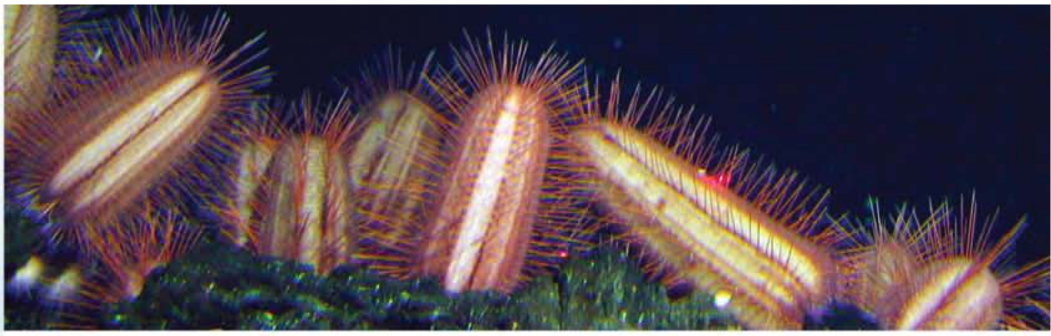
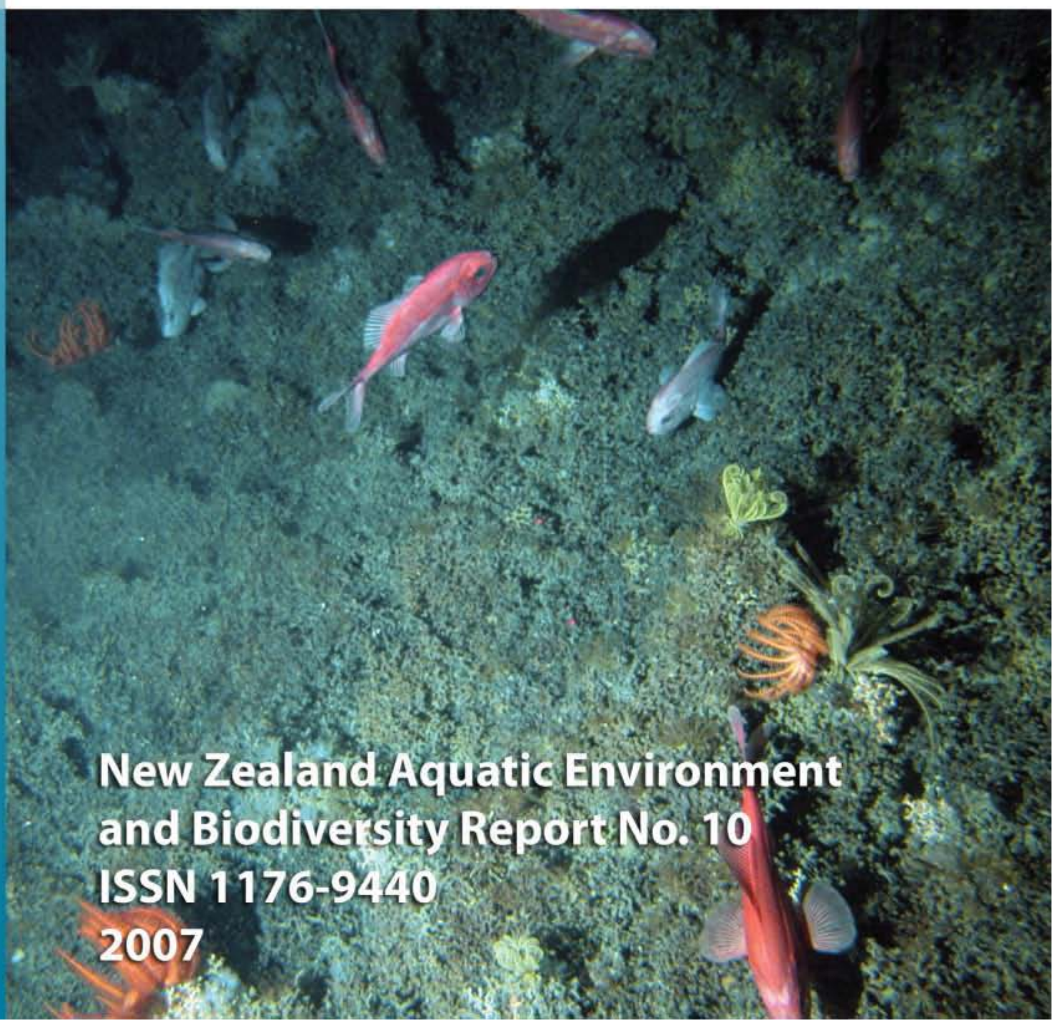


A guide to common **deepsea invertebrates** in New Zealand waters

Second edition

Ministry of
Fisheries
Te Tautiaki i nga tini a Tangaroa



New Zealand Aquatic Environment and Biodiversity Report No. 10
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A guide to common deepsea invertebrates in New Zealand waters

Second edition

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CONTENTS

PREFACE

Worldwide, fisheries managers are facing concerns about the effects of fishing, not only on fish stocks, but also on other species caught incidentally during fishing, particularly those that live on the sea floor. Although these organisms are not part of New Zealand's Quota Management System, catch records of all species are recorded whenever possible by Ministry of Fisheries observers and scientists during commercial fishing trips and research surveys. In 2004, the Ministry of Fisheries published two pictorial identification guides on deepsea invertebrates and offshore crabs to enable observers and researchers to recognise these organisms more easily, and to improve the standard of catch records of these species.

We are pleased to announce this expanded, updated version of the original guides. This Guide to Common Deepsea Invertebrates in New Zealand Waters (Second edition) amalgamates the two 2004 guides, and incorporates a further 98 species. Identification sheets are provided for over 200 invertebrate species, each with an improved colour image and a description of the key diagnostic features. Taxonomic experts have had direct input to each section to provide up-to-date knowledge. Most of the species in the guide are commonly encountered when trawling in water depths of more than 200 m.

The updated guide continues to build on the knowledge and expertise gained by marine scientists during the last 30 years of research in New Zealand waters. With more accurate identification, trends in the capture and distribution of incidental bycatch can be better monitored.

The ongoing development of accessible identification guides is an important step towards the goal of a healthy aquatic environment, as given in the Ministry of Fisheries Statement of Intent 2006–2011.

Pamela Mace
Chief Scientist
Ministry of Fisheries, February 2007

PURPOSE OF THE GUIDE

In New Zealand, invertebrates caught on or close to the seabed (termed 'benthic' in this guide) are identified and weighed by observers or researchers on board commercial and research trawlers. Because identification can be difficult, recording of the invertebrate catch while at sea has been variable, and specimens of many species have had to be retained for later examination by experts ashore.

This guide will enable observers and researchers to more readily identify the more common organisms while at sea, thereby streamlining the process of recording bycatch species. Over 180 benthic invertebrate taxa caught in New Zealand waters are included in the guide (Table 1). The guide provides images of each taxon, written descriptions of the main diagnostic features and details that will assist users to distinguish specimens from similar or closely related organisms. Although the descriptions provided have been checked by taxonomic experts, the guide does not replace formal taxonomic texts.

STRUCTURE OF THE GUIDE

The first section 'Phyla at a glance and group codes' provides a general anatomical description of each phylum and provides representative images of typical phylum species (pages 9–18). This will assist users to distinguish the phyla, as well as their classes and orders, and to place organisms in the correct higher taxon. The phyla description section is followed by a reference table (Table 1) which lists all taxa included in the guide. The group codes are used when identification to a low level is not possible.

Phyla in Table 1 and the identification sheets are arranged in conventional phylogenetic order, from structurally and anatomically less advanced groups (sponges), to the more advanced (echinoderms and tunicates). Each phylum is colour coded.

