Soapstone Ranch Avian Inventory and Monitoring: Year 2

Photo: Common Nighthawk on SPNA by Scott Severs

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ROCKY MOUNTAIN BIRD OBSERVATORY

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Photo: McCown's Longspur by Scott Severs.

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Executive Summary

Rocky Mountain Bird Observatory and the City of Fort Collins, in cooperation with the Colorado Division of Wildlife, started a breeding bird inventory and monitoring program on Soapstone Ranch Natural Area (SPNA) during the spring and summer of 2006. The program is designed to provide an inventory, and estimate densities and nest success, of breeding birds on SPNA. This report summarizes our findings for 2007.

Soapstone Ranch, which totals approximately 18,764 acres, was purchased by the City of Fort Collins Natural Areas Program in 2004. This ranch is located 25 miles north of Fort Collins in Larimer County, Colorado, in the transition zone between the western Great Plains and the southern Rocky Mountains. This transitory landscape includes elements of both eco-regions and supports an array of habitats and a diverse avifauna.

We conducted 737 point counts of breeding birds on Soapstone Ranch, primarily in grassland and shrubland habitats. We observed a total of 87 species in 2007 and estimated densities for 19 breeding bird species. The most abundant and widespread species were Horned Lark, McCown's Longspur, Lark Bunting, and Western Meadowlark. Nest success estimates were calculated for 3 species, Horned Lark, Lark Bunting, and McCown's Longspur. Nest success rates were 43%, 44% and 27% respectively, for these three species. Results of the breeding bird inventory show that SPNA supports virtually the entire suite of high-priority grassland bird species identified by various conservation initiatives, organizations and wildlife agencies. These species include Northern Harrier, Ferruginous Hawk, Swainson's Hawk, Golden Eagle, Prairie Falcon, Long-billed Curlew, Mountain Plover, Wilson's Phalarope, Burrowing Owl, Short-eared Owl, Loggerhead Shrike, Virginia's Warbler, and Savannah Sparrow. Our findings demonstrate the high conservation value of Soapstone Ranch to grassland and foothill shrubland birds, many of which are among the highest avian conservation priorities in North America.

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Introduction

Soapstone Ranch Natural Area (SPNA) covers approximately 18,764 acres of land in north-central Colorado. This ranch was purchased by the City of Fort Collins Natural Areas Program (FCNA) in 2004 with objectives of maintaining open space, conserving biodiversity, and providing recreational opportunities. The goals of this bird monitoring and inventory project on SPNA are; 1) to document and estimate breeding bird density, 2) Provide locations of bird detections, 3) Provide nest success rates for grassland birds. The primary habitat in the eastern half of Soapstone Ranch is shortgrass prairie, which transitions into foothill shrublands to the west, with significant wet meadows running through the north- central and eastern portions of the ranch (Fig. 1). This west to east gradient forms an ecologically rich mosaic of habitats that are used by a wide variety of breeding, migratory, and wintering birds. The elevation on the ranch ranges from 6,000 to 7,200 feet above sea level, following the same west to east habitat gradient. This habitat gradient serves as a migration corridor for many wildlife species that have an elevational migration aspect to their natural history.

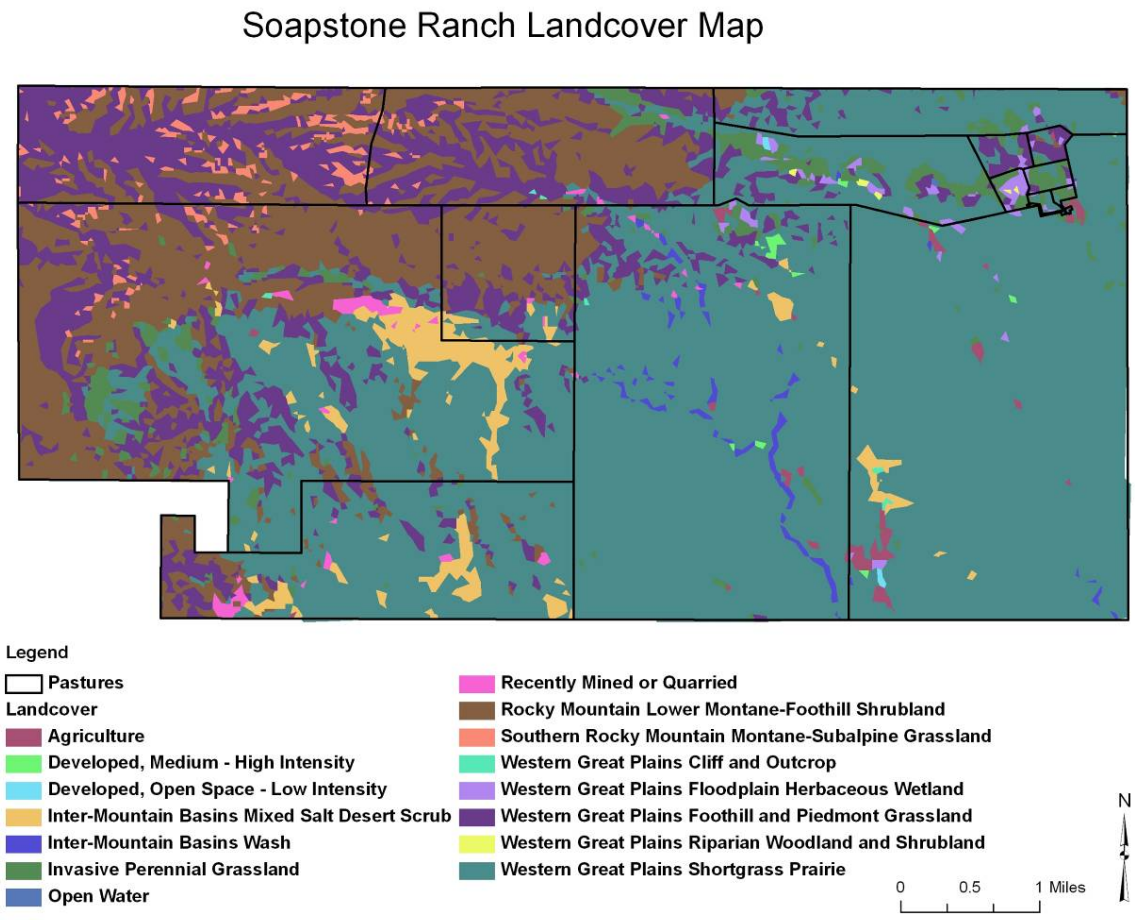

Figure 1. Soapstone Ranch Natural Area Landcover Map.

Native grasslands in North America have been dramatically reduced, fragmented, and altered since European settlement. Consequently, grassland birds have experienced steeper, more consistent, and geographically more widespread declines than any other guild of North American birds (Sampson and Knopf 1996). Several species found in this ecosystem are endemic (found nowhere else) or are closely associated with the Great Plains grasslands (Mengel 1970) such as Cassin's Sparrow, Chestnut-collared Longspur, Ferruginous Hawk, Lark Bunting, Long-billed Curlew, McCown's Longspur, and Mountain Plover. Consequently, many grassland birds are of high conservation interest. Of the 131 bird species on the U.S. Fish and Wildlife Service Birds of Conservation Concern list (2002), 24, or nearly 20%, are grassland species.

Methodology

Bird Surveys

We used Arc Map 9.1 to lay out a grid of 1183 systematic point count stations, each separated by 250 meters, within the boundary of Soapstone Ranch (Fig. 2). Field observers navigated to each point count station on the ground using GPS. During each visit, observers conducted a timed 5-minute point count (Leukering et al. 2000).

All point counts were conducted in the morning, 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, they measured distances using Bushnell® Yardage Pro 500™ laser rangefinders. When it was not possible to measure the distance to a bird, observers estimated distance used rangefinders to gauge estimates by measuring to a nearby object.

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

Nest Monitoring

Field biologists monitored reproductive success of grassland birds on eight 56.25-ha plots (750m x 750 m) between May 2 and July 14 (Fig. 2). We located nests either through behavioral observation of adults or by dragging a rope through the grass to flush birds. When nests were found we recorded species, date and time, plot and location (using GPS), substrate/structure on which the nest was located, number of eggs/chicks present, developmental stage of chicks (if applicable), and behavior of parents, if known. We checked nests every 2-3 days to monitor their fate, and during each visit recorded number of chicks or eggs present and developmental stage of the chicks. When nests became inactive, observers recorded any evidence of success or failure around the nest site (e.g., eggshell fragments, nest damage, feces on and around the rim of the nest, fledglings in area, etc.).

Unless there was evidence to suggest a nest had failed, we assumed that nests were successful if they were found empty on or after their predicted fledge date and they had been checked (and were active) during the previous 2-3 days.

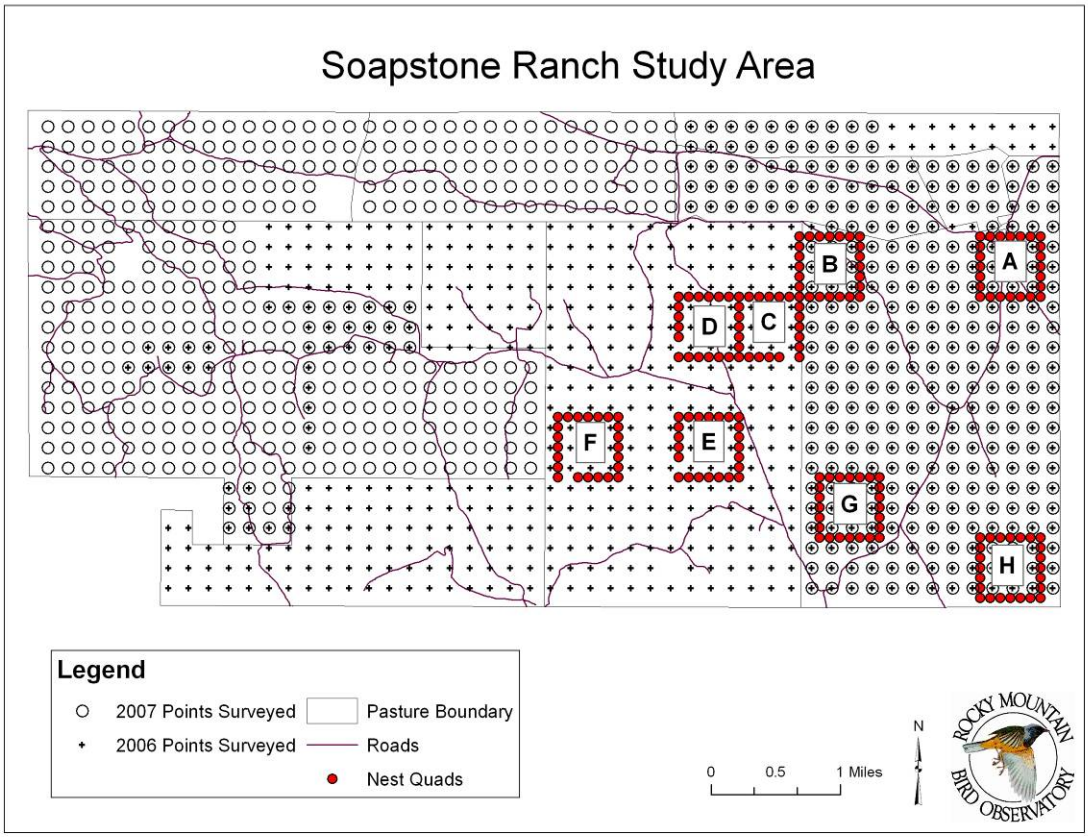

Figure 2 Soapstone Ranch study area.

Data Analysis

Bird Density Estimates

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). Program 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 data from all pastures and used Akaike's Information Criteria (AIC) to evaluate three models (half-normal cosine, hazard-rate simple polynomial, and uniform cosine) to determine the most appropriate detection function for each species. Density estimates for species in individual pastures were derived using this global detection function, with pasture as a stratum. We calculated the global density estimate (i.e. across all pastures) using the mean of the pasture estimates weighted by pasture area.

Nest Survival

We analyzed nest survival data using program MARK (White and Burnham 1999). We followed procedures outlined by Rotella (2007) to estimate daily nest survival rates and determine nesting success for individual species.

Landscape Characterization

Landcover on Soapstone Ranch was analyzed using GIS ArcMap 9.1. Each pasture's landcover classifications were quantified to help understand where core areas of a given habitat occurred. The South west Regional Gap Analysis project developed a landcover classification layer for Colorado with a resolution of 30 meters by 30 meters (Lowry et. al. 2005). This spatial layer was used to qualify and quantify habitat types on the ranch (Table 2).

Results

We conducted 737 point counts in 2007 and 801 point counts in 2006 and detected 87 species in 2007 and 75 species in 2006. Appendix A presents distribution maps for species of greatest conservation need in Colorado's Comprehensive Wildlife Conservation Plan (CCWCP) and other important species. Appendix B presents number of detections for each species observed during point counts for 2007 and 2006. Appendix C is a list of bird species of greatest conservation need on CCWCP and species of Continental Concern/Regional Concern (BCR 16/BCR 18) in the Partners In Flight database.

