

**MOUNTAIN PLOVER (*Charadrius montanus*) SURVEY ON
OTERO MESA IN SOUTHERN NEW MEXICO, 2004**

submitted to

**Las Cruces Field Office
Bureau of Land Management
Las Cruces, New Mexico**

submitted by

**La Tierra Environmental Consulting
Las Cruces, NM**

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INTRODUCTION

BACKGROUND

The Mountain plover (*Charadrius montanus*) inhabits grasslands and shrub-steppe in western North America. Its breeding range in the U.S. extends from New Mexico, Arizona, and Texas north through Montana. Presently, the majority of Mountain plovers breed in Colorado, Montana and Wyoming (Graul and Webster 1976, Tolle 1976). Plovers have also been documented breeding in Canada and northern Mexico. Post breeding flocks of Mountain plovers begin to form as early as mid-June on the breeding grounds, and increase in size through mid-August. Flocks depart for the wintering grounds between August and October (Graul 1975). Mountain plovers winter mainly in California, but also in Mexico (Knopf and Rupert 1995). Mountain plovers begin to arrive on wintering grounds in California in September, but large numbers do not appear until November (Knopf and Rupert 1995). Plovers have been reported during the winter in Arizona and Texas. Migration to the breeding grounds occurs from February through April.

Flat topography, bare ground and short vegetation are common habitat characteristics on breeding and wintering grounds (Graul 1975, Knopf and Miller 1994, Knopf and Rupert 1995). Mountain plovers nest almost exclusively in short grass prairie, in areas with less than 5% slope, low growing vegetation, and at least 30% bare ground (Graul and Webster 1976, Knowles et al. 1982, Olson and Edge 1985, Parrish 1988, Knopf and Miller 1994, Knopf and Rupert 1995). Within semi desert habitat, sparsely vegetated flat areas with cacti, low shrubs, and an open understory are used (Tolle 1976, Day 1994). Native herbivores such as bison (*Bison bison*) and prairie dogs (*Cynomys* spp.), and livestock tend to create or maintain open areas that benefit this species (Leachman and Osmundson 1990). Mountain plovers exhibit a strong association with prairie dog colonies (Knowles and Knowles 1984, Knopf 1996a), and areas disturbed by fire can also provide suitable habitat (Wallis and Wershler 1981, Knopf 1996a).

Vegetation composition of short grass areas used by breeding Mountain plovers is variable but usually dominated by needle-and-thread (*Stipa comata*), blue grama (*Bouteloua gracilis*), buffalo grass (*Buchloe dactyloides*), and June grass (*Koeleria cristata*) (Graul 1975, Graul and Webster 1976, Tolle 1976, USFWS 1983, Parrish 1988, Day 1994, Knowles and Knowles 1984). Shrubs and cacti present may include prickly pear and cholla cactus (*Opuntia* spp.), sagebrush (*Artemisia* spp.), four-wing saltbush (*Atriplex canescens*), rabbitbrush (*Chrysothamnus* spp.), broom snakeweed (*Gutierrezia sarothrae*), *Yucca* spp. and, occasionally, juniper (*Juniperus* spp.).

Wintering habitat includes grasslands (including prairie dog towns), agricultural lands and playa lakes. In California, wintering habitats include grasslands, playas, cultivated and burned fields. Wintering plovers preferred grazed annual grasslands over cultivated fields (Knopf and Rupert 1995).

SPECIES STATUS

Evidence suggests that Mountain plover population declines occurred during the early 1900's (Graul and Webster 1976, Luan 1957). Continuing population declines and range contraction through the 20th and 21st centuries have caused increased concern for the species. Hunting and loss of native prairie habitat to agriculture apparently have been major causes in the approximately 50% reduction of the plover's breeding range, mostly in the eastern section. Breeding Bird Survey trends analyzed for the period 1966 through 1993 show a continuous annual decline of 3.97% and a total decrease of more than 60% (Knopf 1996b). The total population of Mountain plovers was recently estimated at 8,000-10,000 individuals (Knopf 1996a, Fed. Reg. 64: 7587-7601, Dechant et al. 2001) and this was later adjusted to between 5,000 and 11,000 (Fed. Reg. 68: 53083-53101). Land use practices and declining populations of native herbivores are likely factors contributing to the continued decline of Mountain plover populations. Conversion of grassland for other uses continues to be a serious threat to the species (Knopf 1996a, Fed. Reg. 64:7587-7601). Pesticides may be involved in the decline of the Mountain plover, but a relationship has not been established.

In 1999, the U.S. Fish and Wildlife Service (USFWS) proposed the Mountain plover be listed as Threatened under the Endangered Species Act of 1973 (Fed. Reg. Vol. 64 No. 30 pp. 7587-7601). In September 2003 the USFWS withdrew the listing based on more recent information indicating that the threats to the species included in the proposed listing were not as severe as had been thought and that the threat of extinction was not imminent (Fed. Reg. Vol. 68 No. 174 pp. 53083-53101). The Mountain plover was designated as an Endangered Species in 1987 in Canada by the Canadian Wildlife Service. Under law in Mexico, it is listed as threatened (NOM-059-ECOL-1994).

STATUS IN NEW MEXICO

Mountain plovers typically appear in New Mexico in early March and nesting may begin in early April and continue well into July. Ligon (1961) reported that Mountain plovers were observed on the breeding grounds as late as mid-December and January. Breeding birds are found exclusively in open plains, mesas or ridges with short grass and usually a gravelly surface (Ligon 1961, Sager 1996). Nests are often located near prominent objects such as woody plants, cow manure, rocks, fence posts and power poles (Graul 1975, Sager 1996). During migration, the birds are regularly found on turf farms at Moriarty (Torrance County) and Los Lunas (Valencia County).

