IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF SOUTH CAROLINA
CHARLESTON DIVISION

DEFENDERS OF WILDLIFE and SOUTH CAROLINA COASTAL CONSERVATION LEAGUE, Plaintiffs, v. ROBERT H. BOYLES, JR., in his official Capacity as Director of the South Carolina Department of Natural Resources; BLAIK KEPPLER, in her official capacity as Acting Deputy Director of the Marine Resources Division of the South Carolina Department of Natural Resources[1]; MELVIN BELL, in his official capacity as Director of the Office of Fisheries Management of the South Carolina Department of Natural Resources; and CHARLES RIVER LABORATORIES INTERNATIONAL, INC., Defendants.	)	Civ. No. _____

COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF

1. This case challenges the "take" of red knots by the South Carolina Department of Natural Resources ("SCDNR") and Charles River Laboratories International, Inc. ("Charles River"), in violation of Section 9 of the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1538(a)(1)(B), (g).

2. Red knots are a species of shorebird in rapid decline and listed as threatened under the ESA.

[1] Substituted as a party upon the death of former deputy director of the Marine Resources Division Philip P. Maier. Fed. R. Civ. P. 25(d).

3. Each spring, the small birds make one of the longest migrations known in the animal kingdom, from wintering habitat as far as the southern tip of South America to breeding grounds in the Canadian Arctic. For many red knots, a short stop on the beaches of South Carolina to feed on nutrient-rich horseshoe crab eggs is a critical break along the way.

4. Red knots have evolved to time their stopover to coincide with horseshoe crab spawning season. Each spring, the crabs emerge from the sea to lay their tiny eggs in beach sands.

5. The timing is no coincidence: to survive the remainder of their journey and breed, red knots must consume several hundred thousand horseshoe crab eggs during their stopover. Horseshoe crab eggs are fatty, nutrient-rich, and easily digestible; they are the only source of food available to red knots that allows the birds to reliably build up the fat and protein reserves needed to fly to the Arctic, mate, and reproduce. Simply put, the survival and propagation of red knots that stop on South Carolina beaches requires a super-abundance of horseshoe crab eggs.

6. Just as horseshoe crabs emerge from the ocean to spawn each spring, Defendant Charles River takes over seventy-five thousand crabs from South Carolina's beaches. The company, acting pursuant to an SCDNR permit, piles the crabs in artificial containment ponds for the spawning season—weeks or months at a time—before taking them to a bleeding facility in Charleston, where it drains up to half of the crabs' blood for pharmaceutical use.

7. Charles River removes a significant portion of South Carolina's horseshoe crab population from beaches, where crab eggs are accessible to red knots. Instead, the company keeps spawning crabs in man-made ponds beyond the reach of red knots. This substantially depletes egg densities needed to sustain red knots, depriving the birds of up to several billion horseshoe crab eggs each spring migration.

8. South Carolina is the only state that permits the use of horseshoe crab containment ponds. SCDNR's "Horseshoe Crab Possession (No Harvest) Permit HP21-0" authorizes the practice. *See* Ex. A at 22–23 ("Possession Permit"). On its face, the permit is essentially a blank check, with no restrictions on the number of crabs that can be held in ponds or the amount of time they can be held before bleeding, and no concrete measures to ensure that crabs remain healthy and spawn on beaches.

9. The Possession Permit contains no protections whatsoever for eggs laid or crabs spawned in containment ponds; SCDNR does not require Charles River to record their existence or ever return them to their natural habitat.

10. SCDNR hardly monitors Charles River's containment pond practices. In response to an open records request, the agency claimed that "[n]o records exist" of "[m]onthly inspection, compliance, and enforcement," "[r]equirements for size, capacity, infrastructure, and technology of holding ponds," "[r]ecords pertaining to the amount of time horseshoe crabs spend in holding ponds," or "horseshoe crab spawning in holding ponds." Ex. B at 3.

11. Upon information and belief, thousands of horseshoe crabs die each year in the overcrowded, unsanitary conditions in Charles River's containment ponds. Surviving crabs suffer sub-lethal effects and are less likely to reproduce. Tens of thousands more crabs likely spawn each year in containment ponds beyond the reach of red knots.

12. Charles River's containment ponds deprive red knots of the horseshoe crab eggs they need to survive and reproduce, and deplete crab populations needed to sustain red knots on future migrations.

13. These ponds have contributed to a significant decline in red knots and horseshoe crab spawning observed on South Carolina's beaches in recent years. When Charles River stopped

containing horseshoe crabs in ponds for one year in 2016, crab densities shot up fifty percent after a steep, five-year decline.

14. Horseshoe crab egg densities on the State's beaches, once abundant in critical stopover sites such as Cape Romain National Wildlife Refuge, are no longer sufficient to sustain migrating red knots.

15. That red knots depend on a super-abundance of horseshoe crab eggs at their spring stopover sites is not controversial—it is shorebird science 101. By substantially depleting this known critical food source, Charles River and SCDNR are causing the "take" of threatened red knots, in violation of Section 9 of the ESA. To cure these violations and protect the survival chances of red knots, which Plaintiffs' members observe and cherish, Defenders of Wildlife ("Defenders") and the South Carolina Coastal Conservation League (the "League") seek an order from this Court declaring that Defendants are causing the "take" of red knots and enjoining SCDNR's authorization and Charles River's use of horseshoe crab containment ponds.

JURISDICTION AND VENUE

16. Plaintiffs bring their Section 9 claims under the citizen suit provisions of the ESA, 16 U.S.C. § 1540(g)(1)(A). This Court has federal question jurisdiction pursuant to 28 U.S.C. § 1331, and may issue declaratory and injunctive relief under 28 U.S.C. §§ 2201(a), 2202, and 16 U.S.C. § 1540(g)(1).

