

Before the Secretary of Commerce

**Petition for Protective Regulations Under Section 4(d) of the Endangered Species Act for
the Banggai cardinalfish (*Pterapogon kauderni*)**



Banggai cardinalfish, Pterapogon kauderni Photo credit: Amada44-Wikimedia Commons

By:

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NOTICE OF PETITION

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The Center for Biological Diversity (Center) is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 1.7 million members and online activists throughout the United States and internationally. The Center and its members are concerned with the conservation of endangered species and the effective implementation of the Endangered Species Act. The Center engages at the Convention on International Trade in Endangered Species of Wild Fauna and Flora and other international fora to advocate for protections for imperiled species and places. More information about the Center is available at www.biologicaldiversity.org.

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The Animal Welfare Institute (AWI) is an international non-profit organization that has sought, since its founding in 1951, to alleviate the suffering inflicted on animals by people. AWI has worked for decades to safeguard marine species and their habitats. AWI has more than 62,000 members and supporters throughout the United States and internationally. The organization's efforts focus on curbing humankind's harmful impact to animals, including marine species, by urging governments and other policy makers to halt or prevent damaging actions, as well as educating the public and others about the deleterious effects their actions can wreak on the oceans' inhabitants. AWI works to minimize the impacts of all human actions detrimental to endangered species and engages Congress to strengthen the Endangered Species Act. In addition, representatives of AWI regularly attend meetings of the International Whaling Commission, including its Scientific Committee as well as meetings of the Convention on International Trade in Endangered Species of Wild Fauna and Flora to advocate for the international protection of threatened and endangered species. More information about AWI is available at www.awionline.org.



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Defenders of Wildlife (Defenders) is dedicated to the protection of all native animals and plants in their natural communities. With nearly 2.2 million members and activists, Defenders of Wildlife is a leading advocate for innovative solutions to safeguard our wildlife heritage for generations to come. Defenders works to protect marine species in the U.S. and around the world from both legal and illegal trade. Defenders works to ensure that the Endangered Species Act is appropriately implemented to conserve listed species by petitioning for statutory protections, commenting on draft regulations and permits, and, where necessary, litigating to vindicate the statute's objectives. Defenders also engages in advocacy work at the Convention on International Trade in Endangered Species of Wild Fauna and Flora, regional fishery management organizations, and the Convention on the Conservation of Migratory Species of Wild Animals. More information about Defenders is available at www.defenders.org.

Submitted this 22 date of April 2021

Pursuant to Section 4(d) of the Endangered Species Act (ESA) and Section 553 of the Administrative Procedure Act, the Center for Biological Diversity, Animal Welfare Institute, and Defenders of Wildlife hereby petition the Secretary of Commerce (Secretary), acting through the National Marine Fisheries Service (NMFS), an agency within the National Oceanic and Atmospheric Administration, to promulgate a rule under Section 4(d) of the ESA to provide for the conservation of the threatened Banggai cardinalfish (*Pterapogon kauderni*) consistent with the purposes of the Act.¹

As NMFS recognized in its 2014 proposed and 2016 final rules to designate the Banggai cardinalfish as threatened under the ESA, the species is at risk of extinction due to: overutilization for the aquarium trade; the related high mortality rates during capture and transport; habitat loss and destruction; disease and predation; and a lack of adequate regulatory mechanisms to protect the species, including from adverse impacts of trade. NMFS found that Banggai cardinalfish abundance had declined up to 90 percent from historic levels.²

The United States is a lead market for these fish, which are imported primarily for the aquarium trade. Although populations have declined well below historical levels, international trade in the species is not currently regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).³ Despite the species being listed as threatened under the ESA, the fish does not have any legal protections under the statute to prevent further population declines.

A 4(d) rule is needed to protect the species from unsustainable trade. Specifically, we petition NMFS to extend the prohibitions of ESA Section 9(a)(1)⁴ to this species, including prohibitions on import, export, and all commercial activities. Upon receipt and review of this petition, we request that NMFS make specific findings as to whether protective regulations are necessary and advisable for the Banggai cardinalfish and promptly proceed with a rulemaking to promulgate such regulations.

¹ 16 U.S.C. § 1533(d); 5 U.S.C. § 553(e); *see also* 50 C.F.R. §§ 424.14(a), 414.10 (providing for citizen petitions to the agency for 4(d) or “special” rules for threatened species). The APA also requires agencies to definitively respond to petitions and “conclude a matter presented” to them “within a reasonable time.” 5 U.S.C. § 555(b); *In re American Rivers and Idaho Rivers United*, 372 F.3d 413, 419 (D.C. Cir. 2004) (“a reasonable time for agency action is typically counted in weeks or months, not years”).

² Final Listing Determinations on Proposal To List the Banggai Cardinalfish and Harrison’s Dogfish Under the Endangered Species Act, 81 Fed. Reg. 3023 (Jan. 20, 2016); 12-Month Finding for the Eastern Taiwan Strait Indo-Pacific Humpback Dolphin, Dusky Sea Snake, Banggai Cardinalfish, Harrison’s Dogfish, and Three Corals Under the Endangered Species Act, 79 Fed. Reg. 74,954 (Dec. 16, 2014).

³ Although CITES Parties have not voted to list this species on CITES Appendix II, several decisions pertaining to this species have been adopted by the Parties, as detailed below.

⁴ 16 U.S.C. § 1538(a)(1).

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I. Introduction

The Banggai cardinalfish (*Pterapogon kauderni*) is a small fish with a limited endemic range around the Banggai Islands off central-eastern Sulawesi, Indonesia (Allen, 2000 p. 142). Its endemic distribution is limited to 34 of the 67 islands composing the Banggai Archipelago, with a maximum potential habitat of about 23 km² (Vagelli, 2015 p. 5). The species has faced heavy exploitation since the 1990s when it became sought after for the aquarium trade (Allen, 2000 p. 142; Lunn & Moreau, 2004 pp. 346-348; Ndobe et al., 2019 p. 5). As a result, the species suffered a total estimated population decline of up to 90 percent (Ndobe et al., 2018 p. 12; Vagelli, 2008 p. 22; Vagelli, 2015 p. 2). Populations have continued to decline since then, and several populations have been extirpated (Ndobe et al., 2020 pp. 20-25; Ndobe et al., 2018 p. 12; Wiadnyana et al., 2020 p. 2).

