



Marine Threats

Young Marine Champion Training Module





Our oceans and the threats they face ...

70% of the planet is covered by water. Every second breath we take is provided by our oceans. Without healthy thriving oceans and seas we would struggle to survive.

When dealing with a problem, its important to first understand the problem. Once we understand the nature of the problem, we can work towards creating solutions!

So, what's the problem?

Lack of awareness and understanding

Overfishing / destructive fishing / unsustainable fishing

Pollution – oil, plastic, chemical, noise

Land run-off

Climate change

Ocean acidification

Rising sea levels and temperatures

Lack of awareness and understanding ...

Knowledge is power. Without it, we are often powerless. Understanding the threats our oceans face help us develop creative solutions to overcome the problems.

The more people that learn about the marine world, the more brain power and understanding we have to tackle the issues. This is why a lack of awareness and little or no knowledge of the marine environment can be a threat.

The more people who understand the threats, the more actions and solutions can be created to save it! This is where you come in!


Lack of awareness and understanding...

People rely mostly on television and the Internet to find information about marine impacts, but these sources don't always tell the whole story and sometimes things you see on the Internet aren't reliable.

Watching nature documentaries and looking at reliable websites is a good place to start [here are some child-friendly websites about ocean conservation](#).

Marine champions can use their knowledge and skills to educate people on marine life and how to protect it.

POSTIVE ACTION/ SOLUTION: You could do a presentation to your class or talk to your friends and teachers about what you've learnt.



“If you want to achieve conservation, the first thing you have to do is persuade people that the natural world is precious, beautiful, worth saving and complex. If people don’t understand that and don’t believe that in their hearts, conservation doesn't stand a chance. That’s the first step, and that is what I do.” - Sir David Attenborough

Overfishing...



Overfishing means that some sea animals are being fished too quickly, meaning the number of animals left in the ocean is getting smaller and smaller.



This can affect the whole food web, because if we keep fishing one species, the other species that eat that animal go hungry.



Unsustainable fishing ...

Some fisheries use methods which damage the seafloor such as dredging or trawling. The seafloor takes a long time to recover from these harmful methods.

These fishing methods can also kill animals that live in or on the seafloor, and their homes.

Some fishing methods catch a lot of animals which aren't wanted, these are known as 'bycatch'. These animals are then thrown back into the sea but are often dead or injured.

How you can help? – always buy fish from sustainable fisheries (blue tick) or which are hand-caught (pole and line, rowing boat, diver caught, etc.), [read MCS Good Fish Guide for more info](#)



Pollution in the marine environment...

What is pollution? Pollution is when harmful or dangerous substances such as gases, smoke or chemicals are released into the environment.

Noise pollution = Disruptive sounds made by human activity that can affect marine mammals ability to hear the natural sounds of its environment

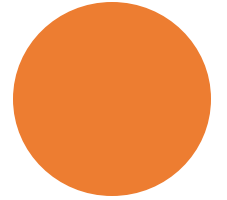
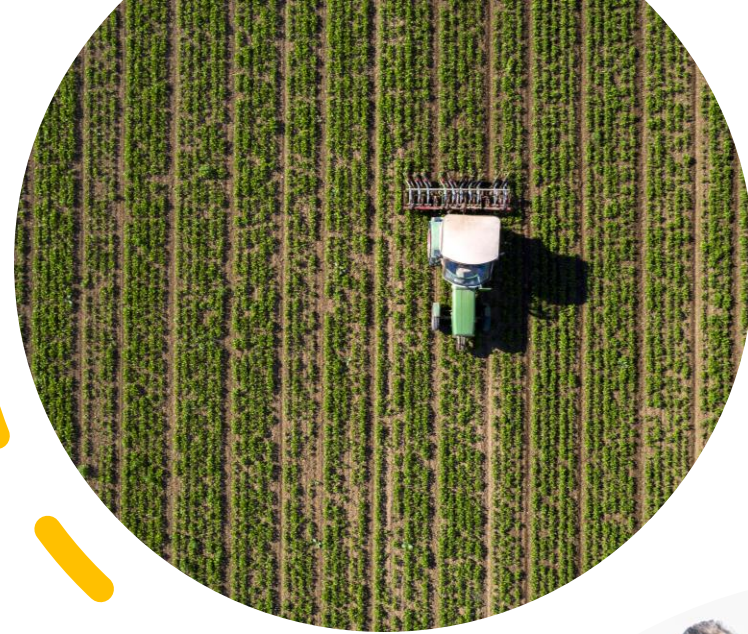
Chemical pollution = chemicals from things we throw away leak into the ground.