The identification sheets assume some prior biological knowledge. General notes on some morphological components used for identifying species within a taxon are provided where necessary. Each sheet contains the following information:

- Standard taxonomic hierarchy of the organism
- Scientific and common name
- 3-letter Ministry of Fisheries code
- Illustration (line drawing or photograph)
- Distinguishing features
- Colour
- Size
- Distribution
- Depth
- Similar species
- References

INSTRUCTIONS FOR COLLECTION AT SEA

The intention of the guide is to assist in the identification of the common deepsea benthic fauna in the New Zealand region. **If you are not confident that you can identify the organism to species, genus, or family level, (i.e. guide sheet level), then we encourage the use of the codes provided in the** Phyla At A Glance **section (pages 9–18), and retain the specimen for identification ashore.**

Specimens should be retained under the following circumstances:

- identification beyond phylum level is uncertain
- the specimen has been caught outside the given depth range or distribution
- they have been specifically requested by the Ministry of Fisheries

If samples or subsamples are retained, they should be preserved according to the facilities and materials available, and the following instructions should be followed.

Handling instructions: observers

- Place the benthic sample or a representative sub-sample of the organism in a plastic bag, separating the groups/species (particularly the sponges).
- Write the trip number and station number on a label, in pencil, and put inside the bag.
- Freeze immediately.

If the organism is fragile (e.g., a crab or prawn), place in a container of seawater and freeze.
Dead shells are not to be recorded on catch forms, but dead shell specimens can be retained for taxonomists.

Please follow the Transport Instructions in the MFish Observer Manual, and send by frozen freight to: Collections Manager, NIWA, 301 Evans Bay Pde, Greta Pt, Kilbirnie, Wellington.

Note: Check the Observer Manual for instructions regarding specific project requests for samples by DOC or MFish. In some projects, the destination of samples may be different from the address given above.

Handling instructions: researchers

Freeze benthic organisms (as above), or, if chemicals are available, carry out instructions for the relevant phyla as described below. Use plastic containers large enough to avoid crowding the specimen, at least 5:1 volume of liquid. If large numbers of an organism are requested, freeze in bulk.

Different fixation and preservation methods are used depending on the purpose, e.g., samples for DNA analysis must be frozen or preserved in ethanol.

For taxonomic work, initially use 5-10% buffered formalin as a fixative (10% formalin = 4% formaldehyde solution) or 95+ % ethanol (EtOH) as a direct preservative.

Use a liquid volume at least 5-10 times that of the animal because water released from the body and tissues of the animal will dilute the fixative or preservative. For large specimens, use a syringe or knife to help fixative or preservative penetrate the tissue. The shells of minute molluscs (<5 mm) are highly susceptible to the acidic effects of formalin, so transfer to 80% ethanol within 2 days of fixation (if using formalin). After initial fixation or preservation, use 70-80% ethanol for long term storage.

Material for DNA studies should be frozen or preserved and stored in 95+ % ethanol. Specimens fixed in formalin are almost useless for DNA studies.

- Cnidaria
  Hydroids, seafans, black corals, gorgonians – fix and preserve in 75% ethanol
  Anemones – fix in 10% formalin (it is essential to inject the body cavity) and store in 75% ethanol or 10% formalin
- Annelida
  Bristle worms, sea worms – fix in 10% formalin and store in 75% ethanol
- Mollusca
  Shelled forms, including chitons – either fix in 10% formalin and store in 75% ethanol, or fix and store in 80% ethanol
  Sea slugs – fix in 10% formalin and store in 75% ethanol
  Octopus and squid – fix in 10% formalin (essential to inject body cavity!) and store in 75% ethanol
- Arthropoda
  Prawns, lobsters, barnacles, isopods, amphipods, sea spiders – fix and store in 75% ethanol (replace after a couple of days)
- Echinodermata
  Sea-stars, brittle stars, sea urchins, sea cucumbers, feather stars, sea lilies – preserve in 75% ethanol
- Tunicata
  Ascidians or sea squirts – Colonial: relax in seawater with a pinch of menthol crystals, then fix in 10% formalin, – Solitary: fix in 10% formalin

PROTECTED SPECIES: see page 50.

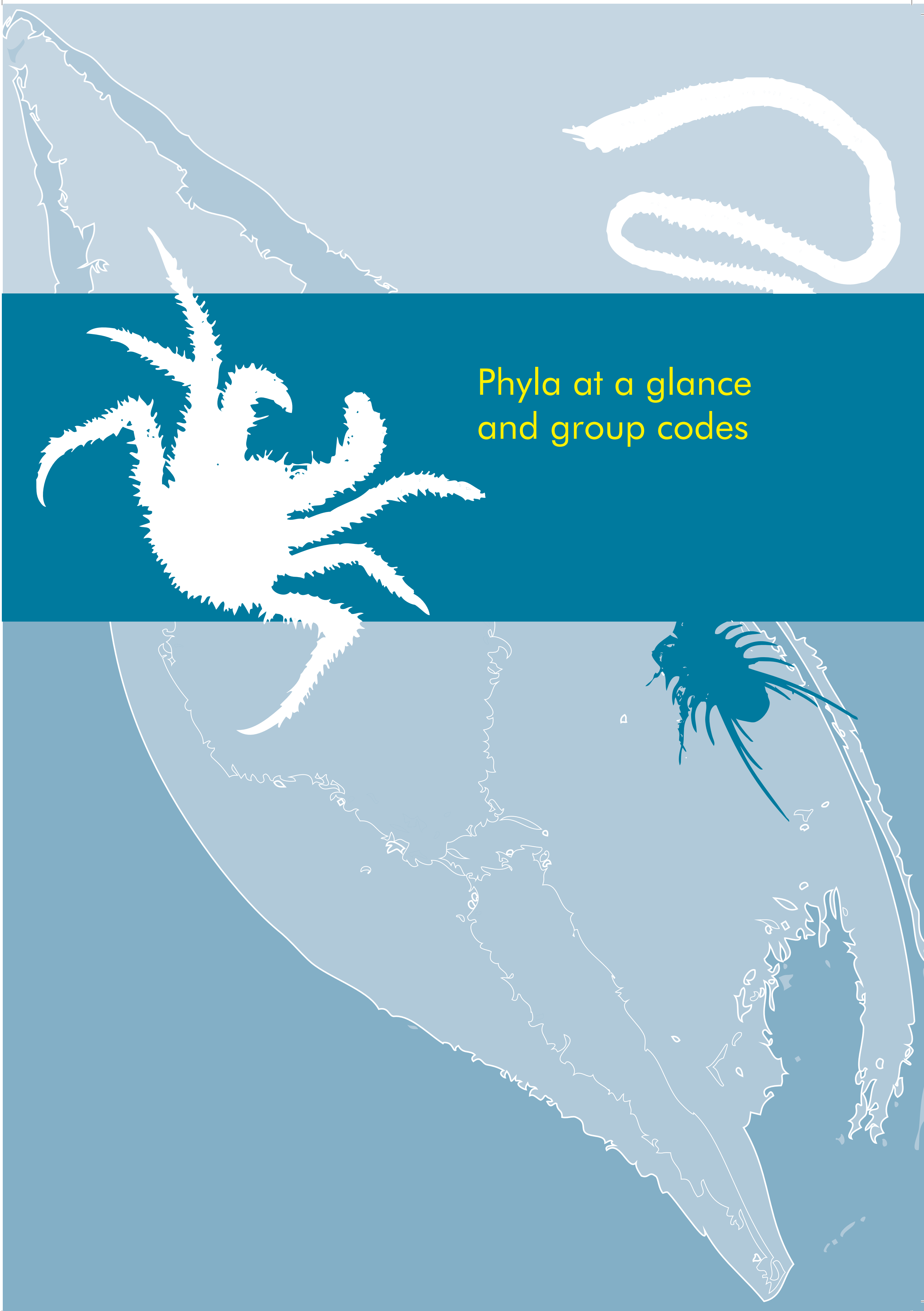
ACKNOWLEDGMENTS

This project was funded by the Ministry of Fisheries (ENV2005/20). Taxonomic information, general advice, images, and help in preparing this document were provided by NIWA personnel: S. Ahyong, N. Bagley, D. Bowden N. Bruce, M. Clark, M. Consalvey, N. Davey, D. Gordon, J. Grieve, M. Kelly, A-N. Lörz, E. Mackay, P. McMillan, P. Marriott, K. Neill, M.D. Oliver, M. Page, G.B. Read, A. Rowden, K. Schnabel, D. Stevens, R. Stewart, H. Sui. Contributions were also received from D.G. Fautin (University of Kansas, Lawrence, USA). D. M. Opresko (Oak Ridge National Laboratory, Tennessee, USA), J.A. Sanchez (Universidad de los Andes, Santafé de Bogotá D.C., Colombia), R. C. Willian (Northern Territory Museum, Australia), D.G. McKnight and J. Booth (on behalf of NIWA), B. Marshall and W.R. Webber (Te Papa Tongarewa, Museum of New Zealand, Wellington), S. O'Shea (Auckland University of Technology). For comprehensive reviews of version 1 of the guide we thank Keith Probert, (University of Otago), and Colin McLay, (Canterbury University).

