TROPICAL MARINE LIFE of AUSTRALIA

Section contributors:

Shane Ahyong (Stomatopods)
Philip Alderslade (Octocorals, black corals)
Peter Davie (Crustaceans)
Gustaaf Hallegraeff (Algae, cyanobacteria)
Anne Hoggett (Echinoderms)
Andrew Hosie (Barnacles)
John Huisman (Algae, seagrasses, cyanobacteria)
John Keesing (Echinoderms)
Russell Kelley (Corals)
Michael van Keulen (Seagrasses)
Stuart Kininmonth (Corals)
Paul Muir (Corals)
Lyle Vail (Echinoderms)

Major photographic contributors:

Ian Shaw
Rick Stuart-Smith
Rokus Groeneveld
Ken Trebilco
Andrew Green
John Huisman
Rudie Kuiter
Kelvin Aitken
Clay Bryce
Denis Riek
Sophie Edgar
Joe Shields
Russell Kelley
Anne Hoggett
Lyle Vail
John Keesing

TROPICAL MARINE LIFE of AUSTRALIA

Plants and animals of the central Indo-Pacific

RICH CAREY | SHUTTERSTOCK

Graham Edgar

DEDICATION

In appreciation of the efforts of
Neville Coleman and Rudie Kuiter,
for bringing order to confusion.

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Publisher and Project Editor: Simon Papps
Designer: Andrew Davies
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PREFACE

Coral reefs are changing. I count myself amongst the lucky few who saw the Great Barrier Reef in full grandeur, as it was 50 years ago. Family holidays were spent at my parents' small block at South Mission Beach, north Queensland. The seas were generally clear, rainforest bordered sand for 6km up to a single motel at North Mission Beach, and the Outer Reef possessed unbelievable colour and structure. I often swam around a reef at South Mission, chasing fish with a small waterproof camera. Since then the reef has deteriorated through cyclones, crown-of-thorns sea stars, sediment and nutrient runoff from catchment development, and coral bleaching. Backpacker sprawl has infilled the Mission Beach forest, and my inshore reef disappeared under silt long ago. Even remote coral ecosystems now show bleaching scars, including favourite reefs on the eastern bounds of Torres Strait.

Memories are, however, often rose-coloured. Perhaps I only recall highlights and have erased the mundane. I hear this from managers, politicians and tourist operators, who affirm that the reef is fine, that there is little reason to change business as usual. Or perhaps the reef was even better before my time, as evidenced by Banfield's writings in 1908 about nearby Dunk Island in his *Confessions of a Beachcomber*. These different perspectives can be attributed to the 'sliding baseline syndrome'. Each generation relates change to their initial experience, and this can differ between parent and child. Massive changes that occur slowly are easily overlooked because each generation only sees a small slice of the total.

We found this in a study relating shark numbers to diver enjoyment in the Galápagos Islands. Over an eight-year period, visiting divers maintained the same average enjoyment from their dives despite shark numbers declining by two-thirds. Yet divers rated individual sites higher when sharks were present. Ongoing shark declines do not seem to affect the happiness of divers because their experience is related to dives at other locations where conditions are equally deteriorating, and the situation in Galápagos remained much better than elsewhere. Similarly, the beauty of coral and fishes continues to awe first-time divers and snorkelers on the Great Barrier Reef, these visitors not realising that they are seeing only a shadow of past splendour for many locations.

The sliding baseline syndrome profoundly affects our relationship with coral reefs, and this in turn affects management priorities. Until the true magnitude of change in the marine environment is made visible, safeguards for our living heritage are inefficient. Managers remain uncertain as to where threats are concentrated, and thus where best to direct their scarce resources, while politicians can continue to dodge obligations to future generations in a relentless quest for jobs and growth. To address these problems, Reef Life Survey was born.

REEF LIFE SURVEY

Through discussions amongst divers, managers and other scientists, we decided to directly tackle the sliding baseline issue through Reef Life Survey (reeflifesurvey.com), a citizen science program that documents population changes in thousands of marine species using rigorous scientific methods. With support from the scientific research community, and managers in the various Australian States and Territories, over 100 trained RLS divers now swim up and down transect lines around the country, counting numbers of fishes, turtles, sea snakes, molluscs, crustaceans and echinoderms, and also taking photographs to assess changing cover of corals, seaweeds and sponges.

