SAVING SPECIES OR SACRIFICING SCIENCE?: NAVIGATING THE LEGAL LABYRINTH OF RESEARCH AND CONSERVATION THROUGH THE CASE OF THE LONG-TAILED MACAQUE

By
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For decades, long-tailed macaques have served an instrumental role in advancing biomedical research. However, due to the recent primate shortage in U.S. laboratories, these macaques have become coveted targets for poachers. In 2022, the International Union for Conservation of Nature (IUCN) elevated the long-tailed macaque's threat level from "Vulnerable" to "Endangered," citing research-related capture as a critical factor contributing to their decline. Under this new status, long-tailed macaques are at risk of being categorized under Appendix I of CITES, a designation that will subject them to stricter trade regulations. Alarmed by the potential obstacles this reclassification may pose to scientific research, the National Association for Biomedical Research (NABR) petitioned against the IUCN's assessment of the long-tailed macaque status. Joining the ranks of horseshoe crabs and chimpanzees, the long-tailed macaque finds itself embroiled in an ethical dilemma only science can resolve.

While sympathetic to the NABR's concerns, this Article argues the true threat to scientific progress lies in the IUCN reverting the long-tailed macaque's conservation status to Vulnerable. Presently listed under Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), States are obligated to regulate the long-tail macaque's trade within their jurisdictions. However, local laws often fall short in protecting these animals, particularly as human-macaque conflicts breed resentment toward the species. Capitalizing on the long-tailed macaques' domestic vulnerability and premium international price tag, poachers have resorted to using falsified CITES permits to capture and sell wild macaques to research laboratories. In light of their rapid decline, this Article advocates

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for heightened protection under CITES for long-tailed macaques to incentivize stronger domestic and international regulations. Furthermore, by aligning the biomedical industry's objectives with those of conservationists, this Article proposes legal strategies grounded in domestic and international law that the research sector can utilize to advance scientific progress while saving a species vital to its success.

I. INTRODUCTION: WHEN SCIENCE AND CONSERVATION COLLIDE

As NASA's Voyager 1 spacecraft departed the solar system on February 14, 1990, it left behind a Valentine's Day gift that captured the hearts of stargazers worldwide.[1] Featuring Earth nestled in the sunbeams of its final photograph to NASA, Voyager 1 documented the view of our planet from six billion kilometers away.[2] Approximately the size of one pixel, this image—famously known as *Pale Blue Dot*—presents one of the few glimpses humanity has received of our place in the cosmos, serving as a poignant reminder of Earth's unique position in this vast universe.[3] Surrounded by darkness, the sense of perspective evoked by

[1] *Voyager 1's Pale Blue Dot*, NASA, https://solarsystem.nasa.gov/resources/536/voyager-1s-pale-blue-dot/ (accessed Feb. 4, 2024).

[2] *Id.*

[3] *Id.*

the *Pale Blue Dot* emphasizes how lonely humankind's existence is. Yet, as Carl Sagan writes, "There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world . . . it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known."[4]

By highlighting this world's exclusive capacity to host life, *Pale Blue Dot* calls attention to humankind's exclusive duty to protect it. Mindful of this responsibility, humans developed sets of international rules and regulations to preserve Earth's ecosystems.[5] Treaties such as the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the World Heritage Convention recognize the mutualistic connection humans have with the natural environment.[6] These international instruments also celebrate how Earth's natural wonders inspire humanity's social and scientific advancements.[7]

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[4] CARL SAGAN, PALE BLUE DOT: A VISION OF THE HUMAN FUTURE IN SPACE 9 (1994).

[5] *See generally* Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 143 [hereinafter CBD] (requiring contracting nations to fulfill a series of obligations in furtherance of conserving biological diversity); Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 244 [hereinafter CITES] (imposing regulations on contracting parties related to the international trade of certain species to protect biodiversity and ecosystems); Convention for the Protection of the World Cultural and Natural Heritage, Nov. 16, 1972, 27 U.S.T. 37, 1037 U.N.T.S. 152 [hereinafter World Heritage Convention] (imposing various responsibilities upon contracting nations to protect and conserve their national heritage, with "natural heritage" including the "habitat of threatened species of animals and plants of outstanding universal value from the point of science or conservation"); Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Mar. 22, 1989, 1673 U.N.T.S. 126 (detailing regulations to govern the transboundary movement of hazardous wastes by recognizing the environmental hazards posed by such wastes); Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, 1973, Feb. 17, 1978, 1340 U.N.T.S. 62 [hereinafter MARPOL 73/78] (outlining various marine regulations on contracting bodies to mitigate environmental degradation from ships, particularly oil tankers). The newest set of regulations involve guidelines protecting marine life in the high seas. General Assembly, Draft agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, A/CONF.232/2023/CRP.2/Rev.1 (Apr. 14, 2023).

[6] CBD, *supra* note 5, pmbl., at 143 ("*Conscious also* of the importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere . . . "); CITES, *supra* note 5, pmbl., at 244 ("Recognizing that wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the natural systems of the earth . . . "); World Heritage Convention, *supra* note 5, pmbl., at 153 ("Considering that parts of the cultural or natural heritage are of outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole . . . ").

[7] CBD, *supra* note 5, pmbl., at 145 ("*Noting* that, ultimately, the conservation and sustainable use of biological diversity will strengthen friendly relations among States and contribute to peace for humankind . . . "); CITES, *supra* note 5, pmbl., at 244 ("Conscious of the ever-growing value of wild fauna and flora from aesthetic, scientific, cultural, recreational and economic points of view . . . "); World Heritage Convention, *supra* note 5, art. 2, at 153–54 (acknowledging the importance of natural heritage sites that

Despite the interdependent role of biodiversity in human evolution,[8] pressure surfaces when anthropological demands supersede humanity's moral obligations to nature. Dating back to antiquity, environmental concerns have often been overshadowed by commercial profits, community needs, or individual gains.[9] In recent years, challenges arising from climate change have further exacerbated this rift as land on Earth becomes increasingly uninhabitable.[10] With resources dwindling and livelihoods at stake, the tension between human and nonhuman interests is approaching a pivotal moment. Furthermore, scientific literature continues to reaffirm both that preserving global biodiversity is key to human survival[11] and that science itself remains one of the last bastions to support such progress.

But what becomes of this progress when scientific pursuits conflict with conservation efforts? On September 11, 2023, the National Association for Biomedical Research (NABR) confronted the International Union for Conservation of Nature (IUCN) with this very question in the case of the long-tailed macaque.[12] For decades, long-tailed macaques have served an instrumental role in advancing biomedical research, including in regulatory approval tests for the COVID-19

"are of outstanding universal value" from the point of view of science, conservation, or natural beauty).

[8] U.S. National Research Council Committee on Research Opportunities in Biology, *Evolution and Diversity* in Opportunities in Biology (1989).

[9] *See* Phoebe Weston, *Humans v Nature: Our Long and Destructive Journey to the Age of Extinction*, The Guardian (Nov. 25, 2022), https://www.theguardian.com/environment/2022/nov/25/cop15-humans-v-nature-our-long-and-destructive-journey-to-the-age-of-extinction-aoe (accessed Feb. 5, 2024) (describing paleontologists' theory that human-led overharvesting of megafauna drove the latter species to extinction, prompting humanity to adopt agriculture as a means to replace the depleted food source); *See, e.g.* Christopher C. Joyner & Jeanene M. Mitchell, *Regulating Navigation through the Turkish Straits: A Challenge for Modern International Environmental Law*, 17 Int'l J. Marine & Coastal L. 521, 523–26 (2002) (investigating "the political problems and inadequacies of the current Turkish Straits navigation regime," which highlights State concerns regarding the balance between commercial and environmental interests).

[10] IPCC, Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II, and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change 98 (H. Lee & J. Romero eds., 2023) ("Vulnerability to climate change for ecosystems will be strongly influenced by past, present, and future patterns of human development, including from unsustainable consumption and production, increasing demographic pressures, and persistent unsustainable use and management of land, ocean, and water.").

[11] *See, e.g.,* Judith Perhay, *The Natural Step: A Scientific and Pragmatic Framework for a Sustainable Society*, 33 S.U.L. Rev. 249, 255–56 (2006) (describing biodiverse ecosystems as a condition precedent to creating a healthy and sustainable society).

[12] *Red List Petitions*, Int'l Union for Conservation of Nature and Nat. Res., https://www.iucnredlist.org/resources/petitions (accessed Feb. 9, 2024) [hereinafter IUCN]; *See also* Press Release, Nat'l Ass'n for Biomedical Rsch., NABR Files Petition Challenging the Listing of Long-Tailed Macaque by the IUCN (June 15, 2023) [hereinafter *NABR Letter*] (challenging the listing of the long-tailed macaque as an endangered species).

vaccine.[13] However, recent years have witnessed a precipitous decline in the species' populations, particularly in range states such as Cambodia, Vietnam, and Laos.[14] Moreover, the current primate shortage in U.S. laboratories has exacerbated threats to their existence, with long-tailed macaques becoming coveted targets for poachers.[15] This increase in trafficking value—in conjunction with habitat loss and escalating human-macaque conflicts—has intensified the suffering commercial exploits have inflicted upon long-tailed macaques.[16]

On March 7, 2022, the International Union for Conservation of Nature (IUCN) released its latest report on the long-tailed macaque's conservation status.[17] In its assessment, the IUCN voiced apprehension over the macaques' population levels due to the species' inflated demand in international trade.[18] Notably, the IUCN cited research-related capture as a critical factor contributing to the long-tailed macaque's decline.[19] As a result of these findings, the IUCN raised the long-tail macaque's status from "Vulnerable" to "Endangered,"[20] stirring debate around the potential this new listing introduces for heightened domestic and international protections. Under this new status, long-tailed macaques are at risk of being placed on Appendix I of CITES, a designation that will strictly regulate the species' trade.[21] Alarmed by the obstacles this reclassification may pose to biomedical research, the NABR—a U.S.-based animal testing advocacy group—petitioned against the IUCN's assessment of the long-tailed macaques' status.[22] joining the ranks of horseshoe crabs and chimpanzees, the long-tailed

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13 Andrew Lehren, et al., *How the Race for a COVID Vaccine Enriched Monkey Poachers and Endangered Macaques*, PULITZER CTR. (Dec. 19, 2022), https://pulitzercenter.org/stories/how-race-covid-vaccine-enriched-monkey-poachers-and-endangered-macaques (accessed Feb. 9, 2024).

