RED KNOT (*Calidris canutus rufa*)

SPOTLIGHT SPECIES ACTION PLAN

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for:

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August 12, 2010
Date

U.S. FISH AND WILDLIFE SERVICE - SPOTLIGHT SPECIES ACTION PLAN
Common Name: Red Knot
Scientific Name: *Calidris canutus rufa*
Lead Region: Region 5
Lead Field Office: New Jersey Field Office

Species Information:
Status: Candidate
Listing Priority Number: 3
Candidate Assessment Form: June 17, 2009
Most Recent 5-year Review: NA
Other: May 2007 Status Assessment Report on Status of the Red Knot in the Western Hemisphere

Threats: A significant factor threatening the red knot is destruction and modification of its habitat and forage, particularly the decline of key food resources resulting from reductions in horseshoe crabs (*Limulus polyphemus*), which are harvested for use as bait and to support a biomedical industry. Other identified threat factors include: habitat destruction due to beach erosion and shoreline protection and stabilization projects, human disturbance, the inadequacy of existing regulatory mechanisms, and competition with other species for limited food resources. The concentration of red knots in the Delaware Bay and coastal Virginia and a relatively small number of wintering areas makes the species vulnerable to potential large-scale events such as oil spills, severe weather, and the effects of climate change on distribution and quality of coastal habitats. Coastal wind turbine farms and climate change are emerging rangewide threats.

Five-Year Goal: Stabilize or improve the conservation status of the species.

Recent surveys at South American and southeastern United States (U.S.) wintering areas and at Delaware Bay during spring migration indicate a substantial decline in red knot populations as compared to baseline information from the 1980s, with relatively stable populations at very low levels since the mid 2000s. Our short-term goal includes: (1) Preventing further declines, and (2) stabilizing or increasing red knot numbers by reducing the magnitude and imminence of habitat-based and human-disturbance threats to red knot at wintering and migration areas.

Measures: Within the 5-year planning horizon, reduce the magnitude and imminence of habitat-based and human-disturbance threats as measured by:

- Elimination of the threat of reduced availability of horseshoe crab egg forage base at the Delaware Bay migration stopover sites by establishing horseshoe crab harvest levels that are compatible with red knot needs.
- Increased protection of red knot foraging and roosting habitat within migration and wintering areas.
- Reduced loss of red knot habitat from coastal development, habitat conversion, and erosion.

- Reduced magnitude of human disturbance to red knots at migration and wintering sites.
- Characterization and abatement of site-specific threats identified within red knot breeding areas.
- Stable or increased populations of red knots at the Delaware Bay stopover area and the Tierra del Fuego, Maranhão, and southeastern U.S. wintering areas.

To evaluate accomplishment of these measures, the U.S. Fish and Wildlife Service (USFWS) will assess the following performance indicators:

- The proportion of red knots reaching a threshold departure weight of $\geq$ 180 grams during the Delaware Bay stopover.
- The Delaware Bay horseshoe crab population trend and number of spawning horseshoe crabs.
- The proportion of the red knot range where actions have occurred that address threats to the species.
- The population trend of red knot as indicated by surveys at the Delaware Bay stopover area and Tierra del Fuego, Maranhão, and southeastern U.S. wintering areas.

Listing Factors: The actions identified within this plan will address threats relative to the following listing factors:

- The present or threatened destruction, modification, or curtailment of a species habitat or range.
- The inadequacy of existing regulatory mechanisms.
- Other natural or manmade factors affecting a species continued existence.

Actions and Roles of USFWS and Other Agencies and Organizations: A number of efforts are currently underway by the USFWS, State agencies, conservation organizations, and others. Following is a far-from-complete list of conservation partners actively engaged in red knot and horseshoe crab protection, recovery, and research. This action plan is not intended to serve as a comprehensive long-term conservation strategy for the red knot but is, rather, intended to complement the various existing plans and ongoing planning efforts. These planning initiatives are key to reducing the magnitude and imminence of habitat-based and human-disturbance threats to the red knot. The USFWS will work collaboratively with shorebird and fisheries researchers and managers to accomplish the goal of this plan.

