Survey of Breeding Birds on Red Top Ranch 2007

Rocky Mountain Bird Observatory
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In Cooperation With:
The Nature Conservancy
2424 Spruce St., Boulder, CO 80302

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ROCKY MOUNTAIN BIRD OBSERVATORY

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Research: *RMBO studies avian responses to habitat conditions, ecological processes, and management actions to provide scientific information that guides bird conservation efforts.*

Monitoring: *RMBO monitors the distribution and abundance of birds through long-term, broad-scale monitoring programs designed to track population trends for birds of the region.*

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EXECUTIVE SUMMARY

Birds are excellent indicators of environmental quality and change. In addition, they are one of the most highly visible and valued components of our native wildlife. Monitoring birds provides data needed not only to effectively manage bird populations, but also to understand the effects of human activities on ecosystem and to gauge their sustainability.

In 2007, Rocky Mountain Bird Observatory, in cooperation with The Nature Conservancy, examined the breeding bird community on Red Top Ranch in southeastern Pueblo County, Colorado. We conducted 67 point-counts using standardized methodology. These point-counts were conducted between May 15 and June 15. We detected a total of 783 individual birds from 20 different species. The most common species were Lark Bunting, Western Meadowlark, Horned Lark, and Cassin's Sparrow; these four species comprised 92% of the individuals detected.

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INTRODUCTION

Grassland birds are among the highest conservation priorities among North American breeding birds (Sampson and Knopf 1996). In 2007, Rocky Mountain Bird Observatory (RMBO), in cooperation with The Nature Conservancy initiated a survey of breeding birds on Red Top Ranch, located south of Pueblo, Colorado. We used standardized inventory and monitoring techniques that are consistent with those conducted by RMBO at regional and state scales. We point counts within the Shortgrass Management Area (SMA) to determine the presence and relative abundance of eight species: Bald Eagle, Burrowing Owl, Cassin's Sparrow, Ferruginous Hawk, Lark Bunting, Loggerhead Shrike, Long-billed Curlew, and Mountain Plover. Additional species detected through efforts aimed at detecting the primary species were also recorded. We compiled the list of species detected on Red Top Ranch during the estimated breeding season for grassland birds for 5 days between May 15 and June 15.

The overall management goal on Red Top Ranch is to maintain a diverse complex of shortgrass prairie, midgrass prairie, arid shrubland, and open juniper woodlands to provide suitable habitat for the eight bird species targeted for protection, as listed above. While overall the property is currently diverse, high-quality native prairie, this project necessitates more extensive early seral shortgrass prairie than is currently present (defined by a low density of shrubs, vegetation height <4", and 30% bare ground). Restoring early seral characteristics to an area large enough to meet the requirements of this project (11,246 acres) will be a primary focus of management efforts. This more focused management will be concentrated in the SMA. Based on observed existing conditions, the P-J zone will remain largely unmanaged, unless inventory and monitoring results indicate need for adjustments.

METHODS

Study Area

In 2007, RMBO established 67 point-count stations within our study area, Shortgrass Management Area (SMA), on Red Top Ranch in southeastern Pueblo County, Colorado (Figure 1). The habitat is native prairie grassland with scattered shrubs and several prairie dog colonies.

