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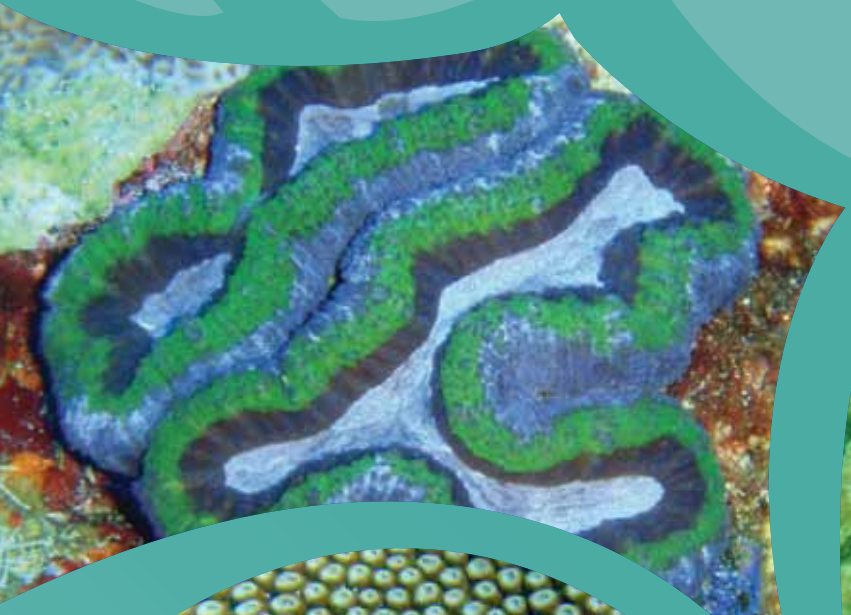

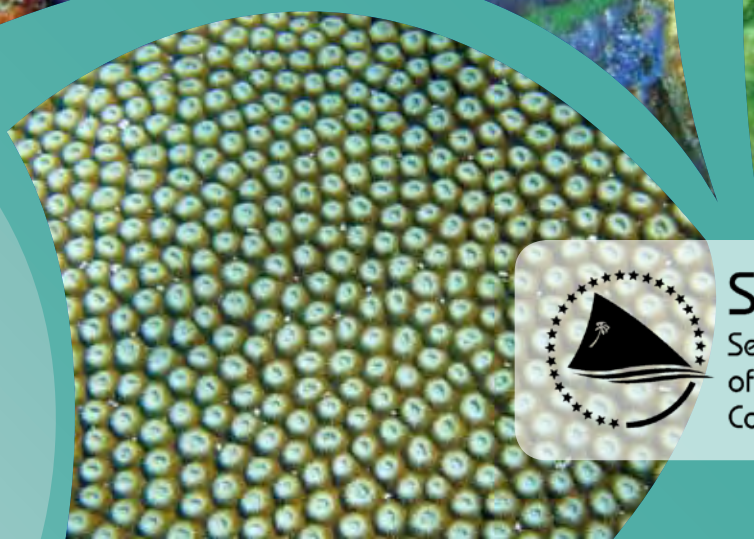

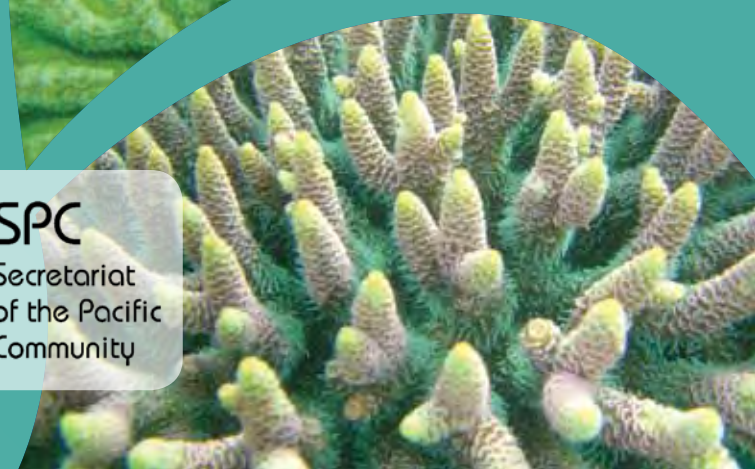

SPC
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Proceedings of the Regional Workshop on Trade in Corals and Determining Non-detrimental Findings

17–20 May 2010
Honiara, Solomon Islands

Jeff Kinch, Antoine Teitelbaum and Helen Pippard

Secretariat of the Pacific Community
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Secretariat of the Pacific Community
Coastal Fisheries Programme
BP D5, 98848 Noumea Cedex, New Caledonia
Tel: +687 26 20 00
Fax: +687 26 38 18
Email: spc@spc.int
http://www.spc.int/

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Acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoP	Convention of the Parties
EMA	Environment Management Act
EPSA	Endangered and Protected Species Act
FDoF	Fiji Department of Fisheries
IMR	Institute of Marine Resources
IUCN	International Union for the Conservation of Nature
MIMRA	Marshall Islands Marine Resources Authority
NDF	Non-detriment findings
NOAA	National Oceanic and Atmospheric Administration
PICT	Pacific Island countries and territories
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Regional Environment Programme
USFWS	United States Fish and Wildlife Service
USNMFS	United States National Marine Fisheries Service

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On behalf of the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, www.cites.org), the Secretariat of the Pacific Community (SPC, www.spc.int), and the Secretariat of the Pacific Regional Environment Programme (SPREP, www.sprep.org), the editors would like to acknowledge and thank all the people who participated in the regional workshop and/or have subsequently contributed to these workshop proceedings.

The involvement of a wide range of interest groups involved in the management and trade of corals has created an opportunity for the Pacific Islands region to deliberate issues relating to CITES, particularly with regards to the determination of non-detriment findings (NDFs).

Disclaimer

The opinions expressed herein are those of the individual authors and do not necessarily reflect the views of the CITES Secretariat, SPC or SPREP.

Selecting donor coral colony in Solomon Islands © Joelle Albert

Executive Summary

On 17–20 May 2010, the Regional Workshop on Trade in Corals and Determining Non-detrimental Findings was held to identify issues with regard to the trade in corals (and other marine species), but also to assist Pacific Island countries and territories to comply with important elements of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), particularly with regard to conducting non-detriment findings.

The four-day workshop involved technical consultation between a wide range of stakeholders, including the government, private and public sectors and specialists who are active in the management of the coral trade in the Pacific Islands region. Attendees included representatives from Australia, Cook Islands, Fiji, French Polynesia, New Caledonia, Palau, Marshall Islands, Papua New Guinea (PNG), Samoa, Solomon Islands, the United States of America, and Vanuatu.

Currently, the coral trade in the Pacific Islands region focuses on the collection of coral specimens for commercial and private marine aquariums and to supply a small trade in decorative souvenirs and ornaments. There is also an increasing move towards maricultured corals as an alternative or supplement to wild harvest.

Before any party to CITES may issue a permit to allow the export of corals listed in Appendix I or II, its Scientific Authority must advise that any proposed export (or import for Appendix I specimens) will not be detrimental to the survival of a species.

This advice is called a non-detriment finding (NDF) and can take the form of written or verbal advice or a quota agreed by the Scientific Authority for a specific period of time.

Most parties in the Pacific Islands region exporting corals included in Appendix II do not have extensive resources to implement NDF protocols that require high levels of labour or expensive equipment. Such protocols therefore need to be as simple and practical as possible commensurate with the nature of the determination to be made. Greater support is also required for coral identification at all levels, from harvester, to exporter, to customs agent, to importer.

Given the success of coral mariculture, especially for branching corals, CITES also needs to (re)evaluate the status of this trade, particularly if sustainability issues continue to become a greater concern and consumers demand greater access to farmed corals from the Pacific Islands region.

Report Structure

This report is divided into four sections. Part I provides an introduction to the coral trade in the Pacific, while Part II contains presentations by individual government representatives. Part III provides a summary of management instruments, particularly in relation to NDFs and the establishment of quotas. Part IV provides a short discussion on issues.

Acropora millepora cultured in Tonga © C.Turnier

Part I: Introduction to Corals in the Pacific

1.1 Background

The focus of coral collection activities until the early 1990s was mainly on dead corals for curios, jewellery, and aquarium decorations, with the main taxa traded being *Fungia* spp., *Pocillopora* spp., *Porites* spp. and *Acropora* spp.

Currently, the coral trade in the Pacific Islands region focuses on the collection of coral specimens for commercial and private marine aquariums and to supply a small trade in decorative souvenirs and ornaments. There is also an increasing move towards maricultured corals as an alternative or supplement to wild harvest.

Because of the technical advances in recent decades, it has become possible to keep a wide range of colourful, large-polyp corals species, which has also enhanced the production of farm corals in some Pacific Island countries and territories (PICTs).

Table 1 details the main coral species exported from PICTs.

Table 1: Coral species commonly exported from PICTs

Large polyp stony	Small polyp stony	Soft corals	Corallimorphs
Euphillia spp.	*Acropora* spp.	*Sarcophyton* spp.	*Rhodactis* spp.
Favites spp.	*Montipora* spp.	*Lobophytum* spp.	*Ricoprdea* spp.
Lobophyllia spp.	*Pocillopra* spp.	*Sinularia* spp.	*Zooanthids* spp.
Platygyra spp.	*Stylophora* spp.	*Pachyclavularia* spp.	*Discosoma* spp.
Caulastrea spp.	*Seriatopora* spp.	*Cladiella* spp.	
Symphillia spp.	*Turbinaria* spp.		
Goniopora spp.	*Porites* spp.		
Galaxea spp.	*Hydnophora* spp.		
Mycedium spp.			
Plerogyra spp.			
Trachyphillia spp.			

Solomon Island coral collecting equipment © A.Teitelbaum

1.2 Wild harvesting

Corals are usually taken by free-diving using hand-held non-mechanical implements, such as a hammer and chisel or screwdriver.

Depending on the coral species harvested, the coral is either fully removed as a solitary/free living specimen or a complete small colony (which usually equates to less mature/juvenile members of the population), or a small portion of a large colony is removed (which is expected to re-grow over time).

Coral collectors should endeavour to remove only the targeted coral itself, taking great care to minimise the amount of substrate that is taken (this facilitates re-growth of coral also helps reduce freight costs) and reducing the incidence of damage to neighbouring corals.

Collecting *Tubastrea* for export in Solomon Islands © A.Teitelbaum

1.3 Coral mariculture

The culture of hard or soft corals is a simple procedure based on coral fragmentation whereby either nubbins (pruned pieces from tips or middles) of branching parent colony hard corals or pie-sliced segments obtained through parent colony soft coral biopsy are affixed to a base (substrate) using epoxy, string, wire, or mesh or hung from monofilament line suspended in the water column and then grown out until they achieve a marketable size, often fist-sized.

Grow-out times for market range from 6 to 18 months and are dependent on location, depth and current. Generally, the stronger the current and the greater the depth, the quicker the cycle will be. *Acropora* spp. grows at a rate of approximately 10 cm/yr, pocilloporids at about 2–3 cm/yr and massive species such as faviids and poritids at about 1 cm/yr.

While culturing coral fragments, it is necessary to use a frag-mount – which can either be a disc or a 'plug', and a grow-out rack. Coral farmers in the Pacific either use simple concrete disks or natural looking mounts. Discs are moulded using a PVC ring and usually have a groove designed for the coral fragment to be placed in and small holes on two sides of the disks to tie the disk to the rack using monofilament line. Natural looking mounts are made from cement dyed red and poured into a mould to create an object with a 'stem and cap' (like a mushroom), giving a final appearance that resembles a natural rock in the wild. Plastic pegs are also used in some PICTs (e.g. Federated States of Micronesia [FSM] and Marshall Islands). These pegs have the advantage of being ready made and reusable. However, they are only suitable for smaller sized corals. Fragmented corals are attached to their mounts with synthetic adhesives or cement.

Fragging *Acripora* coral © A.Teitelbaum

There are two major techniques for growing out cultured corals: land-based (tank) systems or sea-based (ocean rack) systems. Each has advantages and disadvantages (Table 2).

Table 2: Advantages and disadvantages of land-based and sea-based coral farming systems

Indicator	Tank grow out	Ocean grow out
Associated running costs	High, due to electricity consumed by pumps and other technical equipment, rental of the facilities etc.	Low to moderate. Operational costs are mostly for outboard engine fuel to reach production sites.
Associated labour costs	Depends on the production volumes. Coral farming on land can be labour intensive.	Depends of the production volumes. Coral farming in the ocean can be labour intensive.
Control over production	High, since land based systems are easy to inspect.	Low to moderate. Sea based systems are harder to keep control on.
Growth performances	Moderate (depends on species)	High (depends on sites)
Ability to sustain colours	Low to moderate. Depends on equipment used and system in place.	Usually high, probably due to better water motion, turnover.
Labour need	Moderate to high	Low to moderate
Vulnerability to predation	Low, since natural predators do not occur in this type of systems.	High, since wild fish population can have an impact on cultured corals (parrot fish, triggers etc.).
Vulnerability to fouling	Moderate to high. Filamentous and other algae will develop if grazers are not introduced in culture tanks.	Low, as long as macroalgae are removed, filamentous and other algae are consumed by natural predators.
Vulnerability to fluctuating water quality	Depends on system, but most of the time flow through coastal systems suffer high water quality variations.	Low to moderate according to site selection.
Vulnerability to climatic conditions	Low because of lower impact of extreme climatic condition on land-based systems	High. Cyclones can destroy farms.
Initial capital investment	High because of cost of land, raceways, warehouse and various equipment	Low if the farm is small scale. Costs can add up for a bigger farm.

