

Factor D: The Inadequacy of Existing Regulatory Mechanisms
SUPPLEMENT TO
Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the
Rufa Red Knot (*Calidris canutus rufa*)
[Docket No. FWS–R5–ES–2013–0097; RIN 1018–AY17]

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SUMMARY OF FACTORS AFFECTING THE SPECIES

FACTOR D. THE INADEQUACY OF EXISTING REGULATORY MECHANISMS

Under this factor, we examine the effects of existing regulatory mechanisms in relation to the threats to the red knot discussed in the proposed rule under Factors A, B, C, and E. Section 4(b)(1)(A) of the Act requires the Service to take into account “those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species...” In relation to Factor D under the Act, we interpret this language to require the Service to consider relevant Federal, state, and tribal laws, regulations, and other such mechanisms that may reduce any of the threats we describe in our threat analyses under the other four factors. We give strongest weight to statutes and their implementing regulations and to management direction that stems from those laws and regulations. An example would be State governmental actions enforced under a State statute, or Federal actions under Federal statute. The following section includes a discussion of international, Federal, State, and local laws, regulations, and treaties that apply to the red knot. It includes legislation for Federal land management agencies and State and Federal regulatory authorities affecting identified threats to the red knot.

Canadian Laws and Regulations

In 2012, the rufa red knot was determined to be endangered under the Canadian Species at Risk Act (SARA) (Species at Risk Public Registry 2012). The SARA makes it an offense to kill, harm, harass, capture, or take an individual of a listed species that is endangered or threatened; possess, collect, buy, sell, or trade an individual of a listed species that is extirpated, endangered, or threatened, or its part or derivative or to damage or destroy the residence of one or more individuals of a listed endangered or threatened species or of a listed extirpated species if a recovery strategy has recommended its reintroduction. For many of the species listed under SARA, the prohibitions on harm to individuals and destruction of residences are limited to Federal lands, but this limitation does not apply to migratory birds protected under the Migratory Birds Convention Act (MBCA) (Statutes of Canada (S.C.) c. 29, § 34), which includes the red knot (Environment Canada 2013). Hence, SARA protects red knots, where present, from harm and destruction of their residences, not only on Federal lands, but also on provincial and private lands. The MBCA (S.C. c. 22) is Canada’s legislation, similar to the United States’ Migratory Bird Treaty Act (MBTA), implementing the Migratory Bird Treaty among the United States, Canada, and Mexico (Environment Canada 2013). The MBCA and its implementing regulations prohibit the possession or sale of migratory birds or their carcasses, skins, nests, or eggs (C.R.C. c. 1035 §§ 6, 12). Birds in the Family Scolopacidae, including the red knot, are listed as a game species under international treaties with Canada and Mexico (U.S. Fish and Wildlife Service (USFWS) 2012c); thus these shorebirds are classified as game species under the MBCA (Environment Canada 2013). However, the only shorebirds that can be legally hunted in Canada are American woodcock (*Scolopax minor*) and snipe (*Gallinago delicata*); there has not been an open season for any other species of shorebirds in Canada since the passing of the original MBCA in 1917 (J. Bertrand pers. comm. May 16, 2013).

The following administrative divisions of Canada have enacted provincial or territorial laws for the protection of endangered species, but the red knot is not listed in these jurisdictions:

Alberta, New Brunswick, Northwest Territories, Nunavut, Prince Edward Island, Quebec, and Saskatchewan. We consider British Columbia and Yukon to be outside the geographic range of the rufa red knot. The rufa red knot is listed as endangered by the remaining Provinces of Manitoba, Newfoundland and Labrador, Nova Scotia, and Ontario, which all provide some habitat protections and prohibit direct take of listed species.

In summary, SARA provides protections for the red knot and its habitat, both on and off of Federal lands. The red knot is afforded additional protections under the MBCA, and in the Provinces of Manitoba, Newfoundland and Labrador, Nova Scotia, and Ontario where it is listed as an endangered species at the provincial level.

Caribbean and Latin American Laws and Regulations

Wildlife policy and legislation across Latin America and the Caribbean are heterogeneous. A 1996 review by the United Nations Food and Agriculture Organization (FAO) found that a few countries had not yet passed legislation on wildlife utilization, and that the wildlife rules and regulations in other countries were obsolete or incomplete. However, other countries (e.g., Brazil, Colombia, Panama, and Paraguay) had adopted protection-oriented policies, prohibiting almost all wildlife utilization, while still others (e.g., Argentina, Costa Rica, Mexico, Nicaragua, Peru, Suriname, and Venezuela) were trying to combine the protection of endangered species with the controlled utilization of numerically sufficient species. Wildlife policies have tended to change course suddenly in some countries. In many countries, legislation was updated after 1970; this new generation of laws (particularly in Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Peru, Suriname, and Venezuela) recognized wildlife as a public resource and went beyond mere game laws to include wildlife protection, promotion, and management (e.g., habitat protections, research, education) (FAO 1996).

A 1996 survey by the FAO found that nearly half (48 percent) of the experts consulted believed the legislation in force in their respective countries to be obsolete or unrealistic, 26 percent found it adequate, 22 percent found it satisfactory, and 4 percent indicated a lack of legislation in their countries. The Brazilian experts, for example, were in agreement with the legislation in force, whereas most of the Mexican experts felt that their hunting laws were obsolete (FAO 1996) (however, Mexico's wildlife laws were subsequently updated around 2000, as discussed below). Wildlife legislation is national in scope throughout Latin America except for Argentina, which has Federal guidelines but, within which, each province enacts its own specific laws. Countries with modern legislation and where hunting is permitted have generally enacted regionalized timetables of open and closed seasons, bag limits, areas where hunting is permitted, and other regulations covering each specific game species (FAO 1996).

