

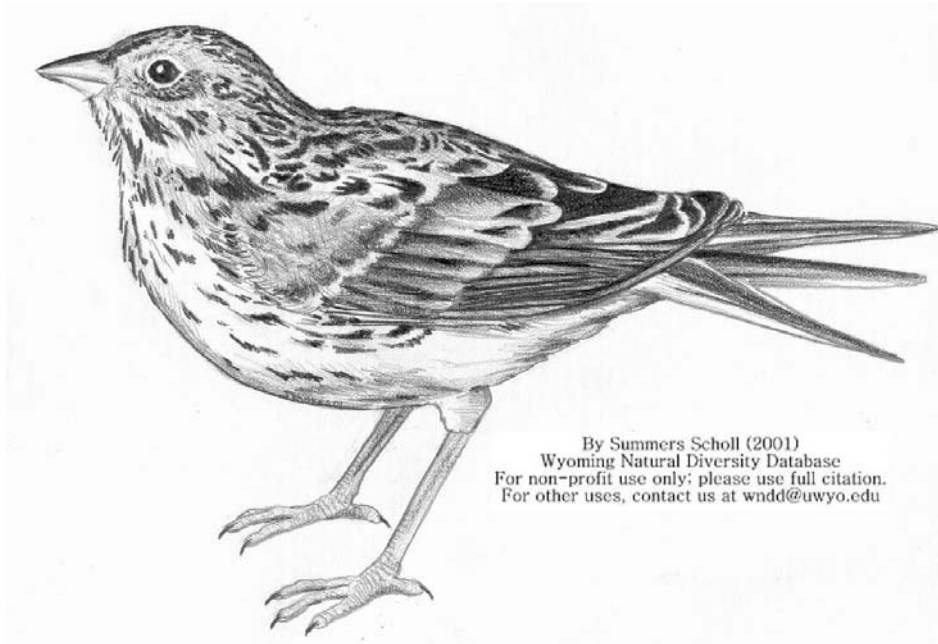
SPECIES ASSESSMENT FOR BAIRD'S SPARROW (*AMMODRAMUS BAIRDII*) IN WYOMING

prepared by

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Introduction

This Species Conservation Assessment was prepared as part of a Species Conservation Project funded by the Wyoming Bureau of Land Management. It represents a complete review of the current published information available for the species, includes consultation with experts, and presents existing information on the distribution, biology, ecological niche, and conservation planning being conducted for this species on a state and range-wide level. The reader will note that there are a number of areas in which biological and ecological data are not well known for this species. Wyoming abundance and distribution data are based on relatively few observation records. The Wyoming Bird Records Committee has reviewed and accepted six of the 11 records shown in the Wyoming Bird and Mammal Atlas (Luce 1999). There is a recent Rocky Mountain Bird Observatory breeding record on Thunder Basin National Grassland (Cerovski, pers. comm.). Therefore, breeding is confirmed in two latilongs, and occurrence in eight. However, the major occurrence of Baird's Sparrow (*Ammodramus bairdii*) in Wyoming is during migration. The Wyoming Bird Conservation Plan lists Baird's Sparrow as peripheral and Native Species Status 4. The ecological value of eastern Wyoming grasslands as Baird's Sparrow migration stopover habitat has not been quantified.

Continued collection and refinement of data, state and federal agency recognition of the need to manage this species, and state and federal development and implementation of effective management strategies for grasslands may be major factors in preventing future need to reexamine the status of this species for listing under the Endangered Species Act.

Natural History

Morphological Description

Identification

Baird's Sparrow is a small, brownish, streaked passerine (subdivision oscine) sparrow, similar and related to Grasshopper Sparrow (*Ammodramus savannarum*) and Savannah Sparrow (*Passerculus sandwichensis*). The sexes are similar. Length averages about 12 cm (range = 13.5-14.2 cm), and mass about 19 g. Average body mass of breeding males in North Dakota was 19.1 g (SD = ± 1.0 ; range = 17.0-21.3 g (Jones and Green 1997) and 17.8 g for females and 18.9 g for males in Alberta (Maher 1979). Wing length is 7.0-7.6 cm and tail length is 5.3-5.8 cm.

The top of the head and nape are brownish yellow, striped with black, especially on the sides of the crown and nape (Figure 1). The sides of the head and neck are pale buff and flecked with black. There is a narrow line of black spots on the side of the throat. Back feathers are dull black centrally with grayish-white margins, thus appearing streaked. The rump is lighter and buff-colored. Under parts are white or buff on the throat and breast, streaked on the sides, flanks, and breast with black. The streaks on the breast form a necklace or collar, whereas the sides are less distinct and tinged with rufous. Wing feathers are grayish-brown, coverts are darker centrally, and all have edges of pale rufous. There are two indistinct pale wing bars. Tail is dull brown or blackish, with the middle pair of tail feathers narrower and more pointed. Outer tail feathers are edged with white and terminally white. The bill is flesh-colored, darker at the tip; legs are flesh-colored, with the feet slightly darker. Juveniles resemble adults, but markings are less distinct and the buff of head and nape is paler (Peterson 1990, Rising 1996, Howell and Webb 1999, Sibley 2000, Green et al. 2002).

Diagnostic field marks: Broad, ochre median crown stripe and narrow band of fine black streaks across the breast; head yellow-brown and streaked (Peterson 1990). Relatively large-billed sparrow with longer and squarer tail than similar species, ochre color on head and dark spots on neck are distinctive (Sibley 2000). Green et al. (2002) also report the notched tail is diagnostic.

Vocalization

The song has been described as consisting of two, three or more “zips” followed by a lower pitched trill (The Nature Conservancy 1997). Sibley (2000) describes the song as a high, clear jingling: several high clear *tink* notes followed by a clear musical trill. The call is a very high, weak *teep*, and the flight call is a high thin *tsee* (Sibley 2000). Each male sings only 1 of 13 distinct song types recorded for the species (Green 1992, Green et al. 2002); song types are not regionally distinct, but rather are interspersed throughout the breeding range.

Taxonomy and Distribution

Taxonomy

Baird’s Sparrow taxonomic hierarchy is as follows: Class: Aves, Order: Passeriformes, Family: (Emberizidae) Fringillidae, Genus: *Ammodramus* Swainson, 1827; and Species: *Ammodramus bairdii* (Audubon 1844).

There are currently no unsettled taxonomic issues. Originally known as *Emberiz bairdii* (Audubon 1844). See Murray (1968) for nomenclature history. Baird’s Sparrow was at one time placed in a separate genus, *Centronyx*, when thought more closely related to the Grasshopper Sparrow (*A. savannarum*) (Ridgway 1901 in Green et al. 2002).). Currently, the closest relative is thought to be Henslow’s Sparrow (*A. henslowii*) (Zink and Avise 1990). There are no subspecies

designated (AOU 1998). The type specimen was collected near Old Fort Union, Williams County, North Dakota in 1843. This was the last bird species described by Audubon, and was the first of several bird species named for Spencer Fullerton Baird, a nineteenth century ornithologist (Green et al. 2002). The species was not recorded again until 1872 when a specimen was taken in Colorado. The first nest was found in 1874 (Allen 1874 *in* Green et al. 2002).

Distribution and Range

Breeding Range

Baird's Sparrow breeds in southern Alberta where it is common (south of Stettler and east of Red Deer River, west to Calgary, and north to Elk Island Park (Godfrey 1986 *in* Green et al. 2002, Semenchuk 1992 *in* Green et al. 2002); southern Saskatchewan north to Manito Lake, Redberry Lake and Nipawin; and in Mixed, Moist-mixed Grassland and Cypress Upland ecoregions north to Saskatoon; grassland pockets in Aspen Parkland region (Godfrey 1986 *in* Green et al. 2002, Davis et al. 1996); and southern Manitoba (Figure 2). In the United States, breeding occurs in central and eastern Montana as far west as Teton County (Montana Bird Distribution Committee 1996 *in* Green et al. 2002); in the glaciated hill region of North Dakota east of the Missouri River in the northwest and central parts of the state (Stewart 1975 *in* Dechant et al. 2001), northwestern and north-central South Dakota (South Dakota Ornithologists Union 1991); and possibly western Minnesota in Clay County, Pennington, and Polk Counties (Coffin and Pfanmuller 1988).

