Marine mollusc use among the women of Brooker Island, Louisiade Archipelago, Papua New Guinea

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Introduction

Milne Bay Province (MBP), at the far eastern tip of Papua New Guinea (PNG), is dominated geographically by its marine environment. Its maritime area is roughly 110,000 km^2 (Omeri 1991), which makes up approximately 32 per cent of the nation's reef area (Munro 1989). Brooker Island (also called Utian and Nogini) is a small island of just over 400 people located in the west Calvados Chain of the Louisiade Archipelago and is approximately 60 km southwest of the main administration of Bwagaioa on Misima Island. Natural population increase is rapid on Brooker Island, rising approximately 2.5 per cent annually. Currently 40 per cent of the population is under 15 years of age and only 5 per cent are aged 60 and over.

Brooker Islanders use approximately 5000 km^2 of sea territory, which includes a very extensive and diverse marine environment. Their livelihoods, identity and way of life are dependent on the exploitation of this environment. Most people on Brooker Island rely on marine resource harvesting (particularly beche-de-mer), trade, and subsistence agriculture for their food security and livelihoods (Kinch 1999, 2001a, 2002a). The beche-de-mer fishery in MBP, however, is currently showing signs of overharvesting of some species in some locations (Kinch 2002a; Skewes et al. 2002). Brooker territorial waters are also affected. Crop failure also contributes to increased pressure on marine resources: people then turn to marine resource harvesting in order to acquire cash to purchase tradestore staples or to trade with more agriculturally well-endowed islands.

Molluscs or *kubai'*[2] make up a significant part of this exploitation, particularly *limwaiya*, the giant clam species *Tridacna* spp. and *Hippopus* spp. and *sineketa* the blood mouth conch, *Strombus luhuanus*. Little is known about the response of mollusc populations, particularly tropical species, to exploitation by humans. This paper outlines the ecological relationships that Brooker women have with the marine environment and their use of molluscs within it. Although there is a wide variety of molluscs exploited by Brooker women, this paper concentrates on the above-mentioned species only.

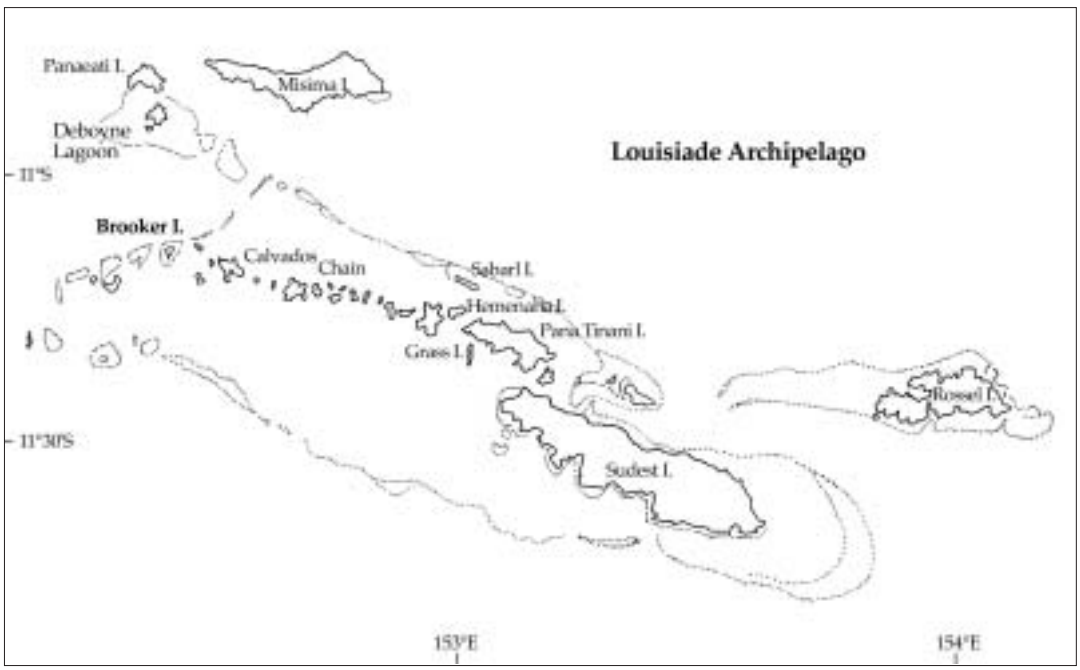

Figure 1. Brooker Island (*source: M. Smaalders*).

