A RIBBITING PROPOSAL: USING THE ANIMAL HEALTH PROTECTION ACT TO COMBAT THE GLOBAL SPREAD OF FROG-KILLING CHYTRID FUNGUS

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INTRODUCTION

Amphibians are sensitive to temperature changes, habitat pollution, and disease.[1] International commercial frog trade is a vector for globally transporting the frog-killing pathogen, *Batrachochytrium dendrobatidis* (*Bd*).[2] Diseased frogs, their legs, and their water are exported all around the world and effectively become vehicles for disease spread in their destination countries.[3] International frog trade exposes wild, captive, and farm-raised frog populations to *Bd*, which can cause mass-frog deaths, ultimately impacting international-trade economics, and devastating amphibian biodiversity.[4]

Mass-frog deaths resulting from *Bd* outbreaks have resulted in several extirpations and extinctions and has thus has dramatic impacts on amphibian biodiversity.[5] Such mass-mortality

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[1] Jonathan E. Kolby et al., *Presence of the Amphibian Chytrid Fungus Batrachochytrium dendrobatidis in Native Amphibians Exported from Madagascar*, PLOS ONE, Mar. 2014, at 1.

[2] *See generally* Ben C. Scheele, *Amphibian fungal panzootic causes catastrophic and ongoing loss of biodiversity*, SCIENCE, Mar. 2019, at 1.; Jonathan E. Kolby et al., *Presence of the Amphibian Chytrid Fungus Batrachochytrium dendrobatidis in Native Amphibians Exported from Madagascar*, PLOS ONE, Mar. 2014, at 1.; Jonathan E. Kolby et al., *First Evidence of Amphibian Chytrid Fungus (Batrachochytrium dendrobatidis) and Ranavirus in Hong Kong Amphibian Trade*, PLOS ONE, Mar. 2014, at 1.; Ché Weldon et al., *Origin of the Amphibian Chytrid Fungus*, EMERGING INFECTIOUS DISEASE, Dec. 2004, at 1.; Trenton W. J. Garner et al., *The Amphibian Trade: Bans or Best Practice?*, ECOHEALTH, May 2009, at 1.; William B. Karesh et al., *Wildlife Trade and Global Disease Emergence*, 11(7) EMERGING INFECTIOUS DISEASES 1000, 1002 (2005)., Kerry Kriger and Jean-Marc Hero, *Chytridiomycosis, Amphibian Extinctions, and Lessons for the Prevention of Future Panzootics*, 6 ECOHEALTH, May 2009, 6, 15.; Rolando Mazzoni et al., *Emerging Pathogen of Wild Amphibians in Frogs (Rana catesbeiana) Farmed for International Trade*, 9(8) Emerging Infectious Diseases 995, 998.; Brian Gratwicke et al., *Is the international frog legs trade a potential vector for deadly amphibian pathogens?* 8(8) Front Ecol Envrion 438, 442.; LiveScience, *Live bullfrog trade blamed for spread of deadly disease*, (Aug. 10, 2012), http://www.nbcnews.com/id/48619490/ns/technology_and_science-science/t/live-bullfrog-trade-blamed-spread-deadly-disease/#.XZUCTihKhPa.; Sandra Altherr et al., *Canapés to Extinction: The International Trade in Frogs' Legs And Its Ecological Impact*, A report by Pro Wildlife, Defenders of Wildlife and Animal Welfare Institute (2011), https://www.prowildlife.de/wp-content/uploads/2016/02/Frogs-Legs_report_finalA4_web.pdf.

[3] Kolby, *supra* note 1, at 1.

[4] *Id*., *also see generally* Scheele, *supra* note 2 at 1.; Kolby, *supra* note 2 at 1.; Weldon, *supra* note 2 at 1.; Trenton *supra* note 2 at 1.; Karesh *supra* note 2 at 1000.; Kriger *supra* note 2 at 6., Mazzoni *supra* note 2 at 995.; Gratwicke *supra* note 2 at 438.; LiveScience, *supra* note 2.; Altherr, *supra* note 2.

[5] ALEX STRAUSS & KEVIN G. SMITH, WHY DOES AMPHIBIAN CHYTRID (BATRACHOCHYTRIUM DENDROBATIDIS) NOT OCCUR EVERYWHERE? AN EXPLORATORY STUDY IN MISSOURI PONDS. PLoS ONE 8(9): e76035 (Sept. 25, 2013). https://doi.org/10.1371/journal.pone.0076035.

events can also have unanticipated, cascading impacts on our economic systems.[6] This note discusses how the Animal Health Protection Act (AHPA) could be used to prevent further spread of *Bd*. Part I provides background about *Bd* and proposes that the USDA, under the powers delegated to it by the AHPA, should move to include frogs in the Act's definition of "livestock," recognize *Bd* as a "pest," and classify frog parts and their shipping water as "articles" under the Act. Part II analyzes relevant case law and legal challenges of this proposal. Part III discusses why using the AHPA, rather than other federal statutes or international agreements, is the most effective legal mechanism for preventing disease spread in farm-raised amphibians and their native ecosystems. While *Bd* impacts all orders of amphibians (frogs, salamanders, and caecilians),[7] this note will specifically focus on frogs, and specifically the regulation of captive-bred frogs introduced into trade for the purpose of human consumption. This note will also not discuss the impacts of frogs involved in pet trade, research, or other commercial uses, nor will this note discuss solutions for disease spread for such frogs.

PART 1: BACKGROUND

A. Batrachochytrium dendrobatidis: What is it and why it is Bad?

Amphibians are natural measures of a healthy ecosystem because they are sensitive to environmental changes, pollution, and toxic substances.[8] When submerged in water, amphibians breathe using their skin.[9] Their permeable skin contains a vast network of blood vessels,

[6] *Id*.; *also see generally* Scheele, *supra* note 2 at 1.; Kolby, *supra* note 2 at 1.; Weldon, *supra* note 2 at 1.; Trenton *supra* note 2 at 1.; Karesh *supra* note 2 at 1000.; Kriger *supra* note 2 at 6., Mazzoni *supra* note 2 at 995.; Gratwicke *supra* note 2 at 438.; LiveScience, *supra* note 2.; Altherr, *supra* note 2.
[7] Robert J. Ossiboff et al., *Differentiating Batracochytrium dendrobatidis and B. salamandrivorans in Amphibian Chytridiomycosis Using RNAScope in situ Hybridization*, Front. Vet. Sci., Sept. 12, 2019, at 1.
[8] Altherr, *supra* note 2.
[9] Brown University, *Frog Respiration*, https://www.brown.edu/Departments/Engineering/Courses/En123/MuscleExp/Frog%20Respiration.htm.

allowing gases to flow from their surroundings into their bodies.[10] This permeability causes their environmental sensitivity.[11] If their environment is polluted, they take in that pollution directly. They are an integral piece of the food web, acting as both prey and predator throughout their lifecycle.[12] Despite their environmental importance, amphibians are "the most threatened taxa of wildlife."[13]

