

MPAs are sometimes approached by aquarium dealers who would like to use the MPA or adjacent areas for collection of live specimens. This sheet gives background information on the problems and potential benefits of collecting marine organisms for the aquarium trade, provides information on environmentally sound practices, and suggests appropriate policies for an MPA.

Globally, about 1,500 marine fish species, 200 hard and soft coral species, about 500 species of other invertebrates (e.g. shrimp, molluscs such as small clams, and anemones) and thousands of tonnes of 'live rock' (benthic substrate with attached organisms) are collected for the aquarium trade. They are known in the trade as marine 'ornamentals'. Fish make up about 85% of the trade by value and most come from coral reefs. The Blue-green damselfish (*Chromis viridis*), Clown anemonefish (*Amphiprion ocellaris*), Humbug and Three spot dascyllus (*Dascyllus aruanus* and *D. trimaculatus*) and Sapphire devil (*Chrysiptera cyanea*) are the most popular species, but angelfish, hamlets, damsels and Blue tangs are also in demand. An estimated 20-24 million fish, 11-12 million pieces of coral, and 9-10 million other invertebrate species are traded each year. Around 1.5-2 million people have marine aquaria, of which almost 50% are in North America and 25% in Europe.

Indonesia and the Philippines currently supply over half the marine fish, and Indonesia and Fiji are the largest suppliers of corals and live rock. Less than 2% of specimens are captive-bred and this is growing only slowly as there are major biological and economic constraints to breeding and rearing aquarium species (but see case study). The main importers of marine ornamentals are the US, Europe and Japan. The WIO is a only small supplier but several countries are involved, and interest among aquarists for WIO species is growing. Kenya has one exporter, Mauritius has three exporters and French companies are interested in developing links with suppliers in the region. Mozambique was once large supplier of corals but the trade was banned in 1999.



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POTENTIAL PROBLEMS

The collection of marine ornamentals has the following effects:

- Damaging techniques have been, and still sometimes are, used to collect specimens, involving poisons (e.g. sodium cyanide, bleach, fish anaesthetics). This practice can lead to the death of both targeted and non-targeted species, including the coral reefs themselves. Fish that shelter in corals are sometimes extracted with sticks that cause damage.
- Poor husbandry and shipping leads to high mortalities for some species (e.g. by leaving cartons of animals outside in extreme weather).
- Endemic species may be at risk if they occur in small populations with a very restricted range.
- Sedentary species such as clams, corals and anemones are at risk as they are very easy to collect.

Since reef fish species are also at risk from other impacts that can damage coral reefs, careful thought should be given before authorising a collection operation to go ahead in an MPA.

BENEFITS FROM MARINE ORNAMENTAL COLLECTION

Keeping tropical fish, however, brings pleasure to millions of people and the trade can be an important source of income for local communities. Marine ornamentals have much higher value than food fish, and may provide a good alternative to other forms of fishing as for a certain amount of revenue generated, fewer fish are removed. The species involved are different from those targeted for food, and their collection could be seen as a complementary activity. Efforts are underway to train collectors in environmentally sound methods and transport methods are being improved to minimise mortality before the specimens reach their destination. Collection and trade in threatened or potentially threatened species, those that have poor survival rates in captivity and those for which there is little to no demand is being discouraged. The life cycle of a species plays a large part in determining how suitable it is for the aquarium trade. Species with slow growth and late maturation will be more vulnerable than those with rapid population turn-over. Corals capable of rapid growth and regeneration, such as *Aeropora* spp. may be suitable but slow growing species such as *Porites* spp. usually cannot be maintained in captivity.

Anemone fish, one of many species collected for aquaria.

SUSTAINABLE MANAGEMENT

Collection of marine ornamentals is often regulated through national or municipal fisheries legislation and a permit is often required. All corals, Giant clams and some seahorses are on Appendix II of CITES and so all shipments must be accompanied by a CITES permit issued by the national CITES authority.

The Marine Aquarium Council (MAC) is an international non-profit organisation, based in Hawaii, that has set up a certification process for collectors, wholesalers and retailers, so that they can be certified as to the quality and environmental sustainability of their business. Certification is based on a set of 'International Performance Standards for the Marine Aquarium Trade' that covers the whole process from collection to the sales point. Thirty operations have been certified by MAC, in the Philippines, Fiji, North America and Europe, although few of these are collecting operations. MAC Certification requires compliance to established international, national and local regulations, assessment of sites before collection and implementation of a monitoring programme, and encourages the formation of no-take MPAs as replenishment areas within MAC Certified collection areas.

KEY POINTS FOR THE MPA

- ❑ If an aquarium collector or dealer wishes to set up an operation in or near an MPA a very thorough EIA should be undertaken to determine if the operation is in line with MPA objectives.
- ❑ The collecting operation should be allowed to operate only if it has been approved by an environmental certification scheme (e.g. MAC which requires an EIA, management plan, and monitoring).
- ❑ Monitor collectors and the numbers of specimens collected, using, for example, the logbook methods developed in the Maldives and Sri Lanka; check figures against export data available from airport customs.
- ❑ A carefully developed zoning plan, ensuring that there are some areas with no collection, will be necessary (aquarium species are often found in very specific locations) and should be part of the overall MPA zonation. The zones should be monitored regularly (particularly nursery areas) and compared to detect any changes due to collection. A rotational system of use and non-use areas is being developed in Hawaii.
- ❑ Dive tourism and collection of ornamentals may be incompatible and may have to be physically separated through zoning; in some cases the conservation and economic benefits of dive tourism may be greater because it is non-extractive.
- ❑ Ensure that local communities are involved in any development; since traders and exporters are often outsiders, local people may be overlooked.

CASE STUDY

A potential new technique for rearing aquarium fish in the WIO

One potentially environmentally sound method is to catch post-larvae (juveniles that swim in open waters before metamorphosing and become reef-based) and rear these in captivity. The technique is well-developed and has been assessed in La Réunion, Mayotte and to a lesser extent Madagascar. A preliminary attempt was made in the Comores, in association with Moheli Marine Park, but was not continued. Reef crest nets or channel nets and light traps are used to harvest the fish larvae when they are most abundant, i.e. when they return to the reef and lagoon from the plankton stage and before they suffer high levels of mortality. Subsequent rearing of the caught fish in cages or inland systems increases the survival rate of the settlement stage by at least 80%.

In addition to exporting the reared fish for the aquarium industry, some of them could be released back onto the reefs. Their larger size means that they are likely to be less susceptible to predation, thus potentially enhancing local reef fish populations. The best location for release of reared fish could be an MPA. This relatively low cost technique may therefore be of value not only for supplying the aquarium trade but also for restocking MPAs. It could also provide employment and income for coastal villages as the methods involve relatively simple technology. However, further commercial testing is required to confirm that the approach is economically viable.

Sources of further information

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