D. Fisher (NIWA) and A. McKinnon and S. Lealand (Ministry of Fisheries) allocated the new Ministry of Fisheries species codes required. The "species" database used to produce the guide sheets was funded independently of this project by NIWA (NSOF project NNRC043 "Species ID tools").

We also thank the Ministry of Fisheries, particularly M. Livingston and M. Cryer for supporting the work on this expanded publication, and H. Palmer and Mike Beardsell (NIWA) for editorial comments.

Phyla at a glance and group codes



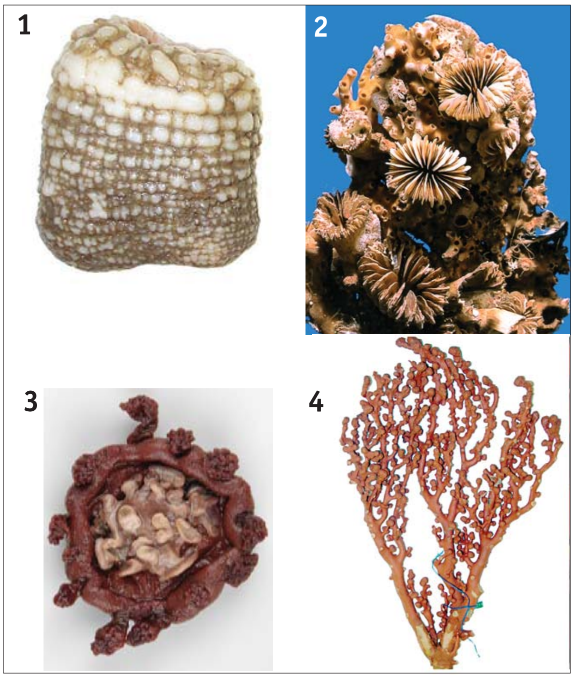
Phyla at a glance and group codes

PHYLUM	Porifera
COMMON NAME	Sponges (ONG)
CLASSES	Demospongiae, Hexactinellida, Calcareous

Sessile (attached) growth forms spongy or stony to the touch, some with obvious glass splinter-like spicules. Can be encrusting, tubular, trumpet- or fan-shaped, massive mounds, spherical, stalked, or branching, ranging in size from tiny (5–10 cm) to huge (several metres long). Many are like fibre-glass strands. The sponge body has no obvious animal features and is often mistaken for a plant. It is typically composed of a skeleton of siliceous (occasionally calcareous) spicules (glass-like fragments) that may be embedded in hard collagen (spongin) fibres.

PHYLUM	Cnidaria
COMMON NAME	Hydroids & Hydrocorals (HDR)
CLASS	Hydrozoa

Small to moderate-sized coral-like forms, mostly colonial and generally attached, consisting of runners (attached to shells and rocks) with erect single or branching stems bearing tiny polyps. Some calcified hydroids e.g. hydrocorals of the family Stylasteridae, with microscopic polyps (right hand photo) resemble stony corals.

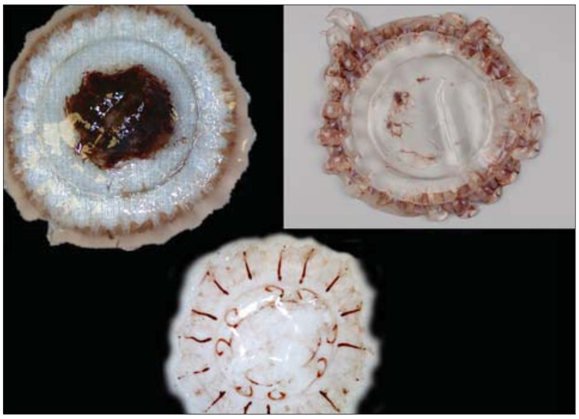


COMMON NAME	Corals (COU), anemones (ANT)
CLASS	Anthozoa

Large solitary polyps, much larger than those of hydroids, and almost always attached (1). Corals are a very diverse group. Stony corals (2) (SIA) have a calcareous skeleton that has radii; there are solitary and colonial species. Octocorals have polyps with 8 pinnate (feathery) tentacles. Some species are encrusting (stoloniferous), soft (SOC) (3) and mounded (e.g., Alcyoniidae), others are quill-like and embedded in sand or mud as a feathery stem (sea pens PTU), or erect and branching and very hard (gorgonians GOC) (4).

COMMON NAME	Jellyfish (JFI)
CLASS	Scyphozoa

Large medusae, comprising a jelly-like disk (umbrella) with the mouth and tentacles underneath. Most are free-swimming.

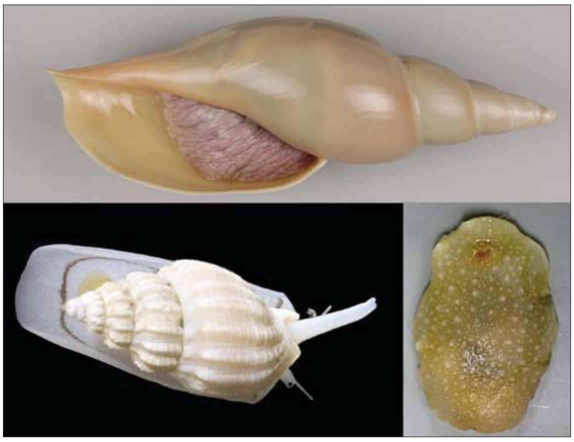


PHYLUM	Annelida
COMMON NAME	Bristle worms, sea worms (POL)
CLASS	Polychaeta

The body is segmented and each segment bears a pair of paddle-like appendages with bristles, hence polychaeta (many bristles). At the head end there may be tiny eyes, sensory antennae, and tentacles that can be short and stubby or very long or fan-like. May live in burrows or tubes, or be free-living.

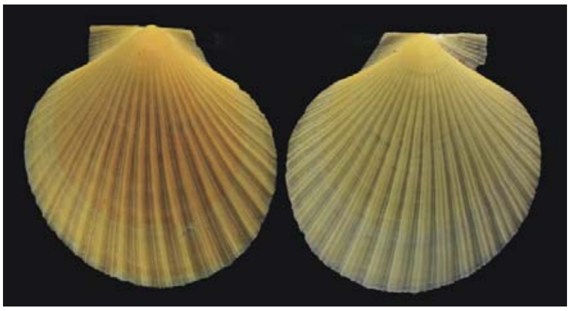
PHYLUM	Mollusca
COMMON NAME	Snails, sea slugs (GAS)
CLASS	Gastropoda

Soft-bodied creatures with a broad, flat creeping sole or foot, generally protected with a well developed shell of one piece (often coiled, top & left image). The shell may be completely lacking or small and concealed within the body (sea slugs, right).



COMMON NAME	Chitons (CHT)
CLASS	Polyplacophora

Characteristically the shell is divided into 8 overlapping plates. Bilaterally symmetrical with an ovoid body with no eyes or tentacles on the tiny head.

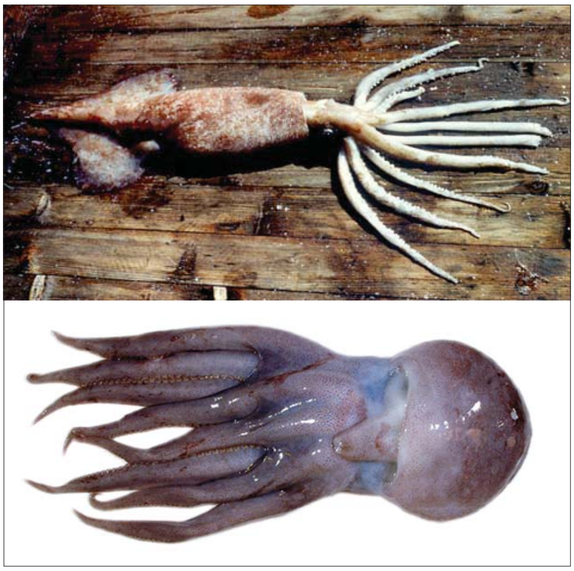


COMMON NAME	Mussels, clams, oysters (BIV)
CLASS	Bivalvia

Laterally compressed with two shells, hinged dorsally, that completely enclose the body in most species. Burrowing bivalve species have a tongue-like foot and long muscular suction tubes or siphons.

