

Managing Palau's aquarium life fishery

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History of the fishery

Exports from Palau of aquarium life were started by a locally-owned company in 1991. Since that time, there has never been more than one company operating at a time, although that company changed hands in 1993. The national government's Palau Mariculture Demonstration Centre has also been involved in the trade, but its business has been limited to cultured giant clams, and, more recently, soft corals.

Accurate production figures for the private sector are not available, but the scale of Palau's aquarium life industry is illustrated in the following rough estimates of 1994 exports¹.

Item	Number of pieces	Gross receipts (US\$)
Finfish	100,000	80,000
Invertebrates	40,000	120,000
Total	140,000	200,000

A total of about 200 species of finfish and 100 invertebrate species were exported in 1994. Among the finfish, the top ten species comprised about 60 per cent of the total number exported.

Management of the fishery

Palau's national congress recently passed the *Marine Protection Act of 1994*. The law places significant restrictions on the use of Palau's inshore marine resources, including restrictions on the harvest, sale, purchase, and/or export of 26 species of food fish. The Act also requires the promulgation of regulations 'regarding the taking and export of fish for aquarium purposes.' This provision was made because of widespread public concern about the potentially negative impacts of the aquarium fishery. Many local fishermen, for example, saw the aquarium industry as unwanted competition for food fish. Recreational divers viewed the industry as destroying the reef by removing fish and corals. There were also questions about why foreigners

were doing the collecting rather than Palauans, and about who exactly was benefiting from the fishery.

Palau's Ministry of Resources and Development spent about six months formulating regulations, and in December 1994, the *Regulations on the Collection of Marine Resources for Aquaria and Research*² became effective.

Described below are the main elements of those regulations and the major management issues of the fishery. Because the regulations have not yet had time to be adequately tested, little discussion is included here on how well they have met their objectives.

Management objectives

The following set of objectives was used to guide the formulation of the regulations:

- To encourage a prosperous and sustainable aquarium life industry;
- To encourage participation in the fishery by Palauans;
- To ensure that the resource owners receive fair compensation for the use of their resources; and
- To ensure that other potential benefits from those resources, including ecological and recreational benefits, are not unduly compromised or lost.

Summary of regulations

- Any person taking more than five pieces of aquarium species in a single day must be the *holder* of an *Aquarium Collecting Permit*.
- Any person exporting from Palau any aquarium species must be the *owner* of an *Aquarium Collecting Permit* (each permit is issued in the names of both a permit *holder* and a permit *owner*).

¹. These estimates are based on a variety of data compiled by Palau's Division of Marine Resources, including data provided by the industry, air cargo export records and inspection records.

². In addition to regulating the collection and export of aquarium species, these regulations also address the collection of marine organisms for science and marine-related research in general. Those aspects of the regulations are not discussed here.

- Starting in January 1997, only Palauan citizens will be eligible to obtain *Aquarium Collecting Permits* as permit holders.
- No more than 20 *Aquarium Collecting Permits* will be issued in any given year, and permit applications will be evaluated based on a set of criteria that include previous experience in the business, compliance with relevant laws, and contributions to marine life conservation efforts.
- An *Aquarium Collecting Permit* is considered valid only when endorsed by the proper authority of the State in which aquarium fish are being collected.
- Hard corals (including 'live rock'), giant clams, and sponges may not be exported.
- Exemptions to these restrictions are provided for cultured specimens, specimens collected from permitted dredge sites, and specimens collected for permitted research purposes.
- The only fishing gears that may be used to collect aquarium species are barrier nets, drop nets and hand nets.
- The national government may at any time further restrict the collection or export for aquarium purposes of any species of marine organism, such as through a ban or a daily or annual bag limit or quota.
- All exports of aquarium species are to be inspected by the national government.
- Owners of *Aquarium Collecting Permits* must report their catches and exports.
- Penalties for violations of the regulations range from a US\$250 fine for the first conviction up to a US\$10,000 fine and a one-year jail sentence for any conviction after a third conviction.



attached to individual fishermen rather than to vessels or companies. The regulations place a cap of 20 permits to be issued in any given year. This number is based on the recommendations of several fisheries experts from the Pacific region, and on historical participation in the fishery (between 5 and 15 full-time collectors were typically active in the past).

