CENTER for BIOLOGICAL DIVERSITY Because life is good.

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SUBMITTED VIA U.S. MAIL AND EMAIL

November 23, 2026

Re: Petition Requesting that the Secretary Initiate Endangered Species Act Review of the Division of Marine Fisheries' Horseshoe Crab Management

Dear Secretary Tepper, Undersecretary Cooper, and the Executive Office of Energy and Environmental Affairs:

Pursuant to the Massachusetts Endangered Species Act ("MESA"), M.G.L. c.131A, and its implementation regulations, 321 Code Mass. Reg. §§ 10.00 et seq., requesters Center for Biological Diversity, American Bird Conservancy, Animal Legal Defense Fund, Animal Welfare Institute, Conservation Law Foundation, Defenders of Wildlife, Horseshoe Crab Recovery Coalition co-founders Lawrence Niles and David Mizrahi, Humane World for Animals, International Conservation Fund, Massachusetts Society for the Prevention of Cruelty to Animals, Sea Turtle Conservancy, Southeastern Massachusetts Pine Barrens Alliance, and New Jersey Audubon (collectively, "Requesters") respectfully ask the Secretary of the Executive Office of Energy and Environmental Affairs ("Secretary" or "Secretary of EOEEA") to initiate MESA review of the Division of Marine Fisheries' ("Division") horseshoe crab management program and regulations. The Division's management of horseshoe crab harvesting authorizes the catching and killing of hundreds of thousands of horseshoe crabs, depleting essential food resources for the red knot and loggerhead sea turtle. In fact, the Division recently sought to increase the total harvesting of horseshoe crabs in the Massachusetts Register, leading to nearly universal public opposition to the increase proposal. Regardless, the current quotas authorize high levels of collecting, blood-draining, and killing of horseshoe crabs, the Division is failing to protect the red knot and loggerhead sea turtle—two species listed as "threatened"—from avoidable damage.

The virtual certainty of state-permitted activity unnecessarily harming state-listed species provides the archetypal conditions for the Secretary to initiate MESA review. Using procedures in 321 Mass. Code Reg. § 10.05, the Secretary should initiate review to protect red knots and loggerhead sea turtles from harm inflicted by agency-authorized deprivation of a key food source—horseshoe crabs and their eggs—and help stanch the damage to state-listed species.

I. Statutory and Regulatory Background.

a. *The Massachusetts Endangered Species Act.*

The Massachusetts Endangered Species Act ("MESA") was enacted "to conserve plant and animal species within the Commonwealth and to protect their habitats." *Pepin v. Div. of Fisheries & Wildlife*, 467 Mass. 210, 215 (2014). In ways that both "parallel" and "expand" the federal Endangered Species Act protections, MESA "works to prevent the decline of at-risk species by protecting species themselves, as well as the habitats in which they live, from undue human encroachment." *Id*. at 215-16 (citations omitted).

MESA "establishes a taxonomy of at-risk species as either endangered, threatened, or of special concern ([i.e.], State-listed species), according to the relative danger of extinction confronting them." *Id*. at 216. The Division of Fisheries and Wildlife, in consultation with the Natural Heritage and Endangered Species Program ("NHESP"), is required to list species in one of these three categories according to biological date. *Id*. (citing G.L. ch. 131A, § 4).

Massachusetts lists both the red knot and loggerhead sea turtle as "threatened." 321 Code Mass. Reg. § 10.90(4) (also noting that both species are listed as "threatened" under the federal Endangered Species Act). The State Wildlife Action Plan 2025 draft update also identifies the red knot and loggerhead sea turtle as two of the 620 "Species of Greatest Conservation Need."[1]

Once a species is listed, several powerful MESA provisions kick in. For example, MESA "prohibits human interference with State-listed species by providing that 'no person may take, possess, transport, export, process, sell or offer for sale, buy or offer to buy'" individuals of the species. *Pepin*, 467 Mass. at 218 (quoting G.L. ch. 131A, § 2). The legislature "broadly" defined "take" so as "to include both harming the species themselves and disturbing their habitats." *Id*. (citing G.L. ch. 131A, § 1). The "take" prohibition contains limited exceptions for scientific or educational activities, but it does not include an exception for "takes" resulting from harvesting of other species. *Id.* at 218-19; *see also* G.L ch. 131A, § 3.

MESA also imposes substantive requirements on agencies to protect State-listed species and their habitats. Under the regulatory scheme, "[a]ll state agencies *shall* use their authorities in furtherance of MESA" and "use all practicable means and measures to avoid or minimize damage to such species and their habitats." 321 Code Mass. Reg. § 10.05(1) (emphasis added). "Habitat" is defined as an area which "protects or provides important elements for the growth and survival of plants and animals such as food, shelter, or living space, and includes without limitation, breeding, *feeding*, resting, *migratory*, or overwintering areas." *Id.* § 10.02 (emphases added). The requirement of using "all practicable means and measures to avoid or minimize" species damage applies to all "state actions." *Id*. § 10.05(1). "State actions" include any work, project, or activity "either directly undertaken by a state agency" or activity undertaken by a third-party but that "requires the issuance of permits by an agency." *Id*.

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[1] *See* Div. of Fisheries & Wildlife, "Massachusetts State Wildlife Action Plan (SWAP)," *available at* https://www.mass.gov/info-details/massachusetts-state-wildlife-action-plan-swap (last accessed May 11, 2026).

To ensure that agencies "use their authorities in furtherance of MESA," the Secretary of the Executive Office of Energy and Environmental Affairs is authorized to "initiate a review of state action when she determines that such a state action may damage state listed species or their habitats." *Id*. § 10.05(2)(d). Once the Secretary initiates review of the state action, the acting agency must undertake the following steps:

- First, the agency carrying out the state action "shall initiate consultation with NHESP;"
- Second, "NHESP shall review the information submitted by the agency and determine if the state action is likely to result in damage to any state listed species or their habitats;"
- Third, if NHESP finds the state action is likely to result in species damage, it "shall provide to the agency guidance and information that is necessary to allow the agency to avoid such damage;" and
- Finally, upon receiving "guidance and information from NHESP," the agency "shall take all practicable means and measures to modify their actions to avoid such damage."