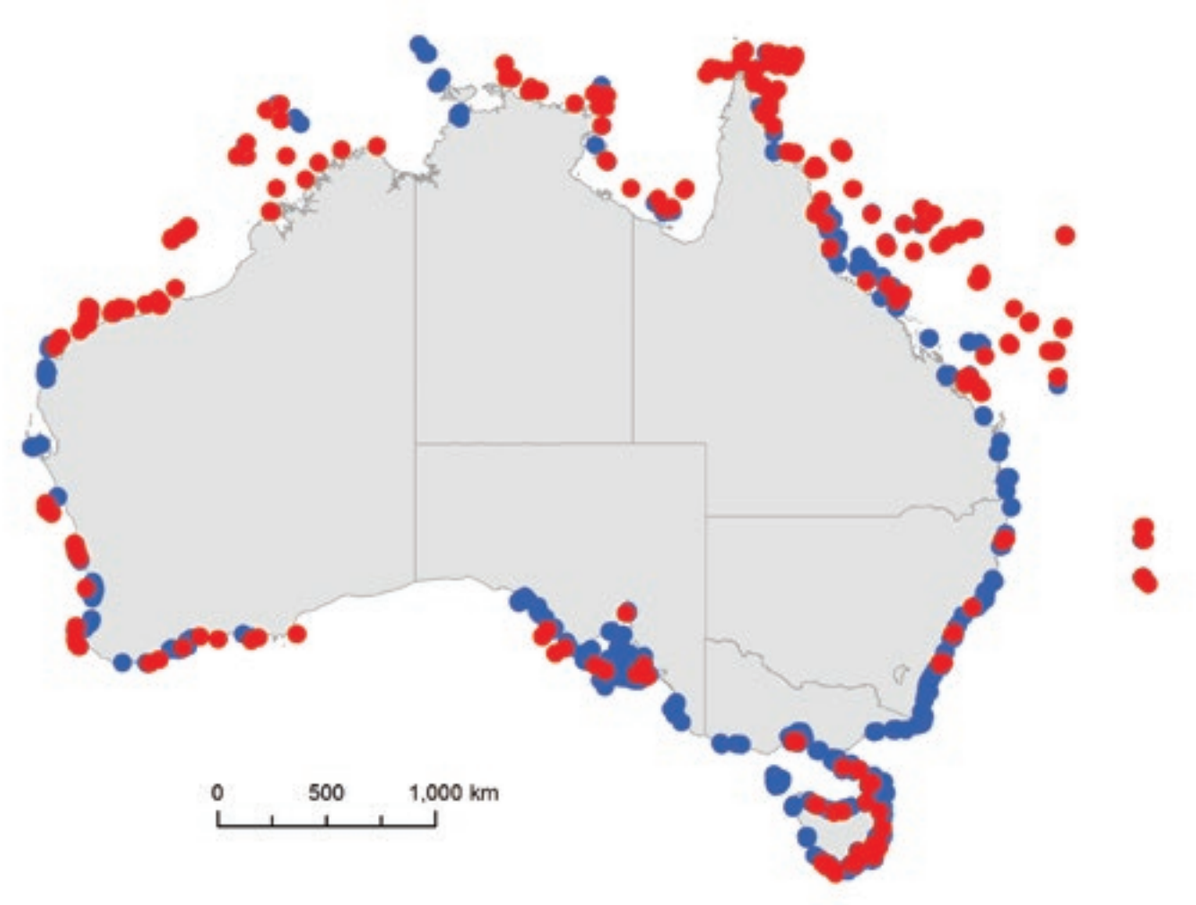
In many ways, we see Matthew Flinders as our inspiration. He circumnavigated and named Australia, mapping out the physical features – the headlands, bays, depths. Following in his footsteps 200 years later, we're now mapping the biological features – the communities of marine plants and

animals. So far, including two circumnavigations of the Australian coastline, we have counted numbers of over 3,000 animal species at over 2,000 sites (see map, which also highlights sites that I have visited while compiling information for this book). An additional 2,000 species have been surveyed at 1,000 sites in 53 other countries, from Svalbard in the Arctic to the Antarctic Peninsula, as well as tropical and temperate seas.

Reef Life Survey data now provide an irreplaceable reference of the marine environment as it is today, a baseline to be used through the future when assessing how communities are changing. RLS data, maps and identification tools can be accessed online (reeflifesurvey.com), allowing anyone to determine exactly what changes are happening, and thus where threats to marine life are concentrated. This information provides a basis for managers when allocating resources to best counter threats.

This book is another outcome of Reef Life Survey. Through images and data generated by the RLS community, new information is now available on species' locations, rarity, and depth distributions. This information and associated photographs should help divers identify species more accurately, while also showcasing the diversity of our living marine heritage.

What is included here is, however, only a small fraction of what we have to lose.



Map of Australian sites surveyed by Reef Life Survey divers (blue), including the author (red), during compilation of this book.

CONTENTS

INTRODUCTION

While the focus of this book is tropical Australia, relatively few of the 2,450 species included here are restricted to Australia, most occur much more widely across the Indian and western Pacific Oceans (the Indo-Pacific region), while some also occur in the eastern Pacific and tropical Atlantic. In addition, because the book is intended to complement *Australian Marine Life: the Plants and Animals of Temperate Waters*, subtropical species are covered to fill the gap in coverage in central Australian latitudes. Thus, many cooler-water species with distributions that extend north to Brisbane in the east and Shark Bay in the west are also considered.

The task of describing all tropical Australian algae, invertebrates, fishes, marine reptiles, birds and mammals is impossible, requiring many volumes just to cover the larger species. Considerable selectivity is therefore needed when choosing species to be included. My emphasis in selecting species was firstly to include all common, conspicuous or noteworthy species, and also to showcase representatives from as wide a range of plant and animal families as possible. Selection was assisted by the Reef Life Survey dataset, which indicated species that are most frequently sighted by divers in northern Australia in water depths less than 30m. Many omissions were, however, inevitable given the huge diversity across the region. To partially remedy this deficiency, a list of the most useful publications for identifying tropical species is included in the bibliography. Readers are urged to consult these articles, websites and books, or to contact the appropriate specialist at a museum, to definitively identify any species. The Reef Life Survey website (reeflifesurvey.com) also includes photographs and distribution maps of additional species.