Where information is available, we discuss applicable laws in countries known to support red knots, generally moving from north to south. However, we largely lack information regarding the implementation (e.g., administration, compliance, and enforcement) and effects of these laws and, unless otherwise indicated, we are not aware of the extent to which these laws apply to the protection of red knots or their habitats (e.g., for many countries we do not have information indicating if the red knot is a protected species, a game species, or neither).

In the Bahamas, the Wild Birds Protection Act (Ch. 249) provides for the appointment of game wardens; prohibits killing or capturing certain wild birds during a closed season; establishes hunting licenses and harvest limits; establishes wild bird reserves; and restricts trade in wild birds, skins, feathers, and eggs. Red knots are included in Schedule 1, for which the closed season is the entire year.

In Cuba, Law 81 of the Environment provides for a National System of Protected Areas, and tasks the Ministries of Agriculture and Fishing Industry to regulate the use of wildlife, establish hunting and collection regulations, and protect threatened and endangered species.

In Jamaica, the Wildlife Protection Act (1945) regulates sport hunting, and has been enhanced by many regulations that attempt to address gaps, particularly in relation to protected animals. However, this act does not address habitat protection (B. Andres pers. comm. December 21, 2011). Red knots are among the protected bird species for which hunting is prohibited.

In the Dominican Republic, the Environment and Natural Resources General Law (No. 64-00) forbids the unauthorized destruction, degradation, disregard for or decrease of the natural ecosystems and of the species of wild flora and fauna and the collection of specimens of flora and fauna; establishes a list of species that are in danger of extinction, threatened, or protected, which shall be the object of rigorous control and of mechanisms of protection; tasks the State Secretariat of Environment and Natural Resources with managing protected areas and wildlife; provides for hunting regulations; and restricts the introduction of exotic species.

In the British Virgin Islands, the Wild Birds Protection Ordinance (Cap. 98, 1959 as amended 1980) provides for the establishment of bird sanctuaries, protects 24 species of birds, and designates game species with a closed season from February 1 to July 15. Procter and Fleming (1999, p. 51) concluded that this statute is in need of updating to address confusion regarding species' common names. The Protection of Endangered Animals, Plants and Articles (Removal and Possession) Ordinance 1981 seeks to prohibit the removal or possession, without a license from the Minister, of black coral or any article principally derived therefrom; provision is made for the addition of other species of plants, animals or articles requiring similar protection (Procter and Fleming 1999, pp. 51–52).

The French government has recently acted to impose new protective measures in Guadeloupe. The National Hunting and Wildlife Agency has begun negotiating bag limits and is working on a new regulation that would stop hunting for 5 days following a tropical storm warning, but these measures are not yet in effect (A. Levesque pers. comm. January 8, 2013; Niles 2012c). Significantly, the red knot was recently added to the list of protected species, and hunter education about red knots is in progress (A. Levesque pers. comm. January 8, 2013; Niles 2012c).

In Barbados, the Wild Birds Protection Act (Chapter 398, 1985) prohibits killing of certain species, but not red knots. There has been voluntary agreement by hunters to stop the harvest of red knots (USFWS 2011e, p. 2), but we are unaware of any regulatory enforcement mechanism. The Barbados Coastal Zone Management Act (Chapter 394, 1998) restricts the

removal of vegetation, sand, or stones from the beaches, and the fouling of a beach via waste disposal.

In Mexico, wildlife management prerogatives and regulatory powers reside in the Federal government with States playing only a minimal role (Valdez *et al.* 2006, p. 270). Mexico's 2001 revision of the General Law on Ecological Balance and Environmental Protection establishes Federal regulation of the sustainable use, protection, and preservation of wildlife and establishes natural areas. In 2000, Mexico enacted the General Wildlife Law, the most comprehensive Mexican wildlife legislation to date, which contains provisions on the sustainable use of wildlife; incentives for land owners; cooperation among Federal, State, and municipal governments and private individuals; wildlife diseases; ethical use of wildlife; restrictions on exotic species, wildlife research and rehabilitation centers; wildlife use by indigenous people; environmental education; species at risk and their critical habitat; reintroduction and translocation protocols; scientific collection permits; control of nuisance species; and law enforcement investigations and citations (Valdez *et al.* 2006, p. 274). Hunting is regulated by the Mexican government, and extensive dove hunting occurs in northern Mexico including the State of Tamaulipas (Valdez *et al.* 2006, pp. 275–276); however, we have no information on shorebird hunting. In a review of Mexico's wildlife conservation laws, Valdez *et al.* (2006, p. 270) concluded that the frequent shifting of the Federal agencies responsible for wildlife management and a concomitant lack of adequate funding and other obstacles have prevented the establishment of a robust wildlife program. These authors concluded that the present Federal wildlife management strategy is an initial positive effort because it promotes participatory wildlife conservation by key stakeholders (Valdez *et al.* 2006, p. 270).

The subspecies composition of *Calidris canutus* in several Central American countries is unknown, but we have data to suggest that at least some of these birds are rufa red knots (see supplemental document—Rufa Red Knot Ecology and Abundance); thus, we have assessed available information regarding applicable laws in this region. The Belize Wildlife Protection Act (Chapter 220) regulates hunting, and the hunting of most birds including red knots is prohibited. In El Salvador, the Law of Conservation of Wildlife (Decree No. 844) tasks the National Park Service and Wildlife Service with developing hunting and other regulations, developing and updating a list of threatened and endangered species, and conducting research. The World Future Council (2011, pp. 5–10) concluded that Costa Rica's 1998 Biodiversity Law was successfully meeting several environmental performance metrics by promoting the conservation and sustainable use of biodiversity and ensuring the fair and equitable sharing of benefits derived therefrom. This Costa Rican law establishes wild protected areas, provides for the conservation and sustainable use of ecosystems and species, provides for environmental impact assessment, and promotes education and research (World Future Council 2011, p. 5). The practice of sport hunting in Panama is governed by Law 24 of 1995 and Law 39 of 2005, which, among other regulations, determine the animal species for which hunting is allowed and the closure periods.