Id. Once the agency completes all these steps, it "shall submit to the Secretary" evidence of taking all practicable means and measures pursuant to NHESP recommendations. *Id*. If the Secretary finds that the agency "has taken all practicable means and measures to avoid damage to state listed species and their habitats," she "shall certify that the state action is in compliance with 321 [Code Mass. Reg. §] 10.05(1)."

b. *Regulation of horseshoe crab harvesting*.

The Division of Marine Fisheries oversees the crabbing industry and issues regulations for "Horseshoe Crab Management." 322 Code Mass. Reg. § 6.34. Such crabs include blue crabs, cancer crabs, and other native crabs suitable for human consumption. *Id*. § 6.19(1). The regulations set an annual quota for the "Commercial Bait Fishery" and for "Biomedical Processors" and require the Division to issue and manage permit endorsements for all commercial horseshoe crab harvesting. The Division of Marine Fisheries regulations sets a commercial bait quota of 140,000 horseshoe crabs and a biomedical harvesting quota of 200,000 horseshoe crabs. 322 Code Mass Reg. § 6.34(4)(a), (5)(a).[2]

* * * *

Because the Division of Marine Fisheries' regulations both set industry-wide quotas (i.e., are a "direct[] undertak[ing]" by the agency) and "require[] the issuance of permits by an agency" for horseshoe crab harvesting, the regulations and the third-party horseshoe crab harvesting are "state actions" regulated by MESA. 321 Code Mass. Reg. § 10.05(1). Accordingly, the Division of Marine Fisheries "must use all practicable means and measures" to ensure that the horseshoe crab harvesting actions "avoid or minimize damage" to State-listed species, including the red knot and loggerhead sea turtle, and their habitats. *Id*.

[2] *See* Code Mass. Reg. 6.00, https://www.mass.gov/doc/322-cmr-6-regulation-of-catches/download at 71-72 (last visited Nov. 13, 2026).

II. The Horseshoe Crab Population in Massachusetts and Across Its Entire Range Has Not Yet Recovered.

Over the past three decades, horseshoe crab populations have declined by more than 70% across their range. Horseshoe crabs are being overharvested, and their spawning beaches are threatened by development, dredging, erosion, pollution, climate change, and sea level rise. Horseshoe crab populations have not recovered.

Humans harvest horseshoe crabs either to turn them into bait or to drain their blood. Horseshoe crab harvests for use in commercial whelk and eel fisheries spiked in the 1990s, which resulted in a massive crash in horseshoe crab populations. Horseshoe crabs are also harvested by the biomedical industry for their blood; Limulus Amebocyte Lysate (commonly referred to as "LAL"), a clotting agent in horseshoe crab blood, is used to test drugs and intravenous devices for bacterial endotoxin. Horseshoe crab blood draining occurs as follows:

> Insert the sharp end of the needle through the hinge joint into the lumen of the heart, keeping the needle positioned parallel to the dorsal midline and inserted at the midline and with the butt of the needle still positioned above the opening of the collection tube. The needle is inserted about 1- 2 cm deep into the portion of the heart in the prosoma. As soon as the heart is punctured, blood will flow rapidly (Figure 4a, arrow), so it is important to ensure that the delivery end of the syringe needle is positioned over the mouth of the collection tube to collect that initial surge of blood. 4. Blood will exit the heart initially in a continuous stream that, after about 30- 50 mL of blood have been collected, will slow to individual drops (Figure 4b). To improve blood flow, it may be good policy to re-orient the tip of the needle slightly. Tilt the needle up or down, left or right; slide its tip deeper into the heart or pull it to closer to the hinge joint to find the position that optimizes blood flow. Do not compress the animal excessively, because this risks damaging the animal and may cause the extravasated blood to initiate clotting.

Armstrong & Conrad, *Blood collection from the American horseshoe crab, Limulus polyphemus*. J. Visualized Experiments. 2008 Oct. 13; (20):958. This process often leads to crab mortality.

Horseshoe crab spawning has also decreased sharply in the past three decades. In a related manner, horseshoe crab egg densities on spawning beaches have declined steeply across their North American range. The outlook for the species is so dire that in 2023, the International Union for the Conservation of Nature ("IUCN") assigned the horseshoe crab a recovery potential score of zero. *See* Smith et al., *Limulus polyphemus*, The IUCN Red List of Threatened Species (2016), *at* https://www.iucnredlist.org/species/11987/80159830 (last visited Nov. 19, 2026).

Massachusetts is no different—the population has declined here, too. Historical records reveal the former abundance of horseshoe crabs in Massachusetts. Even before Massachusetts began a commercial whelk fishery, which utilizes horseshoe crabs as bait, Massachusetts experienced a period of extensive horseshoe crab destruction. In the mid-20th century, the Commonwealth implemented a predator control program to protect soft shell clams for fishermen by offering subsidies to cities and towns that provided a bounty on horseshoe crabs.

During this period, participating fishermen killed over half a million horseshoe crabs annually. Even after this form of killing stopped, horseshoe crab harvesting continued to harm the population. *See, e.g.*, Widener, J.W. & Barlow, R.B., *Decline of a horseshoe crab population on Cape Cod*, Biol. Bull. 197:300-302 (1999) (describing contraction of spawning season at Mashnee Dike as horseshoe crab harvesting increased) (attached as **Ex. A**).

In multiple published assessments and reviews of the species over the past ten years, researchers have concluded that stock status in the Northeast for the horseshoe crab are, at worst, "decreasing" and "poor/declining," or at best, "neutral" or "mixed." *See* D.R. Smith et al., *Conservation status of the American horseshoe crab (Limulus polyphemus): A regional assessment*, Reviews in Fish Biology and Fisheries 27:135-175 (2017) (attached as **Ex. B**); ASMFC 2013 Horseshoe Crab Stock Assessment Update at 16 (Aug. 2013),[3] ASMFC 2024 Horseshoe Crab Stock Assessment Update at 8 (Apr. 30, 2024).[4] Moreover, data on the stock levels from before the 1980s is limited and the ASMFC uses a reference point from 1998 – when the Commission started regulating horseshoe crabs—rather than establishing a biological reference point for determining overfished status. ASMFC 2024 Horseshoe Crab Stock Assessment Update at 7-8 (Apr. 30, 2024).