A number of terms used in this book have a more precise meaning than in general speech. The more important of these are discussed below, while others are explained the first time they are used in the text and in a glossary at the end of the book.

▲ Yellowmouth Moray (*Gymnothorax nudivomer*)

Species information

Information on species described in this book has been summarised using the following format.

Scientific name
Common names

Australian coastal regions where species has been recorded

Species description.
Maximum recorded length.
HABITAT: Habitat type; minimum–most commonly observed–maximum recorded depth.
Country range limits.
OCCURRENCE: Percent of sites within regions at which species was sighted by RLS divers, average number of animals sighted per 50m transect block when present.
DIET: Summarised data when available.
IUCN RED LIST: Status if threatened.

An example is the Yellowmouth Moray (*Gymnothorax nudivomer*).

Gymnothorax nudivomer
Yellowmouth Moray, Starry Moray

Dark moray with constellation of small white spots, distinctive yellow mouth lining, head small relative to body. Length to 180cm.
HABITAT: Outer reef; 1–15–271m. West to Red Sea, north to Japan, east to French Polynesia.
OCCURRENCE: Frequent (8%), solitary (1).

► Paget Cay, Coral Sea

Species name

The basic unit of biological classification is the species, a group of organisms that in the 'biological species' concept can produce fertile offspring but which cannot interbreed with other organisms. This traditional view of species is currently under challenge through application of new methodologies that allow genetic differences between organisms to be precisely measured. Some authorities suggest that these provide a less subjective basis for species determination (the 'genetic species' concept).

Most species are distinctive using either concept, nevertheless disagreement can occur when, for example, a fish looks slightly different between Indian Ocean and Pacific Ocean locations. One biologist may consider those differences sufficient to warrant recognition of two separate species, while another may see them as forms of the one species, creating confusion for bystanders. I use the World Register of Marine Species (WoRMS; marinespecies.org) to arbitrate. This online list summarises current opinion on names of all marine species. While some scientific names used in this book will undoubtedly change following future research, these names can be entered into the WoRMS database to find any update to the name.

Species can be labelled using either common or scientific names. Common names are most usefully applied to well-known groups but generally lack consistency from place to place. In the case of fishes, common names have now been standardised Australia-wide to better inform seafood consumers (fishnames.com.au). In this book, the officially recognised name is provided first with the fish species entries, and other frequently-used local names, some of which may be better recognised, are then listed.

The conventional scientific way to label each species is to give it a unique Latin name written in italics in two parts, with the first letter of the first word capitalised. An example is *Portunus pelagicus*, a name that refers universally to the animal known as the blue swimmer crab in New South Wales, the blue manna crab in Western Australia, the sand crab in Queensland, and something different again in India and elsewhere. This system was originally applied in the 1750s by the Swedish biologist Carl von Linné (latinised as Carolus Linnaeus) and is today known as the Linnaean system of biological nomenclature.

In order to give a scientific name to a new species, a restrictive set of rules now have to be followed, including the designation of a single plant or animal, or strain of bacteria, as the representative or 'type' of that species. The application of these rules is governed by different panels of experts for animals (the International Commission on Zoological Nomenclature), plants (the International Association for Plant Taxonomy) and bacteria (the International Committee for Systematic Bacteriology), and there are some differences in the rules or 'Codes' laid down by each.

The first word in the species name, for example *Portunus*, is also used in the name of closely related organisms and is known as the genus of that species. The genus is often abbreviated (for example *P. pelagicus*) in situations where the name is repeated in a short section of text, providing that it is written in full the first time it is used. A question mark can be added to either the genus or species name in situations where there is some uncertainly about the name's accuracy. The position of this question mark is important. *Portunus ?pelagicus*, for example, is used for a crab that definitely belongs to the genus *Portunus* but is perhaps not *Portunus pelagicus* (this can also be written as Portunus *cf. pelagicus* to make the distinction clearer), whereas *?Portunus pelagicus* is used for an animal that is thought to be *Portunus pelagicus* but may be something quite different. If the genus but not the species is known, or the species is yet to be scientifically named, the abbreviation sp. (for species) is used (for example *Portunus* sp.).

Higher classification of plants and animals

In addition to species and genus, a number of other categories can be used to hierarchically arrange species into groups with similar characteristics. *Portunus pelagicus* groups with other swimmer

crabs in the 'family' Portunidae, which in turn groups with other families of crabs and shrimps in the 'order' Decapoda. The highest categories are the 'kingdoms' (for example, plants, animals, fungi), which are divisible into 'phyla' and then 'classes'. The full classification of the blue swimmer crab is:

Kingdom	Animalia	(animals)
Phylum	Arthropoda	(arthropods)
Class	Malacostraca	(higher crustaceans)
Order	Decapoda	(crabs and shrimps)
Family	Portunidae	(swimmer crabs)
Genus	*Portunus*	
Species	*Portunus pelagicus*	(blue swimmer crab)

Any other plant or animal can be classified using the same hierarchical structure; however, botanists tend to use the term 'division' rather than its zoological equivalent term 'phylum'. If a finer structure in classification is needed than provided by the seven categories listed above, then subcategories are used that are denoted by a prefix. The prefix most often used is sub-, to indicate a slightly lower category, such as subclass to denote a category lower than class but higher than order. Occasionally the prefix super- is used to indicate a slightly higher category, such as superorder to denote a category higher than order but lower than subclass.

