

# U.S. Fish and Wildlife Service Protects the Rufa Red Knot as Threatened Under Endangered Species Act

## Questions and Answers

In a December 11, 2014 final rule, the U.S. Fish and Wildlife Service has made a final determination to protect the rufa subspecies of the red knot (*Calidris canutus rufa*) as threatened under the Endangered Species Act (ESA). The rufa red knot is a robin-sized shorebird that depends on several areas of the United States during its annual journey across North and South America, and its population has declined by about 75 percent in some key areas since the 1980s.

As noted in the [State of the Birds 2014 report](#), the knot's status is representative of the steep declines underway in shorebirds that migrate long distances. Threats to shorebirds have become more diverse and widespread in recent decades, requiring coordinated conservation efforts across their entire ranges.

To see the rule, responses to public comments and related materials, visit <http://www.fws.gov/northeast/redknot/>.

### **1. Why is the Service listing the rufa red knot as threatened under the ESA?**

The Service analyzed the best available science and determined the rufa red knot is threatened by the following primary factors:

1. Loss of habitat across its range due to sea-level rise, some shoreline projects and Arctic warming;
2. Reduced food availability and timing mismatches (asynchronies) throughout the bird's annual migratory cycle; and
3. Potential increases in predation by birds and mammals in the rufa red knot's Arctic breeding grounds.

The rufa red knot faces other ongoing and emerging factors that may cause additional mortality; individually these factors are not expected to affect the rufa red knot as a whole, but cumulatively they could exacerbate the primary threats and reduce the rufa red knot's resiliency. See the rule under the *Summary of Biological Status and Threats* and the *Determination* sections for more information.

**2. Where is the rufa red knot listed?** The Service is protecting the rufa red knot across all of its range, which we determined based on a thorough review of published scientific literature, submitted manuscripts, species experts, and historical and current occurrence data. This range includes inland areas, for a total of 40 U.S. states and two U.S. territories<sup>1</sup>, as well as 24 other countries, two British

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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,

territories and three French overseas regions<sup>2</sup>.

The rufa red 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 rufa red knots can be found anywhere along the coastal and inland United States migration corridors from Argentina to Canada. In the spring, well-known 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, well known 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.

Throughout the range, rufa red knots occur primarily along the coasts but also migrate across areas of open ocean as well as over land. In the United States, knots use both coastal and interior routes during migration, including the Central, Mississippi and Atlantic flyways. Most records in the interior states show small numbers (fewer than 10) of knots, but there are multiple records in every inland state included in this listing. Although several thousand knots migrate through inland areas each year, scientists are just beginning to discover where these birds are stopping to rest and feed along the way. For example, geolocator information shows rufa red knots using stopovers in North Dakota and in Montana, and there are clusters of sightings records along the tributaries to the Mississippi River and along the Great Lakes.

**3. 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 rufa red knot's broad range, we do not have a range-wide estimate of total population. However, reliable regional estimates are available for key areas. The best available data from wintering and spring migration areas include:

- a. Recent winter surveys found about 10,105 knots wintering in Argentina and Chile (2013); 15,485 in northern Brazil (2013); 2,000 in the northwest Gulf of Mexico (2012); and 4,000 in the southeast United States (2011). We do

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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, Martinique), Guatemala, Guyana, Haiti, Jamaica, Mexico, Panama, Paraguay, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

not add these to produce a total population estimate because of differences in survey methods and timing, and incomplete geographic coverage.

- b. The spring mid-Atlantic knot population estimates are: 48,955 knots stopping in Delaware Bay (2013) and 5,547 to 8,482 knots annually stopping in Virginia (2011-2014). These estimates are produced from both direct counts and by 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 *Population Surveys and Estimates* section of the supplemental document to the rule.

**4. How much has the rufa red knot population declined?** Surveys have been conducted in a number of areas across the knot's range, but in many regions, these efforts have not been consistent enough to have high confidence in any apparent trends. However, two key sites have been surveyed consistently, and show numbers of knots declined and remain low relative to counts from the 1980s:

- a. The average counts for Tierra del Fuego (the most southern tip of South America) between 1985 and 2000 (52,244) dropped by about 75 percent between 2011 and 2013 (11,385).
- b. Comparing four different time periods, average knot counts in Delaware Bay declined about 70 percent overall from 59,946 (1981 to 1983) to 18,387 (2005 to 2014). Average counts between those years also include 46,886 (1986 to 1994) and 34,060 (1995 to 2004).

**5. What process did the Service follow in preparing this rule?** The Service carefully assessed the best scientific and commercial information available regarding the past, present and future threats to the rufa red knot. The rufa red knot has been a candidate for federal listing since 2006, but we were precluded from listing it due to other higher priority listing actions. In 2011, the Service committed to publishing a proposed listing determination for the rufa red knot by September 2013 through a court settlement agreement with WildEarth Guardians and the Center for Biological Diversity.