17. Venue is proper in this District and Division under 28 U.S.C. § 1391(b)(2) and Local Civ. Rule 3.01(A)(1) (D.S.C.), respectively, because "a substantial part of the events or omissions giving rise to the claim occurred" in Charleston—namely, the issuance of SCDNR's Possession Permit by Defendant Melvin Bell at the Office of Fisheries Management, 217 Ft. Johnson Road, Charleston, South Carolina 29412.

18. Pursuant to 16 U.S.C. § 1540(g)(2)(A)(i), Plaintiffs commence this action sixty days or more after giving written notice of the violations alleged herein to the Secretary of the Interior and to alleged violators Charles River and SCDNR. Ex. A (notice of intent to sue letter, sent via certified mail and email on November 3, 2021); Ex. C (return receipts, delivery confirmations, and email to Defendants).

PARTIES

I. Plaintiffs

19. Plaintiff Defenders of Wildlife is a non-profit organization headquartered in Washington, D.C., with nearly 2.2 million members and supporters nationwide and about 17,500 in South Carolina. Defenders is dedicated to protecting native animals, plants, and the habitats they depend on, including on the South Carolina coast. Defenders advocates for approaches to wildlife conservation that help keep species from becoming threatened and endangered, using education, research, policy, and, where necessary, litigation to defend wildlife and their habitat.

20. Plaintiff South Carolina Coastal Conservation League is a non-profit organization incorporated in South Carolina with approximately 2,500 active members. The League's mission is to protect the natural environment, wildlife, and aquatic habitat of South Carolina's coastal plain, ensuring that local communities, members, and visitors can access these invaluable resources.

21. Defenders and the League bring this action on behalf of themselves and their members.

22. The challenged horseshoe crab containment practices injure Plaintiffs as organizations. By harming threatened red knots and the horseshoe crabs they depend on, these practices undermine Plaintiffs' missions to protect coastal wildlife and their habitat. This requires Plaintiffs to divert limited resources away from other important projects to identify and

counteract the harms caused by horseshoe crab containment ponds, impeding Plaintiffs' abilities to carry out their missions.

23. For example, Defenders has been forced to divert resources away from advocating to protect an endangered species of mussel from sand mining along Tennessee's Duck River in order to investigate, research, educate the public about, and advocate for regulation of horseshoe crab containment ponds. Moreover, the lack of transparency around containment ponds and their effects deprives Plaintiffs of information critical to their core functions of educating members and the public and proposing policy to address threats to wildlife on the South Carolina coast.

24. Containment ponds also injure the aesthetic, recreational, and business interests of Plaintiff's members. Members visit beaches across South Carolina each spring to photograph and observe migrating red knots and spawning horseshoe crabs, and run ecotourism businesses that lead clients to these species. These activities are harmed by Charles River's removal and containment of tens of thousands of crabs each spawning season, which depletes red knots' critical food source.

25. League members Paula Feldman and Dana Beach eagerly await their annual spring visits to Kiawah Island and Deveaux Bank, where they have photographed red knots for well over a decade. Since the 1990s, Defenders member Chris Crolley has led clients by boat to see red knots and horseshoe crabs on the islands of southern South Carolina as part of his ecotourism business, Coastal Expeditions. Over the years, all have seen marked declines in red knot abundance; flocks that once numbered in the hundreds or thousands now number in the dozens. Mr. Beach and Mr. Crolley have noticed similar declines in spawning horseshoe crabs. The declines have lessened members' enjoyment of a cherished spring tradition, and lost clients for Mr. Crolley. Members suspect that horseshoe crab containment ponds are a key culprit.

II. Defendants

26. Defendant Robert H. Boyles, Jr. is the Director and highest ranking administrator of the South Carolina Department of Natural Resources. SCDNR, under the authority of Director Boyles and other Defendant-officials, issued the authorizations of horseshoe crab containment practices that Plaintiffs challenge in this case. Plaintiffs sue Director Boyles in his official capacity.

27. Defendant Blaik Keppler is the Acting Deputy Director of SCDNR's Marine Resources Division. The challenged authorizations of horseshoe crab containment practices were also issued under Defendant Keppler's authority. Plaintiffs sue Acting Deputy Director Keppler in her official capacity.

28. Defendant Melvin Bell is the Director of SCDNR's Office of Fisheries Management ("OFM"). The challenged authorizations of horseshoe crab containment practices were also issued under Defendant Bell's authority. Plaintiffs sue OFM Director Bell in his official capacity.

29. Defendant Charles River Laboratories International, Inc. is a multinational pharmaceutical company incorporated in Delaware and headquartered in Wilmington, Massachusetts. Pursuant to SCDNR's authorization, Charles River harvests and bleeds horseshoe crabs at an industrial scale in South Carolina. The company opts not to use a synthetic alternative to crab blood that is equally effective for biomedical use. Charles River is the only entity that harvests horseshoe crabs in South Carolina and is responsible for the horseshoe crab containment practices challenged here.

LEGAL FRAMEWORK

I. The Endangered Species Act

30. "In response to growing concern over the extinction of many animal and plant species, Congress enacted the Endangered Species Act of 1973." *Gibbs v. Babbitt*, 214 F.3d 483, 487 (4th Cir. 2000) (citation omitted). Congress' response was "powerful and substantially unequivocal." *Loggerhead Turtle v. Cty. Council of Volusia Cty., Fla.*, 148 F.3d 1231, 1246 (11th Cir. 1998), *cert. denied*, 526 U.S. 1081 (1999) (citation and quotations omitted). Indeed, the ESA is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978).

