Updated educational material prepared for Government observers on the identification of protected corals known to be caught incidental to fishing.

This guide is a revision of the DOC Coral Identification Guide (Tracey et al. 2008) and complements:
- Guide to Common Deepsea Invertebrates in New Zealand Waters (Tracey et al. 2011)
- Pennatulacea (Sea Pens) Descriptions for the New Zealand Region. (Williams et al. 2014)
- Antipatharia Black Corals for the New Zealand Region (Opresko et al. 2014)
- Ministry for Primary Industries — Manatu Ahu Matua (MPI) instructions for the Observer Benthic Materials Form

The protected coral groups listed in both the Wildlife Act (1953) and Wildlife Act amendment (2010), are highlighted.

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Contents

Taxonomy of major coral groups 5
Stony corals SIA 6
  Branching thicket-forming corals CBR
  Solitary or cup corals CUP
Black corals COB 7
Groups that can be confused with black corals 8
Soft corals SOC 9
Gorgonian corals GOC 10
  Bamboo corals 10
  Bubblegum corals 11
  Golden corals 12
  Sea fans 13
Sea pens PTU 14
Hydrocorals (stylasterid hydroids) HDR 15
Hydroids 16
Groups that can be confused with hydrocorals 16
Taxonomy of major coral groups

“Coral” is a general term used to describe several different groups of animals in the Phylum Cnidaria. This guide provides a summary of taxonomic features for the key coral groups we find in the New Zealand region.

Page numbers in the text refer to ID sheets (Tracey et al. 2011)

PHYLUM CNIDARIA

Class Anthozoa – corals, sea anemones, sea pens
  Subclass Hexacorallia (Zoantharia)
    Order Scleractinia – stony corals
    Order Antipatharia – black corals
  Subclass Octocorallia (Alcyonaria)
    Order Alcyonacea – soft corals, sea fans, sea whips
    Order Pennatulacea – sea pens

Class Hydrozoa
  Order Anthoathecatae – stylasterid corals

Glossary of terms for stony corals
Stony corals SIA

Branching thicket-forming corals CBR

Please use the CBR code if you are unsure of the identification as these branching forms are difficult to distinguish to genus level.

How does branching occur?

- The polyp calice divides in two; branching in a ‘v’ shape: *Solenosmilia variabilis* SVA (p 88)
- Branching occurs below the calice:
  - Branches just below the calice: *Madrepora oculata* MOC (p 92)
  - Has main branches, then large calices on one side of the plane of the colony: *Enallopsammia rostrata* ERO (p 90)
- Branches apart from any calice, 90 degrees:
  - Only a few large calices develop as branches: *Eguchipsammia japonica*. (Default CBR)
  - A 3D network of thin branches (note the bridges between branches); polyps branch at right angles: *Goniocorella dumosa* GDU (p 87)
  - *Dendrophyllia* (Default CBR): Small branching form. Colonies with zig-zag branching, corallites (individual polyp) on alternating sides of the branches. Corallites and branches, minutely porous, rough to the touch.

Solitary or cup corals CUP

What is the shape of the solitary coral?

- Compressed, unattached: *Flabellum* spp. COF (p 91)
- Flat bottomed, unattached base: *Fungiacyathus* spp. FUG
- Cup-like (conical base):
  - Radial structures (septa) form from center to edges: *Desmophyllum dianthus* DDI (p 86)
  - Displays several cycles of progressively smaller (less wide) septa: *Caryophyllia* spp. CAY (p 85) and allies.
  - Bowl-shaped, unattached (no conical base): *Stephanocyathus* and allies. *S.platypus* STP (p 89).
Black corals COB
(p 65) Also see the recently published Black Coral Guide (Opresko et al. 2014).

All have spines on the smallest branches and very small polyps (< 1 cm in diameter).

- Colonies unbranched and unpinnulated; straight, curved, whip-like or spirally coiled:
  - One row of polyps only: Stichopathes STI
  - Polyps all around stem or sometimes one side free of polyps: Cirrhipathes CIP whip coral

- Colonies unbranched but with pinnules (terminal branchlets of nearly equal size) arranged in a symmetrical pattern on stem:
  - Feather-like colonies with upright or curved stem with 2 rows of straight or curved pinnules (rows sometimes close together on one side of stem): Bathypathes BTP

- Colonies usually with sparse branching and with pinnules on stem and branches:
  - 2 rows of alternately arranged pinnules, one row on either side; some pinnules with small secondary pinnules: Dendrobathypathes DEN
  - 4 rows of long unbranched pinnules, 2 on each side of branch (grouped in pairs); branches appear feather-like: Lillipathes LIL
  - 4 rows of pinnules; 2 lateral (opposite) rows of long, unbranched pinnules and two anterior rows of shorter, branched pinnules; colonies often very slimy: Trissopathes TPT
  - 6 or more rows of unbranched pinnules, equal number on either side of stem and branches (bottlebrush appearance); small colonies often unbranched with long stem: Parantipathes PTP