The Service solicited information from our state, federal, tribal, academic and other red knot partners, and we received occurrence and habitat use data from state natural resource and federal agencies. On September 30, 2013, we published a proposed rule in the *Federal Register* to protect the rufa red knot as threatened under the ESA. The proposal opened a 30-day public comment period. The comment period was extended and then reopened while we held three public hearings.

In accordance with our peer review policy, we sought the expert opinions of three independent specialists during the comment period. Peer review ensures our listing determination is based on scientifically sound data, assumptions and analyses. The

peer reviewers have expertise in the rufa red knot's biology, habitat or threats, which informs our determination.

Our final determination is based on an analysis of the best available data in more than 1,700 scientific documents, from peer review and issues raised in more than 17,400 comments provided during 130 days of public comment periods and three public hearings. Learn more about the listing process:

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

**6. What kinds of substantive comments did the Service receive on the proposal?** Comments typically fell into these categories: appropriate listing status, adequacy of horseshoe crab management, critical habitat implications (which are outside the scope of the proposed listing rule), wind turbine impacts, inclusion of interior states in listed range, and critiques of use of best available data. The Service addressed and responded to these in the final rule under the *Summary of Comments and Recommendations* section. The proposed and final rules, along with the original comments can be found at [regulations.gov](http://www.regulations.gov).

**7. What changes were made between the proposal and final rule?** Our final determination of the red knot as a threatened species remained unchanged from the proposed rule. Changes were made to the final rule based on new information available since publication of the proposed rule and from peer review and public comments. These include additional location data and updated regional population estimates, updated information on possible effects of horseshoe crab harvest and management, and clarification to the wind energy discussion. The *Summary of Changes from the Proposed Rule* section of the final rule fully describes these changes.

**8. How will listing the rufa red knot affect beach management?** The implications of listing the red knot for beach management will vary based on the specific patterns of beach use by knots and site-specific habitat and project details. Coordination has already begun with our partners in state and other federal agencies. Because many parts of the knot's coastal range overlap with areas used by other listed species, such as piping plovers and sea turtles, some of the management actions needed to protect the knot and its habitat are already in place.

**9. How is development and associated shoreline stabilization affecting the rufa red knot?** Coastal development, which often goes hand-in-hand with shoreline hardening, has already decreased the amount of available rufa red knot habitat. More than 80 percent of the coasts of Florida, New Jersey and New York are substantially or partly developed. From North Carolina south to Texas, just under half of the 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 development pressure.

Further, sea-level rise is expected to increase efforts to stabilize shorelines and

protect coastal development with hard structures, such as seawalls and jetties. These can further degrade and eliminate beach habitat and interfere with the creation of new beach habitat.

**10. How can climate change affect the rufa red knot?** Already reduced in size, the rufa red knot population is highly vulnerable to changes in the environment. The bird's lifecycle makes it susceptible to mismatches in its migration and the timing of its food supply and necessary weather conditions.

Adverse effects from altered timing have already been observed at migration stopovers in some years. For example, in Delaware Bay, warming coastal waters may cause horseshoe crabs to lay their eggs earlier than normal; conversely, more intense and frequent coastal storms can cause late spawning. In both cases, rufa red knots, which feed on the crabs' eggs, can miss their peak refueling opportunity. Additionally, ocean acidification and warming coastal waters are already starting to affect clams and mussels, on which the rufa red knot feeds in other areas along the Atlantic and Gulf coasts. New climate information reinforces this.

The rufa red knot's breeding grounds in the Canadian Arctic are experiencing pronounced effects from climate change. Due to warming temperatures, tundra habitats, which rufa red knots need for nesting, are already becoming shrubbier and less suitable for shorebirds. The ability of red knots to successfully raise their chicks depends on specific snow conditions, the availability of insects as food, and losses to predators—all of which are affected by climate change.

**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 rufa red knot's range.

The best available data suggest reduced horseshoe crab populations in Delaware Bay due to commercial harvest were an important factor in rufa red knot population declines. 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 rufa red knot populations. Though crab numbers have not yet fully rebounded, the full implementation and monitoring of this framework should lead to increased crab populations and help rufa red knot recovery.

Outside Delaware Bay, the rufa red knot feeds mainly on small clams and mussels, except on its Arctic breeding grounds, where it feeds mainly on insects. 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 has been shown to interfere with the ability of clams and mussels to form their shells. Clams and mussels also are sensitive to warming water temperatures, and changes in their geographic distribution or timing of spawning are likely to affect rufa red 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 rufa red knots, has already shrunk due to warming ocean temperatures, and the mussel soon may not be available as a food resource for migrating rufa red knots in the Virginia stopover area. In the Arctic breeding grounds, insects are hatching earlier in the spring due to warming temperatures. This change in timing could cause rufa red knot chicks to miss the peak window for feeding and rapid growth before their long southward migration.

