
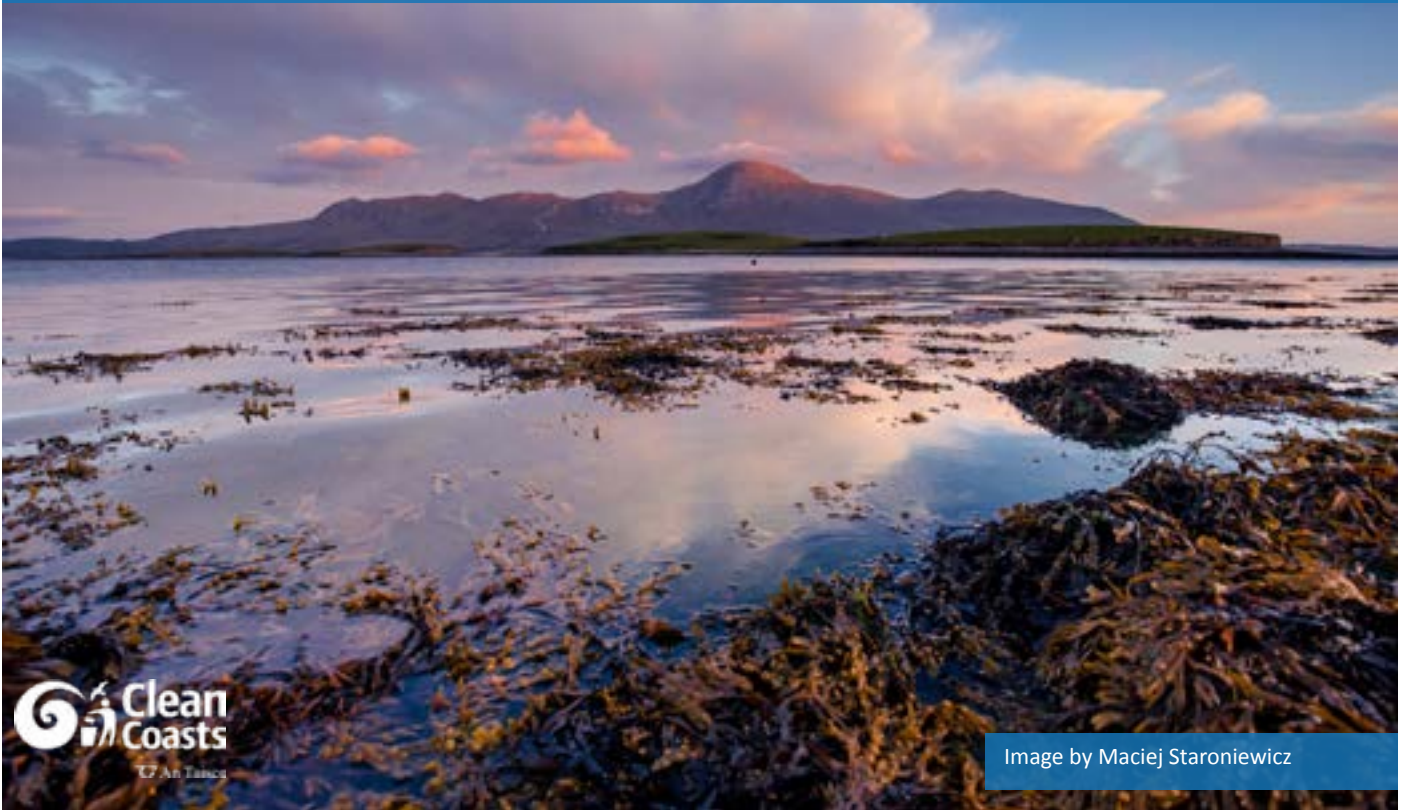


MARINE ZONES AND HABITATS IN IRELAND



 An Taisce

Marine Zones & Habitats



Our coastline and oceans are made up of many types of zones and habitats. The zone we are most likely to encounter is the coastal zone, the area of transition between land and sea. Moving seaward past the coastal zone brings us to the intertidal zone, this is the area of seashore between the high and low tide. From there past the low tide line out to the continental shelf you will find the subtidal zone, and then you will encounter oceanic zones to the deepest parts of the ocean.

Within these zones exists a myriad of habitats and fascinating species. These habitats are some of the most complex and dynamic on earth and range from being fully emerged to fully submerged depending on their proximity to the shoreline. The dynamic nature of the ocean means in order to survive, species must adapt to changing levels in light, temperature, salinity, oxygen and pressure.

Let's explore these zones and habitats a little further, from above the high tide line right out to the edge of the continental shelf. The following habitat classifications are based on 'A Guide to Habitats in Ireland' (Fossitt, 2000).