Much disagreement exists among biologists on the classification of plants and animals into higher categories – the arrangements of various authors differ in the numbers and names of phyla, classes, etc. This is because of the arbitrary nature of how much difference between two groups of organisms constitutes each category, and because the traditional method of classifying organisms relies on structural characteristics rather than kinship. One biologist, for example, may consider that differences in the structure of kidneys are more important than differences in the arrangement of fins, while another thinks the opposite. Fortunately, this disorder is now changing because of recent emphasis on the evolutionary history of organisms and the development of molecular techniques that enable relationships between organisms to be established at the DNA level. These techniques should eventually allow a single family tree to be constructed that unambiguously indicates relationships between all species based on their evolutionary history, although the subjective issue of where to break the tree into genus, family, etc., will always remain.

Habitat

The habitats of the various species are described here in terms of three key features: habitat type (for example sand, reef or open sea), wave exposure, and depth. The habitat requirements of many tropical species are poorly known, particularly with respect to depth, and so sightings can sometimes be made outside the range of habitats listed.

Wave exposure cannot be precisely determined without complex measurement and is therefore subjectively defined here. 'Sheltered' habitat occurs at sites in estuaries and in shallow enclosed coastal bays; 'moderately exposed' habitat is located along sections of the open coast that are protected to some degree from oceanic swell and have wave heights rarely exceeding 2m; 'maximally exposed' habitat occurs along much of the open coast including where large swells almost continuously pound the shoreline. Species that occur throughout moderately and maximally exposed habitats are listed as inhabiting exposed habitat, and coastal species that are not given a wave exposure classification can be found at all levels of exposure.

The **depth range** of species covers the minimum and maximum depths reported from a combination of the Reef Life Survey database (reeflifesurvey.com) and other studies. For species with records in the RLS database, the mean depth where the species has been sighted is also given between the maximum and minimum known values (for example 0–5–23m indicates an average sighting depth of 5m). This provides an indication of the depth where the species is most likely to be seen during dives.

Distribution

Little is known about the full distribution of many species, so ranges shown here are conservative, outlying populations sometimes occurring outside the listed areas. The Australian distribution of species is shown by red shading on small maps, where 28 subregions around Australia are fully shaded when a species presence is confirmed or highly likely (records in subregions either side) for that subregion. These subregions are described in *Tropical Marine Fishes of Australia* (Stuart-Smith *et al*., 2015, Reed New Holland). With few exceptions, records are based on RLS surveys or locations of museum specimens, as listed on the Atlas of Living Australia website (ala.org.au).

Maps shown here differ from distribution maps in most other field guides, which illustrate the full projected range for a species, and are interpreted as indicating that the species could potentially be seen at any location within this range. Such maps are not particularly informative for Australia, as they often present distributions that encompass the full northern coastline. By contrast, maps presented here include more detail, including whether species are found in inshore or offshore reef systems, or both.

Most species found in northern Australia also occur in the waters of at least one other country. Known distribution limits for these non-endemic species to the west, north and east of Australia are indicated in the text in the *Habitat* section. Australia represents the western, northern or eastern known limit for species where no other country is listed in a particular direction. Global distributional limits were partly obtained from the RLS database, supplemented with information in scientific papers and records listed in the Global Biodiversity Information Facility (gbif.org), IUCN Red List of Threatened Species (iucnredlist.org), Fishbase (fishbase.org) and Sealifebase (sealifebase.org).

Occurrence

The rarity of species can be assessed in different ways. Some species are widely distributed and occur at many sites, and thus could possibly be found on any dive, but with only a single individual generally seen. Other species show the opposite distributional pattern, occurring at very few sites but living in large numbers that make them easy to find where present. These two elements of rarity can be separated using the RLS data set: *area of occupancy* is calculated as the proportion of sites where that species has been recorded within the range of a species (in this case, Marine Ecoregions of the World where the species is present; en.wikipedia.org/wiki/Marine_ecoregions), and **abundance** is calculated as the mean number of individuals sighted along 50m transect lines when at least one individual is present. This information is presented in the **Occurrence** section of each species entry. The **area of occupancy** has been subdivided into the categories: rare (sighted at no more than 1% of sites within range), infrequent (2–4% of sites), frequent (5–19%), common (20–49%), and widespread (>50%). **Abundance** is categorised as: solitary (average 1 per transect), few per transect (2–4), several per transect (5–9), many per transect (10–100), large aggregations (>100). When no occurrence information is provided, the species generally has not been recorded by divers during RLS surveys. Information on **total range size** (i.e. whether a species' distribution extends widely across the Indo-Pacific or is confined to a single small area within Australia) covers a third element of rarity.

Diet

The diet of fishes is expressed as the percentage of different food items found in stomachs where such information is reported in the scientific literature. These values were compiled by German Soler for his PhD thesis (*Factors influencing fish consumption in reef food webs*, University of Tasmania, 2016), and are largely based on data distributed in Fishbase (fishbase.org), supplemented by local unpublished sources. Because the underlying studies classified diet in a variety of ways, averages may be given for mixed taxonomic levels. For example, the groups crustaceans, planktonic crustaceans and copepods may all be listed even though copepods form a subset of both planktonic crustaceans and crustaceans.

