



Botteri's Sparrow, photo by ©Bill Radke

Conservation Profile

Species Concerns	
Habitat Loss and Degradation Unsustainable Livestock Grazing Fire Suppression Climate Change (Drought, Habitat Shifting)	
Conservation Status Lists	
USFWS ¹	BCC List (BCR 34)
AZGFD ²	Tier 1B
DoD ³	No
BLM ⁴	Sensitive Species
PIF Watch List ^{5b}	No
PIF Regional Concern ^{5a}	BCR 34
Migratory Bird Treaty Act	
Covered	
PIF Breeding Population Size Estimates ⁶	
Arizona	25,000
Global	170,000 ●
Percent in Arizona	14.7%
PIF Population Goal ^{5b}	
Maintain	
Trends in Arizona	
Historical (pre-BBS)	Possible regional extirpations ⁸
BBS ⁷ (1968 – 2013)	Not given
PIF Urgency/Half-life (years) ^{5b}	
Insufficient Data	
Monitoring Coverage in Arizona	
BBS ⁷	Not adequate
AZ CBM	Covered
Associated Breeding Birds	
Chihuahuan Raven, Cassin's Sparrow, Grasshopper Sparrow, Chihuahuan Meadowlark	

Breeding Habitat Use Profile

Habitats Used in Arizona	
Primary: Semi-desert Grasslands Secondary: None	
Key Habitat Parameters	
Plant Composition	Giant sacaton, alkali sacaton, tobosa, Lehmann's lovegrass, and other grasses; scattered mesquite or other shrubs or trees is a common element ⁸
Plant Density and Size	Dense, senescent sacaton stands reaching 6.5 inches in height ⁸ ; most abundant in stands 20 – 30 years old ⁸
Microhabitat Features	Nests in tall, senescent grass clump with high overhang; substantial ground cover (≥ 85%) of herbaceous plants near nests; forages in relatively open grass stands ⁸
Landscape	Floodplain bottoms and other periodically flooded areas adjacent to grassy hillsides for foraging ^{8,9}
Elevation Range in Arizona	
3,550 – 5,200 feet ⁹	
Density Estimate	
Territory Size: 2 – 5 acres (excluding foraging sites) ⁸ Density: 2 birds/acre in optimal habitat	