Coastal Zones



Intertidal Zones



Subtidal Zones

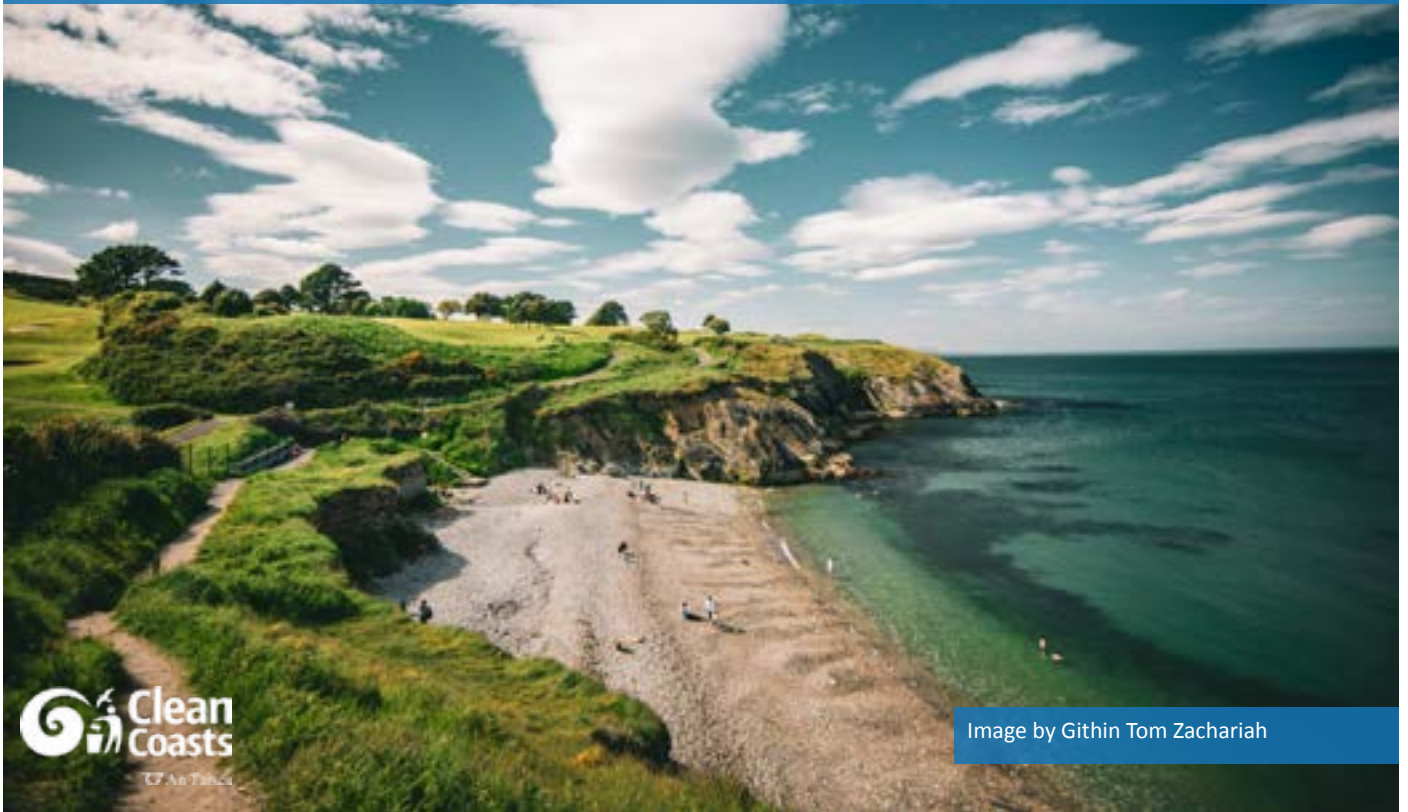


Marine Water Body

COASTAL ZONE



Coastal Zone



Coastal Zones are transition zones between land and sea. The habitats in this zone are usually found above the high tide line, however, sometimes they occur within the intertidal zone if terrestrial vegetation is present. These habitats rely heavily on marine influences such as the salty sea air.

This zone is where most people interact with the ocean, it generates livelihoods and has a strong recreational value. Visiting and living beside the coast can also have positive effects on general health, mental health and wellbeing.

However, the desire to visit, work and live in coastal areas puts incredible pressure on this environment. If care is not taken to deal appropriately with these pressures, areas can become littered, polluted, eroded and result in a casualty of over-development. We can all make a difference by learning about and looking after the coastal areas we love.

Habitats found in this zone include:



Dunes



Machair



Sea cliffs



Salt Marsh



Lagoons

Coastal Zone Habitat

Sand Dunes



Image by Edel Cunningham

Ireland's sand dune systems have been developing for around 5,000 years. The sand originates from glacial deposits that over time have been shaped by the tide and wind to create dunes. During this cyclical process, sand is transferred between dunes, adjoining beaches and offshore sandbanks. This process results in dynamic landforms that are continually changing through erosion and accretion.

Coastal Dunes also include important habitats for many rare plants, insects and ground nesting birds. These habitats and species are protected by EU law under the Habitats and Birds Directives. Some of these habitats are noted as priority habitats, meaning they are at risk of disappearing.

Dune Erosion

From a human perspective, dunes offer natural protection against high seas and storm surges. In recent times erosion has accelerated due to factors relating to climate change, i.e., increased storm force and rising sea levels. These events can cause sand to blow inland and result flooding if the dune area is breached. Therefore, it is important to be aware of their fragility and ever-changing state if developing beside them.