Additionally, sand placement projects and off-road vehicle (ORV) use are known to bury or crush animals that the knots eat. The negative effects to prey resources from these activities are typically short term, though repeated renourishing may prolong the adverse effects to the invertebrate community on which knots rely for food.

**12. Does hunting or predation threaten the rufa red knot?** Although legal and illegal sport and market hunting in the United States substantially reduced rufa red knot populations in the 1800s, the birds are no longer hunted here. Legal and illegal hunting does occur in other parts of its range, but we do not have enough information to determine if this mortality affects populations. The rufa red knot was recently protected from hunting in parts of the Caribbean and in French Guiana.

Despite some localized mortality and disturbance from predators such as peregrine falcons, predation is not currently a threat to the rufa red knot in the United States or other nonbreeding portions of its range. However, predation is an emerging threat on the Arctic breeding grounds. Natural predation cycles are driven by the availability of lemmings and other rodents; when rodents are scarce, 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 Arctic wolf) turn to shorebird eggs and chicks. Historically, high lemming abundance occurred in three- to four-year cycles and so was not a long-term threat to shorebirds. However, climate change is disrupting these cycles, which may put additional predation pressure on red knots resulting in prolonged periods of very low reproductive productivity. Warming temperatures and changes in vegetation may also increase predation pressure in the Arctic.

**13. 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 is considering which specific areas are essential to the rufa red knot's conservation and expects to issue a proposal to designate critical habitat for the rufa red knot in 2015.

Critical habitat designation under the ESA does not set up a preserve, change land ownership or allow government or public access to private land. Critical habitat refers to specific geographic areas that contain elements that are essential to the conservation of a threatened or endangered species. [Critical habitat](#) focuses the coordination of federal agencies, which are directed by the ESA to aid in the conservation of listed species. Designation of critical habitat does not affect land

ownership nor establish a refuge, and does not affect private actions on private lands that do not receive federal funds or require federal permits. Where the species occurs and how often, as well as where the most important natural features exist for its feeding and resting, are considered when determining where critical habitat should be designated. For the rufa red knot, these features may include wide, open beaches for roosting or habitat supporting prey, among others.

**14. How will the rufa red knot benefit from protection under the ESA?** Listing raises awareness about the need for national and international cooperation and coordination of conservation efforts, enhances research programs, and encourages the development of conservation measures that could help slow habitat loss and population declines. A recovery plan, developed after a species is listed, identifies 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 includes regulatory protections regarding import and export and the “take” (killing, harming, harassing, pursuing or removing the species from the wild) of listed species. The ESA also requires federal agencies to conduct their activities in such a way that conserves listed species.

**15. How does the ESA apply to rufa red knots in foreign countries?** ESA regulations apply only to people subject to the jurisdiction of the United States. However, the ESA can generate conservation benefits in foreign countries, such as increased awareness of listed species, research efforts to address conservation needs, or funding for conservation of the species in range countries. The ESA also provides for limited financial and technical assistance to develop and manage programs to conserve listed species in foreign countries.

**16. What actions are already underway to protect the rufa red knot?**

Governments and scientists from several countries where knots breed, stopover or winter are working to address threats faced by the rufa red knot.

In South America, several key rufa red knot sites are becoming shorebird reserves, and regional efforts include the protection of rufa red knot habitats in urban development plans. Hunting regulations, voluntary hunting restrictions, increased hunter education efforts, no-shoot shorebird refuges and sustainable harvest models are also underway to address hunting in various countries.

In areas along the U.S. coast, partners are managing beaches to minimize disturbance and to reduce interference from gulls and peregrines. In Delaware Bay, actions to conserve horseshoe crabs have been important in stabilizing earlier rufa red knot population declines. In addition, biologists in the Carolinas and Florida are improving beach habitat by controlling invasive plants.

Volunteers, conservation organizations and researchers have made valuable

contributions to the understanding and conservation of the rufa red knot, such as surveying populations, banding and resighting birds, outfitting birds with geolocators, documenting breeding habitat, monitoring weight gains, studying the effects of disturbance, and scientific modeling.

The Western Hemisphere Migratory Species Initiative (WHMSI) has supported efforts to protect the Red Knot along with other migratory bird species in the Western Hemisphere by funding capacity-building efforts through workshops, training and development of a “Flyways of the Americas Plan,” which integrates migratory bird conservation initiatives in the Americas. This plan was adopted at the 11<sup>th</sup> Conference of the Parties of the Convention on Migratory Species (CMS) in Quito, Ecuador in November 2014, as the framework for CMS' work in the Americas.

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

- a. Visit <http://www.fws.gov/northeast/redknot/> to learn more, and join the conversation at <http://www.fws.gov/home/socialmedia/index.html>.
- b. Learn what role your backyard plays in the lifecycle of the knot and contact local conservation groups for information on how you can help conserve it.
- c. Be a citizen scientist! Report knot and other shorebird sightings at [bandedbirds.org](http://bandedbirds.org) and [ebird.org](http://ebird.org).