The importance of giant clam fisheries management and trade to the Pacific

Regional Management of Sustainable Fisheries for Giant Clams (Tridacnidae) and CITES Capacity Building Workshop
Nadi, Fiji Islands (4th to 7th August 2009)

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Introduction and Background

There is a long traditional history of giant clam use in the Pacific, where they are an important source of food. They have also found much wider utility as a raw material for tools, containers and ornaments.

During the 1960-1980s, there was a sharp increase in the illegal entry of foreign fishers, mostly Taiwanese fishing vessels. This activity reached its peak in the mid-1970s and then subsided in the face of strong international pressures over depleted stocks, and improved surveillance of reef areas.

Giant clams are used commercially as aquarium specimens, seafood, including sashimi, shells and shell-craft (especially the genus *Hippopus*).

The majority of international trade is in giant clam adductor muscle and shells. The adductor muscle tissue is highly prized by Chinese gastronomes for its purported aphrodisiac properties.

Fishing Methods

Fishing methods for giant clams are simple owing to the shallow distribution, conspicuous appearance and sedentary habit of these bivalves.

Smaller clams are collected opportunistically during reef-gleaning activities and non target-specific fishing, while larger specimens are collected by free diving. The flesh is excised from the shell by slipping a knife or sharpened wooden stick along its inner surface to cut one end of the adductor muscle. Sticks and now-a-days, crow bars, are also used to prise clams from the reef.

Giant clams located in deeper water are hauled to the surface using ropes and chains. The mantle and muscle are then removed and the shell is dropped back into the sea. Hookah gear (diving equipment that uses air supplied through a line from a surface compressor) has also been used in some localities.

Vulnerability

Where rates of giant clam reproduction, recruitment and growth do not keep pace with the demand, excessive human exploitation not only creates marginal habitats for the giant clams, but also often leads to depletion and/or localized extinction, particularly when commercial incentives are involved.

T.gigas is reported to be extinct at Guam and the Mariana Islands, the Federated States of Micronesia (Yap, Chuuk, Pohnpei, and Kosrae), Fiji, New Caledonia, Taiwan, the Ryukyu Islands and Vanuatu;

T. derasa, at Vanuatu; and

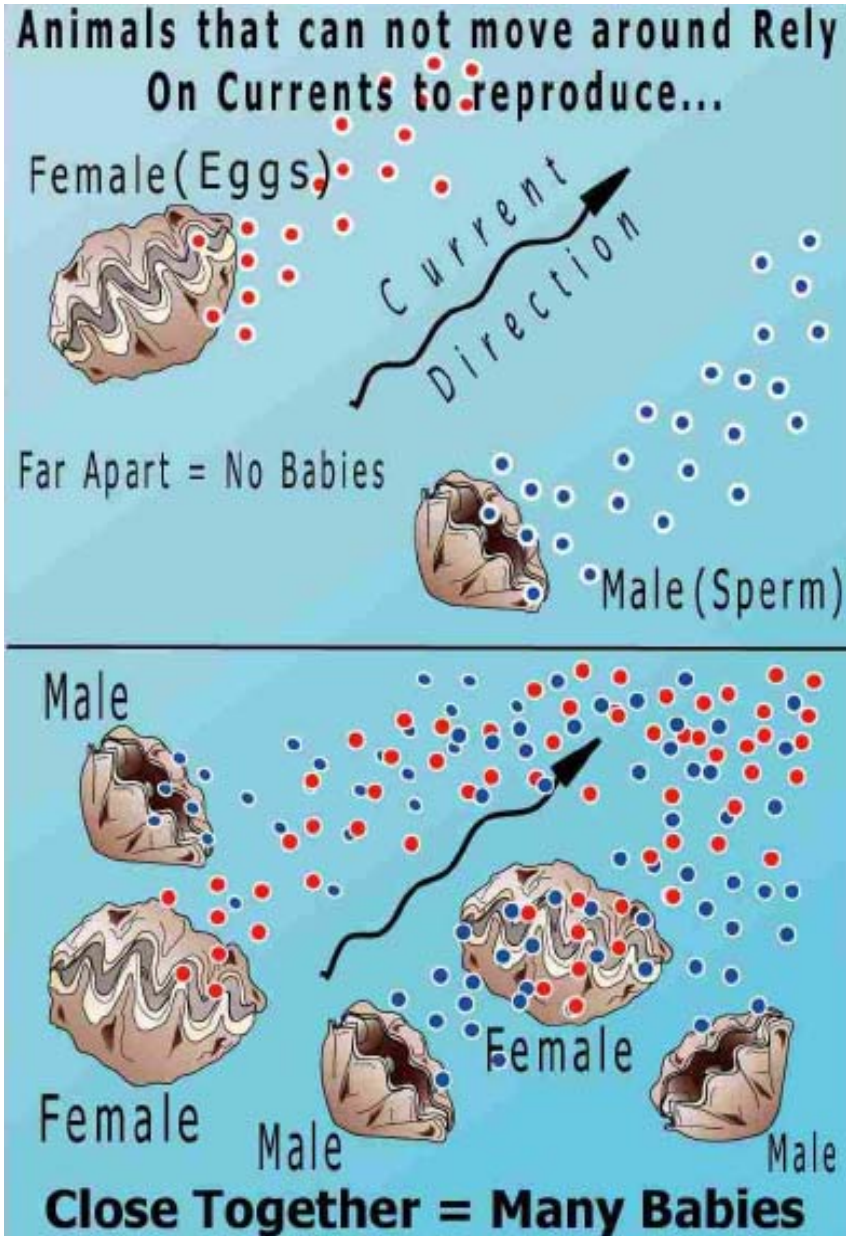
H. hippopus, at Fiji, Tonga, Western and American Samoa, Guam and the Commonwealth of the Northern Mariana Islands.

