

# U.S. Fish and Wildlife Service Proposes to Protect the *Rufa* Red Knot as Threatened under Endangered Species Act

## Questions and Answers

**1. Why is the Service proposing to list the *rufa* red knot (*Calidris canutus rufa*) as threatened under the Endangered Species Act?** The Service analyzed the best available science and determined the knot is threatened by the following primary factors:

- a. Loss of habitat across its range due to sea level rise, shoreline stabilization and Arctic warming.
- b. Reduced food availability.
- c. Increasing frequency and severity of mismatches (called asynchronies) in the timing of the birds' annual migratory cycle.
- d. Potential increases of predation by jaegers and other birds and mammals in the knot's Arctic breeding grounds.

The knot faces other ongoing and emerging threats that are moderate in comparison to the threats of climate change and habitat loss, but they could become significant. These include hunting, predation in other parts of its range, human disturbance, oil spills, red tides and other harmful algal blooms, and the possible widespread installation of wind turbines.

**2. Why is the Service proposing a threatened rather than endangered status?**

An "endangered" species is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

The best available data suggest the knot is not at a high risk of a significant decline in the near term. The knot would meet the definition of endangered if the current ability of the population to withstand threats is further reduced and culminates in: an abrupt and large loss; initiation of a steep rate of decline or of reproductive capability; or if we find the knot does not have the adaptive capacity to adjust to actual shifts in its food and habitat resources.

**3. Are there other types of red knots?** In addition to the *rufa* red knot (*C.c. rufa*), one other red knot subspecies, *C.c. roselaari*, occurs in the United States. This subspecies migrates along the Pacific Coast to breed in Alaska and Wrangel Island, Russia. In 2011, the Service reviewed a petition to protect the *C. c. roselaari* subspecies and determined the petition did not present substantial information

indicating that listing this subspecies may be warranted.

(<http://federal.eregulations.us/rulemaking/document/FWS-R7-ES-2010-0061-0001>)

**4. What is the range of the *rufa* red knot?** The knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the southeast United States, the northwest Gulf of Mexico, northern Brazil and Tierra del Fuego at the southern tip of South America.

During both the northbound (spring) and southbound (fall) migrations, groups of a few individuals to thousands of knots can be found anywhere along the coastal and inland U.S. migration corridors from Argentina to Canada. In the spring, key staging and stopover areas include Patagonia, Argentina; eastern and northern Brazil; the southeast United States; the Virginia barrier islands; and Delaware Bay.

In the fall, key migration stopovers include Hudson Bay, James Bay, St. Lawrence River, Mingan Archipelago and Bay of Fundy in Canada; Massachusetts and New Jersey coasts; Altamaha River in Georgia; the Caribbean; and the northern coast of South America from Brazil to Guyana.

**5. Where would the *rufa* red knot be protected under the ESA?** The Service proposes to protect the knot across all of its range, based on a thorough review of historical and current occurrence data. This would include inland U.S. states, for a total of 40 states and two U.S. territories<sup>1</sup>, as well as 24 other countries, two British territories and two French overseas regions.<sup>2</sup>

The knot occurs primarily along the coasts, but in the United States, data sets contain roughly 1,900 records of knots more than 25 miles from any ocean coast. Most records in the interior states show small numbers (fewer than 10) of knots, but there are multiple records in nearly every inland state. This listing would ensure

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<sup>1</sup>Range states include: Alabama, Arkansas, Connecticut, Colorado, Delaware, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Maryland, Maine, Michigan, Minnesota, Missouri, Mississippi, Montana, Nebraska, North Carolina, North Dakota, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Virginia, Vermont, Wisconsin, West Virginia, Wyoming, Puerto Rico and the U.S. Virgin Islands.

<sup>2</sup> Argentina, Aruba, Bahamas, Barbados, Belize, Brazil, British Virgin Islands, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, France (Guadeloupe, French Guiana), Guatemala, Guyana, Haiti, Jamaica, Mexico, Panama, Paraguay, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

the full protection of knots using interior flyways, such as those wintering in Texas and the Southeast.

**6. Does the ESA apply to *rufa* red knot habitat in foreign countries?**

The ESA's prohibitions regarding listed species apply only to people subject to the jurisdiction of the United States, but the ESA can generate conservation benefits such as increased awareness of listed species, research efforts to address conservation needs, or funding for in-situ conservation of the species in its range countries. The ESA also provides for limited financial assistance to develop and manage programs to conserve listed species in foreign countries, encourages conservation programs for such species, and allows for assistance for programs, such as personnel and training.