Bubble corals cultured on sea racks in Ponhpei waters © Simon Ellis

Tank raised *Acropora* in Tonga © A.Teitelbaum

Part II: Country Profiles

2.1 Cook Islands

Koroa Raumea
Director of Inshore Fisheries & Aquaculture
Ministry of Marine Resources

Cook Islands continues to be a non-party member to the CITES, however it has obligations concerning the export of CITES listed materials to countries that are party. The National Environment Service is the issuing agency for CITES permit in the Cook Islands.

Through the Ministry of Marine Resources, the Cook Islands continues to trial the export of live cultured clams for ornamental trade to markets in the United States, as well as in some part of Europe.

There is no other commodity of commercial export other than aquarium fish; however, there has been expression of interest for coral exports from local operator in the Cook Islands.

2.2 Fiji Islands

Aisake Batibasaga
Principal Fisheries Officer
Dept. of Fisheries
Ministry of Primary Industries

Aminiasi Qareqare
Senior Environment Officer
Dept of Environment
Ministry of Local Government, Housing, Urban Development & Environment.

Fiji became a signatory to the CITES in December 1997 and has since then established its own national legislation on the protection of endangered species called the Endangered and Protected Species Act (EPSA) 2003.

Apart from EPS Act, there are other resource management legislations that regulate the use and exploitation of endangered flora and fauna. Other national resource management legislations that deal with endangered species of aquatic flora and fauna are the Environment Management Act (EMA) 2005 and EMA Regulations, Bio-security Promulgation 2009, Fisheries Act 1942, and the Marine Species Act 1978.

Live rock or 'living rock' has been an export commodity within the aquarium trade in Fiji since 1992, and the industry grew from one initial company to now four companies. The four companies involved in the live rock trade are Walt Smith International, Ocean 2000 Ltd., R.E.L Fisheries Ltd, and Waterlife Exporters (Fiji) Ltd.

Another aquarium company, Aquarium Fish Fiji Limited (AFF) only deals with live coral and live aquarium fish collection and export.

The CITES Secretariat has previously on two occasions imposed bans on the export of corals from Fiji. These bans motivated the Fiji government to develop a quota system, with the first set of quotas for live coral established in November, 2003. These quotas were based on previous historical data sets.

A quota was also established for the live rock trade and was reviewed in 2007, whereby the Scientific Council recommended a reduction to the quotas, which was supported by the Management Authority, and endorsed a 25 % reduction in both the live rock and live coral quota for 2008, and a further 25 % reduction was imposed in 2009.

Wild caught *Trachyphillia* in Fiji © A.Teitelbaum

2.3 French Polynesia

Miri Tatarata
Chargee d'etudes a la Direction

Georges Remoissenet
Responsable des programmes aquaculture de l'Environnement

As French Polynesia is regarded as a territory of France, it is also considered a signatory through France as a party to CITES. Currently, there is no harvest of live corals in French Polynesia, with the exception of scientific collecting.

2.4 New Caledonia

Patrick Laubreaux
Ingénieur
Chargé d'études a la Direction des affaires vétérinaires, alimentaires et rurales

New-Caledonia has four levels of government and each level has its own legal competencies in terms of environmental protection. The French State is in charge of foreign affairs and has signed the CITES convention which therefore is applied to New-Caledonia. So far, the French State has managed CITES in New-Caledonia but this management will be transferred to the government of New-Caledonia during 2010, which will designate a local management authority, advised by a technical committee and a scientific authority.

2.5 Palau

Nannette Malsol
Acting Director
Bureau of Marine Resources
Ministry of Natural Resources, Environment and Tourism

Nick Tmecherur
Coastal Officer
Bureau of Marine Resources
Ministry of Natural Resources, Environment and Tourism

Palau is one of the sovereign countries in the Pacific that is a signatory to CITES since 2004. In 2007, a CITES Act was drafted and has been pending approval by Congress ever since. Under this draft Act, it proposes that the Ministry of Natural Resources, Environment and Tourism assume the Management Authority, with the Director of Marine Resources and the Director of Agriculture designated as the Scientific Authorities.

In compliance and response to CITES, Palau currently implements the Marine Protection Act of 1994 with Regulations regarding the collection of marine resources for aquaria and reporting and labeling of exports of marine resources with proper permit applications and CITES Certification for Appendix II Marine Export Declaration.

The Palau National Code-Title 24 Chapter 10-Endangered Species Act further complements national laws and regulations in implementing CITES through conservation of endangered species through the promulgation of regulations listing species that have become endangered or threatened (including through the use of input and output controls such as prohibiting the taking, possessing or exporting of any threatened or endangered species of plant or animal or part thereof). This Act provides for export of endangered or threatened marine species with provisions that these species are cultured and that exporters have a valid Marine Research Permit.

2.6 Marshall Islands

Darren Nakata
Integrated Marine Resource Manager
Marshall Islands Marine Resources Authority
Division of Policy, Planning and Statistics

At present, the Marshall Islands is not a party to CITES, however it has initiated its process in becoming a party through the Ministry of Foreign Affairs, with the Marshall Islands Marine Resources Authority (MIMRA), within the Ministry of Resources and Development named as the Competent Authority for CITES.

The relevant legislation to be mentioned is the MIMRA Act (revised) 1997. Part 2 Section 11 of this Act, bestows MIMRA the exclusive powers and functions to regulate the processing, marketing and export of fish and fish products.

Aquaculture has also been identified as one of MIMRA's key priority to initiate and support. Through the Community-Based Resource Management Program, aims to link marine ornamental exporting companies in the country with local communities that have identified or shown interest in aquaculture initiatives in their Fisheries Management Plan drafted with assistance by MIMRA.

The two Aquaculture Policies relevant to the trade of corals in the Marshall Islands are the Mariculture Issues and Development Plan for native species and alien species that are considered for cultivation; and the Aquarium Trade and Policy which states the rules and regulations on the trade of Marine aquarium species in the Marshall Islands.

The coral trade in the Marshall Islands is fairly new and still developing. In the past, communities in Ailuk Atoll received training in coral propagation. Currently there are no government aquaculture facilities dedicated to coral propagation, though, MIMRA operates a black lip pearl oyster hatchery in Majuro Atoll, a giant clam hatchery on Loto Island at Likiep Atoll and, with the financial assistance of the Overseas Fisheries Cooperation Foundation of Japan, an additional hatchery to raise giant clams (and other targeted species) on Arno Atoll.

Packing coral for export in Marshall islands © A.Teitelbaum

2.7 Samoa

Malama Momoemausu1
Principal Marine Conservation Officer
Division of Environment and Conservation
Ministry of Natural Resources and Environment

Titimanu Simi
Marine Conservation Officer
Division of Environment and Conservation
Ministry of Natural Resources and Environment

Ulusapeti Tiitii
Senior Fisheries Officer
Fisheries Division
Ministry of Agriculture and Fisheries

Samoa became a CITES Party in February 2005. The Ministry of Natural Resources and Environment has been designated as the Scientific Authority in accordance with its related legislations, policies and guidelines; and issues any export permits required for tourists and other nationals who reside abroad of any CITES-listed species for marine specimens taken out of Samoa as souvenirs (e.g. shells of giant clams).

Samoa is keen to become competent in its CITES administration and enforcement to improve marine biodiversity conservation and sustainable management. To achieve this, a number of areas need addressing, including reviewing a number of CITES-related pieces of legislation (e.g. Land and Environment Act, Fisheries Act and Marine Wildlife Protection Regulations) to ensure consistency and that one complements another.

2.8 Solomon Islands

Josef Hurutarau
Ministry of Environment Conservation and Meteorology

Rosalie Masu
Ministry of Fisheries and Marine Resources

Selina Lipa
Ministry of Fisheries and Marine Resources

Solomon Islands became a party to CITES in 2007 and have developed Wildlife Protection and Management Act 1998 for meeting its requirement at a national level.

The designated Management Authority in the Solomon Islands is Ministry of Environment Conservation and Meteorology while the Scientific Authority is with the Ministry of Fisheries and Marine Resources.

Currently, there are quotas for the export of corals, clam shells and dolphins.

Selecting corals for export in Solomon Islands © A.Teitelbaum

2.9 United States of America

Krista Graham
National Marine Fisheries Service
National Oceanic and Atmospheric Administration

The structure of CITES is similar to the United States EPSA in that species are listed according to their conservation status, which are listed as either endangered or threatened. Species are considered endangered when in danger of extinction throughout all or a significant portion of its range; species are threatened if likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

The purpose of the EPSA is to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved. The EPSA is also the law that implements CITES in the United States. The EPSA doesn't distinguish between foreign and native or domestic species, so the United States can also list foreign species. Under the EPSA, 70 % of listed species are domestic and 30 % are foreign species.

The EPSA requires that foreign species are given the same consideration as native or domestic United States species. The benefit of listing a foreign species under the EPSA is that listing may encourage species conservation in the exporting foreign country. A host country may also then be eligible for permits, grants, and/or education from the United States.

An EPSA listing affects the activities of United States citizens and companies abroad that are subject to United States law, and forbids the import, export, and interstate or foreign commerce in protected species unless authorized by a permit issued by the United States Fish and Wildlife Service (USFWS) or the National Oceanic and Aeronautical Administration (NOAA) Fisheries Service. If a species is listed under a CITES Appendix as well as the United States Endangered Species Act, there is no allowable direct harvest or trade of the species to/from/within the United States, unless there is an enhancement permit. Within the United States, permits for EPSA-listed species may be issued for research or incidental take, but not for direct take of a species.

The USFSW is the lead agency for implementation of CITES, i.e., Scientific and Management Authority. They have jurisdiction over ESA-listed terrestrial and freshwater species as well as a few marine species such as polar bears, manatees, sea otters, walrus, and turtles when on land. The United States National Marine Fisheries Service (NMFS) and NOAA Fisheries Service has jurisdiction over EPSA-listed marine and anadromous species. NMFS helps with status reviews and recommendations of marine species when preparing for CITES Convention of Parties (CoPs).

2.10 Vanuatu

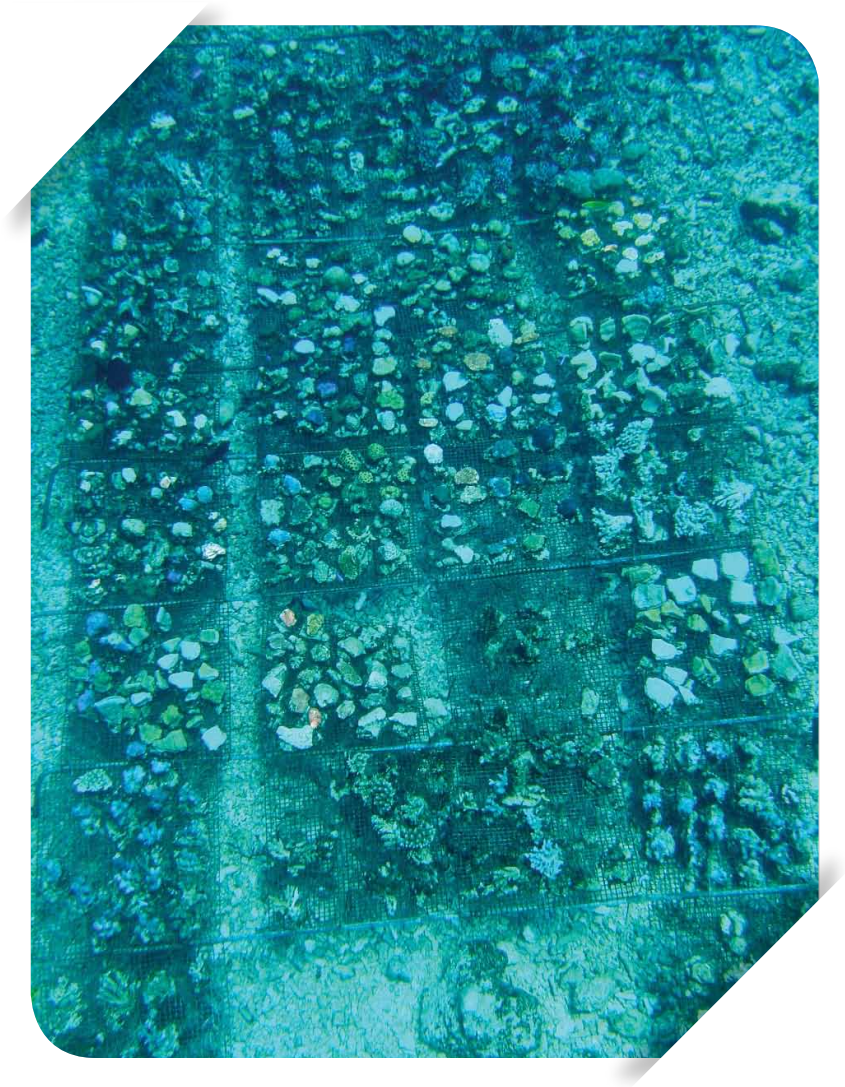
Jayven. Ham
Fisheries Research Officer
Vanuatu Fisheries Department

Vanuatu became a member of CITES in 1989, and the main legal instrument for the administration and implementation of CITES in Vanuatu being the International Trade (Fauna and Flora) Act No. 56 of 1989. This Act has six parts including general provisions, administration, International trade of endangered species, permits and certificates, enforcement and miscellaneous.