Our interaction with coastal dunes is also exacerbating erosion. One major issue is the removal of sand from beaches. Coastal sand is, for the most part, a finite resource. Its depletion impedes on the further development of dunes and nourishment of our beaches.

Other activities putting dune systems at risk are over-grazing, trampling, hard engineering and fires.

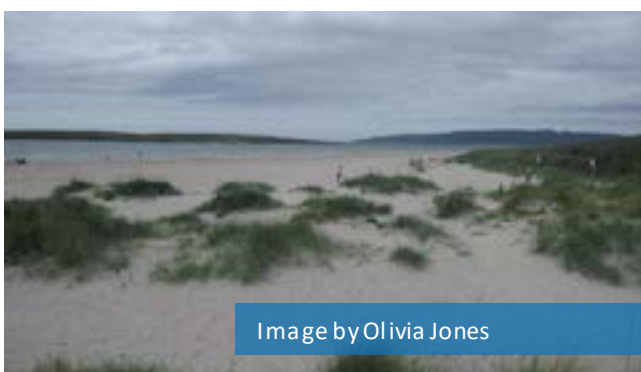


Image by Olivia Jones

Embryonic dunes in Co. Donegal



Image by Olivia Jones

Trampled dunes caused by beach visitors

Coastal Zone Habitat

Sand Dunes



Image by Edel Cunningham

Coastal Dunes contain important habitats for rare plants, insects and ground nesting birds that are protected by EU law under the Habitats and Birds Directives.

A well-established dunes system should consist of the following habitats:

Embryonic Dunes are the early stages of dune development. They are formed when sand and germinating plant seeds accumulate on drift debris along and above the high tide line.

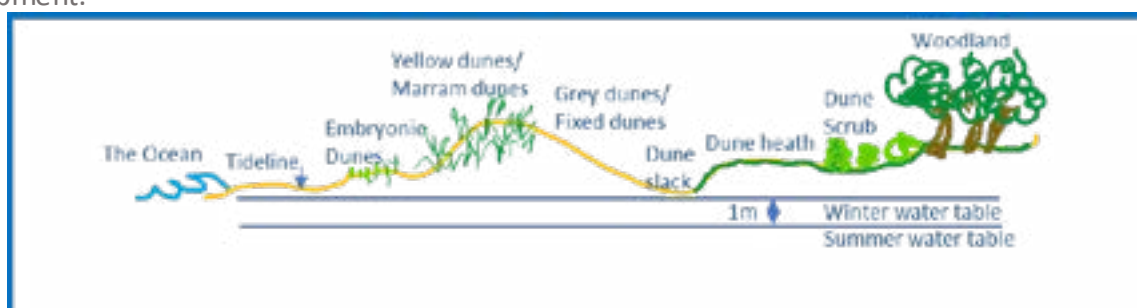
Marram Dunes/Yellow Dunes are located behind embryonic dunes and are rarely ever submerged. The name 'marram dune' comes from the presence of marram grass. This grass plays an important role in the development of dunes systems. It anchors sand through its deep-rooted network, whilst also trapping sand above, adding height to the dunes. Marram grass also acts as a shelter to areas behind it, allowing other plants to colonise and take hold, forming fixed dunes.

Fixed Dunes/Grey Dunes are more stable than marram dunes. The presence of mosses and lichens give good ground coverage helping to stabilise them, which in turn allows other plants and wildlife to take hold.

Dune Grasslands occur when dunes are grazed.

Dune Slack can be found in the hollows and blowouts of dune systems. These areas are waterfilled due to their proximity to groundwater level. However, they may dry up during the summer. They are very diverse and nutrient-rich habitats.

Dune Scrub and Woodland occur when larger scrub and woodland species replace herbaceous plants. This type of habitat is not very common in Ireland due to agricultural practices and amenity development.



The profile of a fully formed dune system

Coastal Zone Habitat Machair



Image by Cian Walsh

Machair is a diverse and unique habitat found only along the west coast of Ireland and Scotland. In Ireland, machair habitats can be found dotted along the coastline from Galway Bay up to Malin Head, Co. Donegal, thriving in the cool, moist, and windy climates of these regions.

Machair is formed from calcareous, shell-rich sands blowing over low-lying coastal land. This combined with the lands proximity to the water table results in species-rich grassy plains, with pockets of water. These varying dry and wet conditions give rise to an abundance of plant life such as white and red clover, wild thyme, cowslip and several types of rush. It is also home to lapwings, choughs, the small heath butterfly and the endangered corncrake

Machair is listed as a priority habitat in Ireland, meaning it is at risk of disappearing. Human activity, such as development and over-grazing, has accelerated its erosion resulting in its overall decline.