As in Central America, best available data indicate that at least some of the *Calidris canutus* along South America's northwest coast are rufa red knots. In Colombia, Law 99 (1993) tasks the Ministry of the Environment with managing the collection, use, and trade of wildlife, and provides for the Regional Autonomous Corporations to establish hunting seasons. In

Venezuela, the Law for the Protection of Wildlife (1970) establishes hunting regulations, as well as wildlife reserves, refuges, and sanctuaries. Trinidad and Tobago has three designated Environmentally Sensitive Areas and three designated Environmentally Sensitive Species, but the red knot is not included (Environmental Management Authority of Trinidad and Tobago 2011).

Current Guyanese legislation consists of the Wild Birds Protection Act of 1987 (B. Andres pers. comm. December 21, 2011), which does not include the red knot on the list of wild bird species protected seasonally or year round. In Suriname, the Nature Conservation Act (1954, last updated 1992) allows for the establishment of nature reserves. Shorebirds in Suriname have been protected since 2002 under multiple use management areas, except for South American snipe and whimbrel (B. Andres pers. comm. December 21, 2011). Shorebird hunting is unregulated in French Guiana (A. Levesque pers. comm. January 8, 2013; D. Mizrahi pers. comm. October 16, 2011), which is an overseas region of France.

Brazil's Federal Constitution of 1988 includes protection of the country's fauna and flora, and establishes the legal standards for environmental protection. Article 225 of Brazil's Constitution confers jointly on the Federal government, States, and municipalities the authority and duty to protect the Brazilian fauna and flora. In 1998, the Environmental Crimes Law (law n. 9.605/98) was enacted to complement the Constitution and impose criminal liability on environmental crimes. The Environmental Crimes Law states that Brazilian wild fauna are considered public property that cannot be appropriated, and their use is subject to regulation by the Federal government. The Environmental Crimes Law includes criminal penalties in cases of actions or activities that may damage the environment and provides for the imposition of criminal liability on a person or legal entity that pollutes or degrades the environment. Crimes against wild fauna include killing, hounding, hunting, capturing, or using any fauna species without authorization or license, with penalties including detention of 6 months to 1 year, a fine, or both. The penalty is aggravated if the crime is committed against rare species or those considered endangered (even if only at the site of violation); in the period in which hunting is prohibited; during the night; by abusing a license; within a conservation unit; or by using methods or instruments capable of provoking mass destruction. There are exceptions including killing of animals to satisfy hunger or, via permit, to protect agriculture. Introductions of species into the country are prohibited without a license. Except for the state of Rio Grande do Sul, commercial, sport, and recreational hunting are prohibited in all Brazilian territory. The State of Rio Grande do Sul hunting law provides a list of animals that can be hunted, and prohibits trapping devices as well as commercialized hunting (Animal Legal and Historical Center 2011). The red knot is not listed as a species threatened with extinction in Brazil (Ministry of Environment 2013).

Uruguay has a variety of laws regarding wildlife, hunting, protected areas, biological diversity, environmental impact assessments, use of coastal and estuarine areas, and environmental contaminants (Vida Silvestre Uruguay 2013). The red knot is not listed as a game species in Uruguay (Uruguay Ministry of Livestock Agriculture and Fish 2013, p. 6). In Argentina, Law 22.421 regulates wildlife hunting, trade, and other uses. With only Federal guidelines, each Argentinean province enacts its own specific laws (FAO 1996). Two of Argentina's Patagonian provinces (Río Negro that includes San Antonio Oeste, and Santa Cruz

that includes Río Gallegos) have declared the conservation of migratory shorebirds to be “in the Provincial interest” and made it illegal to modify wetland habitat important for shorebirds (Western Hemisphere Shorebird Reserve Network (WHSRN) 2011). Chile has a variety of wildlife laws, including regulation of hunting and classification of rare, vulnerable, and endangered species (Chile Law 2013).

In summary, red knots are legally protected from direct take and hunting in several Caribbean and Latin American countries, but we lack information regarding the implementation or effectiveness of these measures. For many other countries, red knot hunting is unregulated, or we lack sufficient information to determine if red knot hunting is legal. We also lack information regarding the regulation of other activities, such as development, disturbance, oil spills, environmental contaminants, and wind energy development that threaten the red knot and its habitat.

U.S. Laws and Regulations

Wildlife Laws and Regulations

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703 *et seq.*) (MBTA) is the only Federal law in the United States currently providing specific protection for the red knot due to its status as a migratory bird. The MBTA prohibits the following actions, unless permitted by Federal regulation: to “pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird...or any part, nest, or egg of any such bird.” Through issuance of Migratory Bird Scientific Collecting permits, the Service ensures that best practices are implemented for the careful capture and handling of red knots during banding operations and other research activities (see proposed rule—Factor B—Scientific Study).

Birds in the Family Scolopacidae, including the red knot, are listed as a game species under international treaties with Canada and Mexico. The MBTA, which implements these treaties, grants the Service authority to establish hunting seasons for any listed game species. However, the Service has determined that hunting is appropriate only for those species for which there is a long tradition of hunting, and for which hunting is consistent with their population status and their long-term conservation. The Service would not consider legalizing the hunting of shorebird species, such as the red knot, whose populations were devastated by market hunting in the last decades of the 19th century (USFWS 2012c) (see proposed rule—Factor B—Hunting).

There are no provisions in the MBTA that prevent habitat destruction unless the activity causes direct mortality or the destruction of active nests, which would not apply since red knots do not breed in the United States. The MBTA does not address threats to the red knot from further population declines associated with habitat loss, insufficient food resources, climate change, or the other threats discussed in the proposed rule under Factors A, B, C, and E.

