

SHELL COLLECTING ON THE GREAT BARRIER REEF
-FIRST IMPRESSIONS

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ABSTRACT

'Shell collecting is a popular activity of visitors to the Great Barrier Reef, including members of shell clubs, tourists and casual visitors to coastal beaches. The majority of collecting is intertidal and is focused on accessible reefs during peak low tides, in the winter season in Queensland. High impact areas are the coastal fringing reefs and the offshore reefs (zoning permitting) within easy access of home ports.

The most **conscientious** collectors are specimen shell collectors with a tendency to collection of live material. Many belong to shell clubs which advocate conservative *collecting. Less discriminating are the 'casual collectors with a preference for visible, **colourful** shells, **dead or alive**. Commercial collectors account for a small percentage of shells removed from the Great Barrier Reef.

The most popular shells are the **cowries** (Cypreaeidae), **cones** (Conidae), **volute**s (Volutidae), **murex** (Muricidae), and **strombs** (Strombidae). The impact of collecting on **molluscs** is governed by the biology of **species** (population size, reproductive strategies, behaviour) and the techniques and frequency of collection.

As an extractive activity, **management** is seen to be necessary, the emphasis being on sustained yield of the resource. Proposals can only be made with a sound knowledge of the biology of the major target **species**. Meanwhile, user education, directed particularly at the casual collector/tourist is recommended.

INTRODUCTION

The reefs of the Great Barrier Reef Region are known to support over 4,000 shell-bearing mollusc species. The distribution patterns vary according to factors such as the physical nature of the reef, the local climate and proximity to the coast and human settlements. **Mollusc** shells have long been appreciated by man for **their aesthetic appeal**, particularly by shell collectors. Today those who exploit the resource may be broadly categorized as follows.

1. commercial shell collectors. This category includes retailers who collect shells for sale or manufacture into shell products and souvenirs, **trochus** fishermen and trawlermen.

A recent, short-term survey of the shell trade in Australia (Willan, 1986) found that the percentage of business derived from the sale of Australian marine mollusc species ranged from 1% in Queensland to 100% in West Australia. Queensland dealers interviewed by McGinnity (1986) revealed that the majority of shells in stock were imported from the Philippines, India and New Guinea, and the limited number of Australian shells sold were obtained from trawlers or **self-collected**. At present there are no full-time commercial specimen shell collectors operating in

the Great Barrier Reef Region. Only two fishermen hold **licences** to fish **trochus** on the Great Barrier Reef, most of which occurs on the seaward side of offshore reefs (Nash, 1985). A small number of prawn trawlers fishing outside reef areas are known to retain shells for purchase by dealers and specimen shell collectors. There is anecdotal evidence of low numbers of regular visitors from the southern states who spend several months of each year on the Queensland coast for the purpose of shell collecting for resale.

2. Specimen shell collectors are those whose prime objective is that of making a collection of good quality shells, local or worldwide, representative of selected **taxa**. The individual interests of specimen collectors **vary**, ranging from the scientific to the aquisitive and competitive approach. Collections vary accordingly, with competitive collectors being more interested in the taking of live material in pursuit of the "gem" specimen for potential display. Shells are obtained by personal collection, purchase and exchange. Many such collectors belong to shell clubs and discussion groups of which there are eleven on the Queensland coast, with active membership totalling approximately 150.

3. Casual collectors, exemplified by the beach walker, reef visitor, tourist, diver and sailor is attracted to the more showy, **colourful** specimens, dead or alive. They may include people at holiday resorts or visitors on **charter** boat cruises, who indulge in casual collection of shells as an activity secondary to others.

3. Researchers. Only a small number of people are at present conducting research on **molluscs** on the Great Barrier Reef. In each case, collection targets a single species from specified sites and all collection information is recorded systematically.

WHEN, WHERE AND WHAT DO THEY COLLECT?

Collecting sites favoured by specimen shell collectors are coastal reefs and accessible inshore reefs. In addition, most shell clubs organize at least one club trip per annum to more distant reef locations. Trips conducted by Queensland shell clubs during the past 3 years averaged one 2-3 day trip per annum, on a charter vessel, with 8 to 13 collectors. Trips were timed to coincide with low water Spring tides, giving the reef walkers 2-3 hours of collecting on exposed reefs. A "shelling season" is recognized, covering the monthly low tides (**May-September**). For 3-4 days each month the low tides result in good **infra-** and sub-littoral exposure during the daytime, allowing access by walking and wading. Committed shellers will plan their activities and holidays around these dates in order to take advantage of every opportunity to pursue the hobby and will focus on specific sites known to be productive, often travelling considerable distances. A limited amount of night shelling occurs at the summer **low** tides. In all **cases shell collecting** would be the prime objective of a reef visit by such people.

The most popular shells collected by specimen collectors; all gastropods, are the cowries (Cypraeidae), cones, (Conidae), volutes (Volutidae), strombs (Strombidae), olives (Olividae), **mitres** (Mitridae) and **murex** (Muricidae). With the development of a collection more obscure shells are sought or specialization in a **particular** group may occur. Fewer people appear to be **interested in** bivalves as a collector **group** and the popularity of these shells is highest with more scientific collectors.