Image by Olivia Jones

Cowslip on machair, Mullaghmore, Co. Sligo

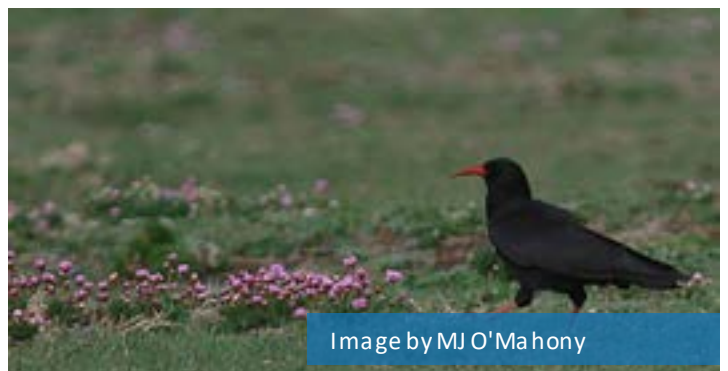


Image by MJ O'Mahony

Chough on Machair

Coastal Zone Habitat

Sea Cliffs



Image by Darragh Gorman

Sea cliffs usually occur along shorelines where erosion is the dominant influence over deposition. Coastal features such as headland are worn away by strong waves to produce steep slopes. These cliffs can be categorised in 2 ways:

Rocky Sea Cliffs

Rocky sea cliffs typically rise over 5 meters high directly from the sea or along a narrow shoreline. To be classified as a rocky cliff, there must be at least 50% of rock, however there may also be gravel and loose soil found. A rocky cliff face may include features such as crevices, overhangs, and ledges. These stable features support an abundance of wildlife, such as lichens which colonise most of the rocks. A huge variety of coastal vegetation and seabirds also take advantage of the inaccessibility as a safe place to breed.

Sedimentary Sea Cliffs

Sedimentary sea cliffs are over 3m high and made up of loosely compacted materials, such as mud, sand, chalk and gravel. These materials may occur alone or as a mixture along with larger stones and boulders. Sedimentary cliff faces appear almost vertical and are home to a variety of coastal plant life. However, due to their unstable nature, they are easily eroded, and this may result in areas that are totally void of vegetation.

In Ireland, sea cliffs are home to bird species such as, Fulmars, Northern Gannets, Peregrines and Falcons and plants like Thrift, and Sea Astor.



Image by MJ O' Mahony

Fulmar on Sea Cliffs



Image by Mark Molly

Gannet on Sea cliffs, Saltee Islands, Co Wexford

Coastal Zone Habitat

Salt Marsh



Image by Olivia Jones

Salt marshes are vegetative wetland habitats found in sheltered coastal bays and estuaries. They generally develop between the mid-neap, high spring tides levels, over waterlogged mud, sand, or peat.

The variation in tidal coverage results in two distinctive zones known as a **lower salt marsh**, covered twice a day by the tide, and an **upper salt marsh** which may only be covered a few times a month by a high tide.

This tidal variation also impacts salinity levels and exposure to the air, creating a variety of vegetative habitats.

In Ireland, salt marshes are threatened by the grazing of livestock, trampling, car parking and invasive species such as cordgrass and coastal development.



Image by Olivia Jones



Image by Olivia Jones

Salt marshes are home to many species of plants including Ragged robin and Scurvy grass

Coastal Zone Habitat Lagoons



Image by Olivia Jones

Lagoons can be defined in many ways depending on what part of the world you live in. The EU's Habitats Directive define them as **“areas of typically (but not exclusively) shallow, coastal saline water, wholly or partially separated from the sea by sandbanks, shingle or less frequently, rocks or other hard substrata. They retain a proportion of their water at low tide and may develop as brackish, fully saline or hypersaline water bodies.”**

Brackish water is a mix of seawater and fresh water. For a body of water to be classified as a lagoon it must have a salinity concentration of more than 1%. This salinity content can vary greatly daily and seasonally due to the weather and tides. Lagoons do not have a current, however, they are subject to tidal influxes and surface water friction created by the wind.

There are roughly 90 identified coastal lagoons scattered along the coastline of Ireland. Due to the increasing pressures lagoons face in Ireland and Europe they have been listed in Annex 1 of the Habitats Directive as a priority habitat and have been flagged as 'in special need of protection'.

The type of species found in lagoons depends on the saline content. The higher the salt content the more marine species will be present, such as seaweeds.

