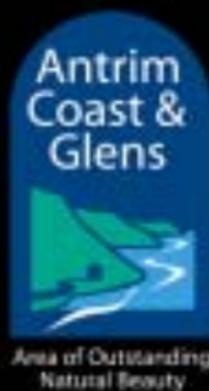


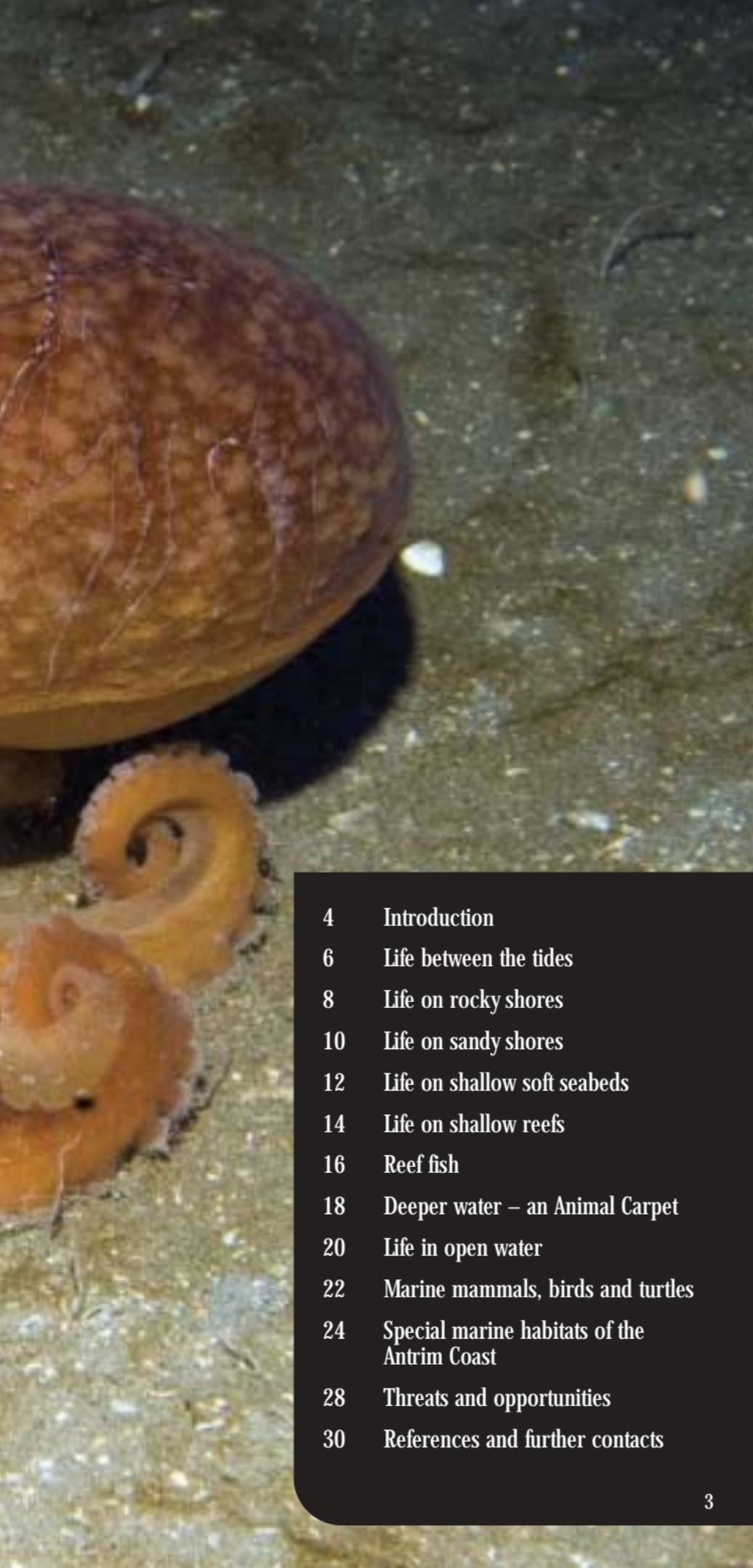


Life in the sea
off the Antrim Coast





Curled octopus



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Introduction

The Antrim Coast & Glens Area of Outstanding Natural Beauty (AONB) is one of nine AONBs in Northern Ireland recognised as being landscapes of national importance. Whilst recognised for its rich cultural heritage and beautiful coastal scenery less is generally known about the rich and diverse marine life which exists below the waves.