Other relevant legal instruments that contribute to CITES implementation include the Environmental Management and Conservation Act No.12 of 2000, the Fisheries Act No. 52 of 2005, the Wild Birds Protection Act of 1962, and the Quarantine act and the National Park Act.

As provided by the International Trade (Fauna And Flora) Act No. 56 of 1989, the Environment Department is the Management Authority and National Scientific Research Council is designated as the Scientific authority of CITES in Vanuatu.

In early 1990's, Vanuatu Fisheries imposed a ban on the harvest and export of wild corals. Currently all corals exported from Vanuatu are cultured.



Coral grow out in Vanuatu © A.Teitelbaum

Inspecting coral grow out racks in Solomon Islands © Joelle Albert

Part III: Management Instruments

3.1 International Union for the Conservation of Nature Redlist

The International Union for the Conservation of Nature (IUCN) Red List of Threatened Species is widely recognised as the most comprehensive, apolitical approach for assessing and monitoring the status of biodiversity. It provides taxonomic, conservation and distribution data on coral species groups in the Pacific Islands region that have been evaluated using the Red List Categories and Criteria (Table 3; see Appendix A for corals status on the IUCN Redlist).

Table 3: Number of coral species groups appearing on IUCN Red List in each PICT

Location	Corals
American Samoa	52
CNMI	47
Cook Islands	25
Fiji	87
French Polynesia	26
FSM	104
Guam	0
Kiribati	72
Marshall Islands	66
Nauru	62
New Caledonia	83
Niue	23
Palau	97
Pitcairn Islands	10
PNG	157
Samoa	51
Solomon Islands	134
Tokelau	31
Tonga	33
Tuvalu	70
Vanuatu	78
Wallis and Futuna	57

Source: www.iucnredlist.org

Hard corals were added to the Red List for the first time in 2008, with around a quarter of the 591 assessed species now listed as threatened (Table 4).

Table 4: Number of hard coral species for the Pacific Islands region

Location	Species Described	Species Assessed
American Samoa	279	279
CNMI	260	260
Cook Islands	178	178
Fiji	410	410
French Polynesia	187	187
FSM	421	421
Guam	260	260
Kiribati	361	361
Marshall Islands	340	340
Nauru	330	330
New Caledonia	387	387
Niue	190	190
Palau	425	425
Pitcairn Islands	60	60
PNG	560	560
Samoa	278	278
Solomon Islands	503	503
Tokelau	208	208
Tonga	218	218
Tuvalu	353	353
Vanuatu	378	378
Wallis and Futuna	306	306
Total	591	591

For total values, note that the same species can be present and assessed in more the one PICT

Source: Pippard, 2009; www.fishbase.org; and www.iucnredlist.org

3.2 Convention on International Trade in Endangered Species of Wild Fauna and Flora

CITES is an international legal framework that aims to regulate, or in some instances prevent, international trade in endangered species.

There are three appendices of CITES:

- Appendix I offers the highest protection for any species under CITES and includes species that are threatened with extinction and/or potentially at risk from international trade; trade in wild-collected specimens of these species must be subject to particularly strict regulation and only authorised in exceptional circumstances.
- Appendix II includes species that may become threatened with extinction if trade is not effectively regulated; trade in Appendix II listed species requires an export permit as a minimum.
- Appendix III includes species that are protected in at least one country; the country must request assistance from other CITES parties in controlling the trade of such species; in all CITES parties, trade is only allowed with either an export permit from the country of listing or a certificate of origin from another country.

3.2.1 CITES in the Pacific

There are currently eight CITES parties in the Pacific Islands region (Table 5), with dependencies of France, United States of America and New Zealand also being parties.

Table 5: CITES Parties in the Pacific Islands region

CITES Party	Date of joining CITES
Papua New Guinea	11 March 1976
Australia	27 October 1976
New Zealand	8 August 1989
Vanuatu	15 October 1989
Fiji	29 December 1997
Palau	15 July 2004
Samoa	7 February 2005
Solomon Islands	24 June 2007

Non-parties trading in CITES-listed species include Cook Islands, Kiribati, Marshall Islands, FSM, Niue and Tonga. The majority of trade occurring in the Pacific Islands CITES parties involves giant clams, hard corals and live rock.

3.2.2 CITES authorities

The Management Authority is responsible for the administrative aspects of implementing CITES in a given country and has two basic roles: granting permits and certificates under the terms of CITES and communicating with the CITES Secretariat and other Parties. Other functions of the Management Authority also include record keeping, reporting, training, enforcement, communicating with the Scientific Authority, circulating information to other government departments.

The Scientific Authority is responsible for advising the Management Authority on whether the export of specimens will be detrimental to the survival of species in the wild. This is a process essential for the effective implementation of CITES.

The Scientific Authority also advises on the following:

- whether the recipient of an import is suitably equipped to house and care for the specimen;
- monitoring export permits granted for Appendix II specimens and the number of actual exports;
- any measures needed to limit the number of export permits granted, e.g. when the population of a species is becoming increasingly threatened;
- the disposal of confiscated/forfeited specimens; and
- conducting research on any other species likely to be endangered, threatened or exploited as a result of trade

3.2.3 Permits and certificates

All international trade in specimens of species listed in the CITES appendices must be accompanied by a CITES permit issued by the exporting (and often the importing) country to indicate that trade has been approved. All permits must be presented for clearance when leaving and entering a country. This requirement for CITES permits allows the legal trade in species to be monitored.

3.2.4 Non-detriment findings

Before any party to CITES may issue a permit to allow the export of corals listed in Appendix I or II, its Scientific Authority must advise that any proposed export (or import for Appendix I specimens) will not be detrimental to the survival of a species.

This advice is called a non-detriment finding (NDF) and can take the form of written or verbal advice or a quota agreed by the Scientific Authority for a specific period of time.

The concept of NDFs is central to CITES and is found in Articles III (for Appendix I specimens) and IV (for Appendix II specimens) of the Convention (Table 6). Article IV is often termed the 'heart of CITES', since the entire convention rests upon the fundamental principle of trade being non-detrimental to a species' survival, with the proper implementation of Article IV essential for the conservation and sustainable use of Appendix II species.

Table 6: CITES Articles III and IV

Article III (for Appendix I species)	Article IV (for Appendix II species)
• An export permit shall only be granted when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species; • An import permit shall only be granted when a Scientific Authority of the State of import has advised that the import will be for purposes which are not detrimental to the survival of the species involved; and • An introduction from the sea certificate shall only be granted when a Scientific Authority of the State of introduction advises that the introduction will not be detrimental to the survival of the species involved.	• An export permit shall only be granted when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species; • A Scientific Authority in each Party shall monitor both the export permits granted by that State for specimens of species included in Appendix II and the actual exports of such specimens; whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I, the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species; • An introduction from the sea certificate shall only be granted when a Scientific Authority of the State of introduction advises that the introduction will not be detrimental to the survival of the species involved; and • There is no non-detriment requirement for Appendix III-listed species.

To ensure that trade in CITES listed species is non-detrimental, the following steps must be completed prior to export:

- the Scientific Authority of the exporting country must advise that the export would not be detrimental to the survival of the species, and may determine limits to be placed on the export of a species in order to maintain it throughout its range at a level consistent with its role in the ecosystems in which it occurs; annual quotas are one example of such limits;
- the Management Authority of the same country must be satisfied that the specimens were legally obtained; and
- after receiving the non-detriment advice from the Scientific Authority, the Management Authority can then grant an export permit/re-export certificate. This must be presented to the importing country.
- Some importing countries, most notably the members of the European Union, have stricter measures in place and also require the prior issuance of an import permit before Appendix II specimens can be imported.

Essentially, the NDF is a science-based risk assessment (Figure 1), which should focus on examining the harvest, population responses, measures and risks in order to determine whether or not removal of a species from the wild will be detrimental; subsequently the Scientific Authority should analyse potential risks, effectively mitigate and address these risks, make a decision and monitor the results. A NDF is achieved if population trends (or indicators) despite any harvesting of a species, are increasing or stable.

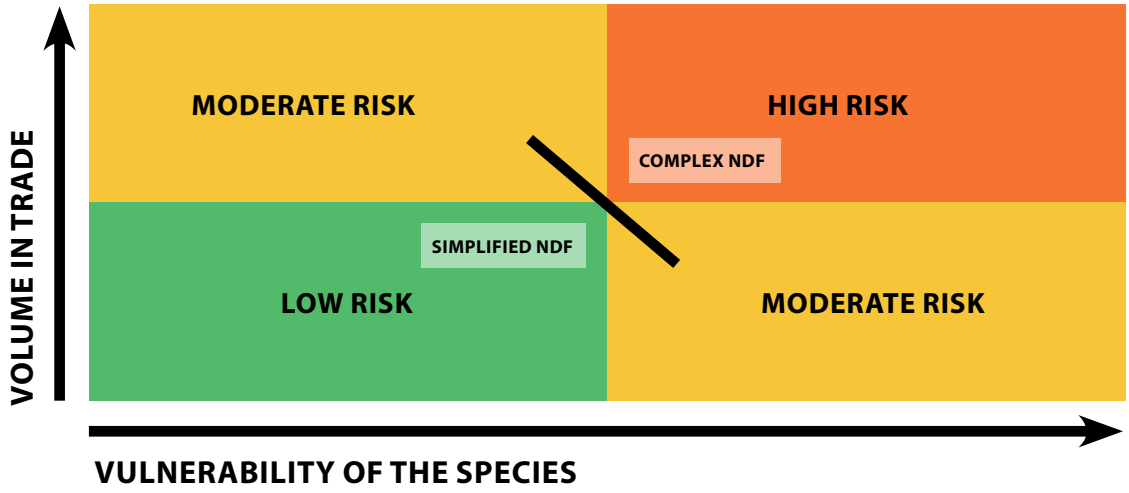


Figure 1: Model of NDF science-based risk assessment

3.2.5 IUCN Checklist

CITES guidance on developing NDFs is limited and largely focuses on the biological aspects of those determinations. However, IUCN has produced a checklist to assist Scientific Authorities.

The IUCN Checklist was developed to act as a starting point to encourage parties that needed assistance to identify some of the core aspects to consider in developing their NDFs, and was guided by the following thoughts:

- Appendix II species should be the main focus
- qualitative data categories should be used due to the difficulty of developing hard criteria for sustainable use across a range of taxa
- guidance should be pragmatic, thus the checklist should be reasonably short
- the checklist should be simple, highlighting accessible data, so as to encourage increased monitoring of particular types of data
- the checklist should aim to develop adaptive management based on adequate monitoring and feedback
- any unanswered questions in the checklist should highlight where management regimes or information collection required improvement
- the checklist should be viewed as an early stage in an evolving process; in the future there may be merit in developing more quantitative categories
- the checklist should promote enhanced communication and cooperation between the Scientific and Management Authorities by identifying data needs and the basis for decision-making
- the checklist should promote enhanced links with, and access to data in, scientific institutions in country and abroad by highlighting points on which data was needed
- the checklist should promote improved cooperation between importing and exporting nations by articulating the basis for decisions and highlighting areas where there is a lack of data

The IUCN Checklist consists of two tables with a series of questions:

- IUCN Checklist Table 1 is used to collect data on the type of harvest, the level of harvest, the demographic segment removed from the population and the economic drivers of that harvest (Table 7).
- IUCN Checklist Table 2 is used to collect information on the biological characteristics and status of the taxa in question, as well as on harvest management measures and incentives for conservation; all this information can then be assessed to determine the likelihood that a given level of trade will be non-detrimental (Table 8).

Table 7: IUCN Checklist Table 1 parameters

Harvest characteristics	• Harvest type • Segment of population • Relative harvest volume • Regulated/unregulated harvest • Data quality • Trends

Table 8: IUCN Checklist Table 2 parameters

Biological and species characteristics	• Life history/life form (number, age, reproductive rate, fecundity) • Distribution • Migratory • Dispersal efficiency • Habitat/ecological adaptability and preference • Human tolerance • Risk of mortality after capture and before export (for species where trade is primarily in live specimens)
Biological status at the national level	• Distribution • Abundance • Population trend • Quality of information/data • Major threats
Control and management of harvest	• Any illegal harvest or trade? • Management plans in place now or in the past? • Protected areas established? • Aim of harvest – e.g. subsistence, commercial • % harvested vs. % effectively protected • Quotas & their basis • Effectiveness of and confidence in harvest management • Methods of monitoring harvest • Off take (including market make-up and demand)
Incentives and benefits from harvest	• Effect of harvest compared with other threats • Species conservation incentive from harvesting/trade • Habitat conservation incentive from harvesting trade • Other local and conservation benefits • Proportion of species' range protected from Harvest

The first two sections of Table 2 were designed so that basic information about species life history and distribution could be gleaned from general references and national records, which can be used to help indicate the likely resilience of a given species to harvest, whilst information on national status and distribution of the taxon may help to indicate sensitivity to given levels of harvest. The remaining sections of Table 2 focus on the actual harvesting to assess the likely impact of the management schemes in place or to pinpoint what additional management is needed.

