LARK SPARROW
Chondestes grammacus

Description

The lark sparrow is a fairly large sparrow with a distinctively colored chestnut, black and white face, unstreaked breast with prominent breast spot, and conspicuous white in its long, rounded tail. The bill is yellowish or pinkish-gray, legs dull flesh colored, and iris sepia or brown (Rising 1996). The sexes have similar coloration. This is a very pugnacious bird during breeding season (Lambeth 1998).

Two subspecies are recognized: *C. g. grammacus* breeds in the eastern portion of the species' range west to Wisconsin and Minnesota, south through eastern Nebraska and eastern Kansas to northeast Texas. Chestnut head markings and plumage are darker than *C. g. strigatus*, which breeds west of *grammacus* (Martin and Parrish 2000).

Life history & behavior

Lark sparrows are ground or shrub-nesters, and ground-foraging omnivores.

Photo of lark sparrow nest with eggs courtesy of C. Ortega.

Migrants arrive on breeding grounds in Colorado in mid-April and depart by mid-September (Righter et al. 2004). The nesting period is lengthy, continuing into mid-August (Lambeth 1998). The lark sparrow is a short- to medium distance migrant, and travels in same-species or mixed-species flocks of up to 50 individuals (Martin and Parrish 2000).

Lark sparrows nest on the ground, often at the base of bunchgrass, cactus, or shrubs, or up to 3 meters high in a tree. They lay 3 to 6 eggs and may double-brood (Rising 1996). Lark sparrows will use abandoned nests of other species, accepting a variety of unusual nest settings to do so, such as tree cavities or rocks. (This behavior has not been documented in Colorado.) They are also known to re-use their own nests. (Martin and Parrish 2000).

Lark sparrows are primarily ground-foraging omnivores, but occasionally glean from low annuals or low shrub branches. They drink and bath often (Martin and Parrish 2000).

During courtship, the lark sparrow male struts turkey-like with tail upright and wings dropped to the ground. He passes a twig to the female during copulation (Martin and Parrish 2000). Based on limited data, lark sparrows exhibit relatively high breeding territory fidelity (Martin and Parrish 2000).

Population trends

In decline in the United States (Sauer et al. 2004).

Standard BBS trend estimates for the period 1966 to 2003 (Sauer et al. 2004) suggest the lark sparrow is in decline:

- 2.9% survey-wide (P<0.01, n=1,098, RA=3.97)
- 2.4% in eastern region (P=0.41, n=50, RA=0.08)
- 3.4% in central region (P<0.01, n=563, RA=6.28)
- 0.9% in western region (P=0.09, n=485, RA=2.82)
- 2.8% in Colorado (P=0.06, n=76, RA=6.93)

Colorado trends tracked by MCB are uncertain (T. Leukering, pers. comm.).

A recent spatial analysis of BBS data by Dobkin and Sauder (2004) suggests that lark sparrows have increased in abundance in the western U.S.; areas predicted to have >5 birds per route expanded by 12% in the shrubsteppe ecoregions.

Range

Although the lark sparrow formerly bred as far east as the northern and central Atlantic states, its breeding range is now receding as eastern lands historically cleared for agriculture during the mid-1800s return to forest, or are progressively taken over by urbanization (Martin and Parrish 2000).

Overall range map reproduced from Martin and Parrish (2000) by permission – dotted lines indicate areas where the species is "rare and irregular."

In their summer range, centers of lark sparrow abundance recorded by BBS lie in north and central Texas, western Oklahoma, southeastern Colorado, northeastern New Mexico, southwestern Kansas, west-central Nebraska, southeastern Montana, and southern and central California (Sauer et al. 2004).