Collecting by casual reef visitors and tourists is usually incidental to other activities. Areas most **likely to** be subject to this form of collecting are fringing reefs close to settlements, tourist resorts, caravan parks and camping sites, and **reefs** frequented by charter boats. Collecting by this group is, on the whole, less **discriminating** than that by club members.

Many casual collectors would be unable to identify the shells they are collecting and may be unaware that most shells contain a live animal. The loss of interest as the **molluscs** decompose is exemplified by repeated reports of shells discarded in resorts and caravan parks. Shells most likely to be taken are the **most** visible and readily available specimens on fringing reefs and **sandbanks**- cowries, strombs (including the popular spider shell, **Lambis lambis**) and olives. Highly patterned cone shells are also **popular but** likely to be collected with more caution. Much of the material collected by the casual collector, including beach specimens, would be considered of unsuitable quality **for the** specimen collector.

HOW DO SHELLERS COLLECT?

Shell collecting involves extensive wading, reef walking, overturning of rocks and boulders and shallow digging and raking. In extreme cases coral heads are broken in the search for specimens. Most club collectors, however, claim to adhere to a "collecting code":

- . do not break coral to look for shells,
- . return all overturned rocks with care,
- . take only sufficient shells for your own needs,
- . do not remove juveniles, shells on eggs or egg-cases,,
- . leave adult shells with scars and breakages to breed,

the emphasis being on sustainable yields of the resource.

On the whole the code is observed, but many such collectors will admit to collecting extra **shells** for the purpose of resale and exchange and it is likely that the discovery of a rare **shell** will result in its removal whatever the condition. The interest in obtaining morphological and **colour** variants means that most private collections will contain several specimens of each species. The collectors' attitude to shells is influenced by the relative "rarity" value, this itself being governed by availability on a local and worldwide scale.

There is widespread concern from club members that the **casual** collector exhibits destructive collecting behaviour, often failing to return rocks to **their** original position, removing juveniles and shells on eggs (albeit in ignorance), and **overcollecting**. There have been repeated **records of unnecessary wastage** of such **shells** which have been rejected by collectors **once** the animal decomposes. Likewise, the few semi-commercial collectors, frequenting accessible coastal fringing reefs at every opportunity are believed to **abuse** the collecting code for the purposes of monetary gain.

IMPACT OF SHELL COLLECTING

What is the potential impact of shell collecting on the reef?
The two major points of concern are:

- depletion through overcollection,
- depletion through habitat destruction,
- and the attendant effects on the environment from which the animals are removed.

It has been stated (Wells and Alcala, 1986) that most marine molluscs, with the exception of volutes, have a wide distribution and planktonic larvae and are therefore unlikely to be threatened with extinction through overcollection. At this stage there is insufficient evidence to support or refute this statement. Most specimen shell collectors would argue that their practices ensure minimal habitat disturbance and conservative extraction. There is a reluctance of this group to admit that their extractive activities have a detrimental effect on the environment and any observed decrease in numbers is attributed to "natural fluctuations". The clubs tend to police activities within the groups, discouraging collecting behaviour contrary to the code. The interest of the northern clubs in exchange and sale of shells, however, does lead to excessive collecting by some members.

By comparison the casual collector is more likely to be party to habitat destruction through failure to return boulders and lack of care in reef walking. Overcollection may occur by large numbers of individuals being attracted to the same species, or by the semi-commercial collector taking all the shells found.

There is anecdotal evidence of depletion on a local scale at a number of sites on the Queensland coast as a result of both overcollection and habitat destruction. The detrimental effects of shell collecting worldwide, on the Kenya coast, in Guam, Hawaii and Florida, have been discussed by Evans et al. (1977), Hedlund (1977), Mills (1977) and Abbott (1980) respectively.

An assessment of the impact on molluscan populations is only valid in relation to the biology of the species concerned. Biological characteristics which effect the vulnerability of a species include:

- . Life-history and reproduction: growth rate, size at maturity, larval duration and recruitment potential.
- . Concealment strategies: camouflage, refuge and burrowing.
- . Distribution and dispersion: intertidal and subtidal; shallow and deep water, scattered and clumped.

To date there is a paucity of literature on molluscan biology at the species level. The emphasis has been on the commercially exploited species Trochus niloticus (Nash 1985), tridacnid clams (Yonge 1975, Heslinga 1979) and the red-lipped stromb, Strombus iuhuanus, which has been the basis of a traditional fishing industry in the Gulf of Papua for centuries.

The biology of specimen shells is less well documented though long-term shell collectors, through their combined experiences, share a good understanding of the characteristics of many species, and will agree that, even after years of observations it is difficult to define any behaviour patterns for most species. A major area of concern has been the volutes (*Volutidae*), the largest of which is the popular bailer, shell *Melo amphora*, which reproduce by direct development. Eggs are laid in capsules from which the young emerge directly. As a consequence local populations develop distinctive characteristics, much sought after by collectors, one notable example being the Heron Island volute, *Cymbiolacca pulchra*. Both this desirability and the lack of larval dispersal make them potentially vulnerable to depletion by overcollection.

