Arctic Tern (*Sterna paradisaea*)

Vulnerability: **Presumed Stable** **Stable Confidence:** Moderate

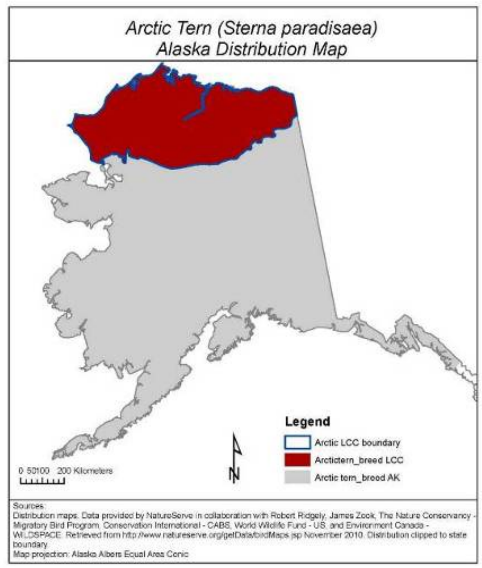
The Arctic Tern completes annual epic migrations from pole to pole covering at least 40,000 km on their round-trip journeys. They breed throughout Arctic Alaska from boreal to tundra habitats and have their highest nesting densities inland (Lensink 1984). Arctic Terns typically choose nest sites on open ground near water and often on small islands in ponds and lakes (Hatch 2002). Arctic terns consume a wide variety of fish and invertebrate prey, fish are particularly important during the breeding season for feeding young (Hatch 2002). This species spends their winters (austral summers) in offshore waters near Antarctica (Hatch 2002). Alaskan Arctic Coastal Plain population estimates from 2011 range from 7-12,000 (Larned et al. 2012).

Range: We used the extant Nature Serve map for the assessment as it matched other range map sources and descriptions (Johnson and Herter 1989, Hatch 2002).

Physiological Hydrologic Niche: Among the indirect exposure and sensitivity factors in the assessment (see table on next page), Arctic Terns ranked neutral in most categories with the exception of physiological hydrologic niche for which they were evaluated to have a "slightly to greatly increased" vulnerability. This response was driven primarily by this species reliance on wetland and shallow water bodies for breeding and foraging. An arctic drying trend could result in loss of small water bodies. However, this drying trend could be offset by changes in surface hydrology that create more nesting and foraging habitat (Martin et al. 2009). 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 was not heavily weighted in the assessment.

Physiological Thermal Niche: Arctic Terns occur throughout Alaska in a variety of habitats including warmer boreal environs so there is no plausible reason to think they could not adapt physiologically to a warmer Arctic environment in the foreseeable future.

Dietary Versatility: Although small fish make up a significant part of the Arctic Tern, they also eat many invertebrates and so exhibit enough flexibility in their diet that they would likely be able to cope with climate-mediated changes in prey base.



Disturbance Regime: Climate-mediated disturbance processes, namely thermokarst, could both create and destroy lake habitats through both ice wedge degradation and draining of thaw lakes (Martin et al. 2009). Loss of both coastal and inland nesting and foraging habitats by coastal erosion, and an increase in sea and riverine levels could have negative impacts although in the foreseeable future these impacts will likely be localized.

Phenological Response: Despite the existence of long-term data sets for Arctic Terns 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.

northern Alaska (Larned et al. 2012) an assessment of phenology-related variables has not been a part of that effort or has not been examined so it is currently unknown how this species will respond to changing biotic schedules.

Interactions with Other Species: Fox nest predation could increase as the availability of "island" nesting sites could be more limited if shallower ponds dry out from a region-wide tundra drying trend.

In summary, the results of this vulnerability assessment indicate that the Arctic Tern will likely be adaptable enough to cope with climate change and associated habitat changes predicted to occur in Arctic Alaska, at least during the 50 year timeline of this assessment.

Literature Cited

Hatch, J.J. 2002. Arctic Tern (*Sterna paradisaea*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/707 doi:10.2173/bna.707

Johnson, S.R. and D.R. Herter. 1989. The birds of the Beaufort Sea, Anchorage: British Petroleum Exploration (Alaska), Inc.

Larned, W., R. Stehn, and R. Platte. 2012. Waterfowl breeding population survey, Arctic Coastal Plain, Alaska, 2011. Unpublished Report, U.S. Fish and Wildlife Service, Anchorage, AK. 51pp.

Lensink, C.J. 1984. The status and conservation of seabirds in Alaska. Pp. 13-27 in Status and conservation of the world's seabirds. (J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, eds.) International Council of Bird Preservation, Cambridge, UK.

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.

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.