

# WHITE PAPER on the Proposed Rule on Banggai Cardinalfish

NOAA-NMFS-2023-0099

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## Introduction and key issues

**Nautilus Park (exporter)** and **Octopus Farm (producer)** are the largest existing aquaculture operation of Banggai Cardinalfish. Our sea-based farm is located in Southern Thailand, where we have established 15 years ago, in collaboration with the Department of Fisheries of Thailand, a new disease-resistant Banggai population in a controlled farm environment.

The operation was initially established as a small demonstration farm within an International Cooperation Project funded by the Government of Italy in the framework of a larger Coastal Habitat & Resources Management Program co-funded by the European Union and the Thai Ministry of Agriculture. After the project termination, the farm has continued as a spin-off, growing quickly to the present commercial scale through the marketing collaboration with the leading US & UK importers and the largest US retailer of marine ornamental fish.

We have been providing to EU (since 2011) and US (since 2012) the largest stable and consistent aquaculture alternative to wild Banggai Cardinalfish.

From March 2012 to August 2023 (11.5 years), we exported to US a total of 1,059,068 cultured Banggai with an average of 92,000 fish per year. Based on NOAA own estimate of the average yearly import into US of 120,000 Banggai Cardinalfish, simple math says that, in average, 76% of Banggai entering the US since 2012 is coming from our certified aquaculture facility.

NOAA specifically acknowledged in 2014 that our farm existed (FR Vol. 79 No. 241, December 16, 2014): *“In 2012, a large-scale aquaculture facility based in Thailand began to breed Banggai Cardinalfish in captivity for export, which may alleviate some of the pressure to collect fish from wild populations (Talbot et al., 2013; Rhyne, Roger Williams University, unpublished data 2014). In 2013, approximately 120,000 Banggai Cardinalfish were imported into the United States from the Thailand facility. The volume represents a significant portion of overall United States imports of the cardinalfish and may even exceed the number of wild fish currently imported (Rhyne, unpublished data, 2014).”*

The data cited by NOAA regarding 2013 US imports are correct, as confirmed in detail below. In 2013 we exported to the US exactly 120,176 Banggai Cardinalfish.

We have been closely monitoring all the diverse regulatory processes for Banggai Cardinalfish (IUCN, CITES, ESA, etc.), but we have never participated directly, limiting ourselves to provide background papers to our partner importers. Being aquaculture producers, we believed that aquacultured specimen would be clearly acknowledged by regulatory and scientific authorities

separately and outside of the contest on wild banggai, and we have always preferred to keep a low profile.

With NOAA's proposed rule that *"The import and export of wild caught and **captive-bred Banggai Cardinalfish** into and from the United States and its territories would be prohibited"*, we are compelled to submit our comments on the significantly adverse impact on our aquaculture activities in Thailand and on the negative impact that will result if pressure reverts on wild-caught specimens when the largest aquaculture operation in the world loses its major market and will be likely forced to cease operations.

The prohibition of captive-bred imports appears in the NOAA proposed rule **out of the blue and without any specific justification**. The NGO petition of April 22-2021 and all current NOAA papers on the proposed rule focus only on the assessment of wild Banggai population in Indonesia and its fisheries and trade. **S.E. Asian aquaculture is not mentioned, quantified and discussed, only abruptly proposed to be banned**.

At the same time the proposed rule will allow only domestic US aquaculture. From the draft NOAA EA: *"Alternative B of the proposed NOAA rule has been selected because still allowing interstate commerce of **domestically-bred Banggai Cardinalfish**"*.

This is a highly unfair, uninformed and biased decision, marking the first time ever in the history of the regulatory framework of the aquarium industry that **"foreign"** aquaculture is considered as negative as wild capture.

For **Environmental Justice** to be really just, it must be applied to all stakeholders at the international level, particularly to the ones from the original producing areas.

We established our farm in Thailand because the **Government of Thailand** totally prohibits the export of wild marine ornamental fish and invertebrates, and only certified aquaculture is allowed (only for fish) under very strict licensing and monitoring protocols.

If approved, the proposed ban of "foreign" aquaculture of Banggai Cardinalfish will:

- **Raise huge issues** on key Conservation, Legal, Environmental Justice and International Trade matters, leading to multiple litigations and closer scrutiny of the NOAA process leading to the rule;
- **Cause the closure of our farm** (for the loss of its main US market) and the forced culling of our 10,000 strong broodstock bank, since we are not allowed to release Banggai Cardinalfish in open Thai waters;
- **Create a very dangerous precedent**, discourage other current and future marine ornamental fish aquaculture efforts in S.E Asia, home of the original biological resources, and cast a shadow also on freshwater ornamental fish, mostly produced by aquaculture in Asia.

