Sage Sparrow
Amphispiza belli

Photo by Jacque Lowery

Habitat Use Profile

Habitats Used in Nevada	
Sagebrush Salt Desert Scrub	
Key Habitat Parameters ●	
Plant Composition	Sagebrush, saltbushes, greasewood, and other xeric shrubs
Plant Density & Height	Variable shrub density with shrub height up to 1 – 2 m [3.3 – 6.6 ft]; typically low amounts of grass / forb cover[7]
Mosaic	Treeless sagebrush or salt desert shrubland with little or no cheatgrass invasion[7]
Distance to Water	No relationship[3, 7]
Response to Vegetation Removal	Negative; but exotic weed control encouraged[7, EO]
Area Requirements ◑	
Minimum Patch Size	Unknown, but avoids small patches
Recommended Patch Size	> 200 ha [430 ac][8, EO]
Territory Size	0.65 – 5.8 ha [1.6 – 14.3 ac][7]

Conservation Profile

Priority Status	
Conservation Priority Species	
Species Concerns	
Historical and possible recent declines Habitat threats High stewardship responsibility	
Other Rankings	
Continental PIF	Stewardship Species
Audubon Watchlist	Yellow
NV Natural Heritage	S4B S4N
USFWS	Bird of Conservation Concern, Migratory Bird
BLM	None
USFS	None
NDOW	Conservation Priority
Trends	
Historical ●	Rangewide declines[14]
Recent ○	Assessments vary, but probably close to stable[1, 14]
Population Size Estimates	
Nevada (NBC) ◑	2,900,000
Global ○	3,900,000 [11]
Percent of Global	> 50%
Population Objective	
Maintain[11, EO]	
Monitoring Coverage	
Source	Nevada Bird Count
Coverage in NV	Good
Key Conservation Areas	
Protection	Extensive, intact sagebrush landscapes
Restoration	Degraded / burned sagebrush

Natural History Profile

Seasonal Presence in Nevada	
Spring – Summer (Great Basin) Winter (Mojave)	
Known Breeding Dates in Nevada	
Early April – early August[2]	
Nest and Nesting Habits	
Nest Placement	In dense crown of 50-100 cm [20 – 40 in] tall shrub, [9] or on ground under shrub[EO]
Site Fidelity	High for breeding territory[7]
Food Habits	
Basic	Ground forager
Primary Diet	Arthropods[7]
Secondary Diet	Seeds and other plant matter[7]

