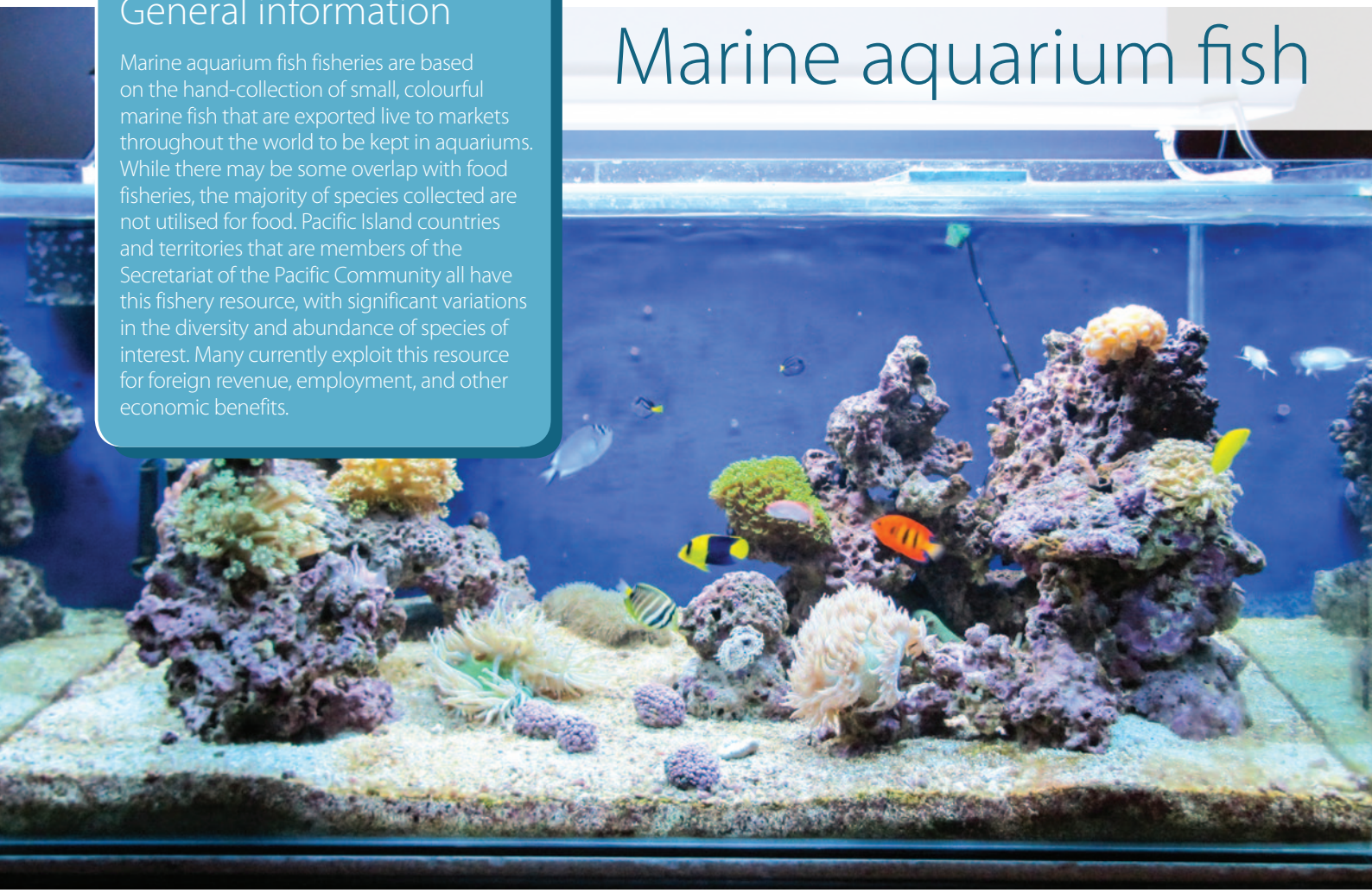
FACTSHEET

SPC Secretariat of the Pacific Community

Marine aquarium fish

General information

Marine aquarium fish fisheries are based on the hand-collection of small, colourful marine fish that are exported live to markets throughout the world to be kept in aquariums. While there may be some overlap with food fisheries, the majority of species collected are not utilised for food. Pacific Island countries and territories that are members of the Secretariat of the Pacific Community all have this fishery resource, with significant variations in the diversity and abundance of species of interest. Many currently exploit this resource for foreign revenue, employment, and other economic benefits.