Historically, the Mountain plover bred across much of New Mexico, but in widely scattered locations (Bailey 1928, Ligon 1961). It was considered fairly common in breeding areas in the early 1900's. Ligon (1961) stated that the most extensive breeding areas occurred in Lea, Roosevelt, Union, and Harding Counties in eastern New Mexico. However, there have been no records in the two southernmost of those counties (Lea and Roosevelt) since the 1970s (Sager 1996). In recent decades breeding Mountain plovers have only been recorded in the central and eastern portions of New Mexico at moderate elevations of 900-2400 m (3000-8000 ft). Historically occupied areas of the Animas Valley, the San Augustine Plains, and Otero Mesa have no known breeding plovers (Hubbard 1978, Sager 1996). In fact, there has been no recent breeding documented south of the 34th latitude in the state with only a few individuals reported in the last several decades (Sager 1996).

A survey conducted in 1995 to determine the status of the Mountain plover in New Mexico resulted in the finding of 152 presumably breeding individuals in 35 areas representing 11 counties (Sager 1996). Breeding locations were concentrated in the northeastern portion of the state. Otero Mesa was not included in the area surveyed and the nearest location occupied by Mountain plovers was to the north in northern Lincoln County (Sager 1996). Only a few sightings of Mountain plovers have been reported for Otero Mesa in recent years. In 1980 a single Mountain plover was observed near Shiloh Hills in the northeastern area of Otero Mesa, approximately 12.8 km (8 mi) east of Fort Bliss Military Reservation's McGregor Range (S.O. Williams, NMDGF, pers. comm.). In the northwestern extreme of the mesa on the McGregor Range, one bird was seen on two successive days in April 1999 at Mesa Horse Camp. In March 2003, two birds were seen a few kilometers east of Mesa Horse Camp. These birds were likely migrants moving northward to their breeding grounds. Other recent reports of plovers in the vicinity of the mesa include one adult with two young in June 1987, and five individuals, presumably migrants, in September 1992, at Lake Holloman in the Tularosa Basin. In the last few years, large numbers of migrant plovers have been seen at Dell City, Texas, southeast of Otero Mesa and just south of the New Mexico state line. In early December 2002, as many as 209 Mountain plovers were seen in pastures and agricultural fields at Dell City (K. Bryan, pers. comm.), and numbers were even greater in 2003.

Formal breeding season surveys were conducted in 1996, 1997, and annually from 1999 through 2004 on the McGregor Range in the western extreme of Otero Mesa. Searches were focused primarily on prairie dog towns and areas with a significant amount of bare ground and low vegetation cover including livestock sacrifice areas, stocking pens and watering units. No sightings have been made during the formal surveys, but two incidental sightings of three individuals, mentioned above were made during these years. Surveys specifically targeting Mountain plovers have not been conducted on Bureau of Land Management (BLM) administered lands east of the McGregor Range on Otero Mesa. The objective of this project was to determine the status of the Mountain plover in this area by performing formal surveys during the 2004 breeding season.

METHODS

SURVEY AREA

Otero Mesa is a large, relatively flat mesa in south-central New Mexico bordered by the Sacramento Mountains to the north, the Crow Flats playa complex to the east, the Texas state line to the south, and the Tularosa Basin to the west. Vegetation on the mesa is mostly grassland interspersed with shrub lands. Major vegetation classes are Chihuahuan Desert Grassland and Chihuahuan Desert Scrub at elevations of 1200-1675m (4,000-5,500 feet) (Thompson et al. 1996). Grassland vegetation on the mesa is dominated by black grama (*Bouteloua eriopoda*) and blue grama in the upland sites and Tobosa (*Pleuraphis mutica*) in the swales. Desert scrub communities are dominated by creosotebush (*Larrea tridentata*), tarbush (*Flourensia cernua*), *Yucca* spp., cholla, and mesquite (*Prosopis glandulosa*). The climate of the mesa is arid with an average annual precipitation of 25.8 cm (12 in) (Western Regional Climate Center 1998), most of which falls July through September in localized thunderstorms of short duration (Hennessy et al. 1983). Maximum and minimum temperatures in July are 35.3°C and 18.6°C, respectively (Western Regional Climate Center 1998).

The survey area included those areas of Otero Mesa in Otero County administered by the Las Cruces Field Office of the BLM. Public lands were interspersed with state and private lands on the mesa. The series of disjunct tracts of BLM land, ranging from 16 to 6,250 ha (39.5 to 15,444 ac), collectively constituted an area of approximately 67,000 ha (165,557 ac) (Fig. 1).

In early May, La Tierra Environmental Consulting performed a habitat reconnaissance with the assistance of regional Mountain plover expert Lawry Sager within the greater survey area to locate and delineate potential plover habitat. We identified several main areas, including prairie dog towns, with generally suitable habitat for Mountain plovers. Common characteristics among areas included flat or gently sloped topography, low shrub and half-shrub densities, significant bare ground, and scattered or sparse herbaceous cover. Where habitat was adjacent to existing roads, roadside transects were established. In instances where potential habitat extended beyond viewing from roads, pedestrian point count transects were set up. A total of 14 roadside transects with 65 observation points and two pedestrian transects with 11 stations were established in areas identified as potential plover habitat (Fig. 2, Append. A).

For roadside surveys observation points were located at 0.8 km (0.5 mi.) intervals along established roads. Observation points along walking transects were 500 m (1640 ft) apart. At each observation station the observer scanned and listened for plovers for one minute. Next, recorded Mountain plover vocalizations were broadcast using a tape playback device to illicit Mountain plover responses. The observer then listened and scanned for a period of approximately three minutes. At each point weather conditions, time, and other vertebrate species detected were all recorded on data sheets. The condition of the habitat with respect to vegetation structure was qualitatively assessed in a 500 m (1640 ft) radius circle around each station. Habitat characteristics evaluated included woody plant and half-shrub (e.g., broom snakeweed, winterfat, dogweed, etc.) composition and density, and herbaceous cover and height. For good Mountain plover habitat conditions, woody plant and half-shrub densities are low, herbaceous cover is sparse, and herbaceous plant height is generally short.