- Colonies densely branched, without distinct pinnules (smallest branchlets not of uniform size or arrangement, but sometimes restricted to sides of branches in fan-shaped colonies):
  - Colonies fan-shaped, densely branched with multiple orders of branches; smallest branches numerous, irregular, but somewhat alternately arranged on opposite sides of larger branches: Antipathes ATP (Antipathes cf. speciosa)
  - Colonies loosely spreading, with multiple orders of branches; thicker branches usually smooth and polished; small branches often curved, with branchlets of the next higher order appearing on the convex side: Leiopathes LEI (L. secunda LSE p 66)
Groups that can be confused with black corals

Hydroids HDF – less robust than black corals, with a 'woody' and flexible skeleton, the axis being chitinous.

Gorgonians GOC – naked gorgonian axes can be confused with black coral axes but can be easily distinguished by absence of skeletal spines. Tissue generally much thicker and can be scraped off gorgonian axes, leaving them naked.

Primnoidae colonies, for example can be easily distinguished from black coral colonies (Parantipathes and others) by the lustre (metallic) or colour of the axis (orange, brown, green), and armoured bud-like polyps (black coral polyps are always fleshy).
Soft corals SOC

How many polyps do they have?

- One or a few connected by stolons, unbranched:
  - Gigantic polyp: *Anthomastus robustus* ARO (p 63)
  - Single cream or greyish-orange polyp tubes joined by runners: *Cornulariella* spp. SOC
  - Single long, red or white tubes joined by runners: *Rhodelinda* spp. SOC

Rhodelinda tubes can be easily snapped, and resemble an inverted cone
  - Very tall and thin white polyp tubes joined by runners: Telestidae, unnamed genus. TLA

- Many polyps, colonies fleshy or branched:

What is the colony shape?:

- Thick stalk with a low domed shape head, large polyps around rim of head: *Heteropolypus* spp. SOC
  - Thick stalk with a rounded rounded ‘hemispherical head’ with polyps distributed all over head: *Anthomastus* sp. SOC

Branching:

- Thin tubular branches: *Telesto* spp. TLO (p 64), are generally red
  - Hard with prickly branches at the top, hollow stem: *Chironephthya* spp. SOC

Page numbers in the text refer to ID sheets (Tracey et al 2007)
Gorgonian corals GOC

Bamboo corals ISI (p 70)

How robust are they?
Small with fine delicate branches and short brownish nodes (need a closer look to spot): Mopseinae

What shape do they have?

• Branched
  – Bottle-brush: Primnopsis spp. (P. antarctica PNA)
  – Branching irregular usually with some flat or tubular branches: Minuisis spp. MIN (p 74)
  – Bushy or other forms with white/brown/orange branches or polyps: Mopseinae spp.

Medium to large with thick branches and large brownish/black nodes: Keratoisidinae.
Some have unusual candelabra form.

• No branches: Lepidisis spp. LLE (p 73), there are scales on the polyps

Where do the branches come from?

  – From the white internodes: Keratoisis spp. BOO (p 72)
  – From the nodes, the white internodes long: Isidella spp.
  – From the brown node with several branches from each branching point: Acanella spp. ACN (p 71)

Several other genera exist but they are uncommon in New Zealand e.g., Jasonisis.

The taxonomy for Lepidisis, Keratoisis and Isidella is still being reconciled.
Central axis not wire-like, is easily crushed and is not surrounded by a ring of canals.

**Bubblegum corals**

What colors?
- Pink and red: *Paragorgia* spp. *P. arborea* PAB (p 75)
- White or beige: *Sibogagorgia* spp.

**Anthothelid corals**

What colour are they?
- Brown or black (fan-like): *Iciligorgia* spp.
- Beige to white: *Anthothela* spp.
- White to red, axis tubular in places: *Solenocaulon*
- Purple: *Victorgorgia* spp.

Central axis not wire-like but solid and extremely hard:

**Precious corals**

*Hemicorallium and Corallium* CLL (p 68) *Hemicorallium* has erect, elongate polyps, *Corallium* has flat or bump-like polyps.

See hydrocoral section to help differentiate them from the precious corals.

Indistinguishable with the naked eye from *Paracorallium*, though the latter is less likely to be found in New Zealand waters, see hydrocoral section to help differentiate them from the precious corals.
Golden corals

What is the overall shape?

