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SAVING NEMO: ENHANCING CITES TO PROTECT MARINE ORNAMENTAL FISH

by Emme Lighthouse

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Just keep swimming, just keep swimming . . .
—Dory, *Finding Nemo*[1]

With her catchy song, Dory, an upbeat blue tang, encouraged Marlin, a grumpy clownfish, to stay brave while swimming into a deep trench to retrieve a fallen scuba mask.[2] Her adventures with Marlin to save his son, Nemo, endeared both these characters, and the fish species they are based on, to audiences young and old.[3]

Nemo's dramatic capture from the coral reef and placement into a private aquarium reflects a modern-day reality. Millions of brightly colored vertebrates, invertebrates, and corals are taken from the wild to fuel the global demand for display in private and public aquariums.[4] Like Nemo, the vast majority of marine aquarium fish are from delicate coral reef habitats that are already experiencing increased stress due to climate change and other anthropogenic factors.[5] Despite the movie's effort to portray the aquarium trade in a negative light, the release of *Finding Nemo* created a cruelly ironic uptick in demand for clownfish that accelerated decimation of coral reefs in the South Pacific.[6]

The marine aquarium trade started in Sri Lanka in the 1930s as a small-scale export fishery, expanded to Hawaii and the Philippines in the 1950s, and became an established global, multimillion trade by the 1970s.[7] As of 2024, 50 to 60 countries export marine ornamental fish, with top exporters including Indonesia, Sri Lanka, and the Philippines.[8] Those fish are imported to countries like the United States, the United Kingdom, Japan, and members of the European Union (EU).[9]

The marine ornamental trade differs from the freshwater ornamental trade in important ways. Ninety percent of freshwater ornamental aquarium fish are bred in captivity.[10] In contrast, only between 1% and 10% of marine aquarium ornamental fish are bred in captivity.[11] The other 90%-99% are wild-caught from coral reefs, with ramifications for their local ecosystems.[12] In addition, the freshwater trade is much larger than its marine counterpart; marine ornamentals are thought to consist of only 10% of the total ornamental fish trade globally.[13] Data concerning the two trades are often lumped or mixed together, leading to uncertainty about the true trade numbers.[14]

The marine aquarium hobby focuses on creating miniature reef ecosystems that create demand for several thousand species.[15] Between 1,040 and 2,300 species of fish have been found in the global trade.[16] Some of those species (around 100) are unevaluated or data-deficient under the

1. Finding Nemo (Pixar Animation Studios 2003).
2. *Id.*
3. *See* Rotten Tomatoes, *Finding Nemo*, https://www.rottentomatoes.com/m/finding_nemo (last visited May 3, 2025).
4. Colette Wabnitz et al., United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), From Ocean to Aquarium: The Global Trade in Marine Ornamental Species 6 (2003).
5. Mark D. Spalding & Barbara E. Brown, *Warm-Water Coral Reefs and Climate Change*, 350 Science 769, 771 (2015).
6. James Prosek, *Beautiful Friendship*, 217 Nat'l Geographic 120 (2010).
7. Andrew W. Bruckner, *The Importance of the Marine Ornamental Reef Fish Trade in the Wider Caribbean*, 53 Revista de Biología Tropical 127, 127 (2005).
8. Monica V. Biondo & Rainer P. Burki, *Monitoring the Trade in Marine Ornamental Fishes Through the European Trade Control and Expert System TRACES: Challenges and Possibilities*, 108 Marine Pol'y art. 103620, at 3 (2019); Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Technical Workshop on Marine Ornamental Fishes, *Developing an Evidence-Led Species Prioritisation Framework*, para. 6 (May 7-10, 2024), https://cites.org/sites/default/files/eng/prog/marine_ornamental_fishes/workshops/brisbane_052024/CITES%20marine%20ornamental%20fishes%20workshop%20-%20OATA-OFI%20paper%20(Final).pdf [hereinafter *OATA/OFI Framework Proposal*].
9. Biondo & Burki, *supra* note 8; CITES, *Species Specific Matters: Conservation Management of and Trade in Marine Ornamental Fishes*, para. 7, CITES Doc. CoP18 Doc. 94 (May 23-June 2, 2019) [hereinafter *Conservation Management of MOF*].
10. Pierluigi Monticini, Food and Agriculture Organization of the United Nations (FAO) Globefish Research Programme, The Ornamental Fish Trade: Production and Commerce of Ornamental Fish: Technical-Managerial and Legislative Aspects 1 (2010).
11. CITES Secretariat & UNEP-WCMC, *International Trade in Non-CITES Listed Marine Ornamental Fish: International Trade, Conservation Status, Management and Legislation for Non-CITES Marine Ornamental Fish in Support of the Implementation of Decision 18.296 [Updated]* 1 (2024) [hereinafter *International Trade in Non-CITES*]; *OATA/OFI Framework Proposal*, *supra* note 8, para. 44.
12. *See* Monica V. Biondo & Rainer P. Burki, *A Systematic Review of the Ornamental Fish Trade With Emphasis on Coral Reef Fishes—An Impossible Task*, 10 Animals 1, 12 (2020).
13. Biondo & Burki, *supra* note 8, at 1.
14. Biondo & Burki, *supra* note 12, at 11; *see also* Andrew L. Rhyne et al., *Revealing the Appetite of the Marine Aquarium Fish Trade: The Volume and Biodiversity of Fish Imported Into the United States*, 7 PLoS One e35808, at 7 (2012).
15. Biondo & Burki, *supra* note 12, at 12.
16. Andrew L. Rhyne et al., *Expanding Our Understanding of the Trade in Marine Aquarium Animals*, 2017 PeerJ e2949, at 7, 15 (2017); *OATA/OFI Framework Proposal*, *supra* note 8, annex paras. 4, 42; *International Trade in Non-CITES*, *supra* note 11, at 6. The difference from the literature is explained by condensing different color morphs, excluding only rarely caught species, and updated taxonomy. *OATA/OFI Framework Proposal*, *supra* note 8, annex para. 42.

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International Union for Conservation of Nature (IUCN) Red List, though the number of unevaluated species is quickly being rectified.[17]

Most species in the trade are classified as "Least Concern" by the IUCN, but such a status does not necessarily mean population trends are stable or even known.[18] In addition, more than 40% of those species evaluated by the IUCN were last evaluated more than 10 years ago.[19] High trade numbers, estimated to be from 11 to 150 million individual fish a year, and old data suggest that even those species listed as Least Concern might need to be monitored.[20]

Internationally, the only regulatory mechanism to control the wildlife trade is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES or the Convention).[21] CITES regulates species in international trade through the use of three appendices that implement varying levels of protection based on the danger to the species.[22] Appendix I applies to species that are threatened with extinction; Appendix II applies to species whose trade presence is high enough to warrant extra regulation; and Appendix III provides international assistance for domestically protected species.[23]

Only three coral reef fish are currently listed under CITES[24]: the genus of seahorses, *Hippocampus spp.* (which includes multiple species); the clarion angelfish, *Holacanthus clarionensis*; and the humphead wrasse, *Cheilinus undulatus*.[25] Another marine ornamental fish, the Banggai cardinalfish (BCF), *Pterapogon kauderni*, was proposed twice for Appendix II listing.[26] The BCF has a well-understood life history and range distribution that makes it easy to overexploit, but it has potential to be sustainably managed.[27]

The international community proposed to list the BCF, but Indonesia, the BCF's only range country, preferred to focus on domestic conservation controls.[28] Without a CITES listing, global trade data are lacking and the success of conservation measures remain uncertain. The story of the BCF illustrates the need for an alternative listing mechanism under CITES to allow range countries to focus on domestic conservation while collecting international trade data on a species.

Part I of this Comment discusses challenges in protecting wild-caught and captive-bred marine ornamental fish. It explains the complexity of the supply chain of wild-caught fish and why the marine ornamental trade lacks trade data. Part II describes the existing framework of CITES that protects species listed under one of the three appendices. CITES Appendix II lists species based on their presence in trade, but it has been underutilized due to the nature of the marine ornamental trade. Appendix III would be the ideal appendix to list marine ornamental species, but it currently relies exclusively on range countries to list at-risk species.

As a case study, Part III examines the conservation attempts for the Banggai cardinalfish. Proposals to list the BCF under Appendix II were unsuccessful because Indonesia preferred to focus on domestic conservation measures even though global trade was the driving force of exploitation. Part IV proposes two solutions to enhance regulation of the marine aquarium trade: amendments to CITES, and certification schemes. The amendments would include (1) providing an alternative listing mechanism under Appendix III to lower the barrier for listing a species without the range country's support, and (2) enhancing technology-sharing under CITES to increase capacity to quantify trade. Certification schemes should first be pursued through regional trade associations and their existing members and then through a global body, like the CITES Secretariat, that builds customer trust and implements and enforces sustainability measures. Part V concludes.