Some red knot concentration areas occur on military bases. The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans with the Secretaries of

Agriculture and the Interior for natural resources on public lands. The Sikes Act Improvement Act of 1997 requires Department of Defense installations to prepare Integrated Natural Resource Management Plans (INRMPs) that provide for the conservation and rehabilitation of natural resources on military lands consistent with the use of military installations to ensure the readiness of the Armed Forces. The INRMPs incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military land uses. While their implementation is subject to funding availability, INRMPs can be an added conservation tool in promoting the recovery of endangered and threatened species on military lands. We have identified one military base with an approved INRMP that explicitly addresses and benefits the red knot, Eglin Air Force Base in northwest Florida. However, INRMPs are not regulatory mechanisms and so are not considered further under Factor D.

Several red knot concentration areas occur in National Seashores or other units of the National Park Service (NPS), which must balance visitation and recreation with the protection of natural resources such as the red knot and its habitat. The National Park Service Organic Act of 1916, as amended (39 Stat. 535, 16 U.S.C. 1) (NPSOA), states that the NPS “shall promote and regulate the use of [NPS units]...to conserve the scenery and the national and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” By policy, NPS (2007) has interpreted the “impairment” standard and made the following findings. The fundamental purpose of all parks includes providing for the enjoyment of park resources and values by the people of the United States. “Enjoyment” means enjoyment both by people who directly experience parks and by those who appreciate them from afar, and includes more than recreation. When there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant. Impairment may occur from visitor activities; NPS activities in the course of managing a park; or activities undertaken by concessioners, contractors, and others operating in the park. The NPS has management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. In these situations, the NPS will ensure that the impacts are unavoidable and cannot be further mitigated. Rarely is there clear-cut evidence that impairment will occur. Superintendents and other NPS decision-makers apply their professional judgment to the facts of each case, taking into account technical and scientific studies and other information provided by subject matter experts (NPS 2007). In addition to the NPSOA, red knots may benefit from a 2010 nonregulatory Memorandum of Understanding (MOU) between the NPS and the Service regarding migratory birds that was executed pursuant to Executive Order 13186 (see Coastal Management, below); section F.4. of the MOU states that the NPS will identify and protect natural habitats of migratory bird species within park boundaries.

Several red knot concentration areas occur in National Wildlife Refuges (NWRs), which are administered by the Service. The National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd *et seq.*) (NWRISA) establishes the protection of biodiversity as the primary purpose of the NWR system; recreational and other uses of a NWR may only be approved if the Service finds such use to be compatible with the purposes of that individual NWR and the purposes of the NWR system. As the primary planning documents guiding

management of NWRs, Comprehensive Conservation Plans typically set goals and list needed actions to protect and enhance populations of key wildlife species on refuge lands.

Among coastal States from Maine to Texas, all except Alabama have enacted some kind of endangered species legislation; however, the red knot is listed only in New Jersey (endangered) and Georgia (rare, a category of protected species). The New Jersey Endangered and Non Game Species Conservation Act of 1973 (N.J.S.A. 23:2A *et seq.*) prohibits taking, possessing, transporting, exporting, processing, selling, or shipping listed species. “Take” is defined as harassing, hunting, capturing, or killing, or attempting to do so. As a State-listed species, the red knot is also afforded habitat protection under the New Jersey Coastal Zone Rules (N.J.A.C. 7:7E). Under the Georgia Nongame and Endangered Species Conservation Act (Code 1976 § 50-15-10 – 90), red knots cannot be captured, killed, or sold, and their habitat is protected on public lands; however, Georgia law specifically states that rules and regulations related to the protection of State-protected species shall not affect rights in private property.

Coastal Management

As discussed in the proposed rule under Factors A and E, shoreline stabilization has significant impacts on red knot habitats, and can also impact knots through disturbance and via impacts on prey resources. Federally funded shoreline stabilization is typically carried out by the U.S. Army Corps of Engineers (USACE) as authorized by a series of Water Resources Development Acts (WRDA), the most recent of which was passed in 2007 (P.L. 110–114). The 2007 WRDA continued Federal authorization for projects including flood damage reduction, stream bank protection, navigation, ecosystem restoration, shoreline protection (e.g., stabilization), and sediment removal (e.g., dredging).

In addition to its role in constructing shoreline stabilization projects, the USACE also administers a permitting program for certain projects in or near the intertidal habitats that support red knots. Many such projects require USACE permits under section 404 of the Clean Water Act (i.e., Federal Water Pollution Control Act) (33 U.S.C. 1251 *et seq.*), as amended, which establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities regulated under section 404 include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and mining. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from section 404 regulation (e.g., certain farming and forestry activities). Under the section 404 program, no discharge of dredged or fill material may be permitted if a practicable alternative exists that is less damaging to the aquatic environment, or if the nation’s waters would be significantly degraded. In addition to section 404 permits, some coastal projects require USACE permits under section 10 of the Rivers and Harbors Appropriation Act of 1899 (30 Stat. 1151, as amended; 33 U.S.C. 403 *et seq.*), which regulates the placement of structures in U.S. navigable waters. In addition to requiring USACE permits, the U.S. Coast Guard (USCG) administers a permitting program under section 9 of the Rivers and Harbors Appropriation Act of 1899, which regulates the construction of bridges, causeways, and dams in navigable waters.

Federal funding or authorization for a project triggers several environmental requirements that may afford some protections to red knots or their habitats. The National Environmental

Policy Act 42 U.S.C. §4321 *et seq.* (1969) (NEPA) requires Federal action agencies to assess the likely impacts from their proposed action as well as various alternative courses of action. However, NEPA does not mandate that Federal agencies include any specific environmental protections in the final project plans, and is therefore considered nonregulatory. Also nonregulatory in nature, Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, directs Federal agencies to evaluate the effects of their proposed actions and plans on migratory birds in the course of their NEPA analyses. Because NEPA and Executive Order 13186 are nonregulatory, they are not considered further under Factor D.