**7. What is the size of the *rufa* red knot population?** Due to challenges with the species' migratory habits and differing survey methods and observers across the knot's broad range, it is difficult to estimate the total population. Surveys are a sample of the population, with some of the birds likely counted more than once or not at all. Nonetheless, the best available data from wintering and spring migration areas include the following:

- a. The most recent winter surveys found about 15,000 knots wintering in Argentina and Chile (2012); 3,600 in northern Brazil (2011); 2,000 in the northwest Gulf of Mexico (2012); and 4,000 in the southeast United States (2011). We do not add these to produce a total population estimate because of differences in survey methods and timing and incomplete geographic coverage.
- b. The mid-Atlantic knot population estimates are: 44,680 knots stopping in Delaware Bay (2012) and 12,611 to 14,688 knots annually stopping in Virginia (2007-2010). These estimates are produced using marked bird data in mathematical models, and they do not include the birds that bypass the mid-Atlantic, such as birds migrating overland from Texas or the Southeast directly to Canada.
- c. Comprehensive counts from the breeding grounds are not available because nesting knots are thinly distributed across a huge and remote area of the Arctic. More details are available in the proposed rule supplemental document, *Rufa Red Knot Ecology and Abundance*.

**8. How is climate change affecting the *rufa* red knot?** Already in decline, the knot population is highly vulnerable to the stress that can be caused by subtle changes in the environment. The knot's life cycle makes it vulnerable to mismatches in its migration and the timing of its food supply and necessary weather conditions. Adverse effects from altered timing have been observed at migration stopovers in

some years.

The knot's breeding grounds in the Canadian Arctic are experiencing pronounced effects from climate change. Some of its tundra breeding habitat is changing to less suitable habitat due to warming temperatures. The ability of knots to successfully raise their chicks is very sensitive to snow conditions, the availability of insects as food, and the presence of predators—all of which are affected by climate change.

Climate change is expected to affect stopover habitat in the United States, as well. For example, in the Delaware Bay, warming coastal waters can cause horseshoe crabs to lay their eggs earlier than normal; conversely, more intense and frequent coastal storms can cause late spawning. In both cases, knots, which feed on the crabs' eggs, can miss their peak refueling opportunity. Additionally, ocean acidification and warming coastal waters are likely to affect the clams and mussels that the knot feeds on in other areas along the Atlantic and Gulf coasts.

**9. How is development affecting the *rufa* red knot?** Development has already decreased knot habitat. More than 80 percent of the coasts of Florida, New Jersey and New York are fully or partly developed. From North Carolina south to Texas, just under half of beaches are developed. Additionally, about a third of knot habitat in the United States is still available for development, and winter and stopover habitats in Argentina and sub-Arctic Canada face ongoing and proposed development.

Where suitable habitat exists, sea level rise is expected to increase efforts to stabilize the shore and protect coastal development with hard structures, such as sea walls and jetties. These eventually will eliminate beach habitat and interfere with the creation of new beach habitat.

**10. Why are stopover habitats like Delaware Bay so important to the *rufa* red knot's survival?** One of the longest-distance migrants in the animal kingdom, some knots fly more than 9,300 miles from south to north every spring and repeat the trip in reverse every autumn. They can fly 1,500 miles during each leg of their incredible journey, pausing at stopover sites to rest and refuel. They rely on the ready abundance of food at each stop to bolster their strength.

For example, each May most knots feed along the shores of the Delaware Bay to prepare for the last leg of their trek to their Arctic breeding grounds. These birds time their arrival in the bay with the annual spawning congregation of horseshoe crabs, which mate and lay eggs in the sand. Without enough crab eggs to fuel them,

the long-distance fliers may not have enough energy to reach the Arctic to breed.

**11. How is the availability of horseshoe crab eggs, mollusks and other food affecting the *rufa* red knot?** Threats to food resources from climate change and other causes occur throughout the knot's range.

The best available data suggest reduced horseshoe crab populations in Delaware Bay due to commercial harvest were an important factor in knot population declines from 2000 to 2005. Since 2000, the Atlantic State Marine Fisheries Commission has restricted harvest, and in 2012, it implemented an adaptive management framework that explicitly ties crab harvest levels to knot population goals. It is likely horseshoe crab harvest is no longer limiting the growth of the crab population, though crab numbers have not yet fully rebounded. Other shorebirds, including sanderlings, ruddy turnstones and semi-palmated sandpipers, also depend on an abundant supply of horseshoe crab eggs each spring along Delaware Bay.

