Nearshore Marine Biodiversity of the Sunshine Coast, South-East Queensland: Inventory of molluscs, corals and fishes July 2010

Baseline Survey Report to the Noosa Integrated Catchment Association,
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Executive Summary

Nearshore reef-associated fauna were surveyed at 14 sites at seven locations on the Sunshine Coast in July 2010. The sites were located offshore from Noosa in the north to Caloundra in the south. The species composition and abundance of corals and fishes and ecological condition of the sites were recorded using standard methods of rapid ecological assessment. A comprehensive list of molluscs was compiled from personal observations, the published literature, verifiable unpublished reports, and photographs. Photographic records of other conspicuous macro-fauna, including turtles, sponges, echinoderms and crustaceans, were also made anecdotally.

The results of the survey are briefly summarized below.

1. Totals of 105 species of reef-building corals, 222 species of fish and 835 species of molluscs were compiled. Thirty-nine genera of soft corals, sea fans, anemones and corallimorpharians were also recorded. An additional 17 reef-building coral species have been reported from the Sunshine Coast in previous publications and one additional species was identified from a photo collection.

2. Of the 835 mollusc species listed, 710 species could be assigned specific names. Some of those not assigned specific status are new to science, not yet formally described.

3. Almost 10 % (81 species) of the molluscan fauna are considered endemic to the broader bioregion, their known distribution ranges restricted to the temperate/tropical overlap section of the eastern Australian coast (Central Eastern Shelf Transition).

4. The Sunshine Coast also hosts species of coral that are uncommon or rare on the Great Barrier Reef. Examples include: *Acanthastrea lordhowensis, A. hillae, A. bowerbanki*, *Acropora glauca*, *Astreopora moretonensis*, *Turbinaria radicalis* and *T. bifrons*, among others.

5. Although the nearshore reef-associated fish fauna is dominated by tropical species, a number of more southerly species are present, including *Paraplesiops bleekeri* (Eastern Blue Devil), which is at the northern end of its distribution range. Both northern New South Wales and Great Barrier Reef colour morphs of the clown fish *Amphiprion akindynos* are present, further illustrating the transitional nature of the area.

6. In respect of harvest pressures, there are indications – in the form of small numbers of individuals present – of depletion in the ornamental (e.g. *Amphiprion* spp.) and edible target species of fish (e.g. lutjanids, serranids, lethrinids), the former likely related to collection for the aquarium trade, the latter to hook and line and other forms of fishing. For example, just 1 subadult Pink Snapper *Pagrus auratus* was recorded from the 14 sites. This species has recently been listed as ‘overfished’ by the Queensland government, a conclusion supported by the present study.

7. There is no significant reef-building by hard corals (biogenic accretion), illustrating marginal conditions for reef growth. Nevertheless living cover of reef-building corals typically ranged between ca. 10 – 30 % (as did soft coral cover), and was higher than cover of dead corals, which typically covered < 5 % of the substratum, in all sites. The overall ratio of live : dead hard coral cover was > 5 : 1, an indicator of good ecological status for corals.

8. Injury or death of corals, particularly larger (older) colonies, was attributable to one or more of the following: overgrowth by sponges, ascidians and other benthos; diseases including an unknown form of tissue necrosis; predation by snails; and potentially earlier bleaching from low sea temperatures and sand scour during high seas.

9. These nearshore reef-associated communities are growing near one end of the physico-chemical environmental spectrum for reefs in respect of cool sea temperatures and the predominantly sandy habitat. The Sunshine Coast is thus considered 'marginal' for reef growth, in the sense of definition 2 of Guinotte et al. (2003, *Coral Reefs*): "On the basis of proximity to an environmental condition known or reasonably assumed, based on physiological or biogeographic evidence, to place an absolute limit on the occurrence of reef communities or key classes of reef organisms".

10. With predicted continued warming in sea temperatures, it is likely that more and more tropical species will live in the area, while species that prefer cooler waters will decline in abundance. There is already some evidence of species distributional changes related to warming sea temperature in the mollusc fauna. The ranges of temperate eastern endemic Australian species (such as the aeolid nudibranch *Austraeolis ornata*) are already contracting southward. These are rapidly becoming rarer on the Sunshine Coast. And conversely, the proportion of widespread tropical species is increasing. For example, the Giant Clam *Tridacna squamosa* was recorded, as single individuals, from three sites. These are among the southern-most distribution records for this species.

11. Similarly to *T. squamosa*, a substantial number of the coral and fish species present were rare in the sites surveyed (e.g. the reef corals *Lobophyllia hemprichii* and *Pavona explanulata*, among others, were recorded from a single colony). For such species, the Sunshine Coast is at the limit of their present distribution range in both physiological and biogeographic senses. In the case of fishes, such species are termed waifs or vagrants, presently forming local 'pseudo-populations' maintained by episodic dispersal from more northerly populations on the GBR, rather than effective local populations. This may change if sea temperatures continue to increase over coming decades, and ranges shift southward.

12. Among reef-building corals, most families typically prefer warmer tropical waters, and show a strong pattern of attenuation in species richness southwards along the east Australian coast. This is well illustrated across most families in the present study.

13. These marginal reef communities offer significant opportunities for research focused on understanding species' acclimation and / or adaptation to changing future conditions. Notably, there are substantial areas of deeper reef communities, ranging from ca. 25 – 50 m depth, further offshore. These were not surveyed during the present study, and their biodiversity attributes remain unknown.

14. Future management options: With the recent designation of various Marine Parks (MP) along the QLD and NSW coasts, the 'Tweed – Moreton' and larger 'Central Eastern Shelf Transition' bioregions are now included in the National Representative MP System. However, the degree to which these MPs function as a 'network' rather than as 'stand-alone' parks remains unclear.

15. In this local – regional biogeographic sense, and in respect of sustaining fisheries, future representation of Sunshine Coast coastal marine habitats in a multiple-use marine park would provide additional protection for this high-energy subtropical marine community type. Given that the area has a coastal National Park centered on the Noosa Headland, opportunities may exist, in the first instance, for the development of zoning provisions in coastal and river waters bordering the Noosa National Park.

16. Key questions include: Does the Sunshine Coast have unique or complementary marine attributes not adequately represented elsewhere? How effective is dispersal in maintaining connectivity via gene flow among populations within and among MPs and adjacent waters? Is there a management gap between Hervey Bay and Moreton Bay? What roles can the Noosa Biosphere Reserve and other management approaches / tools have in the future management process?

17. Analysis of coral species presence in Sunshine Coast, Hervey Bay and Moreton Bay waters indicates that Sunshine Coast corals are most similar in composition to those of Flinders Reef off the northern end of Moreton Island, and dissimilar to those of the remainder of Moreton Bay or Hervey Bay, which share high similarity, being developed in more oceanographically-sheltered bay waters. Flinders Reef is included as a 'no-take' zone in the Moreton Bay MP, although it is a relatively small area (10s of ha in total). Sanctuary zones in NSW waters (e.g. Cape Byron, Solitary Islands) also include similar habitat, although with significant attenuation in richness of tropical species.

18. Files documenting species composition and various demographic, biogeographic and utilization data for molluscs, fish and corals are appended in electronic form.

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Introduction

The Sunshine Coast (Fig. 1) is located in the Great Sandy region, Southeast Queensland, Australia, to the north of Moreton Bay and to the south of the Capricorn – Bunker section of the southern Great Barrier Reef.

From oceanographic, geomorphological, biological, ecological and biogeographic perspectives, the Sunshine Coast forms part of a transition zone between the tropical waters of the Great Barrier Reef and Coral Sea to the north, and the more temperate waters of the Tasman Sea to the south.

In its recent bioregional planning, the Australian Commonwealth Government identified the Sunshine Coast area as forming part of Provincial Bioregion 39 – The Central Eastern Shelf Transition – itself a small section of the East Marine Region (Fig. 2). According to the 'East Marine Bioregional Plan Bioregional Profile', the Central Eastern Shelf Transition has an area of 26,340 km^2 with a maximum depth of 240 m.

"This provincial bioregion extends over the continental shelf from the boundary of the Great Barrier Reef Marine Park around Fraser Island and offshore from Coffs Harbour. … Tropical and temperate benthic species transition offshore from Tweed Heads. Few tropical species are found south of Coffs Harbour and few temperate species are found north of Fraser Island."

There are several major oceanographic influences on the bioregion (Fig. 3). These include the East Australian Current (EAC), which transports warm tropical waters southwards along the East Australian coast, dispersing ultimately into warm core eddies that typically move south-eastwards into the Tasman Sea. The EAC is a major vector in the dispersal of larvae of tropical species southward along the East Australian coast, with its greatest influence in offshore waters, whereas nearshore waters are more influenced by local wind, sea and tidal conditions.

Nearshore sea surface temperatures are typically subtropical, ranging from ca. 25^o C in summer to ca. 20^o C in winter, with episodic hotter and colder periods of daily to weekly duration. The Maroochy and Noosa Rivers can deliver significant quantities of freshwaters to nearshore waters during flood events, with resulting decrease in surface salinity, especially in the vicinity of the estuaries.

The Sunshine Coast is exposed to ocean swells generated by local winds and low pressure systems in the Coral and Tasman Seas. Coral Sea lows can develop into tropical cyclones that episodically impact the region on a decadal time-scale. The prevailing South-easterly 'trade winds' generate a long-shore drift to the north. Over geological time scales, this drift has transported enormous quantities of silica sand, initially deposited into coastal waters by the major river systems of northern New South Wales and south-eastern Queensland, northwards. This has formed the major sand masses of the south-east Queensland coast, notably the Cooloola sand mass and the sand islands of Stradbroke, Moreton, Bribie and Fraser, the latter the largest such island on Earth. Most shallow (< 50 m depth) nearshore substrate is composed of sand, surrounding small patches of sedimentary and igneous rock, the latter ranging in area from less than 1 ha to tens of ha.

On ecological time scales, sand movement caused by long-shore drift and wave energy remains significant. This was evidenced by the major changes in beach replenishment that resulted from deployment of rock breakwalls to protect coastal housing development on the Gold and Sunshine Coasts from cyclone-generated storm surges in the 1960s. Subsequent engineering solutions of sand bypass and replenishment are now in place in an attempt to mitigate sand loss and coastal erosion from many beaches.

The East Marine Bioregional Plan 'Bioregional Profile' also noted that:

"The Central Eastern Shelf Transition is important for shipping, defence, Indigenous activities, sea dumping, commercial fisheries operations, tourism, and recreational fishing."

In terms of demography, the Sunshine Coast forms part of the fastest growing coastal region in Australia. The rapid rate of population growth over the past several decades has fuelled significant urban development (Fig. 1), with corresponding negative environmental impacts to coastal, riverine and lacustrine habitats. These include: the reclamation and conversion of mangrove and wallum swamps and riparian areas for housing, notably the building of 'canal estates'; the shifting and 'training' of river mouths through deployment of breakwalls; and the release of treated sewage into coastal streams and offshore waters. Fishing, notably from the recreational sector, has also increased over the past several decades. These various pressures have all impacted on the quality of coastal and marine ecosystems, although the actual extent of impact is little understood other than anecdotally – a good example of the 'Shifting Baseline Syndrome' (www.shiftingbaselines.org) and an important objective of the present study.

In terms of marine management, there are several pieces of legislation in place. At state government level, these pertain to commercial and recreational fisheries (e.g. licenses, gear restrictions, size and bag limits) and Marine Protected Areas. The Sunshine Coast is bordered on its northern and southern sides, respectively, by the Great Sandy and Moreton Bay marine parks, established under the Queensland Marine Parks Act 2004. The Act is designed to implement multiple use zoning, establishing zones with different levels of use and protection. Zoning and management plans have been developed with the 'cooperative involvement of all stakeholders'. The strategy is to develop a co-ordinated, integrated approach, in recognition of cultural, economic, environmental and social relationships between marine parks and other areas, with application of the Precautionary Principle, and in respect to other conservation legislation. Queensland marine parks now protect a range of habitats including mangrove wetlands, seagrass beds, mudflats, sandbanks, beaches, rocky outcrops and fringing reefs (www.epa.qld.gov.au/parks_and_forests/marine_parks/).

At local level, the Sunshine Coast Regional Council (SCRC) is presently developing a range of strategies to manage biodiversity, waterways and coastal habitats. These strategies are aimed at ensuring that sustainable use of the area's biodiversity values is a key component of ecologically sustainable development. SCRC has committed to maintaining and improving health and resilience of natural areas, ensuring a

coordinated and focused approach to protection of biodiversity on a regional scale. SCRC is also committed to building collective knowledge of the region's biodiversity, towards which the present study is contributing. The knowledge base on which marine management in Southeast Queensland is based has improved significantly in the last decade. This has been driven by the increasing governmental focus at federal, state and local levels, and delivered through research by the regional academic institutions (e.g. University of Queensland, University of Sunshine Coast, University of Central Queensland among others) and non-government organizations (e.g. various Coastcare, Landcare and River Catchment groups, among others). The Reefcheck organization has also undertaken benthic marine surveys since 2009 at various sites in SE Queensland.

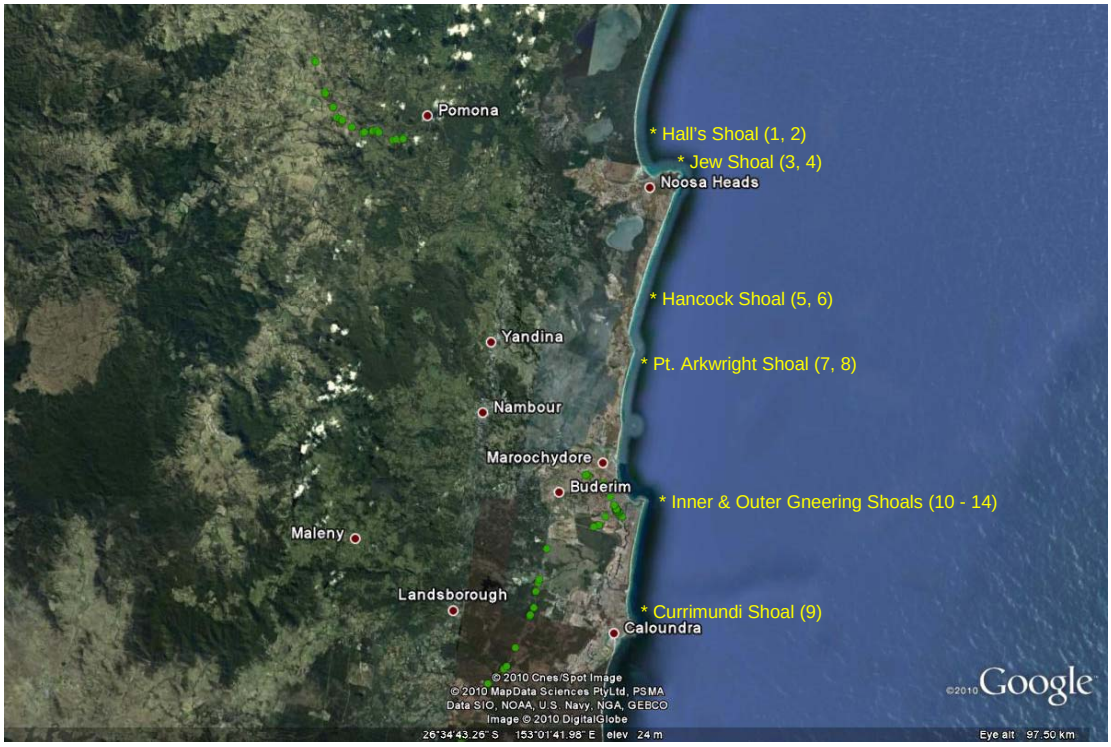


Figure 1. Satellite image of Sunshine Coast showing major towns (in white) and coastal features and approximate location of 14 survey sites (in yellow) (Source of image: Google Earth).

Nevertheless, in respect of biological and ecological baselines, the only prior study of benthic coastal marine biodiversity on the Sunshine Coast known to the present authors was conducted at the time of construction of the offshore sewage disposal system at Kawana (southern-central Sunshine Coast) in the early – mid 1990s (Harriott et al. 1992, Harrison et al. 1993, Banks 1995). The latter study notwithstanding, coastal marine biodiversity has been relatively little studied compared with the more northerly and southerly counterparts along the east Australian coast. For this reason, the Noosa Integrated Catchment Association (NICA), with funding from the Sunshine Coast Regional Council and Norman Wettenhall Foundation, has commissioned the present pilot study.

Figure 2.4 Provincial bioregions of the East Marine Region (IMCRA v.4.0)

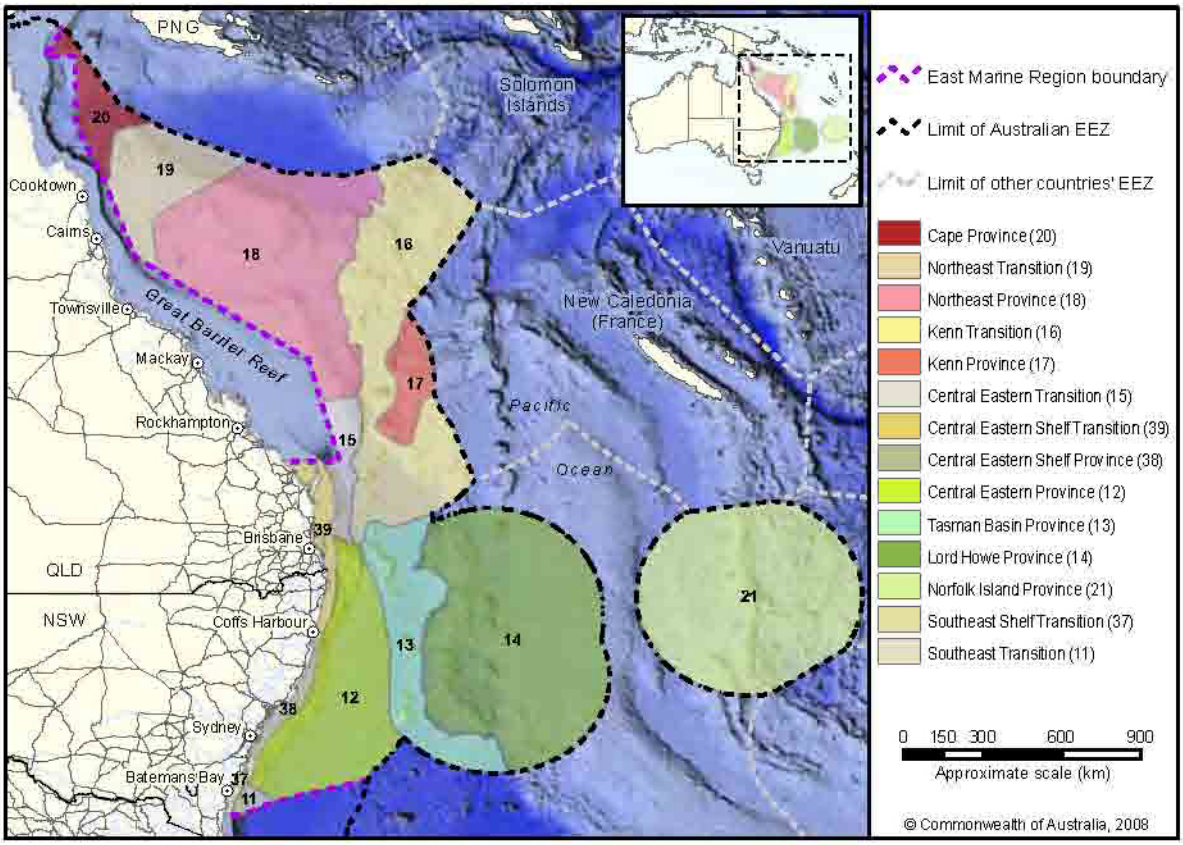
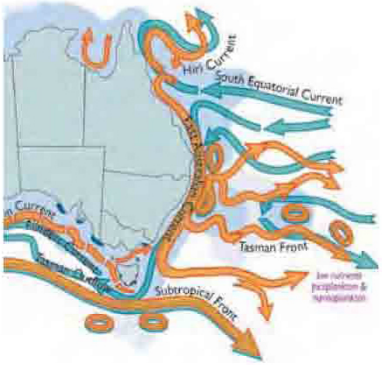


Figure 2. Marine bioregions of eastern Australia. The Sunshine Coast forms part of the Central Eastern Shelf Transition (39). (Source: Commonwealth of Australia 2008 and courtesy CSIRO Marine Research and 'The East Marine Bioregional Plan Bioregional Profile').

Figure 2.2 Major ocean currents in eastern Australian waters
Image courtesy of CSIRO Marine Research.



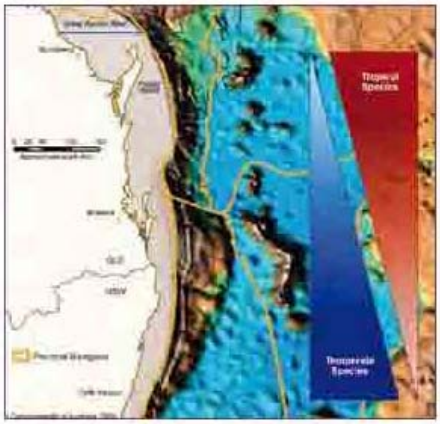


Figure 3. Schematic representation of major oceanographic and biological features of Eastern Australia (Source: Commonwealth of Australia 2008 and courtesy CSIRO Marine Research and 'The East Marine Bioregional Plan Bioregional Profile').

The study's aim and 'deliverables' were to carry out a marine biodiversity assessment of selected nearshore locations off the Sunshine Coast, with provision of:

- A detailed Interim technical report (July 2010) and Final report (October 2010) documenting Methods and Results of the survey
- A public presentation / community workshop to interested parties (15th September 2010)
- Delivery of Final Report.

Methods

Desk-top study

Many marine species, especially molluscs, are rare in time and space (Marshall and Willan 1999) so a single field survey using a rapid ecological assessment would significantly underestimate biodiversity, therefore reliable soueces of information were pooled in a desk-top study. Previous records of occurrence of molluscs, fishes and corals on the Sunshine Coast were accessed from personal observations by R.C. Willan back to 1980, publications (e.g. Harriott et al. 1992, Harrison et al. 1993, 1998, Banks 1995, Cobb and Willan 2006), underwater photography (e.g. as kindly provided by Jan Brown and Ian Banks), and other reliable anecdotal sources.

Field surveys

Rapid Ecological Assessment (REA) surveys were conducted using SCUBA at 14 shallow reef sites at seven widespread locations along the Sunshine Coast in in July 2010 (Fig. 1, Annex 1). The locations ranged from Hall's Shoal off Noosa in the north to Currimundi Shoal off Caloundra in the south. These were selected to provide a broad range of reef habitats, developed in relation to different environmental conditions (e.g. exposure, slope angle, depth) as possible in the limited time available, and were selected following consultation with David Glover (University of Sunshine Coast), David Bunsworth (Underwater World) and Brett Bell (Dive Noosa) and examination of maps and charts of the area.

At each site, a portable GPS device was towed by the fish survey team, allowing the precise survey track to be recorded (Supplementary excel file). Surveys typically averaged 45 minutes in duration, with the fish observer leading the swim, to minimize disturbance to fish by the other divers. Survey depths ranged from ca. 8 – 22 m.

Two types of information were recorded on waterproof data-sheets during the survey swims at each site:
1) An inventory of species of fishes, corals and other sessile benthic taxa; and
2) an assessment of the cover of the substrate by the major benthic groups and status of various environmental parameters (after Done 1982).

1. Taxonomic inventories

Fishes

Reef associated fishes were surveyed by a single observer (DW) using an underwater visual census (UVC) technique on SCUBA. The UVC method utilised one, 45 minute GPS tracked timed swim at each site. A list of all sighted fish species was compiled, identified to species wherever possible (e.g. Willan et al. 1979, Randall et al. 1990, Allen et al. 2003, Allen 2009 and references therein) and numbers and lengths of all fishery target species sighted within an 8 metre wide transect (4 metres either side of the observer) were also recorded.

The GPS unit was set to record a position every 30 seconds and log the data as a track. The GPS was secured to a surface float and towed by the fish observer during the UVC swims. The distance covered during the UVC swims ranged between 198 metres to 337 metres.

Corals

Stony (hard) corals were surveyed by a single observer (LD), and were identified to species wherever possible (Veron and Pichon 1976, 1980, 1982, Veron, Pichon and Wijsman-Best 1977, Veron and Wallace 1984, Veron 1986, 1993, 1995, 2000, Best et al. 1989, Hoeksema 1989, Wallace and Wolstenholme 1998, Wallace 1999, Veron and Stafford-Smith 2002), otherwise genus and growth form (e.g. *Porites* sp. of massive growth-form). Soft corals, zoanthids, corallimorpharians and sea anemones were identified to genus, family or broader taxonomic group (Allen and Steen 1995, Colin and Arneson 1995, Gosliner et al. 1996, Fabricius and Alderslade 2000). Other sessile macro-benthos, such as sponges and ascidians were usually identified to phylum plus growth-form (Allen and Steen 1995, Colin and Arneson 1995, Gosliner et al. 1996).

The inventory was reviewed at the end of each survey swim and each taxon was categorized in terms of its relative abundance in the community (Table 1). These rankings are similar to those long employed in vegetation analysis (Barkman et al. 1964, van der Maarel 1979, Jongman et al. 1997). For each coral taxon present, a visual estimate of the total amount of injury (dead surface area) present on colonies at each site was made, in increments of 0.1, where 0 = no injury and 1 = all colonies dead. The approximate proportion of colonies of each taxon in each of three size classes was also estimated. The size classes were 1 - 10 cm diameter, 11 - 50 cm diameter and > 50 cm diameter (Table 1).

Table 1. Categories of relative abundance, injury and sizes (maximum diameter) of each benthic taxon in the biological inventories.

