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Controlling the destiny of the trade:

Proactive steps now can address the major impediments to developing a more sustainable ornamental fish industry.

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The pet industry in general, and the ornamental fish sector specifically, is facing mounting legislative and regulatory pressures. This is routinely reported on in this journal; as an example, issue 74 had numerous comments to this effect. However, legislation and regulation do not arise de novo. There is typically an interest or advocacy group that is crafting the language behind any proposed governmental action. These groups often have a singular focus, and are likely to word legislation in a manner that does not account for a broader suite of impacts. Consequently, proposed government actions can easily become overly restrictive and/or ineffective.

Legislation

Many groups backing greater legislation or elimination of the ornamental fish trade often state a singular goal of preserving healthy coral reef ecosystems [note - freshwater wild fishery systems such as Brazil and India are typically not acknowledged in the discussion of wild ornamental fisheries by groups advocating preservation]. As researchers working for a public aquarium, we do not disagree with such a laudable goal. In our view, it is important that globally, we maintain healthy coral reefs, freshwater ecosystems, and the communities which depend upon ornamental fisheries as one of many extractive economies. We have worked extensively to highlight how ornamental fisheries can be managed so as to maintain healthy extractive socio-ecological systems (Rhyne et al. 2014). However, some adopting this preservationist goal fail to see the conservation benefits of the trade.

Conservation benefits of the trade

One outcome of failing to see conservation benefits is that groups working to preserve coral reefs will espouse the elimination of all ornamental reef fisheries using one of several strategies. One of the more predominant strategies is to first assert (correctly) that species diversity is important, and then assert that management



Healthy reefs and collection of ornamental marines can support each other

PHOTO: R. TALBOT

is important in order to maintain species diversity (also correct). This is frequently followed by the assertion that most reef fishes do not have management plans (again correct). The logical conclusion they then draw is that to maintain diversity, all fish species need to be managed, and, without management, fishes should not be harvested, and the ornamental fish trade should be halted. This conclusion then gets communicated as a simple solution stating that to preserve functional coral reefs, it is best to “cease and desist” all ornamental fisheries.

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These sergeant majors for sale in a market in Hengchen Township, Taiwan demonstrates the fine line between ornamental and food fish. PHOTO: M TLUSTY

All species require management

We see two problems with this logic. The first is that people in rural and impoverished locales derive their economic well-being mostly from their local environment. How are these people to live if you take away one of a very few possible sources of income, and a highly desirable one at that? They will find alternative livelihoods. In Brazil this largely means that fishermen will turn to agriculture, mining or forestry, all significantly more destructive than ornamental fisheries (see side bar highlighting Project Piaba).

In coral reef regions, closing the ornamental fishery (or stopping the fishery by shifting sourcing to ex-situ captive breeding programs) will not stop fishing. Fishermen will still continue to fish but the targets for this continued fishery will be food fishes. Food fishing often can be more destructive than ornamental fishing. In addition, the species are often the same (see picture of sergeant majors), with the difference being food fish are harvested at greater volumes (kg instead of individuals) for a significantly lower price. The fishermen may also turn to extremely destructive (and often illegal) practices such as fishing for sharks and luxury items such as sea cucumbers, maori wrasses, and groupers for the live food fish trade. Communities in regions of biological importance that have an apparent consistent and long-term market demand for aquarium fish are economically compelled to maintain the most robust and productive environments.

Commercially desirable aquarium fish represent a relatively easily attainable resource for rural people where alternative livelihoods are often unsustainable and environmentally destructive. The continuation of sustained economic benefit from the capture and export of aquarium fish can provide an effective motivator to fend off destructive practices and result in protectionism for not only the target species but the entire reef or rainforest ecosystem. Many IUCN redlisted species are dependent on these regions that are, in effect, Protected Areas, as a result of resident based stewardship. If the result is preservation of stream and flooded tropical forests, or as part of an integrated forest-reef ecosystem, the much desired REDD (Reduced Emissions through Decreased Deforestation) effect is accomplished.

