Tridacna maxima Röding, 1798

FAMILY: Tridacnidae

COMMON NAMES: Maxima Clam; Small Giant Clam (English)

GLOBAL CONSERVATION STATUS: Listed as Lower Risk/Conservation Dependent in the *2004 IUCN Red List of Threatened Species* (IUCN, 2004).

SIGNIFICANT TRADE REVIEW FOR: Australia, Comoros, Egypt, Fiji, French Polynesia (France), India, Japan, Kenya, Kiribati, Madagascar, Malaysia, Marshall Islands, Mauritius, Mayotte (France), Micronesia, Mozambique, Myanmar, New Caledonia (France), Niue, Palau, Papua New Guinea, Pitcairn Islands (United Kingdom), Réunion (France), Saudi Arabia, Somalia, Sri Lanka, Tonga, United Republic of Tanzania, Vanuatu, Viet Nam, Wallis and Futuna Islands (France)

Range States selected for review

Range State	Exports* (1994-2003)	Urgent, possible or least concern	Comments
Australia	5,386 live captive	Least concern	Trade almost entirely in captive-bred specimens.
Comoros	None	Least concern	No trade reported
Egypt	Minimal trade since 1999	Least concern	Minimal trade since 1999
Federated States of Micronesia	18,679 live wild	Possible concern	Population declines in heavily fished areas; high exports from wild sources mainly for aquarium trade; domestic use levels unknown; confusion over commercial trade regulations/ban.
Fiji	ca 28,000 live wild	Possible concern	Significant trade in will specimens (though none recorded since 2002); domestic use levels unknown; status unknown; no population monitoring or basis for non-detriment findings available.
French Polynesia	Low trade	Least concern	Minimal trade
India	None	Least concern	No trade reported
Japan	None	Least concern	No trade reported
Kenya	None	Least concern	No trade reported
Kiribati	Minimal trade	Least concern	Minimal trade
Madagascar	15,833 shells wild, 4,343 live wild	Possible concern	Consistently exported large numbers from wild sources; no population monitoring or basis for ensuring non-detrimental nature of exports available
Malaysia	Minimal trade	Least concern	Minimal trade
Marshall Islands	18,445 live wild, 39,951 live captive	Possible concern	Ban on commercial harvest; considerable trade reported as imports.
Mauritius	None	Least concern	No trade reported
Mayotte	None	Least concern	No trade reported
Mozambique	167,540 kg wild shells, 60,860	Least concern	Consistently high trade level until 2001, after which exports ceased. Situation should be re-reviewed if trade resumes.
Myanmar	None	Least concern	No trade reported
New Caledonia	7,426 wild shells	Possible concern	Shells by-product of considerable domestic market for meat; status of stock unknown; no population monitoring or basis for ensuring non-detrimental nature of exports available.
Niue	None	Least concern	No trade reported
Palau	Minimal trade	Least concern	Minimal trade
Papua New Guinea	31,000 kg farmed meat	Least concern	No exports recorded since 2000 when ban on exports reinstated; unreported trade believed to be occurring
Pitcairn	Minimal trade	Least concern	Minimal trade
Réunion	Minimal trade	Least concern	Minimal trade

Range State	Exports* (1994-2003)	Urgent, possible or least concern	Comments
Saudi Arabia	Minimal trade	Least concern	Minimal trade
Somalia	Minimal trade	Least concern	Minimal trade
Sri Lanka	None	Least concern	No trade reported
Tonga	33,688 live wild, 13,113 live captive	Urgent concern	Population overfished in areas; trade in large volumes of wild specimens reported as imports every year 1997-2003, despite apparent trade ban on wild exports
United Republic of Tanzania	Minimal trade	Least concern	Minimal trade
Vanuatu	19,672 live wild	Possible concern	Export ban since 2001 substantial exports continue to be recorded by Vanuatu:
Viet Nam	44,530 live wild	Possible concern	Consistently traded in significant quantities from wild sources; exports declined in 2003; no information on population monitoring or basis for ensuring non-detrimental nature of exports was available
Wallis and Futuna Islands	None	Least concern	No trade reported

*Excluding re-exports.

SUMMARY

Tridacna maxima, the Small Giant Clam, is along with *T. squamosa*, the most widespread giant clam, occurring from the Red Sea and East African coast across the Indo-Pacific to the Pitcairn Islands in the eastern Pacific. It is considered still reasonably abundant in some range States and is globally classified by IUCN as Lower Risk/Conservation Dependent (IUCN, 2004).

