Savannah Sparrow (*Passerculus sandwichensis*)

Vulnerability: **Increase Likely** Confidence: Very High

The Savannah Sparrow has a widespread breeding range across North America from the southern U.S. to Arctic Alaska. This species will breed in open habitats ranging from meadows, cultivated fields, grazed pastures, roadsides, coastal grasslands and tundra (Wheelwright and Rising 2008). On the coastal plain of Arctic Alaska, tundra nesting habitat is often associated with stream/river drainages, nesting on the ground often hidden under low shrubs (Wheelwright and Rising 2008). During the breeding season they forage in a wide range of habitats on a variety of insect prey although seeds and other vegetative matter are also consumed (Wheelwright and Rising 2008). Savannah Sparrows are short-distance migrants and winter in the southern U.S. and Mexico (Wheelwright and Rising 2008). The North American population trend is currently stable (Wheelwright and Rising 2008).

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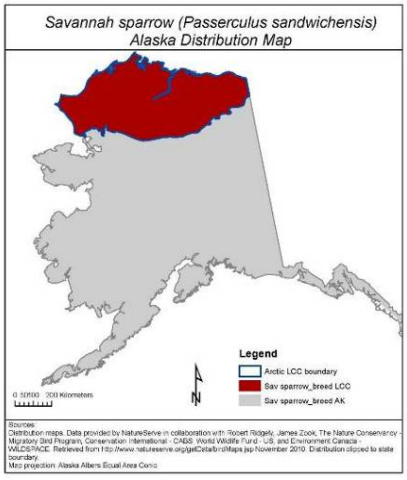
Range: We used the extant NatureServe range map for the assessment as it closely matched the Birds of North America and other range descriptions (Johnson and Herter 1989, Wheelwright and Rising 2008).

For most of the indirect exposure and sensitivity categories in the assessment, Savannah Sparrows were scored with a neutral response (see table on next page). For five categories their traits were considered to decrease vulnerability.

Human Responses to CC: Across their range Savannah Sparrows have generally benefited from human activity, and their densities over the past century are probably greater than at any time in the past because of this species' dependence on human-modified open habitats (e.g. fields, hay fields, cropland) (Wheelwright and Rising 2008). Based on this pattern, human responses to climate change in the Arctic LCC will likely either have no impact or potentially benefit this species.

Physiological Thermal Niche: As they are at the northern extreme of their breeding range in Arctic Alaska, Savannah Sparrows may actually benefit from a warmer climate, particularly during the nestling stage when their thermoregulatory capacity is compromised and cold snaps can be frequent and potentially lethal (Barry 1962) early in the breeding season. At some point, ambient temperatures may exceed a critical point in their ability to adjust physiologically, however the magnitude of climate warming estimated for the next 50 years is likely not great enough for this to be an issue (Martin et al. 2009).



Physiological Hydro Niche: Savannah Sparrows are not known to be closely associated with aquatic/wetland habitats or moisture regimes although they do often use habitats along riparian stretches on the coastal plain (J. Liebezeit, unpublished data.). Reduction in invertebrate communities from net drying affect could negatively affect foraging success during the breeding season but current projections of annual potential evapo-transpiration suggest negligible atmospheric-driven drying for the

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Vulnerability Factors	D	SD	N	SI	I	GI	Unknown or N/A
B1. Sea level rise			*				
B2a. Natural barriers			*				
B2b. Anthropogenic barriers			*				
B3. Human response to CC		*	*				
C1. Dispersal/Movement			*				
C2ai. Historical thermal niche (GIS)			*				
C2aii. Physiological thermal niche		*	*				
C2bi. Historical hydro niche (GIS)			*				
C2bii. Physiological hydro niche		*	*	*	*		
C2c. Disturbance regime			*				
C2d. Ice & Snow habitats			*				
C3. Physical habitat restrictions		*					
C4a. Biotic habitat dependence			*				
C4b. Dietary versatility		*	*				
C4d. Biotic dispersal dependence			*				
C4e. Interactions with other species			*				
C5a. Genetic variation		*					
C5b. Genetic bottlenecks							*
C6. Phenological response		*	*	*			*
D1. CC-related distribution response			*				

D=Decrease vulnerability, SD=Somewhat decrease vulnerability, N=Neutral effect, SI=Slightly increase vulnerability, I=Increase vulnerability, GI=Greatly increase vulnerability.

foreseeable future (TWS and SNAP). Also this species could potentially switch to less aquatic-dependent prey as they have a broad diet (Wheelwright and Rising 2008).

Genetic Diversity: Savannah Sparrows exhibit high genetic diversity (Zink et al. 2005) and would thus likely be more resilient to disease and other disturbance events than species with lower genetic diversity.

Phenological Response: One common breeding passerine, the Lapland Longspur, appears to have adjusted nest initiation in response to climate warming over the last 10 years (J. Liebezeit and S. Zack, unpublished data), but it is unknown whether this result can be generalized. During a 20-year period (1992-2011) Savannah Sparrows have shown no significant shift in earlier or later departure dates from the Alaska Bird Observatory's banding station in Fairbanks, Alaska (S. Guers, unpublished data). Little else is known regarding phenology in this species (S. Guers, pers. comm.).

In general, this assessment suggests that Savannah Sparrows exhibit high flexibility in habitat use and behavior and so will likely increase under current predictions of climate change.

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