Threatened species

Populations of many marine species are declining rapidly as a consequence of overfishing, climate change and habitat destruction. The International Union for the Conservation of Nature (IUCN), and Australian Commonwealth and State governments, all distribute lists of highly threatened species that require urgent protection. Species that are globally threatened and included on the IUCN Red List of Threatened Species are highlighted in species entries. Detailed information on these species can be found at https://www.iucnredlist.org.

Family Hippolytidae

Hippolytid shrimps

The approximately 110 species of hippolytid shrimp often have a hump-backed appearance because of a pronounced bend in the abdomen at the rear of the third segment. The wrist of the second pair of legs is subdivided into additional segments, making these limbs appear to have more than the six segments typical of decapods.

▲ *Alcyonohippolyte commensalis* IAN SHAW

Alcyonohippolyte commensalis

Xenia Shrimp

Translucent body with transverse white bars including semi-circular bar around rear of carapace, white stripe along back, smooth pointed rostrum with a single tooth near lower tip. Hides amongst tentacles of *Xenia* soft corals. Length to 1.6cm.

HABITAT: Soft corals; 3–10m. West to Indonesia, north to Japan.

▲ *Alope orientalis*

Alope orientalis

Oriental Reef Shrimp

Last pair of mouthparts project forward and are very long, resembling legs. Body transparent greenish colour with red spots and red banding on legs. Abundant in rockpools near low-tide level along the NSW coast. Length to 2.7cm.

HABITAT: Exposed reef; 0–46m. West to South Africa, north to Japan, east to New Caledonia.

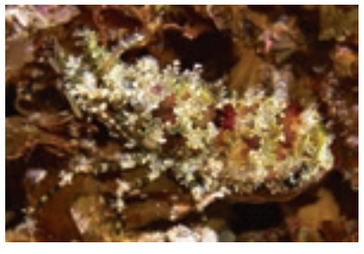
▲ *Lysmata amboinensis*

Lysmata amboinensis

Scarlet Cleaner Shrimp

Rostrum with 5–7 spines along dorsal margin, body red with red back and orange sides, white dorsal stripe extending from tip of rostrum to near end of abdomen, tail with white tip and additional white spot either side, white antennae, orange legs. Over 15 other *Lysmata* species are known, each with a distinctive colour pattern. Removes parasites from fishes at cleaner stations. Length to 5cm.

HABITAT: Crevices in coral reef; 1–9–120m. West to Indonesia, north to Japan, east to French Polynesia.



▲ *Saron marmoratus* DENIS RIEK

Saron marmoratus

Marble Shrimp

Often with bright colours but well camouflaged, large tufts of sensory hairs on body and legs, striped legs. Hides in cracks during the day, active at night. Length to 5cm.

HABITAT: Coral reef, seagrass, rubble; 0–2–25m. West to Red Sea, north to Japan, east to Hawaii.

OCCURRENCE: Infrequent (3%), few per transect (2).

▲ *Saron* sp. ANDREW GREEN

Saron sp.

Lord Howe Coral Shrimp

Saron species display a variety of patterns and coloration, with many species lacking scientific names. The illustrated species, characterised by blue and yellow banding on legs, is so far known only from Lord Howe Island. Length to 5cm.

HABITAT: Reef; 1–20m.

▲ *Thor amboinensis* IAN SHAW

Thor amboinensis

Dancing Shrimp

Short rostrum, green to orange body, large rounded white patches on carapace and tail, abdomen generally held higher than head. Primarily associates with anemones. Length to 2cm.

HABITAT: Coral reef; 1–8–80m. Circumtropical.

OCCURRENCE: Infrequent (2%), few per transect (3).

Tozeuma armatum

Banded Gorgonian Shrimp

Extremely elongate body, long slender rostrum, alternating coloured bands. Sits aligned on gorgonian branch. Length to 5cm.

HABITAT: Gorgonians; 3–30m. North to Japan, east to New Caledonia.

► *Tozeuma armatum* KEN TREBILCO

Family Alpheidae

Snapping shrimps, pistol shrimps

Alpheid shrimps comprise a major family of about 1200 species. They possess a relatively large first pair of legs, with the claw on one side much more enlarged than the other. In many species and genera, the larger claw has a small peg at the base of the moveable finger which produces a loud click as it snaps into a socket on the adjacent fixed finger. The force of the clicking action can stun small prey or deter predators, but the sound is also used to signal potential competitors and mates.

▲ *Alpheus bellulus*

Alpheus bellulus

Tiger Snapping Shrimp, Beautiful Snapping Shrimp

Reticulated body pattern of brown on white, striped claws. Maintains burrows occupied by *Amblyeleotris* gobies. Length to 4cm.

HABITAT: Burrows in sand; 2–18m. West to Indonesia, north to Japan.

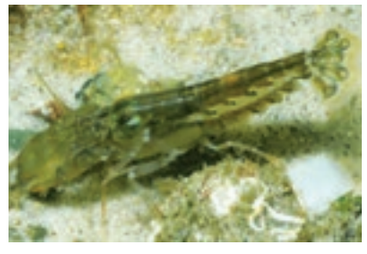
▲ *Alpheus novaezealandiae*

Alpheus novaezealandiae

New Zealand Pistol Shrimp

Dark purple body with white markings on sides. Claws on both the snapping and grasping chelipeds are very long compared with most other alpheids. Lives under rocks and among sponges, ascidians and other attached animals. Length to 7cm.