After the past twenty years of efforts at regulation, horseshoe crab data in Massachusetts do not suggest the species has recovered to its historic abundance. The latest update of certain state surveys may show that horseshoe crab abundance in some (but not all) Massachusetts waters is improving compared to the abundance in the 1980s. Mass. Div. Marine Fisheries, *Horseshoe Crab Monitoring*, (last updated Nov. 17, 2026);[5] Mass. Div. Marine Fisheries, *Horseshoe Crab Abundance Continues to Increase in Massachusetts*, (July 7, 2026).[6] However, the webpages announcing the survey findings do not provide sufficient data to allow the public to test and evaluate the Division of Marine Fisheries' conclusions, and the Division may be overstating population trends and abundance. *See* A. Dey et al., Review of Mass. Div. Marine Fisheries 2026 Website on Surveys (attached as **Ex. Q**) (providing additional context and factors that should be considered in the analysis of horseshoe crab populations in Massachusetts). Data on the species and its trajectory are limited—Massachusetts trawl surveys alone do not provide important details about horseshoe crabs that would be gained by tracking horseshoe crabs not only by sex but also by maturity level, distinguishing between juvenile, newly mature, and mature female horseshoe crabs.

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[3] *Available at* https://asmfc.org/wp-content/uploads/2025/01/2013HSC_StockAssessmentUpdate.pdf (last visited Nov. 19, 2026) ("[T]he evidence from New York and New England suggests that current harvest within those regions is not sustainable").

[4] *Available at* https://asmfc.org/wp-content/uploads/2025/01/HorseshoeCrabStockAssessmentUpdate_April2024.pdf (last visited Nov. 19, 2026) (of the two Northeast most recent stock surveys that cover from Maine to Connecticut, half still show that horseshoe crab populations are below 1998 levels).

[5] *Available at* https://www.mass.gov/info-details/horseshoe-crab-monitoring (last visited Nov. 18, 2026).

[6] *Available at* https://www.mass.gov/news/horseshoe-crab-abundance-continues-to-increase-in-massachusetts (last visited Nov. 11, 2026).

III. The Division of Marine Fisheries' Authorization of Horseshoe Crab Harvesting Likely Damages the Red Knot and Its Habitat.

a. *Overview of the red knot.*

The red knot, scientific name *Calidris canutus rufa*, is "a long-distance migratory shorebird known for nonstop flights and its striking rusty plumage during spring migration." Div. of Fisheries & Wildlife, Mass. State Wildlife Action Plan, "Red Knot" (hereinafter "Mass. SWAP Red Knot").[7] Red knots migrate from as far south as the Tierra del Fuego archipelago at the southern tip of South America all the way to their breeding grounds in the Arctic. Below is a photograph of a red knot from the Division of Fisheries and Wildlife website:



Red knot (*Calidris cantus*)

b. *Red knots are suffering from a steep population decline in the Commonwealth and throughout their migration.*

The red knot is a shorebird with one of the steepest—if not *the* steepest—population declines in North America in the last three decades. *See* P.A. Smith et al., *Accelerating declines of North America's shorebirds signal the need for urgent conservation action,* Ornithological Appl. 125:1-14 (2023) (attached as **Ex. C**).[8] Below is a screen-captured table of population declines in North American shorebirds from Smith et al. (2023):

[7] *Available at* https://www.mass.gov/info-details/red-knot (last visited Nov. 19, 2026).

[8] Separated out, the analysis from P.A. Smith found a 71.7% drop in red knot population in the Northeast United States coastal region between 2004 and 2019. (Personal correspondence).

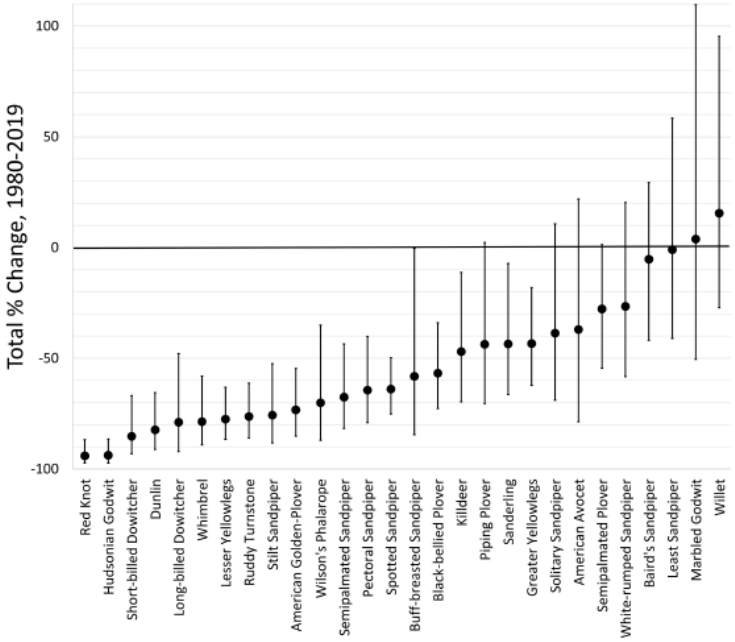


Figure 2. Estimated total percent change in abundance (means ± 95% credible intervals) for 28 species of shorebirds surveyed during fall migration across North America, 1980–2019.

As the Division of Fisheries and Wildlife explains, the red knot "depends on protected coastal stopover sites like those in Massachusetts for survival." *See* Mass. SWAP Red Knot. Massachusetts beaches provide stopover locations for the red knot to rest and gather the sustenance needed for both its northern and southern migrations.

Historical records show that enormous numbers of red knots had stopovers in Massachusetts for their northern migration in the spring. A 1912 overview of Massachusetts birds explained:

> Mackay states that before 1850, [red knots] were more numerous at Chatham Nauset, Wellfleet and Billingsgate on Cape Cod, and on the flats around Tuckernuck and Muskeget islands, than in all the rest of New England combined. Their numbers were so large on Cape Cod that estimates were useless. [. . . .] Everybody shot the Knot, in both fall and spring, for it was in demand for the table, brought a good price in the market, decoyed easily, and flew in such flocks that many could be killed at a shot. [. . . .] The ease with which they may be taken will prove their bane unless all spring shooting can be stopped on the Atlantic coast.