Cushendun Bay

Stretching from Larne to Ballycastle and including Rathlin Island this coastline supports a very wide range of different habitats and marine life. This diversity is determined by a range of different factors including geology, water depth, currents, tidal range and salinity.

The geology of the offshore seabed is similar to that on land with tertiary basalts overlying older sedimentary rocks. In some places like Rathlin the limestone has been eroded to create sea caves.

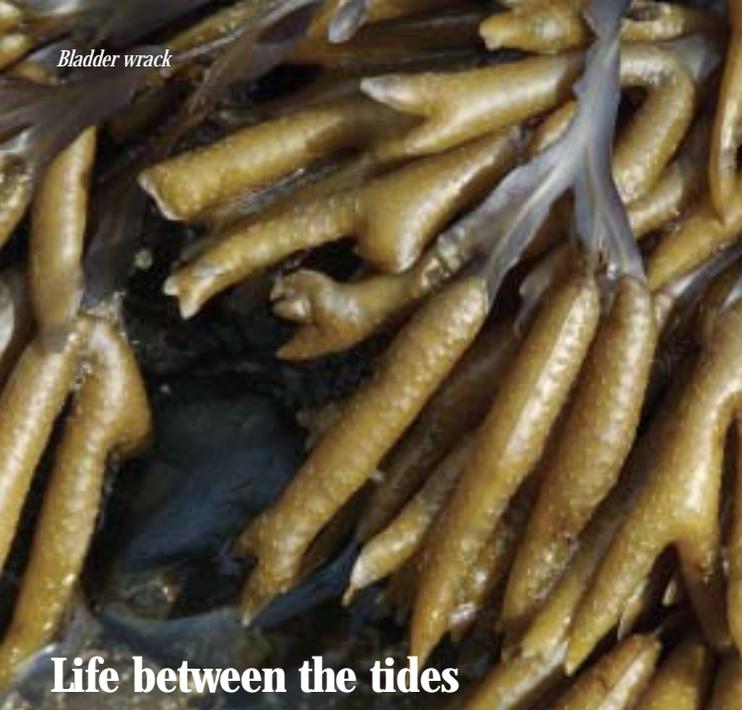
Most of the water around the Antrim Coast and Glens is relatively shallow apart from a deep trench reaching depths of over 200m north of Rathlin Island. Generally there is a low tidal range averaging less than 2m. Red Bay is notable as having one of the lowest tidal ranges in the British Isles.

Variations in current together with exposure to weather and waves determine the underwater character of the area – from bedrock and boulders to gravels, sand or fine mud. Some areas have very strong currents for example around Rathlin, Torr Head and the Maidens.

There is a remarkable mix of habitat, plants and animals in both the Intertidal zone (stretching between the highest and lowest tidemarks and including both rocky and sandy shores) and the Subtidal zone (found below low tide and including both soft bottoms and rocky areas). In addition the open water between the seabed and the surface also provides a major habitat for other animals and plants.

Some special places around the coast are of international importance. Of particular importance is Rathlin Island with its rich biodiversity including many rare sponges, sea anemones and hydroids. Also important are the maerl beds at Garron Point and the seagrass beds at Red Bay.

Bladder wrack



Sea shells



Life between the tides

The intertidal zone is the part of the seashore exposed to the air at low tide but covered by sea water at high tide. Tides are produced by a combination of the earth's rotation and the gravitational pull of the moon and the sun on the earth's sea water. These combine to produce two high and two low tides each day. At each 'new' or 'full' moon, the moon and the sun pull in the same direction producing the highest and lowest tides and the widest tidal range. These are known as 'Spring' tides. 'Neap' tides where the tidal range is small occur when the sun and moon are pulling in opposite directions.



Shore crab

The intertidal zone can be divided in three: the upper, middle and lower shore.