Colorado distribution patterns & abundance

In Colorado, lark sparrows generally nest in appropriate habitat below 8,500 feet (Righter et al. 2004), and less commonly over 9,000 feet (Bailey

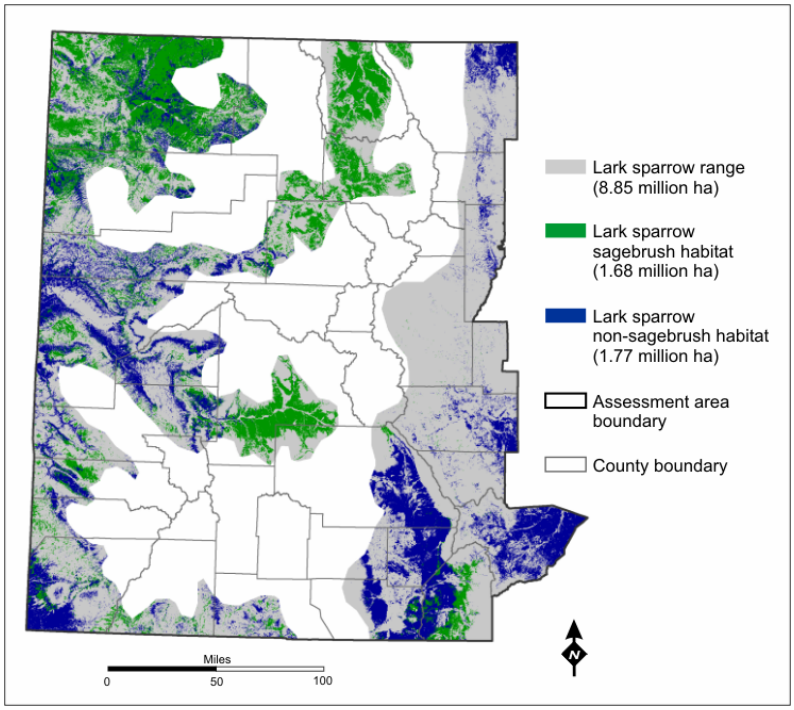
Breeding lark sparrows are largely absent from Colorado's high country and intermountain parks from North Park to the San Luis Valley, and are most abundant in the southeast corner of state (Lambeth 1998). They are uncommon in northwestern Colorado. The largest summer populations occur in the Grand and Uncompahgre Valleys and the San Miguel and San Juan Basins. (Righter et al. 2004). A few birds may winter in Colorado; there are four winter records from Grand Junction, and one from Colorado Springs (Andrews and Righter 1992).

Breeding densities are highly variable. In Colorado between 1999 and 2003, estimates varied from 0.053 to 0.195 birds/ha in sagebrush, 0.161 to 0.345 in semi-desert shrubland, and 0.040 to 0.215 in grasslands (T. Leukering, pers.

and Niedrach 1965).

The total area of the range the lark sparrow in the assessment area (39 contiguous western Colorado counties) is 8.85 million ha, 3.45 million ha of which is suitable habitat.

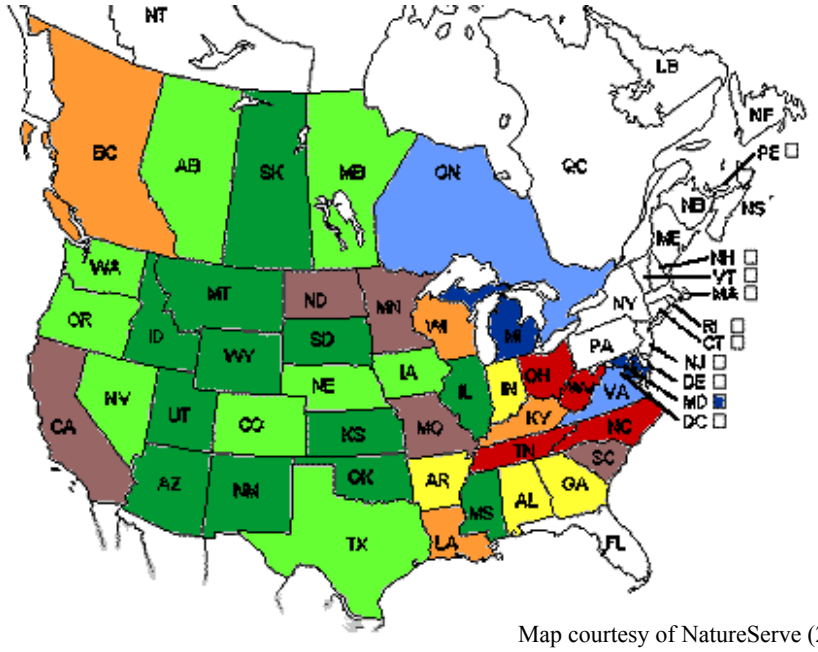
comm.). In Oregon shrubsteppe, Wiens and Rotenberry (1981) estimated densities at 0.01 to 0.33 birds/ha. Near Missouri Breaks in Montana, lark sparrows reached their highest nesting density (1 bird/ha) in sagebrush-greasewood habitat (Walcheck 1970).