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2. *Kubai* is the general term amongst Brooker people for edible molluscs.

Mollusc diversity in Milne Bay Province

Reef communities in PNG are dominated by the following families of molluscs: Arciidae, Strombidae, Tridacnidae, Trochidae, Turbinadae and Conidae. Along rocky shores and mangrove areas the dominant families are Neritidae and Cerithadae (Swadling 1977a, b; Pernetta and Hill 1981; Poraituk 1988).

Milne Bay reef systems are near the epicentre of marine species diversity, an area known as the "Coral Triangle", which contains some of the most biologically diverse and pristine coral reefs, mangrove forests, and seagrass beds in the world (Sekhran and Miller 1994; Piddington et al. 1997; Allen and Werner 1998; Allen et al. 2003a). In 1997 and 2000, Conservation International (CI) conducted two taxonomic surveys in MBP as part of its marine Rapid Appraisal Program (RAP). From these two surveys, 945 species of molluscs were recorded (Wells and Kinch in press). *Coralliophila neritoidea, Drupella cornus, D. ochrostoma, Pyrene turturina, Tridacna squamosa, Turbo petholatus* and *Tectus pyramis* were found to live on or in close association with corals; others, such as *Pedum spondyloidaeum, Lithophaga* sp., *Arca avellana,* and *Tridacna crocea* actually live within the coral. Sandy areas between corals were found to have high numbers of *Rhinoclavis asper.* Five species of the spider shell genus *Lambis* were also recorded, with *L. millepeda* the most predominant (Wells and Kinch, in press). Mangrove and mudflat habitats (important areas for mollusc gathering) were not surveyed and would undoubtedly yield yet more species if they were.

Mollusc use in the Louisiade Archipelago

People of the south coast of PNG have been using molluscs for millennia (see Swadling 1976, 1977a, b). Molluscs are an important source of protein, and parts of them have been used as money, trade, weapons, tools, decoration and ornamentation (Pernetta and Hill 1981).

In the Louisiade Archipelgo, there is a long history of mollusc use for commercial trade and subsistence. For example, when Henry Wickham purchased the Conflict Group in 1896, he employed Papuans to dive for shells, pearls, beche-de-mer and marine sponges (Lewis 1996). Roe (1961) documents "Manila men" pearling fleets at Junet near Sudest Island in 1888, and in the early 1920s several reports of poaching for giant clams (see below) began trickling into the colonial administration (Zimmer 1922-23). During the 1940s, Brooker Islanders gathered shells of customary value for use in the highland areas of Madang and Eastern Highlands Province. At this time, large quantities of cowries, *Cypraea* spp. and *kepu*, pearl shell, *Pinctada margaritifera* were harvested (Toogood, 1947) and this trade continued up until the mid-1950s.

Up until the mid-1990s, Mailu traders from the Central Province were regular visitors to the Louisiade Archipelago, trading for conus shells, which the Mailu use for ceremonial exchange (see Swadling 1994). These visits ceased because local villagers complained that the Mailu visitors were also taking commercially valuable *gunyapu/kival*, *Trochus nilotus* and harvesting giant clams a traditional food source (Heveve 1977; Elimo 1986). The red lip of *Spondylus* sp. is made into *bagi*, which are strings of fine shell discs and used as ceremonial money in mortuary exchanges and the purchase of canoes in MBP. *Bagi* is made in the eastern end of the Louisiade Archipelago (see Armstrong 1924; Liep 1983) and is traded up the archipelago through exchange networks until it reaches the Kula Ring in northern MBP (see Leach and Leach 1983; Damon and Wagner 1989).