14 *See* Lief Erikson Gamalo et al., *Removal from the Wild Endangers the Once Widespread Long-Tailed Macaque*, AM. J. PRIMATOLOGY (2023) (analyzing the rate of decline in Cambodian, Vietnamese, and Lao populations within the past decade).

15 *America Has a Shortage of Lab Monkeys*, THE ECONOMIST (July 8, 2023), https://www.economist.com/united-states/2023/07/06/america-has-a-shortage-of-lab-monkeys (accessed Feb. 9, 2024) (describing that shortages in U.S. laboratories "forced American companies to rely on less scrupulous South-East Asian suppliers").

16 Dayton Martindale, *The US Uses Endangered Monkeys to Test Drugs. This Law Could Free Them*, VOX (Jan. 31, 2024), https://www.vox.com/future-perfect/24055003/long-tailed-macaques-biomedical-testing-ozempic-covid-endangered-species-act-cambodia (accessed Feb. 9, 2024).

17 M.F. Hansen et al., *Macaca fascicularis* in THE IUCN RED LIST OF THREATENED SPECIES (2022) [hereinafter *Macaca fascicularis Red List*].

18 *Id.* at 2.

19 See *id.* at 10 (explaining that conservation groups in Indonesia, the Philippines, and Vietnam have cited research-related capture as a specific concern for population decline in their territories. Cambodia, however, cites deforestation as the main threat).

20 *Id.* at 3.

21 CITES, *supra* note 5, art. II(1) at 245.

22 *NABR Letter, supra* note 12.

macaque finds itself embroiled in an ethical dilemma only science can resolve.[23]

While sympathetic to the NABR's concerns, the true threat to scientific progress lies in the IUCN reverting the long-tailed macaque's conservation status to Vulnerable. Presently listed under Appendix II of CITES, States are obligated to regulate the long-tail macaque's trade within their jurisdictions.[24] However, local laws often fall short in protecting these animals, particularly as human-macaque conflicts breed resentment toward the species among range states' populations.[25] Habitat loss further amplifies the long-tailed macaque's persecution as the species is forced to scavenge food in residential and tourist locations.[26] Capitalizing on the long-tailed macaques' domestic vulnerability and premium international price tag, poachers have resorted to using falsified CITES permits to capture and sell wild macaques to research laboratories.[27] To combat this, this Article argues that listing the long-tailed macaque as Endangered will incentivize stronger domestic and international regulations, thereby giving the species a fair chance at survival.

Part II of this Article delves into the history of animal testing as it relates to the conservation of endangered species. Part III explores the dilemma surrounding conservation efforts to preserve the long-tailed macaque, including the impacts human-macaque conflicts and increased international demand have had on their populations. Part IV examines the legal framework protecting endangered animals, including CITES regulations and the IUCN classification process, and advocates that the highest level of protection be afforded to the long-tailed macaque. Additionally, Part IV dissects a past IUCN petition to inform the concerns brought forward in the current NABR petition. Part V illustrates how the biomedical industry's objectives align with conservationists' desire to implement stricter regulations on long-tailed macaque trade. Part V

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[23] *See* Sami B. Ghubril, *Saving the Horseshoe Crab: The Case for the Oft-Forgotten, Critically Important Living Fossil*, 37 VA. ENV'L. L.J. 272, 278 (2019); *See also* Patricia V. Turner, *The History of Chimpanzees in Biomedical Research, in* NONHUMAN PRIMATE WELFARE 32 (Lauren M. Robinson & Alexander Weiss eds., 2023).

[24] *See* CITES, *supra* note 5, art. IV at 247 (requiring Parties to ensure all findings required under Article IV can be made prior to exporting Appendix II species). CITES Article VIII further requires Parties to take domestic measures prohibiting the illegal trade of CITES-listed species and to enforce the provisions of the Convention. *Id*., art. VIII.

[25] Wanda Kuswanda, Freddy Jontara Hutapea & Titiek Setyawati, *The Endangered Long-Tailed Macaque is Considered a Pest in North Sumatra, Indonesia*, 57 ORYX 9, 12 (2023).

[26] *See Long-Tailed Macaques*, 40 BORN FREE, https://www.bornfree.org.uk/animals/long-tailed-macaques/ (accessed Feb. 20, 2024) (explaining that habitat loss has caused long-tailed macaques into man-made environments).

[27] *Feds Charge 8 with Smuggling Endangered Monkeys into U.S., Including Cambodian Wildlife Official*, CBS NEWS (Nov. 18, 2022), https://www.cbsnews.com/amp/news/eight-smuggling-endangered-monkeys-long-tailed-macaques-into-us/ (accessed Feb. 10, 2024).

further identifies potential domestic and international strategies the industry may leverage to ensure the long-tailed macaques' preservation while protecting industry standards. Part VI concludes by underscoring the necessity for collaboration between commercial researchers and conservationists to ensure the survival of both endangered species and science itself.

II. THE HISTORY: ENDANGERED SPECIES IN RESEARCH

Endangered and trade-restricted species have long been used in medicine to treat illnesses ranging from cancer to toothaches and asthma.[28] In traditional Chinese medicine (TCM), for example, derivatives from endangered animals such as pangolins have been used in homoeopathic treatments for thousands of years.[29] In India, one of the most biodiverse countries on the planet, age-old Ayurvedic medical practices are contributing to the decline of over 90% of medicinal plants native to the region.[30] Likewise in the Balkans, European folk remedies have led to a critical reduction in the area's local flora.[31] And worldwide, commercial exploitation has severely diminished the reptilian and amphibian populations that spiritualists revere for their healing properties.[32]

The problem of this illegal trade has not gone unnoticed in traditional healing circles. Practitioners have opined on the consequences poaching imposes upon their respective ancient practices; for instance,

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[28] Zoe Cormier, *The Life-Saving Medicines Inspired by Animals*, BBC (May 7, 2020), https://www.bbc.com/future/article/20200507-medicines-and-drugs-from-animals-venom (accessed Feb. 11, 2024); ANDREA GASKI & KURT JOHNSON, PRESCRIPTION FOR EXTINCTION: ENDANGERED SPECIES AND PATENTED ORIENTAL MEDICINE IN TRADE ix (1994).

[29] *See generally* WANG ZHENGUO, ET AL., HISTORY AND DEVELOPMENT OF TRADITIONAL CHINESE MEDICINE (1999) (detailing the development of traditional Chinese medicine throughout history). *See also* Amy E. Vulpio, *From the Forests of Asia to the Pharmacies of New York City: Searching for A Safe Haven for Rhinos and Tigers*, 11 GEO. INT'L ENV'T. L. REV. 463, 464 (1999) (describing how ingredient derivations for TCM remedies have pushed tiger and rhino populations to extinction). To understand the extent to which pangolin trafficking has threatened the species, *see generally* Mary-Ann O. Ajayi, *Pangolin Trafficking in Nigeria in the Face of Wildlife Laws*, 1 LAW & SOCIAL JUSTICE REV. (LASJURE) 53 (2020). *See further* K. B. Oyende, *Regulating the Protection of Wildlife: Case for the Local Enforcement of CITES with Regard to Conservation, Poaching and Medicinal Use of Pangolins in Nigeria*, 13 NNAMDI AZIKIWE U. J. INT'L L. & JURIS. 103 (2022).

[30] R. Gowthami et al., *Status and Consolidated List of Threatened Medicinal Plants of India*, 68 GENETIC RES. & CROP EVOLUTION 2235, 2241 (2021) (citing Kumari et al., *Diversity and Status of Ethno-Medicinal Plants of Almora District in Uttarakhand, India*, 3(7) INT'L J. OF BIODIVERSITY & CONSERVATION 298, 298 (2011)).

[31] Susan Langthorp, *Saving Europe's Medicinal Plants from Extinction*, HORIZON: THE EU RSCH. & INNOVATION MAG. (Oct. 7, 2021), https://ec.europa.eu/research-and-innovation/en/horizon-magazine/saving-europes-medicinal-plants-extinction (accessed Feb. 11, 2024).

[32] *See* Rômulo Romeu Nóbrega Alves et al., *Herpetofauna Used in Traditional Folk Medicine: Conservation Implications*, ANIMALS IN TRADITIONAL FOLK MED. 109 (2012); TRAFFIC FOR THE EUROPEAN COMM'N., AN OVERVIEW OF SEIZURES OF CITES-LISTED WILDLIFE IN THE EUROPEAN UNION (2020).

eco-minded TCM experts admonish the illicit use of endangered species for medicinal remedies.[33] Some practitioners argue that overexploitation defies TCM's core tenets—one of which is to be in "balance with nature"—while jeopardizing the community's reputation.[34] Nevertheless, with the popularization of homeopathic remedies,[35] traditional medicine poses risks to endangered species that compound existing perils from climate change, overhunting, and research-related capture.