Density Estimates

We calculated density estimates for 19 bird species in 2007 and 20 bird species in 2006 within and across pastures (Table 1). In 2007 we conducted point counts in pastures we were not able to cover in 2006 such as East Canyon, West Canyon, and LR pasture as well as some pastures we did cover in 2006 such as Jack Springs, Meadow, State Line and Headquarters pastures. We estimated densities for five pastures; some pastures were grouped to obtain sufficient sample size for density estimate analyses. We used the same grouping of pastures in 2007 used in 2006 to obtain density estimates a total of six individual pastures over both years: West Canyon (WC), East Canyon (EC), Jack Springs (JS), Brannigan (BR), "LR" (LR) and Roman & Krafczik (RK) (Figure 3). For analytical purposes, we combined Meadow, State Line, and Headquarters pastures (ME_SL_HQ) into one unit, and only in 2006 the northeast most points in 'LR' pasture with the Roman Inholding pasture (RI_LR) into another unit (Figure 3).

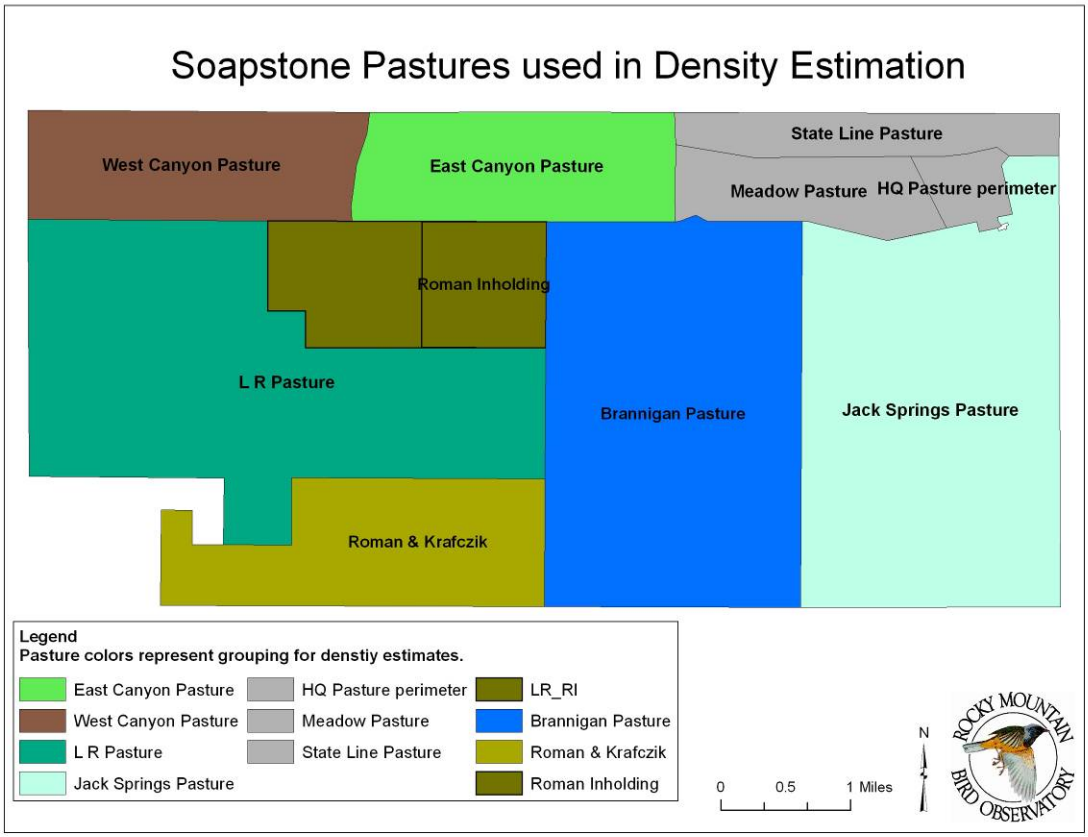

Figure 3. Pastures used to obtain density estimates on Soapstone Ranch Natural Area.

Density estimates for 2006 and 2007 were combined (Table 1). In 2007, highest global density estimates across all pastures surveyed on SPNA were for Horned Lark (0.59 birds/hectare), McCown's Longspur (0.31 birds/hectare), and Brown-headed Cowbird (0.18 birds/hectare). In West Canyon pasture, Horned Lark occurred in highest density (1.1 birds/hectare), followed by Western Meadowlark (0.4 birds/hectare), and Vesper Sparrow (0.27 birds/hectare). In East Canyon pasture, Brown-headed Cowbird was most abundant (0.36 birds/hectare) followed by Mourning Dove (0.23 birds/hectare), and Brewer's Blackbird (0.22 birds/hectare). In Jacksprings pasture, McCown's Longspur occurred in highest density (0.89 birds/hectare) followed by Horned Lark (0.78 birds/hectare), and Lark Bunting (0.45 birds/hectare). In State Line, Meadow, and Headquarters pastures, densities were greatest for Horned Lark (1.57 birds/hectare), Savannah Sparrow (0.18 birds/hectare), Red-winged Blackbird (0.17 bird/hectare), and Western Meadowlark (0.13 bird/hectare).

Table 1: Density estimates (birds/ha) of breeding birds on Soapstone Ranch Natural Area, May 16-14 July, 2007 and 2006 density estimates. D = Density estimate expressed in birds/hectare, LCL & UCL = 90% lower and upper confidence limits of D, n = number of detections used to obtain density estimates, %CV = percent coefficient of variation.

Common Name	Stratum	Year	D	% CV	LCL	UCL	n
Killdeer	BR	2006	0.01	36	0.00	0.01	
	RK	2006	0.00	59	0.00	0.01	
	RI_LR	2006	0.00				
	ME_SL_HQ	2006	0.03	32	0.02	0.05	
	JS	2006	0.04	24	0.03	0.06	
	Global	2006	0.02	21	0.01	0.03	63
Wilson's Snipe	BR	2006	0.01	50	0.00	0.02	
	RK	2006	0.00				
	RI_LR	2006	0.00				
	ME_SL_HQ	2006	0.03	50	0.01	0.06	
	JS	2006	0.01	49	0.01	0.02	
	Global	2006	0.01	45	0.00	0.02	48
Mourning Dove	WC	2007	0.05	42	0.03	0.10	
	EC	2007	0.23	23	0.15	0.33	
	BR	2006	0.01	26	0.01	0.02	
	RK	2006	0.06	23	0.04	0.09	
	RI_LR	2006	0.05	23	0.03	0.07	
	ME_SL_HQ	2006	0.05	25	0.03	0.07	
	ME_SL_HQ	2007	0.02	59	0.01	0.05	
	LR	2007	0.12	21	0.09	0.17	
	JS	2006	0.01	30	0.01	0.02	
	JS	2007	0.01	52	0.00	0.02	
	Global	2006	0.03	19	0.02	0.04	168
	Global	2007	0.08	19	0.06	0.11	125
Common Nighthawk	BR	2006	0.03	34	0.02	0.05	
	RK	2006	0.02	55	0.01	0.04	
	RI_LR	2006	0.01	74	0.00	0.02	
	ME_SL_HQ	2006	0.00				
	JS	2006	0.00	55	0.00	0.01	
	Global	2006	0.01	31	0.01	0.02	36
Say's Phoebe	BR	2006	0.01	49	0.00	0.01	
	RK	2006	0.00				
	RI_LR	2006	0.00	77	0.00	0.01	
	ME_SL_HQ	2006	0.02	85	0.01	0.08	
	JS	2006	0.00				
	Global	2006	0.01	58	0.00	0.01	18
Horned Lark	WC	2007	1.10	17	0.84	1.46	
	EC	2007	0.12	31	0.07	0.19	
	BR	2006	1.66	17	1.26	2.19	
	RK	2006	0.78	21	0.56	1.10	
	RI_LR	2006	0.06	61	0.02	0.15	
	ME_SL_HQ	2006	1.27	19	0.94	1.72	
	ME_SL_HQ	2007	0.57	17	0.43	0.76	

	LR	2007	0.42	15	0.33	0.53	
	JS	2006	1.55	17	1.18	2.05	
	JS	2007	0.78	13	0.63	0.96	
	Global	2006	1.27	4	1.19	1.36	1337
	Global	2007	0.59	13	0.48	0.73	765
Barn Swallow	BR	2006	0.00				
	RK	2006	0.00				
	RI_LR	2006	0.00				
	ME_SL_HQ	2006	0.07	49	0.03	0.15	
	JS	2006	0.05	48	0.02	0.10	
	Global	2006	0.03	42	0.01	0.05	27
Rock Wren	WC	2007	0.01	62	0.00	0.02	
	EC	2007	0.01	62	0.00	0.02	
	BR	2006	0.00	39	0.00	0.01	
	RK	2006	0.07	20	0.05	0.10	
	RI_LR	2006	0.05	27	0.03	0.07	
	ME_SL_HQ	2006	0.00	58	0.00	0.01	
	ME_SL_HQ	2007	0.00				
	LR	2007	0.02	32	0.01	0.03	
	JS	2006	0.00				
	JS	2007	0.00				
	Global	2006	0.02	17	0.01	0.02	66
	Global	2007	0.01	31	0.01	0.01	34
Blue-gray Gnatcatcher	WC	2007	0.11	61	0.04	0.27	
	EC	2007	0.16	46	0.08	0.33	
	ME_SL_HQ	2007	0.00				
	LR	2007	0.12	39	0.06	0.22	
	JS	2007	0.00				
	Global	2007	0.07	37	0.04	0.13	45
Brown Thrasher	BR	2006	0.00	76	0.01	0.00	
	RK	2006	0.03	59	75.95	0.01	
	RI_LR	2006	0.02	52	74.04	0.01	
	ME_SL_HQ	2006	0.00				
	JS	2006	0.00				
	Global	2006	0.01	44	0.00	0.01	14
Green-tailed Towhee	WC	2007	0.08	31	0.05	0.13	
	EC	2007	0.12	19	0.09	0.16	
	BR	2006	0.02	32	0.01	0.04	
	RK	2006	0.12	25	0.08	0.18	
	RI_LR	2006	0.24	18	0.18	0.33	
	ME_SL_HQ	2006	0.00				
	ME_SL_HQ	2007	0.00				
	LR	2007	0.11	15	0.09	0.14	
	JS	2006	0.00				
	JS	2007	0.00				
	Global	2006	0.05	17	0.04	0.06	89
	Global	2007	0.06	13	0.05	0.07	165
Spotted Towhee	WC	2007	0.18	20	0.13	0.25	

	EC	2007	0.19	13	0.15	0.23	
	BR	2006	0.04	26	0.03	0.07	
	RK	2006	0.31	17	0.23	0.41	
	RI_LR	2006	0.94	10	0.80	1.11	
	ME_SL_HQ	2006	0.00				
	ME_SL_HQ	2007	0.00				
	LR	2007	0.19	10	0.16	0.23	
	JS	2006	0.00				
	JS	2007	0.00				
	Global	2006	0.16	10	0.13	0.18	216
	Global	2007	0.11	8	0.09	0.12	276
Brewer's Sparrow	WC	2007	0.19	33	0.11	0.33	
	EC	2007	0.18	31	0.11	0.30	
	BR	2006	0.01	82	0.00	0.02	
	RK	2006	0.00				
	RI_LR	2006	0.13	34	0.08	0.23	
	ME_SL_HQ	2006	0.20	70	0.07	0.61	
	ME_SL_HQ	2007	0.01	103	0.00	0.03	
	LR	2007	0.06	33	0.04	0.11	
	JS	2006	0.00				
	JS	2007	0.00				
	Global	2006	0.04	48	0.02	0.09	33
	Global	2007	0.06	26	0.04	0.10	78
Vesper Sparrow	WC	2007	0.27	23	0.19	0.39	
	EC	2007	0.05	30	0.03	0.09	
	BR	2006	0.12	17	0.09	0.16	
	RK	2006	0.16	20	0.11	0.22	
	RI_LR	2006	0.01	70	0.00	0.02	
	ME_SL_HQ	2006	0.03	36	0.01	0.05	
	ME_SL_HQ	2007	0.01	72	0.00	0.02	
	LR	2007	0.07	21	0.05	0.11	
	JS	2006	0.02	27	0.01	0.03	
	JS	2007	0.01	41	0.00	0.01	
	Global	2006	0.07	16	0.05	0.09	212
	Global	2007	0.06	19	0.05	0.09	174
Lark Sparrow	WC	2007	0.00				
	EC	2007	0.00				
	BR	2006	0.06	37	0.04	0.12	
	RK	2006	0.08	75	0.02	0.30	
	RI_LR	2006	0.04	51	0.02	0.10	
	ME_SL_HQ	2006	0.05	60	0.02	0.11	
	ME_SL_HQ	2007	0.02	73	0.01	0.06	
	LR	2007	0.11	27	0.07	0.18	
	JS	2006	0.00				
	JS	2007	0.00				
	Global	2006	0.04	33	0.02	0.07	31
	Global	2007	0.05	26	0.03	0.07	42
Lark Bunting	WC	2007	0.00				

