Brewer's Sparrow

Spizella breweri

REGULATORY STATUS

USFWS: Migratory Bird
USFS R2: Sensitive
USFS R4: No Special Status
Wyoming BLM: Sensitive
State of Wyoming: Protected Bird

CONSERVATION RANKS

USFWS: Bird of Conservation Concern
WGFD: NSS4 (Bc), Tier II
WYNDD: G5, S5
Wyoming Contribution: LOW
IUCN: Least Concern
PIF Continental Concern Score: 12

STATUS AND RANK COMMENTS

Brewer's Sparrow (*Spizella breweri)* does not have any additional regulatory status or conservation rank considerations beyond those listed above.

NATURAL HISTORY

Taxonomy:

Two subspecies of Brewer's Sparrow are currently recognized: Brewer's Sparrow (*S. b. breweri*) and Timberline Sparrow (*S. b. taverneri*) [1-3]. In Wyoming, *S. b. breweri* is the only known subspecies [1]. *S. b. taverneri* is found in western Canada and southeast Alaska, but may breed as far south as northwestern Colorado [1, 3]. Subspecies designations are generally accepted based on genetic evidence and differences in ecology, behavior, and appearance [1]. Some argue that the two subspecies should be classified as unique species based on allopatric separation [3].

Description:

Brewer's Sparrow is identifiable in the field, especially during the breeding season. Identification of nonbreeding birds may be difficult in the presence of other *Spizella* sparrows. Identification of subspecies is not possible in the field [3]. Brewer's Sparrow is the smallest sparrow species and is typical of *Spizella* sparrows, having a small conical bill, long notched tail, and a slim body. Overall, the species is drab. Its body is dull white underneath with grayish flanks and brown rump and back. Brewer's Sparrow has a finely streaked brown crown with an indistinct, often absent median crown-stripe. Facial markings are weak and include pale gray supercilia, unmarked lores, complete white eye-ring, brown auricular, and a grayish white submoustachial stripe bordered by a thin black malar streak. Coloration of nonbreeding birds is similar but with less contrast of facial markings. Juveniles have a streaked underside but are otherwise similar in appearance to adults. Similar species include Clay-colored Sparrow (*S. pallida*) and Chipping

Sparrow (*S. passerina*). Brewer's Sparrow is identifiable by its complete white eye-ring and weakly contrasting facial markings compared to other species [3, 4].

Distribution & Range:
Wyoming forms a substantial portion of the western edge of the breeding range of Brewer's Sparrow. Confirmed or suspected breeding has been documented in 27 of Wyoming's 28 latitude/longitude degree blocks [5]. The timberline subspecies has a much smaller distribution limited to portions of western Canada and southeast Alaska. However, distribution of *S. b. taverneri* is poorly understood and may extend much further south and may include portions of Wyoming [1]. Both *S. b. breweri* and *S. b. taverneri* winter outside of Wyoming. Distribution during migration and winter is poorly understood. The distribution of Brewer's Sparrow appears stable, with no documented expansions or contractions.

Habitat:
Brewer's Sparrow is a sagebrush obligate species. In Wyoming, Brewer's Sparrow is generally associated with habitats dominated by Big Sagebrush (*Artemisia tridentata*) [2, 3]. In particular, the species prefers areas with sagebrush over 35 cm tall with canopy cover greater than 20% [6]. It may also be found in shrubby openings in forested habitats, mountain mahogany (*Cerocarpus* spp.) shrublands, and mixed desert shrublands [2]. Brewer's Sparrow relies on sagebrush for foraging, refugia from predation, and nesting substrate. Populations are found in much of Wyoming, especially in the southwestern portion of the state, where large tracts of sagebrush steppe habitat exist. Brewer's Sparrow breeds in Wyoming, but migrates south to winter in the southwestern U.S. and northern Mexico. In winter, habitat use is more general and includes shrublands dominated by saltbrush (*Atriplex* spp.) and Creosote (*Larrea tridentata*); but even in winter, Brewer's Sparrow is still largely associated with sagebrush habitats [1, 3].