Much like traditional medicine, the use of endangered species in biomedical research carries a contentious history.[36] Beginning in the 1920s, great apes such as chimpanzees were utilized as subjects for early animal models due to their genetic similarities to humans.[37] As pharmaceutical research expanded, chimpanzees were used to screen a myriad of drug treatments for safety concerns, including treatments for HIV during the AIDS epidemic.[38] Prior to this, chimpanzees served as test subjects for cognitive and behavioral research.[39] While trade of the species peaked in the 1960s,[40] tests on chimpanzee models frequently failed replication in humans due to the inherent differences in disease resistance between the two species.[41]

With the accelerated use of chimpanzees in research came their accelerated population decline in the natural world. Wild chimpanzee populations dropped from hundreds of thousands of members to a

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33 Michael Standaert, *"This Makes Chinese Medicine Look Bad": TCM Supporters Condemn Illegal Wildlife Trade*, THE GUARDIAN (May 26, 2020), https://www.theguardian.com/environment/2020/may/26/its-against-nature-illegal-wildlife-trade-casts-shadow-over-traditional-chinese-medicine-aoe (accessed Feb. 11, 2024).

34 *Id.*

35 Farah Master, *As China Pushes Traditional Medicine Globally, Illegal Wildlife Trade Flourishes*, REUTERS (Mar. 27, 2019), https://www.reuters.com/article/us-china-tcm-idUSKCN1R90D5 (accessed Feb. 11, 2024).

36 *See generally* IUCN, RESOLUTIONS AND RECOMMENDATIONS (2012) (recognizing the socio-economic importance of use in some species while also calling for more protections).

37 KATHLEEN M. CONLEE, *Chimpanzees in Research and Testing Worldwide: Overview, Oversight and Applicable Laws,* in 6TH WORLD CONGRESS ON ALTERNATIVES & ANIMAL USE IN THE LIFE SCIENCES: PROCEEDINGS 111, 111 (2007); *See* NAT'L. RSCH. COUNCIL, *Benefits Derived from the Use of Animals* in USE OF LABORATORY ANIMALS IN BIOMEDICAL AND BEHAVIORAL RESEARCH (1988) (discussing the use of nonhuman primates in animal studies).

38 KATHLEEN M. CONLEE & SARAH T. BOYSEN, *Chimpanzees in Research: Past, Present, and Future* in THE STATE OF ANIMALS III 119, 121-22 (Salem & Rowan eds., 2005).

39 *Id*. at 135. Their use extended as far as U.S. military operations, with the U.S. Air Force experimenting on wild-caught chimpanzees to study the effects of space flight on the human body. *Id.* at 121.

40 Malene Hansen et al., *Monetary Value of Live Trade in a Commonly Traded Primate, The Long-tailed Macaque, Based on Global Trade Statistics*, 3 FRONTIERS IN CONSERVATION SCI. 1 (2022) [hereinafter *Monetary Value*].

41 Aysha Akhtar, *The Flaws and Human Harms of Animal Experimentation*, 24 CAMBRIDGE Q. HEALTHCARE ETHICS 407, 412-13 (2015) (observing that in some treatments, positive outcomes in chimpanzee models have led to adverse outcomes in human consumers).

fraction of that within the past century.[42] Although these populations diminished for reasons largely unrelated to research-capture,[43] the IUCN's Primate Specialist Group reported an 80% population decrease in the past twenty-five years alone.[44] In light of this rapid decline, the IUCN designated chimpanzees as Endangered in 1996.[45] Yet, despite their precarious numbers, captive chimpanzees only recently received endangered status under U.S. law.[46] The delay was due in part to the federal government's concern that listing chimpanzees as endangered would burden scientific research.[47]

Another species central to biomedical research is the horseshoe crab. In the 1930s, researchers began using wild-caught horseshoe crabs to better understand the biological characteristics of vision.[48] Following the horseshoe crab's introduction to the field, biomedical scientists discovered another function for these animals: endotoxin detection.[49] The endotoxin test derived from horseshoe crab blood quickly replaced the previous rabbit test, settling the species' role within the industry as a useful proxy for research applications.[50]

Although its populations are not as threatened as chimpanzees, wild horseshoe crabs have experienced modest declines in their native regions, leading experts to identify the species as "particularly vulnerable to extinction."[51] Regardless, the biomedical industry drained blood from over 700,000 crabs in 2021, marking the highest harvest since conservationists started tracking the species in 2004.[52] And unlike the case for chimpanzees, the population decline of horseshoe crabs is directly related to the importance of their use in scientific research.[53]

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42 Michelle Ann Peters, *The Convention on International Trade in Endangered Species: An Answer to the Call of the Wild?*, 10 CONN. J. INT'L L. 169, 172 (1994).

43 T. HUMLE ET AL., THE IUCN RED LIST OF THREATENED SPECIES, PAN TROGLODYTES (2018).

44 MIKE APPLETON ET AL., THE ARRC TASK FORCE OF THE IUCN SSC PRIMATE SPECIALIST GRP., MOYEN BAFING NATIONAL PARK AS AN OFFSET FOR CHIMPANZEES: ECOLOGICAL AND FINANCIAL CONSIDERATIONS 8 (2021).

45 HUMLE ET AL., *supra* note 43, at 2.

46 Sara Reardon, *U.S. Government Gives Research Chimps Endangered-Species Protection*, NATURE (June 12, 2015), https://www.nature.com/articles/nature.2015.17755 (accessed Feb. 11, 2024).

47 *See* Darryl Fears, *NIH Ends Era of U.S. Medical Research on Chimpanzees,* WASH. POST (Nov. 19, 2015, 2:42 PM) https://www.washingtonpost.com/news/energy-environment/wp/2015/06/12/chimps-just-got-major-new-protection-from-medical-researchers/ (accessed Feb. 19, 2024).

48 Ghubril, *supra*, note 23 at 275.

49 *Id.*

50 *Id*. at 276–277.

51 SMITH ET AL., THE IUCN RED LIST OF THREATENED SPECIES, LIMULUS POLYPHEMUS (2016).

52 Chiara Eisner, *Coastal Biomedical Labs are Bleeding More Horseshoe Crabs with Little Accountability*, NPR (June 30, 2023, 12:00 PM), https://www.npr.org/2023/06/10/1180761446/coastal-biomedical-labs-are-bleeding-more-horseshoe-crabs-with-little-accountabi (accessed Feb. 11, 2024).

53 *Id*.

While conservation efforts and animal welfare reforms have led to federal agencies demonstrating support for alternatives to animal models,[54] the introduction of genetically modified animal technology has reinvigorated the use of animals in modern medicine.[55] Indeed, animal testing remains a staple preclinical procedure in drug development and applied research in the pharmaceutical and biomedical industries. In 2020, the United Kingdom's Home Office documented 2.8 million animal procedures completed; of these tests, more than half were for experimental research purposes.[56] Over the past three years, countries and intergovernmental organizations have implemented policies that signify movement toward animal model alternatives, denoting a shift away from the practice altogether.[57] Notwithstanding such advancements, however, endangered species continue to serve science in capacities that frequently threaten their very existence.

III. THE DILEMMA: PROTECTING THE LONG-TAILED MACAQUE

The long-tailed macaque has become the new animal model to replace great apes in biomedical experiments, with primatologists classifying them as the predominant primate taxon used for modern research.[58] While their prevalence in scientific research sharply increased in the last few years, their presence in the biomedical industry has existed for decades. Biomedical exports of long-tailed macaques originated in Indonesia during the early 1970s.[59] Indonesia established macaque breeding operations in 1987,[60] with Cambodia and Laos following in 2004.[61] As long-tailed macaques' popularity grew, more trapping permits were distributed, allowing hunters to capture the species for

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[54] Mikalah Singer & Paul Locke, *Better Science, Fewer Animals: Catalyzing NIH Grant Making to Improve Biomedical Research and Meet Societal Goals*, 29 ANIMAL L. 65, 71-72 (2023).

[55] Lewis B. Kinter et al., *A Brief History of Use of Animals in Biomedical Research and Perspective on Non-Animal Alternatives*, 62 INST. FOR LAB'Y ANIMAL RSCH. J. 7, 9, 10 (2021).

[56] HOME OFF., ANNUAL STAT. OF SCI. PROC. ON LIVING ANIMALS, GREAT BRITAIN 1 (2020).

[57] U.S. EPA, EPA NEW APPROACH METHODS WORK PLAN (2021); European Parliament, Resolution 2021/2784(RSP) (2021).

[58] Malene Hansen et al., *Conservation of Long-tailed Macaques: Implications of the Updated IUCN Status and the COVID-19 Pandemic*, 35 PRIMATE CONSERVATION 1, 5 (2021) [hereinafter *Macaques Conservation*].

[59] *Id*.

[60] *Id*.