I. The Marine Ornamental Trade

The marine ornamental trade is largely sourced from coral reefs with a complex supply chain that lacks data for the global trade. First, wild-caught fish still supply the majority of the demand, though strides are being made within the captive breeding industry to culture both known species and create new hybrids. Second, the complexity of the supply chain is due to the nature of the countries where the fish are found and the many steps required to transfer the fish. Last, no regulatory body monitors the marine ornamental trade, leaving global figures about the actual trade numbers based on individual studies or voluntary collection from inconsistent sources.

A. Caught in the Wild or Captive-Bred

The two sources of marine ornamental fish present different problems for the trade. Catching ornamental fish in the wild has impacts on both the ecosystem and the fish themselves. On the other hand, captive breeding of marine ornamentals requires the perfection of various environmental factors for each species.

Catching marine ornamentals from their native coral reefs has a broad impact. First, taking a species out of the

17. Monica V. Biondo et al., *An Updated Review of the Marine Ornamental Fish Trade in the European Union*, 14 Animals 1761, 14, 15 (2024); *see* Biondo & Burki, *supra* note 8, at 6.
18. *OATA/OFI Framework Proposal*, *supra* note 8, annex para. 60; Biondo et al, *supra* note 17, at 14, 15.
19. *OATA/OFI Framework Proposal*, *supra* note 8, annex para. 45.
20. Biondo & Burki, *supra* note 8, at 3; Biondo & Burki, *supra* note 12, at 20; *Conservation Management of MOF*, *supra* note 9, para. 5.
21. CITES, *What Is CITES?*, https://cites.org/eng/disc/what.php (last visited May 3, 2025).
22. CITES, *How CITES Works*, https://cites.org/eng/disc/how.php (last visited May 3, 2025).
23. *Id.*
24. For an in-depth discussion on how Appendix II listing has impacted the marine fishes listed, see Amanda C.J. Vincent, *Implementing CITES Appendix II Listings for Marine Fishes: A Novel Framework and a Constructive Analysis*, 30 Fisheries Ctr. Rsch. Rep. 1 (2022).
25. *Conservation Management of MOF*, *supra* note 9, para. 8. If including sharks, there are 35 species: 24 species of seahorses (*Hippocampus*), nine sharks, and the humphead wrasse and clarion angelfish. *International Trade in Non-CITES*, *supra* note 11, at 1-2.
26. See discussion *infra* Part III.
27. *See* FAO, FIAF/R1163 (En), Report of the Fifth FAO Expert Advisory Panel for the Assessment of Proposals to Amend Appendices I and II of CITES Concerning Commercially-Exploited Aquatic Species 57 (2016).
28. *See infra* Part III.

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ecosystem can disrupt the trophic system.[29] The aquarium trade as a whole targets species on all levels of the trophic system, from structure-building corals, which provide homes for other organisms, to sharks, the top predators that help control the whole ecosystem.[30] Marine ornamental fish have important roles within the coral reef ecosystem, acting as cleaners by eating parasites on other organisms or grazing on overgrowths of algae.[31] Removal of these species can shift the ecosystem's balance away from a healthy reef to one imbalanced with less capacity to recover from other stressors like climate change, pollution, or ocean acidification.[32]

The methods for catching marine ornamental fish can be just as destructive to the reef ecosystem. The use of cyanide is an especially harmful way to catch fish, and was the number one cause of death for ornamental fish when it was investigated in the 1980s.[33] Cyanide pills are broken up, diluted in water bottles, then squirted onto the reef to stun the fish.[34] It is often used to catch fish that are more elusive or that hide in crevices.[35]

The cyanide makes the fish easier to scoop up, but it lowers the immune response for the fish, making them more likely to die during transit, and harms the coral reef and nontarget organisms in the area.[36] Some of the exposed fish receive an acute dose and die almost immediately after capture or during the transportation process.[37] The use of cyanide to capture fish has been banned by both the Filipino and Indonesian governments,[38] but it is still commonly used in rural, poor fishing communities that rely on the ornamental trade for their livelihoods.[39]

Partly as a result of cyanide use during fishing, more than 95% of the reefs in the Indo-Pacific region are labeled as "at risk," with almost half in the high or very high threat category.[40] The cyanide disrupts the symbiotic relationship between the coral polyp and the zooxanthellae that provide the coral with nutrients, causing coral bleaching.[41] In addition, the three-dimensional structure of the coral reef can be disrupted if coral colonies are broken off while capturing hiding fish.[42]

The marine ornamental trade also targets males and juveniles for their distinct markings and smaller size.[43] However, the removal of only males can disrupt the reproductive ability of the population, and juveniles are more susceptible to stress and death in captivity.[44] In addition, popular ornamental fish caught in the wild are not necessarily suitable for living in captivity. One extremely popular fish, the mandarinfish (*Synchiropus splendidus*), feeds on specific small crustaceans that are hard to replicate within captivity.[45] As a result, many die of starvation within weeks of capture, requiring even more to be caught from the wild to supply the demand.[46]

The high popularity and low survival rate of mandarinfish in captivity has focused aquaculture research on the species to make owning one more sustainable.[47] Mandarinfish raised in captivity could be fed a prepared diet that was easier to administer than the diet required by wild-caught mandarinfish.[48] In general, species raised in captivity can often be bred to be hardier, faring better in captivity and surviving longer than wild-caught fish.[49]

Raising marine ornamentals can be challenging, however. First, the eggs are extremely small, with some eggs only one-third of a millimeter long.[50] Second, marine ornamentals mainly eat copepods, or microscopic marine organisms, that are much harder to raise than other forms of feed.[51] Recent developments in the raising of copepods have helped immensely with the possibility of raising certain marine ornamentals in captivity.[52] Last, a single hatchery has to raise multiple kinds of marine ornamental fish, often between 10 and 20 unique species, in order to be profitable.[53] Each species has its own unique nutritional, breeding, and water requirements that the hatchery has to perfect before successful breeding can occur.[54]

The industry for breeding marine ornamental fish in captivity is growing. Currently, around 121 species are readily obtainable in aquarium shops from breeding in captivity, though there may be as many as 350 species being bred in captivity (but perhaps not commercially or for international trade).[55] Captive breeding is the most economically viable for popular species already traded in high numbers, like the clownfish genus (*Amphiprion*) and dam-

29. Daniel J. Thornhill, Defenders of Wildlife, Ecological Impacts and Practices of the Coral Reef Wildlife Trade 138 (2012).
30. *Id.*
31. *Id.* at 139-40.
32. *Id.* at 140.
33. Monticini, *supra* note 10, at 49.
34. Victoria Milko et al., *Sparkling Fish, Murky Methods: The Global Aquarium Trade*, AP News (Oct. 19, 2022, 8:54 AM), https://apnews.com/article/fish-saltwater-aquarium-coral-reef-580c16f3aaa6e8e7209597ff92488130.
35. Nancy E. Breen et al., *Can Excreted Thiocyanate Be Used to Detect Cyanide Exposure in Live Reef Fish?*, 13 PLoS One e0196841, at 2 (2018).
36. Milko et al., *supra* note 34; Monticini, *supra* note 10, at 47.
37. Breen et al., *supra* note 35.
38. Milko et al., *supra* note 34.
39. Breen et al., *supra* note 35.
40. *Id.* at 1.
41. *Id.*
42. *Id.*
43. Thornhill, *supra* note 29, at 8.
44. *Id.*
45. *Id.* at 35.
46. *Id.* at 38-39.
47. *Id.* at 39.
48. *Id.*
49. T.T. Ajith Kumar et al., *Breeding and Rearing of Marine Ornamentals*, *in* Advances in Marine and Brackishwater Aquaculture 102 (Santhanam Perumal et al. eds., Springer 2015).
50. Jonah van Beijnen & Gregg Yan, *Culturing Marine Ornamentals: A $5 Billion Opportunity*, Fish Site (Dec. 7, 2020, 8:00 AM), https://thefishsite.com/articles/culturing-marine-ornamentals-a-5-billion-opportunity.
51. *Id.*
52. *Id.*
53. *Id.*
54. *Id.*
55. *OATA/OFI Framework Proposal*, *supra* note 8, para. 44; Jacqueline Juergens et al., Species360 Conservation Science Alliance, The Marine Ornamental Fish Species Knowledge Index: Providing Data to Inform CITES Decisions and Recommendations to Manage the International Trade of Marine Ornamental Fish, at II (2024), https://cites.org/sites/default/files/eng/prog/marine_ornamental_fishes/workshops/brisbane_052024/Marine%20Ornamental%20Fish%20SKI%20Final%20Draft.pdf.