Phenology:
Brewer's Sparrow arrives in Wyoming for the breeding season in mid– to late March and departs for wintering grounds in mid-August through October. In Wyoming, nesting begins in mid-May and extends into early August. Inter-annual timing of migration and nesting can vary by several weeks depending on weather conditions. The species lays one egg per day and a clutch usually consists of 3 or 4 eggs. Chicks hatch after a 10 to 12 day incubation. Fledglings leave the nest 6 to 9 days after hatching. Brewer's Sparrow re-nests following nest failure and frequently produce more than one clutch per year [3].

Diet:
Brewer's Sparrow feeds primarily on small insects gleaned from bark and foliage of shrubs. Seeds are also consumed from the ground, especially during winter [3].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: ABUNDANT
In 2013, Partner's in Flight (PIF) estimated the global population of Brewer's Sparrow to be 13 million birds. Approximately 11% of the global population, or around 1.5 million birds, breed in Wyoming [7]. From 2009–2014, the Integrated Monitoring in Bird Conservation Regions (IMBCR) program estimated an average density of 30.54 birds per km^2 in appropriate habitats in Wyoming (standard deviation 7.67, standard error 3.13) [8].

Population Trends:
Historic: UNKNOWN
Recent: MODERATE DECLINE to STABLE
Some authors indicate significant declines in Brewer's Sparrow abundance range-wide, including Wyoming [1, 2]. Trends calculated from North American Breeding Bird Survey (BBS) data from 1968–2013 indicate that Brewer's Sparrow numbers in Wyoming declined by 0.38 percent annually. Range-wide, numbers declined 0.98 percent annually from 1966–2013. The decline for Wyoming was not statistically significantly, while the range-wide decline was statistically significant [9].

Intrinsic Vulnerability:
MODERATE VULNERABILITY
Brewer's Sparrow is moderately vulnerable to extrinsic threats. The species' primary vulnerability stems from the fact that it is a sagebrush obligate [3, 6, 10]. As a result, the species may be prone to declines related to impacts to this single habitat type.

Extrinsic Stressors:
MODERATELY STRESSED
Stressors to Brewer's Sparrow populations in Wyoming and range-wide are primarily from degradation, fragmentation, and loss of sagebrush steppe habitats. Sagebrush steppe is considered one of the most threatened ecosystems in North America [11]. Fragmentation of sagebrush habitats decreased reproduction of Brewer's Sparrow [6, 10]. In Washington, fragmentation of sagebrush habitats from agricultural activities decreased both nest success and reproductive success [10]. Sagebrush habitats in Wyoming have been fragmented by agricultural activities and energy development. Given the current level of development in Wyoming, similar decreases in reproduction are possible. For example, nest success was lower in areas with natural gas development than in control areas [6]. Similarly, daily nest survival of Brewer's Sparrow declined with increased habitat loss within 1 km^2 of the nest[12]. Likewise, abundance of Brewer's Sparrow was lower near roads associated with natural gas extraction than in areas away from roads [13]. Invasive grasses represent another important threat to sagebrush habitats, primarily from increased fire frequency, which has reduced the amount of sagebrush habitat [11]. However, in the presence of sagebrush, invasive grasses in the understory did not reduce nest survival in Grand Teton National Park [14].