Conservation status

- SX: Presumed extirpated
- SH: Possibly extirpated
- S1: Critically imperiled
- S2: Imperiled
- S3: Vulnerable
- S4: Apparently secure
- S5: Secure
- Not ranked / Under review

The lark sparrow has no legal status in any state.



Map courtesy of NatureServe (2004).

Habitat

In western Colorado, lark sparrows nest in open grasslands with a shrub component, mostly juniper, greasewood, or sagebrush (Righter et al. 2004).

Lark sparrows generally prefer structurally open habitats with scattered shrubs or trees; ecotones or edges; sites disturbed by overgrazing or recent fire; cultivated areas and fallow fields with brushy edges; and woodlands with sparse canopy cover (Martin and Parrish 2000). In western Colorado, lark sparrows nest in open grasslands with a shrub component, mostly juniper, greasewood, or sagebrush (Righter et al. 2004).

Colorado BBA (1998) reported about 13 percent of lark sparrow occurrences in big sagebrush. This percentage would be significantly greater if the BBA analysis were confined to our assessment area. The breakdown of Colorado BBA occurrences by habitat is as follows:

In the Colorado sagebrush assessment area, about 3.45 million ha of suitable habitat exists for lark sparrow, 1.68 million ha of which is sagebrush shrublands (see figure in Colorado Distribution Patterns and Abundance).

25% - shortgrass prairie
20% - other grasslands (6 types)
18% - rural and croplands
13% - big sagebrush
9% - pinyon-juniper
7% - riparian
6% - tall desert shrub
2% - mountain shrub

From 1999 through 2003, MCB found consistently higher densities of lark sparrows in semi-desert shrublands than any of three other habitat types; second and third-highest densities were consistently in sagebrush shrublands and grasslands (T. Leukering, pers. comm.).In southwestern Colorado, Gambel oak seems to be very important to lark sparrows (C. Ortega, pers. comm.). Ortega notes that where she finds oak she “expects to find” lark sparrows.

At the local scale, a “low to modest cover” of grasses appears to be important to lark sparrows, with some interspersion of herbaceous vegetation for cover and open areas for foraging.

Lark sparrow abundances in Oregon shrubsteppe were positively correlated with the presence of *Artemisia tridentata* at the regional spatial scale, and also with decreasing horizontal heterogeneity and increasing grass, litter, and shrub coverage relative to other sagebrush-associated passerines such as sage sparrow, Brewer’s sparrow, sage thrasher, vesper sparrow, and black-throated sparrow (Wiens and Rotenberry 1981). In Nevada, lark sparrows preferred areas of crested wheatgrass with big sagebrush over areas dominated solely by either sagebrush or wheatgrass; bird abundance was negatively correlated with sagebrush density (McAdoo et al. 1989).

At the local scale, a “low to modest cover” of grasses and herbaceous plants appears to be important, with some interspersion of herbaceous vegetation for cover and open areas for foraging (Renwald 1977). According to a synthesis by Martin and Parrish (2000), lark sparrows prefer shrub canopy or other overstory cover less than 24 percent; and ground cover ranging from 40 to 100 percent. In an Arizona mixed grass-shrubland, lark sparrows inhabited areas characterized by mean habitat values of 38 percent bare ground, 54 percent grass cover, 7 percent forb cover, less than 3 percent shrub canopy cover, 13 centimeter grass height, and 0.068 shrubs per square meter; and usually were flushed near mesquite shrubs (Bock and Webb 1984). In a Texas honey mesquite-tobosa grassland, Renwald (1977) found that nesting lark sparrows decreased with increasing litter build-up and presence of dense grass stands. Ground nest sites were selected within a limited grass cover range of 32.1 to 55.4 percent, representing slightly lower cover than the

Minimum or optimum patch size for the lark sparrow is unknown.

surrounding community.

