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Effects of Management Practices on Grassland Birds: Lark Sparrow

Jill A. Dechant

Marriah L. Sondreal

Douglas H. Johnson

Lawrence D. Igl

Christopher M. Goldade

See next page for additional authors

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Authors
Jill A. Dechant, Marriah L. Sondreal, Douglas H. Johnson, Lawrence D. Igl, Christopher M. Goldade, Barry D. Parkin, and Betty R. Euliss

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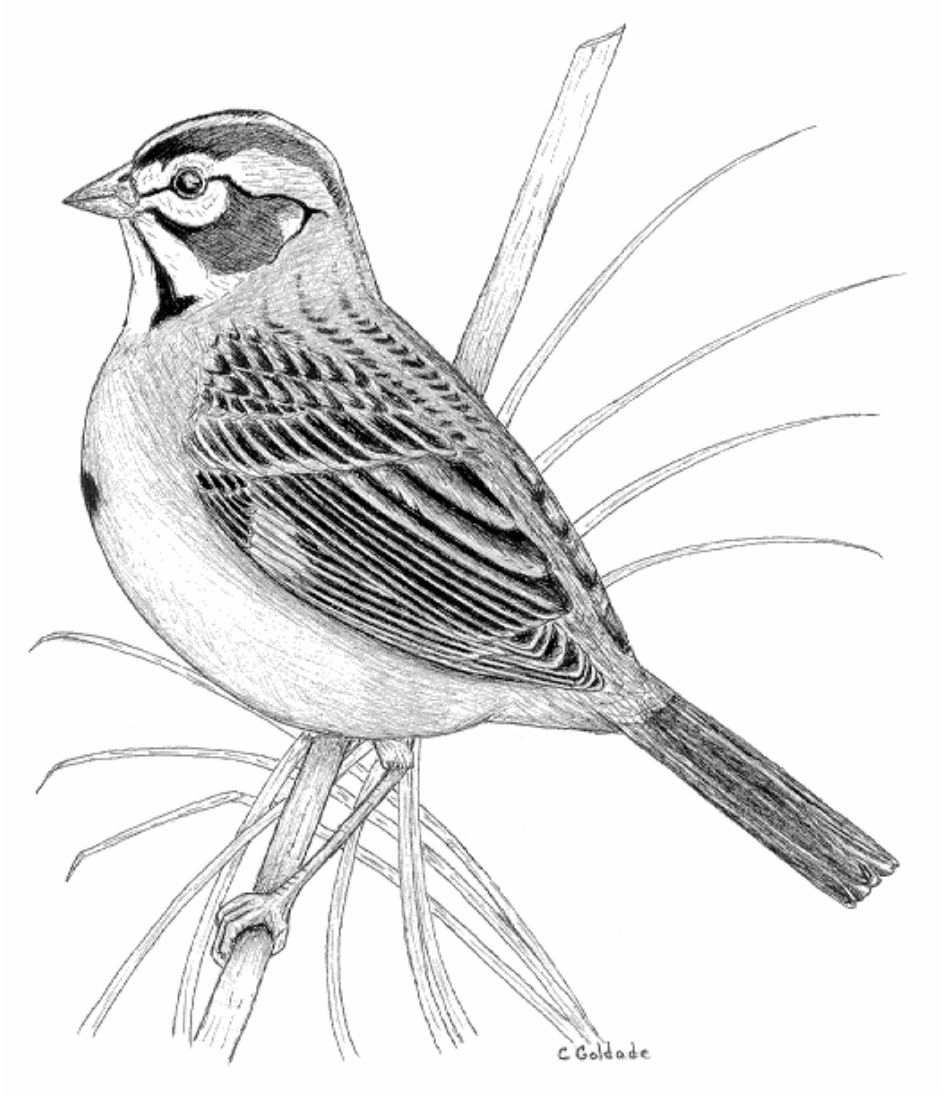
EFFECTS OF MANAGEMENT PRACTICES ON GRASSLAND BIRDS:

LARK SPARROW



Grasslands Ecosystem Initiative
Northern Prairie Wildlife Research Center
U.S. Geological Survey
Jamestown, North Dakota 58401

This report is one in a series of literature syntheses on North American grassland birds. The need for these reports was identified by the Prairie Pothole Joint Venture (PPJV), a part of the North American Waterfowl Management Plan. The PPJV recently adopted a new goal, to stabilize or increase populations of declining grassland- and wetland-associated wildlife species in the Prairie Pothole Region. To further that objective, it is essential to understand the habitat needs of birds other than waterfowl, and how management practices affect their habitats. The focus of these reports is on management of breeding habitat, particularly in the northern Great Plains.