Confirmed breeding records exist for eastern Wyoming in Latilongs 13 and 27 which include parts of Laramie, Platte, Albany, Converse and Campbell Counties (Luce et al. 1999). Occurrence, probably during migration, is suspected in 8 additional latilongs (Luce et al. 1999). Unconfirmed but possible breeding records also exist for Manitowoc County, Wisconsin (Robbins 1991 *in*

Green et al. 2002); western Ontario (Lemey 1981 *in* Green et al. 2002); northwestern Nebraska (Sharpe et al. 2001).

Winter Range

Typical winter range habitat is shown in Figure 3. Baird's Sparrow winters in extreme southeastern Arizona (Sonoita Plains, Altar and San Rafael Valleys, base of Chiricahua, Huachuca, Santa Rita, and Patagonia Mountains (Monson and Phillips 1981, Gordon 2000a); casually in southern New Mexico (Hubbard 1978); and on the high plains grasslands of southwestern Texas (Trans-Pecos) (Oberholser 1974). In Mexico, winter range is northeastern Sonora (Russell and Monson 1998), northwestern Chihuahua, northeastern Durango, and extreme northern Zacatecas (Howell and Webb 1999, AOU 1998).

Casual Records

Migration records occur rarely east or west of the Great Plains migration corridor. Other accidental records include British Columbia, California, Oklahoma, New York, and Maryland. Single records occur in Ohio, Ontario, West Virginia, and Illinois (Green et al. 2002).

Historical Records

The overall breeding distribution has changed little from historical. except that it formerly bred in northwestern Minnesota but is now limited to a small native prairie in Wilkin County, Minnesota and Grand Forks County, North Dakota (Coffin and Pfanmuller 1988, De Smet and Miller 1989). Also, it formerly occurred farther east in Manitoba but is now restricted to southwestern Manitoba (Green et al. 2002). Formerly wintered north to Graham County, Arizona, but now restricted to Cochise, Pima, and Santa Cruz Counties (Monson and Phillips 1981, Gordon 2000a).

Abundance

Once considered one of the most common prairie birds in some areas, Baird's Sparrow is now rare throughout its range and only abundant in local areas with suitable grassland habitat. Baird's Sparrow is common in the Missouri Coteau region of North Dakota (Stewart 1975 *in* Dechant et al. 2001), for instance.

Population Trend

Population numbers dramatically declined from the 1800's when (Coues 1874 *in* Jones and Green 1997) called Baird's Sparrow "one of the most abundant species in the Dakota Territory." The North Dakota population of Baird's Sparrow had an average density of 0.8 pairs/40 ha in 1967, and the estimated population was 376,000 pairs (95% CI: 208,000-543,000)(Stewart and Kantrud 1972. In 1992, Igl and Johnson (1997) estimated the statewide population at 279,000 pairs (140,000-418,000)), while in 1993, the same study design estimated 171,000 pairs (90,000-251,000). Knopf (1994) suggested that distribution in any given year might be tied to precipitation patterns, as is the case with many grassland birds. The year 1992 was a dry year, and 1993 a wet year. During the period 1966-1979, Baird's Sparrow data showed apparent declines (not all were statistically significant) in all of its range except Montana. Likewise there was an apparent downward trend (mean annual percent change) in the continental population as documented by BBS (Sauer et al. 1996). The declines were significant in 46% of the areas analyzed and the decline for the entire survey was significant as well. These declines occurred in the Northern Great Plains, an area with historic large Baird's Sparrow populations. De Smet and Miller (1989) suggest that BBS data for 1970-1985 for the population in Canada may show as much as a 35-55% decline. For the period 1980-1996 trends were level in most areas, and a significant increase was observed in the Glaciated Missouri Plateau region. The average BBS trends over the period 1966-

1996 showed the population to be stable over 115 routes (Sauer et al. 1996). Sauer et al. (2003) showed a (-4.1 %, p=0.00, n=55; CI= -6.6% to -1.5%) downward trend for the U.S. from 1996 to 2002. Local population fluctuations continue to occur and threats to some populations may exist (Janssen 1987, De Smet and Miller 1989).

Habitat Requirements

General

Non-breeding habitat (late fall and winter) includes overgrown fields and open grasslands. Birds prefer areas of taller, dense grasses during all seasons, but can be found on south-facing slopes of mixed-oak grassland where oaks occur on north-facing slopes (The Nature Conservancy 1997). Dechant et al. (2001) and Green et al. (2002) provide complete reviews of Baird's Sparrow habitat characteristics.

Spring/Summer/Fall (Breeding Season)

On the breeding grounds, Baird's Sparrow prefers idle or lightly to moderately grazed native grasslands (Cartwright et al. 1937 *in* Jones and Green 1997). Preferred habitat may change from year to year depending on whether it is a wet or dry year. In dry years, or in the drier parts of the range, breeding occurs in grassy sloughs, alkali flats, and depressions in low lying grasslands (Salt and Wilk 1958 *in* The Nature Conservancy 1997, Kantrud and Kologiski 1982). In northwestern North Dakota the best native habitat is grasslands with litter up to 2 cm deep, < 10% woody cover, a relatively high percentage of forbs (20%), vegetation with an average height of 23 cm, and a mosaic of forbs, bare soil, and grasses (Winter 1994 *in* Green et al. 2002). Grasslands with Baird's Sparrow territories had significantly deeper litter than those without territories (21.19 cm versus

0.87 cm). Sites with >25% shrub cover were avoided. Dale (1983 *in* Green et al. 2002) and Sousa and McDonal (1983 *in* Green et al. 2002) noted that Baird's Sparrow prefers native grasslands with shrub cover <20%, litter depth up to 3-4 cm deep, and grass height 10-20 cm or higher. Baird's Sparrow will use perches in living or dead shrubs (Lane 1968 *in* Green et al. 2002). Baird's Sparrow nests in Montana were an average of 67.9 m (range = 6-365 m) from the nearest perch at least 1 m high (Davis and Sealy 1998).

In Alberta, Baird's Sparrow frequented undisturbed native grasslands comprised of rough fescue (*Festuca scabrella*), sedge (*Carex obtusata*), porcupine grass (*Stipa spartea*), club moss (*Selaginella densa*) and spike oat (*Helictotrichon hookeri*) (Owens and Myres 1973). While breeding Baird's Sparrow prefers native grasslands, it also uses seeded pastures and hayfields (Davis et al. 1996), wheat fields (Lane 1968 *in* Green et al. 2002), dry wetlands (Goossen et al. 1993 *in* Jones and Green 1997), and stubble fields and retired croplands (Kantrud and Kologiski 1983). Madden (1996) found Baird's Sparrow occupied areas with smooth brome and other broad-leaved grasses less commonly than native grasses. Since smooth brome is increasing in mixed grass prairies except on xeric, sandy soils, in North Dakota, Baird's Sparrow habitat is in decline (Madden 1996). Other threats to habitat include invasion of exotic plants such as leafy spurge (*Euphorbia esula*) and western snowberry (*Symphoricarpus occidentalis*) into native prairies and broken ground, leading to monotypic stands that are seldom used by Baird's Sparrow (Jones and Green 1997).

Madden (1996) found that Baird's Sparrow will use exotic grasses that are structurally similar to native mixed grasses, especially Kentucky bluegrass (*Poa pratensis*). Likewise, crested wheatgrass (*Agropyron cristatum*), structurally similar to native grasses, is used by Baird's

Sparrow, and is especially attractive when burned or grazed (Madden 1996). Baird's Sparrow densities are comparable between grazed stands of native grasses and grazed stands of crested wheatgrass in Saskatchewan (Skeel et al. 1995 in Jones and Green 1997, Sutter et al. 1995) and Alberta (Mahon 1995). Johnson and Schwartz (1993) found idle crested wheatgrass in North Dakota was not attractive to Baird's Sparrow. In Saskatchewan parklands, Baird's Sparrow returned to pre-burn densities three years after the burn (Pylpec 1991), but in Alberta, which is drier, densities did not return to pre-burn levels until 5-15 years after the burn (Dale et al. 1999 in Green et al. 2002). Heavy grazing typically makes habitat less attractive to Baird's Sparrow unless the grazing occurs in a mosaic pattern that leaves some areas with dense vegetation (Owens and Myres 1973, Kantrud and Kologiski 1982).