Hatchery-reared individuals have been distributed throughout the Pacific to reseed and to establish population in lagoons and coastal areas.

Giant clams are highly vulnerable to stock depletion because it is a feature of giant clam biology that stocks will become non-sustaining when densities fall below certain undefined levels.

Giant clams maximize fertilization success by spawning in synchrony in response to current-borne pheromones produced by other spawning individuals belonging to the same species. However if there are no con-specific clams downstream, the eggs are unfertilized.

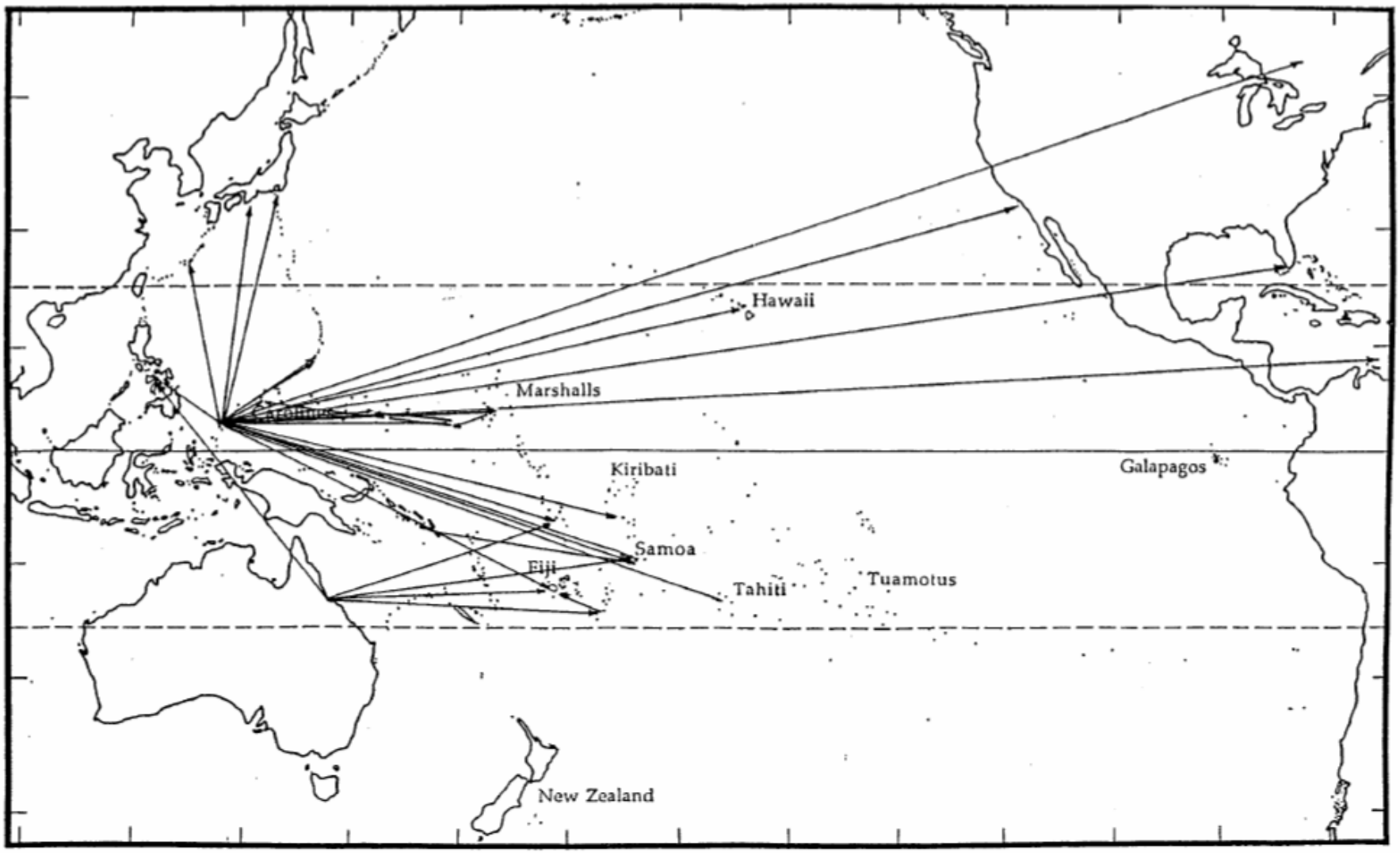
If a reef is entirely depleted of giant clams, re-population will depend on larvae brought in from other reefs by prevailing currents. If the reef is isolated or the current direction is unfavourable, the re-establishment of a stock could take hundreds of years. Even in dense natural populations of giant clams, recruitment is very sporadic.