Given that some permit applications will potentially have to be denied, one difficult issue was deciding how to choose among applicants competing for limited spots in the fishery. Options included first-come-first-served, a weighted lottery (with those having greater prior participation in the fishery earning more lottery tickets), and case-by-case application review. The latter method was adopted, with the Minister of Resources and Development given the authority to grant and deny competing applications based on a list of fairly loose criteria. The criteria include past experience in the business, previous compliance with relevant laws and regulations, previous compliance with reporting and inspection requirements, contributions to marine life conservation efforts, and date of application.

In keeping with the goal of issuing permits only to those with desirable track records in the business, it was decided that the permits would not be freely transferrable.

However, in order to give businesses some flexibility, such as allowing for employee turnover, the permits would be transferable to a certain extent. While each permit would be issued in the name of an individual collector (the permit *holder*), the permit would also bear the name of another party, the permit *owner*, which could be the collector himself, a business (such as the collector's employer), or any other entity. A permit owner could apply for and be granted any number of permits.

Thus, a permit could be transferred among holders but not among owners, allowing for some flexibility in the operations of aquarium businesses that 'own' a number of permits. This system would also help preserve opportunities for inexperienced newcomers to the fishery.

For example, an individual with no previous experience in the fishery might have a difficult time being granted a permit under the determining criteria described above. But by initially finding a

Limited entry permit system

The key feature of the regulations is the establishment of a limited entry system, with entry into the fishery controlled through permits issued by the national government. Because the main purpose of the system is to limit fishing effort, the permits are

sponsor of sorts in an established company—working, for example, either as an employee of the company or simply as an independent supplier to the company—the individual could collect aquarium fish as a permit holder, gaining experience at the same time that could facilitate his eventually becoming a permit owner.

The government's interest in ensuring a 'clean' fishery—with only environmentally responsible collectors in the water—is reinforced in the provision that 'permit owners are considered responsible for the conduct of all permit holders, employees, agents or anyone acting under their general supervision, with respect to permits they own.'

Another responsibility borne by the permit owner and not the holder is the regulation's catch reporting requirements. Finally, while only a permit holder is allowed to collect aquarium fish, only the permit owner is allowed to export them (no permit is needed to buy or sell aquarium fish).

What are 'aquarium species'?

One difficult issue, especially from the enforcement standpoint, was to identify exactly what activities would require the permit described above. That is, how could 'aquarium fishing' be legally differentiated from other types of fishing? One option was to regulate the act of collecting organisms that were to be used for a particular *purpose*—that is, for keeping in aquaria. The difficulty there would be in being able to prove that fish collected in violation of the regulations were indeed to be kept in aquaria. The other option was to regulate the collection of particular *species*.

While legally more straightforward, this option presented the somewhat complex task of describing which species were to be subject to the regulations—that is, defining which species were 'aquarium species'. This latter option was finally adopted, in part in order to remain consistent with the approach of Palau's other marine-related laws, including the *Endangered Species Act* and the *Marine Protection Act*, both of which regulate the use of particular species.

The aquarium regulations define 'aquarium species' as those species identified on a list called the *Regulated Marine Species Register*, which may be amended from time to time by the Division of Marine Resources.

The Division attempts to include on the register all vertebrate and invertebrate species that are popular in the aquarium trade but that are not popular locally as food fish³.

Palauan versus foreign participation

Another difficult issue in the management of the fishery (and throughout the economy of Palau) was whether or not foreign ownership and/or participation should be controlled. Like any other business in Palau, the aquarium life industry is subject to the *Foreign Investment Act*, which controls foreign-owned businesses through a licensing system, and places conditions on the employment of foreigners in those businesses.

Marine-related occupations—particularly fishing—appear to be especially sensitive in terms of foreign versus local participation, no doubt in part because of Palauans' traditional heavy reliance on the resources of the sea and the strict and complex restrictions that have traditionally been placed on their use.