31. "'The plain intent of Congress in enacting this statute . . . was to halt and reverse the trend toward species extinction, whatever the cost. This is reflected not only in the stated policies of the Act, but in literally every section of the statute.'" *Babbitt v. Sweet Home Chapter of Cmtys. for a Great Ore.*, 515 U.S. 687, 699 (1995) (quoting *Hill*, 437 U.S. at 184). "[E]xamination of the language, history, and structure of the legislation . . . indicates beyond doubt that Congress intended endangered species to be afforded the highest of priorities." *Hill*, 437 U.S. at 174.

32. Congress found that "economic growth and development untampered by adequate concern for conservation" had "rendered extinct . . . various species of fish, wildlife, and plants" and "so depleted [the] numbers" of other species "that they are in danger of or threatened with extinction," 16 U.S.C. § 1531(a)(1)–(2).

33. Recognizing these species' "esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people," *id.* § 1531(a)(3), the ESA set out "to provide a means whereby the ecosystems upon which endangered species and threatened species depend

may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species," *id.* § 1531(b). The purpose of the statute is to recover these species to a healthy status. *See id.* § 1532(3) ("conservation" and "conserve" mean "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the ESA] are no longer necessary").

34. In pursuing these objectives, Section 9(a)(1) is the "cornerstone" of the statute. *Gibbs*, 214 F.3d at 487. That section prohibits the "take" of any endangered species. 16 U.S.C. § 1538(a)(1)(B). The Secretary of the Interior may extend the "take" prohibition to threatened species, *id.* § 1533(d), as it has done for the threatened red knot. *See* Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Rufa Red Knot, 79 Fed. Reg. 73,706, 73,728 (Dec. 11, 2014).

35. The legislative history "make[s] clear that Congress intended 'take' to apply broadly," *Babbitt*, 515 U.S. at 704—indeed, "in the broadest possible manner to include every conceivable way in which a person can 'take' or attempt to 'take' any fish or wildlife." S. Rep. No. 93-307, 1973 WL 12683, at *2,995 (1973).

36. Consonant with that intent, the ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19). Relevant here, take by "harass[ment]" means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering." 50 C.F.R. § 17.3. And take by "harm" includes "significant

habitat modification or degredation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." *Id.*

37. "Congress understood § 9(a)(1)(B) to prohibit indirect as well as deliberate takings." *Babbitt*, 515 U.S. at 700. Indeed, Section 10(a) of the statute requires a permit for "any taking otherwise prohibited by [Section 9(a)(1)(B)] if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." 16 U.S.C. § 1539(a)(1)(B). Thus, "activities not intended to harm an endangered species, such as habitat modification, may constitute unlawful takings under the ESA unless the Secretary permits them." *Babbitt*, 515 U.S. at 701.

38. Relatedly, the statute does not require that the defendant himself perform acts that directly exact a taking. Under the ESA, it is unlawful for any person to "cause to be committed" any act that violates Section 9. 16 U.S.C. § 1538(g). That is, the statute "not only prohibits the acts of those parties that directly exact the taking, but also bans those acts of a third party that bring about the acts exacting a taking." *Strahan v. Coxe*, 127 F.3d 155, 163 (1st Cir. 1997), *cert denied*, 525 U.S. 830 (1998).

39. A take by harassment occurs when challenged conduct creates the "likelihood of injury" to listed wildlife. 50 C.F.R. § 17.3. And "habitat modification that is reasonably certain to injure [a listed] species by impairing their essential behavioral patterns . . . [is] sufficient to justify a permanent injunction." *Defenders of Wildlife v. Bernal*, 204 F.3d 920, 925 (9th Cir. 2000).

40. Section 9's "take" prohibition applies to "any individual member of a threatened or endangered species population." *Mausolf v. Babbitt*, 125 F.3d 661, 668 (8th Cir. 1997).

41. Applying these principles, reducing the availability of a critical source of food for a listed species constitutes a "take." Indeed, ESA regulations defining take by "harm" and "harass[ment]" include impacts to an animal's "feeding" patterns. 50 C.F.R. § 17.3.

42. Courts routinely hold government agencies and officials liable under Section 9 for authorizing private conduct that causes the incidental take of listed species. *E.g.*, *Strahan*, 127 F.3d at 163–64 (Massachusetts liable for take of endangered right whales by authorizing fishing practices that risked ensnaring them); *Loggerhead Turtle*, 148 F.3d at 1251–53 (county could be liable for take of endangered sea turtles by authorizing beachfront lighting in turtle nesting areas); *Red Wolf Coalition v. N.C. Wildlife Res. Comm'n*, No. 2:13–CV–60–BO, 2014 WL 1922234, at *7–9 (E.D.N.C. May 13, 2014) (state commission likely liable for take by authorizing hunting practices for coyotes that risked mistaken shootings of endangered red wolves); *Animal Welfare Inst. v. Martin*, 588 F. Supp. 2d 70, 98–100 (D. Me. 2008) (state agency likely violated Section 9 by approving traps that risked incidentally trapping threatened lynx); *United States v. Town of Plymouth*, 6 F. Supp. 2d 81, 90–92 (D. Mass. 1998) (town likely liable for take of threatened piping plover by authorizing off-road vehicles on beach that risked harming the bird's nesting and feeding habitat).

43. In short, if a state's regulatory scheme "likely results in a taking in violation of the far-reaching prohibitions of the ESA," the scheme "cannot continue," *Strahan*, 127 F. 3d at 168.

FACTUAL BACKGROUND

I. The *Rufa* Red Knot

a. Overview

Figure 1. The beach-foraging *rufa* red knot.[2]

44. The *rufa* red knot (*Calidris canutus rufa*) is a robin-sized migratory shorebird in rapid decline.

45. In 2015, the U.S. Fish and Wildlife Service (the "Service") listed the *rufa* red knot as "threatened" under the ESA. Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Rufa Red Knot, 79 Fed. Reg. 73,706 (Dec. 11, 2014). This means that the species is "likely to become [endangered with extinction] within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20), (6). In listing the red knot as threatened, the Service extended Section 9's "take" prohibition to the species. 79 Fed. Reg. at 73,728.