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Species for which syntheses are available or are in preparation:

American Bittern
Mountain Plover
Marbled Godwit
Long-billed Curlew
Willet
Wilson's Phalarope
Upland Sandpiper
Greater Prairie-Chicken
Lesser Prairie-Chicken
Northern Harrier
Swainson's Hawk
Ferruginous Hawk
Short-eared Owl
Burrowing Owl
Horned Lark
Sedge Wren
Loggerhead Shrike
Sprague's Pipit
Grasshopper Sparrow
Baird's Sparrow
Henslow's Sparrow
Le Conte's Sparrow
Nelson's Sharp-tailed Sparrow
Vesper Sparrow
Savannah Sparrow
Lark Sparrow
Field Sparrow
Clay-colored Sparrow
Chestnut-collared Longspur
McCown's Longspur
Dickcissel
Lark Bunting
Bobolink
Eastern Meadowlark
Western Meadowlark
Brown-headed Cowbird

EFFECTS OF MANAGEMENT PRACTICES ON GRASSLAND BIRDS:

LARK SPARROW

Jill A. Dechant, Marriah L. Sondreal, Douglas H. Johnson, Lawrence D. Igl,
Christopher M. Goldade, Barry D. Parkin, and Betty R. Euliss

Series Coordinator: Douglas H. Johnson
Series Assistant Coordinator: Lawrence D. Igl

Reviewer: John W. Martin

Range Map: Jeff T. Price

Cover Art: Christopher M. Goldade

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Collaborators:

Louis B. Best, Iowa State University
Carl E. Bock, University of Colorado
Brenda C. Dale, Canadian Wildlife Service
Stephen K. Davis, Saskatchewan Wetland Conservation Corporation
James J. Dinsmore, Iowa State University
James K. Herkert, Illinois Endangered Species Protection Board
Fritz L. Knopf, Midcontinent Ecological Science Center
Rolf R. Koford, Iowa Cooperative Fish and Wildlife Research Unit
David R. C. Prescott, Alberta NAWMP Centre
Mark R. Ryan, University of Missouri
David W. Sample, Wisconsin Department of Natural Resources
David A. Swanson, Ohio Division of Wildlife
Peter D. Vickery, Massachusetts Audubon Society
John L. Zimmerman (retired), Kansas State University

May 1999
(revised January 2002)

ORGANIZATION AND FEATURES OF THIS SPECIES ACCOUNT

Information on the habitat requirements and effects of habitat management on grassland birds were summarized from information in more than 4,000 published and unpublished papers. A ***range map*** is provided to indicate the relative densities of the species in North America, based on Breeding Bird Survey (BBS) data. Although birds frequently are observed outside the breeding range indicated, the maps are intended to show areas where managers might concentrate their attention. It may be ineffectual to manage habitat at a site for a species that rarely occurs in an area. The species account begins with a brief ***capsule statement***, which provides the fundamental components or keys to management for the species. A section on ***breeding range*** outlines the current breeding distribution of the species in North America, including areas that could not be mapped using BBS data. The ***suitable habitat*** section describes the breeding habitat and occasionally microhabitat characteristics of the species, especially those habitats that occur in the Great Plains. Details on habitat and microhabitat requirements often provide clues to how a species will respond to a particular management practice. A ***table*** near the end of the account complements the section on suitable habitat, and lists the specific habitat characteristics for the species by individual studies. A special section on ***prey habitat*** is included for those predatory species that have more specific prey requirements. The ***area requirements*** section provides details on territory and home range sizes, minimum area requirements, and the effects of patch size, edges, and other landscape and habitat features on abundance and productivity. It may be futile to manage a small block of suitable habitat for a species that has minimum area requirements that are larger than the area being managed. The Brown-headed Cowbird (*Molothrus ater*) is an obligate brood parasite of many grassland birds. The section on ***cowbird brood parasitism*** summarizes rates of cowbird parasitism, host responses to parasitism, and factors that influence parasitism, such as nest concealment and host density. The impact of management depends, in part, upon a species' nesting phenology and biology. The section on ***breeding-season phenology and site fidelity*** includes details on spring arrival and fall departure for migratory populations in the Great Plains, peak breeding periods, the tendency to renest after nest failure or success, and the propensity to return to a previous breeding site. The duration and timing of breeding varies among regions and years. ***Species' response to management*** summarizes the current knowledge and major findings in the literature on the effects of different management practices on the species. The section on ***management recommendations*** complements the previous section and summarizes specific recommendations for habitat management provided in the literature. If management recommendations differ in different portions of the species' breeding range, recommendations are given separately by region. The ***literature cited*** contains references to published and unpublished literature on the management effects and habitat requirements of the species. This section is not meant to be a complete bibliography; a searchable, annotated bibliography of published and unpublished papers dealing with habitat needs of grassland birds and their responses to habitat management is posted at the Web site mentioned below.