Each question or topic in Table 2 allows five possible responses signifying different levels of confidence in the determination that the harvest is likely to be non-detrimental (high, medium, low, none and uncertain). These responses attract purely qualitative answers, although the answers can be underpinned by quantitative data. The responses are then detailed on a radar plot, which produces a central area of colour (Figure 2). If the harvest is likely to be non-detrimental, most of the answers will be low-scoring and fall towards the centre of the circle. Points of colour towards the edge of the radar plot indicate unsustainable characteristics and therefore a higher chance that any export might be detrimental.

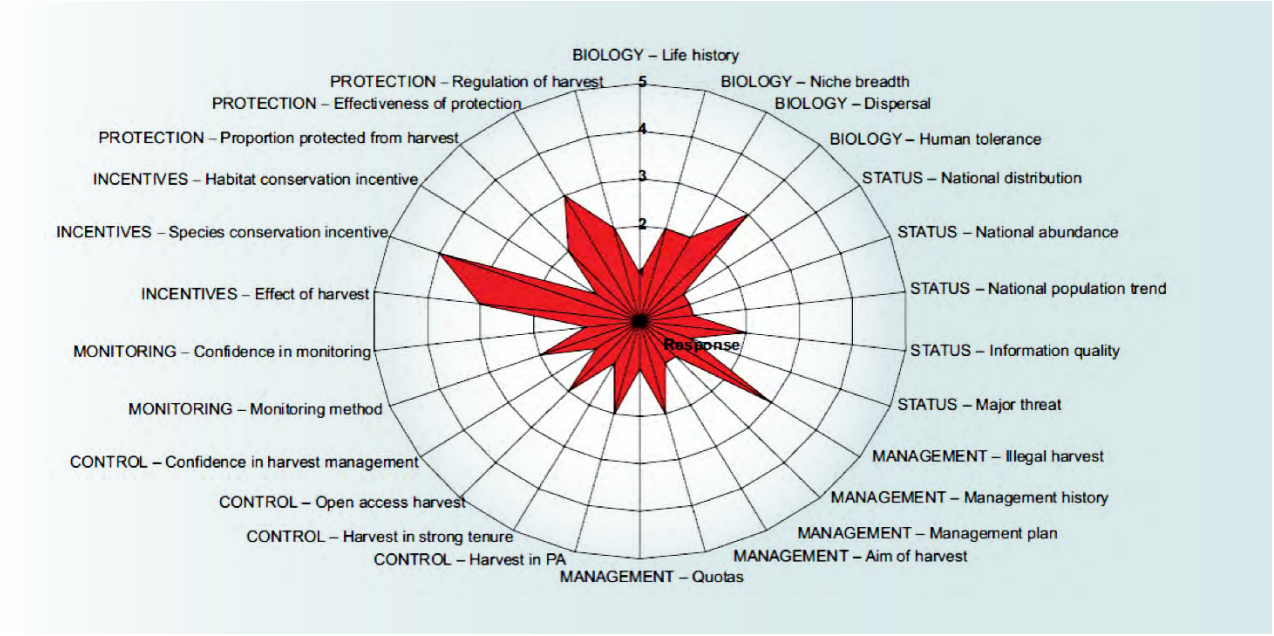


Figure 2: Example of an IUCN Checklist radar plot

The scoring system was designed so that the response 'uncertain' flags the areas of greatest concern and emphasises the need for more research in these areas so as to improve the knowledge base for assessing the likelihood that the harvest is sustainable.

Once all the relevant information has been collected in Tables 1 and 2, the Scientific Authority should be in a much better position to make an NDF.

While the IUCN Checklist is very useful for assisting parties to determine NDFs for specific species, it does have some limitations when dealing with a complex multi-species group like corals, as the issue of coral taxonomy is complex.

Many coral species cannot be identified to species level reliably in the field, or at the point of export, and this influences the level of accuracy in export records. The great number of species of corals and the large extent of coral reefs also presents difficulties when conducting stock assessment studies for each species and for carrying out ongoing monitoring of each species.

To complicate things, export trade figures are only given as numbers of pieces, which conveys no information about total volume and can be misleading (e.g. 100 pieces could represent a few kilograms or it could represent a few tonnes). Therefore, it may be more useful to report numbers of individual pieces for some species and volume for others, but this requires the development of conversion ratios.

Individual coral species also vary in abundance, with some being are very common – so not all species should qualify for listing in CITES. The listing of an entire order, such as Scleractinia, in the CITES appendices is very unusual. This may have been done due to difficulties in identifying individual coral species, but this approach presents difficulties for CITES authorities in exporting and importing countries, and for enforcement officers. More emphasis is thus required on identification training and adoption of standards for reporting.

For reasons related to trade history, soft corals (Alcyonacea) are not currently covered under CITES, although they are currently exported in significant amounts. Also, the listing of corals under CITES does not address the issue of coral-derived rock (live rock) and whether it is modern (weeks to hundreds of years old and captured by CITES definitions) or whether it is fossilised (and therefore exempt from CITES). This issue has yet to be effectively resolved.

Working group discussing non detrimental findings methods in Honiara CITES meeting 2010 © A.Teitelbaum

3.2.6 Quotas

In Resolution Conf. 14.7 on management of nationally-established export quotas, the parties recognised the linkage between export quotas and NDFs and recommended guidelines. In particular, CITES parties agreed that an export quota system could be used as a management tool to ensure that exports of a given species was maintained at a level that had no detrimental effect on the population of the species. The quota should reflect the total amount of each taxon harvested, not the amount exported, as this amount does not reflect the numbers that died during collection and subsequent handling.

For quotas to be used effectively, the Scientific Authority must monitor the actual levels of export. This is to ensure that the species is maintained throughout its range at a level consistent with its role in the ecosystem, and above the level at which the species might become eligible for Appendix I. Export permits for specimens subject to a quota should indicate the total number of specimens of the species exported to date (including those covered by the permit) and the annual quota for the species. Exceeding an annual quota, even a voluntary quota, is regarded as a serious implementation problem. This has led to the suspension of trade in some species from certain parties, and may indicate inadequate quota management and administration.

Many parties routinely establish annual export quotas on a voluntary basis for one or more Appendix II species as a means of limiting exports in those species. The main purposes of such export quotas are to:

- establish a limit on yearly exports at levels that are sustainable, or within the annual production capacity of ranching or captive breeding operations;
- announce the intended level of exports to both producers at national level and importers for the purpose of facilitating trade; and
- establish a basis for allocating amounts to be exported per year to individual exporters.

When a country has established an annual export quota it should:

- indicate the quota amount for that species on each export permit along with a running total of specimens that have already been exported as part of that quota; and
- keep an account of the use of an annual export quota to ensure that all specimens exported are reflected in the running total that must be given on each export permit and to prevent annual quotas from being exceeded.

Export permits for specimens subject to a quota should indicate the total number of specimens of the species exported to date (including those covered by the permit) and the annual quota for the species.

For compliance with CITES, quotas for the trade in corals should be established for each geographic collection area, based on the condition of the reef, the abundance of the targeted coral, the extent of other reef uses, and impacts from natural and anthropogenic disturbances that may affect survival of targeted taxa. The quota must also take into account life history strategies, such as rates of growth, recruitment rates, and population demography. Various quantitative data, such as the abundance, size frequency distribution, growth rates, mortality and recruitment, in combination with the total area occupied by a targeted species and the area under collection pressure, can provide an initial estimate of the potential yield of each taxa under different levels of collection. Harvests for purposes other than trade, unregulated illegal harvests, removal through bycatch, and capture and transport mortality also need to be considered when setting harvest and quota levels.

Currently, the only country in the Pacific Islands region to develop quotas for the coral trade is Fiji. The establishment of quotas for Fiji came as a result of inaction in the development of Fiji's CITES legislation, which resulted in two separate export bans imposed by the CITES authorities.

During the 49th Standing Committee in April 2003, the Fiji Foreign Affairs Minister and Department of Environment suggested re-establishing exports and imposing quotas as a provisional NDF.

Within the Fiji quotas, there are 55 CITES-designated taxa, which comprise both generic and species categories. Twenty-seven of these are genera with 28 species level of taxonomic distinction. Non-scleractinian coral comprises three genera and two species. Eleven generic categories have quotas of zero, meaing that no species within these caregories are allowed for export. Thirty-six genera containing 81 species are not included in the quota and likewise may not be exported.

To review the quotas, the Fiji Department of Fisheries (FDoF) and the University of the South Pacific's Institute of Marine Resources (IMR) undertook resource assessments in 2009 for two live coral traders in Fiji: AFF and Walt Smith International. Resource assessments by both FDoF and IMR confirmed that the collection of live coral is conducive to sustainable exploitation, with export numbers low when compared to the natural abundance of the hard coral resource.

The survey methodology for the IMR resource assessment was approved by the Fiji CITES Scientific Council and Management Authority, and involved assessing coral abundance by counting the number of coral colonies within belt transects and categorizing them by size and by CITES-dictated coral category (i.e. generic and species). Coral densities were calculated from the transect data and extrapolated to the wider collection area for the reef flat habitat only. These quantities were later compared as a percentage with the number of corals collected by AFF in 2007.

Surveyors conducting underwater visual census © P.Boblin

Results from the IMR study showed that the amount removed for the aquarium trade equated to 0.0085% of the total estimated colonies on the reef flat with a living cover reduction of 0.0014%. Based on this information and considering both ecological impact and the conservation of biodiversity, the IMR team found that the extraction for the corals surveyed was minimal in terms of the reduction of species numbers, the reduction in living coral cover, and consequent impact on the ecosystem.

In Indonesia, a similar methodology was used, which involved first determining the total number of different habitat types and their aerial coverage within the defined area, then assessing/estimating the total number of each taxon found within the region and its structure, as determined from the abundance and diameter of stony corals identified per unit area (from belt transects), and multiplying that number by the area occupied by each taxon, to determine how many were available for harvest. This number was then used to establish a conservative calculation of the percentage of the population that could be removed, considering the life history of each taxon and the actual size distribution. Results ranged from 1% to 10 % of the population, with higher numbers for the faster growing corals that were very common and were known to recruit well. These numbers were then compared to the existing harvest quota for the defined location, to determine whether the quota was sustainable or had the potential to result in overexploitation. Ultimately, it was determined that Indonesia's coral collectors were removing from <1% to 96 % of the population of each taxon on an annual basis, and it was recommended that there be a reduction in the level of harvest of certain taxa that were under high collection pressure (based on the field data and empirical life history data).

3.2.7 Trade in captive-bred species

Species bred in captivity or artificially propagated for commercial purposes, like giant clams for the global marine aquarium trade, must have a certificate issued for export. To comply with the definition of 'bred in captivity' under CITES, a specimen must have been born or produced in a controlled environment (i.e. maintained without the introduction of wild specimens), with parents mating (or gametes transferred, as is the case for giant clams) in the same or similar controlled environment. 'Bred in captivity' also applies to the production of a second generation or subsequent generations, or use of management techniques that have been demonstrated to be capable of reliably producing second generation offspring in a controlled environment. Breeding stock has to be established and maintained in accordance with CITES regulations.

First-generation offspring (F1) are specimens produced in a controlled environment with at least one parent taken from the wild or conceived in the wild. Second or subsequent generation offspring (F2, F3, F4 etc.) are specimens produced in a controlled environment by specimens also produced in a controlled environment.

Trade in specimens bred in captivity should be permitted only if the specimen is marked appropriately as bred in captivity. For example, putting the offspring of an F1 giant clam into the sea for 'grow out' does not satisfy the requirement to be 'grown in a controlled environment' and thus they would not be considered F2.

Coral farm in Fiji © Marj Awai

Part IV: Discussion

If it is managed and carried out carefully, harvesting corals for the aquarium trade can be a sustainable and viable activity that can help generate much needed revenue for many people across the Pacific Islands region.

Most CITES parties in the Pacific Islands region exporting corals included in Appendix II do not have extensive resources to implement NDF protocols that require high levels of labour or expensive equipment. Such protocols therefore need to be as simple and practical as possible commensurate with the nature of the determination to be made. Greater support is also required for coral identification at all levels, including harvesters, exporters, customs agents and importers.

Under CITES the main point of leverage revolves around what can be traded and ensuring that trade doesn't significantly impact on population status at a species level. However, in most parts of the world it is very likely that the amount of coral removed for the aquarium and curio trade is small relative to the combined impacts of poor water quality (from land use practices), coastal development, destructive fishing practices, industrial-scale coral removal for the construction and agricultural industries, and lastly (and more specific to some parts of the Pacific) the production of lime for the consumption of betel nut. Overlaid on this is the prospect of significant climate-induced changes. CITES does not, at this stage, explicitly address these matters.