[61] Species Survival Network, *Selection of the Long-Tailed Macaque (Macaca fascicularis) for Inclusion in the Review of Significant Trade*, Resolution Conf. 12.8 (July 18–22, 2011), § 2.2.1 at 10. However, scholars have noted the countries' premature export timelines raise concerns on whether Cambodia and Laos have been delivering wild-caught macaques to purchasers, including research labs. *Id*. The consequences of this practice on scientific research are grave. *See infra*, Part V(A).

breeding purposes.[62] Beginning in the 1990s, countries began requesting proof of origin documents from exporters, preferring captive-bred species to wild-caught.[63] Now, captive-bred macaques comprise a majority of the individuals legally traded among the species, with breeding facilities having sold over 475,000 live macaques from 2010 to 2019. [64]

Although the long-tailed macaque provided researchers with an alternative model organism for animal testing, the species' popularity within scientific communities decreased alongside chimpanzees' as international markets tightened primate trade policies.[65] Prior to 2019, demand for live long-tailed macaques was at an all-time low.[66] In 2012, the CITES trade database recorded a mere 207 individual macaques traded worldwide.[67] Demand steadily grew in the years after, with the United States importing approximately 70,000 macaques annually from range states such as Vietnam and Cambodia.[68]

After 2020, however, demand for the long-tailed macaque climbed sharply after China—the macaque's top exporter—banned its trade during the COVID-19 pandemic.[69] Soon after, the price of the long-tailed macaque increased ten-fold.[70] Among the eighty-two million animals traded within the exotic wildlife industry from 2012 to 2020, the long-tailed macaque emerged as the second most valuable.[71] In 2022, a single macaque sold for nearly $24,000 on the international market.[72] That same year, the IUCN raised the long-tailed macaque's conservation status to Endangered due to its rapid population decline. Its assessment noted that high demand for long-tailed macaques in laboratories poses significant threats to wild populations.[73] Specifically, the IUCN stated "the legitimate and illicit trade for research and other usages" encourages the species' persecution by traffickers.[74] The IUCN

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62 *Id*.

63 Chris Shepherd, *Illegal Primate Trade in Indonesia Exemplified by Surveys Carried Out Over a Decade in North Sumatra*, 11 ENDANGERED SPECIES RSCH. 201, 202 (2010).

64 *Monetary Value*, *supra* note 40, at 2-3, 4.

65 T. Sayektiningsih & B. Broto, *An Overview of International Trade of Macaca fascicularis from Indonesia Based on the CITES Trade Database*, 914 IOP CONF. SERIES: EARTH & ENVIRON. SCI. 012013, 012015 (2021).

66 *See Id.* (In 2015, 2016, 2017, and 2018, live macaques made up approximately 0% of global exports).

67 *Id.* at 012014.

68 Phoebe Weston, *$20,000 Monkeys: Inside the Booming Illicit Trade for Lab Animals*, THE GUARDIAN (Dec. 7, 2023, 5:00 AM), https://www.theguardian.com/environment/2023/dec/07/how-the-demand-for-lab-monkeys-is-driving-trade-in-endangered-macaques-aoe (accessed Feb. 10, 2024).

69 *Id*.

70 *Id.* Prior to the pandemic, long-tailed macaques sold for approximately $2,000 to $5,000 across all markets. *Id.* After the pandemic, the price of one long-tailed macaque rose steeply, selling for as much as $20,000 to research facilities. *Id.*

71 CITES, *World Wildlife Trade Report* 35, CoP19 Inf. 24 (Nov. 14–25, 2022).

72 Weston, *supra* note 68.

73 *Macaca fascicularis Red List*, *supra* note 17, at 2–3.

74 *Id.*

emphasized the significance of these trends to the species' viability "given that primate species are well-documented to be sensitive to heavy hunting pressures . . ."[75]

On a broader scale, however, the current debate around long-tailed macaques is subsumed by the larger conflict between anthropological and environmental interests. In the center of that conflict lies a struggle for resources and competitive advantage, a battle which motivates many endangered species' illegal trade.[76] There also exist overarching ethical concerns around the wild capture of nonhuman primates, which the European Union acknowledges is "highly stressful for the animals concerned and carries an elevated risk of injury and suffering during capture and transport."[77] Despite these issues, research facilities have yet to substitute the use of long-tailed macaques in animal testing models.

A. HUMAN-MACAQUE CONFLICTS AND POPULATION DECLINE

One confirmed reason for the long-tailed macaques' decline is the destruction of their native lands through deforestation and habitat conversion.[78] For millennia, long-tailed macaques have inhabited a variety of ecosystems across Southeast Asia.[79] A species with few natural predators, long-tailed macaques are among the most adaptable animals to withstanding anthropogenic encroachment, maintaining relatively stable numbers prior to 1996.[80] Over the course of twenty years, however, macaque habitats have undergone substantial destruction.[81] Once native to Bangladesh, the IUCN declared the species extinct in the range state after researchers failed to locate a single macaque in the region.[82] Experts cite the removal of mangrove forests by the farming and livestock industry as the main reason for the macaques' disappearance.[83]

As their natural habitats shrink, long-tailed macaques are pushed into human-occupied pockets within agricultural lands, urban settings, and temple grounds, which increases the likelihood of their persecution.[84] In search of food, long-tailed macaques raid crops, tourist

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75 *Id.* at 3.

76 *Id.*

77 Council Directive 2010/63/EU, 2010 O.J. (L 276) 33, 35 (EU).

78 Rafiqul Islam, *Habitat Loss Drove Long-Tailed Macaques Extinct in Bangladesh, Experts Say*, MONGABAY (Sept. 29, 2023) https://news.mongabay.com/2023/09/habitat-loss-drove-long-tailed-macaques-extinct-in-bangladesh-experts-say/ (accessed Feb. 7, 2024).

79 Gamalo et al., *supra* note 14, at 2.

80 *Id*.

81 *Id*.

82 *Id*. at 3.

83 Islam, *supra* note 78.

84 *Macaca fascicularis Red List*, *supra* note 17, at 8–9.

locations, and family homes.[85] Humans respond in the form of retaliation killings, using poisons and traps to exterminate macaques.[86] As a result of their proximity to human beings and their conspicuous characteristics, long-tailed macaque population numbers are notoriously overestimated.[87]

In addition to conflict arising from habitat loss, misinformed public officials label the species as an overabundant 'pest' due to their frequent appearance in urban landscapes, provoking further hostility to justify the macaques' culling.[88] Long-tailed macaques are considered invasive in five regions: Sulawesi, West Papua, Mauritius, Hong Kong, and Palau.[89] Despite this, wildlife authorities in native range states like Malaysia perceive long-tailed macaques as invasive and have ordered mass removals to eradicate the species from the country.[90] Places like Cambodia have also enabled illegal wild-capture schemes to exist in order to reduce macaque populations while garnering profit from wildlife trafficking markets.[91]

B. SCARCE RESEARCH SUPPLY AND INCREASED POACHING PROFITS

Indeed, long-tailed macaques' profitable returns on the black market make them particularly vulnerable to poaching. Due to the exorbitant price offered by research facilities for a single long-tailed macaque,[92] capture for research exists as a strong impetus for long-tailed macaque trafficking.[93] Concerningly, the long-tailed macaques' lucrative selling point only serves to expand the international wildlife trafficking industry, which now rivals underground markets for illegal drugs and arms.[94] Even in regions that enforce permitting requirements,

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85 Hansen et al., *Estimating Densities and Spatial Distribution of a Commensal Primate Species, the Long-Tailed Macaque (Macaca fascicularis)*, 1 CONSERVATION SCI. AND PRAC. 1, 2 (2019).

86 Gamalo et al., *supra* note 14, at 3.

87 *Id.*

88 *Macaca fascicularis Red List*, *supra* note 17 at 9.

89 *Id.* at 5.

90 *Id.* at 9. A mass removal event that took place from 2011 to 2018 resulted in over 400,000 individual macaques vanishing from the region. *Id.*

91 Press Release, Internal Revenue Service, Cambodian Officials and Six Co-Conspirators Indicted for Taking Part in Primate Smuggling Scheme, IRS (Nov. 16, 2022).

92 Weston, *supra* note 68.

93 *Macaca fascicularis Red List*, *supra* note 17, at 8.

94 *Illegal Wildlife Trade Has Become One of the 'World's Largest Criminal Activities,'* INTERPOL (Nov. 6, 2023) https://www.interpol.int/en/News-and-Events/News/2023/Illegal-wildlife-trade-has-become-one-of-the-world-s-largest-criminal-activities (accessed Feb. 11, 2024). INTERPOL estimates the black-market value for illegal wildlife trade to be at $20 billion annually, linking the underground industry to other forms of transnational organized crime including money laundering, armed violence, and corruption. *Id.*

poachers often exploit legal permit systems to capture and trade wild-caught long-tailed macaques.[95]

The latest scandal in Cambodia exposed the streamlined nature of the country's wild macaque-to-breeder racketeering chain. Due to a scarcity of macaques in Cambodian breeding facilities—which supply over 60% of the long-tailed macaques used in U.S. laboratories—Cambodian officials fabricated CITES special permits for local poachers to trap wild macaques.[96] By enlisting the help of the country's CITES representatives, agents in the Cambodian Ministry of Agriculture, Forestry, and Fisheries (MAFF) distributed 3,000 fraudulent permits to collect wild long-tailed macaques in exchange for cash.[97]

Between 2017 and 2022, thousands of macaques were captured and laundered to Cambodian breeding companies such as Vanny Bio Research Corporation, who then sold the macaques to U.S. laboratories.[98] In 2022, U.S. prosecutors apprehended a Cambodian wildlife official involved in the conspiracy.[99] While officials at MAFF denied the wild-caught status of the macaques sold to U.S. labs, the indictment against Vanny Bio Research Corporation revealed that the corporation's chairman bribed MAFF staff to capture long-tailed macaques from Cambodian national parks in order to address the facility's shortage.[100]

The Cambodian smuggling ring exemplifies how excessive economic entanglement between scientific research and corporate incentives erodes even State-sponsored conservation endeavors. Bridging these concerns requires acknowledgement of the socioeconomic drivers behind poaching in the country. In Cambodia, low incomes in rural areas prompt traffickers to supplement their earnings through wild macaque capture cashbacks.[101] Even two decades ago when the export price for one long-tailed macaque was one fifth its current price, the profits earned for a macaque capture was more than double the average monthly wage for rural farmers.[102] Given their lavish price point in 2023, it is no surprise poaching has increased alongside the macaque's profitability. Combining both the vulnerability of macaques in their native habitats with the government subsidies available for

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95 *See* Gerald Flynn, *Alleged Macaque-Smuggling Ring Exposed as U.S. Indicts Cambodian Officials*, MONGABAY (Nov. 18, 2022) https://news.mongabay.com/2022/11/alleged-macaque-smuggling-ring-exposed-as-u-s-indicts-cambodian-officials/ (accessed Feb. 13, 2024) (discussing how Cambodian officials were bribed to create fake papers from CITES for wild caught monkeys).