The second problem with the “all species require management” argument is that the harvest pressure of a majority of ornamental species is very low. In our assessment of the 2005 Marine Aquarium Tropical Fish imports to the U.S., we observed 11 million individuals were imported from over 1,800 species. The single most imported fish was the blue-green chromis (*Chromis viridis*) (900,000 individuals), which were imported from nearly 30 countries. Only 12% of the trade was comprised of high-volume species, where high volume is considered to be > 1,000 individuals of one species from a single country (data presented in Rhyne et al. 2012). Instead of requiring *all* species to have a management plan, we argue that

Project Piaba - Established to foster an environmentally and socially beneficial ornamental fish trade.

The Mission of Project Piaba is to increase the environmental, animal welfare, and social sustainability of the Amazonian aquarium fish trade, to develop and incorporate metrics through which this progress can be assessed, and to provide mechanisms to promote this industry.

40,000

People are impacted in the riverine communities in the municipality of Barcelos [Amazonas state, Brazil] where the ornamental fishery is the principal subsistence activity.



46,000

Square Miles or 122,490 km² of preserved forest in the Project Piaba study area, approximately the size of the State of Pennsylvania.

60%

of the income revenues in the municipality are generated with the trade in ornamental fish. Approximately 80% of trade from the artisanal fishery is from a single species, the cardinal tetra (*Paracheirodon axelrodi*) export from the Rio Negro basin. 245 Fish Species are on Brazil's export list and have been observed by scientists

25

Years of Project Piaba scientists have been researching the ornamental fishery of the Rio Negro in Brazil. Early on it was discovered that the ornamental fishery was not only sustainable, but it was the principal driver for creating value for the environment.

90%

of freshwater aquarium fish worldwide are from fish farms, and not the wild. Some pet stores are relying on captive breeders in the U.S. and Asia, who sometimes use hormones to force their fish to spawn. This is threatening this ornamental fishery.

1,000

Fisherfolk families called "Piaberos and Pieberas" fish along the Rio Negro capturing shy, small fish quietly and gently, by hand. Families who live in thatched-roof houses built on stilts above the rising and falling river scoop the fish from the water with handheld nets, then transfer them with hollowed-out gourds to baskets. Unwanted fish are released instantly where they are caught..

100

Students have benefited as Project Piaba has provided the basis of study for hundreds of Amazonian undergraduate and advanced students.

40 Million

Fish are bound for exporters supplying home aquaria around the world. Every year, when the dry season comes and the water level drops, billions of ornamental fish lie doomed in drying puddles. Many species compensate by producing extravagant numbers of offspring, with each female laying hundreds, if not thousands, of eggs.

adaptive management could be used in the coral reef ornamental fish trade to target high volume species or those that involve a management concern.

Argue by proxy

A second strategy used to preserve coral reefs is to "argue by

proxy". This strategy creates a diversion through an ancillary concern that results in a call to stop wild ornamental fisheries. Often, animal welfare is the proxy argument that is used as a means to block "wild" animals from entering retail supply chains (as was discussed for the current situation in Germany, see *OFI Journal* 74).



The marine ornamental industry is a labour intensive industry, many jobs are involved.

PHOTO: R. TALBOT

Animal welfare is a critical concern and cannot be ignored. However, by focusing on the “wild” component only, this sends the message that while welfare is important, wild fishes have more rights than captive bred fishes. We maintain that animal welfare remains just as important whether a clownfish or sweetlips (or cardinal tetra – don’t forget freshwater species!) is wild caught or farm raised. All animals in our care require that their welfare be respected and met to the highest possible degree. [Note - we are aware that some advocacy groups use “wild” to indicate non-domesticated animals and raise our concern that such messaging points a significant lack of understanding of the ornamental fish hobby].

The unintended consequence of stopping the wild fishery will be that fish will be grown in aquaculture outside of their native country. Farm-raised cardinal tetras are now being offered from the Czech Republic, Singapore and the USA --all with no economic benefits being returned to Brazil. This is-essentially a form of biopiracy that sidesteps important economic opportunities to promote local conservation. Some animal welfare issues arise because certain species grow too large to be properly maintained in home aquaria. We point to the number of large sized fish (grouper, sweet lips, and pacu) that are now being grown as food fish in aquaculture (and would not be stopped through fishery closures).