Globally, amphibian populations are rapidly declining.[14] A leading cause of this is the infectious pathogen, *Batrachochytrium dendrobatidis* (*Bd*).[15] *Bd* is a chytrid fungus.[16] In its infectious stage, *Bd* is a swimming zoospore.[17] The zoospore swims to the host species, infecting tadpole mouthparts and adult frog skin cells.[18] The zoospores swim less than two centimeters before latching onto a host,[19] so the infection is likely spread through direct frog contact or via *Bd*-infected water.[20] After the zoospores mature in the host's healthy skin cells, the zoospores become motile, and travel towards ion transport activity.[21] This leads to chytridiomycosis—the disruption of an amphibian's ability to pass ions and water (and by

[10] *Id.*
[11] *Id.*
[12] Kolby, *supra* note 1, at 1.
[13] *Id.*
[14] *See generally* Scheele, *supra* note 2 at 1.; Kolby, *supra* note 1, at 1.; Kolby, *supra* note 2 at 1.; Weldon, *supra* note 2 at 1.; Trenton, *supra* note 2 at 1.; Karesh *supra* note 2 at 1000.; Kriger, *supra* note 2 at 6., Mazzoni, *supra* note 2 at 995.; Gratwicke, *supra* note 2 at 438; LiveScience, *supra* note 2.; Altherr, *supra* note 2.
[15] Kolby, *supra* note 1, at 1.
[16] *Id.*
[17] Louise A. Rollins-Smith, *Amphibian Immune Dense against Chytridiomycosis: Impacts of Changing Environments*, 51(4) Integrative and Comparative Biology, 552, 562 (2011).
[18] Rollins-Smith, *supra* note 13, at 552.
[19] Jeff Piotrowski et al., *Physiology of Batrachochytrium dendrobatidis, a chytrid pathogen of amphibians*, 96(1) Mycologia 9, 15 (2004).
[20] Kolby, *supra* note 2 at 1.
[21] Rollins-Smith, *supra* note 13, at 552.

extension, to breathe normally) through its skin.[22] Eventually, chytridiomycosis can cause cardiac arrest and death in many amphibian species.[23]

The catastrophic impacts of chytridiomycosis and *Bd* cannot be overstated. Experts deem chytrid fungus as "the most destructive pathogen ever described by science."[24] Globally, chytridiomycosis is conservatively linked to the decline of at least 501 amphibian species.[25] *Bd* is highly tolerant to a wide range of temperatures: 4˚C to 28˚C (39˚F to 82˚F).[26] This temperature tolerance allows *Bd* to successfully infect hosts across at least thirty-seven countries, spread over six continents.[27]

Chytridiomycosis is an emerging infectious disease in the wild, and international frog trade is the main vector for spreading this disease.[28] Despite being highly infectious, *Bd* is not lethal for all frog species.[29] Instead, the frogs that survive infection become disease-introducing vehicles when they are transported to new geographic locations. Imported disease-carrying frogs can infect both regional livestock and wild populations, effectively causing global pathogen pollution.[30] The disease can spread from captive-bred populations to wild populations in a number of ways including: infected or host frogs accidentally escaping from or being intentionally released from breeding operations, or by improperly releasing contaminated frog

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[22] *Id.*
[23] *Id.*
[24] Michael Greshko, *Amphibian apocalypse caused by most destructive pathogen ever*, NATIONAL GEOGRAPHIC, Mar. 28, 2019.
[25] *Id.*; Ben Scheele, et al., *Amphibian fungal panzootic causes catastrophic and ongoing loss of biodiversity*, Science (2019).
[26] Jamie Bosch et al., *Climate change and outbreaks of amphibian chytridiomycosis in a montane area of Central Spain; is there a link?*, 274(1607) Proc Biol Sci, 253, 260 (2007).
[27] Kerry Kriger, *Chytridiomycosis, Amphibian Extinctions, and Lessons for the Prevention of Future Panzootics*, EcoHealth 6 (2009).
[28] *See generally* Scheele, *supra* note 2 at 1.; Kolby, *supra* note 1, at 1.; Kolby, *supra* note 2 at 1.; Weldon, *supra* note 2 at 1.; Trenton, *supra* note 2 at 1.; Karesh, *supra* note 2 at 1000.; Kriger, *supra* note 2 at 6., Mazzoni, *supra* note 2 at 995.; Gratwicke, *supra* note 2 at 438.; LiveScience, *supra* note 2.; Altherr, *supra* note 2.
[29] LiveScience, *supra* note 2.
[30] Mazzoni, *supra* note 2 at 995.

holding tank water into the natural environment.[31] Under proper conditions, the fungal pathogen can live outside hosts for months at a time.[32] Because of these factors, the international transportation of these frogs a major contributor to global pathogen pollution.

Over 85,000 tons of amphibians were harvested through aquaculture in 2005 alone.[33] Large-bodied frogs are at the fore-front of amphibian species that are transported for their meat.[34] The North American bullfrog is "farmed in the United States, Mexico, Guatemala, Salvador, Panama, Ecuador, Argentina, Thailand, Indonesia, Laos, Vietnam, Malaysia, Uruguay, Taiwan PC, and mainland China."[35] While many farmed amphibians are raised and consumed domestically, a substantial part are farmed for international trade.[36] No matter where they are destined, farm-raised frogs are at risk of infection. An example of this occurred in at commercial farm in Uruguay in 1999.[37] The farm normally produced 150,000 tadpoles and 30,000 metamorphs each summer, with a regular mortality rate of 0.5%.[38] Following the twenty-six-day *Bd* epidemic, only 2,000 of the metamorphs survived, and 95% of the recent metamorphs perished.[39]

Most frogs imported into the United States for human consumption are captive-bred frogs.[40] As both an importer and exporter of farm-raised frogs,[41] the United States should be concerned with *Bd* for two reasons: the economic impact from stock collapse of farm-raised

[31] Ohio Department of Natural Resources Division of Wildlife
[32] Michael Greshko, *Amphibian apocalypse caused by most destructive pathogen ever*, NATIONAL GEOGRAPHIC, Mar. 28, 2019.
[33] Trenton, *supra* note 2 at 1.
[34] Trenton, *supra* note 2 at 2., and Altherr, *supra* note 2.
[35] *Id.*
[36] *Id.* at 3.
[37] Mazzoni, *supra* note 2 at 995.
[38] *Id.*
[39] *Id.*
[40] Mazzoni, *supra* note 2 at 995., Altherr *supra* note 2.
[41] Altherr *supra* note 2.

frogs and the risk to wild amphibian biodiversity.[42] Multiple studies have found *Bd*-positive frogs or parts being imported into the United States.[43] Currently, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international amphibian trade.[44]

However, many amphibian species that the United States trades are not included in CITES.[45] Scientists are tracking the fungal spread through regional networks, but this does not proactively prevent the pathogen from moving.[46] The World Organization for Animal Health (OIE) issued recommendations for ways to minimize *Bd* spread in amphibian trade.[47] These are merely recommendations, and are not binding on the United States. As a substantial trade participant, the United States needs an effective mechanism of disease detection and prevention or else amphibians across the globe are at risk of devastating infection and death. This note proposes that an existing law, the Animal Health Protection Act (AHPA), offers the mechanisms to help mitigate this pressing problem.