	EC	2007	0.00				
	ME_SL_HQ	2007	0.03	47	0.01	0.06	
	LR	2007	0.06	25	0.04	0.09	
	JS	2007	0.45	12	0.37	0.54	
	Global	2007	0.18	11	0.15	0.21	350
Savannah Sparrow	WC	2007	0.00				
	EC	2007	0.00				
	BR	2006	0.00	73	0.00	0.01	
	RK	2006	0.00				
	RI_LR	2006	0.00				
	ME_SL_HQ	2006	0.26	28	0.16	0.41	
	ME_SL_HQ	2007	0.18	28	0.11	0.28	
	LR	2007	0.00				
	JS	2006	0.03	44	0.01	0.05	
	JS	2007	0.02	40			
	Global	2006	0.04	26	0.03	0.06	48
	Global	2007	0.02	26	0.02	0.04	49
McCown's Longspur	WC	2007	0.00				
	EC	2007	0.00				
	BR	2006	0.39	11	0.32	0.47	
	RK	2006	0.00				
	RI_LR	2006	0.00				
	ME_SL_HQ	2006	0.26	20	0.19	0.37	
	ME_SL_HQ	2007	0.09	29	0.06	0.15	
	LR	2007	0.01	50	0.00	0.01	
	JS	2006	1.61	6	1.45	1.79	
	JS	2007	0.89	9	0.76	1.03	
	Global	2006	0.67	6	0.61	0.74	773
	Global	2007	0.31	9	0.27	0.36	631
Black-headed Grosbeak	WC	2007	0.04	39	0.02	0.07	
	EC	2007	0.03	37	0.02	0.05	
	ME_SL_HQ	2007	0.00				
	LR	2007	0.00	62	0.00	0.01	
	JS	2007	0.00				
	Global	2007	0.01	31	0.00	0.01	28
Red-winged Blackbird	WC	2007	0.00				
	EC	2007	0.00				
	BR	2006	0.05	27	0.03	0.08	
	RK	2006	0.00				
	RI_LR	2006	0.00				
	ME_SL_HQ	2006	0.31	22	0.22	0.44	
	ME_SL_HQ	2007	0.17	29	0.10	0.27	
	LR	2007	0.00	60	0.00	0.01	
	JS	2006	0.07	23	0.05	0.11	
	JS	2007	0.04	31	0.02	0.06	
	Global	2006	0.08	17	0.06	0.10	201
	Global	2007	0.03	24	0.02	0.05	68
Western Meadowlark	WC	2007	0.40	9	0.35	0.47	

	EC	2007	0.13	12	0.11	0.16	
	BR	2006	0.22	17	0.16	0.29	
	RK	2006	0.25	18	0.18	0.33	
	RI_LR	2006	0.15	19	0.11	0.21	
	ME_SL_HQ	2006	0.22	18	0.16	0.29	
	ME_SL_HQ	2007	0.13	11	0.11	0.16	
	LR	2007	0.12	9	0.10	0.14	
	JS	2006	0.18	18	0.14	0.24	
	JS	2007	0.04	14	0.03	0.05	
	Global	2006	0.20	17	0.15	0.27	1031
	Global	2007	0.13	7	0.11	0.14	639
Brewer's Blackbird	WC	2007	0.24	34	0.14	0.42	
	EC	2007	0.22	38	0.12	0.40	
	BR	2006	0.14	31	0.08	0.22	
	RK	2006	0.16	31	0.09	0.26	
	RI_LR	2006	0.36	35	0.21	0.63	
	ME_SL_HQ	2006	0.00				
	ME_SL_HQ	2007	0.06	60	0.02	0.15	
	LR	2007	0.22	26	0.14	0.33	
	JS	2006	0.02	59	0.01	0.06	
	JS	2007	0.01	73	0.00	0.02	
	Global	2006	0.11	24	0.07	0.16	87
	Global	2007	0.13	23	0.09	0.19	133
Brown-headed Cowbird	WC	2007	0.21	22	0.15	0.31	
	EC	2007	0.36	17	0.27	0.47	
	BR	2006	0.06	28	0.04	0.09	
	RK	2006	0.20	18	0.15	0.27	
	RI_LR	2006	0.20	16	0.15	0.26	
	ME_SL_HQ	2006	0.05	27	0.03	0.08	
	ME_SL_HQ	2007	0.07	42	0.04	0.14	
	LR	2007	0.31	13	0.25	0.38	
	JS	2006	0.01	45	0.01	0.02	
	JS	2007	0.03	40	0.01	0.05	
	Global	2006	0.08	13	0.06	0.09	157
	Global	2007	0.18	11	0.15	0.22	232
Bullock's Oriole	WC	2007	0.09	41	0.05	0.17	
	EC	2007	0.03	53	0.01	0.08	
	ME_SL_HQ	2007	0.00				
	LR	2007	0.04	37	0.02	0.07	
	JS	2007	0.00				
	Global	2007	0.03	29	0.02	0.04	30
American Goldfinch	WC	2007	0.10	27	0.06	0.16	
	EC	2007	0.06	35	0.03	0.10	
	ME_SL_HQ	2007	0.02	59	0.01	0.04	
	LR	2007	0.04	28	0.02	0.06	
	JS	2007	0.00				
	Global	2007	0.03	22	0.02	0.04	56

Landscape Characterization

Table 2 presents the results for landscape analysis using ArcMap 9.1. Seventy-four percent of the habitat on SPNA is shortgrass prairie with core areas in Jack Springs and Brannigan pastures. Grazing, fire and climate are processes that influence this habitat the most. Eleven percent of the ranch is composed of foothill and piedmont grasslands primarily located in the western and northern parts of the ranch. This habitat is best characterized as mixed grass to tall grass prairie occurring on foothill slopes (Lowry et. al. 2005). Foothill shrublands, comprising 5% of land on SPNA, are interspersed within the foothill and piedmont grasslands.

Table 2. SouthWest Regap percent landcover composition by pasture for Soapstone Ranch.

Pasture	Western Great Plains Cliff and Outcrop	Inter-Mountain Basins Wash	Rocky Mountain Lower Montane-Foothill Shrubland	Inter-Mountain Basins Mixed Salt Desert Scrub	Southern Rocky Mountain Montane-Subalpine Grassland	Western Great Plains Foothill and Piedmont Grassland	Western Great Plains Shortgrass Prairie	Western Great Plains Riparian Woodland and Shrubland	Western Great Plains Floodplain Herbaceous Wetland	Open Water	Developed,Open Space-Low Intensity	Developed,Medium-High Intensity	Agriculture	Recently Mined or Quarried	Invasive Perennial Grassland
Brannigan Pasture	0%	3%	1%	1%	0%	4%	89%	0%	0%	0%	0%	0%	1%	0%	1%
Jack Springs Pasture	0%	0%	0%	1%	0%	0%	96%	0%	0%	0%	0%	0%	2%	0%	1%
HQ Pasture perimeter	0%	0%	1%	0%	0%	32%	23%	1%	14%	0%	0%	0%	1%	0%	28%
State Line Pasture	0%	0%	3%	0%	0%	9%	80%	0%	1%	0%	0%	0%	0%	0%	7%
Meadow Pasture	0%	0%	0%	0%	0%	10%	65%	1%	4%	0%	0%	0%	0%	0%	19%
L R Pasture	0%	0%	35%	6%	1%	20%	34%	0%	0%	0%	0%	0%	0%	1%	4%
Roman Krafczik	0%	0%	11%	7%	0%	10%	69%	0%	0%	0%	0%	0%	0%	2%	1%
Roman Inholding	0%	0%	58%	5%	0%	23%	14%	0%	0%	0%	0%	0%	0%	0%	1%
East Canyon Pasture	0%	0%	49%	0%	2%	39%	5%	0%	0%	0%	0%	0%	0%	0%	4%
West Canyon Pasture	0%	0%	34%	0%	12%	54%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Percent	0%	1%	5%	1%	1%	11%	74%	0%	1%	0%	0%	0%	1%	0%	4%

Bird species richness was used to produce a smoothed surface using raw counts at each point within Soapstone Ranch for both years of data combined (Fig. 4). Areas of relatively high species richness occurred in Headquarters pasture (northeast portion of ranch). This pasture contains a variety of habitat types-herbaceous wetland, riparian willows, shrubland, and shortgrass prairie.

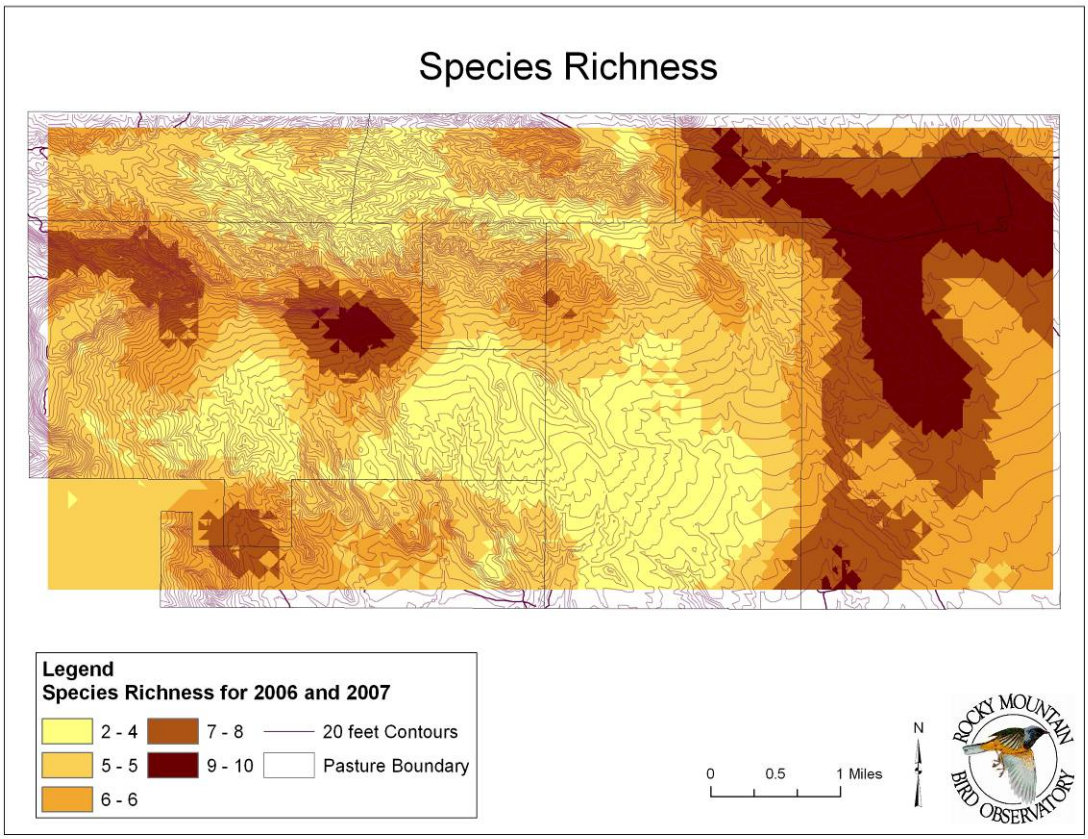

Figure 4. Species richness kriged surface for Soapstone Ranch Natural Area.


Photo: McCown's Longspur nest on Soapstone Ranch Natural Area, by Scott Severs.

Nest Success

We found 158 nests on Soapstone Ranch in 2007 compared to 63 nests in 2006. The difference mostly is attributed to effort spent in the field searching for nests. In 2007 the most common nest found was those of Lark Bunting (n= 60) followed by those of McCown's Longspur (n = 41) and Horned Lark (n = 31). Other species for which we found nests were Western Meadowlark (n = 5), Mountain Plover (6), Vesper Sparrow (n=2), Lark Sparrow (n=2), Common Nighthawk (n = 5), Red-winged Blackbird (n=5), and American Robin (n=1).

We were able to calculate daily survival rates and overall nest success for three species- Horned Lark, Lark Bunting, and McCown's Longspur. The average number of eggs for Horned Lark was 2.7 per nest. Estimated daily survival rate (DSR) for Horned Lark nests was 0.97 (SE= 0.011) compared to 0.96 (SE= 0.013) in 2006, using a constant model. Nest success using a 24-day nesting period for this species was 43% compared to 35% in 2006.

The average number of eggs for McCown's Longspur was 3 per nest. Estimated daily survival rate for McCown's Longspur nests using a constant model was 0.95 (SE= 0.01) compared to 0.96 (SE=0.013) in 2006. Nest success using a 25-day nesting period for this species was 27% compared to 34% in 2006.

The average number of eggs for Lark Bunting was 3.9 per nest. Estimated daily survival rate for Lark Bunting nests using a constant model was 0.97 (SE= 0.012). Nest success using a 24-day nesting period for this species was 44%. We were able to calculate daily nest survival rates and nest success in Jack Springs pasture (DSR= 0.97, nest success = 43%) and Brannigan pasture (DSR= 0.97, nest success = 44%).

Discussion

The relationship between public open space and people fosters an appreciation and sense of stewardship for these places in nature. Public open space forms an integral part of conservation networks that sustain species and their habitats. Because of its' unique geographical location in the transition zone between the southern Rocky Mountains and the western Great Plains, Soapstone Ranch hosts a diverse suite of habitats and bird species.