This report has been downloaded from the Northern Prairie Wildlife Research Center World-Wide Web site, www.npwrc.usgs.gov/resource/literatr/grasbird/grasbird.htm. Please direct comments and suggestions to Douglas H. Johnson, Northern Prairie Wildlife Research Center, U.S. Geological Survey, 8711 37th Street SE, Jamestown, North Dakota 58401; telephone: 701-253-5539; fax: 701-253-5553; e-mail: Douglas_H_Johnson@usgs.gov.

LARK SPARROW
(*Chondestes grammacus*)

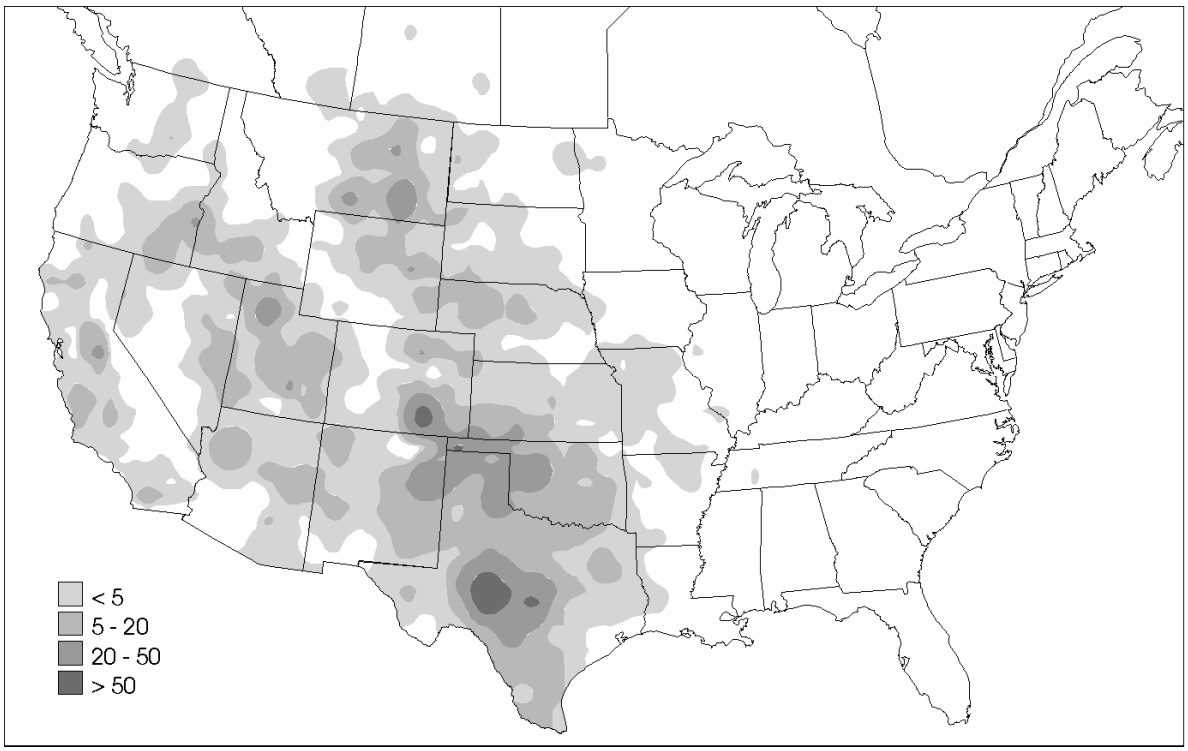

Figure. Breeding distribution of the Lark Sparrow in the United States and southern Canada, based on Breeding Bird Survey data, 1985-1991. Scale represents average number of individuals detected per route per year. Map from Price, J., S. Droege, and A. Price. 1995. The summer atlas of North American birds. Academic Press, London, England. 364 pages.

