

# Oceanic Divisions



Herring gull  
(max diving depth 2m)



Bottlenose dolphin  
(max 50m)



Cormorant  
(max diving depth 10m)



Humpback whale  
(max 200m)

EPHELAGIC  
(0–200m)

Kelp  
(max 30m)



Sea nettle jellyfish  
(10–20m)



Diving sperm whale  
(max 1,200m)

Pacific herring  
(0–350m)



Indo-Pacific snailfish  
(max 200m)

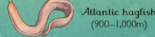


Giant squid  
(300–1,000m)

MESOPHELAGIC  
(200–1,000m)



Great white shark  
(0–1,200m)



Atlantic hagfish  
(900–1,000m)



Bluntnose sixgill shark  
(max 2,500m)



Giant isopod  
(max 2,000m)

BATHYPELAGIC  
(1,000–4,000m)

Tripod fish  
(max 4,700m)



Giant sea spider  
(max 4,900m)



Humpback anglerfish  
(max 4,500m)



Dumbo octopus  
(3,000–4,000m)



Vampire squid  
(max 3,000m)

ABYSSOPHELAGIC  
(4,000–6,000m)



Whale carcass

Benthic comb jellyfish  
(max 7,200m)



Mariana snailfish  
(6,000–8,000m)



Cuttle eel  
(max 8,370m)



Sea pig  
(1,200–5,000m)

HADALPELAGIC  
(6,000–11,000m)

# Jellyfish

Jellyfish are wanderers of the ocean, drifting with the currents wherever the water takes them. Despite their name, they are not fish at all as they lack a skeleton, making them invertebrates. Their soft, bell-shaped bodies are around 95 per cent water and contain neither brain nor heart. Without a skeleton, they have only limited movement, but can propel themselves gently through the water by filling their body (the bell) with water, and squeezing it back out again.

Along with coral and anemones, jellyfish belong to the phylum Cnidaria, all of which have stinging cells used to catch prey and provide defence. Most jellyfish have long tentacles, which are lined with cnidocytes, and dangle them into the water beneath them to catch prey. Each cnidocyte consists of a coiled, harpoon-like sting, which fires venom into the victim the moment they brush against it. Several species are translucent, meaning other animals will not see the danger ahead until it is too late, whereas others use bright colours to attract prey. For instance, flower hat jellyfish have fluorescent-tipped tentacles, which may look like green algae to unsuspecting fish. The fish approach the tentacles in the hope of food, but instead swim into a fatal trap. Incredibly, some animals seek out these tentacles intentionally, with juvenile fish and crabs sometimes taking shelter within them as a means of avoiding predators. They rely on a thick mucus coating to protect them or nimbly dodge the tentacles as they sway in the water.

Jellyfish are known to gather in huge numbers known as blooms. These swarm-like groups occur naturally, but are increasing in their frequency and size every year. In some cases, blooms have been big enough to weigh down fishing nets and sink boats. The rising numbers of blooms could be a result of overfishing. Evidence suggests that when small fish are over-harvested, jellyfish have no competition for food, and quickly reproduce. If overfishing cannot be managed, a jellyfish-filled ocean may be the future for our planet!

## Key to plate

### 1: Box jellyfish

*Cyanea fleckeri*  
Bell diameter: Up to 35cm  
Tentacle length: Up to 3m  
Also known as the sea wasp, this species has such a powerful venom that it can kill a person if untreated.

### 2: Lion's mane jellyfish

*Cyanea capillata*  
Bell diameter: Over 2m  
Tentacle length: Up to 37m  
This is the largest known species of jellyfish.

### 3: Common kingslayer

*Mastigias*  
Height: Approx. 3cm bell  
Tentacle length: Up to 100cm  
This tiny box jellyfish is highly venomous and its sting can be fatal.

### 4: White-spotted jellyfish

*Phyllorhiza punctata*  
Bell diameter: Up to 5cm  
Tentacle length: Up to 1cm  
Native to Australia and Japan, this species has been accidentally introduced to other areas including Hawaii and Mexico.

### 5: Pacific sea nettle

*Chrysaora fuscescens*  
Bell diameter: Usually less than 50cm  
Tentacle length: Up to 4.5m  
Sea nettles provide shelter for young fish and crabs.