Lark sparrows will nest on the ground or in woody vegetation, including big sagebrush. Ground nests may be located in areas with sparser ground cover than general surroundings (Renwald 1977). Above-ground nests may be placed in various species of shrubs, saplings, and small trees (at heights up to 3 meters). In Montana, Walcheck (1970) found ground nests at bases of *A. tridentata* and *A. cana* shrubs in an area where sagebrush canopy cover was 9 percent. Soils under big sagebrush had higher litter content and were less compacted than the surrounding area.

Lark sparrows generally defend their immediate nest site but not large territories (Martin and Parrish 2000). In Kansas mixed prairie, 3 territories measured 66, 90, and 248 square meters where nests were defended and foraging was concentrated. Extended foraging occurred over a 6 ha area, however. No data are available on lark sparrow territory size in Colorado shrubland habitats.

Lark sparrows winter in agricultural areas, suburban gardens, oak woodlands, chaparral, and mesquite/acacia grassland (Rising 1996). Anecdotal accounts describe winter and migrating habitats as similar to breeding habitats (Martin and Parrish 2000).

Threats & sensitivities

In western Colorado, where sagebrush makes up about 49 percent of lark sparrow suitable habitat, threats to sagebrush are a major concern.

See Chapter 6 for more detail about habitat estimates and predictive threats modeling for lark sparrow sagebrush habitat in the Colorado assessment area. Chapter 4 presents rule sets for threats modeling in sagebrush habitat.

Reversion of farmlands to forests or conversion to other land uses in the eastern U.S. is the main threat to the species (Martin and Parrish 2000).

In the Colorado sagebrush assessment area, where sagebrush makes up about 49 percent of the lark sparrow's suitable habitat, threats to sagebrush are major concerns also. Lark sparrow sagebrush habitat in the assessment area is at risk of four widespread threats modeled in the Colorado sagebrush conservation assessment and strategy: pinyon-juniper encroachment, encroachment by invasive herbaceous plants, residential development, and energy development.

Residential development probably poses the lowest threat of the four, with an estimated 3 percent of lark sparrow sagebrush habitat at high or moderate risk and 14 percent at low risk. About 83 percent of lark sparrow sagebrush habitat is at no risk of residential development based on our predictive model. Residential development in sagebrush shrublands could be detrimental to the lark sparrow in terms of habitat loss and indirect effects, but in certain cases it could benefit the lark sparrow where appropriate habitat edge conditions are created.

Pinyon-juniper encroachment risk is also relatively low in lark sparrow sagebrush habitat; pinyon-juniper encroachment is not anticipated to be a serious threat to the lark sparrow at short or moderate temporal scales because the species tolerates scattered trees in its habitat.

Risk of energy development is broadly moderate in lark sparrow sagebrush habitat. About 60 percent of lark sparrow sagebrush habitat is at moderate risk of energy development in the Colorado sagebrush assessment area, 34 percent is at low or no risk, and 8 percent is at high risk. Energy development

can result in destruction, degradation, and fragmentation of habitat via mechanisms described in Chapter 2. Sagebrush habitat at highest risk of energy development is scattered throughout the western-most counties in the assessment area, with larger hot spots clustered in Rio Blanco, Garfield, and southern La Plata Counties. Lark sparrows are not considered to be particularly sensitive to habitat fragmentation, given that their preference for ecotone or edge situations.

Over 99 percent of the lark sparrow's sagebrush habitat is at some degree of risk of encroachment by invasive herbaceous plants. Our model predicts 26 percent at high risk, 23 percent at moderate risk, and 51 percent at low risk. Sagebrush habitat at moderate or high risk of invasive herbaceous plant encroachment in lark sparrow range is mostly broadly scattered across the western-most counties at lower elevations. Moffat and Rio Blanco counties contain the largest contiguous patches of sagebrush habitat at high risk.