The upper shore is only submerged at high water, especially during spring tides. The middle shore is submerged and exposed on a daily basis whilst the lower shore is only exposed to the air for a short time at low water (again especially during spring tides). The area above the upper shore is known as the splash zone.

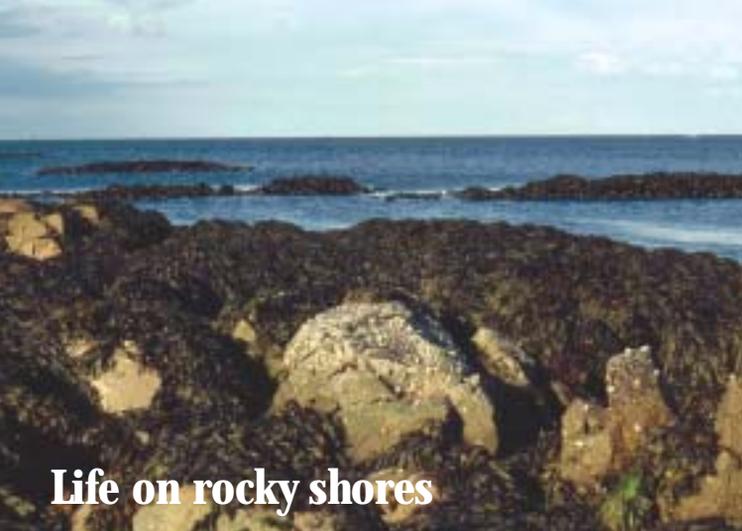
It is 'splashed' with seawater only occasionally, for example during storms. Beyond the lower shore, and permanently covered with sea water, is known as the subtidal area.

The physical characteristics of the seabed also affect what can live on it. Hard bedrock supports both attached and unattached organisms such as limpets and crabs. You will find these hiding behind seaweed, under rocks or in rock pools before they emerge at high tide. Burrowing animals live in the softer sand and mud.

Spring Tides



The best time to observe marine life is during spring tides when most of the intertidal zone is exposed. Tide tables are useful to let you know low and high water times which change every day. These can be obtained from local marinas, ship chandlers or alternatively from the United Kingdom Hydrographic Office.



Life on rocky shores

Intertidal habitats are particularly important along the rocky coastline of the Antrim Coast and Glens AONB. Different types of seaweed and marine animals have become adapted to how long they are exposed to air, wind, wave and tide.



Channelled wrack



Knotted wrack



Toothed wrack

- Lichens have become specially adapted to the harsh and changing environment of the splash zone.
- Between the upper and lower shore, different brown algae called wracks are common:
 - The upper shore is characterised by channelled and spiralled wrack which can tolerate long periods out of the water. Channelled wrack has become specially adapted to life on the extreme upper shore. It can live for up to 8 days out of water. Channelled wrack 'fronds', the seaweed equivalent of leaves on flowering plants, are curled longitudinally forming a characteristic channel. Spiralled wrack is found lower on the shore and characterised by twisted 'fronds'.
 - Knotted wrack and bladder wrack are common in the middle shore. Both have air bladders on their fronds to help them stay afloat. This allows them to benefit from sunlight. Knotted wrack has large egg shaped air bladders whilst those on the bladder wrack are almost spherical and usually paired.



Lichen

- Toothed wrack has distinctive serrated edges and dominates the lower shoreline. Below this thongweed and kelp are common. Thongweed starts life as a button-like seaweed before developing long straps or fronds which can grow to up to 2m in length.
- Kelp is often dominant in the shallow water below the shore.

There is a wide range of marine life along the rocky shoreline including red seaweeds, molluscs, crabs and anemones.

Rock pools

Rock pools are common and full of life forming mini natural aquariums at low tide. Look closely and you could see crabs, anemones, shrimps or even a small blenny tucked away behind a rock. Crustaceans have hard shells or exoskeletons, which help to protect them from predators. Hermit crabs use old discarded seashells such as the periwinkle or dog whelk as a temporary home. These are exchanged for larger shells as the crab grows.