HABITAT: Sheltered reef; 0–26m. East to New Zealand.



▲ *Alpheus papillosus*

Alpheus papillosus

Green-headed Snapping Shrimp

Green body, abdominal segments with green upper half diagonally separated from pale lower half. Overlaps in southern Qld with Richardson's Snapping Shrimp (*Alpheus richardsonii*), which also has green body but with banded abdominal segments. Length to 4cm.

HABITAT: Rubble, sand; 0–20m. Endemic to Australia.

▲ *Alpheus* sp.

Alpheus sp.

Blue Snapping Shrimp

Blue-green body and legs, banded claw, white saddle behind head and at abdominal hump. Maintains burrows occupied by *Cryptocentrus* gobies. Length to 4cm.

HABITAT: Burrows in sand; 5–14m. Endemic to Australia.

▲ *Alpheus villosus*

Alpheus villosus

Orange Hairy Pistol Shrimp

Bright orange body with numerous hairs, reduced eyes. Two forms present in Australia: a tropical form associated with corals and a temperate form that lives under rocks. Neither

form is recorded from the east coast. Length to 7cm.
HABITAT: Sheltered reef; 0–45m. West to South Africa, north to Philippines.

▲ *Synalpheus* cf. *neomeris*
MARINETHEMES.COM/KELVIN AITKEN

Synalpheus neomeris

Soft Coral Snapping Shrimp

Light translucent body with white internal organs visible, white eyes, large left chelae. Lives amongst branches of soft corals. Length to 2cm.
HABITAT: Soft corals; 2–250m. West to Red Sea, north to Japan.

Family Stenopodidae

Cleaner shrimps

This small family of about 35 small bottom-dwelling shrimps is characterised by the third pair of legs being much larger than the first two, and all three pairs having pincers at the end. They also have the second abdominal segment overlapped by the first. Thus they are a separate lineage that is neither "penaeid" or "carid". Many stenopodids pick parasites from the backs and mouths of visiting fishes at permanent 'cleaner stations'.

▲ *Stenopus hispidus*

Stenopus hispidus

Banded Coral Shrimp

White body with one dark red band behind eyes, two red bands on abdomen, antennae long and white, legs white, claws slender, white with four red bands. Length to 9cm.
HABITAT: Crevices in reef; 1–8–210m. Circumglobal.
OCCURRENCE: Frequent (5%), few per transect (2).

Stenopus tenuirostris

Blue Coral Shrimp

Purple-blue carapace, red and white bands on abdomen, antennae and legs bluish, claws with red, orange and white bands. Length to 5cm.
HABITAT: Crevices in reef; 1–15m. West to South Africa, north to Hawaii, east to French Polynesia.

Family Enoplometopidae

Reef lobsters

Enoplometopids have long lobster-like claws with symmetric pincers, a cylindrical body with bristles, triangular rostrum with spines along its margins, and long thin antennae. One genus and 12 species are known.

▲ *Enoplometopus occidentalis* RUDIE KUITER

Enoplometopus occidentalis

Reef Lobster

Orange-red body with a few white spots, claws three times longer than wide with tubercles on pincers. Rarely observed during day. Length to 14cm.
HABITAT: Coral reef, rubble; 6–100m. West to South Africa, north to Japan, east to French Polynesia.

◄ *Stenopus tenuirostris*

Family Callianassidae

Ghost shrimps, marine yabbies

Callianassids have a pale shrimp-like body with large claws on the first pair of legs (chelipeds). The claw on one side is generally much larger than on the other. The rostrum is inconspicuous and the eyes are located on top of flattened stalks. Callianassids are commonly known as 'yabbies' in Australia, although this term is more widely applied to freshwater crayfish. They are burrowers in soft sediment, where they feed on organic particles. At least 250 species are known.

▲ *Trypaea australiensis* RUDIE KUITER

Trypaea australiensis

Bass Yabby, Ghost Nipper

Dense fringe of long hairs on the first antennae, large claw relatively slender with prominent hook on second segment. The most common ghost shrimp on intertidal mudflats in eastern Australia, reaching densities of many hundreds per square metre. Hunted by fishermen for bait. Length to 6.5cm.
HABITAT: Sheltered mud; low intertidal. Endemic to Australia.

Family Axiidae

Mangrove yabbies

A family of over 100 species of yabby-like crustaceans, but with sharp well-developed rostrums. They generally live in burrows under rocks on mud or rubbly substrates.

▲ *Scytoleptus barbatus* CLAY BRYCE

Scytoleptus barbatus

Bearded Mangrove Yabby

Olive carapace with pointed rostrum, groove running from low on front margin to middle of back; numerous hairs along edge of carapace and on abdominal segments. Length to 8cm.
HABITAT: Mud, rubble; intertidal to 36m. North to Philippines.

Family Laomediidae

Mangrove yabbies

The 20 laomediid species are closely related to the callianassids but have a pointed rostrum, cylindrical eyestalks, left and right chelipeds of approximately equal size, and a tailfan with a groove across both pairs of flaps.

Laomedia healyi

Healy's Mangrove Yabby

Smooth red-brown carapace with a triangular rostrum, tiny spine projecting over each eye; normally lives in burrows or under rocks amongst mangroves. Length to 6cm.
HABITAT: Mangroves, mud; intertidal. Endemic to Australia.