Late Fall/Winter

Baird's Sparrow is most often observed in areas with large grasslands, frequently in association with small flocks of the same species, or mixed with other grassland specialists. In Arizona, this species is found in grasslands dominated by bunchgrasses (*Bouteloua* spp. and *Eragrostris* spp), and few mesquite (*Prosopis* spp.), with mesquite the only woody plant >1 m in height (Gordon 2000a). Baird's Sparrow was more abundant in winter in pastures grazed in the summer rather than in areas idled for 30 years (Gordon 2000a). Less is known about winter habitat use requirements, particularly in Mexico.

Migration

Baird's Sparrow is not often observed during migration, but has been documented in grasslands, weedy fields, hay fields, and near water bodies with bare shorelines (Jones and Green 1997).

Landscape Pattern

Davis and Sealy (1998) found that Baird's Sparrow requires greater than 63 ha of unfragmented grassland for breeding use, while Sutter et al. (2000) found that species abundance reached 50% of maximum occurrence in grassland fragments of 58 ha. Roads influence Baird's Sparrow abundance in native grasslands; the species is less abundant along roads than along pasture trails (Sutter et al. 2000). Grassland fragments smaller than about 60 ha may increase parasitism (Jones and Green 1997). During breeding season in dry years, Baird's Sparrow may be restricted to only a small part of the landscape, dry shallow ponds, depressions, and drainages through cultivated fields (Cartwright et al. 1937 *in* Jones and Green 1997, Faanes 1982 *in* Green et al. 2002).

Movement and Activity Patterns

Migration

Baird's Sparrow is a short- to medium distance migrant within North America, with seasonal movements between the northern Great Plains (U.S. and Canada) (summer range) to wintering areas in the southwestern U.S. (primarily Arizona) and north central Mexico (American Ornithologists Union 1998).

Spring

In early spring birds leave wintering grounds and begin northward movement. The latest sighting in Sonora, Mexico is March 4 (Russell and Monson 1998). In the U.S. portion of the migration corridor, observations have been as follows: Texas - May 21, latest record (Oberholser 1974); Kansas - April 6-May 9 (Thompson and Ely 1992; Nebraska - April 24-May 16 (Sharpe et

al. 2001); South Dakota - April 3, earliest banding record (South Dakota Ornithologists Union 1991); Montana - April 26, earliest arrival, to May 3 (Madden pers. comm. *in* Green et al. 2002); Saskatchewan - average arrival is May 8, earliest recorded was May 2; and Alberta - arrives third week of May (Semenchuk 1992 *in* Green et al. 2002).

Fall

Fall migration begins in September. In Manitoba the latest record is September 23 (Seton 1885 *in* Green et al. 2002). The latest banding record in South Dakota is October 25 (South Dakota Ornithologists Union 1991); Nebraska, September 26 and October 15 banding records (Sharpe et al. 2001); Kansas, specimen records August 25-October 7, observations September 11-October 27 (Thompson and Ely 1992); Texas earliest arrival September 6 (Oberholser 1974); earliest arrival in Sonora, Mexico October 2 (Russell and Monson 1998). Records from Arizona and New Mexico indicate that individuals arrive on wintering grounds in early to mid August (Jones and Green 1997).

Behavior

This species is secretive and difficult to see during migration. Evans (pers. comm. *in* Green et al. 2002) documented night migration, and flight calls by Baird's Sparrow during migration. Migrates as individuals or in small flocks. Thompson and Ely (1992) infer night flight from records in Kansas of birds killed at television towers.

Daily Activity

Local movements include hopping, and walking between clumps of grass and over grass litter. Sometimes runs rapidly, preferring running rather than flying to avoid predators. When not

moving remains hidden on the ground (Thompson and Ely 1992). Sometimes flies directly between singing perches, usually <50 m apart, with an undulating flight pattern on longer flights. Uses fluttery wing-beats during interactions with other individuals of the same species, often twittering at the same time (Green et al. 2002).

Reproduction and Survivorship

Territoriality

Males establish territories upon arrival and immediately begin to defend territories against other males, most often and most intensely early in the nesting season. Chases and face-to-face conflicts settle some boundary disputes (Winter 1994 *in* Green et al. 2002). Males take to flight to defend their territory, directly chase intruders, sometimes approaching the intruder on fluttering wings, or flying directly at the intruder, then returning to the territory on fluttering wings (Cartwright et al. 1937 *in* Jones and Green 1997). Territories are sometimes clustered, but not necessarily related to visual vegetative characteristics (Winter 1994 *in* Green et al. 2002). Males sing on territories, and playbacks elicit walking or running through the grass or short flights towards the tape player. Twittering calls with wing fluttering nearly always accompany interactions with other Baird's Sparrow near territory boundaries (Cartwright et al. 1937 *in* Jones and Green 1997).

In North Dakota, territories in plots burned twice between the late 1970's and 1993 had a mean size of 1.5 ha +_0.33 SE (range = 1.07-2.25, n=11), and in plots burned four times had a mean territory size of 1.2 ha +_0.06 SE (range = 0.8-1.69, n=19) (Winter 1999). Gordon (2000a) during repeated mist netting, found that Baird's Sparrow tended to remain in the vicinity of their first capture, suggesting a winter home range.

Breeding

Baird's Sparrow arrives on the breeding grounds from as early as May 4 (Davis and Sealy 1998) to as late as the second week of June (Cartwright et al. 1937 *in* Jones and Green 1997). Semenchuk (1991 *in* Green et al. 2002) documented arrival on breeding grounds in Alberta on May 10, and there are similar records for Saskatchewan and Manitoba. At Medicine Lake NWR in northeastern Montana, males arrive from April 26 to mid May, usually over a 7-10 day period. Females arrive 3-7 days after males (Cartwright et al. 1937 *in* Jones and Green 1997). Pairs form after territories are established by males (Lane 1968 *in* Green et al. 2002).

This species is primarily monogamous, but females may switch mates between broods (Cartwright 1937 *in* Jones and Green 1997). Breeding takes place from late May to mid-August, the peak period being early June to late July. Dependent juveniles have been observed as early as June 30 and as late as August 18 (Stewart 1975 *in* Dechant et al. 2001, Davis and Sealy 1998). Nest building begins in late May in most areas (Davis and Sealy 1998). The interval between completion of the first nest and initiation of the second nest construction is usually less than 5 days (Davis and Sealy 1998). Dates of observation of eggs: June 13-July 24 in South Dakota (South Dakota Ornithologists Union 1991), June 5-July 21 in North Dakota (Stewart 1975 *in* Dechant et al. 2001), May 21 to July 29 in Saskatchewan (Davis and Sealy 1998), and in Montana, May 23 is the earliest date of egg laying (Green et al. 2002). Second broods have been confirmed in Manitoba on July 20 or 21, 5 to 8 days after fledging the first nest (Davis and Sealy 1998). Cartwright et al. (1937 *in* Jones and Green 1997) concluded that two broods is the norm, and Mahon (1995) concluded that two broods are produced in some years. In Montana, second peak in clutch initiation occurred from June 27 to July 1, and the latest clutch was August 2 (Green et al.

2002). The latest clutch was initiated in Saskatchewan on July 26, and in Manitoba on August 11 (Cartwright et al. 1937 *in* Jones and Green 1997).

Nests are a scrape or depression in the ground, and are constructed of grasses with moss, stems of forbs or other fine nest materials interwoven (Lane 1968 *in* Green et al. 2002). Nests are hidden in the grass and usually under overhanging grass, making them difficult to see from overhead (Lane 1968 *in* Green et al. 2002). Nests in Manitoba averaged 6.2 cm in diameter and 4.6 cm deep, and were located in a scrape at the base of a clump of grass (Davis and Sealy 1998).

Clutch size varies from 3 – 6 eggs, 5 being the most common (Stewart 1975 *in* Dechant et al. 2001), but often 4 (Davis and Sealy 1998). Incubation is 11-12 days, and young fledge between 8 and 11 days (Davis and Sealy 1998). Fifty percent of nests fledged at least one young, with a mean of 1.4 ± 0.2 young fledged per nest, while more successful nests fledged an average of 2.8 ± 0.2 (Davis and Sealy 1998). Nest success in Manitoba was 37%, Montana 57% (Green et al. 2002).