Outside of Delaware Bay, the knot feeds mainly on small clams and mussels. The effects of climate change have begun affecting both types of prey. Oceans become more acidic as carbon dioxide emitted into the atmosphere dissolves in the ocean; this can interfere with the ability of clams and mussels to form their shells. Clams and mussels are also sensitive to warming water temperatures, and changes in their geographic distribution or timing of spawning are likely to affect knot food supplies during important stopover periods. For example, the range of blue mussels, the young (called spat) of which are an important prey species for knots using the Virginia stopover areas, has already shrunk due to warming ocean temperatures, and the mussel may soon not be available as a food resource for migrating knots.

Additionally, sand placement in beach stabilization or nourishment projects and off-road vehicle (ORV) use are both widespread within the U.S. range of the knot, and these activities are known to crush and disturb animals that are the knot's food.

**12. How do people directly affect *rufa* red knots?** As the knot makes its journey through the United States and other countries, it depends on safe beach habitat for resting and feeding without disturbance. At a large scale, people alter the knot's habitat through development and shoreline stabilization.

Recreational beach activities from pedestrians, ORVs, dog walkers and boaters can damage habitat, lead to knots abandoning habitat, interfere with feeding, and force knots to use up their much-needed energy reserves. For example, research in Florida shows chronic disturbance, which may affect the ability of birds to maintain

adequate weights in some areas, to be the most immediate and tangible threat to migrating and wintering red knots,

Within the developed portion of the knot's range, sand placement and ORV use are both widespread; these activities are known to crush and disturb prey available to shorebirds. Knot habitats are also degraded by beach cleaning machines and invasive beach plants.

**13. Do hunting or predation threaten the *rufa* red knot?** Although legal and illegal sport and market hunting in the United States substantially reduced knot populations in the 1800s, knots are no longer hunted here. Legal and illegal hunting does occur in parts of the Caribbean and South America, but the individual mortality does not seem to affect the population as a whole. Conservation efforts are underway in these areas.

Despite some localized mortality and disturbance from predators like peregrine falcons, predation is not currently a threat to the knot in the United States or other nonbreeding portions of its range.

However, predation is an emerging threat on the Arctic breeding grounds. These predation cycles are driven by the availability of lemmings and other rodent populations; when rodents like lemmings are scarce, avian predators including the long-tailed jaeger and other jaeger species, herring and glaucous gulls, peregrine falcon, and snowy owl, as well as arctic fox, and sometimes the arctic wolf, turn to shorebirds. Historically, three- to four-year cycles of high lemming abundance occurred. These cycles probably relieved predation pressure on shorebirds. However, climate change may disrupt these cycles, resulting in prolonged periods of very low knot reproduction. Warming temperatures and changes in vegetation may also increase predation pressure in the Arctic.

**14. Where is this step (proposed listing) in the overall process for adding the *rufa* red knot to the list of threatened and endangered species?** In September 2006, the Service determined the knot was a candidate for protection under the ESA, meaning protection of the knot was warranted but precluded by the Service's need to first protect species at greater risk.

In 2011, the Service committed to publishing the proposed listing for the knot by September 2013 through a settlement agreement with WildEarth Guardians and Center for Biological Diversity. The Service has now published a proposed rule to protect the knot under the ESA; the public is invited to comment and submit

information for 60 days. Based on that, the Service will prepare a final listing determination within one year of the proposal. Learn more:

<http://www.fws.gov/endangered/esa-library/pdf/listing.pdf>.

**15. Will the Service designate critical habitat for the *rufa* red knot?** If a species is listed as threatened or endangered, the Service must consider whether designating critical habitat is appropriate. The Service will issue a proposal to designate critical habitat for the knot in the near future.

Critical habitat designation under the ESA does not set up a preserve, and it does not allow government or public access to private land. Critical habitat is a term in the ESA that refers to specific geographic areas that contain elements that are essential to the conservation of a threatened or endangered species. For the knot, these could include sand dunes for roosting or habitat supporting prey, among other elements. Critical habitat is only designated in the United States.

The Service designates critical habitat under the ESA for the purpose of consulting with federal agencies, which have to make special efforts to protect elements of these areas. It applies only to federal actions—activities carried out, funded or authorized by a federal agency, not private landowners.