The policy was made in the aquarium regulations that within two years of the effective date of the regulations, participation in the aquarium fishery would be limited to Palauan citizens. This restriction, which becomes effective in 1997, will apply only to permit holders and not to permit owners, and thus will not necessarily affect ownership of aquarium fishing businesses or their shoreside employees.

National versus state jurisdiction

Palau's Constitution states that 'each state shall have exclusive ownership of all living and non-living resources, except highly migratory fish, from the land to twelve (12) nautical miles seaward from the traditional baselines; provided, however, that traditional fishing rights and practices shall not be impaired' (Republic of Palau Constitution, Article I).

At the same time, some jurisdiction over those resources is exercised by the national government, particularly through the provisions of the *Marine Protection Act*. There appears, therefore, to be potential for conflict between the national and state governments over jurisdiction of inshore resources.

³ Although the taking of food fish for aquarium purposes is not explicitly prohibited, it is discouraged through a provision of the *Marine Protection Act* that prohibits the use of scuba or hookah while fishing except by special permit. The government may, for example, choose to permit the use of compressed air to take aquarium species — that is, species not popular as food.

The approach taken in drafting the aquarium regulations was to give some recognition to the states' authority in the permit system. An *Aquarium Collecting Permit* is considered valid (by the national government) only if endorsed by the appropriate authority in the state where collecting is being done. Obtaining this endorsement is the responsibility of the permittee.

The states also have the clear authority to impose any additional permits, restrictions, conditions, or fees on fishing of any sort, and some states do have general fishing permit systems in place.

The *Marine Protection Act* authorises the national government to charge fees only for expenses incurred in administering the Act, such as those associated with processing permits, inspections, and so forth. The annual fee for an *Aquarium Collecting Permit* is US\$100. While the national government may thus only collect 'management fees', there is nothing to keep the state governments from collecting more substantial compensation from aquarium collectors—something more like 'resource rent'.

Trade in endangered species

Palau currently does not have a list of threatened or endangered species under its *Endangered Species Act*. Several animals popular in the aquarium trade are, however, listed in the appendices of the *Convention on International Trade in Endangered Species of Fauna and Flora* (CITES). Although Palau is not yet a signatory to CITES, the export of these species to signatory countries must comply with their CITES implementation laws. Hard corals and giant clams are listed on Appendix II of the convention, so their trade is regulated, but not prohibited. For example, what the US requires from non-party countries for Appendix II species is simply export documentation certifying that the shipment satisfies all the laws of the exporting country⁴.

Palau's new aquarium regulations do, in fact, place special restrictions on the export of giant clams and hard corals. Exports are allowed only for specimens of hard coral that have been: 1) cultured, 2) taken incidentally in permitted dredging opera-

tions, or 3) allowed under the terms of a *Marine Research Permit*. The *Marine Protection Act* prohibits the export of giant clams, except cultured specimens.

The trade restrictions on giant clams have not unduly hindered their export for aquaria since Palau has a source of competitively-priced cultured giant clams. The coral restriction, however, has had more of an impact, since nobody in Palau is currently culturing hard corals on a commercial scale. There are at least four aquarium and curio products that are affected by the restriction: 1) live hard corals, 2) dead coralline rock covered with live algal and other growth, known in the trade as 'live rock', 3) live soft corals, which are 'planted' on small pieces of dead coralline rock⁵, and 4) dead hard corals sold as decorative pieces.

The local aquarium industry exported significant quantities of wild corals and live rock in the last few years⁶. It has also grown out hard corals on an experimental scale, and it wanted to know whether or not those products would be considered 'cultured' and thus exempt from the export prohibition.

Exemptions for 'cultured' organisms

The decision to allow the export of only cultured giant clams, hard corals, and sponges was a straightforward one, but deciding just what would constitute a 'cultured' animal was not so simple. After considerable debate with the industry, which naturally argued for a fairly loose definition of 'cultured', the definition finally adopted was that recommended in CITES for the term 'bred in captivity'⁷.