Banggai cardinalfish are particularly vulnerable to extinction from collection for the aquarium trade. While many species in the aquarium trade have wide geographic ranges and abundant populations, Banggai cardinalfish have a limited range and small, genetically isolated populations (Bernardi & Vagelli, 2004 p. 807; Rhyne et al., 2012 pp. 4-6; Wiadnyana et al., 2020 p. 4-6). They also have low reproductive capacity, with low fecundity and few male brooding cycles per year (Vagelli, 1999 p. 84; Vagelli., 2002 p. 85; Vagelli, 2011 pp. 65-66, 93).

In 2016, the National Marine Fisheries Service (NMFS) published a final rule listing the Banggai cardinalfish as threatened under the Endangered Species Act (ESA) (81 Fed. Reg. 3023 (Jan. 20, 2016)). NMFS determined that the Banggai cardinalfish faces many threats, predominantly from trade and the lack of enforcement of trade regulations, loss of microhabitat, and habitat degradation. However, NMFS did not provide any ESA 4(d) protections for the fish when it granted threatened status.

The ESA requires that “[w]henver any species is listed as threatened . . . , the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species” (16 U.S.C. § 1533(d)). These regulations “may” include prohibiting any action prohibited under ESA Section 9(a)(1), including the take, import, and export of the species (*id.*). When NMFS issued its final listing rule, NMFS stated it would “consider potential protective regulations pursuant to section 4(d) for the Banggai cardinalfish in a future rulemaking” (81 Fed. Reg. at 3030). Yet despite the threat to the Banggai cardinalfish from continued collection for the aquarium trade *to the United States*, NMFS has not issued 4(d) regulations banning import, export, and domestic trade to protect the Banggai cardinalfish.

Although Indonesia has implemented some conservation measures, the scope, effectiveness, and conservation value of these efforts remain unclear. In its final decision to list the Banggai cardinalfish as threatened NMFS also cast doubt on the measures, concluding “we are less certain that compliance and trade practices will improve in the future” due to the voluntary nature of regulation compliance and a lack of implementation of improved trade practices (81 Fed. Reg. at 3027).

Since NMFS listed Banggai cardinalfish in 2016, recent evidence has shown that populations continue to decline and collection from the wild to supply the aquarium trade is still

occurring (Ndobe et al., 2018 p. 15; Wiadnyana et al., 2020 p. 7). Additionally, loss of microhabitat has increased and become a leading threat to the species (Moore et al., 2011 pp. 108-109; Ndobe et al., 2020 p. 22; Wiadnyana et al., 2020 pp. 6-7). The ecosystem that Banggai cardinalfish depend on is becoming unsuitable due to loss of key microhabitat species, bleaching events, and climate change (Lilley, 2008 p. 6; Moore et al., 2011 pp. 108-109; Moore et al., 2018 pp. 70-78; Moore et al., 2019a p. 4; Ndobe & Moore, 2008 p. 1028). Between this and the decrease in the species' population abundance and fitness resulting from decades of overexploitation, Banggai cardinalfish cannot withstand continued, high levels of take from the wild. A 4(d) rule is both "necessary and advisable" for the conservation of the species (16 U.S.C. § 1533(d)).

II. Status of the Species

The Banggai cardinalfish is listed on the International Union for Conservation of Nature (IUCN) Red List as endangered (Allen & Donaldson, 2007 full paper), and, as noted, is designated as threatened under the ESA. The proposed and final rules listing the Banggai cardinalfish provide substantial support for why the fish is threatened with extinction, including from U.S. imports for the aquarium trade (81 Fed. Reg. at 3023; 79 Fed. Reg. at 74,966). To further support our request and explain why a 4(d) rule is both necessary and advisable for the Banggai cardinalfish's conservation, we provide the following summary of updated information regarding the species' status and threats.

Population Abundance

Banggai cardinalfish population surveys were conducted between 2001 and 2019. The area surveyed and number of sites visited have not been consistent across all years and, therefore, the population trends are difficult to interpret (Conant 2015, p. 12). Nevertheless, several locations have been repeatedly surveyed (particularly during the surveys conducted in 2004, 2007 and 2015) allowing density to be compared over time (Vagelli 2008, p. 19, Vagelli 2015, p. 18, Wiadnyana et al., 2020 p. 3). The density of the Banggai cardinalfish prior to the species collection for the aquarium trade is estimated to be about 0.6 fish/m² (Vagelli, 2008 p. 17). According to Ndobe et al. (2018 p. 12), all surveys done on Banggai cardinalfish since 2000 have found the native populations declining at most sites, and several populations have been extirpated.

Conant (2015, p. 12) provided a useful summary of the population surveys conducted between 2001 and 2015. In the 2001 survey, Banggai cardinalfish populations were found in waters surrounding 16 out of 37 islands searched within the Banggai Archipelago. The total estimated population in 2001 was 1.7 million, with a mean density of 0.03 fish/m² based on a survey at three sites (Vagelli, 2002, p. 88; Vagelli & Erdmann 2002, p. 1). Additional surveys of the entire Banggai Archipelago undertaken between 2001 and 2004 expanded the known range of the species to 17 major islands and 10 minor islands at a total of 34 sites (CITES, CoP14 Prop. 19, p. 7). With more populations surveyed, the total estimated population in 2004 was 2.4 million with a mean density of 0.07 fish/m² (Vagelli 2005, pp. 2, 230). Three years later, in 2007, based on surveys of 34 sites, the total population size slightly declined to an estimated 2.2 million fish with a mean density of 0.08 fish/m² (Vagelli 2008, p. 20). In 2011-2012, the total estimated

population numbers ranged between 1.5-1.7 million with density measured at 0.05 fish/m² at 24 surveyed sites (Ndobe et al., 2013, p. 119). While high density sites were excluded from the 2011-2012 estimate potentially negatively biasing the population estimate, seven of the major sites surveyed in 2004 and 2011-2012 declined in mean density (Ndobe et al. 2013, p.119).

In 2015, a comprehensive population assessment and habitat survey was conducted that included 52 sites across 25 islands, representing 90 percent of the species' natural range (Vagelli, 2015 p. 2, 5). Banggai cardinalfish were found at 22 of the 25 islands surveyed (Vagelli, 2015 p. 5). At that time, the species population estimate was approximately 1.4 million individuals (Vagelli, 2015 p. 1). The mean Banggai cardinalfish density of visited sites was 0.05 fish/m² (Vagelli, 2015 p. 9). This is less than the mean density 0.08 fish/m² found during the 2007 surveys but similar to the 0.05 fish/m² reported by Ndobe et al. (2013, p. 119) during the 2011-2012 surveys. In 2015, no populations were found to persist near the historical density for the species (~0.60 fish/m²) (Vagelli, 2015 p. 1). The abundance of 76 percent of the populations surveyed in 2015 ranged from "vulnerable" to "critical" with densities of approximately 0.11 to <0.01 fish/m² (Vagelli, 2015 pp. 4-6).