Sousa and McDonal (1983 *in* Green et al. 2002) summarized breeding densities from several studies. Densities varied from 11.5 pairs/40 ha to 22.5 pairs/40 ha for ungrazed, undisturbed grasslands in North Dakota (Stewart and Kantrud 1972), Alberta (Owens and Myres 1973, and Saskatchewan (Maher 1979). Grazed sites had densities less than 5 pairs/40 ha (Maher 1979, Renken and Dinsmore 1987). Densities differences have been documented between burned sites: there were more individuals on plots burned 4 times (3.2 males/16 ha and 8 males/40 ha) versus plots burned twice (1.1 males/16 ha and 2.75 males per 40 ha) between 1970 and 1972 (Winter 1994 *in* Green et al. 2002, Madden 1996). Schmidt (1990) documented 10-32 singing males/40 ha in Alberta, and in North Dakota, 8.5, 30.6, 32.5, 22.6, and 21.2 males/40 ha were documented between 1987 and 1991 (Jones and Green 1997).

Breeding territory size ranges from 0.68 ha to 1.2 ha, with larger territories early in the breeding season (Winter 1994 *in* Green et al. 2002). Breeding sites with the highest densities averaged 1.5 ha (0.89-1.43 ha, n=11); while in area with a lower density of birds, territories averaged 1.42 ha (1.19-1.75 ha) (Winter 1994 *in* Green et al. 2002).

Several grassland bird species, including Baird's Sparrow, are noted for a lack of breeding site fidelity, wandering in response to climatic fluctuations (Green 1992, Price et al. 1995). Research at Lostwood Lake NWR in North Dakota documented return of only 5% of banded breeding males to the same site they occupied the previous year, but those that did return once were more likely to return for a third year (Green 1992).

Young of the year juveniles begin to wander away from the parent's territory by 19 days after hatching (Cartwright 1937 *in* Jones and Green 1997).

Population Demographics

Limiting Factors

Limiting factors for this species are heavily weighted toward loss of grassland habitat and habitat management practices that do not favor the species on both the breeding and winter ranges.

No body of information exists on disease or body parasites (Green et al. 2002) but these very likely are not limiting factors. Inclement weather has been shown to cause nest abandonment in Montana, with 8 of 52 nests abandoned (Green et al. 2002). Predation is the primary cause of nest failure but probably varies annually and geographically. Predation caused nest loss for 29 (39%) of 74 nests in Manitoba (Davis and Sealy 1998), 105 (63%) of 167 nests in Saskatchewan (Green et al. 2002), and 19 (37%) of 52 nests in Montana (Green et al. 2002). Cody (1974) documented

some interspecific rivalry between Baird's Sparrow and Grasshopper Sparrows, however overlap of territories with several other species is common, suggesting interspecific competition is not common (Green et al. 2002).

Metapopulation Dynamics

The literature has no reference to metapopulation dynamics.

Genetic Concerns

The literature has no reference to genetic concerns.

Food Habits

Food Items

The main foods are invertebrates, including insects: Coleopteran beetles, grasshoppers (Orthoptera) and caterpillars (Lepidoptera larvae), mainly during the breeding season; also wide variety of grass and weed seeds and waste grains (Lane 1968 *in* Green et al. 2002). Contents of four stomachs taken June-August in Manitoba included leafhoppers (Homoptera), beetles and flies (Diptera), moths (Lepidoptera), grasshoppers and spiders (Araneae), and seeds, probably timothy (*Phleum pratense* (Cartwright et al. 1937 *in* Jones and Green 1997)).

Foraging Strategy

Baird's Sparrow picks insects from the ground and also gleans from grass and forb stems (Green et al. 2002)

Foraging Variation

None indicated in the literature.

Community Ecology

Predation

Few records of documented predation exist, but it is likely a cause of reproductive failure in some cases (Davis and Sealy 1998). Davis (1994) documented predation rates as high as 26-46% in southwestern Manitoba, and Davis and Sealy (1998) up to 50-71% in Saskatchewan. Predation records include one instance of decapitated nestlings assumed predated by weasel, either least (*Mustela rixosa*) or long-tailed (*M. frenata*) (Green et al. 2002). Remains of young birds have been found in nests of Northern Harrier (*Circus cyaneus*) (Munro 1929) and Merlin (*Falco columbarius*) (Lane 1968 in Green et al. 2002), Striped skunk (*Mephitis mephitis*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), and Richardson's ground squirrel (*S. richardsoni*) have been documented as nest predators (Mahon 1995, Davis and Sealy 1998). Deer mice (*Peromyscus* spp), other ground squirrels (*Spermophilus* spp), badger (*Taxidea taxa*), plains garter snake (*Thamnophis haydeni*), American Crow (*Corvus brachyrhyncos*), red fox (*Vulpes vulpes*), and coyote (*Canis latrans*) are opportunistic predators of all ground nesting birds, probably including Baird's Sparrow (Mahon 1995, Davis and Sealy 1998, Pietz and Granfors 2000).

Brown-headed Cowbirds (*Molothrus ater*) parasitize Baird's Sparrow nests. Davis and Sealy (1998) found that 36% of 74 nests in southwestern Manitoba were parasitized with 1-4 cowbird eggs. Fewer young were fledged from parasitized nests, resulting in 1.1 Baird's Sparrow fledglings lost per parasitized nest. Egg removal by cowbirds was the most likely cause. Davis (pers. comm. in Jones and Green (1998) found that 32% of 61 nests were parasitized, and 79% of parasitized nests contained more than one cowbird egg.

Competition

Cody (1974) documented some interspecific rivalry between Baird's Sparrow and Grasshopper Sparrows, however overlap of territories with several other species is common, suggesting interspecific competition is not significant (Green et al. 2002).

Parasites and Disease

No information exists on disease or body parasites (Green et al. 2002) but these very likely are not limiting factors.

Conservation

Conservation Status

Baird's Sparrow is protected under the Migratory Bird Treaty Act (1918) in the U.S., Migratory Bird Conservation Act (1916) in Canada, and the Convention for the Protection of Migratory Birds and Game Mammals (1936) in Mexico.

Federal Endangered Species Act

In the U.S., the Biodiversity Legal Foundation proposed Baird's Sparrow for Endangered Species Act (ESA) listing on June 26, 1997. The U.S. Fish and Wildlife Service responded to the petition with a 90-Day Finding posted in the Federal Register/Volume 64, No. 98/Friday, May 21, 1999. The Service finding was that the "petition does not present substantial information indicating that listing of this species as threatened may be warranted." Previously the Service initiated a Status Review when Baird's Sparrow was designated a Category 2 Species in the November 21, 1991 Federal Register. At that time, a Category 2 Species was one being considered for ESA listing, but not enough data were available to support listing. The Service completed a

Baird's Sparrow Status Assessment and Conservation Plan (Jones and Green 1997) in April 1998. Based on the Assessment, the Service recommended no change in status and Baird's Sparrow has remained on the list of Nongame Migratory Bird Species of Management Concern since that time (USFWS 1995, USFWS 2002).

Bureau of Land Management

Listed on the BLM Wyoming State Director's Sensitive Species List, and occurs in 7 of 10 BLM Field Offices in Wyoming (USDI 2002).

U. S. Forest Service

Listed as sensitive in Region 2, and on Thunder Basin National Grassland (Region 4).

State Wildlife Agencies

See Table 1.

Heritage Ranks

See Table 2.

Biological Conservation Issues

Abundance

As previously discussed, overall breeding distribution is nearly unchanged from historical except that Baird's Sparrow is missing from its former range in Minnesota and parts of Manitoba (Coffin and Pfanmuller 1988, De Smet and Miller 1989). However, population numbers are drastically reduced from the 1800's due to conversion of native grasslands to agriculture (Jones and Green 1997). Baird's Sparrow populations remain high in portions of the range (Schmidt

1990) and some populations may be larger than previously believed (Skeel et al. 1995 in Jones and Green 1997). Nevertheless, local populations are declining in some areas and there are significant threats to the species (Janssen 1987).

Trends

Trends in population and distribution have been monitored annually since 1966, and are mainly limited to the Breeding Bird Survey (BBS). Since BBS is a roadside survey, Baird's Sparrow BBS data may be somewhat biased towards underestimation of population because Baird's Sparrow avoids roadsides (Davis et al. 1996). BBS data for (1966-2002; n+55, P=0.00) show a -4.1 trend in the U.S. range (Table 3).