Water pollution = chemicals from refuse can be carried by rain and rivers to the ocean, or the rubbish itself can end up in the ocean.

Light pollution = excessive light at night that creates a 'artificial skyglow' and disrupts marine animals that rely on the moon to regulate certain biological behaviours.

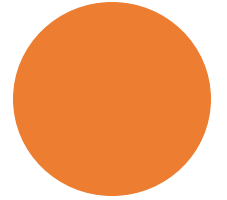
Chemical pollution

- Chemical pollution is when pollutants such as pesticides, herbicides, fertilizers, detergents, oil, industrial chemicals, and sewage, are introduced into a environment like our oceans. Most ocean pollutants get introduced into our seas by our rivers and coastlines. What happens on land, happens to our oceans.
- Fertilizers are natural or man-made chemicals that farmers add to the soil to encourage plant growth.
- Certain fertilizers, e.g., those containing chemicals such as nitrogen and phosphorus, dissolve in rain, drain through the soil and end up in streams, rivers and eventually the ocean.



Fertilizer pollution ...

- Extra chemical nutrients from fertilizers cause problems in the ocean. They cause algae to grow excessively and form dense patches. These are called algal or algae blooms.
- Algal blooms can be toxic and cause harmful effects for wildlife and humans. They also block sunlight from plants underwater.
- They also deplete oxygen from the water. When algae blooms consume all the nutrients in the water, they start to die off. When this happens, bacteria break the algae down, but in doing so use up all the oxygen in that area of water. This causes the mass death of many marine species that need the oxygen to survive.
- For a more detail explanation visit this link from [earthhow](#).





Eutrophication =

Excessive nutrients
in a lake or other
body of water,
frequently due to
run-off from the
land, which causes
a dense growth of
plant life.

Chemical pollution



What can you do?



Think about what cleaning products you are putting down the drain. Try to go for more eco friendly version if possible.



Try to buy local organic fruit and vegetables, as organic growing uses less pesticides and chemicals during production. Try growing your own food.



Plastic pollution...

- Plastics can be large (macro and mega plastics) or small (micro or nano plastics).
- Large plastics can entangle and injure fish, dolphins, turtles and other animals, or animals can mistake things like plastic bags for food.
- Micro plastics can be eaten by smaller animals like plankton, which are then eaten by larger animals.
- As bigger animals eat small fish, shrimp or plankton, plastics build up in their body. This is called [bioaccumulation](#). It can make the animals unwell and could even make humans who catch and eat this seafood unwell too.



Solutions – prevention and clean-up ...

- **Prevention – avoid single-use plastics such as plastic bottles, plastic shopping bags, or plastic cutlery. You could ask for a re-usable bottle for your birthday and take long-life canvas bags when you go shopping. Also make sure you always dispose of your masks appropriately .**
- **Clean-up – this is harder because most ocean plastic sinks so we cannot retrieve it. Taking part in beach cleans can help get rid of plastic that has washed up on the beach, helping keep animals and people on the shore safe, and preventing it getting washed back into the ocean.**
- **Support businesses or companies that try to reduce their plastic wastage**
- **Every time you wash your synthetic clothes, the plastic in the fibers breaks down into smaller pieces that go into the wastewater and then into our oceans. Try to buy secondhand clothes; wash your clothes only when needed; buy clothing with natural fibers or setup up a**
- **See our Positive Actions Module for more solutions!**

Noise pollution

- Excessive or unwanted noise can deeply impact the marine environment and specific marine animals. Sound waves can travel far in the water and prevent animals such as dolphins, whales and fish from using their hearing successfully. This means they may not be able to locate their prey/predators. They can become disorientated and lose their way, or struggling to connect with mates, group members, or their young.
- What are the contributors to anthropogenic (human) ambient noise?

