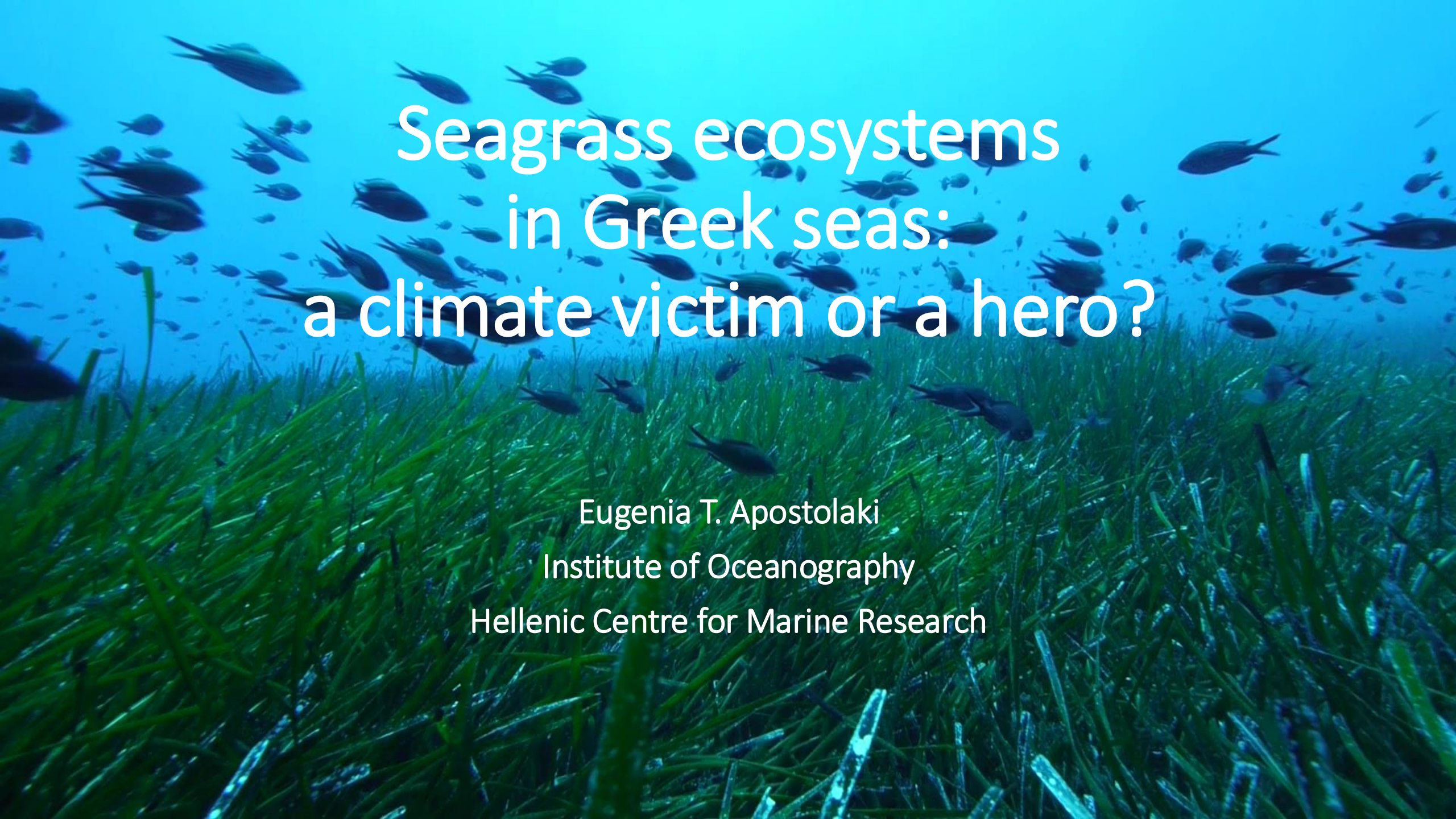
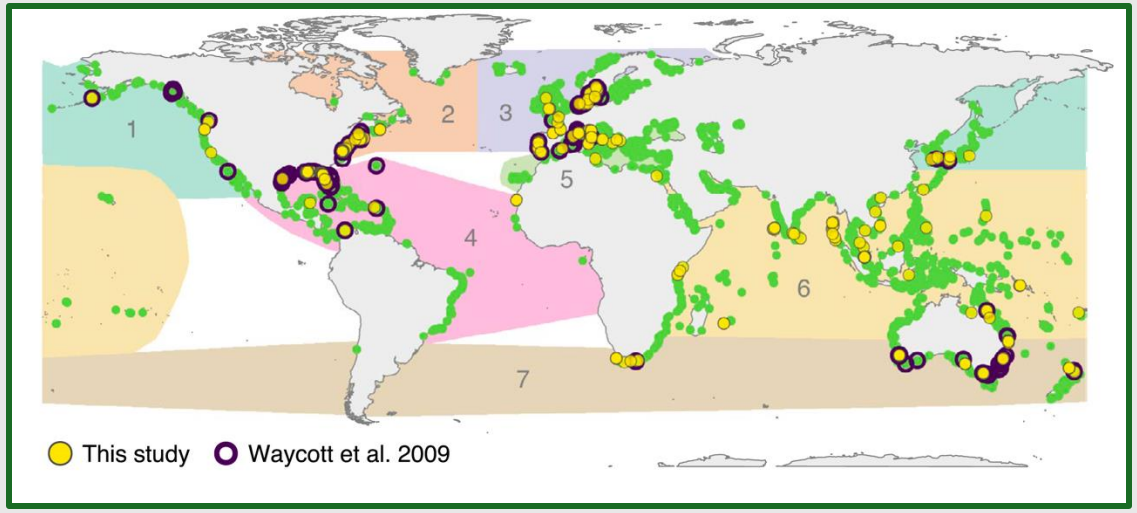