96 *Feds Charge 8 with Smuggling Endangered Monkeys into U.S., Including Cambodian Wildlife Official*, *supra* note 10.

97 *Id.*

98 IRS, *supra* note 91.

99 Carolyn Johnson & Daniel Gilber, *How a Cambodian Monkey-Smuggling Ring Could Worsen U.S. Lab Shortages*, THE WASH. POST (Mar. 1, 2023), https://www.washingtonpost.com/science/2023/03/01/monkeys-cambodia-research/ (accessed Feb. 11, 2024).

100 Flynn, *supra* note 95.

101 *Macaques Conservation*, *supra* note 58, at 6.

102 *Id.*

macaque capture, poachers have substantial incentives to circumvent laws protecting these animals. It is for these reasons that heighted protection should be afforded to long-tailed macaques to safeguard them from increasing threats to their existence.

IV. THE LAW: CITES REGULATIONS AND IUCN CLASSIFICATIONS

At the heart of the illegal long-tailed macaque trade lie weaknesses in the international system designed to preserve endangered species. The principal treaty governing these initiatives is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).[103] Introduced in the 1960s by the International Union for Conservation of Nature (IUCN) and entered into force in 1975, CITES aims to safeguard the survival of wild animals and plants.[104] Its stated purpose is to facilitate "international co-operation . . . essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade."[105] Ratified by 184 countries—including the United States and Cambodia—CITES is the first comprehensive multilateral treaty to protect endangered species in international trade.[106]

CITES operates through the principle of subsidiarity, meaning the treaty delegates law-making and enforcement power to its sovereign Parties while designating regulatory power to an international body.[107] In this case, the regulatory body is the CITES Standing Committee.[108] For CITES to actualize its purpose, CITES Article IV sets out the requirement for each State's domestic authorities to develop permit and certification systems that regulate imports, exports, and re-exports of the treaty's listed species.[109] Under Article III of the treaty, each State must appoint a Management Authority tasked with overseeing the State's trading regime to confirm each trade is made in compliance with CITES regulations.[110] A State must also appoint a Scientific Authority responsible for evaluating the species' local conservation status and adjusting domestic trade regulations accordingly.[111] Most Parties have

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103 CITES, *supra* note 5.

104 CONVENTION ON INT'L. TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA, WHAT IS CITES? (2023).

105 CITES, *supra* note 5, at 245.

106 WHAT IS CITES?, *supra* note 104.

107 *See* Richard E. Levy, *The Law and Economics of Supranationalism: The European Union and the Subsidiarity Principle in Collective Action Perspective,* 43 EUR. J.L. & ECON. 441, 465 (2017) (explaining that "subsidiarity principle" is traditionally referenced when analyzing governmental frameworks bifurcated into separate levels of enforcement).

108 CITES, *supra* note 5, art. VIII(7)(b) at 251. *See* CITES Resolution Conf. 14.3 (Rev. CoP19) (detailing guidelines on CITES regulation).

109 CITES, *supra* note 5, art. IV(5)(b) at 247.

110 *Id.* at art. III(3)(b) at 246.

111 *Id.* at art. III(2)(b) at 246.

codified CITES requirements into domestic law;[112] however, this subsidiarity structure renders international trade for all species susceptible to the downstream effects of domestic commerce policies within Parties' sovereign jurisdictions, including policies governing endangered species use.

A. CITES APPENDICES AND PROTECTIONS

In its overarching structure, CITES conceptualizes a framework States may use to craft domestic legislation on wildlife trade. Under CITES, listed species are categorized into three levels of protection depending on the species' population status and the threat international trade poses to their survival.[113] Parties may submit amendments to list, de-list, or move species between the three Appendices.[114] Appendix III is the most lenient trade regime for CITES-listed species and is primarily used to call attention to unlisted species facing conservation challenges.[115] Restrictions under this Appendix are governed by domestic law and arise from unilateral requests by a species' range State for assistance in its collective protection.[116]

Appendix II invokes trade restrictions on animals or plants that "may become threatened with extinction,"[117] thus requiring stricter domestic control over commercial activities surrounding the species.[118] Appendix II regulates two categories of species: those where it is observed, inferred, or projected "that the regulation of trade . . . is" (1) "necessary to avoid it becoming eligible for inclusion in Appendix I in the near future,"[119] or (2) "required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or

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112 Endangered Species Act, 16 U.S.C. §1531(4)(f) (1973); Council Regulation No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein, 1997 O.J. (L 061) 1, 7–8 (EC).

113 Sonja Fordham & Coby Dolan, *A Case Study in International Shark Conservation: The Convention on International Trade in Endangered Species and the Spiny Dogfish*, 34 GOLDEN GATE U. L. REV. 531, 535 (2004).

114 *See* CITES, *supra* note 5, art. XV-XVI at 254-56.

115 CITES *supra* note 5, art. III(3) at 246. *See also* Fordham & Dolam, *supra* note 113, at 537 (stating that Appendix III is used to highlight species of concern to the other Parties).

116 CITES *supra* note 5, art. XVI at 256; *See* CONVENTION ON INT'L. TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA, THE CITES APPENDICES (2023) (stating that the species in Appendix III were submitted by the Parties); Fordham & Dolan, *supra* note 113, at 537.

117 CITES, Criteria for Amendment of Appendices I and II, Resolution Conf. 9.24 (Rev. CoP17), 1 (1994) [hereinafter CITES Rev CoP17]. *See generally* CITES, *supra* note 5, art. II(1) at 245.

118 CITES, *supra* note 5, art. II(2)(b) at 245; *See also* CITES, Appendices I, II and III, 2023 [hereinafter CITES Appendices]

119 CITES Rev CoP17, *supra* note 117, at 4. *See also* CITES, *supra* note 5, art. II(2)(a) at 245.

other influences."[120] In addition to the species that meet these criteria, all wildlife reasonably resembling Appendix II species in appearance are protected.[121] A majority of CITES-listed species belong to this Appendix,[122] including the long-tailed macaque.[123]

In contrast, endangered animals such as the chimpanzees and Chinese pangolin are protected under Appendix I,[124] which houses the treaty's most stringent trade regulations. Appendix I handles "all species threatened with extinction which are or may be affected by trade."[125] Commercial trade of an Appendix I species is generally prohibited under CITES.[126] Any trade involving Appendix I species "must be subject to particularly strict regulation in order not to endanger further their survival and must only be authorized in exceptional circumstances."[127] Consequently, this classification has a ripple effect on domestic regulations, requiring stronger State action to control the species' trade.[128]

Legal scholars have noted that certain mechanisms within CITES enable illegal trafficking and hinder the spirit of conservation inspiring the object and purpose of the treaty.[129] For instance, Appendix I species are not safe from commercial exploitation because under Article VII of the treaty, they are granted a general exemption that allows the species to be commercially traded if bred in captivity.[130] When an Appendix I species falls under this exemption, the treaty directs Parties to regulate them under Appendix II's standards.[131] In many countries, this means no import permit is required for the exempt species.[132] In the United States, the bred-in-captivity exemption merely requires the exporting country to issue an exemption certificate.[133]

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120 CITES Rev CoP17, *supra* note 117, at 5.

121 *Id*.

122 Fordham & Dolan, *supra* note 113, at 537.

123 *Macaca fascicularis*, SPECIES+ (2023), https://speciesplus.net/#/taxon_concepts/3920/legal (accessed Feb. 9, 2024).

124 *See Pan troglodytes*, SPECIES+ (2023), https://speciesplus.net/species#/taxon_concepts/6692/legal (accessed Feb. 9, 2024); *See Manis pentadactyla*, SPECIES+ (2023), https://speciesplus.net/species#/taxon_concepts/5373/legal (accessed Feb 9., 2024).

125 CITES, *supra* note 5, art. II(1) at 245.

126 Fordham & Dolan, *supra* note 113, at 535.

127 CITES, *supra* note 5, art. II(1) at 245.

128 *See generally* Commission Regulation (EU) 2023/966 of 15 May 15, 2023 amending Council Regulation (EC) No 338/97 to reflect the amendments adopted at the 19th meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, 2023 O.J. (L133) (EC); 50 C.F.R. § 23.23(6) (2022). *See also* 16 U.S.C. §1531 (1988).