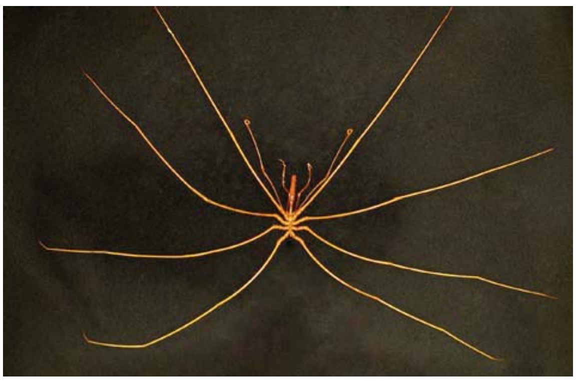
COMMON NAME	Tusk shells (SPH)
CLASS	Scaphopoda

Deepwater molluscs with a distinctive tapering shell that has a hole at each end. The shell is cylindrical and shaped like an elephant's tusk. Some species grow up to 60 mm in length.



COMMON NAME	Squid (SQX), octopus (OCP)
CLASS	Cephalopoda

Squids (top) have an elongate, torpedo-like body with, 8 arms and 2 tentacles. Arms have 2 or more rows of stalked suckers with rings and/or hooks running the entire length; tentacles have 2 or more rows of suckers and/or hooks at the distal end. Octopuses (bottom) have a short globular sac-like body and 8 arms (no tentacles) with unstalked suckers along their length.



PHYLUM	Arthropoda
COMMON NAME	Sea spiders (PYC)
CLASS	Pycnogonida

Pycnogonids resemble spiders. The body is much reduced with 8–12 legs. The head has an obvious proboscis with adjacent appendages, a pair of which is used by males to carry egg masses.

COMMON NAME	Krill (EUP)
CLASS	Malacostraca
ORDER	Euphausiacea

Shrimp-like plankton about 3 cm long. A shell-like carapace extends behind the head and forward as a rostrum, below which is a pair of stalked compound eyes. Unlike true shrimps, the sides of the carapace do not tightly enclose the gills.

COMMON NAME	Sea slaters (ISO)
CLASS	Malacostraca
ORDER	Isopoda

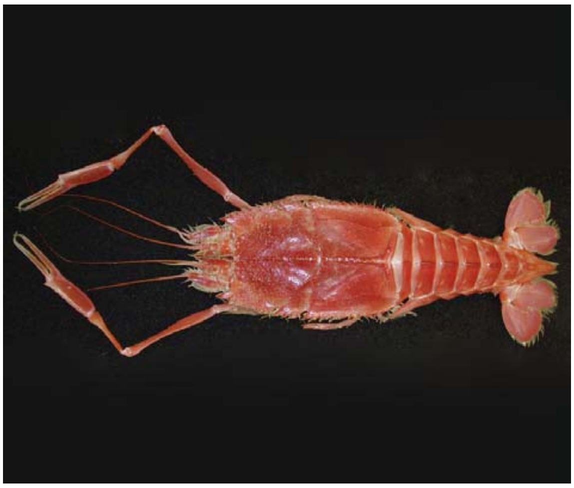
Dorsoventrally flattened body with a shield-shaped head and no carapace. Most legs appear similar in shape and size. There are many parasitic forms (e.g., fish lice). Small to 2–5 cm long, although a few species are much larger.

COMMON NAME	Sand hoppers (APH)
CLASS	Malacostraca
ORDER	Amphipoda

Body laterally compressed (compared with isopods) and antennae often relatively long, giving a shrimp-like appearance. There is no carapace. Generally 1 cm long or less (a few species are larger).

COMMON NAME	Shrimps, prawns (NAT)
CLASS	Malacostraca
ORDER	Decapoda

Carapace well developed, often with a long rostrum. Five pairs of legs, of which any of the first 2 or 3 pairs may be large and chelate (clawed). Shrimps and prawns are often called natant decapods, (i.e. able to swim).



COMMON NAME	Deep-sea blind lobsters (PLY)
CLASS	Malacostraca
ORDER	Decapoda

All legs, or the first four pairs, have pincers; these are long and slender on the first pair and small and short on the rest. Elongate, flat-topped cephalothorax, bordered with sharp spines. Rostrum small, often with two spines. Eyes represented by pigment-free points at the front of carapace.

COMMON NAME	Rock lobster (CRA), Packhorse rock lobster (PHC)
CLASS	Malacostraca
ORDER	Decapoda

Rostrum small. Frontal horns over eyes. Large spiny antennae and spiny carapace. Pincers on females only — small and on last pair of legs. Photo is of packhorse lobster.

COMMON NAME	Slipper (shovel-nosed) lobsters (SLL)
CLASS	Malacostraca
ORDER	Decapoda

Rostrum very reduced. Second antennae modified to a hinged series of five, flat plates. Pincers on females only — small and on last pair of legs. Carapace flattened and often with strong spines on margins. Eyes are small.

COMMON NAME	Clawed lobsters, scampi (SCI)
CLASS	Malacostraca
ORDER	Decapoda

Cylindrical carapace with well developed rostrum. First 3 pairs of legs clawed; first pair in the form of heavy chelipeds.

COMMON NAME	True crab (true crabs) (CRB)
CLASS	Malacostraca
ORDER	Decapoda

Abdomen reduced and tightly flexed beneath thorax. First legs in form of heavy chelipeds (having large claws); third legs never chelate. Eyes on the outside of second antennae.

COMMON NAME	King crab (lithodid crabs) (KIC)
CLASS	Malacostraca
ORDER	Decapoda

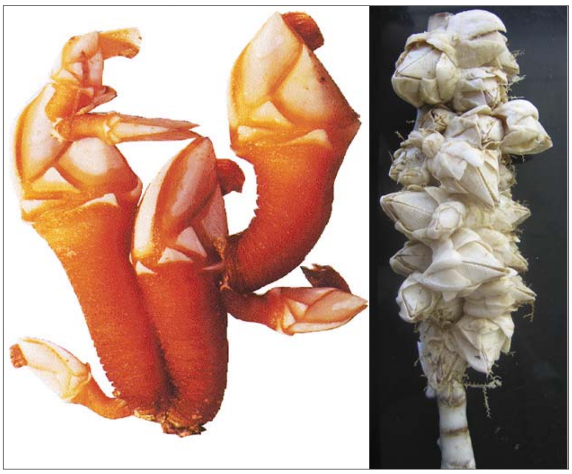
Abdomen asymmetrical (in females only) and flexed under thorax. First legs in the form of heavy chelipeds (claws); third legs never chelate. Appear to have only four pairs of legs because the fifth legs are much reduced and turned under the body. Eyes between antennae.

COMMON NAME	Hermit crab (hermit crabs) (PAG)
CLASS	Malacostraca
ORDER	Decapoda

Abdomen asymmetrical and housed within a gastropod shell or anemone or folded beneath the carapace. First pair of legs are chelipeds.

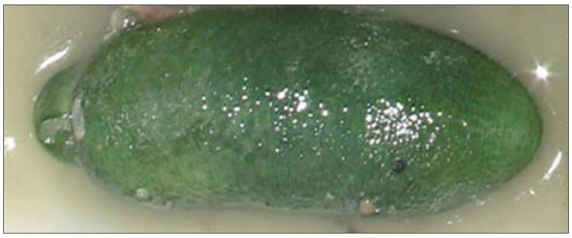
COMMON NAME	Barnacles (BRN)
CLASS	Maxillopoda
ORDER	Thoracica

There are stalked (goose barnacles), left photo, and non-stalked (acorn barnacles), right photo. The mantle surface of any barnacle bears at least 5 major plates, which are pulled together for protection.