Natural History Profile

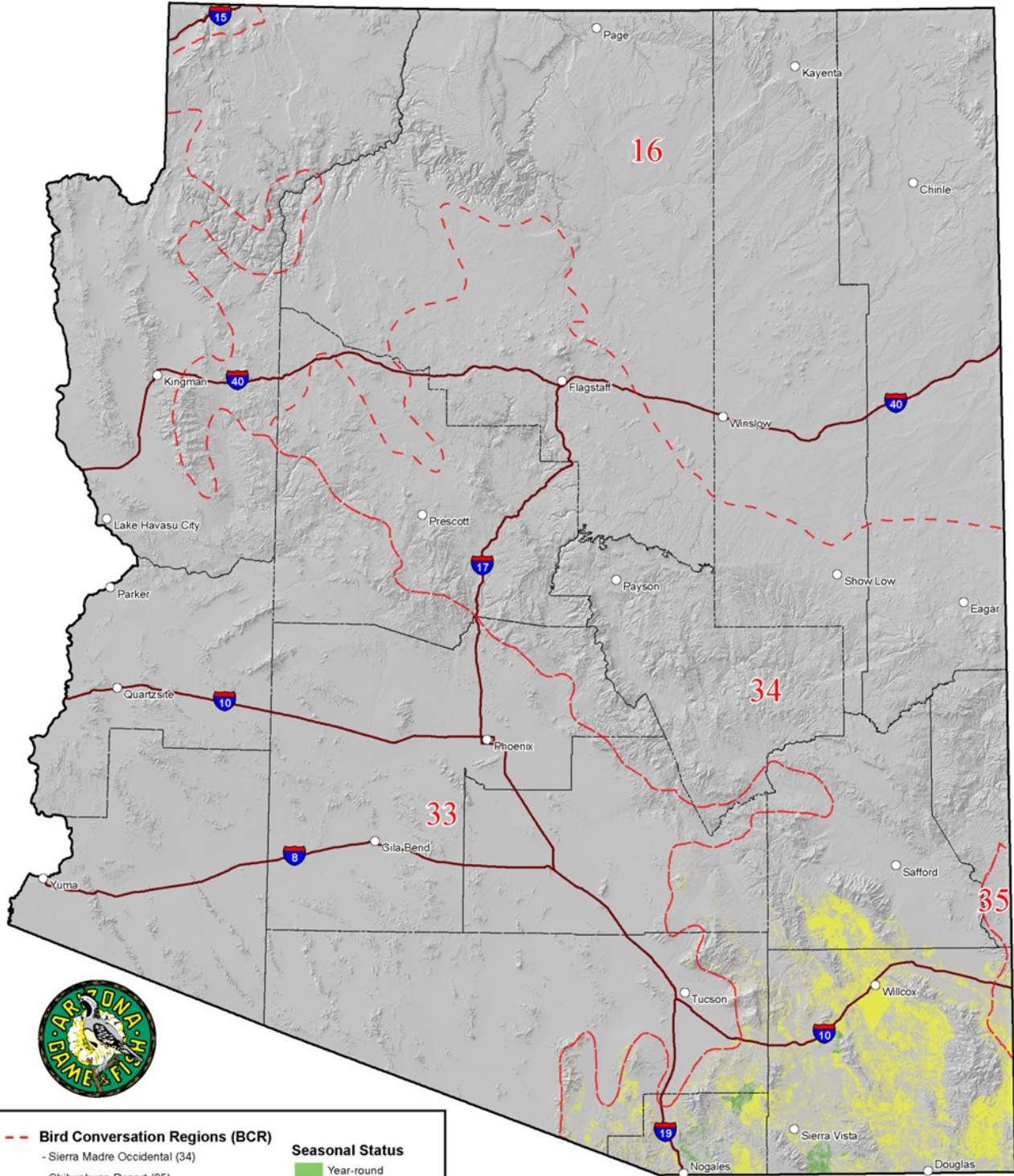
Seasonal Distribution in Arizona	
Breeding	July – mid-September ⁹
Migration	April – May; September – October
Winter	Mostly absent mid-October – April, but some winter locally
Nest and Nesting Habits	
Type of Nest	Cup ⁸
Nest Substrate	Often a tall, dense grass clump ⁸
Nest Height	Ground ⁸
Food Habits	
Diet/Food	Insects, mostly grasshoppers; some seeds ⁸
Foraging Substrate	Ground in open grass stands



Confidence in Available Data: ● High ● Moderate ○ Low ^ Not provided

Last Update: April 2023

Distribution of Botteri's Sparrow



-- Bird Conservation Regions (BCR)	Seasonal Status
- Sierra Madre Occidental (34)	■ Year-round
- Chihuahuan Desert (35)	■ Breeding Only
- Sonoran & Mojave Deserts (33)	Counties
- Southern Rockies & Colorado Plateau (16)	

This map represents the predictive distribution for an individual species. AZGFD warrants no guarantees of accuracy or currency of the data represented.

SPECIES ACCOUNT ● BOTTERI'S SPARROW *Peucaea botterii*



General Information

Distribution in Arizona

During summer, Botteri's Sparrows are found in the southeastern corner of Arizona, ranging west to the Buenos Aires National Wildlife Refuge, east to the Animas Valley of southwestern New Mexico, and very locally north of I-10 (Corman 2005). The Arizona subspecies (*arizonae*) winters largely south of the U.S. border in Mexico, although they have been found wintering locally within some of their breeding areas in the state (Schmierer 2013). Botteri's Sparrows reach the northern-most extension of their global breeding range in southeastern Arizona (Webb and Bock 2012).