Mollusc use at Brooker Island

No specialised technology is used in collecting, gathering and gleaning by Brooker women. Women generally reef glean by walking along the reef flats at low tide, collecting molluscs, invertebrates, small fish, octopus, and lobster as encountered (see Kinch 1999; also Yamelu 1984). Molluscs are extracted from the surface or sediment either by hand, feet or with the aid of a small hand-held digging stick. The commercially valuable molluscs such as *Pinctada margaritifera, Trochus nilotus* and some *Tridacna* spp. are predominately collected by men as they search for beche-de-mer or when found in deep water with women occasionally helping in these activities. Smaller clams such as *Tridacna crocea* and *Hippopus hippopus* are collected opportunistically by women during reef gleaning activities (see Kinch 2001a, b, 2002b).

Molluscs are collected year round but there is recognition of good collecting periods by Brooker women, such as during the day-time low tides in June and July. From data collected during my PhD field research, the frequency of collection coincides with this period or when there is a shortage of fish in the village because the men were away harvesting beche-de-mer. A day or evening of collecting and fishing among women and children provide both a chance to spend hours outside with family, relatives or friends while simultaneously providing nutritious food for the family.

Brooker women have vast knowledge and beliefs associated with many different molluscs and their

habitats. Especially important are the tides and associated wind–current relationships, which help to define access and availability of species[3] as all molluscs have certain food and substrate requirements. The shell species most commonly consumed in Brooker households include the commercially harvested species, including *Tridacna* spp., *Hippopus* spp., *Pinctada margaritifera* and *Trochus nilotus*; and non-commercial shells such as cockles, abalone, oysters (both mangrove and rock), *pwepwet* (unidentified), *wiluwilu* (unidentified), *giambut* (unidentified), *Lambis* spp., *Trochus maculates, Turbo* spp., *Haliotis* spp., *Cypraea* spp., *Cerithium nodulosor, Charonia tritonis, Melo* spp. and *Strombus luhuanus* (Kinch, 1999). *Ovula ovum* and *Cypraea* spp. are used for knifes, *Tridacna* spp. are used as pig troughs and *kabwadau* (unidentified) is used for cleaning and shaping claypots.

***Kabwadau* (unidentified) used for smoothing claypots.**
Photo: Jeff Kinch, 1999

Sineketa — Strombus luhuanus

The Strombid gastropod, *Strombus luhuanus* (Linne 1758) or blood mouth conch, has traditionally been one of the most important molluscs and is still gathered in parts of PNG (see Swadling 1976, 1977a, b; Asigau 1988; Porairuk 1988). Poiner and Catterall's (1988) work in the Central Province shows there has never been a well-developed conservation ethic towards *S. luhuanus* and this is also true for MBP. It has been suggested that because of the biological traits of *S. luhuanus* it is able to maintain recruitment and growth at high densities when exploited by traditional gatherers. Both size and age-dependent burying and the partly subtidal distribution achieve this and provide refugia from human exploitation. The existence of unexploited, adjacent sub-tidal populations and moderate bethnic mobility allows them to migrate over short distances, which also provides a buffer against gathering. *S. luhuanus* also has a pelagic larval period of three to four weeks, which could permit dispersal distances of hundereds of kilometers (see Catterall and Poiner 1987). *S. luhuanus* is found in mix-aged colonies on sand patches of rocky or coral reefs and from the intertidal zone to a depth of ten metres (Swadling 1977b). They breed mainly between the months of August to March (Poiner and Catterall 1988) as do most marine species in the tropics.

During the 2001 stock assessment of sedentary resources, conducted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the National Fisheries Authority (NFA), and Conservation International (CI), 1126 sites were surveyed across MBP (see Skewes et al. 2002; Kinch 2002a). This survey predominately focused on beche-de-mer, but other benthic fauna and substrate conditions were also recorded. *S. luhuanus* numbers were recorded as common (about 50+ per transect[4], >3.2 per m^2) and abundant (200+ per transect, >12.8 per m^2) for areas that Brooker women use. The bottom substrates of fringing reefs for the area of interest for this paper were made up of varying proportions of sand (range 20–100%), live coral boulders (range 1–10%), and rubble (dead coral heads and other coral detritus; range 1–80%). Macro and filamentous algae were present in variable densities (range 1–30%). Areas with high numbers of *S. luhuanus* also had high levels of the seagrass, *Thalassia hemprichii*.