Rank	Relative abundance	Injury	Size frequency distribution
0	absent	0 - 1 in increments of 0.1	proportion of corals in each of 3 size classes: 1) 1 - 10 cm 2) 11 - 50 cm 3) > 50 cm
1	rare		
2	uncommon		
3	common		
4	abundant		
5	dominant		

Taxonomic certainty in corals:

Despite recent advances in field identification and stabilizing of coral taxonomy (e.g. Hoeksema 1989, Veron 1986, Wallace 1999, Veron 2000, Veron and Stafford-Smith 2002), substantial taxonomic uncertainty and disagreement among different workers remains. This is particularly so in the families Acroporidae and Fungiidae, with different workers presenting different taxonomic classifications and synonymies for various corals (see e.g. Hoeksema 1989, Sheppard and Sheppard 1991, Wallace 1999, Veron 2000, Fukami et al. 2008). The taxonomy presented here relies on a personal synthesis and interpretation of these recent revisions.

Extensive use of digital underwater photography and a limited collection of specimens of taxonomically difficult reef-building coral species were made, to aid in confirmation of field identifications. Small coral samples, < 10 cm on longest axis, were removed from taxonomically-difficult corals in situ, leaving the majority of the sampled colonies intact. Living tissue was removed from the specimens by bleaching with household bleach and the specimens were identified using the taxonomic references cited above. Specimens will be deposited at the Museum of Tropical Queensland, Townsville, Australia.

2. Benthic cover and reef development

At completion of each survey swim, six ecological and six substratum attributes were assigned to 1 of 6 standard categories (Table 2), based on an assessment integrated over the length and depth range of the swim (following Done 1982, Miller and De'ath 1995). Because the cover estimates apply for the area and depth range over which each survey swim was conducted (e.g. 6 – 0.5 m depth respectively), these may not correspond precisely with line transect estimates made at a single depth or set of depths.

Table 2. Categories of benthic attributes

Attribute		**Ranks of benthic cover of substrate**	
ecological	**physical**	**% cover**	**Rank**
Hard coral	Hard substrate	0	0
Dead standing coral	Continuous pavement	1 – 10 %	1
Soft coral	Large blocks (diam. > 1 m)	11 – 30 %	2
Coralline algae	Small blocks (diam. < 1 m)	31 – 50 %	3
Turf algae	Rubble	51 – 75 %	4
Macro-algae	Sand	76 – 100 %	5

The sites were classified into one of four categories based on the amount of biogenic reef development (following Hopley 1982, Hopley et al. 1989, Sheppard and Sheppard 1991):

1) Coral communities developed directly on non-biogenic rock, sand or rubble;

2) Incipient reefs, with some calcium carbonate accretion but no reef flat;
3) Reefs with moderate flats (< 50 m wide); and
4) Reefs with extensive flats (> 50 m wide).

The sites were also classified arbitrarily on the degree of exposure to wave energy, where: 1) sheltered; 2) semi-sheltered; 3) semi-exposed; and 4) exposed.

The depths of the sites (maximum and minimum in m), average angle of reef slope to the horizontal (estimated visually to the nearest 5 degrees), and underwater visibility (to the nearest m) were also recorded. The presence of any unique or outstanding biological features, such as particularly large corals or unusual community composition, and evidence of impacts, were also recorded, such as:

- sedimentation
- anchoring
- bleaching impact
- predation by crown-of-thorns seastar
- predation by *Drupella* snails
- coral diseases

The field and analytical methods are also explained in detail elsewhere (e.g. DeVantier et al. 1998, 2006).

All data were input to EXCEL or similar spreadsheets for storage and analysis of summary statistics. Files documenting species composition and various demographic, biogeographic and utilization data for molluscs, fish and corals are appended here and also provided in electronic form.

Results

Molluscs

Species composition and richness

A total of 835 mollusc species was recorded (Annex 2), comprised of six polyplacophorans (chitons), seven cephalopods (squid, cuttlefish, octopus and relatives), 13 scaphopods (tusk shells), 140 bivalves (scallops, clams and relatives) and 669 gastropods (snails, nudibranchs and relatives) and representing more than 160 molluscan families in all (see supplementary excel file for full list).

Of the 835 mollusc species recorded, 710 spp. could be assigned specific names. The majority of those that could not be assigned to species are less than 5 mm long (micromolluscs) for which the Australian literature is very inadequate at present. Some are new to science, including *Glossodoris* sp., discovered and photographed recently (Plate 1) by Ian Banks on "Shellacy Reef" dive site.

Almost 10 % (81 spp.) of the molluscan fauna are endemic to the broader bioregion, their known distribution ranges restricted to the temperate/tropical overlap section of the East Australian coast (Central Eastern Shelf Transition).

In terms of temporal occurrence, approximately two-thirds of mollusc species (565 spp.) are always present on Sunshine Coast; 20 % (168 spp.) are occasionally or episodically present; 3 spp. are rarely present, and for 11 % (94 spp.), temporal occurrence is presently unknown. approximately half the mollusc species (415 spp.) are considered to be rare (28 %, 231 spp.) or very rare (22 %, 184 spp.) on the Sunshine Coast, meaning they are recorded from less than five individuals. Conversely 15 % (128 species) occur frequently; and a further 8 % (69 species) are very common.

Examples of these various temporal and spatial distribution patterns are provided by the Tiger Cowrie *Cypraea tigris* and Egg Cowrie *Calpurnus verrucosus* (Plate 2), both of which are always present on Sunshine Coast. The Tiger Cowrie, however, is considered very rare spatially, whereas the Egg Cowrie is more common. Another example is provided by the Giant Clam *Tridacna squamosa* (Plate 3), which is considered to be very rare in both temporal and spatial contexts, and was recorded, as single individuals, from three sites. These are among its southern-most distribution records.
In respect of species distributional changes related to increasing sea temperatures, the ranges of temperate endemic East Australian species, such as the aeolid nudibranch *Austraeolis ornata* are contracting southward (Plate 4). These are rapidly becoming rarer on the Sunshine Coast. Conversely, with predicted continued warming, more tropical species will be expected to recruit to more southerly waters, while species that prefer cooler waters will decline locally.

Plate 1. *Glossodoris* sp., discovered and photographed by Ian Banks. www.nudibranch.com.au

Plate 2. Tiger Cowrie *Cypraea tigris* and two Egg Cowries *Calpurnus verrucosus*, with orange papillose mantles extended. Both species are always present on Sunshine Coast. The Tiger Cowrie is rare, whereas the Egg Cowrie is more common locally.

Plate 3. Giant Clam *Tridacna squamosa* was recorded, as single individuals, from 3 sites, among its southern-most distribution records. Photo Liz Harlin, Undersea Productions.

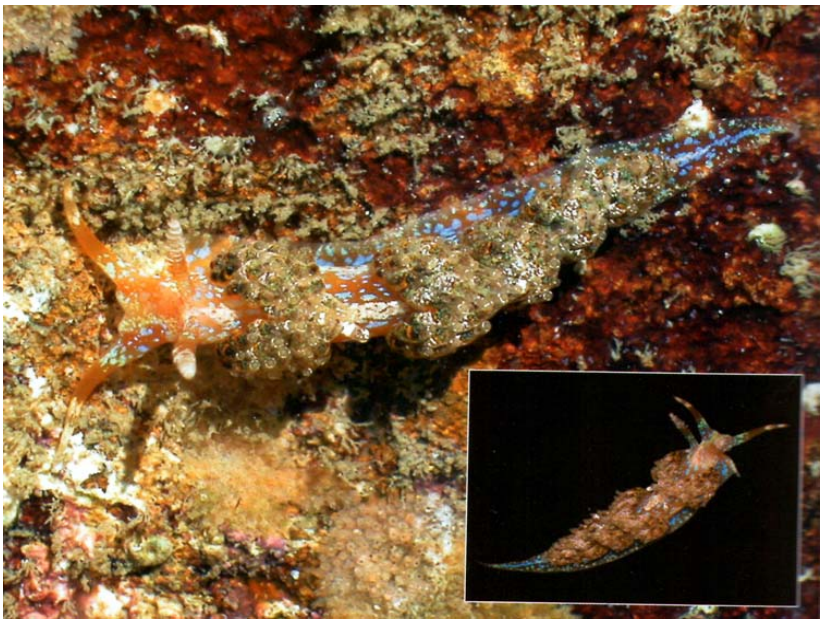


Plate 4. Ranges of some temperate endemic E. Australian molluscs such as the distinctive, shallow water aeolid nudibranch *Austraeolis ornata* are contracting southward. These are rapidly becoming rarer on the Sunshine Coast. Photos courtesy Gary Cobb and Richard Willan (2006).

Corals

Distribution and extent of coral communities and level of reef-building

The reef formations at all 14 sites were characterized as coral communities developed directly on non-biogenic substrates. There is no significant reef-building or carbonate accretion present, as would be exemplified by the presence of large intertidal reef-flats having developed since the Holocene Transgression on antecedent topography, as is typical of most reefs of the GBR further north. Rather, Sunshine Coast reefs occur as subtidal patches typically more than 7 m deep at their shallowest point, with the living veneer of coral and other sessile benthic species growing on non-reefal rock, mostly of igneous origin. These reef communities are nevertheless quite extensive in places, covering areas of tens of hectares, as well exemplified at the Gneering Shoals off Mooloolaba.

An additional series of deeper reef patches, ranging from ca. 25 to > 50 m depth, occur further offshore (e.g. off Sunshine Beach). These were not surveyed during the present study, being too deep to allow sufficient time to conduct an adequate survey on SCUBA using compressed air. The shallower portions of these deeper patches could, however, be surveyed using Nitrox in future.

Species composition and richness

A total of 105 species of reef-building (hermatypic) corals were recorded, with the richest individual site at the Inner Gneering Shoal hosting 58 species. The three sites at this location also had the highest mean richness (54 spp., Fig. 4), followed closely by Outer Gneering Shoal (51 spp.), Hancock Shoal (49 spp.) and Jew Shoal (46 spp.). An additional 17 reef-building coral species have been reported from the Sunshine Coast in previous publications (e.g. Harriott et al. 1992, Harrison et al. 1993) and another species was identified from a photo collection from Jew Shoal, Noosa provided by Jan Brown (all listed in Annex 3). It is also likely that some additional species are present, albeit sparsely distributed in low abundance, or in areas not yet surveyed, and further surveys will likely add to the present species list. Representative examples of the different species present are illustrated in the photo Plates below.

Several genera of corals, notably *Acanthastrea*, *Turbinaria*, *Goniastrea* and *Acropora*, are well represented in terms of their contributions to benthic cover and abundance. The main contributing species are tabular - plating *Acropora glauca* and *A. solitaryensis*, encrusting *Turbinaria radicalis*, vase-shaped *T. frondens*, massive *Goniastrea australiensis*, *Acanthastrea hemprichii*, *A. lordhowensis* and *A. hillae*. Thirty-nine genera of alcyonacean soft corals, gorgonian sea fans, antipatharian 'black corals', anemones and corallimorpharians were also recorded, making major contributions to community structure and benthic cover at most sites. Richest locations for soft corals and allies were Jew Shoal, Hall's Shoal and Pt. Arkwright Shoal, with at least 15 genera present (Fig. 5, Plates 5 and 6).

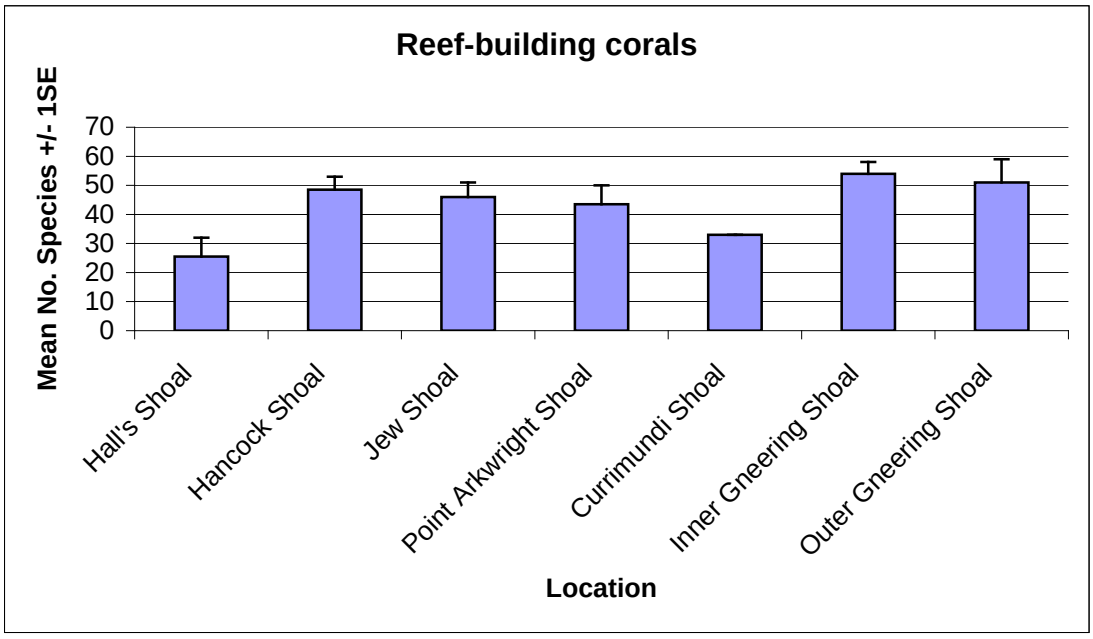


Figure 4. Mean species richness (+ 1 SE) of reef-building corals at seven Sunshine Coast locations, July 2010.

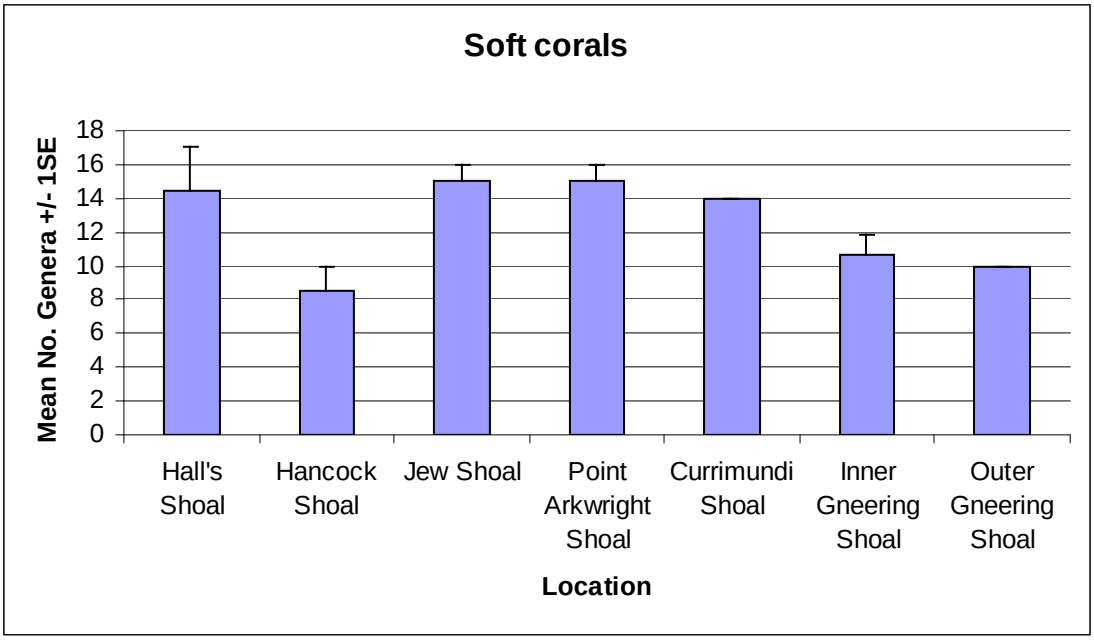


Figure 5. Mean generic richness (+ 1 SE) of soft corals and allies at seven Sunshine Coast locations, July 2010.

Plate 5. Sea fan *Melithea* sp. and hard corals on igneous rock, Jew Shoal.

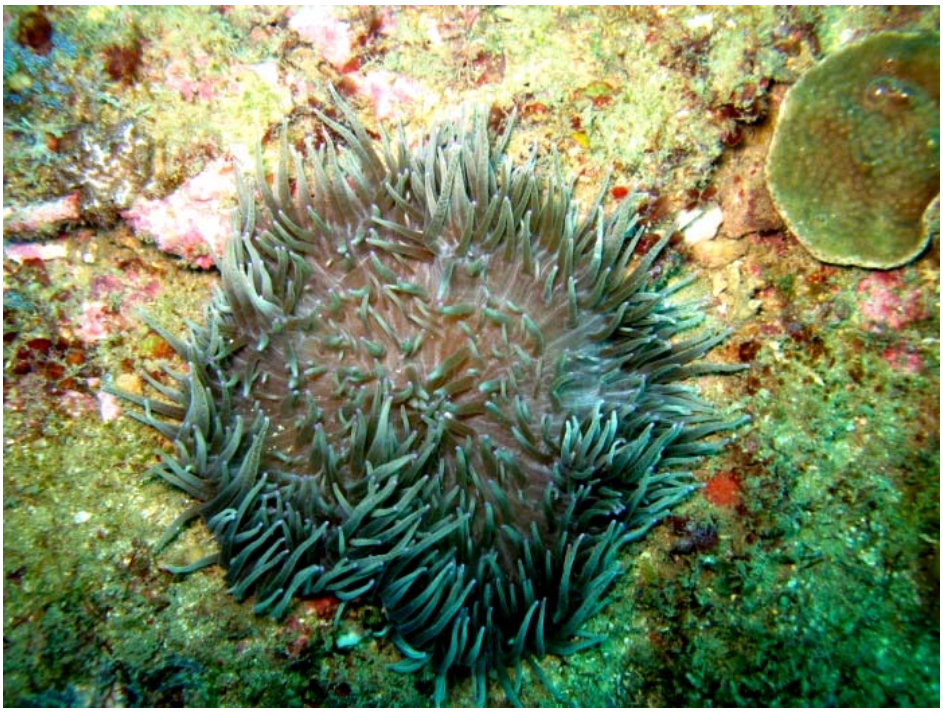


Plate 6. Sea anemone *Heteractis crispa*. A favoured host of many species of clownfish, most anemones on the Sunshine Coast were without such fish, although at least two species, *Amphiprion akindynos* and *A. clarkii*, occur there.

Approximately 10 % of the reef-building coral species present are uncommon or rare in more tropical waters of the Great Barrier Reef (GBR). Examples include: *Acanthastrea lordhowensis, A. bowerbanki* (Plates 7 and 8) and *A. hillae, Astreopora moretonensis, Turbinaria radicalis, T. patula* and *T. bifrons*, among others.

Plate 7. *Acanthastrea lordhowensis*, a characteristic and colourful member of Sunshine Coast coral communities.

Plate 8. *Acanthastrea bowerbanki,* a species rarely found further north on the GBR.

Relative abundance

Approximately one-third of reef-building coral species (36 species) present were locally common on the Sunshine Coast, with a total summed abundance score across the 14 sites of 14 or more. Several genera of soft corals were also ubiquitous and the most common of these are tabled below (Table 4). These various species (e.g. Plates 9 and 10) are the major contributors to community structure and provision of three-dimensional habitat for other species. Their populations on the Sunshine Coast are likely to be maintained by reproduction locally, rather than through larval dispersal from more distant populations on the GBR or elsewhere. There is, however, likely to be episodic larval recruitment from these more distant populations to the local gene pool.

Table 4. The most common corals on the Sunshine Coast, July 2010. SC – soft coral.

Species	**No. sites**	**Sum of rel. abundance**	**Mean abundance**
Turbinaria radicalis	14	47	3.357143
Goniastrea australensis	14	47	3.357143
Sarcophyton (SC)	14	42	3
Turbinaria frondens	14	40	2.857143
Sinularia (SC)	14	39	2.785714
Acanthastrea hemprichii	12	38	3.166667
Lobophytum (SC)	12	35	2.916667
Acropora glauca	11	34	3.090909
Turbinaria peltata	14	33	2.357143
Sansibia (SC)	14	33	2.357143
Dendronephthya (SC)	13	32	2.461538
Acanthastrea lordhowensis	12	31	2.583333
Cladiella (SC)	14	31	2.214286
Favia speciosa	14	29	2.071429
Stylophora pistillata	14	28	2
Psammocora superficialis	13	28	2.153846
Acanthastrea hillae	13	28	2.153846
Plesiastrea versipora	14	28	2
Anthelia (SC)	14	28	2

Conversely, about one-third (38 spp.) of the reef-building coral species present were rare on the Sunshine Coast, with a total summed abundance score of < 3 across the 14 sites (Plates 11 and 12). The rarest of these, recorded from a single colony at a single

site (Table 5), include *Acropora hyacinthus* and *A. cytherea*, *Lobophyllia hemprichii*, *Pavona duerdeni* and *P. explanulata*, among other common, tropical reef-building species. The Sunshine Coast is presently near the edge of their biogeographic ranges in terms of dispersal and / or physiology. Several of these species, including *Acropora digitifera*, have larger subtropical populations in nearby waters of Hervey Bay and Moreton Bay, and others further afield (e.g. *Acropora abrotanoides* at Lord Howe Island).

Plate 9. *Turbinaria radicalis*, one of the commonest corals on Sunshine Coast, is rarely found on the GBR.

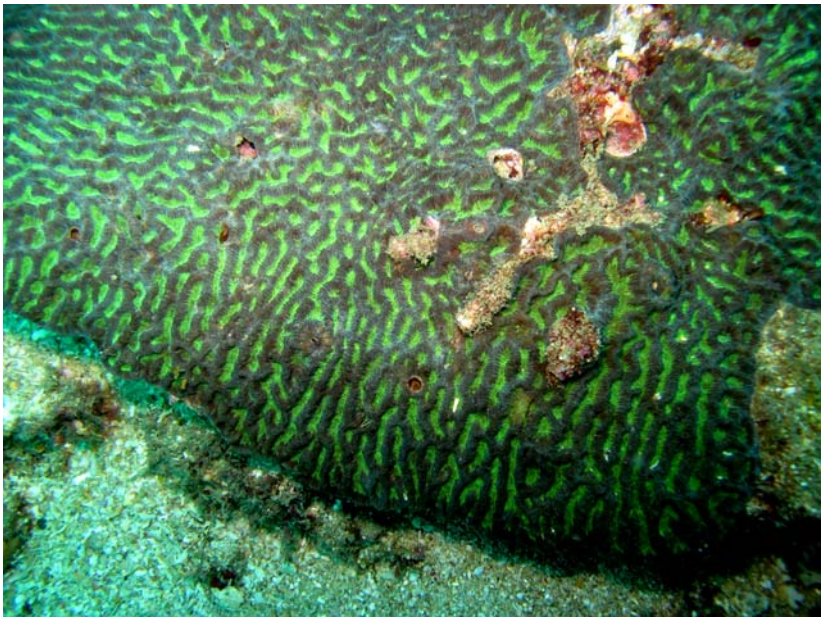


Plate 10. *Goniastrea australensis*, another of the most common corals on the Sunshine Coast, is also common on tropical coral reefs.

Plate 11. *Alveopora allingi*, an uncommon coral on the Sunshine Coast, is recorded from several colonies at Jew Shoal.

Plate 12. *Lobophyllia hemprichii*, one of the rarest corals on the Sunshine Coast, is recorded from this single colony at Gneering Shoal.

Based on the results from 14 sites, it is unlikely that these species are presently sustained on the Sunshine Coast by local reproduction. Rather they are likely to have arrived as larvae dispersed from larger populations to the north (or south) and presently form 'pseudo-populations' on the Sunshine Coast. These are likely not

permanent members of the local species pool, their local populations subject to episodic extirpation and subsequent re-establishment via larval dispersal from further afield. Although it cannot be discounted that larger local populations will be found here with additional surveys, at present these species are considered more likely to be the coral equivalents of 'waifs and vagrants', terms more commonly applied to fish found outside their usual distribution ranges (see later). Changing future environmental conditions may however promote expansion of their populations locally.

Table 5. The rarest reef-building corals on the Sunshine Coast, July 2010.

Species	**No. sites**	**Relative abundance**
Pocillopora danae	1	1
Montipora millepora	1	1
Acropora abrotanoides	1	1
Acropora clathrata	1	1
Acropora cytherea	1	1
Acropora digitifera	1	1
Acropora hyacinthus	1	1
Acropora samoensis	1	1
Acropora subulata	1	1
Psammocora haimeana	1	1
Coscinaraea crassa	1	1
Coscinaraea exesa	1	1
Pavona duerdeni	1	1
Pavona explanulata	1	1
Pavona varians	1	1
Hydnophora microconos	1	1
Hydnophora pilosa	1	1
Turbinaria bifrons	1	1
Turbinaria heronensis	1	1
Lobophyllia hemprichii	1	1
Scolymia australis	1	1
Favia danae	1	1
Favia maxima	1	1
Favites russelli	1	1
Goniastrea aspera	1	1

Species	No. sites	Relative abundance
Goniastrea palauensis	1	1
Goniastrea pectinata	1	1
Platygyra pini	1	1
Platygyra sinensis	1	1
Leptastrea purpurea	1	1
Porites deformis	1	1

Comparison with adjacent sub-tropical locations

Sunshine Coast coral communities share similarities and differences with those to the north in Hervey Bay and south in Moreton Bay and Flinders Reef. These sub-tropical communities all have relatively low overall richness (ca. 50 – 125 species, Annex 3). Flinders Reef located off Moreton Island shares closest similarity in species composition and richness with the Sunshine Coast (Fig. 6).

Flinders Reef is one of the closest adjacent sites geographically, and also is more exposed to wave action than the more sheltered environmental settings inside Moreton Bay and Hervey Bay. The latter bays are also subject to higher turbidity when fine sediments are resuspended, and to more pronounced fluctuations in salinity following flood runoff from the Brisbane and Mary Rivers and coastal streams.

In Hervey Bay in particular, a diverse group of foliose species of *Turbinaria* and massive – columnar *Goniopora* assemblages are well developed along the mainland coast, being the dominant corals in nearshore communities there. Diverse assemblages of *Turbinaria* are also present in the other sub-tropical localities, although their relative abundance is typically lower; and hence they have a lesser role in structuring the coral communities. *Acropora glauca* and *A. solitaryensis*, both major components of most Sunshine Coast coral communities, were not recorded in Hervey Bay.