Habitat Description

Botteri's Sparrows are most abundant in grassy swales, floodplain bottoms, and lower canyon drainages that are dominated by giant sacaton and periodically flooded (Webb and Bock 2012). In Arizona, they are often the most common species breeding in sacaton grasslands, especially in tall, dense, senescent stands that are 20 – 30 years old (Jones and Bock 2005). Sacaton is a coarse grass that accumulates a large amount of dead standing biomass that is undesirable to ungulates (Webb and Bock 2012) but is favored by Botteri's Sparrows. In upland grasslands, Botteri's Sparrow is a less common but regular breeder in areas of alkali sacaton and tobosa that are lightly interspersed with shrubs or trees such as mesquite, acacia, and oak woodland. The species also occurs in upland stands of exotic lovegrasses (Jones and Bock 2005).

Microhabitat Requirements

Giant sacaton is a dense bunchgrass that can reach 6 – 7 feet in height, and Botteri's Sparrows usually select the tallest, densest giant sacaton stands for their nest sites (Webb and Bock 2012). Nests are located on the ground in thick, overhanging grass clumps with dead biomass. However, in some areas, Botteri's Sparrows nest in shorter bunchgrass species such as tobosa and alkali sacaton, often far from stands of giant sacaton. All nest sites have a nearby cluster of song perches (Webb and Bock 2012), which may consist of scattered shrubs or trees. Botteri's Sparrows forage in nearby open grass stands that support large insects, particularly grasshoppers (Webb and Bock 2012).

Landscape Requirements

Botteri's Sparrows occur at the edge or in elevated patches of sacaton bottomlands and, to a lesser extent, in adjoining upland slopes where they are safe from inundation and have access to relatively open, grassy hillsides (Webb and Bock 2012). Sacaton stands that are bordered by thornscrub, were recently burned, or have significant amounts of weeds and fewer grasshoppers are less suitable for Botteri's Sparrow (Webb and Bock 1990). Minimum patch sizes and responses by Botteri's Sparrows to landscape disturbances have not been studied quantitatively.



Conservation Issues and Management Actions

Population Decline

Historic records suggest that Botteri’s Sparrows were more widely distributed in Arizona grasslands in the 19th century and prior to extended droughts and cattle grazing practices that leave today’s sacaton landscapes at < 5% of their original range (Webb and Bock 2012). No Arizona records of Botteri’s Sparrows are known from 1903 – 1932; the species may have been extirpated during that time, or small undetected populations may have survived in sacaton, which is largely unpalatable for cattle (Webb and Bock 2012). Climate change, drought, and severe weather can also negatively impact Botteri’s Sparrows by potentially increase the frequency and severity of wildfire, decrease grassland habitat through lack of adequate groundwater recharge, create conditions that favor shrub invasion into grasslands, and influence the diversity, population dynamics, and biomass of prey items (insects).

Threats Assessment

This table is organized by Salafsky et al.’s (2008) standard lexicon for threats classifications. Threat level is based on expert opinion of Arizona avian biologists and reviewers. We considered the full lexicon but include only medium and high threats in this account.

Threat	Threat Rating
Residential and Commercial Development <ul style="list-style-type: none"> Housing and urban areas 	High
Agriculture <ul style="list-style-type: none"> Livestock farming and ranching 	High
Energy Production and Mining <ul style="list-style-type: none"> Renewable energy 	Medium
Transportation and Service Corridors <ul style="list-style-type: none"> Roads and roadways Utility and service lines 	Medium
Natural System Modifications <ul style="list-style-type: none"> Fire and fire suppression Dams and water management/use Other ecosystem modifications 	High
Invasive and Problematic Species <ul style="list-style-type: none"> Invasive non-native/alien plants Problematic native plants 	High
Climate Change <ul style="list-style-type: none"> Ecosystem encroachment Changes in temperature regimes Changes in precipitation and temperature regimes 	High

In the following section we provide more detail about threats, including recommended management actions. Threats with similar recommended actions are grouped.