Brooker women collect *S. luhuanus* year round during the day-time and usually on an ebbing tide when the shells are collected by walking and wading. *S. luhuanus* is a major subsistence food and trade item for Brooker Islanders and hundreds or thousands may be collected in one gleaning session. Women and girls are the predominant collectors, although men occasionally help. Only a knife and plastic bag are used. The areas exploited by Brooker women are highly productive as the two examples provided below show: On 16 September 1999, three women were observed gleaning for 1 hr 15 min on the large and extensive sandy reef flats at Manua Island. Within this period they

3. See Appendix for names of species identified by Brooker women
4. On the reef top, a diver swam along a 40 m transect and recorded resource and habitat information 2 m either side of the transect line. On the reef edge, at each site two divers swam adjacent transects perpendicular to the reef edge from the top of the reef edge to a depth of 20 m or a distance of 100 m whichever came first. At each site, substrate was described in terms of the percentage of sand, rubble, consolidated rubble, pavement and live coral. The growth forms and dominant taxa of the live coral component and the percentage cover of all other conspicuous biota such as seagrass and algae was also recorded (see Skewes et al. 2002).

gathered 63.1 kg of *S. luhuanus* or 1753 individual animals. They also collected eight *Lambis* spp. and two *Hippopus hippopus*. The next day, one woman was observed gleaning in the same area for 20 min. She gathered 345 individual animals or 12.4 kg. Catch per unit of effort (CPUE) ranged from 420–1020 animals per hour per person or between 4.2–10.2 kg per person per hour. All *S. luhuanus* collected exhibited mature traits. Mature *S. luhuanus* are thick-lipped with fluting occurring only on the upper whorls.

S. luhuanus reach maturity within two years of settlement, at which time the shell length stabilises at about 40–60mm. Male *S. luhuanus* are usually smaller than females (Abbot 1960). Poiner and Catterall (1988) found that traditional gleaners rarely collect individuals that are buried or are subtidal or less than 30 mm in shell length (approximately one year old). As they grow to maturity, the shells spend less time buried, although even adults spend some time buried (Catterall and Poiner 1987) and the proportion of buried shells frequently increases during adverse weather conditions (Catterall and Poiner 1983, 1987). Brooker women also reject individual *S. luhuanus* below a certain size.

S. luhuanus is processed first by laying them down on the shore and draping them with dried coconut fronds that are then set alight. After this, they are cracked open and threaded onto a stripped midriff of a coconut frond and then smoked. Each strand contains between 45 and 50 individual animals, and is approximately 55–60 cm long. The strands are either be traded or sold at market for 1 kina (approximately USD 0.25). They are eaten as snacks or are cooked in a soup with local greens such as *kalolu*, *Hibiscus manihot* and *aupe*, *Amaranthus dubius*.

Processed *Strombus luhuanus* ready for a snack or for trade.
Photo: Jeff Kinch, 1999

Limwaiya — giant clams

The giant clams, *Tridacna* spp. and *Hippopus* spp. are a major fishery in the Pacific. Their large size, shallow water habitat, and longevity means these species can be rapidly fished out in local areas. Clams are predominantly found on the sheltered sides of fringing reefs, followed by the sheltered sides of barrier reefs, with smaller numbers found on exposed barrier reefs and lagoon reefs, preferring rocky bottoms surrounded by live corals (Allen et al. 2003b).