Aquaculture, as alternative to wild capture, has always been considered as the main accepted path to improve the environmental sustainability of the aquarium industry. **The proposed ban will undermine this path in S.E. Asia, putting a huge responsibility on NOAA side.**

The information submitted herein details our work and results, and includes our comments on the negative impacts that will result if NOAA's proposed rule is adopted.

We are available for any further request for information on our activities and regulatory safeguards, but, as a necessary step for a true scientific and data-based assessment, we strongly recommend that NOAA directly communicate with the Government of Thailand's Department of Fisheries to verify:

1. The Thai legal system for the protection of wild marine ornamental fish and invertebrates;
2. The Thai legal system for the certification and monitoring of aquaculture farms for export;
3. The certification documents regarding our farming and exporting operations;
4. The data of our cultured Banggai exports as inspected and recorded for each shipment by the Phuket Fish Inspection Office.

**We encourage NOAA to consider the inevitable negative impact if the proposed rule is adopted as crafted, and to ensure that Government regulated aquacultured facilities be allowed to continue trading with the United States.**

## Farm Presentation

The sea-based farm is located in Southern Thailand. We have produced and exported aquacultured Banggai since 2011. US is our main export market. From March 2012 to August 2023 (11.5 years), we have exported to US a total of 1,059,068 cultured banggai, as detailed per month and year below:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>2012</b>			4,080	4,080	4,080	4,080	6,120	4,704	11,856	17,136	14,208	6,144	<b>76,488</b>
<b>2013</b>	13,332	8,880	14,232	10,032	13,296	9,744	3,348	3,408	10,464	13,392	9,872	10,176	<b>120,176</b>
<b>2014</b>	13,392	6,864	6,912	9,792	6,992	6,960	6,960	7,032	6,912	10,608	7,056	9,504	<b>98,984</b>
<b>2015</b>	11,568	7,008	7,104	13,296	10,320	10,368	10,320	5,856	3,936	10,800	10,560	8,640	<b>109,776</b>
<b>2016</b>	8,496	7,248	7,248	5,136	5,760		1,104	3,216	5,568	7,196	15,744	8,400	<b>75,116</b>
<b>2017</b>	8,496	8,544	4,368	8,624	12,968	8,544	8,496	4,182	3,848	3,272	10,178	6,964	<b>88,484</b>
<b>2018</b>	7,056	8,112	7,536	6,816	7,104	6,768	6,768	3,744		4,800	6,300	7,536	<b>72,540</b>
<b>2019</b>	8,880	10,080	5,136	10,224	8,112	3,408	5,520	2,832	3,216	1,872	9,360	6,000	<b>74,640</b>
<b>2020</b>	10,800	9,600	6,048		8,424	6,456	6,816	3,120	2,832	4,656	3,696	10,176	<b>72,624</b>
<b>2021</b>	9,024	4,128	8,784	7,632	7,344	7,152	6,864	3,144	3,264	8,880	9,360	14,184	<b>89,760</b>
<b>2022</b>	11,568	9,360	11,760	8,736	10,944	6,960	4,560	3,552	4,176	9,552	14,592	10,224	<b>105,984</b>
<b>2023</b>	15,696	10,032	4,848	8,928	10,752	9,120	8,592	6,528					<b>74,496</b>
<b>Total General</b>													<b>1,059,068</b>

With an average export of 92,000 fish per year, and given that NOAA estimates the import into US of Banggai Cardinalfish at 120,000 specimen per year, it is evident that in average the majority (76%) of Banggai entering the US since 2012 is coming from us.

This can be easily verified through:

- Nautilus Park Invoices
- Customs Records (THAI & US)
- Movement Documents (MV) by Department of Fisheries of Thailand
- Inspection Reports of all our shipments by the Phuket Fish Inspection Office

Given the situation in Indonesia 15 years ago, we believed that it was necessary to establish a new “clean” Banggai population outside of the Indonesian exporters’ **hot spots**, where mass viral diseases of the very sensitive wild fish can be greatly enhanced.

Thailand was selected because the **Government of Thailand** specifically prohibits the export of wild marine ornamental fish and invertebrates, and only aquaculture productions of fish are allowed to be exported under a very strict licensing and monitoring protocols.