Family Upogebiidae

Mud shrimps

Upogebiids are closely related to ghost shrimps, differing in possessing claws of equal size and a flat furry rostrum. They live under rocks or in sponges, or burrow in sediment. About 200 species are known.

▲ *Acutigebia simsoni*

Acutigebia simsoni

Simson's Mud Shrimp

Flat carapace deeply divided at front into three forward-projecting spines with rows of tubercles along edges. Length to 10cm.
HABITAT: Sheltered sand, under rocks; 0–3m. Endemic to Australia.

▼ *Laomedia healyi*

▲ *Carcharodon carcharias*
MARINETHEMES.COM/KELVIN AITKEN

water slightly faster than a swimming diver can sustain, filtering small fishes and other plankton through its cavernous mouth. Length to 20m.
HABITAT: Ocean; 0–6–700m. Circumtropical.
OCCURRENCE: Infrequent (2%), solitary (1).
DIET: Fish (38%), planktonic invertebrates (31%), phytoplankton (16%), squid (15%).
IUCN RED LIST: Vulnerable

Family Odontaspididae

Grey nurse sharks, sand sharks

Grey nurses are large, heavy-bodied sharks with two high dorsal fins of approximately equal size, a large anal fin, and narrow pointed teeth. Three species are known in the family.

▲ *Carcharias taurus* ANDREW GREEN

Carcharias taurus
Grey Nurse Shark, Sand Tiger Shark

Two large dorsal fins, open-mouthed gape with long front teeth exposed; juvenile covered in small black blotches. Once considered a man-eater but now considered harmless unless antagonised. The species is now fully protected in Australia; however, population numbers remain low as recovery from indiscriminate hunting is slow due to a very low birth-rate; juveniles develop teeth within the uterus and predate each other, with only a single animal surviving per litter. Length to 320cm.
HABITAT: Exposed reef; 1–16–190m. Circumglobal.
OCCURRENCE: Frequent (5%), few per transect (2).
DIET: Fishes (99%).
IUCN RED LIST: Vulnerable

Family Lamnidae

Mackerel sharks, makos

The five species in this family of primarily oceanic sharks have approximately equal-sized upper and lower lobes on the tail, a pointed snout, large first dorsal fin, small second dorsal and anal fins, five large gill slits, and a keel along the side of the body in front of the tail.

Carcharodon carcharias
White Shark, Great White Shark, White Pointer

Massive shark, very high first dorsal fin, small second dorsal and anal fins, blue-grey upper body with abrupt change to white on the under surface. Possesses a deservedly fearsome reputation as responsible for more human fatalities than any other shark. Animals smaller than 3m in length feed mainly on fish, but at larger sizes marine mammals are important in the diet. Protected in all Australian waters. Length to 640cm.
HABITAT: Pelagic; 0–7–1280m. Circumglobal.
OCCURRENCE: Rare (1%), solitary (1).
DIET: Fishes (49%), mammals (47%), squid (2%).
IUCN RED LIST: Vulnerable

Family Carcharhinidae

Whaler sharks, requiem sharks

Whaler sharks possess streamlined bodies, a large first dorsal fin slightly forward of midway along the back, a small second dorsal fin in front of the tail, five gill slits (the last above the pectoral fin), and mouth set well back under the head. Included among the 60 species are many of the world's most dangerous sharks.

Carcharhinus albimarginatus
Silvertip Shark

Streamlined body, white trailing edge of dorsal fin, white tips on both tail lobes. The similar Oceanic Whitetip Shark (*Carcharias longimanus*, not shown) has higher first dorsal fin that is rounded on top. An inquisitive species attracted to divers. Generally encountered on remote oceanic reefs with steep walls. Length to 300cm.
HABITAT: Outer reef slopes; 1–11–800m. West to Red Sea, north to Japan, east to French Polynesia.
OCCURRENCE: Frequent (6%), solitary (1).
DIET: Fishes (81%), squid (13%), invertebrates (6%).

▲ *Carcharhinus amblyrhynchos*

Carcharhinus amblyrhynchos
Grey Reef Shark

Grey streamlined shark with dark margins to fins other than first dorsal. Commonly observed by divers on reefs with clear water, particularly near drop-offs. Length to 260cm.
HABITAT: Outer reef slopes; 0–10–1,000m. West to Madagascar, north to Japan, east to French Polynesia.
OCCURRENCE: Frequent (12%), few per transect (2).
DIET: Fishes (61%), crustaceans (23%), squid (13%), molluscs (3%).

Carcharhinus falciformis
Silky Shark

Relatively small first dorsal fin with rounded trailing edge, low second dorsal fin that is about half as high as long, large tailfin, long sickle-shaped pectoral fins. An oceanic species that occasionally congregates in large numbers near isolated islands and rocks. Potentially dangerous. Length to 350cm.
HABITAT: Ocean; 0–500m. Circumtropical.
DIET: Fishes (61%), squid (31%), detritus (5%), crustaceans (2%), molluscs (1%).

▲ *Carcharhinus galapagensis*

Carcharhinus galapagensis
Galapagos Shark

Nondescript whaler with uniformly grey upper body and pale belly, but no particularly distinctive features. May include more than one 'cryptic' species. Commonly observed around

▲ *Carcharhinus albimarginatus*

▲ *Carcharhinus falciformis*

▲ *Carcharhinus obscurus* JOHN TURNBULL

remote oceanic pinnacles and reefs. Length to 370cm.
HABITAT: Midwater; 1–8–286m. Circumtropical.
OCCURRENCE: Frequent (9%), few per transect (2).
DIET: Fishes (65%), squid (28%), crustaceans (5%), mammals (1%).