Commercial fisheries for giant clams developed in MBP in the wake of the reduction of illegal fishing by Taiwanese vessels and in response to sustained demand. The Milne Bay Fisheries Authority, established in 1979 (Munro 1989), began exporting giant clams from the province in 1983 (Lokani and Ada 1998). A ban was placed on purchasing and exporting wild-caught giant clam meat in May 1988 but lifted in May 1995. During the ban, some regeneration of giant clam stocks occurred, which provided an incentive for a local fishing company to commence harvesting and exporting. The ban was reinstated in 2000 when it was found that the local fishing company had infringed on its licensing arrangements (Kinch 2001b, 2002b).

From the 2001 CSIRO/NFA/CI sedentary resources stock assessment, mean densities for species of giant clam in Brooker territorial waters were recorded to be: 0.77/ha for *alitau/kakoama*, *Tridacna gigas;* 10.03/ha for *puapual/pat lagona*, *T. maxima;* 0.58/ha for *malina*, *T. derasa;* 3.52/ha for *baliseya*, *T. squamosa;* 11.54/ha for *pualpual*, *T. crocea* and 4.93/ha for *pwapapwaha*, *Hippopus hippopus* (Kinch 2002). There has been a noticeable decline in giant clam populations by Brooker people in traditional fishing areas (see Kinch 1999) and this has been confirmed by the CSIRO/NFA/CI stock assessment (see Kinch 2002b). Mean densities for *Trochus nilotus* were 9.91/ha and *Pinctada margaritifera* was 0.47/ha.

The low numbers of giant clam species can be attributed to the commercial harvest for the adductor muscle. During my PhD field research, volume of sales were recorded from January to the end of September 1999, where a local fishing company purchased 697 kg of giant clam muscles — mostly *T. gigas* and *T. derasa* — from Brooker Islanders. Total purchases from January to September were broken down into 551 kg (or 1970 clams) of specimens under 400 g earning 3306 kina, and 146 kg (or 170 clams) earning 1460 kina (Kinch 1999, 2001a, b, 2002b). Of this volume, almost one-third of the *T. gigas* were not full-grown adults.

I also conducted a more detailed catch survey from 5 January to 1 May 1999. During this period, 121 trips were recorded where fishers from Brooker Island targeted giant clams, holothurians, and crayfish in the Long/Kosmann Reef area surrounding Nagobi and Nabaina Islands, and the Bramble Haven Group.

These trips were divided into three sub-types depending on the use of vessels and main targeted species. These include:

- Trip type 1: Fishers harvesting holothurians as the main target species, with giant clam taken opportunistically. Fishers operating from sailing canoes. There were a total of 39 trips recorded in this category with an average dive time of 6.8 hrs/trip. The combined total duration for trips of this type was 265.2 hrs.

- Trip type 2: Fishers harvesting lobster and giant clam as the main target species to sell to a local fishing company, with holothurians collected opportunistically. Fishers operating from sailing canoes. There were a total of 37 trips recorded in this category with an average dive time of 10.4 hrs/trip. The combined total duration for trips of this type was 384.1 hrs.

- Trip type 3: Fishers harvesting lobster and giant clam as the main target species, with holothurians collected opportunistically. Fishers using dugout and outrigger canoes launched and picked up from a local fishing vessel. There were a total of 45 trips recorded in this category with an average dive time of 3.9 hrs/trip. The combined total duration for trips of this type was 174.1 hrs.

Catches of all commercial and utilitarian shells were also recorded throughout this period, and the CPUE rates (number of individual animals caught per person per hour) are provided below for each species for three different day trip types. The most commonly harvested species during the first part of 1999 was *Hippopus* spp., which made up the bulk of the species in the unidentified category. These clams are not for commercial sale, but are utilised for subsistence and trade and are mainly collected by women.

Juveniles or subadult giant clams are collected and placed in secret locations or on the foreshore reefs outside village houses where they can be harvested as needed. This is done predominately by both women and girls who collect them during calm weather from the outer reefs. They are placed in shallow lagoon areas where they will grow, and become accessible during bad weather, and as a reserve food source. This has a conservation value, but it is done for subsistence rather than management purposes (Kinch 1999, 2001a,b; Hinton 1982; McLean 1978; Wells 1997).

