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THE UNDERESTIMATED VALUE OF SEAGRASS IN CLIMATE MITIGATION, CLIMATE ADAPTATION AND RESILIENCE

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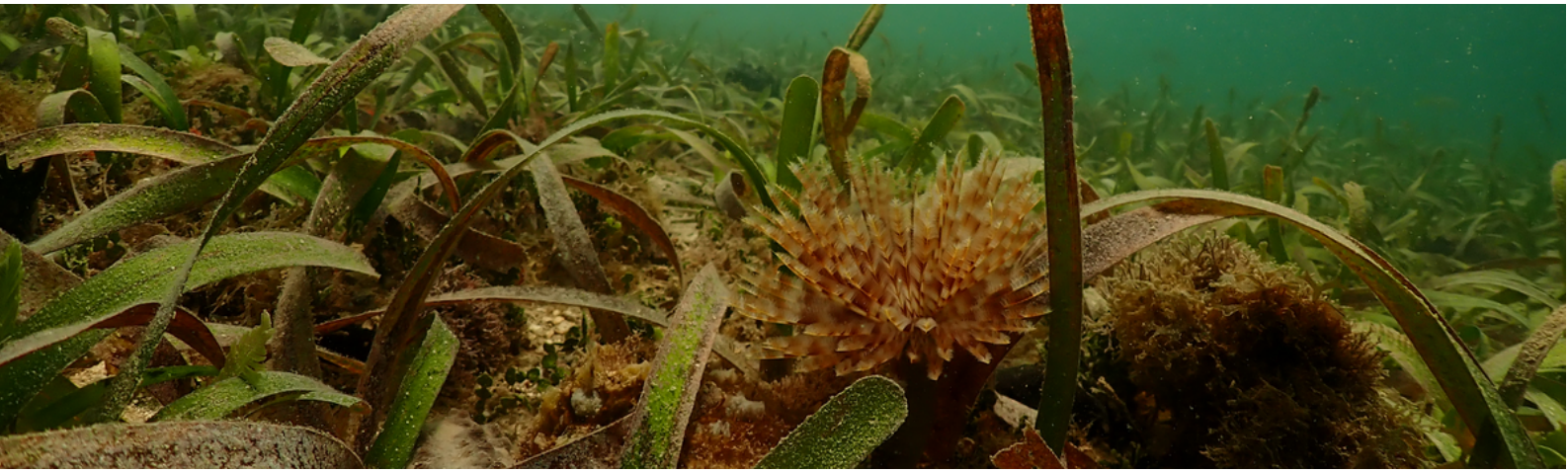

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WHAT ARE THEY AND WHY ARE THEY IMPORTANT?

The terminology of seagrass beds encompasses at least 4 distinct families, and more than 70 species. They are widely spread as they can be found from the tropics nearly all the way to the north and south poles at least in 159 countries, on 6 continents. Healthy seagrass beds provide many benefits – climate mitigation, climate adaptation, enhanced resilience, coastal protection from erosion (sediments storage) and many other societal benefits. They are benefiting ecosystems as well as communities. Indeed, seagrass beds form important shelters, breeding and feeding habitats. They serve as nursery for several species of fishes and invertebrates that move to coral reefs and other ecosystems as they grow. They are also feeding ground for herbivorous grazers, such as turtles and manatees - Therefore damaged seagrass impacts the survival of species dependent on it. Moreover, they allow disease control as they reduce the incidence of pathogenic marine bacteria in seawater by 50%. Generally, their ability to filter water provides an improved quality of water for all living beings in marine ecosystems. This not only ensures a rich biodiversity and healthy ecosystems but also food security for human communities. Indeed, seagrasses support around 20% of the world's biggest fisheries (at least EU 200 million per year in the Mediterranean alone). Seagrasses are also providing pharmaceutical resources. As such, they overall provide economic benefits. Seagrasses are efficient in climate mitigation and adaptation. Like mangroves, they sequestrate and store carbon - emissions from global seagrass degradation is estimated to reach around 0.65 GtCO2 per year, which is until now the equivalent to yearly emissions from the entire global shipping industry. They are also known as ocean acidification buffer, mitigating the effect of climate change on oceans acidification. They protect coastal areas from erosion, storms and floods as they reduce wave energy hitting coasts by around 40%. The dense root systems observed on most seagrass beds trap and fix sediments. Therefore, these sediments are caught and prevented to affect the reefs located downstream – this ensures a protection against coastal erosion (esp. after strong winds, rain and flooding), a protection of ecosystems and communities against strong ocean storms.