[2] Source: On Nature Magazine, *Red Knot*, https://onnaturemagazine.com/red-knot.html (last visited Jan. 6, 2022).

46. Between the 1980s and 2000s, red knot populations declined from an estimated 100,000–150,000 to below 45,000. In their main wintering area—Tierra del Fuego, Chile—red knot numbers decreased from 56,000 in 1986 to 12,000 in 2011, and have not improved since. This has led "researchers to suggest the population is highly vulnerable to extinction." F.M. Smith et al., *Investigating Red Knot Migration Ecology Along the Georgia and South Carolina Coasts: Spring 2019 Season Summaries* at 3, CTR. FOR CONSERVATION BIOLOGY TECHNICAL REPORT SERIES (2019).[3]

47. From their main wintering area on the southern tip of South America, red knots make a remarkable journey. Each spring, red knots fly over 9,000 miles to reach their breeding grounds in the Canadian Arctic, a round-trip nearing 19,000 miles. This is "one of the longest distance migrations known in the animal kingdom." Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Rufa Red Knot (Calidris Canutus rufa), 78 Fed. Reg. 60,024, 60,027 (Sept. 30, 2013).

48. In preparation for their journey, red knots undergo a series of physiological changes:

> Before takeoff, the birds accumulate and store large amounts of fat to fuel migration and undergo substantial changes in metabolic rates. In addition, leg muscles, gizzard (a muscular organ used for grinding food), stomach, intestines, and liver all decrease in size, while pectoral (chest) muscles and heart increase in size.

Id.

49. Many red knots rely on only one or two stopovers between South America and their Arctic breeding grounds. After flying thousands of miles, red knots are often emaciated by the time they reach a stopover site.

[3] https://scholarworks.wm.edu/cgi/viewcontent.cgi?article=1587&context=ccb_reports.

50. During a stopover, red knots must consume substantial amounts of food to (1) recover fat and protein reserves from the first leg of the migration, (2) fuel the remainder of the journey, and (3) build up energy to facilitate reproduction in frigid breeding habitat. If red knots do not consume enough food during their stopover, they are far less likely to survive migration and reproduce.

51. Red knots must reach the Arctic and breed before cold weather makes the region inhospitable. Because "stopovers are time-constrained," and due to the physiological changes to the birds' digestive systems before migration, red knots "require[] stopovers rich in easily digested food to achieve adequate weight gain that fuels the next migratory flight and, upon arrival in the Arctic, fuels a body transformation to breeding condition." *Id.* (citations omitted).

52. Simply put, the survival and propagation of the species requires an abundance of fatty, nutrient-rich, soluble prey on stopover beaches at the precise time red knots arrive each spring.

b. South Carolina Beaches are Critical Stopover Sites for Red Knots

53. For many red knots, a stop on the beaches of South Carolina is a critical break along a 9,000-mile flight to the Arctic. According to SCDNR, "as many as two-thirds of the [red knots in South Carolina] fly directly to the Arctic after leaving our beaches." SCDNR, *Shorebird research underscores importance of South Carolina beaches* (June 7, 2018).[4]

54. Research by the Service, SCDNR, and other agencies shows that the "Georgia and South Carolina Coasts are a major stopover area for *rufa* Red Knots in spring migration." F.M. Smith et al., *supra*, at 18. Studies suggest that a "high percentage" of the red knot population stops on the beaches of Georgia and South Carolina on their way to the Canadian Arctic. *See id.*

[4] https://www.dnr.sc.gov/news/2018/jun/jun7_shorebirds.html.

55. In July, the Service proposed a rule designating beaches across the South Carolina coast as red knot critical habitat. Proposed Rule, Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Rufa Red Knot (Calidris canutus rufa), 86 Fed. Reg. 37,410, 37,425–27 (July 15, 2021). These beaches "contain[] one or more of the physical or biological features essential to the conservation of the species" and "serve[] as . . . important northbound migration stopover site[s] in South Carolina and on the Southeastern U.S. portion of the subspecies range." *Id.* at 37,453–62. Two of the State's beaches—Kiawah and Seabrook Island––comprise "the most important known spring migration staging area in the Southeast." *Id.* at 37,458.

c. Red Knots Require a Super-Abundance of Horseshoe Crab Eggs to Survive and Reproduce

Figure 2. Red knots forage in the surf around a horseshoe crab.[5]

[5] Source: U.S. Fish & Wildlife Service.

56. Horseshoe crabs (*Limulus Polyphemus*) have existed for over four hundred million years, earning the nickname "living fossil." A member of the arthropod family, the "crabs" are actually a closer relative to spiders.

57. Horseshoe crabs live on the ocean floor in coastal areas.

58. Each spring, they emerge from sea to mate and lay their eggs in beach sands, between the mean low and high tide lines. Female crabs can lay about four thousand tiny eggs in one spawning event, and over one hundred thousand eggs in repeated events over a spawning season, which runs from late spring to early summer. This ancient ritual attracts significant public interest, particularly in the southern part of South Carolina.

59. It carries much greater significance for red knots, who have evolved to time their stopover to coincide with horseshoe crab spawning season. The timing is no coincidence: red knots must consume several hundred thousand horseshoe crab eggs during the stopover to fuel the next leg of their journey and reproduce.

60. Horseshoe crab eggs are soft, fatty, energy-rich, and easily digestible. They allow red knots to gain about six grams of weight per day—a significantly higher rate than afforded by other prey that knots consume during stopovers, like clams and mussels, which only allow the birds to gain between one and two grams per day. Studies show that red knots departing stopover locations with lower mass are significantly less likely to survive migration and reproduce. That is, red knots unable to consume their share of horseshoe crab eggs are far less likely to survive and propagate.

