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EFFECTS OF MANAGEMENT PRACTICES ON GRASSLAND BIRDS: NELSON'S SHARP-TAILED SPARROW



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

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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and effects of habitat management on grassland birds were summarized from information in more than 4,000 published and unpublished papers.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.

NELSON'S SHARP-TAILED SPARROW
(*Ammodramus nelsoni nelsoni*)



Figure. Breeding distribution of the Nelson's Sharp-tailed Sparrow (*Ammodramus nelsoni nelsoni*) 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 dense grasses or emergent vegetation near damp areas or freshwater wetlands.

Breeding range:

In 1995, Sharp-tailed Sparrow (*Ammodramus caudacutus*) was split into two species, Saltmarsh Sharp-tailed Sparrow (*A. caudacutus*) and Nelson's Sharp-tailed Sparrow (*A. nelsoni*) (AOU 1995). This account deals only with the subspecies of Nelson's Sharp-tailed Sparrow, *A. n. nelsoni*, that breeds in freshwater wetlands and damp areas in northcentral North America. The subspecies *A. n. alterus* and *A. n. subvirgatus* occur outside of the region of focus, the Great Plains.

Nelson's Sharp-tailed Sparrows (*A. n. nelsoni*) breed from the southern Northwest Territories and northeastern British Columbia through Alberta, northwestern and southcentral Saskatchewan, and southern Manitoba, south to northeastern Montana, North Dakota, and northeastern South Dakota, and east to northwestern Minnesota (National Geographic Society 1987). (See figure for the relative densities of Nelson's Sharp-tailed Sparrows in the United States and southern Canada, based on Breeding Bird Survey data.)

Suitable habitat:

Nelson's Sharp-tailed Sparrows are secretive, are unpredictable singers, and are difficult to detect when not singing (Breckenridge 1930; Greenlaw and Rising 1994; D. R. C. Prescott, Land Stewardship Centre of Canada, St. Albert, Alberta, pers. comm.). Consequently, they are difficult to survey, and knowledge of their habitat preferences is limited mostly to notes of incidental observations. In Alberta, no Nelson's Sharp-tailed Sparrows were detected during daytime fixed-point-radius counts on study plots, or during surveys that used North American Breeding Bird Survey methodology (Prescott et al. 1993). Moderate numbers, however, were detected during surveys of wetlands conducted 0.5 hr after sunset.

Nelson's Sharp-tailed Sparrows prefer freshwater wetlands with dense, emergent vegetation or damp areas with dense grasses (Bowman 1904, Murray 1969, Stewart 1975, Krapu and Green 1978, Knapton 1979, Williams and Zimmer 1992, Berkey et al. 1993). Suitable habitat includes fens, wet meadows, peatlands, lake margins with emergent cattails (*Typha*), native prairie, idle fields, and planted cover (e.g., Conservation Reserve Program lands and dense nesting cover [DNC]), but habitat use may vary annually depending on moisture conditions (Bowman 1904; Breckenridge and Kilgore 1929; Roberts 1932; Hill 1968; Stewart 1975; Salt and Salt 1976; Knapton 1979; Renken 1983; Johnson and Schwartz 1993; Hartley 1994a,b; Prescott et al. 1995; Prescott and Murphy 1999).

Nests usually are built in stands of grasses with litter that is persistent from year to year (Greenlaw and Rising 1994). Nests are built on or slightly above the ground in damp areas among emergent vegetation (Murray 1969, Stewart 1975). In North Dakota, Nelson's Sharp-tailed Sparrows are more abundant in dry years than in wet years (Stewart 1975). In dry years, they nest in the shallow-marsh and deep-marsh zones of wetlands; in wet years, they nest in cordgrass (*Spartina*) within wet-meadow zones. Breeding populations in fens are restricted to areas dominated by cattail, reed (*Phragmites*), and softstem bulrush (*Schoenoplectus tabernaemontani*); species that provide nesting cover within shallow-marsh and deep-marsh zones include cattail, hardstem bulrush (*Schoenoplectus acutus*), river bulrush (*Schoenoplectus fluviatilis*), alkali bulrush (*Scirpus maritimus*), sprangletop (*Scolochloa festucacea*), sloughgrass (*Beckmannia*), slough sedge (*Carex atherodes*), and marsh smartweed (*Polygonum amphibium*). In North Dakota, Nelson's Sharp-tailed Sparrows were common in prairie cordgrass (*Spartina pectinata*) stands, occurred at the edges of common reed (*Phragmites australis*) stands, and nested in sprangletop (Murray 1969). Nelson's Sharp-tailed Sparrows in northeastern North Dakota nested in thin, sparse grass on a wet alkali flat (Rolle 1899, Hill 1968). They were found nesting in bulrushes (*Scirpus*) and dense grass in South Dakota (Williams and Zimmer 1992). In Alberta, abundances of Nelson's Sharp-tailed Sparrows in mixed-grass prairie were similar to those in tame grasslands (Prescott et al. 1995). In Minnesota and Canada, Nelson's Sharp-tailed Sparrows nested in wetlands located in wooded areas (Breckenridge 1930, Salt and Wilk 1958, Salt and Salt 1976).

