Snowy Owl (*Bubo scandiacus*)

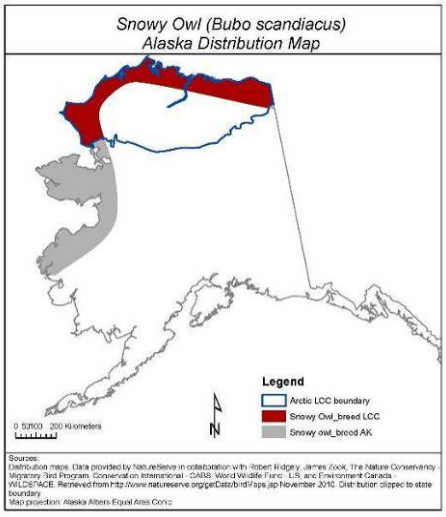
Vulnerability: **Presumed Stable** Confidence: High

The Snowy Owl, a conspicuous and majestic bird of the circumpolar arctic, is an efficient hunter of small mammals in tundra environs. In years of high lemming numbers they will focus on this abundant food source but will readily switch to a wide variety of other prey when lemmings are scarce (Parmelee 1992). Their breeding range in Alaska is generally restricted to the Arctic Coastal Plain, typically nesting in more upland tundra habitats, although they often, though not exclusively, forage in wetter tundra (Parmelee 1992). Snowy Owls are unpredictable migrants and will sometimes "invade" portions of southern Canada and the northern contiguous US, in winters when lemmings are scarce in the Arctic. The current global population is estimated at 300,000 (Rich et al. 2004).

Range: We used the extant Nature Serve range map for the assessment as it closely matched the Birds of North America (Parmelee 1992) and other range descriptions (Johnson and Herter 1989).

Interactions with Other Species: Snowy owl nesting seems to be tied to some degree to lemming population booms, so reductions in brown lemmings or less frequent population booms (through habitat change and/or increased icing events; see Ims and Fuglei 2005) could impact nest survivorship of snowy owls, distribution, and abundance. Thus, in this assessment, related categories ("dietary versatility", "species interaction") were ranked as "slightly increased" vulnerability. However, Snowy Owl's ability to switch to a variety of other prey sources suggest that it may be able to compensate for such changes with little negative effect.

Physiological Hydro Niche: Similarly, although Snowy Owls do utilize wet tundra habitats for foraging, sometimes extensively, they exploit drier tundra habitats as well, typically nesting in drier upland tundra. Because of this, they are unlikely to be significantly affected by a tundra drying trend in the arctic which could result in a net loss of wet tundra habitats. Current projections of annual potential evapo-transpiration suggest negligible atmospheric-driven drying for the foreseeable future (TWS and SNAP). Thus moisture balance, as an exposure factor (most influential on the "hydrological niche" sensitivity category), was not heavily weighted in the assessment.



Disturbance Regime: In terms of climate-mediated disturbances, deeper snow and subsequent flooding in early spring could reduce hunting success. Additionally, increased fires (Racine et al. 2004) could reduce available hunting and nesting areas but it is likely this would not result in significant impacts as the effects of these disturbances would be localized. However, over time (probably >50 years to be significant) increased fires could accelerate shrubification (Tape et al. 2006) reducing habitat quality.

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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.

Physiological Thermal Niche: While habitat and prey are available further south, Snowy owl breeding range in the Arctic LCC is restricted along a 50-100km band along the Alaskan coastline, where temperatures are cooler compared to inland in the summer, suggesting a potential thermal sensitivity.

Phenological Response: There is at least one long-term data set in Arctic Alaska that could shed some light on how this species phenology may be changing with climate (D. Holt, pers. comm.). To date, though, it has not been analyzed so it is unknown how this species is or will respond to changing biotic schedules.

In summary, Snowy Owls certainly have some life history traits that potential make them vulnerable to climate change. However, within the time frame of this assessment this species will likely be able to cope with impacts associated with a changing climate and remain stable.

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