The Animals Committee selected 31 countries and territories for the review of significant trade. No trade was recorded from 10 of these for the period under review (Comoros, India, Japan, Kenya, Mauritius, Mayotte, Myanmar, Niue, Sri Lanka, Wallis and Futuna Islands), and they were therefore categorized as of Least Concern and excluded from more detailed analysis. Of the remaining 21, recorded trade in the species during at least the last five years of the period under review was at a low level in ten (Egypt, French Polynesia, Kiribati, Malaysia, Palau, Pitcairn, Réunion, Saudi Arabia, Somalia, United Republic of Tanzania). These were also categorized as of Least Concern. Substantial exports were reported from the remaining 11: Australia, Fiji, the Federated States of Micronesia, Madagascar, the Marshall Islands, Mozambique, New Caledonia, Papua New Guinea, Tonga, Vanuatu and Viet Nam. These were subject to a more detailed review.

Australia has traded almost totally in captive-bred specimens over the period so trade from this country is considered of Least Concern.

Trade in *T. maxima* is considered to be of Possible Concern for the Federated States of Micronesia. There are relatively high levels of exports of *T. maxima*, reported from both wild as well as captive-bred sources, and inconsistencies between national regulations of the Federated States of Micronesia, i.e. prohibition to export giant clams collected in the wild.

Reported trade from Fiji in wild-collected specimens remained substantial until 2002. Reported trade in 2003 is limited to farmed specimens. Trade in the species is considered to be of Possible Concern from Fiji pending further information concerning current trade controls for wild specimens.

Madagascar has consistently exported large numbers of wild-sourced specimens over the review period. In the absence of any detailed information it is unclear whether non-detriment findings have been made, therefore trade in this species is considered to be of Possible Concern.

Trade in *T. maxima* is of Possible Concern in the Marshall Islands. While the trade in captive- bred specimens may be consistent with the species being bred in mariculture in the Marshall Islands no information was available on this occurring. Five years of trade in wild-sourced specimens appears inconsistent with a ban on commercial harvest. In the absence of information on population monitoring or recent stock status information it is difficult to judge if trade is detrimental to the survival of the species.

Large amounts of *T. maxima* have been recorded as exported from Mozambique, although none in the last two years of the period under analysis, with the result that trade is at present considered of Least Concern. No information was available on the basis for non-detriment findings; the situation should be re-reviewed should the trade in *T. maxima* from Mozambique resume.

Recorded exports of *T. maxima* from New Caledonia are higher than those of other *Tridacna* species. Given high local demand for giant clam products and absence of available information on the status of *T. maxima,* it is difficult to judge whether adequate information is available to ensure that exports of the species from New Caledonia are sustainable, and therefore trade is of Possible Concern.

The ban on exports from Papua New Guinea imposed in 2000 appears to have been successful in stemming trade in *T. maxima*. There have been no recorded exports since 2000 and the trade in this species is therefore considered of Least Concern.

Although Tonga (a non-Party) adopted, in 1993, a ban on export of giant clams unless they are from farmed sources, imports from Tonga reported as from wild sources continue. Trade in large volumes of specimens reported as taken from the wild were reported every year from 1997 to 2003, as were significant quantities of specimens reported at the generic level. For these reasons and Tonga reporting exports at generic levels and with inconsistent units, an Urgent Concern category is considered to apply for the trade from Tonga.

Substantial trade in *T. maxima* from Vanuatu declared as wild-collected has been reported, despite an apparent export ban since 2001. In the absence of population information and basis for ensuring non-detrimental nature of exports available, trade is of Possible Concern.

Viet Nam has consistently traded in significant quantities of wild-sourced *T. maxima*. No information was available on the basis of non-detriment findings, with export of the species from Viet Nam is considered of Possible Concern.

Ongoing trade in giant clam species recorded to the family level hinders accurate analysis of the impact of trade on specific species.

SPECIES CHARACTERISTICS

T. maxima has one of the largest range of all giant clams, occurring in 45 countries extending from the Red Sea and East African coast across the Indo-Pacific to the Pitcairn Islands. Globally, IUCN (2004) classifies the conservation status of *T. maxima* as Lower Risk/Conservation Dependent. *T. gigas* reaches a maximum shell size of 40 cm (Table 1). They reach maturity at age two when they are approximately four cm in size.