129 Fordham & Dolan, *supra* note 113, at 538.

130 CITES, *supra* note 5, art. VII(4) at 249.

131 *Id.*

132 U.S. Fish & Wildlife Service, *CITES Permits and Certifications* (2012), https://www.aphis.usda.gov/regulations/vs/iregs/products/downloads/fws-cites.pdf (accessed Feb. 9, 2024).

133 *Id.*

This exemption is troubling for the long-tailed macaque, whose trafficking is mainly channeled to the United States.[134] Without a permit approval system in place in the United States for Article VII exemptions, U.S.-based laboratories must rely on the good faith of exporting countries to properly label macaques as captive-bred. Unfortunately, the Cambodian scandal illuminates how tenuous such faith can be. In a country with fragile rule of law, this exception permits traffickers to manipulate valid CITES documentation for illicit purposes, thereby detracting from the treaty's core objective to protect endangered species from overexploitation.

Further enlarging this loophole is the state of CITES's permit issuing system. At the time of writing, all CITES authorities issue hard copy permits, including those issuing special permits.[135] For Parties that do not have secure administrative databases, this system is susceptible to fraudulent reporting and data inaccuracies, obscuring oversight of real-time species trade.[136] However, the CITES administrative body is in the process of implementing a cohesive electronic permitting system to counter the setbacks of the current permitting regime.[137] Once this system is fully implemented, poachers may avoid co-opting Article VII's commercial trade exemption due to the enhanced security capacity offered by a more sophisticated permit tracking system. This update bodes well for long-tailed macaques, particularly if their IUCN status remains elevated.

B. IUCN DESIGNATIONS AND PETITIONS

The IUCN operates as the chief international organization responsible for monitoring global natural resources. It stands as the apex authority in determining CITES conservation matters and is formally recognized as a partner to the CITES Secretariat, to whom the IUCN offers scientific and technical guidance on regulating wildlife trade.[138] The IUCN uses knowledge gathered from specialized experts and member organizations to classify species by conservation status in its Red List of Threatened Species ('the Red List'), a database informing international and domestic trade institutions on over 157,100 species' wildlife conservation status.[139] The Red List is referenced by academic

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134 Gamalo et al., *supra* note 14, at 4.

135 THE eCITES IMPLEMENTATION FRAMEWORK: A PRACTITIONERS GUIDE TO IMPLEMENT ELECTRONIC CITES PERMITS, CITES 13 (2018).

136 Willow Outhwaite, *Addressing Corruption in CITES Documentation Processes*, TARGETING NAT. RES. CORRUPTION 1–3 (Mar. 2020) (accessed Feb. 18, 2024).

137 *eCITES*, CITES (updated Apr. 31, 2023), https://cites.org/eng/prog/eCITES (accessed Feb. 18, 2024).

138 Memorandum of Understanding Between the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora and IUCN-The World Conservation Union, July 1999 (Oct. 8, 1999).

139 *Background & History*, IUCN RED LIST OF THREATENED SPECIES, http://www.iucnredlist.org/about/background-history (accessed Feb. 16, 2024).

journals, multilateral environmental agencies, and domestic customs authorities when deciding the parameters of their trading operations.[140]

Within the Red List, species are divided into nine extinction risk categories: 'Extinct,' 'Extinct in the Wild,' 'Critically Endangered,' 'Endangered,' 'Vulnerable,' 'Near Threatened,' 'Least Concern,' 'Data Deficient,' and 'Not Evaluated.'[141] As of 2022, the long-tailed macaque is categorized under the Endangered category, meaning it faces a "very high risk of extinction in the wild."[142] The IUCN employs five criteria to determine whether a species should be considered Vulnerable, Endangered, or Critically Endangered: (A) temporal population reduction; (B) geographic population reduction; (C) low numbers of mature individuals in the species relative to its population decline, or uneven dispersal of mature individuals within subpopulations; (D) extremely low standalone numbers of mature individuals; or (E) quantitative analyses estimating probabilities of extinction within certain timeframes.[143] Satisfying the standards for at least one of the five factors allows the IUCN to categorize the species under the applicable heightened conservation status.

While the IUCN researches, assesses, compiles, and notifies States of a species' conservation status, IUCN categorizations do not govern CITES Appendix classifications. The IUCN's decisions and reports do, however, hold persuasive authority in informing CITES Appendix I and II designations and provide a basis for scrutinizing amendment proposals to the Appendices.[144] Given the weight IUCN judgments hold, Parties may challenge any current IUCN Red List classifications through the IUCN's petition process.[145]

The petitions process is designed to ensure that species listings are based on the best available scientific information.[146] To maintain impartiality, a petition cannot advocate for listing alterations grounded in "political, emotional, economic, or other reasons not based on the IUCN Red List Categories and Criteria."[147] However, a petition may contain information on "how the proposed amendment is expected to affect the nature of the [species' legal international] trade."[148] Over the years, several petitions have been filed to dispute a species' Red List

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140 *How the Red List is Used,* IUCN RED LIST OF THREATENED SPECIES, https://www.iucnredlist.org/about/uses (accessed Feb. 11, 2024).

141 IUCN SPECIES SURVIVAL COMM'N, IUCN RED LIST CATEGORIES AND CRITERIA: VERSION 3.1 14–15 (2001).

142 *Id.* at 14.

143 *Id.* at 16–23.

144 *See* CITES Rev CoP17, *supra* note 117, at 2–3 ("[W]hen considering proposals to amend Appendices I and II . . . the views, if any, of intergovernmental bodies with competence for the management of the species concerned should be taken into account.").

145 IUCN, PROCEDURE FOR HANDLING OF PETITIONS AGAINST CURRENT LISTINGS ON THE IUCN RED LIST OF THREATENED SPECIES: VERSION 3 (2021).

146 *See id.*

147 *Id.*

148 CITES Rev CoP17, *supra* note 117, at 15.

categorization based on the enumerated grounds. Exploring these petitions may help conservationists and biomedical researchers understand the potential results of the long-tailed macaques' upcoming evaluation.

i Previous Concerns of IUCN Petitioners

To date, six petitions have been submitted to the IUCN.[149] Five have been resolved,[150] with the status of the long-tailed macaque's petition pending as of 2023.[151] The first petition was filed in 2001 and involved the IUCN's 1996 listings for four marine turtle species: the Flatback turtle (*Natator depressus*), the Olive Ridley turtle (*Lepidochelys olivacea*), the Green turtle (*Chelonia mydas*), and the Hawksbill turtle (*Eretmochelys imbricata*).[152] The consolidated petitions were filed by two renowned zoologists, Nicholas Mrosovsky and Grahame Webb, who specialized in sea turtle biology and reptile conservation, respectively.[153]

In their petitions, Mrosovsky and Webb contested the IUCN's data interpretation regarding the turtles' population decrease, the source of the IUCN's data, and the qualitative data used to assess the turtles' population properties.[154] In an editorial published prior to the petitions' filing, however, Mrosovsky openly questioned the IUCN's transparency, claiming the organization was "disseminating statements derived from information that is not publicly available."[155] He further noted that "attempts to obtain copies of some of the letters cited in [the hawksbill turtle assessment] were unsuccessful."[156] Criticizing the IUCN's lack of verifiable data on the hawksbill turtle's conservation status, Mrosovsky proposed the IUCN label the turtle and similarly situated species as Data Deficient.[157] In its decision, the IUCN found the scientific literature available on the species corroborated a majority of its original determinations for all of the challenged classifications except for the Flatback turtle.[158]

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149 *Red List Petitions*, IUCN RED LIST OF THREATENED SPECIES, https://www.iucnredlist.org/resources/petitions (accessed Feb. 7, 2024).

150 *Id*.

151 *Id.*

152 IUCN, RULING OF THE IUCN RED LIST STANDARDS AND PETITIONS SUBCOMMITTEE ON PETITIONS AGAINST THE 1996 LISTINGS OF FOUR MARINE TURTLE SPECIES 1 (2001) [hereinafter FOUR TURTLES].

153 *Id.*; *see* Patricia Lakin-Thomas, *In Memoriam: Nicholas Mrosovsky*, 30 J. BIOLOGICAL RHYTHMS 359, 359–60 (2015) (describing Mrosovsky's achievements and passion for sea turtles); *see also About Crocodylus Park*, CROCODYLUS PARK, https://www.crocodyluspark.com.au/about (accessed Feb. 7, 2024) (detailing Webb's credentials and appreciation for the family Crocodylidae).

154 FOUR TURTLES, *supra* note 152, at 1–2.

155 Nicholas Mrosovsky, *IUCN's Credibility Critically Endangered*, 389 NATURE 436, 436 (1997).

156 *Id.*

157 *See id.*

158 *See generally* FOUR TURTLES, *supra* note 152. (showing that the Flatback turtle was the only species recategorized as a result of the petition).