Similar concern has been expressed for rarer, target species which have their distribution on accessible fringing reefs. A notable example is the small cowrie, *Cypraea stolidia brevidentata* which, though dispersed throughout North Queensland, is most heavily collected on the fringing reefs of Dingo Beach, by specimen and semi-commercial collectors alike, resulting in local depletion. Other shells at the same locality would be subject to heavy collecting pressures simultaneously,

Further to the immediate effect of depleted populations of molluscs, the removal of a link in the food chain has been seen to cause imbalance in East African coral reefs (Kendall 1985). Removal of predatory gastropods has meant increases of echinoderms (*Diadema*, sp.) in plague proportions which, in turn, feed on coral. Less well proven, but well advertised, in Australia, the current population explosions of the crown-of-thorns starfish, *Acanthaster planci*, have been attributed to overcollection of a major predator, the giant triton *Charonia tritonis* (Endean 1977).

MANAGEMENT

The recognition that shell collecting has had an impact on molluscan populations on several reefs emphasizes the need for local management of the limited resource on a sustainable yield basis, particularly in the light of increasing reef usage.

Management options practiced overseas are the imposition of controls and restrictions such as take limits, closed areas, export controls; the establishment of marine parks and reserves; education and small-scale mariculture (Wells 1986).

On the Great Barrier Reef recreational shell collecting, like most activities, is regulated in Sections of the Marine Park for which zoning plans have been developed, and is allowed in the General Use Zones "A" and "B", subject to possession of a permit obtainable from Queensland National Parks and Wildlife Service Maritime Estate Branch. Permits are issued for periods of up to 12 months and permit holders are required to submit a collection report with each application for renewal. Since 1981 274 permits

have been issued to groups of one to 42 individuals, mostly shell club- members, for periods of one week to 12 months. Collection of Tridacnid clams, the helmet shell Cassis cornuta, the trumpet shell Charonia tritonis, and shells on egg **masses** is prohibited. The permits authorize only the taking of shells for the private collection of the permittee and for limited exchange. This represents a revision of the original bag-limit of two specimens of each species which was received by club collectors with considerable opposition.

The export of Australian native shells is regulated by the Australian National Parks and Wildlife Service though no sound policy has yet been developed for the export of **molluscs** under the Wildlife Protection Act. As an interim measure authority has been granted to a number of shell clubs and dealers to export shells on condition that permission is obtained from ANPWS prior to the export of each consignment and a list of the shells supplied.

Though still in the early stages some inadequacies in these management measures are apparent. The original objectives of the permit system were:

1. to encourage responsible behaviour by reef users,
2. to separate potentially conflicting activities,
3. to impose limits on certain activities,
4. to collect data on the activity.

Preliminary assessment of the permit returns and discussions with **collectors reveal that** some **of these objectives have** not been realized. The majority of people applying for shell collecting permits already see themselves as responsible reef users. The casual collector is the one **least likely** to be in possession of a permit and may be unaware of the requirements. Estimates of permit non-compliance by two shell clubs, using a randomized response survey technique, indicated that, whilst people were willing to make the initial permit application, there was a high rate of non-compliance with permit conditions suggesting significant underestimation of the quantities of live shells removed (Chaloupka, 1985). The value as a monitoring tool is therefore questionable, with very low collection returns (10%) being recorded to date.

Policing in the field is seen by many to be inadequate. Only approximately 2% of the shell club members (**100-plus**) questioned on this subject have been approached in the field to date.

Shell collectors are **further** confused by the status of the coastal fringing reefs on which they collect, several of which, at present, fall outside the Marine Park and are therefore covered by State jurisdiction, as yet undeveloped.

The export controls also lack credibility. The data accruing to ANPWS contains obvious misidentifications and taxonomic **confusion**. **Recommendations made by Willan (1986) in a review of** the shell trade in Australia emphasize that this legislation be rescinded.

ALTERNATIVE MANAGEMENT OPTIONS

It is clear that localized regulatory measures, directed towards, all collector groups, are necessary, and must concentrate on the high-impact fringing reefs, unless they are to be regarded as "sacrificial sites". Club members themselves, in their representations to GBRMPA, have supported the principal of periodic closures of the Dingo Beach area, on a cyclical basis. Habitat management is more feasible than species management at this stage but if such measures are to be taken seriously, adequate policing should be ensured, albeit a problem with current, field staffing levels.'

Education, particularly of the casual collector group must be given a high priority. The detailing of some basic guidelines to reef behaviour and an introduction to the fauna of the fringing reefs, to be distributed to coastal and reef resorts and caravan parks, to campers with their permits, and to school groups, is recommended. It is acknowledged that some club members already play a significant part in school education 'by means of instruction and displays. Further afield, the East African Wildlife Society has produced a series of posters for display in Kenyan hotels and resorts, illustrating the damage caused by shell and coral collecting (Wells and Alcalá, 1986).

Whilst club members may be considered more enlightened than others they should be encouraged to reassess their collecting behaviour by means of supervised participation in monitoring programmes on a local scale. Such programmes should be seen as supplementary to, more detailed research on the biology of the major target species.

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