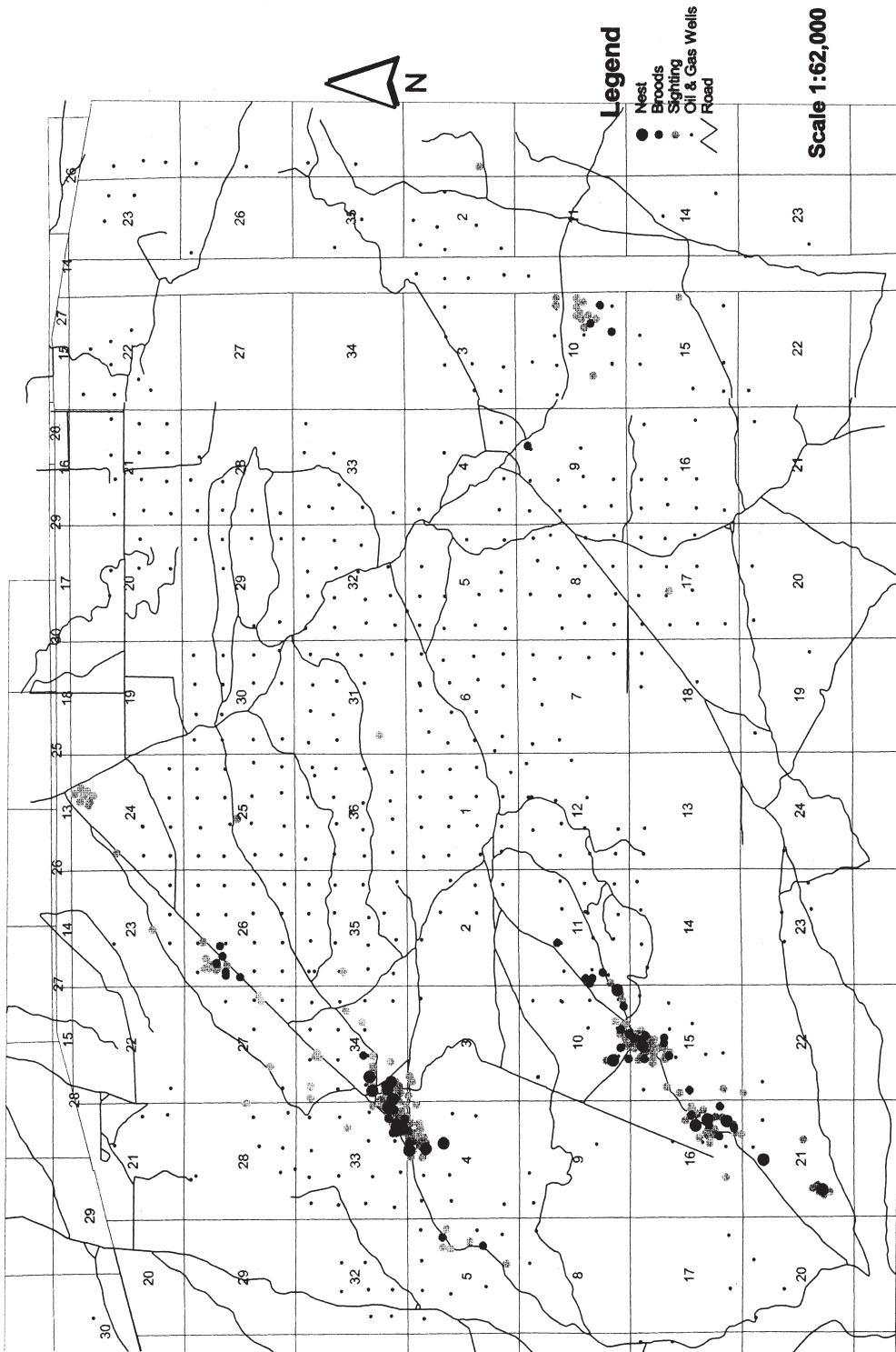


Fig. 1. Observations of adult Mountain Plovers, brood sites, and nest sites on the Myton Bench, Utah, 1992–1998.



season observations have been made, may reveal other clusters of nesting Mountain Plovers. An area of special concern is Eightmile Flat. Should this prove to be the case, every additional, related breeding location potentially increases the heterogeneity of Mountain Plovers in Utah and adds robustness to its small populations.

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