The Coastal Barrier Resources Act (P.L. 97-348) (96 Stat. 1653; 16 U.S.C. 3501 *et seq.*), as amended by the Coastal Barrier Improvement Act of 1990 (P.L. 101-591; 104 Stat. 2931) designated relatively undeveloped coastal barriers along the Atlantic and Gulf coasts as part of the John H. Chafee Coastal Barrier Resources System and made these areas ineligible for most new Federal expenditures and financial assistance, including Federal flood insurance that can promote development. The goal of these laws is to remove Federal incentives for the development of coastal barriers (e.g., barrier islands), because such development can lead to loss of natural resources, threats to human life and property, and imprudent expenditure of tax dollars.

The Coastal Zone Management Act of 1972 (P.L. 92-583) (86 Stat. 1280; 16 U.S.C. 1451-1464) (CZMA) provides Federal funding to implement the States' federally approved Coastal Zone Management Plans, which guide and regulate development and other activities within the designated coastal zone of each State. To be federally approved, a State plan must identify areas needed to protect, maintain, or replenish coastal lands or resources including coastal flood plains, aquifers and their recharge areas, estuaries, sand dunes, reefs, beaches, offshore sand deposits, and mangrove stands; include a definition of the term "beach" and a planning process for the protection of, and access to, public beaches and other public coastal areas of environmental, recreational, historical, esthetic, ecological, or cultural value; provide for the management of those land and water uses having a direct and significant impact on coastal waters and those geographic areas that are likely to be affected by or vulnerable to sea level rise; and assure the appropriate protection of those significant resources and areas, such as wetlands, beaches, dunes, and barrier islands, that make that State's coastal zone a unique, vulnerable, or valuable area (15 CFR Part 923). All eligible States in the red knot's U.S. range (including the Great Lakes) have approved Coastal Zone Management Plans (National Oceanic and Atmospheric Administration (NOAA) 2012c, p. 2). In those States with approved plans, the CZMA requires Federal action agencies to ensure that the activities they fund or authorize are consistent, to the maximum extent practicable, with the enforceable policies of that State's federally approved coastal management program; this provision of CZMA is known as Federal consistency (NOAA 2012c, p. 2).

Titus (2000, p. 743) reviewed the shoreline armoring and beach nourishment policies of all 18 coastal States from Maine to Texas. The States of Maine, Maryland, North Carolina, South Carolina, Mississippi, and Texas had policies to prohibit the armoring of ocean beaches, while the remaining 12 states allowed for at least some oceanfront armoring. More recently (in 2011), the State of North Carolina authorized an exception to its 1985 ban on new oceanfront structures, to allow for the construction of up to four new terminal groins (Rice 2012a, p. 7).

Thus, 72 percent of Atlantic or Gulf coast States (13 of 18) allow for new hard structures along the oceanfront beach. Titus (2000, p. 743) found that only Maine and Massachusetts had policies to prohibit the armoring of bays and sounds, with the other 16 States allowing these practices. Every State from Maine to Texas allowed oceanfront beach nourishment, although beach nourishment of bays and sounds was permitted in only 7 of these 18 States (Titus 2000, p. 743). Due to the Federal consistency provision of CZMA, the policies of each State are generally also followed by Federal agencies in determining if coastal projects may be federally funded or authorized under the statutes discussed above (e.g., WRDA, section 404 of the Clean Water Act, Rivers and Harbors Act).

State policies regarding beach grooming and sand removal or transfers are varied, and we do not have comprehensive information for each State. Above the high tide line, these activities are typically not regulated by the USACE, and thus fall under State and local jurisdictions. In those jurisdictions for which information is available, beach grooming is generally permitted in red knot habitat, including while the birds are present. Maine's Coastal Sand Dune Rules (Chapter 355) state that no review or permit is required for removal of debris from a beach, provided that little or no sand is removed with the debris, or for the removal of seaweed from the beach by hand or mechanical means provided the seaweed is not removed from the coastal sand dune system and does not disturb dune vegetation. The Massachusetts Wetlands Protection regulations (310 CMR 10.27) state that vegetative debris along the drift line is vital for resident and migratory shorebirds, which feed largely on invertebrates that eat the vegetation, and below the drift line in the lower intertidal zone are infauna (invertebrates such as mollusks and crustacea), which are also eaten by shorebirds; however, these regulations do not prohibit mechanical beach grooming that would remove such vegetative debris. New Jersey's Coastal Zone rules (N.J.A.C. 7:7E) seasonally restrict beach raking in nesting areas for piping plovers and State-listed beach species, and limit mechanical sifting and beach raking to recreational beach areas within 300 ft (91 m) of a staffed lifeguard stand. Florida regulates mechanized beach cleaning under its Beach and Shore Preservation Act (Florida Statute 161); special conditions must be followed for beach cleaning to occur during the sea turtle nesting season. The City of South Padre Island, Texas strives to rake the beaches only when there is a significant amount of seaweed present; any seaweed removed is separated from nonnatural material and then placed at the toe of the dunes for possible future use in dune restoration (City of South Padre Island 2013).

Invasive Species Control

Several Federal laws and policies relate to the control of invasive species. Invasive vegetation can affect red knot habitat (Factor A), while nonnative marine species can threaten red knot food supplies and facilitate the spread of harmful algal species (Factor E). Under Executive Order 13112, Invasive Species, Federal agencies may not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species, and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

The Plant Protection Act of 2000 (P.L. 106-224) regulates the movement of noxious weeds, which are defined as any plant or plant product that can directly or indirectly injure or cause damage to crops or other interests of agriculture, navigation, the natural resources of the United States, the public health, or the environment. The U.S. Department of Agriculture (USDA) publishes, by regulation, a list of noxious weeds that are prohibited or restricted from entering the United States or that are subject to restrictions on interstate movement within the United States. Of the invasive plant species discussed in the proposed rule under Factor A, none are on the Federal list, but *Carex kobomugi* is listed as a noxious weed by the States of Massachusetts and Connecticut, and *Casuarina* species are considered noxious weeds by the State of Florida. By policy, the USDA considers a plant species invasive only when it occurs on the Federal or a State-specific noxious weed list or a similar State list.