Keys to management include providing suitable habitat (open grasslands with sparse to moderate herbaceous and litter cover, and a shrub component), and allowing moderate grazing or occasional burning.

Breeding range:

Lark Sparrows breed from southern British Columbia to southern Manitoba, south to southern California and southern Texas, and east to western North Carolina, western Ohio, and southern Michigan (National Geographic Society 1987). (See figure for the relative densities of Lark Sparrows in the United States and southern Canada, based on Breeding Bird Survey data.)

Suitable habitat:

Lark Sparrows use riparian areas, shrubsteppe, and mixed-grass and shortgrass uplands with a shrub component and sparse litter (Rand 1948, Walcheck 1970, Salt and Salt 1976, Wiens and Rotenberry 1981, Kahl et al. 1985, Wershler et al. 1991, Bock et al. 1995). Suitable habitat includes shortgrass, mixed-grass, and tallgrass prairie; parkland; sandhills; barrens; oldfields; cultivated fields; shrub thickets; woodland edges; shelterbelts; parks; riparian areas; brushy pastures; and overgrazed pastures (Baepler 1968, Newman 1970, Rising 1974, Stewart 1975, Faanes 1983, Dinsmore et al. 1984, Walley 1985, Sample 1989, Wershler et al. 1991, Cable et al.

1992, Kaspari and Joern 1993, Zimmerman 1993, Faanes 1995, Best et al. 1997, Prescott 1997, Martin and Parrish 2000). In Nebraska, Lark Sparrows were observed in low abundance in wet-meadow habitat (Helzer 1996, Helzer and Jelinski 1999). In Colorado, Bock et al. (1999) compared the abundance of Lark Sparrows between upland (mixed-grass prairie) and lowland (tallgrass prairie or tame hayland) grasslands. Lark Sparrows were significantly more abundant on upland than on lowland plots. Lark Sparrows use both native and tame vegetation in shrubsteppe (Bock and Bock 1992). In Nevada, Lark Sparrows preferred areas of crested wheatgrass (*Agropyron cristatum*, *Agropyron desertorum*) that were invaded by sagebrush (*Artemisia*) over areas dominated solely by either sagebrush or wheatgrass; Lark Sparrow abundance was negatively correlated with sagebrush density (McAdoo et al. 1989). In Arizona, areas inhabited by Lark Sparrows were characterized by mean habitat values of 38% bare ground, 54% grass cover, 7% forb cover, <2% canopy cover, 13 cm grass height, and 0.068 shrubs/m^2; Lark Sparrows usually were flushed near mesquite (*Prosopis juliflora*) (Bock and Webb 1984).

Lark Sparrows nest either on the ground or close to the ground (within 4 m) in woody vegetation (Ely 1957, Baepler 1968, McNair 1985). Ground nests may be located in areas of sparse ground cover such as those areas associated with burning, moderate to heavy grazing, or poor or eroded soils (Fitch 1958, Graber and Graber 1963, Baepler 1968, Kahl et al. 1985, Walley 1985, Zimmerman 1993, Prescott 1997), or in idle fields, lawns, and cemeteries (Baepler 1968, Salt and Salt 1976, Walley 1985). Ground nests often are placed at the base of a plant (Ely 1957, Baepler 1968, Rising 1974). In Montana, Lark Sparrow nests always were located under sagebrush (Cameron 1908). Also in Montana, Walcheck (1970) found seven of eight nests placed under big sagebrush (*Artemisia tridentata*). The eighth nest was placed under greasewood (*Sarcobatus vermiculatus*). Above-ground nests may be located in various species of shrubs, saplings, and small trees (Baepler 1968, Newman 1970, McNair 1985). A table near the end of the account lists the specific habitat characteristics for Lark Sparrows by study.

Area requirements:

Little is known concerning area requirements of the Lark Sparrow. No studies have investigated a relationship between patch size and nest success or patch size and rates of brood parasitism by Brown-headed Cowbirds (*Molothrus ater*). In a Kansas oldfield, one pair used 6 ha for foraging and nesting activities (Fitch 1958). In Colorado, Bock et al. (1999) compared the abundance of Lark Sparrows between interior and edge locations. Edge was defined as the interface between suburban development and upland or lowland habitat, and interior locations were 200 m from edge. Lark Sparrows occurred more frequently on interior plots than on edge plots but the difference was not significant due to high variation in numbers of Lark Sparrows among plots.