Given the success of coral mariculture, especially for branching corals, CITES also needs to (re)evaluate the status of this trade, particularly if sustainability issues continue to become a greater concern and consumers demand greater access to farmed corals from the Pacific Islands region.

Healthy coral reef in Vanuatu © A. Teitelbaum

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Montipora effusa cultured in Tonga © C.Turnier

Resource Persons

Government Representatives

Australia

- **Ms Lorraine Hitch**
  Australian Scientific Authority (Marine)
  Department of Environment, Water, and Heritage
  GPO Box 787
  Canberra
  Australian Capital Territory 2601
  Australia
  Email: Lorraine.Hitch@environment.gov.au

Cook Islands

- **Mr Koroa Raumea**
  Director
  Inshore Fisheries and Aquaculture
  Ministry of Marine Resources
  PO Box 85
  Avarua
  Rarotonga
  Cook Islands
  Tel: (682) 28730
  Fax: (682) 29721
  Email: k.raumea@mmr.gov.ck

Fiji Islands

- **Mr Aisake Batibasaga**
  Principle Fisheries Officer
  Department of Fisheries
  Ministry of Fisheries and Forestry
  PO Box 481
  Nausori
  Fiji Islands
  Email: abatibasaga@gmail.com

- **Mr Aminiasi Qareqare**
  Department of Environment
  PO Box 2109
  Suva
  Fiji Islands
  Email: aminiasi.qareqare@environment.gov.fj

French Polynesia

- **Ms Miri Tatarata**
  Chargee d'etudes a la Direction de l'Environnement
  BP 4562
  Papeete 98713
  Tahiti
  French Polynesia
  Tel: (689) 476607
  Fax: (689) 419252
  Email: miri.tatarata@environnement.gov.pf

- **Mr Georges Remoissenet**
  Responsable des programmes aquaculture
  BP 20
  Papeete 98713
  Tahiti
  French Polynesia
  Tel: (689) 502550
  Fax: (689) 434979
  Email: georges.remoissenet@peche.gov.pf

Marshall Islands

- **Mr Darren Nakata**
  Integrated Marine Resource Manager
  Marshall Islands Marine Resources Authority
  Division of Policy, Planning and Statistics
  PO Box 860
  Majuro 96960
  Marshall Islands
  Tel: (692) 625 8262
  Fax: (692) 625 5447
  Email: dtnakata@gmail.com

New Caledonia

- **Mr Patrick Laubreaux**
  Ingénieur
  Chargé d'études a la Direction des affaires vétérinaires, alimentaires et rurales
  New Caledonia
  Tel: (687) 255126
  Email: pat_lbx@hotmail.com

Palau

- **Ms Nannette Malsol**
  Acting Director
  Bureau of Marine Resource
  Ministry of Natural Resources, Environment and Tourism
  PO Box 359
  Koror 96940
  Palau
  Tel: (680) 4885722
  Email: Tunapal@palaunet.com

- **Mr Nick Tmecherur**
  Coastal Fisheries Officer
  Bureau of Marine Resource
  Ministry of Natural Resources, Environment and Tourism
  PO Box 359
  Koror 96940
  Palau
  Tel: (680) 4885722
  Email: tunapal@palaunet.com

Papua New Guinea

- **Mr Leban Gisawa**
  Inshore Fisheries Manager
  National Fisheries Authority
  PO Box 2016
  Port Moresby
  National Capital District
  Papua New Guinea
  Tel: (675) 3090444
  Email: lgisawa@fisheries.gov.pg

- **Mr Vagi Rei**
  Marine Species Officer
  Marine Division
  Marine Ecosystem, Management Branch
  Department of Environment and Conservation
  PO Box 6601
  Boroko
  NCD
  Tel: (675) 3250195
  Email: vrei@dec.gov.pg

Samoa

- **Mr Ulusapeti Tiitii**
  Senior Fisheries Officer
  Inshore Fisheries Section
  Fisheries Division
  Ministry of Agriculture and Fisheries
  Private Bag
  Apia
  Samoa
  Tel:(685) 20369
  Fax: (685) 24292
  Samoa
  Email: sapeti.tiitii@fisheries.gov.ws

- **Mr Titimanu Alain Simi**
  Marine Conservation Officer
  Ministry of Natural Resources and Environment
  Private Bag
  Apia
  Samoa
  Tel: (685) 23800
  Fax: (685) 23176
  Email: titi.simi@mnre.gov.ws

Solomon islands

- **Ms Selina Lipa**
  Principal Fisheries Officer (Licensing)
  Ministry of fisheries and Marine Resources
  PO Box G13
  Honiara
  Solomon Islands
  Tel: (677) 39143/38730
  Fax: (677) 38730
  Email: slipa@fisheries.gov.sb

- **Ms Rosalie Masu**
  Senior Fisheries Officer (Research)
  Ministry of Fisheries and Marine Resources
  PO Box G13
  Honiara
  Solomon Islands
  Tel: (677) 39143/38730
  Fax: (677) 38730
  Email: rmasu@fisheries.gov.sb

- **Mr Tia Masolo**
  Deputy Director
  Environment and Conservation Division
  Ministry of Environment, Conservation and Meteorology
  PO Box 21
  Honiara Solomon Islands
  Tel: (677) 23031
  Fax: (677) 28054
  Email: masolot@gmail.com

- **Mr Joseph Hurutarau**
  Chief Conservation Officer
  Environment and Conservation Division
  Ministry of Environment, Conservation and Meteorology
  PO Box 21
  Honiara Solomon Islands
  Tel: (677) 23031
  Fax: (677) 28054
  Email: jhurutarau@gmail.com

- **Mr Fred Patison Sibo**
  Chief Environment Officer
  Environment and Conservation Division
  Ministry of Environment, Conservation and Meteorology
  PO Box 21
  Honiara Solomon Islands
  Tel: (677) 23031
  Fax: (677) 28054
  Email: fred.patison@gmail.com

Vanuatu

- **Mr Jayven Ham**
  Fisheries Biologist
  Department of Fisheries
  PMB 9045
  Port Vila
  Vanuatu
  Tel: (678) 23119/2362
  Fax: (678) 23641
  Email: 3jraudinbani@gmail.com
  Email: jayven04@gmail.com

- **Mr Vatumaraga Molisa**
  Marine Biologist
  Department of Environment and Conservation
  PMB 9063
  Port Vila
  Vanuatu
  Tel: (678) 22227/25302
  Fax: (678) 22227
  Email: vatumaraga@gmail.com

United States of America

- **Dr Krista Graham**
  Regional coordinator for Species of Concern
  NOAA Fisheries Service
  Pacific Islands Regional Office
  Kapiolani Blvd Suite 1110
  96814-4700
  Honolulu, Hawaii 1601
  United States of America
  Tel: (808) 9442238
  Email: Krista.Graham@noaa.gov

- **Dr Karen Frutchey**
  Marine Species Officer
  NOAA Fisheries Service
  Kapiolani Blvd Suite 1110
  96814-4700
  Honolulu, Hawaii 1601
  United States of America
  Tel: (808) 9442227
  Email: Karen.Frutchey@noaa.gov

Organisation Representatives

Secretariat for the Convention on the International Trade in Endangered Species

- **Mr Robert Boljesic**
  CITES Secretariat
  International Environment House
  11-13 Chemin des Anémones
  1219 Châtelaine
  Geneva
  Switzerland
  Tel: (41 22) 9178131
  Fax: (41 22) 7973417
  Email: Robert.BOLJESIC@cites.org

International Union for the Conservation of Nature

- **Ms Helen Pippard**
  Species and Membership Officer
  IUCN Regional Office for Oceania
  5 Ma'afu Street
  Suva
  Fiji Islands
  Tel: (679) 3319084
  Email: helen.pippard@iucn.org

Pacific Islands Forum Secretariat

- **Dr Dale Hamilton**
  Trade facilitator Officer
  Pacific Islands Forum Secretariat
  Private Mail Bag
  Suva, Fiji Islands
  Email: daleh@forumsec.org.fj

Secretariat of the Pacific Community

- **Mr Lindsay Chapman**
  Manager
  Coastal Fisheries Programme Manager
  Secretariat of the Pacific Community
  BP D5 9884
  Noumea, New Caledonia
  Tel: (687) 260174
  Fax: (687) 263818
  Email: LindsayC@spc.int

- **Mr Antoine Teiltelbaum**
  Aquaculture Officer
  Secretariat of the Pacific Community
  BP D5 9884
  Noumea, New Caledonia
  Tel: (687) 260174
  Fax: (687) 263818
  Email: AntoineT@spc.int

- **Ms Hélène Lecomte**
  Secretary to the Director of Fisheries, Aquaculture and Marine Ecosystems
  Secretariat of the Pacific Community
  BP D5 9884
  Noumea, New Caledonia
  Tel: (687) 260174
  Fax: (687) 263818
  Email: Helenel@spc.int

Secretariat of the Pacific Regional Environment Program

- **Mr Jeff Kinch**
  Coastal Management Advisor
  Secretariat of the Pacific Regional Environment Program
  PO Box 240
  Apia, Samoa
  Phone: (685) 21929
  Fax: (685) 20231
  Email: jeffreyk@sprep.org

University of the South Pacific

- **Dr Edward Lovell**
  Lecturer
  Marine Studies Program
  University of the South Pacific
  PO Box 1168
  Suva
  Fiji
  Phone: (679) 3232943
  Fax: (679) 3231526
  Email: lovell_e@usp.ac.fj

Wild caught corals ready for export in a Solomon Island station © A.Teitelbaum

Appendix A:
IUCN Redlist for Coral Species

CR = critically endangered, EN = endangered, VU = vulnerable, NT = near threatened, LC = least concern, DD = data deficient.

Family	Species	Red List status	Population trend
ACROPORIDAE	*Acropora abrolhosensis*	VU	decreasing
ACROPORIDAE	*Acropora abrotanoides*	LC	decreasing
ACROPORIDAE	*Acropora aculeus*	VU	decreasing
ACROPORIDAE	*Acropora acuminata*	VU	decreasing
ACROPORIDAE	*Acropora akajimensis*	DD	decreasing
ACROPORIDAE	*Acropora anthocercis*	VU	decreasing
ACROPORIDAE	*Acropora aspera*	VU	decreasing
ACROPORIDAE	*Acropora austera*	NT	decreasing
ACROPORIDAE	*Acropora awi*	VU	decreasing
ACROPORIDAE	*Acropora batunai*	VU	decreasing
ACROPORIDAE	*Acropora bifurcata*	DD	decreasing
ACROPORIDAE	*Acropora bushyensis*	LC	decreasing
ACROPORIDAE	*Acropora cardenae*	DD	unknown
ACROPORIDAE	*Acropora carduus*	NT	decreasing
ACROPORIDAE	*Acropora caroliniana*	VU	decreasing
ACROPORIDAE	*Acropora cerealis*	LC	decreasing
ACROPORIDAE	*Acropora chesterfieldensis*	LC	decreasing
ACROPORIDAE	*Acropora clathrata*	LC	decreasing
ACROPORIDAE	*Acropora cophodactyla*	DD	decreasing
ACROPORIDAE	*Acropora copiosa*	DD	decreasing
ACROPORIDAE	*Acropora cytherea*	LC	decreasing
ACROPORIDAE	*Acropora dendrum*	VU	decreasing
ACROPORIDAE	*Acropora derawanensis*	VU	decreasing
ACROPORIDAE	*Acropora desalwii*	VU	decreasing
ACROPORIDAE	*Acropora digitifera*	NT	decreasing
ACROPORIDAE	*Acropora divaricata*	NT	decreasing
ACROPORIDAE	*Acropora donei*	VU	decreasing

ACROPORIDAE	*Acropora echinata*	VU	decreasing
ACROPORIDAE	*Acropora efflorescens*	DD	decreasing
ACROPORIDAE	*Acropora elegans*	VU	decreasing
ACROPORIDAE	*Acropora elseyi*	LC	decreasing
ACROPORIDAE	*Acropora exquisita*	DD	decreasing
ACROPORIDAE	*Acropora fastigata*	DD	decreasing
ACROPORIDAE	*Acropora florida*	NT	decreasing
ACROPORIDAE	*Acropora formosa*	NT	decreasing
ACROPORIDAE	*Acropora gemmifera*	LC	decreasing
ACROPORIDAE	*Acropora glauca*	NT	decreasing
ACROPORIDAE	*Acropora globiceps*	VU	decreasing
ACROPORIDAE	*Acropora gomezi*	DD	decreasing
ACROPORIDAE	*Acropora grandis*	LC	decreasing
ACROPORIDAE	*Acropora granulosa*	NT	decreasing
ACROPORIDAE	*Acropora halmaherae*	DD	decreasing
ACROPORIDAE	*Acropora hoeksemai*	VU	decreasing
ACROPORIDAE	*Acropora horrida*	VU	decreasing
ACROPORIDAE	*Acropora humilis*	NT	decreasing
ACROPORIDAE	*Acropora hyacinthus*	NT	decreasing
ACROPORIDAE	*Acropora indonesia*	VU	decreasing
ACROPORIDAE	*Acropora inermis*	DD	decreasing
ACROPORIDAE	*Acropora insignis*	DD	decreasing
ACROPORIDAE	*Acropora irregularis*	DD	decreasing
ACROPORIDAE	*Acropora jacquelineae*	VU	decreasing
ACROPORIDAE	*Acropora kimbeensis*	VU	decreasing
ACROPORIDAE	*Acropora kirstyae*	VU	decreasing
ACROPORIDAE	*Acropora latistella*	LC	decreasing
ACROPORIDAE	*Acropora listeri*	VU	decreasing
ACROPORIDAE	*Acropora loisetteae*	VU	decreasing
ACROPORIDAE	*Acropora lokani*	VU	decreasing
ACROPORIDAE	*Acropora longicyathus*	LC	decreasing
ACROPORIDAE	*Acropora loripes*	NT	decreasing
ACROPORIDAE	*Acropora lovelli*	VU	decreasing