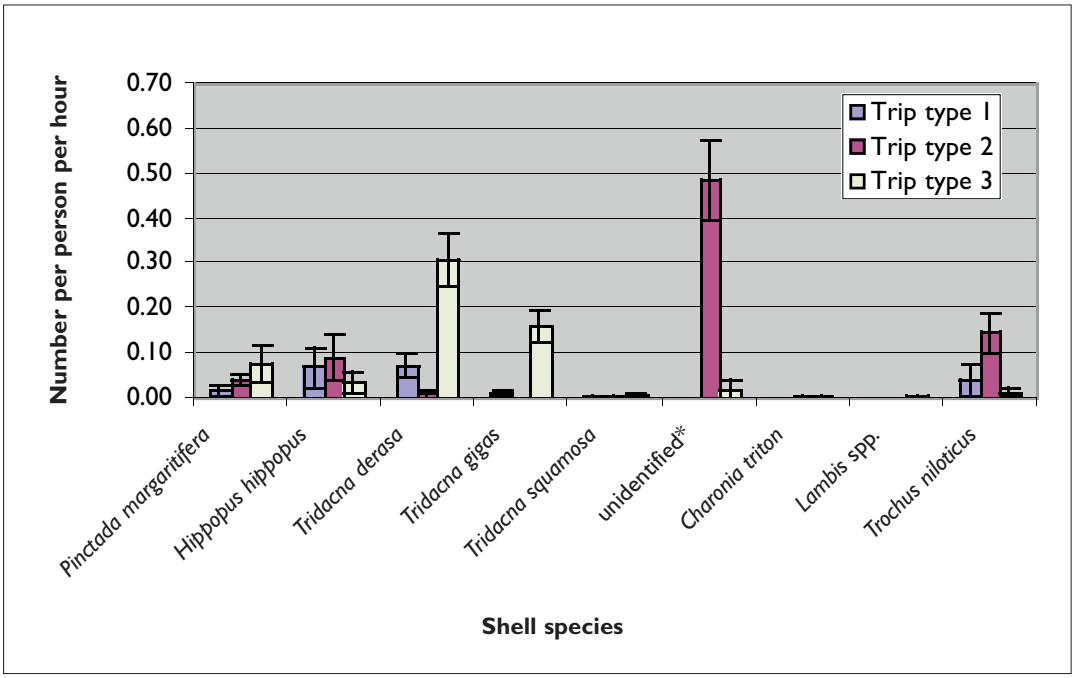
Conclusion

Population growth has had, and will continue to have, an increasing effect on marine resource use. Changes in demographic patterns have resulted in the depletion of molluscs in some areas (see Swadling 1977a, b; Asigau 1988). This has been observed in other parts of MBP at East Cape on the mainland (Sando et al. 2002) and in the Engineer Group of Islands (Lima et al. 2002).

With increased exploitation shell morphology changes because gathering within a population over a period of time produces a consistent mortality of large individuals, which is far higher than usual for a particular species. The size at maturity is also important in relation to the minimum size typically taken by gatherers. If the animals mature at a size significantly smaller than the smallest size typically harvested, then some reproductive potential is conserved within the population. However, if the shells mature at a larger size than the minimum harvested, recruitment overfishing can rapidly follow (see Catterall and Poiner 1987). This combined with the continual gathering of older, larger sized individuals has the effect of inducing a rapid turnover of age classes, resulting in a general reduction in size range, and hence overall shell size of the population. Thus, the heavier the exploita-

Species	Trip type 1		Trip type 2		Trip type 3	
	No	CPUE	No	CPUE	No	CPUE
Pinctada margaritifera	9	0.02	81	0.04	18	0.08
Hippopus hippopus	78	0.07	99	0.09	14	0.04
Tridacna derasa	64	0.07	10	0.01	85	0.31
Tridacna gigas	9	0.01	2	0.00	39	0.16
Tridacna squamosa	4	0.00	3	0.00	3	0.01
Unidentified*	-	-	781	0.49	4	0.02
Charonia tritonis	-	-	5	0.00	1	0.00
Lambis spp	-	-	2	0.00	2	0.00
Trochus niloticus	14	0.04	169	0.15	5	0.01

* Mostly *H. hippopus*.