Extent and Connectivity

There appears to have been no overall contraction of range since historic times, however, grasslands have been highly fragmented and suitable habitat is interspersed within areas of unsuitable, unoccupied habitat. Baird's Sparrow requires an area of approximately 63 ha during breeding season (Davis and Sealy 1998). Size of blocks of suitable habitat may be less strict during migration; therefore habitat along the migration corridor, such as in Wyoming, may need to meet a less severe standard.

Habitat

Description of the current trend in acres of grassland habitat across the range of Baird's Sparrow is beyond the scope of this assessment. However it is significantly reduced from the historic level.

Range Context

Partners In Flight identifies priority bird species and habitats for land birds by Physiographic Areas (Pashley et al. 2000). Baird's Sparrow is a high priority species in the following

Physiographic Areas:

- Northern Mixed-Grass Prairie (Eastern South and North Dakota, central Saskatchewan and Alberta)
- Northern Shortgrass Prairie (Northeastern Wyoming, central and eastern Montana, southern Alberta and Saskatchewan)
- West River (Western South and North Dakota)

Extrinsic Threats and Reasons for Decline

Habitat

Habitat fragmentation, at least from a historical perspective, and perhaps a modern one as well, has significantly impacted grasslands (Ricketts et al. 1999). Habitat fragmentation occurs when parts of a large, continuous block of vegetation are converted to other vegetation types, leaving only scattered tracts of the original habitat. Problems associated with fragmentation include loss of habitat, increase in edge effect (higher parasitism and nest predation) and isolation effects.

Baird's Sparrows are grassland specialists endemic to the grasslands of the northern Great Plains; therefore, the primary threat to the species remains conversion of native grasslands to cropland (Lane 1968 *in* Green et al. 2002, Stewart 1975 *in* Dechant et al. 2001, Goossen et al. 1993 *in* Jones and Green 1997), or shrubland (Green 2002) i.e. further fragmentation and habitat loss. This is probably most significant on the breeding range, but may be a factor on the winter range as well. Impacts due to further conversion/fragmentation on the migration corridor, such as in eastern Wyoming, are unknown, and probably not significant at a range-wide level. Range

management practices that reduce quality of habitat, especially overgrazing, and mowing and haying in croplands, may also impact the species (Samson and Knopf 1994). Samson and Knopf (1994) estimate a decline of 60-99% in the mixed grass prairie in the U.S., and over 90% of grasslands in Canada have been converted to cropland. The decline of Baird's Sparrow from historic to present has paralleled the decline of the grasslands, and the population is still vulnerable to habitat loss. Since size of grassland fragments may be important, even small conversions may be significant at this point in time.

Disease or Predation

Disease has not been documented to be a threat, however the recent emergence of diseases such as West Nile Virus may have implications that are not yet obvious. Predation can be a factor during breeding, and nest failure has often been documented (Davis and Sealy 1998). Davis (1994) found predation rates from 26-46% for nests in southwestern Manitoba, and 50-71% in Saskatchewan (Davis 1998). Striped skunk (*M. mephitis*), thirteen-lined ground squirrel (*S. tridecemlineatus*), and Richardson's ground squirrels (*S. richardsoni*) depredated eggs, nests and fledglings in Alberta (Mahon 1995, Davis and Sealy 1998), and are probably the most common predators. Other potential predators were listed previously in this document. Predation rate is tied to quality and quantity of habitat, and is likely to increase as habitat fragment size decreases as well.

Inadequacy of Regulatory Mechanisms

Current federal and state regulations are adequate for protection of the species from intentional take (Jones and Green 1997). However, no regulations for direct protection of grassland habitats exist in either the breeding or winter range in the U.S. or Canada. Federal Farm Bill programs in

the U.S. have not favored Baird's Sparrow since much of the cover established has been exotic grasses (Johnson and Igl 1995). The 2002 Farm Bill made provisions for planting native grasses, and some states are requiring native seed mixtures in the Conservation Reserve Program. The Grassland Reserve Program in the 2002 Farm Bill may provide the opportunity for conservation of grasslands important for grassland birds including Baird's Sparrow. A recent proposal to expand the High Plains Partnership begun in TX, CO, KS, OK, and NM in 1998, to include all grassland bird species in the Great Plains and parts of the desert Southwest, may help to conserve habitat for Baird's Sparrow. Proposed conservation practices that can be adopted by the USDA Natural Resource Conservation Service are shown in Appendix B. A guide to best management practices for grassland birds was recently published by the Wyoming Game and Fish Department (Wyoming Partners In Flight 2002). In Mexico, current regulatory mechanisms are not adequate to protect habitat on the winter range.

Other Natural or Manmade Factors

According to Jones and Green (1998) factors that could impact Baird's Sparrow include: pesticides, small population size, burning, mowing, grazing, and introduced, exotic vegetation. Pesticides are not considered a direct threat, and it does not appear that populations are small enough to be radically impacted by random stochastic factors. Controlled burning to restore vigor and habitat capability can benefit the species on both breeding and winter range, however burns must be planned on a landscape scale since Baird's Sparrows typically experience population declines during the first growing season post fire (Pylypec 1991, Madden 1996, Johnson 1997). Mowing before July 15, possibly even later (Davis et al. 1996), is detrimental to the species, and Baird's Sparrow is likely to be absent in mowed areas except fallow land and stubble fields left standing until after July 15.

Research has shown that Baird's Sparrow tolerates moderate but not heavy grazing (Kantrud 1981, Samson and Knopf 1994, Mahon 1995). Grazed grasslands support fewer Baird's Sparrows than ungrazed grasslands (Owens and Myres 1973, Maher 1979, Dale 1983) since grazing affects vegetation height, percent bare ground, litter depth, and soil features such as rate of compaction. Response of grasses to grazing depends upon several climatic factors and varies from season to season as well as with intensity and season of grazing (Jones and Green 1997). Dale (1983 *in* Green et al. 2002) found a negative correlation between smooth brome and Baird's Sparrow. Other exotic grasses and invasive noxious weed species can or render unusable large acreages of grasslands, thus impacting this species.

Intrinsic Vulnerability

Baird's Sparrow occurs in disjunct breeding sub-populations, and in highly fragmented habitat, factors that indicate moderate vulnerability. The species is a generalist in terms of foraging, which reduces its level of vulnerability to some degree. However, suitable habitat is limited to native grasslands, or in some cases properly managed introduced grasslands, limiting available habitat.

Protected Areas

Protected Areas that occur in the range of Baird's Sparrow and have records of Baird's Sparrow (Jones and Green 1997):

- Audubon Research Ranch AZ
- BLM Las Cienegas National Conservation Area AZ
- The Nature Conservancy San Rafael Valley AZ
- Buenos Aires National Wildlife Refuge AZ
- Benton Lake National Wildlife Refuge MT
- Bowdoin National Wildlife Refuge MT
- Medicine Lake National Wildlife Refuge MT

- BLM near Bowdoin National Wildlife Refuge MT
- Des Lacs National Wildlife Refuge ND
- J. Clark Salyer National Wildlife Refuge ND
- Lostwood National Wildlife Refuge MT
- Theodore Roosevelt National Park ND
- Little Missouri River National Grassland ND
- TNC Cross Ranch Nature Preserve ND
- Upper Souris National Wildlife Refuge ND
- Chase Lake Prairie Project ND

Population Viability Analysis

No Population Viability Analysis exists for this species. Sousa and McDonal (1983 *in* Green et al. 2002) attempted a habitat model for the species but it failed to consider some significant vegetative characteristics, leaving doubt as to its value in predicting habitat value (Jones and Green 1997).

Conservation Action

Conservation Elements

Inventory and Monitoring

Monitoring efforts in the U.S. and Canada are primarily comprised of the BBS. Since BBS is a roadside survey, Baird's Sparrow BBS data may be somewhat biased towards under estimation of populations because Baird's Sparrow avoids roadsides (Davis et al. 1996). Two Christmas Bird Counts (CBC) in Mexico have recorded Baird's Sparrow Dieni et al. 2003). One to two Baird's Sparrows are recorded on CBCs in Arizona each year depending upon winter weather conditions. Baird's Sparrow has been recorded on 23 CBCs in Texas. The Nature Conservancy (1997) and Jones and Green (1998) listed the following monitoring programs in the Baird's Sparrow range:

1. Lostwood National Wildlife Refuge ND
2. Bowdoin NWR MT
3. Medicine Lake NWR MT
4. BLM / Bowdoin NWR MT
5. MT Natural Heritage Program - Database of locations

There are at least six BBS routes in the Baird's Sparrow range in Wyoming. Soda Well, Arvada, Wyarno, and Clarkelen have all recorded 0.01 Baird's Sparrows/route, while Bill and Pine Tree have no records.

