King Eider (*Somateria spectabilis*)

Vulnerability: **Presumed Stable** Confidence: Moderate

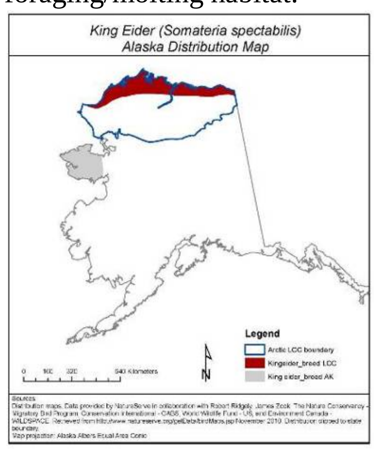
The King Eider, conspicuous for the male's elegant plumage, is a common nester on the Arctic Coastal Plain of Alaska. King Eiders typically nest in wet lowland tundra with many small ponds and pools, islands, and wet marshes. Dry tundra is also used when small lakes and ponds are available nearby as foraging areas (Powell and Suydam 2012). Unlike other eiders, this species is not as closely tied to coastal breeding habitats. During the breeding season, their diet is primarily omnivorous (Powell and Suydam 2012). Alaskan breeders spend their winters in marine environments mostly in the Bering Sea and along the Aleutians (Powell and Suydam 2012). Eider populations have declined since the 1970s (Powell and Suydam 2012). Current Arctic Coastal Plain population is estimated at approximately 15,000 (Larned et al. 2005).

Range: We used the extant NatureServe range map for this assessment as it closely matched the Birds of North America and other range descriptions. Because of their reliance on habitats relatively near the coast their ability to shift to new habitats is restricted.

Human Response to CC: All-weather roads (necessitated by a warming climate and shortened ice road season) associated with energy extraction activities could impact this species. At the same time, impounded water created by a road network could provide additional foraging habitat (J. Liebezeit, pers. obs.). Overall, human activity related to climate change mitigation will likely be localized in the near future so would only slightly increase vulnerability.

Physiological Hydro Niche: King Eiders showed the strongest "increased vulnerability" response in the "physiological hydrologic niche" category, ranging from "slightly" to "greatly increased" vulnerability. This range represents uncertainty both in the direction and intensity of change in Arctic hydrology, as well as in the effect this will have on the eider. If substantial tundra drying occurs, this species could experience a negative impact as they are highly dependent on wet tundra habitats for nesting and foraging (Powell and Suydam 2000). 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, was not heavily weighted in the assessment. Also, interaction with hydrologic processes is very poorly understood (Martin et al. 2009).

Disturbance Regime: Climate-mediated disturbance, namely thermokarst, could both create and destroy good foraging and nesting habitats through both ice wedge degradation and draining of thaw lakes (Martin et al. 2009). 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/molting habitat.



Interactions with Other Species: King Eiders are known to benefit from nesting in the vicinity of aggressive species, (e.g. Glaucous Gulls) but these interactions are not required for

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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.

persistence (Bentzen et al. 2009. It is possible that red fox nest predation could increase as this species may become more numerous in the arctic (Pamperin et al. 2006) and eiders would not be able to defend nests as successfully as against the smaller arctic foxes.

Genetic Variation: King Eiders have relatively

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.

climate driven changes.

Phenological Response: The relationship between seasonal temperature/precipitation and phenology for this species in the Arctic LCC has not yet been studied, so it is at best speculative to assert how King Eiders would respond to changing habitat phenology.

Related Distribution Response: Decline of birds from 1970s to 1990s is potentially explained by reduced carrying capacity of wintering habitats in the Bering Sea due to a regime shift towards warmer waters supporting a different and less energetically profitable benthic invertebrate community (Suydam et al. 2000).

In summary, despite some sources of vulnerability, King Eiders will likely remain "stable" and adjust to climate-mediated changes in their breeding range for the next 50 years.

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