Commercial shipping, defense-related activities, hydrocarbon exploration and development, research activities, and recreational activities.



Noise pollution

- What is being done?

Scientific studies are being carried out to gather more data and understand the impacts the noise has on different species. However, more research and awareness is needed to drive productive changes such as moving shipping lanes, slower boat speed limits, re-designing propellers.

The good news is that noise pollution is much easier to tackle, compared to other marine threats such as climate change. Extremely rapid changes can be made are doing so. More and more boats are being fitted with electric motors meaning the noise they produce will be diminished significantly.

- What can you do?

Why not get involved in citizen science? We have a [Marine mammals recording form](#). By reporting marine mammals that you spot in the Solent you can help create important data about what animals visit our Solent and what might be affecting them.



Light pollution

The presence of artificial light at night creates a 'artificial skyglow' obscure the stars and moon's natural light. This light is directly caused by human activity can disrupt marine animals that rely on the moon to regulate certain biological behaviors.

- What can we do?

Use artificial light for only what you need. If you can control the direction of the light, ensure its focused for what you need it to be.





Climate Change

Climate change refers to the changes in temperature, rainfall, etc. over a long period of time. These changes can impact on the plants and animals that can grow or live in certain areas.

Climate change is caused by the production of greenhouse gases. These are gases which are produced through burning fossil fuels (for example driving vehicles or heating our homes and industries, etc.)

Effects of greenhouse gases on our climate ...

When radiation from the sun reaches our planet some of it is absorbed, but the rest is reflected into space.

Greenhouse gases absorb some of this reflected radiation and reflect it back towards the Earth. This is very important, without greenhouse gases, the Earth's average temperature would be -18 degrees C!

However, because we are producing too much of these greenhouse gases, too much radiation is being reflected towards Earth. This means Earth is becoming hotter than it should be.

Carbon dioxide (CO₂) is the most produced greenhouse gas, but other greenhouse gases (e.g., methane and nitrous oxide) absorb more radiation heating the Earth more than CO₂

Trees take up CO₂ and use it to produce oxygen. Activities such as deforestation reduce the number of trees and so the levels of CO₂ rise even quicker.



Impacts of climate change

- **Drought (because it is too hot and dry), means that people don't have enough water to keep hydrated and keep their plants and animals healthy.**
- **More storms and cyclones (because the sea heats up more, thus more water is evaporating from it, forming more storm clouds), this can cause more floods.**
- **Difficulty keeping food crops alive, reducing the amount of food and increasing starvation.**



Impacts of climate change

- **Animals relocating in search of food and suitable habitat**
- **Ocean acidification because the sea absorbs a lot of carbon dioxide, which makes it more acidic. This can make animal's shells weaker and smaller, so they are more vulnerable.**
- **In the UK, we are experiencing warmer summers and milder winters. If climate change continues, we will have wetter winters and drier summers. This could cause more flooding in winter and more droughts in summer.**



Coastal Erosion

- Coastal erosion is the removal of beaches, dunes, cliffs, and other coastal habitats by waves.
- Softer rocks are eroded much more quickly than harder rocks, leading to the formation of rock structures such as tunnels, arches, columns, and pillars.



Types of Erosion

- **Hydraulic action** – when waves hit a cliff face, the water forces air into tiny cracks in the rock. This puts pressure on the rock and, over time, causes the cracks to expand. This can eventually lead to the formation of a cave.
- **Attrition** – the bits of rock (also known as scree) removed by hydraulic action can hit each other when being thrown around by waves. This causes them to chip and scratch each other, making the scree smaller and more rounded.