USFWS - As lead for the species, the New Jersey Field Office (NJFO), Endangered Species Program will coordinate conservation efforts by other Ecological Services offices and other USFWS programs [Partners for Fish and Wildlife, Coastal Program, Conservation Planning Assistance, National Wildlife Refuges (NWRs), Fisheries, Migratory Birds, Wildlife and Sport Fish Restoration (WSFR), and Landscape Conservation Cooperatives (LCC)] within the USFWS Northeast (Region 5), Southeast (Region 4), and Southwest (Region 2) regions. The NJFO will continue to assess any changes in the conservation status of the red knot and will work with other USFWS

Ecological Services offices, other USFWS programs, and partners to facilitate implementation of the conservation actions and survey, monitoring, and research needs outlined in the 2007 red knot status assessment report. The NJFO and other Ecological Services, Coastal, Migratory Bird, and LCC programs will establish collaborative partnerships with State, Federal, and international natural resource agencies, as well as conservation organizations, universities, and others. The USFWS Partners for Wildlife and Coastal Programs will work with private landowners to seek opportunities to restore and enhance coastal foraging and roosting habitats for the red knot, often in conjunction with other Federal and State agencies. Many coastal NWRs provide habitat for migrating and wintering red knots. NWRs will monitor use of sites by red knot and implement actions to increase protection and reduce disturbance to red knots. The WSFR, through Section 6 Grants and State Wildlife Grants, will provide needed funding to States to carry out conservation programs. LCC's in the U.S. Atlantic and Gulf Coasts will form broad-based partnerships providing the science necessary to undertake strategic conservation efforts across large geographic areas (e.g., at landscape and regional scales) to address issues such as effects of global climate change on red knot habitat and prey resources. Specific actions to be taken by the USFWS to accomplish the objectives of this plan include:

- Conduct an annual assessment of the conservation status of the red knot and make recommendations for any change in listing priority number, as appropriate, based on new information provided by action plan partners.
- Clarify the subspecies taxonomy of the three main red knot wintering populations (Tierra del Fuego, northern Brazil, and southeastern U.S.) to determine if other subspecies of red knot occur within the action plan area.
- Provide technical assistance to partners, landowners, and others who are interested in participating in red knot conservation activities.
- Work cooperatively with Federal regulatory agencies to incorporate red knot conservation measures into federally approved coastal planning projects and permits.
- Work with partners to restore and enhance coastal habitats to benefit the red knot.
- Manage USFWS-owned lands for red knot and, where appropriate, incorporate actions to protect, enhance, and restore the red knot and its habitat in NWR Comprehensive Conservation Plans.
- Monitor red knot use on NWRs and assist States in surveys of the species.
- Work with LCC and other conservation partners to assess the vulnerability from climate change of breeding, migrating, and wintering red knots and their habitats.
- Request and provide funding to achieve the goals of this Spotlight Species Action Plan.
- Develop partnerships to implement conservation actions and address research needs identified within the red knot status assessment and other red knot and shorebird conservation plans.

State Wildlife Agencies - The historic range of the red knot includes Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Louisiana, and Texas. Within migration and wintering areas, habitat management and

protection of red knots from human disturbance on State, county, municipal, and private lands will play a key role in conservation efforts. States will be instrumental in conducting surveys of migrating and wintering red knots, assessing threats to the species and its habitat, identifying key stopover and wintering sites, conducting research on life history and habitat requirements, and implementing protective measures. The red knot is included as a species of conservation concern in wildlife action plans in Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Rhode Island, South Carolina, Texas, and Virginia. State wildlife action plans outline steps needed to conserve wildlife and habitat. In addition, some States, such as Delaware, have or are preparing shorebird conservation plans that outline State-specific conservation actions for red knot. Specific actions to be implemented by States that will contribute to the objectives of this plan include:

- Conduct ground and/or aerial surveys to document migration and wintering use along the U.S. Atlantic coast.
- Identify key forage resources in areas outside of Delaware Bay and determine if those resources are sufficient to sustain red knots.
- Develop State-wide conservation strategies to protect the red knot, its habitat, and key forage species.
- Protect and manage red knots on State-owned lands.
- Participate in the development of regulatory programs to protect red knot and its habitat.
- Work cooperatively with State regulatory agencies to incorporate red knot conservation measures into State-approved coastal planning projects and permits.

Atlantic States Marine Fisheries Commission (ASMFC), National Marine Fisheries Service (NMFS), and State Fisheries Managers - In response to concerns that horseshoe crab harvest may have a negative effect on food resources for migrating shorebirds, the ASMFC prepared a Horseshoe Crab Stock Assessment and an Interstate Fishery Management Plan for Horseshoe Crab. Beginning in 1999, the ASMFC has imposed increasingly reduced harvest quotas and stricter harvest regulations for horseshoe crabs. Based on recommendations of the ASMFC, NMFS established the 1,500-square mile Carl N. Shuster, Jr. Horseshoe Crab Reserve, a no-harvest zone off the mouth of the Delaware Bay. Fisheries managers in some Atlantic coastal States have voluntarily imposed regulations in addition to ASMFC requirements, such as New Jersey's moratorium on all harvest of horseshoe crabs for bait and Maryland's 2:1 male to female horseshoe crab harvest ratio. Specific actions to be implemented by the ASMFC and State Fisheries Managers to accomplish the objectives of this plan include:

- Assess whether existing horseshoe crab fishery management actions (*i.e.*, reduced harvest quotas, use of bait bags, designation of the Shuster Horseshoe Crab Reserve, and increased efficiency of use and better handling procedures by biomedical industry) have eliminated threats to red knot food resources.
- Continue to develop and implement horseshoe crab harvest restrictions that are protective of red knot food resources.