Sea anemone

Waterfoot beach



Life on sandy shores

Sandy shorelines are another type of intertidal habitat common along the Antrim Coast (for example at Ballygally, Carnlough and Ballycastle). Whilst it is not immediately obvious these are also rich habitats. Look closely and you could find a lugworm cast produced by a worm working in its burrow. Carefully dig a section of the sand or mud and you might find cockles, razorshells, crabs as well as the worm. These areas are teeming with life and provide rich feeding grounds for many different wading birds such as the redshank and oystercatcher common along the Coast.

Lugworm casts



Molluscs

Molluscs are one of the largest and most diverse groups of marine animals.

This group includes periwinkles, for example painted top shells, mussels, scallops, sea slugs and also, but less well known, the octopus and squid. Razorshells and mussels are called bivalves because they have two hinged shells encasing their softer parts. Try digging on the beach with a small spade to see what you can find or collect dead shells where they have been cast up on the beach!



Lugworms

Lugworms are responsible for the curly sand casts so common on many of our sandy or muddy shores. Lugworms live in U-shaped tubes about 30cm beneath the surface of the sand. Look for a hole in the sand close to each cast. Each worm feeds by swallowing sand at one end of the tube then forcing it out as waste product from its tail to form a cast.



Sea potatoes

Sea potatoes are sometimes called heart urchins because of their shape. Each urchin is covered in a dense felt of yellow brown spines pointing backwards. They live in permanent burrows about 8 to 15cm below the surface in sheltered intertidal areas.





Dab

Life on shallow soft seabed

Soft seabed habitats are found in more sheltered areas. These consist of soft sand or muddy sediment. Although it is difficult for plants or animals to attach to this kind of surface some animals have become specially adapted to live within the sediment. Tube anemones live in tubes buried under the sand or gravel. Their mouth and tentacles project above the surface of the sand and can extend to up to 40 cm. Tentacles can be brown, green or white with darker brown banding and if disturbed these will retract into the tube.



Tube anemone



Brittlestars

Brittlestars scavenge on the surface or sit on the bottom and feed on creatures in the water. These are part of the echinoderm group which also includes the starfish, sea urchin and sea cucumber. Echinoderms only exist in the marine environment and uniquely they do not have a head, tail or brain. Amazingly should starfish lose a limb they have the ability to grow a new one!

Flatfish such as plaice or dab are specially adapted to life on the soft seabed. Plaice have smooth brown skin and bright orange spots with a bony ridge behind the eyes. Both of these are found on the right hand side of their head. Plaice can change colour to match their surroundings but the orange spots always remain distinct. Mainly nocturnal, they feed at night on small crustaceans, worms and molluscs then spend most of the day covered by sand on the seabed. Adult fish can grow to between 50 and 60cm in length.

Sea cucumber

The distinctive body shape of sea cucumbers has given them their name. They can live both on the seabed (epifaunal) or burrowed in crevasses, gravel or mud (infaunal). Their long cylindrical body tapers at each end whilst the mouth is surrounded by retractile tentacles used for feeding. Burrowed sea cucumbers are often only visible when their tentacles emerge to feed.





Kelp holdfasts

Life on shallow reefs



Kelp forest



Blue-rayed limpets



Red cushion star

Hard seabed habitats (or reefs) in shallow water are dominated by kelp, a general term used to describe the large brown seaweeds which form the kelp forest. Kelp need light to grow and attach to the bedrock using branching rootlets called holdfasts. In clear water areas such as around Rathlin Island they can live as deep as 30 metres. They can live for up to 12 years and each plant has a thick stipe topped by huge swaying leathery fronds. These can reach several metres in length. The most common species found in these waters is the cuvie (*Laminaria hyperborea*) growing up to 3.5m in length but sugar kelp (*Laminaria saccharina*) is also common. The cuvie has broad fronds divided into 5 to 20 straps whereas the sugar kelp has undivided fronds with a distinctive frilly undulating margin.