KEY ACTIVITIES IN WYOMING

State-wide monitoring efforts for songbirds, including Brewer's Sparrow, have been implemented though the IMBCR program since 2009 [15]. Occupancy, density, population estimates, and decision support tools are available through the Rocky Mountain Avian Data Center [8]. In 2010, the Wyoming Cooperative Fish and Wildlife Research Unit completed a research project evaluating the influence of energy development on sagebrush-obligate songbirds. Results suggest that both nest success and numbers of Brewer's Sparrow decreased as the density of natural gas wells increased [6, 16]. Continuation of this work included a study identifying specific mechanisms for observed patterns of decreased nest survival of song birds in the Jonah-Pinedale Development Area in Wyoming [17]. Results from this work indicate that nest survival rates of Brewer's Sparrow decreased with increasing habitat loss due to natural gas development. Additionally, increased prevalence of nest predators in areas with natural gas development were observed and may be linked to increased nest predation observed in these areas [18]. In addition, a project initiated by the Wyoming Cooperative Fish and Wildlife Research

Unit in 2011 evaluated the effectiveness of using Greater Sage-Grouse (*Centrocercus urophasianus*) as a single-species surrogate for the conservation and management of co-occurring wildlife species in sagebrush steppe habitats through the Wyoming Governor's Greater Sage-Grouse Core Area Protection Policy. Results indicate that 36% of suitable habitat for Brewer's Sparrow is protected by the umbrella reserve created for Greater Sage-Grouse by the core area concept [19]. Up to 63% (median = 17.3%) of the suitable habitat of shrubland/grassland-associated SGCN falls within the Greater Sage-Grouse Core Area [19, 20]. Of the 52 SGCN examined, Brewer's Sparrow ranks 13th, with 36% of its habitat protected by the core area concept [19].

ECOLOGICAL INFORMATION NEEDS

Knowledge of Brewer's Sparrow distribution during migration and winter is lacking. Breeding range of *S. b. taverneri* is poorly understood and may extend into Wyoming and northern Colorado [3]. Better estimates of population trends are needed and will continue to be refined through the IMBCR program. It is unclear how Brewer's Sparrow will respond to habitat modifications related to climate change [15].

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Andrea C. Orabona. The Brewer's Sparrow is classified as a Species of Greatest Conservation Need (SGCN) in Wyoming [15]. Although populations are stable, the species is vulnerable to severe habitat impacts that can occur from increased industrialization in the state. Two separate but compatible survey programs are in place to monitor Brewer's Sparrow populations. The first is the long-term BBS started in Wyoming in 1968 with 108 established routes [9]. Species must be detected on at least 14 routes for data analyses to be significant for tracking population status and trend over time. The IMBCR program was established in 2009 in Wyoming with many state, federal, and nongovernmental organization partners that contribute funding, field personnel, technical assistance, or in-kind services. Data analyses produce density, occupancy, and population estimates at various scales and provide decision support tools for managers [8]. Best management practices to benefit Brewer's Sparrows include continued monitoring, as well as maintaining large unfragmented stands of sagebrush habitat comprised of a mosaic of shrubs of various ages and heights with a patchy distribution and open to moderate canopy cover for grass seed and insect production [15, 21]. The Wyoming Governor's Greater Sage-Grouse Core Area Protection policy provides a mechanism to reduce human disturbance in areas with large Greater Sage-Grouse populations [20]. The core area comprises approximately 62,000 km^2, or 24% of Wyoming [20].

CONTRIBUTORS

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Figure 1: Adult Brewer's Sparrow in Sweetwater County, Wyoming. (Photo courtesy of Tom Koerner, USFWS)