The two main *Acropora* species present in Hervey Bay are *A. digitifera* and *A. bushyensis*, both of which form large monospecific stands in places. *A. digitifera* grows as a characteristic 'ecomorph', also present in Moreton Bay (Wallace et al. 2009, DeVantier 2010). This ecomorph was not found in the more wave-exposed communities of the Sunshine Coast, where *A. digitifera* is rare and represented by the more typical stout digitate Indo-Pacific morphology. The other main *Acropora* species from Hervey Bay, *A. bushyensis*, was not recorded on the Sunshine Coast, and is not listed from Moreton Bay either.

Another difference among these locations is the apparent dearth, on the Sunshine Coast, of huge individual coral colonies or large monospecific stands, as may be formed by many species with indeterminate growth. These are more common in the

more sheltered waters of Hervey Bay and, to a lesser extent, Moreton Bay, where such stands are formed by *Goniopora* spp. and *Acropora digitifera*.

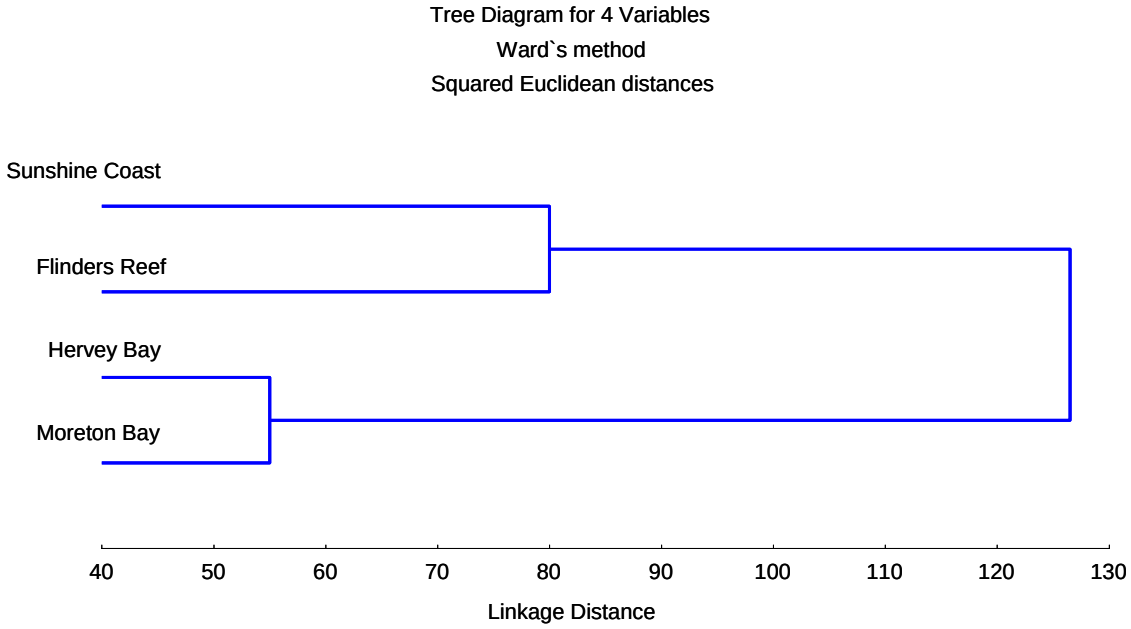


Figure 6. Similarity of coral species at four sub-tropical Queensland locations. Data for Moreton Bay from Wallace et al. (2009), Flinders Reef from Veron (1993).

Coral growth – benthic cover

Large, long-lived coral colonies (> 100 cm diam.) typical of families Faviidae (e.g. *Favia maritima, F. lizardensis, Favites flexuosa, F. complanata* and *Plesiastrea versipora* and Poritidae (*Porites* and *Goniopora* spp.) were rare. This is consistent with major episodic disturbance on a decadal time scale limiting the survival of most individual coral colonies to periods of decades rather than centuries. Similarly, most plating colonies of *Acropora* were < 200 cm diameter.

Several large massive corals were present, including *Favia lizardensis* and *Porites lutea* (Plates 13 and 14). There were also large (> 100 cm diam.) encrusting colonies of *Goniastrea australensis*, *Acanthastrea hemprichii*, *A. hillae* and several other species present at most sites (Table 4), contributing significantly to coral cover.

Plate 13. A large colony of *Favia lizardensis*, likely to be a century or more in age, Gneering Shoal. Such large colonies are very rare on the Sunshine Coast.

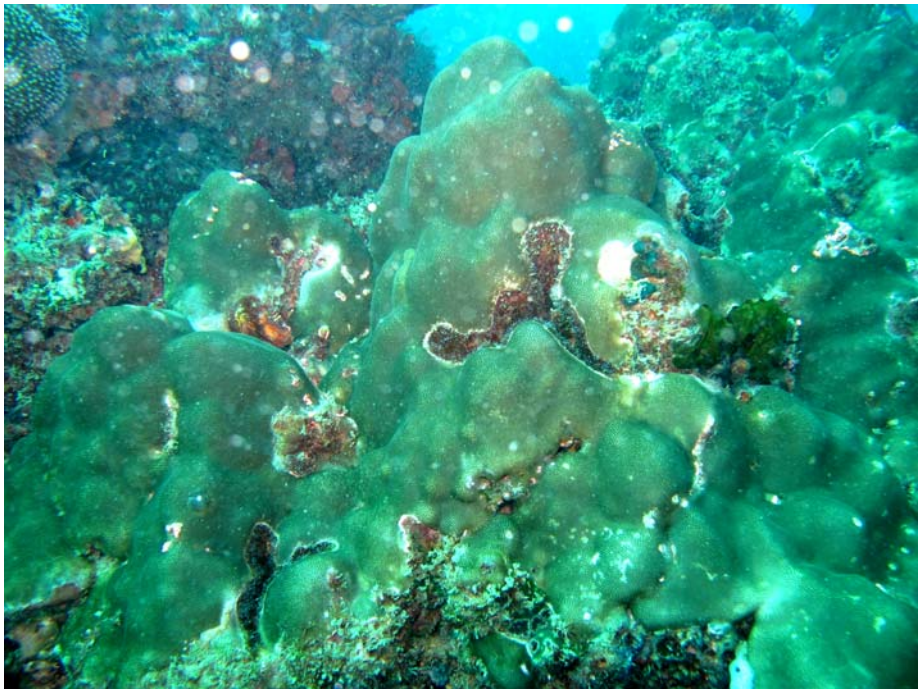


Plate 14. Portion of a large colony of *Porites lutea*, Gneering Shoal. The Sunshine Coast is near the southern distribution limit for this species, and for *F. lizardensis* (above).

Overall, cover of living sessile benthos was distributed relatively evenly among hard corals (mean 22 %), soft corals (mean 16 %), coralline and turf algae (17 % and 16 %, Fig. 7). Most locations had patches of very high cover of live coral, ranging up to 100 % over 100s of m^2, composed of mixed assemblages of hard and soft corals (Plates 15 and 16). Among hard corals, as noted above, encrusting - submassive colonies of *Acanthastrea* and *Goniastrea*, plating *Acropora* and encrusting – vase-shaped *Turbinaria* were major contributors to cover. Soft coral cover was composed predominantly at different sites by varied mixed assemblages of the genera *Sarcophyton, Lobophytum, Cladiella, Sinularia, Sansibia* and *Anthelia*. Cover estimates for living hard and soft corals and dead corals were similar to earlier 1993 estimates (Banks 1995), the latter made for Gneering Shoal region (Figs. 7 and 8).

Dead corals generally covered < 5 % of the substrate, of which recently dead corals accounted for 1 % or less, on average (Fig. 7). Thus there was a strong overall ratio of living : dead hard corals of ca. 5 : 1. Partial – total coral mortality, particularly on larger (older) colonies, was attributable to one or more of the following: overgrowth by sponges, ascidians and other benthos, diseases including an unknown form of tissue necrosis (Plates 17 and 18), predation by snails, and potentially prior bleaching events (Loder 2009) from high or low sea temperatures, or sand scour / dislodgement during rough sea conditions. Compensating for coral mortality, continuing recruitment of both hard and soft corals was occurring, most notable on old dead coral skeletons (Plates 19 and 20). At individual locations, cover of living hard corals was highest (> 25 %) at Inner Gneering Shoal and Hancock Shoal (Fig. 8), and lowest at Hall's Shoal and Currimundi Shoal. For soft corals, highest cover (ca. 25 %) was at Point Arkwright Shoal and Inner Gneering Shoal (Fig. 9). Lowest cover (< ca. 5 %) was at Hancock Shoal and Jew Shoal.

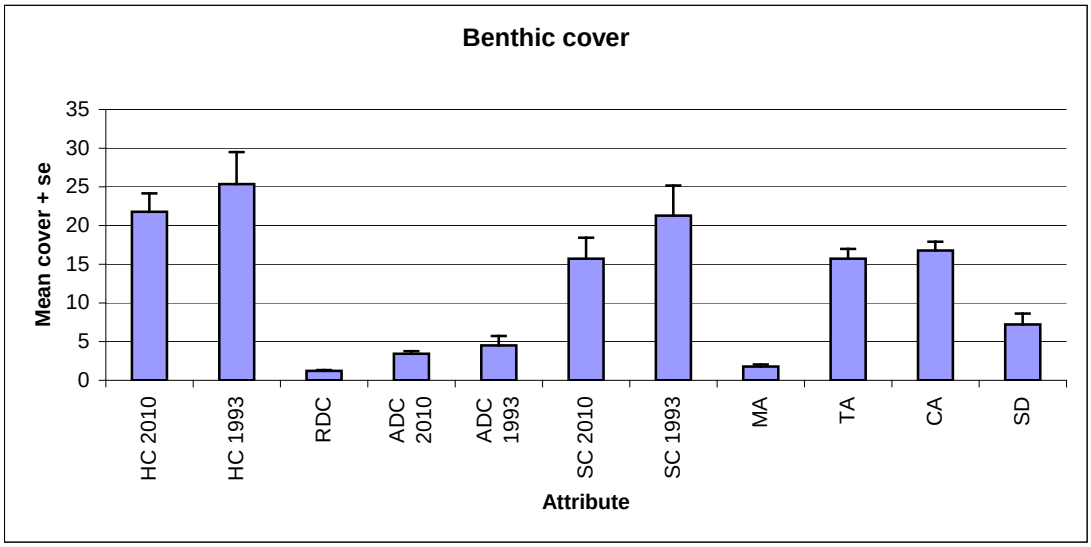
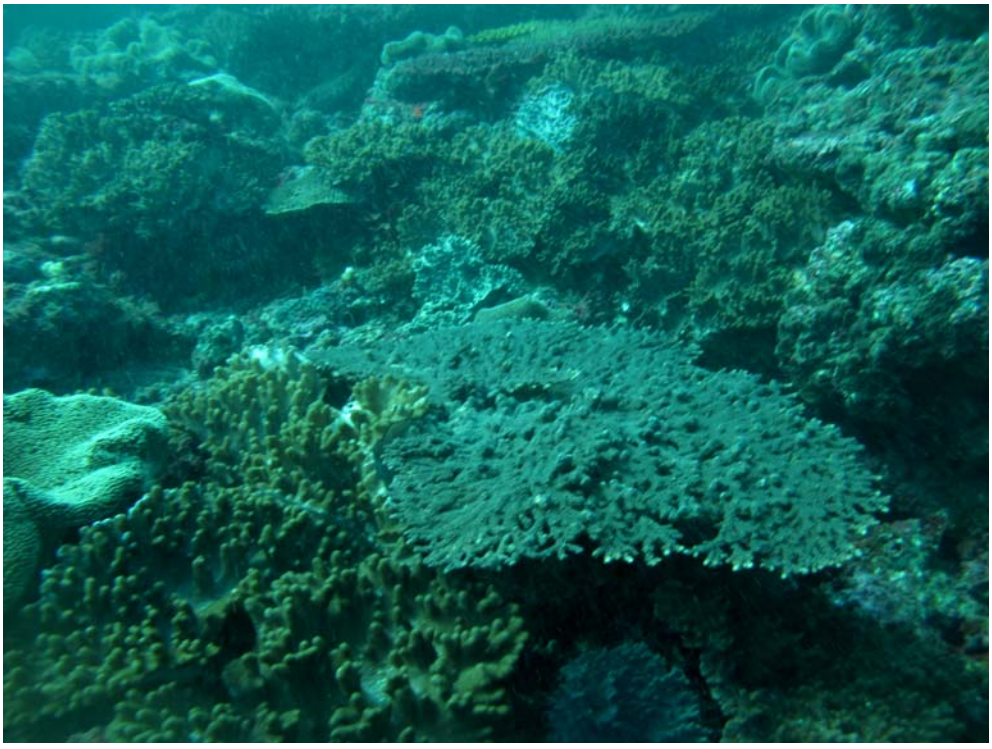


Figure 7. Mean cover (+ 1 SE) of major sessile benthic attributes, Sunshine Coast July 2010. HC – Hard Coral, RDC – Recently Dead Coral, ADC – All Dead Coral, SC – Soft Coral, MA – Macro-Algae, TA – Turf Algae, CA – Coralline Algae. 1993 data from Banks (1995).

Plates 15 and 16. Mixed cover of hard (mainly *Acropora* and *Turbinaria* spp.) and soft corals (mainly *Sinularia* sp.), typical of most Sunshine Coast coral communities.



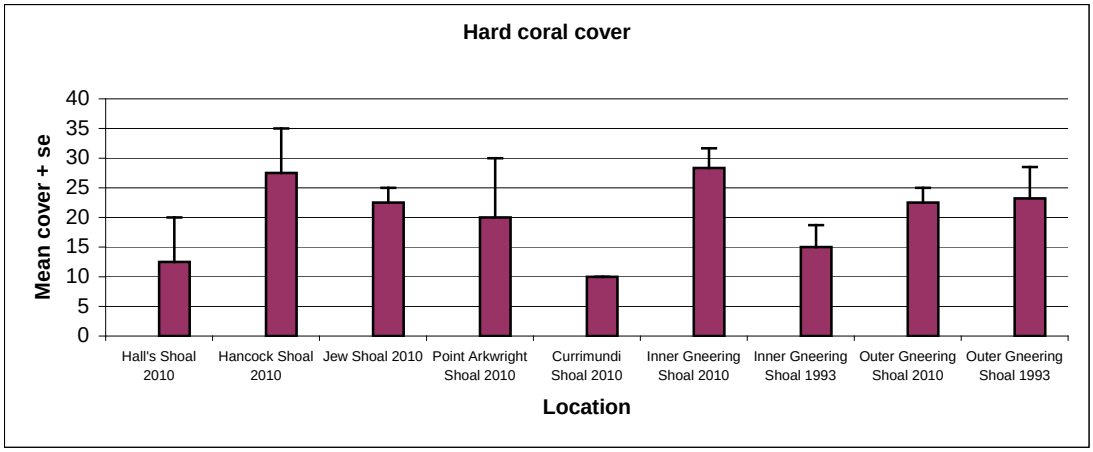


Figure 8. Mean cover of hard corals (+ 1 SE), Sunshine Coast, July 2010. 1993 data from Banks (1995).

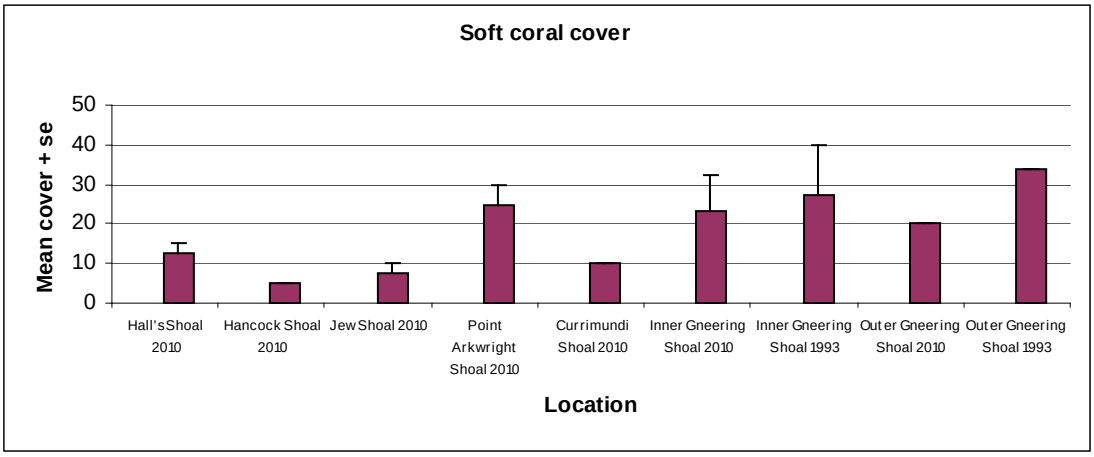


Figure 9. Mean cover of soft corals (+ 1 SE), Sunshine Coast, July 2010. 1993 data from Banks (1995).

Generally, these results are consistent with those obtained by Reef Check surveys (RC) from the same locations the previous year (Loder 2009). For example, at Jew Shoal, the present estimate of hard coral cover from two sites of 23 % was very close to RC's estimate from one site there (24 %). At Hancock Shoal, RC's estimate for hard coral cover from two sites was 22 %, compared with 28 % from the present survey, which was located several 100s of m from the RC sites (B. Bell pers. comm.). At the Inner Gneering Shoal, the present estimate of hard coral cover from three sites of 29 % was higher than the RC estimate from one site (Caves – 19 %). Our site near Caves had ca. 25 % cover, closer to the RC estimate there. At Currimundi Shoal, the RC estimate for hard coral cover from two sites of 21 % was, however, substantially higher than the present estimate (10 %) from one site there, which was surveyed under marginal conditions of underwater visibility (Annex 1), highlighting the need for further survey work in that location. For soft corals, estimates from the present

survey (PS) for the same locations were less consistent with those of RC from the previous year. Jew Shoal: PS – 8 %; RC – 15 %. Hancock Shoal: PS – 5 %; RC - < 5 %. Inner Gneering Shoal: PS – 24 %; RC – 14 %. Currimundi Shoal: PS – 10 %; RC – 22 %. These differences are likely attributable in part to greater spatial and / or temporal variability in the abundance and cover of soft corals as compared with hard corals, and to the different survey methods employed.

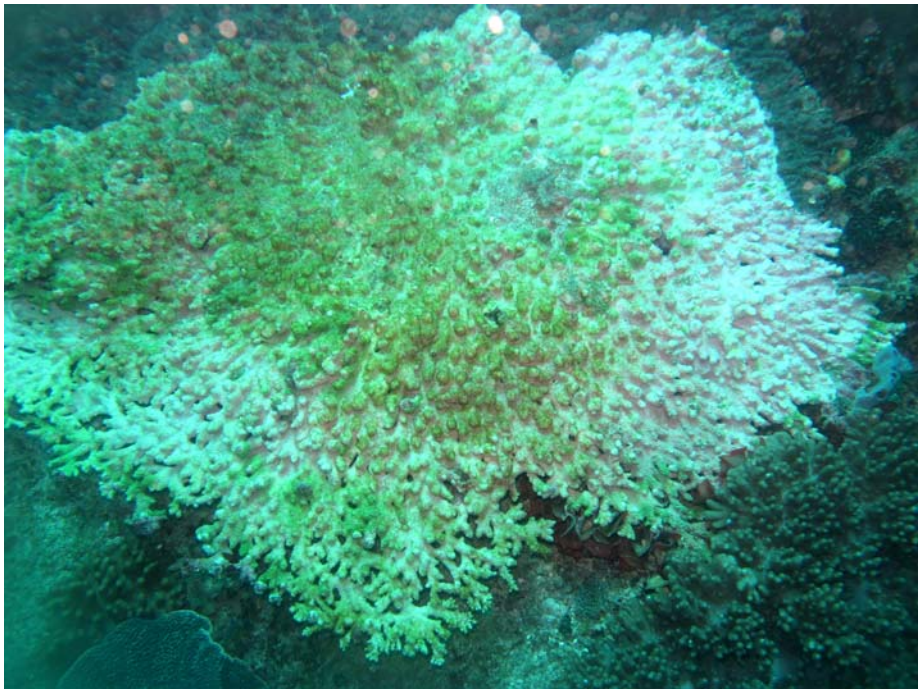


Plate 17. Unknown form of tissue necrosis on tabular *Acropora solitaryensis*.

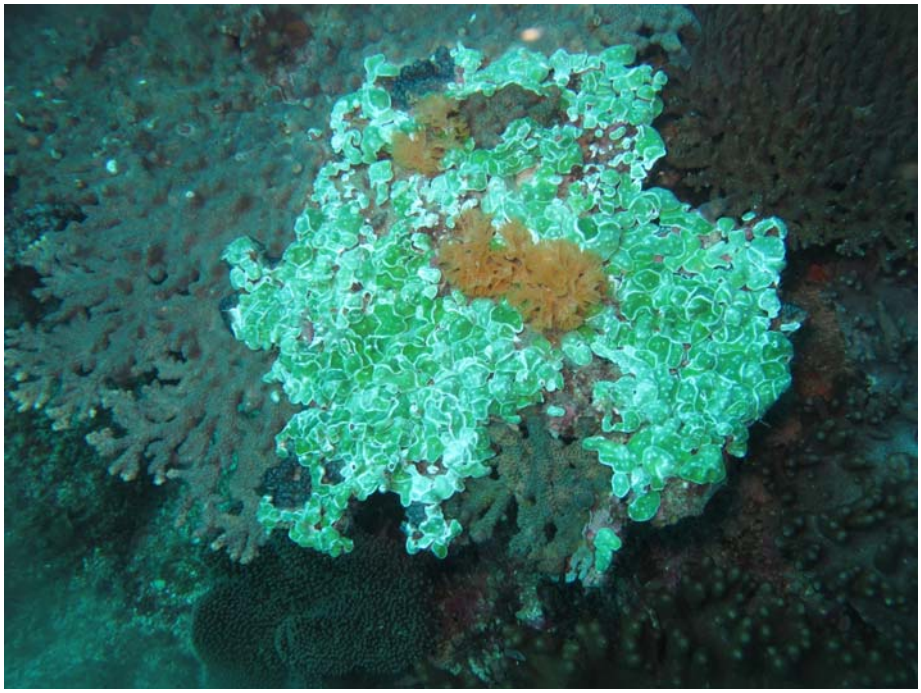


Plate 18. Overgrowth by ascidian *Lissoclinum bistriatum* on tabular *Acropora glauca*.

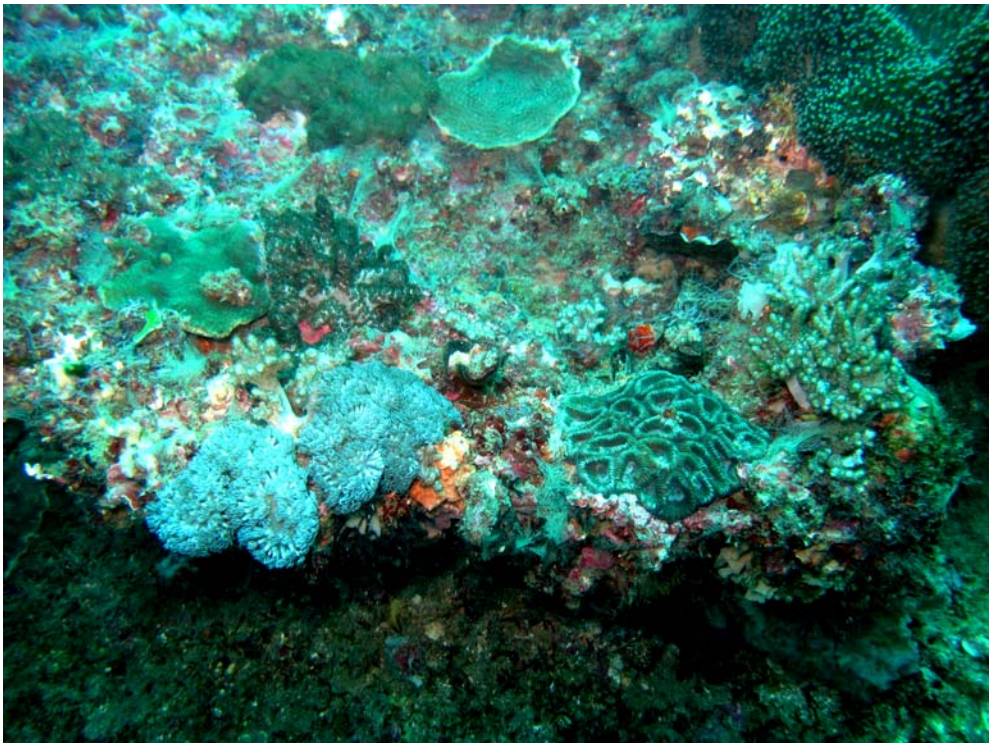


Plate 19. Recruitment of hard corals, including *Favia veroni* (lower right), *Turbinaria spp.* (left and top), and various soft corals on an old dead *Acropora* table, Point Arkwright Shoal.

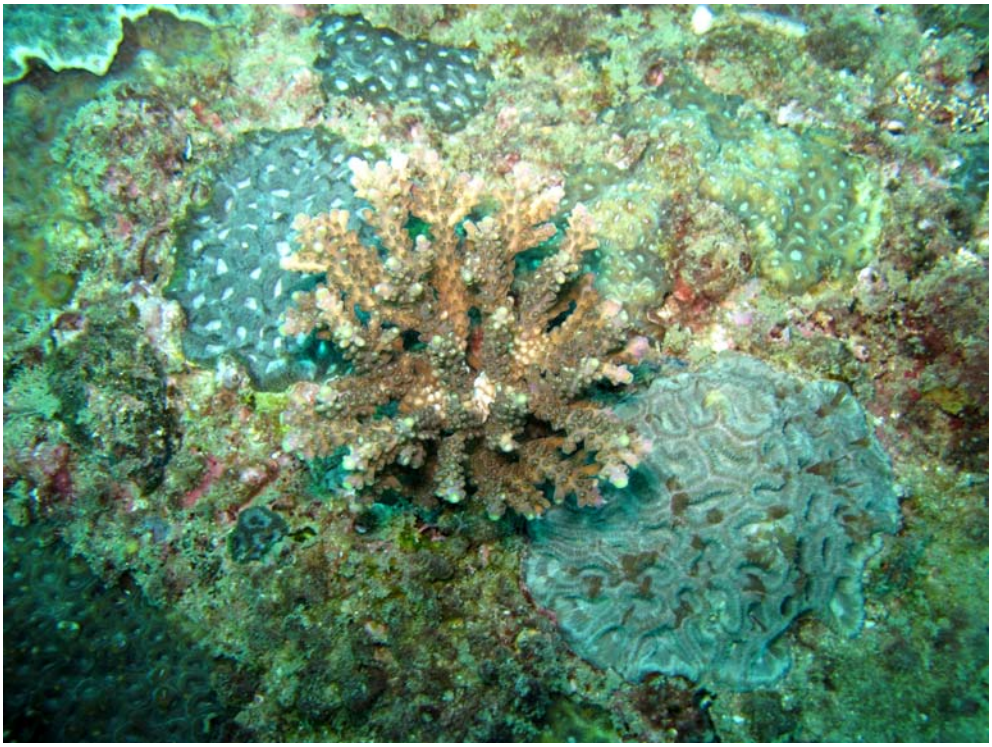


Plate 20. Young colony of *Acropora divaricata* between *Favia speciosa* (bottom right), *Montastrea curta* (top right and bottom left), and *Acanthastrea hemprichii* (top left). A number of smaller coral recruits are also present.