In Minnesota, Breckenridge and Kilgore (1929) observed Nelson's Sharp-tailed Sparrows nesting in vegetation above damp soil on the edge of a 500-ha wetland dominated by moss (*Sphagnum*) and sedge (*Carex*). Another Minnesota study found that graminoid density within breeding territories was high (>180 stems/m²) (Hanowski and Niemi 1988). Stem density of phanerophytes (graminoids, forbs, or shrubs >40 cm tall that are present each year) was low (mean of 0.06 stems/m²) in habitats used by Nelson's Sharp-tailed Sparrows (Hanowski and Niemi 1988). The most common forbs near nests were mints (Lamiaceae); the phanerophytes

comprised broad-leaved cattails (*Typha latifolia*) and willows (*Salix* spp.). Nests in northwestern Minnesota were in wetlands surrounded by bands of tamarack (*Larix laricina*), thickets of aspen (*Populus*), and patches of tallgrass (Breckenridge 1930). Nelson's Sharp-tailed Sparrows in the St. Croix River Valley of Minnesota and Wisconsin used northern sedge meadows containing mannagrass (*Glyceria*), bluejoint (*Calamagrostis canadensis*), and water sedge (*Carex aquatilis*) (Faanes 1981). A table near the end of the account lists the specific habitat characteristics for Nelson's Sharp-tailed Sparrows by study.

Area requirements:

Little information is available regarding the area requirements of Nelson's Sharp-tailed Sparrows. 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*). Nelson's Sharp-tailed Sparrows are colonial nesters, and have been suggested to be non-territorial (Murray 1969, Greenlaw and Rising 1994). However, they do respond to recorded playbacks of songs, which suggests some territoriality (D. R. C. Prescott, pers. comm.). They are interspecifically territorial with Le Conte's Sparrows (*Ammodramus leconteii*) (Murray 1969; D. R. C. Prescott, pers. comm.). In northern Minnesota, the average wetland size used by Nelson's Sharp-tailed Sparrows was 130 ha (range was from 15 to 250 ha) (Hanowski and Niemi 1986). Nelson's Sharp-tailed Sparrows also were found in a 500-ha wetland (Breckenridge and Kilgore 1929). In southcentral North Dakota, Nelson's Sharp-tailed Sparrows occurred on wetlands ranging in size from 5.0 to 6.4 ha (Krapu and Green 1978).

Brown-headed Cowbird brood parasitism:

The only record of brood parasitism by Brown-headed Cowbirds was that of a single egg discovered in a nest in Manitoba (Hill 1968).

Breeding-season phenology and site fidelity:

Nelson's Sharp-tailed Sparrows arrive on the breeding grounds from early to mid-May in Minnesota, from mid- to late May in North Dakota and the aspen parkland of Alberta, and not before June in southeastern Saskatchewan and southwestern Manitoba (Roberts 1932; Murray 1969; Salt and Salt 1976; Knapton 1979; D. R. C. Prescott, pers. comm.). In North Dakota, the peak breeding season is mid-June to early August (Murray 1969, Stewart 1975). Nelson's Sharp-tailed Sparrows leave the breeding grounds from late August to mid-October (Roberts 1932, Murray 1969, Salt and Salt 1976, Greenlaw and Rising 1994). Saltmarsh Sharp-tailed Sparrows on the East Coast raise second broods and renest following failed nests (Greenlaw and Rising 1994), but renesting has not been reported for Nelson's Sharp-tailed Sparrow.

Limited evidence exists in North Dakota for breeding-site fidelity (Murray 1969). One of three banded males and the only banded female returned to a study site in the year after they were banded. Saltmarsh Sharp-tailed Sparrows on the East Coast exhibited strong breeding-site fidelity, with 53-60% (sample size not given) of both sexes returning to the same marsh in which they initially were captured (Greenlaw and Rising 1994). Many of these birds returned to the same area of the marsh where they had been captured.

Species' response to management:

Few studies have examined the effects of burning, mowing, or grazing on Nelson's Sharp-tailed Sparrow. Greenlaw and Rising (1994) have suggested that removal of vegetation by burning or mowing may cause local extirpation of populations.