Whether or how invasions of exotic herbaceous vegetation affect lark sparrows is unknown. At the U.S. Army Dugway Proving Ground in Utah, Martin et al. (1999) found that breeding lark sparrows were abundant in mixed semi-desert shrub, juniper, and sagebrush communities with infestations of cheatgrass, Russian thistle, and annual mustards. When fire removed dense living and dead annual weeds, exposed bare soils, and left standing shrub and juniper snags, numbers of adult and hatch-year birds remained high for 2 years. The authors suggested that in the third year following the fire, annual weed ground cover had reestablished to the extent that lark sparrows abandoned nesting efforts except in areas that had burned again since the first fire (cited in Martin and Parrish 2000). Nesting densities in the Missouri River Breaks in Montana were significantly higher in greasewood-sagebrush than in sagebrush-cheatgrass (Walcheck 1970). Whether characteristic high densities of exotic herbaceous vegetation, floristics, or some other factor ultimately make certain weedy areas unsuitable for the lark sparrow is unknown. Although the lark sparrow's tolerance of non-native understory is probably relatively high, complete replacement of habitats with non-native ground cover is likely unfavorable.

Livestock grazing is potentially beneficial to lark sparrow in habitats dominated by grasses. The effects of grazing in shrubsteppe are undocumented but presumed to be unfavorable.

Common knowledge holds that lark sparrows are attracted to "overgrazed" and other disturbed sites (Martin and Parrish 2000). Although little published data are available to corroborate this notion, a literature review by Bock et al. (1993) tentatively concluded that the lark sparrow's response to grazing is positive or neutral. In grazed and ungrazed sites in Arizona mixed grass-shrublands, lark sparrows were more abundant in grazed habitats (Bock and Webb 1984). Other studies summarized by Martin and Parrish (2000) have shown similar preference for grazed versus ungrazed habitats, although differences in between-year densities in both grazed and ungrazed habitats could not be attributed to grazing impacts or other environmental parameters measured during the studies. None of these studies occurred in shrubsteppe habitats, however, in which grazing could produce unfavorable physiognomic conditions for the lark sparrow (such as increased shrub canopy and decreased grass and forb cover). Livestock grazing is also potentially associated with the introduction of exotic plants and higher densities of parasitic cowbirds in shrubsteppe habitats, both of which could affect habitat suitability or nesting success of the lark sparrow.

Lark sparrow responses to chemical or mechanical sagebrush range treatments are undocumented.

Lark sparrow responses to chemical or mechanical sagebrush range treatments are undocumented. Given their preference for grass habitats with a relatively sparse shrub component, sagebrush treatments that increase grass cover but do not completely remove the shrub component will probably benefit the lark sparrow. In Nevada, lark sparrows preferred areas of crested wheatgrass invaded by big sagebrush over areas dominated solely by either sagebrush or wheatgrass (McAdoo et al. 1989). The toxicity to lark sparrows of herbicides applied to sagebrush and their effects on nesting success are unknown. Local declines in suitable habitats are potentially related to intense grasshopper control measures with pesticides (Paige and Ritter 1999).

Low or moderate intensity fires in shrublands probably benefit lark sparrow, whereas long-term fire suppression may result in habitat reduction.

Low or moderate intensity fires in shrublands probably benefit lark sparrows, except where complete removal of the shrub component occurs or where burned off areas develop a heavy cover of weedy annuals (Martin and Parrish 2000). Lark sparrows avoided an area devoid of woody vegetation burned 2 years previously within Montana shrubsteppe, instead preferring areas dominated by big sagebrush within unburned sites (Bock and Bock 1999). In a Texas honey mesquite shrub-tobosa grassland, lark sparrows nested at higher densities in newer burns than older burns, avoiding increased litter build-up and decadent stands of grass (Renwald 1977). Nesting success was not measured. The author attributed increased densities to “adequate interspersion of grassy areas for nesting and open spaces for foraging,” and noted that “hot” fires would affect nesting lark sparrows during the year of the burn, reducing the number of potential nest sites by removing all grass material. Similarly, complete burn-off of woody plants would remove perching and shrub nesting sites. It follows that long-term fire suppression in some cases would adversely affect the lark sparrow where shrublands develop into dense stands and edge habitat is reduced.