Forbush, E.H., *A History of the Game Birds, Wild-fouwl and shore birds of Massachusetts and adacent states (including those used for food which have disappeared since the settlement of the country, and those which are now hunted for food or sport, with observations on their former abundance and recent decrease in numbers; also means for conserving those still in existence.)* at 263-64, 267, Wright & Potter Printing Co. (Boston 1912) (hereinafter "Forbush 1912"). And Massachusetts Audubon relates "a report from a market hunter" in 1850 of "over 25,000 Red Knots on Billingsgate Island." Mass. Audubon, *Horseshoe Crabs and Red Knots—An Old Cape*

Cod Connection? (Apr. 28, 2015) (attached as **Ex. D**) (noting the red knots subsequent decline and its relationship to the decline in horseshoe crabs).

Red knots continue to use Massachusetts as a stopover during their northbound migration, albeit in greatly reduced numbers. According to a 2020 review, the population that uses Tierra del Fuego as a non-breeding location as well as the population that uses the southeast United States and Caribbean for non-breeding locations both include individuals who stopover in Massachusetts while migrating north in the spring. *See* Baker et al., *Birds of the World: Red Knot*, Cornell Lab of Ornithology (Mar. 4, 2020) (citing 1993 and 2012 resighting studies) (attached as **Ex. E**). And Brad Winn of Manomet observed and photographed red knots in Massachusetts in at least May 2023 and July 2018—estimating 265 red knots in May 2023. *See* Manomet Comment re: American Horseshoe Crab Listing (Jul. 11, 2023) (hereinafter "Manomet MESA Comment") (attached as **Ex. F**). Below is a photograph of red knots on North Monomoy Island on May 23, 2023, taken from the comment.



Image 6. Part of our 265 Red Knot estimate on North Monomoy. Photo by Brad Winn, Manomet, May23 2023.

Red knots also pass through Massachusetts on their southbound migration in the fall. Massachusetts plays an important—and perhaps even unique—role in providing shorebirds horseshoe crab eggs during their southward migration. *See, e.g.*, Mallory & Schneider, *Agnostic Behavior in Short-billed Dowitchers Feeding on a Patchy Resource*, Wilson Bull. 91:271-278 (1979) (describing how a flock of dowitchers fought over horseshoe crab eggs near Plymouth and left once the eggs disappeared) (attached as **Ex. G**). Third Cliff, Duxbury Beach, and Plymouth Beach on Cape Cod are, in particular, sites where red knots stop en route south. *See* Harrington et al., *Molt and Body Mass of Red Knots in the Eastern United States*, Wilson J. Ornithology 119:35-42 (Mar. 2007);[9] *see also* Mass. SWAP Red Knot ("Major historical

[9] *Available at* https://www.biodiversitylibrary.org/part/240839 (last accessed Mar. 4, 2026).

migratory stop-over locations for red knots in Massachusetts include beaches on outer Cape Cod and mainland beaches along West Cape Cod Bay").

c. *Horseshoe crab eggs are essential for individual red knot survival and population-wide recovery.*

Red knots rely on horseshoe crab eggs for survival. *See* Mass. SWAP Red Knot ("The annual horseshoe crab spawning produces a superabundance of eggs, and red knots rely on this food resource prior to their arrival at the breeding grounds"). Shorebirds, including red knots, "historically (Cramer, 2015) and currently exploit horseshoe crab eggs wherever horseshoe crabs spawn on the eastern seaboard (Smith et al., 2019; Takahashi, Sanders & Jodice, 2021)." J.A. Smith et al., *Horseshoe crab egg availability for shorebirds in Delaware Bay: Dramatic reduction after unregulated horseshoe crab harvest and limited recovery after 20 years of management*, Aquatic Conserv.: Mar. Freshw. Ecosyst. 2022; 1-13 (attached as **Ex. H**). The non-government organization Defenders of Wildlife reviewed the scientific literature to explain why horseshoe crab eggs are such a valuable resource for red knots:

> Horseshoe crab eggs are the favored food source for the federally listed red knot and provide the highest energy accumulation rates in the birds worldwide (Piersma et al., 2005). Each knot must consume roughly 400,000 eggs to fuel the second leg of its journey (Cramer, 2018). With breeding season performance, recruitment, and population dynamics correlated to body condition, the birds that fail to acquire such reserves are less likely to survive and reproduce (Dujins et al., 2017). [. . . .] Areas supporting higher densities of horseshoe crabs attract more birds because eggs are likelier to be within their reach (Niles, 2021).

Defenders of Wildlife, *A Call for Intervention: The Decline of South Carolina's Horseshoe Crab Population* (2022) at 5 (hereinafter "Defenders of Wildlife 2022") (attached as **Ex. I**).

As with elsewhere on the Atlantic coast, red knots have historically exploited horseshoe crab eggs in Massachusetts and continue to do so today. According to the U.S. Fish and Wildlife Service, "documentation of shorebirds feeding on horseshoe crab eggs on Cape Cod dates back to 1881, when red-breasted sandpiper (Red Knot), and turnstones are referenced with respect to foraging on horseshoe crab eggs (Ha[p]good 1881)." U.S. Fish & Wildlife Serv., *Compatibility Determination for Monomoy Nat'l Wildlife Refuge* at 24 (May 22, 2002) (hereinafter "FWS Compatibility Determination") (attached as **Ex. J**); *see also* Forbush 1912 (noting red knots "are fond of the spawn of horsefoot crab, which, often in company with the turnstone, they dig out of the sand, sometimes fighting the former birds before the can claim their share"). Red knots feed on horseshoe crab eggs in Massachusetts to this day. *See* FWS Compatibility Determination at 24 (noting that red knot is "present on Monomoy during horseshoe crab spawning periods, or soon enough after spawning that horseshoe crab eggs would be an available food item"); *id.* at 25 ("Evidence of horseshoe crabs in the guts of shorebirds collected on Monomoy NWR confirms visual observations (documented by video camera) that horseshoe crab eggs are a prey item of shorebirds feeding there. This information corroborates documentation from the late 1800s of Red Knots and Ruddy Turnstones feeding on horseshoe crab eggs on Cape Cod."). Moreover, Manomet estimated hundreds of red knots among several shorebird species searching for and

eating horseshoe crab eggs during the spring 2022 and 2023 stopovers. *See* Manomet MESA Comment.