Since 2017, annual population surveys have been conducted in several sites within the endemic range of the Banggai cardinalfish (Ndobe et al., 2018 pp. 13-14; Wiadnyana et al., 2020 pp. 3-4 and 6-7). However, scientists have raised questions about the surveys, particularly about the methodology for conducting population assessments of a sedentary species with a highly patchy distribution that lives in close association with living benthic organisms (Ndobe et al., 2018 p. 37; Pers. Comm. Dr. A. Vagelli, April 2021). Ndobe et al. (2018 p. 37) suggested that roving diver swims are more appropriate for conducting surveys of Banggai cardinalfish. The resulting data from the surveys also raise questions, as densities reported exceed the highest density of Banggai cardinalfish ever recorded at any site. For example, the 2018 population survey found that three sites (Bone Baru, Toado, and Toropot) had mean densities of 6.35, 4.48, and 3.29 fish/m², respectively, while the highest density of Banggai cardinalfish ever recorded at any other site within the endemic range was 0.21-0.22 fish/m² in 2004 (Vagelli, 2005 p. 234; Vagelli, 2015 p. 2).

The 2017 survey covered 24 sites finding densities ranging from 0.05 fish/m² at Mandel 2 to 5.21 fish/m² at Toada 2 (Ndobe et al., 2018 pp. 13-14). Density estimates from the 2018 survey ranged from 0.013 to 8.268 fish/m² (Wiadnyana et al., 2020 p. 6). However, the 2018 survey data show low densities of Banggai cardinalfish and negative trends from 2017 to 2018 in some or all size classes (recruits, juveniles, and adults) at several sites (Wiadnyana et al., 2020 pp. 3-7). The Mandel site had no juveniles in 2017 or 2018 and the Tj Nggasuang site had no adults in 2018 (Wiadnyana et al., 2020 pp. 4-6). In all, the average population densities of recruits and juveniles decreased from 2017 to 2018, while the average density of adults increased by 0.081 fish/m² (Table 1). Unlike the extensive surveys conducted in 2007 and 2015, the 2018 survey only sampled 24 sites, thus it is not possible to accurately compare overall population densities and estimates with the earlier surveys.

Wiadnyana et al. (2020 p. 7) suggest that fishing pressure is a potential variable contributing to population decline. The sites showing declines in the 2018 surveys were identified as the most remote sites in the southern Banggai Archipelago of the sites surveyed

(Wiadnyana et al., 2020 p. 7). In one of these sites, Tj Nggasuang, population density seemed to be trending positively in the 2017 survey, but it declined in the 2018 survey (Wiadnyana et al., 2020 p. 7). According to Wiadnyana et al. (2020 p. 7), this is likely a result of fishing and transport of Banggai cardinalfish to a trading center, Kendari, where the dispatch numbers are much greater than the capacity of the introduced populations in that area.

The Banggai cardinalfish population survey in 2019 covered only eight sites and found that populations are declining, with one subpopulation at high risk of extirpation (Ndobe et al., 2020 pp. 20-25). Additionally, there were no juveniles recorded at the Mandel site for the third year in a row (Ndobe et al., 2020 p. 22). It is difficult to further compare the findings from the 2018 and 2019 population surveys as the 2019 survey covered far fewer sites and did not publish the same metrics. It is also difficult to compare the 2017-2019 annual Banggai cardinalfish surveys to earlier population surveys to track changes in population status over time because the sites surveyed and methods used prior to 2017 differ from those used in more recent surveys, and the recent population surveys have sampled less than 50 percent of previously reported populations.

Population Fitness

Data from genetic studies of Banggai cardinalfish provide evidence of severe bottlenecks and reduced gene flow between populations (Bernardi & Vagelli, 2004 p. 807; Hoffman et al., 2005 pp. 1371-1372; Vagelli et al., 2009 p. 132). Up to 21 Ecologically Significant Units (ESUs) of Banggai cardinalfish have been identified (Moore et al., 2017 p. 65; Ndobe et al., 2018 p. 11). Some of these reproductively isolated populations are separated by as little as 2 km, and some morphological differences have been observed between them (Hoffman et al., 2005 p. 1371; Ndobe & Moore, 2013 p. 2).

Of the marine ornamental fishes in the aquarium trade, Banggai cardinalfish are particularly susceptible to extinction. Small populations within a limited endemic range risk extirpation by extreme weather events (Moore et al., 2019b pp. 2-5). Additionally, this species is one of very few marine fishes that lacks a pelagic larval phase, leading to limited dispersal and gene flow potential (Allen, 2000 p. 142; Bernardi & Vagelli, 2004 p. 807; Vagelli et al., 2008 p. 132). Individuals also show high site fidelity and are therefore unlikely to mix with other populations (Hoffman et al., 2005 p. 1373).

With small group sizes and genetic isolation, this species may be experiencing decreases in individual fitness due to Allee effects which can lead to more genetic drift, decreased predator dilution, and decreased antipredator vigilance among the population (Kolm & Berglund, 2003 p. 913; Stephens & Sutherland, 1999 p. 402). While noting the deficiencies in Wiadnyana et al. (2020), the 2018 population survey results found that the mean abundance of adult Banggai cardinalfish was higher than in 2017 but that recruits and juveniles were more abundant in 2017 (Wiadnyana et al., 2020 p. 3). This could be an indication of mate limitation, which can further contribute to Allee effects (Gascoigne et al., 2009 full paper).

III. Threats Facing Banggai Cardinalfish

Despite the Banggai cardinalfish's ESA threatened listing in 2016, threats to the species remain, including from continued collection for the aquarium trade for which the United States remains a principal destination. Ongoing and increasing habitat damage and loss, climate change, and disease exacerbate that threat.

A. Trade

Banggai cardinalfish remained virtually unknown to the international trade of marine ornamentals until the mid-1990s (Marini & Vagelli, 2007 p. 2). Shortly after its rediscovery the species became popular in the aquarium trade (Allen, 2000, p. 1; Ndobe et al., 2018 p. 12). By the early 2000s it was estimated that a minimum of 600,000-700,000 fish were collected annually (Lunn & Moreau, 2004 p. 348; Vagelli, 2002 p.88). Because of the collection for trade, group size and population numbers were reduced by up to half at sites with higher levels of fishing pressure (Kolm & Berglund, 2003 pp. 912-914), and there was a significant decline in catch per unit effort (Vagelli, 2011 p. 172).

