Pectoral Sandpiper (*Calidris melanotos*)

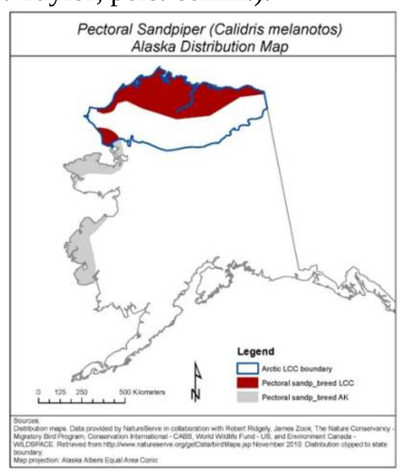
Vulnerability: **Presumed Stable** Confidence: High

The Pectoral Sandpiper is one of the most abundant breeding birds on the Arctic Coastal Plain of Alaska. They typically have low nest site fidelity which is likely related to their promiscuous mating strategy, thus nest densities are highly variable from year to year at a given site (Holmes and Pitelka 1998). In Arctic Alaska, primary breeding habitat includes low-lying ponds in a mix of marshy to hummocky tundra and nests are typically placed in slightly raised or better drained sites (Holmes and Pitelka 1998). Pectoral Sandpipers spend their winters primarily in southern South America (Holmes and Pitelka 1998). The current North American population estimate is 500,000 and they are believed to be declining (Morrison et al. 2006).

Range: We used the extant NatureServe range map for the assessment as it closely matched that of the Birds of North America (Holmes and Pitelka 1998). It should be noted that in Alaska the highest densities occur in the western portion of the coastal plain (Johnson et al. 2007).

Physiologic Hydro Niche: Net loss of nesting and foraging habitat related to drying tundra is likely to be the most important source of vulnerability for this species (see table on next page). Wet / moist coastal tundra habitats in the Arctic LCC may decrease in extent if changes in summer temperature and soil active layer depth create a generally drier summer environment in the Arctic. 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. Increasing shrubs and paludification may also decrease sedge/wet meadow tundra extent (Martin et al. 2009).

Physical Habitat Restrictions: Shoreline armoring related to climate change mitigation could reduce the availability of brackish water staging habitats that this species sometimes uses prior to fall migration. However, shoreline armoring would be focused on existing communities or infrastructure, which is limited in extent at present. Overall, pectoral sandpipers tend to stopover/stage infrequently at coastal areas (most birds tend to feed in tundra habitats prior to fall migration), so this limits their exposure to coastal land use changes as well (A. Taylor, pers. comm.).



Disturbance Regime: Climate-mediated disturbance, namely thermokarst, could both create and destroy 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 aggregations of staging birds by destroying and creating foraging habitat.

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. Pectoral sandpiper nest survivorship is often higher in

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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.

boom lemming years (J. Liebezeit, unpublished data). Lemming cycles are predicted to become rarer (Ims and Fuglei 2005) and could potentially expose this species to greater nest predation pressure.

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

In summary, despite the potential negative effects of tundra drying, Pectoral Sandpipers will likely be able to compensate for such changes and remain "stable" with regard to climate change at least during the timeframe of this assessment.

Literature Cited

Ims, R.A. and E. Fuglei. 2005. Trophic interaction cycles in tundra ecosystems and the impact of climate change. BioScience 55: 311-322

Holmes, R.T. and F.A. Pitelka. 1998. Pectoral Sandpiper (*Calidris melanotos*). In The Birds of North America, No. 348. (A. Poole and F. Gill, eds.). The Birds of North America, Inc. Philadelphia, PA.

Johnson, J.A., R.B. Lanctot, B.A. Andres, J.R. Bart, S.C. Brown, S.J. Kendall, and D.C. Payer. 2007. Distribution of breeding shorebirds on the Arctic Coastal Plain of Alaska. Arctic 60(3): 277-293.

Jones, B.M., C.D. Arp, M.T. Jorgenson, K.M. Hinkel, J.A. Schmutz, and P.L. Flint. 2009. Increase in the rate and uniformity of coastline erosion in Arctic Alaska. Geophysical Research Letters 36, L03503.

Martin, P., J. Jenkins, F.J. Adams, M.T. Jorgenson, A.C. Matz, D.C. Payer, P.E. Reynolds, A.C. Tidwell, and J.R. Zelenak. 2009. Wildlife response to environmental Arctic change: Predicting future habitats of Arctic Alaska. Report of the Wildlife Response to Environmental Arctic Change (WildREACH), Predicting Future Habitats of Arctic Alaska Workshop, 17-18 November 2008. Fairbanks, Alaska, USFWS, 148 pages.

Morrison, R.I.G., B.J. McCaffery, R.E. Gill, S.K. Skagen, S.L. Jones, G.W. Page, C.L. Gratto-Trevor, and B.A. Andres. 2006. Population estimates of North American shorebirds, 2006. Wader Study Group Bulletin 111:67-85.

Taylor, A.R., R.B. Lanctot, A.N. Powell, F. Huettmann, D. Nigro and S.J. Kendall. 2010. Distribution and Community Characteristics of Staging Shorebirds on the Northern Coast of Alaska. Arctic 63(4): 451-467.

The Wilderness Society (TWS) and Scenarios Network for Alaska Planning (SNAP), Projected (2001-2099: A1B scenario) monthly total potential evapotranspiration from 5 AR4 GCMs that perform best across Alaska and the Arctic, utilizing 2km downscaled temperature as model inputs. http://www.snap.uaf.edu/data.php.

From: Liebezeit et al. 2012. Assessing Climate Change Vulnerability of Breeding Birds in Arctic Alaska. A report prepared for the Arctic Landscape Conservation Cooperative. Wildlife Conservation Society, North America Program, Bozeman, MT., 167pp.