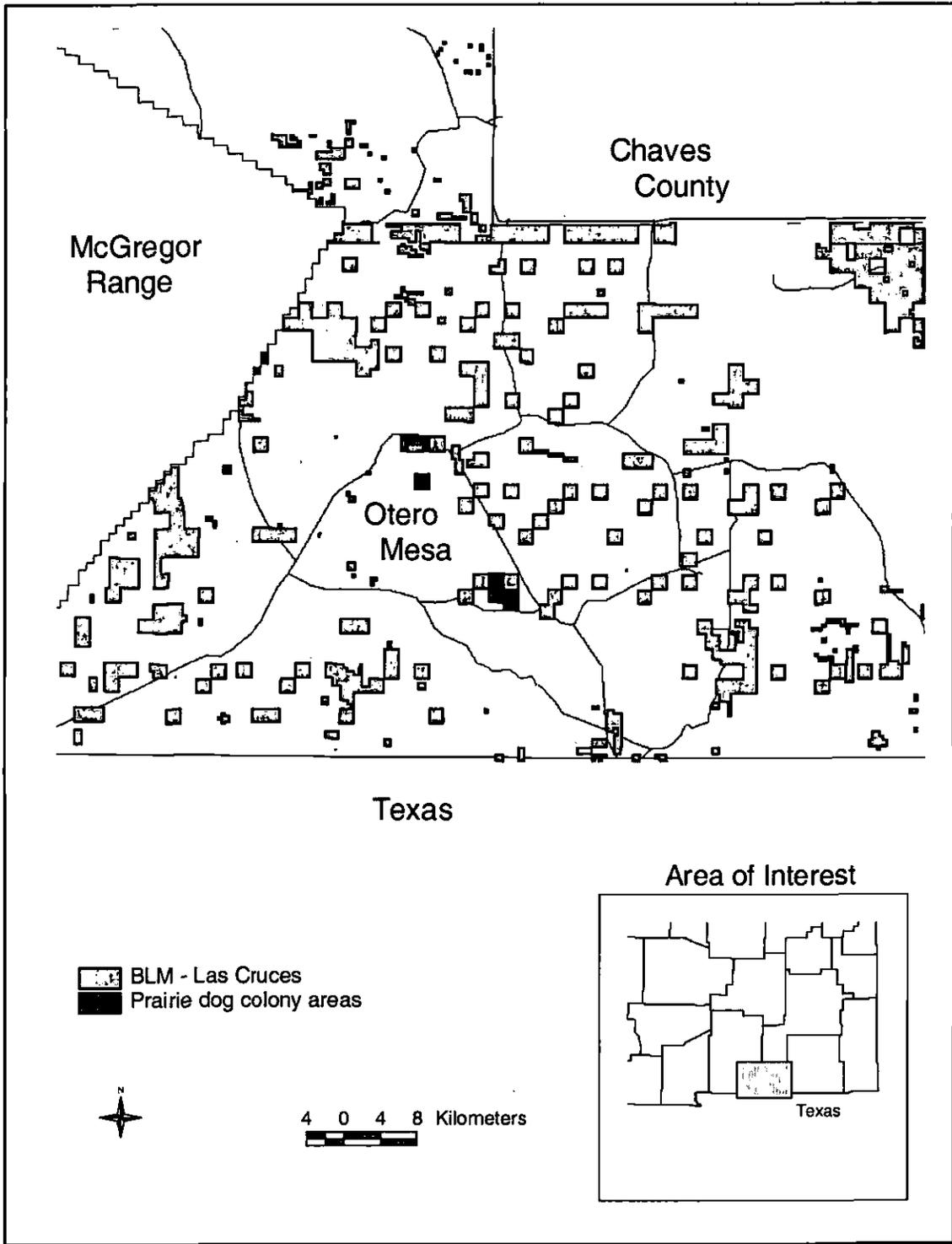


Figure 1. Otero Mesa with BLM lands administered by the Las Cruces Field Office in southern New Mexico.