The farm has the following licenses, all available for certified translation and verification:

- **Permit of Occupation of Public Waters** by Harbor Department No. 676-2561. This is a permanent Permit.
- **GAP (Good Aquaculture Practices) Certificate** by Department of Fisheries No. 82202-82-GAPC1-04-54-00001. The Certificate lasts 3 years and the farm is inspected every year by Department of Fisheries.
- **Farm for Export Certificate** by Department of Fisheries No. TH8221110001. The Certificate lasts 3 years, and the farm is inspected by Department of Fisheries every 6 months, including detailed health checks on every species cultured.

For each one of our shipment, we must obtain from Department of Fisheries the **Movement Documents (MV)**, detailing species and quantity of the fish that we intend to export. Department of Fisheries keep a list of the species inspected and verified as cultured at the farm, and the farm can export only these approved species.

Each one of our shipments is then inspected by the **Fish Inspection Office at Phuket Airport**, and a report with pictures of the inspection is sent to the headquarters of Department of Fisheries at Bangkok each time. The control of marine ornamental fish exports is a serious issue in Thailand.

A part Banggai Cardinalfish, we produce and export also the following species:

Pajama Cardinalfish <i>Sphaeramia nematoptera</i>	Azure Damselfish <i>Chrysiptera hemicyanea</i>
Rolland’s Damselfish <i>Chrysiptera rollandi</i>	Talbot’s damselfish <i>Chrysiptera talboti</i>
Lemon Damselfish <i>Pomacentrus moluccensis</i>	Pavo Damselfish <i>Pomacentrus pavo</i>
Ocellaris Clownfish <i>Amphiprion ocellaris</i>	Black & White Ocellaris <i>Amphiprion ocellaris</i> var.

## Farm History

Our farm originates from an International Cooperation Project funded by the Government of Italy in collaboration with Department of Fisheries of Thailand, and operated by an Italian NGO. The project was a sub-component of a larger Coastal Habitat & Resources Management Program co-financed by the European Union and the Thai Ministry of Agriculture.

The Italian-Thai project focused on sustainable aquaculture for small-scale fishermen, the poor majority of Thai fishermen.

- Within the project, a small demonstration marine aquaculture farm was set up to promote a new concept of ecological farming, somehow comparable to permaculture, and based on the localized enhancement of natural zooplankton productivity in large semi-closed marine-based mesocosms populated by a very low-density fish biomass.
- The target was marine ornamental fish, with the objective to support aquaculture alternatives to wild caught fish and develop small scale fishermen technical and business skills in a niche market not occupied by the large corporations dominating Thai seafood exports. In short, achieving environmental sustainability through income-generating activities, and not anymore through public or private donations.
- During the project, many marine ornamental fish species were imported from Indonesia directly by Department of Fisheries under the project financing, in order to test their adaptability and resilience in the eco-specific conditions of South Western Thai coastal waters. Among these, Department of Fisheries imported around 2,500 Banggai Cardinalfish, and the team at the demonstration farm spent a couple of years to select and develop a broodstock strain resistant to the main disease affecting Banggai Cardinalfish, a specific variation of Iridovirus.

At the end of the project, the demonstration farm was transferred to a small cooperative of local small-scale Muslim fishermen (**Octopus Farm**), taking care of production, while a small fish exporter company (**Nautilus Park**) was set up to take care of marketing and export. The 2 Italian project managers of the implementing NGO remained to become the technical and marketing advisors.

The farm was immediately supported by leading US and UK importers of marine ornamental fish, that is **Quality Marine (QM) in US** and **Tropical Marine Centre (TMC) in UK**, which also serves continental Europe.

In particular, QM has been instrumental in having its US-based customers, including major national retail companies, shift to cultured banggai, thus allowing our farm to consolidate and grow to the present level.

We define these companies not as simple buyers, but as real partners that have made our sustainable aquaculture efforts a viable and significant contribution to reduce the demand for wild-caught Banggai. Our farm has been visited and verified by QM (2 times), PETCO (1 time) and TMC (3 times).

## Farm Description

Our farm covers a marine area of 5,000 m<sup>2</sup> at 300 m from the coast. It is located in a protected bay connected to the open Andaman Sea and flushed by clean oceanic water through semi-diurnal tides of 3.5 m. The farm design is an upgraded version of traditional Thai small scale fishermen rafts, built only with local materials. The farm is composed by:

- 7 production rafts, managed separately for disease control. The rafts are composed by a total of 282 large mesocosm units of 20 m<sup>3</sup> each, all lined by a wide variety of seaweed. The units are semi-closed with nets of very fine mesh size. All units are fitted with an upwelling aeration-destratification system, protected by shading nets and served by dedicated pumps for all routine cleaning and water mixing operations.
- 2 covered floating rafts for storage and working area
- 1 large covered floating raft for conditioning the fish before shipments and for packing.