Types of Erosion

- **Solution** – sea water contains some acids which dissolve some types of rock such as chalk and limestone.
- **Abrasion** – when waves throw scree at a cliff, chipping and wearing it away.



Prevention?

- Coastal defences – structures such as sea walls, gabbions, and natural beaches can prevent waves eroding the beach by reducing the power of the waves.
- **HOWEVER** – this can lead to coastal squeeze...



Coastal Squeeze

- Beaches and other coastal habitats naturally change shape and size in response to changes in the sea level, climate or wave action.
- When humans remove or damage coastal habitats (such as beaches, mudflats and marshes) they stop these habitats from naturally expanding landward in response to rising sea level.
- The sea level is rising because of warmer waters and the melting of polar ice, this means the low water mark (the level reached by the sea at low tide) is moving further landward.



Coastal squeeze

- However, human development and the damage of habitats means that the high-water mark (the level reached by the sea at high tide) cannot move landward in response.
- This causes coastal habitats to become squeezed, limiting the space and food available for the organisms living there.
- Impacts – shorebirds have less space to nest and hunt for food; competition between organisms that have similar diets increases – some more competitive or better-adapted species can take over, leaving no food or space for less-adapted species (known as competitive exclusion).



Biofouling

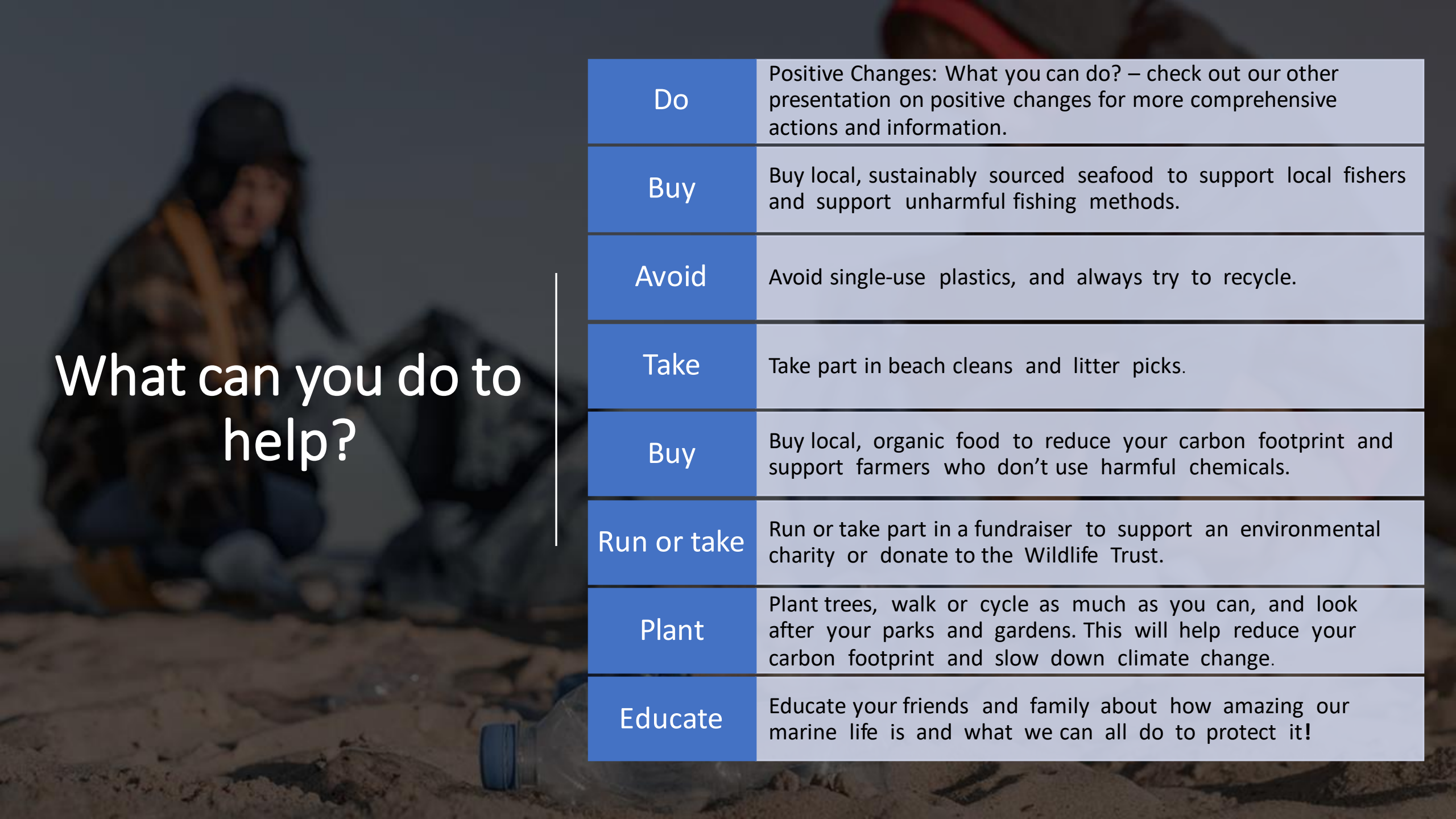
- Biofouling is the accumulation of by micro-organisms, plants, algae or small animals where they are not wanted and can cause damage to the structure (e.g., on ships or underwater pipes).
- Biofouling of ships can cause drag which means it is harder for the ship to move through the water. Consequently, biofouling can increase the amount of fossil fuel used by industrial shipping which then contributes to climate change.
- Biofouling can cause harm to marine environment. Biofouling on ships and boats can turn them into to carries for invasive marine species that can devastate local marine environments, which in turn can affect us. Watch this [video](#) explaining this further.