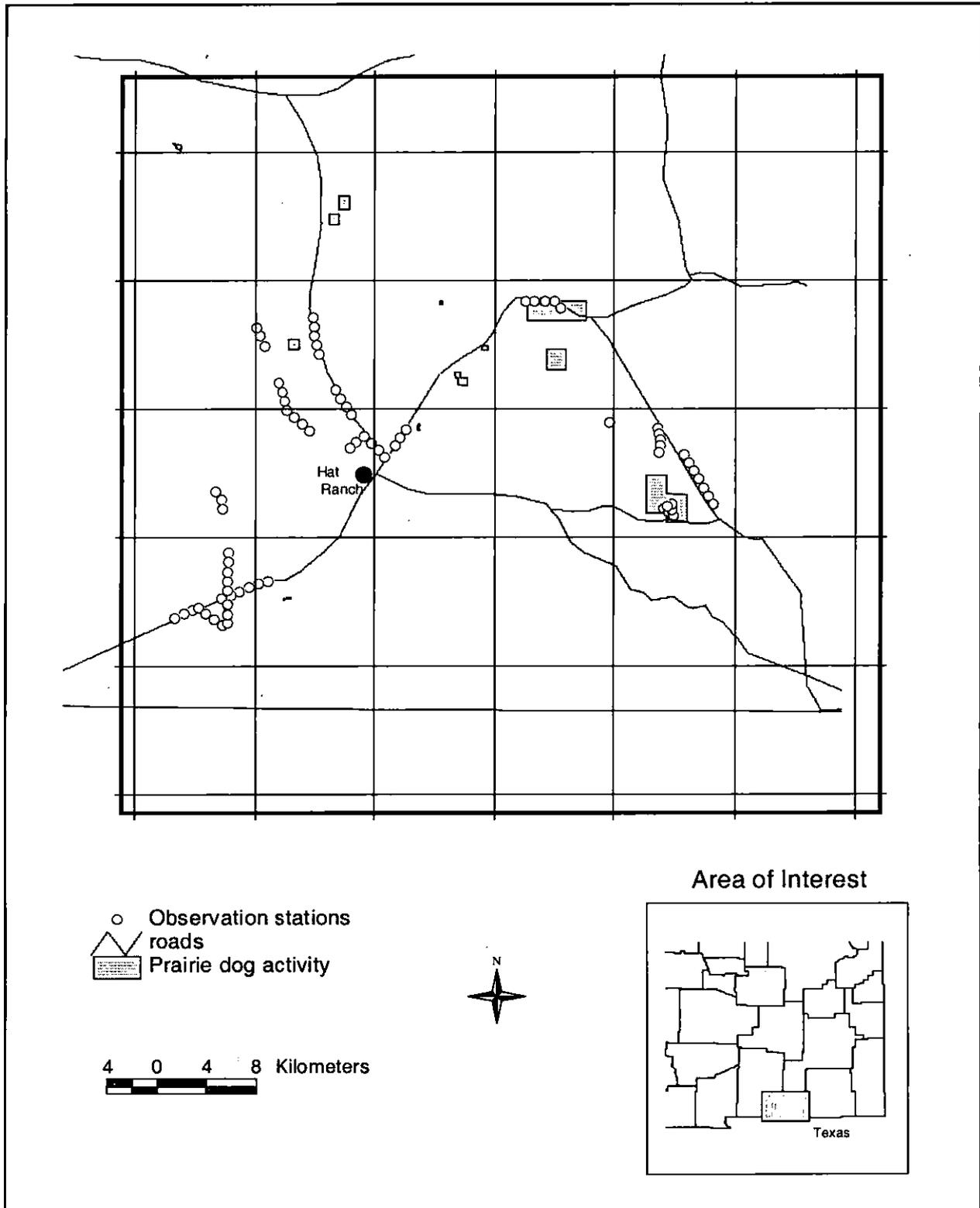


Figure 2. Locations of observation points used in Mountain plover surveys on Otero Mesa, 2004.

RESULTS AND DISCUSSION

There were no detections of Mountain plovers made during habitat reconnaissance and surveys (survey summaries provided in Appendix B). It is unlikely that a significant number of Mountain plovers occur during the breeding season on Otero Mesa, but it is possible that surveys have failed to detect isolated breeding pairs. Historically, Otero Mesa was located on the southern periphery of the Mountain plover's breeding range but was mentioned as an important breeding area by Ligon (1961).

The apparent absence of the plover in southern New Mexico more recently may be the result of changes in local habitat or retraction of the range limit due to overall population reductions. The recent reports of large numbers of Mountain plovers at Dell City approximately 60 km (37.5 mi) to the southeast during migration and early winter, indicate that plovers move through the general area and the possibility for individuals occurring on the mesa, at least in migration, does exist.

Other bird species regularly observed during surveys included Horned lark (*Eremophila alpestris*), which was the most common bird observed, Ash-throated flycatcher (*Myiarchus cinerascens*), Western kingbird (*Tyrannus verticalis*), Northern mockingbird (*Mimus polyglottos*), and Black-throated sparrow (*Amphispiza bilineata*). Black-tailed prairie dogs (*Cynomys ludovicianus*) and Burrowing owl (*Athene cunicularia*) were detected at six points (Table 1). A complete list of vertebrate species observed during surveys is given in Appendix C.

There are areas of structurally suitable habitat for breeding Mountain plovers on Otero Mesa, although the grassland areas are fragmented and interspersed with shrub lands. Most observation stations on survey transects exhibited "good" vegetation structure for Mountain plover habitat (Table 2). The most limiting factor was half-shrub densities which were moderate or high at 64% of sites. However, this probably is not as critical as the density of woody plants. Prairie dog towns are scattered and limited in size within the survey area. Mountain plovers show an affinity for prairie dog towns, and in areas with prairie dog colonies, the size of towns is an important factor (Dechant et al. 2001). Mountain plovers in Montana occurred at highest densities on towns that were 6-50 ha (14.8-123.5 ac), and were less abundant on smaller towns (Knowles et al. 1982, Olson 1984, Olson-Edge and Edge 1987). The average size of towns used by Mountain plovers in north-central Montana was 57.5 ha (142.1 ac) (Knowles and Knowles 1984). Two prairie dog towns on the McGregor Range recently expanded to this approximate size and a few other colonies may provide suitable habitat. The McGregor Range contains a greater density of prairie dog towns than the rest of the mesa with some fairly substantial colonies which may attract Mountain plovers to that portion of Otero Mesa.

In the northwestern extreme of the mesa on the McGregor Range, one bird was seen on two successive days in April 1999 feeding among the corrals at Mesa Horse Camp. A prairie dog town was present adjacent to the corral. In March 2003, two birds were seen a few kilometers east of Mesa Horse Camp. These birds were likely migrants moving northward to their breeding grounds. The locations of these occurrences were flat, open grassland at watering units with sparse ground cover. Similar conditions existed in areas surveyed during this project.

Table 1. Observations of Black-tailed prairie dogs and Burrowing owls during Mountain plover surveys on Otero Mesa, 2004. Locations are UTM coordinates in Z13 NAD'83 datum.