[42] Gratwicke, *supra* note 2 at 438.
[43] *See generally* Kolby, *supra* note 1, at 1.; Kolby, *supra* note 2 at 1.; Weldon, *supra* note 2 at 1.; Trenton, *supra* note 2 at 1.; Karesh, *supra* note 2 at 1000.; Kriger, *supra* note 2 at 6., Mazzoni, *supra* note 2 at 995.; Gratwicke, *supra* note 2 at 438.
[44] Phillip J. Bishop et al., *The Amphibian Extinction Crisis—what will it take to put the action into the Amphibian Conservation Action Plan?*, 5(2) Sapiens 101, 111.
[45] Bishop, *supra* note 39 at 101.
[46] Greshko, *supra* note 24.
[47] *Id.*.; Aquatic Code, *Article 8.1.9: Infection with Batrachochytrium Dendrobatidis* OIE (adopted Aug. 29, 2019). https://www.oie.int/index.php?id=171&L=0&htmfile=chapitre_batrachochytrium_dendrobatidis.htm art 8.1.9

B. The AHPA's History, Purpose, and Why it is a Potential Solution.

The AHPA was passed in the wake of the September 11, 2001 attacks, as part of the 2002 Farm Bill,[48] for the stated purpose of protecting health of animal, human consumers, American agricultural economy, and the environment.[49] However, the AHPA's applicability scope is limited to livestock.[50] Particularly, the AHPA focuses on diseases and pests that could negatively impact livestock health.[51] The AHPA begins by defining the following terms: "livestock," "pest," and "article."[52]

"Livestock" is defined as "all farm-raised animals."[53] A "pest" includes any fungus or pathogen that "can directly or indirectly injure, cause damages to, or cause disease in livestock."[54] An "article" is "any pest or disease or material or tangible object that could harbor a pest or disease."[55] The AHPA authorizes the United States Department of Agriculture (USDA), at the Secretary of Agriculture's (Secretary) discretion, to limit imports, exports, and interstate movement; impose importation quarantines; and order the destruction of animals and articles that may be infected with a pest.[56] The USDA may do so if it deems a restriction necessary to prevent the transmission of disease to livestock.[57] The AHPA also defines the term "move" to include "to release into the environment."[58] Meaning, the AHPA's scope extends to

[48] Stanley Abramson, Law of Environmental Protection §19:26 Agricultural statutes—Animal Health Protection Act (3d ed. 2018).
[49] 7 USCA § 8301.
[50] Jan Cynthia Graham, *Snakes of a Plain, or in a Wetland: Fighting Back Invasive Nonnative Animals—Proposing A Federal Comprehensive Invasive Nonnative Animal Species Statute*, 25 TLNELJ 19 (2011).
[51] *Id.*
[52] 7 U.S.C. § 8302.
[53] *Id.*
[54] *Id.* at § 8302(13).
[55] *Id.*
[56] *Id.* at § 8303; Stanley Abramson, Law of Environmental Protection §19:26 Agricultural statutes—Animal Health Protection Act (3d ed. 2018).
[57] 7 U.S.C. § 8303.
[58] *Id.*

preventing diseases that devastate livestock from spreading to surrounding natural ecosystems. While the AHPA does not directly protect wildlife,[59] it could be used to do so.

The USDA "must continue to conduct research on animal disease and pests that constitute a threat to the livestock of the United States."[60] Scientific research reveals that the international trade of farm-raised amphibians is significantly contributing to the catastrophic spread of *Bd*.[61] Even though frogs may not be livestock in the traditional sense, they are a piece of international agricultural trade.[62] Therefore, farm-raised frogs could fall within the AHPA's scope. Farm-raised frogs fall within the definition of "livestock," as the definition includes all farm-raised animals.[63] Since *Bd* is a chytrid fungus that can "directly…injure, cause damages to, or cause disease in livestock," it meets the definition of "pest."[64] Frog legs, and the water that frogs or their parts are shipped in, are "articles,"[65] too, as they are tangible objects that can harbor *Bd*.[66] Including farm-raised frogs, *Bd*, frog parts, and their storage water within the AHPA's definitions would allow the USDA to put limits on the international frog trade. Doing so would provide a proactive legal mechanism for preventing disease spread and ultimately could protect amphibian biodiversity.

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[59] Jan Cynthia Graham, *Snakes of a Plain, or in a Wetland: Fighting Back Invasive Nonnative Animals—Proposing A Federal Comprehensive Invasive Nonnative Animal Species Statute*, 25 TLNELJ 19 (2011).
[60] 7 U.S.C. § 8301.
[61] *See generally* Scheele, *supra* note 2 at 1.; Kolby, *supra* note 1, at 1.; Kolby, *supra* note 2 at 1.; Weldon, *supra* note 2 at 1.; Trenton, *supra* note 2 at 1.; Karesh, *supra* note 2 at 1000.; Kriger, *supra* note 2 at 6., Mazzoni, *supra* note 2 at 995.; Gratwicke, *supra* note 2 at 438.; LiveScience, *supra* note 2.; Altherr, *supra* note 2.
[62] Altherr, *supra* note 2.
[63] 7 U.S.C. § 8302.
[64] *Id.*
[65] *Id.*
[66] Kolby, *supra* note 1, at 1.

PART II: ARGUMENT

A. The AHPA and How the Courts Have Applied It.

Regulating animal trade through statutory provisions is not a new concept. [67] In 1884 Congress enacted "An Act for the Establishment of a Bureau of Animal Industry, to Prevent the Exportation of Diseased Cattle, and to Provide Means for the Suppression and Extirpation of Pleuropneumonia and Other Contagious Diseases among Domestic Animals."[68] This statute made it the Commissioner of Agriculture's (the Commissioner) duty to draft rules and regulations to effectively prevent disease spread.[69] This gave the Commissioner the power to use his discretion to authorize or expand quarantine measures as needed to prevent disease spread across the states.[70] However, this statute limited funds for quarantines only to states whose executive authorities agreed to cooperate with the quarantine measures.[71]

To make quarantines more consistent and ultimately more effective across state lines, Congress enacted "An Act to enable the Secretary of Agriculture to establish and maintain quarantine districts, to permit and regulate the movement of cattle and other lives stock therefrom, and for other purposes."[72] This statute gave the USDA the power to enact a quarantine in any state, or part of a state, where cattle or other livestock had any "contagious, infectious, or communicable disease."[73] This history demonstrates that Congress has long recognized the importance of preventing disease spread and that the agency, at its discretion,

[67] *See generally* U.S. v. Johnson, 35 F.2d 256 (1929); Reid v. People of State of Colorado, 187 U.S. 137 (1902).
[68] 23 Stat, at L. 31, chap. 60, U.S. Comp. Stat. 1901, p. 299.
[69] *Id.* at p. 300.
[70] *Id.*
[71] U.S. v. Johnson, 35 F.2d 256 (1929) (citing Section 1 (21 U.S.C. § 123).
[72] *Id.*
[73] *Id.*

should be responsible for determining how to do so. This regulatory trend currently lives on in the AHPA.[74]

The Animal and Plant Health Inspection Service (APHIS) enforces the AHPA and the bans put forward by the United States Department of Agriculture (USDA).[75] As stated in Part I, the AHPA gives the USDA a great breadth of discretion for dealing with disease.[76] The AHPA's legislative history shows that Congress believed that the most efficient way to prevent disease spread was to give the USDA broad discretionary authority.[77] The Conference Report states, "a regulatory definition of disease should be left to the discretion of the Secretary . . . [allowing] . . . the agency to have maximum flexibility to focus its resources and respond to new or emerging disease threats."[78]