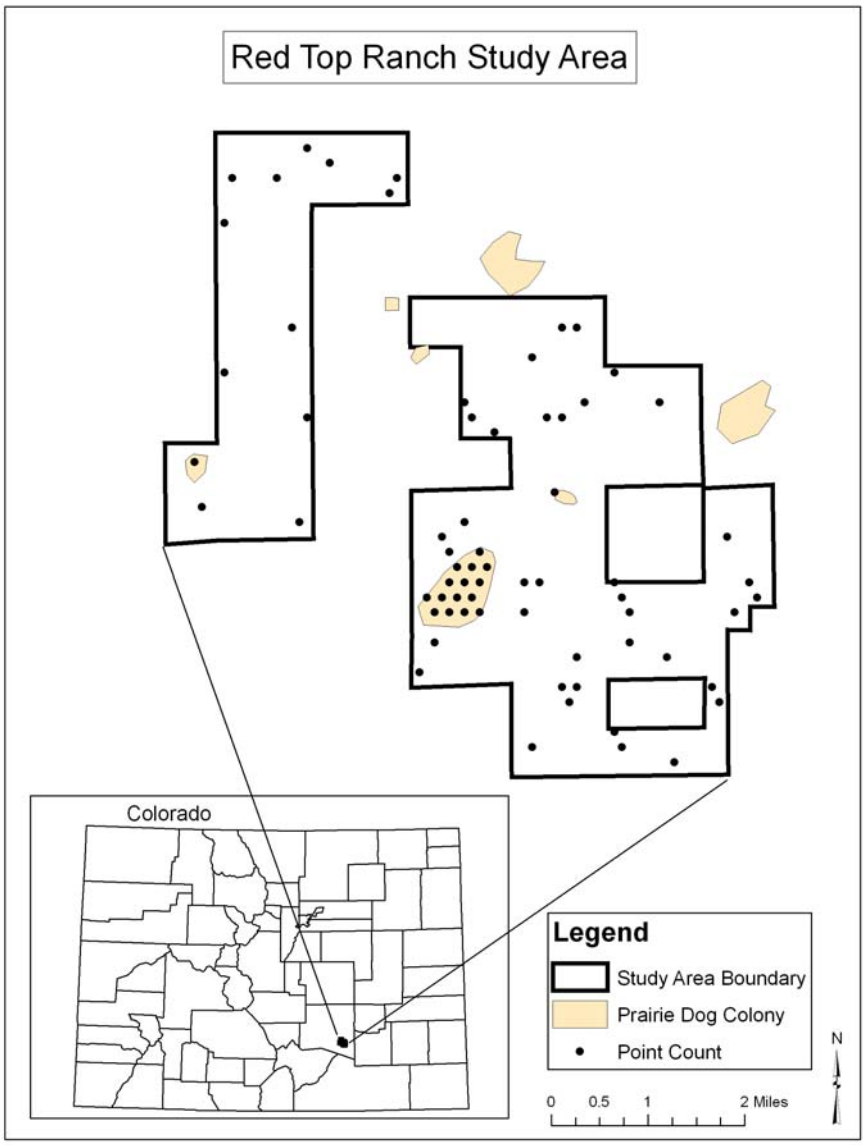

Figure 1. Point-count locations for breeding-bird surveys on Red Top Ranch, Pueblo County, Colorado, 2007.

Field Personnel

All field technicians had extensive prior experience in identifying birds by sight and sound. Technicians were further trained in point-count survey protocol (Panjabi et al. 2006).

Point Transect Protocol

Point-count locations were selected randomly throughout the SMA with additional effort placed on collecting data on prairie dog colonies (Figure 1). Point-count locations were placed at least 250m apart. Field workers navigated to each point-count station on the ground using hand-held GPS (Global Positioning System) units. During each visit, observers conducted a timed 5-minute point count (Panjabi et al. 2006).

All transect surveys were conducted in the mornings, between ½-hour before sunrise and 11 AM. For each bird detected, observers recorded the species, sex, how it was detected (e.g., call, song, etc.), and distance from the observation point. Whenever possible, observers measured distance to the bird using Bushnell® Yardage Pro 500™ laser rangefinders. When it was not possible to measure the distance, biologists used rangefinders to estimate the distance by measuring to some closer object.

Observers recorded weather data (i.e., temperature in degrees Fahrenheit, cloud cover, precipitation, and wind—Beaufort scale) and the time at the start and end of each set of counts. All GPS data were logged in Universal Transverse Mercator (UTM) North American Datum 1927.

Data Analysis

We used program DISTANCE version 5.0 (Thomas et al. 2006) to analyze the point-count data. The notation, concepts, and analysis methods of DISTANCE were developed by Buckland et al. (1993). Analysis using DISTANCE assumes that: 1) all birds at distance zero are detected, 2) distances of the birds close to the points or line are measured accurately, and 3) birds do not move in response to the observer's presence. We treated flocks and similar clusters of birds detected together as single observations. We pooled all data and used Akaike's Information Criteria (AIC) to evaluate three models (half-normal cosine, hazard-rate simple polynomial, and hazard-rate cosine) to determine the most appropriate detection function for each species. Density estimates for species with adequate sample sizes were derived using this global detection function, with sampling area as strata (i.e., grassland, prairie dog colony). We calculated the global density estimate (i.e., ranch-wide) using the mean of the strata estimates weighted by effort.