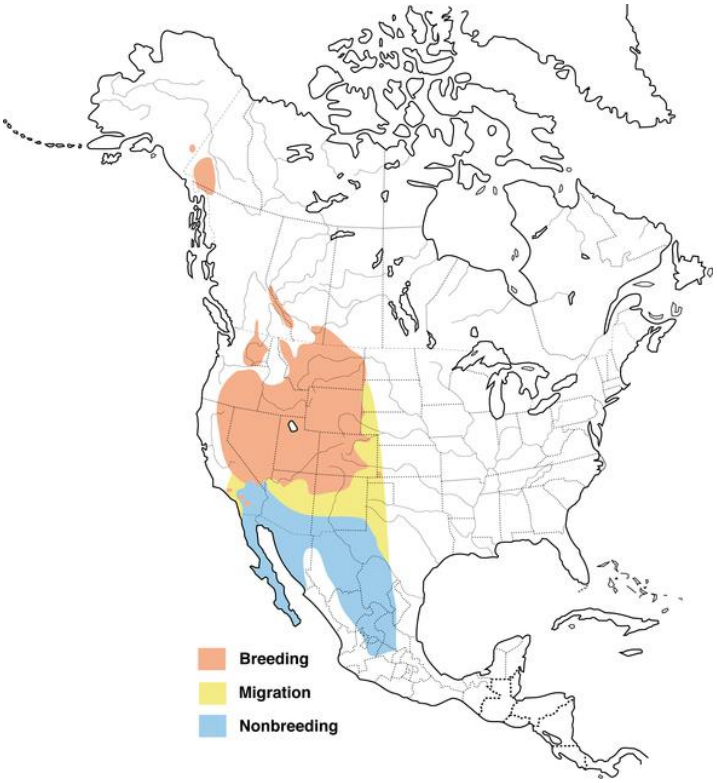

Figure 2: North American range of *Spizella breweri*. Disjunct range in Alaska and northwestern Canada represents known distribution of *taverneri* subspecies. (Map courtesy of Birds of North America, http://bna.birds.cornell.edu/bna, maintained by the Cornell Lab of Ornithology)

Figure 3: Wyoming Big Sagebrush habitat in Sweetwater County, Wyoming. (Photo courtesy of Ian M. Abernethy)

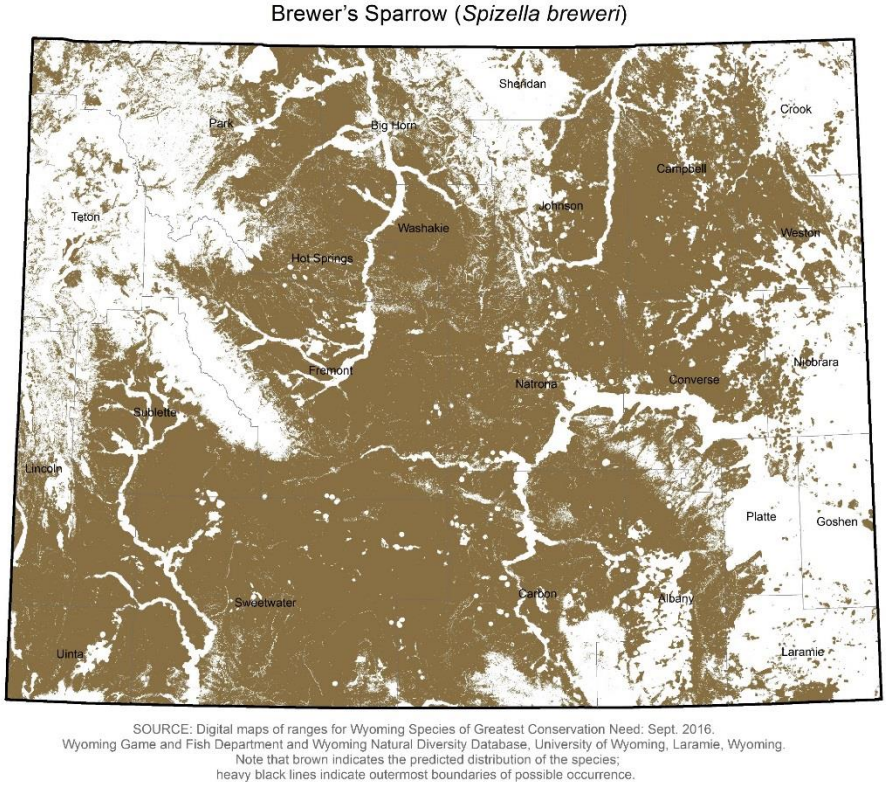

Figure 4: Range and predicted distribution of *Spizella breweri* in Wyoming.