Prevention?

- **Anti-fouling – using special plants or paints to remove or prevent biofouling.**
- **Anti-fouling has pros and cons.**
- **Pro: It's a good deterrent against invasive marine species attaching to boats and being distributed elsewhere. It also reduces drag and therefore fuel usage.**
- **Con: The chemicals, paints and competitive plants used are designed to kill, or deter, the animals growing on the pipes, ships and machinery. Removing these animals means the populations cannot grow as quickly. This makes them vulnerable to extinction because there are fewer individuals and therefore fewer offspring.**





What can you do to help?

Do	Positive Changes: What you can do? – check out our other presentation on positive changes for more comprehensive actions and information.
Buy	Buy local, sustainably sourced seafood to support local fishers and support unharmed fishing methods.
Avoid	Avoid single-use plastics, and always try to recycle.
Take	Take part in beach cleans and litter picks.
Buy	Buy local, organic food to reduce your carbon footprint and support farmers who don't use harmful chemicals.
Run or take	Run or take part in a fundraiser to support an environmental charity or donate to the Wildlife Trust.
Plant	Plant trees, walk or cycle as much as you can, and look after your parks and gardens. This will help reduce your carbon footprint and slow down climate change.
Educate	Educate your friends and family about how amazing our marine life is and what we can all do to protect it!

What is already being done?

Governments across the world are beginning to recognise the threats of pollution, so they are banning the use of some single use plastics and encouraging reusable alternatives.

There is lots of research being done on how we can get rid of ocean plastic, such as using sea bins.

Marine protected areas are being created all over the UK, and the 30x30 campaign is aiming for 30% of the oceans to be protected by 2030. The Wildlife Trust is putting a lot of work into making sure this happens.

Fishing quotas have been introduced to avoid overfishing and keep the food web balanced.

Documentaries are being filmed all the time to educate people on the importance of ocean conservation.

Schools are changing their curriculum to educate young people on some of these issues.



**Remember every little actions
helps towards the solution!**

**You are not alone in this. You are part
of a community working towards
creative and positive solutions.**