The property and surrounding area provide breeding habitat for an extensive list of high-priority species for conservation, as recognized by the Colorado Division of Wildlife, the U.S. Fish and Wildlife Service, Partners in Flight, the U.S. Shorebird Conservation Plan, The Nature Conservancy, and other conservation organizations. These species include Northern Harrier, Ferruginous Hawk, Swainson's Hawk, Golden Eagle, Prairie Falcon, Mountain Plover, Long-billed Curlew, Wilson's Phalarope, Short-eared Owl, Burrowing Owl, Red-headed Woodpecker, Loggerhead Shrike, Virginia's Warbler, Vesper Sparrow, Savannah Sparrow, Lark Bunting, McCown's Longspur, and Chestnut-collared Longspur. Few properties support such an array of top priority bird conservation targets, many of which require different grassland habitat conditions. The protection of the ranch and the surrounding lands will play an important role in the conservation of these species both locally and globally.

In 2007 Lark Buntings were more abundant on the grassland portion of the ranch compared to 2006. This highlights the nomadic nature of Lark Buntings and potential shifts in distribution of grassland birds. Lark Bunting nest success (44%) on SPNA was higher than a study conducted for several years on Pawnee National Grassland that found an overall nest success of 31% (Adams Yackel 2005). High Lark Bunting nest success on SPNA may indicate that the ranch is a "source" for this species but breeding site fidelity fluctuates which confounds the problem. More research needs be conducted to help understand the causes driving nest success on the ranch.

Our survey efforts generated sufficient observations to estimate densities for 19 species breeding in grasslands and shrublands on Soapstone Ranch. These density estimates are baseline density estimates of individual species that will allow managers to assess future population trends on the property. Changes in population can also be examined at various scales (e.g., pastures) and can be used to assess impacts of grazing, recreation, and other management activities. Local trends from the ranch could also be compared with statewide and regional trends to assess whether local changes to species differ from statewide trends. The density information can also be used to identify "hotspots" for each species on the ranch, such as those evident in the maps presented in Appendix A. Such maps provide a convenient tool for incorporating the conservation needs of priority bird species in a holistic management approach.

Perhaps the most sensitive metric for assessing impacts of management on bird populations are measures of vital rates such as nest success. Changes in nest success rates typically occur immediately following impacts. Thus, nest success rates provide the

most reliable information for assessing impacts of management activities on breeding conditions for birds. Such "real-time" information can help guide adaptive management activities such as grazing that can enhance habitat conditions for some birds and degrade them for others.

Tall trees around the house in the Roman Inholding pasture seem to offer preferred stopover habitat for transient migrant forest-dwelling species that only stopover on Soapstone Ranch during their semi-annual migrations. This area will undoubtedly offer great opportunities for bird watching at certain times of the year and recreation in this area should not adversely impact the bird diversity of the ranch. Wet meadows in Headquarters and Meadow pastures have potential habitat for migrating Long-billed Curlew, Wilson's Snipe, Savannah Sparrow, and Bobolink.

Management Recommendations

The major landcover types on Soapstone Ranch are shortgrass prairie 74%, foothill and piedmont grassland 11%, and foothill shrublands 5%. These landcover types are also the most fragmented in the northern front range of Colorado due to development and other anthropogenic disturbances. This highlights the importance of developing management guidelines to help protect and maintain species diversity and the habitats they depend on.

Management recommendations at the pasture level or grouping of pastures will allow for a more focused management discussion as well as a finer scale for evaluating future management plans. The ability to quantify management actions on the landscape is important and can be used as a metric to meet management benchmarks. We suggest using density estimates and nest success to serve as metrics for the benchmarks used to guide management activities on the ranch as a whole and at the pasture or group of pastures level. The density estimates and nest success rates obtained during this monitoring effort can be used as baseline benchmarks which can be compared to density estimates or nest success rates obtained after management actions are implemented. Presence -absence data for high priority species can also be used to guide management actions since these species merit more attention and some have specific habitat associations. Bird species mentioned in the following management recommendations were detected on the ranch.

Jack Springs and Brannigan pastures represent the core of shortgrass prairie habitat on the ranch and management practices on these pastures should be aimed at maintaining or improving this habitat type. Jack Springs pasture is the second largest pasture with 96% of it comprised of shortgrass prairie. Thus this pasture is very important for maintaining the integrity of the shortgrass prairie and associated shortgrass prairie obligates on the ranch. The prairie dog town currently restricted to the southern-most part of this pasture should be allowed to expand as this will increase and provide prime habitat for some of the highest priority species found on the ranch such as Ferruginous Hawk, Golden Eagle, Mountain Plover, Long-billed Curlew, Burrowing Owl, and McCown's Longspur. The presence of these species reflects a healthy shortgrass prairie bird community. Brannigan Pasture, west of Jack Springs, is dominated by rolling shortgrass prairie (89%). Four percent of this pasture contains piedmont grasslands, which occur on slopes slightly higher in elevation, and 3% of land in Brannigan is in basin washes. There is more topography and washes in the north-central, central, and southeastern parts of the pasture. On the sides of these washes there are patches of yucca that provide good habitat for Vesper's Sparrow and Brewer's Sparrow.

State Line, Meadow, and Headquarters pastures contain the most flood plain herbaceous wetlands habitat. This habitat is important for Savannah Sparrow, Wilson's Snipe, Long-Billed Curlew and Northern Harrier. Seventy two percent 72% of wetland habitat type is in Headquarters. Seventy eight percent of these three pastures combined are comprised of grassland habitat. Management for these pastures should emphasize on preserving the

wetland habitat since they are restricted and have high conservation value on the ranch. This combination of habitat types is important for Savannah Sparrow, Wilson's Snipe, Long-Billed Curlew, and Northern Harrier. These pastures should be grazed after the breeding season to reduce impacts on nest success for these species since they build nests on the ground.

Roman Krafczik pasture is mostly comprised of grassland (80%) but is unique in that the western edge is dominated by foothill shrublands and the central portion contains patches of four-winged salt bush and skunk bush. Shrubland habitat in the shortgrass prairie are uncommon and provide breeding habitat for a suite of grassland species. Management for this pasture should have an emphasis on maintaining the mosaic of shrubland habitat for Spotted Towhee, Green-tailed Towhee, Brown Thrasher, and Lark Sparrow.

West Canyon, East Canyon, LR, and Roman Inholding pastures, located in the western and north central portions of the ranch, contain the core (93%) of foothill shrubland habitat. This area contains a unique assemblage of birds that rely on shrubs for nesting and foraging during the breeding season. Loggerhead Shrike, Green-tailed Towhee, Spotted Towhee, Vesper Sparrow, Brewer's Sparrow, and Blue-gray Gnatcatcher nest in this area and represent a healthy foothill shrubland habitat. Within the foothill shrublands there are limited patches of junipers, choke cherry and rocky mountain maple which provide habitat for Virginia's Warbler, Black-headed Grosbeak, and Bullock's Oriole. Foothill shrubland and pockets of juniper, rocky mountain maple and other deciduous shrubs should be maintained within these pastures.

Acknowledgements

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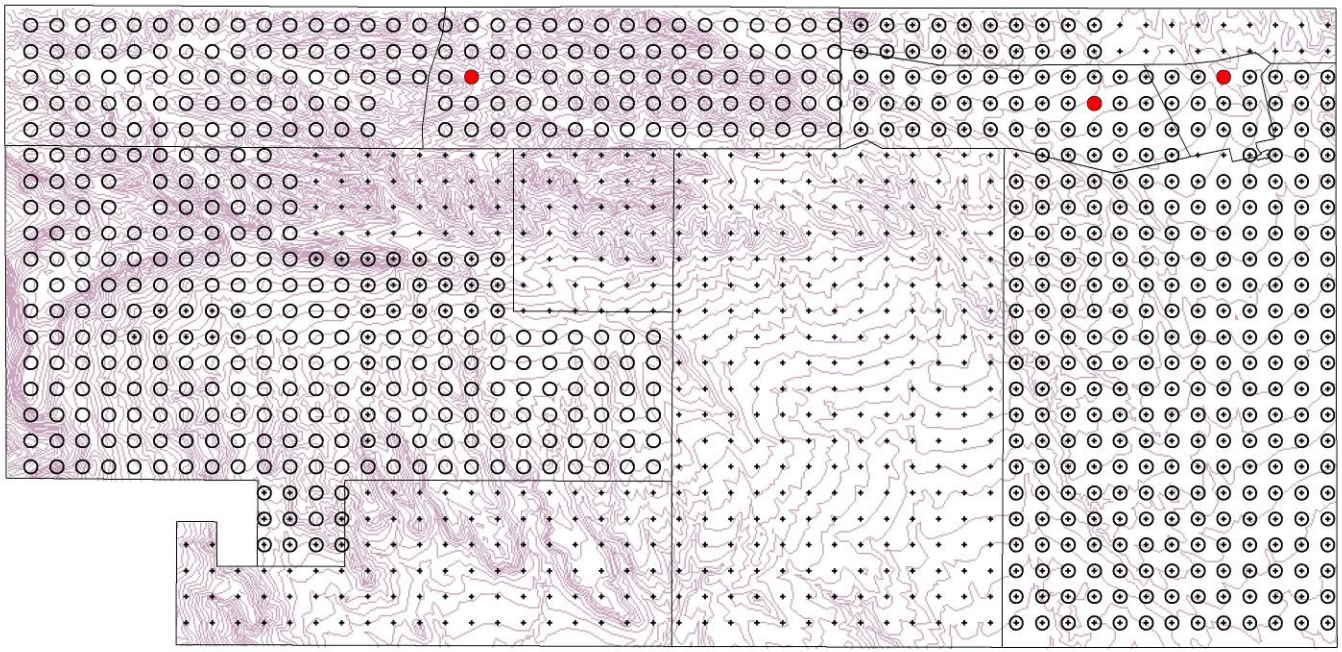
APPENDIX A - Species Distribution Maps

The following presence-absence distribution maps are based on data collected at point count stations, represented by circles (2007) and dots (2006), on Soapstone Ranch. The map for each species indicates locations of all observations for years 2007 and 2006.

Northern Harrier



These maps represent presence absence for species using 2 years of data.

Presence

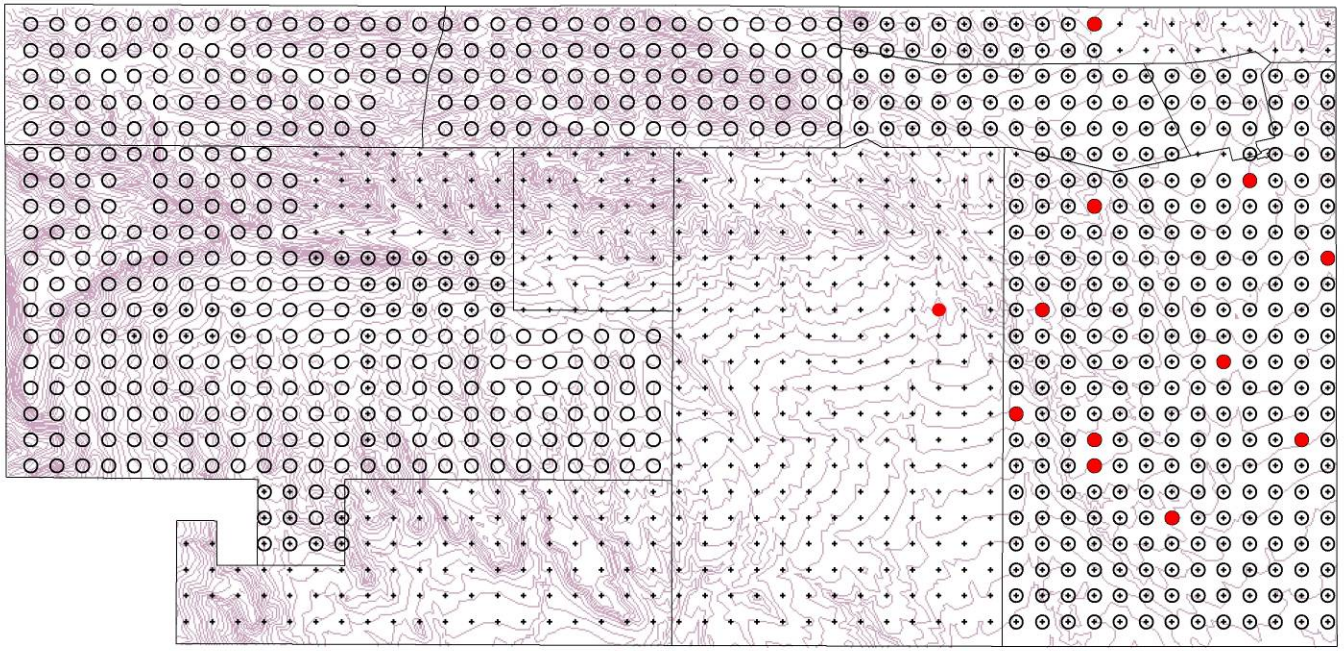
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Swainson's Hawk