The Wyoming Game and Fish Department Nongame Bird and Mammal Plan (Oakleaf et al. 1996), in its Priority Actions for Nongame Birds, lists the following priorities that apply to Baird's Sparrow:

1. Coordinate and participate in the statewide BBS and act as liaison between BBS participants and the USFWS – Division of Migratory Bird Management.
2. Participate in statewide Partners In Flight efforts at a level to insure that a Wyoming working group is active in regional (Western Working Group), national and international aspects of PIF; obtaining and sharing additional data on populations and habitat requirements of nongame birds; participating in regional conservation planning for nongame birds; and providing PIF information to the public.

Habitat Preservation and Restoration

Jones and Green (1998) summarized studies of Baird's Sparrow habitat and management. Consistent predictors of any bird species' habitat parameters are subjective within a given year and between years due to precipitation and other climatic variables (Dale 1983, Mahon 1995). In

addition, the nomadic nature of Baird's Sparrow makes habitat definition difficult (Kantrud and Faanes 1979, Schmidt 1990, Green 1992). Height and thickness of vegetation and litter depth are important vegetative characteristics (Dale 1983, Sousa and McDonal 1983 *in* Green et al. 2002, Mahon 1995). Vegetation height is important, but when considering occupied versus unoccupied habitat the range of vegetation heights overlap.

However this may be because Baird's Sparrow tends to use sites with lower vegetation relative to surrounding vegetation when it is tall (Renken 1983, Dale 1991 *in* Jones and Green 1997) and taller vegetation relative to surrounding vegetation when it is short (Dale 1991, 1992 *in* Jones and Green 1998), Anstey et al. 1995 *in* Dechant et al. 2001). Baird's Sparrows are found nesting in the thicker vegetation in dry years or on dry sites, and in wetter years or on more mesic sites they occupy lower and less dense sites relative to the surrounding vegetation. Dale (1992 *in* Dechant et al. 2001) and Winter (1994) found heterogeneity of height of grasses a factor in abundance of Baird's Sparrow. Highest densities of sparrows were found in the areas with the highest variability in numbers of forbs and bunchgrasses. Boundaries of territories may be influenced by heterogeneity of grass heights.

Habitat preservation or restoration for this species must therefore seek to provide a mosaic of grass heights and densities to accommodate Baird's Sparrows in different years and on different sites across the landscape. Bock et al. (1992) suggest that livestock operate as a keystone species, largely responsible for determining the structure and function of grassland ecosystems in which grazing takes place. They recommend the following management considerations: 1) substantially increase the amount of public rangeland from which all livestock are permanently excluded, and 2) require the Farm Bill Conservation Reserve Program to use only native grass seed mixtures rather

than exotics, and perhaps allow a moderate amount of grazing or haying to make the changeover attractive to private landowners.

Habitat improvement for Baird's Sparrow may include shrub removal to a maximum of 25% of the cover on a given site or pasture. In Manitoba, Baird's Sparrow nests near shrubs that provided perches for cowbirds were more likely to be parasitized by cowbirds (Davis 1994 *in* Dechant et al. 2001).

Forbs may or may not be important to Baird's Sparrow (Mahon 1995, Madden 1996), so no recommendation can be made on species or percent ground cover of forbs to maximize Baird's Sparrow habitat potential.

Specific to Wyoming, habitat should be considered primarily in the context of migration. Moore et al. (1992) note that persistence of migratory bird populations depends upon maintaining favorable habitat through the annual cycle. Protection and management of grasslands in the eastern Wyoming migration corridor, although not significant for the Baird's Sparrow, is important for many grassland birds and should be a management priority. If stopover habitat is degraded or lost, successful migration between winter and breeding areas may be jeopardized. In addition, suitable stopover sites may be used longer in some years due to a late, cold spring or slow vegetative development on the breeding range, therefore high quality stopover habitat is necessary.

Grazing

Bock et al. (1992) evaluated the response of grassland birds to grazing, and listed the Baird's Sparrow as a species that responds negatively to grazing. Birds respond to changes in habitat structure, changes that normally occur when livestock grazing is permitted. Impacts are especially severe in tall grass prairies, and in the desert grasslands of the Southwest where historical grazing

converted desert grasslands into desert scrub (Bock et al. 1992). This conversion continues today. The most significant vegetative structure issue is that grazing leads to relatively uniform vegetative communities, a situation that does not favor Baird's Sparrow (Bock et al. 1992). Jones and Green (1998) cite several studies showing sensitivity of Baird's Sparrow to livestock grazing. The extent of the response of Baird's Sparrow to grazing depends upon intensity, timing, and duration of grazing; the vegetation, soil, moisture, and geographic location. In the drier portions of the mixed grass prairie, or at least in drier years, studies have shown that continuous grazing almost completely eliminates or significantly reduces use by Baird's Sparrow (Smith and Smith 1966, Owens and Myres 1973), especially compared to idle sites (Maher 1979, DeSmet and Conrad 1991). In more moist areas or in years of higher precipitation, grazing can improve habitat conditions (Kantrud 1981, Renken 1983). Renken (1983) studied Baird's Sparrow responses to grazing in pastures that had previously been idle for several years. Grazing took place only after her initial counts. Baird's Sparrow did not use study sites after the cattle were put into her study area.

There is usually a direct correlation between Baird's Sparrow densities and grazing pressure. Sparrow density typically decreases as grazing intensity increases (Kantrud 1981, De Smet and Conrad 1991) probably because grazing both decreases vegetation height and amount of residual ground litter, both important for nesting habitat. Soil type can also play a role in impact of grazing. In North Dakota, Kantrud and Kologiski (1982) found that Typic Borolls had the most Baird's Sparrows and Ustolls and Aridsols the fewest. Typic Boroll soils also had less impact from heavy grazing than other soil types.

Timing and frequency of grazing have been examined in several studies. Messmer (1990) found that grazing twice per season supported the highest number of Baird's Sparrows compared to continuous, idle, or short-duration, and increased density of Baird's Sparrows over 6 years, the only treatment to do so. Likewise, in Alberta, rotation rather than continuous grazing supported the highest densities (Prescott et al. 1993 *in* Jones and Green 1997). Grass height in rotation pastures was higher than in continuous grazed sites in Canada (Trottier and Barry *in* Jones and Green 1997). It appears that rotation grazing can not only improve grazing from an economic point of view (Adams et al. 1993), but also produces good Baird's Sparrow habitat, at least in some areas. George et al. (1992) found that even in drought, sites with good range condition still provided suitable habitat, whereas sites in poor range condition did not.

Haying

Dale et al. (1997) found that Baird's Sparrow was more common in idle native grasslands than in hayed areas dominated by exotics and hayed annually or periodically. Fields cut annually were more attractive than those cut periodically due to less build up of excessive litter. (Anstey et al. (1995) *in* Dechant et al. 2001) found Baird's Sparrow more frequently in pastures than hayfields. Timing of haying is critical to the quality of habitat provided by hayfields. Pairs nesting in hayfields experienced greater reproductive failure in fields harvested before July 15, and Dale (1993) suggested that even July 15 was too early for harvest on that study site. Swanson (1996) recommends delaying harvest of hayfields until August 1 for Savannah Sparrow (*P. sandwichensis*), a date Dale et al. (1997) suggests for grassland passerines. Delaying cutting on one-half of a field until after August 1, or cutting a field every second year are options for maximum Baird's Sparrow productivity.

Burning

Burning, like grazing, appears to have varied impacts on habitat viability. Considerable variation in rate of regrowth has been documented. Drier, poor sites recover habitat potential slower because it takes longer for residual grasses and litter to accumulate, but all research shows that Baird's Sparrow is absent from burned areas for the first breeding season (Jones and Green 1997). In North Dakota, burned sites reached maximum densities of Baird's Sparrow 1-3 years post burn, and sites burned four times in 15 years had the highest densities (Winter 1994 in Green et al. 2002, Madden 1996). At 5-8 years post burn, lower densities occur, as is also the case with areas idled for long periods (Jones and Green 1997). In Saskatchewan, the natural fire interval is estimated to be 25 years in the driest parts of the prairie, and 6 years in the more moist areas. Controlled burning at Lostwood Lake NWR using a 5-7 year burn interval appears to be most favorable for Baird's Sparrow (Jones and Green 1997). Controlled burning should be considered an important management tool for maximizing Baird's Sparrow habitat capability.