Fishes

Species composition and richness

A total of 222 species of reef-associated fishes were recorded, from 53 families (Annex 4). As is typical of reef-associated fish assemblages, richness was dominated by the families Pomacentridae and Labridae, with 46 and 34 species respectively. Chaetodontidae (14 species), Acanthuridae and Serranidae (12 species each) also made significant contributions to overall richness. Overall species richness of reef-associated fishes was approximately double that of the reef-building corals, typical of similar surveys from other Indo-Pacific regions.

As with the other taxonomic groups, it is certain that other fish species are present in the area, occurring cryptically (e.g. Gobidae) or sparsely distributed in low abundance. Some species are known to occur episodically in Sunshine Coast waters as waifs or vagrants. Examples include the Blue-spot Coral Trout *Plectropomus laevis* (Plate 21). This species was not recorded during the present survey, but has been sighted from Jew Shoal during previous dives. Waifs and vagrants may be represented by both tropical and temperate species in relation to dispersal of larvae in long-shore southerly or northerly current flows.

Overall, the reef-associated fish fauna was dominated by tropical species, although a number of more southerly species are present, including the Eastern Blue Devil *Paraplesiops bleekeri*, here at the northern end of its distribution range. Large schools of the Eastern Pomfret *Schuettea scalaripinnis*, considered endemic to coastal waters of central QLD to southern NSW (http://australianmuseum.net.au/Eastern-Pomfred-Schuettea-scalaripinnis), and Western Australia (http://fishbase.org) are another characteristic feature of Sunshine Coast waters (Plate 22). Both northern New South Wales and Great Barrier Reef colour morphs of the Clownfish *Amphiprion akindynos* were present (Plate 23), illustrating the transitional nature of the area from a biogeographic perspective.

At individual locations, the highest richness of reef associated fishes was recorded at Jew Shoal (85 species) and Outer Gneering Shoal (82 species), with lowest richness (41 species) at Currimundi Shoal (Fig. 10). However, as noted above, Currimundi Shoal requires further survey work.

Density of fishery target species was also highest at Outer Gneering Shoal (42 fish 1000 m^{-2}, Plate 24) and Currimundi Shoal (36 fish 1000 m^{-2}) (Fig. 11). Inner Gneering Shoal and Arkwright Shoal had significantly lower densities (ca. 5 fish 1000 m^{-2}). The most commonly sighted fishery target species were members of the families Sparidae (e.g. *Acanthopagrus australis, Rhabdosargus sarba*), Lutjanidae (e.g. *Lutjanus carponotatus, L. russelli*), Serranidae (*Epinephelus fasciatus, E. undulatostriatus*) and Labridae (*Choerodon graphicus, C. venustus*). Only one individual Pink Snapper (*Pagrus auratus* – Sparidae) was sighted during the July 2010 survey and this fish was a subadult of approximately 25 cm in length.

Ornamental species, such as Anenomefishes (*Amphiprion* spp.), Angelfishes (Pomacanthidae) and butterflyfishes (Chaetodontidae) were patchily distributed (Figs. 12 – 14).

Plate 21. Sub-adult *Plectropomus laevis*, Jew Shoal, photographed in January 2010. This species was not recorded during the July survey.

Plate 22. Large school of Eastern Pomfret *Schuettea scalaripinnis*, Jew Shoal. This species is considered endemic to coastal waters of central QLD to southern NSW and central Western Australia.

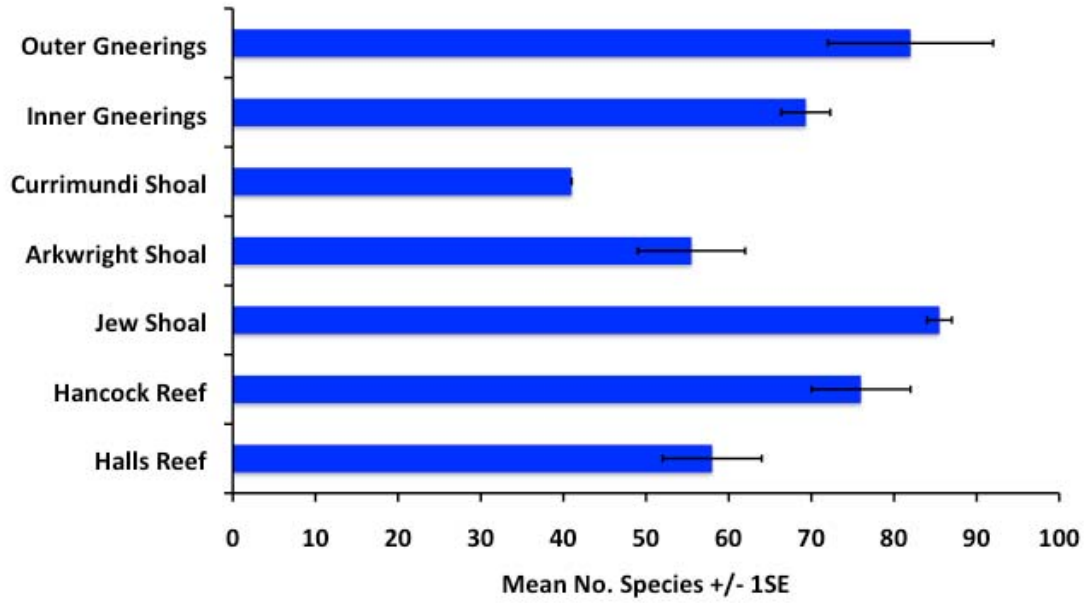


Figure 10. Species richness of reef-associated fishes at seven Sunshine Coast locations, July 2010.

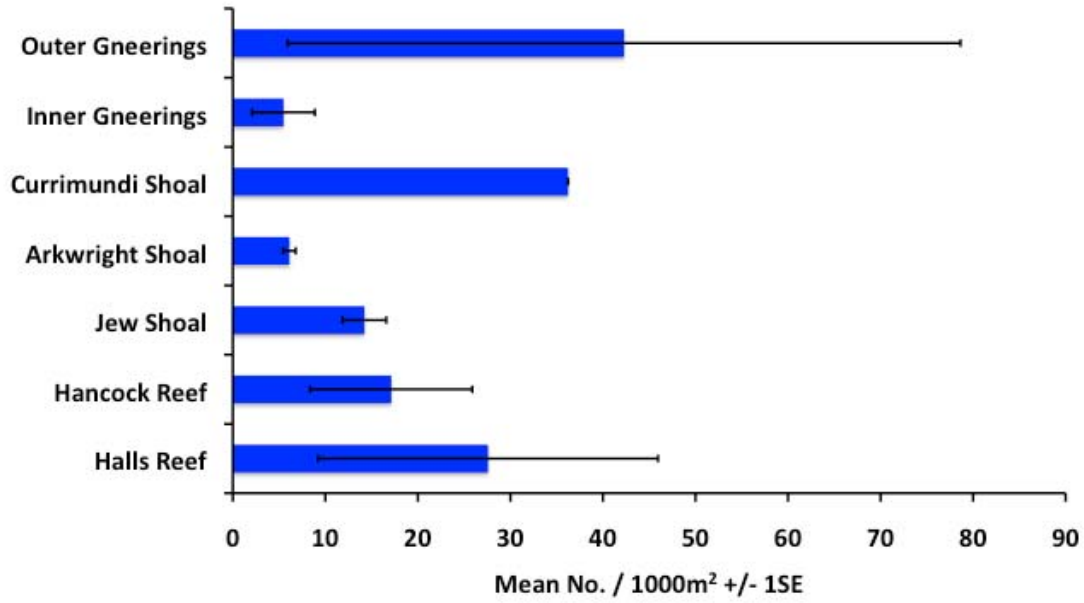


Figure 11. Density of hook and line, and spear fishery targeted species at seven Sunshine Coast locations, July 2010.

Anenomefishes were not recorded from Hall's Shoal, Jew Shoal and Currimundi Shoal, and were consistently in low abundance (< 1 individual 1000 m^{-2}) at Hancock Shoal, Arkwright Shoal and Outer Gneering Shoal. The highest density of anenomefishes (5 individuals 1000 m^{-2}) was recorded at Inner Gneering Shoal. However, this was attributable to a single large colony (19 individual fish) of *Amphiprion akindynos* at just one of the three sites surveyed there. In contrast,

angelfishes and butterflyfishes were recorded from all seven locations. Angelfish densities ranged from a low of < 4 individuals 1000 m^{-2} at Hall's Shoal to a high of > 27 individuals 1000 m^{-2} at Currimundi Shoal (Fig. 13). Butterflyfish densities ranged between < 6 individuals 1000 m^{-2} at Hall's Shoal to a high of > 30 individuals 1000 m^{-2} at Currimundi Shoal (Fig. 14).

Plate 23. Part of large school of Yellowtail kingfish *Seriola lalandi*, Outer Gneering Shoal. Few large schools of target fishery species were recorded during the survey.

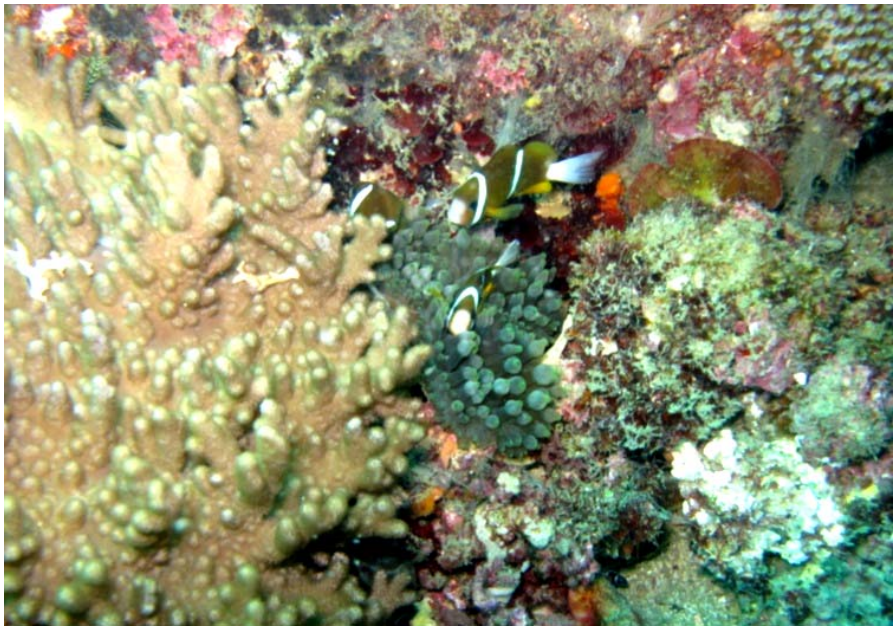


Plate 24. One of very few colonies of Anenomefish (*Amphiprion akindynos*) in host anemone *Entacmaea quadricolor*.

Only two species of anemonefish were recorded during the July 2010 survey period, the Barrier Reef Anemonefish (*Amphiprion akindynos*) and Clarke's Anemonefish (*Amphiprion clarkii*). Suitable hosts for clownfishes, in the form of several species of sea anemone *Heteractis* and *Entacmaea*, was present at all sites, and hence the low clownfish numbers are not considered the result of lack of available habitat. These fish are targeted by commercial and recreational aquarium fish collectors, and the low numbers present on Sunshine Coast reefs are potentially attributable to harvest pressure. However, a lack of prior data on the local distribution and abundance of these species means that it is not possible to assign definitive trends to their local population sizes, and hence these comments remain speculative. Previous studies have shown that anenomefish densities can range between 1 and 25 individuals per 1000 m^{-2} on reefs of the Southern Great Barrier Reef (Sale et al. 1986; Frisch & Hobbs 2007), to between 6 and 520 individuals per 1000 m^{-2} on reefs in northern New South Wales (Richardson 1996, 1999).

According to a recent QLD State Government Dept. of Primary Industry and Fisheries (DPIF) report (2007), clownfish are not the most harvested ornamental species on the Sunshine Coast, perhaps reflecting the fact that few are presently available for harvest:

"Personifer angelfish and butterflyfish species are the most harvested species groups in the Sunshine Coast SMA, averaging nearly 40% of the total catch since 2003. Harvest levels appear to be steady for this area".

A more recent QLD DPIF report (Roelofs 2008) has identified local impacts to the Personifer angelfish on reefs of the Sunshine Coast, although the species is not considered to be under significant harvest-driven threat more generally in QLD waters.

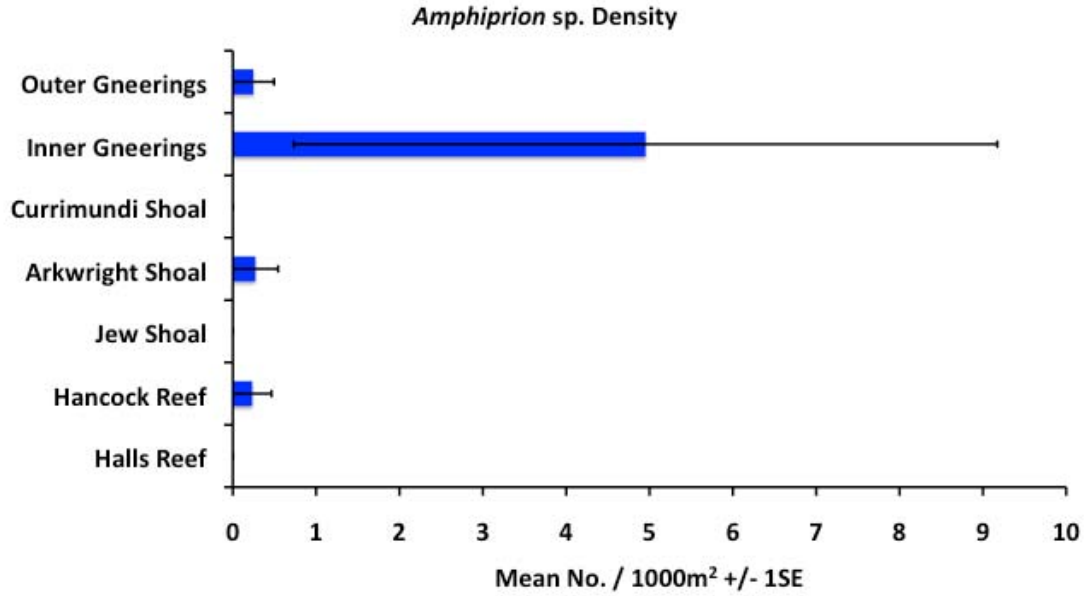


Figure 12: Density of anemonefishes (*Amphiprion* spp.), at seven Sunshine Coast locations, July 2010.

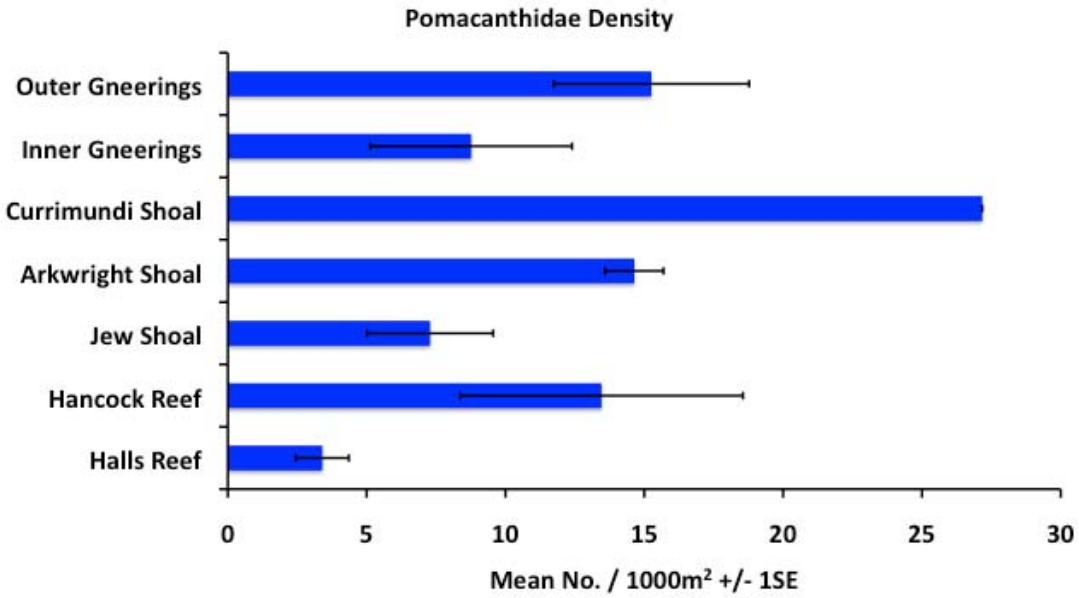


Figure 13. Density of Angelfishes (Pomacanthidae) at seven Sunshine Coast locations, July 2010.

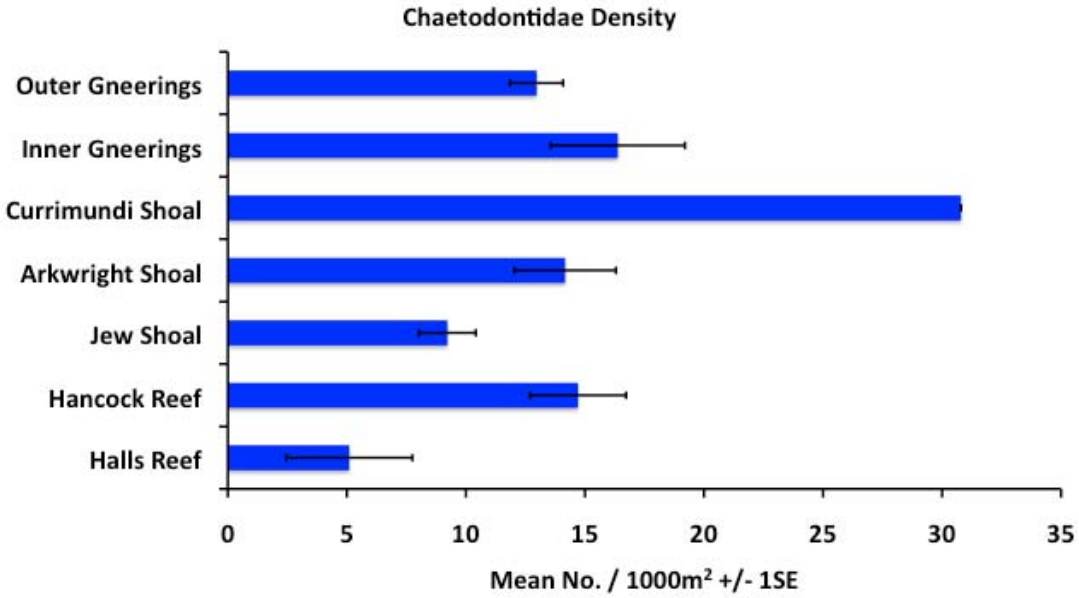


Figure 14. Density of Butterflyfishes (Chaetodontidae) at seven Sunshine Coast locations, July 2010.

Snagged or tangled fishing lines and/or lures were present at all locations (Fig. 15, Plates 25 and 26), having highest density (> 3 lines 1000 m^{-2}) at Outer Gneering Shoal, Currimundi Shoal, Hall's Reef and Jew Shoal. Notably, a dedicated clean-up at Jew Shoal in January 2010 had already removed a substantial amount of line from this location. Although, fishing line can persist in the marine environment for many years, much of the sighted lines were only lightly fouled, suggesting that they had not been present on the reefs for very long. It is evident that hook and line fishing is occurring at all 14 of the sites surveyed in July 2010.

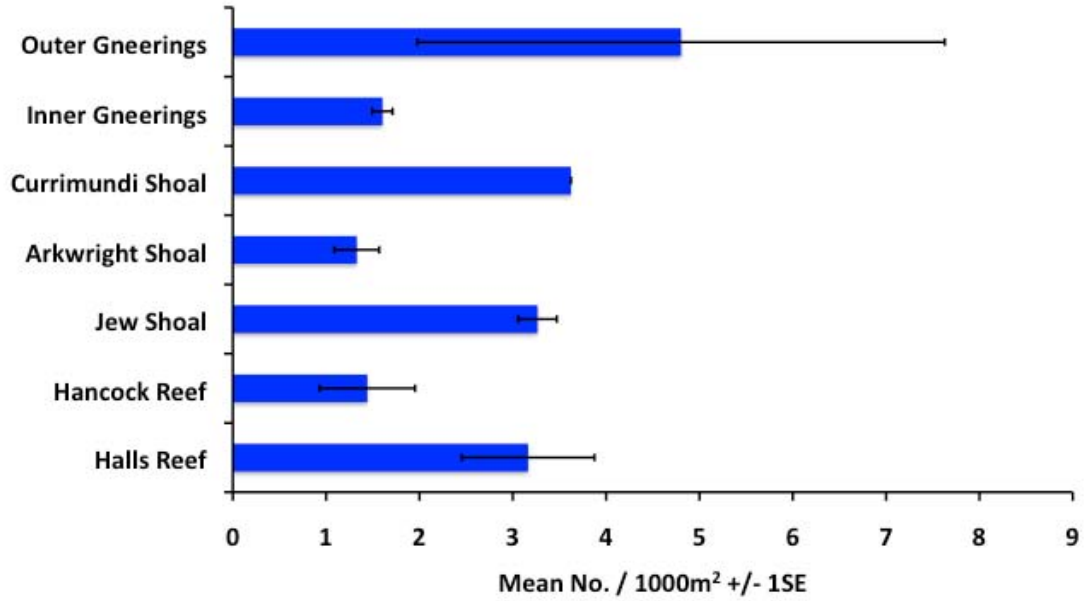


Figure 15. Mean number of fishing lines per 1000m² at seven Sunshine Coast locations, July 2010.

Plate 25. Tangled lines and / or lost lures were present at all survey sites.

Plate 26. Fishing line snagged on *Acropora divaricata*.

Other fauna

Preliminary lists of other conspicuous fauna were compiled during the survey. Individual adult Green or Loggerhead turtles *Chelonia mydas* and *Caretta caretta* were sighted at five of the seven locations (Plate 27). Painted crayfish *Panulirus ornatus* were recorded from three locations, with a slipper lobster *Scyllarides squammosus* from one location (Plate 28).

For the echinoderms, a very preliminary list incldes eight species of asteroid seastars, four species of crinoid featherstars, two species of echinoid urchins and two species of holothurian sea cucumbers. The asteroid fauna provides another good example of the transitional nature of the area biogeographically, with the widespread tropical species *Echinaster callosus* at the southern end of its distribution range and the temperate Australian *Pentagonaster duebeni* at the northern end of its range (Plate 29). According to Dr Anne Hoggett, an echinoderm specialist of the Australian Museum (Lizard Island Research Station):

" the echinoderm volume of the Zoological Catalogue of Australia (1995) notes that it [Echinaster callosus] is known in Australia only from Lizard Island and Double Island Point, Qld. The Lizard Island record is based on a specimen in the Australian Museum collection …. It's certainly not common at Lizard Island - I may have seen two in 20 years. Neville Coleman's book "Seastars" (2007) has a photo of it from Mooloolaba that he says is a new southern record", a finding supported by the present study.

Sponges were a common feature of the sessile benthos at most sites, comprised of both tropical and temperate species and including several colonies of the large, long-

lived tropical species *Xestospongia testudinaria*. Bryozoans and ascidians were also well represented, and appear more common and diverse on Sunshine Reef reef patches than in more northerly tropical waters.

Plate 27a. Green turtle *Chelonia mydas*, Inner Gneering Shoal. **27b.** Eagle Ray *Aetobatus narinari*, Jew Shoal.

Plate 28a. Painted crayfish, *Panulirus ornatus*, Hall's Shoal. **28b.** Slipper lobster *Scyllarides squammosus*, Hall's Shoal.

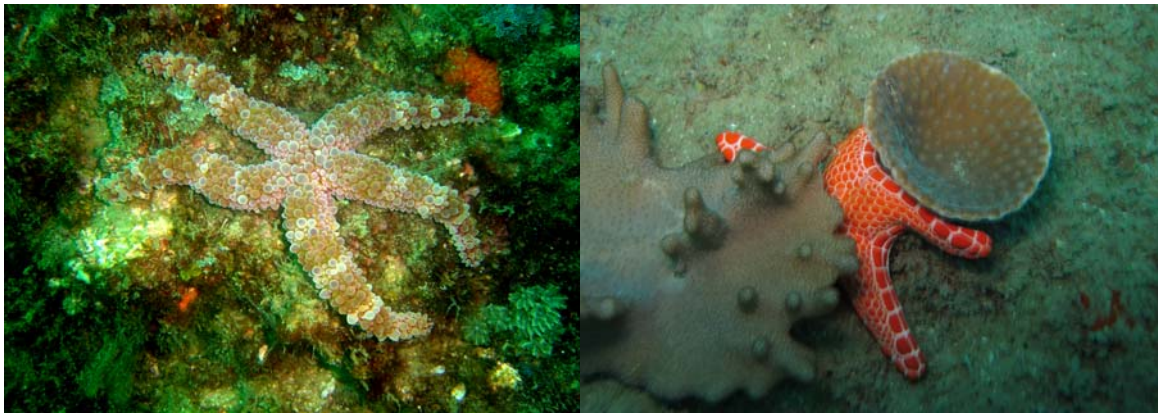


Plate 29a. Seastar *Echinaster callosus*, Jew Shoal. **29b.** *Pentagonaster duebeni*, Hall's Shoal.