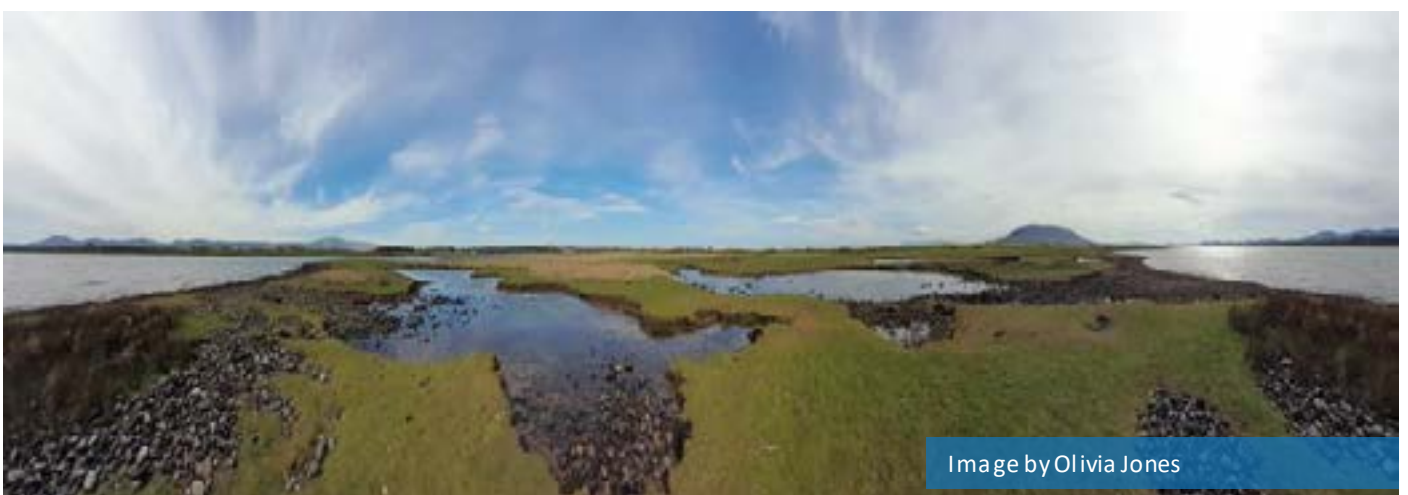


Image by Olivia Jones

Portavaud Saltmarsh Lagoon, Co. Sligo

INTERTIDAL ZONE - THE SEASHORE



Intertidal Zone - The Seashore

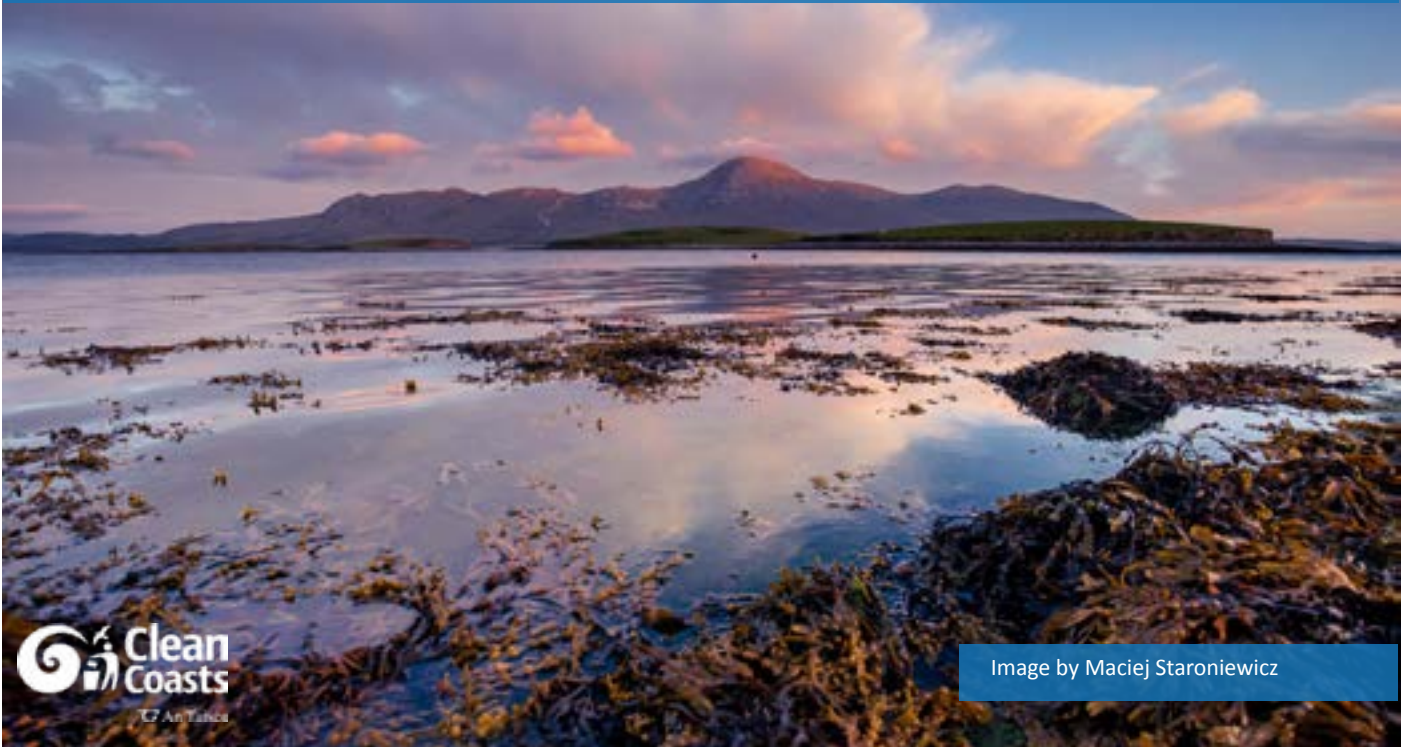


Image by Maciej Staroniewicz

The Intertidal (Littoral) Zone is the area of coastline located between the high and low tide. It is divided into 3 sections known as:

The Upper Shore

This area of the intertidal zone is found high up on the shoreline and is only submerged during high tide. Consequently, it can dry out on hot days and the species living here must be tough to withstand the ever-changing conditions. Common species found here include channeled wrack, barnacles and limpets.