RESULTS

We conducted 67 point counts and detected 783 individual birds of 20 species (Appendix A). There were 50 points in grassland habitat and 17 points in prairie dog towns. The most common species (in decreasing order of abundance) were Lark Bunting, Western Meadowlark, Horned Lark, and Cassin's Sparrow; these four species comprised 92% of the individuals detected. All transects were conducted between 15 May and 15 June. We were able to determine the presence of three of the eight target species on this project: Burrowing Owl, Cassin's Sparrow, and Lark Bunting. We were able to calculate density estimates for two of these species, Cassin's Sparrow and Lark Bunting.

In 2007 we detected 20 different bird species, 12 of which are species of management interest, as designated by either U.S. Forest Service, U.S. Fish and Wildlife Service, Colorado Division of Wildlife, or Partners In Flight (Appendix A). Although sample sizes were too low to calculate densities for most of these species, tracking their numbers or presence absence data over time could yield coarse information about their local populations.

We were able to calculate density estimates for the four most common species (Table 1). The density estimates were post-stratified; results are presented with 95% confidence intervals.

Table 1. Density estimates of breeding birds on Red Top Ranch, Pueblo County, Colorado, 2007[1].

Species	Strata	D	%CV	LCL	UCL	n
Horned Lark	Grassland	45.89	22	29.85	70.52	107
	Prairie dog colony	36.58	24	22.61	59.17	29
	Ranch-wide	43.52	21	28.94	65.45	136
Cassin's Sparrow	Grassland	13.22	12	10.35	16.90	113
	Prairie dog colony	6.88	21	4.51	10.51	20
	Ranch-wide	11.61	12	9.14	14.76	133
Lark Bunting	Grassland	52.36	13	40.27	68.09	147
	Prairie dog colony	31.43	16	22.81	43.30	30
	Ranch-wide	47.05	12	36.98	59.87	177
Western Meadowlark	Grassland	9.94	13	7.72	12.79	116
	Prairie dog colony	6.30	17	4.48	8.85	25
	Ranch-wide	9.02	12	7.07	11.50	141

[1]D = estimated density (birds/km^2); LCL and UCL = lower and upper 95% confidence limits on D; %CV = percent coefficient of variation (std. dev. /mean *100) of D; n = number of independent detections used to estimate D.

Horned Lark was the second most dense of the four species. This species prefers bare ground and low vegetation, and of the four species it had the highest density in the prairie dog colonies (Beason, 1995).

Cassin's Sparrow had the third highest overall density of the four species. Its density was almost twice as high in grassland habitat as it was in the prairie dog colonies with overlapping confidence intervals. This would be expected, given the species preference for grassland and scattered shrubs (Dunning et al. 1999).

Lark Bunting had the highest overall density of the four species, and had the highest density in grassland. Its density was also much higher in grassland habitat than it was in the prairie dog colonies. Like Cassin's Sparrow, this species prefers grassland and scattered shrubs over open ground (Shane 2000).

Western Meadowlark had the lowest overall density, as well as the lowest density in the other two strata. This species is associated with comparatively dense grass and forb cover, and as expected its density was greater in grassland habitat than it was in the prairie dog colonies (Lanyon 1994).

DISCUSSION

Red Top Ranch is located in Pueblo County, Colorado, on the western edge of the Shortgrass Prairie Bird Conservation Region (BCR 18). The dominant landcover on the Ranch is shortgrass prairie scattered with patches of shrubs. Within the shortgrass prairie habitat there are prairie dog towns on the ranch with the largest comprising 264 acres, although during the survey period this colony was completely dead which reduces the benefits for many sensitive grassland birds. The Black-tailed Prairie Dog has been called a keystone species of shortgrass prairie (USFWS 1999). Many species are influenced by the presence of prairie dog colonies, although many do not depend on them for survival. Predators such as Ferruginous Hawk readily use prairie dog colonies as a source of dense prey availability (Van Pelt, 1999). Other species rely on prairie dog colonies for low growing vegetation high in nitrogen that characteristically grows around these colonies (Van Pelt, 1999). The habitat created in and around prairie dog towns provides suitable nesting habitat for Mountain Plover and Burrowing Owl.