# Seagrass ecosystems in Greek seas: a climate victim or a hero?

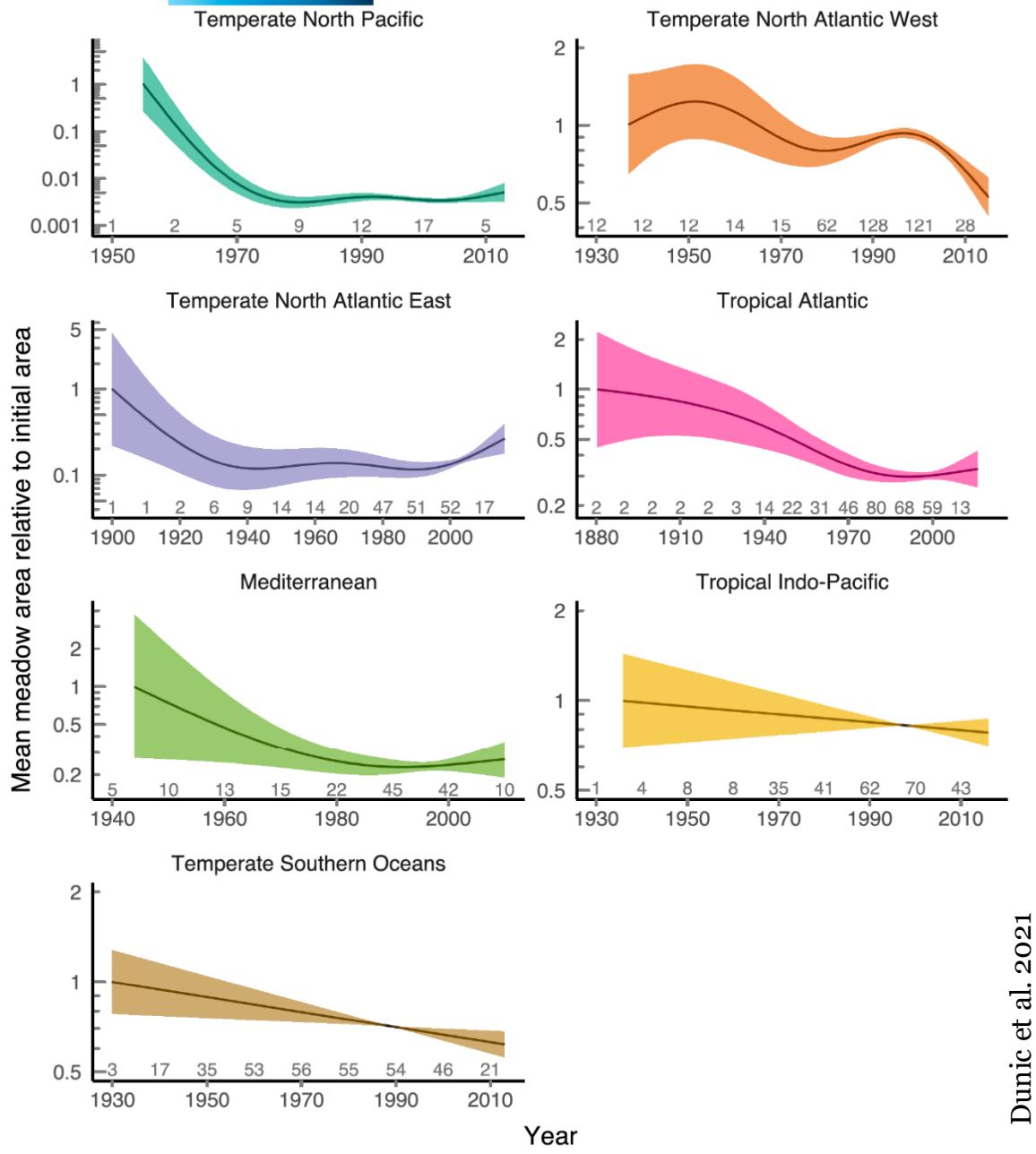
Eugenia T. Apostolaki
Institute of Oceanography
Hellenic Centre for Marine Research