Species	Shell length in cm by age in years									
	1	2	3	4	5	6	8	10	15	20
Tridacna gigas[1]	4.80	13.97	22.02	29.09	35.29	40.74	49.73	56.66	67.82	73.64
Tridacna gigas[1]	4.80	12.73	20.00	26.67	32.78	38.38	48.22	56.49	71.84	81.77
Tridacna squamosa	4.75	9.16	12.99	16.32	19.22	21.74	-	-	-	-
Tridacna maxima	2.08	5.09	7.78	10.19	12.34	14.27	-	-	-	-
Hippopus hippopus	5.04	11.75	17.17	21.55	25.09	27.95	-	-	-	-

Compilation of growth parameters and estimates for tridacnid species in PNG

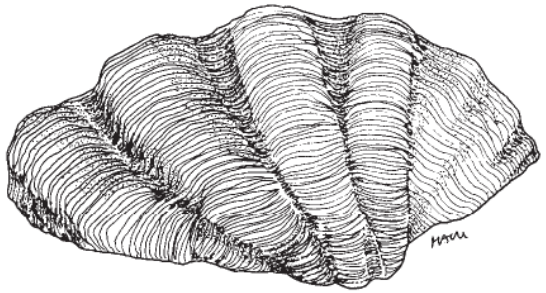
Introductions

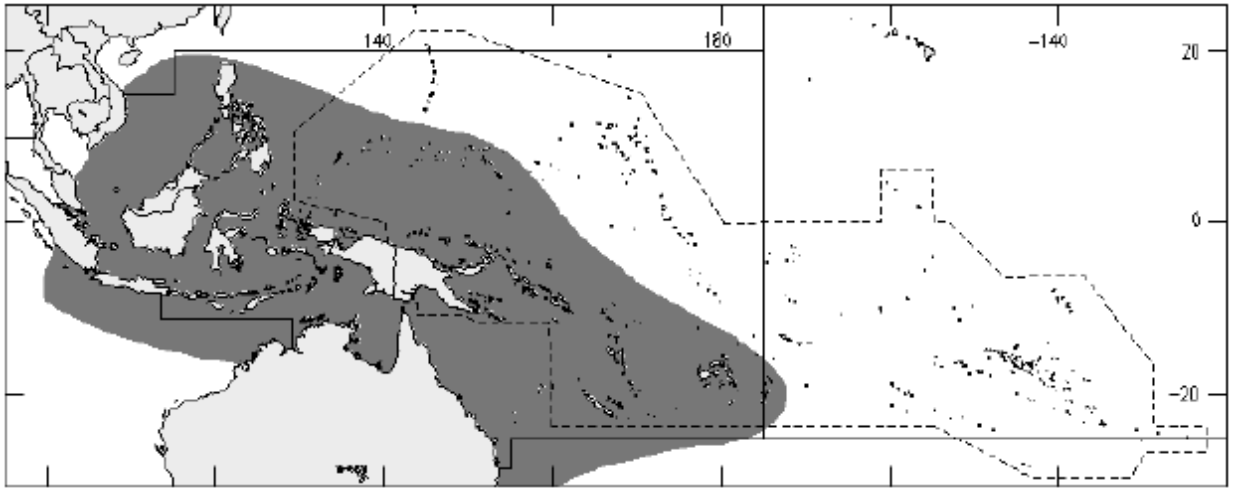


Map of giant clam transfers among the Pacific islands

Tridacna derasa

1984 – Palau to Guam, Yap
1985 – Palau to Marshall Islands, Pohnpei, Yap, and Fiji