Despite population declines and compounding threats to Banggai cardinalfish and the habitat the species depends on, collection of the species from the wild continues for the ornamental fish trade (Wiadnyana et al., 2020 p. 2) (Table 1). In 2013, more than 150,000 Banggai cardinalfish were shipped from the species' endemic range in Central Sulawesi (Wiadnyana et al., 2020 p. 2). In 2015 and 2016, the Fish Quarantine Service in Indonesia recorded an estimated 500,000 Banggai cardinalfish shipped to export centers each year (Wiadnyana et al., 2020 p. 2). For the decade between 2007 to 2016, Indonesia's Ministry of Marine Affairs and Fisheries found the average number of wild-caught Banggai cardinalfish being exported from 2007 to 2016 to be 217,498 specimens (Soehartono & Mardiatuti, 2020 p. 601).

The United States Fish and Wildlife Service's Law Enforcement Management Information System (LEMIS) shows imports of wild-caught Banggai cardinalfish in its most recently accessible data from 2014.⁵ A brief internet search also shows wild-caught Banggai cardinalfish or those that were tank-raised from wild stock advertised for sale.⁶ None of these reported trade figures include the number of Banggai cardinalfish that died during capture, confinement, and transport to Indonesian export facilities or during and after shipment overseas.

As NMFS has acknowledged, most of the Banggai cardinalfish specimens taken from the wild are exported to the United States, Europe, and Asia (Allen & Donaldson, 2007 p. 9; 79 Fed. Reg. at 74,966). Overall, the United States is the world's largest consumer of aquarium fish and accounts for over 60 percent of the global market for coral reef wildlife, including marine and freshwater aquarium fish (Dee et al. 2014 p. 232; Dee et al., 2019 p. 2). Banggai cardinalfish are

⁵ See [U.S. imports of Banggai cardinalfish and unspecified tropical fish which may include Banggai cardinalfish in 2014 from U.S. LEMIS database](#). This data underrepresents actual Banggai cardinalfish imports, as the United States does not identify all imported aquarium fish to species level. The U.S. Fish and Wildlife Service has not provided more recent LEMIS data (post 2015), including import data for Banggai cardinalfish, to the public.

⁶ See, e.g. <https://www.bluezooaquatics.com/productDetail.asp?did=1&cid=27&pid=2098>, <https://www.exoticaquacultureaustralia.com/products/banggai-cardinal>

very popular among aquaria keepers in the United States – the fish was among the top ten most-imported marine aquarium fish imported in 2008 and 2011 (Rhyne et al., 2017 p. 27).

Data from the most recent population surveys of Banggai cardinalfish exhibit evidence of ongoing fishing pressure (Ndobe et al., 2018 p. 12; Wiadnyana et al., 2020 p. 7) presumably to supply the demand for the species from the aquarium trade. Wiadnyana et al. (2020 p. 7) analyzed possible factors contributing to population decline and found that more than 50 percent of the variance in population density could not be explained by loss of microhabitat, and that capture and transport Banggai cardinalfish to a trading center (Kendari) may be another factor contributing to population decline. Species dispatch numbers at the trading center are much greater than the capacity of the introduced Banggai cardinalfish populations in that area, suggesting that endemic wild populations are being exploited to supplement fish captured from the introduced populations (Moore et al., 2021 p. 5; Wiadnyana et al., 2020 p. 7). Additionally, the 2017 population survey found that juveniles observed at sites in the southern portion of the Banggai Archipelago were below 25mm SL and adults were above 40mm SL, while individuals within the marketable size range of 25-35mm SL were noticeably depleted (Ndobe et al., 2018 p. 15).

Over time, the trade chain for the species has become less centralized (Ndobe et al., 2018 p. 22). In 2015 the shipment of Banggai cardinalfish out of the Banggai Archipelago involved less traffic through the traditional collection centers and increased use of “public” transportation (small and medium boats and speed boats) (Vagelli, 2015 p. 12). Also in 2015, holding nets containing thousands of Banggai cardinalfish were encountered in several islands, suggesting that collection pressure had not decreased from previous years (Vagelli, 2015 p. 11; Pers. Comm. with A. Vagelli, April 2021).

Banggai cardinalfish have several characteristics that make them vulnerable to trade, as they lack adaptations that allow populations to recover quickly after exploitation (Dee et al., 2019 pp. 4-5; Fujita et al., 2013 pp. 9-11; Moore et al., 2019b pp. 2-3; Vagelli, 2002 p. 88; Vagelli, 2011 pp. 147-149;). Individuals tend to congregate in groups, so it is easy to catch multiple fish at once (Lilley, 2008 pp. 5-7; Vagelli, 2008 p. 18; Vagelli, 2011 pp. 152-153). Once collected in large numbers, populations cannot rebound quickly due to low reproductive capacity (Moore et al., 2019b p. 3). Furthermore, to meet demand, Banggai cardinalfish must be collected in large numbers because there are high rates of die-off during transit (Lilley, 2008 p. 7-8; Vagelli, 2008 p. 20) including from the wild to collection centers and from collection centers to international destinations. It is estimated that 75-80 percent of Banggai cardinalfish collected die before ever being exported (Lilley, 2008 p. 8; Vagelli, 2008 p. 20). Such high mortality throughout the trade chain incentivizes further collection of the species from the wild (Lilley, 2008 pp. 7-8).

Table 1. Banggai cardinalfish trade through the Kendari Fish Quarantine Unit from January 2013-February 2019. Extracted from CITES, *Banggai Cardinalfish (Pterapogon kauderni)*, AC31 Doc. 31.