ACROPORIDAE	*Acropora lutkeni*	NT	decreasing
ACROPORIDAE	*Acropora meridiana*	DD	decreasing
ACROPORIDAE	*Acropora microclados*	VU	decreasing
ACROPORIDAE	*Acropora microphthalma*	LC	decreasing
ACROPORIDAE	*Acropora millepora*	NT	decreasing
ACROPORIDAE	*Acropora mirabilis*	DD	decreasing
ACROPORIDAE	*Acropora monticulosa*	NT	decreasing
ACROPORIDAE	*Acropora multiacuta*	VU	decreasing
ACROPORIDAE	*Acropora nana*	NT	decreasing
ACROPORIDAE	*Acropora nasuta*	NT	decreasing
ACROPORIDAE	*Acropora navini*	DD	decreasing
ACROPORIDAE	*Acropora nobilis*	LC	decreasing
ACROPORIDAE	*Acropora ocellata*	DD	decreasing
ACROPORIDAE	*Acropora orbicularis*	DD	decreasing
ACROPORIDAE	*Acropora pagoensis*	DD	decreasing
ACROPORIDAE	*Acropora palmerae*	VU	decreasing
ACROPORIDAE	*Acropora paniculata*	VU	decreasing
ACROPORIDAE	*Acropora parilis*	DD	decreasing
ACROPORIDAE	*Acropora pectinatus*	DD	decreasing
ACROPORIDAE	*Acropora pharaonis*	VU	decreasing
ACROPORIDAE	*Acropora pichoni*	NT	decreasing
ACROPORIDAE	*Acropora pinguis*	DD	decreasing
ACROPORIDAE	*Acropora plana*	DD	decreasing
ACROPORIDAE	*Acropora plumosa*	VU	decreasing
ACROPORIDAE	*Acropora polystoma*	VU	decreasing
ACROPORIDAE	*Acropora prostrata*	DD	decreasing
ACROPORIDAE	*Acropora pulchra*	LC	decreasing
ACROPORIDAE	*Acropora rambleri*	DD	decreasing
ACROPORIDAE	*Acropora retusa*	VU	decreasing
ACROPORIDAE	*Acropora robusta*	LC	decreasing
ACROPORIDAE	*Acropora rongelapensis*	DD	decreasing
ACROPORIDAE	*Acropora rosaria*	DD	decreasing
ACROPORIDAE	*Acropora rudis*	EN	decreasing
ACROPORIDAE	*Acropora samoensis*	LC	decreasing

ACROPORIDAE	*Acropora sarmentosa*	LC	decreasing
ACROPORIDAE	*Acropora schmitti*	DD	decreasing
ACROPORIDAE	*Acropora secale*	NT	decreasing
ACROPORIDAE	*Acropora sekiseiensis*	DD	decreasing
ACROPORIDAE	*Acropora selago*	NT	decreasing
ACROPORIDAE	*Acropora seriata*	DD	decreasing
ACROPORIDAE	*Acropora simplex*	VU	decreasing
ACROPORIDAE	*Acropora solitaryensis*	VU	decreasing
ACROPORIDAE	*Acropora spathulata*	LC	unknown
ACROPORIDAE	*Acropora speciosa*	VU	decreasing
ACROPORIDAE	*Acropora spicifera*	VU	decreasing
ACROPORIDAE	*Acropora striata*	VU	decreasing
ACROPORIDAE	*Acropora subglabra*	LC	decreasing
ACROPORIDAE	*Acropora subulata*	LC	decreasing
ACROPORIDAE	*Acropora tenella*	VU	decreasing
ACROPORIDAE	*Acropora tenuis*	NT	decreasing
ACROPORIDAE	*Acropora teres*	DD	decreasing
ACROPORIDAE	*Acropora torihalimeda*	DD	decreasing
ACROPORIDAE	*Acropora torresiana*	DD	decreasing
ACROPORIDAE	*Acropora tortuosa*	LC	decreasing
ACROPORIDAE	*Acropora turaki*	VU	decreasing
ACROPORIDAE	*Acropora tutuilensis*	DD	decreasing
ACROPORIDAE	*Acropora valencienn esi*	LC	decreasing
ACROPORIDAE	*Acropora valida*	LC	decreasing
ACROPORIDAE	*Acropora vaughani*	VU	decreasing
ACROPORIDAE	*Acropora verweyi*	VU	decreasing
ACROPORIDAE	*Acropora walindii*	VU	decreasing
ACROPORIDAE	*Acropora wallaceae*	DD	decreasing
ACROPORIDAE	*Acropora willisae*	VU	decreasing
ACROPORIDAE	*Acropora yongei*	LC	decreasing
ACROPORIDAE	*Anacropora forbesi*	LC	decreasing
ACROPORIDAE	*Anacropora matthai*	VU	decreasing
ACROPORIDAE	*Anacropora pillai*	DD	decreasing
ACROPORIDAE	*Anacropora puertogalerae*	VU	decreasing

ACROPORIDAE	*Anacropora reticulata*	VU	decreasing
ACROPORIDAE	*Anacropora spinosa*	EN	decreasing
ACROPORIDAE	*Astreopora cucullata*	VU	decreasing
ACROPORIDAE	*Astreopora eliptica*	DD	decreasing
ACROPORIDAE	*Astreopora expansa*	NT	decreasing
ACROPORIDAE	*Astreopora gracilis*	LC	decreasing
ACROPORIDAE	*Astreopora incrustans*	VU	decreasing
ACROPORIDAE	*Astreopora listeri*	LC	decreasing
ACROPORIDAE	*Astreopora macrostoma*	NT	decreasing
ACROPORIDAE	*Astreopora moretonensis*	VU	decreasing
ACROPORIDAE	*Astreopora myriophthalma*	LC	decreasing
ACROPORIDAE	*Astreopora ocellata*	LC	decreasing
ACROPORIDAE	*Astreopora randalli*	LC	decreasing
ACROPORIDAE	*Astreopora scabra*	LC	decreasing
ACROPORIDAE	*Astreopora suggesta*	LC	decreasing
ACROPORIDAE	*Isopora brueggemanni*	VU	decreasing
ACROPORIDAE	*Isopora crateriformis*	VU	decreasing
ACROPORIDAE	*Isopora cuneata*	VU	decreasing
ACROPORIDAE	*Isopora cylindrica*	DD	decreasing
ACROPORIDAE	*Isopora palifera*	NT	decreasing
ACROPORIDAE	*Montipora aequituberculata*	LC	decreasing
ACROPORIDAE	*Montipora altasepta*	VU	decreasing
ACROPORIDAE	*Montipora angulata*	VU	decreasing
ACROPORIDAE	*Montipora australiensis*	VU	decreasing
ACROPORIDAE	*Montipora cactus*	VU	decreasing
ACROPORIDAE	*Montipora calcarea*	VU	decreasing
ACROPORIDAE	*Montipora caliculata*	VU	decreasing
ACROPORIDAE	*Montipora capitata*	NT	decreasing
ACROPORIDAE	*Montipora capricornis*	VU	decreasing
ACROPORIDAE	*Montipora cebuensis*	VU	decreasing
ACROPORIDAE	*Montipora cocosensis*	VU	decreasing
ACROPORIDAE	*Montipora confusa*	NT	decreasing
ACROPORIDAE	*Montipora corbettensis*	VU	decreasing
ACROPORIDAE	*Montipora crassituberculata*	VU	decreasing

ACROPORIDAE	*Montipora danae*	LC	decreasing
ACROPORIDAE	*Montipora delicatula*	VU	decreasing
ACROPORIDAE	*Montipora digitata*	LC	decreasing
ACROPORIDAE	*Montipora efflorescens*	NT	decreasing
ACROPORIDAE	*Montipora effusa*	NT	decreasing
ACROPORIDAE	*Montipora florida*	VU	decreasing
ACROPORIDAE	*Montipora floweri*	LC	decreasing
ACROPORIDAE	*Montipora foliosa*	NT	decreasing
ACROPORIDAE	*Montipora foveolata*	NT	decreasing
ACROPORIDAE	*Montipora friabilis*	VU	decreasing
ACROPORIDAE	*Montipora gaimardi*	VU	decreasing
ACROPORIDAE	*Montipora grisea*	LC	decreasing
ACROPORIDAE	*Montipora hirsuta*	NT	decreasing
ACROPORIDAE	*Montipora hispida*	LC	decreasing
ACROPORIDAE	*Montipora hodgsoni*	VU	decreasing
ACROPORIDAE	*Montipora hoffmeisteri*	LC	decreasing
ACROPORIDAE	*Montipora incrassata*	NT	decreasing
ACROPORIDAE	*Montipora informis*	LC	decreasing
ACROPORIDAE	*Montipora lobulata*	VU	decreasing
ACROPORIDAE	*Montipora mactanensis*	VU	decreasing
ACROPORIDAE	*Montipora malampaya*	VU	decreasing
ACROPORIDAE	*Montipora meandrina*	VU	decreasing
ACROPORIDAE	*Montipora millepora*	LC	decreasing
ACROPORIDAE	*Montipora mollis*	LC	decreasing
ACROPORIDAE	*Montipora monasteriata*	LC	decreasing
ACROPORIDAE	*Montipora niugini*	NT	decreasing
ACROPORIDAE	*Montipora nodosa*	NT	decreasing
ACROPORIDAE	*Montipora orientalis*	VU	decreasing
ACROPORIDAE	*Montipora palawanensis*	NT	decreasing
ACROPORIDAE	*Montipora peltiformis*	NT	decreasing
ACROPORIDAE	*Montipora porites*	NT	decreasing
ACROPORIDAE	*Montipora samarensis*	VU	decreasing
ACROPORIDAE	*Montipora spongodes*	LC	decreasing
ACROPORIDAE	*Montipora spumosa*	LC	decreasing

ACROPORIDAE	*Montipora stellata*	LC	decreasing
ACROPORIDAE	*Montipora tuberculosa*	LC	decreasing
ACROPORIDAE	*Montipora turgescens*	LC	decreasing
ACROPORIDAE	*Montipora turtlensis*	VU	decreasing
ACROPORIDAE	*Montipora undata*	NT	decreasing
ACROPORIDAE	*Montipora vaughani*	DD	decreasing
ACROPORIDAE	*Montipora venosa*	NT	decreasing
ACROPORIDAE	*Montipora verrilli*	DD	decreasing
ACROPORIDAE	*Montipora verrucosa*	LC	decreasing
ACROPORIDAE	*Montipora verruculosus*	VU	decreasing
ACROPORIDAE	*Montipora vietnamensis*	VU	decreasing
AGARICIIDAE	*Coeloseris mayeri*	LC	unknown
AGARICIIDAE	*Gardineroseris planulata*	LC	unknown
AGARICIIDAE	*Leptoseris amitoriensis*	NT	unknown
AGARICIIDAE	*Leptoseris explanata*	LC	unknown
AGARICIIDAE	*Leptoseris foliosa*	LC	unknown
AGARICIIDAE	*Leptoseris gardineri*	LC	unknown
AGARICIIDAE	*Leptoseris hawaiiensis*	LC	unknown
AGARICIIDAE	*Leptoseris incrustans*	VU	unknown
AGARICIIDAE	*Leptoseris mycetoseroides*	LC	unknown
AGARICIIDAE	*Leptoseris papyracea*	LC	unknown
AGARICIIDAE	*Leptoseris scabra*	LC	unknown
AGARICIIDAE	*Leptoseris solida*	LC	unknown
AGARICIIDAE	*Leptoseris striata*	NT	unknown
AGARICIIDAE	*Leptoseris tubulifera*	LC	unknown
AGARICIIDAE	*Leptoseris yabei*	VU	unknown
AGARICIIDAE	*Pachyseris foliosa*	LC	unknown
AGARICIIDAE	*Pachyseris gemmae*	NT	unknown
AGARICIIDAE	*Pachyseris involuta*	VU	unknown
AGARICIIDAE	*Pachyseris rugosa*	VU	unknown
AGARICIIDAE	*Pachyseris speciosa*	LC	unknown
AGARICIIDAE	*Pavona bipartita*	VU	unknown
AGARICIIDAE	*Pavona cactus*	VU	unknown
AGARICIIDAE	*Pavona clavus*	LC	unknown