Carcharhinus obscurus

Dusky Whaler

Grey whaler with white belly, distinguished from other grey reef sharks by long pectoral fins and dusky tips to underside of pectoral fins and lower tailfin. Length to 370cm.
HABITAT: Coastal and offshore waters, bays; 0–4–400m. Circumglobal.
OCCURRENCE: Infrequent (2%), few per transect (3).
DIET: Fishes (52%), squid (19%), crustaceans (17%), detritus (7%), molluscs (4%).
IUCN RED LIST: Vulnerable

▲ *Carcharhinus melanopterus*

Carcharhinus melanopterus

Blacktip Reef Shark

Distinctive dorsal fin with dark black tip and white stripe below, black trailing edges to other fins, grey body. Occasionally observed on shallow coastal reefs. Length to 200cm.
HABITAT: Lagoons, sheltered reef; 2–8–75m. West to Red Sea, north to Japan, east to French Polynesia.
OCCURRENCE: Frequent (6%), few per transect (2).
DIET: Fishes (78%), squid (8%), invertebrates (7%), crustaceans (3%), algae (3%).

▲ *Galeocerdo cuvier* MARLENE DAVEY

Galeocerdo cuvier

Tiger Shark

Large deep-bodied shark with vertical bars down body that fade with age, rounded snout, small black eye, pronounced keel along rear of body that extends onto tail base. Generally swims slowly but can accelerate rapidly. Regarded amongst the five most dangerous sharks worldwide. Length to 750cm.
HABITAT: Reef; 0–12–371m. Circumtropical.
OCCURRENCE: Infrequent (1%), solitary (1).
DIET: Fishes (48%), invertebrates (41%), crustaceans (4%), birds (3%), mammals (2%), squid (2%).

▲ *Triaenodon obesus*

Triaenodon obesus

Whitetip Reef Shark

Reef-associated shark with slender sinuous body, white tips to upper tailfin and dorsal fins. Commonly seen cruising past divers in reef lagoons and drop-offs, also rests for long periods in gutters. Length to 220cm.
HABITAT: Lagoons, sheltered reef; 1–10–330m. West to Red Sea, north to Japan, east to Pitcairn Is.
OCCURRENCE: Frequent (14%), few per transect (2).
DIET: Fishes (79%), squid (17%), molluscs (3%).

Family Sphyrnidae

Hammerhead sharks

Unmistakable group of ten shark species with eyes on the side of hammer-shaped head lobes.

Sphyrna lewini

Scalloped Hammerhead

Distinguished from other hammerheads by shape of the leading edge of the hammer, which is rounded into a bulge with large central indentation. Aggregates in large numbers off remote offshore reefs. Dangerous, with multiple non-fatal attacks recorded. Length to 430cm.
HABITAT: Ocean; 0–14–512m. Circumtropical.
OCCURRENCE: Few per transect (4).
DIET: Fishes (76%), crustaceans (19%), squid (5%).
IUCN RED LIST: Endangered

Family Rhinobatidae

Guitarfishes

Species in this family combine characteristics of both sharks and rays, possessing a triangular head formed by the fusion of the snout and pectoral fins, and a long tail with two large dorsal fins and tailfin. They feed on benthic crustaceans and molluscs, and also spend considerable time resting on the seabed. Most of the 57 known species are restricted to shallow tropical areas.

Aptychotrema vincentiana

Western Shovelnose Ray

Possesses a slightly shorter snout and less obvious blotches on the body than its close eastern relative, the Eastern Shovelnose Ray (*Aptychotrema rostrata*, not shown). Feeds actively at night on crustaceans and molluscs that live on or under sand. Occasionally seen by divers or caught in nets off sheltered beaches. Length to 120cm.
HABITAT: Sheltered sand, seagrass; 1–32m. Endemic to Australia.

▲ *Rhynchobatus australiae* IAN SHAW

Rhynchobatus australiae

Whitespotted Guitarfish

Large body, two high and acutely-pointed dorsal fins, three rows of spines along top of head in adult, scattering of white spots along side of pectoral fins and body. Length to 270cm.
HABITAT: Sand, seagrass; 0–60m. North to Japan.
IUCN RED LIST: Vulnerable

▼ *Sphyrna lewini*

▼ *Aptychotrema vincentiana*

Family Hypnidae

Coffin rays, electric rays

Coffin rays have a flabby oval body with short tail and rounded dorsal and tail fins. A characteristic feature is a pair of kidney-shaped electric organs located on the side of the disc. Only one species is known.

▲ *Hypnos monopterygius*

Hypnos monopterygius

Coffin Ray, Numbfish

Double-lobed shape with very short tail, small eyes set close together. Produces a severe electric shock on contact. In many cases, divers receive shocks when placing a hand on apparently bare sand with a concealed ray underneath. Feeds on comparatively large fish, which are stunned and pounced on, the lobes wrapping around the victim. Length to 69cm.
HABITAT: Sand; 2–7–220m. Endemic to Australia.
OCCURRENCE: Frequent (7%), solitary (1).