In Alberta aspen parkland, Nelson's Sharp-tailed Sparrows were absent from mixed-grass pasture and uncommon in tame pasture (Prescott and Murphy 1996). Tame pastures were characterized by lower percentages of grass and shrub cover, higher percentages of forb cover and bare ground, fewer shrub clumps, and taller grasses and forbs than mixed-grass pastures (Prescott and Murphy 1996). The effects of three intensities of late-season (dates were not provided) grazing were examined in Alberta (Prescott 1996). The only Nelson's Sharp-tailed Sparrow recorded was on a site subjected to the highest intensity of grazing (biomass loss due to grazing was 71%, but vegetation height was not reduced significantly).

In North Dakota, Nelson's Sharp-tailed Sparrows were present in DNC planted to tame species and absent in idle and grazed mixed-grass prairie (Renken 1983, Renken and Dinsmore 1987). DNC was characterized by taller and denser vegetation cover and a deeper litter layer than idle mixed-grass (Renken 1983). Nelson's Sharp-tailed Sparrows in Alberta were more abundant in seeded-native DNC than in tame DNC (Prescott et al. 1995). In Saskatchewan, Nelson's Sharp-tailed Sparrows were present in seeded-native and tame DNC and in native mixed-grass, but were absent from wheat fields (Hartley 1994*a,b*). In a Manitoba study comparing abundance of Nelson's Sharp-tailed Sparrows in idle native grassland, tame DNC, and seeded-native DNC, the species was detected only in native grassland (Dhol et al. 1994). In another Manitoba study, which compared seeded-native DNC, DNC planted to tame grasses and legumes, hayland planted to tame grasses and legumes, and idle native grassland, Nelson's Sharp-tailed Sparrows were recorded only in hayland (single occurrence) (Jones 1994). The species was rare or absent in tame DNC <2 yr old in Alberta; abundance increased with age of DNC until the fifth year, after which abundance decreased (Prescott and Murphy 1999). In North Dakota, South Dakota, and Minnesota, Nelson's Sharp-tailed Sparrows were present at low densities in Conservation Reserve Program fields (Johnson and Schwartz 1993; Igl and Johnson, *unpublished data*).

Management Recommendations:

Protect wetlands from drainage (Greenlaw and Rising 1994).

Prevent removal of vegetation through burning or harvesting, or increase ground cover in areas where short grasses prevail (Greenlaw and Rising 1994, Prescott and Murphy 1996).

Table. Nelson's Sharp-tailed Sparrow habitat characteristics.

Author(s)	Location(s)	Habitat(s) Studied*	Species-specific Habitat Characteristics
Bownan 1904	North Dakota	Idle, wetland	Inhabited dense clumps of grass near wetlands
Breckenridge and Kilgore 1929	Minnesota	Idle, wetland	Nested in vegetation above damp soil on the edge of a 500-ha wetland dominated by moss (<i>Sphagnum</i>) and sedge (<i>Carex</i>)
Dhol et al. 1994	Manitoba	Dense nesting cover (DNC; idle seeded-native, idle tame), idle mixed-grass	Single occurrence in idle mixed-grass; absent from seeded-native and tame DNC; mixed-grass grasslands had average vegetation values of 6.8 cm litter depth and 27.5 cm vegetation height; percent cover of dominant plant species were 2.5% slender wheatgrass (<i>Agropyron caninum</i>), 7.3% western wheatgrass (<i>Pascopyrum smithii</i>), 1.7% green needlegrass (<i>Stipa viridula</i>), 21% Kentucky bluegrass (<i>Poa pratensis</i>), 7.9% smooth brome (<i>Bromus inermis</i>), 9.1% Baltic rush (<i>Juncus balticus</i>), and 6.2% sedge (<i>Carex</i> spp.)
Faanes 1981	Minnesota, Wisconsin	Cropland, idle, idle tallgrass/tame, shrub carr, tame hayland, tame pasture, wet meadow, wetland, woodland	Nested in sedge meadow with managrass (<i>Glyceria</i>), bluejoint (<i>Calamagrostis canadensis</i>), and water sedge (<i>Carex aquatilis</i>)
Hanowski and Niemi 1986, 1988; Niemi and Hanowski 1983	Minnesota	Idle tallgrass, peatland, shrub carr, wetland	Used areas with average habitat variables as follows: 9.9% ground cover, 121.9 cm vegetation height, 11.7 cm water depth, 53 cm phanerophyte (shrubs, forbs, or graminoids >40 cm tall and present each year) height, and 130 ha wetland size; mean density measurements were 181.9 stems/m ² graminoids, 17.2 stems/m ² forbs, and 0.06 stems/m ² phanerophytes; coverages of forb species were 76% mint (Lamiaceae), 10% bur-reed (<i>Sparganium</i> spp.), 5% parsley

