Semipalmated Sandpiper (*Calidris pusilla*)

Vulnerability: **Presumed Stable** Confidence: High

The Semipalmated Sandpiper is likely the most abundant breeding shorebird on the Arctic Coastal Plain of Alaska, with the highest densities occurring in the western portion of the coastal plain (Johnson et al. 2007). In Arctic Alaska, this species nests in a range of upland dry to moist and wet tundra habitats near water and typically focus their foraging along marsh and pond edges (Gratto-Trevor 1992). The current North American population estimate is 2 million (Morrison et al. 2006). While the Alaska breeding population appears to be stable, there is evidence that eastern Semipalmated Sandpiper populations are declining (Andres et al. 2012).

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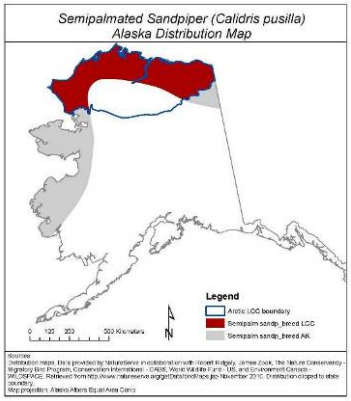
Range: We used the extant NatureServe range map for the assessment as it closely matched that of the Birds of North America (Gratto-Trevor 1992) and other sources (Johnson et al. 2007, Bart et al. 2012).

Physical Habitat Restrictions: Among the indirect exposure and sensitivity factors (see table on next page), Semipalmated Sandpipers scored "neutral", in many categories. Although this species breeds primarily on the coastal plain in the Arctic LCC assessment area, they do occur well inland and so sea level rise impacts will likely be minimal and their ability to shift range (e.g. in response to habitat changes) will not be significantly compromised.

Physiological Hydro Niche: Although this species relies on water-dominated habitats for foraging, they often utilize moist to dry tundra for nesting. For this reason, the physiological hydrologic niche category was scored only as "slightly increased" vulnerability. Significant tundra drying could certainly have an impact on their foraging habitats. However, current projections of annual potential evapo-transpiration suggest negligible atmospheric-driven drying for the foreseeable future (TWS and SNAP). Thus atmospheric moisture, as an exposure factor (most influential on the "hydrological niche" sensitivity category), was not heavily weighted in the assessment.

Disturbance Regime: Climate-mediated disturbance processes, namely thermokarst, could both create and destroy good foraging and nesting habitats through both ice wedge degradation and draining of thaw lakes. Likewise, increased coastal erosion and resulting salinization (Jones et al. 2009) could both negatively and positively affect post-breeding staging birds by destroying and creating foraging habitat.



Dietary Versatility: Semipalmated Sandpipers have a flexible diet and evidence suggests they take advantage of a wide variety of invertebrate prey (Gratto-Trevor 1992) so they would likely not face negative impacts from a changing prey base.

Interactions with Other Species: In terms of dependence on interspecific interactions, this species will communally feed and flock with other shorebirds during post- breeding staging (Taylor et al. 2010), but it is unknown if these behaviors increase species persistence. Climate change may reduce the amplitude of lemming cycles (Ims and Fuglei 2005) and thus could expose this species to greater nest predation pressure if lemmings become less available as alternative prey.

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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.

Genetic Variation: Little is known about Semipalmated Sandpiper genetics although, in general, many shorebird species are believed to have low genetic variation (Baker and Stauch 1988) and thus potentially would be more vulnerable to certain climate-mediated events in the near future (e.g. disease outbreaks). However, at this time, there is no support for low genetic variation for this species.

Phenological Response: There is evidence suggesting that this species is able to track phenological changes associated with a warming climate at least with respect to nest initiation (J. Liebezeit and S. Zack unpublished data, D. Ward, pers. comm.). However, it is unknown if they can synchronize timing with other organisms they depend on (e.g. invertebrate prey).

In summary, despite some potential sources of vulnerability, Semipalmated Sandpipers will likely be able to compensate for most and remain "stable" with regard to climate change at least during the timeframe considered by this assessment.

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