Discussion

The Sunshine Coast hosts an extremely interesting nearshore marine fauna, comprised of both widespread tropical and temperate species near the edges of their respective distribution ranges, and regional endemics. Considerable further taxonomic work is required to document biodiversity adequately, particularly among molluscs. For example, of the 835 mollusc species listed, 125 species could not be assigned specific names. Some of these are new to science, not yet formally described.

Almost 10 % (81 species) of the molluscan fauna are considered endemic to the broader bioregion, their known distribution ranges restricted to the temperate/tropical overlap section of the eastern Australian coast (Central Eastern Shelf Transition). The Sunshine Coast also hosts species of coral and fish that are uncommon, rare or absent in more tropical waters of the Great Barrier Reef. Examples for corals include: *Acanthastrea lordhowensis*, *A. hillae*, *A. bowerbanki*, *Acropora glauca*, *Astreopora moretonensis*, *Turbinaria radicalis*, *T. bifrons*, among others. Examples for fishes include the Eastern Blue Devil and Eastern Pomfret.

The Australian CSIRO and the United Nations Intergovernmental Panel on Climate Change (2007) predict continued warming of sea temperatures over coming decades. This may contribute to increasing species richness and abundance of tropical species in Sunshine Coast waters, but with concomitant declines in species adapted to more temperate conditions. These nearshore reef communities offer significant opportunities for research focused on understanding species' acclimation and / or adaptation to changing future conditions. Notably, there are substantial areas of deeper reef communities, ranging from ca. 25 – 50 m depth, offshore. These were not surveyed during the present study, and their biodiversity attributes remain unknown.

There is already some evidence of species distributional changes related to changing sea temperature in the mollusc fauna. The ranges of temperate eastern endemic Australian species, such as the common shallow-water aeolid nudibranch *Austraeolis ornata*, are contracting southward. These are rapidly becoming rarer on the Sunshine Coast, and conversely, the proportion of widespread tropical species is increasing. For example, the tropical Fluted Giant Clam *Tridacna squamosa* was recorded, as single individuals, from three sites. These are among the southern-most distribution records for this species. Among starfishes, the tropical species *Echinaster callosus* is at the southern end of its range, and conversely the temperate *Pentagonaster duebeni* is at its northern extent here.

Similarly, almost one-third of the coral species present were very rare in the sites surveyed, being recorded from one to several colonies during the surveys. For such species, the Sunshine Coast is at the edge of their present distribution ranges. Most, if not all, of these species form local 'pseudo-populations' maintained by episodic dispersal from more distant populations on the southern GBR or elsewhere, rather than effective local populations. This may change if sea temperatures continue to increase over coming decades, and ranges shift southward.

Among reef-building corals and reef-associated fishes, highest richness in most families occurs in warmer tropical waters, with a strong pattern of attenuation in species richness southwards along the east Australian coast. The GBR in total hosts ca. 400 reef coral species, progressively declining southwards along the reef tract from > 300 species in the north to ca. 200 species in the far southern GBR, with further decline in richness on the Sunshine Coast (ca. 105 spp.). This attenuation is well illustrated across most, though not all, coral families in the present study. For example, no mushroom corals (family Fungiidae) were recorded, and while 'absence of evidence' is not necessarily 'evidence of absence', these corals are clearly extremely rare, if present locally in Sunshine Coast waters. One species (*Cycloseris cyclolites*) is known from Hervey Bay to the north and Moreton Bay to the south (Wallace et al. 2009, DeVantier 2010), where it is rare. Similar trends are apparent in the speciose coral families Acroporidae, Faviidae, Poritidae and Mussidae. In the latter family, just one species of *Lobophyllia* (*L. hemprichii* from a single colony) and no species of *Symphyllia* was recorded. The coral genera *Acanthastrea* and *Turbinaria*, were, however, well represented in respect of species richness and contributions to community structure and benthic cover, both having characteristic cool water species present.

The absence of significant reef accretion at any of the sites indicates that Sunshine Coast marine communities are growing near one end of the physico-chemical environmental spectrum for coral reefs, in a relatively homogeneous cool water habitat of patches of non-reefal rock substrate surrounded by predominantly sandy substratum, with associated episodic turbidity and scouring during periods of rough weather. The area may thus be considered 'marginal' for coral survival and reef growth, in the sense of definition 2 of Guinotte et al. (2003):

"On the basis of proximity to an environmental condition known or reasonably assumed, based on physiological or biogeographic evidence, to place an absolute limit on the occurrence of reef communities or key classes of reef organisms".

The absence of reef accretion notwithstanding, cover of living hard and soft corals was moderate at most sites (also see Loder 2009), with an overall positive ratio of living : dead reef-building coral cover of > 5 : 1. Anecdotal information, and the results of a previous 1993 survey of reef patches off Mooloolaba (Banks 1995) suggests that coral cover has fluctuated around these levels for at least the past several decades, with episodic decline and recovery following disturbance events. Continuing recruitment of corals, particularly of the common sub-tropical species, was evident at all sites surveyed, contributing to maintenance of coral-dominated habitats.

Most families of reef-associated fishes also show strong attenuation with increasing latitude, although the Sunshine Coast fish fauna remains dominated by tropical species. Nevertheless, a number of more southerly species are present, including, as noted above, *Paraplesiops bleekeri* (Eastern Blue Devil), which is at the northern end of its distribution range. Another species considered endemic to the central east and west Australian coasts, *Schuettea scalaripinnis* (Eastern Pomfret) is also common in Sunshine Coast waters. Both northern New South Wales and Great Barrier Reef colour morphs of the anemonefish *Amphiprion akindynos* are present, further illustrating the transitional nature of the area.

The abundances of large, edible reef-associated fishery target species (e.g. Serranidae, Lutjanidae, Sparidae and Labridae) and targeted aquariumfish species such as anemonefishes and certain species of angelfishes (i.e. *Chaetodontoplus meredithi*, *Centropyge bicolor*) were notably low at most sites during the July 2010 survey. Although, no previous baseline data were available, the observed patterns of low target fish abundances are most likely attributable to harvesting pressure from both commercial and recreational sectors of the hook and line and aquarium fish fisheries. Furthermore, incidental mortality of juvenile reef fishes in demersal prawn and scallop trawl bycatch may be a contributing factor to the observed low abundances of targeted reef fishes on nearshore reefs of the Sunshine Coast (Kennelly 1995).

It should be noted that from the fisheries perspective, Queensland fishers are already subject to significant regulation, including commercial gear restrictions, bag and size limits. These measures notwithstanding, the exponential increase in recreational boat licences, and associated fishing, over the past several decades, is placing increasing pressures on some stocks, with one, Pink Snapper (*Pagrus auratus*), currently considered to be overfished (DEEDI 2010). This species is near the northern end of its distribution range in Sunshine Coast waters, and although it is still caught regularly on deper offshore reefs, it is clearly underrepresented in our survey, with just one sub-adult fish recorded from the 14 sites.

Future Management Options

In respect of ecological sustainability, there are several future options:

- 'Status quo' or 'business as usual', but with potential for increasing impacts on fish stocks and coastal marine habitats from population growth, continuing development, and climate change.
- Adaptive management
  - – Marine Parks
  - – Other options

Both the Queensland (QLD) and New South Wales (NSW) state governments have recently designated and / or reviewed the zoning plans of marine parks (MP) in their waters, contributing to Australia's National Representative System of MPAs. These include two MPs in SE Queensland – Great Sandy MP (Hervey Bay) and Moreton Bay MP; and three along the northern – mid NSW coast, at Cape Byron, Solitary Islands and Port Stephens – Great Lakes (Fig. 15). All are 'multiple-use', with different areas zoned to manage for different activities. Although names of zones vary between states, their purposes range from 'general use' with little restriction on commercial or recreational activities, to 'habitat protection' and 'national park' or 'sanctuary', with increasing restrictions on activities.

Some objectives of these MPs include:

- Conservation of species and habitats
- Maintenance of ecosystem functioning
- Support for fishery management
- Provision for sustainable tourism Provision for research

- Provision for education and recreation

In respect of fisheries, closing areas to fishing, either permanently or seasonally, subject to review, can be a contentious issue. However, there is nowadays much evidence, both locally and globally, of benefits (e.g. Halburn and Warner 2002, Williamson et al. 2004, Russ et al. 2008, Marine Parks Authority 2008):

1. Fish stocks do increase in 'no take' zones
2. High local fish abundances, particularly of the larger, older fishes, promote successful spawning
3. The resultant larvae can be 'exported', via dispersal in ocean currents, to adjacent areas open to fishing, and with potential for
4. 'Spill over' of fish from no-take zones into adjacent areas open to fishing.

Evidence of increasing fish stocks is strong from the southern GBR, and is also occurring in Moreton Bay, with significant rise in numbers of mud crabs and other species in the 'no-take' zones.

With the recent designation of the various MPs along the QLD and NSW coasts, the 'Tweed – Moreton' and larger 'Central Eastern Shelf Transition' bioregions (Fig. 15) are now included in the National Representative MPA System. However, the degree to which these MPs function as a 'network' rather than as 'stand-alone' parks remains unclear.

Key questions include:

Does the Sunshine Coast have unique or complementary marine attributes not adequately represented elsewhere?
How effective is dispersal in maintaining connectivity via gene flow among populations within and among MPs and adjacent waters?
Is there a management gap between Hervey Bay and Moreton Bay?
What roles can the Noosa Biosphere Reserve and other management approaches / tools have in the future management process?
Most of the MPs are widespread (Fig. 15), separated by gaps of hundreds of km, distances greater than those recommended for maintaining regular gene flow via larval dispersal and adult migration of tens of km. In this respect, and in consideration of local oceanographic patterns, it is unlikely that the marine communities of Hervey Bay have regular connectivity with those of the Sunshine Coast or Moreton Bay. Rather, marine populations on the Sunshine Coast may be relatively isolated and mainly 'self-seeding' (Banks 1995), with episodic inputs from the southern GBR or reef patches further south (e.g. Flinders Reef). These speculations are consistent with the common local occurrence of a suite of cooler water corals, and presence of (mainly tropical) waifs and vagrants.

Analysis of coral species presence in Sunshine Coast, Hervey Bay and Moreton Bay waters indicates that SC corals are most similar in composition to those of Flinders Reef (Fig. 6 and also see Banks 1995), and dissimilar to those of the remainder of Moreton Bay or Hervey Bay, which share high similarity, being developed in more oceanographically-sheltered bay waters.

Flinders Reef, off the northern end of Moreton Island, is included as a 'no-take' zone in the Moreton Bay MP, although it is a relatively small area (tens of ha in total). Sanctuary zones in NSW waters (e.g. Cape Byron, Solitary Islands) also include similar habitat, although with significant attenuation in richness of tropical species. In this local – regional biogeographic sense, and in respect of sustaining fisheries, future representation of Sunshine Coast coastal marine habitats in a multiple-use marine park would provide additional protection for this high-energy subtropical community type.

Figure 16. Approximate location of Marine Parks in SE Queensland and northern to central New South Wales.

Given that the area has a coastal National Park centered on the Noosa Headland, opportunities may exist, in the first instance, for the development of zoning provisions in coastal and river waters bordering the Noosa National Park. Further south, approximately midway between Noosa and the northern extent of Moreton Bay MP, the Gneering Shoals also had high species richness and cover. These shoals

are heavily used by fishers and divers at present, although some future zoning provisions in this area could contribute to long-term sustainable use and conservation goals.

The SCRC Draft Waterways and Coastal Management Strategy notes, in part, that:
"establishment of marine zones and associated compliance arrangements … [may be] considered as a planning tool to assist … management and regulation of onriver activities for … estuarine waters.

Under the Transport Operations (Marine Safety) Act 1994, marine zones can be established to regulate on-river activity while taking into account the issues and interests of waterway and land users, environmental impacts, safety, general amenity, as well as the enforceability of regulations."

"… management and regulation of areas of high environmental value (for example reefs) and fish populations within the coastal zone are the responsibility of the Queensland government. … Formal submissions and advice may be provided to inform the development of state planning policies as they relate to coastal management."

To the latter purpose, the Sunshine Coast Waterways and Coastal Management Committee has recently been established to address waterway and coastal management issues occurring within the local government area of the Sunshine Coast Council, and to ensure state government actions and responsibilities are supported. The committee has representatives from SCRC, QLD Dept. of Environment and Resource Management, QLD Primary Industries and Fisheries, QLD Boating and Fisheries Patrol, QLD Transport and Main Roads, Maritime Safety QLD and QLD Water Commission. Such local – state collaboration may be the most effective way of fostering sustainable management of Sunshine Coast coastal marine resources.

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Annex 1. Site characteristics, Sunshine Coast, July 2010.

		Maximum depth (m)	Minimum depth (m)	Ave. angle of reef slope to horizontal	Visibility (m)	Water temperature degrees C	Latitude		Longtitude		
Site name	**Sites**	**max**	**min**	**Slope**	**VIS**	**WT**	**S**		**E**		**Date**
Big Halls Shoal	1	19	15.5	10	5	21	26	20.462	153	5.05	6/07/2010
Little Halls Shoal	2	16	13	30	5	21	26	21.283	153	4.99	6/07/2010
Hancock Shoal #1	3	14	11	20	10	20	26	30.44	153	6.92	7/07/2010
Hancock Shoal #2	4	15	11	20	8	20	26	30.428	153	6.92	7/07/2010
Jew Shoal Caves	5	16	12	10	7	20	26	21.823	153	6.93	8/07/2010
Jew Shoal Pinnacle	6	16	11	20	7	20	26	21.648	153	6.86	8/07/2010
Pt. Arkwright Sh. 1	7	18.5	15.5	10	5	20	26	33.002	153	7.28	12/07/2010
Pt. Arkwright Sh. 2	8	15	11	10	10	20	26	33.147	153	7.21	12/07/2010
Currimundi Shoal	9	21	17	20	3	20	26	45.148	153	10.3	13/07/2010
Inner Gneering Shoal 'Trench' dive site	10	15	11	5	10	20	26	39.046	153	9.78	13/07/2010
Inner Gneering Shoal near 'Caves' dive site	11	9.5	5.5	10	10	20	26	38.697	153	9.64	13/07/2010
Outer Gneering Shoal 'Fairy Gardens' dive site	12	17	11	10	7	20	26	38.925	153	11	16/07/2010
Inner Gneering Shoal ' Chef's Surprise' dive site	13	14	10	15	6	20	26	38.857	153	9.7	16/07/2010
Outer Gneering Shoal 'Wobby Rock' dive site	14	18	14	30	6	20	26	39.081	153	12.4	16/07/2010

Annex 2. List of Mollusca from the Sunshine Coast.

Explanatory notes:
DISTRIBUTION RANGE: IP = Indo-Pacific; WP = Tropical Western Pacific; EA = Eastern Australian endemic (wide range through temperate Australia); RA = Endemic to temperate/tropical overlap section of eastern Australian coast; U = Unknown
SPATIAL ABUNDANCE (relative scale): 5 = Very common; 4 = Frequent; 3 = Occasional; 2 = Rare; 1 = Very rare
TEMPORAL ABUNDANCE: A = Always present on the Sunshine Coast; O = Occasionally present on the Sunshine Coast; E = Episodic presence on the Sunshine Coast; R = Only rarely present on the Sunshine Coast; U = Unknown
SIZE: L = macroscopic (i.e., maximum length/diameter > 10 mm); M = microscopic (i.e., maximum length/diameter < 10 mm)
COMMERCIALLY EXPLOITED: Y = yes; N = no
POTENTIAL FOR EXPLOITATION as food, or manufacturing industry, or the aquarium trade, or the specimen shell trade: H = high; M = Medium; L = low

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
POLYPLACOPHORA	NEOLORICATA	ISCHNOCHITONIDAE	*Callistochiton*	*antiquus*	EA	2	A	L	N	L
POLYPLACOPHORA	NEOLORICATA	ISCHNOCHITONIDAE	*Callochiton*	*crocinus*	WP	2	A	L	N	L
POLYPLACOPHORA	NEOLORICATA	ISCHNOCHITONIDAE	*Ischnochiton*	*examinandus*	EA	5	A	L	N	L
POLYPLACOPHORA	NEOLORICATA	ACANTHOCHITONIDAE	*Acanthochitona*	*sp. 1*	U	2	A	L	N	L
POLYPLACOPHORA	NEOLORICATA	CHITONIDAE	*Acanthopleura*	*gemmata*	WP	4	A	L	N	L
POLYPLACOPHORA	NEOLORICATA	CHITONIDAE	*Onithochiton*	*quercinus*	RA	4	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	PATELLOGASTROPODA	NACELLIDAE	*Cellana*	*conciliata*	RA	2	A	L	N	M
GASTROPODA	PATELLOGASTROPODA	NACELLIDAE	*Cellana*	*tramoserica*	RA	5	A	L	N	M
GASTROPODA	VETIGASTROPODA	SCISSURELLIDAE	*Incisura*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Amblychilepas*	*nigrita*	EA	3	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Clypidina*	*rugosa*	EA	5	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Diodora*	*granifera*	WP	2	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Diodora*	*jukesii*	WP	5	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Diodora*	*ticaonica*	WP	5	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Emarginula*	*dilecta*	EA	2	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Emarginula*	*incisura*	WP	2	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Emarginula*	*sp. 1*	U	1	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Hemitoma*	*panhi*	WP	2	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Scutus*	*unguis*	IP	3	A	L	N	L
GASTROPODA	VETIGASTROPODA	FISSURELLIDAE	*Tugali*	*parmophoidea*	EA	2	A	L	N	L
GASTROPODA	VETIGASTROPODA	HALIOTIDAE	*Haliotis*	*brazieri*	RA	3	A	L	N	M
GASTROPODA	VETIGASTROPODA	HALIOTIDAE	*Haliotis*	*hargravesi*	RA	2	A	L	N	M
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Archiminolia*	*oleacea*	RA	3	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Astele*	*scitulum*	RA	3	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Astrocochlea*	*porcata*	RA	5	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Calliostoma*	*comptum*	RA	1	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Calliostoma*	*speciosum*	RA	3	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Calliostoma*	*sp. 1*	U	1	U	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Cantharidella*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Clanculus*	*johnstoni*	WP	3	A	M	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Euchelus*	*atratus*	IP	4	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Euchelus*	*mysticus*	WP	2	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Euchelus*	*rubrus*	IP	3	A	M	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Euchelus*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Eurytrochus*	*strangei*	RA	4	A	M	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Minolia*	*atrata*	RA	3	A	M	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Odontotrochus*	*indistinctus*	RA	4	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Phasianotrochus*	*eximius*	EA	2	A	L	N	L
GASTROPODA	VETIGASTROPODA	TROCHIDAE	*Stomatella*	*impertusa*	IP	4	A	L	N	L
GASTROPODA	VETIGASTROPODA	TURBINIDAE	*Australiotia*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	VETIGASTROPODA	TURBINIDAE	*Astralium*	*tentoriiformis*	EA	3	A	L	N	M
GASTROPODA	VETIGASTROPODA	TURBINIDAE	*Turbo*	*militaris*	WP	3	A	L	Y	**H**
GASTROPODA	VETIGASTROPODA	PHASIANELLIDAE	*Phasianella*	*variegata*	WP	4	A	L	N	L
GASTROPODA	VETIGASTROPODA	TRICOLIIDAE	*Tricolia*	*variabilis*	WP	5	A	L	N	L
GASTROPODA	VETIGASTROPODA	VITRINELLIDAE	*Crosseola*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	VETIGASTROPODA	VITRINELLIDAE	*Pseudoliotia*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	VETIGASTROPODA	VITRINELLIDAE	*Sigaretornus*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	NERITOMORPHA	NERITIDAE	*Nerita*	*albicilla*	IP	5	A	L	N	L
GASTROPODA	NERITOMORPHA	NERITIDAE	*Nerita*	*chamaeleon*	IP	3	A	L	N	L
GASTROPODA	NERITOMORPHA	NERITIDAE	*Nerita*	*costata*	IP	4	A	L	N	L
GASTROPODA	NERITOMORPHA	NERITIDAE	*Nerita*	*insculpta*	IP	1	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NERITOMORPHA	NERITIDAE	*Nerita*	*melanotragus*	RA	5	A	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Afrolittorina*	*acutispira*	RA	5	A	M	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Austrolittorina*	*unifasciata*	EA	5	A	M	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Bembicium*	*auratum*	EA	1	R	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Bembicium*	*nanum*	EA	5	A	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Echinolittorina*	*cf. tricincta*	WP	1	R	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Echinolittorina*	*vidua*	WP	4	A	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Littoraria*	*luteola*	WP	3	A	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Littoraria*	*philippiana*	WP	4	A	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Littoraria*	*undulata*	WP	4	A	L	N	L
GASTROPODA	LITTORINIMORPHA	LITTORINIDAE	*Nodilittorina*	*pyramidalis*	RA	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Australaba*	*sp. 1*	U	5	A	M	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Cerithium*	*citrinum*	IP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Cerithium*	*columna*	IP	4	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Cerithium*	*egenum*	IP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Cerithium*	*nesioticum*	IP	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Cerithium*	*novaehollandiae*	WP	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Clypeomorus*	*batillariaeformis*	WP	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Rhinoclavis*	*brettinghami*	WP	4	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Rhinoclavis*	*sinensis*	IP	4	A	L	N	L
GASTROPODA	SORBEOCONCHA	CERITHIIDAE	*Royella*	*sinon*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	SILIQUARIIDAE	*Tenagodus*	*sp. 1*	U	2	U	L	N	L
GASTROPODA	SORBEOCONCHA	ANABATHRIDAE	*Pisinna*	*nitida*	EA	4	A	M	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	SORBEOCONCHA	RISSOIDAE	*Alvania*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	SORBEOCONCHA	RISSOIDAE	*Merelina*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	SORBEOCONCHA	RISSOIDAE	*Rissoina*	*crassa*	RA	3	A	M	N	L
GASTROPODA	SORBEOCONCHA	RISSOIDAE	*Rissoina*	*ferruginea*	RA	3	A	M	N	L
GASTROPODA	SORBEOCONCHA	RISSOIDAE	*Rissoina*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	SORBEOCONCHA	ASSIMINEIDAE	*Assiminea*	*sp. 1*	U	3	A	M	N	L
GASTROPODA	SORBEOCONCHA	HYDROBIIDAE	*Tatea*	*huonensis*	RA	3	A	M	N	L
GASTROPODA	SORBEOCONCHA	DIALIDAE	*Diala*	*albugo*	IP	5	A	M	N	L
GASTROPODA	SORBEOCONCHA	DIALIDAE	*Diala*	*semistraiata*	IP	5	A	M	N	L
GASTROPODA	SORBEOCONCHA	PLANAXIDAE	*Angiola*	*lineata*	IP	1	O	M	N	L
GASTROPODA	SORBEOCONCHA	PLANAXIDAE	*Hinea*	*brasiliana*	EA	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	PLANAXIDAE	*Planaxis*	*sulcatus*	IP	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	TURRITELLIDAE	*Colpospira*	*decoramen*	RA	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	VANIKORIDAE	*Vanikoro*	*sp. 1*	U	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	HIPPONICIDAE	*Sabia*	*trigona*	IP	4	A	L	N	L
GASTROPODA	SORBEOCONCHA	CALYPTRAEIDAE	*Cheilea*	*equestris*	IP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	CALYPTRAEIDAE	*Bostrycapulus*	*pritzkeri*	RA	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	STROMBIDAE	*Strombus*	*campbelli*	WP	4	A	L	N	L
GASTROPODA	SORBEOCONCHA	STROMBIDAE	*Strombus*	*dilatatus*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	STROMBIDAE	*Strombus*	*microurceus*	WP	4	A	L	N	L
GASTROPODA	SORBEOCONCHA	STROMBIDAE	*Strombus*	*mutabilis*	IP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	XENOPHORIDAE	*Xenophora*	*peroniana*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	TRIVIIDAE	*Proterato*	*lachryma*	IP	4	A	M	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	SORBEOCONCHA	TRIVIIDAE	*Proterato*	*sulcifera*	IP	4	A	M	N	L
GASTROPODA	SORBEOCONCHA	TRIVIIDAE	*Trivia*	*edgari*	WP	2	A	M	N	L
GASTROPODA	SORBEOCONCHA	TRIVIIDAE	*Trivia*	*globosa*	WP	2	A	M	N	L
GASTROPODA	SORBEOCONCHA	TRIVIIDAE	*Trivia*	*oryza*	IP	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	VELUTINIDAE	*Lamellaria*	*sp. 1*	U	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*annulus*	IP	3	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*arabica*	IP	4	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*asellus*	IP	4	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*brevidentata*	WP	2	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*caputserpentis*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*carneola*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*caurica*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*clandestina*	IP	4	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*erosa*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*errones*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*felina*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*flaveola*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*gracilis*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*hammondae*	WP	3	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*helvola*	IP	4	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*humphreysii*	IP	3	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*isabella*	IP	4	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*kieneri*	IP	3	A	L	N	M

