

# BE THE WAVE AR FRIG Y DON

# Climate Change

Background Information



cadwch keep  
gymru'n wales  
daclus tidy

**MARINE  
CONSERVATION  
SOCIETY**



UNDEB EWROPEAIDD  
EUROPEAN UNION



Llywodraeth Cymru  
Welsh Government

**Cronfeydd Strwythurol a  
Buddosoddi Ewropeaidd**  
European Structural  
and Investment Funds



Ariennir gan  
Llywodraeth Cymru  
Funded by  
Welsh Government



## Climate Change

### Why is the ocean so important?

- The ocean is incredibly diverse and home to a huge range of habitats and species
- It plays a major role in the water cycle
- Marine plants and algae produce over 50% of the oxygen we breathe
- Marine habitats help to store carbon, which is incredibly important in the fight against climate change
- The ocean regulates our climate and weather systems
- Coastal habitats help to protect coastal communities and towns from storms and flooding by reducing wave energy
- Seafood provides a source of food and protein for millions of people
- Millions of people have jobs in marine industries
- The ocean is important for our health and wellbeing, with millions of people using the ocean and coastline recreationally and creatively

### How does climate change effect the ocean?

**Sea temperature** - Global warming is causing a rise in both atmospheric and sea temperatures. In fact, the ocean has absorbed more than 90% of the excess heat in the climate system.

**Sea level rise** - Ice melting on land in our polar regions is causing sea levels to rise. It is estimated that by 2050 sea levels will rise globally by one metre. Flooding caused by sea level rise will affect many coastal communities and habitats, with some low-lying islands in countries like the Maldives becoming submerged. Sea level rise also leads to increased coastal erosion, threatening UK towns like Happisburgh, which is losing 2 metres of land per year.

**Ocean acidification** - Increasing concentrations of carbon dioxide are causing a decrease in ocean pH, known as ocean acidification. This causes problems for animals that grow a calcium carbonate shell, like corals. Coral reefs create vitally important habitats for many other animals. Shellfish and some plankton species, which are important food sources, also have calcium carbonate shells and will be affected by ocean acidification.

**Distribution of animals and plants** - Plant and animal species are travelling further north, and to greater depths, to search for cooler waters. These new areas may not provide animals with the food they need or effective reproduction sites. New species moving to an area could also have a negative impact on native plants and animals through competition for resources and space.

**Ocean currents** - The ocean plays a huge role in regulating our climate and our water cycle. However, rising temperatures are impacting ocean currents and the circulation of water around our planet, which in turn is having an impact on our climate.

**Extreme Weather** - Climate change is causing an increase in the frequency and size of storms and extreme weather events. These events have devastating effects on fragile marine coastal environments, like coral reefs and seagrass beds.



How does the ocean help to reduce climate change?

**Blue Carbon** – The term blue carbon refers to carbon that is removed from the atmosphere by ocean plants and is then stored in ocean ecosystems and sediments. Essentially carbon sequestration in the ocean.

**Habitats** - In the UK, habitats like seagrass beds and salt marshes, as well as mangrove forests in tropical waters, are brilliant at absorbing carbon dioxide from the atmosphere through photosynthesis. These habitats take up and store more carbon per metre than forests on land. Activities that are damaging to these habitats, such as dredging, not only harm the plants and animals living there but release sequestered carbon along with methane and nitrous oxide.

**Plankton** - Plankton is the term for tiny algae (phytoplankton) and animals (zooplankton). Phytoplankton produce huge amounts of oxygen and absorb huge amounts of carbon dioxide through photosynthesis. Carbon is transferred up the food chain from small plankton species to larger fish species. When plankton that isn't eaten dies, their bodies sink down to the seafloor (known as marine snow) and carbon in the plankton is buried and stored in the seabed.

**Fish** - As fish move from deep waters to shallow waters to feed, they bring nutrient-rich waters from below. These nutrients enhance the production of plankton and therefore enhance the uptake of carbon dioxide. Carbon also builds up through the food chain and is stored in the bodies of marine species. When they die, their bodies can sink to the seafloor and some of this carbon is eventually stored and buried in deep ocean sediments.

#### Protecting our ocean for the future

Globally we need to reduce carbon emissions from activities both on land and at sea.

- We need to increase the amount of **renewable energy** sources such as tidal, wind and wave, and decrease the extraction of fossil fuels.
- Marine industries like shipping, ferries and fishing need to improve their **environmental efficiency** to reduce carbon emissions.
- Damaging activities like dredging, coastal development or destructive fishing methods, can release carbon from sediments and destroy important blue carbon habitats. These activities need to be **managed in a climate-smart way**.
- Protein in our diet from meat raised on land produces huge amounts of carbon emissions. **Sustainable fishing** practices produce much less carbon, and a shift towards a sustainable fish diet could offer positive solutions to providing protein with less carbon emissions. Protein doesn't just come from fish, but other seafood species like mussels, crabs and even seaweed, which have especially low carbon emissions.
- **Marine protected areas** (MPAs) are essentially like nature reserves on land but in the ocean. They are a great way to help protect and recover blue carbon habitats. Currently MPA's don't protect against all activities so, to give blue carbon habitats a chance to recover and thrive, we need to introduce Highly Protected Marine Areas where no activity at all is allowed.
- **Outreach and education services** are essential, helping to raise awareness amongst schools, universities, the public and businesses. They also offer guidance and support in ways to take action and protect the climate.



cadwch keep  
gymru'n wales  
daclus tidy