d. *Horseshoe crab harvesting reduces the availability of horseshoe crab eggs, depleting a needed red knot food source and exacerbating red knot decline.*

Because red knots rely on horseshoe crab eggs to sustain their lengthy migration—including long-distance flights over the ocean—Massachusetts Division of Fisheries and Wildlife identifies a central threat to red knot survival as "horseshoe crab overharvesting." *See* Mass. SWAP Red Knot. Red knots are "especially dependent" on horseshoe crab eggs, and "[i]t appears that loss or impaired use of this resource would have major impacts to populations" of shorebirds like the red knot. FWS Compatibility Determination at 23. Studies show that "drastic decrease in horseshoe crab egg abundance . . . corresponds with an equally drastic decline in shorebird populations," especially for the red knot. Smith et al. (2022) at 6; *id*. at 9 ("There is empirical support for stopover population size of shorebirds scaling with prey availability and quality") (citing Witte, 2019); *id*. ("Indeed, it has been established that annual survival of red knots stopping over in Delaware Bay (Dujins et al., 2017) and elsewhere (Morrison, Davidson & Wilson, 2007) is influenced by the relative body condition of the birds during stopover, i.e. their feeding success, rate and quantity of mass gain"); *see also* Kevin Shoemaker, *Review of the Atlantic States Marine Fisheries Commission's (ASMFC) Adaptive Resource Management (ARM) framework for regulating Horseshoe Crab bait harvest in Delaware Bay* at 4-5 (Sept. 2023) (attached as **Ex. K**) ("My reanalysis of the Delaware Bay mark-resight database indicates that REKN [red knot] survival is strongly and positively influenced by annual fluctuations in HSC [horseshoe crab] egg density"); *see id*. at 19-27 (explaining how "persistent degradation of the HSC [horseshoe crab] egg resource could have dire consequences for the REKN [red knot] population").

In light of the demonstrated connection between horseshoe crab egg supply and red knot survival, as well as the steep decline of the red knot population in general and in Massachusetts in particular, it is no surprise that the U.S. Fish and Wildlife Service found both bait and biomedical harvesting to be incompatible with primary purpose of protecting migratory birds at a stopover site in Massachusetts—Monomoy National Wildlife Refuge. FWS Compatibility Determination at 1; *see id*. at 25-26 ("Over-harvesting horseshoe crabs on Monomoy NWR may result in a decline of available horseshoe crab eggs for migratory shorebirds. This degraded habitat could affect shorebird productivity, survival, and ultimately the total population.").

IV. The Division of Marine Fisheries' Authorization of Horseshoe Crab Harvesting Likely Damages the Loggerhead Sea Turtle and Its Habitat.

The loggerhead sea turtle, scientific name *Caretta caretta*, is "one of three hard-shelled sea turtles (family Cheloniidae) found regularly in Massachusetts." Div. of Fisheries & Wildlife, Mass. State Wildlife Action Plan, "Loggerhead Sea Turtle" (hereinafter "Mass. SWAP Loggerhead Turtle").[10] They tend to be the largest hard-shelled sea turtles found in Massachusetts, with adults about three feet long and weighing 250 pounds. *Id*.

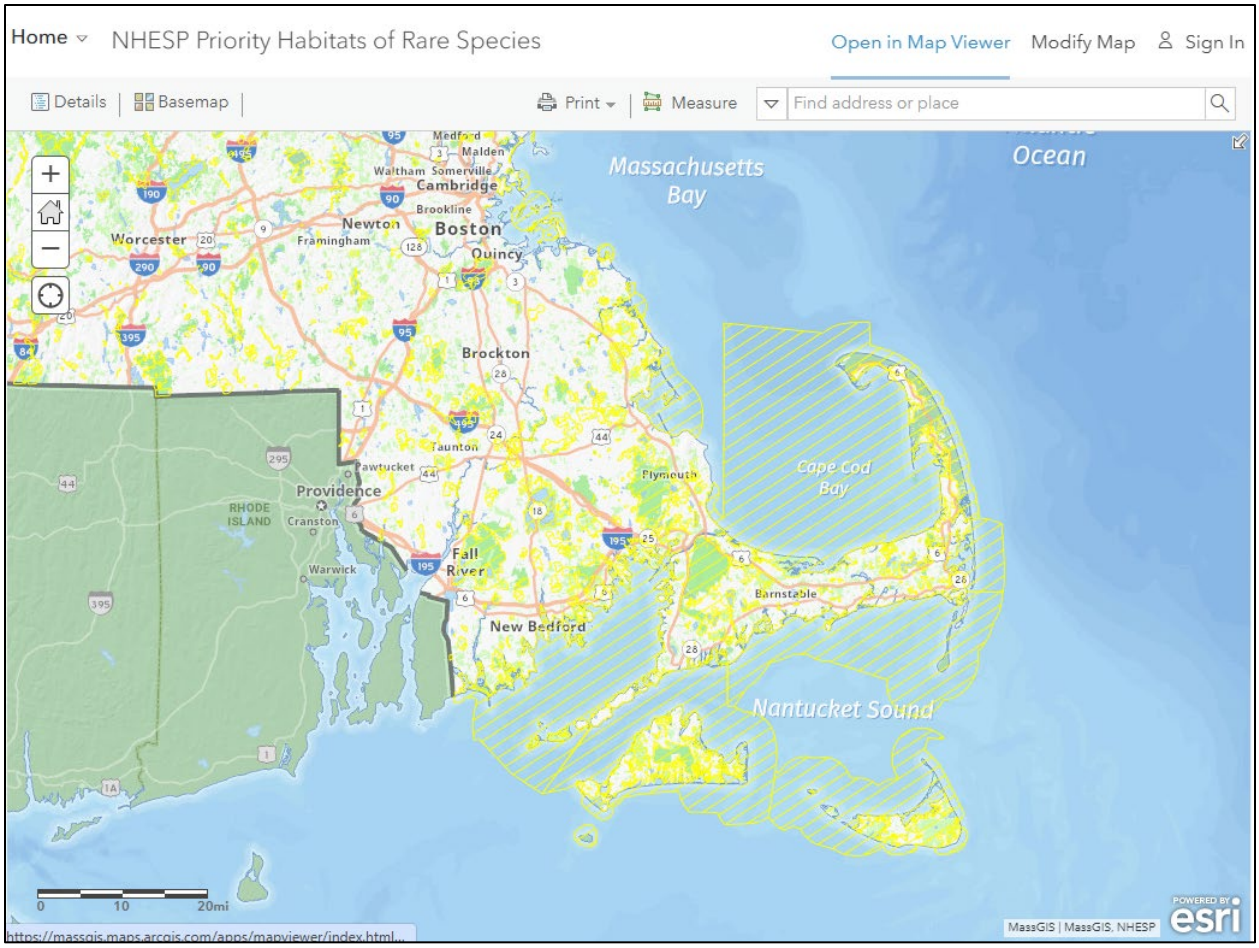
[10] *Available at* https://www.mass.gov/info-details/loggerhead-sea-turtle (last visited Nov. 19, 2026).