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selfish.[56] For those species traded in low numbers, captive breeding may never be an economically feasible option.[57]

Both governments and private companies have sponsored captive breeding programs. The Indian government supported a hatchery project to develop hatchery techniques for clownfish and damselfish in order to transfer them to coastal and island communities for their sustainable development.[58] A private venture in Panama, Bocas Mariculture, focuses more on sustainably producing high-demand coral reef species while providing jobs for the local community.[59] Another private company in Indonesia, Bali Aquarich, produces high-value species and creates demand for new hybrids, letting them control the price without competition from wild-caught specimens.[60]

B. Overview of the Supply Chain and Network

The supply chain for wild-caught marine ornamental fish is a complex network with hundreds of actors. The trade largely relies on rural communities in Southeast Asia, like the Philippines or Indonesia, to catch the fish.[61] Fishing communities will work individually or in small family groups, sometimes acting as the intermediary wholesalers or exporters.[62] If they live too far away from stocking stations, where fish are separated and prepared for further transport, then the fishing communities will sell the fish to an intermediary who then brings them to the stocking station, who then passes them on to the wholesalers.[63]

Once the fish are at the stocking facilities, they are shipped out immediately or very soon after.[64] The ornamental fish trade relies on third parties that combine orders from multiple small importers to create larger shipments to reduce shipping costs.[65] The third party handles all the specialized shipping logistics to get the fish to their destination as quickly and efficiently as possible.[66]

This distributional system creates several problems for both regulation and the health of the fish or the environment. Regulating the initial capture of the fish among the local communities is a nearly impossible task.[67] The Philippines and Indonesia, the top exporters, are archipelagic countries with widely dispersed fishing communities.[68] Monitoring capture of the fish to ensure that fishing communities abstain from using harmful practices, like cyanide, is a problem the national governments struggle to control.[69] Efforts to educate the communities on safer ways to catch the fish using nets are difficult to implement because of the large number of people who catch the fish, which can be in the thousands for a single country.[70]

There is also little incentive for the fishing communities to implement safer ways to catch the fish. The fishing communities are only paid for the number of fish they catch,[71] incentivizing the quickest and least intensive work method. Exporters demand fish at the lowest price to stay competitive on the international market and do not care whether the fish were caught using cyanide or nets.[72] The quick movement of the fish between the original catch location, any intermediaries, and wholesalers who export the fish make the whole system very hard to regulate and difficult to track how the fish are caught and transported.[73]

Practices like using cyanide[74] can lead to increased post-capture mortality of the fish during transit. Repeated handling and transport of fish in the ornamental trade has been shown to cause immunosuppression, making them more susceptible to disease.[75] Any additional practice, like cyanide stunning, that compromises the fishes' immune systems also increases mortality rates. A true mortality rate is hard to measure due to the supply chain and multiple variables, but estimates range from 2% to 73%.[76]

Approximately 15% of fish die immediately after being caught, 10% die during the various stages of transport, and 5% die at stocking stations.[77] Additional stressors, like fasting before transport, characteristics of the holding water, the high density of fish in bags for travel, unsuitable temperatures, and mismanagement of the boxes upon arrival at the airport all contribute to a high mortality rate.[78] However, high mortality rates might be mostly associated with illegal trade, as long as legal traders respect the International Air Transport Association Live Animals Regulations or International Air Transport Association Perishable Cargo Regulations.[79]

When the fish make it to their final destination, they are distributed to the various small importers. The price of fish at retail depends on the species and its current popularity.[80] The fishing communities are often only paid 15% of the price paid for the export of the fish, creating a huge discrepancy in the pay scale.[81] For example, a Filipino fisher receives roughly $0.2 for a clownfish that retails for around $20.[82]

56. *See* Kumar et al., *supra* note 49.
57. *International Trade in Non-CITES*, *supra* note 11, at 1.
58. Kumar et al., *supra* note 49.
59. van Beijnen & Yan, *supra* note 50.
60. *Id.*; *see generally* Bali Aquarich Indonesia, *Home Page*, https://bali-aquarich.com/ (last visited May 3, 2025) (website for selling marine ornamental fish).
61. Monticini, *supra* note 10, at 19.
62. *Id.* at 48.
63. *Id.* at 20, 49.
64. *Id.* at 49.
65. *Id.* at 20.
66. *Id.*
67. Milko et al., *supra* note 34.
68. *Id.*
69. *Id.*
70. Monticini, *supra* note 10, at 49.
71. *Id.*
72. *Id.* at 50.
73. Milko et al., *supra* note 34; Christine H. Stevens et al., *Stress and Welfare in Ornamental Fishes: What Can Be Learned From Aquaculture?*, 91 J. Fish Biology 409, 416 (2017).
74. See discussion *supra* Section I.A.
75. *See* Stevens et al., *supra* note 73, at 412 (study addressing goldfish).
76. *Id.* at 410.
77. Monticini, *supra* note 10, at 48.
78. *Id.* at 79.
79. CITES Joint Session of the 29th Meeting of the Animals Committee and 23d Meeting of the Plants Committee, *Transport of Live Specimens*, para. 8, CITES Doc. AC29 Doc. 17/PC23 Doc. 17 (July 22, 2017), https://cites.org/sites/default/files/eng/com/ac-pc/ac29-pc23/E-AC29-17-PC23-17.pdf.
80. Monticini, *supra* note 10, at 49.
81. *Id.*
82. van Beijnen & Yan, *supra* note 50.

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C. Lack of Data

The major problem the marine ornamental trade faces is a lack of trade data.[83] Even though certain species are traded in high numbers, they could recover quickly due to high reproductive rates, fast growth rates, and long dispersal distances.[84] Other species may have low reproductive rates, slow growth rates, or short dispersal distances that expose them to higher risk of overfishing.[85] Knowing the biological traits for each marine ornamental fish is vital to implement proper conservation measures, but resources are limited to pursue such research.[86] Some fish, like the BCF, have enough trade value to warrant individual surveys on their wild populations. But less valuable specimens might be undergoing just as much trade with no surveys to assess their wild population.[87]

Monitoring the trade in each species is equally important to collect a general idea of how much each species is traded. There is no global or comprehensive data set tracking the marine ornamental trade.[88] Regional and national data sets have provided extremely useful data, but it is patchwork data limited by geography and time frame.[89] Several studies have analyzed import data for the United States or the EU, but the data gleaned from those studies are only snapshots of a couple of years that were published years later.[90] Initiatives like the Global Marine Aquarium Database provided global trade data for a short period of time, but relied on voluntarily submitted data and did not have the funding to sustain a longer existence.[91]

Current data are often aggregated and not very accurate. Some figures might be based on historical estimates or inferred using limited data from trade organizations.[92] Those estimates are often based on the declared value of the shipments, not on individuals within the shipment, which varies depending on current market price and makes quantity estimates very unreliable.[93] Some existing databases also do not have separate import codes for each marine ornamental species and lump them all together under one code, making species-specific data impossible to discern.[94] Additionally, shipments might mix together freshwater and marine fishes, and sometimes even invertebrates, in their calculations.[95] Overall, the state of the trade data for the marine ornamental industry has been a discussion among scientists and conservationists for decades.[96]

II. Legal Framework: CITES

There is a startling lack of global regulation of the marine ornamental trade. The only international legal framework that governs the trade of marine ornamentals is CITES.[97] CITES assigns different levels of protection to a wide range of listed species in its three appendices. This part provides an overview of CITES and then focuses on Appendices II and III, as they are the most relevant to the marine ornamental trade.