# Most threatened habitats

30 % lost with an accelerating median rate of 0.9 % per year before 1940 to 7 % per year since 1990

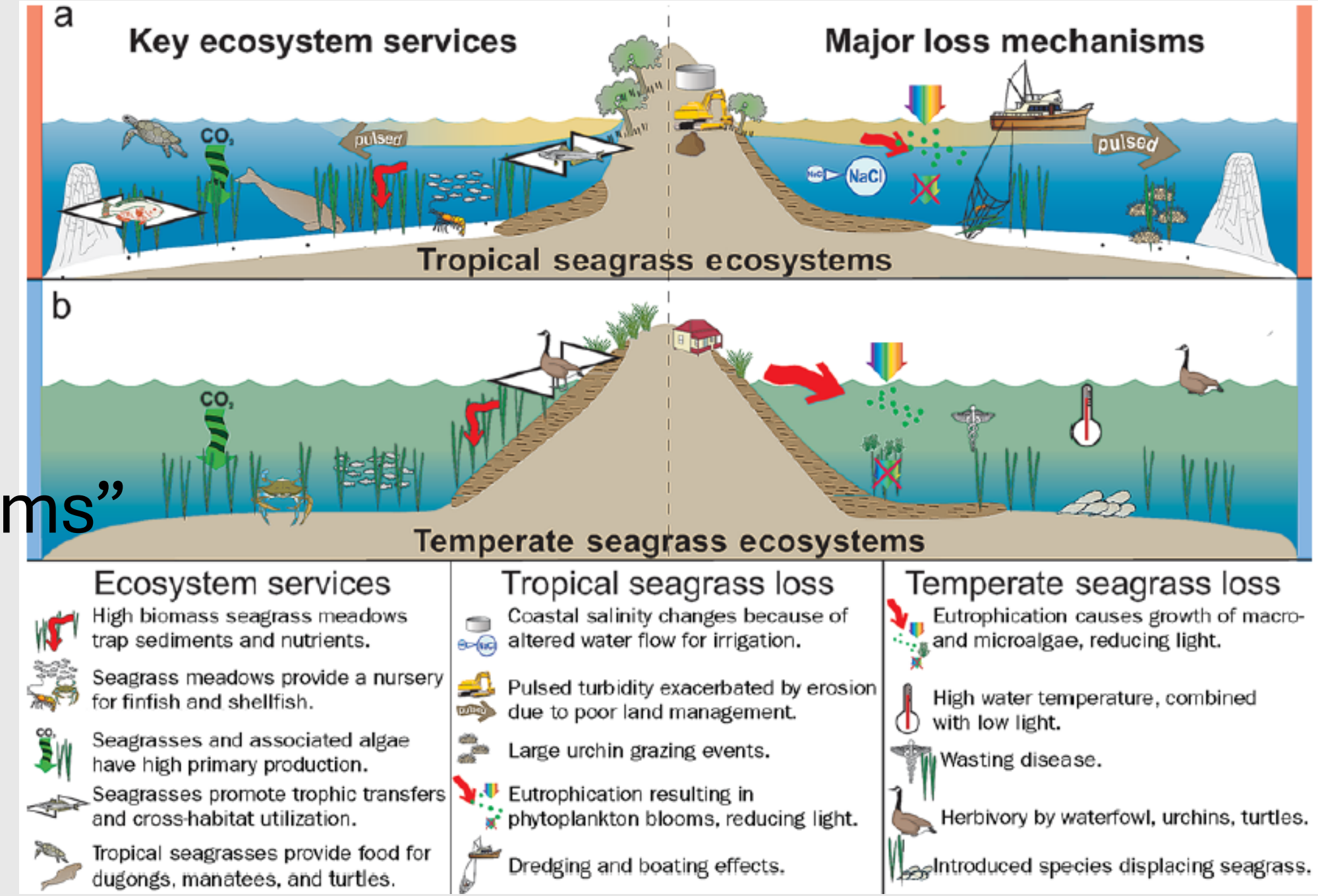




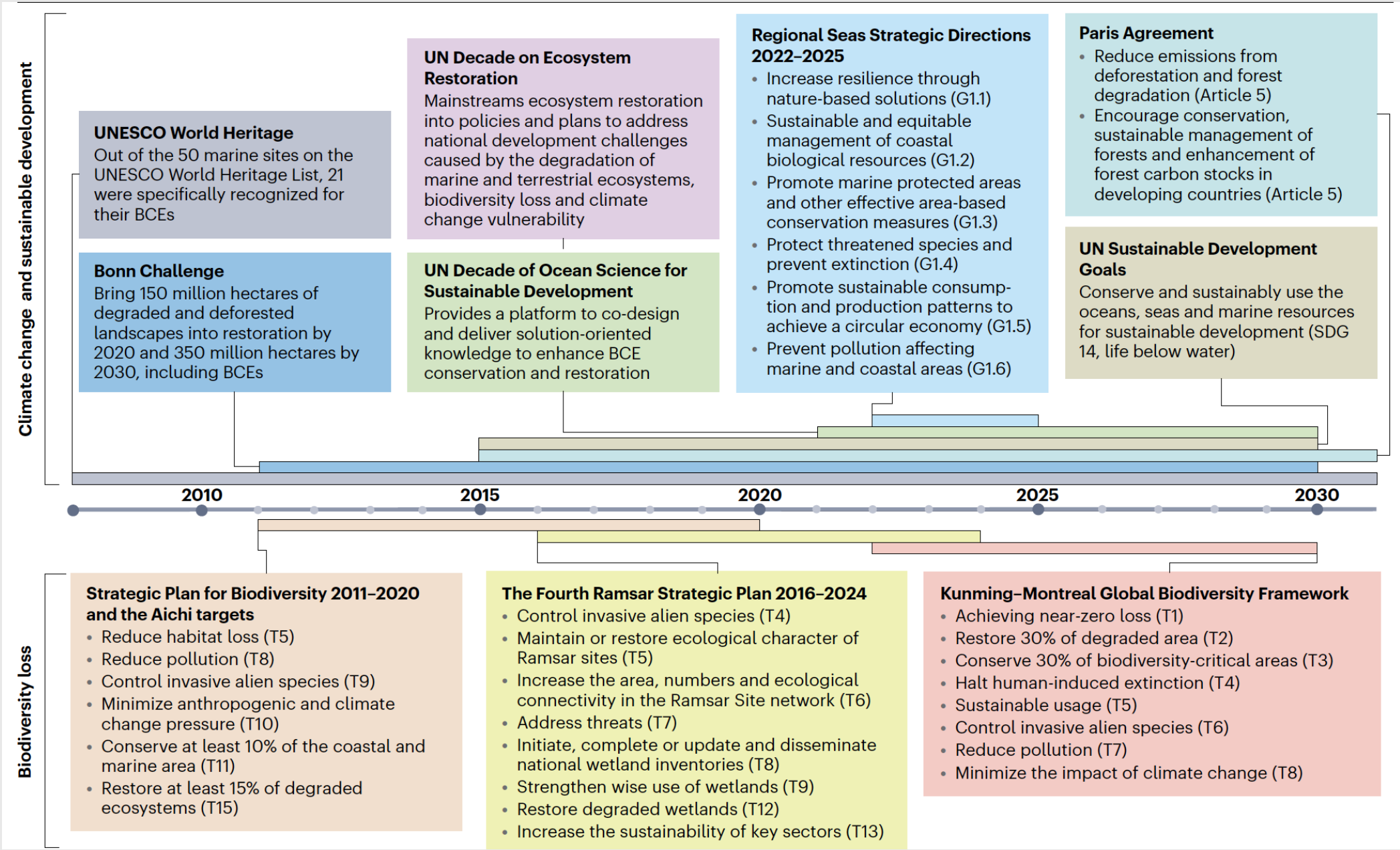

Dunic et al. 2021

“A global crisis for seagrass ecosystems”