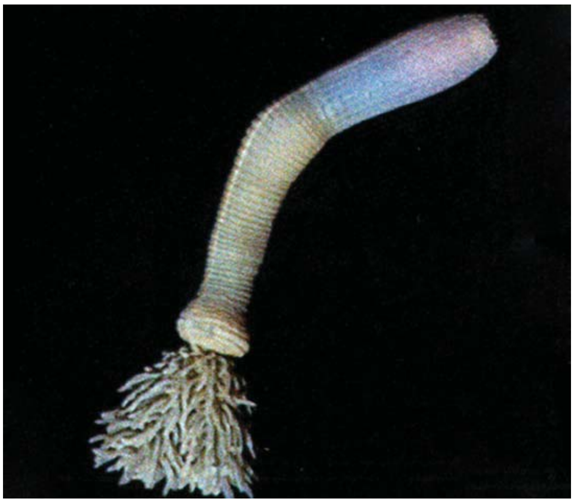
PHYLUM	Sipuncula
COMMON NAME	Peanut worms (SIP)

Unsegmented and rigid worm-like body divided into a narrow anterior section containing the mouth, surrounded by a fringe of tentacles, and a large posterior trunk. Gut is U-shaped, and the anus opens as a tiny pore in the anterior part of the body.



PHYLUM	Echiura
COMMON NAME	Spoon worms (EHI)

Unsegmented and soft, sausage-shaped body, with a scoop-like process (proboscis) at the head end; proboscis may be rather flattened and cannot be retracted into the trunk. The anus is at the posterior end of the body.



PHYLUM	Priapulida
COMMON NAME	Penis worms (PDL)

Elongate, with a retractable proboscis and extended trunk region. The proboscis is wider and ornamented with rib-like papillae and minute thorn-like spines. The trunk is covered with small spines or tubercles and is externally (not internally) segmented. There are 1 or 2 branched tail-like processes.

PHYLUM	Bryozoa
COMMON NAME	Moss animals, sea mats, lace corals (COZ)

A very diverse group, forming colonies of tiny box- or tube-like individual zooids. Colonies may be a few centimetres in height or diameter, being erect and bushy, flat and encrusting, large and lacy, or coral-like. Individual zooids rarely exceed 1 mm in length.

PHYLUM	Brachiopoda
COMMON NAME	Lamp shells (BPD)

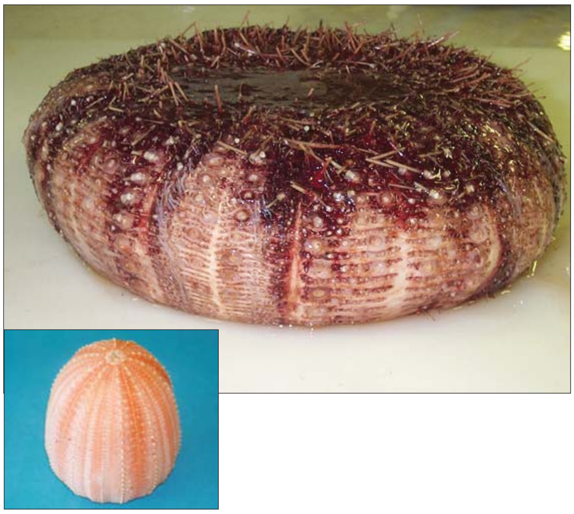
Resemble bivalve molluscs, but the valves enclose the body dorsally and ventrally rather than laterally. Ventral valve typically larger than the dorsal, unlike most clams which have two equal valves. Each valve is bilaterally symmetrical and may be ornamented with concentric growth lines and a fluted or spiny surface. Attached species have a short stalk emerging from the hinge area of the valves.

PHYLUM	Echinodermata
COMMON NAME	Sea stars (ASR)
CLASS	Asteroidea

Star-shaped, free-moving echinoderms with prominent rays or arms projecting from a central area and usually covered with calcareous plates and spines. Arm usually wider at the base, merges into the disc (in contrast to ophiuroids). At least 5, and often many more, arms and in some species these may be so short that the body appears pentagonal.

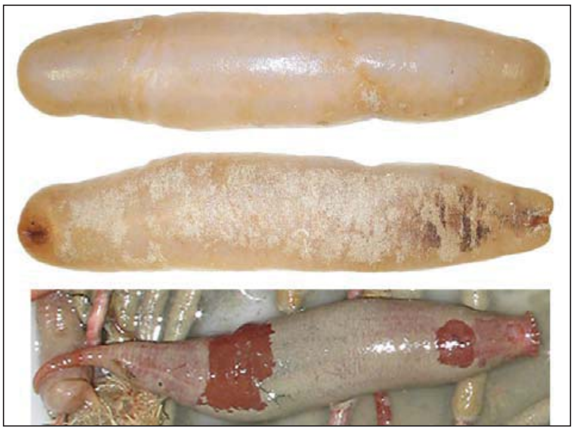
COMMON NAME	Brittle stars, basket stars (OPH)
CLASS	Ophiuroidea

Extremely long, slender flexible arms, clearly differentiated from the central disc. The arms are much branched in basket stars.



COMMON NAME	Sea urchins (ECN)
CLASS	Echinoidea

Body called a test, covered with spines and without arms. Circular or oval and the test often spherical. Irregular echinoids, such as the sand dollars and heart urchins, are flattened and have much smaller and far more numerous spines.



COMMON NAME	Sea cucumbers (HTH)
CLASS	Holothuroidea

Elongated cylindrical body with a circle of tentacles around the mouth. There is no obvious calcareous skeleton (unlike sea urchins). Instead, microscopic calcareous elements called spicules are embedded in the skin; a few species have spicules in dense numbers and can be very firm.

COMMON NAME	Feather stars and sea lilies (CRN)
CLASS	Crinoidea

Free-living or attached by a stalk with root-like processes to the substratum. Arms are pinnately branched (feather-like). In contrast to other echinoderms, the mouth faces upwards.

PHYLUM	Tunicata
COMMON NAME	Tunicates, sea squirts (ASC)
CLASS	Ascidiacea

Attached, colonial or solitary. One end is attached to the substratum and the other contains two openings that may be extended as separate siphons. Body feels gelatinous or leathery and has a basket shape. Colonial forms can resemble sponges (or even encrusting bryozoans); tunicate individuals can be recognised by their small siphonal openings.

COMMON NAME	Salps (SAL)
CLASS	Thaliacea

Salps may be solitary or colonial, are gelatinous, transparent, free-swimming and planktonic. Siphons are at opposite ends of body (cf. tunicates).

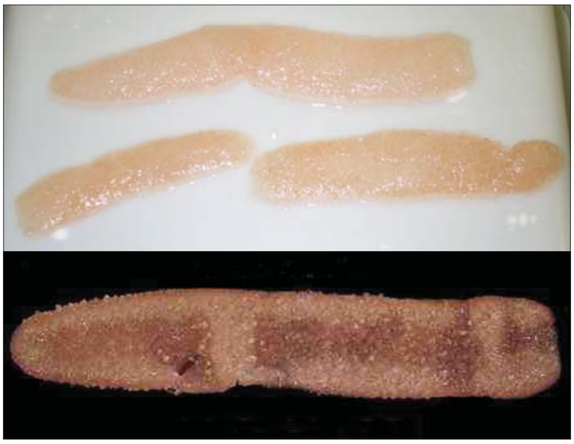


Table 1: Full list of taxa in guide

Table 1: Summary of the 204 taxa included in this guide. Phyla are arranged in conventional phylogenetic order and then within phyla, the table is sorted alphabetically by class/order (suborder for natant decapods), then family, then species name.
s, species; g, genus; f, family; f+, several families; c, class; o, order; n, natant decapods.