61. As noted, red knots' Arctic breeding period is limited by weather and must end before frigid conditions take hold. As a result, birds arriving late at a stopover site must make up for lost

time by rapidly gaining weight. Horseshoe crab eggs are the only resource that enables such rapid weight gain.

62. In modern times, the Georgia and South Carolina coastal region and Delaware Bay were the only reliable locations for red knots to forage on horseshoe crab eggs during their northbound migration. These locations have therefore been the most used spring stopover locations for the species in the last twenty years. Red knots can stopover in other places, but will gain far less weight because they can only prey on species with much lower caloric value, like clams and mussels.

63. Studies of South Carolina stopover sites confirm that horseshoe crab eggs are critical to red knots' diet and predict their foraging locations. In Cape Romain National Wildlife Refuge ("Cape Romain")—once the site of significant horseshoe crab spawning in South Carolina before overharvesting by Charles River depleted local crab populations—ninety-five out of one hundred red knot fecal samples taken between 2015 and 2016 tested positive for horseshoe crab DNA. Fumika Takahashi, *Shorebird Utilization of Horseshoe Crab (Limulus polyphemus) Eggs at Cape Romain National Wildlife Refuge, South Carolina*, CLEMSON UNIVERSITY TIGERPRINTS, ALL THESES, at 21, 61 (2016).[6] The same study found a significant positive correlation between horseshoe crab egg densities and the number of foraging red knots. *Id.* at 20, 59.

64. For a stopover site to be viable, red knots require a super-abundance of crab eggs created by repeated spawning events. Female horseshoe crabs deposit their eggs about six inches below the beach surface, where they are inaccessible to red knots. When horseshoe crab populations are at a healthy, sustainable level, repeated spawning events deposit thousands of eggs in the same spot. This displaces earlier-laid eggs, causing them to rise to the beach surface, where they

[6] https://tigerprints.clemson.edu/all_theses/2577/.

become accessible to red knots.[7] Without repeated spawning events by a robust population of horseshoe crabs, red knots cannot obtain the sustenance they need during stopovers.

65. Red knots unable to obtain sufficient crab eggs at a stopover site have few options, all of which harm the birds. First, red knots may risk a dangerous flight to the Arctic directly from the egg-depleted site. This may occur if no other viable foraging areas are available or if there is too much competition for limited resources at other sites. Red knots that make such a flight may lack sufficient body weight and are significantly less likely to survive and reproduce.

66. Second, red knots may forage at the egg-depleted stopover site for other, less effective food sources. Birds that do this are similarly likely to depart the stopover with insufficient body mass, reducing their chances of surviving the migration and reproducing.

67. Third, red knots can search for another of only a few stopover sites with an adequate supply of horseshoe crab eggs. That search takes time and energy, further depleting fat and protein reserves needed to survive and propagate, shortening what is left of the hospitable Arctic breeding season, and increasing the need to rapidly gain weight by consuming crab eggs. All of these factors reduce the birds' likelihood of survival and reproduction. Relocating red knots are also likely to face increased competition from other knots at the alternative stopover site, and vice versa. Increased competition reduces the likelihood that either group of red knots will obtain the necessary sustenance.

68. In sum, without a robust population of horseshoe crabs spawning on beaches in South Carolina, red knots face significant impairments to their breeding and feeding, causing death and lower rates of reproduction.

[7] Because surfaced eggs are not viable, red knot egg consumption does not have an adverse effect on horseshoe crab populations.

II. Horseshoe Crab Containment Ponds

a. The Biomedical Harvest

69. Each spring, just as red knots arrive in South Carolina and horseshoe crabs come ashore to spawn, agents of Charles River take tens of thousands of crabs from the State's beaches.

70. Charles River is the only entity that harvests or contains horseshoe crabs in South Carolina.

71. The company drains up to half of the crabs' blood for use in the biomedical market, releasing the survivors.

72. Horseshoe crab blood contains a substance called Limulus Amebocyte Lysate, "LAL," which coagulates in the presence of toxins. LAL is used to test the sterility of medical equipment and injectable drugs.

73. Once a revolutionary product, multiple pharmaceutical companies have since developed a synthetic alternative to LAL, called recombinant Factor C ("rFC"), shown to be "equivalent or even superior to LAL . . . for routine bacterial endotoxin testing."[8] Scientists from biomedical companies, including Pfizer and Eli Lilly, have found that "rFC is comparable to the more traditional LAL tests and may be technologically superior," as it can "detect endotoxin more selectively."[9] Use of the synthetic "reduces potential impacts to the horseshoe crab and related species dependent upon the crab," such as "migrating shorebirds," "maintain[s] patient safety for

[8] Maike Piehler et al., *Comparison of LAL and rFC Assays—Participation in a Proficiency Test Program Between 2014 and 2019*, 8 Microorganisms 418, 418 (2020).
[9] Jay Bolden et al., *Currently Available Recombinant Alternatives to Horseshoe Crab Blood Lysates: Are They Comparable for the Detection of Environmental Bacterial Endotoxins? A Review*, 74 PDA J. Pharm. Sci. & Tech. 602, 602 (2020).

those who depend upon medicines," and "secur[es] pharmaceutical supply chains" overly-reliant on vulnerable horseshoe crab populations.[10]

74. The U.S. Food and Drug Administration approves the use of rFC if each tested drug meets purity standards. In 2018, the FDA approved a drug tested using rFC.[11] In February 2021, the U.S. government contracted to purchase at least one hundred thousand doses of two COVID-19 antibody drugs produced by Eli Lilly and tested using rFC. Eli Lilly now conducts the vast majority of its endotoxin tests using rFC. *See* Deborah Cramer, *Inside the Biomedical Revolution to Save Horseshoe Crabs and the Shorebirds that Need Them*, NAT'L AUDUBON SOC'Y (2018).[12]

75. Rather than transitioning to a synthetic, Charles River and certain other companies have ramped-up horseshoe crab harvesting in recent years. *See generally* Chiara Eisner, *Vaccine testing is changing. Why is this $13B lab still bleeding SC horseshoe crabs?*, THE STATE (Dec. 14, 2021).[13] Between 1989 and 2012, the number of horseshoe crabs harvested for biomedical bleeding on the Atlantic Coast of the United States rose from one hundred and thirty thousand to over five hundred thousand. Between 2004 and 2017, the Atlantic biomedical harvest increased by sixty-seven percent.