The Middle Shore

This region of the intertidal zone is covered by the tide twice a day for equal amounts of time. You will find more species here than the upper zone, including anemones, mussels and hermit crabs.

The Lower Shore

This area is only exposed during low tide, resulting in a more hospitable environment and a greater variety of species. Here you will find, fish such as blennies, kelp forests, urchins and star fish.

In this zone, the tide comes in and goes out twice a day. The habitats found in this zone are classified by the material the seashore is made up of, i.e rock or sediment. Wildlife here must show resilience and adapt to extreme changes in temperature, light, salinity levels, weather conditions and the possibility of drying out.

Habitats found in this zone include:



Rocky shore



Sand shore



Shingle & Gravel Shore



Mud shore

Intertidal Zone Habitat

Rocky Shores



Image by Anna-Marie Fagan

The Rocky Shore gets its name from its rocky shoreland. The stability and shelter of this hard substrate creates a safer environment for seashore communities to form. As a result, the rocky shore is one of the most biodiverse habitats in the marine environment.

Although the rocky substrate offers shelter, the environment is also very dynamic. Due to its location in the intertidal zone, the habitat is constantly changing from being submerged to being exposed. Exposure can cause species to dry out in the sun, strong wave action can dislodge inhabitants from the rocks and there are many intertidal predators on the lookout for their next meal.

In order to deal with these situations, many species have adapted to survive, including seaweeds with anchoring holdfasts, cement fastened barnacles and the limpet with its large sucker foot that keeps it held tightly to rocks, preventing drying out and dislodgment.

Rocky Shore Zone		Species
Splash Zone		Lyme grass, Thrift, Lichens
Intertidal zone	Upper Shore	Channeled wrack, Acorn barnacles, Gut weed, Egg wrack(knotted Wrack)
	Middle Shore	Limpets, Barnacles, Bladder wrack
	Lower Shore	Beadlet anemone, Dog whelk, Purple laver(Nori)
Subtidal Zone		Blenny, Sea Hare, Dulse (Dilisk), Sugar Kelp

Rocky shore zones and common species

Intertidal Zone Habitat Sand Shores



Image by Olivia Jones

Sand shorelines are usually found in shallow bays and along the open coastline where the pull of the tide and currents prevent silt from depositing. Sand particles can range from fine to coarse and may also be exposed rock, small amounts of mud, gravel, loose pebble and shells present.

This type of habitat is fully covered at high tide and exposed at low tide. If the coastline is very exposed lower levels of wildlife are found with sandhoppers being the most common species present. In areas where Eelgrass grows the rate of biodiversity increases, creating habitats that act as a shelter and nurseries for invertebrates and fish, a rich food source for birdlife.



Image by Olivia Jones

Downings beach, Co. Donegal



Image by Olivia Jones

Lugworms are a common site on our sand shores

Intertidal Zone Habitat Shingle and Gravel Shores



Image by Olivia Jones

This intertidal habitat is found on shores that are fully to moderately exposed. The shoreline is made up of coarse and loose gravel, pebbles and boulders. These shorelines are usually a result of a combination of longshore drift deposition and onshore wave action. The material type and size can vary seasonally with finer sediments often accumulating during calmer weather in the summer months.

In addition to significant amounts of materials, there is also substantial drying out in between tides. This creates a dynamic and hostile environment where only a few species are found, typically in the form of small crustaceans and oligochaete worms. Towards the upper strand where the environment is more stable, you may find plant species such as sea beet, seakale and sea mayweed.



Image by Olivia Jones

Gravel beach, Greenore, Co. Louth

Intertidal Zone Habitat Mud Shores/ Mudflats



Image by Olivia Jones

Mud shores are usually found in sheltered coastal areas that adjoin rivers and estuaries. These shorelines are made up of very fine silt and clay sediment deposited by rivers. Although they are tidal, they have reduced salinity levels due to the freshwater influx from rivers.

The habitat can appear mosaic-like at low tide with elevated mudflats crisscrossed by drainage channels. Plant life on mud shores is low, however, it does support many invertebrate species such as mud shrimp, cockles, mud snails and polychaeta worms. These species in turn attract wading birds such as curlews, and oystercatchers. Many birds use these areas as a stop off to refuel on their way to their destination.