Non-native Vegetation

Dense, monotypic stands of smooth brome (*Bromus inermis*) are poor habitat for Baird's Sparrow, however, cutting, grazing and burning may improve the habitat by removing heavy residual matter (Dale et al. 1997, Mahon 1995, Madden 1996). Madden (1996) found no negative impact from encroachment of Kentucky bluegrass (*Poa pratensis*) into native grasslands, however sites sown to bluegrass were not suitable habitat 2-3 years after establishment (Dale 1992 in Dechant et al. 2001, 1993).

Crested wheat grass (*Agropyron cristatum*), commonly planted in seeded pastures, is structurally similar to native grasses, especially when grazed, and may be suitable habitat (Madden

1996). Idle crested wheatgrass in North Dakota was not attractive to Baird's Sparrow (Johnson and Schwartz 1993 *in* Dechant et al. 2001). Grazed stands of native grasses and crested wheatgrass in Saskatchewan had equal numbers of Baird's Sparrow (Skeel et al. 1995 *in* Jones and Green 1997).

Leafy spurge (*Euphorbia esula*) and western snowberry (*Symphoricarpos* spp.) are exotic invaders that render native grasslands unsuitable as Baird's Sparrow habitat (Jones and Green 1997). In general, the Farm Bill Conservation Reserve Program has used exotic grasses that are poor Baird's Sparrow habitat (Dale 1991 *in* Jones and Green 1997). Changing seed mixtures on CRP lands to native grasses would improve habitat for all native grassland birds. Conventionally tilled croplands provide almost nothing in the way of Baird's Sparrow habitat, however minimum tilled fields with standing stubble and weeds may have some habitat value (Martin 1997 *in* Jones and Green 1997).

Captive Propagation and Reintroduction

Captive propagation and reintroduction are not needed or being considered for this species.

Information Needs

The following surveys, research, and data collection are needed:

- 1) Reliable population data are not available for all areas in the breeding range.
- 2) Site-specific surveys should be conducted on all proposed federal projects to document whether Baird's Sparrow habitat is present in the project area. If suitable habitat exists, surveys should be conducted to determine whether or not the species occurs. If occurrence is documented, conservation measures should be implemented.

- 3) A better understanding of minimum patch size or the minimum reserve that would benefit the species is needed.
- 4) Designation of priority habitats and areas for preservation and/or restoration are needed.
- 5) More information is needed on reproductive capability, habitat use survivorship, and timing of reproduction across the range.
- 6) Response of Baird's Sparrow to habitat management manipulation and techniques is needed over the range.
- 7) Further quantification of winter range and habitat use on the winter range in Mexico is needed

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Tables and Figures

Table 1: Legal Status of Baird's Sparrow - U.S. State Wildlife Agencies
(Jones and Green 1997)

Arizona: Threatened

Colorado: No legal designation

Kansas: No legal designation

Nebraska: No legal designation

Oklahoma: No legal designation

Wyoming: No legal designation

Illinois, Iowa, Missouri, Utah, Wisconsin: Casual, vagrant, not breeding

Minnesota: Endangered

Montana: Species of Special Concern

New Mexico: Threatened

North Dakota: None – no list

South Dakota: No legal designation

Texas: No legal designation

Table 2: Heritage Ranks by state for Baird's Sparrow

Arizona:	S2N	Utah:	SA
Colorado:	SZN, SN, S?	Wisconsin:	SAN
Kansas:	SZN, SN, S?	Minnesota:	S1
Nebraska:	SZN, SN, S?	Montana:	S3S4B, SZN
Oklahoma:	SA	New Mexico:	S2N
Wyoming:	S2?B?, SZN	North Dakota:	(G3), SU
Illinois:	SR	South Dakota:	S2B, SZN
Iowa:	SA	Texas:	S2
Missouri:	SA		

Table 3: North American BBS regional trends for Baird's Sparrow, 1966-2002
(USGS Patuxent Prairie Wildlife Research Center)

Region	Trend		
	1966-2002	1966-1979	1980-2002
Alberta	-2.1	-13.7	-5.2
Manitoba	-10.2	-0.1	-28.3
Montana	-1.7	-0.5	-1.8
North Dakota	-4.2	-3.3	-5.0
Saskatchewan	-1.7	-0.8	-0.9
South Dakota	5.6	100.6	-10.6
Aspen Parklands	-10.3	2.9	-14.8
Drift Prairie	-2.3	-6.2	-3.5
Glaciated Missouri Plateau	-2.0	-10.3	-2.4
Great Plains Roughlands	-4.0	-1.1	-4.8
Dissected Rockies	-2.2	--	--
Central BBS Region	-4.1	-2.8	-4.5
Western BBS Region	-1.7	-9.2	-2.6
FWS Region 6	-4.1	-3.0	-4.3
United States	-4.1	-3.1	-4.4
Canada	-1.7	-8.1	-2.9
Survey-wide	-3.4	-4.5	-3.8

Figure 1: Photo of Baird's Sparrow.



Figure 2: Baird's Sparrow North American distribution map.
Pink = Breeding, Purple = Wintering, Grey = Rare.

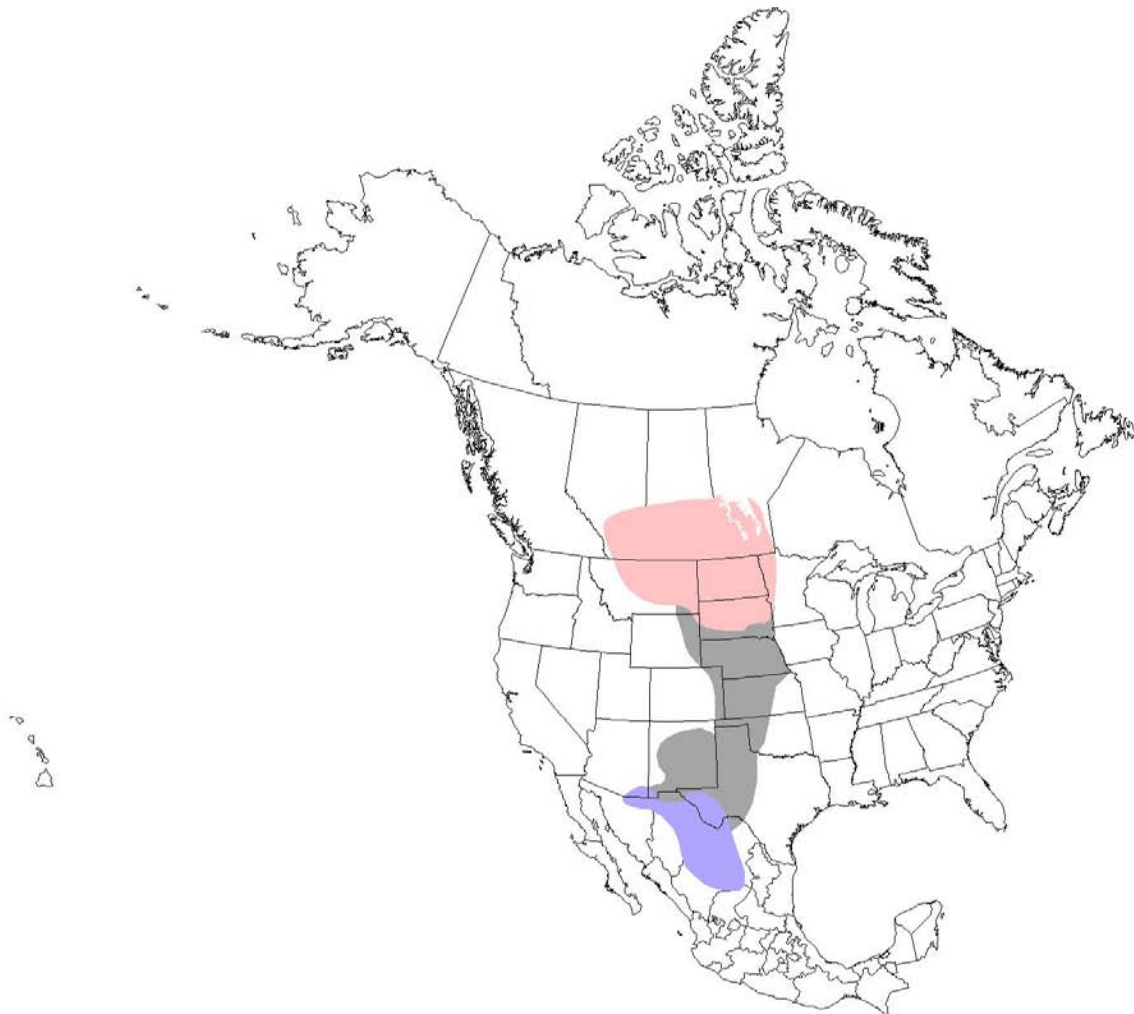


Figure 3: Typical Baird's Sparrow habitat in winter range in Arizona.