Loggerhead sea turtles also include horseshoe crabs as part of their diet. *See* FWS Compatibility Determination at 26-27 ("Observations of other fauna feeding on horseshoe crab eggs, hatchlings and adults include: [. . .] loggerhead sea turtles (*Caretta caretta*). All of these species occur on or near Monomoy NWR"); *see also* Defenders of Wildlife 2022 at 5 ("The species is also considered the preferred prey of the loggerhead sea turtle"). Accordingly, reducing horseshoe crabs through bait and biomedical harvesting will deplete a food source and force loggerhead turtles to search for other types of food, including in traps and nets that can harm them. *See id.* (explaining how "management of [horseshoe crab] stock directly tied to alterations in loggerhead foraging patterns," including "scavenging on net-entangled or discarded fish") (citing Seney & Musick, *Historical diet analysis of loggerhead sea turtles (Caretta Caretta) in Virginia*, Copeia 2007:478-489 (2007)). For example, the drop in horseshoe crab and blue crab populations in the Chesapeake Bay "may also correlate to the overall decrease in the number of sea turtles in the Chesapeake Bay over the past few decades." Krisfalusi-Gannon et al., *The Role of Horseshoe Crabs in the Biomedical Industry and Recent Trends Impacting Species Sustainability*, Frontiers in Marine Science 5:185 (June 2018) (attached as **Ex. L**) (citing M. Botton, *The ecological importance of horseshoe crabs in estuarine and coastal communities: a review and speculative summary,* in Biology and Conservation of Horseshoe Crabs at 45-64 (Tanacredy et al. eds.) (2009)).

V. The Division of Marine Fisheries' Authorization of Horseshoe Crab Harvesting Reduces Key Food Sources for State-Listed Species in their Priority Habitat.

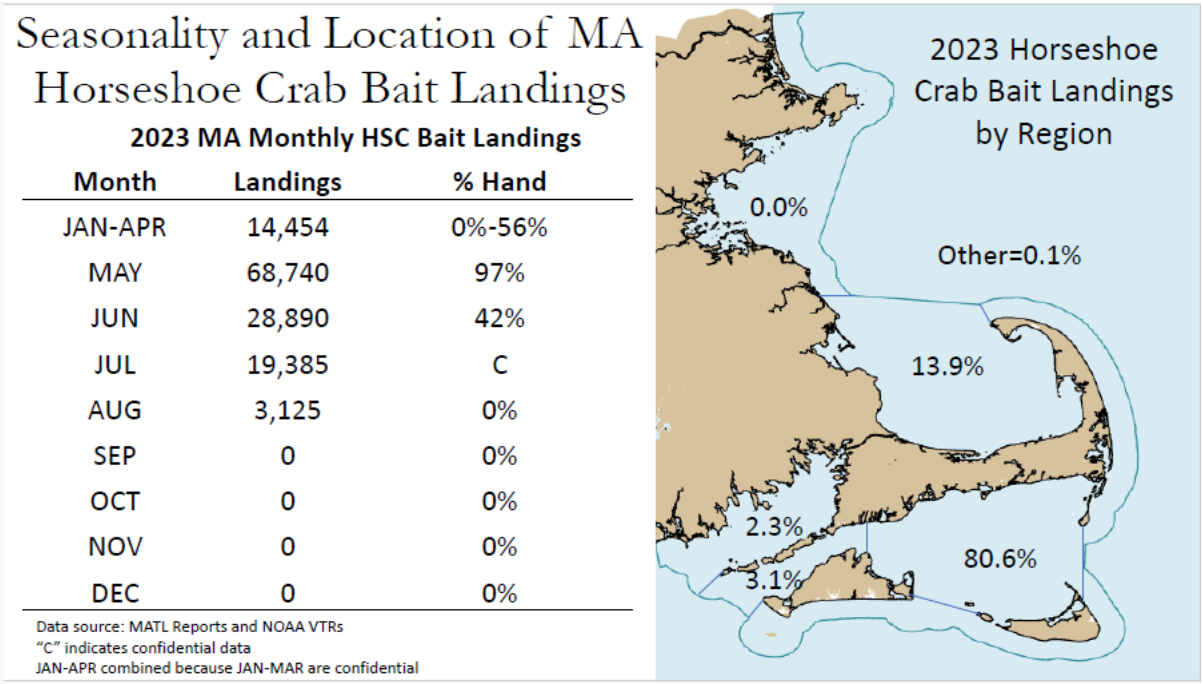
The Division of Marine Fisheries' authorization of increased horseshoe crab harvesting is also a "Project or Activity that will be located or will take place in Priority Habitat." 321 Code Mass. Reg. § 10.18(1).