**Trade Data of Banggai Cardinalfish
through Kendari Fish Quarantine Unit
January 2013 - February 2019**

Destination	Unit	Year							Volume
		2013	2014	2015	2016	2017	2018	2019	
Denpasar	Individual	72,180	112,445	296,930	387,051	354,142	217,461	16,946	
Jakarta	Individual	20,085	34,832	54,232	54,054	48,186	60,711	6,682	
Makassar	Individual	300						225	
Surabaya	Individual	225	200						
Mataram	Individual				2,025				
Sumatera Selatan	Individual					150	420		
Total	Individual	92,790	147,477	351,162	443,130	402,478	278,592	23,853	

Destination	Unit	Year							Value
		2013	2014	2015	2016	2017	2018	2019	
Denpasar	IDR	725,579,700	449,780,000	1,180,647,500	1,548,204,000	1,416,568,000	869,844,000	67,784,000	
Jakarta	IDR	116,782,500	139,328,000	213,253,000	216,216,000	192,744,000	242,844,000	26,728,000	
Makassar	IDR	750,000						900,000	
Surabaya	IDR	562,500	800,000						
Mataram	IDR				8,100,000				
Sumatera Selatan	IDR					600,000	1,680,000		
Total	IDR	843,674,700	589,908,000	1,393,900,500	1,772,520,000	1,609,912,000	1,114,368,000	95,412,000	

B. Habitat Damage and Loss

Sea Urchins and Sea Anemones

In addition to collection for the aquarium trade, habitat damage and loss of microhabitat are major contributors to Banggai cardinalfish decline. The species is commonly found in protected bays, preferring shallow reefs and seagrass beds (Allen, 2000 p. 142; Vagelli & Erdmann, 2002 p. 3). Within this habitat, Banggai cardinalfish require healthy populations of branching corals, sea urchins, and sea anemones as microhabitat for protection from predators (Allen, 2000 p. 142; Kolm & Berglund, 2003 pp. 912-913; Vagelli & Erdmann, 2002 pp. 3-5). Sea anemones are particularly critical for recruits and juvenile Banggai cardinalfish that need protection from predation and cannibalism (Allen, 2000 p. 142; Moore et al., 2012 p. 12).

Banggai cardinalfish population levels appear to be limited by sea urchin and sea anemone density (Kolm & Berglund, 2003 p. 912; Moore & Ndobe, 2013 pp. 240-241; Wiadnyana et al., 2020 pp. 5 -7). Yet the sea urchins and sea anemones that Banggai cardinalfish depend on are declining rapidly (Ndobe et al., 2020 p. 24; Ndobe et al., 2012 p. 12). Sea anemones have been overexploited for human consumption within the endemic range of the Banggai cardinalfish (Ndobe & Moore, 2008 p. 1028). Anemones have also been impacted by bleaching events, which has negative implications for anemone-dependent fishes like Banggai cardinalfish, leading to decreased populations (Jones et al., 2008 p. 758; Moore et al., 2019a p. 4). Banggai cardinalfish were observed occupying partially or fully bleached anemones in 2016 and 2018 (Moore et al., 2018 pp. 70-78; Moore et al., 2019a p. 4).

Vagelli (2015, pp. 7-8) documented a severe and widespread decline in the abundance of sea urchins (*Diadema setosum*) during a 2015 population assessment and habitat survey. In 79 percent of the sites visited sea urchin abundance was low, and three sites had no sea urchins present (Vagelli, 2015 pp. 4, 7-10). Of the 34 sites surveyed in 2007 and revisited in 2015, 53 percent showed a decline in sea urchin abundance (Vagelli, 2015 pp. 7-10). From 2007 to 2015,

the number of sites with 4-10 sea urchin clumps dropped from 73.5 to 38.2 percent (Vagelli, 2015 pp. 7-10). For sea anemones, the 2015 survey data showed 9 of the 52 sites with no sea anemones present and 16 with 1-3 individuals/site (Vagelli, 2015 pp. 4, 7-11).

Similarly, Wiadnyana et al. (2020 pp. 6-7) observed a steep decline in sea urchins from 2017 to 2018 within the endemic range of the Banggai cardinalfish. In 2019, Ndobe et al. (2020, p. 22) reported no sea urchins at 3 of the 8 sites surveyed. In 2017, sea urchin collection, which had already experienced increases for subsistence farming (Moore et al., 2012 pp. 12-13), became commercialized (Wiadnyana et al., 2020 p. 6). Moore et al. (2019a p. 5) reported truckloads of sea urchins being collected from Banggai cardinalfish habitat once or twice a month. Sea urchins are also used as a food source for carnivorous fish in the live reef fish trade, further increasing demand for collection from the wild (Ndobe et al., 2012 p. 12). Commercial sea urchin collection has led to increased disturbance in the area which may be adversely impacting Banggai cardinalfish populations (Wiadnyana et al., 2020 p. 6). Tolokibit, the site where this collection is primarily occurring, had a negative trend in Banggai cardinalfish population density from 2017 to 2018 (Wiadnyana et al., 2020 p. 6). In response to steep declines, scientists have called for a moratorium on sea urchin and anemone collection to help conserve the Banggai cardinalfish (Ndobe et al., 2020 p. 26).

Corals

With the decline of sea urchins and sea anemones, branching corals have become increasingly important for providing microhabitat for Banggai cardinalfish (Moore et al., 2019a pp. 3-4; Ndobe et al., 2020 p. 24). A 2001 study of 92 groups of Banggai cardinalfish found that 44 percent were using branching corals for microhabitat (Vagelli & Erdmann, 2002 p. 3). Whereas sea anemones provide important microhabitat for recruits and small juveniles, corals are important for large juvenile, sub-adult, and adult Banggai cardinalfish (Moore et al., 2019a p. 3-4).

Corals within the Banggai Archipelago are facing a multitude of threats that jeopardize their ability to provide habitat for Banggai cardinalfish. Moore et al. (2012 p. 11) found significant coral degradation during surveys in 2004 and 2006 and a decline in coral cover from 25 to 11 percent at surveyed sites within the Banggai cardinalfish range. A bleaching event affected this region in 2016 and disproportionately impacted coral genera and other Banggai cardinalfish microhabitat, leading to a decrease in both the amount of coral cover and coral biodiversity (Moore et al., 2018 pp. 70-78).

In addition to bleaching, direct anthropogenic damage is causing coral degradation in the region. Increased sedimentation from inland development like logging, construction, and building sea walls is negatively impacting corals (Lilley, 2008 p. 6; Moore et al., 2012 p. 11). Along with sedimentation, changes in hydrology and decreased water quality have resulted from increased strain on inland resources, leading to periodic population growth of the starfish *Acanthaster planci*, a predator of corals (Moore et al., 2011 p. 108). This ecological imbalance is compounded with increased algal growth on reefs due to nitrate runoff and stress from trash like plastic, nets and Styrofoam found in the reefs (Lilley, 2008 p. 6). Moore et al. (2019a p. 5) found

that these direct sources of anthropogenic damage caused most of the coral degradation in the region between 2016 and 2018.