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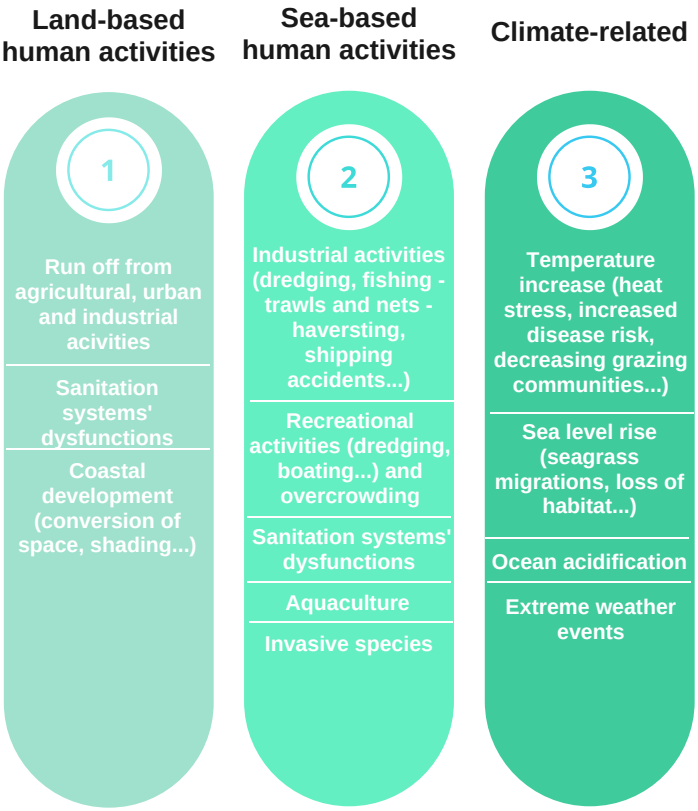
A THREATENED ECOSYSTEM

Seagrasses suffer from human activities as well as climate-related stressors. It is estimated that 7% of all seagrasses are lost worldwide per year, which is the equivalent of a football field of seagrass every 30 minutes. The highest impact threats to seagrass are urban industrial and agricultural run-offs and coastal infrastructure. Fishing activities, anchoring, trampling and dredging are considered to be also very harmful to seagrass as they take years to heal from these activities - severe or repeating scarring can completely denude seagrass beds as they take a long time to grow and restore. The greatest climate-related threat is perceived to be from increased frequency and intensity of tropical storms and related over-flooding and increasing waves physical impact. To accurately measure the scale of threats posed on seagrass, it appears essential to consider different spatial and temporal scales and intensities of threats. Indeed, the impacts of multiple activities occurring together can interact, increasing or decreasing the effects of other activities.



@ Main natural and anthropic threats posed on seagrasses

A further 20% to 90% of current coastal wetlands is at risk of being lost by 2100, as seagrass are also expected to migrate towards the poles in the coming decades, in response to climate change. Nevertheless, today, most seagrass beds are not covered by management plans or protected against human activities - 26% of recorded seagrass fall in Marine Protected Areas (MPAs), including the seagrass located in Guadeloupe, against 40% of coral reefs and 42% of mangroves.

WHAT CAN BE DONE?

Taking France as an example, as the major part of French seagrass is located overseas, many local actions are undertaken to guarantee the protection and restoration of seagrass and marine ecosystems more broadly. Legislation is of primary importance - the 1984, 1990 and 1999 international protocols are fundamental in the implementation of a strong local cooperation and response to human pollution. Regulation is essential when it comes to harmful human activities (as detailed above).

The Syracuse Project (DEAL) is also essential in gathering knowledge and tools as it is the basis of a thoughful response to the issue of seagrass' protection. Seagrass can also be protected by being put under Marine Protected Areas (MPAs). They can also be restored through various methods.The LIFE Adapt'Island project is of particular interest taking France as example, this project is attempting to protect and restore segrasses in Guadeloupe.

THE LIFE ADAPT'ISLAND PROJECT:

In Guadeloupe, the LIFE Adapt'Island project, co-funded by the European Union and Guadeloupe Port-Caraibes (GPC), is working at the restoration of seagrass beds (notably of the emblematic Caribbean species *Thalassia testidinum*). The project emphasizes on the necessity to reduce anthropic pressures on seagrass beds to allow their efficient restoration. This is notably done by the establishment and management of environmentally friendly mooring fields that preserve seagrasses. In concrete terms, it refers to the implementation of eco-moorings reducing the pressures associated with anchorage and offering a habitat adapted to reef communities.

Several restoration methods are considered in the framework of this project.

- The "rhizome" method involves sampling and transplanting healthy rhizomes from the edge of donor meadows.
- There is also the sowing of *Thalassia testudinum* seeds since this is the only Caribbean seagrass species that produces seed in sufficient quantity to consider sowing for an active restoration project.
- The sod method involves transplanting entire sods of healthy seagrass individuals from beds that are slated for eradication (due to a coastal or marine development project, for example).

These protection and restoration actions must be coupled with efficient monitoring actions associated with the establishment of relevant indicators. These indicators relate to the survival rate, the expansion and growth rates, but also sediments dynamics or again the frequency of human interventions to sustain the seagrass... They will allow to assess the efficiency of the restoration actions and react to any negative impact on seagrasses. Similarly, the various marine ecosystems managers need to interact together, share research and homogenize their procedures.

Finally, the LIFE Adapt'Island project is also working on education and awareness, notably through workshops discussing the preservation of coastal ecosystems more broadly but also implementing a seagrass underwater educational trail.

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