The USDA's discretion was challenged in a series of cases (*Ranchers Cattleman Action Legal Fund Unite Stockgrowers of America v. United States Dep't of Agric. I, II, and III*), that will be referred to as *R-CALF I*, *II*, and *III*. In *R-CALF I*, *II*, and *III*, the Ranchers Cattlemen Action Legal Fund United Stockgrowers of America (R-CALF) sued the USDA for issuing a final rule that partially lifted a ban on the importation of ruminants and ruminant products from Canadian beef and cattle.[79] R-CALF sought a preliminary injunction to bar this final ruling,

[74] 7 U.S.C. § 8303.
[75] United States v. 8,800 Pounds, more or less, of Powdered Egg White Product, 551 F.3d 759, 760 (2008).
[76] 7 U.S.C. § 8303.
[77] H.R. Conf. Rep. 107-424, *reprinted in* 2002 U.S.C.C.A.N. 141, 388).
[78] *Id.*
[79] *See generally* Ranchers Cattleman Action Legal Fund United Stockgrowers of Am. v. United States Dep't of Agric., 359 F.Supp.2d 1058 (D.Mont.2005) ("R-CALF I").; Ranchers Cattleman Action Legal Fund United Stockgrowers of America v. United States Dep't of Agric., 415 F.3d 1078, 1084 (2005) ("R-CALF II").; Ranchers Cattleman Action Legal Fund United Stockgrowers of Am. v. United States Dep't of Agric., 499 F.3d 1108 (2007) ("R-CALF III").

wanting to maintain USDA's original ban on Canadian ruminant cattle products into the United States to prevent the potential spread of Bovine Spongiform Encephalopathy (BSE).[80]

BSE, commonly known as "mad cow disease," originated in England from the agricultural practice of feeding cows the brains and central nervous system tissues of deceased cows.[81] In 2003, there was a case of a native North American cow, Alberta, who was diagnosed with BSE. This discovery led to then-Secretary Veneman to issue an Emergency Order (Change in Disease Status of Canada Because of BSE), which added Canada to the list of countries with known BSE incidents.[82] The USDA then issued an official ban on "all imports of live ruminants or ruminant meat products from Canada."[83]

However, in 2005, the USDA changed its tune and issued a final rule named "Bovine Spongiform Encephalopathy: Minimal Risk Regions and Importation of Commodities: Final Rule and Notice."[84] This rule now allowed some ruminant imports from Canada.[85] The agency began to further relax the ban, and on April 19, 2004, the USDA moved to allow for increased types of ruminant imports from Canada.[86] The USDA ultimately issued the Final Rule on January 4, 2005, lifting the ban on ruminant imports from Canada.[87] While the main issues raised in R-CALF's initial complaint were alleged violations of the Administrative Procedure

[80] R-CALF I, 359 F.Supp.2d 1058 (D.Mont.2005).
[81] R-CALF II, 415 F.3d 1078, 1084 (2005).
[82] *Id*. at 1088.
[83] 9 C.F.R. §§ 93.401, 94.18 (2003).
[84] 70 Fed.Reg. 460 (Jan. 4, 2005).
[85] R-CALF II, 415 F.3d 1078, 1084 (2005); 70 Fed.Reg 460 (Jan. 4, 2005).
[86] R-CALF II, 415 F.3d 1078, 1084 (2005).
[87] *Id*. at 1089 (citing 70 Fed.Reg. at 460, 469)(this ban also allowed for imports of Canadian cattle under 30 months old, as long as the cattle were immediately slaughter or fed than slaughtered upon arrival, and allowed for the imports of beef from Canadian cows of all ages).

Act (APA), the Regulatory Flexibility Act (RFA), and the National Environmental Policy Act (NEPA), the AHPA played a large role in the appellate and Supreme Courts' decisions.[88]

In *R-CALF I*, the court granted R-CALF's request for an injunction, calling the USDA's Final Rule arbitrary and capricious.[89] On remand, the court in *R-CALF II* concluded that the district court failed to give deference to the agency, as instructed by the AHPA, and ultimately reversed the lower court's judgement.[90] The *R-CALF II* court found that the AHPA's statutory language (e.g., the use of the word "may") and legislative history gave the agency broad discretion to make decisions on the imports of animal products.[91] Further, the *R-CALF II* court held that the AHPA "does not impose any requirement on USDA that all of its actions carry no associated increased risked of disease."[92] By holding that the Final Rule was arbitrary and capricious, the district court effectively imposed an additional requirement of disease-risk eradication because the court found that the USDA did not completely eliminate the risk of disease communication to humans or animals.[93] The *R-CALF II* court further noted that open borders are default under the AHPA, and that the USDA may only close the borders when they deem it necessary to prevent contagion.[94]

In *R-CALF III*, the Ninth Circuit Court of Appeals affirmed the *R-CALF II*'s decision, agreeing that the district court did substitute its judgment for the agency's, despite the broad discretion given to the USDA.[95] The *R-CALF III* court held the ban was appropriate because the agency properly relied on studies available at the time off issuing the ban, and that the ban was

[88] R-CALF I, 359 F.Supp.2d 1058 (D.Mont.2005); R-CALF II, 415 F.3d 1078, 1090 (2005); R-CALF III, 499 F.3d 1108 (2007).
[89] R-CALF I, 359 F.Supp.2d 1058 (D.Mont.2005).
[90] R-CALF II, 415 F.3d 1078, 1094 (2005).
[91] *Id.*
[92] *Id.*
[93] *Id.*
[94] *Id.*
[95] R-CALF III, 499 F.3d 1108, 1117 (2007).

merely considered as part of the solution instead of the sole mitigating factor for disease spread.[96] Further, the court held that, as long as the USDA provided its reasoning for banning some products and not others, the agency properly acted within the agency's discretion.[97]

The AHPA also grants the agency discretion to "order the destruction or removal from the United States," animals, articles, or means conveyance that have been imported but have not entered; were improperly imported or entered; or animals that "have strayed" into the United States, if it is deemed necessary to prevent pest or disease introduction to livestock.[98] This issue was argued in *United States v. 8,000 Pounds, more or less, of Powered Egg White Product*, where the defendant, Creative Compounds, LLC ("Creative") argued that the courts should allow the illegal shipment of 8,800 pounds of powdered egg whites to be exported back to Peru instead of destroyed.[99] One of the relevant statutes regulating treatment of the illegal powdered egg white product was the AHPA.[100] USDA regulations barred imports of egg products from Peru unless the "eggs have been cooked or processed or will be handled in a manner that will prevent the introduction of [Exotic Newcastle Disease] into the United States."[101]

While much of this case's decision is based on a separate statute protecting human consumers from potential harm,[102] language from the AHPA was also a deciding factor. Creative lacked the proper permits to allow for the product to be used for human or animal consumption, so the USDA sought for condemnation and destruction of the illegal imported

[96] *Id.*
[97] *Id.* at 1120.
[98] 7 U.S.C. § 8303(c).
[99] United States v. 8,800 Pounds, more or less, of Powdered Egg White Product, 551 F.3d 759, 760 (2008).
[100] *Id.*
[101] *Id.*
[102] 9 C.F.R. § 94.6(c)(4); United States v. 8,800 Pounds, more or less, of Powdered Egg White Product, 551 F.3d 759, 763 (2008).

shipment.[103] The court held that this judgment was proper because the USDA, under both acts, was acting within its discretion to prevent the introduction of disease into the United States.[104]

The fact that courts have continuously upheld the USDA's broad discretion under the AHPA to make and loosen bans and quarantines indicates that the AHPA may be a powerful tool in the fight against the spread of *Bd.*[105] If the USDA deemed it necessary to protect captive-bred frogs and wild, native populations of frogs from *Bd*, the agency could issue a ban on frog imports from areas with known instances of the fungal pathogen. A ban would be well within the USDA's purview, so long as it relied on current data when issuing the ban and reiterated that a ban of this kind is merely a piece of the contagion-mitigation puzzle. The current science clearly and urgently begs for governmental intervention to prevent the communication of *Bd* into new geographic areas.[106] The AHPA may be that solution.