PORIFERA (sponges)

Class or Order	Family	Common Name	Scientific name	Mfish code	Page
Demospongiae (c)	Ancorinidae	Knobbly sandpaper sponge (s)	*Ancorina novaezelandiae*	ANZ	30
Demospongiae (c)	Geodiidae	Ostrich egg sponge (s)	*Geodinella vestigifera*	GVE	31
Demospongiae (c)	Pachastrellidae	Fibreglass cup sponge (s)	*Poecillastra laminaris*	PLN	32
Demospongiae (c)	Pachastrellidae	Yoyo sponge (s)	*Thenea novaezelandiae*	THN	33
Demospongiae (c)	Irciniidae	Rubber sponge (s)	*Psammocinia* sp.	PHW	34
Demospongiae (c)	Suberitidae	Fleshy club sponge (s)	*Suberites affinis*	SUA	35
Demospongiae (c)	Callyspongiidae	Airy finger sponge (s)	*Callyspongia* sp.	CRM	36
Demospongiae (c)	Corallistidae	Smooth white cup sponge (s)	*Corallistes fulvodesmus*	CFU	37
Demospongiae (c)	Scleritodermiidae	Pimpled ear sponge (s)	*Aciculites pulchra*	APU	38
Demospongiae (c)	Crellidae	Orange frond sponge (s)	*Crella incrustans*	CIC	39
Demospongiae (c)	Hymedesmiidae	Grey fibrous massive sponge (g)	*Phorbas* spp.	PHB	40
Demospongiae (c)	Tetillidae	Furry oval sponge (s)	*Tetilla leptoderma*	TLD	41
Hexactinellida (c)	Farreidae	Lacey honeycomb sponge (s)	*Farrea* sp.	FAR	42
Hexactinellida (c)	Euplectellidae	Basket-weave horn sponge (s)	*Euplectella regalis*	ERE	43
Hexactinellida (c)	Rossellidae	Floppy tubular sponge (s)	*Hyalascus* sp.	HYA	44
Hexactinellida (c)		Glass sponges (c)		GLS	45

CNIDARIA (anemones, corals, jellyfish, hydroids)

Class or Order	Family	Common Name	Scientific name	Mfish code	Page
Actiniaria (o)	Actiniidae	Deepsea anemones (g+)	*Bolocera* spp.	BOC	51
Actiniaria (o)	Actinostolidae	Smooth deepsea anemones (f)		ACS	52
Actiniaria (o)	Hormathiidae	Warty deepsea anemones (f)		HMT	53
Actiniaria (o)	Liponematidae	Deepsea anemones (g)	*Liponema* spp.	LIP	54
Alcyonacea (o)	Alcyoniidae	Gigantic coral (s)	*Anthomastus (Bathyalcyon) robustus*	ARO	55
Alcyonacea (o)	Clavulariidae	Long polyp soft corals (g)	*Telesto* spp.	TLO	56
∞Antipatharia (o)	Leiopathidae	Leiopathes black coral (g)	*Leiopathes secunda*	LSE	57
∞Antipatharia (o)		Black corals (o)		COB	58
Gorgonacea (o)	Coralliidae	Precious corals (g+)	*Corallium* spp.	CLL	59
Gorgonacea (o)	Paragorgiidae	Bubblegum coral (s)	*Paragorgia arborea*	PAB	60
Gorgonacea/ (o)	Chrysogorgiidae	Golden corals (g+)	*Chrysogorgia* spp.	CHR	61
Gorgonacea/ (o)	Isididae	Branching bamboo coral (g)	*Keratoisis* spp.	BOO	62
Gorgonacea/ (o)	Isididae	Bamboo coral (f)	*Lepidisis* spp.	LLE	63
Gorgonacea/ (o)	Isididae	Bamboo coral (f)		ISI	64
Gorgonacea/ (o)	Primnoidae	Bottlebrush coral (g)	*Thouarella* spp.	THO	65
Anthoathecata (o)	Stylasteridae	White hydrocoral (s)	*Calyptopora reticulata*	CRE	66
∞Anthoathecata (o)	Stylasteridae	Red hydrocorals (g)	*Errina* spp.	ERR	67
Anthoathecata (o)	Stylasteridae	Spiny white hydrocorals (g)	*Lepidotheca* spp.	LPT	68
Pennatulacea (o)	Pteroeididae	Siboga sea pen (s)	*Gyrophyllum sibogae*	GYS	69
Pennatulacea (o)	Pennatulidae	Purple sea pen (g)	*Pennatula* spp.	PNN	70
Scleractinia (o)	Caryophyllidae	Solitary bowl coral (s)	*Stephanocyathus platypus*	STP	71
Scleractinia (o)	Caryophyllidae	Carnation cup coral (g)	*Caryophyllia* spp.	CAY	72
Scleractinia (o)	Caryophyllidae	Crested cup coral (s)	*Desmophyllum dianthus*	DDI	73
Scleractinia (o)	Caryophyllidae	Bushy hard coral (s)	*Goniocorella dumosa*	GDU	74
Scleractinia (o)	Caryophyllidae	Deepwater branching coral (g+)	*Solenosmilia variabilis*	SVA	75
Scleractinia (o)	Dendrophylliidae	Deepwater branching coral (g+)	*Enallopsammia rostrata*	ERO	76

∞ Protected under the Wildlife Act 1953

Scleractinia (o)	Flabellidae	Flabellum cup corals (g)	*Flabellum* spp.	COF	77
Scleractinia (o)	Oculinidae	Madrepora coral (g)	*Madrepora oculata*	MOC	78
Scleractinia (o)	Oculinidae	Deepwater branching coral (g+)	*Oculina virgosa*	OVI	79
Zoanthidea (o)	Epizoanthidae	Zoanthid anemone (o)	*Epizoanthus* sp.	EPZ	80

ANNELIDA (bristle worms, leeches)

Amphinomida (o)	Amphinomidae	Fire worm (s)	*Chloeia inermis*	CIM	85
Eunicida (o)	Eunicidae	Eunice sea-worm (s)	*Eunice (undescribed)*	EUN	86
Eunicida (o)	Onuphidae	Quill worm (g)	*Hyalinoecia tubicola*	HTU	87
Phyllodocida (o)	Aphroditidae	Sea mouse (f)	*Aphrodita* spp.	ADT	88
Phyllodocida (o)	Polynoidae	Thermiphione scaleworm (g)	*Thermiphione (undescribed)*	THE	89

MOLLUSCA (snails, sea slugs, chitons, bivalves, octopus, squid, tusk shells)

Bivalvia (c)	Limidae	Giant file shell (s)	*Acesta maui*	AMA	97
Bivalvia (c)	Limidae	Lesser giant file shell (s)	*Acesta saginata*	ASG	98
Bivalvia (c)	Pectinidae	Queen scallop (s)	*Zygochlamys delicatula*	QSC	99
Bivalvia (c)	Pectinidae	Scallop (f)	*Delectopecten fosterianus*	DFO	100
Bivalvia (c)	Pectinidae	Scallop (f)	*Veprichlamys kiwaensis*	VKI	101
Bivalvia (c)	Euciroidae	Euciroa bivalve (g)	*Euciroa galatheae*	EGA	102
Cephalopoda (c)	Octopodidae	Deepwater octopus (f)	*Benthoctopus* spp.	BNO	103
Cephalopoda (c)	Octopodidae	Yellow octopus (s)	*Enteroctopus zealandicus*	EZE	104
Cephalopoda (c)	Octopodidae	Deepwater octopus (s+)	*Graneledone* spp.	DWO	105
Cephalopoda (c)	Octopodidae	Common octopus (s)	*Pinnoctopus cordiformis*	OCT	106
Cephalopoda (c)	Opisthoteuthididae	Umbrella octopus (s)	*Opisthoteuthis* spp.	OPI	107
Cephalopoda (c)	Architeuthidae	Giant squid (g)	*Architeuthis* spp.	GSQ	108
Cephalopoda (c)	Cranchiidae	Glass squid (f)		CHQ	109
Cephalopoda (c)	Histioteuthidae	Violet squid (g)	*Histioteuthis* spp.	VSQ	110
Cephalopoda (c)	Ommastrephidae	Gould's arrow squid (s)	*Nototodarus gouldi*	NOG	111
Cephalopoda (c)	Ommastrephidae	Sloan's arrow squid (s)	*Nototodarus sloanii*	NOS	112
Cephalopoda (c)	Ommastrephidae	Ommastrephid squid (g)	*Ommastrephes* spp.	OMM	113
Cephalopoda (c)	Ommastrephidae	Todarodes squid (g)	*Todarodes filippovae*	TSQ	114
Cephalopoda (c)	Onychoteuthidae	Warty squid (g)	*Moroteuthis ingens*	MIQ	115
Cephalopoda (c)	Onychoteuthidae	Warty squid (g)	*Moroteuthis robsoni*	MRQ	116
Cephalopoda (c)	Pholidoteuthidae	Large red scaly squid (s)	*Pholidoteuthis boschmai*	PSQ	117
Gastropoda (c)	Capulidae	Cap limpet (s)	*Malluvium calcareum*	MCC	118
Gastropoda (c)	Ranellidae	Tritons (f)	*Fusitriton magellanicus*	FMA	119
Gastropoda (c)	Buccinidae	Whelk (f+)	*Aeneator recens*	AER	120
Gastropoda (c)	Buccinidae	Knobbed Whelk (f+)	*Austrofusus glans*	KWH	121
Gastropoda (c)	Buccinidae	Whelk (f+)	*Penion chathamensis*	PCH	122
Gastropoda (c)	Turbinellidae	Pagoda shell (s)	*Coluzea mariae*	CMR	123
Gastropoda (c)	Turridae	Turrid (f)	*Comitas onokeana vivens*	COV	124
Gastropoda (c)	Volutidae	Volute (f)	*Alcithoe larochei*	ALL	125
Gastropoda (c)	Volutidae	Volute (f)	*Alcithoe wilsonae*	AWI	126
Gastropoda (c)	Volutidae	Golden volute (s)	*Provocator mirabilis*	GVO	127
Gastropoda (c)	Nudibranchia (o)	Sea slug, Nudibranch (o)		NUD	128
Gastropoda (c)	Calliostomatidae	Maurea (s)	*Calliostoma selectum*	CSS	129
Gastropoda (c)	Calliostomatidae	Top shell (f+)	*Calliostoma turnerarum*	CTN	130
Polyplacophora (c)		Chiton (c)		CHT	131