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*mappa*	IP	3	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*stolida*	IP	3	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*teres*	IP	3	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*vitellus*	IP	5	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*xanthodon*	RA	4	A	L	N	M
GASTROPODA	SORBEOCONCHA	CYPRAEIDAE	*Cypraea*	*tigris*	IP	1	A	L	N	M
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Ovula*	*ovum*	IP	2	A	L	N	M
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Calpurnus*	*lacteus*	IP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Calpurnus*	*verrucosus*	IP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Crenavolva*	*howlandae*	WP	2	A	M	N	L
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Diminovula*	*punctata*	WP	3	A	M	N	L
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Globovula*	*cavanaghi*	WP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Phenacovolva*	*angasi*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Phenacovolva*	*rosea*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	OVULIDAE	*Volva*	*volva*	IP	1	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Natica*	*colliei*	WP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Neverita*	*aulacoglossa*	EA	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Notocochlis*	*cernica*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Notocochlis*	*gualteriana*	IP	5	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Polinices*	*conica*	EA	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Polinices*	*incei*	RA	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Polinices*	*peselephanti*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Polinices*	*simiae*	IP	3	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Tanea*	*areolata*	IP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	NATICIDAE	*Tanea*	*euzona*	IP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	CASSIDAE	*Phalium*	*areola*	WP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	CASSIDAE	*Phalium*	*bandatum*	WP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	RANELLIDAE	*Cabestana*	*spengleri*	EA	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	RANELLIDAE	*Cymatium*	*comptum*	IP	1	O	L	N	L
GASTROPODA	SORBEOCONCHA	RANELLIDAE	*Cymatium*	*exaratum*	WP	3	A	L	N	L
GASTROPODA	SORBEOCONCHA	TONNIDAE	*Tonna*	*cerevisina*	EA	1	A	L	N	L
GASTROPODA	SORBEOCONCHA	TONNIDAE	*Tonna*	*cumingii*	IP	2	A	L	N	L
GASTROPODA	SORBEOCONCHA	TONNIDAE	*Tonna*	*perdix*	IP	1	A	L	N	L
GASTROPODA	SORBEOCONCHA	RANELLIDAE	*Cymatium*	*labiosum*	IP	2	O	L	N	L
GASTROPODA	SORBEOCONCHA	RANELLIDAE	*Cymatium*	*pileare*	IP	2	O	L	N	L
GASTROPODA	SORBEOCONCHA	RANELLIDAE	*Ranella*	*australasia*	EA	2	A	L	N	L
GASTROPODA	NEMATOGLOSSA	COLUBRARIIDAE	*Colubraria*	*fantomei*	RA	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Agnewia*	*tritoniformis*	EA	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Chicoreus*	*denudatus*	RA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Cronia*	*amygdala*	IP	5	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Cronia*	*contracta*	IP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Dicathais*	*orbita*	EA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Drupa*	*ricinus*	IP	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Drupella*	*cornus*	IP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Ergalatax*	*margariticola*	IP	5	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Haustellum*	*tweedianum*	RA	3	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Maculotriton*	*serriale*	IP	4	A	M	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Mancinella*	*alouina*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Morula*	*biconica*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Morula*	*chaidea*	RA	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Morula*	*marginalba*	RA	5	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Morula*	*nodicostata*	IP	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Morula*	*uva*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Murexiella*	*brazieri*	RA	1	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Nassa*	*serta*	IP	1	O	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Neothais*	*clathrata*	IP	1	O	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Pascula*	*ochrostoma*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Phycothais*	*botanica*	RA	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Phyllocoma*	*speciosa*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Pinaxia*	*versicolor*	IP	1	O	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Thais*	*ambustulatus*	RA	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Vexilla*	*vexillum*	IP	1	O	L	N	L
GASTROPODA	NEOGASTROPODA	MURICIDAE	*Xenotrophon*	*euschema*	RA	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	CORALLIOPHILIDAE	*Mipus*	*erosus*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	CORALLIOPHILIDAE	*Rapa*	*rapa*	WP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	TYPHIDAE	*Typhis*	*philippensis*	EA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	BUCCINIDAE	*Cantharus*	*fumosus*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	BUCCINIDAE	*Engina*	*armillata*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	BUCCINIDAE	*Engina*	*cf. spica*	U	2	A	M	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NEOGASTROPODA	BUCCINIDAE	*Engina*	*lineata*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	BUCCINIDAE	*Engina*	*zonalis*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	BUCCINIDAE	*Phos*	*naucratoros*	WP	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	BUCCINIDAE	*Phos*	*roseatus*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	NASSARIIDAE	*Nassarius*	*burchardi*	EA	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	NASSARIIDAE	*Nassarius*	*conoidalis*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	NASSARIIDAE	*Nassarius*	*gaudiosus*	IP	5	A	L	N	L
GASTROPODA	NEOGASTROPODA	NASSARIIDAE	*Nassarius*	*nigellus*	EA	3	A	M	N	L
GASTROPODA	NEOGASTROPODA	NASSARIIDAE	*Nassarius*	*particeps*	EA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	NASSARIIDAE	*Nassarius*	*pauper*	IP	5	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Aesopus*	*cumnigii*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Euplica*	*borealis*	WP	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Euplica*	*scripta*	WP	5	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Euplica*	*turturina*	WP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Euplica*	*varians*	WP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Macrozafra*	*atkinsoni*	RA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Mitrella*	*albina*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Mitrella*	*molectulina*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Mitrella*	*tayloriana*	RA	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Pardalina*	*testudinaria*	WP	5	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Pyrene*	*flava*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Pyrene*	*punctata*	WP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	COLUMBELLIDAE	*Zafra*	*troglodytes*	WP	5	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NEOGASTROPODA	MARGINELLIDAE	*Mesoginella*	*sp. 1*	U	2	A	M	N	L
GASTROPODA	NEOGASTROPODA	CYSTISCIDAE	*Persicula*	*sp. 1*	U	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	FASCIOLARIIDAE	*Latirus*	*sp. 1*	U	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	FASCIOLARIIDAE	*Peristenia*	*brazieri*	RA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	FASCIOLARIIDAE	*Peristenia*	*fastigium*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Mitra*	*aurantia*	IP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*MItra*	*cookii*	RA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Mitra*	*coronata*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Mitra*	*fraga*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*MItra*	*rosacea*	IP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Mitra*	*tabanula*	IP	2	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Mitromorpha*	*atramentosa*	IP	1	A	M	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Neocancilla*	*takiisaoi*	IP	1	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Strigatella*	*litterata*	IP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Strigatella*	*scutulata*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Subcancilla*	*annulata*	WP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	MITRIDAE	*Tiarella*	*scabricula*	IP	1	A	L	N	L
GASTROPODA	NEOGASTROPODA	COSTELLARIIDAE	*Vexillum*	*crocatum*	IP	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	COSTELLARIIDAE	*Vexillum*	*daedalum*	IP	4	A	M	N	L
GASTROPODA	NEOGASTROPODA	COSTELLARIIDAE	*Vexillum*	*pacificum*	IP	4	A	L	N	L
GASTROPODA	NEOGASTROPODA	TURBINELLIDAE	*Columbarium*	*caragarang*	RA	3	A	L	N	L
GASTROPODA	NEOGASTROPODA	TURBINELLIDAE	*Tudivasum*	*rasilistoma*	RA	2	A	L	n	L
GASTROPODA	NEOGASTROPODA	OLIVIDAE	*Amalda*	*sp. 1*	U	3	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NEOGASTROPODA	OLIVIDAE	*Belloliva*	*leucozona*	RA	2	A	M	N	L
GASTROPODA	NEOGASTROPODA	OLIVIDAE	*Oliva*	*annulata*	IP	1	O	L	N	L
GASTROPODA	NEOGASTROPODA	VOLUTIDAE	*Amoria*	*canaliculata*	RA	3	A	L	N	M
GASTROPODA	NEOGASTROPODA	VOLUTIDAE	*Amoria*	*zebra*	RA	3	A	L	N	M
GASTROPODA	NEOGASTROPODA	VOLUTIDAE	*Cymbiola*	*pulchra*	RA	1	A	L	N	M
GASTROPODA	CONOIDA	TEREBRIDAE	*Duplicaria*	*bernardii*	WP	4	A	L	N	L
GASTROPODA	CONOIDA	TEREBRIDAE	*Terenolla*	*pygmaea*	WP	4	A	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Bathytoma*	*lacertosa*	RA	3	A	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Bathytoma*	*luhdorfi*	RA	3	A	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Clavus*	*cf. fusconitens*	WP	1	A	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Epidirella*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Epidirona*	*cookii*	RA	3	A	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Eucithara*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Inquisitor*	*sterrhus*	WP	3	A	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Kermia*	*bernardii*	WP	2	A	M	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Lophiotoma*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Mitromorpha*	*atramentosa*	WP	2	A	M	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Philbertia*	*barnardi*	WP	1	A	M	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Tomopleura*	*cognata*	RA	2	A	L	N	L
GASTROPODA	CONOIDA	TURRIDAE	*Turridrupa*	*cerithina*	WP	3	A	L	N	L
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*aculieformis*	WP	2	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*catus*	WP	5	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*chaldeus*	WP	3	A	L	N	M

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*coronatus*	WP	5	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*cyanostoma*	WP	4	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*ebraeus*	WP	4	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*frigidus*	WP	4	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*geographus*	WP	3	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*lischkeanus kermadecensis*	WP	3	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*miliaris*	WP	4	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*muriculatus*	WP	3	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*musicus*	WP	5	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*rufimaculosus*	RA	4	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*sculletti*	RA	3	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*sponsalis*	WP	5	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*striatus*	WP	3	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*terebra*	WP	2	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*varius*	WP	3	A	L	N	M
GASTROPODA	CONOIDA	CONIDAE	*Conus*	*viola*	WP	2	A	L	N	M
GASTROPODA	PTENOGLOSSA	CERITHIOPSIDAE	*Cerithiopsis*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	PTENOGLOSSA	CERITHIOPSIDAE	*Cerithiopsis*	*sp. 2*	U	2	U	M	N	L
GASTROPODA	PTENOGLOSSA	TRIPHORIDAE	*Bouchetriphora*	*pallida*	IP	4	A	M	N	L
GASTROPODA	PTENOGLOSSA	TRIPHORIDAE	*Euthymella*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	PTENOGLOSSA	TRIPHORIDAE	*Mastonia*	*rubra*	IP	4	A	M	N	L
GASTROPODA	PTENOGLOSSA	EULIMIDAE	*Eulima*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	PTENOGLOSSA	EPITONIIDAE	*Epitonium*	*fasciatum*	WP	3	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	PTENOGLOSSA	EPITONIIDAE	*Epitonium*	*lamellosum*	IP	2	A	L	N	L
GASTROPODA	PTENOGLOSSA	EPITONIIDAE	*Epitonium*	*lyra*	WP	2	A	L	N	L
GASTROPODA	PTENOGLOSSA	EPITONIIDAE	*Epitonium*	*sandvicense*	WP	3	A	L	N	L
GASTROPODA	PTENOGLOSSA	JANTHINIDAE	*Janthina*	*exigua*	IP	3	E	L	N	L
GASTROPODA	PTENOGLOSSA	JANTHINIDAE	*Janthina*	*globosa*	IP	3	E	L	N	L
GASTROPODA	PTENOGLOSSA	JANTHINIDAE	*Janthina*	*janthina*	IP	4	E	L	N	L
GASTROPODA	ARCHITECTONICOIDA	ARCHITECTONICIDAE	*Heliacus*	*variegatus*	IP	2	O	L	N	L
GASTROPODA	ARCHITECTONICOIDA	ARCHITECTONICIDAE	*Heliacus*	*sp. 1*	U	2	O	M	N	L
GASTROPODA	PYRAMIDELLOIDA	PYRAMIDELLIDAE	*Paracingulina*	*inequicingulata*	WP	1	A	M	N	L
GASTROPODA	PYRAMIDELLOIDA	PYRAMIDELLIDAE	*Paracingulina*	*triarata*	WP	1	A	M	N	L
GASTROPODA	PYRAMIDELLOIDA	AMATHINIDAE	*Amathina*	*violacea*	WP	2	A	L	N	L
GASTROPODA	CEPHALASPIDEA	RINGICULIDAE	*Ringicula*	*sp. 1*	U	2	A	M	N	L
GASTROPODA	CEPHALASPIDEA	ACTEONIDAE	*Acteon*	*subroseus*	EA	3	A	L	N	L
GASTROPODA	CEPHALASPIDEA	ACTEONIDAE	*Pupa*	*cf. nivea*	EA	2	A	L	N	L
GASTROPODA	CEPHALASPIDEA	ACTEONIDAE	*Pupa*	*sulcata*	IP	1	A	L	N	L
GASTROPODA	CEPHALASPIDEA	BULLINIDAE	*Bullina*	*lineata*	WP	1	O	L	N	L
GASTROPODA	CEPHALASPIDEA	BULLINIDAE	*Bullina*	*nobilis*	WP	1	A	L	N	L
GASTROPODA	CEPHALASPIDEA	APLUSTRIDAE	*Hydatina*	*amplustre*	IP	1	O	L	N	L
GASTROPODA	CEPHALASPIDEA	APLUSTRIDAE	*Hydatina*	*physis*	IP	2	A	L	N	L
GASTROPODA	CEPHALASPIDEA	APLUSTRIDAE	*Micromelo*	*undata*	IP	2	O	L	N	L
GASTROPODA	CEPHALASPIDEA	CYLICHNIDAE	*Tornatina*	*sp. 1*	U	2	A	M	N	L
GASTROPODA	CEPHALASPIDEA	PHILINIDAE	*Philine*	*trapezia*	WP	2	A	M	N	L
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Aglajidae*	*sp. 1*	U	2	U	M	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Aglajidae*	*sp. 2*	U	1	U	M	N	L
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Chelidonura*	*electra*	WP	2	O	L	N	L
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Chelidonura*	*fulvipunctata*	EA	2	O	L	N	L
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Chelidonura*	*hirundinina*	IP	2	O	L	N	L
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Chelidonura*	*inornata*	WP	5	A	L	N	L
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Chelidonura*	*sp. 1*	U	3	O	L	N	L
GASTROPODA	CEPHALASPIDEA	AGLAJIDAE	*Philinopsis*	*pilsbryi*	IP	4	E	L	N	L
GASTROPODA	CEPHALASPIDEA	GASTROPTERIDAE	*Sagaminopteron*	*ornatum*	IP	4	A	L	N	L
GASTROPODA	CEPHALASPIDEA	GASTROPTERIDAE	*Sagaminopteron*	*psychedelicum*	WP	2	O	L	N	L
GASTROPODA	CEPHALASPIDEA	GASTROPTERIDAE	*Siphopteron*	*tigrinum*	WP	1	O	M	N	L
GASTROPODA	CEPHALASPIDEA	GASTROPTERIDAE	*Siphopteron*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	CEPHALASPIDEA	DIAPHANIDAE	*Colpodaspis*	*thompsoni*	IP	2	O	M	N	L
GASTROPODA	CEPHALASPIDEA	BULLIDAE	*Bulla*	*angasi*	EA	2	A	L	N	L
GASTROPODA	CEPHALASPIDEA	BULLIDAE	*Bulla*	*orientalis*	WP	2	A	L	N	L
GASTROPODA	CEPHALASPIDEA	RUNCINIDAE	*Runcina*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	CEPHALASPIDEA	RUNCINIDAE	*Runcina*	*sp. 2*	U	1	U	M	N	L
GASTROPODA	CEPHALASPIDEA	RUNCINIDAE	*Runcina*	*sp. 3*	U	1	U	M	N	L
GASTROPODA	CEPHALASPIDEA	RUNCINIDAE	*Runcina*	*sp. 4*	U	1	U	M	N	L
GASTROPODA	CEPHALASPIDEA	HAMINOEIDAE	*Haminoea*	*fusca*	WP	4	A	L	N	L
GASTROPODA	CEPHALASPIDEA	HAMINOEIDAE	*Haminoea*	*sp. 1*	U	5	A	L	N	L
GASTROPODA	CEPHALASPIDEA	HAMINOEIDAE	*Haminoea*	*sp. 2*	U	1	U	L	N	L
GASTROPODA	CEPHALASPIDEA	HAMINOEIDAE	*Haminoea*	*sp. 3*	U	1	U	L	N	L
GASTROPODA	ANASPIDEA	APLYSIIDAE	*Aplysia*	*dactylomela*	IP	4	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	ANASPIDEA	APLYSIIDAE	*Aplysia*	*parvula*	IP	4	A	L	N	L
GASTROPODA	ANASPIDEA	APLYSIIDAE	*Aplysia*	*sowerbyi*	WP	3	A	L	N	L
GASTROPODA	ANASPIDEA	APLYSIIDAE	*Bursatella*	*leachii*	IP	1	O	L	N	L
GASTROPODA	ANASPIDEA	APLYSIIDAE	*Dolabrifera*	*brazieri*	RA	1	O	L	N	L
GASTROPODA	ANASPIDEA	APLYSIIDAE	*Dolabrifera*	*dolabrifera*	IP	1	O	L	N	L
GASTROPODA	ANASPIDEA	APLYSIIDAE	*Stylocheilus*	*longicauda*	IP	1	O	L	N	L
GASTROPODA	SACOGLOSSA	OXYNOIDAE	*Lobiger*	*souverbii*	IP	3	A	L	N	L
GASTROPODA	SACOGLOSSA	OXYNOIDAE	*Oxynoe*	*viridis*	IP	3	A	L	N	L
GASTROPODA	SACOGLOSSA	JULIIDAE	*Julia*	*exquisita*	WP	1	O	M	N	L
GASTROPODA	SACOGLOSSA	JULIIDAE	*Tamanovalva*	*limax*	WP	1	O	M	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysia*	*coodgeensis*	RA	5	A	M	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysia*	*obtusa*	WP	1	O	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysia*	*ornata*	IP	1	O	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysia*	*verrucosa*	WP	2	O	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysia*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysia*	*sp. 2*	U	1	U	M	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysia*	*sp. 3*	U	1	U	M	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Elysiella*	*pusilla*	IP	3	A	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Thuridilla*	*albopustulosa*	WP	2	O	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Thuridilla*	*carlsoni*	WP	4	A	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Thuridilla*	*livida*	WP	2	O	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Thuridilla*	*multimarginata*	WP	2	O	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Thuridilla*	*splendens*	WP	5	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Thuridilla*	*vatae*	WP	2	O	L	N	L
GASTROPODA	SACOGLOSSA	PLAKOBRANCHIDAE	*Thuridilla*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	SACOGLOSSA	LIMAPONTIIDAE	*Costasiella*	*kuroshimae*	WP	1	A	M	N	L
GASTROPODA	SACOGLOSSA	LIMAPONTIIDAE	*Placida*	*cremoniana*	IP	2	O	L	N	L
GASTROPODA	SACOGLOSSA	LIMAPONTIIDAE	*Stiliger*	*aureomarginatus*	WP	1	O	L	N	L
GASTROPODA	SACOGLOSSA	LIMAPONTIIDAE	*Hermaea*	*sp.*	U	1	U	L	N	L
GASTROPODA	SACOGLOSSA	POLYBRANCHIIDAE	*Cyerce*	*nigra*	WP	2	A	L	N	L
GASTROPODA	SACOGLOSSA	POLYBRANCHIIDAE	*Cyerce*	*cf. pavonina*	IP	1	O	L	N	L
GASTROPODA	SACOGLOSSA	POLYBRANCHIIDAE	*Cyerce*	*sp. 1*	U	2	O	L	N	L
GASTROPODA	SACOGLOSSA	POLYBRANCHIIDAE	*Polybranchia*	*orientalis*	IP	2	A	L	N	L
GASTROPODA	SACOGLOSSA	VOLVATELLIDAE	*Volvatella*	*angeliniana*	WP	1	O	L	N	L
GASTROPODA	SACOGLOSSA	VOLVATELLIDAE	*Volvatella*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	UMBRACULIDA	UMBRACULIDAE	*Umbraculum*	*umbraculum*	IP	2	O	L	N	L
GASTROPODA	UMBRACULIDA	TYLODINIDAE	*Tylodina*	*corticalis*	EA	3	A	M	N	L
GASTROPODA	PLEUROBRANCHIDA	PLEUROBRANCHIDAE	*Berthella*	*martensi*	IP	4	A	L	N	L
GASTROPODA	PLEUROBRANCHIDA	PLEUROBRANCHIDAE	*Berthella*	*stellata*	IP	4	A	L	N	L
GASTROPODA	PLEUROBRANCHIDA	PLEUROBRANCHIDAE	*Berthellina*	*citrina*	IP	4	A	L	N	L
GASTROPODA	PLEUROBRANCHIDA	PLEUROBRANCHIDAE	*Pleurobranchus*	*albiguttatus*	IP	2	O	L	N	L
GASTROPODA	PLEUROBRANCHIDA	PLEUROBRANCHIDAE	*Pleurobranchus*	*caledonicus*	WP	1	O	L	N	L
GASTROPODA	PLEUROBRANCHIDA	PLEUROBRANCHIDAE	*Pleurobranchus*	*forskalii*	IP	2	O	L	N	L
GASTROPODA	PLEUROBRANCHIDA	PLEUROBRANCHIDAE	*Pleurobranchus*	*peronii*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	HEXABRANCHIDAE	*Hexabranchus*	*sanguineus*	IP	4	O	L	N	L
GASTROPODA	NUDIBRANCHIA	TRIOPHIDAE	*Crimora*	*edwardsi*	RA	1	O	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	TRIOPHIDAE	*Crimora*	*lutea*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	TRIOPHIDAE	*Kaloplocamus*	*acutus*	P	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TRIOPHIDAE	*Plocamopherus*	*ceylonicus*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TRIOPHIDAE	*Plocamopherus*	*imperialis*	EA	3	O	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Nembrotha*	*lineolata*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Nembrotha*	*purpureolineata*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Polycera*	*cf. japonica*	U	2	A	M	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Polycera*	*risbeci*	WP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Polycera*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Roboastra*	*luteolineata*	WP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Tambja*	*amakusana*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Tambja*	*limaciformis*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Tambja*	*morosa*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Tambja*	*tenuilineata*	RA	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Tambja*	*victoriae*	RA	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	POLYCERIDAE	*Tambja*	*sp. 1*	U	2	U	L	N	L
GASTROPODA	NUDIBRANCHIA	VAYSSIEREIDAE	*Vayssierea*	*caledonica*	WP	5	A	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Goniodoridella*	*savignyi*	WP	3	A	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Goniodoridella*	*sp. 1*	U	2	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Goniodoridella*	*sp. 2*	U	2	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Goniodoris*	*joubini*	WP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Goniodoris*	*sp. 1*	U	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Murphydoris*	*sp. 1*	U	1	O	M	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Okenia*	*hallucigenia*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Okenia*	*plana*	WP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Okenia*	*rhinorma*	IP	2	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Trapania*	*brunnea*	RA	2	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GONIODORIDIDAE	*Trapania*	*cf. aurata*	U	2	O	M	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Analogium*	*amakusanum*	WP	3	A	M	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Gymnodoris*	*alba*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Gymnodoris*	*bicolor*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Gymnodoris*	*aff. citrina*	U	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Gymnodoris*	*okinawae*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Gymnodoris*	*sp. 1*	U	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Gymnodoris*	*sp. 2*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	GYMNODORIDIDAE	*Gymnodoris*	*sp. 3*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	AEGIRIDAE	*Aegires*	*citrinus*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	AEGIRIDAE	*Aegires*	*flores*	WP	3	A	M	N	L
GASTROPODA	NUDIBRANCHIA	AEGIRIDAE	*Aegires*	*gardineri*	WP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	AEGIRIDAE	*Aegires*	*hapsis*	WP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	AEGIRIDAE	*Aegires*	*incusus*	WP	2	O	M	N	L
GASTROPODA	NUDIBRANCHIA	AEGIRIDAE	*Aegires*	*pruvotfolae*	WP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	AEGIRIDAE	*Aegires*	*villosus*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	ACTINOCYCLIDAE	*Actinocyclus*	*verucosus*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	ACTINOCYCLIDAE	*Hallaxa*	*cryptica*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	ACTINOCYCLIDAE	*Hallaxa*	*fuscescens*	WP	2	O	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	ACTINOCYCLIDAE	*Hallaxa*	*iju*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	ACTINOCYCLIDAE	*Hallaxa*	*indecora*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	ACTINOCYCLIDAE	*Hallaxa*	*translucens*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Ardeadoris*	*egretta*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Cadlinella*	*ornatissima*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Ceratosoma*	*magnificum*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Ceratosoma*	*moloch*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Ceratosoma*	*sinuatum*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Ceratosoma*	*tenue*	IP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Ceratosoma*	*trilobatum*	IP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*aff. africana*	U	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*albonares*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*albopunctata*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*annae*	WP	3	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*aspersa*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*aureopurpurea*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*burni*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*coi*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*collingwoodi*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*colemani*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*conchyliata*	IP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*daphne*	RA	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*decora*	IP	4	A	L	N	L

