gulls out competed all shorebird species including Red Knots for horseshoe crab eggs, and that the influence of gulls increases with repeated disturbance. In contrast to shorebirds, people walking dogs caused gulls to leave but they returned shortly after the disturbance ended.

Red Knot foraging efficiency is also adversely affected by the mere presence of gulls. Hernández (2005) found that the foraging efficiency of Red Knots feeding on horseshoe crab eggs decreased by as much as 40% when feeding close to a gull.

Risks Associated with Small Population Size

The threat to *C. c. rufa* may become further increased if the population drops below about 10,000 because Baker et al. (2005a) has shown that, due to their low genetic variability, the effective size of shorebird populations is much smaller than numbers censused (i.e., not all individuals contribute to the gene pool). As a result, census populations of 5,000–10,000 are likely to be especially vulnerable to the accumulation of harmful genetic mutations. Small populations are also at greater risk from the effects of stochastic events. This applies especially those which, like the Red Knot, are highly dependent on a small number of sites.

Weather-Related Threats to Red Knots

Cold and/or wet weather during the brief arctic summer can have a severely adverse effect on the breeding success of shorebirds (van de Kam et al. 2004). Global climate warming may lead to alterations in arctic weather patterns. These may be beneficial to shorebirds if they lead to warmer, longer breeding seasons but this is by no means certain (Rehfisch and Crick 2003).

In the very long term global warming may lead to large-scale habitat changes which will be greatly exacerbated by vegetation responses to increased atmospheric carbon dioxide (Rehfisch and Crick 2003). It has been predicted that this may lead to a 65% decrease in tundra habitat over a large area of the Arctic (Cramer 1997). If so, Red Knot breeding habitat would become so scarce that there is little doubt that this would restrict the size of its population.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION FOR POPULATIONS

Appendix 4 summarizes details of the ownership of all land considered to be important for Red Knots throughout the western Atlantic flyway. This appendix also indicates the approximate percentage of land that is subject to some arrangement for habitat protection. However, it should be noted that the nature of such arrangements varies from place to place and in only a very few cases is the arrangement specifically for the benefit of Red Knots.

PAST AND CURRENT CONSERVATION AND HABITAT MANAGEMENT ACTIVITIES UNDERTAKEN TO BENEFIT THE SPECIES

As part of this assessment, biologists representing each state and country were contacted and were requested to outline management efforts for Red Knots. We found that no management efforts are directed specifically at Red Knots along the entire length of the flyway except in the area of Delaware Bay. However, many global, national, regional, and state-specific management and conservation efforts have been implemented to benefit shorebirds in general, including the Red Knot.

The Ramsar Convention on Wetlands

The Convention on Wetlands, signed at Ramsar, Iran in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Presently the convention has 146 contracting parties with 1,463 wetland sites, totaling 125,400,000 ha, designated for inclusion in the Ramsar List of Wetlands of International Importance.

The mission of the convention agreed at the eighth meeting of the Conference of the Contracting Parties in Valencia in 2002 is to promote the conservation and wise use of all wetlands through local, regional, and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world (http://www.ramsar.org).

Western Hemisphere Shorebird Reserve Network

The network is a voluntary, non-regulatory coalition of over 160 private and public organizations in seven countries working together to study and conserve shorebirds throughout their habitats. Membership in Western Hemisphere Shorebird Reserve Network (WHSRN) provides the site with international recognition as a major host for shorebirds. The network now includes 46 officially designated sites that are responsible for managing >80,940,000 ha. Member sites are located in Argentina, Brazil, Peru, Suriname, Mexico, U.S., and Canada. Further, almost 150