The densities of Cassin's Sparrow and Lark Bunting were lower on the prairie dog colonies than the grassland, as would be expected given these species' association with grassland and scattered shrubs (Dunning et al. 1999, Shane 2000). Similarly, Western Meadowlark densities on the prairie dog colonies were lower, as was expected given that species' association with comparatively dense grass and forb cover (Lanyon 1994). Cassin's Sparrow breeds in areas with scattered shrubs and open grassland preferring more vegetation structure than most shortgrass prairie bird species. Lark Bunting and Western Meadowlark have similar nesting requirements as they tend to nest in clumps of taller grass or at bases of low lying shrubs. Other species that were detected on the ranch that are of management interest are Scaled Quail, Curve-billed Thrasher and Brewer's Sparrow. These species are in the periphery of their breeding range and require vegetation structure during their breeding season.

We were unable to detect five of the eight target species on Red Top Ranch during point counts. These species were Bald Eagle, Ferruginous Hawk, Loggerhead Shrike, Long-billed Curlew, and Mountain Plover. While point-counts are an effective way to detect bird species some species are harder to detect and occur in lower densities which require using different sampling techniques. Raptors maintain large territories during the breeding season limiting the number of pairs possible on the ranch. Knowing the locations of nest sites would allow TNC to manage for these species on the Ranch.

We recommend allowing the prairie dog town to expand which will provide good habitat for many target species such as Mountain Plover, Ferruginous Hawk, and Burrowing Owl. We also recommend maintaining the shrub cover on the ranch

which provides optimal habitat for Cassin's Sparrow, Brewer's Sparrow, Lark Sparrow, Curve-billed Thrasher, Scaled Quail and potential habitat for Loggerhead Shrike. This combination of shortgrass prairie with prairie dog towns interspersed with shrubs creates a healthy and rich and diverse shortgrass prairie ecosystem.

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APPENDIX A. Bird species documented, with management designations and numbers of individuals recorded, during point counts on Red Top Ranch, Pueblo County, Colorado, 2007.

Common Name[1]	Species Management Designation[2]					Habitat[3]	Count
	USFS	USFWS	CDOW	TES	PIFBCR18		
Scaled Quail			SGCN		CC,RC	PD	1
Swainson's Hawk		BCC	SGCN		CC,RS	BT	4
Red-tailed Hawk						GR	1
American Kestrel						GR	1
Killdeer						GR	1
Mourning Dove						BT	8
Burrowing Owl	R2SS	BCC	SGCN	ST	RC,RS	BT	8
Common Nighthawk					RC	GR	2
Western Kingbird						GR	2
Chihuahuan Raven					RS	GR	1
Horned Lark						BT	144
Barn Swallow						GR	1
Northern Mockingbird						BT	15
Curve-billed Thrasher			SGCN			GR	1
Cassin's Sparrow	R2SS	BCC	SGCN		RC,RS	BT	140
Brewer's Sparrow	R2SS	BCC	SGCN		CC,RC	GR	1
Lark Sparrow					RC	BT	13
Lark Bunting			SGCN		RC,CS,RS	BT	272
Dickcissel		BCC			CC	GR	1
Western Meadowlark					RS	BT	166

[1] Common Names are from the A.O.U. Check-list of North American Birds, Seventh Edition (2003).

[2] Special management designations: USFS=United States Forest Service, R2SS=USFS Region 2 Sensitive Species; USFWS=U.S. Fish and Wildlife Service, BCC=USFWS Bird of Conservation Concern for Region 6 (Mountain-Prairie Region); CDOW=Colorado Division of Wildlife, SGCN=Species of Greatest Conservation Need; TES=Colorado Threatened or Endangered Species List, ST=State Threatened; PIF-BCR18=Partners In Flight Bird Conservation Region 18, CC=Continental Concern, CS=Continental Stewardship, RC=Regional Concern, RS=Regional Stewardship.

[3] Habitat: PD = Prairie Dog Town, BT= Prairie Dog Town and Grassland, GR = Grassland.