Hippopus hippopus Linnaeus, 1758

FAMILY: Tridacnidae

COMMON NAMES: Bear Paw, Horse's Hoof 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, Fiji, India, Japan, Kenya, Kiribati, Malaysia, Marshall Islands, Mauritius, Micronesia, Myanmar, New Caledonia (France), Palau, Papua New Guinea, Somalia, Tonga, Vanuatu, Viet Nam

Range States selected for review

Range State	Exports* (1994-2003)	Urgent, possible or least concern	Comments
Australia	Minimal	Least concern	Minimal trade
Comoros	None	Least concern	No trade reported
Fiji	911 live (wild & captive) 100 shells	Least concern	Reported trade at species level low and all current populations artificially established. Significant trade reported at family level
Federated States of Micronesia	Minimal	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	Least concern	Minimal trade
Malaysia	None	Least concern	No trade reported
Marshall Islands	1,368 live captive, 325 live wild	Least concern	Low level of export in wild specimens recorded although commercial harvest prohibited
Mauritius	Minimal	Least concern	Minimal trade
Myanmar	None	Least concern	None
New Caledonia	9,233 shells	Possible concern	Exports reducing; level of domestic use unknown; no population monitoring or basis for ensuring non-detrimental nature of exports.
Palau	Minimal	Least concern	Minimal trade
Papua New Guinea	None	Least concern	No trade reported
Somalia	None	Least concern	No trade reported
Tonga	Minimal	Least concern	Minimal trade recorded at species level, but significant export recorded at family level, the identity of which should be established.
Vanuatu	Minimal	Least concern	Minimal trade recorded at species level; relatively low level of trade recorded at family level.
Viet Nam	1,000 shells	Least concern.	All trade reported in 2000; no subsequent trade in *H. hippopus* or 'Tridacnidae spp.

* Excluding re-exports

SUMMARY

Hippopus hippopus, Bear Paw or Horse's Hoof Clam, occurs from Myanmar, east to the Marshall Islands and south to New Caledonia. Populations are widely depleted and the species has become locally extinct. It is classified by IUCN as Lower Risk/Conservation Dependent.

The Animals Committee selected 19 countries and territories for review of trade in *H. hippopus.* No trade was reported from eight of these (Comoros, India, Japan, Kenya, Malaysia, Myanmar, Papua New

Guinea, Somalia), which were therefore excluded from further analysis and classified as Least Concern. Of the remaining 11, seven exported minimal numbers of *H. hippopus* (Australia, Federated States of Micronesia, Kiribati, Mauritius, Palau, Tonga, Vanuatu) and therefore were identified as countries of Least Concern. Analysis focused on the remaining four countries and territories: Fiji, the Marshall Islands, New Caledonia and Viet Nam.

New Caledonia was the largest recorded exporter of *H. hippopus* during the period 1994-2003, with just over 9000 shells reported in trade, all from 1998 onwards and all described as of wild origin. Information is insufficient to determine if exports will be detrimental to the survival of the species in New Caledonia, so that trade is of Possible Concern.

The species is reportedly widespread in the Marshall Island, it seems unlikely that the small number of wild specimens reported in trade is detrimental and therefore is of Least Concern. However, the fact that trade is ongoing despite a harvest ban merits further investigation.

Trade from Viet Nam has only been recorded in a single year 2000,therfore it is currently of Least Concern. Reported trade from other Fiji and was all at a low level and was considered to be of Least Concern. However notable trade from Fiji and Tonga is reported at family level; the specific identity of the specimens in trade should be established.

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

SPECIES CHARACTERISTICS

H. hippopus reaches a maximum shell size of 40 cm and occurs from Myanmar, east to the Marshall Islands and south to New Caledonia (Wells, 1997). In addition to the countries under review, UNEP-WCMC (2004) report the occurrence of *H. hippopus* in American Samoa, Cook Islands, Guam, Indonesia, Northern Mariana Islands, Philippines, Samoa, Singapore, Taiwan POC, Thailand, Tuvalu and Western Samoa. Wells (1997) noted that populations were in general greatly reduced in abundance and that the species was now extinct in several places. Globally, the IUCN Red List classifies the conservation status of *H. hippopus* as Lower Risk/Conservation Dependent (IUCN, 2004).

INTERNATIONAL TRADE

Over the period 1994-2003, exports of *H. hippopus* were recorded from 22 countries and territories. These included 11 of the 19 countries and territories selected by the CITES Animals Committee for inclusion in the present review. No trade was reported from the other eight (Comoros, India, Japan, Kenya, Malaysia, Myanmar, Papua New Guinea, Somalia), which were therefore excluded from further review and classified as Least Concern. Of the remaining 11, seven exported minimal numbers of *H. hippopus* (Australia, Federated States of Micronesia, Kiribati, Mauritius, Palau, Tonga, Vanuatu) and therefore were identified as countries of Least Concern. Analysis thus focused on Fiji, the Marshall Islands, New Caledonia and Viet Nam. Of the other 11 countries recording exports not selected for the review, the Solomon Islands appeared to be exporting significant quantities. Exports from these countries are shown in Table 1.