Brown-headed Cowbird brood parasitism:

Lark Sparrows are highly susceptible to brood parasitism by Brown-headed Cowbirds (Friedmann et al. 1977). Rates of brood parasitism vary from 6% of 17 nests (Ely 1957) to 82% of 11 nests (Hill 1976). Refer to Table 1 in Shaffer et al. (2003) for rates of cowbird brood parasitism. Lark Sparrows may be multiply-parasitized (Newman 1970). Abandonment of parasitized nests has been reported in two cases (Baepler 1968, Walley 1985).

Breeding-season phenology and site fidelity:

Lark Sparrows arrive on their southern breeding grounds as early as mid-March and on their northern breeding grounds from mid-April to May (Cameron 1908, Fitch 1958, Maher 1974, Stewart 1975, Dinsmore et al. 1984, Walley 1985, Zimmerman 1993, Martin and Parrish 2000). Lark Sparrows depart for their wintering grounds from mid- to late September (Maher 1974, Dinsmore et al. 1984, Walley 1985, Martin and Parrish 2000). Some Lark Sparrows may depart as early as mid-July or as late as mid-November (Dinsmore et al. 1984, Zimmerman 1993, Martin and Parrish 2000). Although no concrete evidence exists (Baepler 1968), some authors suggested that double-broodedness occurs (Cameron 1908, Newman 1970, Joern 1992, Kaspari and Joern 1993). Klimkiewicz and Futcher (1972) reported that a banded bird was recaptured 8 yr later at the same site where it was banded.

Species' response to management:

Burning usually is beneficial to Lark Sparrows. In a Kansas study of spring-burned and unburned native fields enrolled in the Conservation Reserve Program, abundance of Lark Sparrows was nonsignificantly higher on spring-burned than unburned fields (Robel et al. 1998). Within Arizona desert grasslands, Lark Sparrow abundance increased in native vegetation 2 yr postburn; abundance was positively correlated with percent herbaceous cover (Bock and Bock 1992). A nonsignificant increase in abundance occurred 2 yr postburn in fields composed of Lehmann lovegrass (*Eragrostis lehmanniana*) and weeping lovegrass (*Eragrostis curvula*) (Bock and Bock 1992). Prior to the burn, no Lark Sparrows inhabited those fields and they were absent 3 and 4 yr postburn (Bock and Bock 1988, 1992). In Arizona floodplains dominated by sacaton grass (*Sporobolus wrightii*), there was no difference in Lark Sparrow abundance between burned and unburned stands (Bock and Bock 1988). Within a honey mesquite (*Prosopis glandulosa*)/tobosagrass (*Hilaria mutica*) grassland in central Texas, Lark Sparrow abundance was highest in most recent burns and decreased as litter and grass cover increased (Renwald 1977). A negative correlation was found between number of nests and percent cover of tobosagrass; Lark Sparrows nested in tobosagrass ranging from 32 to 55% cover (Renwald 1977). In a Missouri study examining avian composition within 53 sites ranging from hardwood forest to oldfields to grasslands, Lark Sparrows were found on only one site (Kahl et al. 1985). This site was a recently burned grassland characterized by sparse litter cover and few (24-50 stems/ha) woody stems $\geq$2.5 cm diameter at breast height (Kahl et al. 1985). In contrast to the aforementioned studies, Lark Sparrows avoided an area devoid of woody vegetation burned 2 yr previously within Montana shrubsteppe, preferring instead areas dominated by big sagebrush within unburned sites (Bock and Bock 1987).

Little information is available concerning the response of Lark Sparrows to mowing or grazing. In Colorado, Lark Sparrows preferred shortgrass and mixed-grass uplands over tallgrass remnants or hayfields (Bock et al. 1995). In Nebraska, Lark Sparrow abundance was higher on an area both burned and grazed by American bison (*Bison bison*) than on an area grazed by cattle (Griebel et al. 1998). Lark Sparrow abundance was not different between burned and unburned areas within the pasture grazed by American bison. In Oklahoma and Manitoba, Lark Sparrows nested in moderately to heavily grazed pastures, but also nested in idle fields (Baepler 1968, Newman 1970, Walley 1985). Lark Sparrow abundance was significantly higher on grazed than on ungrazed desert grasslands in Arizona (Bock et al. 1984, 1993; Bock and Webb 1984; Bock and Bock 1988).