## Farming System

Our farming system is based on the following cornerstones:

- **Biomimicry.** In general, the farm replicates, in a controlled environment, the social & bio-ecological settings of wild fish colonies.
- **Social settings.** Natural social settings of fish are necessarily overlooked in land-based aquaculture for lack of space and high cost of operations. On the contrary, in our sea-based farm each unit of 20 m<sup>3</sup> hosts only a small colony of fish similar to what can be observed in nature, with a very small biomass of less than 0.3 kg (broodstock & offspring). The tribal spatial organization of Banggai Cardinalfish is respected, becoming the foundation of fish welfare, health, resilience and tamed aggressivity.
- **Nutrition** is primarily based on the abundant natural zooplankton population blooming in our seaweed-lined marine mesocosms units (harpacticoid and calanoid copepods, small shrimp eggs/nauplii, small crab eggs/zoeae, fish eggs/larvae, isopods, amphipods etc.), enhanced by new management protocols developed along 15 years of trials and errors. It takes around 1 year of careful work for the seaweed population to mature and stabilize in new units. We define these units as “plankton reactors”. Moist feed composed of shrimps, fish, mussels and squid is used 2 times per day as integrative feed. Larval rearing of fish other than Banggai (pajama, damsels, clownfish) is supported by the collection, size selection and distribution of very small coastal copepods, ciliates and micro-algae.
- **Disease prevention and control** starts from the first line of fish resilience supported by wild-like social and bio-ecological settings. The second line is the subdivision of the farm in 7 sections, each physically separated from the others. At the first (but extremely rare) appearance of diseases, the affected section is isolated and specifically managed. The third line are the disease identification analysis conducted at the

Veterinary Lab of a major Southern Thailand University by both traditional methods and nested PCR.

- **No chemicals or veterinary drugs** are used at the farm. Only freshwater baths are used, but rarely needed. Banggai never needs them.
- **Valorization of human resources.** We owe a lot of our success to the capacity and dedication of the small-scale Muslim fishermen working at the farm since many years. They have grown along with the farm, and all achievements in such a difficult operation must also be credited to their Thai “holistic” eye and intimate knowledge of marine life. We call them “professors”, and every technical decision is discussed and adjusted with them before implementation.

## Final Considerations on the Proposed Rule NOAA-NMFS-2023-0099

### Aquaculture

- The information provided to NOAA in support of the proposed rule is absolutely uncomplete, inaccurate and misleading. There is no mention of the fact that US imports have been mostly composed, in the last decade, of aquacultured Banggai from our farm and other smaller Indonesian producers.
- It is very important to remark that US consumers have well endorsed imported aquacultured Banggai, and have been willing to pay a higher price for them. Consumers anyhow do not seem to be included among the stakeholders considered by NOAA for the proposed rule.
- With all NOAA papers related to the proposed rule focusing only on wild Banggai, “foreign” aquaculture is proposed to be banned without any background information, discussion and justification, a very strange act indeed in a supposedly science and data-based decision.
- In the history of the aquarium industry, the proposed NOAA rule marks the first time ever that aquaculture productions could be banned together with wild capture. Aquaculture, as alternative to wild capture, has always been considered (wherever is conducted) as the main accepted path to improve the environmental sustainability of the aquarium industry. The proposed ban will create a dangerous precedent that could derail this path in S.E. Asia, putting a huge responsibility on NOAA side.
- In particular, “foreign” aquaculture could be dismissed for the “suspected” lack of reliable certification. On the contrary, it is easy to verify, in our case, that the Government of Thailand strictly controls and certifies aquaculture, while totally banning the export of wild caught marine ornamental fish. Being Thailand a leading exporter of cultured seafood in a challenging world market, the Thai aquaculture certification and monitoring system is by far the best in Asia.