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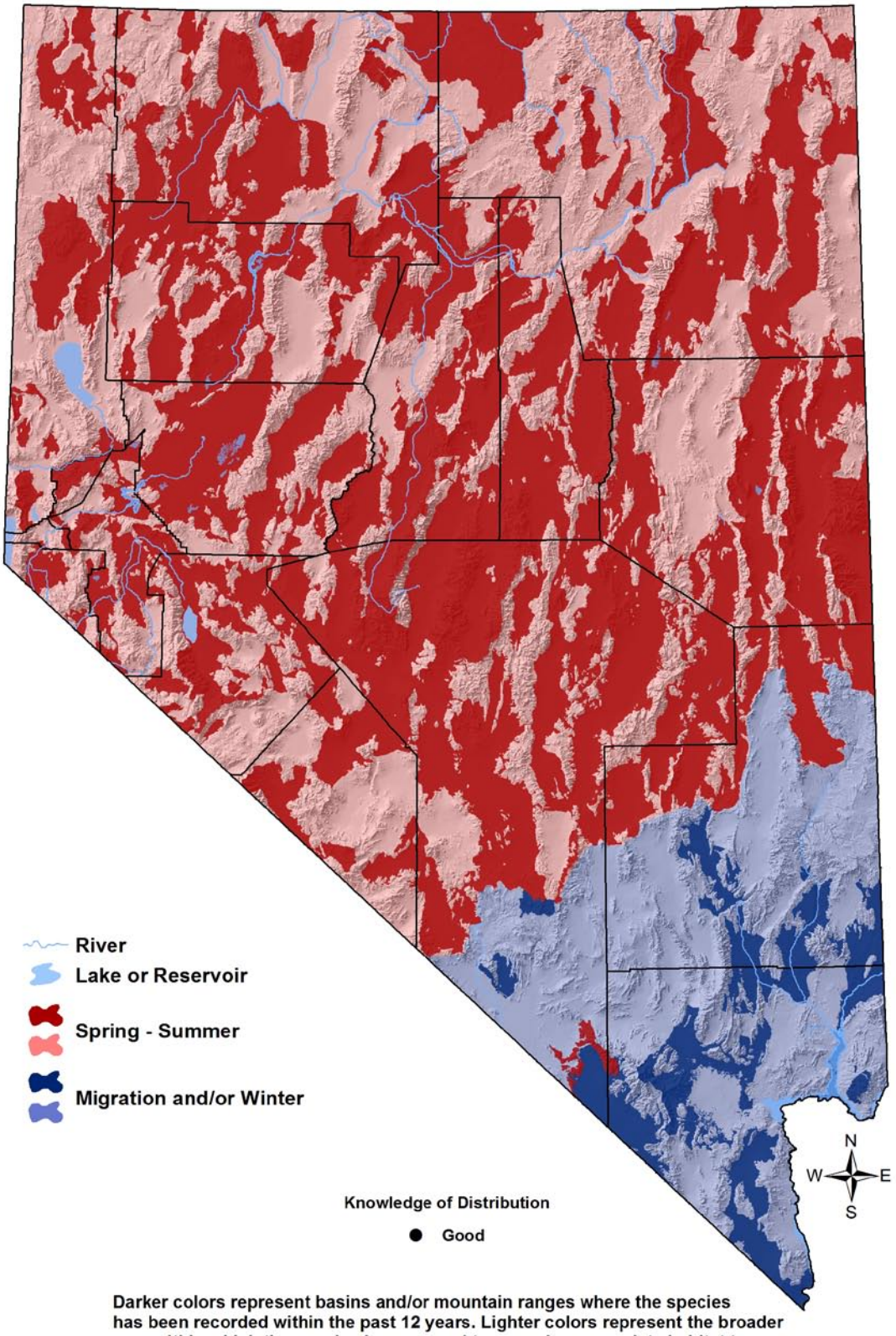

Darker colors represent basins and/or mountain ranges where the species has been recorded within the past 12 years. Lighter colors represent the broader area within which the species is presumed to occur in appropriate habitat types.

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Overview

The Sage Sparrow is abundant in Nevada, but it is nonetheless a significant conservation concern here because of its history of declines, threats to its preferred habitat, and Nevada's stewardship of approximately one-half of the species' global breeding population. Nevada also has among the highest known breeding densities for the Sage Sparrow. Sparrows are most abundant in sagebrush habitat, but they also breed in salt desert scrub more frequently than other sagebrush "obligate" birds.[6] Greasewood may also be used as a breeding substrate with some frequency, although existing evidence is ambiguous.[17] Some Sage Sparrows winter in southern Nevada, usually in sagebrush or Mojave scrub shrublands, but also in honey mesquite stands.[7]

Sage Sparrows avoid highly fragmented landscapes and are most abundant in large expanses of unbroken shrubland.[5, 16] Where present in fragmented landscapes, they are usually found nesting in only the largest shrubland fragments, although the minimum patch size threshold differs among studies,[6, 8] and nest success is typically reduced as fragmentation increases.[15] Landscape level attributes that have been positively correlated with Sage Sparrow abundance include high sagebrush density, large patch size, spatial homogeneity, and low levels of disturbance.[5, 12] At a microhabitat scale, Sage Sparrows are positively associated with density of sagebrush, total shrub cover, and amount of bare ground, and they tend to occur where shrub height is locally greater than is typical of surrounding areas.[4, 8] Sage Sparrows may also prefer a locally heterogeneous shrub-clumping pattern, but the data are not definitive.[7] The Sage Sparrow is thought to be sensitive to cheatgrass invasion because it results in less sagebrush cover for nesting and less bare ground suitable for foraging.[8] Although such information is valuable, managing directly for sagebrush microhabitat structure is difficult, in part because preferred microhabitat may vary among years, across space, and with different landscape contexts.[10, 12, 13] Fortunately, if sagebrush habitat is managed to ensure the presence of healthy intact landscapes, appropriate microhabitat will be present within this mosaic.[12]