Lark Sparrows are not common in fields enrolled in the Conservation Reserve Program or Permanent Cover Program or in fields of dense nesting cover (Johnson and Schwartz 1993, Hull et al. 1996, Best et al. 1997, Klute et al. 1997, McMaster and Davis 1998).

In a study examining the effects on avian density of discing, spraying of the herbicide (2,4,5-T) about 14 yr earlier, and construction of brush shelters, there were no effects on brushland sparrows as a group; effects on particular species, including Lark Sparrow, composing the group of brushland sparrows, were not examined (Gruver and Guthery 1986). In a study examining the effects of DDT dust for tick (*Amblyomma americanum*) control in Texas, numbers of nesting Lark Sparrows decreased in both the treated and untreated area (George and Stickel 1949). In North Dakota, brain levels of acetylcholinesterase (AChe) in Lark Sparrows did not differ between areas treated with carbaryl bait and untreated areas (George et al. 1992). Carbaryl is an AChe-inhibiting chemical.

Management Recommendations:

Reduce amount of grassland edge near suburban interfaces (Bock et al. 1999).

Conduct burns before (early March) Lark Sparrows arrive on the breeding grounds (Renwald 1977).

During brush removal, leave about 10% brush cover for use by Lark Sparrows (McAdoo et al. 1989). Removal of all woody vegetation would make an area unsuitable for Lark Sparrows (Renwald 1977).

Conduct burns at intervals of 5 to 8 yr to increase amount of open foraging area; burns should be conducted at moderate temperatures so as to provide patches of unburned habitat for nesting and perching, while still providing open areas for foraging (Renwald 1977).

Table. Lark Sparrow habitat characteristics.

Author(s)	**Location(s)**	**Habitat(s) Studied***	**Species-specific Habitat Characteristics**
Baepler 1968	Oklahoma	Cropland, hayland, idle, pasture, tame	Nested in ornamental evergreens near buildings, in grass-free depressions on the ground in the shade of broad-leaved plants, in low trees and shrubs, and on the ground in pastures, lawns, idle fields, and cotton fields
Bock and Bock 1987	Montana	Burned shrubsteppe, idle shrubsteppe	Preferred shrubs in unburned areas; avoided shrubless burned areas
Bock and Bock 1992	Arizona	Burned semidesert grassland, burned tame, idle semidesert grassland, idle tame	Abundance was positively correlated with herbaceous cover; were more abundant in native burned areas 2 yr postburn; were found in tame grassland 1-2 yr postburn
Bock et al. 1999	Colorado	Idle mixed-grass, idle tallgrass, mixed-grass pasture, tallgrass pasture, tame hayland	Occurred more frequently on interior plots than on edge plots and was more abundant in upland habitat than in lowland habitat; edge was defined as the interface between suburban development and upland or lowland habitat, and interior locations were 200 m from edge; upland grasslands were mixed-grass prairie and lowland grasslands were tallgrass prairie or tame hayland
Bock et al. 1984	Arizona	Idle semidesert grassland, semidesert grassland pasture	Were significantly more abundant on grazed than ungrazed sites
Bock and Webb 1984	Arizona	Idle semidesert grassland, semidesert grassland pasture	Densities were significantly higher in grazed than ungrazed sites; were often found near mesquite (*Prosopis juliflora*); measurements at flush sites were 38.2% bare ground, 54.2% grass cover, 12.9 cm average grass height, 2.4% mesquite cover, 1.4% shrub