**16. How will the *rufa* red knot benefit from protection under the ESA?**

Protecting a species under the ESA provides a means for federal, state, local and private organizations and landowners to work together to restore an animal or plant to ecological health. Listing will indirectly enhance national and international cooperation and coordination of conservation efforts, enhance research programs, and encourage the development of conservation measures that could help slow habitat loss and population declines.

The listing rule evaluates the threats faced by a species and identifies the barriers to recovery. A recovery plan, developed after the species is listed, identifies the specific ways to recover the species and typically depends on the assistance of species experts; other federal, state and local agencies; tribes; nongovernmental organizations; academia; and other stakeholders.

The ESA prohibits anyone to import, export or engage in interstate or foreign sale of endangered and threatened animals and plants without a special permit. It also makes “take”—the killing, harming, harassing, pursuing, or removing the species from the wild—illegal without Service authorization.

The ESA requires federal agencies to conduct their activities in such a way that conserves listed species. It also requires federal agencies to consult with the Service to conserve listed species on their lands and to ensure any activity they carry out, fund or authorize will not jeopardize the survival of a threatened or endangered species. This is known as consultation under section 7 of the ESA.

**17. What actions are underway to protect the *rufa* red knot?** Governments and scientists from several countries where knots breed, stopover or winter are working to address the threats faced by the knot. Many global, national, regional and state-specific management and conservation efforts have been implemented to benefit shorebirds in general, including the knot.

In South America, several key knot sites are becoming shorebird reserves, and regional efforts are including the protection of knot habitats in urban development plans. Voluntary restrictions on knot hunting, increased hunter education efforts, “no-shoot” shorebird refuges and sustainable harvest models are also underway in various countries.

Examples of actions underway to improve feeding conditions for knots and other shorebirds in the Delaware Bay include beach management to minimize disturbance and to reduce interference from gulls and peregrines. Actions to conserve horseshoe crabs have included reduced harvest quotas, more efficient use of crabs as bait, closure of the harvest in certain seasons and places and the designation of a sanctuary off the mouth of Delaware Bay. In addition, biologists in the Carolinas and Florida are improving beach habitat by controlling invasive plants.

Volunteers, conservation organizations and researchers have made invaluable contributions to the monitoring of the knot, particularly through South America and mid-Atlantic population surveys.

**18. What are some examples of activities that could help restore the *rufa* red knot?** The Service would identify specific conservation activities in a recovery plan. Examples of management recommendations would likely include:

- a. Continue implementation of the science-based horseshoe crab management plan (the Adaptive Resource Management Framework) under the Atlantic States Marine Fisheries Commission in the Delaware Bay.
- b. Continue and expand programs that manage disturbance in key habitats, targeting times of high knot use.
- c. Continue managing peregrine falcon predation by, for example, considering knots when placing peregrine nesting platforms.

- d. Avoid developing priority knot habitats and consider setting back new developments to allow for natural habitat migration.
- e. Improve management of hunting in countries outside the United States.
- f. Continue collecting and publishing data to better understand knot ecology and to support knot recovery goals.

**19. How does the status of the red knot relate to that of other shorebirds?**

Threats to shorebirds have become more diverse and widespread in recent decades and pose serious conservation challenges. Recent data suggest several Atlantic Flyway shorebird species have experienced alarming declines of between 50 and 90 percent within the last three decades.

Many of the declining populations were found to be those of long-distance migrants, with the rufa red knot as the best-known example in shorebird conservation. Long-distance migrants depend on limited key stopover sites, which makes them particularly vulnerable to habitat loss and declining food resources at these sites. Human-induced threats, including habitat destruction, recreational disturbance, unregulated hunting and pollution, can wreak havoc on these populations. Changes in the environment put additional strain on shorebirds by inflating predator populations and altering weather patterns.

**20. What can I do now?** The Service invites you to:

- a. Visit <http://www.fws.gov/northeast/redknot/> to learn more. A link to the proposed rule and supplemental supporting materials is available there.
- b. Comment on or submit information regarding the proposal by visiting [www.regulations.gov](http://www.regulations.gov) and typing in docket number FWS-R5-ES-2013-0097. Comments and information will be accepted through November 29, 2013.
- c. Engage in active discussions on the proposal or knot conservation on our social media platforms, which you can find at <http://www.fws.gov/home/socialmedia/index.html>.
- d. Learn what role your “backyard” plays in the life cycle of the knot and contact conservation groups for information on how you can help ensure that it continues providing the knot with what it needs.
- e. Be a citizen scientist! Report knot and other shorebird sightings at [bandedbirds.org](http://bandedbirds.org) and [ebird.org](http://ebird.org).