Image by Olivia Jones

Mud Flats in Ballisodare Bay

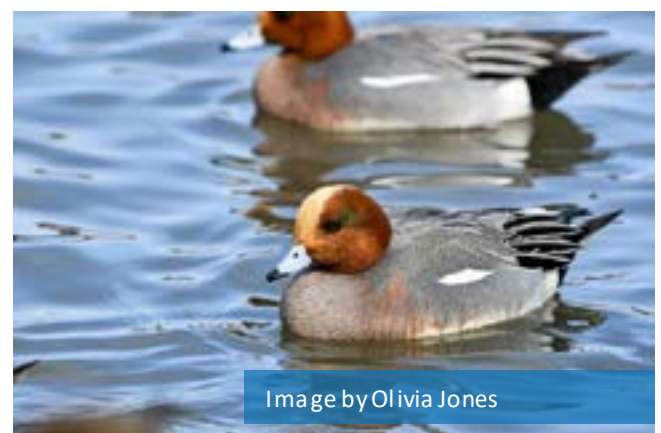


Image by Olivia Jones

Widgeons are just some of the birdlife found on mudflats

SUBTIDAL ZONE



Subtidal Zone



The Subtidal Zone is the area of seabed that extends seaward from the low tide mark out to the edge of the continental shelf. It is also part of the benthic zone, which is another name for the entire ocean seabed. The subtidal zone is always submerged underwater except for an area known as the subtidal fringe that is only exposed during the lowest spring tides.

Subtidal habitats are primarily categorised by the seabed's material:

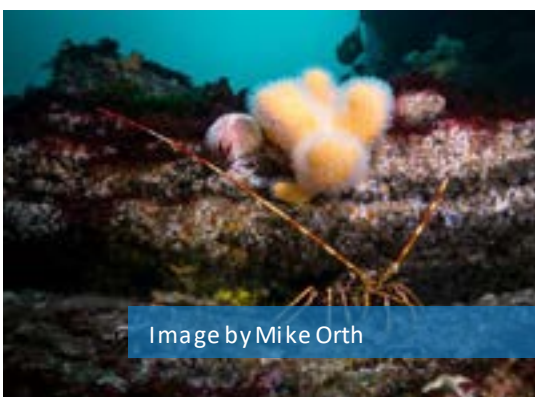
Subtidal Rock habitats are made up of bedrock, accumulations of loose rock (boulders, cobbles and pebbles) and peat substrate.

Subtidal Sediment habitats are made of finer particles such as sand, shingle and mud.

These habitats are further categorised by the presence of algae, light levels and exposure to wave action and tidal movement.

Infralittoral Zone is the shallower light-filled waters where plant-life is common.

Circalittoral Zone commences as the seabed descends and light levels diminish. Plant life begins to decrease and animal communities take over.