Agriculture:

- Livestock farming and ranching

Invasive and Problematic Species:

- Invasive non-native/alien plants
- Problematic native plants

Certain agricultural practices create the potential for grassland habitat loss, conversion, and fragmentation. Altered fire regimes, shrub encroachment, unsustainable livestock grazing, and introduced grasses are the main factors that contribute to changes in plant species composition and density that reduce habitat suitability for Botteri's Sparrow (Van Auken 2000, Merola-Zwartjes 2005, Webb and Bock 2012). Unsustainable grazing can reduce adequate nesting cover and create "sacrifice areas" surrounding salt blocks, water tanks, and other livestock attractants. Human-induced habitat disturbances result in loss of grassland cover, soil compaction, dewatering, erosion, and replacement of grasses by other vegetation (Webb and Bock 2012). For example, Botteri's Sparrows observed in early 1970s in San Rafael Valley had apparently disappeared by 1983, likely as a result of heavy livestock grazing and weed invasion (Webb and Bock 2012). Unsustainable grazing also encourages invasion by woody plants by reducing fine fuels and leaving unpalatable woody plants (Van Auken 2000, Merola-Zwartjes 2005). Motorized recreation has similar impacts on vegetation cover to livestock grazing and may need to be addressed as a conservation concern for sacaton grasslands. All of these activities have the potential for altering habitat, which can impact plant and insect density, diversity, and biomass needed by Botteri's Sparrows. Shrub and tree invasion can increase predation on grassland nesting birds by ravens, which benefit from increased hunting perches. Non-native grasses can alter nesting success and fledging success by decreasing the timing and species composition of insects fed upon by young birds.

Recommended Actions:

1. Maintain mature sacaton grasslands, mesquite grasslands, and tobosa swales from the Altar Valley east to New Mexico and south of I-10 (Latta et al. 1999).
2. Strategically plan for habitat conservation of areas currently occupied by Botteri's Sparrows, as well as potentially suitable or restorable areas.
3. Protect these areas from destructive land use practices, as well as areas adjacent to mature sacaton, which are important for Botteri's Sparrow foraging.
4. Limit livestock use to 35 – 40 percent in years of good rainfall and reduce stocking rates in drought years (Merola-Zwartjes 2005).
5. Create a mosaic of ungrazed and grazed areas; create permanent grazing exclosures of at least 2,500 acres (Merola-Zwartjes 2005).
6. Maintain a mosaic of ungrazed sacaton stands in different stages of post-fire succession to facilitate Botteri's Sparrow nest site availability and dispersal of fledglings (Webb and Bock 2012).
7. Where appropriate, use active fire management to restore sacaton stands (Browning and Archer 2010).
8. Disseminate information to partners on effects of grazing on Botteri's Sparrow habitat.
9. Exclude vehicles in critical Botteri's Sparrow habitat and focus recreation on already degraded areas.

Residential and Commercial Development:

- Housing and urban areas



Energy Production and Mining:

- Renewable energy

Transportation and Service Corridors:

- Roads and roadways
- Utility and service lines

Natural System Modifications:

- Other ecosystem modifications

Residential and commercial development can fragment Botteri's Sparrow habitats, encouraging invasive plants, increasing nest predation by native birds (grackles and ravens) and exotic animals (especially cats), changing insect population levels, and increasing groundwater use. Roads and firebreaks (planned or otherwise) promote habitat fragmentation and create the potential for altered fire regimes, increased direct mortality, and weed introduction (Frair et al. 2008; Christen and Matlack 2009; Sayre and Knight 2010).

Recommended Actions:

1. Maintain mature sacaton grasslands, mesquite grasslands, and tobosa swales in the regions from the Altar Valley east to New Mexico and south of I-10 (Latta et al. 1999).
2. Strategically plan for habitat conservation of areas currently occupied by Botteri's Sparrow, as well as potentially suitable or restorable areas.
3. Protect these areas from destructive land use practices, as well as areas adjacent to mature sacaton, which are important for Botteri's Sparrow foraging.
4. Exclude vehicles in critical Botteri's Sparrow habitat; designate recreation for already degraded areas.