1986 – Palau to American Samoa, Saipan, Yap, and Cook Islands
1987 – Palau to Yap
1988 – Palau to Kosrae, Yap, Pohnpei, Chuuk, and Majuro
1989 – Palau to Guam, and Tuvalu
1990 – Palau to Marshall Islands, and Pohnpei
1991 – Palau to Kosrae, Chuuk, Saipan, Yap, and American Samoa
1992 – Kosrae to Chuuk, and Yap
1993 – Palau to Yap



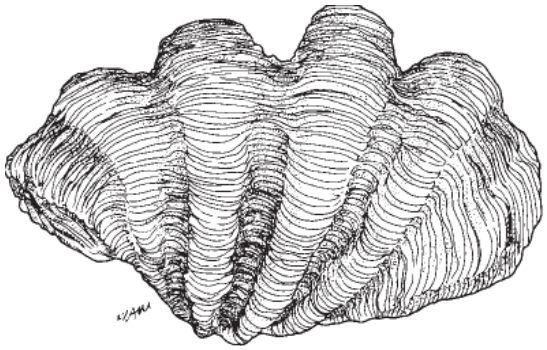


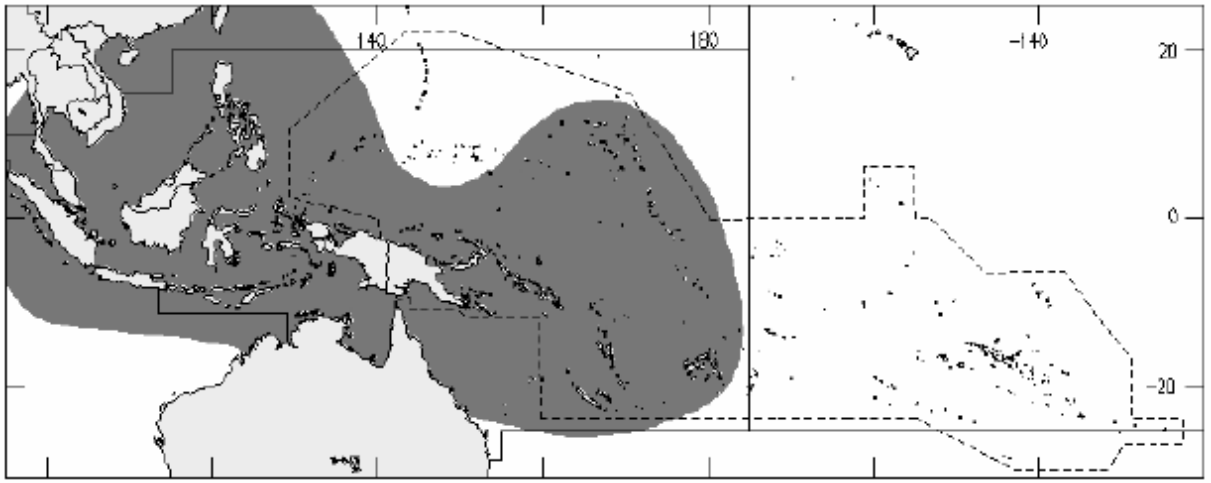
Natural distribution

Tridacna gigas

1982 – Palua to Guam
1986 – Australia to Fiji
1987 – Australia to Fiji
1990 – Palau to Pohnpei
1990 – Australia to Fiji, and Samoa
1991 – Palau to Kosrae, Chuuk, Saipan, Yap, and American Samoa
1991 – Australia to Cook Islands, Tonga, and Samoa
1991 – Marshall Islands to Kosrae