"Priority Habitat" is "the geographic extent of Habitat for State-listed Species," which is "based on records of State-listed Species observed within the 25 years prior to delineation and contained in the Division's NHESP database." *Id.* § 10.02. "Habitat" is further defined as an area which "protects or provides important elements for the growth and survival of plants or animals such as food, shelter, or living space, and includes without limitation, breeding, feeding, resting, migratory, or overwintering areas." *Id*. NHESP has created a map of Priority Habitat for all of Massachusetts:



See https://www.mass.gov/info-details/massgis-data-nhesp-priority-habitats-of-rare-species (last visited Nov. 17, 2026).

The authorized horseshoe crab harvesting occurs both via hand collection on beaches or shallow water and via trawling by boat. "The bait fishery for horseshoe crabs principally occurs south and west of Cape Cod with Nantucket Sound being the primary harvest area." Dec. 14, 2023, Memorandum from Daniel McKiernan re: Proposal Affecting Horseshoe Crab Management at 2 (attached as **Ex. M**). "The biomedical fishery is similarly focused south and west of Cape Cod. However, Pleasant Bay—along the Outer Cape—has been an important site for the collection of biomedical crabs for nearly 50 years and has been closed to bait harvest since 2006." *Id*.; *see* Dec. 12, 2025 McKiernan Memorandum re Public Hearing Proposal on Horseshoe Crab Quota Management at 2 n.2 (attached as **Ex. N**) ("Dec. 2025 McKiernan Memo") ("Note that biomedical harvest is primarily occurring within the northeast portion of Nantucket Sound by mobile gear vessels. Fishery participants have expressed concern to DMF that there may be an over-reliance on this small area."). A visual depiction of the locations for harvest activities is below:



Slide screenshot taken from Derek Perry presentation on March 14, 2025.

Comparing these harvest areas with the NHESP Priority Habitat map depicted above, it is clear beyond cavil that each year, the authorized horseshoe crab harvesting "take[s] place in Priority Habitat." 321 Code Mass. Reg. § 10.18(1). This makes sense, because "Priority Habitats are delineated based on records of State-listed Species observed within the 25 years prior to delineation," and state-listed species feeding on horseshoe crabs (i.e. red knots and loggerhead sea turtles) and their eggs would naturally be observed where they feed. *See id*. § 10.02.

VI. Harvest Phaseouts Are "Practicable Means and Measures" that Will Avoid Damage to State-listed Red Knots, Loggerhead Sea Turtles, and Their Habitats.

Under MESA regulations, upon a finding that state action "is likely to result in damage to any state listed species or their habitats," NHESP "shall provide to the agency such guidance and information that is necessary to allow the agency to avoid such damage." 321 Code Mass. Regs. § 10.05(2)(d)(2). The agency receiving NHESP's guidance and information then "shall take all practicable means and measures to modify [its] actions to avoid such damage." *Id*. As explained above, the harvesting of horseshoe crabs for bait use and for blood-draining biomedical purposes is likely causing damage to the red knot, loggerhead sea turtle, and their habitats. Accordingly, NHESP must provide the Division of Marine Fisheries guidance and information to undertake "all practicable means and measures" to avoid damaging the state-listed species.

Scientific evidence and regulatory experience demonstrate that phasing out the harvesting of horseshoe crabs for both the bait and biomedical industries are "practicable means and measures" to avoid state-authorized damage to horseshoe crab populations and eggs—the essential food sources for red knots and loggerhead sea turtles.

a. *The bait industry in Massachusetts is decimated, and bait dealers are not selling horseshoe crabs at profit.*

The horseshoe crab bait harvest is intended to supply bait for the eel and whelk (also known as "conch") fishery. The eel fishery appears to be nonexistent. The whelk fishery has so drastically declined that in 2024 the largest bait dealer sold all 59,909 bait crabs it acquired at $0.50 per crab and offered $0.25 per crab in 2025. *See* Aug. 8, 2025, Shellfish Broker Letter (attached as **Ex. O**) ("In our opinion, this indicates systemic overcapacity in the bait quota . . ."). Indeed, that bait dealer appears to make all its money through the Commonwealth's Rent-a-Crab program, showing that the bait harvest is a stalking horse for biomedical bleeding sales. *See id.* (explaining its "100% Rent-a-Crab participation").[11] Using the Division of Marine Fisheries' December 2025 estimate that "current local bait crab demand approximates 75,000 – 90,000 horseshoe crabs annually," *see* Dec. 2025 McKiernan Memo at 1, sales at $0.25 per crab means that bait dealers' *total revenue* from the bait industry is a meager $18,750 – $22,500—and profit would be even less.

b. *There are viable and feasible alternatives to the use of horseshoe crab as bait and for biomedical endotoxin testing.*

Even if a remnant whelk fishery did exist, eliminating the harvest of horseshoe crabs for bait would have no effect on the fishery. Researchers in New England recently found that an alternative bait made from parts of invasive green crabs and clams "resulted in greater whelk interaction" than bait from horseshoe crabs. *See* Munley et al. *Laboratory investigations into alternative baits for the channeled whelk* (Busycotypus canaliculatus) *fishery*, Fisheries Research 271 (2024) 106920 (attached as **Ex. P**). In other words, there is already a viable, practicable alternative to the use of horseshoe crabs for bait—there is no need to authorizing killing 140,000 crabs for use as eel or whelk bait.

Similarly, horseshoe crab blood is no longer necessary for endotoxin testing in the biomedical industry. The standards-setting body U.S. Pharmacopeia set industry standards for synthetic endotoxin testing.[12] Relatedly, Congress recently directed the U.S. Food and Drug Administration to update its guidance to accept synthetic endotoxin testing in the manufacturing of new and existing products, and FDA revised its guidance "to accommodate a broader scope of recombinant reagents," i.e., synthetic alternatives to horseshoe crab blood.[13] Large players in the pharmaceutical industry are acting in parallel with these regulatory changes—companies like Eli

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[11] *See also* Dec. 2025 McKiernan Memo at 4 ("I am skeptical that the [whelk] fishery will soon return to prior peak levels – not just because of market conditions – but because the resource is depleted throughout its range within Massachusetts waters, as evidenced by a lack of larger whelk in the observed catches.").

[12] *See* U.S. Pharmacopeia, "Expert Committee approves endotoxin testing using non-animal derived reagents," Jul. 26, 2024, *at* https://www.usp.org/news/expert-committee-approves-endotoxin-testing-using-non-animal-derived-reagents (last visited Nov. 19, 2026).