Transect	Point	Prairie dogs	Burrowing owls	Easting	Northing
E	6	--	1	468016	3558035
K	2	present	1	446629	3563705
L	5	--	5	443030	3563304
L	7	--	2	442595	3565720
M	2	present	1	438650	3564880
M	3	present	--	439267	3564331

Table 2. Proportions of observation points in three qualitatively assessed categories of Mountain plover habitat quality. Good – low woody plant and half shrub densities, low herbaceous cover, low herbaceous cover height; Moderate

	Woody plant density	Half shrub density	Herbaceous cover	Herbaceous cover height
Good	66	36	72	68
Moderate	26	42	28	29
Poor	8	22	0	3

Mountain plovers have shown a preference for areas with natural herbivores, prairie dogs and bison in particular, where disturbance and reduction in vegetation occur. In some areas, the presence of cattle has also been shown to attract Mountain plovers (Graul 1975, Bicak et al. 1982). However, there is concern that certain domestic livestock grazing strategies alter vegetation structure and grassland system functioning so as to negatively affect plover habitat. The effects of long term cattle grazing on Mountain plover habitat have not been studied in the southern reaches of the plover's range. Prairie dog colony expansion and occasional fires on Otero Mesa may enhance habitat for the Mountain plover. However, considering the limited overall population of the species and its continuing decline, the probability of expansion of the breeding range may be low. In particular, the southern portion of the range where cultivated fields are a major component of the habitat, possibly represents a reproductive sink that decreases the possibility of range expansion further south (Fed. Register 64:7587-7601).

CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

- No Mountain plovers were detected during breeding season surveys on Otero Mesa. There have been no records for breeding Mountain plovers on Otero Mesa for decades. Formal surveys conducted on the McGregor Range of Fort Bliss in 1996, 1997, and 1999-2004 have not detected breeding Mountain plovers. Factors involved in the disappearance of the Mountain plover from Otero Mesa are unknown, but may be related to changes in the grasslands and the status of prairie dog towns. It may also be related to overall population declines causing the range limit for the species to contract from the outer limits.
- Restoring grasslands to natural conditions with native herbivores may improve Mountain plover habitat. In areas where Mountain Plovers are associated with prairie dog towns, the size of towns is an important factor (Dechant et al. 2001). Expanding prairie dog colonies on Otero Mesa may increase the likelihood of the Mountain plover recolonizing the mesa. Cooperative efforts to allow the expansion of prairie dog colonies to the east from McGregor Range would be beneficial to species of concern including the Black-tailed prairie dog, Mountain plover, and Ferruginous hawk (*Buteo regalis*).
- The long term effects of intensive domestic livestock grazing on Mountain plover habitat are unknown. Current rangeland conditions resulting from the historical and recent grazing regimes may be different than the habitat mosaic resulting from native herbivores with which the Mountain plover evolved. Varying the grazing pressure within an area to include heavy, light, and non-grazing, which may simulate historic grazing by American bison, is recommended (Wallis and Wershler 1981). Persistent heavy grazing by livestock that degrades rangeland may have a deleterious effect on Mountain plover habitat in the long term, especially in sensitive xeric grasslands (Laun 1957, Wallis and Wershler 1981).
- Prescribed burns outside of the breeding season have been shown to enhance Mountain plover habitat (Leachman and Osmundson 1990). The U.S. Forest Service and the BLM have used prescribed burning to maintain the needed short-grass habitat at both breeding and wintering sites. Mountain plovers that winter in southeastern California typically are found in recently-burned agricultural fields. The use of fire promotes short-grass habitat that attracts mountain plovers to sites that would otherwise not provide suitable breeding or wintering habitat. Fires caused by military activities on the McGregor Range occur fairly frequently and may potentially affect Mountain plover habitat on the mesa (D. Bash, Dir. of Environ., Fort Bliss, pers. comm.). The effects of the frequency and timing of fire occurring on Otero Mesa should be evaluated with respect to Mountain plovers potentially breeding on the range and effects on potential habitat.

- The decline of the Mountain plover has been identified as a primary conservation concern (Knopf 1996b). Because Otero Mesa is known as a historical breeding area and is at the periphery of the current range of the plover, and because of the large numbers of plovers using adjacent areas, monitoring should be conducted periodically to monitor the possibility of colonization of the mesa. Expanding surveys and developing a monitoring program to determine population levels and trends have been recommended (NM Dept. Game and Fish 1994). As part of this effort BLM should continue to conduct occasional surveys to detect the presence of this species.

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Appendix A. Locations of Mountain plover survey points on roadside and pedestrian transect routes on Otero Mesa, 2004.

DATE	TIME	ROUTE	STOP #	EASTING	NORTHING
51404	1015	A	1	456705	3575171
51404	1048	A	2	457491	3575169
51404	1101	A	3	458312	3575172
51404	1111	A	4	459101	3575165
51404	1122	A	5	459644	3574622
51404	1215	B	1	463507	3564952
51404	1333	C	1	469490	3562297
51404	1345	C	2	466978	3561589
51404	1356	C	3	470257	3560912
51404	1411	C	4	470659	3560214
51404	1422	C	5	471060	3559514
51404	1432	C	6	471470	3558800
51404	1442	C	7	471846	3558118
51404	1535	D	1	467407	3564467
51404	1550	D	2	467538	3563976
51404	1605	D	3	467555	3563495
51404	1620	D	4	467592	3563012
51404	1635	D	5	467521	3562497
51504	738	E	1	467849	3557759
51504	750	E	2	468252	3557455
51504	803	E	3	468647	3557151
51504	828	E	4	468577	3557651
51504	906	E	5	468512	3558164
51504	924	E	6	468162	3557964
51504	1058	F	1	435912	3551688
51504	1108	F	2	435152	3551483
51504	1122	F	3	434377	3551152
51504	1130	F	4	433618	3550831
51504	1139	F	5	432878	3550519
51504	1148	F	6	432140	3550210
51504	1218	G	1	429850	3549238
51504	1226	G	2	429124	3548930
51504	1238	G	3	428381	3548618
51504	1303	H	1	430312	3549407
51504	1311	H	2	430909	3548970
51504	1321	H	3	431546	3548491
51504	1334	H	4	432208	3548022
51504	1344	H	5	432588	3548171
51504	1354	H	6	432599	3548902
51504	1406	H	7	432613	3549741
51504	1642	I	1	431633	3559167
51504	1650	I	2	432099	3558543
51504	1702	I	3	432228	3557781
51504	1725	J	1	432675	3554070

Appendix A, cont'd.