Regarding invasive marine species, the Aquatic Nuisance Species Task Force is an intergovernmental organization dedicated to preventing and controlling aquatic nuisance species and to implementing the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646), which was expanded with the passage of the National Invasive Species Act (NISA) (P.L. 104-332) in 1996. Under NISA, the USCG established both regulations and guidelines to prevent the introduction of aquatic nuisance species via ship ballast water. The USCG's final ballast water rule was published in the Federal Register on March 23, 2012, and became effective on June 21, 2012 (77 FR 17254). The USCG amended its regulations on ballast water management by establishing a standard for the allowable concentration of living organisms in ballast water discharged from ships in waters of the United States. The USCG also amended its regulations for engineering equipment by establishing an approval process for ballast water management systems (USCG 2013). Although the Aquatic Nuisance Species Task Force is still actively working to reduce the risk of new introductions, and the harmful effects of existing aquatic nuisance species, several funding provisions of NISA expired in 2002 and have not been reauthorized or replaced.

Under the Lacey Act (18 U.S.C. 42; 50 CFR 16), species listed as injurious may not be imported into the United States or transported between the continental United States, the District of Columbia, Hawaii, the Commonwealth of Puerto Rico, or any territory or possession of the United States by any means without a permit issued by the Service. The Service implements the injurious wildlife provisions of the Lacey Act through regulations at 50 CFR part 16. Species are added to the list of injurious wildlife to prevent their introduction or establishment through human movement in the United States. Regulation of transport or use within a State is the responsibility of each State. Possession of a species within State boundaries is also the responsibility of each State and is not regulated by an injurious wildlife listing. Injurious wildlife are defined as vertebrates, crustaceans, mollusks, and their offspring that are injurious to the interests of human beings, agriculture, horticulture, forestry, or the wildlife resources of the United States (USFWS 2007a, p. 1). Because Asian horseshoe crabs are not among the taxa eligible for listing as injurious, the Service currently lacks the regulatory authority to restrict their importation (USFWS 2013, pp. 1–2); see proposed rule—Factor E—Reduced Food Availability—Horseshoe Crab Harvest.

In addition to their introduction via ballast water (regulated by USCG) and deliberate import (regulated by the Service), nonnative marine and estuarine species can also be introduced

into red knot habitats via aquaculture, and can involve pathogens as well as marine invaders and harmful algal species. In addition, red knot habitats can be directly converted to aquaculture facilities (see proposed rule—Factor A—Agriculture and Aquaculture). Aquaculture in the United States is regulated at both the Federal and State level. At the Federal level, the primary agencies include the Food and Drug Administration (FDA), the USDA, and the U.S. Environmental Protection Agency (USEPA). The USEPA is responsible for wastewater permitting across all industries, while the FDA covers food safety regulations and drug approvals. Several other Federal agencies and programs, including NOAA and the Service, are involved indirectly in aquaculture activities. A coordinating body, the Joint Subcommittee on Aquaculture, was created by enactment of the National Aquaculture Act of 1980 (P.L. 96-362), as amended, which promotes aquaculture and is nonregulatory in nature. Federal regulatory statutes rarely address aquaculture directly, but collectively these laws (e.g., Federal Water Pollution Control Act; Food, Drug and Cosmetic Act; Animal Drug Availability Act; Magnuson-Stevens Fisheries Conservation Act; Lacey Act; Coastal Zone Management Act; and Virus Serum Toxin Act) provide the statutory framework for regulating food safety, veterinary medicines, fisheries, coastal zone management, and other activities related to aquaculture (National Agricultural Law Center undated).

State and local governments generally regulate activities that are permitted or licensed at the community level. In aquaculture, the majority of operations fall into this regulatory scheme. Generally, permits deal with zoning, building, water use, waste discharge, species certification related to wildlife management, marketing or processing, and trade. Often, regulations differ based on the position of the operation—inland, wetland, coastal, or offshore. Due mainly to environmental concerns, requirements for each type of operation are varied, with each State administering permits based on its own specific rules. There are no consistent or universal laws and regulations of aquaculture among the several States; thus, regulations can vary considerably between geographic locations (National Agricultural Law Center undated).

Regulation of Other Threats

As discussed in the proposed rule under Factor E, reduced food availability at the Delaware Bay stopover site due to commercial harvest of the horseshoe crab is considered a primary causal factor in the decline of the rufa red knot in the 2000s. The Atlantic Coastal Fisheries Cooperative Management Act of 1993 set forth the current role of the Atlantic States Marine Fisheries Commission (ASMFC), which had been established under an interstate compact among all States from Maine to Florida and previously approved by Congress (P.L. 77-539 and 81-721). Under the 1993 law, the ASMFC develops coastal fishery management plans and monitors each State's compliance with the plans. If a State fails to implement and enforce a fishery plan, NOAA declares a moratorium in the fishery in question within the waters of the noncomplying State. The ASMFC adopted a horseshoe crab management plan in 1998, with different provisions for the bait industry versus the biomedical industry. In 2012, the ASMFC adopted Addendum VII to the plan, which utilizes an Adaptive Resource Management (ARM) framework to manage the bait fishery in the Delaware Bay Region (New Jersey, Delaware, and parts of Maryland and Virginia) (ASMFC 2012a, p. 2). Under the ARM, bait harvest levels are tied to red knot populations via scientific modeling. There have been no instances of State noncompliance with the horseshoe crab management plan. In 2008, New Jersey enacted a law (N.J.S.A. 23.2b.21) extending an earlier (2006) Statewide moratorium on the bait harvest until

specific red knot recovery targets are achieved. Thus, New Jersey does not use its bait harvest quota as allocated by the ASMFC. Regulation of the horseshoe crab harvest is discussed further in the proposed rule under Factor E.