* *Mostly H. hippopus*

tion, the more dominant the younger age classes will become (Swadling 1976).

From the research carried out by the author, Brooker Islanders have had an impact on *Tridacnid* spp. and *Hippopus* spp. abundances. This is due to the previous commercial harvest but may also be due to selective harvesting; smaller clams are more highly prized for subsistence as these are considered better eating. The trend towards smaller species is also a feature of the ecology of these animals. Once populations are reduced below certain levels, even subsistence fishing may be sufficient to keep populations below recruitment levels (Munro 1993; Kinch 2002b). The impact on *S. luhuanus* has been negligible.

In order to ensure the sustainability of all marine resources, effective management strategies must be implemented. CI has been contracted by the United Nations Development Program to execute the Milne Bay Community-based Coastal and Marine Conservation Program (CMCP). The CMCP constitutes the first large-scale marine conservation and resource management initiative in PNG. It is to be a 10-year programme assisting many coastal and island communities in village-based marine resource management and conservation activities aimed at the betterment of their livelihoods. Strategies to achieve this are assisting communities in the establishment of Locally Managed Marine Areas (LMMAs) (Kinch 2002d). The CMCP needs to take into account that women harvest a great deal of molluscs and other sedentary inshore resources, and retain considerable information on the distribution of these marine resources (Kinch 2001a). Therefore as women are involved in the harvesting of inshore marine resources, they must also be included in any conservation and management activities.

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Appendix: Molluscs identified by Brooker women

Misima name	Family	Scientific name	Etymology
alitau	Tridacnidae	*Tridacna gigas (large)*	tau-man
baliseya	Tridacnidae	*Tridacna squamosa*	-
bololi	Cypraeidae	*Cypraea mauritania*	nil
bubuna	Trochidae	*Trochus lacintus*	bubunama-to be shiny
bunloga	Cypraeidae	*Ovula costellata*	nil
bwagigi talmwalawa	Cymatiidae	*Cassis cornuta*	mwalawa-whistle
bwagigi tautauyoga	Cassidae	*Charonia tritonis*	yoga-call; tau-man
bwanolal	Bursidae	*Tutofa bubo*	nil
datudatu	Volutidae	*Cymbiola rutila* *Aulica flavicans* *Voluyoconus bednalli* *Amoria turneri* *Aulivina vesperitillo*	datu-low tide
dumosi	Strombidae	*Strombus urceus*	nil
dunal	Ovulidae	*Ovula ovum*	nil
ebunol	Gaaleodidae	*Syrinx aruanus*	nil
gabali	Tonnidae	*Tonna galea* *Tonna dolium* *Tonna luteostomo* *Tonna allium* *Tonna cepa* *Tonna perdix*	nil
giambut	Unidentified	-	giam-axe, but-blunt
gigig	Unidentified	-	nil
gigiyoyu*	Camaenidae	*Papuina taumantias* *Megalacron alfredi* *Megalacron boivini* *Megalacron lambei*	gilolu-a slimy substance, spittle
gimbul	Cerithiidae	*Cerithium nodulosor*	nil
gonu	Cypraeidae	*Cyprae testundinaria*	gonu-spotted (once used to make knives)
gunyapu	Trochidae	*Trochus niloticus*	gunina-bottom,yapu-long; kival-nil
kakaoma	Tridacnidae	*Tridacna gigas* (small)	kakoama-steal
halhal	Muricidae	*Thais armigera*	halhal-rough or hard surface
kaboboma	Haliotidae	*Haliotis asisnina* *Haliotis ovina* *Haliotis varia*	nil
kabwadau	Unidentified	Large bivalve	nil
kakanilu	Unidentified	Small venerid bivalve	nil
kalomi	Turbindae	*Turbo petholatus* *Turbo argyrostoma* *Turbo marmoratus* *Turbo crassus* *Turbo setosus* *Turbo spaverius*	nil
kalomi mata yanayana	Turbindae	*Turbo chrysostomus*	matana-eye; yanayana-white
kanenel/kawaliya	Cyraeidae	*Cypraea caputserpentis*	nil
kepu	Pteriidae	*Pinctada margaritifera*	-
kival**	Trochidae	*Trochus niloticus*	nil
kokoyou	Conidae	*Conus leopardus* *Conus litteratus* *Conus betulinus*	nil
lotupa	Potamidadae	*Cerithidea largeillitieri* *Telescopium telescopium* *Terebralia sulcata* *Cerithidea anticipata*	lo-to go down, tupa-to come up against
malina	Tridacnidae	*Tridacna derasa*	-
matahup	Turindae	*Turbo cinereus*	matana-eye, hup-jump in
nevanak	Unidentified	*Spondylus* spp.?	nevanak-women