Table 1: Maximum shell length observed and size and age at first year of sexual maturity

Species	**Maximum Shell length**	**First year of sexual maturity**				**Remarks**
			Male	**Hermaphrodite**		
		Age (y.)	**Size (cm)**	**Age (y.)**	**Size (cm)**	
T. maxima	35-40	2	3.5	2	4.5	Sometimes embedded in corals; widespread species (distribution from the Red Sea to French Polynesia); cultured for aquarium trade

(Source: Raymakers *et al*., 2003)

INTERNATIONAL TRADE

Over the period 1994-2003, exports of *Tridacna maxima* were recorded from 31 countries and territories. These included 17 of the 31 countries and territories selected for inclusion in the present review. No trade was reported from ten of these for the period under review (Comoros, India, Japan, Kenya, Mauritius, Mayotte, Myanmar, Nuie, Sri Lanka, Wallis and Futuna Islands), and they were therefore categorized as of Least Concern and excluded from more detailed analysis. Of the remaining 21, recorded trade in the species during at least the last five years of the period under review was at a low level in ten (Egypt, French Polynesia, Kiribati, Malaysia, Palau, Pitcairn, Réunion, Saudi Arabia,

Somalia, United Republic of Tanzania). These were also categorized as of Least Concern. Analysis thus focused on Australia, Fiji, the Federated States of Micronesia, French Polynesia, Kiribati, Madagascar, the Marshall Islands, Mozambique, New Caledonia, Papua New Guinea, Tonga, Vanuatu and Viet Nam in the analysis. In addition, notable imports of *T. maxima* from the Solomon Islands (not a Party to CITES) were recorded by importing Parties.

Table 2: Exports excluding re-exports of *T. maxima* by significant trading range States 1994-2003

Term	Unit	Source	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Australia													
Live		C	1000	100	200							4086	5386
Shells		C			30								30
Live		W			34							270	304
Shells		W	91			1	5						97
Specimens		W	50										50
Egypt													
Live		C					80						80
Live		W	520	1311	1517	992	1928	905					7173
Shells		W		50									50
Fiji													
Live		C			8	731	1285	3910	1145	946	68		8093
Shells		C							300				300
Live		F									52	302	354
Shells		F									300		300
Live		W	55		35	5585	5486	4988	5069	5168	1558		27944
Live	kg	W				211	165			117			493
Shells		W					215			775			990
Shells	kg	W				26							26
Federated States of Micronesia													
Live		C						806	339	564	1981	101	3791
Live		F										817	817
Live		W					465	2996	5876	3641	3608	2093	18679
Kiribati													
Live		C									400		400
Live		F										600	600
Live		W										200	200
Madagascar													
Live		W					4283			60			4343
Shells		W			4375			2500	2500	3491		2967	15833
Marshall Islands													
Live		C	2702	925			579	2863	5069	5727	11472	10614	39951
Shells		C						268					268
Live		F										4828	4828
Live		R							218	471	399		1088
Carvings		W								126			126
Live		W	571	580	25		770	5129	2281	3380	5409	300	18445
Shells		W								37	163		200
Mozambique													
Shells		W				6260	27000	16600		11000			60860
Shells	kg	W		10000		64000	25500	25040	21000	22000			167540
New Caledonia													
Shells		W					1991	855	1108	1200	1217	1055	7426
French Polynesia													
Shells		W				20				3		605	628

Term	Unit	Source	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Papua New Guinea													
Meat	kg	F				22000	4000	5000					31000
Shells		F				210							210
Shells		W				9			4				13
Solomon Islands													
Live		C		134	345	1630	574	750	537	314	789	119	5192
Shells		C							21				21
Live		F								350	37	202	589
Live		W	1588	3809	4420	2962	1662	541	453	162	721	2	16320
Shells		W				18							18
Tonga													
Live		C				351	2313	1769	1860	3131	2686	1003	13113
Live	kg	C							49	380		11	440
Shells		C										300	300
Live		F									30	720	750
Live		R						100		400			500
Live		W				2276	9021	5901	4955	4621	5572	1342	33688
Live	kg	W				62		264	276	399	100		1101
Shells		W				2			4				6
Shells	kg	W						25		500			525
Viet Nam													
Live		C										88	88
Live		W				310	5240	9000	9250	8250	7700	4780	44530
Shells	kg	W							1000				1000
Vanuatu													
Live		C									110	625	735
Live		F										586	586
Live		W				20	800	525	6641	2798	5079	3809	19672
Live	kg	W							10			100	110
Shells		W	4			45	22	6	140		200	30	447

(Source: CITES trade statistics derived from the *CITES Trade Database*, UNEP World Conservation Monitoring Centre, Cambridge, UK)

COUNTRY ACCOUNTS

Australia

Status:

Widespread and abundant (Braley, 1988 and 1993).

Management and trade

There were no exports of *T. maxima* between 1999 and 2002. In 2003, 4,086 captive-bred and 270 wild-sourced live specimens were exported.