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

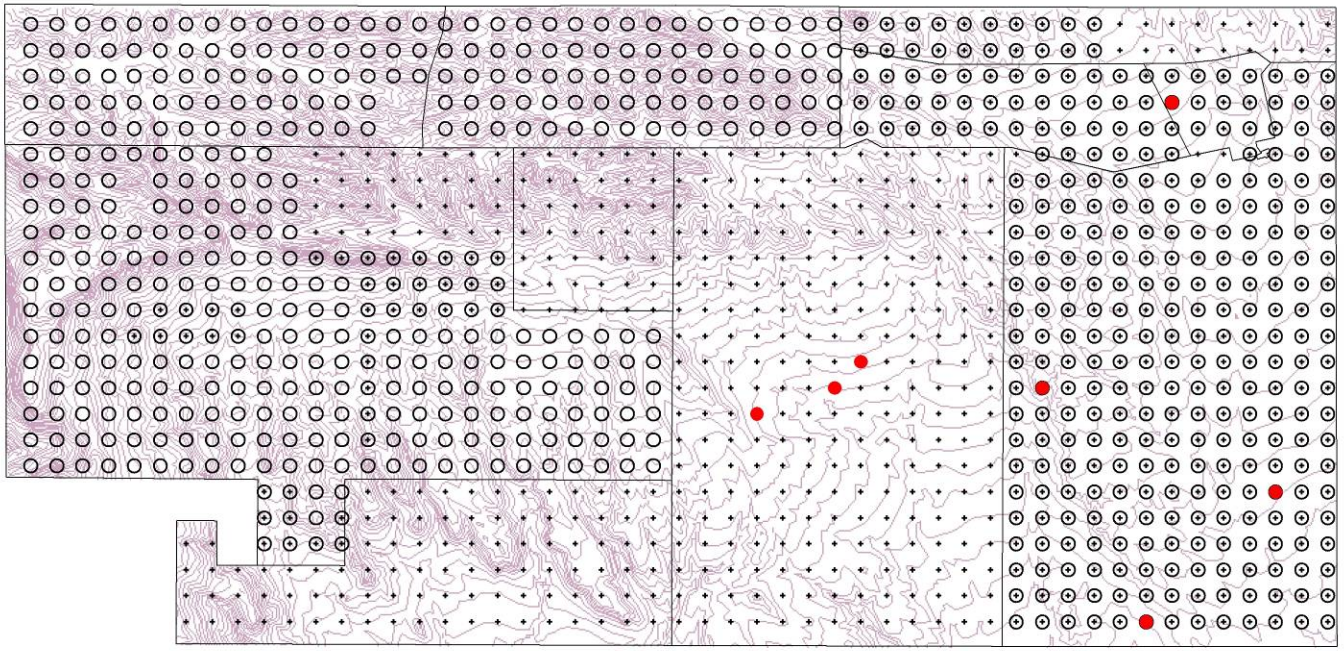
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Ferruginous Hawk



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

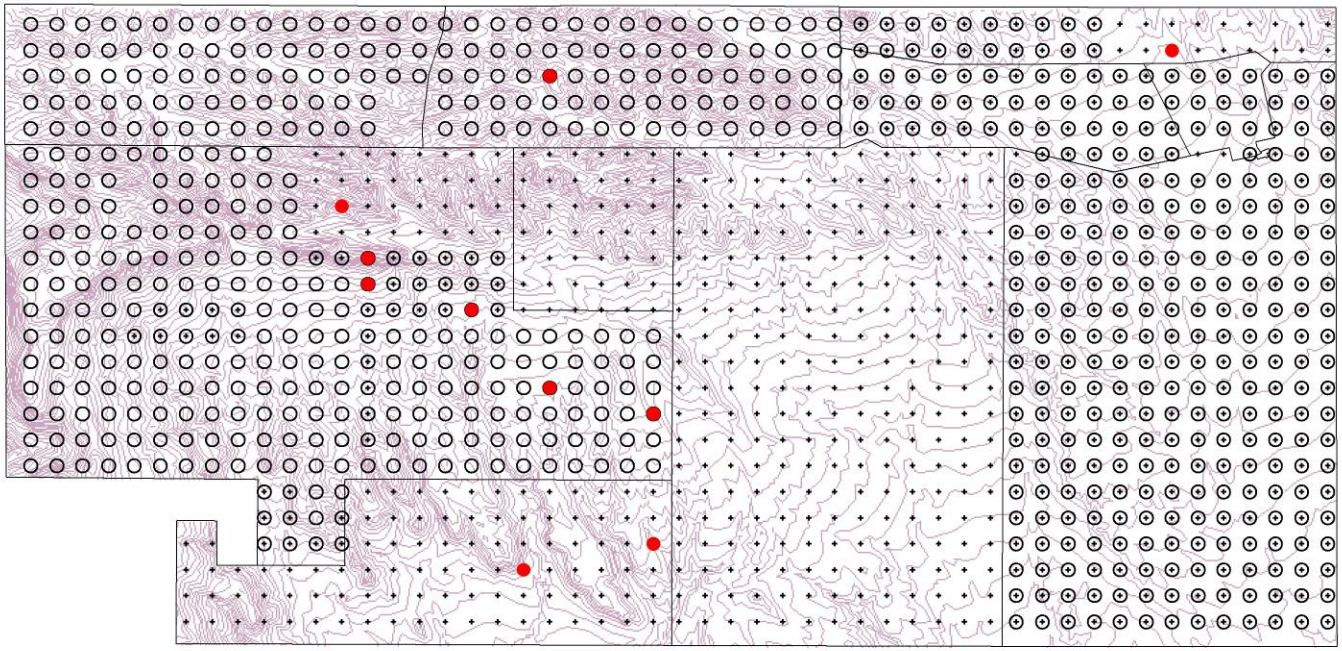
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Golden Eagle



These maps represent presence absence for species using 2 years of data.

Presence

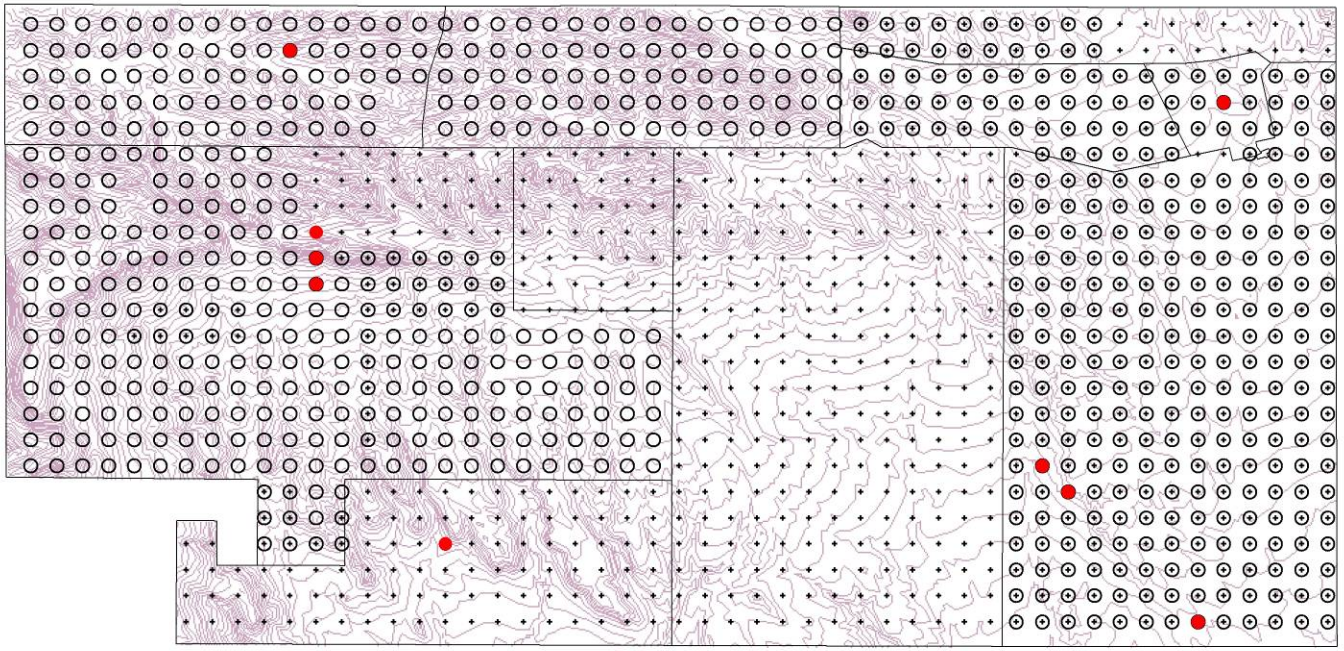
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Prairie Falcon



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

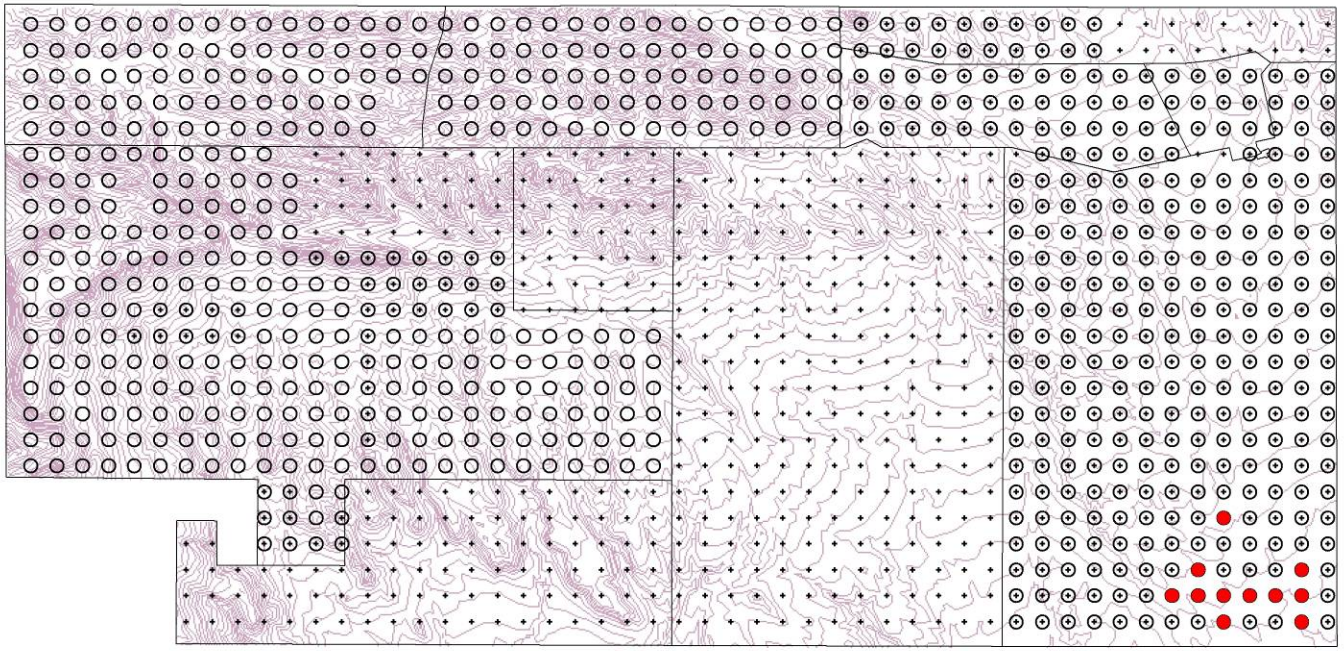
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Mountain Plover



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

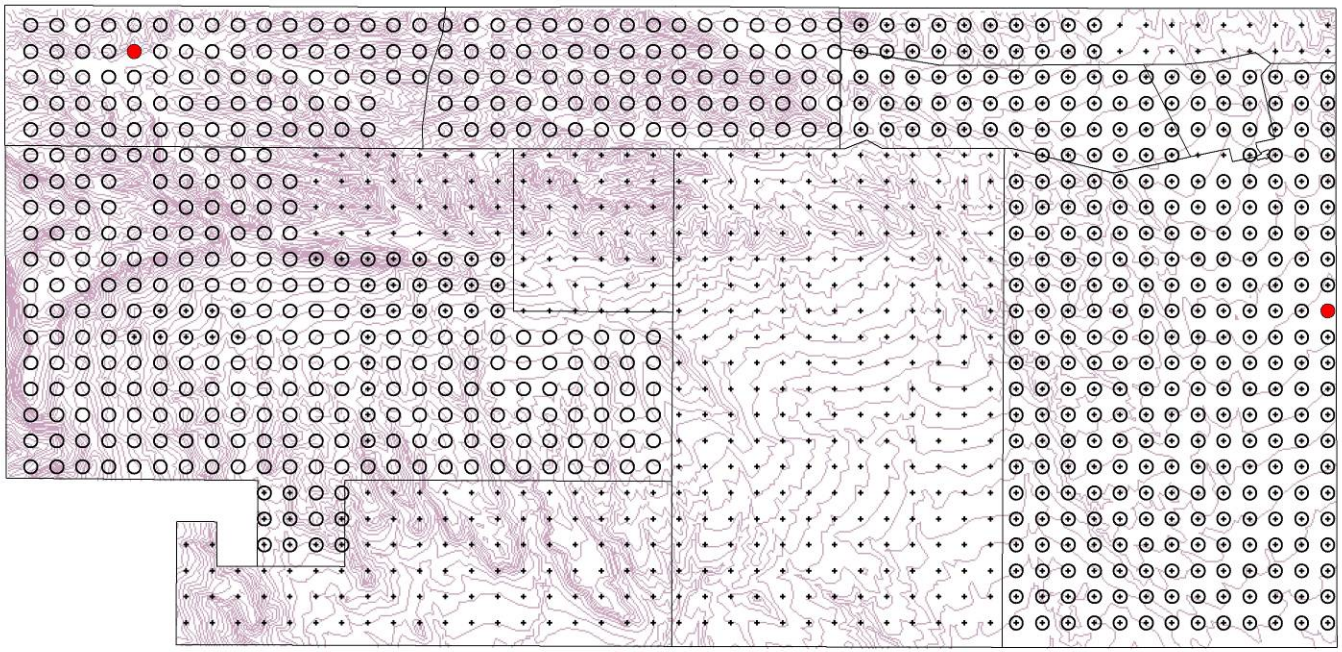
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Upland Sandpiper



These maps represent presence absence for species using 2 years of data.