In terms of the range of life they support, kelp forests are sometimes viewed as the marine equivalent of an equatorial rainforest! Hydroids attach to the fronds whilst the stipes are covered with red seaweeds such as 'dulse'. Dried dulce is prized as a local delicacy. Holdfasts also attract sea anemones and sea squirts whilst sea urchins graze the fronds. Other animals such as blue-rayed limpets attach to the plants and sometimes graze pits in the kelp itself. Kelp forests also provide food and cover for young fish such as cod, pollack and herring.

As the light fades in deeper water, the kelp forest changes to become a kelp park. Here individual plants are smaller and less concentrated providing room for other species to live including other red seaweeds, hydroids, bryozoans, sea squirts and anemones.

Sea squirts

Baked bean sea squirts have been named for obvious reasons as they are often thought to resemble baked beans spattered on a rock. They are very common and although sometimes solitary they usually form dense colonies attached to rocks or shells and even other animals. Looking at this animal it is hard to believe they are more closely related to fish and birds than worms or other invertebrates. As part of the chordate phylum, free living larvae have a notochord, the beginning of a backbone, but the adults as we normally see them do not.

Sea squirts feed by filtering sea water through one of two openings using the other to expel excess water and waste.





Ballan wrasse

Reef Fish

Reefs provide food and shelter for a wide variety of fish life.

Slate blue conger eels lurk in holes or openings in the rock. They have long smooth bodies with no scales and are common around harbours and old ship wrecks.

Pollack, coalfish, cod and bib are all members of the cod family (Gadidae). They are found in shoals around rocky areas or old wrecks and feed on other small fish and crustaceans.

The bull rout and the long-spined sea scorpion are both members of the sea scorpion family. Instead of scales these fish have spines on their skin and again feed mainly on small bottom-living fish or crustaceans. These fish can also change colour to match their surroundings.

Cuckoo wrasse, ballan wrasse and goldsinny are all members of the wrasse family. Wrasse are very colourful fish and easily spotted as they patrol their territory within the kelp forest. Their tough mouth and lips have adapted to help them eat small crabs and molluscs.

Lemon sole and topknot are two kinds of flatfish specially adapted to life on the rocky seabed. Their beige-brown colouring helps them blend in with their surroundings and to protect them against predators. Whilst similar they can be distinguished; lemon sole are right-eyed flatfish whilst topknots are usually left-eyed.



Conger



Pollack



Sea scorpion



Cuckoo wrasse



Lemon sole



Cod

Deeper water - an Animal Carpet

Moving deeper down the reef the light fades and seaweed is replaced by a rich and colourful animal carpet including many different types of sponge, anemone, hydroid and sea cucumber. These attach themselves to the rocks and feed off food suspended in water. Some of the more exotic animals include dead man's fingers, jewel anemone and the oaten-pipes hydroid.

Jewel anemone

Jewel anemone

The jewel anemone is a small colonial anemone often found forming large groups in more shaded areas. They reproduce asexually from a single parent dividing vertically to produce two identical organisms. They have up to 100 tentacles each ending in a small swelling or knob and are very colourful including green, pink, red, orange and white variations. Colouring can vary between the tentacle, body and knob.



Dead man's fingers

Dead man's fingers are actually soft colonial corals forming fleshy irregular masses with finger-like lobes of approximately 2cm in diameter. Known as colonial organisms they grow by dividing and remain connected to each other forming larger masses or colonies. Small polyps expand and become more visible when the animal feeds. Colouring varies but can include white, orange, yellow and brown. They are usually found attached to bedrock but sometimes they can also attach to crab shells.



Hydroids

Hydroids are part of the Cnidarian family which includes jellyfish and sea anemones. Most hydroids have both a fixed (polyp) and free-living (medusa) stage, but others make use of only one or the other. The oaten-pipes hydroid is a fixed hydroid common around Rathlin where it lives in the strong tidal streams. Usually its stems are clustered together fusing at the base of the colony. Polyp colours include pale pink and red and these form two rings of tentacles around the mouth. These large hydroids can grow to between 10 and 15cm high.



Life in open water

Plankton live in the open sea and form the basis of the marine food chain. Phytoplankton are miniature floating plants found in the top few metres of the world's oceans where they spend their time converting light into organic material through a process known as photosynthesis. Phytoplankton provide food for small animals called zooplankton which in turn become food for larger animals. Many forms of zooplankton are the juvenile stage of other creatures such as crabs or shellfish. Others spend their whole life in the plankton.

