

BEYOND SUSTAINABILITY

How to Create Protected Areas and Provide for Exhibits in the Future by Promoting a Socially and Environmentally Beneficial Aquarium Fish Trade

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Sustainability, or improving efficiency thus ensuring long term success, is the fundamental way the aquarium and zoo industry strives to do business. We work to ensure that the economics, ecological balance, planning, development and infrastructure, innovation, and education of our institutions and the environments we replicate exist now, and for future generations.

Nowhere has this been more in the forefront than in discussions of sustaining our live collections. While historically, we have collected animals from the wild, recent moves towards sustainability have focused around breeding as the sole source of animals with periodic inoculations of new genes from meticulously crafted import and wild collection agreements and governmental confiscations. This is true for many of the iconic species in our institutions, but for fishes, we cannot, and should not, solely rely on captive breeding. Firstly, the diversity of fishes in our collections is immense, with more than 2,600 marine and freshwater species combined. The space needed to breed that many species and in the numbers needed for exhibit exceeds facility footprints and budgets. Furthermore, many of the species in collections have never been bred in captivity. Thus, space and skillsets are not up to the task. But the need for animals exists, and it is recognized that the approach to ensuring species availability for aquatic exhibits into the future must be anchored in multi-pronged creative, alternative approaches.

In 2009, the aquatic community reviewed its current collection status, envisioned its future and published an action plan that would facilitate an organized, diversified effort to providing exhibit specimens. In the Action Plan, several traditional and cutting edge approaches were addressed as means to sustain our collections. One of the most exciting cutting-edge opportunities is the creation of extractive reserves. Extractive reserves identify large tracts of marine and freshwater habitats that can be managed and effectively protected for the purpose of regulated collecting by stakeholders. They build on the positive social and environmental aspects of the ornamental fish trade. This is a major step to ecosystem sustainability because of the benefits to the environment, the local economy, and the community. The extractive reserves concept flies in the face of traditional views of tightly managed aquatic sanctuaries that preserve populations rather than manage them for specific purposes. However, to fully implement the sustainability of the extractive reserve, a focus must be placed on supporting the resident human population and culture of the area. Extractive reserves are not merely about creating a low impact supply of animals for our exhibits. It is about creating a well-managed and high (positive) impact socio-ecological system that accentuates the benefits of an intact, bio diverse ecosystem, while simultaneously limiting any negative impact. While Project Piaba is not a true extractive reserve, it is a fishery model that has a 20-plus year history as a sustainability success story in Brazil. Lessons learned from Project Piaba can enlighten us as we move forward in our unique sustainability initiatives.

Project Piaba started as an academic study, looking at the commercial ornamental fishery centered at Barcelos, Brazil in the mid-Rio Negro. The cardinal tetra (*Paracheirodon axelrodi*) is the primary species fished, representing roughly 85 percent of exports

by volume. Though annual capture of the cardinal tetra alone is estimated to be around 40,000,000 fish, long-term research on the fishery indicates that it has a low negative impact on the long term stability of the wild fish population.

The ornamental fishery in this region began in the 1950s and intensive study of it began in the 1990s. Today, the fishery continues to maintain a place in the global market of the fishes exported. Over the years, research has noted that this particular fishery supports positive socioeconomic and environmental outcomes for the region, too. In this region, where opportunities for livelihoods are scarce, at least 60 percent of incomes come from the export of live fishes for the global aquarium fish trade. The fishing community involves the majority of the residents directly or indirectly throughout a tropical river-forest area larger than the state of Pennsylvania.

The fishing communities have known for generations that although stocks for marketable species, such as the cardinal tetra, are quite robust and replenish annually, they are also quite sensitive to environmental conditions. Deforestation and other destructive resource extractive practices could likely decimate the ornamental fishery. However, as long as these communities continue to have access to the aquarium fish market and the export market for fish remains strong, they will be inseparably dependent on the environment. Their regional protection goes far beyond the cardinal tetra, extending to the entire ecosystem. If environmental conditions continue to be maintained, geared toward maintaining the most productive wild-capture ornamental fishery, the entire ecology and biodiversity of the river-forest will be maintained as well. The countless species that depend on this ecosystem (the river dolphins, primates, macaws, etc.) will benefit from the protection by the residents. Based on the long history of this fishery, the fishing communities will continue to be very effective stewards and protect the region from the ravages that scar so much of the Amazon basin today.

In recent years, similar management systems that realize socioeconomic and environmental benefits as well as financial gain have been discovered in other regions of the tropics. In further developing the Brazilian system as a model, Project Piaba researchers have found that existing ornamental fisheries can be relatively easily adapted to maximize sustainable off-take, connect residents to the environment, and create protected areas.

India is an emerging entity in the global aquarium fish trade. Currently, 114 ornamental species from the Kerala part of the Western Ghats are being exported for the aquarium trade, an increase from a dozen only a decade ago. There has been an initial push by the Indian government to conduct captive rearing of many of India's most marketable species. Business plans are being geared to be competitive in the global market, even if it means competing against the country's own biological resources. However, even while this momentum is building, the Indian government, universities, and NGOs, have invited Project Piaba to establish partnerships with the goal of adapting the successful Rio Negro model in the Western Ghats region to create socioeconomic benefits and protect critical habitat. Scientists within India are working to analyze the trade to better understand where potential problems may be, and how they can improve the fishery for the benefit of the environment via protectionism from fishing.

Recently, a pilot program was proposed enlisting resident households as small scale fish collectors. Collection households were selected in areas where there was need for environmental awareness and protectionism abutting borders of traditional protected areas (national parks) where boundaries were delineated by rivers and streams. Researchers will engage with residents to measure changes in the collectors' household wellbeing and increase environmental stewardship to get metrics to determine success. It is hoped that by giving residents motivation to steward local resources, the discrepancy of land use and degradation of resources would lessen. A conservation "buffer zone" would be created around the traditional protected lands. A connection with the profits of the aquarium fish trade would connect them closer to the protection of the habitat that provides the fishery. Funding sources for the project are now being investigated and Indian researchers are anxious to begin the work.

If the Indian effort can support such collaboration as the Project Piaba model, the ecological, economic, and humanitarian gains could be impressive. Preserving cultures, poverty alleviation and ecological protection would be the exchange for maintaining a fishery for trade and education at public aquarium facilities. The Piaba effort establishes a win-win approach to supply and demand through the effective management of truly natural resources.

Sustainability is a journey we travel every day. The Aquatic Sustainability Action Plan established the road map by which we travel. Having the creativity and flexibility to spring from the established path to develop unique strategies based on traditional concepts is the key to our collective success in collection management. While not a true extractive reserve in the traditional sense, Project Piaba provides a model for developing important fishery sources for our collections and ensuring the cultural and economic

future of the region in which the fishery exists. The Piaba model is proving to be applicable for other necessary fisheries as well. It is proof that a balance can be struck between ecological and cultural considerations and supply and demand with a result that stocks our exhibits and gives back to humanity and nature.

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