C. Climate Change

The impacts of climate change are expected to continue to negatively impact Banggai cardinalfish populations. Banggai cardinalfish face an increased risk from climate change because its populations are already threatened by exploitation and loss of habitat. The species also has a limited endemic range, making it more vulnerable to extirpation from extreme weather events (Moore et al., 2019b pp. 2-5). Extreme weather events can increase predation on recruits due to loss of microhabitat and cause a decline in water quality (Moore et al., 2019b p. 5). In 2018, a severe storm resulted in the loss of important Banggai cardinalfish microhabitat (i.e., sea urchins) on the west side of Banggai Island (Moore et al., 2019b p. 4). Moore et al. (2019b p. 4) found the decline in microhabitat was still evident months later, the Banggai cardinalfish population there had declined, and recruits and juveniles were missing from most groups.

Ocean temperatures have experienced a multidecadal increase and are expected to continue increasing with climate change (Abraham et al., 2013 full paper). This is likely to impact Banggai cardinalfish and the habitat the species depends on. Banggai cardinalfish typically inhabit waters with temperatures varying from 28-31 degrees Celsius (Vagelli & Erdmann, 2002 p. 3). Moore et al. (2019b p. 5) found that the species can experience emaciation and higher rates of mortality in waters above 31-32 degrees Celsius. In addition to individuals being directly impacted by changes in temperature, Banggai cardinalfish habitat which is located between depths of 0.5 and 4.5m, is likely to decline due to sea level rise as oceans continue warming (Vagelli & Erdmann, 2002 p. 3).

Higher temperatures can also affect the symbiotic relationship between Banggai cardinalfish and the sea urchin, *Diadema setosum*, causing *D. setosum* to prey on the cardinalfish (Moore et al., 2019b p. 5). Moore et al. (2019a p. 4) reported that temperatures at Tolokibit that were higher than usual in 2018 resulted in the bleaching of about 10 percent of coral colonies that serve as microhabitat for Banggai cardinalfish, while around 25 percent appeared very pale.

D. Disease

Banggai cardinalfish can contract diseases in trade that are not present in wild populations due to stressful conditions like poor water quality and nutrition (Ndobe et al., 2018 pp. 16-17). One of these diseases is the Banggai cardinalfish iridovirus (BCIV), a type of Megalocytivirus, which leads to high mortality throughout the supply chain (Weber III et al., 2009 p. 310). In addition to BCIV, bacteria from the genus *Vibrio* impacts Banggai cardinalfish in trade, causing several problems including lethargy, loss of appetite, darkening, abnormal swimming (including spinning), increased respiration, distended body cavity, subcutaneous hemorrhage, fin erosion, ulcerated wounds, pale gills/anemia, white feces, abnormally protruding eyes, and mortality (Ndobe et al, 2018 pp. 16-17; Yanong & Waltzek, 2019). Parasites can also lead to death in trade (Ndobe et al., 2018 pp. 16-17). A breeding facility in the United States experienced close to 100 percent mortality of wild-caught Banggai cardinalfish in 2005 (Weber III et al., 2009 p. 308). High mortality throughout the supply chain leads to increased collection

pressure from wild populations (Lilley, 2008 p. 7-8), making this species particularly unsuitable for trade.

IV. Section 9(a)(1) Protections for the Threatened Banggai Cardinalfish: Basis, Rationale, and Proposed Content

A. The Banggai Cardinalfish Remains Threatened with Extinction

The threatened Banggai cardinalfish remains at risk of extinction in the foreseeable future due to wild collection for the aquarium trade and microhabitat loss. Microhabitat species (i.e., sea urchins, sea anemones, corals) are likely to continue decreasing with the commercial trade of sea urchins and climate change, leading to higher rates of predation on Banggai cardinalfish. Since the 1990s, when collection for the international aquarium trade began, the species has declined dramatically. Several populations have been extirpated while others are still declining. Banggai cardinalfish will remain threatened, and some remaining populations may be lost, if trade of wild-caught fish continues. As documented above, the species is not suitable for trade because of low reproductive capacity, small, isolated populations, lack of dispersal capacity, and high mortality in the trade chain, yet collection from the wild continues to supply the United States aquarium trade.

B. Existing Regulatory Mechanisms Are Inadequate to Protect Banggai Cardinalfish from Threats Covered by Section 9(a)(1)

Conservation regulations through a 4(d) rule are warranted for the Banggai cardinalfish because existing regulatory mechanisms are inadequate to protect the species. Despite its ESA listing, the United States currently offers the species no protection from import, export, or trade.

Despite over a decade of conservation effort by the Indonesian government⁷, Indonesia's management has not adequately protected the species. In 2007, facing international concern about the Banggai cardinalfish, Indonesia developed a multi-year Banggai Cardinalfish Action Plan (2007-2012) (BCAP) (Ndobe & Moore, 2008 p. 1028) and created a district Marine Protected Area (MPA) (Moore and Ndobe, 2013 p. 240; Ndobe et al., 2012 p. 2). The BCAP was developed to focus on conservation, trade, and management and included the establishment of a Banggai Cardinalfish Center (BCC) on Banggai Island to coordinate conservation and management actions (Moore et al., 2011 p. 103). As of 2011, no integrated or comprehensive species monitoring system had been implemented. Moore et al. (2011 p. 101) stated that "few types of data have been or are being collected on a regular, long term basis." Moreover, Moore et al., (2011 p. 103) reported that the BCC had no operational budget. When local stakeholders proposed trade quotas in 2010, they were not implemented mainly due to a lack of legal support (Yahya et al., 2012 p. 307).

Following the expiration of the BCAP in 2012, scientists raised concerns about Banggai cardinalfish habitat protection and enforcement actions. Ndobe et al. (2012 p. 4) and Yahya et al. (2012 p. 307) both determined that threats to the species habitat and microhabitat remained unaddressed. Yahya et al., (2012 p. 307) also found that enforcement of management measures

⁷ See https://www.coraltriangleinitiative.org/sites/default/files/resources/Indonesia%20NPOA_Final.pdf

was lacking while species collection for export was continuing without reporting to the relevant authorities and that measures to monitor trade were not being effectively enforced. Given these deficiencies and based on surveys conducted in 2011-2012, Ndobe et al. (2013 pp. 121, 125) concluded that Banggai cardinalfish were not being harvested sustainably.

In 2015, Vagelli (2015 p. 3) conducted interviews with local and regional government officials as well as local stakeholders including the village leaders, fish collectors, and traders, and visited sites where Banggai cardinalfish conservation actions were reportedly occurring including the BCC and MPAs. Vagelli (2015 p. 12) concluded that: no effective conservation program had been implemented in the Banggai regions since the IUCN's 2007 listing of the species as endangered; local conservation efforts were lacking primarily due to a lack of funding/technical support or were so poorly designed that there was no positive benefit to the conservation status of the species; no MPA had been physically established; and the Banggai cardinalfish fishery was not being meaningfully tracked by local fishery authorities.