- Continue to work jointly with the USFWS Shorebird Technical Committee to develop and refine an Adaptive Resource Model to serve as a structured decision making tool to aid the ASMFC in setting sustainable horseshoe crab harvest levels that will ensure adequate horseshoe crab eggs are available as forage for migrating red knots and other shorebirds.
- Continue to monitor horseshoe crab populations and spawning trends needed as critical inputs into the Adaptive Resource Model and to provide information to alert fisheries managers to circumstances that may require action to ensure availability of horseshoe crab eggs for migrating shorebirds, specifically:
  - Monitor horseshoe crab populations by continuing the annual horseshoe crab trawl surveys.
  - Monitor horseshoe crab spawning trends by continuing the annual Delaware Bay horseshoe crab spawning survey.

Shorebird Technical Committee (SBTC) - At the ASMFC's request, the USFWS formed a technical committee to provide advice to the Horseshoe Crab Fishery Management Board of the ASMFC on how horseshoe crab management actions might affect shorebird populations. The SBTC includes representatives from the USFWS, NMFS, States of Delaware and New Jersey, Conserve Wildlife Foundation of New Jersey, New Jersey Audubon Society, and Rutgers University. The SBTC and the ASMFC's Horseshoe Crab Technical Committee are working jointly using a adaptive management approach to model impacts of varying levels of horseshoe crab harvest on red knot populations within Delaware Bay. This Adaptive Resource Model will serve as a structured decision making tool to aid the ASMFC in setting sustainable horseshoe crab harvest levels that will ensure adequate horseshoe crab eggs are available as forage for migrating red knots and other shorebirds. Specific actions to be implemented by the SBTC to accomplish the objectives of this Spotlight Species Action Plan include:

- Provide technical advice to the Horseshoe Crab Fishery Management Board of the ASMFC on shorebird status and population trends, and on how horseshoe crab management actions might affect shorebird populations.
- Continue to work jointly with the ASMFC's Horseshoe Crab Technical Committee to develop and refine an Adaptive Resource Model to serve as a structured decision making tool to aid the ASMFC in setting sustainable horseshoe crab harvest levels that will ensure adequate horseshoe crab eggs are available as forage for migrating red knots and other shorebirds.
- Work with partners to implement recommendations from the Adaptive Resource Model work group on monitoring and assessment methods for red knot.
- Recommend high priority research needs to address the interrelationship between red knot and horseshoe crab.

National Fish and Wildlife Foundation (NFWF) - As part of its "Keystone Initiative" for red knot, the NFWF is developing a red knot logic model and business plan in coordination with Federal and State agencies, conservation organizations, universities and other shorebird biologists. The plan will establish goals, measures for assessing progress toward the goals, and actions necessary to achieve goals. The business plan will

provide specific guidance on the types of projects that will be considered for funding by the NFWF. The red knot business plan will be a key planning document that will outline further specific actions to accomplish the objectives of this Spotlight Species Action Plan. Through the business plan, the costs of implementing needed conservation actions will be estimated. NFWF actions in support of this Spotlight Species Action Plan include:

- Work with stakeholders to develop a red knot logic model and business plan.
- Provide funding to implement conservation actions to achieve the goals of the business plan and Spotlight Species Action Plan.

Western Hemisphere Shorebird Reserve Network (WHSRN) and Manomet Center for Conservation Sciences - The WHSRN is a hemispheric alliance of conservation, business, community, and government organizations united to protect over 22 million acres of wetlands and the wildlife and human communities that are dependent on them. The Network is governed by a Hemispheric Council, with an Executive Office operated as a program of the Manomet Center for Conservation Sciences. The WHSRN has developed a red knot Conservation Action Summary and is playing a key role in assisting the NFWF in developing the red knot business plan. WHSRN actions in support of this Spotlight Species Action Plan include:

- Bring together stakeholders to develop an overall strategy to support research efforts and support site-based conservation and monitoring.
- Organize a red knot working group and host a meeting of the red knot working group as a follow-up to the Fall 2009 meeting.
- Continue to identify and promote conservation of sites of hemispheric, international, and regional importance for red knot and other shorebirds.