DATE	TIME	ROUTE	STOP #	EASTING	NORTHING
51504	1725	J	1	432675	3554070
51504	1746	J	2	432663	3553274
51504	1755	J	3	432650	3552454
51504	1803	J	4	432635	3551662
51504	1813	J	5	432630	3550888
51604	844	K	3	447041	3564384
51604	904	L	1	445369	3562122
51604	913	L	2	444803	3562621
51604	921	L	3	444270	3563228
51604	929	L	4	443733	3563844
51604	942	L	5	443030	3563304
51604	950	L	6	442549	3562850
51604	1010	L	7	442610	3565654
51604	1035	L	8	442201	3566344
51604	1045	L	9	441806	3567007
51604	1054	L	10	441377	3567727
60204	854	M	1	438037	3565442
60204	908	M	2	438650	3564880
60204	925	M	3	439267	3564331
60204	1000	N	1	437448	3566060
60204	1020	N	2	437238	3566849
60204	1029	N	3	437006	3567569
60204	1039	N	4	436746	3568325
60204	1055	O	1	435591	3571461
60204	1109	O	2	435204	3572261
60204	1123	O	3	434915	3572954
60204	1158	P	1	440038	3570748
60204	1206	P	2	439844	3571565
60204	1214	P	3	439666	3572300
60204	1222	P	4	439606	3573071
60204	1230	P	5	439566	3573885

KEY TO DATA

FIELDS

DATE = Date of survey: month/day/year, May 14, 2004 is 51404

ROUTE = Letter identifying individual survey route (A, B, C...P)

STOP # = Survey point number (1,2,3...9), dependent on length of route

TIME = Time of survey for that

Stop #

EASTING = UTM Easting coordinate of survey stop

NORTHING = UTM Northing coordinate of survey stop

Appendix B. Summary results of Mountain plover surveys on roadside and pedestrian transect routes on Otero Mesa, 2004.

Route A

Driving route located on “Dell City Road”/Co. Rd. F052, a maintained gravel road with survey stations spaced at 0.5 mile intervals. The route consisted of 5 stations, all located on very level terrain. Mountain plover habitat was “Good” along route with only 2 stations assessed as “Marginal” in terms of amount of herbaceous cover. Overall, there was very low woody plant density, low density of half-shrubs, low amounts of herbaceous cover, and low height of herbaceous plants. No MOPLs were detected, but other species observed include Horned lark and Barn swallow. Besides grasses, other plant species present include broom snakeweed, yucca, desert zinnia, and dogweed.

Route B

Driving route located on a non-maintained dirt road at a dry playa lake in Coffelt Draw. The route consisted of 1 station on level terrain. Mountain plover habitat was “Good to Marginal” at this site. Overall, there was low woody plant density (consisting mostly of cholla cactus), low density of half-shrubs, marginal amounts of herbaceous cover and herbaceous plant height. This location would probably rate higher in terms of habitat, but due to recent rains, the lakebed had a dense cover of grasses over 4” tall. Otherwise the site would resemble a cattle “sacrifice area” similar to areas located at a watering trough or corral. Cattle apparently frequent this location based on the amount of trails and other sign. No MOPLs were detected, but other avian species observed include Cactus wren, Black-throated sparrow, Western kingbird, Turkey vulture, and Horned lark.

Route C

Driving route located on “Dell City Road”/Co. Rd. F052, a well-maintained gravel road with survey stations spaced at 0.5 mile intervals. The route consisted of 7 stations on level terrain. Mountain plover habitat was “Poor to Good” along route with high densities of woody plants and half-shrubs at 3 stations. This was likely influenced by the amount of large woody plants associated with the roadside drainage and valley edges. Herbaceous cover and herbaceous height was “Good” overall. No MOPLs were detected, but other species observed include Crissal thrasher, Northern mockingbird, Western kingbird, House finch, Cactus wren, Mourning dove, White-throated swift, Ash-throated flycatcher, Western wood-pewee, Horned lark, and Loggerhead shrike. Pronghorn antelope were also observed along the route. The grasses along the route were interspersed with woody plants such as mesquite, yucca, and cholla cactus, half shrubs such as broom snakeweed, and herbaceous plants such as pepperweed.

Route D

Walking route located along a series of small playa lakes on relatively level terrain, south of Van Winkle Lake and west of “Dell City Road”/Co. Rd. F052. Survey stations were spaced at 500 meter intervals. The route consisted of 5 stations. Mountain plover habitat was “Marginal to Good” along the route with very low densities of woody plants and half-shrubs at all stations. Herbaceous cover and herbaceous height was “Marginal to Good” overall. The route contained a

large amount of bare ground in patches, but tobosa grass was tall and dense along the lake margins. No MOPLs were detected, but other avian species observed include Northern mockingbird, Mourning dove, Horned lark, Scaled quail, Chihuahuan raven, and Cassin's sparrow. Pronghorn antelope were also observed along the route.