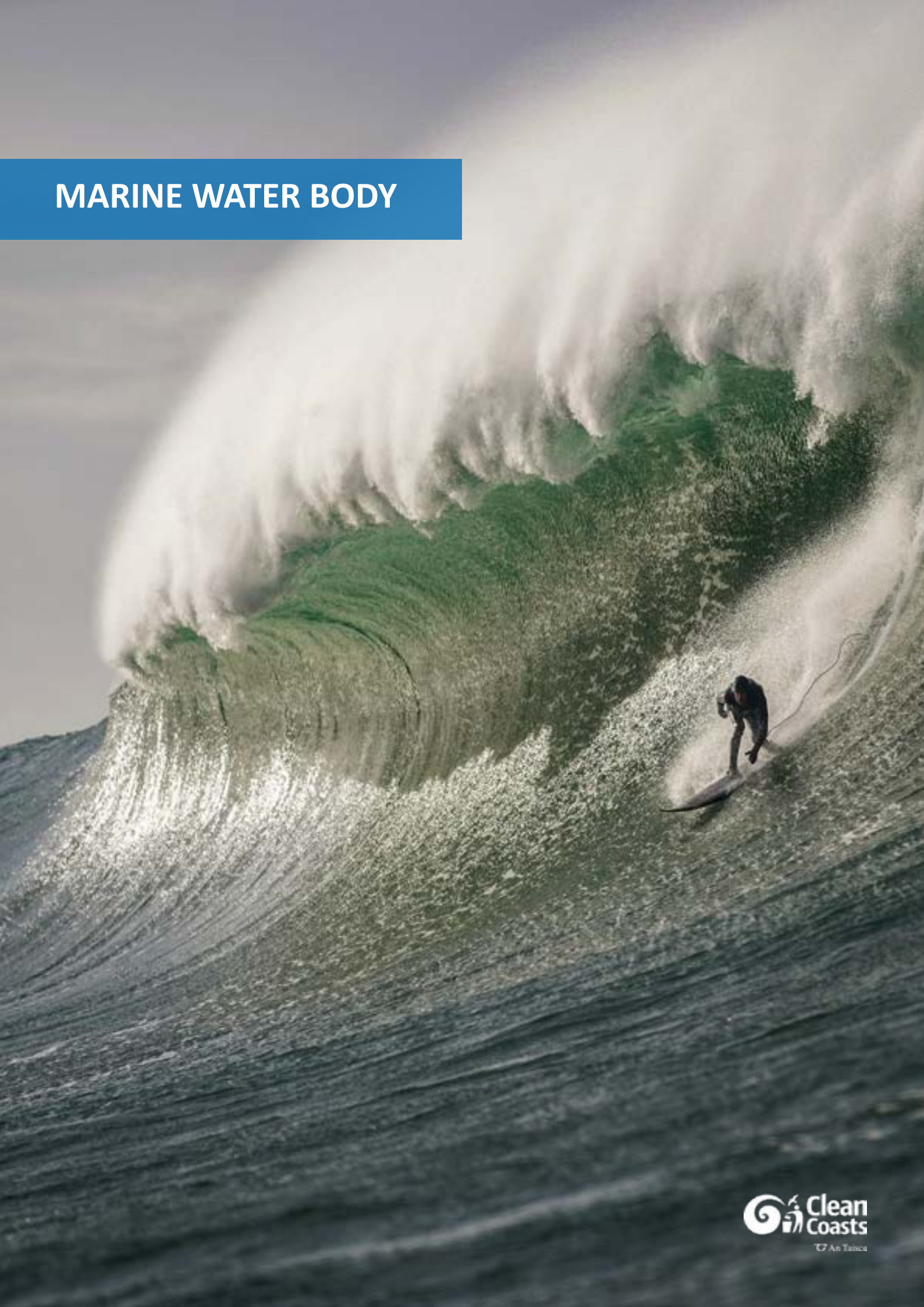


Top of the Pinnacle, Quilty, Co. Clare



Spider crabs off The Saltee Islands, Co. Wexford

MARINE WATER BODY



Marine Water Body



A marine water body is the body of water located above the seabed. This zone begins past the low tide mark and stretches right out to the deepest parts of the ocean, where it is also referred to as the Pelagic zone.

These vast blue spaces contain 97% of the world's water and cover around 70% of the earth's surface. This water is a key component of the water cycle and when it warms up on the ocean's surface it rises and can fall on land as rain or snow where it further supports life there. Our ocean's warm and cold currents also act as temperature control expressways and are important for the survival of many habitats and regions on earth.

The oceans also play vital role in climate regulation. They are one of the earth's largest carbon sinks and are responsible for producing at least half of all the oxygen we breath. This process would not be possible without phytoplankton, marine algae, plants and bacteria that take in carbon and release oxygen through a process known as photosynthesis.

Habitats found in this zone include:



Estuaries



Sea Inlets & Bays



Open Marine Waters

Marine Water Body Habitat Estuaries



Image by Marc Jennings

An estuary is often described simply as ‘a partially enclosed body of water, where a river joins the sea’. However, estuaries are really defined by their saltwater content. Only an inlet with a reduced salinity of < 30S can be classified as an estuary.

This happens when fresh river water and salty sea water are mixed by the ebb and flow of the tide, wave action and the wind. This mix of salt and fresh water produces many complex sub-habitats including salt marshes, swamps, and mud flats. The largest estuary in Ireland is located on the Shannon River.

Species found in estuaries include lugworms, horned wrack, curlews, grey seals, brent geese, mud shrimp, herons and the European otter.



Image by MJ O' Mahony

Brent geese are common winter visitors to Irish estuaries



Image by Anni Wilton Jones

Curlews can be found in estuaries during winter



Image by James Wellwood

Heron are common resident in most Irish estuaries

Marine Water Body Habitat

Bays and Inlets

Image by Olivia Jones

Looking at a map of Ireland, you will see the coastline has quite an irregular shape, this is due to the many inlets and bays found right around the coast. They range from tiny hidden coves to large bays like Dingle and Dublin Bay. They can be found on exposed and sheltered coastlines stretching up to 2km inland and are surrounded by at least 50% land. The water found in bays is typically salty seawater, with little or no freshwater present. If freshwater is present from a source such as a river it can result in the formation of an estuary in the upper region of a bay.

The seabed of bays and inlets also varies in composition depending on how exposed they are. In sheltered bays you will find mudflats and sandflats and on more exposed coasts, courser material is common. Bays with softer material usually support a great variety of life, with single and gravel bays hosting less life. Many important species such as eel grass grow in bays along the Irish coastline. This is an important keystone species, as it acts as a shelter and nursery for spawning fish and other wildlife.



Image by Jaqui Mair

Fanad head



Image by Derek Lowry

Dublin Bay

Marine Water Body Habitat

Open Marine Water



Image by Ivan Donoghue

Open marine water habitats include coastal waters that are enclosed by less than 50% land and the open sea. The habitat describes the body of water itself and not the seabed below, which is classified as the benthic zone.

The characteristics of open marine water habitats vary. Shallower waters and waters near the ocean's surface have higher levels of light and are warmer compared to deeper regions of the ocean where light diminishes, and pressure levels increase. These variabilities can influence the type of species you will find from one regions of ocean to the next. Open marine water habitats are also the basis for marine food webs with species ranging from microscopic organisms such as phytoplankton right up to the largest mammal on earth, the elusive blue whale.

Other common animals found in the ocean are fish, squid, octopus, sharks, and marine mammals, all these animals swim and spend much of their time in the open water.

Unfortunately, due to the amount of litter and waste entering our ocean, these habitats and species are under threat. You can do your bit by organising a beach clean and saying no to unnecessary packaging and single use plastic.

To find out more please visit cleancoasts.org



Image by Mark N Thomas

Horse mackerel off Tory Island



Image by Ivan Donoghue

Cuckoo Wrasse