International Government Agencies – Red knot breeding areas and two of three known key wintering areas are located outside of the U.S. Natural resource agencies in Canada, Brazil, Argentina, Chile, and other areas of South and Central America will conduct surveys of breeding, migrating, and wintering red knots, assess threats to the species and its habitat, identify key breeding, stopover, and wintering sites, conduct research on life history and habitat requirements, and implement protective measures. In addition, the Canadian Wildlife Service has conducted periodic aerial surveys of key red knot wintering areas within Tierra del Fuego and the Patagonian Coast of South America. Results of these surveys have served as the basis for determining long-term population trends for the red knot. Actions in support of this Spotlight Species Action Plan include:

- Continue to conduct red knot surveys at key wintering and migration areas in South America.
- Identify all important breeding locations in Canada and develop conservation actions for the top 10 sites.
- Develop conservation strategies to protect the red knot, its habitat, and key forage species within migration stopovers and wintering areas in Canada and South America.

- Protect and manage red knots on Federal, provincial, local government, and privately owned lands.
- Participate in the development of regulatory programs to protect red knot and its habitat.
- Work cooperatively with regulatory agencies to incorporate red knot conservation measures into coastal planning projects and permits.

International Shorebird Team - Since the 1980s, an international *ad hoc* group comprised of biologists from other countries, State and Federal agencies, shorebird researchers from conservation organizations and universities, environmental consultants, shorebird experts and birders, and volunteers has functioned as an international shorebird team to conduct high priority research and monitor and protect shorebirds within the Delaware Bay. To identify and abate threats to the red knot rangewide, the team forged increased partnerships and expanded efforts to include work within Arctic breeding areas, southeastern U.S. and South American wintering areas, and other Atlantic coastal States used by migrant red knots. Actions of the international shorebird team in support of this Spotlight Species Action Plan include:

- Participate in working groups and other discussions regarding the development of rangewide and State-specific conservation strategies, or recovery plans, which meet the measures identified in this plan.
- Coordinate to ensure that each partner's conservation programs are complementary and are, together, achieving the goals of this plan.
- Collaborate and encourage participation by other conservation partners through information sharing, outreach and providing assistance, including both technical and financial.
- Collaborate in the development and implementation of voluntary conservation agreements.
- Expand efforts to identify and monitor red knot breeding areas.
- Develop new partnerships with other researchers working in Arctic that could incorporate red knot surveys into existing projects to allow greater coverage of extensive Arctic breeding areas.
- Model phenology shifts in red knot and associated species likely to occur as a result of global climate change (*e.g.* changes in migration timing, especially in relation to timing of horseshoe crab spawning; changes in timing of insect availability in Arctic; and predator-prey cycles in breeding and/or wintering areas).
- Develop a system for coast-wide surveillance of red knots as they migrate.
- Determine the interrelationship between red knot breeding, stopover, and wintering sites within and between years.
- Continue to conduct red knot surveys at key wintering and migration areas and expand survey efforts during late fall and winter throughout the U.S. Atlantic coast.
- Increase banding and re-sighting efforts throughout the U.S. Atlantic coast, particularly in newly identified migration and wintering sites.
- Develop and maintain a system for determining yearly population demographic status based on survey results, capture data, and re-sightings of banded individuals.

- Determine key southbound and northbound stopovers supporting at least 100 red knots.
- Target red knot conservation through the development and implementation of practices that result in the restoration, enhancement and management of coastal habitats supporting the red knot and its food resources.
- Address site-specific threats to reduce the impact of human-related disturbance (vehicles, pedestrians, boats, jet-skis, and pets) at stopovers and wintering areas.
- Work cooperatively to determine the genetic and breeding status of the three main non-breeding populations of red knot (Tierra del Fuego, northern Brazil, and Florida).

***Estimated costs of the actions*:** Conservation of breeding, migrating, and wintering red knots entails labor-intensive surveys, monitoring, capture efforts, and banding programs, and expensive habitat management (*i.e.,* fencing, signing, site stewardship, and law enforcement). Costs for these ongoing actions throughout the species range are estimated at well above $1 million per year. Additionally, costs for habitat enhancement and restoration (*i.e.,* sand nourishment, beach restoration, marsh restoration) and land acquisition range from $10,000 to over $1 million per project. It is anticipated that similar effort and costs will be required to protect the red knot and secure habitat protection during the next 5 years. A more precise cost estimate for individual conservation actions will be developed as part of the NFWF red knot business plan and other planning efforts.

Additional funding analysis: Additional funding would enable the USFWS to accelerate and expand conservation efforts, thereby reducing the magnitude and imminence of habitat-based and human-disturbance threats, and potentially reducing the timeframe for stabilizing or increasing red knot numbers. Additional funds would be used to support additional monitoring, research, and conservation efforts by USFWS offices and programs, State and Federal agencies, non-Governmental organizations, and other partners.