The giant clam trade is regulated by the Australian Management Authority under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In cases of exports where the trade is for commercial purposes, a permit may only be issued if the specimens are sourced from a captive breeding program or an approved harvesting or ranching operation (Management Authority of Australia *litt*., 2005). Captive breeding programmes are approved on the basis that the parental stock was established in a way that is not detrimental to the survival of the species in the wild and is managed in a way that ensures its long-term genetic viability. Two operations have been approved to breed *T. maxima* There are no wild-harvest or ranching operations approved for Tridacnidae species. No information was available on

population monitoring, but it is likely that this species is included in coral reef monitoring activities undertaken on the Great Barrier Reef.

With trade limited largely to captive-bred specimens, trade from Australia of *T. maxima* is considered of Least Concern.

Federated States of Micronesia *(not a Party to CITES)*

Status:

The most common giant clam species, but has declined in areas of heavy fishing (Wells, 1997; Lindsay *et al*., 2004); more recently it has been reported that local wild populations of all species of giant clam have been over-exploited in this country (CITES Management Authority Federated States of Micronesia, 2002).

Management and Trade:

Since the Federated States of Micronesia is not a Party to CITES, all reported trade is based on records from importing Parties only. Most reported trade in *T. maxima* from FSM over the five years 1998-2003 has been in live specimens, both from the wild and captive-bred. Live specimens are sold for the aquarium trade (CITES Management Authority Federated States of Micronesia, 2002). Wild-sourced exports occurred each year, peaking at just under 6,000 in 2000 and falling to ca 2,000 in 2003. Captive-bred specimens were also exported between 1991 and 2003, with the highest level recorded (ca 2,000) in 2002. In 2003, exports of (F) generation (817) were recorded for the first time.

Giant clams are collected for food subsistence purposes and *T. maxima* is the main species harvested. According to the FSM Department of Economic Affairs, giant clam meat is sold in local restaurants and shells are sold to tourists as souvenirs and curios on the domestic market. Shells are also used for jewellery (CITES Management Authority Federated States of Micronesia, 2002).

Subsistence harvesting of clams is permitted. The Yap State Code**,** Title 18, Section 1006, Protection of Clams prohibits the commercial sale of giant clam meat and violations can lead to a maximum fine of US$500 or 60 days imprisonment. The code authorises the Governor to declare a harvesting season and set a size limit, but in the early 1990s, no season had been established and this law was not enforced (Smith, 1992). Raymakers *et al*. (2003) also state that there are no limitations in place regarding fishing seasons, types of fishing gear utilised, harvest quotas and size limits for Tridacnidae species, and that poaching is a problem. The FSM Department of Economic Affairs, National Government and State Marine Resource Management Departments are responsible for enforcement. Under the Resource Conservation Law (FSM Code Title 23), giant clams taken from the wild may not be exported. The FSM Department of Economic Affairs has stated that this law is outdated and that a new text should be adopted to amend the current one and comply with CITES requirements. Specific laws are being designed for each state under current decentralisation (Lindsay *et al*., 2004).

The FSM Department of Economic Affairs collects information on population abundance and stock assessment of Tridacnidae (CITES Management Authority Federated States of Micronesia, 2002).

Mariculture: There are two government operated and owned hatcheries, both culturing *T. maxima* specifically for the aquarium trade: the National Aquaculture Centre in Kosrae (which was not originally intended to be a commercial operation) (Anon., 1992; CITES Management Authority Federated States of Micronesia, 2002) and a hatchery in Pohnpei also produces giant clam seeds (Ellis 1999; Lindsay *et al*., 2004). There are several government-established sanctuaries, such as the Utwe Walung Sanctuary in Kosrae State, as well as other sanctuaries around the reefs of Yap State, Pohnpei State and Chuuk State.

Relatively high levels of imports of *T. maxima* are reported from both wild and captive-bred sources, which is inconsistent with the reported ban on export of giant clams from the wild. Given evidence of declines owing to overexploitation, clarification should be sought on current export controls and trade in this species is of Possible Concern.

Fiji (CITES Party since 1997)

Status:

Overfished, especially near population centres (Lewis *et al.,* 1988).

Management and trade:

Although Fiji provided export data for giant clams in their CITES annual reports beginning in 1998, these have not been incorporated into the CITES trade database by UNEP-WCMC as there are questions concerning the data. Queries have been sent to Fiji's CITES Management Authority, and the data will be incorporated into the database once the questions have been resolved (Caldwell *in litt*., 2006). Information below on CITES-reported trade is therefore based solely on data from CITES Parties reporting imports from Fiji. The ability of CITES data to support assessment of the potential impacts of recent trade levels on wild populations is hindered further by the failure to report some imports to the species level. Significant quantities of giant clams have been reported simply as "Tridacnidae spp." precluding accurate analysis of the impact of trade on specific species.