Other larger marine creatures also live in the open water. These are known as pelagics and include many different species of fish, jellyfish, whale and dolphin.

Like plankton, jellyfish float in the open water moving up and down the water column at the mercy of tide and current. Common jellyfish around the Antrim Coast include the moon jellyfish, the blue jellyfish and the lion's mane jellyfish. Whilst the blue jellyfish has up to 50 tentacles the lion's mane jellyfish can have as many between 70 and 150 red tentacles which they use to sting and catch fish. Lion's mane jellyfish are considered to be the most dangerous animal in the British Isles.

Over 100 species of fish live in the open water off Northern Ireland's coast. Pelagic fish include herring, mackerel and the atlantic salmon. There are also more unusual species like the spectacular sun fish and the basking shark. Most pelagic fish are migratory following plankton and other fish in annual cycles. Adult atlantic salmon spend their lives at sea travelling as far as the Norwegian Sea and Greenland before returning to freshwater to spawn.



Jellyfish and following fish



Zooplankton



Each juvenile fish spends the early part of its life in freshwater before undergoing a morphological and physiological change which allows it to adapt to life at sea. Four years later they return often to the same river and even the same pool where they hatched using their highly advanced sense of smell.

Sunfish



These spectacular fish have a short flattened body resembling a disc and a very small mouth. The sunfish has a distinctive dorsal fin and a tail reduced to a stiff, frill like membrane. The dorsal fin is clearly visible as they drift along the surface.

Sharks



Sharks and skates have a cartilaginous skeleton instead of a bony one like other fish. The largest of these is the basking shark which sometimes visit the Antrim Coast. Basking sharks are the second biggest fish in the world and feed on plankton which they filter from the water using their gill rakers inside their enormous mouth.

Leatherback turtle

Bottlenose dolphins

Marine Mammals, birds and turtles

Some mammals like the otter and the seal have become adapted to life at the sea. Others like whales, dolphins and porpoises are truly creatures of the open water.



Eider duck



Common dolphin



Seal pup

Whales, dolphins and porpoises, are all known collectively as cetaceans. Toothed whales including the porpoise, dolphin and killer whale regularly visit this coast. Killer whales are black and white with a distinctive dorsal fin which helps identification. Risso's dolphins are distinguished from other dolphins by their colouring, the blunt rounded shape of their head and their larger body size. Harbour porpoise are probably the most common cetacean along the Antrim Coast. Although sometimes confused with common and bottlenose dolphin they are much smaller and have very different behavioural patterns. For example porpoise will never follow a boat or leap clear from the water like a dolphin. Occasionally small 'baleen' whales also visit these waters. Minke whales have no teeth like some of the other large whales but instead they have plates which are used to filter plankton from the water. The minke whale can grow up to 8m long.

Many birds depend on the sea for food. Every year up to 66,000 seabirds return to breed on the cliffs of Rathlin Island. Breeding seabirds include the fulmar, eider, shag, common gull, lesser black-backed gull, herring gull, black guillemot and, probably the most colourful and popular of all, the puffin.



Other animals visiting our waters include the leatherback turtle, a sea going reptile. Sometime the leathery carapace of this amazing animal is mistaken for an "upturned boat". Leatherback Turtles are the largest living turtles in the world and can grow to 1.5m in length weighing anything between 200 and 700kg. They are capable of diving for up to 2 hours reaching depths of 1,200 metres where they feed mainly on jellyfish. Leatherback turtles can live to a great age and will undertake many long distance migrations in a single life time.



Razorbill

Seals



Both grey and common seals are found around the Antrim Coast. Grey seals are bigger than common seals and distinguished by the shape of their nostrils. Common seals have V-shaped nostrils whilst grey seals have parallel nostrils. Colouring varies from grey to brown and helps them blend in with their surroundings. Although seals can appear very curious always take care when approaching them. These are wild animals with very sharp teeth!