A. Overview

CITES is a binding international agreement between governments to prevent international trade from threatening or leading to the extinction of wild animals and plants.[98] Eighty-eight countries signed the draft convention on March 3, 1973, and CITES entered into force two years later on July 1, 1975.[99] As of 2024, 184 countries are Parties to this treaty that protects more than 40,000 species.[100]

The Convention established a Secretariat and holds conferences of the parties (COPs), both of which contribute to the functioning of the Convention.[101] The CITES Secretariat is administered by the United Nations Environment Programme, located in Geneva, Switzerland, to help coordinate meetings and other workings of the Convention, assist with implementation and monitoring of the provisions, undertake scientific and technical studies, and make recommendations regarding implementation of CITES, among other roles.[102] The COP meets every two to three years to discuss conservation of listed species, consider whether to amend Appendices I or II, consider other documents or reports from Parties or committees, recommend measures to improve the effectiveness of the Convention, and make provisions necessary for the functioning of the Secretariat.[103]

The COP also established several permanent committees to help run the Convention between COP meetings.[104] The Standing Committee helps the Secretariat with implementation of the Convention, manages the

83. Michael F. Tlusty et al., *Species-Level, Digitized Wildlife Trade Data Are Essential for Achieving Biodiversity Targets*, 121 PNAS e2306869121, at 1 (2024).
84. *OATA/OFI Framework Proposal*, *supra* note 8, para. 4.b.
85. *Id.*
86. *See id.* para. 4.c.
87. Kristin E. Lunn & Marie-Annick Moreau, *Unmonitored Trade in Marine Ornamental Fishes: The Case of Indonesia's Banggai Cardinalfish (*Pterapogon kauderni*)*, 23 Coral Reefs 344, 349 (2004).
88. *International Trade in Non-CITES*, *supra* note 11, at 7.
89. *See id.*
90. *See generally* Rhyne et al., *supra* note 16 (U.S. import data); Biondo & Burki, *supra* note 8 (EU import data).
91. *International Trade in Non-CITES*, *supra* note 11, at 8.
92. Biondo & Burki, *supra* note 12, at 2.
93. *Id.*
94. *International Trade in Non-CITES*, *supra* note 11, at 7. The EU system, TRACES, introduced a separate import code just for marine ornamental fish based on species in 2014 that has greatly increased its ability to track specific species information. However, it has also allowed genus, family, or order level identification that has muddied data collection. Biondo et al., *supra* note 17, at 2.
95. Biondo & Burki, *supra* note 12, at 2.
96. *Id.*
97. *Conservation Management of MOF*, *supra* note 9, para. 8.
98. CITES, *supra* note 21. For a more in-depth discussion of each article in CITES, see David S. Favre, International Trade in Endangered Species: A Guide to CITES (1989).
99. Willem Wijnstekers, The Evolution of CITES 32 (9th ed. 2011).
100. CITES, *supra* note 21.
101. Wijnstekers, *supra* note 99, at 48.
102. CITES, art. XIII, Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243 [hereinafter CITES Treaty]; CITES, *The CITES Secretariat*, https://cites.org/eng/disc/sec/index.php (last visited May 3, 2025).
103. CITES, *Conference of the Parties*, https://cites.org/eng/disc/cop.php (last visited May 3, 2025).
104. Wijnstekers, *supra* note 99, at 48.

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budget, and coordinates the other committees and working groups.[105] The Animals and Plants Committees were established to provide more biological and scientific knowledge about species that might become subject to protection under CITES.[106]

The CITES preamble recognizes that no single country could tackle the regulation of the wildlife trade by itself, stating that the contracting States "*Recogniz[e]* . . . that international co-operation is essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade."[107] Creating effective conservation strategies requires international cooperation to share the often-limited knowledge about the exact exploitation of species.[108]

CITES recognizes that many species protected by the Convention are located within developing countries.[109] As a result, it invites Parties to "support the capacity-building efforts of other Parties" and "ensure the inclusion of capacity-building, including . . . technical, enforcement and compliance assistance" in cooperation programs.[110] It also recognizes that conservation measures have to consider the livelihoods of the local communities that might rely on the wildlife trade and may require incentives for the sustainable use of species.[111]

CITES acknowledges that, if done correctly, commercial reliance on wild animals and plants could assist conservation efforts.[112] Profit from the legal trade could be utilized against the illegal trade and support management of the targeted species.[113] However, CITES was created to "prevent unsustainable use, not to promote sustainable use over non-use."[114] Any sustainability goals have to fit within the key concepts of international cooperation, trade controls, and species survival.[115]

CITES established three appendices that have different levels of protection for the listed species. Appendix I provides the strictest protection for species threatened with extinction, and should only be used in "exceptional circumstances."[116] Appendix II includes species that may be threatened with extinction unless trade is regulated, as well as look-alike species that need to be regulated in order to protect the threatened species.[117] Appendix III includes species regulated within a Party's jurisdiction and for which that Party wants international assistance to control trade.[118]

Each Party has to designate management authorities that can issue permits and certifications if certain conditions are met, subject to the advice from scientific authorities.[119] The issuance of permits and certificates relies on questions like whether the trade would be detrimental to the species' survival, whether the specimen was acquired legally, and how a live specimen will be transported.[120] Appendix I requires both import and export permits to be granted by the relevant management authority of the State.[121] Requirements for Appendices II and III are listed below.[122]

Exemptions from CITES provisions, including for Appendix I species, can be granted for specimens in transit or being transshipped, specimens that are household or personal effects, specimens acquired before CITES provisions applied to them, captive-bred animals, specimens collected for scientific use, or for specimens part of a traveling exhibition.[123] Parties can enter specific reservations against species listed in all three appendices but cannot request general reservations.[124]

The permits are used to monitor and collect data. Countries are required to annually submit trade records to the Secretariat for all appendices.[125] The annual reports of all Parties help to keep track of CITES species globally and measure implementation success within countries by comparing the export and import numbers.[126] Parties that are not signatories of CITES are still required to provide documentation that is substantially similar to Convention requirements for permits and certificates when trading with Parties that have signed CITES.[127]

B. Appendix II

Appendix II provides protections to prevent the overexploitation of species due to trade pressure. Species are listed under Appendix II for two reasons. Under Article II, paragraph 2(a), species can be listed if trade needs to be strictly regulated in order to "avoid utilization incompatible with their survival."[128] It has to be known, projected, or inferred that regulation of trade is either necessary to prevent the species from being listed on Appendix I in the near future, or required to ensure that harvest of wild specimens will not threaten its population.[129] Under Article II, paragraph 2(b), species can be listed if (1) its exclusion puts listed species under paragraph 2(a) or Appendix I at risk and it is hard to distinguish the two species, or (2) other "compel-

105. CITES, *Standing Committee*, https://cites.org/eng/disc/sc.php (last visited May 3, 2025); *see* CITES Res. Conf. 18.2, Annex 1.
106. CITES, *Animals and Plants Committees*, https://cites.org/eng/disc/ac_pc.php (last visited May 3, 2025); *see* CITES Res. Conf. 18.2, Annex 2.
107. CITES Treaty, *supra* note 102, pmbl.; Wijnstekers, *supra* note 99, at 32.
108. Wijnstekers, *supra* note 99, at 32.
109. CITES Res. Conf. 8.3 (Rev. CoP13).
110. CITES Res. Conf. 19.2.
111. CITES Res. Conf. 8.3 (Rev. CoP13).
112. Wijnstekers, *supra* note 99, at 383.
113. CITES Res. Conf. 8.3 (Rev. CoP13).
114. Rosalind Reeve, Policing International Trade in Endangered Species: The CITES Treaty and Compliance 28 (2002). For a discussion about CITES' shift toward sustainable use, see Michael J. Hickey, *Acceptance of Sustainable Use Within the CITES Community*, 23 Vt. L. Rev. 861 (1999).
115. Reeve, *supra* note 114, at 29.
116. CITES Treaty, *supra* note 102, art. II.1.
117. *Id.* art II.2.
118. *Id.* art. II.3.
119. Wijnstekers, *supra* note 99, at 47.
120. *Id.*
121. CITES, *supra* note 22; *see* CITES Treaty, *supra* note 102, art. III.
122. *See infra* Sections II.B and II.C.
123. CITES Treaty, *supra* note 102, art. VII.
124. *Id.* art. XXIII.
125. Wijnstekers, *supra* note 99, at 48.
126. *Id.*
127. *Id.*
128. CITES Treaty, *supra* note 102, art. II.2.a.
129. CITES Res. Conf. 9.24 (Rev. CoP17), Annex 2a.