Reported imports of *T.maxima* from Fiji are predominantly live, wild-sourced specimens. Exports from captive-bred sources (C and F) occurred between 1996 and 2003 with the highest amount being 3,910 (C) in 1999. Live exports from the wild were at an annual level of around 5,000 between 1997 and 2002. In 2003 the only recorded exports of *T. maxima* were 310 of farmed product. In 1999, 6,620 live specimens of giant clam, and in 2002, 1,413 shells, were imported from Fiji as *Tridacnidae* spp.; it is not known how many of these were *T. maxima*.

There was no information available on the domestic market for, or level of collection of, *T. maxima* specifically, but this species is known to be used in Fiji along with other giant clam species. Clams are collected for subsistence purposes and considered as 'high status food' for use on special occasions or as a reserve food when times are difficult. In the 1980s, giant clam meat was sold in municipal markets and directly to restaurants, supermarkets and other outlets, and was considered to be expensive relative to other seafood products (Wells, 1997). In 2003, clam meat from wild stocks was being sold in markets (Raymakers *et al*., 2004) and in 2004 clam meat was still served in at least one restaurant (Parry-Jones, *in litt*., 2006).

There is no regulation of domestic harvest of giant clams, although exploitation guidelines were drawn up by the Fisheries Division in 1984 (Wells, 1997). Available information indicates that domestic use and sale is also unregulated. Export of wild giant clam meat was banned in 1988 under the Fisheries Act (Cap. 1.58) of 1942, amended in 1992. The Act includes a clause allowing the Permanent Secretary responsible for fisheries to make exceptions for meat from verified mariculture sources. It is therefore possible that the classification of 'wild' in trade data may refer to clams from hatcheries that are placed on the reefs to grow out (Parry-Jones, *in litt*., 2006). It is not clear whether the export ban also applies to the export of live specimens. No information was available with regard to population monitoring.

Mariculture: The Makogai Hatchery is the only facility producing giant clams at present for both restocking and for the aquarium trade including *T. maxima*. There are small village grow-out operations (Gervis, 1995; Lindsay *et al.,* 2004; Wells, 1997). Records of trade in wild rather than captive-bred specimens may be a result of misreporting by importing Parties.

Although the reported trade has dropped from around 5000 wild specimens a year between 1997 and 2001 to 310 farmed specimens in 2003, the total trade over the period 1994 –2003 has been significant. Without information on the status of stocks and harvest levels for domestic consumption, it is not possible to assess whether or not current export levels are detrimental to the species' survival in Fiji. Trade from Fiji of *T. maxima* has been therefore been categorized as of Possible Concern.

Madagascar

Status:

Occurs naturally (Wells, 1997).

Management and Trade:

All of Madagascar's reported exports of *T. maxima* between 1994 and 2003 were wild-sourced. Trade in live product was restricted largely to 1998 when just over 4,000 were recorded as exported. Exports of shells were between 2500 and 4,500 a year from 1995 to 2003. No information was obtained on domestic use of the species.

Listed as a "Species of Wild Fauna Requiring Special Protection" under the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region; Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region". No further information was obtained on legislation, management interventions or population monitoring.

Given the consistent export of large numbers of wild *T. maxima* from Madagascar, trade in *T. maxima* from this country is of Possible Concern.

Marshall Islands (Not a Party to CITES)

Status:

The most common tridacnid species (Munro, 1989) but populations are considerably reduced especially near urban areas (Lindsay *et al*., 2004).

Management and Trade:

Since the Marshall Islands is not a CITES Party, all reported trade is based on records from importing Parties only. *T. maxima* is one of the main species of giant clam traded. Exports of *T. maxima* comprise largely live specimens from wild, captive-bred and farmed sources. Exports of live, wild product were between 3,500 and 5,500 specimens a year between 1998 and 2002, but fell to 300 specimens in 2003. Exports of captive breed and farmed product have been growing, reaching a total of around 14,000 in 2003.

Giant clams are collected for subsistence purposes as food in the Marshall Islands (Hart *et al.*, 1998; Raymakers *et al.,* 2003), and the meat is also used to fertilise breadfruit trees.

Raymaker *et al*. (2003) report that commercial harvest is prohibited. Poaching was known to be taking place in the 1980s (Munro, 1989).

No information was available on population monitoring.

Mariculture: There are two government owned and operated hatcheries (on Likiep and Arno Atolls) currently producing giant clams, including *T. maxima* for the aquarium trade and for re-seeding depleted areas (Lindsay *et al*., 2004; Wells, 1997).