Whether or how invasions of exotic herbaceous vegetation affect lark sparrows is unknown. At the U.S. Army Dugway Proving Ground in Utah, Martin et al. (1999) found that breeding lark sparrows were abundant in mixed semi-desert shrub, juniper, and sagebrush communities with infestations of cheatgrass, Russian thistle, and annual mustards. When fire removed dense living and dead annual weeds, exposed bare soils, and left standing shrub and juniper snags, numbers of adult and hatch-year birds remained high for 2 years. The authors suggested that in the third year following the fire, annual weed ground cover had reestablished to the extent that lark sparrows abandoned nesting efforts except in areas that had burned again since the first fire (cited in Martin and Parrish 2000). Nesting densities in the Missouri River Breaks in Montana were significantly higher in greasewood-sagebrush than in sagebrush-cheatgrass (Walcheck 1970). Whether characteristic high densities of exotic herbaceous vegetation, floristics, or some other factor ultimately make certain weedy areas unsuitable for the lark sparrow is unknown. Although the lark sparrow’s tolerance of non-native understory is probably relatively high, complete replacement of habitats with non-native ground cover is likely unfavorable.

Agricultural habitats could be environmental sinks due to farming practices.

Agriculture benefits lark sparrows where preferred edge or ecotone habitats are created in crop margins (Martin and Parrish 2000). Historically, agricultural development facilitated a range expansion of this species in the eastern U.S. However, many crop habitats could be environmental sinks due to farming practices (pesticide and harvest effects).

Lark sparrows probably benefit from habitat fragmentation where suitable edge habitats are created.

Fragmentation of shrubland habitat leading to an increase of appropriate or preferred edge habitats probably benefits this species (Martin and Parrish 2000). At the U.S. Army Dugway Proving Ground in Utah, lark sparrows, horned larks, and brown-headed cowbirds increased where contiguous juniper, sagebrush, and greasewood habitat was fragmented by fires and road construction. The fragmentation occurred in artillery maneuver training areas, and resulted in canopy reduction and conversion of native shrub-grasslands to annual exotic weeds (Martin et al. 1999 cited in Martin and Parrish 2000). Bock et al. (1999) found that lark sparrows were more abundant on interior plots than on edge plots in City of Boulder Open Space grasslands, but the difference was not statistically significant due to high variation in numbers of lark sparrows among plots.

As an edge-dwelling species and common ground nester, lark sparrows are vulnerable to cowbird parasitism and predation.

Lark sparrows apparently do not readily reject cowbirds eggs and are known to raise brown-headed cowbird young (Chace and Cruz 1996). Colorado BBA observers reported lark sparrow fostering cowbird young in Las Animas, Yuma, and Phillips Counties (Lambeth 1998). In southwestern Colorado Ortega (pers. comm.) found parasitism by brown-headed cowbirds in 10 percent of lark sparrow nests observed. The effects of cowbird parasitism on lark sparrow nesting success rates are unknown, but nest abandonment has been reported (Dechant et al. 1999).

Eggs and nestlings are vulnerable to predation by snakes and small mammals, and loggerhead shrikes are known to take young. Nest failure rate can be quite high due to predation (Martin and Parrish 2000). Adults are likely taken by raptors.

Research needs

Much of the information regarding the lark sparrow's natural history and ecology remains anecdotal.

Due to its preference for edge habitats, the lark sparrow has not been the focus of any definitive avian study in western North America. Consequently, it is a poorly understood species relative to shrubland obligate or grassland obligate passerines.

Research on lark sparrows should focus on nest success (including brood parasitism and predation) under alternate sagebrush rangeland management regimes, over a range of habitat conditions and geographic areas. Inquiries into specific habitat needs and how management affects those needs may be in order.

More study is needed to gain better understanding of wintering ecology and degree of breeding territory fidelity of lark sparrows.

Alternative methods for estimating long-term population trends of lark sparrows with statistical confidence are needed for lark sparrow habitats in western North America.

Management issues

Potential high fidelity to breeding and winter territory based on limited banding studies (Martin and Parrish 2000) may confound results of short-term studies regarding effects of habitat degradation on species abundance.

Management efforts involving shortgrass prairie-obligate and shrubsteppe-

obligate species that enhance edge effects between wooded and grassland or shrubsteppe habitats may favor the lark sparrow. Conversely, impacts on ecotones between wooded and grassland/shrub habitat types would adversely affect the lark sparrow (Knopf 1994).

The lark sparrow may be useful as an indicator of habitat disturbance or successional development during rehabilitation (Martin and Parrish 2000).

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