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Editorial: Seagrasses Under Times of Change

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The Editorial on the Research Topic

Seagrasses Under Times of Change

Awareness of the ecological importance of seagrasses is growing due to recent attention to their role in carbon sequestration as a potential blue carbon sink (Fourqurean et al., 2012; Bedulli et al.), as well as their role in nutrient cycling (Romero et al., 2006), sediment stabilization (James et al., 2019), pathogen filtration (Lamb et al., 2017), and the formation of essential habitats for economically important marine species (Jackson et al., 2001; Jones et al.). Despite their importance and the increasing public and scientific awareness of seagrasses, simultaneous global (e.g., ocean warming, increase in frequency and severity of extreme events, introduction and spread of invasive species) and local (e.g., physical disturbances, eutrophication, and sedimentation) anthropogenic stressors continue to be the main causes behind the ongoing global decline of seagrass meadows (Orth et al., 2006; Waycott et al., 2009).

Degradation of seagrass ecosystems entails the loss of the associated biota, primary productivity, and local fisheries, and increased sediment re-suspension and beach erosion, processes that result in severe ecological and socio-economic consequences not only for seagrass meadows but also for neighboring ecosystems and human inhabitants (Erftemeijer and Lewis, 2006; Joseph et al., 2019; Moksnes et al., 2021).

Will climate change exert diverging effects on different seagrass species? Will ocean warming eventually exceed the adaptive potential of local seagrass species resulting in a shift of their biogeographic ranges? Does eutrophication cause similar stress as exposure to thermal stress? Do seagrass populations with different “histories” respond differently to stress? Can we suggest new improvements for conservation and management of local meadows that will enhance resilience to the predicted and unpredicted scenarios of change?

In this issue dedicated to seagrasses under times of change, we have collected 17 studies authored by 104 seagrass researchers from around the world that are trying to answer many of these and other questions.

In this Research Topic, readers will find studies that compare the responses of seagrasses to single and combined stressors in their environment and their interactions through multi-stressor laboratory experiments, field studies, and spatial-temporal modeling, ranging from the cellular level (Nguyen, Yadav et al.) to ecosystem processes (e.g., Helber, Procaccini et al.; Helber, Winters et al.).

We are particularly happy to see the diversity of the seagrass studies presented here. This includes:

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species and populations in the area. This Research Topic has also demonstrated high levels of plasticity exhibited by certain species to adverse environmental conditions, and that regular and consistent long-term monitoring of seagrass sites is needed to detect significant declines and plan conservation policies. Modeling species distribution under future temperature and salinity conditions project an increase in invasive species and a dramatic change of species composition in an exemplary study for the Mediterranean.

We hope that this Research Topic has not only answered some of the initial questions but has opened new research lines that generate a better understanding of seagrass loss in these changing times. This knowledge is needed to make effective decisions for the conservation of seagrass meadows worldwide.

AUTHOR CONTRIBUTIONS

GW initiated and led the writing. DW, MT, HR, and IV edited and improved earlier versions. All

authors contributed to the article and approved the submitted version.

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