Other petitions filed to the IUCN also contested the methodology of the data used or the parameters under which the data was evaluated.[159] On the whole, most petitions scrutinized the IUCN's data collection techniques and its subsequent interpretations, yet no petitions exhibited the same level of doubt regarding the IUCN's credibility as was expressed in Webb and Mrosovsky's petitions. Notably, Mrosovsky's apprehensions toward the IUCN's scientific integrity is similarly shared by the NABR in its petition for reclassification of the long-tailed macaque. More significant, however, is the fact that the NABR's petition casts doubt upon the IUCN's impartiality, presenting more forceful assertions within the petition's scope that seemingly encompass political considerations that extend beyond that of its predecessors.

ii. Current Concerns about Long-Tailed Macaques

Filed by the National Association for Biomedical Research (NABR), a U.S.-based nonprofit advocating on behalf of the use of animals in laboratory research,[160] the petition challenges the long-tailed macaque's heightened classification on several grounds: (1) the lack of data "support[ing] a historical decline" in long-tailed macaque populations; (2) the "misuse[] and misinterpret[ation of] published scientific literature"; (3) the calculations used to determine the long-tailed macaques' generation length; (4) the cited reasons for the species' removal from the wild; (5) the incongruence between the 2020 and 2022 IUCN assessments on the species; and (6) the observational methods for determining the long-tailed macaques' extinction risk.[161]

Underlying the NABR's petition, however, are economic motivations to challenge the long-tailed macaques' new listing on behalf of the U.S. biomedical industry. In its letter announcing its petition, the NABR noted that arbitrary import restrictions on the species could jeopardize public health due to the critical role long-tailed macaques serve in medical research.[162] Restrictions could also hinder new drug development, according to the NABR, because regulatory agencies rely on nonhuman primate testing given the species' genetic and biological similarities to humans.[163] Therefore, unlike Mrosovsky's and Webb's

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159 *See generally* IUCN, RULING OF THE IUCN RED LIST STANDARDS AND PETITIONS COMMITTEE ON THE LISTING OF THE MIGRATORY MONARCH BUTTERFLY (2023) (raising an issue regarding the mode of data calculation).

160 *About NABR,* NAT'L ASS'N FOR BIOMEDICAL RSCH., https://www.nabr.org/about (accessed Feb. 10, 2024). The organization's stated purpose is to "safeguard the future of biomedical research that involves the responsible, humane, and ethical use of animals." *Id.*

161 NAT'L ASS'N FOR BIOMEDICAL RSCH., PETITION CHALLENGING THE RED-LIST STATUS OF LONG-TAILED MACAQUE 1–7 (2023) [hereinafter *NABR Macaque Petition*].

162 *NABR Files Petition Challenging the Listing of Long-Tailed Macaque by the IUCN*, NAT'L ASS. FOR BIOMEDICAL RSCH. (June 15, 2023), https://www.nabr.org/about-nabr/news/nabr-files-petition-challenging-listing-long-tailed-macaque-iucn (accessed Feb. 10, 2024) [hereinafter *NABR Challenge*].

163 *Id*.

conservation-focused petitions, the NABR's position seemingly rests on the viability of the U.S. biomedical industry.

Regardless of its motives, the NABR's arguments in its petition must be confined to the sub-criteria selected for the long-tailed macaque. In its updated assessment, the IUCN labeled the species as "Endangered A3cd."[164] The code following the categorization refers to the specific sub-criteria used to assess the long-tailed macaque's status. The A3cd subcategory of Endangered species refers to species that have been "observed, estimated, inferred or suspected population size reduction of [greater than or equal to] 50% over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible."[165] This population assessment is taken in light of the long-tailed macaque's "decline in area of occupancy, extent of occurrence and/or quality of habitat" and "actual or potential levels of exploitation."[166]

In other words, the IUCN raised the long-tailed macaque's conservation status due to a possible 50% decrease in the species' population size caused by habitat conversion and overexploitation. Comparing this status to its previous Vulnerable status, it indicates that long-tailed macaques are vanishing at rates higher than predicted in 2021. Indeed, existing in numbers as high as five million in the 1980s, the long-tailed macaque's observable population dropped to three million by 2000—a staggering 40% decline.[167] From the Least Concern status they possessed in 2008 to the current Endangered status they have held since 2022, the long-tailed macaques' population decline over the next three generations is anticipated to reach 50%, a rate which the IUCN determines to be inconducive to a species' survival.[168]

The NABR's petition contests this decline rate, proffering several rebuttals: (1) properly interpreted, no quantitative studies referenced by the IUCN evidence such a rate; (2) long-tailed macaques' "multiple life history traits . . . make extinction highly unlikely," including their anthropogenic adaptation, quick population growth in new habitats, and the presence of macaque-human conflicts (which the NABR purports "likely would not exist" if the long-tailed macaque was endangered); and (3) the long-tailed macaques' published longevity brings their projected decline to sustainable rates.[169]

Further, the NABR claimed the long-tailed macaque "thrives in close association with humans" and, contrary to the IUCN's assessment, demand for the long-tailed macaques' *decreased* after COVID-19.[170] In its final statement, the NABR requested the IUCN redo its assessment

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164 *Macaca fascicularis Red List*, *supra* note 17, at 2–3.

165 IUCN Species Survival Comm'n, *supra* note 141, at 19.

166 *Id*. at 18–19.

167 Gamalo et al., *supra* note 14, at 2.

168 *Id*.

169 *NABR Challenge, supra* note 162.

170 *Id*.

of the long-tailed macaque "in a more scientifically-defensible way by an independent group of authors who are not involved in advocacy work involving this species."[171] For its petition to succeed, however, the NABR must also ensure that its presented data was not procured to pursue the organization's own economic objective to sustain animal testing in U.S. laboratories.

V. THE LABYRINTH: NAVIGATING A NEW DESIGNATION

While this Article advocates for stricter scrutiny regarding the long-tailed macaques' trading regimes, it does not endeavor to predict the outcome of the NABR's petition. Rather, it seeks to provide solutions should research confirms that the long-tailed macaque's populations are indeed decreasing at unsustainable rates. In this scenario, the scientific community must evolve its trading capabilities to match the conservation needs of this critical species. This means shifting the mechanisms through which the U.S. biomedical industry achieves its goals in order to guarantee the industry's continued success.

According to the NABR, this priority to remain globally competitive is under stress due to deteriorating trade relationships between the United States and China.[172] In its policy note on the use of non-human primates in biomedical research, the NABR states that "[e]scalating tensions between the U.S. and China and the COVID-19 pandemic have stopped the import of monkeys from China."[173] It further explains that China's ban on exporting research primates to other countries has halted scientific development in the United States.[174] With such concerns looming large over industry profits, bioresearch facilities must employ additional precautions to ensure shortsighted illegal actions do not interfere with their revenue streams.

A. SOLVING THE SUPPLY CRISIS BY REDUCING DOMESTIC NEEDS

One immediate solution is to adjust supply and demand for the long-tailed macaque. Environmental scholars have noticed the disproportionate responsibility the CITES Secretariat places on exporting countries to decrease the illegal trade of protected species.[175] However, equally observed by experts is the lack of accountability for importing countries, meaning when an importer reduces its demand for an illegal

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171 *Id*.

172 Nat'l Ass'n For Biomedical Rsch., Non-Human Primates (NHPs) in Biomedical Research (n.d.), https://www.nabr.org/view_file/5516/7769/5074/NABR_TPs_-_NHP_Backgrounder_-_Transportation_Backgrounder_-_Importation_Ask.pdf (accessed Mar. 5, 2024) [hereinafter *NABR NHPs*].

173 *Id.*

174 *Id*.

175 Erica Lyman, *It Takes Two: CITES, Illegal Wildlife Trade, and Importing Country Accountability*, 47 Wm. & Mary Env't & Pol'y Rev. 707, 748 (2023).

good from one exporting country, it also increases its demand of that same good from other exporters.[176] As mentioned, a key reason for the long-tailed macaque's costly prices comes from their limited supply in U.S. laboratories coupled with their increased demand for use in clinical research. Although captive-bred long-tailed macaques with proper documentation are available for sale, their hefty price-point incentivizes U.S. facilities to be parsimonious when validating the long-tailed macaques' source.

Thus, the most straightforward approach to lowering demand among all long-tailed macaque exporters is to reduce the reliance on them in scientific research. This is a field in which the biomedical industry can benefit from animal welfare expertise. Indeed, such a solution is on par with emerging trends in conservationism, which are witnessing a downturn in the use of animals for scientific research.[177] This recession is primarily driven by a growing body of evidence demonstrating how animal models produce unreliable, untranslatable, and unsafe outcomes.[178] While discussion on the utility of animal testing is beyond the scope of this Article, it is important to emphasize how testing on wild-caught macaques invariably harms scientific progress.

Given the fallibility of animal models in the most controlled settings,[179] it is reasonable to assume animal models using wild-caught species would lend to more egregious validity issues. For native long-tailed macaques, uncontrollable factors in their natural habitats pose exceptional problems to their trustworthiness as scientific models, including the contraction and spread of zoonotic diseases.[180] Considering the dangers posed to public health and safety, continuing research on endangered animals without performing due diligence in investigating proof of origin could lead to greater societal harms beyond failed science.

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176 *Id*.

177 U.S. EPA, NEW APPROACH METHODS WORK PLAN 6 (2021); EUR. PARL. DOC. P9_TA(2021)0387 (2021).

178 *See generally* Samantha Fox, *Chimpanzee Use in Invasive Biomedical Research: The One-Percent Difference that Affects One-Hundred-Percent of the Studies*, 27 J. C.R. & ECON. DEV. 237, 244 (2014).

179 Akhtar, *supra* note 41, at 407.

180 Supakarn Kaewchot et al., *Zoonotic Pathogens Survey in Free-Living Long-Tailed Macaques in Thailand*, 10 INT'L J. VETERINARY SCI. & MED. 11, 11, 15–17 (2022). *See also* Claire Colley, *Revealed: US Allowing Long-Tailed Macaque Imports Despite Risk of Disease*, THE GUARDIAN (Jan. 8, 2023), https://www.theguardian.com/us-news/2023/jan/08/us-long-tailed-macaque-imports-disease-risks (describing how the U.S. macaque trade has allowed the import of wild-caught macaques carrying deadly pathogenic agents, some of which are classified as potential Tier 1 bioterrorism weapons). Moreover, U.S. laboratories have acknowledged the uncontrollable risks third-party captive-breeders pose to the transmission of zoonotic diseases. United States Securities & Exchange Commission, Charles River Laboratories International, Inc. Quarterly Report on Form 10-Q, Commission File No. 001-15943, 42 (May 7, 2020) (stating that the "risk of contamination may be outside of [Charles River Laboratories'] control, and we depend on the practices and protocols of third parties to ensure a contamination-free environment").