To paraphrase the CITES definition, 'bred in captivity' would refer only to:

- offspring that were born or otherwise produced in a controlled environment, of parents that transferred gametes in a controlled environment (if reproduction is sexual) or that were in a controlled environment when development of the offspring began (if reproduction is asexual); and where:

⁴ Up until 1 October 1994, the date of Palau's independence from the US, trade between Palau and the US mainland was domestic, and so was not subject to CITES.

⁵ Other substrates, such as basalt rock, are sometimes used, but coralline rock is apparently preferred for both its appearance and its superior binding properties for the soft coral.

⁶ It is estimated that aquarium life exports in 1994 included 1,300 pieces of hard coral, 8,000 pounds of live rock and 8,000 pieces of soft coral (based on data compiled by Palau Division of Marine Resources).

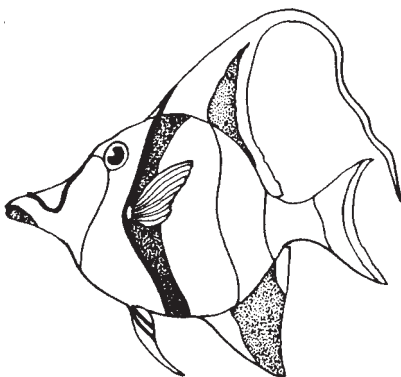
⁷ In the context of CITES, the term 'bred in captivity' is used to provide exemptions from trade restrictions for Appendix I animals. It is not relevant to Appendix II animals such as giant clams and corals, the trade of which is not prohibited by the Convention.

- *a controlled environment is one that is intensively manipulated by man for the purpose of producing the species in question and that has boundaries designed to prevent animals, eggs, or gametes from entering or leaving the controlled environment; and finally:*
- *the parental breeding stock must be managed in a manner designed to maintain the breeding stock indefinitely.*

Although the exemptions for cultured specimens and specimens taken from permitted dredge sites are consistent with the aim of making 'best use' of the resources, they also pose some problems for enforcement. How are enforcement personnel to differentiate illegally taken specimens from cultured products or specimens taken from permitted dredge sites? The regulations require documentation from the Division of Marine Resources certifying cultured products as such, and place the burden of proof on the producer. In other words, in order for a piece of coral to be legally considered cultured, it must not only be cultured in fact, but the government must also be convinced that it has been cultured.

The Division of Marine Resources has issued guidelines for providing evidence that a product was cultured or taken from a permitted dredge site. The guidelines recommend that the government be invited to inspect all culture facilities and methods, that photos be taken of as much of the process as possible, and that invoices for all materials purchased, such as dredge spoils, be maintained. Pursuant to a provision of the *Marine Protection Act*, these guidelines will eventually have to be translated into regulatory law.

A single one-page form, called the *Marine Resource Export Certification*, is being used to serve most documentation needs of the aquarium regulations and related laws. The document serves as a certificate of origin, a certification of culture, and/or as an in-lieu export certification pursuant to CITES.



Contentious issues

There were three elements of the regulations (when they were being proposed) that brought objections from the aquarium life industry: 1) the Palauan-collector-only provision, 2) the export restrictions for hard corals and live rock, and 3) the definition of the term 'cultured'.

According to the regulations, only Palauans would be allowed to collect aquarium fish starting two years from the effective date of the law. The two-year delay was intended to allow the industry time to turn over its staff and to train local collectors. The aquarium company, which is Palauan-owned, has had a mixture—both shoreside and in the water—of Palauan and foreign employees (38% Palauan in 1994).

The company claimed to agree with the policy of encouraging participation by Palauans in the fishery, but it opposed the outright ban on foreign collectors. It proposed an alternative policy that would limit the proportion of foreign workers in any aquarium life business to no more than 30 per cent of the total number.

The business would then have the flexibility of deciding how to use the foreigners; that is, to collect fish or to perform other jobs. This alternative was rejected by the government, and the prohibition on foreign collectors was adopted in the regulations.

The government's decision was based not only on its policy of encouraging employment of Palauans in businesses in general, but also on the premise that certain occupations need to be protected for Palauans. Water-based occupations, especially fishing, are particularly sensitive in this regard.

The second contentious issue was the prohibition placed on the export of hard coral and live rock. The industry argued against the restrictions on several fronts.

