Lapland Longspur (*Calcarius lapponicus*)

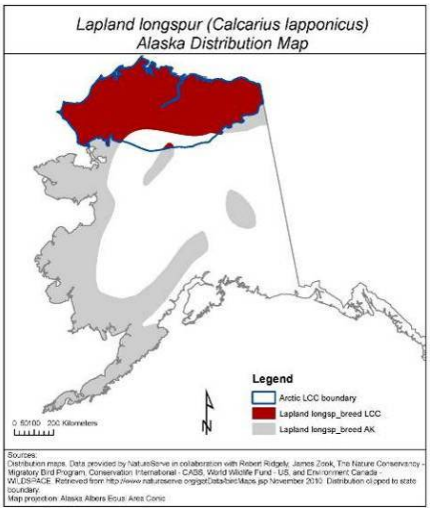
Vulnerability: **Increase Likely** Confidence: Moderate

The Lapland Longspur is the most abundant passerine breeder on the North Slope of Alaska. This species is most commonly associated with the Arctic Coastal Plain, but also nests in alpine habitats in the interior Brooks Range. High nesting densities have been found throughout the Alaskan coastal plain (Custer and Pitelka 1977, Liebezeit et al. 2011) with nesting sites often in dry/moist tundra near tussocks and less frequently in wetter tundra habitats (Hussell and Montgomerie 2002). During the breeding season they typically forage in a wide range of habitats on a variety of invertebrates but also consume seeds and other vegetative matter (Hussell and Montgomerie 2002). Alaskan Lapland Longspurs are short-distance migrants and are believed to winter in temperate North America. Current North American population estimate is 40-50 million.

Range: We used the extant NatureServe range map for this assessment as it closely matched the Birds of North America and other range maps (Hussell and Montgomerie 2002, Bart et al. 2012).

For most of the indirect exposure and sensitivity categories in the assessment, Lapland Longspurs were ranked with a neutral response (see table on next page). For five categories, longspurs were ranked as potentially having decreased vulnerability. For two categories ("habitat restrictions" and "biotic dispersal potential") this ranking is a reflection of this species ubiquitous range across the assessment area and flexible usage of habitats for both nesting and foraging.

Physiological Thermo Niche: Longspurs may actually benefit from a warmer physiological thermal niche, particularly during the nestling stage when their thermo-regulatory 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 tipping point in longspur ability to adjust physiologically, however summer climate warming estimates in the next 50 years are probably not drastic enough for this to be an issue (Martin et al. 2009).



Phenological Response: Some evidence indicates that Lapland Longspurs are able to track phenological changes associated with a warming climate at least in terms of nest initiation (J. Liebezeit and S. Zack, unpublished data) suggesting they may be able to compensate for a warming climate, at least in terms of nest timing. However their ability to cope with decoupling of nest initiation and other events is unknown.

Physiological Hydro Niche: In terms of hydrological niche, longspurs may experience some detrimental impact as they do have some level of dependency on wetter habitats. They would unlikely be significantly affected. In fact, a drying trend could expand preferred habitat. It is important to note that current moisture

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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.

balance predictions suggest, at best, negligible drying for the foreseeable future (TWS and SNAP). Thus moisture balance, as an exposure factor was not heavily weighted in the assessment.

Disturbance regime: Unlike many of the shorebirds and waterfowl species, longspurs are not dependent on shoreline habitats and so would likely not be significantly impacted by rising sea level or coastal disturbance events.

Overall, this assessment suggests that Lapland Longspus could benefit and possibly increase under the current predictions of climate change during the timeframe of this assessment.

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