A tropical reef aquarium *(Photo: A Gilbert).*

Hooded fairy wrasse (*Cirrhilabrus bathyphilus*) *(Photo: A Winckler).*

Fish species

Until the early 1980s, the marine aquarium hobby was focused on aquariums with, typically, fish as the only live animals in them; dead coral or rocks were used for decoration. Due to advances over the last two decades, mainly in lighting technology, hobbyists can now keep, grow and propagate corals, and live coral reef aquariums, rather than fish-only aquariums, have grown steadily in popularity. Coral reef aquariums today usually contain fish that perform an important function, such as cleaning the sand, eating algae, or eating parasites – fish that do not eat or damage coral. In the last decade, coral reef aquariums have become so popular that the demand for fish species has dramatically changed in accordance with this trend. Wrasses (*Labridae*) that eat parasites off clams and corals, as well as tangs (*Acanthuridae*) that eat algae are particularly sought after.

Left: Getting ready to dive with a holding ('bait') bucket, small barrier net and a scoop net; right: Collecting fish using a barrier net, scoop net and tickler stick; below: Getting ready for a fishing trip (photos: C Wabnitz).

Logistical requirements for a marine aquarium fish fishery

An essential requirement for establishing a viable industry and exporting marine aquarium fish is reliable flights to key markets: the United States of America, Asia and Europe. It is also critical to assess the freight rate to each destination and whether it is competitive with other areas exporting the same species. If the freight rate is lower than average, this provides a market advantage. If the freight rate is substantially higher, this will lower the export value (i.e. the revenue for exporters and fishermen) of any species that importers may be able to obtain in sufficient numbers from other exporters. In addition, easy access to packing material such as plastic bags and insulated boxes is required.

Final destinations should be reached within 48 hours from the time of the first fish being packed to the last fish being unpacked. This is to comply with the International Air Transport Association's Live Animals Regulations, which specify that fish must be packed to survive unattended for at least 48 hours. While long flight times are possible without compromising the quality of the shipment, they require excellent fish health at the origin and a superior degree of proficiency in packing. In addition, long flight times will require additional water per fish, which increases freight expense and is a competitive disadvantage. If there is a flight connection to be made between origin and final destination, it is important that there are back-up flights available in the connecting city to ensure that fish get to their final destination (or back to origin) as quickly as possible should the original connecting flight be missed.

Fish collection

Aquarium fish are typically collected by hand, snorkeling or using an underwater breathing apparatus such as SCUBA. All collectors should be well trained and professionally certified if they use any type of underwater breathing apparatus.

Sustainable aquarium fish collection revolves around the use of small mesh nets that do not damage the target fish or non-target species, or the habitat. These nets are usually made as a barrier: a stretched net with weights on the bottom and floats at the top. A rod, commonly referred to as a tickler stick, is used to herd the fish into the net. These nets are always supervised. A scoop net is typically used to remove the fish from the barrier net. The fish are then placed in individual cups and/or 'bait' buckets before being transferred to larger holding containers on board the boat and then taken to a holding system. These collection methods are used across the Pacific region. In Indonesia and Philippines, sodium cyanide is sometimes used for collection. This method is unsustainable and has detrimental effects on target and non-target species, including corals. It is therefore critical to ban the use of chemicals and to promote the sustainable collection of fish using nets.

Fish-holding facilities

Once the fish are collected, they are held in land-based holding systems or in cages in the ocean. Many aquarium fish are territorial, so it is common to put them in separate small cubes or cups to prevent them from fighting and damaging each other.

Importers generally prefer to purchase fish from suppliers with a land-based holding system as it allows control of the conditions, and hence fish health, in a way that ocean-holding does not.

Land-based systems can be closed, where the same water circulates through filtering equipment (e.g. skimmers), or they may be open circuit, with water from the ocean being pumped through the system. Land-based systems require maintenance and care, in turn providing opportunities for employment.

Packing fish for export

Fish are packed – one individual per plastic bag – with enough water in the bottom of the bag to cover the fish when the bag is upright. The bags are wide enough to allow each fish to turn around comfortably. Once filled with water, air is removed from the bag and replaced with oxygen. The final step is to seal the bag with a rubber band or mechanical clip. The bags are then placed in insulated boxes that need to be marked with an International Air Transport Association 'Live Tropical Marine Fish' label. The label specifies that perishable animals are in the box and require special handling (e.g. specific temperature, boxes to be kept upright). The boxes also have to be labeled with the address of the exporter, the importer, and the quantity of each species of fish.