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ling reasons" ensure that effective control of trade for the listed species can be achieved.[130]

A species can be listed under Appendix II by a two-thirds majority vote of Parties present and voting at a COP meeting.[131] Whenever a Party suggests a species be listed on either Appendix I or II, the range State should be consulted by either the proponent or the Secretariat on its behalf.[132] Such amendments should include accurate and relevant scientific information, account for socioeconomic factors, and meet agreed biological and trade criteria.[133]

Under Appendix II, an export permit must be granted when the scientific authority determines trade is non-detrimental to the species, and the management authority determines the specimen was not obtained illegally and will be shipped to minimize risk of injury or damage.[134] The scientific authority has to monitor both the export permits and the actual exports of the specimens to assess whether trade should be limited so it will not need future protection.[135]

While the process for listing to Appendix II is supposed to rely on a series of factors assessing the species' risk of requiring Appendix I protections and avoiding decline through trade,[136] the power of economics cannot be ignored.[137] Several shark species were proposed to be listed on Appendix II at COP 15, but only garnered a simple majority in votes, if they gained a majority at all.[138] Many of them were ultimately rejected because countries claimed other regulatory bodies should be in charge of those populations, CITES would infringe on sovereign fishing rights, or there seemed to be some behind-the-scenes political maneuvering.[139] Not surprisingly, all of the listed shark species were commercially valuable for shark fin soup, meat, or other uses.[140] The political maneuvering of countries who rely on a species' trade as either imports or exports, instead of relying purely on scientific assessments, is a huge obstacle to getting a species listed on Appendix II with the two-thirds majority vote.

C. *Appendix III*

Appendix III is much different from Appendices I and II. While those appendices require adherence to regulations of international trade, Appendix III was created as a supplement to domestic laws. Species listed under Appendix III need to be regulated by laws to prevent or restrict exploitation in their range country, but for which the Party wants the cooperation of other Parties to help control trade.[141]

Listing under Appendix III requires that a Party ensure (1) the species is native to that country; (2) national regulations are adequate to protect the species from exploitation and include penalties for taking; and (3) national enforcement measures are adequate to implement those regulations.[142] The Party must submit the relevant domestic laws and regulations to the Secretariat, along with any relevant interpretations.[143] Additionally, Parties also have to show that there are indications that international cooperation is needed to control illegal trade.[144]

Appendix III does not require a vote to amend and listings can be submitted at any time, but Parties are encouraged to submit listings three months before a COP so amendments for all three appendices can be released at the same time.[145] Before a Party submits the species to the Secretariat for listing, it has to alert other range States, major importing countries of the proposed species, the Secretariat, and relevant committees about the consideration of inclusion, and verify that the biological and trade status of the proposed species justifies the listing.[146] Once other Parties are alerted to the listing, any Party can enter a reservation to be treated as a non-Party for that species.[147]

Once a species is listed under Appendix III, an export permit is required to show that the management authority is satisfied that the specimen was not obtained illegally and the shipping will not risk or damage the specimen.[148] For range States that did not join the listing for Appendix III, certificates of origin are required upon importation.[149]

Implementation of Appendix III could fill the holes seen in the other two appendices. Appendix III provides a much easier listing and permitting process than either of the other appendices.[150] As a result, there is less bureaucracy for the relevant national CITES authorities to contend with while also providing helpful documentation about trade in at-risk species.[151] The listing of a species on Appendix III also gives non-native countries a legal enforcement mechanism to prevent the importation of at-risk species without binding national laws.[152]

In addition, Appendix III could be used as a stepping stone between no listing and a higher listing of a species.[153] Because a listing on Appendix III can be submitted at any time, it could prevent last-minute overexploitation of a species listed on another appendix but before the enforcement

130. *Id.* Annex 2b.
131. CITES Treaty, *supra* note 102, art. XV.2.j.
132. CITES Res. Conf. 9.24 (Rev. CoP17), pmbl.
133. *Id.* at 2.
134. CITES Treaty, *supra* note 102, art. IV.2.
135. *Id.* art. IV.3. For a discussion of some of the problems with enforcing CITES, specifically Appendices I and II, see Elisabeth M. McOmber, *Problems in Enforcement of the Convention on International Trade in Endangered Species*, 27 Brook. J. Int'l L. 673 (2002).
136. CITES Res. Conf. 9.24 (Rev. CoP17), Annexes 2(a), 2(b), 5.
137. Melissa Blue Sky, *Getting on the List: Politics and Procedural Maneuvering in CITES Appendix I and II Decisions for Commercially Exploited Marine and Timber Species*, 10 Sustainable Dev. L. & Pol'y 35 (2010).
138. *Id.* at 38.
139. *Id.*
140. *Id.*
141. CITES Treaty, *supra* note 102, art. II.3.
142. CITES Res. Conf. 9.25 (Rev. CoP17), para. 2(a).
143. CITES Treaty, *supra* note 102, art. XVI.4.
144. CITES Res. Conf. 9.25 (Rev. CoP17), para. 2(b).
145. *Id.* para. 3.
146. *Id.* paras. 2(c), (d).
147. CITES Treaty, *supra* note 102, art. XVI.2.
148. *Id.* art. V.2.
149. *Id.* art. V.3.
150. Sarah Heinrich et al., *Using CITES Appendix III to Protect Native Species Found in International Trade: The Case of the Philippines*, 151 Philippine J. Sci. 127, 128 (2022).
151. *Id.*
152. *Id.* at 129.
153. *Id.*

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requirements take action.[154] Last, Appendix III can be used to track trade patterns and data to observe whether a species needs further protection under a different appendix.[155]

The effectiveness of Appendix III is questionable. Some species listed under Appendix III only rarely occur in international trade, so CITES has limited effect.[156] Parties also view Appendix III with wariness and are unconvinced of its effectiveness, resulting in their "unwilling[ness] to take on the administrative burden of implementing the provisions" for Appendix III.[157] In addition, species can only be listed on Appendix III by range countries. If those countries refuse to list the species, there is no way for the benefits of Appendix III to get implemented for at-risk species.

III. Case Study: The BCF

One species that could have benefitted from a listing on Appendix II was the BCF. Rare for marine ornamental fish, the BCF has been the focus of scientific studies to assess its ecology and the impacts of international trade. The BCF hit all the criteria required for listing onto Appendix II, but proposals to list the species failed twice. Indonesia argued successfully that it could take care of the conservation of the species itself, and that international management would only hinder its conservation efforts. However, seven years after the second listing attempt, the BCF is still not recovering, and perhaps international support is still warranted, even in the face of Indonesia's opposition.

The BCF is a dainty, spotted, black-and-white-striped coral reef fish endemic to the Banggai Archipelago in Central Sulawesi, Indonesia.[158] Its native range is restricted to 27 small islands, amounting to around 10,000 square kilometers (km^2) (3,861 square miles (mi^2)),[159] though the BCF may directly occupy an area as small as 30 km^2 (9 mi^2).[160] It can also be found in several spots outside its native range where it has successfully established populations.[161] Population estimates in 2004 suggested there were 2.4 million individuals in the wild, but by 2015 that number decreased to 1.4 million.[162]

BCF live in shallow coastal waters among reefs, reef flats, and seagrass.[163] Males incubate the eggs and the hatched young in their mouths before releasing them to live nearby among protective microhabitats, like urchins, sea anemones, and some corals.[164] This reproductive strategy has likely restricted the number of offspring each brood can contain, and the small dispersal range makes individual populations vulnerable to extinction.[165] The BCF's reliance on benthic organisms requires a holistic conservation strategy, making BCF conservation "arguably inseparable from the ornamental fish trade and governance issues."[166]

The district surrounding the BCF's native habitat has a high poverty level, with income driven by natural resources.[167] As such, the area's biodiverse reefs are under considerable pressure and have experienced substantial degradation in certain areas.[168] A 2001 study estimated that 230 individuals regularly collected BCF, though most did not rely solely on BCF for their livelihood.[169] No cyanide use was reported, as BCF are a fairly docile species that travel in groups and are easy to catch in a net.[170]

Concern about the BCF's wild population was first raised in the 1990s.[171] In response, a study focused on the livelihoods of poor communities in Asia reliant on marine resources.[172] The report found, among other things, that (1) the BCF trade provided valuable income but was poorly managed; (2) subpopulations of BCF had been significantly reduced; and (3) with proper harvesting patterns, the BCF could be sustainably fished.[173] Additionally, a ban would have adverse effects on human welfare and put more pressure on other marine resources, leading to difficult enforcement and resentment.[174] Several improvements to fishing practices were implemented, along with a draft action plan and several proposals.[175]

Nevertheless, international concern persisted, culminating in the United States proposing to list the BCF under Appendix II at COP 14 in 2007.[176] The IUCN Red List listed the BCF as endangered earlier the same year.[177] The main reason for the proposal was the potentially unsustainable harvest for the aquarium trade based on the limited geographic range of the BCF.[178] However, the Food and Agriculture Organization of the United Nation's (FAO's) Expert Advisory Panel did not think the BCF met the listing requirements for Appendix II, and found that the Indonesian government took appropriate actions to protect