### 6: Flower hat jellyfish

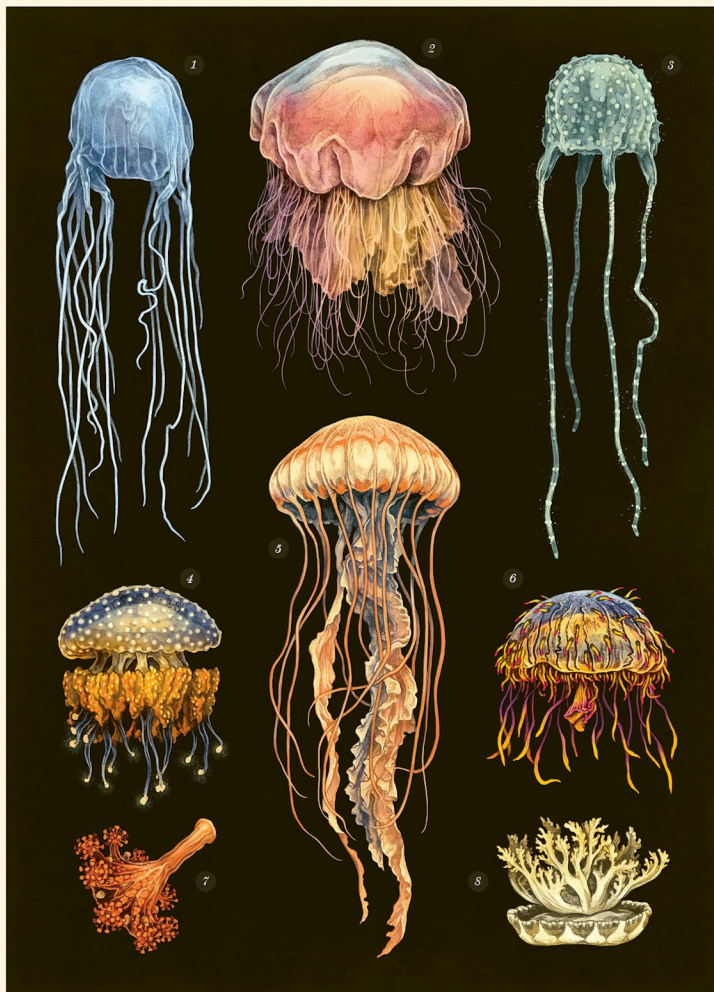
*Otilodas formosus*  
Bell diameter: Approx. 15cm  
This species lives near the seafloor and has tentacles all over its bell (body).

### 7: Kaleidoscope jellyfish

*Haliyetus auricula*  
Height: Up to 2.5cm, including tentacles  
This stalked jellyfish spends its whole life in one place, attached to seagrass or seaweed by its slender stalk.

### 8: Upside-down jellyfish

*Cassiope andromeda*  
Bell diameter: Up to 15cm  
Tentacle length: Up to 7cm  
This peculiar species sits upside down on the seabed with its tentacles waving above it.



# Habitat: Coral Reef

Vibrant and bustling with life, this habitat is like an underwater metropolis, supporting an incredible 25 per cent of marine life worldwide. The animals that live here seek shelter in the reef's nooks and crannies, find camouflage against its bright backdrop, and feast on an abundant supply of food within its colourful corridors.

Coral reefs are formed by coral polyps: tiny animals that resemble sea anemones and live in huge groups called colonies. When they die, the polyps leave behind their hard calcium carbonate (stone) skeletons, and the reef gradually becomes bigger. Coral polyps find food by waving their tentacles in the water to catch drifting scraps. They also take extra nutrients from microscopic algae called zooxanthellae, which live inside the polyps themselves and make food using energy from the sun (via photosynthesis). Zooxanthellae are also what give coral reefs their characteristic bright colours, by producing colourful pigments, and several million can be found in just one square inch of coral. Corals make enormous habitats such as the Belize Barrier Reef in Central America and the Great Barrier Reef in Australia. These places are so big that they are visible from space, making coral reefs the largest living structures on our planet.

These complex habitats only grow under specific conditions, requiring temperatures of 20 to 32°C and shallow, sunlit waters. These conditions vary naturally with our planet's cycles, but are altering more dramatically due to climate change. If sea temperatures rise, the zooxanthellae cannot survive, so they leave the polyps. The corals then lose their colour and most of their food, and the whole habitat is threatened. It's not just marine species that this will impact. Coral reefs are also an important resource for humans, providing food in many regions and they may also hold the key for the treatment of infections, heart disease and even cancer.

## Key to plate

### Belize Barrier Reef, Central America

#### 1: Reef manta ray

*Mobula alfredi*  
Width: Approx. 3.5m  
This is the second largest species of ray in the world.

#### 2: Green turtle

*Chelonia mydas*  
Length: Approx. 1.5m  
This turtle takes its name from the colour of its fat rather than the colour of its shell.