76. South Carolina mirrors the coast-wide trend. In 2010, twenty seven harvesters were permitted by SCDNR to collect horseshoe crabs for Charles River. Over the last five years, the number of permitted harvesters has increased by forty-one percent. *Id.*

---

[10] *See* Jay Bolden & Kelly Smith, *Application of Recombinant Factor C Reagent for the Detection of Bacterial Endotoxins in Pharmaceutical Products*, 71 PDA J. Pharm. Sci. & Tech 405, 405 (2017).
[11] *See* Lonza, *Recombinant Factor C Assay*, https://bioscience.lonza.com/lonza_bs/US/en/recombinant-factor-c-assay (last visited Jan. 6, 2022).
[12] https://www.audubon.org/magazine/summer-2018/inside-biomedical-revolution-save-horseshoe-crabs.
[13] https://www.thestate.com/news/local/environment/article248306895.html.

77. The biomedical harvest takes an immense toll on horseshoe crabs. An independent (i.e., not industry-funded) study estimates that about thirty percent of crabs die from bleeding; other studies show that surviving crabs are less likely to reproduce. Thousands more crabs are injured, spawn, or die each year in biomedical containment ponds used only in South Carolina. *See infra* Section II(b)–(c).

78. In 2016, the American horseshoe crab was added to the International Union for Conservation of Nature's "Red List" as vulnerable to extinction, one grade below endangered.

79. Horseshoe crabs are highly susceptible to overharvesting, as their long lives (up to twenty years) and high age of sexual maturity (nine years for males, eleven years for females) mean the species can take nearly a decade to recover from high mortality events under ideal conditions—i.e., with no further harvesting. In reality, continued harvesting lengthens population recovery times.

80. Harvesting on land during spawning season increases the risk, as beach-mating exposes all mature crabs to capture. The risk is even greater in areas like South Carolina, where horseshoe crabs often breed on small, isolated barrier islands, substantially delaying repopulation after local extinction. Studies show that the crabs of these isolated spawning areas sometimes interchange, suggesting a loss to any one area will impact the broader population around South Carolina.

81. In a study of red knot migration in South Carolina, researchers from the Service, SCDNR, and other agencies found that "heavy" horseshoe crab "[h]arvest levels are likely unsustainable in the few locations where significant numbers of spawning horseshoe crabs and shorebirds were observed." F.M. Smith et al., *supra*, at 18. The researchers concluded that "[t]he magnitude of the horseshoe crab harvest in critical shorebird foraging locations in South

Carolina is likely *the most significant* shorebird conservation issue moving forward in the region." *Id.* at 17 (emphasis added).

82. As the sole harvester in South Carolina, it is Defendant Charles River's practices that pose a threat to shorebirds.

83. In July, the Service echoed these concerns, identifying Charles River's biomedical harvest as a threat to red knots in South Carolina. In proposing to list numerous beaches in the State as red knot critical habitat, the Service found that "managing the collection of spawning horseshoe crabs for biomedical use" is a "[s]pecial management consideration[] or protection measure[] to reduce or alleviate the threats" to red knots in South Carolina. *See, e.g.*, 86 Fed. Reg. at 37,454–62.

84. Of all aspects of the biomedical harvest, Charles River's containment ponds may pose the greatest threat to red knots.

b. Containment Ponds

Figure 3. Ariel view of a likely horseshoe crab containment pond near Beaufort, SC.

85. In South Carolina, Charles River harvests horseshoe crabs from the State's beaches at an industrial scale and piles them in artificial containment ponds during the spawning season. Charles River built its bleeding facility too small to accommodate the crabs it harvests, so contains them in ponds until capacity opens up for bleeding, often for weeks or months at a time.

86. The practice significantly depletes horseshoe crab egg densities needed to sustain red knots in critical stopovers sites. Charles River, with SCDNR's approval and permitting, effectively moves the annual spawning of tens of thousands of horseshoe crabs from the State's beaches, where crab eggs are accessible to red knots, into artificial containment ponds, beyond the reach of red knots. These practices have a profound effect on egg availability for red knots.

87. South Carolina is the only state that permits harvested horseshoe crabs to be placed in containment ponds.

88. SCDNR regulates horseshoe crab harvesting and containment solely through two permits, with less than a page of conditions in each. The first permit, "Horseshoe Crab Hand Harvest Permit HH19," Ex. D, authorizes agents of Charles River to harvest crabs by hand. The second permit, "Horseshoe Crab Possession (No Harvest) Permit HP 21-0," Ex. A at 22–23 ("Possession Permit"), authorizes agents of Charles River to operate horseshoe crab containment ponds.

89. These permits contain *no limits* on the number of horseshoe crabs that can be taken and held in ponds or the amount of time they can be held before bleeding, and no concrete protections to ensure that crabs remain healthy and spawn in their natural beach habitat. The Possession Permit does not require that pond water be aerated, changed, or temperature-controlled, that water quality be monitored, or that horseshoe crabs be fed during their detention.

90. There are no protections whatsoever for eggs laid or crabs spawned *in* holding ponds—SCDNR does not require Charles River to record their existence or ever return them to their

natural habitat. Under SCDNR's Possession Permit, containment ponds may be operated as crab *farms*, with juvenile crabs held until they reach maturity, and perhaps lay eggs themselves, before being taken to Charles River for bleeding. Operators have every financial incentive to exploit this.