Packing is a task that needs to be done with care. It is also labour intensive, as the fish are packed one at a time, thereby creating additional opportunities for casual labour.

Left: Using cubes to keep fish separated (photo: A Teitelbaum).

Middle: Shipping boxes at holding facility (photo: J Kinch).

Right: Packing fish for export (photo: M Lam).

Sustainable marine aquarium fish fisheries

Listed below are examples of environmental and species life cycle **factors that naturally limit the collection of, and effects on, fish** for marine aquariums.

- **Weather** – Weather conditions do not allow boats to collect fish every day. In general, the windward side of islands can be fished only on relatively calm days. During rough weather, these areas are informally closed, thereby limiting fishing pressure.
- **Habitat** – Wherever coral is very dense, it can be difficult to collect. These areas will generally not be targeted, providing a natural no-take area.
- **Depth** – Fishers cannot safely stay in deep water for long periods of time, so few fish can be collected at these depths.
- **Natural mortality** – Reef fish recruits and juveniles mostly die from predation, with only very few individuals reaching maturity. As the aquarium trade mostly targets juvenile fish, collection removes individuals from the wild that are subject to naturally higher mortality rates than adults, therefore having limited impact on stocks.
- **Broodstock (large fish)** – Many of the fish species collected attain sizes at maturity that are too large for aquariums, and they are typically not targeted by the industry. This provides protection for spawners, particularly large ones, who produce greater numbers of and higher quality eggs, and contribute disproportionately more to population replenishment and stability than smaller ones.

Left: Diver collecting flame angels with a small barrier net; right: The flame angelfish (*Centropyge loricula*) (photos: C Wabnitz).

As with any fishery, sustainability is enhanced through the implementation and enforcement (e.g. by random checks and fines) of a suite of management tools to regulate and monitor the fishery. Listed below are **examples of recommended procedures**.

- Issuance of permits for aquarium fishing and/or export.
- All collectors should be professionally certified if they use any type of underwater breathing apparatus.
- Limited entry into the fishery through control on the number of collectors and/or exporters.
- Size restrictions on fish collected, by species.
- Establishment of protected or no-take areas (i.e. areas that are off limits to aquarium fishermen, often placed to reduce user conflict, such as a popular dive site).
- Submission of reports on quantities caught and/or exported, by species.
- A ban on the use of chemicals and other natural or artificial substances.
- Species-specific quotas or bag limits.
- A ban on any damage to coral during collection.
- A set of minimum requirements for fish-holding facilities.
- Regulations relating to fishing gear.
- A set of recognised best practice standards (i.e. a code of conduct for responsible fisheries).

Below is a **range of advantages** that make the Pacific Island region a good choice for the collection and export of marine aquarium fish.

- The presence and abundance of a variety of desirable species not found in Asia.
- Short transit times and generally reasonably priced freight to markets in the United States of America from some locations in the Central and Eastern Pacific.
- Collection centered on the use of nets.
- High-quality products achievable via short supply chains (fish usually collected and brought to the holding facility the same day).
- Opportunities for livelihoods at the community level, where often few other choices are available.
- Aquarium fish collection is compatible with a traditional lifestyle.

Below are **some of the main challenges** that the Pacific Island region faces in developing sustainable and viable marine aquarium fish fisheries.

- Low price competition when the same species can be sourced from both Asia and the Pacific regions.
- Difficulty of access to, and high cost of, packing materials.
- High operating expenses.
- Limited freight space and flight availability to the majority of market destinations.
- High freight costs from a number of locations.
- Difficulty in meeting the administrative requirements of importing countries, most notably European Union members and Australian health permit requirements.

CONTACT DETAILS
Secretariat of the Pacific Community

SPC
Headquarters
BP D5, 98848
Noumea Cedex
New Caledonia
Tel: +687 26 20 00
Fax: +687 26 38 18

SPC
Suva Regional Office
Private Mail Bag
Suva, Fiji Islands
Tel: +679 337 0733
Fax: +679 337 0021

SPC
Regional Office
PO Box Q, Kolonia
Pohnpei, 96941 FM
Federated States of Micronesia
Tel: +691 3207 523
Fax: +691 3202 725

SPC
Solomon Islands Country Office
PO Box 1468
Honiara, Solomon Islands
Tel: +677 25543 +677 25574
Fax: +677 25547

Email: spc@spc.int
Website: www.spc.int