154. *Id.*
155. *Id.* at 129-30.
156. CITES Res. Conf. 9.25 (Rev. CoP17), pmbl.
157. *Id.*
158. Abigail Moore & Samliok Ndobe, *The Banggai Cardinalfish: An Overview of Management and Conservation Initiatives*, Galaxea J. Coral Reef Stud. (Special Issue) 238, 238 (2013).
159. Lunn & Moreau, *supra* note 87, at 345; Alejandro A. Vagelli & Mark V. Erdmann, *First Comprehensive Ecological Survey of the Banggai Cardinalfish*, Pterapogon kauderni, 63 Env't Biology Fishes 1, 3 (2002).
160. Adam Cruise, *This Popular Aquarium Fish Might Vanish From the Wild*, Nat'l Geographic (Sept. 16, 2016), https://www.nationalgeographic.com/animals/article/wildlife-banggai-cardinalfish-trade-cites-protections.
161. Moore & Ndobe, *supra* note 158, at 239.
162. FAO, *supra* note 27, at 58.
163. Moore & Ndobe, *supra* note 158, at 239.
164. *Id.*; Lunn & Moreau, *supra* note 87, at 345.
165. Lunn & Moreau, *supra* note 87, at 345.
166. Abigail M. Moore et al., *Importance of Monitoring an Endangered Endemic Species—Intra-Species Biodiversity Perspectives on the Banggai Cardinalfish Conservation and Trade*, 681 IOP Conf. Series: Earth & Env't Sci. art. 012120, at 1 (2021).
167. Moore & Ndobe, *supra* note 158, at 238-39.
168. *Id.* at 239.
169. Lunn & Moreau, *supra* note 87, at 346, 348.
170. *Id.* at 347; Cruise, *supra* note 160.
171. Moore & Ndobe, *supra* note 158, at 239.
172. *Id.*
173. *Id.* at 239-40.
174. *Id.* at 240.
175. *Id.*
176. CITES 14th Meeting of the COP, *Consideration of Proposals for Amendment of Appendices I and II*, CITES Doc. CoP14 Prop. 19 (June 3-15, 2007).
177. Tonny R. Soehartono & Ani Mardiastuti, *Banggai Cardinalfish (*Pterapogon kauderni*) and the Attempt for the Inclusion of CITES Appendix II*, 12 J. Ilmu dan Teknologi Kelautan Tropis 595, 596 (2020).
178. *Id.* at 597.

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the BCF.[179] With Indonesia and several other Parties opposing, the United States withdrew its proposal.[180]

After COP 14, Indonesia created a BCF action plan, established the BCF Center, passed national legislation to manage the BCF, and initiated local and community conservation.[181] Nongovernmental organizations and the BCF Center facilitated efforts to train the fishing communities in sustainable fishing methods, post-harvest care, and marketing skills.[182] Captive breeding of the BCF was also found to be highly feasible, and the national government promoted commercial operations in cooperation with the local government.[183] In 2016, captive breeding was able to supply about half the demand for the BCF.[184]

Notwithstanding these positive conservation developments, the EU listed the BCF under its Annex D in 2008 because it thought the high imports of BCF warranted monitoring.[185] In 2016, the United States listed the BCF as threatened under the Endangered Species Act (ESA), prohibiting the commercial importation of the species to the United States.[186]

The international community again raised concern about the BCF's status in 2015.[187] Despite Indonesia's opposition once again, the EU proposed the BCF for listing onto Appendix II at COP 17 in 2016.[188] The proposal cited several studies that reported the local extinction of several subpopulations of the BCF in certain areas within its native range.[189]

The FAO Panel supported the listing, but noted the BCF had a good chance for recovery.[190] A listing on Appendix II could help Indonesia record global trade, trace the illegal trade, and ensure effectiveness when dealing with international trade issues.[191] Indonesia countered that a BCF listing might disrupt conservation by requiring additional management resources and encourage illegal trade.[192]

COP 17 adopted decisions requesting Indonesia to make and report on more specific conservation measures, commissioning a study on the BCF, and encouraging other Parties to support Indonesia.[193] Once Indonesia agreed to implement additional conservation measures, the EU withdrew the proposal.[194]

The study requested by COP 17 found that Indonesia had already initiated several conservation activities for the BCF, as well as harvest and trade management.[195] The 30th meeting of the Animals Committee congratulated Indonesia on its work based on the report, and encouraged it to continue the conservation efforts and report back at the 31st meeting.[196] In April 2019, Indonesia released a decree barring harvest of the BCF during its breeding seasons.[197] However, there are no rules regulating the harvest of BCF during the open season besides catch limits for different islands.[198]

The current management status may not be as rosy as the Indonesian government would like the Parties to believe, however. The BCF Center created after the first CITES proposal was apparently never occupied and only built for show.[199] The BCF population has decreased in several locations, with some at a critical level, though other, monitored sites saw an increased population.[200] Due to overfishing in their native range, BCF are now largely wild-caught in locations where they were introduced because their original populations are so low.[201] The BCF could potentially benefit from international trade regulation, but Indonesia does not want to list it.

IV. Proposals for CITES Amendments and Certification

The BCF's story demonstrates that CITES' reliance on range country cooperation prohibits utilizing the global system to collect trade data. This Comment proposes amendments to Appendix III that (1) would help collect international trade data for certain marine ornamental species, and (2) encourage technology-sharing to gather more accurate trade data. In addition, scaled-back certification schemes in collaboration with trade associations or funneled through CITES should be pursued to encourage sustainable practices and communication with the local communities.

A. *Amendments to CITES*

As the only current global regulatory framework that governs the marine ornamental trade, amending CITES to create an alternative listing mechanism oriented toward collecting data and sharing technology among States could

179. *Id.* at 597, 598.
180. *Id.* at 598.
181. Moore & Ndobe, *supra* note 158, at 240.
182. *Id.*
183. Soehartono & Mardiastuti, *supra* note 177, at 598.
184. FAO, *supra* note 27, at 62.
185. Commission Regulation 318/2008 of March 31, 2008, Amending Council Regulation No. 338/97 on the Protection of Species of Wild Fauna and Flora by Regulating Trade Therein, 2008 O.J. (L 95/4).
186. Soehartono & Mardiastuti, *supra* note 177, at 601; National Oceanic and Atmospheric Administration Fisheries, *Banggai Cardinalfish: Conservation & Management*, https://www.fisheries.noaa.gov/species/banggai-cardinalfish/conservation-management (last updated Oct. 18, 2023).
187. Soehartono & Mardiastuti, *supra* note 177, at 599.
188. CITES 17th Meeting of the COP, *Consideration of Proposals for Amendment of Appendices I and II*, CITES Doc. CoP17 Prop. 46 (Sept. 24-Oct. 5, 2016) [hereinafter App. II 2016 Proposal].
189. Soehartono & Mardiastuti, *supra* note 177, at 599; App. II 2016 Proposal, *supra* note 188, para. C.4.4.
190. FAO, *supra* note 27, at 63.
191. Soehartono & Mardiastuti, *supra* note 177, at 600.
192. *Id.*
193. *Id.* at 602-03.
194. *Id.* at 603.
195. *Id.*
196. *Id.*
197. *Id.*
198. *Id.* at 604; Ari Syamsudin, *Indonesia Struggles to Protect Banggai Cardinalfish*, Dialogue Earth (Mar. 25, 2024), https://dialogue.earth/en/nature/40094296-indonesia-struggles-to-protect-banggai-cardinalfish/.
199. Cruise, *supra* note 160.
200. Christopel Paino, *Banggai Cardinal Fish, the Future of the Bone Baru Community*, Mongabay (Nov. 3, 2019), https://www.mongabay.co.id/2019/11/03/banggai-cardinal-fish-masa-depan-masyarakat-bone-baru/ (translated by Google).
201. Syamsudin, *supra* note 198.

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be a viable option. Alternative listing criteria would create an easier path to list at-risk species to collect more trade data. Sharing technology among States would meet the capacity-building goals of CITES to create a more global implementation plan.

1. Appendix III: Alternative Listing Mechanism

Like the United States' ESA, one of the most significant limitations to CITES is that protection only extends to those species listed under one of the appendices.[202] Listing under Appendix II involves consultation with the range State(s)[203] and works best with subsequent approval from the State or States involved, though such approval is not required. Under Appendix III, species can only be listed by the range State(s).[204] Thus, if a range State does not think that a native species requires international protection, it is extremely difficult for the species to be listed under CITES.