- If approved, the proposed ban of “foreign” aquaculture of Banggai Cardinalfish will immediately raise huge Conservation, Legal, Environmental Justice and International Trade issues, discourage other marine ornamental fish aquaculture efforts in S.E Asia, home of the original biological resources, and cast a shadow also on freshwater ornamentals, mostly produced by aquaculture in Asia.
- On US aquaculture production, we can only notice that Banggai breeding looks easy at a small-scale level, but a few US ornamental fish aquaculture companies have tried to breed Banggai on a commercial scale and failed. Banggai in reality is a very difficult fish to breed on a mass scale in land-based operations for its specific requirements on space, social settings and nutrition. Without respecting these requirements, the fish immune system can be easily weakened, opening the door to viral upsurges and mass mortalities. Land based aquaculture systems, while successful with other marine ornamental species, cannot compete, in the specific case of Banggai Cardinalfish, with sea-based operations for space, costs and environmental settings.
- The proposed ban will destroy 15 years of our work, force the closure of our farm (US is by far our main export market), the disbanding of the small-scale fishermen group operating it and the culling of our 10,000 strong broodstock bank carefully selected and refreshed every year, since we are not allowed to release our Banggai Cardinalfish in the open waters.
- All the extensive knowledge and expertise developed at our farm for the breeding and management of a huge population of Banggai Cardinalfish along so many years, seasons and diverse climatic events will be completely wiped out. This will set the Banggai conservation effort to ground zero, achieving exactly the opposite results of the stated intention. Shutting down aquaculture operations in S.E Asia will inevitably result in more wild Banggai returning to the world market.
- The proposed ban will destroy also 15 years of our experiments and progress on a new system of ecological aquaculture biomimicking natural processes in a controlled environment. This low-density chemicals-free technology is particularly suitable for high value marine ornamental fish species and small-scale fishermen, and works in the opposite direction of hyper-intensive industrial aquaculture, dominated by large corporations all along the chain from inputs to market. Our technology has still a lot of untapped potentials, but the proposed ban will mark its definitive end.

### **General Considerations**

- We do not want to comment in detail on the various and often confused assessments of the wild population of Banggai Cardinalfish in Indonesia and of its fisheries and trade. It is a vast collection of fragmented, highly approximate and often incomparable information, with citations building up on themselves and mostly ultimately referring to old pre-aquaculture “estimates”. We acknowledge that it is a difficult task for scientists to orient themselves among such a mess of mostly un-peer-reviewed papers. Science has strict protocols that must be duly followed to provide credible outputs.



- We are accustomed to speak only of what we know exactly, and that is the real numbers of our export to US of certified aquacultured Banggai as the majority of total US Banggai imports estimated by NOAA. After the “discovery” of Banggai Cardinalfish by the aquarium trade in the 90ies, there was a short-lived boom, but already in 2011 large retailers in US had de-listed wild Banggai for its unsustainable mass mortalities. Only new aquaculture productions put healthier and more resilient Banggai on the US map again from 2012. Wild Banggai trade numbers in US have dropped substantially since then.
- US customers have consistently shifted to imported aquacultured Banggai, and leading actors in the US aquarium industry have played a key role in promoting and distributing only aquacultured Banggai. We strongly believe that this trend must be fully supported and not unreasonably punished.
- We observe that at the CITES Animal Committee of June 2021, the US Government, along with the CITES Parties, agreed that Indonesia would continue to monitor the trade without the need for any international restriction. The Indonesian 5 years plan and system of trade quota, season restrictions, licenses and resource monitoring of Banggai Cardinalfish was deemed satisfactory only two years ago.
- It is quite strange that another branch of the US Government could issue regulations in clear contrast with the established Convention on International Trade of Endangered Species. One Government One Voice is the basis of good international relations.
- NOAA should encourage the progress done by the Indonesians, even if small and difficult, and not just tell them that they are unreliable bad boys. The “teach them a lesson” attitude has nothing to do with the hard and serious work needed to support a strategic geopolitical US ally to work its way towards environmental conservation.
- From 30 years of experience of European funded International Cooperation with S.E. Asian countries by our present advisors, we strongly recommend that engagement is always much more useful than repulsion. The former give a better chance to assist and influence the outcome. The latter means “up to you”, and in this case could signify a worsening of the Banggai conservation status, particularly if aquaculture operations are banned. Our farm is an evident example of the results of positive engagement.
- In the world, US has the largest number of pet-loving families and the largest pet industry, with livestock representing only less than 4% of total sales value. Any discussion on this huge industry and its customers must be open and honest, and not disguised as the underground agenda of a series of small specific prohibitions ultimately aiming at the industry’s “eradication”. In US there are excellent scientists, tools and knowledge able to boost aquaculture of marine ornamentals, but nearly zero budget because the market for each species is quite small compared to mass seafood productions attracting most private and public funding. Please invest in aquaculture, not petitions.

## Conclusion and Pledge

- We trust that with the detailed information provided in this White Paper, NOAA can revise its approach to ensure Environmental Justice and provide support for the continuation of Government certified aquaculture exports of Banggai Cardinalfish from S.E. Asia to the United States.
- Please take aquaculture, wherever is conducted, out of the ban. Don't cull us, but join us, aquaculture producers in Thailand and Indonesia, for the real rescue and conservation of the Banggai Cardinalfish.