Recreational activities, including off-road vehicle (ORV) use, can impact red knots through disturbance, and through effects on prey resources. The MBTA prohibits direct take of migratory birds including red knots on both Federal and non-Federal lands. However, recreational activities occurring within the red knot's U.S. range seldom cause direct mortality; rather, recreational activities typically cause disturbance of and other impacts to (including indirect take of) migratory birds. On Federal lands, the development and implementation of recreation management regulations and policies are subject to several of the statutes, orders, and policies discussed above, including the MBTA, the Sikes Act, NPSOA, NWRSA, NEPA, and Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds); collectively, these laws and policies strongly encourage Federal land managers to consider the effects of red knot disturbance and prey availability as a result of recreational disturbance. On non-Federal lands, recreation is managed by a patchwork of State and local laws, many of which are contingent upon the land ownership of thousands of individual parcels along the coasts. We lack information regarding most of the existing non-Federal recreation management policies and their effects on the red knot. However, we are aware of only a few locations (e.g., portions of the Delaware bayshore) in which beaches are closed, regulated, or patrolled to protect nonbreeding shorebirds.

The Harmful Algal Bloom and Hypoxia Amendments Act of 2004 (Public Law 108-456) authorizes funding for research on harmful algal blooms (HABs) and hypoxia to advance scientific understanding and our ability to detect, assess, predict, control, and mitigate events. However, this law is nonregulatory. To the extent that HABs may be caused or intensified by poor water quality, section 402 (the National Pollutant Discharge Elimination System) and other provisions of the Clean Water Act likely reduce these effects, through discharge requirements and by seeking to achieve minimum surface water quality standards. Regulatory provisions relevant to the spread of harmful algal species (e.g., USCG ballast water regulations, the aquaculture regulatory framework) are discussed above.

The Oil Pollution Act of 1990 (P.L. 101-380) (104 Stat. 484; 33 U.S.C. 2701 *et seq.*) (OPA) expanded the ability of Federal agencies to respond to oil spills. The OPA also created the national Oil Spill Liability Trust Fund, which is available to provide up to one billion dollars per spill incident. In addition, the OPA provided new requirements for contingency planning by both government and industry in a three-tiered approach: the Federal government is required to direct all public and private response efforts for certain types of spill events; Area Committees (composed of Federal, State, and local officials) must develop detailed, location-specific Area Contingency Plans; and owners or operators of vessels and certain facilities that pose serious threats to the environment must prepare their own Facility Response Plans. The USEPA has published regulations for aboveground storage facilities, and the USCG has done so for oil tankers. The OPA also increased penalties for regulatory noncompliance, broadened the response and enforcement authorities of the Federal government, and preserved State authority to establish law governing oil spill prevention and response (USEPA 2011). All oil and gas operations on the Outer Continental Shelf (OCS) (e.g., exploration, extraction) are governed by

laws and regulations to ensure safe operations and preservation of the environment (50 CFR 203-291). The Bureau of Safety and Environmental Enforcement (BSEE) within the Department of the Interior (DOI) enforces these regulations and periodically updates rules to reflect changes in technology and new information.

The USEPA and the States register or license pesticides for use in the United States. The USEPA receives its authority to register pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. §136 *et seq.*) (FIFRA). States are authorized to regulate pesticides under FIFRA and under State pesticide laws. States may place more restrictive requirements on pesticides than USEPA. Pesticides must be registered both by USEPA and the State before distribution.

The construction and operation of terrestrial wind turbines are potentially subject to various Federal regulations. The MBTA applies to all activities (both Federal and non-Federal) that result in the “take” of migratory birds, including the construction and operation of wind turbines. To help both Federal and non-Federal project proponents minimize the risk of take under the MBTA, the Service recently updated its voluntary Land-Based Wind Energy Guidelines, to provide a structured, scientific process for addressing wildlife conservation concerns at all stages of land-based wind energy development (USFWS 2012d, p. vi). Because the MBTA does not allow for the authorization of take that is incidental to an otherwise lawful activity (“incidental take”), the Service cannot authorize the take of red knots or other migratory birds caused by collisions with wind turbines. The Service makes decisions whether to refer for prosecution any alleged take of migratory birds at wind energy facilities, and takes into account the adherence of the developer or operator with the voluntary guidelines (USFWS 2012d, p. 6).

In addition to MBTA, other Federal regulatory mechanisms may apply to terrestrial wind energy development, depending on the role (if any) of a Federal agency in turbine construction and operation (i.e., the nature of the Federal nexus, if any). For wholly non-Federal projects, section 10 of the Endangered Species Act (incidental take permits for listed species upon completion of a Habitat Conservation Plan (HCP)) would apply and can provide protection for nonlisted species, but only if the section 10 permittee chooses to include the nonlisted species as a species covered by the HCP. For wind energy projects that are federally funded (e.g., by the USDA’s Rural Energy for America Program) or authorized (e.g., if a section 404 wetland permit is required) or located on Federal land, several of the regulations and policies described above would apply, such as NEPA and Executive Order 13186; however, as these measures are nonregulatory, we do not consider these further here. Additional Federal regulations and policies (e.g., NPSOA, NWRSA) apply to any wind energy development on Federal land.