Marine ornamental fish, like the BCF, would be ideal candidates for listing under Appendix III except for refusal by range countries.[205] Listing certain, at-risk species under Appendix III without the range country's support could help collect global trade data if implemented carefully and within the current system.

Successful listings often involve as much or more political maneuvering as scientific necessity.[206] Such political concerns may include (1) sufficiency of national management measures; (2) difficulties implementing a listing; (3) thinking CITES is not the correct regulatory method; or (4) arguing that a listing would have a negative socioeconomic impact.[207]

Appendix III provides range States with an avenue to ask the international community for help in enforcing or monitoring species in international trade.[208] Previous listings under Appendix III acted as a way to collect more data to ultimately list on Appendix II.[209] For instance, the Australian government listed the great white shark under Appendix III, and reported that the requirement for export permits and certificates of origin "enable[ed] a trail to be built up" and facilitated a "greater understanding" of the international trade.[210] Three years after the Appendix III listing, the great white was successfully listed under Appendix II.[211]

In other instances, like the Atlantic walrus, an Appendix III listing indicated that additional protections were not required, but the CITES documentation provided an "index of global consumption" to help with monitoring.[212] In another instance, data collected through the listing of the Siberian weasel under Appendix III revealed that its current trade numbers seemed unsustainable and needed to be further researched.[213] Even though 24 countries entered a reservation against the listing by India, the listing provided useful data that was otherwise impossible to get.[214]

Several factors indicate which species will have the highest likelihood of successful regulation under Appendix III: (1) easy identification of the species; (2) the trade is largely commercial; (3) the species is not found in the high seas; and (4) it does not require the cooperation of multiple range States.[215] The marine ornamental trade is commercial and not from the high seas, but some fish can be found in multiple range States and identification between look-alike species can be tricky.[216] However, they are not traded in derivative forms, like a shark fin that is completely indistinguishable among species.[217]

This Comment proposes to allow non-range States to list species under Appendix III. The other two appendices already allow non-range States to propose a listing, and the listing is only confirmed with a two-thirds majority vote. A similar practice could be implemented for Appendix III: a non-range State could propose a listing that would be confirmed with a simple majority vote at a COP meeting. If a non-range State proposed the listing, all range States would only have to issue certificates of origin. The purpose of the listing would be focused on gathering data about the international trade of the species instead of enforcing domestic laws. Other requirements, like the existence of national laws and enforcement, would still be included.

Concerns that Appendix III adds to the administrative burden of States might be allayed by findings that CITES controls "mirrored or complemented national export and import controls."[218] Many countries that export marine ornamental fish already have national legislation concerning their export, so the added administrative burden would be lessened.[219] Regardless, even if countries are not properly implementing the full requirements of Appendix III, the export permits required can still help gather data about how often the species is traded.[220]

This is not a proposal to list all the species in the marine ornamental trade under CITES. In May 2024, a CITES technical workshop convened in Brisbane, Australia, to

202. United Nations Office on Drugs and Crime, *CITES and the International Trade in Endangered Species*, https://www.unodc.org/e4j/en/wildlife-crime/module-2/key-issues/cites-and-the-international-trade-in-endangered-species.html (last visited May 3, 2025).
203. CITES Res. Conf. 9.24 (Rev. CoP17), pmbl.
204. CITES Treaty, *supra* note 102, art. II.3.
205. *See supra* Part III.
206. *See* United Nations Office on Drugs and Crime, *supra* note 202.
207. CITES 25th Meeting of the Animals Committee, *Criteria for the Inclusion of Species in Appendices I and II (Decisions 15.28 and 15.29)*, Annex 1 para. 12, CITES Doc. AC25 Doc. 10 (July 18-22, 2011).
208. *Appendix III . . .?*, CITES World (CITES, Geneva, Switzerland), July 2003, at 1 [hereinafter CITES World].
209. Anna Willock et al., TRAFFIC International, First Choice or Fallback? An Examination of Issues Relating to the Application of Appendix III of CITES to Marine Species 1, 9 (2004).
210. *Id.* at 9.
211. *Id.*
212. *Id.* at 6 (quoting P. Hall, Fishery Management Coordinator (Marine Mammals), Central and Arctic Region, Fisheries and Oceans Canada).
213. Sarah Heinrich & Lalita Gomez, *India's Use of CITES Appendix III*, 44 Nature Conservation 163, 170, 171 (2021).
214. *See id.*
215. *Id.* at vii.
216. Felipe P.A. Cohen et al., *Traceability Issues in the Trade of Marine Ornamental Species*, 21 Revs. Fisheries Sci. 98, 101 (2013).
217. *See* Willock et al., *supra* note 209, at 7.
218. CITES World, *supra* note 208, at 8.
219. *International Trade in Non-CITES*, *supra* note 11, at 46; *OATA/OFI Framework Proposal*, *supra* note 8, at 19-20 (tbl.14).
220. Heinrich et al., *supra* note 150, at 133.

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discuss how to best conserve marine ornamental fish while balancing other concerns.[221] During the workshop, several methodologies were suggested to rank the vulnerability of species based on life history, global trade volumes, sourcing methods, conservation status, distribution, and vulnerability to harvest.[222] The workshop acknowledged the need for assessment, but did not settle on a single approach.[223] One of these methodologies should be used to identify the most at-risk marine ornamental fish species that need global trade data the most.

2. Distribution of Technology

Current import and export monitoring technology does not automatically collect species-specific information.[224] Technology could be developed to help with this information gap and lessen the burden on States. One such technology, a software program dubbed the Nature Intelligence System, has already been developed and proven to be useful in analyzing shipping documents for species-specific information, but it is not perfect.[225]

The software implements automated optical character recognition that has been specially adapted for wildlife shipments.[226] The software can scan shipping documents and pull out the specific species that were listed, drastically improving the trade data gathered during review of import or export documents.[227] It is currently limited by its ability to decipher the shipping documents, so blurry or low-resolution shipping documents cannot be analyzed, and by a lack of standardization among those shipping documents.[228] Nevertheless, it continues to be developed and provides a viable way to assess the marine ornamental trade.[229]

CITES laid out in its Strategic Vision for 2021-2030 that it is "conscious of the need to ensure the effective implementation of the Convention globally."[230] It also listed as Goal 3 to aim for all Parties to have the "tools, resources and capacity to effectively implement and enforce the Convention."[231] As part of that goal, CITES listed out objectives to develop, adopt, and implement adequate capacity-building programs, to make available sufficient resources for both the national and international stages to support necessary capacity-building programs and ensure compliance, to invest in building the capacity of CITES and prioritize improvement through time, and that Parties take full advantage of emerging technologies to improve effective implementation.[232]

CITES recognizes that developing countries have special and diverse needs when implementing CITES through their national authorities and other enforcement entities.[233] It also recognizes that capacity-building and compliance-assistance efforts should be integrated broadly into all aspects of the Convention.[234] CITES specifically invites Parties to "support the capacity-building efforts of other Parties through sharing of information regarding capacity-building materials and efforts."[235]

Sharing a technological solution with the countries at the source of the wildlife trade would help immensely with the monitoring of the data and make CITES more efficient as a whole.[236] CITES faces a funding crisis that makes it inefficient and unable to protect the species already listed.[237] Part of the inefficiency is due to the sheer number of species listed under CITES and the manual labor required to process CITES documents,[238] which technology could help address.

B. Certification

Sustainability within the supply chain is required to protect the fish, the coral reefs, and the communities that rely on them. Certifying the entire supply chain through a third-party verifier did not work in the past due to the complexity of the trade, but perhaps streamlined certification schemes through trade associations or the CITES Secretariat could work better.