			cover, 6.8 shrubs/100 m^2, and 7% forb cover
Dinsmore et al. 1984	Iowa	Cropland, hayland, idle, pasture	Used sandy grasslands, field edges, and brushy areas
Ely 1957	Oklahoma	Idle, tame pasture, woodland	Of 13 nests found, five were on the ground and eight were in woody vegetation $\leq$4 m above the ground
Faanes and Lingle 1995	Nebraska	Mixed-grass, shortgrass, tallgrass, woodland edge	Highest densities were found in upland prairie followed by lowland forest; observed most often in native grassland that was being invaded by Rocky Mountain juniper (*Juniperus scopulorum*) and that contained an abundance of soapweed yucca (*Yucca glauca*)
Graber and Graber 1963	Illinois	Cropland, hayland, idle, idle grassland, tame pasture, wetland, woodland	Used areas with sandy or other poor soil types; were found in hedgerows, plowed fields, fallow fields, shrub-grown areas and pasture
Kahl et al. 1985	Missouri	Burned tallgrass, cropland, idle, idle tallgrass, tallgrass hayland, tallgrass pasture, woodland, woodland edge	Used recently burned grassland cleared of trees; habitat was characterized by shallow litter (0.1-1.0 cm deep), sparse (40-45%) litter cover, and few (24-50 stems/ha) woody stems $\geq$2.5 cm diameter at breast height
McAdoo et al. 1989	Nevada	Shrubsteppe pasture, tame pasture	Abundance was negatively correlated with shrub density; were more abundant in fields seeded to crested wheatgrass (*Agropyron cristatum*, *Agropyron desertorum*) invaded by big sagebrush (*Artemisia tridentata*) than in pure stands of either wheatgrass or sagebrush
Newman 1970	Oklahoma	Cropland, mixed-grass pasture	Nested on the ground in grazed fields at the base of herbaceous or woody plants, in cultivated fields, above ground in small trees or shrubs; some nests were found

			in the open on the ground
Prescott 1997	Alberta	Cropland, hayland, mixed-grass pasture, shrubland, tame pasture, woodland	Were common in badlands and riparian shrub; were found in low numbers in shelterbelts, native mixed-grass, and riparian woodland
Rand 1948	Alberta	Cropland, idle shortgrass, shortgrass pasture	Were locally common where native, arid shrubbery existed in valleys; were absent from the open plains; a nest was found on the ground under sagebrush
Renwald 1977	Texas	Burned shortgrass, idle shortgrass	Were most abundant in recently burned areas; density decreased as litter increased and areas became dominated by residual tobosagrass (*Hilaria mutica*)
Rising 1974	Kansas	Cropland, shortgrass pasture, woodland	Were abundant in woodland edge and mixed-grass prairie; nested in trees or at the base of plants or rocks
Robel et al. 1998	Kansas	Conservation Reserve Program (CRP; burned seeded-native, idle seeded-native)	Abundance was nonsignificantly higher on spring-burned than unburned fields
Sample 1989	Wisconsin	Burned tallgrass, cropland, dense nesting cover (DNC; idle seeded-native, idle tame), idle, idle seeded-native, idle tallgrass, idle tallgrass/tame, idle tame, tame hayland, tame pasture, tame savanna pasture, wet meadow, wet-meadow pasture	Were found in low numbers in a few sandy sites in dry prairie and barrens habitat; habitat was characterized as containing very sparse vegetation with scattered small trees
Stewart 1975	North Dakota	Cropland, hayland, idle, pasture	Nested in pastures, cultivated and weedy fields, woodland edges, or shrubby areas

Walcheck 1970	Montana	Shrubsteppe, woodland	Placed nests under big sagebrush and greasewood (*Sarcobatus vermiculatus*)
Walley 1985	Manitoba	Cropland, idle tame, mixed-grass pasture	Nested in gardens, cultivated fields, cemeteries, and heavily grazed pastures containing scattered shrubs
Wershler et al. 1991	Alberta	Cropland, idle mixed-grass, idle tame, mixed-grass pasture, parkland, wet meadow	Inhabited woodland edges, river valleys, sandhills, parkland, and edge habitats of cultivated fields
Zimmerman 1993	Kansas	Burned tallgrass, idle, idle tallgrass, woodland	Nested in areas with sparse ground cover due to poor soils, overgrazing, or formerly cultivated fields undergoing secondary succession

*In an effort to standardize terminology among studies, various descriptors were used to denote the management or type of habitat. "Idle" used as a modifier (e.g., idle tallgrass) denotes undisturbed or unmanaged (e.g., not burned, mowed, or grazed) areas. "Idle" by itself denotes unmanaged areas in which the plant species were not mentioned. Examples of "idle" habitats include weedy or fallow areas (e.g., oldfields), fencerows, grassed waterways, terraces, ditches, and road rights-of-way. "Tame" denotes introduced plant species (e.g., smooth brome [*Bromus inermis*]) that are not native to North American prairies. "Hayland" refers to any habitat that was mowed, regardless of whether the resulting cut vegetation was removed. "Burned" includes habitats that were burned intentionally or accidentally or those burned by natural forces (e.g., lightning). In situations where there are two or more descriptors (e.g., idle tame hayland), the first descriptor modifies the following descriptors. For example, idle tame hayland is habitat that is usually mowed annually but happened to be undisturbed during the year of the study.

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