Route E

Walking route located on a flat, grassy plain northeast of Shiloh Draw and west of "Dell City Road"/Co. Rd. F052. Survey stations were spaced at 500 meter intervals. The route consisted of 6 stations positioned along a triangular transect approximately 3 km long. Mountain plover habitat was "Good to Marginal" along the route with very low densities of woody plants and half-shrubs at most stations. Herbaceous cover and herbaceous height was "Good to Marginal" overall. No MOPLs were detected, but other avian species observed include Horned lark, Mourning dove, Northern mockingbird, Eastern meadowlark, Black-throated sparrow, Brown-headed cowbird, Western kingbird, Swainson's hawk, Chihuahuan raven, Burrowing owl, White-throated swift, and Common raven. Nests of Burrowing owl, Swainson's hawk and Common raven were located along the route. Lesser earless and little-striped whiptail lizards were observed, as was a single hog-nosed snake. The grasses along the route were interspersed with woody plants such as mesquite, yucca, and cholla cactus, half shrubs such as broom snakeweed, and herbaceous plants such as pepperweed, globemallow, and bladderpod.

Route F

Driving route located on a well-maintained gravel road (Co. Rd. F001), northwest of Alamo Mountain and Hackberry Draw, with survey stations spaced at 0.5 mile intervals. The route consisted of 6 stations on level to slightly rolling terrain. Mountain plover habitat was "Marginal to Good" along the route with low densities of woody plants and half-shrubs at most of the stations. Herbaceous cover and herbaceous height was "Marginal" overall. No MOPLs were detected, but other avian species observed include Horned lark, Northern mockingbird, Chihuahuan raven, and House finch. Pronghorn antelope were also observed along the route. The grasses along the route were interspersed with woody plants such as yucca and cholla cactus, and half shrubs such as broom snakeweed.

Route G

Driving route located on a well-maintained gravel road (Co. Rd. F001), west of Route F and south of Grief Well. Survey stations were spaced at 0.5 mile intervals. The route consisted of 3 stations on gently rolling terrain. Mountain plover habitat was "Marginal to Good" along route with moderate densities of woody plants and half-shrubs at the stations. Herbaceous cover and herbaceous height was "Good to Marginal" overall. No MOPLs were detected, but other avian species observed include Horned lark, Turkey vulture, Northern mockingbird, and Scott's oriole. A female pronghorn antelope was also observed along the route. The grasses along the route were interspersed with woody plants such as yucca and cholla cactus, half shrubs such as broom snakeweed, and herbaceous plants such as pepperweed.

Route H

Driving route located partially on a dirt road and partly on a well-maintained gravel road east of Route G and southwest of Route F and Co. Rd. F001. Survey stations were spaced at 0.5 mile

intervals. The route consisted of 7 stations on level terrain. Mountain plover habitat was “Marginal to Good” along the route with low densities of woody plants and moderate densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was “Good to Marginal” overall. No MOPLs were detected, but other avian species observed include Horned lark, Turkey vulture, Northern mockingbird, Scott’s oriole, Lark sparrow, Western kingbird, Swainson’s hawk, Chihuahuan raven, Black-throated sparrow, Eastern meadowlark, and Common nighthawk. The route encompasses a small prairie dog colony, and prairie dogs were observed during the survey. This small colony is subjected to shooting pressures from local ranchers, as witnessed by DJG approximately 1.25 hr prior to the survey.

Route I

Driving route located on a maintained gravel road north of Badger Well and Route J. Survey stations were spaced at 0.5 mile intervals. The route consisted of 3 stations on gently rolling terrain. Mountain plover habitat was “Good to Marginal” along the route with moderate densities of woody plants and half-shrubs at the stations. Herbaceous cover and herbaceous height was “Good” overall. No MOPLs were detected, but other avian species observed include Horned lark, Northern mockingbird, Eastern meadowlark, Western kingbird, Ash-throated flycatcher, Lark sparrow, and Black-throated sparrow.

Route J

Driving route located on a maintained gravel road north of Co. Rd. F001 and Route F, and south of Badger Well. Survey stations were spaced at 0.5 mile intervals. The route consisted of 5 stations on level to gently rolling terrain. Mountain plover habitat was “Good to Marginal” along the route with very low densities of woody plants, and moderate densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was “Good” overall. No MOPLs were detected, but other avian species observed include Horned lark and Chihuahuan raven. Five pronghorn antelope were also observed along the route. An adult kit/swift fox and 2 pups were observed west of the road at a den site north of the gas pipeline. The grasses along the route were interspersed with woody plants such as yucca and cholla cactus and half shrubs such as broom snakeweed.

Route K

Driving route located on a well-maintained gravel road (Co. Rd. F001) approximately 2 miles northeast of the Hat Ranch headquarters. Survey stations were spaced at 0.5 mile intervals. The route consisted of 3 stations on rolling terrain. Mountain plover habitat was “Good to Marginal” along the route with very low densities of woody plants, and moderate densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was “Good” overall. No MOPLs were detected, but other avian species observed include Horned lark, Western kingbird, Northern mockingbird, and Burrowing owl. One pronghorn antelope was observed along the route. At survey Station #2, an active prairie dog colony was located in a small swale west of Co. Rd. F001. The grasses along the route were interspersed with woody plants such as yucca, cholla cactus, sand sagebrush and half shrubs including broom snakeweed and winter fat.