Seagrass bed habitat



Maerl bed habitat



Special marine habitats of the Antrim Coast

Red Bay seagrass beds:

Sheltered Red Bay has important seagrass beds, these are one of the few true flowering plants found in the sea. One of the most common types found here is common eelgrass. Seagrass beds are one of the most productive of all the soft sea bottom communities and support a wide range of flora and fauna including snails, jellyfish, hydroids and various different algae. They also provide a nursery ground for fish and crustaceans as well as helping to stabilise sediment and prevent erosion. This can also help to protect the coastline.

Garron Point maerl bed

Garron Point and Ballygally Head have important maerl beds. They take hundreds of years to develop and can be up to 6,000 years old. These are rare and sensitive habitats of international importance which need special protection. Maerl is the 'skeleton' of a free-living red seaweed with a calcified and ramified skeleton which grows at about 1 mm a year. The "branches" of the maerl accumulate to form deep beds however only the red top layer is alive. The white and grey bottom sections are dead. Maerl beds provide a habitat for shellfish like the dog cockle and some special sea cucumbers.



Seals, Rathlin Island



Common lobster

Rathlin Island sea caves

Rathlin Island has many submerged or partially submerged caves especially along the north coast. Living conditions and local habitats change dramatically from the entrance to the back of the cave. The entrance is similar to reef habitats and colonised mainly by seaweed, but deeper within the cave the light fades and seaweed is replaced by an exciting array of sponges, sea anemones and hydroids.



Devonshire cup coral

Over 130 species have been recorded in Rathlin waters including about one third of the total sponge fauna recorded in Britain and Ireland. Sponges can be bright yellow like *Axinella damicornis*, dark grey like *Pachymatisma johnstonia*, white like *Stryphnus ponderosus* or stretch-membrane-shaped like the black *Dercitus bucklandi*. There are even cup-shaped species like *Axinella infundibuliformis*. These are fantastic underwater animals bringing vibrant colour to the seabed. Sponges have no mouth but feed by pumping water through their bodies to filter food.



A sponge

They are some of the simplest animals on earth lacking muscles, nerve systems or even internal organs. Although sometimes associated with the sponges we use at home these are much too hard for use in the bath.

Rathlin's sea caves also provide shelter for many other creatures such as starfish, lobsters, crabs, fish and seals. Seals even use the intertidal caves to rest and breed.



A sponge



Crawfish

Threats and opportunities

Whilst important to the social and economic life of the area some human activity can have a negative impact on the marine environment. Equally many industries like tourism depend on a high quality marine environment. It is critical to ensure we manage this resource for the benefit of future generations.

Coastal defences and coastal development

Coastal defence work such as groynes or the construction of sea walls common along the Antrim Coast can affect natural processes. Larger scale development like harbour improvements or the construction of marinas will also have an effect.

Extraction

Extraction of sand, gravel and rock can also have an impact. Large scale extraction will change habitats and make life more difficult for the many different species that live there. Sand and gravel extraction has traditionally been practiced on many of the beaches along the Antrim Coast for example at Cushendun, Glenarm and Carnlough.

Harvesting

Traditionally red seaweed or dulse has been gathered and sold to visitors along the Antrim Coast. It even features in song and is one of the main attractions of the 'Ould Lammas Fair' in Ballycastle. Whilst small scale harvesting is acceptable, intensive collection can affect marine habitats. Similarly 'winkling' is popular along the Antrim Coast. If unmanaged this also has the potential to affect the marine ecology of the area.

Fishing

Both recreational and commercial fishing are important along the Antrim Coast. Shore angling is popular at beaches like Glenarm, Red Bay, Cushendun and Ballycastle. Other notable fishing marks include Fair Head, Murlough, Torr Head, Garron Point and Ballygally Head. Commercial fishing is mainly for lobster but includes inshore trawling and scallop fishing. Whilst important to the local economy over fishing will affect fish stocks and the marine environment. Torr Head has the only remaining fixed net salmon fishery along the coast. The others have been bought out in an attempt to preserve existing stocks. Similarly local lobster fishermen operate a v notch scheme returning 'buried' (or egg bearing) female lobsters to the sea. Whilst there are no 'bag limits' for shore anglers along the Antrim Coast these have proven helpful in other areas for example the bass fishery in South West Ireland.