PART III: PROPOSAL

A. How the USDA Could Weaponize the AHPA.

The USDA should impose a ban on imports of captive-frogs, their legs, and their storage water from countries with recorded instances of *Bd* in frog farms. The AHPA prevents disease spread and introduction of pests from imports and exports among livestock.[107] The AHPA affords the agency broad discretion to restrict the imports, further movement, or means of conveyance of any animal, article, or pest that the USDA deems necessary to prevent disease

[103] United States v. 8,800 Pounds, more or less, of Powdered Egg White Product, 551 F.3d 759, 763 (2008).
[104] *Id.* at 760.
[105] *See generally* R-CALF II, 415 F.3d 1078 (2005); R-CALF III, 499 F.3d 1108 (2007).
[106] *Supra* Part I.
[107] 7 U.S.C. § 8301.; Jan Cynthia Graham, *Snakes of a Plain, or in a Wetland: Fighting Back Invasive Nonnative Animals—Proposing A Federal Comprehensive Invasive Nonnative Animal Species Statute*, 25 TLNELJ 19 (2011).

spread to livestock.[108] The USDA may do so via rulemaking, adjudicatory orders, or post-importation quarantines.[109] As the case law discussed in Part II demonstrates, the AHPA foundationally provides broad discretion to the USDA to restrict or ban importations, and to impose quarantines, as they deem necessary. To satisfy the conditions set forth in the AHPA, a restriction must reasonably rely on the best scientific data available to the agency at the time the restriction was implemented.[110] The USDA, in its discretion, can place restrictions on certain "parts" or "articles" as long as their decision reasonably relied on experts at the time.[111] The ban needs only to be part of the solution for mitigating disease transmission; it does not need to be 100% effective to be appropriate under AHPA.[112]

Much like BSE for cattle and Exotic Newcastle Disease for avians, *Bd* poses a substantial threat to farm-raised and native frog populations in the United States. The current science, stated in Part I, points to trade as being one of the main vectors for the global spread of *Bd*.[113] There are two main differences between BSE and Exotic Newcastle Disease and *Bd*: (1) *Bd* does not directly impact human health[114] and (2) cattle and poultry products are traditional farm-raised products, unlike frog parts. AHPA's purpose, however, is not *only* to protect human health; it is also to protect the health of "livestock."[115] In the AHPA, livestock is defined as "all farm-raised animals."[116] Therefore, despite not being a *staple* of traditional American cuisine, farm-raised frogs could fall under this definition of "livestock."[117] A "pest" is any fungal pathogen that "can

[108] 7 U.S.C. § 8303(a).
[109] *Id.* at § 8301(b).
[110] R-CALF II, 415 F.3d 1078, 1094 (2005).
[111] *Id.*
[112] *Id.*
[113] *Supra* Part I.
[114] FISH & WILDLIFE, NOTICE OF INQUIRY FOR INJURIOUS SPECIES LIGHTING FOR AMPHIBIANS WITH CHYTRID FUNGUS 1-4, https://www.fws.gov/injuriouswildlife/pdf_files/Chytrid_fungus_FAQs_045679_FINAL_9-15-10.pdf.
[115] 7 U.S.C. § 8301.
[116] *Id.* at § 8302.
[117] *Id.*

directly or indirectly injure, cause damages to, or cause disease in livestock."[118] *Bd*, thus, is also clearly a "pest."[119] Lastly, an "article" is "any pest or disease or material or tangible object that could harbor a pest or disease."[120] Frog legs, and the water that frogs or their parts are shipped in, arguably fall under this statutory term.[121] The USDA, using its discretionary power provided by the AHPA, could limit or ban imports, exports, and interstate movement; impose importation quarantines; or order the destruction of frogs, their parts, and articles from countries with known instances of *Bd* in their captive-raised frogs.

The AHPA states that the USDA must "continue to conduct research on animal disease and pests that constitute a threat to the livestock of the United States."[122] Following this mandatory call-to-action, the agency, relying on current expert studies of the time, could reasonably conclude there is a need to regulate trade of farm-raised frogs. In the *R-CALF* cases, the USDA first enacted the ban and quarantine of ruminant products from Canada following reported instances of BSE.[123] If the USDA relied on studies that showed which countries have tested positive for *Bd* in their frog populations, it would be within the agency's discretion to implement any restrictions, bans, or quarantines that they saw fit.

The AHPA defines the term "move" to include "to release into the environment."[124] The USDA, within its discretion, could implement regulation or ban on frogs, parts, and articles from countries with known *Bd* instances (i.e., from countries with populations of captive frogs known to be infected with *Bd*) to prevent disease spread to native frog populations. The science again

[118] 7 U.S.C. § 8302(13).
[119] *Id.*
[120] *Id.*
[121] *Id.*
[122] *Id.* at § 8301.
[123] R-CALF I, 359 F.Supp.2d 1058 (D.Mont.2005).
[124] 7 U.S.C. § 8303.

suggests that *Bd* is being spread from captive frog populations to the wild, and frogs raised for human consumption play a significant role in that. *Bd* is hopping into wild populations by virtue of rouge-escapee frogs, intentionally released frogs, and/or via the careless disposal of contaminated frog tank water.[125] While the AHPA does not directly protect wildlife[126] and there has been no case law debating this use of the AHPA, the courts in *R-CALF I* and *II* highlighted the importance of agency discretion afforded by the AHPA.[127]

B. Why Defining Frogs as "Livestock" May be a Problem.

As stated in Part III A, farm-raised frogs *could* fall under the definition "livestock."[128] However, the USDA has defined "livestock" to include different animals, depending on the statute.[129] Under the Human Methods of Slaughter Act (HMSA), "livestock" currently includes cows, horses, pigs, and most other four-legged animals.[130] The HMSA purposefully excludes poultry birds.[131] The USDA's inconsistent history with the term "livestock" re-illuminates the discretionary power of the agency to include. Re-defining AHPA's definition "livestock" to include frogs would be a wholly discretionary choice.