Amphipoda (o)	Eurytheneidae	Amphipod (o)	*Eurythenes gryllus*	EUG	139
Decapoda (o)	Atelecyclidae	Pteropeltarion crab (s)	*Pteropeltarion novaezelandiae*	PNO	140

ARTHROPODA

(Isopods, amphipods, mysids, prawns, lobsters, crabs, barnacles, sea spiders)

Decapoda (o)	Atelecyclidae	Frilled crab (s)	*Trichopeltarion fantasticum*	TFA	141
Decapoda (o)	Chirostylidae	Squat lobsters (f+)	*Gastroptychus* spp.	GTC	142
Decapoda (o)	Chirostylidae	Squat lobsters (f+)	*Uroptychus* spp.	URP	143
Decapoda (o)	Galatheidae	Squat lobster (g)	*Munida* spp.	MNI	144
Decapoda (o)	Geryonidae	Red crab (s)	*Chaceon bicolor*	CHC	145
Decapoda (o)	Goneplacidae	Two-spined crab (s)	*Carcinoplax victoriensis*	CVI	146
Decapoda (o)	Goneplacidae	Policeman crab (s)	*Neommatocarcinus huttoni*	NHU	147
Decapoda (o)	Homolidae	Antlered crab (s)	*Dagnaudus petterdi*	DAP	148
Decapoda (o)	Homolidae	Carrier crab (s)	*Homola orientalis*	HOO	149
Decapoda (o)	Homolidae	Yaldwyn's crab (s)	*Yaldwynopsis spinimana*	YSP	150
Decapoda (o)	Inachindae	Dell's spider crab (s)	*Platymaia maoria*	PTM	151
Decapoda (o)	Inachindae	Deep-sea spider crab (s)	*Vitjazmaia latidactyla*	VIT	152
Decapoda (o)	Lithodidae	Long-spined king crab (s)	*Lithodes cf. longispinus*	LLT	153
Decapoda (o)	Lithodidae	Murray's king crab (s)	*Lithodes murrayi*	LMU	154
Decapoda (o)	Lithodidae	Brodie's king crab (s)	*Neolithodes brodiei*	NEB	155
Decapoda (o)	Lithodidae	Warty king crab (s)	*Paralomis dawsoni*	PDA	156
Decapoda (o)	Lithodidae	Prickly king crab (s)	*Paralomis zealandica*	PZE	157
Decapoda (o)	Majidae	Giant spider crab (s)	*Jacquinotia edwardsii*	GSC	158
Decapoda (o)	Majidae	Giant masking crab (s)	*Leptomithrax australis*	SSC	159
Decapoda (o)	Majidae	Garrick's masking crab (s)	*Leptomithrax garricki*	GMC	160
Decapoda (o)	Majidae	Long-handed masking crab (s)	*Leptomithrax longimanus*	LHC	161
Decapoda (o)	Majidae	Long-legged masking crab (s)	*Leptomithrax longipes*	LLC	162
Decapoda (o)	Majidae	Spiny masking crab (s)	*Teratomaia richardsoni*	SMK	163
Decapoda (o)	Nephropidae	Scampi (f)	*Metanephrops challengeri*	SCI	164
Decapoda (o)	Paguridae	Hermit crab (f+)	*Diacanthurus rubricatus*	DIR	165
Decapoda (o)	Palinuridae	Deepwater rock lobster (s)	*Projasus parkeri*	PPA	166
Decapoda (o)	Parapaguridae	Hermit crab (f+)	*Sympagurus dimorphus*	SDM	167
Decapoda (o)	Polychelidae	Deepsea blind lobster (s)	*Polycheles* spp.	PLY	168
Decapoda (o)	Portunidae	Dwarf swimming crab (s)	*Liocarcinus corrugatus*	LCO	169
Decapoda (o)	Portunidae	Hairy red swimming crab (s)	*Nectocarcinus antarcticus*	NCA	170
Decapoda (o)	Portunidae	Smooth red swimming crab (s)	*Nectocarcinus bennetti*	NCB	171
Decapoda (o)	Portunidae	Paddle crab (s+)	*Ovalipes catharus*	PAD	172
Decapoda (o)	Portunidae	Swimming crab (f)	*Ovalipes molleri*	OVM	173
Decapoda (o)	Scyllaridae	Prawn killer (s+)	*Ibacus alticrenatus*	PRK	174
Isopoda (o)	Aegidae	Fish biter (s)	*Aega monophthalma*	AMO	175
Isopoda (o)	Cymothoidae	Gill biter or tongue biter (f)	*Elthusa neocytta*	ENE	176
Isopoda (o)	Cymothoidae	Gill biter (s)	*Elthusa propinqua*	ELP	177
Isopoda (o)	Serolidae	Spiny serolid isopod (s)	*Acutiserolis* spp.	ACU	178
Lophogastrida (o)	Gnathophausiidae	Giant red mysid (s)	*Neognathophausia ingens*	NEI	179
Natantia (n)	Aristaeidae	Royal red prawn (s)	*Aristaeomorpha foliacea*	AFO	180
Natantia (n)	Aristaeidae	Scarlet prawn (s)	*Aristaeopsis edwardsiana*	PED	181
Natantia (n)	Campylonotidae	Sabre prawn (s)	*Campylonotus rathbunae*	CAM	182
Natantia (n)	Glyphocrangonidae	Goblin prawn (s)	*Glyphocrangon lowryi*	GLO	183
Natantia (n)	Nematocarcinidae	Omega prawn (s)	*Lipkius holthuisi*	LHO	184
Natantia (n)	Nematocarcinidae	Spider prawn (f)	*Nematocarcinus* spp.	NEC	185
Natantia (n)	Oplophoridae	Subantarctic ruby prawn (s)	*Acanthephyra* spp.	ACA	186
Natantia (n)	Oplophoridae	Scarlet prawn (s)	*Notostomus auriculatus*	NAU	187
Natantia (n)	Oplophoridae	Deepwater prawn (s+)	*Oplophorus* spp.	OPP	188
Natantia (n)	Pandalidae	Golden prawn (s)	*Plesionika martia*	PLM	189
Natantia (n)	Pasiphaeidae	Deepwater prawn (s)	*Pasiphaea aff. tarda*	PTA	190