First, it pointed out that corals are renewable resources that can be harvested sustainably. It also tried to illustrate that the environmental impacts of a selective live rock 'fishery' would be less than those of the widespread (and legal) coral dredging operations (primarily for construction material).

It also argued that live rock (exported at US\$1 to US\$2 per pound [US\$2.2 to US\$4.4 per kilo]) constituted a better use of coral rock than did construction material (sold locally for less than US\$0.01 per pound [US\$ 0.02 per kilo]).

In response to these arguments, the government provided an exemption for hard corals or live rock that are taken incidentally to permitted dredging operations. The idea was that the aquarium industry might be able to negotiate with the dredging industry to remove the valuable top layer of hard corals and live rock before the dredgers moved in. This exemption would also provide for a cheap supply of coral rubble (coral rubble is a popular substrate for soft corals in the aquarium trade).

The third issue was the definition of 'cultured'. The industry lobbied for a fairly loose definition of 'cultured', arguing, for example, that *Acropora* branches clipped from wild colonies and subsequently grown in tanks for several weeks or months should be considered cultured. The industry also wanted to be able to lease areas of reef from the states, and argued that anything produced in such an area should be considered cultured.

The government's coral and rock export prohibitions were aimed at limiting the impact of the industry on coral resources to near-zero. It therefore opted for a more strict interpretation of the term 'cultured', and finally adopted the definition of 'bred in captivity' recommended by CITES. Although this definition is fairly strict, it does not preclude the possibility of farming corals or live rock in open reef areas. The key elements of the definition are simply that the organisms reproduce in a controlled environment and that the brood stock be managed to last indefinitely.

Conclusions

In adopting its *Regulations on the Collection of Marine Resources for Aquaria and Research*, the government of Palau has taken a significant step towards proactive management of its inshore resources.

A primary aim of the regulations is to minimise detrimental impacts to Palau's reef systems. The basic strategy is to put a cap on fishing effort so the industry does not expand out of control. If any species are found to be in need of special protection, the regulations are flexible enough so that additional controls on particular species can be put in place as needed.

The regulations also aim to manipulate the flow of benefits from the fishery, first by prohibiting foreign collectors, and second by providing a framework for the states (i.e. the villages) to control collecting in their waters and to levy access fees.

Less than one year has passed since the regulations went into effect, so it is not yet clear how well they are serving their objectives. The public is still learning about the regulations, and the national and state governments are still gearing up to fully administer and enforce them. In any case, the approach embodied in the regulations will serve as a precedent, if not a model, for more active management of Palau's other commercial fisheries.

Environmental, economic and social implications of the fishery for live coral reef food fish in Asia and the Western Pacific

by Bob Johannes & Michael Ripen

Summarised below is a just-released 33,000 word report on the environmentally devastating but not widely recognised live reef food-fish trade that is spreading for thousands of miles from its centre in South-East Asia. The report is based on an investigation which took the authors to nine countries in the region and involved interviews with several hundred individuals, including fishermen, divers, dive tour operators, social and biological researchers, members of national and international NGOs, live reef food-fish exporters and importers, government officials, aquaculture experts, fish farmers and village leaders.

Copies of the full report can be obtained from Carol Fox of the Nature Conservancy in Honolulu, Fax: (1) 808 545 2019. For more information contact, Dr Bob Johannes, 8 Tyndall Court, Bonnet Hill, Tasmania 7053, Australia, Phone: (61) 2 298 061, Fax: (61) 2 198 066 (e-mail: bobjoh@ice.net.au).

Scale of the industry

Growing economic prosperity in Asia has prompted the rapid and continuing expansion of the market for live reef food fish. Humphead wrasse (also known as Napoleon or Maori wrasse) and the highfin grouper (also known as polka dot grouper, barramundi cod, panther or mouse head), are the

most highly-valued species. Prime, plate-sized specimens sell to Hong Kong consumers for as much as US\$180 per kilogram. Next in value are the variety of other groupers (coral cod and coral trout).

The industry currently exports an estimated 25,000 tonnes of live reef food-fish per year, with about 60 per cent from wild capture.