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Appendix A: High Plains Partnership Grassland Wildlife Species

Suggested NRCS Conservation Practices*

Purpose: To provide tools for landowners to use to restore and maintain a mosaic of vegetation structure that provides habitat for a variety of native wildlife, particularly species-at-risk, and which contributes to landscape-level habitat restoration and improvement.

Prioritizing Practices: The goal of implementing these practices is to restore ecosystem health. Every acre of land cannot be managed for every species, therefore landowners and local wildlife and land managers must decide which practice(s) are suitable for a particular parcel of land to achieve the most benefit to native at-risk wildlife. Priority should be given to practices that benefit species at risk if they are present or were present historically and can be restored. Priority species are shown in bold. All practices and planting must use native species and be appropriate to the ecological site.

Conservation Practices

Brush Management (314)

- For LPC increase or decrease the structural density of shinnery oak, sand sagebrush, and other shrubs as appropriate for each ecological site.
- or
- For BS and CS maintain or restore up to 5% woody plant cover of “local ecotype” and appropriate to the ecological site.
- or
- For SG maintain existing sagebrush stands with a mosaic of 10 – 30% canopy cover depending season of use (winter, nesting, brood-rearing, etc.).

- For LPC, BO, BTPD, SG, and MP clip or saw tamarisk, cedar, locust, Russian olive, or evergreen trees to prevent encroachment into native grasslands.
- Remove or reduce distribution and density of shrubs such as tamarisk, cedar, locust, Russian olive, mesquite and sagebrush on ecological sites capable of supporting habitat for BO, MP, BTPD, and SP; for LPC use mechanical treatments and herbicides to restore habitat to historical densities for each ecological site.
- For BS and CS maintain up to 5% woody plant cover of “local ecotype” and appropriate to the ecological site where compatible with other practices.

Critical Area Planting (342)

- Establish habitat with a mixture of medium height (8-24 inches) native vegetation (grasses, forbs and legumes) and/or native shrubs of “local ecotype” appropriate to the ecological site to improve nesting, brood rearing and winter cover for LPC, SP, BS, GS, and US.
- or
- Interseed native shrubs to densities historically found on each ecological site. These shrubs will provide perching sites for BS, LB, and CS, and restore essential SG habitat.
- or
- Restore habitat with mixtures of low-growing native grasses, broadleaf forbs, and legumes of “local ecotype” and appropriate to the ecological site in ratios historically present in areas occupied by BO, BFF, BTPD, and MP.

Fence (382)

- Develop fencing, where appropriate and warranted, to facilitate livestock grazing systems that include rest to increase height and density of grasses for LPC, LBC, SG, SP, CCL, US, and GS; LB and nesting and brood-rearing cover, and BO foraging areas, during March through August.
- or
- Create and maintain low vegetative condition, with up to 30% bare ground for MP; optimal habitat for BO, LBC, BTPD, FH, BFF, and MCL, optimal lek habitat for LPC and GPC, and brood-rearing habitat for LBC, by grazing management that maintains vegetation at < 4 inches height.
 - Exclude livestock from newly established native vegetation plantings.

Prescribed Burns (338)

- Burn vegetation at appropriate intervals to reduce woody encroachment into grasslands, facilitate invasive species control, and achieve desired habitat conditions (allow litter to accumulate between burns and to stimulate growth and vigor of native vegetation) for LPC, BS, SP, and US nesting and brood rearing habitat.

or

- Burn vegetation as necessary to remove residual cover and grasses to achieve <4 inches height to improve habitat or create expansion areas for BTPD, BO, BFF, and MP.

Prescribed Grazing (528A)

Design a grazing plan for each individual ranch incorporating the wildlife management objectives agreed upon by the rancher and wildlife manager

- For LPC, SF, SP, GS and US, employ a rest-rotation livestock grazing system, possibly including yearlong deferment of one pasture, to increase density, height and distribution of native grasses, for LPC especially in nesting areas and brood-rearing areas within 5-km radius of active leks.
 - Lightly or short-duration graze shortgrass pastures in summer, moderately in winter for BS, SP, LB, and CCL.
- or
- Defer grazing on mixed-grass prairies to control BTPD expansion or new occupation.
- or
- For SG employ a rest-rotation livestock grazing system that increases density and height of residual cover of native grasses in sagebrush stands, especially in nesting areas within 5-km radius of active leks.
 - For SG lightly graze wet meadows and riparian edges to retain optimal forb density.
- or
- Graze shortgrass and mixed-grass prairie at moderate to high levels in summer, late winter, or early spring to create and maintain LBC, BTPD, BFF, BO, MP and MCL habitat.

Upland Wildlife Habitat (645)

Artificial burrows

- Create burrows necessary for establishment of BTPD before translocation to areas without existing burrow systems. By reintroduction of BTPD provide habitat for MP, BO, and BFF.

Interseed forbs

- Improve LPC, SP, and US nesting and brood rearing cover by interseeding native forbs and legumes of “local ecotype” and appropriate to the ecological site at recommended rates.
- Improve MP, BO, and BTPD yearlong habitat by interseeding native forbs and legumes of “local ecotype” and appropriate to the ecological site at recommended rates.

Mowing

- Mow vegetation in ungrazed pastures to maintain or create expansion areas for BTPD, BFF, BO, and MP.
- Mow vegetation adjacent to existing BTPD colonies, at appropriate times of the year to

minimize impacts to nesting birds, to create expansion areas for BTPD, BFF, BO, and MP.

Shrub establishment

- Re-establish shinnery oak and sand sagebrush across LPC range on ecological sites where appropriate

or

- Re-establish sagebrush of “local ecotype” and appropriate to the ecological site for SG where appropriate

or

- Establish scattered native trees and tall shrubs of “local ecotype” and appropriate to the ecological site for FH to use as perches (should not be used in LPC, GPC, or SG habitat)

Strip discing

- Improve vigor and distribution of native forbs and grasses for LPC, SF, BS, SP, CS, and US.
- Create fireguards for prescribed burning.

Vegetative Barrier (601)

- Restore native vegetation – grasses, forbs, legumes, or shrubs > 24 inches in height and appropriate to the ecological site to prevent or reduce expansion of BTPD colonies onto adjacent lands, or to contain animals on recently created or restored colonies.

Well (642) or

Pond (378) or

Spring Development (574) and

Pipeline (516) and

Watering Facility (614)

- Create water sources to facilitate grazing management systems that optimize LPC, SG and US nesting and brood-rearing habitat. Wells should be placed greater than one mile from active LPC and SG leks.
- Design structures to provide adequate ingress and egress to water sources for all wildlife species, and to prevent accidental death of wildlife.
- Fence spillover ponds at wells to limit grazing around pond margins for SG brood habitat and US habitat.
- Fence ponds and create off-site watering facility to limit grazing around pond margins for SG brood habitat and US habitat.

Priority Species-at-risk*

BFF	Black-footed Ferret
BO	Burrowing Owl
BTPD	Black-tailed Prairie Dog
FH	Ferruginous Hawk
LBC	Long-billed Curlew
LPC	Lesser Prairie Chicken
MP	Mountain Plover
SF	Swift Fox
SG	Sage Grouse

*Present on three or more state species of concern lists

Secondary Species-at-risk

Present on two or more state species of special concern lists:

BS	Baird's Sparrow
GPC	Greater Prairie Chicken
GS	Grasshopper Sparrow

One state species of concern list, or one NGO list:

SP	Sprague's Pipit
US	Upland Sandpiper
CCL	Chestnut-collared Longspur
CS	Cassin's Sparrow
LB	Lark Bunting
MCL	McCown's Longspur