Banggai cardinalfish are not listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The species was proposed for listing in 2007 and 2016 because of international concern about steep population declines, heavy collection pressure, and the species' biological characteristics that make it particularly vulnerable to trade. In response to this concern and instead of a CITES listing, the Parties requested that Indonesia implement conservation measures in 2016 and report progress to the Animals Committee (CITES, Decision 17.259 Rev.CoP17). The CITES Secretariat was also directed to commission a study to assess the impact of trade on Banggai cardinalfish, which was then funded by the United States and the European Union (CITES, Decision 17.260 Rev. CoP17). This process is ongoing, with Indonesia submitting progress reports at Animals Committee meetings, and the Animals Committee continuing to make further recommendations.

Indonesia created a National Plan of Action (NPOA) (2017-2021) for Banggai cardinalfish and continues to submit progress on this Plan to the CITES Animals Committee (Ndobe et al., 2018 p. 34-36). As part of the NPOA, an MPA was established that covers 90 percent of the endemic Banggai cardinalfish distribution (Ndobe et al., 2019 p. 2). The MPA consists of several zones with varying levels of protection including a core zone with no take or entry, a sustainable fisheries zone where regulated fishing is allowed, a utilization zone where regulated tourism is allowed, and a rehabilitation zone for ecosystem restoration activities (CITES, Banggai Cardinalfish (*Pterapogon kauderni*), AC Doc. 31 p. 3-4). Banggai cardinalfish density has not significantly increased with the designation of the MPA, as population surveys show no significant difference between population densities within the protected area and outside of it in the control site (AC Doc. 31 p. 2). Moore et al. (2021 p. 7) raised concerns about surveillance and enforcement of protected areas within the Banggai Archipelago, stating that a new Regional Autonomy Law (UU 23/2014), which moved jurisdiction of inshore waters from the district to the provincial level, has led to a steep increase in illegal fishing and shipments of ornamental fish from the southern part of the Banggai Archipelago to Kendari. Additionally, the Marine Conservation Institute's Marine Protection Atlas categorizes this protected area as a

“Less Protected/Unknown” level of protection.⁸ Indeed, of Indonesia’s 202 designated MPA’s, 201 covering 178,171 km² are categorized as less protected/unknown.⁹

Because of the CITES decisions, population surveys to measure population density of Banggai cardinalfish and its microhabitat have been done, though as noted above, scientists raised concerns about Indonesia’s survey methods (Ndobe et al., 2018 p. 37; CITES, Banggai Cardinalfish (*Pterapogon kauderni*), AC Doc. 31 p. 1). Among the concerns, there was a lack of understanding around survey locations because some coordinates given are in areas with no suitable Banggai cardinalfish habitat (Ndobe et al., 2018 p. 37). Ndobe et al. (2018 p. 37) also raised concerns about the transect method being used and suggested that roving diver swims are more appropriate for conducting surveys of species with patchy and shifting distributions like the Banggai cardinalfish. The Animals Committee encouraged Indonesia to consider these concerns (CITES, Banggai Cardinalfish (*Pterapogon kauderni*), AC Doc. 31 p. 1).

In 2018, Indonesia’s Ministerial Decree Kepmen 49-2018 imposed a ban on the Banggai cardinalfish fishery during the peak breeding periods of February-March and October-November (Ndobe et al., 2018 p. 36). The species has also been found to reproduce year-round with peaks in breeding synchronized with the lunar cycle (Ndobe et al., 2019 p. 7; Ndobe et al., 2018 p. 6; Vagelli, 2005 pp. 2,3,184; Vagelli, 2017 p. 205; Vagelli & Volpedo, 2004 p. 237). The CITES Animals Committee recommended that Indonesia consider the suggestions by Ndobe et al. (2018 p. 42) that additional regulations are needed to prevent unsustainable fishing when these seasonal closures are not in effect and that each ESU should be managed as its own stock because of the genetic structure of the Banggai cardinalfish (AC Doc. 31 p. 1). In addition to managing Banggai cardinalfish stocks, the Committee recommended Indonesia consider managing the collection of sea urchins and sea anemones within the marine protected area, as recommended by Ndobe et al. (2018, p. 38; AC Doc. 31 p. 1).

The CITES Animals Committee also recognized the need for more accurate and accessible trade data, recommending Indonesia consider the suggestion by Ndobe et al. (2018, p. 39) to conduct a field survey on trade through Kendari due to the lack of clarity about the source of increased consignments there. It also recommended accessible databases for records that provide detail to the species level (Ndobe et al., 2018 p. 40; AC Doc. 31 p. 15). This would be useful from importing countries and such data may be particularly important if reported by Indonesia given the high mortality in the supply chain (Ndobe et al., 2018, p. 40).

Additional regulations are needed to help this species recover. In its proposed rule to list the Banggai cardinalfish as threatened, NMFS stated “regulatory mechanisms on the commercial harvest industry do not appear adequate to ensure the population will be sustainable” (79 Fed. Reg. at 74,967) and this remains true. While Indonesia has implemented some conservation measures to protect the Banggai cardinalfish, there is no significant difference between the populations within the protected areas and the ones that are not found within such areas. The most recent population surveys, noting their methodological flaws, suggest that a few, select populations are recovering but the general trend in the population is negative. Additionally, until

⁸ See <https://mpatlas.org/>

⁹ See <https://mpatlas.org/countries/IDN>

survey methods are adjusted from transect surveys to more species-appropriate methodologies (e.g., roving diver swims), it will be difficult to determine an accurate population status.

C. Section 4(d) of the Endangered Species Act Requires Regulations that Ensure the Survival and Recovery of Listed Species, Including Section 9(a)(1) Protections

The purpose of the ESA is to protect and recover species that are in danger of extinction, as well as to safeguard the ecosystems upon which these species depend to survive.¹⁰ Species may be categorized as either “threatened” or “endangered” under the ESA.¹¹ A species is “threatened” if it is “likely to become endangered within the foreseeable future.”¹²

Section 4(d) of the ESA requires that “[w]henver any species is listed as a threatened species . . . the Secretary shall issue such regulations as [she] deems necessary and advisable to provide for the conservation of such species” and “may by regulation . . . prohibit by regulation any act prohibited under section 1538(a)(1)” of the ESA.¹³ The ESA defines “conservation” to mean:

the use of *all* methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.¹⁴

Thus “conservation” requires ensuring a species’ survival and promoting its recovery.¹⁵ In adopting Section 4(d), Congress provided NMFS broad authority to issue regulations to conserve threatened species, explaining that agencies have “almost an infinite number of options available” to conserve threatened species.¹⁶ The Senate Report noted that:

[Section 4(d)] requires the Secretary, once he has listed a species of fish or wildlife as a threatened species, to issue regulations to protect that species. Among other protective measures available, he may make any or all of the acts and conduct

¹⁰ 16 U.S.C. § 1531(b).