Table 1: Exports excluding re-exports of *H. hippopus* by significant trading range States 1994-2003

Export Country	Term	Source	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Fiji													
	live	C					5	540	150	50			745
	shells	C							100				100
	live	W				30	27	73	22		14		166
Marshall Islands													
	live	C						5	28	24	197	1114	1368
	live	F										213	213
	live	R								45	25		70
	live	W						52		20	225	28	325
	shells	W						2	8	3	15		28

Export Country	Term	Source	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
New Caledonia													
	carvings	W							11				11
	shells	W					5112	718	926	1067	1018	392	9233
Solomon Islands													
	live	C		7	41	199	81	72	49	195	229	171	1044
	live	F								100	44	268	412
	live	W	88	583	340	319	105	82	39	325	177	5	2063
Viet Nam													
	shells (kg)	W							1000				1000

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

COUNTRY ACCOUNTS

Fiji (CITES Party since 1997)

Status:

Originally native but only fossil records are known (Munro, 1989). Brood stock was imported from Australia in 1992 to the Makogai hatchery; small village farms were also being established in the 1990s (Wells, 1997). The current status of stocks is unknown.

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 *H. hippopus* from Fiji are predominantly live specimens and small quantities of shells. Imports from Fiji were first reported in 1997, with a maximum of about 600 specimens in 1999 and a decline since, with no imports reported thus far for 2003. Trade mainly involved captive-bred specimens, with reported imports of wild specimens limited to 166 live clams. 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 *H. hippopus*.

There was no information available on the domestic market for, or level of collection of, *H. hippopus* 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*., 2003) 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. There are small village grow-out operations (Sant, 1995; Wells, 1997). Brood stock of *H. hippopus* was imported in 1992 from Australia (Wells, 1997).

Without information on the status of reintroduced stocks and harvest levels for domestic consumption it is difficult to determine whether or not current export levels are detrimental to the species' survival in Fiji. However, the number of specimens recorded in international trade is low and trade in the species has therefore been categorised as of Least Concern.

Marshall Islands (not a Party to CITES)

Status:

Widespread, but varies in abundance (Wells, 1997).

Management and trade:

Since the Marshall Islands is not a CITES Party, all reported trade is based on records from importing Parties only. Imports of *H. hippopus* from the Marshall Islands were reported for each of the years 1999 to 2003. Most of this product was reported as captive-bred, with a low level of trade in live specimens and shells declared as of wild origin.

Giant clams are collected for subsistence purposes as food in the Marshall Islands (Raymakers *et al.* 2003; Hart *et al.*, 1998 in Adams *et al.*, 2001).

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

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

No information was available on population monitoring.

As the species is widespread, it seems unlikely that the small number of wild specimens reported in trade is detrimental and therefore is of Least Concern. However, the fact that trade is ongoing despite a harvest ban merits further investigation.

New Caledonia (France)

Status:

Indigenous (Raymakers *et al.,* 2003; Wells, 1997).

Management and trade:

H. hippopus 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. Exports fell from 5,112 shells in 1998 to 392 in 2003.

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 and the meat of *H. hippopus* is known to be sold directly to restaurants (Raymakers *et al.,* 2003). Giant clam shells, including *H. hippopus,* are collected in the lagoon, are sold to tourists and residents either unworked or in the form of "*lapidaires*" (lamp bases), decorative board (thin

polished slices used by painters or sculptures), etc. There seems to be no local demand for live specimens of giant clams or export of these for the aquarium markets (Baillon *et al. in litt.,* 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 (Constantin *in litt.*, 2004).

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 is 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. 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 (Richer de Forges, 2002).

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 *H. hippopus*. Private investments are envisaged for ranching of *H. hippopus* in a shallow bay in the North Province, where captive-bred specimens reached adult age through a private ranching operation started in 1993 to support IFREMER's efforts. Six to eight 1.5-2 cm juvenile batches were transferred to 0.5 ha of the bay from 1994 to 1997. Taking into account the impact of natural predators, particularly Loggerhead Turtles, the estimated mortality of the first batch was 30%, but mortality decreased rapidly with the next batches to an estimated 3%. In 2002 the ranched population was estimated at 9,000 individuals ranging from two to eight years old (Seraphin, 2002).

Although reported exports have recently fallen, information is insufficient to determine whether these exports will be detrimental to the survival of the species in New Caledonia, especially in consideration of high local use of the product. Trade in *H. hippopus* from New Caledonia is therefore of Possible Concern**.**

Tonga (not a Party to CITES)

Status:

Overfished especially near population centres (Anon, 1995; Wells, 1997).

Management and trade:

Since Tonga is not a CITES Party, all reported trade is based on records from importing Parties only. Very little trade in *H. hippopus* from Tonga was reported during the period 1994-2003. However: significant quantities of giant clams imported from Tonga have been reported simply as "Tridacnidae *spp*." 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 was between 4,500 and 8,000 annually. It is assumed that this represents the number of specimens rather than the total weight of the shipments.

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

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).

Tridacnidae were protected under the Fisheries Act 1989 because of concern about over-fishing (Anon., 1991). 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. 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, but poaching has been reported (Chesher, 1993).

Wild Tridacnidae populations are not currently monitored.

Mariculture: Although there is no commercial "mariculture operation" in Tonga, commercial imports of live clams from Tonga have been reported that have been declared as either captive-born (F) or captive-bred (C). 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.

The very low level of trade reported as *H. hippopus* originating in Tonga is currently of Least Concern. However, the identity of the substantial number of giant clams exported from Tonga as 'Tridacnidae *spp*.' should be clarified.

Viet Nam

Status:

Although not reported specifically to occur in early papers (Wells, 1997), the distribution of this species includes Viet Nam (Yonge, 1975).

Management and trade:

The only exports of *H. hippopus* during the period 1994-2003 were 1,000 kg of shell in 2000.

No information was available on the regulation of wild harvesting and trade, nor on population monitoring.

Mariculture: no information available.

Because trade has only been recorded in a single year, it is currently of Least 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 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 from Indonesia have been noted 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. The nature of the specimens currently in trade from the Solomon Islands should be verified.

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