The AHPA differs from the HMSA in two important ways. First, the AHPA's priority is maintaining livestock health through the prevention of pest or disease introduction.[132] Second, the AHPA has a stated interested in protecting the natural environment.[133] In contrast, the

[125] Ohio Department of Natural Resources Division of Wildlife
[126] Jan Cynthia Graham, *Snakes of a Plain, or in a Wetland: Fighting Back Invasive Nonnative Animals—Proposing A Federal Comprehensive Invasive Nonnative Animal Species Statute*, 25 TLNELJ 19 (2011).
[127] *See generally* R-CALF II, 415 F.3d 1078 (2005); R-CALF III, 499 F.3d 1108 (2007).
[128] *See* Part III A.
[129] 7 U.S.C. § 1902.
[130] *Id.*
[131] *Id.*
[132] 7 U.S.C. § 831.
[133] *Id.*

HMSA is a welfare statute.[134] Its purpose is to prevent "needless suffering" of livestock, while balancing the economic desires of "producers, processors, and consumers" against the working conditions of "persons engaged in the slaughtering industry."[135] The HMSA is not concerned with disease outbreaks from imported animals that could lead to economic and environmental devastation.[136] Its purpose is to make slaughter as humane as possible, while maintaining economic efficiency.[137] This note acknowledges the discrepancies of "livestock" definitions across various statutes, however seeing that the AHPA and HMSA are fundamentally different, their definitions of "livestock" could reasonably encompass different animals. Therefore, frogs could fall into the AHPA's definition of "livestock" without being included in the HMSA's definition.

C. Why Other Federal Statutes and International Agreements are not the most Effective Solution.

The AHPA could help mitigate *Bd* dissemination in the United States, but it is recognizably not a panacea. The number of frogs in trade for human consumption is minuscule compared to those in trade for research or pets.[138] Having the USDA, in its discretion, redefine key definitions of AHPA may seem like a round-about way to prevent disease-spread, but it is also currently the most efficient and effective means of responding to the spread of *Bd.* Congress could *always* pass legislation specifically addressing the devastation of amphibian populations wrought by *Bd*, but Congress is a lethargic creature, and frogs have never been the most charismatic of megafauna.

[134] 7 U.S.C. § 1902.
[135] *Id.*
[136] *Id.*
[137] *Id.*
[138] Altherr, *supra* note 2.

While other federal legislation and international agreements, such as the Animal Welfare Act (AWA), the Endangered Species Act (ESA), and the CITES agreement, could play a role in preventing disease-spread, they have not been effective for combating *Bd*. These statutes either do not protect frogs[139] or captive frogs[140] or do not adequately protect the native frogs in this import country.[141] In fact, imports of frogs that are not meant for human-consumption, such as frogs for pets, or research, or even wild frogs, have been left virtually unregulated. Consequently, while the "solution" this note proposes may be an ad hoc, "stopgap," half-measure, it is also the most likely to occur. The AHPA's purpose is to protect the health of domestic "livestock."[142] The USDA could therefore theoretically block one key vector for the transmission of Bd, and perhaps even stop amphibian Armageddon, with one wave of their hand. The regulatory architecture created under the AWA, ESA, and CITES lack such broad grants of authority, and are thus worse-suited to the task of *Bd* prevention.

1. The Animal Welfare Act

At first glance, the AWA seems to be a promising solution for preventing the spread of *Bd* in captive-bred frogs. Diseases, including fungal pathogens, are arguably an animal welfare issue. It is facially inhumane to not take precautionary measures to prevent animals from contracting a fast-spreading disease that can cause cardiac arrest and death.[143] However, the AWA is riddled with exemptions that effectively eradicate protection for many animals, including amphibians and farm-raised animals.[144]

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[139] 7 U.S.C. § 2132(g) (defining "animals" to include warm-blooded animals only).
[140] 16 U.S.C. §§1531-1544.
[141] *How CITES Works*, CITES, https://www.cites.org/eng/disc/how.php.
[142] 7 U.S.C. § 8301.
[143] *Supra* Part I.
[144] 7 U.S.C. § 2132(g).

Animal and Plant Inspection Service (APHIS) is within the USDA, and is responsible for administering the AWA.[145] The purpose of the AWA is three-fold: First, to provide humane care and treatment of animals used for the purpose of research, exhibition, or as pets, second to extend that humane treatment throughout transportation in commerce, and third to prevent the sale or use of stolen animals in order to protect the interest of the animal's actual owner.[146]

Businesses that work with animals covered by the AWA must either obtain an AHPIS license or register with AHPIS.[147] Businesses and activities which require licensing include: "dealers" ("pet and laboratory animal breeders and brokers, auction operators, and anyone who sells exotic or wild animals, or dead animals or their parts…"), "exhibitors" ("zoos, marine mammals shows, circuses, carnivals, and promotional and educational exhibits."), and "animal transporters" (specifically "[b]usinesses that contract to transport animals for compensation [because they] are considered dealers.…"[148] Businesses and activities that require AHPIS registration include: "animal transporters" (specifically "general carriers (e.g., airlines, railroads, and truckers)"), and "research facilities" (including "state and local government-run research institutions, drug firms, universities, diagnostic laboratories, and facilities that study marine mammals")).[149] To receive a license, APHIS first inspects the facility to verify that it is complying with its regulations, then the business pays an annual fee to renew the license.[150] For businesses that only require registration with APHIS, the business only undergoes "periodic inspections" to verify compliance to regulations.[151]

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[145] Animal Welfare; Definition of Animal, 69 Fed. Reg. 31513 (June 4, 2004).
[146] 7 U.S.C. § 2131.
[147] Tadlock Cowan, *The Animal Welfare Act: Background and Selected Animal Welfare Legislation* 1-14 (Cong. Res. Serv., 2016), http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RS22493.pdf.
[148] Cowan, *supra* note 127.
[149] *Id*.
[150] *Id*.
[151] Cowan, *supra* note 127.

Under the AWA, the term "animal" includes "any live or dead dog, cat, monkey (nonhuman primate mammal), guinea pig, hamster, rabbit, or such other warm-blooded animal, as the Secretary may determine is being used, or is intended for use, for research, testing, experimentation, or exhibition purposes, or as a pet . . . ."[152] By specifically including "warm-blooded" animals in the definition, the AWA intended to exclude cold-blood animals, such as frogs, from its protection. Even though the agency may expand the definition of an animal, the plain reading of the definition seems to restrict this expansion only to "other warm-blooded animals." This effectively would exclude frogs, other amphibians, reptiles, and fishes from receiving welfare protections.[153]

While the AWA has been amended eight times, amendments are not a surefire method to gaining broader species protections.[154] The AWA of 1970 expanded the protection from dogs and cats in research facilities to all warm-blooded animals used for "experimentation or exhibition."[155] This expansion specifically excluded cold-blooded animals and farm animals from welfare protections.[156] The remaining amendments gained baseline protections for animals used in research and pet trade,[157] prohibited animal fighting,[158] and gained protections for animal