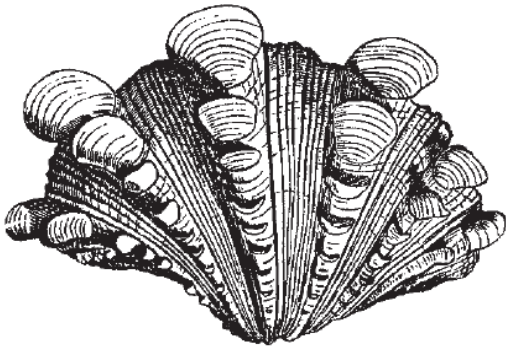
2006 – Tonga to Vanuatu

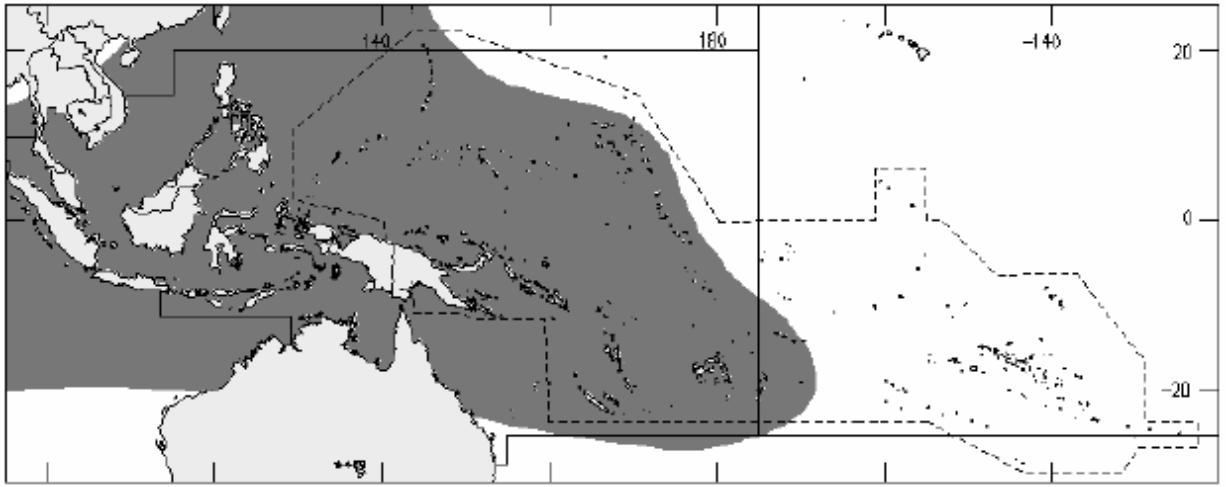




Natural distribution

Tridacna squamosa
1982 – Palau to Guam

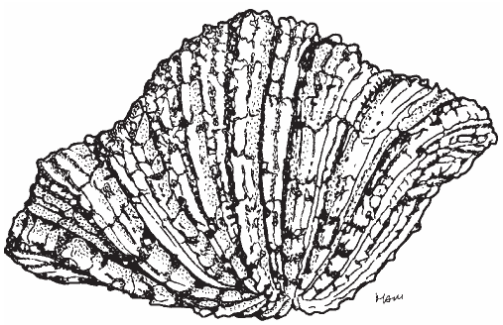


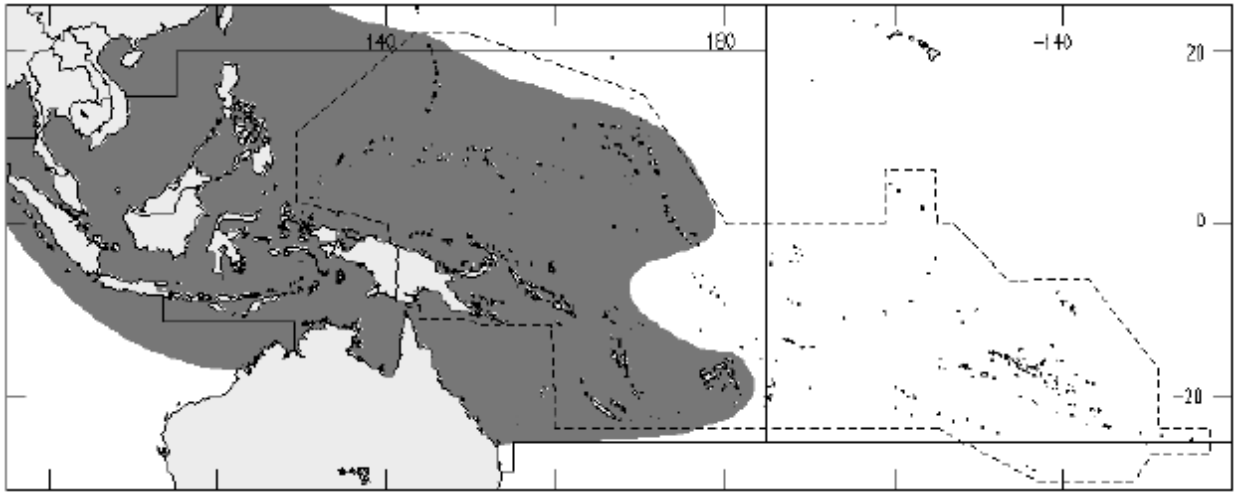


Natural distribution

Hippopus hippopus

1990 – Palau to Kosrae
1990 – Solomon Islands to Samoa
1991 – Palau to Kosrae, Chuuk, Saipan, and Yap
1991 – Australia to Fiji, Cook Islands, Tonga, and Samoa
1991 – Pohnpei to Kosrae
1992 – Marshall Islands to Kosrae
1992 – Solomon Islands to Samoa





Natural distribution

Existing Legislation in the Pacific

In American Samoa, there is a size limit of 180 mm across the longest part of the shell for all clam species.

In the Federated States of Micronesia, there is a ban on commercial harvest and export.

In Fiji, there is a ban on commercial harvest and export; a limit of 3 shells (ornamental) weighing up to 3 kg is allowed for personal use (tourists).

In French Polynesia, there is a size limit of 120 mm across the longest part of the shell for *T. maxima;* as well as a ban on commercial harvest.

In Guam, there is a size limit of 180 mm across the longest part pf the shell for all clam species; as well as a ban on commercial harvest and export; there is also a bag limit of three clams/person/day for subsistence use.

In Kiribati, there is a ban on commercial harvest and export (except for aquaculture species).

In New Caledonia, there is a bag limit of 3 clams/boat/trip; a limit of 3 shells (ornamental) weighing up to 3 kg is allowed for personal use (tourists).

In Nuie, there is a size limit of 180 mm across the longest part pf the shell for all clam species; there is also a bag limit of 10 clams/person/day for subsistence use.