#### 3: Common bottlenose dolphin

*Tursiops truncatus*  
Length: Up to 4m  
This species lives in social groups called pods. They can contain as many as 1,000 individuals.

#### 4: Staghorn coral

*Acropora cervicornis*  
Height: Up to 2m  
This coral grows faster than most, adding 10–20cm a year.

#### 5: Blue chromis

*Chromis cyanea*  
Length: Up to 15cm  
Normally found in big shoals, these bright fish live near branching coral when they are young and are always ready to dart for shelter if threatened.

#### 6: Table coral

*Acropora cytherea*  
Diameter: Up to 2m  
Growing in flat, table-like structures, this coral gives prey animals shelter from predators hunting above.

#### 7: Brain coral

*Diploria labyrinthiformis*  
Diameter: Up to 2m  
The brain coral's polyps sit protected within its maze-like grooves and folds.

#### 8: Spotted moray eel

*Gymnothorax moringa*  
Length: Approx. 60cm  
This solitary eel lives in crevices in the reef. It normally hides away with only its head poking out.

#### 9: Caesar grunt

*Haemulon carbonarium*  
Length: Up to 20cm  
*Haemulon carbonarium*  
This family of fish, called grunts, make noises underwater by grinding their teeth together.



# Seabirds

Seabirds make up around 3.5 per cent of all bird species. Whether they spend the majority of their lives gliding over the waves like the wandering albatross or visit the ocean only to collect food like the puffin, these birds all have a connection to the sea. Their plumage is often less colourful than other birds, which helps them camouflage against the ocean waves.

The hunting methods of seabirds vary with each species. Some, like the blue-footed booby, will plummet almost 30 metres from the air into the sea, diving underwater in pursuit of prey. Others are better adapted to surface feeding, either skimming the water while still in flight or, in the case of the Wilson's storm petrel, stopping for a moment to dip their feet in the water, to attract plankton to the water's surface. Penguins have given up flight altogether and have strong, short wings that behave more like flippers, providing powerful swimming strokes underwater.

Many seabirds migrate to breed, with some travelling enormous distances. Wandering albatross have been known to fly around 10,000 kilometres in a single journey, barely flapping their wings. Instead, they use the wind, catching updrafts to keep themselves airborne and to conserve energy. Each season, they gather on rocky outcrops at sea or on cliffs. Males and females pair together, with some returning to each other after long periods apart. This bonding between parents means that they can successfully care for their chick while one adult is away foraging for food.

This strategy is important for emperor penguins too – the only animal that spends the winter in Antarctica. These amazing birds will walk 80 to 120 kilometres inland to breed in colonies. Once the egg is laid and hatched, the pair will take turns to guard their chick, while the other returns to feed at sea. Only by working together can they raise the next generation of emperor penguins in such extreme conditions.

## Key to plate

### 1: Herring gull

*Larus argentatus*  
Wingspan: Up to 1.5m  
Climate change may have turned this bird from a predator into a scavenger – taking food from waste and even directly from people.

### 2: Wilson's storm petrel

*Oceanites oceanicus*  
Wingspan: Up to 42cm  
At home in stormy seas, these birds fly through the troughs of the waves, avoiding the worst of the weather.

### 3: Red-billed tropicbird

*Phaethon aethereus*  
Wingspan: Up to 1.1m  
A favourite food for this bird is flying fish, which they are known to catch in mid-air.

### 4: Wandering albatross

*Diomedea exulans*  
Wingspan: Up to 3.5m  
Wandering albatrosses have the largest wingspan of any bird and can spend years at sea without returning to land once.

### 5: Blue-footed booby

*Sula nebouxi*  
Wingspan: Up to 90cm  
The bright blue feet on these birds are used by the males to attract a mate as part of a display of courtship.

### 6: Atlantic puffin

*Fratercula arctica*  
Wingspan: Up to 63cm  
When the breeding season is finished, these birds shed their colourful beak plates and eye patches.

### 7: Australian pelican

*Pelecanus conspicillatus*  
Wingspan: Up to 2.6m  
This species has the longest beak of any known bird, reaching up to half a metre.

### 8: Emperor penguin

*Aptenodytes forsteri*  
Height: Up to 1.2m  
This is the largest penguin species. They can dive to depths of up to 500m in search of food.

### 9: African penguin

*Spheniscus demersus*  
Height: Up to 70cm  
The only penguin to be found on the continent of Africa, this penguin has to cope with hotter environments. The pink patch above their eye helps them to lose heat.