Abundance and Occupancy by Habitat

Birds / 40 ha on NBC Transects in the Great Basin and Mojave Regions

Primary Habitat at Transect	Transects Occupied	Birds/40 ha (95% C.I.)
Great Basin		
Sagebrush	76% (25/33)	14.4 (9.8 – 19.0)
Salt Desert Scrub	70% (16/23)	8.0 (5.1 – 10.9)
Montane Shrubland	35% (7/20)	5.5 (1.6 – 9.4)
Mojave		
Sagebrush	46% (12/26)	12.4 (5.6 – 19.2)
Salt Desert Scrub	20% (2/10)	0.4 (0.0 – 0.9)

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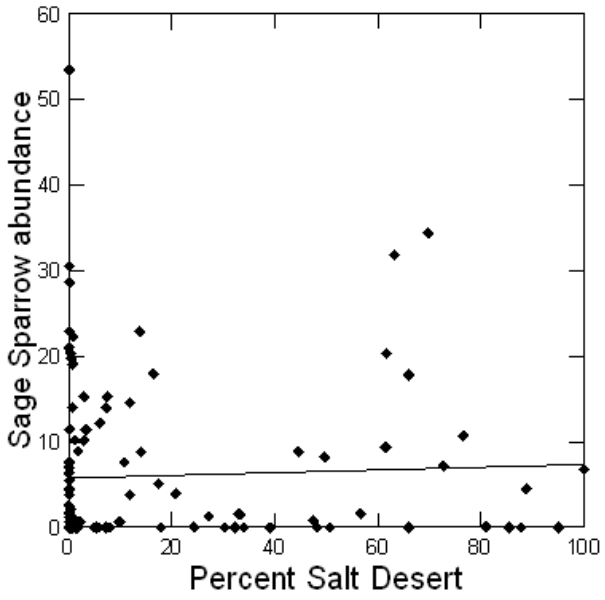
Nevada-Specific Studies and Analyses

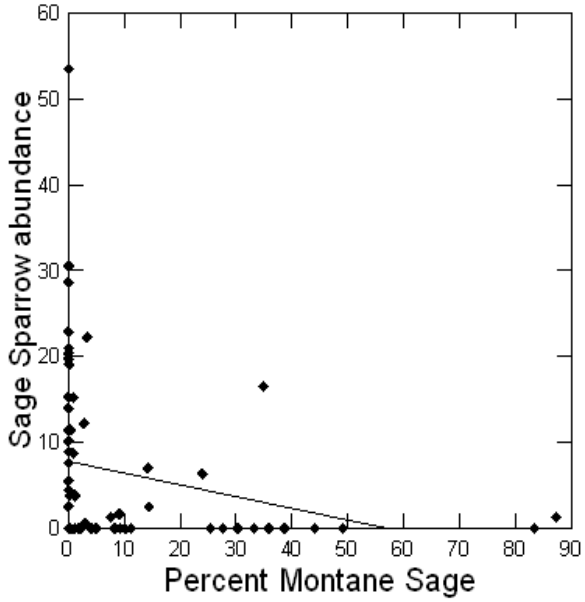
Habitat Requirements (NBC data)

Sage Sparrows were strongly associated with greater shrub cover ($p = 0.003$) and the absence of trees ($p = <0.001$). They were negatively associated with greater herbaceous cover ($p = <0.001$), shrub height was not a strong predictor, and there was no relationship to proximity of water (*Appendix 3*).