Misima name	Family	Scientific name	Etymology
onon	Trochidae	*Trochus maculatus*	onon-white
pinyapu	Terbridae	*Tereba* spp. *Dupicaria* spp. *Hastula* spp. *Impages hecitca*	pinin-bottom, the end of something; yapu-long
potokipa	Conidae	*Conus marmoreus*	potokipa-disease like piles
pat lagona	Tridacnidae	*Tridacna maxima*	pat-stone, lagona-wife
puapual	Tridacnidae	*Tridacna crocea*	puan-embed; pat-stone, lagona-wife
pwahapwaha	Tridacnidae	*Hippopus* spp.	pwaha-decay
pwepwet gonugonu	Unidentified	Perriwinkle	pwet-to turn over, gonugonu-black
siki	Strombidae	*Lambis crocata* *Lambis lambis* *Lambis scorpius* *Lambis truncata* *Lambis millepeda*	nil
siki bala	Strombidae	*Lambis chiragra*	sala-tusk
siniketa	Strombidae	*Strombus luhuanus*	ket-red
siyam	Ostridae	Mangrove oyster	nil
siyakal	Unidentified	Large bivalve	-
tamwatamwailu	Cypraeidae	*Cypraea arabica*	tamwatamwayagin-easily freed
tanapat	Trochidae	*Trochus lineatus*	ta-we,na-go, pat-rock
uduudu	Turbindae	*Turbo marmoratus*	nil
veveloga	Nautiladae	*Nautilus pompilius* *Nautilus macrompha* *Nautilus scrobiculatus*	veve-flap
wiluwilu	Unidentified	-	-
yaluman	Volutidae	*Melo broderipi*	yal-bailing/yalu-sail
yaluman bodiman	Volutidae	*Melo umbilicatus*	bodiman-any object used for bailing

* Generic term for snails
** Not used by Brooker people these day due to the practice of "tomati" (see below).

Methodology

Most shells were identified when collected on diving or fishing trips to outer islands, while others were found on the foreshore or as debris in the villages. The names of shells were recorded when encountered. These specimens were used in association with the following reference materials (Hinton no date, 1972) in an identification workshop held on the 26 May 1999. Women who attended this workshop were mainly middle-aged or elderly women. Further consultations were held with knowledgeable women to correct any anomalies.

Language use and orthography

The Misiman language is spoken by approximately 14,000 people who live on the islands of Misima, Panaeati, Panapompom, Kimuta; and Brooker, Motorina, Bagaman, Panuamarla and Kuanak in the West Calvados Chain of the Louisiade Archipelago. From island to island and in some cases from village to village, slight distinctions can be heard in the use of the language (dialects or different "tunes"). Many words also differ from place to place. Reasons for this include isolation, heterogeneous use and the practice of "tomati" where the name of something is changed if it sounds similar to the name of someone who is deceased. Consequently, many mollusc names are specific to Brooker Islanders and not known across the wider Misima District. Misiman vowels are: "a" as in father, "e" as in pet, "i" as in seek, "o" as in corn, and "u" as in lute.

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