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GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*elisabethina*	WP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*geometrica*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*kuiteri*	EA	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*kuniei*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*leopardus*	IP	3	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*lochi*	WP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*magnifica*	IP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*cf. reticulata*	U	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*roboi*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*rufomaculata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*splendida*	RA	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*striatella*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*strigata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*tinctoria*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*verrieri*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*cf. verrieri*	U	2	U	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*willani*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Chromodoris*	*sp. 1*	U	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Diversidoris*	*aurantionodulosa*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Durvilledoris*	*pusilla*	WP	1	O	L	L	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*aeruginosa*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*atromarginata*	IP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*averni*	WP	2	O	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*aff. averni*	U	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*carlsoni*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*cf. pullata*	U	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*cincta*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*dendrobranchia*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*electra*	IP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*hikuerensis*	IP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*rubroannulata*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*rufomarginata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*vespa*	RA	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*sp. 1*	U	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Glossodoris*	*sp. 2*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*aff. bollandi*	U	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*aff. maculosa*	U	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*apolegma*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*babai*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*bullockii*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*emmae*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*jacksoni*	RA	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*kanga*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*maculosa*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*maritima*	WP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*obscura*	RA	5	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*sagamiensis*	WP	3	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*whitei*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*zephyra*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*sp. 1*	U	3	U	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Hypselodoris*	*sp. 2*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Mexichromis*	*festiva*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Mexichromis*	*macropus*	EA	3	A	L	L	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*alboannulata*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*crocea*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*flava*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*haliclona*	EA	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*laboutei*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*norba*	WP	3	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*romeri*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*simplex*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Noumea*	*verconiforma*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Pectenodoris*	*trilineata*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Risbecia*	*godeffroyana*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Risbecia*	*tryoni*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Thorunna*	*australis*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Thorunna*	*daniellae*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Thorunna*	*florens*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Thorunna*	*furtiva*	IP	1	O	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Thorunna*	*halourga*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Thorunna*	*montrouzieri*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	CHROMODORIDIDAE	*Thorunna*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DORIDIDAE	*Doriopsis*	*pecten*	IP	2	A	M	N	L
GASTROPODA	NUDIBRANCHIA	DORIDIDAE	*Doris*	*sp. 1*	U	2	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DORIDIDAE	*Siraius*	*nucleola*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Atagema*	*albata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Atagema*	*ornata*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Atagema*	*spongiosa*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Discodoris*	*cf. mauritiana*	U	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Discodoris*	*fragilis*	IP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Discodoris*	*palma*	EA	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Discodoris*	*schmeltziana*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Discodoris*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Discodoris*	*sp. 2*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Discodoris*	*sp. 3*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Geitodoris*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Halgerda*	*albocristata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Halgerda*	*aurantiomaculata*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Halgerda*	*tessellata*	IP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Halgerda*	*willeyi*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Hoplodoris*	*nodulosa*	EA	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Jorunna*	*funebris*	IP	2	O	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Jorunna*	*pantherina*	RA	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Jorunna*	*ramicola*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Jorunna*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Jorunna*	*sp. 2*	U	3	A	M	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Jorunna*	*sp. 3*	U	2	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Platydoris*	*cruenta*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Platydoris*	*formosa*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Platydoris*	*inframaculata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Platydoris*	*inornata*	IP	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Platydoris*	*sabulosa*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Rostanga*	*arbutus*	RA	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Rostanga*	*bifurcata*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Sclerodoris*	*apiculata*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Sclerodoris*	*cf. coriacea*	U	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Sclerodoris*	*tarka*	RA	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Sclerodoris*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Sclerodoris*	*sp. 2*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Sclerodoris*	*sp. 3*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Sclerodoris*	*sp. 4*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	DISCODORIDIDAE	*Thordisa*	*verrucosa*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*albobrunnea*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*albopurpura*	EA	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*carbunculosa*	IP	1	O	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*coronata*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*denisoni*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*fumata*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*nigra*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*rainfordi*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DENDRODORIDIDAE	*Dendrodoris*	*tuberculosa*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidia*	*babai*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidia*	*coelestis*	IP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidia*	*elegans*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidia*	*exquisita*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidia*	*ocellata*	IP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidia*	*picta*	IP	3	O	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidia*	*varicosa*	IP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidiella*	*lizae*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidiella*	*pustulosa*	IP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllideilla*	*sp. 1*	U	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidiopsis*	*burni*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidiopsis*	*cardinalis*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidiopsis*	*fissurata*	WP	1	A	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidiopsis*	*loricata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	PHYLLIDIIDAE	*Phyllidiopsis*	*xishaensis*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	ARMINIDAE	*Dermatobranchus*	*cf. fortunata*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	ARMINIDAE	*Dermatobranchus*	*ornatus*	IP	3	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	ARMINIDAE	*Dermatobranchus*	*sp. 1*	U	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	ARMINIDAE	*Dermatobranchus*	*sp. 2*	U	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	ARMINIDAE	*Dermatobranchus*	*sp. 3*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	MADRELLIDAE	*Madrella*	*ferrudinosa*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	ZEPHYRINIDAE	*Janolus*	*mirabilis*	WP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	ZEPHYRINIDAE	*Janolus*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Marianina*	*rosea*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Marionia*	*cf. distincta*	U	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Marionia*	*cyanobranchiata*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Marionia*	*pustulosa*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Tritonia*	*sp. 1*	U	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Tritonia*	*sp. 2*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Tritonia*	*sp. 3*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	TRITONIIDAE	*Tritoniopsis*	*alba*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	BORNELLIDAE	*Bornella*	*anguilla*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	BORNELLIDAE	*Bornella*	*stellifer*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	LOMANOTIDAE	*Lomanotus*	*vermiformis*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	LOMANOTIDAE	*Lomanotus*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	DOTIDAE	*Doto*	*cf. pita*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	DOTIDAE	*Doto*	*rosacea*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	DOTIDAE	*Doto*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	DOTIDAE	*Doto*	*sp. 2*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	DOTIDAE	*Doto*	*sp. 3*	U	1	U	M	N	L

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GASTROPODA	NUDIBRANCHIA	SCYLLAEIDAE	*Scyllaea*	*pelagica*	IP	1	E	L	N	L
GASTROPODA	NUDIBRANCHIA	TETHYDIDAE	*Melibe*	*japonica*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	FLABELLINIDAE	*Flabellina*	*bicolor*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FLABELLINIDAE	*Flabellina*	*bilas*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	FLABELLINIDAE	*Flabellina*	*exoptata*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	FLABELLINIDAE	*Flabellina*	*rubrolineata*	IP	4	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FLABELLINIDAE	*Flabellina*	*rubropurpurata*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	EUBRANCHIDAE	*Eubranchus*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	EUBRANCHIDAE	*Eubranchus*	*sp. 2*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Myja*	*longicornis*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Phestilla*	*melanobrachia*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Phestilla*	*minor*	IP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Phestilla*	*sp. 1*	U	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Phestilla*	*sp. 2*	U	2	U	L	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Tergipes*	*sp. 1*	U	1	E	L	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*acinosa*	WP	2	A	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*diversicolor*	WP	1	O	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*ornata*	WP	4	A	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*puellula*	WP	2	A	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*sibogae*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*yamasui*	WP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*sp. 2*	U	2	U	M	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*sp. 3*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*sp. 4*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	TERGIPEDIDAE	*Trinchesia*	*sp. 5*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	AEOLIDIIDAE	*Aeolidiella*	*alba*	IP	3	A	M	N	L
GASTROPODA	NUDIBRANCHIA	AEOLIDIIDAE	*Antaeolidiella*	*foulisi*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	AEOLIDIIDAE	*Baeolidia*	*major*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	AEOLIDIIDAE	*Baeolidia*	*sp. 1*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	AEOLIDIIDAE	*Cerberilla*	*ambonensis*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	AEOLIDIIDAE	*Protaeolidiella*	*juliae*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	AEOLIDIIDAE	*Spurilla*	*neapolitana*	IP	1	R	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Austraeolis*	*ornata*	EA	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Cratena*	*cf. affinis*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Cratena*	*lineata*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Cratena*	*simba*	IP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Cratena*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Facelina*	*sp. 1*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Facelina*	*sp. 2*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Facelina*	*sp. 3*	U	2	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Facelina*	*sp. 4*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Facelina*	*sp. 5*	U	1	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Favorinus*	*japonicus*	WP	2	O	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Favorinus*	*tsuruganus*	WP	1	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Favorinus*	*sp. 1*	U	1	U	M	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Favorinus*	*sp. 2*	U	3	U	M	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Herviella*	*albida*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Herviella*	*claror*	RA	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Moridilla*	*brockii*	IP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phidiana*	*bourailli*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phidiana*	*indica*	IP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*colemani*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*crypticum*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*koehleri*	WP	1	O	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*macphersonae*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*magnum*	WP	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*poindimiei*	WP	2	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*sp. 1*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*sp. 2*	U	3	A	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Phyllodesmium*	*sp. 3*	U	1	U	L	N	L
GASTROPODA	NUDIBRANCHIA	FACELINIDAE	*Pteraeolidia*	*ianthina*	IP	5	A	L	N	L
GASTROPODA	NUDIBRANCHIA	GLAUCIDAE	*Glaucus*	*atlanticus*	IP	3	E	L	N	L
GASTROPODA	NUDIBRANCHIA	GLAUCIDAE	*Glaucus*	*marginatus*	IP	3	E	L	N	L
GASTROPODA	NUDIBRANCHIA	FIONIDAE	*Fiona*	*pinnata*	IP	1	E	L	N	L
GASTROPODA	BASOMMATOPHORA	SIPHONARIIDAE	*Siphonaria*	*currumbinensis*	RA	4	A	L	N	L
GASTROPODA	BASOMMATOPHORA	SIPHONARIIDAE	*Siphonaria*	*zealandica*	RA	5	A	L	N	L
GASTROPODA	BASOMMATOPHORA	SIPHONARIIDAE	*Siphonaria*	*sp. 1*	U	3	A	L	N	L
GASTROPODA	EUPULMONATA	TRIMUSCULIDAE	*Trimusculus*	*conicus*	EA	2	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
GASTROPODA	EUPULMONATA	ELLOBIIDAE	*Cassidula*	*cf. paludosa*	U	2	A	L	N	L
GASTROPODA	EUPULMONATA	ELLOBIIDAE	*Laemodonta*	*siamensis*	WP	2	A	L	N	L
GASTROPODA	EUPULMONATA	ELLOBIIDAE	*Ophicardelus*	*sulcatus*	EA	4	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*cheverti*	U	2	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*concretum*	EA	1	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*francisense*	EA	2	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*garrardi*	RA	1	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*jelli*	RA	2	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*octangulatum*	WP	2	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*robustum*	WP	1	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Dentalium*	*thetidis*	U	1	A	L	N	L
SCAPHOPODA	DENTALIIDA	DENTALIIDAE	*Fissidentalium*	*clathratum*	U	2	A	L	N	L
SCAPHOPODA	DENTALIIDA	LAEVIDENTALIIDAE	*Laevidentalium*	*crocinum*	WP	4	A	L	N	L
SCAPHOPODA	DENTALIIDA	LAEVIDENTALIIDAE	*Laevidentalium*	*erectum*	WP	2	A	L	N	L
SCAPHOPODA	GADILIDA	GADILINIDAE	*Cadulus*	*simillimus*	U	1	A	M	N	L
SCAPHOPODA	GADILIDA	GADILINIDAE	*Episiphon*	*virgula*	EA	3	A	L	N	L
BIVALVIA	NUCULOIDA	NUCULIDAE	*Nucula*	*sp. 1*	U	3	A	M	N	L
BIVALVIA	NUCULANOIDA	NUCULANIDAE	*Nuculana*	*caloundra*	RA	5	A	L	N	L
BIVALVIA	ARCOIDA	ARCIDAE	*Anadara*	*trapezia*	EA	2	A	L	Y	L
BIVALVIA	ARCOIDA	ARCIDAE	*Arca*	*navicularis*	IP	2	A	L	N	L
BIVALVIA	ARCOIDA	ARCIDAE	*Arcopsis*	*afra*	IP	4	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
BIVALVIA	ARCOIDA	ARCIDAE	*Barbatia*	*helblingi*	WP	2	A	L	N	L
BIVALVIA	ARCOIDA	ARCIDAE	*Barbatia*	*pistachia*	EA	2	A	L	N	L
BIVALVIA	ARCOIDA	GLYCYMERIDIDAE	*Glycymeris*	*holosericeus*	EA	5	A	L	N	L
BIVALVIA	ARCOIDA	GLYCYMERIDIDAE	*Glycymeris*	*cf. striatularis*	U	4	A	L	N	L
BIVALVIA	ARCOIDA	GLYCYMERIDIDAE	*Glycymeris*	*sp. 1*	U	2	A	L	N	L
BIVALVIA	ARCOIDA	LIMOPSIDAE	*Limopsis*	*soboles*	RA	4	A	L	N	L
BIVALVIA	MYTILOIDA	MYTILIDAE	*Modiolus*	*auriculatus*	IP	3	A	L	N	L
BIVALVIA	MYTILOIDA	MYTILIDAE	*Musculus*	*impactus*	WP	3	A	L	N	L
BIVALVIA	MYTILOIDA	MYTILIDAE	*Musculus*	*nanus*	EA	3	A	M	N	L
BIVALVIA	MYTILOIDA	MYTILIDAE	*Septifer*	*cf. bryanae*	EA	2	A	M	N	L
BIVALVIA	MYTILOIDA	MYTILIDAE	*Trichomya*	*hirsuta*	EA	4	A	L	N	L
BIVALVIA	PTERIOIDA	PTERIIDAE	*Electromactra*	*physoides*	IP	3	A	L	N	L
BIVALVIA	PTERIOIDA	PTERIIDAE	*Pinctada*	*maxima*	IP	2	O	L	N	L
BIVALVIA	PTERIOIDA	PTERIIDAE	*Pinctada*	*sp. 1*	U	3	A	L	N	L
BIVALVIA	PTERIOIDA	PTERIIDAE	*Pteria*	*lata*	WP	3	A	L	N	L
BIVALVIA	PTERIOIDA	PTERIIDAE	*Pteria*	*scabriuscula*	WP	3	A	L	N	L
BIVALVIA	PTERIOIDA	MALLEIDAE	*Vulsella*	*vulsella*	IP	4	A	L	N	L
BIVALVIA	PTERIOIDA	ISOGNOMONIDAE	*Isognomon*	*legumen*	IP	4	A	L	N	L
BIVALVIA	PTERIOIDA	ISOGNOMONIDAE	*Isognomon*	*nucleus*	IP	4	A	L	N	L
BIVALVIA	PTERIOIDA	ISOGNOMONIDAE	*Isognomon*	*perna*	IP	4	A	L	N	L
BIVALVIA	PTERIOIDA	GRYPHAEIDAE	*Hyotissa*	*hyotis*	IP	4	A	L	N	L
BIVALVIA	PTERIOIDA	GRYPHAEIDAE	*Hyotissa*	*imbricata*	IP	3	A	L	N	L
BIVALVIA	PTERIOIDA	OSTREIDAE	*Dendostrea*	*folium*	IP	4	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
BIVALVIA	PTERIOIDA	OSTREIDAE	*Ostrea*	*angasi*	EA	1	A	L	N	L
BIVALVIA	PTERIOIDA	OSTREIDAE	*Planostrea*	*pestigris*	IP	2	A	L	N	L
BIVALVIA	PTERIOIDA	OSTREIDAE	*Saccostrea*	*cucullata*	WP	4	A	L	N	H
BIVALVIA	PTERIOIDA	OSTREIDAE	*Saccostrea*	*mordax*	WP	3	A	L	N	H
BIVALVIA	PTERIOIDA	PINNIDAE	*Atrina*	*pectinata*	IP	2	A	L	N	L
BIVALVIA	PTERIOIDA	PINNIDAE	*Pinna*	*bicolor*	IP	3	A	L	N	L
BIVALVIA	PTERIOIDA	PINNIDAE	*Pinna*	*muricata*	IP	2	A	L	N	L
BIVALVIA	PTERIOIDA	PINNIDAE	*Streptopinna*	*saccata*	IP	1	A	L	N	L
BIVALVIA	PECTINOIDA	PLICATULIDAE	*Plicatula*	*chinensis*	IP	2	A	L	N	L
BIVALVIA	PECTINOIDA	PROPEAMUSSIIDAE	*Amusium*	*balloti*	EA	3	A	L	Y	H
BIVALVIA	PECTINOIDA	PECTINIDAE	*Bellchlamys*	*aktinos*	EA	3	A	L	N	L
BIVALVIA	PECTINOIDA	PECTINIDAE	*Chlamys*	*sp. 1*	U	1	A	L	N	L
BIVALVIA	PECTINOIDA	PECTINIDAE	*Decatopecten*	*strangei*	EA	3	A	L	N	L
BIVALVIA	PECTINOIDA	PECTINIDAE	*Laevichlamys*	*lemniscata*	WP	2	A	L	N	L
BIVALVIA	PECTINOIDA	PECTINIDAE	*Mimachlamys*	*gloriosa*	WP	3	A	L	N	L
BIVALVIA	PECTINOIDA	PECTINIDAE	*Pascahinnites*	*coruscans*	IP	1	A	L	N	L
BIVALVIA	PECTINOIDA	PECTINIDAE	*Pecten*	*fumatus*	EA	2	A	L	Y	M
BIVALVIA	PECTINOIDA	PECTINIDAE	*Scaeochlamys*	*livida*	WP	2	A	L	N	L
BIVALVIA	LIMOIDA	LIMIDAE	*Limaria*	*orientalis*	WP	2	A	L	N	L
BIVALVIA	TRIGONOIDA	TRIGONIIDAE	*Neotrigonia*	*lamarckii*	RA	3	A	L	N	L
BIVALVIA	CARDITOIDA	CRASSATELLIDAE	*Eucrassatella*	*cumingi*	RA	3	A	L	N	L
BIVALVIA	CARDITOIDA	CARDITIDAE	*Cardita*	*excavata*	EA	4	A	L	N	L
BIVALVIA	CARDITOIDA	CARDITIDAE	*Carditamera*	*incrassata*	WP	4	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
BIVALVIA	CHAMOIDEA	CHAMIDAE	*Chama*	*fibula*	WP	3	A	L	N	L
BIVALVIA	CHAMOIDEA	CHAMIDAE	*Chama*	*pulchella*	WP	3	A	L	N	L
BIVALVIA	VENEROIDA	GALEOMMATIDAE	*Kellia*	*sp. 1*	U	2	U	L	N	L
BIVALVIA	VENEROIDA	GALEOMMATIDAE	*Scintilla*	*sp. 1*	U	2	U	M	N	L
BIVALVIA	VENEROIDA	LUCINIDAE	*Anodontia*	*sp. 1*	U	3	U	L	N	L
BIVALVIA	VENEROIDA	LUCINIDAE	*Ctena*	*bella*	IP	3	A	L	N	L
BIVALVIA	VENEROIDA	LUCINIDAE	*Ctena*	*sp. 1*	U	2	U	L	N	L
BIVALVIA	VENEROIDA	LUCINIDAE	*Divalucina*	*cumingi*	WP	5	A	L	N	L
BIVALVIA	VENEROIDA	LUCINIDAE	*Wallucina*	*sp. 1*	U	3	U	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Afrocardium*	*skeeti*	WP	2	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Acrosterigma*	*dianthinum*	WP	#	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Acrosterigma*	*foveolatum*	WP	2	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Acrosterigma*	*impolitum*	WP	2	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Lyrocardium*	*lyratum*	WP	2	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Maoricardium*	*setosum*	WP	4	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Nemocardium*	*bechei*	WP	3	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Pratulum*	*thetidis*	EA	3	A	L	N	L
BIVALVIA	VENEROIDA	CARDIIDAE	*Vasticardium*	*vertebratum*	WP	3	A	L	N	L
BIVALVIA	VENEROIDA	TRIDACNIDAE	*Tridacna*	*squamosa*	IP	1	R	L	Y	H
BIVALVIA	VENEROIDA	HEMIDONACIDAE	*Hemidonax*	*dactylus*	RA	3	A	L	N	L
BIVALVIA	VENEROIDA	HEMIDONACIDAE	*Hemidonax*	*pictus*	WP	4	A	L	N	L
BIVALVIA	VENEROIDA	DONACIDAE	*Deltachion*	*brazieri*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	DONACIDAE	*Donax*	*deltoides*	EA	4	A	L	Y	M

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
BIVALVIA	VENEROIDA	DONACIDAE	*Donax*	*veruinus*	WP	4	A	L	N	L
BIVALVIA	VENEROIDA	SEMELIDAE	*Semele*	*sp. 1*	U	1	U	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Cadella*	*diluta*	WP	4	A	M	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Cadella*	*obtusalis*	WP	3	A	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Cadella*	*semen*	WP	4	A	M	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Macomona*	*deltoidalis*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Pinguitellina*	*languida*	WP	3	A	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Pseudarcopagia*	*botanica*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Strigilla*	*euronia*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Tellina*	*tenuilirata*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Tellina*	*cf. tenuilirata*	U	2	U	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Tellina*	*gemonia*	EA	2	A	L	N	L
BIVALVIA	VENEROIDA	TELLINIDAE	*Tellina*	*imbellis*	EA	3	A	L	N	L
BIVALVIA	VENEROIDA	PSAMMOBIIDAE	*Gari*	*maculosa*	IP	4	A	L	N	L
BIVALVIA	VENEROIDA	PSAMMOBIIDAE	*Gari*	*modesta*	EA	3	A	L	N	L
BIVALVIA	VENEROIDA	PSAMMOBIIDAE	*Gari*	*pennata*	IP	2	A	L	N	L
BIVALVIA	VENEROIDA	PSAMMOBIIDAE	*Gari*	*rasilis*	WP	1	A	L	N	L
BIVALVIA	VENEROIDA	PSAMMOBIIDAE	*Heteroglypta*	*contraria*	IP	4	A	L	N	L
BIVALVIA	VENEROIDA	PSAMMOBIIDAE	*Soletellina*	*alba*	EA	3	A	L	N	L
BIVALVIA	VENEROIDA	PSAMMOBIIDAE	*Soletellina*	*burnupi*	IP	3	A	L	N	L
BIVALVIA	VENEROIDA	MACTRIDAE	*Electromactra*	*antecedens*	EA	3	A	L	N	L
BIVALVIA	VENEROIDA	MACTRIDAE	*Mactra*	*australis*	EA	1	A	L	N	L
BIVALVIA	VENEROIDA	MACTRIDAE	*Mactra*	*contraria*	EA	4	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
BIVALVIA	VENEROIDA	MACTRIDAE	*Meropesta*	*nicobarica*	IP	4	A	L	N	L
BIVALVIA	VENEROIDA	MACTRIDAE	*Nannomactra*	*pusilla*	EA	3	A	L	N	L
BIVALVIA	VENEROIDA	MACTRIDAE	*Spisula*	*trigonella*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	MESODESMATIDAE	*Paphies*	*elongata*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Antigona*	*chemnitzii*	IP	2	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Antigona*	*lamellaris*	IP	2	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Circomphalus*	*disjecta*	EA	3	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Circomphalus*	*jacksoni*	RA	2	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Dosinia*	*deshayesii*	WP	2	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Dosinia*	*histrio*	WP	2	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Dosinia*	*nedigna*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Eumarcia*	*fumigata*	EA	2	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Globivenus*	*embrithes*	RA	4	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Globivenus*	*toreuma*	IP	4	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Gomphina*	*undulosa*	EA	2	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Granicorium*	*indutum*	RA	3	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Notocallista*	*disrupta*	RA	3	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Periglypta*	*reticulata*	IP	3	A	L	N	M
BIVALVIA	VENEROIDA	VENERIDAE	*Plcamen*	*calophylla*	WP	3	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Placamen*	*tiara*	WP	3	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Tapes*	*platyptycha*	WP	4	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Tapes*	*sp. 1*	U	2	U	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Tawera*	*subnodulosa*	RA	4	A	L	N	L

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
BIVALVIA	VENEROIDA	VENERIDAE	*Timoclea*	*ethica*	RA	5	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Timoclea*	*sp. 1*	U	2	U	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Venerupis*	*anomala*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	VENERIDAE	*Venerupis*	*crenatus*	EA	4	A	L	N	L
BIVALVIA	VENEROIDA	PETRICOLIDAE	*Petricola*	*divergens*	IP	2	A	L	N	L
BIVALVIA	VENEROIDA	TRAPEZIDAE	*Trapezium*	*obesum*	IP	1	A	L	N	L
BIVALVIA	VENEROIDA	GLOSSIDAE	*Meiocardia*	*moltkiana*	WP	1	A	L	N	L
BIVALVIA	VENEROIDA	GLAUCONOMIDAE	*Glauconome*	*plankta*	WP	3	A	L	N	L
BIVALVIA	MYOIDA	CORBULIDAE	*Anisocorbula*	*moretonensis*	RA	2	A	M	N	L
BIVALVIA	MYOIDA	CORBULIDAE	*Notocorbula*	*tunicata*	EA	3	A	L	N	L
BIVALVIA	MYOIDA	CORBULIDAE	*Notocorbula*	*vicaria*	RA	3	A	L	N	L
BIVALVIA	MYOIDA	CORBULIDAE	*Serracorbula*	*coxi*	WP	2	A	L	N	L
BIVALVIA	MYOIDA	CORBULIDAE	*Serracorbula*	*verconis*	EA	2	A	L	N	L
BIVALVIA	MYOIDA	HIATELLIDAE	*Hiatella*	*arctica*	IP	4	A	L	N	L
BIVALVIA	MYOIDA	PHOLADIDAE	*Barnea*	*obturamentum*	EA	3	A	L	N	L
BIVALVIA	MYOIDA	PHOLADIDAE	*Jouannetia*	*globulosa*	WP	2	A	L	N	L
BIVALVIA	MYOIDA	PHOLADIDAE	*Pholas*	*australasiae*	EA	3	A	L	N	L
BIVALVIA	MYOIDA	GASTROCHAENIDAE	*Gastrochaena*	*cuneiformis*	IP	4	A	L	N	L
BIVALVIA	PHOLADOMYOIDA	THRACIIDAE	*Thraciopsis*	*elongata*	EA	1	A	L	N	L
BIVALVIA	PHOLADOMYOIDA	MYOCHAMIDAE	*Myadora*	*brevis*	EA	3	A	L	N	L
CEPHALOPODA	SEPIOIDA	SEPIIDAE	*Metasepia*	*pfefferi*	WP	3	A	L	N	L
CEPHALOPODA	SEPIOIDA	SEPIIDAE	*Sepia*	*plangon*	WP	4	A	L	N	M

CLASS	ORDER/HIGHER CLADE	FAMILY	*GENUS*	*SPECIES*	DISTRIBUTIONA:L RANGE	SPATIAL ABUNDANCE	TEMPORAL ABUNDANCE	SIZE	COMMERCIALLY EXPLOITED	POTENTIAL FOR EXPLOITATION
CEPHALOPODA	SEPIOIDA	SEPIIDAE	*Sepia*	*cf. plangon*	U	3	O	L	N	L
CEPHALOPODA	SEPIOIDA	SEPIIDAE	*Sepia*	*mestus*	EA	1	O	L	N	L
CEPHALOPODA	SEPIOIDA	SEPIIDAE	*Sepia*	*opipara*	RA	1	O	L	N	L
CEPHALOPODA	SEPIOIDA	SEPIIDAE	*Sepia*	*smithi*	WP	4	A	L	N	M
CEPHALOPODA	OCTOPODA	OCTOPODIDAE	*Octopus*	*sp. 1*	U	2	A	L	N	M

Annex 3. List of reef-building coral species from Sunshine Coast.

Comparison of coral species occurrence of three subtropical Queensland locations: Hervey Bay, Sunshine Coast, and Moreton Bay. Data sources: Hervey Bay – DeVantier 2010, Sunshine Coast – This study and Harriott et al. 1992, Harrison et al. 1993, Banks 1995 (17 species from these studies that were not recorded during the present survey are denoted PR for previously Published Record) and the photo records of Jan Brown (1 species, denoted JB); Moreton Bay – Wallace et al. 2009, Flinders Reef – Veron 1993.