91. As a result, Charles River may take unlimited numbers of crabs and hold them in containment ponds for unlimited periods of time. SCDNR imposes no concrete protections for the health of horseshoe crabs in containment ponds, and no measures at all to ensure that crabs spawn in their natural habitat.

92. Every year, thousands of horseshoe crabs die and spawn in the unsanitary, overcrowded conditions in Charles River's containment ponds. The practice removes a critical food source for migrating red knots—horseshoe crab eggs—and impairs crab populations needed to sustain future migrations.

93. Information from Charles River and public records requests indicates that the company takes between one hundred thousand and one hundred and fifty thousand horseshoe crabs from South Carolina beaches each spring, holding about seventy-five percent of harvested crabs—at least seventy-five thousand—in containment ponds before bleeding.

94. Upon information and belief, Charles River has historically taken over twenty-five thousand crabs from Cape Romain each harvest season. *See* Ex. E (email from Refuge Officer to Refuge Manager, stating "25,000 crabs [had been] harvested" from Cape Romain near the end of the 2014 season). According to company representatives, crabs taken from Cape Romain constitute around twenty-five percent of Charles River's annual South Carolina harvest. Crabs harvested in Cape Romain are typically taken directly to the company's bleeding facility.

95. Most or all of the rest of Charles River's annual South Carolina harvest—at least seventy-five thousand crabs taken from outside Cape Romain—is held in artificial ponds for the spawning season before being bled. *See* Ex. A at 15 (email between SCDNR researchers, suggesting seventy-five percent of harvested crabs are held in ponds).

96. Although SCDNR has refused to disclose the number of containment ponds in use, one or more such ponds were used this year, and in previous years several have been used, *see* Ex. A at 18 (July 20, 2015 Letter from Melvin Bell, Director, SCDNR Office of Fisheries Mgmt., noting four containment ponds were permitted in 2015). Based on representations from Charles River, these containment ponds often hold between ten and fifteen thousand horseshoe crabs each; as noted, there is no regulatory limit.

c. The Impacts of Containment Ponds on Red Knots

97. Charles River's containment practices, as authorized by SCDNR, harm red knots in several ways.

98. First, by removing unlimited numbers of spawning horseshoe crabs from beaches—likely over seventy-five thousand each year—and placing them in artificial ponds, Charles River may deprive red knots of access to several billion horseshoe crab eggs annually (one female can lay one hundred thousand eggs in a spawning season). Red knots can only feed on eggs that are surfaced through repeated spawning events on beaches by a robust population of horseshoe crabs. Charles River's containment practices preclude the super-abundant egg densities red knots need to survive migration and reproduce.

99. Second, eggs laid and horseshoe crabs spawned in containment ponds need not be protected or ever returned to the wild. This depletes egg-laying crab populations over the long run, and thus, egg deposits needed to sustain future migrations of red knots.

100. Last, the unsanitary, overcrowded conditions in containment ponds kill thousands of adult crabs and injure thousands more each year. This further depletes egg-laying crab populations needed to sustain red knots.

101. In 2016, no horseshoe crabs were harvested or held in South Carolina because Charles River's bleeding facility was being renovated. That year, "[t]he density of horseshoe crabs . . . was higher than the estimated density in 2015 and was the third highest since 1995," according to SCDNR's *Horseshoe Crab Fishery and Management Program Compliance Report for the Year 2016* at 6 (Mar. 1, 2017). The rebound in 2016 followed a fifty percent decline between 2011 and 2015 in horseshoe crab densities reported in South Carolina trawl surveys. *Id.* Measured crab densities rose by fifty percent from 2015 to 2016. *Id*.

102. Although SCDNR does not know what percentage of crabs taken and held by Charles River are spawning females, harvesters have a greater incentive to contain larger, more profitable female crabs.

103. Researchers have identified harvest-induced reductions in horseshoe crab egg availability as a cause of red knot decline and a threat to the birds' survival. Overharvesting in Delaware Bay, for example, has depleted horseshoe crab egg densities needed to sustain migrating red knots. As a result, the number of red knots that used Delaware Bay as a stopover site fell from a high of ninety thousand in 1986 to about twelve thousand in the early 2000s. Neither red knot nor horseshoe crab populations have recovered since. *See, e.g.*, Jon Hurdle, *Red Knots in Steepest Decline in Years, Threatening the Species' Survival*, THE NEW YORK TIMES (June 5, 2021).[14]

[14] https://www.nytimes.com/2021/06/05/science/threatened-red-knot-shorebird-decline.html.

104. Horseshoe crab egg densities in overharvested beaches of South Carolina, such as Cape Romain, are already lower than densities seen in Delaware Bay that cannot support red knots. This is consistent with significant reductions in horseshoe crab spawning observed on beaches across the State in recent years. Large numbers of crabs now spawn in containment ponds rather than on beaches.

105. Containment ponds take a grave toll on horseshoe crab health. A study by an SCDNR researcher and others found that "the physiological condition of [horseshoe crabs] deteriorated as a consequence of prolonged holding in captivity, especially at warmer temperatures." Kristin Linesch Hamilton et al., *Physiological Impacts of Time in Holding Ponds, Biomedical Bleeding, and Recovery on the Atlantic Horseshoe Crab, Limulus polyphemus*, Part A, 239 COMPARATIVE BIOCHEM. & PHYSIOLOGY 3 (2020). Crabs held for the longest periods of time—in the study, up to eight weeks—suffered the worst health effects both in ponds and from the bleeding process. Yet, as noted, SCDNR imposes virtually no conditions on horseshoe crab containment ponds.