Despite a reported ban on commercial harvest, considerable trade has been reported in wild-sourced specimens. However, records of trade in wild rather than captive-bred specimens may be a result of misreporting by importing Parties. Nevertheless in the absence of information on population monitoring and stock status, it is not possible to assess whether or not current export levels are detrimental to the species' survival in the Marshall Islands. Trade from the Marshall Islands of *T. maxima* has therefore been categorized as of Possible Concern.

Mozambique

Status:

Occurs naturally (Wells, 1997).

Management and trade:

Mozambique exported large amounts of wild-sourced *T. maxima* shells between 1995 and 2001 with exports of 21- 64 tonnes a year together with up to 27,000 specimens in each year, virtually of which were destined for the European Union. It is not possible to convert weight to number of shells without information on the size of the shells which makes more detailed analysis difficult. There were no recorded exports in 2002 or 2003.

Shell collection in Mozambique is regarded as being a subsistence activity, and no permits are required. Trade is regulated by the Ministry of Commerce, which issues licences for sale and export. CITES is implemented by the National Directorate of Forests and Wildlife (DNFFB), which issues all CITES permits and certificates. According to Marshall *et al.* (2001), CITES annual report data for exports from Mozambique may be based on permits issued rather than actual exports, which could explain the relatively lower imports reported from this country. *T. maxima* is listed as a "Species of Wild Fauna Requiring Special Protection" under the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region; Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region.

In Bazaruto National Park, efforts have been made to prohibit shell collection of *Tridacna maxima* and *T. squamosa* (DNFFB, 1995).

As no trade in *T. maxima* from Mozambique has been reported since 2001, trade is currently of Least Concern. However, given the lack of information on stock status and management, and the high level of exports in previous years, trade in *T. maxima* from Mozambique in previous years, further clarification should be sought if trade resumes.

New Caledonia (France)

Status:

Occurs naturally (Wells, 1997).

Management and status

T. maxima is one of the main giant clam species traded from New Caledonia. Nearly all exports are in the form of shells collected from the wild. Export of wild-sourced shells averaged around 1,200 a year between 1998 and 2003. New Caledonian authorities have advised that these shells are effectively a byproduct of domestic harvest of clams for meat consumption (Constantin *in litt*., 2004).

Giant clams are traditionally fished for meat in New Caledonia. Domestic markets for clam meat are poorly documented and difficult to separate from subsistence use. Quantities sold locally (i.e. excluding subsistence consumption) are estimated at two to three tonnes per year. Many restaurants have giant clam meat on their menu. There seems to be no local demand for live specimens of giant clams or export of these for the aquarium markets (Baillon *et al*., 2002).

Information on legislation relevant to giant clams is incomplete. Non-commercial fisheries are not regulated in the *Province des Iles,* although the customary Kanak tenure system may have some relevance. It is understood that giant clams may only be collected by free divers without any underwater air supply device, e.g. scuba and hookah, and only for personal consumption (e.g. sport, leisure). Harvest and trade of giant clams are also regulated through the national licensing and reporting system (Raymakers *et al.,* 2003). In the Northern Province, giant clams are on the list of protected fauna under *Délibération N°23 & N°85-2001/BPN,* but under Article 2 of this regulation, fishing for giant clam species is allowed with an easily acquired "hunting" permit. In 2002 draft legislation was under consideration in the South Province to restrict harvest to licensed professional fishermen and thereby prohibit harvest by non-professionals. It is understood that similar provisions are being drafted for the Northern Province. "Commercial" export of shells is not permitted, but personal exports of up to six valves per family is permitted. In 2003 the maximum size of exportable shells was set at 25 cm to provide some protection for breeding adults (Raymakers *et al*., 2003).

Very little scientific research has been carried-out on wild populations, with baseline information on which to base management plans and information on population monitoring lacking. The preliminary results of a study conducted in the Northern Province to evaluate clam resources do not yet provide insight on the abundance of the resource but indicate that less than 5% of fishers target clams (Raymakers *et al*., 2003). Knowledge of abundance and recruitment does not provide sufficient basis to set-up adequate management measures or ensure that exports are non-detrimental, as required under CITES (Raymakers *et al*., 2003).

Mariculture: Experiments on artificial breeding of giant clams were conducted by IFREMER (Institut français de recherche pour l'exploitation de la mer) in New Caledonia from 1993 to 1999 and were successful for *T. maxima.*

Given significant trade and in the absence of information on wild populations, trade in *T. maxima* from New Caledonia is of Possible Concern**.**

Papua New Guinea

Status:

Occurs naturally (Wells, 1997), but populations are declining; for example the population in Milne Bay was estimated to be at a low density, thought to reflect previous unsustainable practices from commercial use, poaching and subsistence harvesting (Kinch, 2002).

