Glaucous Gull (*Larus hyperboreus*)

Vulnerability: **Presumed Stable** Confidence: Moderate

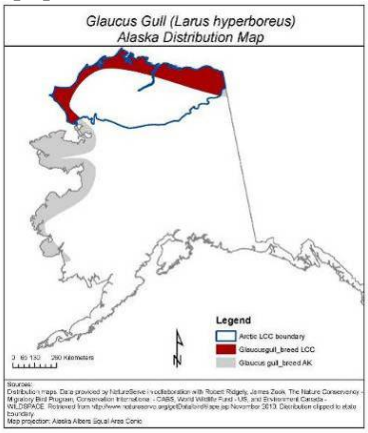
The Glaucous Gull is a large gull with a circumpolar distribution. In Alaska, it is the most common gull along Arctic Ocean coastal areas. Like other gulls, this generalist species has benefited from the presence of humans in the arctic and readily utilizes human-subsidized food resources (e.g. edible garbage, roadkills; Day 1998). Glaucous Gulls take advantage of a wide variety of natural prey as well and are a noted nest predator. Alaskan populations of this species winter in the Pribilof and Aleutian islands of Alaska and in decreasing numbers down to coastal Oregon and California (Denlinger 2006). The global population is estimated at 340,000-2,400,000 (Wetlands International 2006).

Range: We used the extant NatureServe range map for this assessment as it closely matched the Birds of North America (Gilchrist 2001) and other range descriptions (Johnson and Herter 1989).

Physical Habitat Restrictions: Among the indirect exposure and sensitivity factors (see table on next page), Glaucous Gull ranked neutral in most categories with the exception of physiological hydrologic niche for which they were evaluated to have a "neutral to greatly increased" vulnerability. This response was driven primarily by their common use of small islands in shallow ponds and lakes for nesting to escape fox and bear predation (Gilchrist 2001). If tundra lakes drain due to permafrost melting and/or if less surface water is available, Glaucous Gulls could become limited by nesting habitat or at least experience years of low nesting success more frequently as predation rates could increase.

Physiological Hydro Niche: The wide range in responses in this category captures the significant uncertainty both in the direction and intensity of change in Arctic hydrology, as well as in the effect this will have on gulls. Current projections of annual potential evapotranspiration 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.

Human Response to CC: Increased human activity and infrastructure associated with climate change mitigation could benefit Glaucous Gulls as witnessed by the influence of current human developments in the region (Day 1998). Glaucous Gull reproductive success is often higher in human developed areas in the Arctic (Weiser and Powell 2010). Melting sea ice will likely allow for additional offshore drilling and new shipping routes – both of which have the potential to benefit Glaucous Gulls if they provide a new at-sea source of food (garbage). This could improve subadult / nonbreeding survival rates and result in an increased population in Arctic Alaska.



Physiological Thermal Niche: Glaucous Gulls are coastally oriented (the coast being cooler than inland areas). The lakes/ponds on which they nest are also quite cold with water

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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.

temperatures barely above 0° C for most of the summer. Glaucous Gulls are thermoneutral to 2° C (Gabrielsen and Mehlum 1989) so it is not surprising that these cold-adapted birds would be uncomfortable in warm weather. This could potentially change their distribution if local temperatures increase although it is unlikely that summer coastal temperatures would change so much as to eliminate them from arctic Alaska.

Phenological Response: Currently, there are no long-term data sets to provide sufficient information on Glaucous Gull phenological response to climate change in the arctic and so it is unknown how they will respond to changing phenologies.

In summary, this vulnerability assessment suggests that Glaucous Gulls will remain stable in the region with regard to climate change impacts and potentially even benefit from a warming climate.

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