Presence

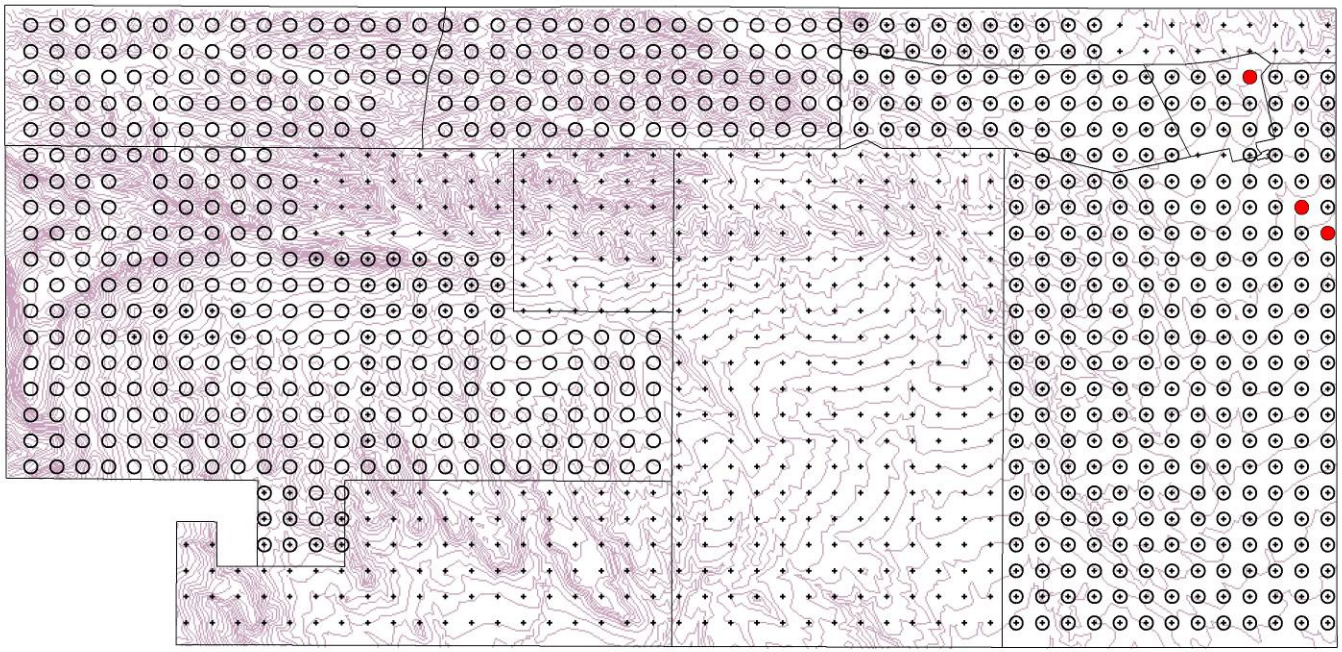
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Long-billed Curlew



These maps represent presence absence for species using 2 years of data.

Presence

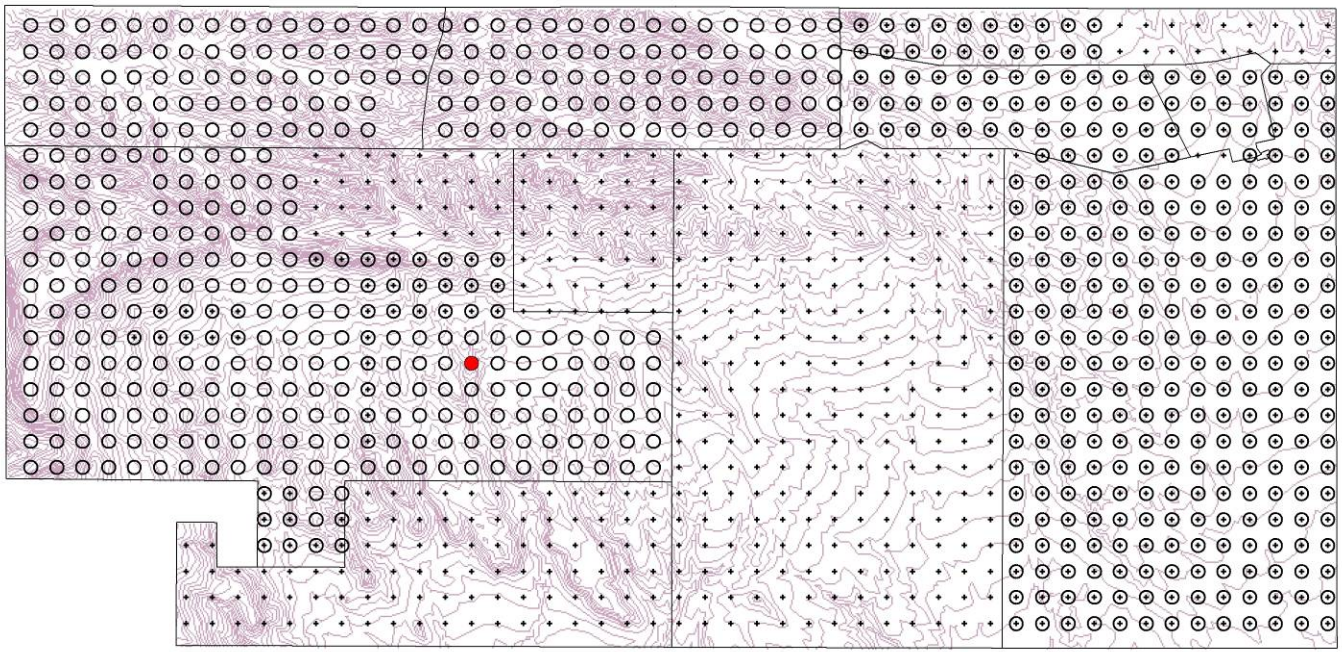
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Barn Owl



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

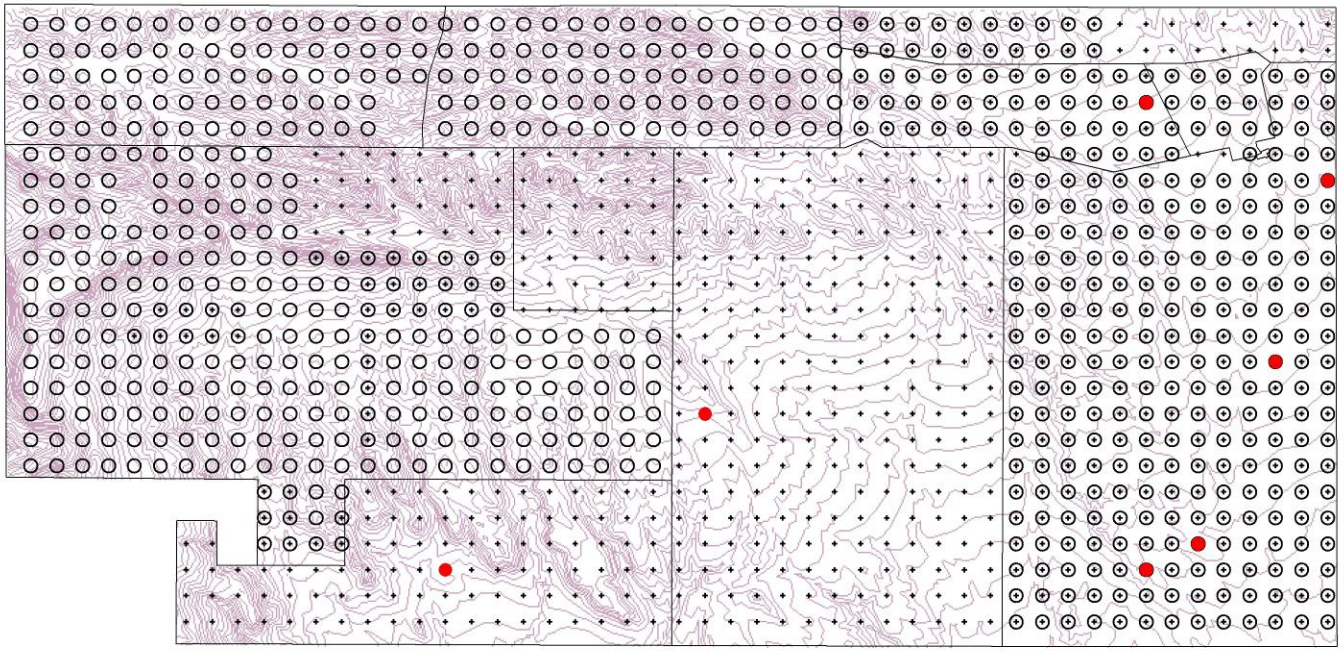
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Burrowing Owl



These maps represent presence absence for species using 2 years of data.

Presence

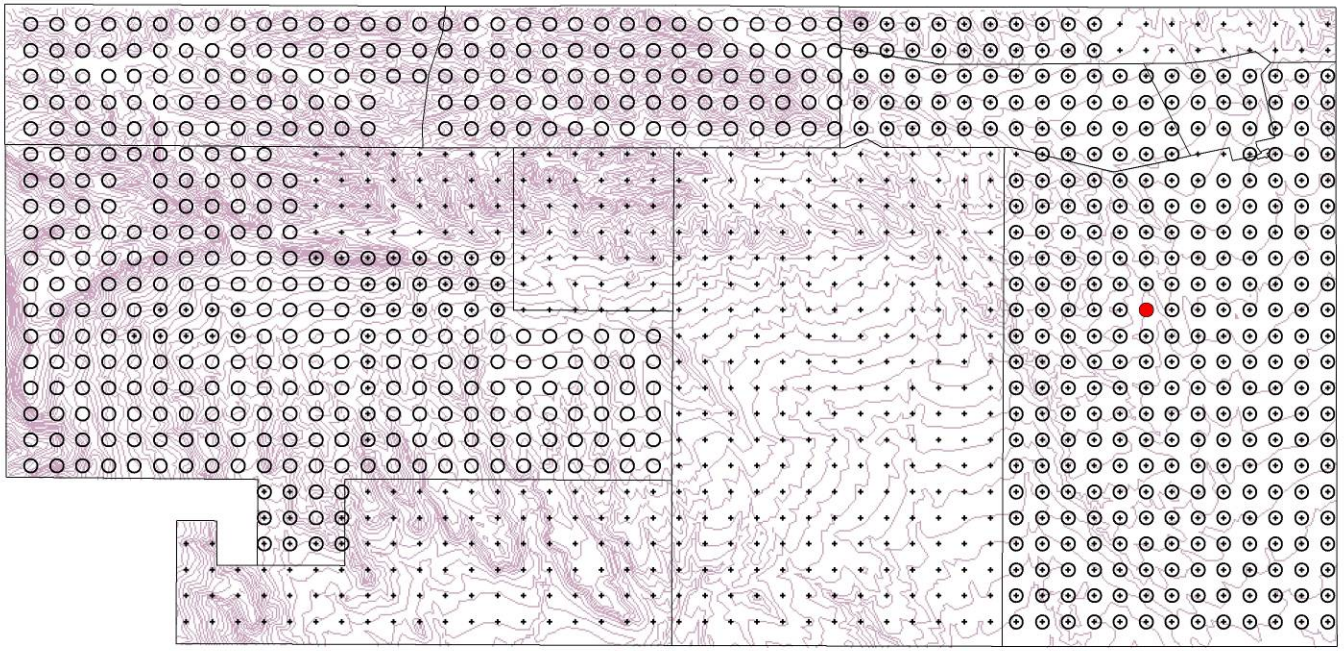
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Short-eared Owl



