

## The Wynter Bee Global Citizen Award

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### **UN Sustainable Development Goal 14. Life below water**

I have chosen this sustainable development goal because of the importance of retaining our underwater ecosystems. Approximately 71% of the Earth's surface is water-covered and 15% of species live in the ocean. However only 5% of the oceans have been explored. This means there could be millions of underwater species which are still undiscovered. The oceans may be some of the last pristine environments on Earth.

Numerous articles have expressed concern about what is really happening beneath the surface of the ocean, and how these ecosystems are deteriorating as a result of man-made issues like global warming and pollution.

Recent events in the Sea of Marmara illustrate how human behaviour impacts life below water. I chose to focus on the Sea of Marmara, because of its proximity to home. Having visited it a few years ago, it would be sad to let this beautiful and fragile ecosystem deteriorate.

### **Where is the Sea of Marmara and what is happening?**

The Sea of Marmara is located at the eastern end of the Mediterranean in Turkey. It is a historically important body of water connecting the Aegean with the Black Sea. It is home to deeply diverse marine life including crabs, clams, coral, mussels, and around 250 species of fish.

The Sea of Marmara is 280km long, and nearly 80km wide. Its average depth is about 500 metres with a maximum depth of 1355 metres in the centre.

This sea is of significant, and growing, importance to those who live on its shores, as the tourism and fishing industries depend on it.

The growing rise of tourism, by an average of a 4.3% per year, although creating millions of jobs, also has the disadvantage of making it increasingly hard to take care of the environment and has had a direct negative impact on the Sea of Marmara, because the sea is being asphyxiated by an alarming outbreak of sea snout.



## What is Sea Snot?

Sea snot, or in more scientific terms, marine mucilage, is a foam that has been accumulating over the past 6 months over the surface of the Marmara Sea. This thick, slimy grey-brown growth consists of both living and dead organic material, mostly phytoplankton.

## Why Does Sea Snot occur?

Phytoplankton are microscopic algae which usually help supply the waters with oxygen, but when stressed, can grow uncontrollably, causing sea snot.

Three underlying causes have contributed to the rapid growth of phytoplankton:

- High levels of nutrients and other pollutants, such as pesticides, entering the sea as a result of the large amounts of untreated sewage being pumped into the Marmara. Much of this increase in sewage has resulted from growth in tourism and agriculture in the area.
- Global warming has increased the water temperatures in the sea, meaning that levels of oxygen in the water have been reduced.
- Water in the Marmara is very stratified with a warm top layer that has low salt levels.

The warm water encourages the phytoplankton to bloom. The blooms, encouraged by the low salt levels in the surface layer of water and feeding on the nutrients provided by sewage and agricultural pollution, flourish.

The photo shows the impact of sea snot on a local harbour.



Although instances of sea snot have been identified in the Mediterranean as long ago as 1729, and impacted the Marmara on a smaller scale in 2007, records of occurrences have not been kept. There is, however, agreement that the number and seriousness of sea snot incidents have increased over the years.

Now, research from the Marine Sciences faculty at Turkey's Middle East Technical University (METU) has revealed that occurrences of sea snot have reached unprecedented levels and it is affecting more of the ocean than previously thought, as living sea snot has been identified at depths of up to 100 metres.

## Why is it a problem?

Sea snot is unsightly and smelly, impacting the tourist industry and therefore the income of the local community. Furthermore, sea snot can attract other microorganisms, like viruses and bacteria, including deadly *E. coli*, which can harm sea creatures and humans alike. This threat to public health

means that beaches have had to be closed, another blow to a tourism industry which is already struggling as a result of the COVID-19 pandemic.

More importantly the foamy sludge seals the surface of the water, impacting oxygen levels that are already under pressure as a result of temperatures rising over 20% faster in the Mediterranean region than the rest of the world (according to a report published by the Union for the Mediterranean).

This worryingly high rise in temperatures could mean that by 2040, the region will be 2.2 degrees warmer than today. Warmer water holds less oxygen, is more buoyant than cooler water and also raises demand for oxygen from living organisms. As a result less oxygen is available for marine life, decimating local fish stocks.

When the phytoplankton bloom dies it sinks beneath the waves and covers the seabed, creating dead zones that suffocate ocean floor dwelling marine life including coral, sponges and crustaceans, further threatening the diverse ecosystem.

Worryingly, it is evident that the sea snout is spreading. Marine mucilage was recently spotted in the Black Sea (to the north-east of the Marmara). This is a significant threat as the majority of Turkey's fishing industry is located in this area.

### **What can be done to help the Sea of Marmara's industries and ecosystems survive?**

Action is being taken to clean up marine mucilage by skimming it off the surface of the sea and by sucking up blooms using giant marine based vacuum cleaners. This needs to be done quickly, before the sea snout dies and sinks, completely smothering the organisms that are on the ocean floor, depriving them of oxygen.

However, cleaning the current sea snout is only a short-term resolution, as these actions do not tackle sea snout below the surface or the conditions that allowed the snout to bloom in the first place, but it is still a start.

I believe that another step Turkey can take is to ratify the 2015 Paris Agreement, as Turkey remains the only G20 country that has not done so. Ratifying this agreement will help unite Turkey with other countries and show that Turkey is keen to nurture their ecosystems.

Secondly, the Marmara Sea should be designated as a protected area (as the Turkish government plans to do by the end of the year). This is critical to ensuring that more effort is put in to reducing pollution and properly treating wastewater from the local population and tourism. The discharge of raw sewage into the sea should be stopped.

Thirdly, instances of sea snout should be monitored and recorded so we have the data to see if the problem is being controlled.

Although sea snout will never be eliminated completely, clearing the Marmara Sea now will allow life below water there to recover. This will benefit not only nature, but also the local economy as the tourism and fishing industries will have a chance to recover.

### **What can I do?**

To help tackle the problem of sea snot we can think more deeply about where we take our holidays, avoiding locations that do not respect their environment and supporting those where tourism is sustainable

Sea snot is an example of what can occur if we treat our oceans and water resources without respect. However, this is not only a developing world problem; Thames Water is regularly fined for dumping raw sewage into the Thames (Gordon's Boat Club members take note). How we act closer to home can also impact the marine environment.

As an individual, I am not able to clean up the Sea of Marmara, however, I am able to tidy up litter dropped outside my house and consistently recycle, helping reduce the amount of waste entering the sea. I can write to Thames Water to encourage them to behave better, and I can encourage everyone around me to do so too, as it will, in time, make this world a better place.

I am truly passionate for the need to change the way my generation view the planet and take steps to make sure it doesn't crumble. We need to focus on smaller and achievable resolutions. Many small steps make a big difference. Every individual should strive to make a change, rather than leaving it to big organisations to change the Earth.