

# Scientists turn underwater gardeners to save precious marine plant

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Vital for fisheries and climate mitigation, seagrasses are under threat. Credit: © Damsea, Shutterstock

Whoever said there's nothing more boring than watching grass grow wasn't thinking about seagrass. Often confused with seaweeds and rarely receiving the attention they deserve, there's nothing boring about seagrasses. In fact, they are one of the most productive ecosystems in the world.

Next time you are swimming and enjoying the sea's cool embrace look down and try to spot the slender blades of seagrass, a remarkable marine plant that plays a vital role in the coastal environment but is now under threat.

Forming dense underwater meadows, seagrasses are vital to maintain fisheries, absorb carbon and protect coastlines from erosion—but their future is threatened by [climate change](#), pollution and other impacts of human activities, scientists say.

The plants grow in shallow coastal waters in all regions except the Antarctic. They act as nurseries or feeding grounds for hundreds of species of seafood, including sea bream, octopus, cuttlefish and Alaska pollock—one of the most [fished species](#) in the world.

In the Mediterranean alone, at least [30%](#) of the value of commercial fisheries landings comes from fish that rely on seagrass for food and protection while they are young. They also provide important fishing grounds for recreational fishing.

"Despite covering a very low proportion of our ocean floor, they make a significant contribution to fisheries and local economies," said Marija Sciberras, assistant professor of fisheries conservation at Scotland's Heriot Watt University.

Dr. Sciberras studied [seagrass meadows](#) in Mallorca as part of a project called [PIONEER](#). She found that fish had higher body mass in areas

with higher density of seagrass.

But the growth rate of juvenile fish was higher in areas with lower density of seagrass. This could be because they need to grow fast because they are more exposed to predators, she said.

## **Seagrass stress**

Seagrass species globally are facing growing stress caused by human activities. The underwater meadows are sometimes ripped up to make way for new port infrastructure, dykes, or seawalls—even though the plants protect coastlines from storm erosion.

In regions where seagrasses are protected by law—including the European Union—they must be reforested if this happens. But attempts to do so often fail, said Francesca Rossi, senior researcher at France's National Centre for Scientific Research (CNRS) at the University of Côte d'Azur.

"They try to plant seagrasses in areas where they weren't before' – locations which are not their [natural habitat](#)—said Dr. Rossi, who is coordinator of [HEALSEA](#) project.

Seagrasses can also be uprooted by boats which anchor over them or drag fishing equipment through them, leaving bare sediment behind. It can take years for them to recover.

HEALSEA researcher Laura Soissons studied the impact of yet another stressor that affects seagrass: pollution from fertilisers. This can reduce the amount of light reaching seagrass leaves and slow their growth.

Dr. Soissons found that seagrasses often show no obvious signs of stress until they pass a tipping point after which they suddenly collapse.

Researchers want to find ways to spot signs of stress in the plants before they reach that tipping point. These could be used help to protect seagrasses—and other species, said Dr. Rossi.

The impact of declining meadows on fish species, for example, is likely to be devastating, she said. "If we don't have a habitat where the species can feed, hide or reproduce ... this species is lost."

"Seagrass is fundamentally important for all coastal ecosystems and for humans, because they create life, they protect life and they protect from coastal erosion," she added.

Despite the crucial role they play, data on the existence and decline of seagrass meadows is limited. However, a picture is emerging of plants struggling to survive in many regions.

One [study](#) in the Mediterranean found that between 13% and 50% of the areal extent of one species—*Posidonia oceanica*—was lost between 1842 and 2009. The remaining meadows may have lost much of their shoot density and become more fragmented.

Globally, rates of seagrass decline average about [7% a year](#) according to another study.

## **Carbon sink**

Any decline in seagrass could affect oceans' ability to absorb carbon.

Seagrass meadows absorb carbon up to 35 times faster than tropical rainforests, according to [WWF](#). And although they only cover 0.2% of the sea floor, they absorb 10% of the oceans' carbon each year, the conservation organisation says.

Unlike many land plants, seagrasses store most of the carbon they absorb in their roots, so the carbon remains buried underground even after they die.

Species which grow faster or have denser structures are particularly good at absorbing carbon. So the ocean's ability to absorb carbon is impacted both if seagrass meadows shrink in size, and if certain species are lost, said Nick Kamenos, Reader in Global Change at Britain's University of Glasgow.

## **Climate change**

And that decline could worsen with climate change, which is already warming seawaters and increasing their acidification.

Dr. Kamenos coordinated a project called [SEAMET](#) which studied the impact of climate change on seagrasses in the Atlantic, Pacific and Indian Oceans and the Mediterranean Sea. They also tested plants in the laboratory.

The researchers found that plants respond differently to temperature rises, depending on the species and their location. But many are at risk, especially those already living at the limits of their heat tolerance, said Dr. Kamenos.

Meadows in the Arctic are also at high risk, he said. This region is projected to have the fastest rate of warming over the century, and rapid acidification.

Variable temperatures are another risk linked to climate change. Plants which have been used to stable conditions for millennia are unlikely to tolerate temperatures which change from year to year, said Dr. Kamenos.

The combination of rapid warming and increased variability in temperatures 'can push some of these systems over the edge,' he said.

Acidification is another threat. It damages plants and animals with calcium carbonate structures, including tiny marine plants called [coralline algae](#) which live in seagrass meadows. These algae are important in absorbing carbon.

"How seagrasses will respond to climate change is still not well understood," said Dr. Kamenos. "But the evidence is that it's not fantastic," he added.

One important way to help seagrasses cope with its impacts is to protect them from other stressors including pollution and damage from construction and boats.

The EU has set targets to [protect 30% of its sea area](#), restore marine ecosystems and curb pollution in its waters. Globally, more than [70 countries](#) are pushing for the [UN Convention on Biological Diversity](#) to adopt a target of protecting 30 percent of marine waters by 2030.

Improving their habitat will give seagrasses 'a very small amount of extra breathing space until we can get a grip on climate change,' said Dr. Kamenos.

"But that is not an excuse to be to be lethargic about acting on climate change because there... we need to act fast," he added.

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