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

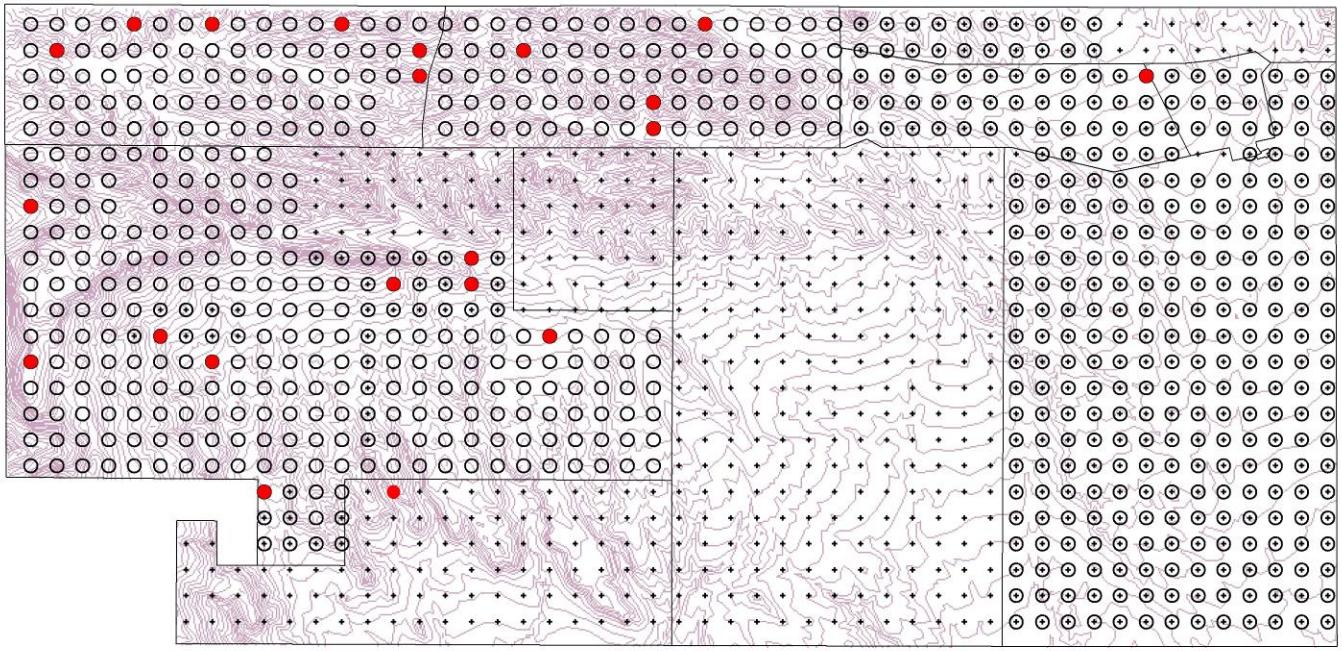
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Loggerhead Shrike



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

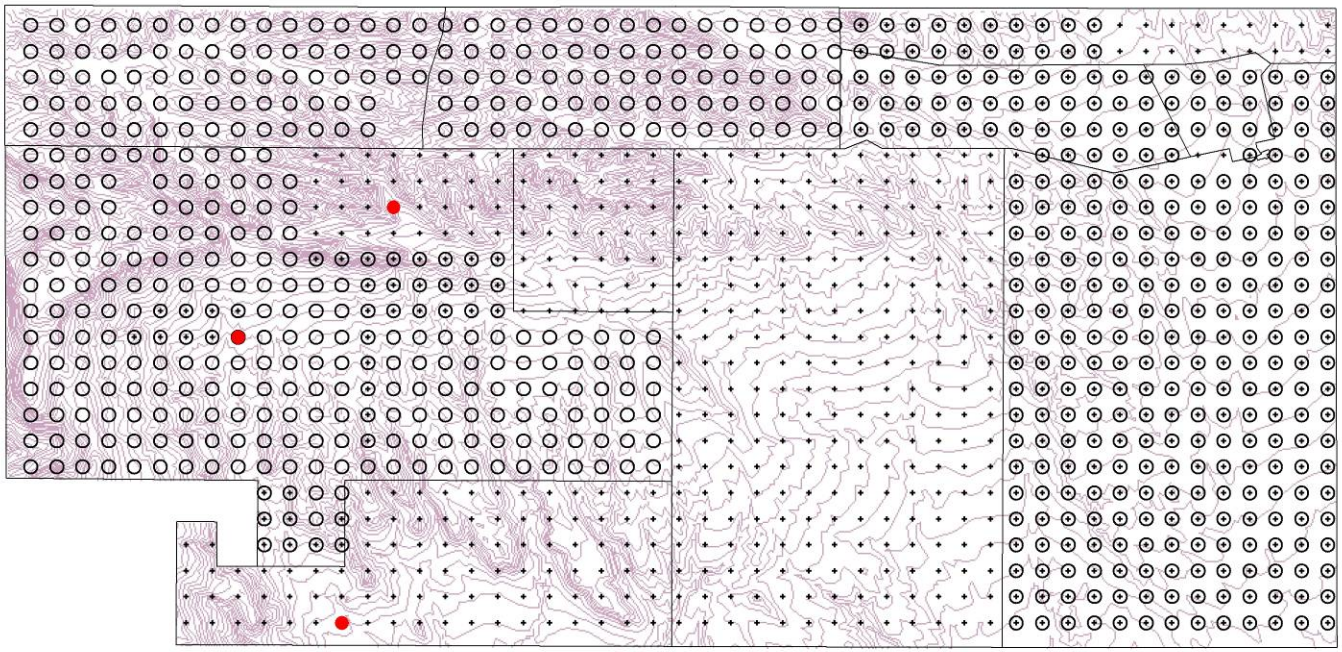
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Sage Thrasher



These maps represent presence absence for species using 2 years of data.

Presence

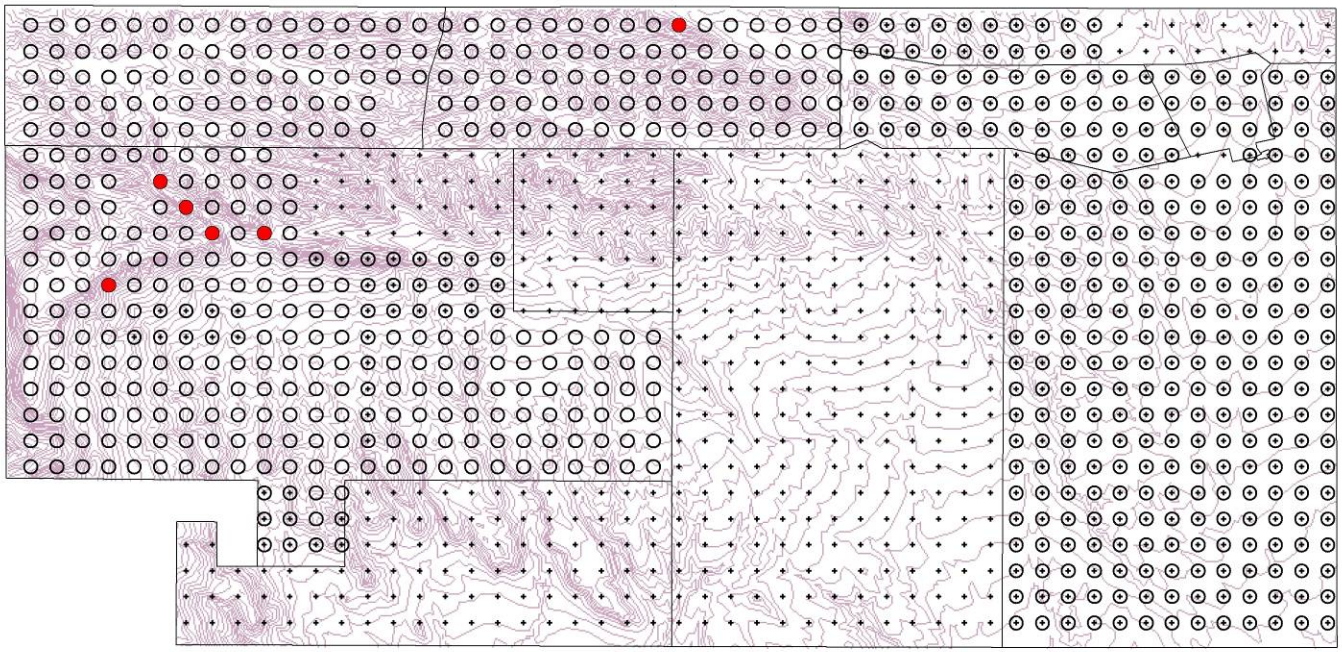
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Virginia's Warbler



These maps represent presence absence for species using 2 years of data.

Presence

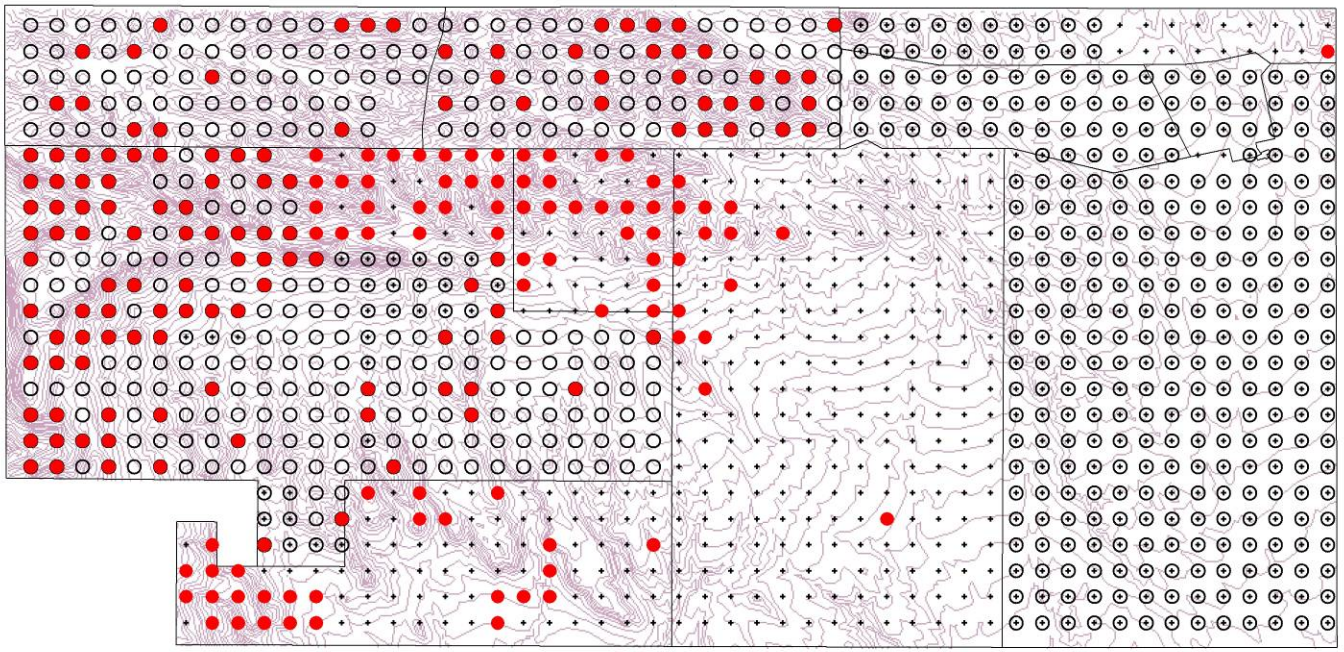
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Green-tailed Towhee



These maps represent presence absence for species using 2 years of data.

Presence

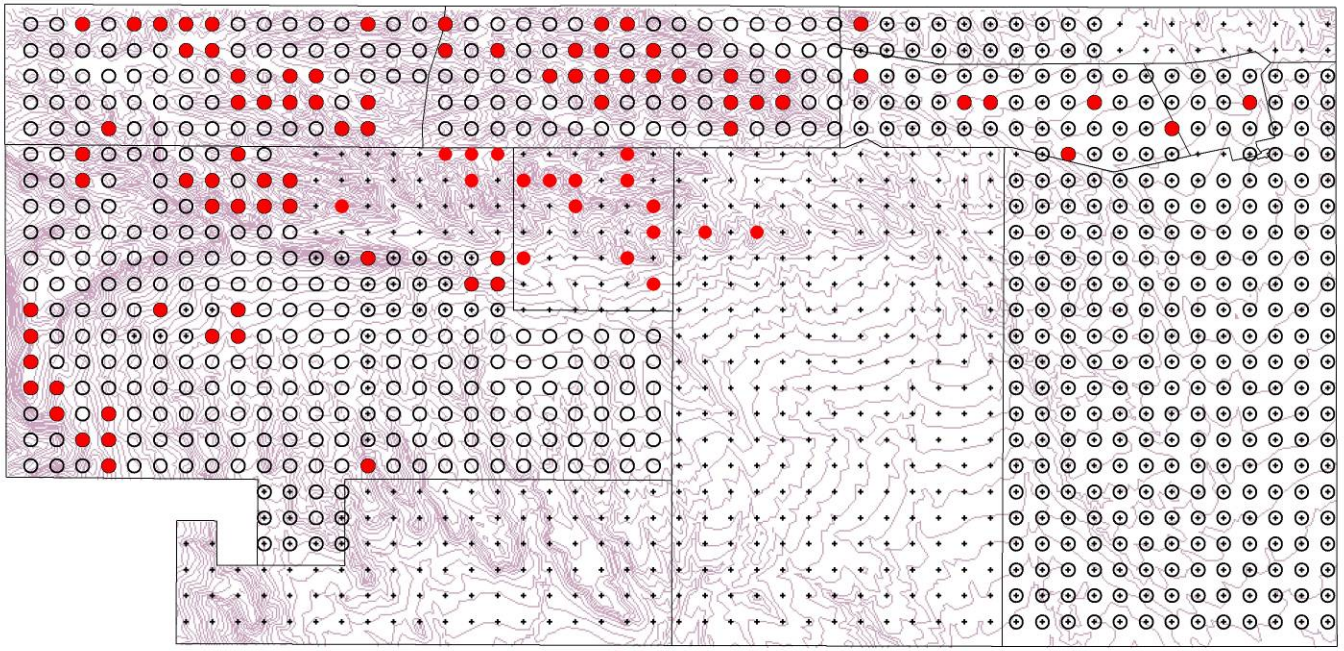
- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Brewer's Sparrow



These maps represent presence absence for species using 2 years of data.