Natural System Modifications:

- Fire and fire suppression

In Arizona, fire intervals of 20 – 30 years in grasslands benefit Botteri's Sparrow. The species may not reach maximum density in protected sacaton bottoms for 20 years after fires or other disturbances, although accumulation of dead biomass and erosion in older stands may also reduce habitat value (Webb and Bock 2012). While frequent burns of grasslands are detrimental, initial treatment with prescribed fire may be necessary to restore shrub-encroached grasslands.

Recommended Actions:

1. Manage grasslands at 20 – 30 year fire intervals to maintain optimal Botteri's Sparrow habitat.
2. Restore degraded areas that have potential for Botteri's Sparrow habitat, including determining the role of fire management.

Natural System Modifications:

- Dams and water management/use

Because of their dependence on floodplain grasslands and swales, Botteri's Sparrows are vulnerable to groundwater table lowering. This may be the result of municipal groundwater pumping or dispersed private



wells. A potential solution to improve groundwater recharge is construction of retention/detention dams. These slow precipitation runoff, increase water absorption and infiltration, and increase aquifer recharge capacity. However, retention/detention dams also have the potential to catch and trap fine, water-borne sediment, which can create a clay layer that is resistant to water infiltration. In some habitats this can actually be a detriment to groundwater recharge because it increases evaporation loss and woody shrubs, and may alter the density and relative abundance of native grass species. This can result in additional vulnerability to Botteri's Sparrows and other grassland dependent species (Jones and Bock 2005), but individual site characteristics will dictate proper water management.

Recommended Actions:

1. Monitor and manage groundwater table to retain sacaton communities.
2. Encourage water-efficient agricultural practices.
3. Promote public pride in water-efficiency and the benefits to native birds and other wildlife.
4. Assess benefits of site-specific retention/detention dam construction prior to supporting and implementing modifications to the landscape.

Climate Change

- Ecosystem encroachment
- Changes in temperature regimes
- Changes in precipitation and temperature regimes

Recommended Actions:

1. See Research and Monitoring Priorities below.

Research and Monitoring Priorities

1. Monitor Botteri's Sparrows to determine population trends; this may require additional efforts beside standard multi-species monitoring programs due to the species' delayed breeding season.
2. Determine area requirements and responses to landscape disturbances by Botteri's Sparrow.
3. Study the effects of residential and commercial development on Botteri's Sparrow nesting success.
4. Study the effects of climate change and drought on bottomland grasslands.
5. Encourage research into mechanisms that allow Botteri's Sparrows to persist in the face of climate change and habitat fragmentation.

Literature Cited

⁴Arizona Bureau of Land Management Sensitive Species List – March 2017.

²Arizona Game and Fish Department. 2012. Arizona's State Wildlife Action Plan: 2012 – 2022. Arizona Game and Fish Department, Phoenix, AZ.