¹¹ 16 U.S.C. § 1532(6), (20).

¹² *Id.* § 1532(20).

¹³ 16 U.S.C. § 1533(d).

¹⁴ 16 U.S.C. § 1532(3) (emphasis added).

¹⁵ *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv.*, 378 F.3d 1059, 1070 (9th Cir. 2004) (quoting *Sierra Club v. United States Fish & Wildlife Serv.*, 245 F.3d 434, 441-42 (5th Cir. 2001) (“‘Conservation’ is a much broader concept than mere survival. The ESA’s definition of ‘conservation’ speaks to the recovery of a threatened or endangered species.”)).

¹⁶ H.R. Rep. No. 93-412, 93d Cong., 1st Sess. 12 (1973).

defined as ‘prohibited acts’ . . . as to ‘endangered species’ also prohibited acts as to threatened species.¹⁷

Furthermore, in interpreting Section 4(d), the D.C. Circuit explained:

[T]he first sentence of § 1533(d) contains the ‘necessary and advisable’ language and mandates formal individualized findings. This sentence requires the [agency] to issue whatever other regulations are ‘necessary and advisable,’ including regulations that impose protective measures beyond those contained in § 1538(a)(1).¹⁸

Thus, NMFS has very broad authority under Section 4(d) of the ESA to take all necessary steps to recover threatened species. Additionally, Section 7(a)(1) of the ESA reiterates the conservation obligation placed upon all federal agencies, including NMFS.¹⁹ Indeed, in listing the Banggai cardinalfish as threatened, NMFS said that it “will consider potential protective regulations pursuant to section 4(d) for the Banggai cardinalfish in a future rulemaking.”²⁰

D. Section 9(a)(1) Protections Are Necessary and Advisable for Banggai Cardinalfish Conservation

The Banggai cardinalfish requires the protections of Section 9(a)(1) for its conservation and recovery. As evidenced in the final listing rule and this petition, the species is threatened with extinction due in substantial part to collection for the aquarium trade. That threat is compounded by the threat of habitat damage and loss, climate change, and disease. Existing international regulations are insufficient to protect the species, as the species is not currently listed under CITES and Indonesia’s domestic regulations are inadequately protective. Because the United States is a major consumer of Banggai cardinalfish, Section 9(a)(1)’s prohibitions will reduce collection and trade (*see* 79 Fed. Reg. at 53,886) and encourage sustainable and transparent management of the fishery in Indonesia and contribute to the recovery of the fish.

E. Proposed 4(d) Rule and Support Therefor

Pursuant to NMFS’s ESA authority and obligations, we petition the agency to adopt a 4(d) rule to provide for the conservation of the Banggai cardinalfish. We recommend the following regulatory language:

50 C.F.R. § 223.302 Banggai cardinalfish (*Pterapogon kauderni*)

(a) Prohibitions. The prohibitions of sections 9(a)(1)(A) and 9(a)(1)(E) through 9(a)(1)(G) of the ESA (16 U.S.C. § 1538) relating to endangered species apply to the threatened Banggai cardinalfish (*Pterapogon kauderni*).

¹⁷ S. Rep. No. 93-307, 93d Cong., 1st Sess. 8 (1973).

¹⁸ *Sweet Home Chapter of Communities for a Great Or. v. Babbitt*, 1 F.3d 1, 7-8 (D.C. Cir. 1993).

¹⁹ 16 U.S.C. § 1536(a)(1).

²⁰ 81 Fed. Reg. at 3030.

(b) A threatened species import or export permit under 50 C.F.R. § 222.308 is required for the importation or exportation of specimens, products, and live Banggai cardinalfish (*Pterapogon kauderni*) and the requirements of 10(c) of the ESA (16 U.S.C. § 1539(c)) related to endangered species permits apply to import or export permits for Banggai cardinalfish (*Pterapogon kauderni*) required under this section.

(i) Introduced populations of Banggai cardinalfish are covered by this requirement.

(ii) Captive-bred Banggai cardinalfish are covered by this requirement unless accompanied by a valid Pre-Act certificate issued pursuant to 50 C.F.R. §§ 222.201-222.205.

(c) All applicable provisions of 50 C.F.R. §§ 222.301-310 and 50 C.F.R. § 23 must be met.

As described above, we request that NMFS apply Section 9(a)(1)'s prohibition on import, export, and sale to the Banggai cardinalfish, whether specimens are wild- or captive-sourced. If NMFS considers allowing continued import/sale of captive-bred fish, it must do so only under the strictest term and only if laundering of wild-sourced fish as captive-bred can be prevented.[1] We would urge NMFS to develop a registry of approved captive breeding operations, requiring those operations to document that: (1) the operation does not source from the wild; (2) the operation contributes to the conservation of wild populations of the species; (3) the operation meets the requirements of CITES Resolution Conf. 12.10 for registration of captive-bred operations for Appendix-I species (Resolution Conf. 12.10 (Rev. CoP15) Registration of operations that breed Appendix-I animal species in captivity for commercial purposes, Annex 1),[2] and (4) the operation is U.S.-based, to ensure oversight.

V. Conclusion

Banggai cardinalfish have experienced dramatic declines in population abundance and fitness resulting from decades of overexploitation for the ornamental fish trade, making the species extremely vulnerable to habitat loss, climate change, and the continued exploitation that it faces today. Wild Banggai cardinalfish populations cannot continue to supply the United States aquarium trade sustainably due to their low reproductive capacity, small, isolated populations, lack of dispersal abilities, and high mortality in the trade chain. The number of reported imports of Banggai cardinalfish represent only a fraction of the total number of fish collected from the wild given the significant mortality rate for the species from capture to import. As demonstrated throughout this petition, the promulgation of a 4(d) Rule that extends the protections of ESA Section 9(a)(1) to the Banggai cardinalfish is both necessary and advisable for the conservation of the species.

Please contact us at any time if you have questions or require additional information. We have provided a copy of all references cited in this petition on a DVD for inclusion in the administrative record on this issue. If you require the references in a different form, please advise.

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