Natantia (n)	Penaeidae	Funchalia prawn (s)	*Funchalia* spp.	FUN	191
Natantia (n)	Sergestidae	Sergestid prawn (g)	*Sergestes* spp.	SER	192
Natantia (n)	Solenoceridae	Jack-knife prawn (s)	*Haliporoides sibogae*	HSI	193
Pantopoda (o)	Colossendeidae	Giant sea spiders (g)	*Colossendeis* spp.	PYC	194
Thoracica (o)	Scalpellidae	Stalked barnacles (f+)		SBN	195

BRYOZOA

Gymnolaemata (c)		Erect cheilostome bryozoan (s)	*Hippellozoon novaezelandiae*	HNO	201
Stenolaemata (c)		Erect cyclostome bryozoans (s+)		ECB	202

ECHINODERMATA
(sea stars, brittle stars, sea urchins, sea cucumbers, feather stars and sea lilies)

Asteroidea (c)	Brisingidae‡	Armless stars (f+)		BRG	207
Asteroidea (c)	Asteriidae	Cat's-foot star (s)	*Cosmasterias dyscrita*	CDY	208
Asteroidea (c)	Asteriidae	Sea-star (c)	*Pseudechinaster rubens*	PRU	209
Asteroidea (c)	Asteriidae	Cross-fish (s)	*Sclerasterias mollis*	SMO	210
Asteroidea (c)	Zoroasteridae	Rat-tail stars (g)	*Zoroaster* spp.	ZOR	211
Asteroidea (c)	Benthopectinidae	Sea-star (c)	*Benthopecten* spp.	BES	212
Asteroidea (c)	Benthopectinidae	Sea-star (c)	*Cheiraster monopedicellaris*	CMP	213
Asteroidea (c)	Astropectinidae	Magnificent sea-star (s)	*Dipsacaster magnificus*	DMG	214
Asteroidea (c)	Astropectinidae	Abyssal star (s)	*Plutonaster knoxi*	PKN	215
Asteroidea (c)	Astropectinidae	Geometric star (s)	*Psilaster acuminatus*	PSI	216
Asteroidea (c)	Radiasteridae	Sea-star (c)	*Radiaster gracilis*	RGR	217
Asteroidea (c)	Echinasteridae	Sea-star (c)	*Henricia compacta*	HEC	218
Asteroidea (c)	Astropectinidae	Sea-star (c)	*Proserpinaster neozelanicus*	PNE	219
Asteroidea (c)	Goniasteridae	Pentagon star (s+)	*Ceramaster patagonicus*	CPA	220
Asteroidea (c)	Goniasteridae	Trojan star (s)	*Hippasteria phrygiana*	HTR	221
Asteroidea (c)	Goniasteridae	Rock star (s)	*Lithosoma novaezelandiae*	LNV	222
Asteroidea (c)	Goniasteridae	Sladen's star (s)	*Mediaster sladeni*	MSL	223
Asteroidea (c)	Goniasteridae	Sea-star (c)	*Pillsburiaster aoteanus*	PAO	224
Asteroidea (c)	Odontasteridae	Pentagonal tooth-star (s)	*Odontaster benhami*	ODT	225
Asteroidea (c)	Pterasteridae	Sea-star (c)	*Diplopteraster* sp.	DPP	226
Asteroidea (c)	Pterasteridae	Sea-star (c)	*Hymenaster carnosus*	HYC	227
Asteroidea (c)	Solasteridae	Sun-star (f)	*Crossaster multispinus*	CJA	228
Asteroidea (c)	Solasteridae	Chubby sun-star (s)	*Solaster torulatus*	SOT	229
Crinoidea (c)		Feather stars (o)		CMT	230
Crinoidea (c)		Sea lilies with cirri (o)		CRN	231
Crinoidea (c)		Sea lilies without cirri (o+)		CRN	232
Echinoidea (c)	Cidaridae	Parasol urchin (s)	*Goniocidaris parasol*	GPA	233
Echinoidea (c)	Cidaridae	Umbrella urchin (s)	*Goniocidaris umbraculum*	GOU	234
Echinoidea (c)	Cidaridae	Cidaroid urchin (o)	*Ogmocidaris benhami*	OBE	235
Echinoidea (c)	Cidaridae	Cidaroid urchin (o)	*Stereocidaris* spp.	STC	236
Echinoidea (c)	Histocidaridae	Cidaroid urchin (o)	*Histocidaris* spp.	HIS	237
Echinoidea (c)	Histocidaridae	Cidaroid urchin (o)	*Poriocidaris purpurata*	PCD	238
Echinoidea (c)	Laganidae	Sand dollar (o)	*Peronella hinemoae*	PHI	239
Echinoidea (c)	Echinidae	Deepsea urchin (s)	*Dermechinus horridus*	DHO	240
Echinoidea (c)	Echinidae	Deepsea kina (s)	*Gracilechinus multidentatus*	GRM	241
Echinoidea (c)	Echinothuriidae	Tam O'Shanters (o)		ECT	242
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‡*Includes families Brisingidae, Hymenodiscidae, Novodiniidae, Freyellidae*

Echinoidea (c)	Phormosomatidae	Tam O'Shanters (o)	*Phormosoma* spp.	PHM	244
Echinoidea (c)	Pedinidae	Banded-spine urchin (s)	*Caenopedina novaezelandiae*	CNO	245
Echinoidea (c)	Pedinidae	Sea urchin (c)	*Caenopedina otagoensis*	CAO	246
Echinoidea (c)	Pedinidae	Giant purple pedinid (s)	*Caenopedina* sp.	CAL	247
Echinoidea (c)	Spatangidae	Microsoft mouse (s)	*Paramaretia peloria*	PMU	248
Echinoidea (c)	Spatangidae	Matheson's heart urchin (s)	*Spatangus mathesoni*	SMT	249
Echinoidea (c)	Spatangidae	Purple-heart urchin (s)	*Spatangus multispinus*	SPT	250
Echinoidea (c)	Temnopleuridae	Fleming's urchin (s)	*Pseudechinus flemingi*	PFL	251
Holothuroidea (c)	Synallactidae	Sea cucumbers (c)	*Bathyplotes moseleyi*	BAM	252
Holothuroidea (c)	Synallactidae	Sea cucumbers (c)	*Pseudostichopus mollis*	PMO	253
Holothuroidea (c)	Laetmogonidae	Sea cucumbers (c)	*Laetmogone* sp.	LAG	254
Holothuroidea (c)	Laetmogonidae	Sea cucumbers (c)	*Pannychia moseleyi*	PAM	255
Holothuroidea (c)	Pelagothuridae	Sea cucumbers (c)	*Enypniastes eximia*	EEX	256
Holothuroidea (c)	Psychropotidae	Sea cucumbers (c)	*Benthodytes* sp.	BTD	257
Holothuroidea (c)		Sea cucumbers (c)		HTH	258
Ophiuroidea (c)	Asteroschematidae	Brittle star (c)	*Ophiocreas sibogae*	OSI	259
Ophiuroidea (c)	Gorgonocephalidae	Waite's snake-star (s)	*Astrothorax waitei*	AWA	260
Ophiuroidea (c)	Gorgonocephalidae	Gorgon's head basket-stars (g)	*Gorgonocephalus* spp.	GOR	261
Ophiuroidea (c)	Ophiodermatidae	Deepsea brittle star (s)	*Bathypectinura heros*	BHE	262
Ophiuroidea (c)	Ophiuridae	Brittle star (c)	*Ophiomusium lymani*	OLY	263

TUNICATA (sea squirts and salps)

Ascidacea (c)		Sea squirt or Ascidian (c)		ASC	269
Thaliacea (c)	Salpidae	Salp (c)	*Pyrosoma atlanticum*	PYR	270

ID Sheets


Phylum
PORIFERA
Sponges
Phylum
CNIDARIA
Anemones, corals, jellyfish, and hydroids
Phylum
ARTHROPODA
Sea spiders, isopods, amphipods, prawns, lobsters, hermit crabs, barnacles
Phylum
BRYOZOA
Dennis Gordon
Phylum
ANNELIDA
Bristle-worms (sea-worms), and leeches
Phylum
MOLLUSCA
Snails, clams, octopus, squid, chitons, and tusk shells
Phylum
ECHINODERMATA
Sea-stars, brittle stars, sea urchins, sea cucumbers, feather stars and sea lilies
Phylum
TUNICATA
Sea squirts and salps
Mike Page