			(Apiaceae), 5% thistle (<i>Cirsium</i> spp.), 1% blue flag (<i>Iris versicolor</i>), 1% purple marshlocks (<i>Comarum palustre</i>), 1% clover (<i>Trifolium</i> spp.), and 1% bedstraw (<i>Galium</i>); coverages of phanerophytes were 79% willow (<i>Salix</i>), 15% quaking aspen (<i>Populus tremuloides</i>), and 6% common reed (<i>Phragmites australis</i>)
Hartley 1994a,b	Saskatchewan	Cropland, DNC (idle seeded-native, idle seeded-native/tame, idle tame), idle mixed-grass, idle tame hayland	Used idle mixed-grass and DNC; absent from cropland
Hill 1968	Rangewide	Idle mixed-grass, wetland, woodland	Nested in freshwater wetlands and in short, sparse grass on alkali flats in mixed-grass prairie
Jones 1994	Manitoba	Cropland, DNC (idle seeded-native, idle tame), idle mixed-grass, idle tame, tame hayland	Observed only in tame hayland
Knapton 1979	Manitoba, Saskatchewan	Hayland, idle, wetland	Occupied idle wet areas and created wetlands
Murray 1969	North Dakota	Wetland, wet-meadow hayland	Inhabited freshwater wetlands; were common in stands of prairie cordgrass (<i>Spartina pectinata</i>); also occurred in sprangletop (<i>Scolochloa festucacea</i>) and at the edges of stands of common reed; the only nest observed was in a stand of sprangletop; were absent from upland areas
Prescott and Murphy 1996	Alberta	Mixed-grass pasture, tame pasture	Were absent from native pasture and uncommon in tame pasture; compared to native pasture, tame pasture had lower

			grass cover (58%), lower shrub cover (4.5%), higher forb cover (24%), more bare ground (13%), fewer shrub clumps (0.6 clumps/ha), taller grasses (20 cm), taller forbs (17 cm), and taller total herbaceous growth (20 cm) (all values are means)
Prescott and Murphy 1999	Alberta	Cropland, DNC (idle seeded-native/tame)	Were absent from DNC <2 yr old; abundance increased with age of DNC from 2- to 5-yr-old DNC, after which abundance decreased
Prescott et al. 1995	Alberta	Aspen parkland, cropland, DNC (idle seeded-native, idle tame), idle mixed-grass, idle tame, mixed-grass pasture, tame hayland, tame pasture, wetland, woodland	Were most abundant in seeded-native DNC, followed by tame DNC, idle tame grassland, idle mixed-grass, large (>8 ha) saline wetlands, and small (<1 ha) fresh wetlands; absent from brush/shrub, continuously grazed mixed-grass, continuously grazed native parkland, cropland, deferred-grazed (grazed only after 15 July) mixed-grass, deferred-grazed tame grassland, deferred-mowed hayfields, idle deciduous upland, idle native parkland, large freshwater wetlands, medium (1-8 ha) freshwater wetlands, medium saline wetlands, shelterbelts, small saline wetlands, and tame pasture
Renken 1983, Renken and Dinsmore 1987	North Dakota	DNC (idle seeded-native, idle tame), mixed-grass pasture	Present only in tame DNC; occupied plots had taller and denser vegetation than unoccupied plots; average vegetation values in occupied plots were 89% grass cover, 35% forb cover, 99% litter cover, 0% shrub cover, 0.3% bare ground, 41 cm effective vegetation height, and 2.4 cm litter depth
Roberts 1932	Minnesota	Wetland, wet meadow	Used shallow wetlands
Rolfe 1899	North Dakota	Idle mixed-grass, wetland	Nested in short, sparse grass on an alkali flat in wet mixed-grass prairie

Stewart 1975	North Dakota	Wet meadow, wetland	During dry years, nested in shallow- and deep-marsh wetland zones dominated by cattails (<i>Typha</i> spp.), sprangletop, American sloughgrass (<i>Beckmannia syzigachne</i>), slough sedge (<i>Carex atherodes</i>), marsh smartweed (<i>Polygonum amphibium</i>) and bulrushes (<i>Scirpus</i> spp.); during wet years, nested in wet-meadow zones dominated by prairie cordgrass
Williams and Zimmer 1992	South Dakota	Wet meadow, wetland	Nested in bulrush (<i>Scirpus</i>) and dense grass adjacent to wetland

*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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