By using this species without proper safeguards, the biomedical industry risks skewing research results with poor experimental design and controls. Moreover, macaque models' unpredictability compromises the efficacy, reputation, and resources of U.S. labs.[181] If the U.S. biomedical industry collectively encourages the use of unreliable animal testing models, trust in its institutions and research findings could deteriorate. Such skepticism will invariably impair the U.S. biomedical industry's global competitiveness, which is a key concern the NABR outlined in its nonhuman primate campaign.[182] More importantly, mounting distrust in the biomedical industry will cause significant disruptions within health campaigns, leaving the world susceptible to resurgences in diseases such as polio, measles, and COVID-19.[183]

To prevent science from imperiling itself, research facilities must engage in a serious cost-benefit analysis to determine whether regulatory lapses within the long-tail macaque trade are worth the consequences they pose to biomedicine's goals. Unless laboratories can guarantee all acquired long-tailed macaques are captive-bred, the biomedical industry should cease using them to avoid undermining scientific integrity and endangering public health. Even so, it is in the best interest of laboratories to abandon animal testing altogether given the above-mentioned complications nonhuman models present to research validity and safety. To do so, research facilities should staff welfare scientists to aid in the development and transition toward animal-free models.

B. HALTING TRAFFICKERS THROUGH INTERNATIONAL MEASURES

If demand cannot be mitigated, then the next best solution is to encourage long-tail macaque exporters to abide by CITES standards. One feasible strategy is to utilize the Pelly Amendment, which is a U.S. law allowing the federal government to impose targeted sanctions against foreign governments "directly or indirectly . . . engaging in trade or taking which diminishes the effectiveness of any international program for endangered or threatened species."[184] The phrase "international programs" refers to "any ban, restriction, regulation, or other measure in effect pursuant to a multilateral agreement which is in force with respect to the United States, the purpose of which is to protect

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181 Akhtar, *supra* note 41, at 407, 413–15. *See also* United States Securities & Exchange Commission, *supra* note 180 (showcasing how biomedical facilities such as Charles River Laboratories have recognized the financial threat illegal wildlife trafficking poses to its operations).

182 *NABR NHPs*, *supra* note 172.

183 *See* Brian Kennedy & Alec Tyson, *Americans' Trust in Scientists, Positive Views of Science Continue to Decline*, PEW RSCH. CTR. (Nov. 14, 2023), https://www.pewresearch.org/science/2023/11/14/americans-trust-in-scientists-positive-views-of-science-continue-to-decline (accessed Feb 16. 2024).

184 22 U.S.C. § 1978(a)(2).

endangered or threatened species of animals."[185] Although the relationship between the Pelly Amendment and CITES is unclear, the law appears to comport with Article XIV(1)(a) of CITES, which allows States to take "stricter domestic measures regarding conditions for trade . . . of species included in Appendices I, II, and III."[186]

Traditionally deployed to strengthen domestic conservation efforts, the U.S. government's utilization of the Pelly Amendment has encouraged extraterritorial policy changes on wildlife trafficking, from Japan eliminating the trade of endangered Hawksbill turtle shells to Taiwan tightening wildlife protections for tiger and rhinoceros.[187] Therefore, a key stakeholder the biomedical industry should consider working with in developing this strategy are conservationists, who are most familiar with the Pelly Amendment's nuances and pathways to success.

Together, they can petition the U.S. Secretary of Commerce to certify Cambodian long-tailed macaque exporters—and all other similarly situated long-tailed macaque breeders—as detrimental to the effectiveness of CITES in order to invoke Pelly embargos against these States until they meet CITES regulations. To employ this tactic, however, the industry must consider how such embargos may be viewed in a World Trade Organization (WTO) Dispute Settlement System.[188] Furthermore, not only is the process time-intensive,[189] but rising criticism against the selective employment of sanctions against developing countries leaves the option rather untenable without careful consideration.[190]

An alternative avenue for the biomedical industry to settle its grievances with long-tailed macaque breeders like Vanny Bio Research Corporations—the corporation responsible for the Cambodian trafficking scandal—is through international arbitration. If breeders cannot be relied upon to provide legally-sourced supply, then research laboratories should pursue legal action in the Permanent Court of Arbitration (PCA) to hold distributors accountable. As outlined Article XVIII of CITES, "Parties may, by mutual consent, submit the dispute to arbitration, in particular that of the Permanent Court of Arbitration at the

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185 22 U.S.C. § 1978(h)(4).

186 CITES, *supra* note 5, art. XIV(1)(a) at 253.

187 Paul C. Lin-Easton, *Ending the Siege on America's Bears: Implementing GATT-Consistent Pelly Sanctions Against Bear-Trading Nations*, 2 ASIAN-PAC. L. & POL'Y J. 196, 208–210 (2001). *See also* P.H. Sand, *Whither CITES? The Evolution of a Treaty Regime in the Borderland of Trade and Environment*, 8 EUROPEAN J. INT'L L. 29, 39 (1997) (noting how Singapore ratified CITES after the U.S. sanctioned all Singaporean wildlife imports).

188 *Id*. (presenting an overview of U.S.-W.T.O. jurisprudence involving endangered species embargos).

189 *See Biden Declines to Embargo Products from Mexico Despite Vaquita Violation*, CTR. FOR BIOLOGICAL DIVERSITY (July 17, 2023), http://www.biologicaldiversity.org/w/news/press-releases/biden-declines-to-embargo-products-from-mexico-despite-vaquita-violation-2023-07-17/ (accessed Feb. 17, 2024) (detailing a nine-year battle to have the Interior Secretary certify Mexico under the Pelly Amendment for its overfishing).

190 Peter Sand, *Enforcing CITES: The Rise and Fall of Trade Sanctions*, 33 REV. OF EUROPEAN CMTY. & INT'L ENV'T LAW 251, 261 (2013).

Hague."[191] Therefore, the biomedical industry may seek to persuade the United States to represent the industry's interests in the PCA. This would involve demonstrating the detrimental effects exporters' misrepresentation of long-tailed macaques' proof of origin has had on the industry, as analyzed earlier.[192]

Indeed, in light of the PCA's adjudicatory history on CITES breaches, it would be favorable for the biomedical industry to invest time and resources into convincing the United States to pursue a claim within the court. Its recent judgments exemplify the PCA's hardline stance against States breaching CITES provisions concerning the illegal trade of endangered species.[193] In its *South China Sea Arbitration* decision, for example, the Tribunal ruled that China had breached its obligations under CITES by neglecting to adopt and enforce "appropriate rules and measures to prohibit [wildlife trafficking]."[194]

In its decision, the Tribunal highlighted China's government support for illegal poaching activities targeting endangered giant clams and sharks.[195] This state-sponsorship gave the Tribunal "no hesitation in finding that China breached its obligations under [CITES]."[196] Here, the parallels between China and Cambodia's actions are evident: both countries brazenly defied CITES regulations by directly facilitating illegal wildlife poaching within their domestic jurisdictions.[197] As such, initiating legal proceedings in the PCA may prove fruitful if the biomedical industry can collaborate with IUCN conservation experts to influence the United States into bringing suit against Cambodia. In fact, it could be argued that it is incumbent upon the industry to advocate for such action given the previously examined repercussions that exist should it fail to curb the growing underground market for long-tailed macaques.

VI. CONCLUSION: AN UNLIKELY YET NECESSARY ALLIANCE

Considering the gravity of the long-tailed macaques' plight, animal testing has transcended beyond a moral issue; rather, it has evolved into a predicament that deeply affects the sustainability of our planet. As Earth's ecosystems confront growing threats from climate change, illegal wildlife trafficking, and strained resources, biomedical advancements must be tempered by humankind's responsibility to conserve life on this planet. With species such as the horseshoe crab, chimpanzees,

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191 CITES, *supra* note 5, art. XVIII at 256.

192 *See supra*, Part V(A).

193 South China Sea Arbitration Award of 12 July 2016 (Phil. v. China), PCA Case No. 2013-19, ¶ 964 (Perm. Ct. Arb. 2016).

194 *Id*.

195 *Id.*

196 *Id*.

197 *See supra*, Part III(B) (detailing the Cambodian poaching scandal facilitated by Cambodian wildlife officials).

and now the long-tailed macaque having been recognized by experts as under threat from research-related trade, science finds itself at a critical juncture in its ethical trajectory.

The power to dismantle what has become one of the world's largest criminal syndicates rests on the integrity of the scientific community. Given the far-reaching ramifications wildlife trafficking will have on the future availability of species like the long-tailed macaque, research facilities bear an obligation to procure test subjects in accordance with the law. To do so, they must ensure their purchases, partnerships, and advocacy efforts do not compromise the macaque's broader ecological existence. Without cooperation between environmentalists and scientists to safeguard the long-tailed macaque, science risks causing irreparable harm to a species it deems an irreplaceable resource. However, with strategic foresight and a collaborative mindset, the biomedical sector can leverage its long-tailed macaque dilemma to advance scientific progress while saving a species vital to its own success.