These species are attractive to uninformed hobbyists when they are small because they are “cute”, or in the case of pacu, look like piranha. When they outgrow their tanks, however, they become a management issue, likely being released into the wild and potentially causing an invasive species concern. This is a potential problem that could easily be remedied by the industry through voluntarily offering not to source these species, as opposed to waiting for the issue to be regulated or legislatively adjudicated.

Certain stakeholders have sought to stop the ornamental fish trade as a single solution to preserve coral reefs. Given the fact that the collection of ornamental species is very low on the list of the major threats that coral reefs are facing, this “one size fits all” strategy is insufficient by itself and can have serious and negative unintended consequences. These range from not stopping (or even exacerbating) the “problem” that legislation was intended to fix to more dire consequences such as collapsing the social economy and fabric that was built upon ornamental fish extraction. In either case, unintended consequences can lead to broader scale ecosystem degradation.

While there are numerous legislative and regulatory actions that benefit the ornamental fish industry, we have observed the industry to be reactive to these actions. It is clear that industry, beginning with OFI members, need to carefully consider species lists and business practices, and that they must be willing to compromise. If not, regulations and legislation will become increasingly stringent, and perhaps also, increasingly misguided.

We propose that the industry take a proactive stance and develop a multistakeholder working group to address issues such as which

species should be in the trade and wild sourcing. We believe these are issues that, if left unattended, would likely become externally regulated. If a majority of the industry could subscribe voluntarily to working group suggestions, the declarations could be used to show due diligence, to show progress toward improving the trade, and to attempt to create pre-legislative solutions that perhaps could become more officially enforced. The industry should take the lead in developing proactive preventative measures (e.g., limiting the trade in tank-busters) that could be developed into targeted regulations rather than sweeping regulatory actions designed to legislate the trade out of business.

The global trade in ornamental fishes is complicated. Millions of individual fish representing multiple thousands of species from tens of countries are taken from both aquaculture and wild sources. From a science-based perspective, this is why the trade is so interesting. As an industry, this entire suite of characteristics must be honed to find the best subset of sourcing scenarios to benefit the planet and its people. Many outside the trade would find it surprising to learn that there are examples of where the aquarium trade is a positive force in some of the world’s biggest problems: poverty alleviation in developing countries, preserving our remaining areas of biological importance and critically endangered species, and even climate change. By proactively fostering these desirable outcomes, the aquarium industry can demonstrate itself to be a leader in driving the sustainability of the industry, and as a means to protect high value natural areas world-wide

When any advocacy protectionist group offers a simple solution, such as claiming all fish can or should be produced in aquaculture, the industry should be cautious. Simplifying this beautifully messy trade will reduce any potential conservation benefits. This is our challenge. Let us together create a working group that is interested in improving the trade in ornamental fishes. This will not be easy, but we believe now is the time. Those interested are welcome to join. Those that do not and carry on not supporting solutions to benefit both the planet and its people will be declaring a lack of interest in conservation, in working to maintain healthy coral reefs, intact freshwater ecosystems, and sustainability in those human communities that depend on ornamental fisheries as one of many extractive economies supported by these natural areas.

For additional reading, see

- Rhyne AL, Tlusty MF, Kaufman L. 2014. Is sustainable exploitation of coral reefs possible? A view from the standpoint of the marine aquarium trade. *Current Opinion in Environmental Sustainability* 7, 101-107
- Rhyne AL, Tlusty MF, Schofield PJ, Kaufman L, Morris JA, Bruckner AW. 2012. Revealing the Appetite of the Marine Aquarium Fish Trade: the Volume and Biodiversity of fish imported into the United States. *PLoS one* 7 (5), e35808
- Tlusty MF, Rhyne AL, Kaufman L, Hutchins M, Reid GM, Andrews C, Boyle P, Hemdal J, McGilvray F and Dowd S. 2013. Opportunities for Public Aquariums to Increase the Sustainability of the Aquatic Animal Trade. *Zoo Biology*, 32: 1–12.