Red Phalarope (*Phalaropus fulicarius*)

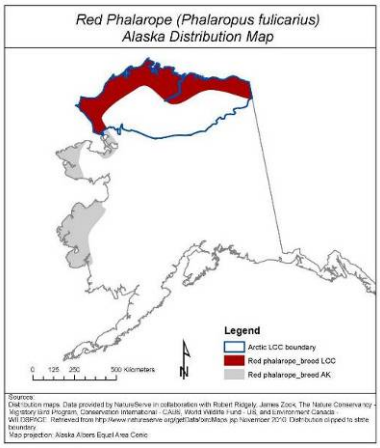
Vulnerability: **Moderately Vulnerable** Confidence: Low

The Red Phalarope commonly breeds on the Arctic Coastal Plain of Alaska, but is more abundant west of the Colville River primarily near the coast (Johnson et al. 2007). In Alaska, this species almost exclusively nests in wet/moist polygonal or marshy tundra and are dependent on aquatic food sources for much of their diet (Tracy et al. 2002). Red Phalaropes are the most pelagic of the three phalarope species and spend most of their winters in subtropical and tropical seas near areas of nutrient upwelling (Tracy et al. 2002). Current population estimate of the North American population is 1.25 million with a suspected declining trend (Morrison et al. 2006).

Range: We used the extant Nature Serve range map for the assessment as it closely matched that of the Birds of North America (Tracy et al. 2002) as well other range descriptions (Johnson et al. 2007, Bart et al. 2012).

Physiological Hydro Niche: Among the indirect exposure and sensitivity factors in the assessment (see table on next page), the greatest potential source of vulnerability for Red Phalaropes was in the "physiological hydrologic niche" category. Scores for physical hydrological niche ranged 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 phalarope. If substantial tundra drying occurs this species could experience a considerable negative impact as they primarily depend on wet tundra habitats for nesting and foraging in Alaska as well as in other parts of their range (Tracy et al. 2002). It is unknown how adaptable this species would be in utilizing drier habitats for nesting. Current projections of annual potential evapo-transpiration suggest negligible atmospheric-driven drying for the foreseeable future (TWS and SNAP), and its interaction with hydrologic processes is very poorly understood (Martin et al. 2009). Thus atmospheric moisture, as an exposure factor, was not heavily weighted in the assessment.

Physiological Thermal Niche: Red Phalarope were also scored as having a "slight increase" in vulnerability with respect to physiological thermal niche because they tend to breed closer to the coast which is cooler than interior habitats where the same breeding and foraging habitat types are available. It is possible, phalaropes are responding to some other factor, rather than thermal conditions, in their coastal restriction.



Disturbance Regime: During post-breeding, Red Phalaropes will often use the leeward side of barrier islands for foraging (Taylor et al. 2010). These types of habitat features are relatively uncommon and are vulnerable to disturbances. In particular, coastal erosion and overwash (Jones et al. 2009) related to more frequent and severe storms may negatively impact post-breeding phalaropes. Other disturbance processes, such as thermokarst-mediated changes on the landscape, could both create and destroy nesting and foraging habitats.

Interactions with Other Species: Climate change may reduce the amplitude of lemming cycles (Ims and Fuglei 2005) and thus could

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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.

expose this species to greater nest predation pressure if lemmings become less available as alternative prey. In addition, 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.

Phenological Response: There is evidence suggesting some shorebirds are 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 other organisms changing schedules that they depend on (e.g. invertebrate prey).

In summary, as a result of the combined potential sources of vulnerability, Red Pharalope was considered "moderately vulnerable" to climate change in this assessment.

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