- Bock, C.E. and J.H. Bock. 1978. Response of birds, small mammals, and vegetation to burning of sacaton grassland in southeastern Arizona. *J. Range Manage.* 31(4):289 – 300.
- Bock, C.E., and W.M. Block. 2005. Fire and birds in the southwestern United States. *Studies in Avian Biology* 30:14–32.
- Christen, D.C., and G.R. Matlack. 2009. The habitat and conduit functions of roads in the spread of three invasive plant species. *Biological Invasions* 11:453 – 465.
- ⁹Corman, T.E. 2005. Botteri's Sparrow. *In: Arizona Breeding Bird Atlas.* Corman, T.E., and C. Wise-Gervais (eds.) University of New Mexico Press. Albuquerque, NM.
- ³Department of Defense. 2012. DoD PIF Mission-Sensitive Priority Bird Species. Fact Sheet #11. Department of Defense Partners in Flight Program.
- Frair, J.L., E.H. Merrill, H.L. Beyer, and J.M. Morales. 2008. Thresholds in landscape connectivity and mortality risks in response to growing road networks. *Journal of Applied Ecology* 45(5):1504 – 1513.
- Jones, Z.F. and C.E. Bock. 2005. The Botteri's Sparrow and exotic Arizona grasslands: an ecological trap or habitat regained? *Condor* 107(4):731 – 741.
- Merola-Zwartjes, M. 2005. Birds of Southwestern grasslands: Status, conservation, and management. *In* Finch, D.M., Editor. 2005. Assessment of grassland ecosystem conditions in the Southwestern United States: wildlife and fish—Volume 2. Gen. Tech. Rep. RMRS-GTR-135-vol. 2. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pp. 71 – 140.
- ^{5a}Partners in Flight. 2019. Avian Conservation Assessment Database, version 2019. Accessed on March 31, 2020.
- ⁶Partners in Flight Science Committee. 2019. Population Estimates Database, version 3.0. Accessed on March 31, 2020.
- ^{5b}Rosenberg, K.V., J.A. Kennedy, R. Dettmers, R.P. Ford, D. Reynolds, J.D. Alexander, C.J. Beardmore, P. J. Blancher, R.E. Bogart, G.S. Butcher, A.F. Camfield, A. Couturier, D.W. Demarest, W.E. Easton, J.J. Giocomo, R.H. Keller, A.E. Mini, A.O. Panjabi, D.N. Pashley, T.D. Rich, J.M. Ruth, H. Stabins, J. Stanton, T. Will. 2016. Partners in Flight Landbird Conservation Plan: 2016 Revision for Canada and Continental United States. Partners in Flight Science Committee.
- Salafsky, N., Salzer, D., Stattersfield, A.J., Hilton-Taylor, C., Neugarten, R., Butchart, S.H.M., Collen, B., Cox, N., Master, L.L., O'Connor, S. and Wilkie, D. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. *Conservation Biology* 22(4): 897 – 911.
- ⁷Sauer, J.R., J.E. Hines, J.E. Fallon, K.L. Pardieck, D.J. Ziolkowski, Jr., and W.A. Link. 2016. The North American Breeding Bird Survey, Results and Analysis 1966 – 2013, Version 2016. USGS Patuxent Wildlife Research Center, Laurel, MD. Accessed on July 1, 2016.



- Sayre, N.F., and R.K. Knight. 2010. Potential effects of United States – Mexico border hardening on ecological and human communities in the Malpai Borderlands. *Conservation Biology* 24(1):345 – 348.
- Schmierer, A. 2013. Current post-breeding, winter, and spring status of Botteri's Sparrow (*Peucaea botterii arizonae*) in Arizona. *Arizona Birds Online - The Journal of the Arizona Field Ornithologists*.
- ¹U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 85 pp.
- Van Auken, O.W. 2000. Shrub invasions of North American semiarid grasslands. *Annual Review of Ecology and Systematics*. 31(1):197 – 215.
- Webb, E. A. and C.E. Bock. 1990. Relationship of the Botteri's Sparrow to sacaton grassland in southeastern Arizona. Pp. 199-209 *in* Managing wildlife in the southwest: proceedings of the symposium. (Krausman, P. R. and N. S. Smith, Eds.) Arizona Chapter Wildlife Society, Tucson.
- ⁸Webb, E.A. and C.E. Bock. 2012. Botteri's Sparrow (*Peucaea botterii*), *The Birds of North America Online* (A. Poole, ed.) Ithaca: Cornell Lab of Ornithology.

Recommended Citation

Arizona Bird Conservation Initiative and Sonoran Joint Venture. 2023. Botteri's Sparrow (*Peucaea botterii*) Species Account. Available at <https://sonoranjv.org/accounts/botteris-sparrow.pdf>.