Route L

Driving route located on a well-maintained gravel road (Co. Rd. F037), north of the Hat Ranch Headquarters and terminating east of Stone Well. Two additional survey stations were placed along a gas pipeline access road south of Co. Rd. F037. Survey stations were spaced at 0.5 mile intervals. The route consisted of 10 stations, on mostly level to somewhat rolling plains. Mountain plover habitat was “Good to Marginal” along the route with low densities of woody plants, and moderate densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was “Good” overall. No MOPLs were detected, but other avian species observed include Western kingbird, Horned lark, Northern mockingbird, Burrowing owl (pair), Chihuahuan raven, Loggerhead shrike, Ash-throated flycatcher, and an unidentified *Selasphorus* hummingbird. Two pronghorn antelope were observed along the route, one spotted ground squirrel was seen, and cattle were present at 4 of the survey stations. An adult kit/swift fox was observed north of the road at a den site near survey Station #7. The fox was located very close to a pair of burrowing owls and was observed to jump up and try to catch one of the owls in mid-air. The grasses along the route were interspersed with woody plants such as yucca and cholla cactus and half shrubs such as broom snakeweed.

Route M

Driving route located on a dirt road approximately 2.5 miles southwest of Stone Well, and south of an abandoned home site (“Red Ranch House”). Survey stations were spaced at 0.5 mile intervals. The route consisted of 3 stations on level to gently rising terrain. Mountain plover habitat was “Marginal” along the route with moderate densities of woody plants, and moderate densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was “Good” overall. No MOPLs were detected, but other avian species observed include Horned lark, Mourning dove, Cliff swallow, Swainson’s hawk, Burrowing owl, Eastern meadowlark, and Lark sparrow. Pronghorn antelope were also observed along the route. A large, active prairie dog town was observed about 150 meters east of the route. The town appears to be approximately 0.75 miles wide and extending to the valley bottom, and approximately 1.0 mile long north to south. The Burrowing owls observed were associated with the prairie dog town. Grasses along the route were interspersed with woody plants such as yucca, cholla cactus, creosotebush, and javelina bush, and half shrubs such as broom snakeweed.

Route N

Driving route located on a dirt road approximately 2.0 miles west of Stone Well and 0.75 mi north of Route M. Survey stations were spaced at 0.5 mile intervals. The route consisted of 4 stations on level to rolling terrain. Mountain plover habitat was “Good to Marginal” along most the route with low densities of woody plants, and moderate to high densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was “Good” overall. No MOPLs were detected, but other avian species observed include Horned lark, Common nighthawk, Mourning dove, Swainson’s hawk, Blue grosbeak, Turkey vulture, Ash-throated flycatcher, Scott’s oriole, and Common raven. The grasses along the route were interspersed with woody plants such as yucca and cholla cactus and half shrubs such as broom snakeweed.

Route O

Driving route located on a dirt road approximately 1.0 mile south of Antelope Well and north of Route N. Survey stations were spaced at 0.5 mile intervals. The route consisted of 3 stations on gently rolling to level terrain. Mountain plover habitat was "Poor to Marginal" along the route with high to moderate densities of woody plants, and moderate densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was "Good to Marginal" overall. No MOPLs were detected, but other avian species observed include Loggerhead shrike, Lark sparrow, and Scott's oriole. The grasses along the route were interspersed with woody plants such as yucca, cholla cactus, and javelina bush and half shrubs such as broom snakeweed.

Route P

Driving route located on a well-maintained gravel road (Co. Rd. F037), approximately 1.0 mile north of Stone Well and 3.5 miles east of Antelope Well. Survey stations were spaced at 0.5 mile intervals. The route consisted of 5 stations on level to gently rolling terrain. Mountain plover habitat was "Marginal" along the route with moderate to low densities of woody plants, and moderate densities of half-shrubs at the stations. Herbaceous cover and herbaceous height was "Good" overall. No MOPLs were detected, but other avian species observed include Northern mockingbird, Horned lark, Lark sparrow, Loggerhead shrike, Chihuahuan raven, and Scott's oriole. Cattle were present at 2 of the survey stations. The grasses along the route were interspersed with woody plants such as yucca, cholla cactus, and creosotebush, and half shrubs such as broom snakeweed.

Appendix C. Vertebrate species observed during Mountain plover surveys on the BLM Las Cruces Field Office Otero Mesa Resource Area, May 14 to June 2, 2004.

Common Name	Scientific Name
Birds	
Turkey vulture	<i>Cathartes aura</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Scaled quail	<i>Callipepla squamata</i>
Mourning dove	<i>Zenaida macroura</i>
Burrowing owl	<i>Athene cunicularia</i>
Common nighthawk	<i>Chordeiles minor</i>
White-throated swift	<i>Aeronautes saxatalis</i>
Unknown <i>Selasphorus</i> hummingbird	<i>Selasphorus sp.</i>
Western wood-pewee	<i>Contopus sordidulus</i>
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Western kingbird	<i>Tyrannus verticalis</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Chihuahuan raven	<i>Corvus cryptoleucus</i>
Common raven	<i>Corvus corax</i>
Horned lark	<i>Eremophila alpestris</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Cactus wren	<i>Campylorhynchus brunneicapillus</i>
Northern mockingbird	<i>Mimus ployglottos</i>
Crissal thrasher	<i>Toxostoma crissale</i>
Cassin's sparrow	<i>Aimophila cassinii</i>
Lark sparrow	<i>Chondestes grammacus</i>
Black-throated sparrow	<i>Amphispiza bilineata</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Eastern meadowlark	<i>Sturnella magna</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Scott's oriole	<i>Icterus parisorum</i>
House finch	<i>Carpodacus mexicanus</i>
Mammals	
Spotted ground squirrel	<i>Spermophilus spilosoma</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>
Kit/Swift fox	<i>Vulpes macrotis</i> or <i>V. velox</i>
Pronghorn antelope	<i>Antilocapra americana</i>
Domestic cattle	<i>Bos taurus</i>
Reptiles	
Lesser earless lizard	<i>Holbrookia maculata</i>

Little-striped whiptail	<i>Cnemidophorus inornatus</i>
Western hognose snake	<i>Heterodon nasicus</i>