1. Trade Associations

A global, independent third-party certification scheme for the entire marine ornamental trade has been attempted, but it did not gain enough recognition to stay in business. Established in 1996, the Marine Aquarium Council (MAC) aimed to promote the sustainability of the marine aquarium trade through a vigorous certification program

221. CITES, *Technical International Workshop on Marine Ornamental Fishes*, https://cites.org/eng/node/139057 (last visited May 3, 2025).
222. *OATA/OFI Framework Proposal*, *supra* note 8; Gabrielle A. Baillargeon et al., *Evaluating Species at Risk in Data-Limited Fisheries: A Comprehensive Productivity-Susceptibility Analysis of the Most Traded Marine Aquarium Fish* (2024) (preprint), https://cites.org/sites/default/files/eng/prog/marine_ornamental_fishes/workshops/brisbane_052024/Baillargeon2024_PSA_Preprint.pdf.
223. CITES 33d Meeting of the Animals Committee, *Marine Ornamental Fishes*, at 15, CITES Doc. AC33 Doc. 44 (July 12-19, 2024), https://cites.org/sites/default/files/documents/E-AC33-44-R1.pdf.
224. Rhyne et al., *supra* note 16, at 3; *see generally* Bruce J. Weissgold, *US Wildlife Trade Data Lack Quality Control Necessary for Accurate Scientific Interpretation and Policy Application*, 17 Conservation Letters e13005, at 1 (2024), https://conbio.onlinelibrary.wiley.com/doi/10.1111/conl.13005 (analyzing the United States' LEMIS system); Biondo & Burki, *supra* note 8 (analyzing the EU's TRACES system).
225. *See* Rhyne et al., *supra* note 16; Wildlife Detection Partnership, *Automated Shipment Document and Forensics Dashboard*, https://wildlifedetection.org/nis (last visited May 3, 2025).
226. Rhyne et al., *supra* note 16, at 2.
227. *Id.*
228. *Id.* at 8.
229. Michael F. Tlusty et al., *Real-Time Automated Species Level Detection of Trade Document Systems to Reduce Illegal Wildlife Trade and Improve Data Quality*, 281 Biological Conservation art. 110022, at 3, 6 (2023).
230. CITES Res. Conf. 18.3, pmbl.
231. CITES Res. Conf. 18.3.
232. *Id.* Goal 3, Objectives 3.2, 3.3, 3.7, 3.8.
233. CITES Res. Conf. 19.2, pmbl.
234. *Id.*
235. *Id.* para. 2(a).
236. *See* Tlusty et al., *supra* note 229, at 7.
237. Peter Lanius & Lynn Johnson, Nature Needs More, Fixing the CITES Funding Crisis Through a Levy on Business 4 (2024).
238. *See id.*

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with standards covering all aspects of the trade.[239] MAC operated the certification scheme for six years before it proved, ironically, to be unsustainable due to the complexity and costs of enforcement.[240]

As second-party certifiers, trade associations have an interest in what they certify but are still in a position to guarantee sustainably sourced marine ornamental fish.[241] Additionally, the financial and administrative burden might be reduced because they already have a paying member base. The Ornamental Aquatic Trade Association (OATA) in the United Kingdom is one such trade association that requires their members to follow a set of standards.[242] In order for businesses to use the OATA trademark, they must follow the code of conduct, including 7.1.6: "Aquatic organisms from the wild should have been collected using legal, ethical techniques which do not damage the ecosystem."[243]

A regional certification scheme backed by a trade association might have the best chance of getting consumer support.[244] The failure of MAC certification showed that a global scheme might be unsustainable without a committed customer base, while company-driven schemes are more prone to greenwashing and creating customer confusion.[245] A certification scheme is reliant on customers preferring certified fish for certain guarantees over noncertified fish without those guarantees. Thus, a regional association is best placed to garner the consumer support required to maintain a successful certification scheme.

Not all trade associations have a code of conduct like OATA for their members to follow. For example, the Pet Advocacy Network (formerly the Pet Industry Joint Advisory Council) is located within the United States and advocates for a variety of pets, including marine ornamental fish,[246] but lacks a set of standards to hold members accountable for sustainability concerns. Without a global organization, it is left up to the individual trade associations within countries to impose their own form of second-party certification. National trade associations should adopt codes of conduct like OATA to promote sustainability within their supply chain.

2. CITES Secretariat

MAC failed partly due to distrust by customers of their sustainability goals.[247] Sustainability requires a traceable supply chain that separates the sustainable catches from the unsustainable, like using a net instead of cyanide.[248] However, exporters have no financial incentive to separate differently sourced fish and mix specimens together for efficiency.[249] Companies abused the MAC certification by claiming sustainable practices without providing supply chain transparency to back it up.[250]

Any organization pursuing the creation of a global certification has to address the traceability of the supply chain, especially for cyanide fishing. Multiple studies have tried to develop methods to detect cyanide in fish after exposure, but none have been successfully replicated.[251] As long as cyanide is still undetectable after exposure, a truly traceable and sustainable supply chain is out of reach.[252]

In light of these limitations, a better approach may be educating consumers on the sustainability of the trade and building trust in a certification brand. Buying trends still indicate that most hobbyists buy the cheapest fish when possible.[253] Consumer trends need to be changed to create a demand for a certification scheme that prioritizes sustainability over price. One possible way to do this could capitalize on the finding that hobbyists preferred fish with a life guarantee.[254] Consumers ranked healthiness of the fish as the top reason for buying a price-premium fish, with best practices of the industry and environmental sustainability coming next.[255]

It was also found that consumers cared more about a certification brand than looking at the originating country of the fish.[256] Prioritizing building a certification brand around first the healthiness of the fish and then industry best practices would target consumers with the concerns they care about most. Once a larger customer base is built, implementing environmental sustainability within the certification would be easier to do.

A global body, like the CITES Secretariat, could issue a preliminary certification for stores that sell fish with a life guarantee. The Secretariat is meant to assist with implementation and monitoring of CITES.[257] While marine aquarium fish are not covered by CITES, the Secretariat has already organized technical workshops to address the trade because of its prevalence and lack of global regulation.

Channeling the certification through the Secretariat could therefore be an expansion of their responsibilities to

239. Wabnitz et al., *supra* note 4, at 12-13. For more information on MAC, visit Seasmart, *Marine Aquarium Council (MAC)*, https://seasmart.org/marine-aquarium-council-mac/ (last visited May 3, 2025) (a repository of MAC documents and guidance).
240. Wabnitz et al., *supra* note 4, at 13-14; Tracey A. King, *Wild Caught Ornamental Fish: A Perspective From the UK Ornamental Aquatic Industry on the Sustainability of Aquatic Organisms and Livelihoods*, 94 J. Fish Biology 925, 933 (2019).
241. Wabnitz et al., *supra* note 4, at 12.
242. King, *supra* note 240, at 926; OATA, *Set Standards*, https://ornamentalfish.org/what-we-do/set-standards/ (last visited May 3, 2025).
243. OATA, Code of Conduct 12 (2015).
244. Thane A. Militz et al., *Consumer Perspectives on Theoretical Certification Schemes for the Marine Aquarium Trade*, 193 Fisheries Rsch. 33, 39 (2017).
245. *Id.*
246. Pet Advocacy Network, *Mission*, https://petadvocacy.org/mission (last visited May 3, 2025).
247. Cohen et al., *supra* note 216, at 100.
248. *Id.* at 101.
249. *Id.*
250. *Id.*
251. King, *supra* note 240, at 930-31.
252. *Id.* at 933.
253. van Beijnen & Yan, *supra* note 50.
254. Megan Dykman, *The Environmental and Economic Benefits of Eco-Certification Within the Ornamental Fish Trade*, 3 Int'l J. Trade Econ. & Fin. 1, 5 (2012).
255. Militz et al., *supra* note 244, at 39.
256. *Id.*
257. *See supra* Section II.A.

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help monitor the trade. However, it is important to note that the Secretariat has a duty to the species actually listed within CITES, and should not spend too many resources on non-listed species.[258] As a result, the Secretariat should only be involved with the certification in the preliminary stages to help create a customer base before it becomes fully independent.

V. Conclusion

The marine ornamental trade is a huge industry that is not going away anytime soon. As long as it exists, there will be pressure on coral reefs and fish populations to meet the demand that cannot be supplied by captive breeding. The supply chain remains complex and untraceable, with no global monitoring system in place to track how many fish are traded each year.

CITES is considered to be one of the most successful wildlife treaties. Its three appendices help categorize species that require different levels of protection. Requirements under Appendix II help prevent traded species from reaching the point where they need stricter protections, while Appendix III targets species that range countries want help controlling in international trade. Both Appendices II and III are poorly adapted to help regulate the marine aquarium trade due to requiring the cooperation of the range States.

The BCF's story exposes the limitations within CITES as it relates to marine ornamental fish. The BCF satisfied the scientific criteria to be listed on Appendix II, but Indonesia resisted the proposal due to economic interests. A listing onto Appendix III would require Indonesia to list it itself, which did not happen, so the BCF was left with little international protection.

Listing requirements dependent on range countries prevent the monitoring of marine ornamental species that have no other means to gather global trade data. Expanding the listing criteria under Appendix III could fill those gaps in data for species most at risk of overexploitation. Additionally, sharing technology among countries could increase efficiency at export and import and track species-specific trade data. Last, streamlined certification schemes through trade associations or through the CITES Secretariat could promote sustainability without creating too much of a financial burden on consumers.

258. *Conservation Management of MOF*, *supra* note 9, at 3.