Aquaculture

As traditional fishing declines aquaculture has emerged as an alternative way of meeting increased demand. Aquaculture can create employment opportunities but may also have negative impacts. Some argue that salmon farming has a negative impact on the marine area through the concentrated release of organic waste, nutrients and medicinal chemicals. Others argue

that farmed fish can encourage the spread of sea lice. It is further argued that escaped fish can breed with the existing wild stock and overtime this can alter their genetic character. Whilst fish farms may bring economic benefit it is critical to ensure these are properly managed and monitored. Shellfish farming has yet to develop as a significant industry along the Antrim Coast.

Litter and waste

Marine waste can pose a hazard for both wildlife and visitors. Fish, seals, cetaceans and seabirds can all be affected by litter and waste. All kinds of waste can end up along the coast and the impact of this on wildlife is sometimes fatal. Old fishing gear is particularly dangerous for seabirds. Plastic bags are sometimes mistaken by small whales and turtles for jellyfish and ingested with similar effects. Litter also affects the appearance of an area and makes it less attractive to visitors. Everyone using the coastal area should ensure they take their litter home and dispose of it properly. More significantly sewage disposal can have a serious impact on water quality. It is always critical to ensure sewage treatment work operates to the highest standards if we want to protect our marine environment.

Climate change

In the long term climate change poses the greatest threat not only to the marine environment but also the planet. Climate change has the potential to completely change the physical, chemical and biological characteristics of the water around our coast. Many argue this change is already well underway. Possible impacts include sea level rise (it is predicted sea level will rise by over 0.5m during the next century) and the probability of more unpredictable weather patterns. This will affect the marine environment as will the possibility of decreased salinity. Decreased salinity has the potential to affect the Gulf Stream and without its warming influence, Britain and Ireland could develop climatic conditions more similar to those in Northern Canada than those we enjoy today!

Integrated Coastal Zone Management (ICZM) and Marine Management

Growing interest in the different issues affecting the marine environment has seen the development of a concept known as Integrated Coastal Zone Management. This recognises that all actions within the coastal zone are inter related. It also recognises the link between land and sea. The need for coastal zone management is being promoted by the European Union which has asked each Member State to produce an Integrated Coastal Zone Management strategy. Northern Ireland produced an Integrated Coastal Zone Management strategy in 2006. It has also established a Northern Ireland Coastal Forum to help take forward implementation of the strategy. In parallel to this the UK is currently developing a Marine Bill. The overall aim of both initiatives is to establish sustainable levels of economic and social activity along the coast whilst also ensuring the protection of the environment. This presents a considerable challenge to all those with an interest in the coastal and marine area but it is one which must be addressed.



References and further contacts

Further contacts and readings

Inshore Marine Life of Northern Ireland

D. Erwin and al, DoE (NI) 1990

A glossary of Marine Nature Conservation and Fisheries.

Countryside Council for Wales, Bangor. 2001

A guide to the identification of the Whales & Dolphins of Ireland.

Jim Wilson, Simon Berrow, The Irish Whale and Dolphin Group (IWDG). 2006

Charting progress – An integrated assessment of the state of the UK seas.

Department for Environment Food and Rural Affairs. 2005

Out and about around Strangford Lough.

Strangford Lough Marine Nature Reserve. 2006

Beaches... and island's treasure.

Coleraine Borough Council

The underwater world of Northumberland and Berwickshire.

Northumberland County Council. 2006

Exploring the shore in Northumberland and Berwickshire.

Northumberland Coast AONB partnership. 2004

Marine health check.

WWE 2005

Environment & Heritage Service

www.ehsni.gov.uk/biodiversity/hap_uk/coast.htm

Ulster Museum, Sciences Division

www.habitas.org.uk/marinelife

Marine Life Information Network for Britain and Ireland

www.marlin.ac.uk

Joint Nature Conservation Committee, Marine section

www.jncc.gov.uk/page-3

UK Marine SACs Project

www.ukmarinesac.org.uk

OSPAR Commission, for the protection of the marine environment of the North-East Atlantic

www.ospar.org



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