Regarding offshore wind energy development, section 388 of the Energy Policy Act of 2005 granted the DOI discretionary authority to issue leases, easements, or rights-of-way for activities on the OCS that produce or support production, transportation, or transmission of energy from sources other than oil and gas, and that are not otherwise authorized by other applicable law. The DOI has delegated this authority to the Bureau of Ocean Energy Management (BOEM), which has jurisdiction over projects on the OCS including but not limited to offshore wind energy, wave energy, ocean current energy, offshore solar energy, and hydrogen generation, as well as other projects that make alternate use of existing oil and natural

gas platforms in Federal waters on the OCS. Under NEPA, the BOEM has prepared a Programmatic Environmental Impact Statement setting forth policies and best management practices, and has promulgated regulations and guidelines (Department of Energy (DOE) and Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) 2011, p. iii).

Summary—U.S. Laws and Regulations

The MBTA and state wildlife laws protect the red knot from direct take resulting from scientific study and hunting. The Sikes Act, NPSOA, and NWRSA provide protection for the red knot from habitat loss and inappropriate management on many Federal lands. Although shorebirds are not their focus, some laws do regulate shoreline stabilization and coastal development, including section 404 of the Clean Water Act, the Rivers and Harbors Act, the Coastal Barrier Resources Act, and the Coastal Zone Management Act as implemented by Federal and State regulations. We have limited information regarding State and local regulations regarding beach cleaning or recreational disturbance. Several Federal and State policies are in effect to stem the introductions and effects of invasive species, but collectively these do not provide complete protection for the red knot from impacts to its habitats or food supplies resulting from beach or marine invaders or the spread of harmful algal species. Although threats to the horseshoe crab egg resource remain (see proposed rule—Factor E—Reduced Food Supplies), the current regulatory management of the horseshoe crab fishery is adequately addressing threats to the knot's Delaware Bay food supply from direct harvest. Although we lack information regarding the overall effect of recreation management policies on the red knot, we are aware of only a few locations in which beaches are closed, regulated, or monitored to protect nonbreeding shorebirds. Relatively strong Federal laws likely reduce risks to red knots from oil spills and pesticides, but both have caused documented shorebird mortalities and other impacts in recent decades. Similarly, existing Federal laws and policies are likely to reduce the red knot's collision risks from new wind turbine development, but some level of mortality is expected upon buildout of the Nation's wind energy infrastructure.

International Laws and Regulations

Internationally, there are different laws among nations that affect aquaculture. However, the United Nations (UN) has played a significant role in the development of international law for seas and fisheries, directly impacting coastal or open ocean aquacultural operations. The 1982 UN Conference on the Law of the Sea (UNCLOS) set offshore territorial boundaries that establish zones of exclusive economic and fisheries rights for coastal nations. While some nations have not ratified this convention, it is the de facto set of guidelines for the world's oceans. Furthermore, the UN has developed a Code of Conduct for Responsible Fisheries, based on international laws including UNCLOS (National Agricultural Law Center undated).

International regulations can also slow or halt the spread of diseases that could potentially affect red knots. For example, many countries have applied trade restrictions on the import of birds and their products from countries affected by the H5N1 avian influenza virus, by invoking the Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization (Fidler 2004). The World Health Organization (WHO) has protocols for the containment of diseases such as pandemic influenza (WHO 2007, entire).

The International Maritime Organization (IMO) is the UN specialized agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships (IMO 2013). The 1969 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties affirms the right of a coastal State to take such measures on the high seas as may be necessary to prevent, mitigate or eliminate danger to its coastline or related interests from pollution by oil or the threat thereof, following upon a maritime casualty; the coastal State is, however, empowered to take only such action as is necessary, and after due consultations with appropriate interests. The 1973 International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The MARPOL has been updated by amendments through the years. Since 1992, it has been mandatory for new oil tankers to have double hulls, and a schedule has been implemented for existing tankers to be retrofitted double hulls. Other MARPOL provisions prohibit the discharge of noxious substances within 12 mi (19 km) of the nearest land (IMO 2013).

In summary, the existing international regulatory mechanisms are likely reducing threats to the red knot from oil spills, other contaminants, and disease incidental to the pursuit of other goals.

Summary of Factor D

In Canada, SARA provides protections for the red knot and its habitat, both on and off of Federal lands. The red knot is afforded additional protections under the MBCA and by provincial law in four of the Provinces. Red knots are legally protected from direct take and hunting in several Caribbean and Latin American countries, but we lack information regarding the implementation or effectiveness of these measures. For many other countries, red knot hunting is unregulated, or we lack sufficient information to determine if red knot hunting is legal. We also lack information for countries outside the United States regarding the protection or management of red knot habitat, and regarding the regulation of other activities that threaten the red knot such as development, disturbance, oil spills, environmental contaminants, and wind energy development.

The MBTA and state wildlife laws protect the red knot from direct take resulting from scientific study and hunting. The Sikes Act, NPSOA, and NWRSA provide protection for the red knot from habitat loss and inappropriate management on Federal lands. Section 404 of the Clean Water Act, the Rivers and Harbors Act, the Coastal Barrier Resources Act, the Coastal Zone Management Act, and State mechanisms regulate shoreline stabilization and development. State regulations provide varying levels of protection from impacts associated with beach grooming. Several Federal and State policies are in effect to stem the introductions and effects of invasive species, but collectively do not provide complete protection to the red knot from impacts to its habitats or food supplies resulting from beach or marine invaders or the spread of harmful algal species. Although threats to the horseshoe crab egg resource remain (see proposed rule—Factor E—Reduced Food Supplies), the current regulatory management of the horseshoe crab fishery is adequately addressing threats to the knot's Delaware Bay food supply from direct harvest. Although we lack information regarding the overall effect of recreation management policies on the red knot, we are aware of a few locations in which beaches are closed, regulated, or monitored to protect nonbreeding shorebirds. Relatively strong Federal laws likely reduce

risks to red knots from oil spills and pesticides, but both have caused documented shorebird mortalities and other impacts in recent decades. Similarly, Federal law and policy reduce the red knot's collision risks from new wind turbine development, but some level of mortality is expected upon buildout of the Nation's wind energy infrastructure.