AGARICIIDAE	*Pavona decussata*	VU	unknown
AGARICIIDAE	*Pavona diffluens*	VU	unknown
AGARICIIDAE	*Pavona duerdeni*	LC	unknown
AGARICIIDAE	*Pavona explanulata*	LC	unknown
AGARICIIDAE	*Pavona frondifera*	LC	unknown
AGARICIIDAE	*Pavona gigantea*	LC	increasing
AGARICIIDAE	*Pavona maldivensis*	LC	unknown
AGARICIIDAE	*Pavona minuta*	NT	unknown
AGARICIIDAE	*Pavona varians*	LC	unknown
AGARICIIDAE	*Pavona venosa*	VU	unknown
ASTROCOENIIDAE	*Madracis asanoi*	DD	unknown
ASTROCOENIIDAE	*Madracis kirbyi*	LC	unknown
ASTROCOENIIDAE	*Palauastrea ramosa*	NT	unknown
ASTROCOENIIDAE	*Stylocoeniella armata*	LC	unknown
ASTROCOENIIDAE	*Stylocoeniella cocosensis*	VU	unknown
ASTROCOENIIDAE	*Stylocoeniella guentheri*	LC	unknown
CARYOPHYLLIIDAE	*Heterocyathus aequicostatus*	LC	unknown
CARYOPHYLLIIDAE	*Heterocyathus alternatus*	LC	unknown
CARYOPHYLLIIDAE	*Heterocyathus sulcatus*	LC	unknown
DENDROPHYLLIIDAE	*Duncanopsammia axifuga*	NT	unknown
DENDROPHYLLIIDAE	*Heteropsammia cochlea*	LC	unknown
DENDROPHYLLIIDAE	*Turbinaria bifrons*	VU	unknown
DENDROPHYLLIIDAE	*Turbinaria conspicua*	LC	unknown
DENDROPHYLLIIDAE	*Turbinaria frondens*	LC	unknown
DENDROPHYLLIIDAE	*Turbinaria heronensis*	VU	unknown
DENDROPHYLLIIDAE	*Turbinaria irregularis*	LC	unknown
DENDROPHYLLIIDAE	*Turbinaria mesenterina*	VU	unknown
DENDROPHYLLIIDAE	*Turbinaria patula*	VU	unknown
DENDROPHYLLIIDAE	*Turbinaria peltata*	VU	unknown
DENDROPHYLLIIDAE	*Turbinaria radicalis*	NT	unknown
DENDROPHYLLIIDAE	*Turbinaria reniformis*	VU	unknown
DENDROPHYLLIIDAE	*Turbinaria stellulata*	VU	unknown
EUPHYLLIDAE	*Catalaphyllia jardinei*	VU	unknown
EUPHYLLIDAE	*Euphyllia ancora*	VU	unknown

EUPHYLLIDAE	*Euphyllia cristata*	VU	stable
EUPHYLLIDAE	*Euphyllia divisa*	NT	unknown
EUPHYLLIDAE	*Euphyllia glabrescens*	NT	unknown
EUPHYLLIDAE	*Euphyllia paraancora*	VU	unknown
EUPHYLLIDAE	*Euphyllia paradivisa*	VU	unknown
EUPHYLLIDAE	*Euphyllia paraglabrescens*	VU	unknown
EUPHYLLIDAE	*Euphyllia yaeyamaensis*	NT	unknown
EUPHYLLIDAE	*Nemenzophyllia turbida*	VU	unknown
EUPHYLLIDAE	*Physogyra lichtensteini*	VU	unknown
EUPHYLLIDAE	*Plerogyra discus*	VU	unknown
EUPHYLLIDAE	*Plerogyra simplex*	NT	unknown
EUPHYLLIDAE	*Plerogyra sinuosa*	NT	unknown
FAVIIDAE	*Australogyra zelli*	VU	decreasing
FAVIIDAE	*Barabattoia amicorum*	LC	decreasing
FAVIIDAE	*Barabattoia laddi*	VU	decreasing
FAVIIDAE	*Caulastrea curvata*	VU	decreasing
FAVIIDAE	*Caulastrea echinulata*	VU	decreasing
FAVIIDAE	*Caulastrea furcata*	LC	decreasing
FAVIIDAE	*Caulastrea tumida*	NT	decreasing
FAVIIDAE	*Cyphastrea agassizi*	VU	decreasing
FAVIIDAE	*Cyphastrea chalcidicum*	LC	decreasing
FAVIIDAE	*Cyphastrea decadia*	LC	decreasing
FAVIIDAE	*Cyphastrea japonica*	LC	decreasing
FAVIIDAE	*Cyphastrea microphthalma*	LC	decreasing
FAVIIDAE	*Cyphastrea ocellina*	VU	decreasing
FAVIIDAE	*Cyphastrea serailia*	LC	decreasing
FAVIIDAE	*Diploastrea heliopora*	NT	decreasing
FAVIIDAE	*Echinopora gemmacea*	LC	decreasing
FAVIIDAE	*Echinopora hirsutissima*	LC	decreasing
FAVIIDAE	*Echinopora horrida*	NT	decreasing
FAVIIDAE	*Echinopora lamellosa*	LC	decreasing
FAVIIDAE	*Echinopora mammiformis*	NT	decreasing
FAVIIDAE	*Echinopora pacificus*	NT	decreasing
FAVIIDAE	*Echinopora taylorae*	NT	unknown

FAVIIDAE	*Favia danae*	LC	decreasing
FAVIIDAE	*Favia favus*	LC	decreasing
FAVIIDAE	*Favia helianthoides*	NT	decreasing
FAVIIDAE	*Favia laxa*	NT	decreasing
FAVIIDAE	*Favia lizardensis*	NT	decreasing
FAVIIDAE	*Favia maritima*	NT	decreasing
FAVIIDAE	*Favia marshae*	NT	decreasing
FAVIIDAE	*Favia matthaii*	NT	decreasing
FAVIIDAE	*Favia maxima*	NT	decreasing
FAVIIDAE	*Favia pallida*	LC	decreasing
FAVIIDAE	*Favia rosaria*	VU	decreasing
FAVIIDAE	*Favia rotumana*	LC	decreasing
FAVIIDAE	*Favia rotundata*	NT	decreasing
FAVIIDAE	*Favia speciosa*	LC	decreasing
FAVIIDAE	*Favia stelligera*	NT	decreasing
FAVIIDAE	*Favia truncatus*	LC	decreasing
FAVIIDAE	*Favia veroni*	NT	decreasing
FAVIIDAE	*Favia vietnamensis*	NT	decreasing
FAVIIDAE	*Favites abdita*	NT	decreasing
FAVIIDAE	*Favites acuticollis*	NT	decreasing
FAVIIDAE	*Favites bestae*	NT	decreasing
FAVIIDAE	*Favites chinensis*	NT	decreasing
FAVIIDAE	*Favites complanata*	NT	decreasing
FAVIIDAE	*Favites flexuosa*	NT	decreasing
FAVIIDAE	*Favites halicora*	NT	decreasing
FAVIIDAE	*Favites micropentagona*	NT	decreasing
FAVIIDAE	*Favites paraflexuosa*	NT	decreasing
FAVIIDAE	*Favites pentagona*	LC	decreasing
FAVIIDAE	*Favites russelli*	NT	decreasing
FAVIIDAE	*Favites spinosa*	VU	decreasing
FAVIIDAE	*Favites stylifera*	NT	decreasing
FAVIIDAE	*Favites vasta*	NT	decreasing
FAVIIDAE	*Goniastrea aspera*	LC	decreasing
FAVIIDAE	*Goniastrea australensis*	LC	decreasing

FAVIIDAE	*Goniastrea edwardsi*	LC	decreasing
FAVIIDAE	*Goniastrea favulus*	NT	decreasing
FAVIIDAE	*Goniastrea minuta*	NT	decreasing
FAVIIDAE	*Goniastrea palauensis*	NT	decreasing
FAVIIDAE	*Goniastrea pectinata*	LC	decreasing
FAVIIDAE	*Goniastrea ramosa*	VU	decreasing
FAVIIDAE	*Goniastrea retiformis*	LC	decreasing
FAVIIDAE	*Leptastrea aequalis*	VU	decreasing
FAVIIDAE	*Leptastrea bewickensis*	NT	decreasing
FAVIIDAE	*Leptastrea bottae*	NT	decreasing
FAVIIDAE	*Leptastrea inaequalis*	NT	decreasing
FAVIIDAE	*Leptastrea pruinosa*	LC	decreasing
FAVIIDAE	*Leptastrea purpurea*	LC	decreasing
FAVIIDAE	*Leptastrea transversa*	LC	decreasing
FAVIIDAE	*Leptoria irregularis*	VU	decreasing
FAVIIDAE	*Leptoria phrygia*	NT	decreasing
FAVIIDAE	*Montastrea annuligera*	NT	decreasing
FAVIIDAE	*Montastrea colemani*	NT	decreasing
FAVIIDAE	*Montastrea curta*	LC	decreasing
FAVIIDAE	*Montastrea magnistellata*	NT	decreasing
FAVIIDAE	*Montastrea multipunctata*	VU	decreasing
FAVIIDAE	*Montastrea salebrosa*	VU	decreasing
FAVIIDAE	*Montastrea valenciennesi*	NT	decreasing
FAVIIDAE	*Moseleya latistellata*	VU	decreasing
FAVIIDAE	*Oulastrea crispata*	LC	unknown
FAVIIDAE	*Oulophyllia bennettae*	NT	decreasing
FAVIIDAE	*Oulophyllia crispa*	NT	decreasing
FAVIIDAE	*Oulophyllia levis*	LC	decreasing
FAVIIDAE	*Platygyra acuta*	NT	decreasing
FAVIIDAE	*Platygyra carnosus*	NT	decreasing
FAVIIDAE	*Platygyra contorta*	LC	decreasing
FAVIIDAE	*Platygyra daedalea*	LC	decreasing
FAVIIDAE	*Platygyra lamellina*	NT	decreasing
FAVIIDAE	*Platygyra pini*	LC	decreasing

FAVIIDAE	*Platygyra ryukyuensis*	NT	decreasing
FAVIIDAE	*Platygyra sinensis*	LC	decreasing
FAVIIDAE	*Platygyra verweyi*	NT	decreasing
FAVIIDAE	*Platygyra yaeyamaensis*	VU	decreasing
FAVIIDAE	*Plesiastrea versipora*	LC	decreasing
FUNGIIDAE	*Cantharellus jebbi*	LC	unknown
FUNGIIDAE	*Cantharellus noumeae*	EN	unknown
FUNGIIDAE	*Ctenactis albitentaculata*	NT	unknown
FUNGIIDAE	*Ctenactis crassa*	LC	unknown
FUNGIIDAE	*Ctenactis echinata*	LC	unknown
FUNGIIDAE	*Fungia concinna*	LC	unknown
FUNGIIDAE	*Fungia costulata*	LC	unknown
FUNGIIDAE	*Fungia curvata*	VU	unknown
FUNGIIDAE	*Fungia cyclolites*	LC	unknown
FUNGIIDAE	*Fungia fragilis*	LC	unknown
FUNGIIDAE	*Fungia fralinae*	LC	unknown
FUNGIIDAE	*Fungia fungites*	NT	unknown
FUNGIIDAE	*Fungia granulosa*	LC	unknown
FUNGIIDAE	*Fungia hexagonalis*	LC	unknown
FUNGIIDAE	*Fungia horrida*	LC	unknown
FUNGIIDAE	*Fungia moluccensis*	LC	unknown
FUNGIIDAE	*Fungia paumotensis*	LC	unknown
FUNGIIDAE	*Fungia repanda*	LC	unknown
FUNGIIDAE	*Fungia scabra*	LC	unknown
FUNGIIDAE	*Fungia scruposa*	LC	unknown
FUNGIIDAE	*Fungia scutaria*	LC	unknown
FUNGIIDAE	*Fungia sinensis*	LC	unknown
FUNGIIDAE	*Fungia somervillei*	LC	unknown
FUNGIIDAE	*Fungia spinifer*	LC	unknown
FUNGIIDAE	*Fungia tenuis*	LC	unknown
FUNGIIDAE	*Fungia vaughani*	LC	unknown
FUNGIIDAE	*Halomitra clavator*	VU	unknown
FUNGIIDAE	*Halomitra pileus*	LC	unknown
FUNGIIDAE	*Heliofungia actiniformis*	VU	unknown