Presence

Species detected

2007 Points Surveyed

2006 Points Surveyed

Pasture Boundary

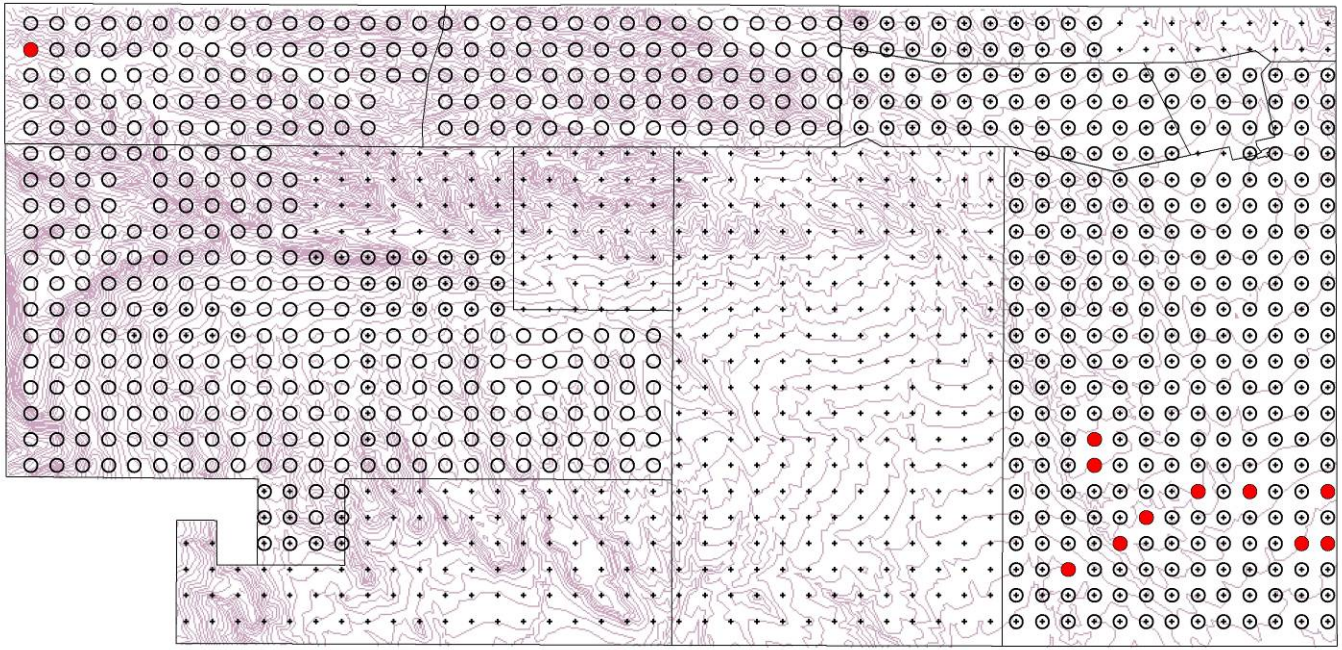
20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

Chestnut-collared Longspur



These maps represent presence absence for species using 2 years of data.

Presence

- Species detected
- 2007 Points Surveyed
- 2006 Points Surveyed
- Pasture Boundary
- 20 feet Contours

0 0.5 1 Miles

N

ROCKY MOUNTAIN BIRD OBSERVATORY

APPENDIX B - Species List. List of all species detected during point counts on Soapstone Ranch (May –July, 2007 and 2006).

Common Name	Scientific Name	Total	2006	2007
Canada Goose	*Branta canadensis*	12		12
Mallard	*Anas platyrhynchos*	8	6	2
Chukar	*Alectoris chukar*	2		2
Double-crested Cormorant	*Phalacrocorax auritus*	5		5
Great Blue Heron	*Ardea herodias*	1	1	
Cattle Egret	*Bubulcus ibis*	1	1	
Turkey Vulture	*Cathartes aura*	19	9	10
Northern Harrier	*Circus cyaneus*	3	2	1
Sharp-shinned Hawk	*Accipiter striatus*	1		1
Cooper's Hawk	*Accipiter cooperii*	2		2
Swainson's Hawk	*Buteo swainsoni*	17	11	6
Red-tailed Hawk	*Buteo jamaicensis*	4		4
Ferruginous Hawk	*Buteo regalis*	13	11	2
Golden Eagle	*Aquila chrysaetos*	10	6	4
American Kestrel	*Falco sparverius*	16	10	6
Prairie Falcon	*Falco mexicanus*	10	5	5
Killdeer	*Charadrius vociferus*	118	90	28
Mountain Plover	*Charadrius montanus*	24	6	18
Upland Sandpiper	*Bartramia longicauda*	2		2
Long-billed Curlew	*Numenius americanus*	3	3	
Wilson's Snipe	*Gallinago delicata*	66	55	11
Common Snipe	*Gallinago gallinago*	8	8	
Wilson's Phalarope	*Phalaropus tricolor*	6	2	4
Rock Pigeon	*Columba livia*	13	11	2
Eurasian Collared-Dove	*Streptopelia decaocto*	1		1
Mourning Dove	*Zenaida macroura*	393	238	155
Barn Owl	*Tyto alba*	1		1
Great Horned Owl	*Bubo virginianus*	1	1	
Burrowing Owl	*Athene cunicularia*	8	6	2
Short-eared Owl	*Asio flammeus*	1		1
Common Nighthawk	*Chordeiles minor*	81	67	14
Common Poorwill	*Phalaenoptilus nuttallii*	2	1	1
Broad-tailed Hummingbird	*Selasphorus platycercus*	4	1	3
Western Wood-Pewee	*Contopus sordidulus*	6	3	3
Dusky Flycatcher	*Empidonax oberholseri*	2		2
Cordilleran Flycatcher	*Empidonax occidentalis*	1		1
Say's Phoebe	*Sayornis saya*	70	56	14
Western Kingbird	*Tyrannus verticalis*	16	11	5
Eastern Kingbird	*Tyrannus tyrannus*	15	10	5

Common Name	Scientific Name	Total	2006	2007
Loggerhead Shrike	*Lanius ludovicianus*	24	3	21
Warbling Vireo	*Vireo gilvus*	2		2
Western Scrub-Jay	*Aphelocoma californica*	12	6	6
Black-billed Magpie	*Pica hudsonia*	18	12	6
American Crow	*Corvus brachyrhynchos*	2		2
Common Raven	*Corvus corax*	15	7	8
Horned Lark	*Eremophila alpestris*	3661	2655	1006
Tree Swallow	*Tachycineta bicolor*	9	2	7
Violet-green Swallow	*Tachycineta thalassina*	24	12	12
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	37	22	15
Bank Swallow	*Riparia riparia*	8	3	5
Cliff Swallow	*Petrochelidon pyrrhonota*	46	22	24
Barn Swallow	*Hirundo rustica*	108	46	62
Red-breasted Nuthatch	*Sitta canadensis*	1		1
Rock Wren	*Salpinctes obsoletus*	140	103	37
House Wren	*Troglodytes aedon*	3	1	2
Blue-gray Gnatcatcher	*Polioptila caerulea*	57	10	47
Mountain Bluebird	*Sialia currucoides*	2	1	1
Hermit Thrush	*Catharus guttatus*	1		1
American Robin	*Turdus migratorius*	50	23	27
Gray Catbird	*Dumetella carolinensis*	6	6	
Northern Mockingbird	*Mimus polyglottos*	23	16	7
Sage Thrasher	*Oreoscoptes montanus*	8	8	
Brown Thrasher	*Toxostoma rufum*	38	22	16
Curve-billed Thrasher	*Toxostoma curvirostre*	1	1	
European Starling	*Sturnus vulgaris*	8	4	4
Virginia's Warbler	*Vermivora virginiae*	9		9
Yellow Warbler	*Dendroica petechia*	16	2	14
Yellow-rumped Warbler	*Dendroica coronata*	1		1
Common Yellowthroat	*Geothlypis trichas*	1	1	
Wilson's Warbler	*Wilsonia pusilla*	1	1	
Yellow-breasted Chat	*Icteria virens*	2	1	1
Green-tailed Towhee	*Pipilo chlorurus*	327	150	177
Spotted Towhee	*Pipilo maculatus*	812	524	288
Chipping Sparrow	*Spizella passerina*	13	11	2
Clay-colored Sparrow	*Spizella pallida*	31	31	
Brewer's Sparrow	*Spizella breweri*	161	74	87
Vesper Sparrow	*Pooecetes gramineus*	556	369	187
Lark Sparrow	*Chondestes grammacus*	104	50	54
Lark Bunting	*Calamospiza melanocorys*	1005	451	554
Savannah Sparrow	*Passerculus sandwichensis*	149	93	56
Grasshopper Sparrow	*Ammodramus savannarum*	3	1	2
Song Sparrow	*Melospiza melodia*	1	1	

Common Name	Scientific Name	Total	2006	2007
McCown's Longspur	*Calcarius mccownii*	2345	1620	725
Chestnut-collared Longspur	*Calcarius ornatus*	12	11	1
Black-headed Grosbeak	*Pheucticus melanocephalus*	30	1	29
Blue Grosbeak	*Passerina caerulea*	1		1
Lazuli Bunting	*Passerina amoena*	10		10
Bobolink	*Dolichonyx oryzivorus*	1	1	
Red-winged Blackbird	*Agelaius phoeniceus*	439	355	84
Eastern Meadowlark	*Sturnella magna*	1	1	
Western Meadowlark	*Sturnella neglecta*	3855	3156	699
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	27		27
Brewer's Blackbird	*Euphagus cyanocephalus*	420	197	223
Common Grackle	*Quiscalus quiscula*	14	5	9
Brown-headed Cowbird	*Molothrus ater*	533	224	309
Bullock's Oriole	*Icterus bullockii*	53	18	35
House Finch	*Carpodacus mexicanus*	2		2
Red Crossbill	*Loxia curvirostra*	1		1
Pine Siskin	*Carduelis pinus*	4		4
Lesser Goldfinch	*Carduelis psaltria*	11		11
American Goldfinch	*Carduelis tristis*	138	50	88

APPENDIX C - Species of Greatest Conservation Need and PIF Species of Continental Importance / Regional Concern (BCR 16 & BCR 18).

Species detected on SPNA which are listed on Colorado's Comprehensive Wildlife Conservation Strategy as species of greatest conservation need (SGCN) and Partner's In Flight species of Continental Concern (CC)/Regional Concern (RC).

Common Name	Scientific Name	SGCN	CC	RC
Northern Harrier	*Circus cyaneus*	X		X
Swainson's Hawk	*Buteo swainsoni*	X	X	X
Ferruginous Hawk	*Buteo regalis*	X		X
Golden Eagle	*Aquila chrysaetos*	X	X	X
Prairie Falcon	*Falco mexicanus*	X		X
Burrowing Owl	*Athene cunicularia*	X		X
Short-eared Owl	*Asio flammeus*	X	X	
Common Nighthawk	*Chordeiles minor*			X
Broad-tailed Hummingbird	*Selasphorus platycercus*	X		
Dusky Flycatcher	*Empidonax oberholseri*	X		
Cordilleran Flycatcher	*Empidonax occidentalis*	X		
Loggerhead Shrike	*Lanius ludovicianus*	X		X
Mountain Bluebird	*Sialia currucoides*			X
Curve-billed Thrasher	*Toxostoma curvirostre*	X		
Virginia's Warbler	*Vermivora virginiae*	X	X	X
Yellow Warbler	*Dendroica petechia*			X
Brewer's Sparrow	*Spizella breweri*	X	X	X
Vesper Sparrow	*Pooecetes gramineus*	X		
Lark Sparrow	*Chondestes grammacus*			X
Lark Bunting	*Calamospiza melanocorys*	X		X
Grasshopper Sparrow	*Ammodramus savannarum*			X
McCown's Longspur	*Calcarius mccownii*	X	X	
Chestnut-collared Longspur	*Calcarius ornatus*	X		X
Lazuli Bunting	*Passerina amoena*	X		
Bobolink	*Dolichonyx oryzivorus*	X		
Red Crossbill	*Loxia curvirostra*	X		
Pine Siskin	*Carduelis pinus*			X