Landscape Associations (NBC data)

Sage Sparrows were strongly associated with Sagebrush habitat, and secondarily with Salt Desert Scrub habitat ($p < 0.001$ for both), and were negatively associated with most other habitat types (*Appendix 3*). Sage Sparrows were more likely to use Salt Desert Scrub habitat than any of the other sagebrush "obligate" birds (e.g. Brewer's Sparrow, Sage Thrasher). In fact, as demonstrated in the first graph below (where the X-axis shows the proportion of Salt Desert Scrub habitat present within transects containing only Sagebrush and Salt Desert Scrub habitats), they appear to use the two habitats almost interchangeably. Although the table of densities shown above suggests some association with Montane Shrubland habitat (which includes Montane Sagebrush, an NBC-defined habitat type), a more detailed analysis indicates that Sage Sparrows occurred in Montane Shrubland transects only when they contained or adjoined large amounts of (lowland) Sagebrush habitat. This is demonstrated in the second graph, where the X-axis shows the amount of "Montane Sage" habitat present within the transects that contained only Montane Sagebrush (i.e. Montane Shrubland) and (lowland) Sagebrush habitats.





The pattern of results obtained in these analyses suggest that Sage Sparrows tend to be "edge avoiders" that prefer large patches of suitable, unfragmented shrubland.

Main Threats and Challenges

Habitat Threats

Because Sage Sparrows prefer relatively large expanses of intact shrubland,[8] they are negatively affected by many factors that fragment their habitat or alter its basic structure, including:

- Fire
- Cheatgrass invasion
- Heavy livestock use
- Expansion of Pinyon-Juniper woodland into shrubland
- Heavy OHV use

Additionally, Sage Sparrows may attempt to nest unsuccessfully in degraded habitat because of persistent fidelity to breeding territories.[7]

Research, Planning, and Monitoring Challenges

- Minimum patch size needs to be further investigated in different shrubland types
- Although short-term fire management strategies are established, further research and planning is needed to clarify the most beneficial longer-term fire management strategies that protect important habitat while promoting its long-term viability

Sage Sparrow habitat in eastern Nevada. Photo by John Boone.

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Conservation Strategies

Habitat Strategies

- Sagebrush (p. Hab-17-1) and Salt Desert Scrub (p. Hab-18-1) habitat conservation strategies benefit this species
- Protect large expanses of high-quality sagebrush (see below) from fire
- Within large expanses of high-quality sagebrush with few invasive plants, attempt to channel activities that can promote establishment or maintenance of cheatgrass, including heavy livestock grazing and heavy OHV use, to areas that are already degraded
- Where pinyon-juniper encroachment is known to have recently occurred within high-quality sagebrush habitat, conduct pinyon-juniper removal projects. However, we recommend that pinyon-juniper management projects consider the importance of maintaining a natural, interspersed interface zone between sagebrush shrublands and pinyon-juniper woodlands, as discussed in the Pinyon-Juniper (p. Hab-16-1) habitat conservation plan
- Development activities should be conducted to minimize the fragmentation of large expanses of high-quality habitat
- Preserve soil integrity in salt desert scrub shrubland

Research, Planning, and Monitoring Strategies

- Identify and map large patches of intact, mature sagebrush that contain dense shrubs and little cheatgrass
- Develop a fire management strategy that ensures that high-quality sagebrush habitat receives priority fire suppression efforts in the immediate future. Additionally, develop fire management strategies that balance the need for short-term habitat protection with long-term habitat viability
- Conduct additional research to determine how pinyon-juniper management projects can both benefit Sage Sparrows as well as the suite of birds that use the pinyon-juniper / sagebrush interface zone (see p. Hab-16-1)

Public Outreach Strategies

- None identified

References: [1]Dobkin and Sauder (2004); [2]GBBO unpublished Atlas data; [3]GBBO unpublished NBC data; [4]Holmes and Johnson (2005); [5]Knick and Rotenberry (1995); [6]Knick et al. (2008); [7]Martin and Carlson (1998); [8]Paige and Ritter (1999); [9]Petersen and Best (1985); [10]Petersen and Best (1987); [11] Rich et al. (2004); [12]Rotenberry and Knick (1999); [13]Rotenberry and Wiens (2009); [14] Sauer et al. (2008); [15]Vander Haegan (2007); [16]Vander Haegan et al. (2000); [17]Wiens and Rotenberry (1981); [EO] Expert opinion