[13] *See* FDA, "FDA Clarifies Current Thinking on Pyrogen and Endotoxins Testing," *at* https://www.fda.gov/science-research/advancing-alternative-methods-fda/fda-clarifies-current-thinking-pyrogen-and-endotoxins-testing (last visited Nov. 19, 2026).

Lilly are making the transition to synthetic for both new and legacy products.[14] Indeed, even the two biomedical processors in Massachusetts, Charles River Laboratories and Associates of Cape Cod, are producing and selling synthetic alternatives to horseshoe crab blood.

c. *Moratoria and harvest phaseouts are occurring without hiccups in other states.*

In light of the lack of a market for horseshoe crabs as bait and the available alternatives for both bait and biomedical use, regulatory experience from the Commonwealth's northeast Atlantic neighbors shows that phaseouts are feasible and practicable. The harvesting of horseshoe crabs for biomedical bleeding purposes is currently prohibited in Connecticut and phasing out in New York. *See* Conn. House Bill No. 6484, Public Act No. 26-3 (effective Oct. 1, 2023); N.Y. C.L.S. Envtl. Conserv. L. § 13-0331. New Jersey has imposed a moratorium on the taking of horseshoe crabs and their eggs, with an exception for biomedical harvest "provided that the horseshoe crabs are released otherwise unharmed." N.J.S.A. § 23:2B-21. If Connecticut, New York, and New Jersey find it feasible and practicable to phase out the horseshoe crab harvesting, so should Massachusetts.

VII. The Secretary Should Initiate Review of the Division of Marine Fisheries' Oversight of the Horseshoe Crab Harvesting Industry to Avoid Damage to the Red Knot and Loggerhead Sea Turtle.

Applying the MESA regulatory standard above, 321 Code Mass. Reg. § 10.05, the Division of Marine Fisheries' horseshoe crab management clearly triggers the need for the Secretary of EOEEA to initiate review. The virtual certainty that Division-authorized and Division-permitted horseshoe crab harvesting and killing eliminates key food sources for threatened red knots and loggerhead sea turtles, *see* Sections III-V above, more than satisfies the threshold determination of whether Division's horseshoe crab management program and regulations "may damage state listed species or their habitats." 321 Code Mass. Reg. § 10.05(2)(d).[15] Accordingly, the Secretary should initiate review and notify the Division of Marine Fisheries that its horseshoe crab management program and regulations may damage the state-listed red knot and loggerhead sea turtle and the species' habitats. *Id*. § 10.05(2)(d)(1).

a. *Proposed Language for Practicable Means and Measures*.

While Requesters generally request that the Secretary initiate a review of the Division of Marine Fisheries' horseshoe crab management program for compliance with MESA with regard to the red knot and loggerhead sea turtle, we also respectfully propose specific regulatory language that the Division should promulgate to minimize horseshoe crab harvest damage to the species. Specifically, for the regulation on "Horseshoe Crab Management," Requesters propose

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[14] *See* "Sustainability Scorecard for Endotoxin Testing," *at* https://pharmascore.org/ (last visited Nov. 19, 2026) (clickable scorecard).

[15] This likelihood of damage is true regardless of whether the current quota is what existed before Director McKiernan proposed the revised quota numbers in December 2025, or what is promulgated in the May 8, 2026, Massachusetts Register.

to amend the following regulation by removing language in ~~strikethrough~~ and adding language in ***bold italic***:

322 Code Mass. Reg. § 6.34 – Horseshoe Crab Management.

[. . . .]

(4) Bait Fishery Management.

- (a) Commercial Bait Fishery Quota. ***Until January 1, 2027*****,** [t]he annual bait fishery quota shall be 140,000 horseshoe crabs. ***Effective January 1, 2027, the annual bait fishery quota shall be 70,000 horseshoe crabs. Effective January 1, 2028, the annual bait fishery quota shall be 35,000 horseshoe crabs. Effective January 1, 2029, no person shall take horseshoe crabs for commercial bait purposes from the waters of this state.***

[. . . .]

(5) Biomedical Fishery for Horseshoe Crabs.

(a) Biomedical Processor Quota. ***Until January 1, 2027,*** [t]he biomedical processor quota shall be 200,000 crabs annually. This shall be divided equally between all entities permitted as biomedical processors, in accordance with 322 CMR 7.01(3). Only horseshoe crabs processed by biomedical processors and harvested from within the waters under the jurisdiction of the Commonwealth exclusively by biomedical harvesters for biomedical purposes shall be counted against the biomedical processor quota. The biomedical processor quota shall not include any horseshoe crabs borrowed from a bait dealer for processing or horseshoe crabs imported into the Commonwealth from another jurisdiction. ***Effective January 1, 2027, the annual biomedical processor quota shall be 100,000 horseshoe crabs. Effective January 1, 2028, the annual biomedical processor quota shall be 50,000 horseshoe crabs. Effective January 1, 2029, no person shall take or use horseshoe crabs from the waters of this state for biomedical processor purposes.***

VIII. Conclusion.

The red knot and loggerhead sea turtles are charismatic species that have seen their population numbers continue to plummet throughout its range, to the point that both are listed under MESA and the federal Endangered Species Act as "threatened." A central driver of their decline—both broadly as well as at local population levels—is the depletion of their horseshoe crab and horseshoe crab egg food supplies. Yet the Division manages horseshoe crab harvesting in a way that continues to remove important food resources for the red knot and loggerhead sea turtle, thus "damag[ing] the species." Accordingly, we request that the Secretary initiate review of the horseshoe crab management program and regulations and take steps to bring the Division's actions into compliance with MESA.

Respectfully,

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On behalf of Requesters:
Center for Biological Diversity
American Bird Conservancy
Animal Legal Defense Fund
Animal Welfare Institute
Conservation Law Foundation
Defenders of Wildlife
Horseshoe Crab Recovery Coalition co-founders Lawrence Niles and David Mizrahi
Humane World for Animals
International Conservation Fund
Massachusetts Society for the Prevention of Cruelty to Animals
New Jersey Audubon
Sea Turtle Conservancy
Southeastern Massachusetts Pine Barrens Alliance

Cc:
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