FUNGIIDAE	*Herpolitha limax*	LC	unknown
FUNGIIDAE	*Lithophyllon mokai*	LC	unknown
FUNGIIDAE	*Lithophyllon undulatum*	NT	unknown
FUNGIIDAE	*Podabacia crustacea*	LC	unknown
FUNGIIDAE	*Podabacia motuporensis*	NT	unknown
FUNGIIDAE	*Polyphyllia novaehiberniae*	NT	unknown
FUNGIIDAE	*Polyphyllia talpina*	LC	unknown
FUNGIIDAE	*Sandalolitha dentata*	LC	unknown
FUNGIIDAE	*Sandalolitha robusta*	LC	unknown
FUNGIIDAE	*Zoopilus echinatus*	LC	unknown
HELIOPORIDAE	*Heliopora coerulea*	VU	decreasing
MERULINIDAE	*Boninastrea boninensis*	DD	unknown
MERULINIDAE	*Hydnophora exesa*	NT	unknown
MERULINIDAE	*Hydnophora grandis*	LC	unknown
MERULINIDAE	*Hydnophora microconos*	NT	unknown
MERULINIDAE	*Hydnophora pilosa*	LC	unknown
MERULINIDAE	*Hydnophora rigida*	LC	unknown
MERULINIDAE	*Merulina ampliata*	LC	unknown
MERULINIDAE	*Merulina scabricula*	LC	unknown
MERULINIDAE	*Paraclavarina triangularis*	NT	unknown
MERULINIDAE	*Scapophyllia cylindrica*	LC	unknown
MILLEPORIDAE	*Millepora dichotoma*	LC	stable
MILLEPORIDAE	*Millepora exaesa*	LC	stable
MILLEPORIDAE	*Millepora foveolata*	VU	decreasing
MILLEPORIDAE	*Millepora intricata*	LC	stable
MILLEPORIDAE	*Millepora murrayi*	NT	unknown
MILLEPORIDAE	*Millepora platyphylla*	LC	unknown
MILLEPORIDAE	*Millepora tenera*	LC	unknown
MILLEPORIDAE	*Millepora tuberosa*	EN	decreasing
MUSSIDAE	*Acanthastrea bowerbanki*	VU	unknown
MUSSIDAE	*Acanthastrea brevis*	VU	unknown
MUSSIDAE	*Acanthastrea echinata*	LC	unknown
MUSSIDAE	*Acanthastrea faviaformis*	VU	unknown
MUSSIDAE	*Acanthastrea hemprichii*	VU	unknown

MUSSIDAE	*Acanthastrea hillae*	NT	unknown
MUSSIDAE	*Acanthastrea ishigakiensis*	VU	unknown
MUSSIDAE	*Acanthastrea lordhowensis*	NT	unknown
MUSSIDAE	*Acanthastrea regularis*	VU	unknown
MUSSIDAE	*Acanthastrea rotundoflora*	NT	unknown
MUSSIDAE	*Acanthastrea subechinata*	NT	unknown
MUSSIDAE	*Australomussa rowleyensis*	NT	unknown
MUSSIDAE	*Blastomussa merleti*	LC	unknown
MUSSIDAE	*Blastomussa wellsi*	NT	unknown
MUSSIDAE	*Cynarina lacrymalis*	NT	unknown
MUSSIDAE	*Lobophyllia corymbosa*	LC	unknown
MUSSIDAE	*Lobophyllia dentatus*	VU	unknown
MUSSIDAE	*Lobophyllia diminuta*	VU	unknown
MUSSIDAE	*Lobophyllia flabelliformis*	VU	unknown
MUSSIDAE	*Lobophyllia hataii*	LC	unknown
MUSSIDAE	*Lobophyllia hemprichii*	LC	unknown
MUSSIDAE	*Lobophyllia pachysepta*	NT	unknown
MUSSIDAE	*Lobophyllia robusta*	LC	unknown
MUSSIDAE	*Lobophyllia serratus*	EN	unknown
MUSSIDAE	*Micromussa amakusensis*	NT	unknown
MUSSIDAE	*Micromussa diminuta*	DD	unknown
MUSSIDAE	*Micromussa minuta*	NT	unknown
MUSSIDAE	*Scolymia australis*	LC	unknown
MUSSIDAE	*Scolymia vitiensis*	NT	unknown
MUSSIDAE	*Symphyllia agaricia*	LC	unknown
MUSSIDAE	*Symphyllia hassi*	VU	unknown
MUSSIDAE	*Symphyllia radians*	LC	unknown
MUSSIDAE	*Symphyllia recta*	LC	unknown
MUSSIDAE	*Symphyllia valenciennesii*	LC	unknown
OCULINIDAE	*Galaxea acrhelia*	VU	unknown
OCULINIDAE	*Galaxea astreata*	VU	unknown
OCULINIDAE	*Galaxea fascicularis*	NT	unknown
OCULINIDAE	*Galaxea horrescens*	LC	unknown
OCULINIDAE	*Galaxea longisepta*	NT	unknown

OCULINIDAE	*Galaxea paucisepta*	NT	unknown
OCULINIDAE	*Simplastrea vesicularis*	DD	unknown
PECTINIIDAE	*Echinomorpha nishihirai*	NT	unknown
PECTINIIDAE	*Echinophyllia aspera*	LC	unknown
PECTINIIDAE	*Echinophyllia costata*	VU	unknown
PECTINIIDAE	*Echinophyllia echinata*	LC	unknown
PECTINIIDAE	*Echinophyllia echinoporoides*	LC	unknown
PECTINIIDAE	*Echinophyllia orpheensis*	LC	unknown
PECTINIIDAE	*Echinophyllia patula*	LC	unknown
PECTINIIDAE	*Echinophyllia pectinata*	DD	unknown
PECTINIIDAE	*Mycedium elephantotus*	LC	unknown
PECTINIIDAE	*Mycedium mancaoi*	LC	unknown
PECTINIIDAE	*Mycedium robokaki*	LC	unknown
PECTINIIDAE	*Oxypora crassispinosa*	LC	unknown
PECTINIIDAE	*Oxypora glabra*	LC	unknown
PECTINIIDAE	*Oxypora lacera*	LC	unknown
PECTINIIDAE	*Pectinia alcicornis*	VU	unknown
PECTINIIDAE	*Pectinia ayleni*	NT	unknown
PECTINIIDAE	*Pectinia elongata*	NT	unknown
PECTINIIDAE	*Pectinia lactuca*	VU	unknown
PECTINIIDAE	*Pectinia maxima*	EN	unknown
PECTINIIDAE	*Pectinia paeonia*	NT	unknown
PECTINIIDAE	*Pectinia pygmaeus*	NT	unknown
PECTINIIDAE	*Pectinia teres*	NT	unknown
POCILLOPORIDAE	*Pocillopora ankeli*	VU	unknown
POCILLOPORIDAE	*Pocillopora capitata*	LC	unknown
POCILLOPORIDAE	*Pocillopora damicornis*	LC	unknown
POCILLOPORIDAE	*Pocillopora danae*	VU	unknown
POCILLOPORIDAE	*Pocillopora elegans*	VU	unknown
POCILLOPORIDAE	*Pocillopora eydouxi*	NT	unknown
POCILLOPORIDAE	*Pocillopora kelleheri*	LC	stable
POCILLOPORIDAE	*Pocillopora ligulata*	LC	unknown
POCILLOPORIDAE	*Pocillopora meandrina*	LC	unknown
POCILLOPORIDAE	*Pocillopora setichelli*	LC	unknown

POCILLOPORIDAE	*Pocillopora verrucosa*	LC	unknown
POCILLOPORIDAE	*Pocillopora woodjonesi*	LC	unknown
POCILLOPORIDAE	*Pocillopora zelli*	LC	unknown
POCILLOPORIDAE	*Seriatopora aculeata*	VU	unknown
POCILLOPORIDAE	*Seriatopora caliendrum*	NT	unknown
POCILLOPORIDAE	*Seriatopora dendritica*	VU	unknown
POCILLOPORIDAE	*Seriatopora guttatus*	LC	unknown
POCILLOPORIDAE	*Seriatopora hystrix*	LC	unknown
POCILLOPORIDAE	*Seriatopora stellata*	NT	stable
POCILLOPORIDAE	*Stylophora pistillata*	NT	unknown
POCILLOPORIDAE	*Stylophora subseriata*	LC	unknown
PORITIDAE	*Alveopora allingi*	VU	unknown
PORITIDAE	*Alveopora catalai*	NT	unknown
PORITIDAE	*Alveopora daedalea*	VU	unknown
PORITIDAE	*Alveopora fenestrata*	VU	unknown
PORITIDAE	*Alveopora gigas*	VU	unknown
PORITIDAE	*Alveopora marionensis*	VU	unknown
PORITIDAE	*Alveopora minuta*	EN	unknown
PORITIDAE	*Alveopora ocellata*	DD	unknown
PORITIDAE	*Alveopora spongiosa*	NT	unknown
PORITIDAE	*Alveopora tizardi*	LC	unknown
PORITIDAE	*Alveopora verrilliana*	VU	unknown
PORITIDAE	*Alveopora viridis*	NT	unknown
PORITIDAE	*Goniopora burgosi*	VU	unknown
PORITIDAE	*Goniopora columna*	NT	unknown
PORITIDAE	*Goniopora djiboutiensis*	LC	unknown
PORITIDAE	*Goniopora eclipsensis*	LC	unknown
PORITIDAE	*Goniopora fruticosa*	LC	unknown
PORITIDAE	*Goniopora lobata*	NT	unknown
PORITIDAE	*Goniopora minor*	NT	unknown
PORITIDAE	*Goniopora norfolkensis*	LC	unknown
PORITIDAE	*Goniopora palmensis*	LC	unknown
PORITIDAE	*Goniopora pandoraensis*	LC	unknown
PORITIDAE	*Goniopora pendulus*	LC	unknown

PORITIDAE	*Goniopora planulata*	VU	unknown
PORITIDAE	*Goniopora polyformis*	VU	unknown
PORITIDAE	*Goniopora somaliensis*	LC	unknown
PORITIDAE	*Goniopora stokesi*	NT	unknown
PORITIDAE	*Goniopora stutchburyi*	LC	unknown
PORITIDAE	*Goniopora tenella*	NT	unknown
PORITIDAE	*Goniopora tenuidens*	LC	unknown
PORITIDAE	*Porites annae*	NT	unknown
PORITIDAE	*Porites aranetai*	VU	unknown
PORITIDAE	*Porites arnaudi*	LC	unknown
PORITIDAE	*Porites attenuata*	VU	unknown
PORITIDAE	*Porites australiensis*	LC	unknown
PORITIDAE	*Porites bernardi*	LC	unknown
PORITIDAE	*Porites cumulatus*	VU	unknown
PORITIDAE	*Porites cylindrica*	NT	unknown
PORITIDAE	*Porites deformis*	NT	unknown
PORITIDAE	*Porites densa*	NT	unknown
PORITIDAE	*Porites eridani*	EN	unknown
PORITIDAE	*Porites evermanni*	DD	unknown
PORITIDAE	*Porites flavus*	DD	unknown
PORITIDAE	*Porites heronensis*	LC	unknown
PORITIDAE	*Porites horizontalata*	VU	unknown
PORITIDAE	*Porites latistella*	LC	unknown
PORITIDAE	*Porites lichen*	LC	unknown
PORITIDAE	*Porites lobata*	NT	unknown
PORITIDAE	*Porites lutea*	LC	unknown
PORITIDAE	*Porites mayeri*	LC	unknown
PORITIDAE	*Porites monticulosa*	LC	unknown
PORITIDAE	*Porites murrayensis*	NT	unknown
PORITIDAE	*Porites myrmidonensis*	LC	unknown
PORITIDAE	*Porites napopora*	VU	unknown
PORITIDAE	*Porites negrosensis*	NT	unknown
PORITIDAE	*Porites nigrescens*	VU	unknown
PORITIDAE	*Porites profundus*	LC	unknown

PORITIDAE	*Porites rugosa*	VU	unknown
PORITIDAE	*Porites rus*	LC	unknown
PORITIDAE	*Porites sillimaniana*	VU	unknown
PORITIDAE	*Porites solida*	LC	unknown
PORITIDAE	*Porites stephensoni*	NT	unknown
PORITIDAE	*Porites studeri*	LC	unknown
PORITIDAE	*Porites tuberculosa*	VU	unknown
PORITIDAE	*Porites vaughani*	LC	unknown
PORITIDAE	*Stylaraea punctata*	DD	unknown
SIDERASTREIDAE	*Coscinaraea columna*	LC	unknown
SIDERASTREIDAE	*Coscinaraea crassa*	NT	unknown
SIDERASTREIDAE	*Coscinaraea exesa*	LC	stable
SIDERASTREIDAE	*Coscinaraea monile*	LC	unknown
SIDERASTREIDAE	*Coscinaraea wellsi*	LC	unknown
SIDERASTREIDAE	*Psammocora contigua*	NT	unknown
SIDERASTREIDAE	*Psammocora digitata*	NT	unknown
SIDERASTREIDAE	*Psammocora explanulata*	LC	unknown
SIDERASTREIDAE	*Psammocora haimeana*	LC	unknown
SIDERASTREIDAE	*Psammocora nierstraszi*	LC	stable
SIDERASTREIDAE	*Psammocora obtusangula*	NT	unknown
SIDERASTREIDAE	*Psammocora profundacella*	LC	unknown
SIDERASTREIDAE	*Psammocora stellata*	VU	unknown
SIDERASTREIDAE	*Psammocora superficialis*	LC	unknown
SIDERASTREIDAE	*Psammocora vaughani*	NT	unknown
SIDERASTREIDAE	*Pseudosiderastrea tayami*	NT	unknown
SIDERASTREIDAE	*Siderastrea savignyana*	LC	unknown
TRACHYPHYLLIIDAE	*Trachyphyllia geoffroyi*	NT	decreasing
TUBIPORIDAE	*Tubipora musica*	NT	unknown

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