[152] Cowan, *supra* note 127.
[153] 7 U.S.C. § 2132(g)
[154] Animal Welfare Act Amendments of 1970, Pub. L. No. 91-579, 84 Stat. 1560; Animal Welfare Act Amendments of 1976, Pub. L. No. 94-279, 90 Stat. 417; The Improved Standards for Laboratory Animals Act, Pub. L. No. 99-198, 99 Stat. 1649-1650 (1985); Food, Agriculture, Conservation, and Trade Act of 1990, Pub. L. No. 101-624, § 2503, 104 Stat. 4066-4067; Farm Security and Rural Investment Act of 2002, Pub. L. No. 107-171, 116 Stat. 492; Animal Fighting Prohibition Enforcement Act of 2007, Pub. L. No. 110-22, 121 Stat. 88; Food, Conservation, and Energy Act of 2008, Pub. L. No. 110-246, 122 Stat. 1651; Animal Welfare Amendments of 2013, Pub. L. No. 112-261, 126 Stat. 2428 (demonstrating that the AWA was amended in 1970, 1976, 1985, 1990, 2002, 2007, 2008, and 2013).
[155] Animal Welfare Act Amendments of 1970, Pub. L. No. 91-579, 84 Stat. 1560.
[156] *Id.*
[157] The Improved Standards for Laboratory Animals Act, Pub. L. No. 99-198, 99 Stat. 1649-1650 (1985).
[158] Animal Welfare Act Amendments of 1970, Pub. L. No. 91-579, 84 Stat. 1560; Animal Welfare Act Amendments of 1976, Pub. L. No. 94-279, 90 Stat. 417; Food, Agriculture, Conservation, and Trade Act of 1990, Pub. L. No. 101-624, § 2503, 104 Stat. 4066-4067; Pub. L. No. 107-171, 116 Stat. 492; Animal Fighting Prohibition Enforcement Act of 2007, Pub. L. No. 110-22, 121 Stat. 88; Food, Conservation, and Energy Act of 2008, Pub. L. No. 110-246, 122 Stat. 1651; Animal Welfare Amendments of 2013, Pub. L. No. 112-261, 126 Stat. 2428.

owners.[159] Amendments are often pushed by public opinion. Protections for pets and their owners occurred after dogs were being "dognapped" from their yards and improperly sold to research laboratories.[160] The 2008 amendment followed the indictment of National Football League quarterback Michael Vick, who was charged due to dog-fighting related activities.[161] The public may never gain the opinion that cold-blooded animals need welfare protections. The public may not believe that animals produced for human consumption require welfare protections either. While public campaigning and outcry has forced much-needed legislative movement to expanding animal welfare protections, a campaign for increasing welfare rights for non-charismatic microfauna is likely not the most effective or expedient route to preventing global *Bd* spread. Therefore, the AWA is an unlikely solution to this complex problem.

2. The Endangered Species Act

The purpose of the ESA is to "protect and recover imperiled species and the ecosystems upon which they depend."[162] U.S. Fish and Wildlife Services (FWS) and National Marine Fisheries Service (NMFS) administer the ESA, but have jurisdiction over different animals.[163] FWS is primarily responsible for "terrestrial and freshwater organisms," whereas NMFS has jurisdiction over organisms that interact with marine wildlife.[164] Frogs are primarily aquatic, freshwater organisms, they are under FWS's purview. Animal species can be listed as "endangered" or "threatened" to gain protection under the ESA.[165] "Endangered" species are those who are "in danger of extinction throughout all or a significant portion of its range," while

[159] Food, Agriculture, Conservation, and Trade Act of 1990, Pub. L. No. 101-624, § 2503.
[160] Cowan, *supra* note 127.
[161] *Id.*
[162] U.S. Fish & Wildlife Serv., ESA Basics: 40 Years of Conserving Endangered Species 1-2 (2013), https://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf.
[163] *Id.*
[164] *Id.*
[165] *Id.*

"threatened" species are those who are "likely to become endangered within the foreseeable future."[166]

As discussed in Part I, when *Bd* is introduced to new areas, it has wreaked havoc on native species of frogs.[167] It is a fast-spreading disease, and listing a species as "threatened" or "endangered" is not a quick process.[168] Animals are listed species-by-species; consequently, because *Bd* impacts whole families of *Lissamphibia*, it would take a very long time to list all of the species impacted. Review of whether a species can be listed can occur in two ways: through the initiation of a petition to list a species or through an intra-agency determination that a certain species is a "candidate."[169] A proposal is a formal request to list a species.[170] Within 90 days of receiving the petition, FWS must make a finding on whether there is "substantial information" that demonstrates the animal in the petition should receive status review.[171] Within a year, FWS must find whether "listing is warranted." If so, the species may be listed, but if there are species with higher priority, FWS may defer the proposal and add them to the "candidate" list to be reviewed later.[172] The priority system ranks candidate species in order of greatest degree of threat, "immediacy of threat and the taxonomic distinctiveness of the species."[173] FWS must publish notices of review of "candidate" species, which are species the agency believes could fall

[166] U.S. Fish & Wildlife Serv., ESA Basics: 40 Years of Conserving Endangered Species 1-2 (2013), https://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf.
[167] *Supra* Part I.
[168] U.S. Fish & Wildlife Serv., Listing a Species as a Threatened or Endangered Species: Section 4 of the Endangered Species Act 1-2 (2016), https://www.fws.gov/endangered/esa-library/pdf/listing.pdf (showing that a petition to list a species can take more than two-years to get a final rule on whether a species will be listed as endangered, and that a species that FWS declares as a "candidate" species can take over a year to get a finale rule on that species listing status).
[169] *Id.*
[170] *Id.*
[171] *Id.*
[172] *Id.*
[173] *Id.*

within the definition of "threatened" or "endangered."[174] The agency reviews biological information throughout the notices of review period to determine whether a candidate species falls within these definitions.

If a species is listed, the ESA makes it "unlawful for a person to take a listed animal species without a permit."[175] A "take" is defined as any of the following: "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."[176] Hypothetically, the ESA could protect a listed species if this specific scenario occurred: a person actively took *Bd*-infect frogs from the wild, transported these frogs to another area, where they then released these frogs into the wild, where these frogs then infected and already listed frog species with *Bd*. Outside of this specific scenario, the ESA could likely not prevent the spread of *Bd* to new frog populations. The ESA could also only protect captive-bred species of listed frogs if they were found to not be given proper care.[177] Even then, contracting or carrying *Bd* may not be seen as improper care, so it may not trigger ESA protection.

While the ESA provides some great protection against human-induced harm on listed species, listing a species is a long process, and does not attack the problem of disease-spread. As the government reviews what animals should be listed as endangered, amphibians are succumbing to *Bd*.[178] Due to the fast-acting nature of this fungal pathogen, we cannot afford to wait for individual species to gain ESA protection (which may not even protect them from contracting

[174] U.S. Fish & Wildlife Serv., Listing a Species as a Threatened or Endangered Species: Section 4 of the Endangered Species Act 1-2 (2016), https://www.fws.gov/endangered/esa-library/pdf/listing.pdf.
[175] U.S. Fish & Wildlife Serv., ESA Basics: 40 Years of Conserving Endangered Species 1-2 (2013), https://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf.
[176] *Id.*
[177] *Captive Animals*, Animal Legal Defense Fund, https://aldf.org/focus-area/captive-animals/.
[178] Forrest M.R. Brem, *Bd: The Amphibian Plague*, Encyclopaedia Britannica, https://www.britannica.com/topic/Bd-The-Amphibian-Plague-2037002 (citing nine species which have succumbed to Bd).

Bd). The ESA is therefore not the appropriate mechanism to prevent catastrophic declines in amphibian populations from the perils of *Bd* infection.