In Papua New Guinea, it is forbidden to take all species of clams at night using underwater lights.

In Palau, there is a ban on commercial harvest and export (except for aquaculture species).

In Samoa, there is a size limit of 180 mm across the longest part of the shell for *T. maxima,* and 160 mm for *T. squamosa.*

In the Solomon Islands, there is a ban on commercial harvest and export (except for aquaculture species).

In Tonga, there is a size limit of 260 mm for *T. derasa,* 155 mm across the longest part of the shell for *T. maxima,* and 180 mm for *T. squamosa.*

Management Measures

Setting a minimum size that corresponds to sexual maturity is a frequently used measure that allows giant clams to reproduce at least once before they are harvested.

Concentrating adult genitors so as to increase the probability of gamete fertilisation and increase recruitment within and outside the zone.

Villagers have already been doing this to a certain extent but for subsistence rather than conservation or management purposes (as clam gardens): juveniles or sub-adults are collected and placed in secret locations or on the foreshore reefs outside the villagers' houses where they can be harvested as needed.

Promote the use of Marine Managed Areas and/or Community-based Fisheries Management.

Impose harvesting quotas or bag limits.

Temporal closures on harvesting during main spawning period from October-February, or allow harvesting in a single short season (pulse fishing).

Restricting fishing for giant clams to free diving only (ie. no hookah or scuba).

Ban the use of mechanical fishing methods such as ropes with hooks.

The End