Management and trade:

During the review period, exports of meat from specimens born in captivity (F) were recorded between 1997 and 2000, the largest amount being 22,000 kg in 1997; however there are no known breeding facilities in Papua New Guinea. There were also very small quantities of shells (F and wild) exported. There have been no recorded exports since 2000. There have been anecdotal reports of substantial amounts of clam (species not known) being caught in PNG waters, transferred by land across the border to West Papua (former Irian Jaya, Indonesia) and sold on Indonesian markets and hence not appearing in trade statistics.

Giant clams are harvested in Papua New Guinea for subsistence purposes (Munro, 1989). The number of fishermen involved is unknown, but the main domestic use is for meat. A representative of the PNG National Fisheries Authority stated that it was difficult to estimate the annual harvest of giant clams as well as their export (CITES Management Authority Papua New Guinea, 2002).

Export of wild giant clam products was banned between 1988 and 1994; the ban was reinstated in 2000 and is believed to still be in place. Fishing for subsistence purposes by villagers is allowed (Kinch, 2002).

No information was available regarding population abundance and/or stock assessments.

The ban on exports imposed in 2000 appears to have been successful in stemming trade in *T. maxima*. There have been no recorded exports since 2000 and therefore trade is of Least Concern.

Tonga (Not a Party to CITES)

Status:

Most abundant tridacnid species; overfished, especially near population centres (Langi and 'Aloua, 1988; McKoy, 1980; Munro 1989). Late 1980s surveys by Langi and 'Aloua (1988) found many sites with lower abundance than in 1978-79 surveys (McKoy, 1980).

Management and trade:

Since Tonga is not a CITES Party, all reported trade is based on records from importing Parties only. Significant quantities of giant clams imported from Tonga have been reported simply as "Tridacnidae spp." precluding accurate analysis of the impact of trade on specific species. In addition, the majority of

trade in meat, which is typically reported by weight, was reported without any units attached - between 1999 and 2003, imports from Tonga of "Tridacnidae" meat were between 4,500 and 8,000 annually. It must therefore be assumed that this represents the number of specimens rather than the total weight of the shipments.

Reported imports over the period from Tonga of *T. maxima* were from captive-bred, ranched and wild sources, and were predominantly live with intermittent exports of shells. Both live and shell product is variously reported in kg and numbers of specimens. Reported imports of live wild product from Tonga peaked at 9,021 specimens in 1998 but were consistently around 5,000 between 1999 and 2002 before falling to 1,342 in 2003. Reported imports of captive-bred product increased from 1997 peaking at 3,131 in 2001, and declined to 1,003 specimens in 2003.

Substantial imports of "Tridacnidae" meat have been seized in New Zealand, primarily items carried as personal effects from Tonga by people visiting relatives. It is not known whether this includes specimens of *T. maxima*.

In Tonga, giant clams are harvested for domestic use, the shell is used for decorative purposes and specimens are also exported live for the aquarium trade. A representative of the Ministry of Fisheries estimated that 20-50 fishermen were engaged in giant clam harvesting for domestic use (Raymakers *et al.,* 2003), but local demand for clam meat as a food source is relatively limited (Tacconi and Tisdell, 1992). *T. maxima* is harvested predominantly for meat and shell.

Tridacnidae were protected under the Fisheries Act 1989 because of concern about over-fishing (Anon., 199l). More specific legislation covering harvest and sale of, as well as domestic/international trade in, Tridacnidae products is the Fisheries (Conservation and Management) Regulation, 1993, which came into force in 1994. Harvesting of wild giant clams for commercial export is banned, but local consumption and the souvenir trade is permitted. Clams produced on farms may be exported. There are limitations regarding the types of fishing gear used for some species but not for *T. maxima,* but there is a size limit of 155 mm for this species (Lindsay *et al.,* 2004). There are no harvest and/or export quotas for Tridacnidae. Enforcement is the responsibility of the Ministry of Fisheries which does not consider poaching to be a problem, although there are indications that measures should be strengthened.

Protected areas in Ha'atafu, Pangaimotu, Hakautapu and Malinoa, and other sanctuary areas have been established since 1988, and provide suitable habitat for Tridacnidae species but poaching has been reported (Chesher, 1993).

Wild Tridacnidae populations are not currently monitored.

Mariculture: Three species of giant clam, including *T. maxima*, are cultured for both community-based farming and for the international aquarium trade. The juvenile giant clams are first generation specimens (i.e. 'F') born in a State-owned hatchery run for a conservation programme that is being carried-out to restock Tongan waters (CITES Management Authority Tonga, 2002). The Ministry of Fisheries has stated that:

1. There is a giant clam sanctuary: Some large clams were collected and placed in a protected area in the hope that it will increase the chance of natural reproduction.