3. Convention on International Trade in Endangered Species of Wild Fauna and Flora

CITES governs the international trade of endangered flora and fauna species.[179] CITES' purpose is to prevent the overutilization of wild species to protect them from extinction.[180] The United Nations Environment Programme (UNEP) administers CITES, and a Secretariat verifies proper CITES implementation and aids in facilitating proper trade between counties.[181] By joining CITES, countries voluntarily agree to be legally bound to its guidelines.[182] Governments that join CITES are called "Parties."[183] A Party must adopt its own legislation enacting the terms the Party has agreed to[184] and designate a Management Authority and Scientific Authority to ensure that the treaty is properly implemented.[185] The Management Authority issues permits, allowing CITES-listed species to be legally traded.[186] The Scientific Authority, a fact-finding body, decides if trade of a certain species may negatively impact the species' ability to survive in the wild.[187] Currently, there at 183 Parties, including the United States.[188] FWS acts as both the Management Authority and Scientific Authority for the United States; therefore, FWS

[179] *How CITES Works*, CITES, https://www.cites.org/eng/disc/how.php.
[180] *Do I Need a Permit?*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/permits/do-i-need-a-permit.html.
[181] *How CITES Works*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html.
[182] *Conference of the Parties*, CITES, https://www.cites.org/eng/disc/what.php.
[183] *Id.*
[184] *Id.*
[185] *How CITES Works*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html.
[186] *Id.*; *Do I Need a Permit?*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html.
[187] *Id.*
[188] *What is CITES?*, CITES, https://www.cites.org/eng/disc/what.php.

determines whether the trade is legal and if trade would detrimentally impact a species survival in the wild prior to issuing a trade permit.[189]

Like in the regulatory framework under the ESA, there are CITES-listed species that are separated into categories based on trade's impact on the species survival rate.[190] The categories are Appendix I, II, and III.[191] Appendix I protects species that are "threatened with extinction" and only allows trade of these species under "exceptional circumstances." Trade of an Appendix I species requires a permit from both the exporting and importing countries (provided that both countries are CITES Parties).[192] Appendix II protects species that could become threatened with extinction if trade is not regulated and requires a permit from the exporting country.[193] Appendix III is for species that Parties have specifically requested for help to control and only requires a certificate of origin from the exporting country.[194] The majority of species fall into Appendix II.[195] Currently, amphibian species fall under the following categories in the following quantities: in Appendix I, twenty-four species; in Appendix II, 134 species; in Appendix III, four species.[196]

As a comprehensive, international trade agreement, CITES appears to be another promising disease-preventing mechanism. CITES is broader than the AHPA in terms of what types of trade imports and exports it can regulate and how many countries must follow it.

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[189] *How CITES Works*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html.
[190] *Id.*
[191] *Id.*
[192] *How CITES Works*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html; *Do I Need a Permit?*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/permits/do-i-need-a-permit.html.
[193] *How CITES Works*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html; *Do I Need a Permit?*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/permits/do-i-need-a-permit.html.
[194] *How CITES Works*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html; *Do I Need a Permit?*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/permits/do-i-need-a-permit.html.
[195] *How CITES Works*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/cites/how-cites-works.html.
[196] *Id.*

Amphibian trade is a global issue, and amphibians are introduced into trade for far more reasons than human consumption. These factors make CITES *seem* like the best option for protecting amphibians across the globe from *Bd.* However, CITES' permitting process still allows Parties to trade species, so long as the Parties comply to the permitting requirements.[197] As long as a Party's Management and Scientific Authorities agree that the specific instance of trade is legal and will likely not detrimentally impact that specific species' survival in the wild, a permit will likely be issued.[198] As stated in Part I, carrier species of *Bd* may not succumb to the pathogen, but instead act as vectors for spreading the disease to other vulnerable frog populations.[199] The Scientific Authority is concerned with how the trade of a species would impact wild populations of the traded species, specifically; it does not necessarily look at how the trade of that species could impact other related populations in an importing Party's borders. The purpose of CITES is not to prevent disease-spread, but to ensure that wild species are not being overutilized or over-captured in a way that could threaten extinction.[200]

CITES also focuses narrowly on wild species, so captive-bred amphibians could not benefit from the CITES protections.[201] Further, CITES enforcement poses an issue. Each Party to the agreement adopts its own implementing legislation, that enables the Party to implement and enforce the treaty.[202] The ESA is the United States' implementing and enforcement legislation (and we have already discussed the ESA and its short comings for preventing Bd-

[197] *Do I Need a Permit?*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/permits/do-i-need-a-permit.html.
[198] *Id.*
[199] *Supra* Part I.
[200] *Do I Need a Permit?*, U.S. Fish & Wildlife Serv., https://www.fws.gov/international/permits/do-i-need-a-permit.html.
[201] *What is CITES?*, CITES, https://www.cites.org/eng/disc/what.php.
[202] *FAQs about CITES*, Humane Society International, https://www.hsi.org/news-media/faqs_about_cites/.

spread).[203] For international trade, Parties may cooperate with each other and may work with the International Criminal Police Organization (Interpol) to preventing illegal trade.[204] However, this is a remedy for illegal—not legal—trade, and is not mandatory.[205] Ultimately, CITES may play an important role for preventing the global spread of *Bd*, but it is not currently the most efficient way to safeguard the United States' vulnerable amphibian populations.

CONCLUSION

Using current legislation that relies on the discretion of the USDA to implement a regulation on trade may be the most efficient response to immediately address this large-scale problem of global amphibian collapse. Captive-bred frogs are a likely vector for disease, and the frogs that do not die from *Bd* host it instead, and communicate it to healthy populations. If contaminated frogs in trade escape captivity, or their carcasses, their parts, or the water they are stored in are improperly disposed of, *Bd* is released into our environment. Consequently, an AHPA regulation on frogs, their legs, and the water they are transported in is an appropriate measure to stem the spread of *Bd*.

Importantly, the USDA order does not have to be 100% effective to be an appropriate use of the agency's discretion.[206] A regulation on farm-raised frogs, bred specifically for human consumption, may only be one piece of the puzzle in the fight against *Bd*-spread but, as recent studies show, susceptible amphibian populations may be running out of time. The AHPA prevents disease spread and introduction of pests from imports and exports amongst livestock.[207] Farm-raised frogs should be included within the definition of "livestock," *Bd* should be

[203] *FAQs about CITES*, Humane Society International, https://www.hsi.org/news-media/faqs_about_cites/.
[204] *Id.*
[205] *Id.*
[206] R-CALF II, 415 F.3d 1078, 1094 (2005).
[207] 7 U.S.C. § 8301.; Jan Cynthia Graham, *Snakes of a Plain, or in a Wetland: Fighting Back Invasive Nonnative Animals—Proposing A Federal Comprehensive Invasive Nonnative Animal Species Statute*, 25 TLNELJ 19 (2011).

considered as a "pest," and imported frog parts and their shipping water should be considered "articles" under the AHPA. Including farm-raised frogs, *Bd*, frog parts and their water in these definitions may provide disease protection to amphibians in trade at the federal level. Expanding these definitions would utilize existing legislation instead of relying on Congress to pass a new disease-preventing statute. Doing so is within the USDA's power and conforms to the purpose of the statue.[208] This is a necessary step in safeguarding the United States' farm-raised frogs, and preventing catastrophic disease spread in wild frog populations.

[208] 7 U.S.C. § 8301.