- Delicate bottle-brush: *Chrysogorgia* spp. CHR (p 69) and the recently described *Pseudochrysogorgia*
- Long stalk ending in a network of branches: *Metallogorgia* spp. MTL
- Twisted: *Iridigoria* spp. IRI
- Whip-like: *Radicipes* spp.

Axes of golden corals have a metallic lustre, they can appear as black/green as well as golden sheen.
Sea Fans GOC
Central axis a wire-like, black or brown skeleton?
- Check to ensure they have also a layer of semi-soft tissue covering the skeleton, otherwise they can be hydroids; note that hydroids have very thin end branches and they never have a hard axis; a darker skeleton with a very thin layer of tissue could be a black coral.
- Uniform colour, usually beige to dark brown, red, pink or purple with surface polyp bumps: plexaurid sea fans PLE (p 76) (many genera indistinguishable by the naked eye such as Placogorgia, Paramuricea, Dentomuricea, etc.)
- Long and spiny polyps, colonies sometimes multicoloured: Acanthogorgia spp.
Central axis a wire-like golden skeleton often with orange, white, yellow, pink large and small polyps and often hard polyps: Primnoiidae PRI (page 77)

What is the overall shape?
- Bottlebrush: supercommon Thouarella spp. THO (p 79) can be confused with Tokoprymno
- Whip-like: Primnoella spp.
- Bushy to fan-like and large with robust branches and scales or plates on knobby polyps: Primnoa spp. PMN (page 78) (Common Primnoiidae)
- Fan-like and thin branches: Callogorgia CLG and others.
- Thick branches with very elaborated calyces in girdles:
  - Calyx composed of two pairs of fused body wall sclerites (scale-like structure): Calyptrophora CPT spp.
  - Calyx composed of 3 pairs of unfused body wall sclerites: Narella NAR spp.
  - Axial skeleton, not wiry or solid and easily crushed: bubblegum corals and similar forms (page 11).
Sea pens PTU

Also see the recently published Sea Pen Guide (Williams et al. 2014).
(N.B. Sea pens are found only on soft muddy bottoms with the exception of “rockpens” that attach to deep-sea rocky outcrops by a sucker-like modification of the base of the peduncle.)

Whip-like (small polyps):
Type of axis?
- Square in section: *Funiculina* FQU
- Cylindrical: *Kophobelemnon KST* and *Distichoptilum DGR*

Fleshy:
- Flower-like polyps arranged along stem: *Kophobelemnon KST*
- Long stalk with a terminal bump of large flower-like polyps: *Umbellula UMB*
- Short with large fleshy ‘leaves’: *Gyrophylum sibogae GYS* (p 83)

Pen-like:
- Purple and looking like a soaked feather: *Pennatula PNN* (p 84)
- The polyps appear in oblique rows and each have a calyx that has two conspicuous, broad teeth: *Halipteris HWL* (Stylatula is similar but not very common in New Zealand).
**Hydrocorals** (stylasterid hydroids) HDR

Recognising hydrocorals COR
- Growths with main branches usually obviously thicker than the side branches.
- Side branches break easily.
- Pore-like apertures, with tiny radii on the circular rim. (i.e. cyclosystems).

**Groups of hydrocorals**
- Pink to red (some species white, however), short spines, thick branches: *Errina* spp ERR (p 81).
- White colonies: *Stylaster* STL, *Conopora* COO, *Lepidotheca* LPT (p 82), *Stenohelia*, and *Cryptelia* CRY (among others). All groups form very similar colonies and are easy to tell apart with a microscope.

Most stylasterids other than some *Errina ERR* (p 67) species are similar and difficult to tell apart with the naked eye. *Calyptopora reticulata* CRE (p 80) is very similar to *Stylaster* STL species; but the latter have visible bump-like reproductive ampullae towards one side of the colony, not present in *Calyptopora*. Some large white colonies of the precious coral *Corallium* can be confused with stylasterids but *Corallium* differs in lacking pores of any kind on its corallum (skeleton). *Corallium* does not have the small side branches of *C. reticulata*. Some branching bryozoans can have similar shapes but are somewhat crystalline, have thinner branches, and are without robust main branches.
Recognizing Hydroids **HDF**
- Non calcified and generally small, soft and feathery with a ‘woody’ and flexible skeleton, the axis being chitinous. Hydroids have diminutive coral-like open branched or reticulate lace-like growths with microscopic openings.

*Groups that can be confused with hydrocorals*

**Hydroids HDF**

**Bryozoans COZ** – stout, very hard growths or hydroid-like and flexible.

Precious red corals (*Hemicorallium* and *Corallium CLL*).