2. Artificial seed production of giant clam ("ranching"): juvenile clams are protected by coastal village communities until they reach marketable size. Some of these clams are already 10 years old and are sexually mature. Some communities are using these as an attraction for tourists.

Reported imports of specimens declared as being of wild origin continue despite the 1993 ban on exports of wild stocks, and large volumes were reported for each year from 1997-2003. No information was available on non-detriment findings, therefore trade from Tonga in *T. maxima* has been categorized as Urgent Concern.

Vanuatu

Status:

Common; stocks secure (Munro, 1989; Zann and Ayling, 1990). No recent population information was identified.

Management and Trade:

Substantial quantities of *T. maxima* have been recorded as exported from Vanuatu in the period concerned, virtually all from 2000 onwards, in live animals declared as wild-collected.

Giant clams are prized subsistence foods for the local Ni-Vanuatu population (Zann and Ayling, 1988). This is still true today, with clams eaten and shell sold on.

An export ban on giant clams was declared in 2001, but harvest for domestic use is legal still occurs. A protected area has been created for giant clams around the island of Efate and its offshore islands, which have been closed to giant clam fishing since 2000.

There is no information on population monitoring.

Mariculture: Giant clam breeding started in the late 1990s (Adams *et al*., 2001) with the aim of enhancing depleted stocks of some species (Zann and Ayling, 1988; Lindsay *et al.,* 2004). It is not known if *T. maxima* is part of this initiative.

Owing to the persistence of substantial trade in *T. maxima* from Vanuatu declared as wild-collected, despite an apparent export ban since 2001 and no information on non-detriment findings trade in the species is categorised as of Possible Concern.

Viet Nam

Status:

Probably occurs (Wells, 1997).

Management and trade:

Viet Nam has exported significant quantities of live, wild-sourced specimens of *T. maxima* annually since 1998. These exports peaked at 9,000 specimens in 1999 and but had declined to 4,780 by 2003.

No information was available on legislation, management activities or population monitoring.

Mariculture: no information available.

Viet Nam has consistently traded in significant quantities of wild-sourced *T. maxim. G*iven the lack of information on stocks and management activities, it is difficult to judge if export will be detrimental to the survival of the species. Trade in *T. maxima* from Viet Nam is therefore categorized as of Possible Concern.

PROBLEMS IDENTIFIED THAT ARE NOT RELATED TO THE IMPLEMENTATION OF ARTICLE IV, PARAS 2(a), 3, or 6(a)

As noted above, the ongoing reporting of trade in giant clam species to the genus (e.g. *Tridacna*) or family level (Tridacnidae spp.) (see Annex) prevents a full assessment of trade levels, and therefore of the potential impact of international trade on wild populations. However, it is important to note that the quality of reporting by some countries has improved significantly, e.g. Indonesia, Viet Nam and Philippines. Reporting of trade from Cook Islands, Fiji, French Polynesia, Tonga, Vanuatu, Samoa and Solomon Islands continues to contain significant information only at the genus or higher level, often in conjunction with reporting by importing Parties. Reporting of trade at the species level would facilitate

more accurate analysis of the impact of trade on specific species. Additional reporting problems that hinder accurate aggregation of data across years and species include: variations in the unit of measurement cited; difficulty in estimating the number of specimens involved when reports are made in "kg", which is common in the case of meat and shells; inconsistencies between records provided by importing and exporting countries.

Concerns regarding illegal trade in Tridacnidae have been noted, from Indonesia, and merit further review.

Trade from the Solomon Islands (not a Party and not selected for review) continues to be of concern. The entire family Tridacnidae was included in Phase 3 of the Review of Significant Trade review. Recommendations concerning export from the Solomon Islands were made in 1996, at which time the Secretariat's policy was to recommend against accepting export permits issued by the Solomon Islands. In July 1996 the Minister for Agriculture and Fisheries in the Solomon Islands explained by letter that the country prohibited the export of wild clams, and that those exported were cultured clams produced by a number of village-based farms from clams supplied by an ICLARM (now WorldFish Center) hatchery, which the Minister considered met the CITES definition of bred in captivity. In view of this, the Secretariat considered its recommendation to be no longer applicable. However, more recent sources, including the Food and Agriculture Organization of the United Nations (FAO) (Anon. 2002) and the South Pacific Commission, through its aquaculture portal (http://www.spc.org.nc/aquaculture, viewed March 3rd 2006) note that aquaculture activity had ceased by 2000 at the latest owing to civil unrest. Since then, Parties have recorded imports from the Solomon Islands of specimens of wild origin of all of the species of giant clam under review here except *T. crocea*. The nature of the specimens currently in trade from the Solomon Islands should be verified.

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