106. In sum, Charles River's containment practices, as authorized by SCDNR, substantially deplete horseshoe crab egg densities critical to the survival and reproduction of red knots, as well as horseshoe crab populations needed to sustain future migrations of red knots.

CLAIMS FOR RELIEF

I. Count 1: Charles River's Use of Horseshoe Crab Containment Ponds Violates Section 9 of the ESA

107. The allegations of the preceding paragraphs are incorporated herein by reference.

108. Section 9(a)(1) of the ESA prohibits the unpermitted "take" of threatened red knots. 16 U.S.C. § 1538(a)(1)(B); 79 Fed. Reg. 73,743 (extending take prohibition to red knots).

109. During their short stopover on the beaches of South Carolina each spring, red knots must consume several hundred thousand horseshoe crab eggs. Red knots unable to obtain their

share of crab eggs are significantly less likely to survive the remainder of their migration and reproduce. To create the requisite egg densities, red knots require a robust population of horseshoe crabs depositing eggs in repeated spawning events at critical stopover beaches.

110. Charles River's horseshoe crab containment ponds deprive red knots of eggs they need to survive and reproduce and deplete crab populations needed to sustain future migrations of red knots.

111. By depriving red knots of a critical food source, Charles River's horseshoe crab containment ponds have likely caused the death of red knots and prevented others from reproducing. These containment ponds will continue to kill red knots and prevent others from reproducing.

112. Charles River is a "person" subject to Section 9's take prohibition. *See* 16 U.S.C. § 1532(13) ("The term 'person' means an individual, corporation, partnership, trust, association, or any other private entity . . . .").

113. Charles River's horseshoe crab containment ponds "take" red knots by harassing and harming them. *See* 16 U.S.C. § 1532(19). These ponds "create[] the likelihood of injury to [red knots] by annoying [them] to such an extent as to significantly disrupt normal behavioral patterns," including "breeding [and] feeding," *see* 50 C.F.R. § 17.3 (definition of "harass"), and cause "significant habitat modification or degredation [that] actually kills or injures [red knots] by significantly impairing essential behavioral patterns, including breeding [and] feeding," *see id.* (definition of "harm").

114. By "taking" threatened red knots without a permit, Charles River is violating Section 9 of the ESA. In the alternative, Charles River is violating Section 9 by causing its agents to

operate containment ponds that result in the "take" of red knots. *See* 16 U.S.C. § 1538(g) ("It is unlawful for any person . . . to . . . cause to be committed[] any offense defined in [the ESA].").

II. Count II: The Authorization and Management of Horseshoe Crab Containment Ponds by Defendant-Officials of SCDNR Violates Section 9 of the ESA

115. The allegations of the preceding paragraphs are incorporated herein by reference.

116. Section 9(a)(1) of the ESA prohibits the unpermitted "take" of threatened red knots. 16 U.S.C. § 1538(a)(1)(B); 79 Fed. Reg. 73,743 (extending take prohibition to red knots).

117. "Person[s]" subject to the Section 9 take prohibition include "any officer, employee, agent, department, or instrumentality . . . of any State . . . ." 16 U.S.C. § 1532(13).

118. Section 9 prohibits state officers from "allow[ing] or authoriz[ing] acts that exact a taking and that, but for the permitting process, could not take place." *Strahan,* 127 F.3d at 163 (collecting cases).

119. SCDNR's Possession Permit, Ex. A at 22–23, authorizes the containment pond practices described above that cause the "take" of red knots. These practices could not occur without SCDNR's Possession Permit. S.C. Code Ann. § 50-5-1330(A) ("Taking or possessing horseshoe crabs (Limulus polyphemus) is unlawful except under permit granted by the department.").

120. SCDNR's Possession Permit is signed by Defendant Melvin Bell, Director of SCDNR's Office of Fisheries Management, under the Authority of Defendant Robert H. Boyles, Jr., Director of SCDNR, and Blaik Keppler, Acting Deputy Director for SCDNR's Marine Resources Division.

121. The legislature tasked SCDNR with regulating the biomedical harvest "so as to minimize injury to [horseshoe] crab[s]," S.C. Code Ann. § 50-5-1330(C), but the agency is derelict in its duty. SCDNR imposes virtually no limits on the number of crabs that can be taken and held in ponds; no limits on the amount of time crabs can be held before bleeding; no

concrete protections for crab health in containment ponds; no requirements related to water quality, aeration, temperature, monitoring, or crab feeding; no measures to ensure crabs spawn on beaches rather than in ponds; and no protections or recording requirements for eggs or crabs spawned in ponds.

122. By authorizing horseshoe crab containment ponds and managing the practice so as to maximize harm to horseshoe crabs and minimize egg availability on beaches, Defendants Robert H. Boyles, Jr., Blaik Keppler, and Melvin Bell, in their official capacities as officers of SCDNR, are causing the unpermitted "take" of red knots, in violation of Section 9 of the ESA.

REQUEST FOR RELIEF

For the reasons stated herein, Plaintiffs respectfully request that the Court:

1. Declare that Charles River's use of horseshoe crab containment ponds violates Section 9 of the ESA, 16 U.S.C. § 1538(a)(1)(B), by causing the unpermitted "take" of red knots;

2. Declare that Robert H. Boyles, Jr., Blaik Keppler, and Melvin Bell, in their official capacities as officials of SCDNR, are causing the unpermitted "take" of red knots through their authorization and management of containment ponds, in violation of Section 9 of the ESA, 16 U.S.C. § 1538(a)(1)(B);

3. Enjoin the use and authorization of horseshoe crab containment ponds in South Carolina;

4. Award Plaintiffs their reasonable fees, costs, and expenses, including attorneys' fees, associated with this litigation; and

5. Grant Plaintiffs such further and additional relief as the Court may deem just and proper.

Respectfully submitted this the 12th day of January, 2022.