Coral Family	Reef-building coral species	Sunshine Coast	Hervey Bay	Moreton Bay	Flinders Reef
POCILLOPORIDAE	*Pocillopora damicornis*	1	1	1	1
POCILLOPORIDAE	*Pocillopora danae*	1			
POCILLOPORIDAE	*Stylophora pistillata*	1			1
POCILLOPORIDAE	*Seriatopora hystrix*	1			1
ACROPORIDAE	*Montipora aequituberculata*				1
ACROPORIDAE	*Montipora angulata*	PR			
ACROPORIDAE	*Montipora caliculata*	1			1
ACROPORIDAE	*Montipora danae*				1
ACROPORIDAE	*Montipora efflorescens*	1			
ACROPORIDAE	*Montipora floweri*	1			
ACROPORIDAE	*Montipora foliosa*				1
ACROPORIDAE	*Montipora foveolata*				1
ACROPORIDAE	*Montipora grisea*	1			
ACROPORIDAE	*Montipora hispida*	PR			
ACROPORIDAE	*Montipora hoffmeisteri*	1			
ACROPORIDAE	*Montipora incrassata*	1			
ACROPORIDAE	*Montipora informis*	1			
ACROPORIDAE	*Montipora mollis*	1	1		1
ACROPORIDAE	*Montipora millepora*	1			
ACROPORIDAE	*Montipora monasteriata*	PR			1
ACROPORIDAE	*Montipora nodosa*	PR			
ACROPORIDAE	*Montipora peltiformis*				1
ACROPORIDAE	*Montipora spongodes*	1			1
ACROPORIDAE	*Montipora spumosa*	PR			1
ACROPORIDAE	*Montipora tuberculosa*				1

Coral Family	Reef-building coral species	Sunshine Coast	Hervey Bay	Moreton Bay	Flinders Reef
ACROPORIDAE	*Montipora turgescens*	1			
ACROPORIDAE	*Montipora turtlensis*	PR			1
ACROPORIDAE	*Montipora venosa*	1			1
ACROPORIDAE	*Acropora abrotanoides*	1			1
ACROPORIDAE	*Acropora anthocercis*	1			
ACROPORIDAE	*Acropora aspera*		1		
ACROPORIDAE	*Acropora austera*	PR			1
ACROPORIDAE	*Acropora bushyensis*		1		
ACROPORIDAE	*Acropora clathrata*	1			1
ACROPORIDAE	*Acropora cytherea*	1			1
ACROPORIDAE	*Acropora digitifera*	1	1	1	
ACROPORIDAE	*Acropora divaricata*	1		1	1
ACROPORIDAE	*Acropora donei*			1	1
ACROPORIDAE	*Acropora florida*	1			1
ACROPORIDAE	*Acropora gemmifera*				1
ACROPORIDAE	*Acropora glauca*	1		1	1
ACROPORIDAE	*Acropora grandis*				1
ACROPORIDAE	*Acropora humilis*				1
ACROPORIDAE	*Acropora hyacinthus*	1		1	1
ACROPORIDAE	*Acropora latistella*	PR		1	1
ACROPORIDAE	*Acropora lutkeni*			1	1
ACROPORIDAE	*Acropora microclados*				1
ACROPORIDAE	*Acropora millepora*				1
ACROPORIDAE	*Acropora nana*				1
ACROPORIDAE	*Acropora nasuta*			1	1
ACROPORIDAE	*Acropora intermedia (aka A. nobilis)*				1
ACROPORIDAE	*Acropora palmerae*				1
ACROPORIDAE	*Acropora pulchra*		1		
ACROPORIDAE	*Acropora robusta*				1
ACROPORIDAE	*Acropora samoensis*	1		1	1
ACROPORIDAE	*Acropora sarmentosa*	1	1		1

Coral Family	Reef-building coral species	Sunshine Coast	Hervey Bay	Moreton Bay	Flinders Reef
ACROPORIDAE	*Acropora secale*	1			1
ACROPORIDAE	*Acropora solitaryensis*	1		1	1
ACROPORIDAE	*Acropora subulata*	1			1
ACROPORIDAE	*Acropora valida*	1		1	1
ACROPORIDAE	*Acropora verweyi*			1	1
ACROPORIDAE	*Acropora yongei*				1
ACROPORIDAE	*Isopora palifera*	1			1
ACROPORIDAE	*Astreopora cucullata*				1
ACROPORIDAE	*Astreopora listeri*			1	1
ACROPORIDAE	*Astreopora moretonensis*	1			1
ACROPORIDAE	*Astreopora myriophthalma*				1
EUPHYLLIIDAE	*Euphyllia ancora*				1
OCULINIDAE	*Galaxea fascicularis*	JB			
SIDERASTREIDAE	*Psammocora albopicta*	1	1	1	
SIDERASTREIDAE	*Psammocora contigua*			1	1
SIDERASTREIDAE	*Psammocora digitata*				1
SIDERASTREIDAE	*Psammocora haimeana*	1			1
SIDERASTREIDAE	*Psammocora nierstraszi*	1	1	1	
SIDERASTREIDAE	*Psammocora profundacella*			1	
SIDERASTREIDAE	*Psammocora superficialis*	1	1	1	
SIDERASTREIDAE	*Coscinaraea columna*	1			1
SIDERASTREIDAE	*Coscinaraea exesa*	1			
AGARICIIDAE	*Pavona duerdeni*	1			1
AGARICIIDAE	*Pavona explanulata*	1			1
AGARICIIDAE	*Pavona maldivensis*	PR			1
AGARICIIDAE	*Pavona varians*	1			1
FUNGIIDAE	*Cycloseris costulata*				1
FUNGIIDAE	*Cycloseris cyclolites*		1	1	
PECTINIIDAE	*Echinophyllia aspera*	1		1	1
PECTINIIDAE	*Mycedium elephantotus*	1			1
DENDROPHYLLIIDAE	*Turbinaria bifrons*	1	1		1

Coral Family	Reef-building coral species	Sunshine Coast	Hervey Bay	Moreton Bay	Flinders Reef
DENDROPHYLLIIDAE	*Turbinaria conspicua*	1	1		
DENDROPHYLLIIDAE	*Turbinaria frondens*	1	1	1	1
DENDROPHYLLIIDAE	*Turbinaria heronensis*	1			
DENDROPHYLLIIDAE	*Turbinaria mesenterina*	1	1		1
DENDROPHYLLIIDAE	*Turbinaria patula*	1	1	1	1
DENDROPHYLLIIDAE	*Turbinaria peltata*	1	1	1	1
DENDROPHYLLIIDAE	*Turbinaria radicalis*	1	1	1	1
DENDROPHYLLIIDAE	*Turbinaria reniformis*	1	1		
DENDROPHYLLIIDAE	*Turbinaria stellulata*	1	1		1
DENDROPHYLLIIDAE	*Heteropsammia cochlea*				1
DENDROPHYLLIIDAE	*Heteropsammia moretonensis*			1	
CARYOPHYLLIIDAE	*Heterocyathus aequicostatus*			1	
MUSSIDAE	*Blastomussa wellsi*			1	
MUSSIDAE	*Micromussa amakusensis*	1		1	
MUSSIDAE	*Acanthastrea bowerbanki*	1		1	1
MUSSIDAE	*Acanthastrea echinata*	1		1	1
MUSSIDAE	*Acanthastrea hemprichii*	1		1	
MUSSIDAE	*Acanthastrea hillae*	1	1	1	1
MUSSIDAE	*Acanthastrea lordhowensis*	1	1	1	1
MUSSIDAE	*Lobophyllia corymbosa*			1	1
MUSSIDAE	*Lobophyllia hemprichii*	1			1
MUSSIDAE	*Symphyllia radians*	1			
MUSSIDAE	*Scolymia australis*	1			1
MUSSIDAE	*Scolymia vitiensis*				1
FAVIIDAE	*Favia danae*	1	1		
FAVIIDAE	*Favia favus*	1	1	1	1
FAVIIDAE	*Favia lizardensis*	1			
FAVIIDAE	*Favia maritima*	1	1	1	1
FAVIIDAE	*Favia matthaii*	1		1	
FAVIIDAE	*Favia maxima*	1			
FAVIIDAE	*Favia pallida*	1		1	1

Coral Family	Reef-building coral species	Sunshine Coast	Hervey Bay	Moreton Bay	Flinders Reef
FAVIIDAE	*Favia speciosa*	1	1	1	1
FAVIIDAE	*Favia rotumana*			1	
FAVIIDAE	*Favia veroni*	1		1	
FAVIIDAE	*Barabattoia amicorum*			1	
FAVIIDAE	*Favites abdita*	PR		1	1
FAVIIDAE	*Favites chinensis*	1	1	1	1
FAVIIDAE	*Favites complanata*	1	1		
FAVIIDAE	*Favites flexuosa*	1	1	1	1
FAVIIDAE	*Favites halicora*	PR		1	
FAVIIDAE	*Favites cf. paraflexuosa*		1		
FAVIIDAE	*Favites pentagona*	1			1
FAVIIDAE	*Favites russelli*	1			1
FAVIIDAE	*Goniastrea aspera*	1	1	1	
FAVIIDAE	*Goniastrea australensis*	1	1	1	1
FAVIIDAE	*Goniastrea favulus*	1	1		1
FAVIIDAE	*Goniastrea palauensis*	1		1	
FAVIIDAE	*Goniastrea pectinata*	1		1	1
FAVIIDAE	*Platygyra acuta*		1		
FAVIIDAE	*Platygyra daedalea*	1			1
FAVIIDAE	*Platygyra lamellina*	PR		1	1
FAVIIDAE	*Platygyra pini*	1			
FAVIIDAE	*Platygyra sinensis*	1			1
FAVIIDAE	*Leptoria phrygia*	PR			1
FAVIIDAE	*Oulophyllia crispa*	1		1	
FAVIIDAE	*Montastrea annuligera*				1
FAVIIDAE	*Montastrea curta*	1	1	1	1
FAVIIDAE	*Montastrea magnistellata*				1
FAVIIDAE	*Plesiastrea versipora*	1	1	1	1
FAVIIDAE	*Leptastrea bewickensis*				1
FAVIIDAE	*Leptastrea purpurea*	1			1
FAVIIDAE	*Leptastrea transversa*				1

Coral Family	Reef-building coral species	Sunshine Coast	Hervey Bay	Moreton Bay	Flinders Reef
FAVIIDAE	*Cyphastrea chalcidium*		1		
FAVIIDAE	*Cyphastrea microphthalma*		1		
FAVIIDAE	*Cyphastrea serailia*	1	1	1	1
MERULINIDAE	*Hydnophora exesa*	1		1	1
MERULINIDAE	*Hydnophora microconos*	1			1
MERULINIDAE	*Hydnophora pilosa*	1			
PORTIDAE	*Porites australiensis*	1			1
PORTIDAE	*Porites deformis*	1			
PORTIDAE	*Porites heronensis*	PR			
PORTIDAE	*Porites lobata*	PR			1
PORTIDAE	*Porites lutea*	1			1
PORTIDAE	*Porites lichen*	1			
PORTIDAE	*Porites murrayensis*				1
PORTIDAE	*Goniopora cf. cellulosa*		1		
PORTIDAE	*Goniopora columna*	1	1		
PORTIDAE	*Goniopora djiboutiensis*	1	1	1	1
PORTIDAE	*Goniopora lobata*	PR	1	1	1
PORTIDAE	*Goniopora minor*	1	1	1	
PORTIDAE	*Goniopora norfolkensis*	PR			
PORTIDAE	*Goniopora somaliensis*	1			1
PORTIDAE	*Goniopora stokesi*	1	1	1	
PORTIDAE	*Goniopora stutchburyi*	1	1		1
PORTIDAE	*Goniopora tenuidens*	1			
PORTIDAE	*Alveopora allingi*	1			1
PORTIDAE	*Alveopora marionensis*				
PORTIDAE	*Alveopora spongiosa*				
	Total	105	46	61	112
	Additional records	17 PR, 1 JB			

Annex 4. List of reef-associated fishes from the Sunshine Coast.

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
ACANTHURIDAE	*Acanthurus blochii*		
ACANTHURIDAE	*Acanthurus dussumieri*		
ACANTHURIDAE	*Acanthurus lineatus*		
ACANTHURIDAE	*Acanthurus mata*		
ACANTHURIDAE	*Acanthurus nigrofuscus*		
ACANTHURIDAE	*Acanthurus xanthopterus*		
ACANTHURIDAE	*Ctenochaetus binotatus*		
ACANTHURIDAE	*Ctenochaetus striatus*		
ACANTHURIDAE	*Naso brevirostris*		
ACANTHURIDAE	*Naso unicornis*		
ACANTHURIDAE	*Prionurus maculatus*		
ACANTHURIDAE	*Prionurus microlepidotus*		
APOGONIDAE	*Apogon angustatus*		
APOGONIDAE	*Apogon apogonoides*		
APOGONIDAE	*Apogon capricornis*		
APOGONIDAE	*Archamia leai*		
AULOSTOMIDAE	*Aulostomus chinensis*		
BALISTIDAE	*Rhinecanthus rectangulus*		YES
BALISTIDAE	*Sufflamen bursa*		

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
BALISTIDAE	*Sufflamen chrysopterus*		
BALISTIDAE	*Sufflamen fraenatus*		
BLENNIIDAE	*Aspidontus dussumieri*		
BLENNIIDAE	*Aspidontus taeniatus*		
BLENNIIDAE	*Ecsenius bicolor*		YES
BLENNIIDAE	*Laiphognathus multimaculatus*		
BLENNIIDAE	*Meiacanthus lineatus*		
BLENNIIDAE	*Plagiotremus rhinorhyncos*		
BLENNIIDAE	*Plagiotremus tapeinosoma*		
CAESIONIDAE	*Pterocaesio diagramma*		
CARANGIDAE	*Carangoides gymnostethus*	YES	
CARANGIDAE	*Carangoides orthogrammus*	YES	
CARANGIDAE	*Seriola lalandi*	YES	
CARANGIDAE	*Trachurus novaezelandiae*		
CHAETODONTIDAE	*Chaetodon aureofasciatus*		YES
CHAETODONTIDAE	*Chaetodon auriga*		YES
CHAETODONTIDAE	*Chaetodon citrinellus*		YES
CHAETODONTIDAE	*Chaetodon flavirostris*		YES
CHAETODONTIDAE	*Chaetodon kleinii*		YES
CHAETODONTIDAE	*Chaetodon plebius*		YES
CHAETODONTIDAE	*Chaetodon rainfordi*		YES

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
CHAETODONTIDAE	*Chaetodon trifascialis*		YES
CHAETODONTIDAE	*Chaetodon vagabundus*		YES
CHAETODONTIDAE	*Chelmon rostratus*		YES
CHAETODONTIDAE	*Chelmonops truncatus*		YES
CHAETODONTIDAE	*Coradion altivelis*		YES
CHAETODONTIDAE	*Heniochus accuminatus*		YES
CHAETODONTIDAE	*Heniochus monoceros*		YES
CHEILODACTYLIDAE	*Cheilodactylus fuscus*		
CHEILODACTYLIDAE	*Cheilodactylus vestitus*		
CIRRHITIDAE	*Cirrhitichthys aprinus*		
DASYATIDAE	*Taeniura melanospila*		
DIODONTIDAE	*Dicotylichthys punctulatus*		
DIODONTIDAE	*Diodon hystrix*		
EPHIPPIDAE	*Platax teira*		
GERREIDAE	*Gerres argyreus*		
GLAUCOSOMATIDAE	*Pelates sexlineatus*		
GOBIIDAE	*Eviota prasites*		YES
GOBIIDAE	*Fusigobius neophytus*		
GOBIIDAE	*Istigobius hoesei*		
HAEMULIDAE	*Diagramma pictum*	YES	
HAEMULIDAE	*Plectorhinchus flavomaculatus*	YES	

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
HAEMULIDAE	*Plectorhinchus lessonii*	YES	
HAEMULIDAE	*Plectorhinchus pictus*	YES	
HAEMULIDAE	*Plectorinchus gibbosus*	YES	
HEMISCYLLIIDAE	*Chiloscyllium punctatum*		
HOLOCENTRIDAE	*Myripristis murdjan*		
HOLOCENTRIDAE	*Sargocentron melanospilos*		
HOLOCENTRIDAE	*Sargocentron rubrum*		
KYPHOSIDAE	*Kyphosus sp.*		
LABRIDAE	*Anampses geographicus*		YES
LABRIDAE	*Anampses neoguinaicus*		YES
LABRIDAE	*Bodianus axillaris*		YES
LABRIDAE	*Bodianus perdito*		YES
LABRIDAE	*Cheilinus chlorourus*	YES	
LABRIDAE	*Choerodon fasciatus*		YES
LABRIDAE	*Choerodon graphicus*	YES	
LABRIDAE	*Choerodon venustus*	YES	
LABRIDAE	*Cirrhilabrus punctatus*		YES
LABRIDAE	*Coris aurilineata*		
LABRIDAE	*Coris batuensis*		
LABRIDAE	*Coris pictoides*		
LABRIDAE	*Gomphosus varius*		YES

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
LABRIDAE	*Halichoeres hortulanus*		YES
LABRIDAE	*Halichoeres margaritaceus*		YES
LABRIDAE	*Halichoeres melanurus*		YES
LABRIDAE	*Halichoeres prosopeion*		YES
LABRIDAE	*Halichoeres trimaculatus*		YES
LABRIDAE	*Hemigymnus fasciatus*		YES
LABRIDAE	*Hologymnosus annulatus*		YES
LABRIDAE	*Labrichthys unilineatus*		YES
LABRIDAE	*Labroides bicolor*		YES
LABRIDAE	*Labroides dimidiatus*		YES
LABRIDAE	*Labropsis australis*		YES
LABRIDAE	*Macropharyngodon choati*		YES
LABRIDAE	*Macropharyngodon meleagris*		YES
LABRIDAE	*Pseudolabrus guentheri*		YES
LABRIDAE	*Stethojulis bandanensis*		YES
LABRIDAE	*Stethojulis interrupta*		YES
LABRIDAE	*Suezichthys devisi*		YES
LABRIDAE	*Thalassoma amblycephalum*		YES
LABRIDAE	*Thalassoma jansenii*		YES
LABRIDAE	*Thalassoma lunare*		YES
LABRIDAE	*Thalassoma lutescens*		YES

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
LETHRINIDAE	*Lethrinus minatus*	YES	
LUTJANIDAE	*Lutjanus argentimaculatus*	YES	
LUTJANIDAE	*Lutjanus bohar*		
LUTJANIDAE	*Lutjanus carponotatus*	YES	
LUTJANIDAE	*Lutjanus fulviflamma*	YES	
LUTJANIDAE	*Lutjanus gibbosus*		
LUTJANIDAE	*Lutjanus lemniscatus*	YES	
LUTJANIDAE	*Lutjanus russelli*	YES	
MICROCANTHIDAE	*Atypichthys strigatus*		
MICROCANTHIDAE	*Microcanthus strigatus*		
MICRODESMIDAE	*Ptereleotris evides*		YES
MONACANTHIDAE	*Aluterus scriptus*		
MONACANTHIDAE	*Cantherhines pardalis*		
MONACANTHIDAE	*Pervagor aspircaudus*		
MONADACTYLIDAE	*Monodactylus argenteus*		
MONADACTYLIDAE	*Schuettea scalaripinnis*		
MULIDAE	*Parupeneus multifasciatus*		
MULIDAE	*Parupeneus spilurus*		
MULIDAE	*Upeneus tragula*		
MYLIOBATIDIDAE	*Aetobatus narinari*		
NEMIPTERIDAE	*Pentapodus paradiseus*		

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
NEMIPTERIDAE	*Scolopsis bilineatus*		
NEMIPTERIDAE	*Scolopsis monogramma*		
ORECTOLOBIDAE	*Orectolobus maculatus*		
OSTRACIIDAE	*Ostracion cubicus*		YES
PEMPHERIDAE	*Pempheris affinis*		
PEMPHERIDAE	*Pempheris schwenkii*		
PINGUIPEDIDAE	*Parapercis millepunctata*		
PINGUIPEDIDAE	*Parapercis stricticeps*		
PLATYCEPHALIDAE	*Platycephalus fuscus*	YES	
PLESIOPIDAE	*Paraplesiops bleekeri*		YES
PLESIOPIDAE	*Trachinops taeniatus*		YES
POMACANTHIDAE	*Centropyge bicolor*		YES
POMACANTHIDAE	*Centropyge tibicen*		YES
POMACANTHIDAE	*Centropyge vroliki*		YES
POMACANTHIDAE	*Chaetodontoplus meredithi*		YES
POMACANTHIDAE	*Pomacanthus sextriatus*		YES
POMACENTRIDAE	*Abudefduf bangalensis*		
POMACENTRIDAE	*Abudefduf sexfasciatus*		
POMACENTRIDAE	*Abudefduf vaigiensis*		
POMACENTRIDAE	*Abudefduf whitleyi*		
POMACENTRIDAE	*Amblyglyphidodon curacao*		

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
POMACENTRIDAE	*Amphiprion akindynos*		YES
POMACENTRIDAE	*Amphiprion clarkii*		YES
POMACENTRIDAE	*Chromis margaritifer*		YES
POMACENTRIDAE	*Chromis nitida*		YES
POMACENTRIDAE	*Chromis weberi*		
POMACENTRIDAE	*Chrysiptera flavipinnis*		YES
POMACENTRIDAE	*Chrysiptera rex*		YES
POMACENTRIDAE	*Chrysiptera sp.*		YES
POMACENTRIDAE	*Dascyllus reticulatus*		YES
POMACENTRIDAE	*Dascyllus trimaculatus*		YES
POMACENTRIDAE	*Mecaenichthys immaculatus*		
POMACENTRIDAE	*Neoglyphidodon melas*		YES
POMACENTRIDAE	*Neoglyphidodon polyacanthus*		YES
POMACENTRIDAE	*Neopomacentrus azysron*		YES
POMACENTRIDAE	*Neopomacentrus cyanomos*		YES
POMACENTRIDAE	*Parma oligolepis*		
POMACENTRIDAE	*Parma unifasciata*		
POMACENTRIDAE	*Plectroglyphidodon dickii*		
POMACENTRIDAE	*Plectroglyphidodon johnstonianus*		
POMACENTRIDAE	*Plectroglyphidodon leucozonus*		
POMACENTRIDAE	*Pomacentrus amboinensis*		

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
POMACENTRIDAE	*Pomacentrus australis*		
POMACENTRIDAE	*Pomacentrus bankanensis*		YES
POMACENTRIDAE	*Pomacentrus brachialis*		
POMACENTRIDAE	*Pomacentrus chrysurus*		YES
POMACENTRIDAE	*Pomacentrus coelestis*		YES
POMACENTRIDAE	*Pomacentrus imitator*		
POMACENTRIDAE	*Pomacentrus lepidogenys*		
POMACENTRIDAE	*Pomacentrus molucencis*		YES
POMACENTRIDAE	*Pomacentrus nagasakiensis*		YES
POMACENTRIDAE	*Pomacentrus smithi*		
POMACENTRIDAE	*Pomacentrus wardi*		
POMACENTRIDAE	*Pristotis obtusirostris*		
POMACENTRIDAE	*Stegastes apicalis*		
POMACENTRIDAE	*Stegastes fasciolatus*		
POMACENTRIDAE	*Stegastes gascoynei*		
PSEUDOCHROMIDAE	*Ogilbyina novaehollandiae*		YES
PSEUDOCHROMIDAE	*Ogilbyina queenslandiae*		YES
RHINOBATIDAE	*Rhinobatos batillum*		
RHINIDAE	*Rhynchobatus australiae*		
SCARIDAE	*Scarus frenatus*		
SCARIDAE	*Scarus ghobhan*		

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
SCOMBRIDAE	*Grammatorcynus bicarinatus*	YES	
SCOMBRIDAE	*Scomberomorus commerson*	YES	
SCORPAENIDAE	*Dendrochirus zebra*		YES
SCORPAENIDAE	*Liocranium sp.*		YES
SCORPAENIDAE	*Scorpaena cardinalis*		YES
SCORPAENIDAE	*Scorpaenopsis diabola*		YES
SSCORPIDIDAE	*Scorpis lineolata*		
SERRANIDAE	*Cephalopholis boenak*		
SERRANIDAE	*Epinephelus caeruleopunctatus*	YES	
SERRANIDAE	*Epinephelus fasciatus*	YES	
SERRANIDAE	*Epinephelus coioides*	YES	
SERRANIDAE	*Epinephelus quoyanus*	YES	
SERRANIDAE	*Epinephelus undulatostriatus*	YES	
SERRANIDAE	*Hypoplectrodes maccullochi*		
SERRANIDAE	*Plectropomus leopardus*	YES	
SERRANIDAE	*Plectropomus maculatus*	YES	
SERRANIDAE	*Pseudanthias squamipinnis*		YES
SERRANIDAE	*Diploprion bifasciatum*		
SERRANIDAE	*Grammistes sexlineatus*		
SIGANIDAE	*Siganus fuscescens*		
SIGANIDAE	*Siganus spinus*		

FAMILY	SPECIES	Hook & Line/Spear Target Species	Aquarium Fish Target Species
SPARIDAE	*Acanthopagrus australis*	YES	
SPARIDAE	*Pagrus auratus*	YES	
SPARIDAE	*Rhabdosargus sarba*	YES	
SPHYRAENIDAE	*Sphryaena flavicauda*		
SPHYRAENIDAE	*Sphyraena obtusata*		
SYNODONTIDAE	*Synodus dermatogenys*		
TETRAODONTIDAE	*Arothron hispidus*		
TETRAODONTIDAE	*Arothron stellatus*		
TETRAODONTIDAE	*Canthigaster bennetti*		YES
TETRAODONTIDAE	*Canthigaster valentini*		YES
TORPEDINIDAE	*Hypnos monopterygium*		
TRIPTERYGIIDAE	*Enneapterygius rufopileus*		YES
TRIPTERYGIIDAE	*Enneapterygius sp.1*		YES
ZANCLIDAE	*Zanclus cornutus*		YES