Orth et al. 2006

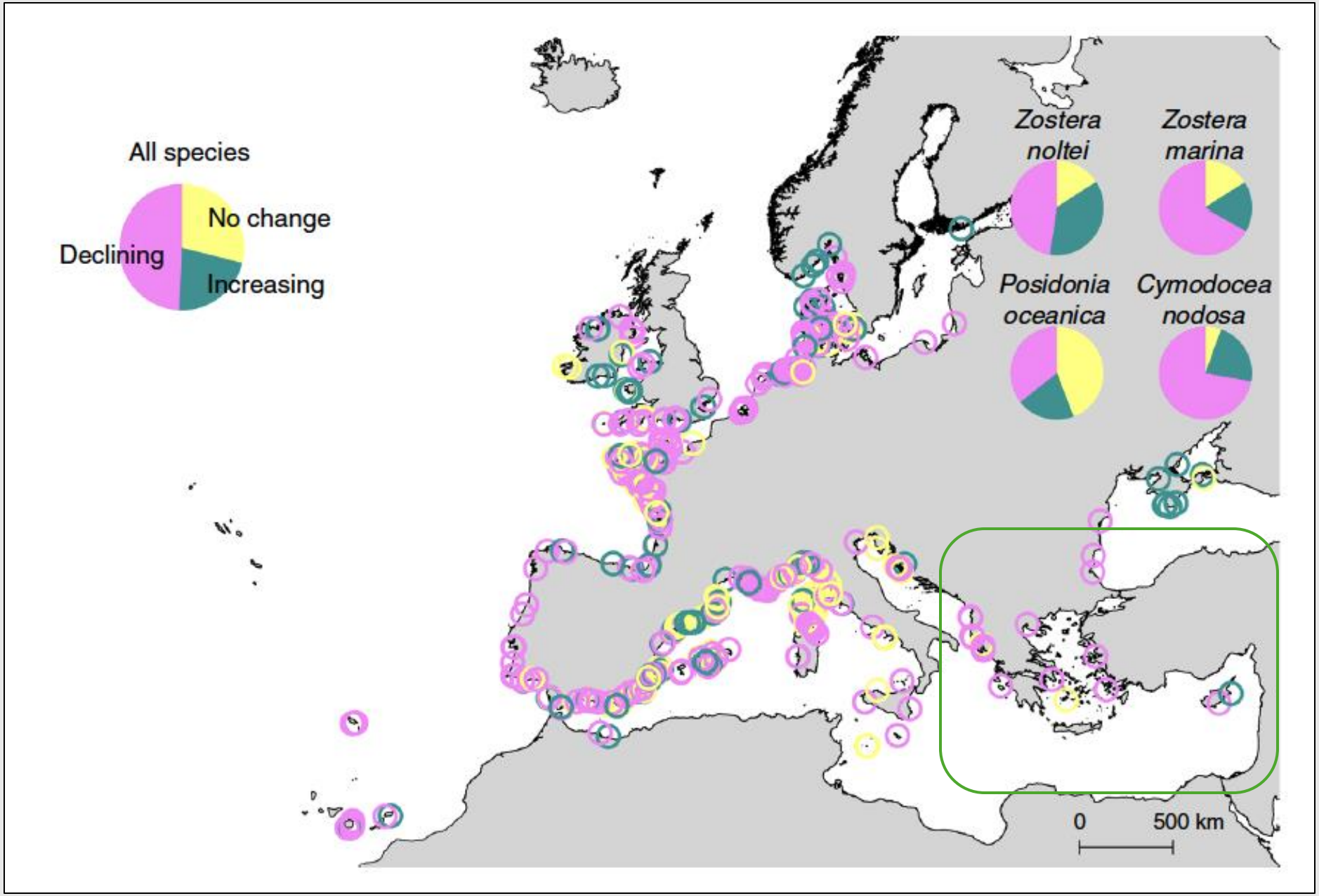
Unique opportunity to couple the assessment of biodiversity and climate crisis to protect these critical ecosystems




Duarte et al. 2024

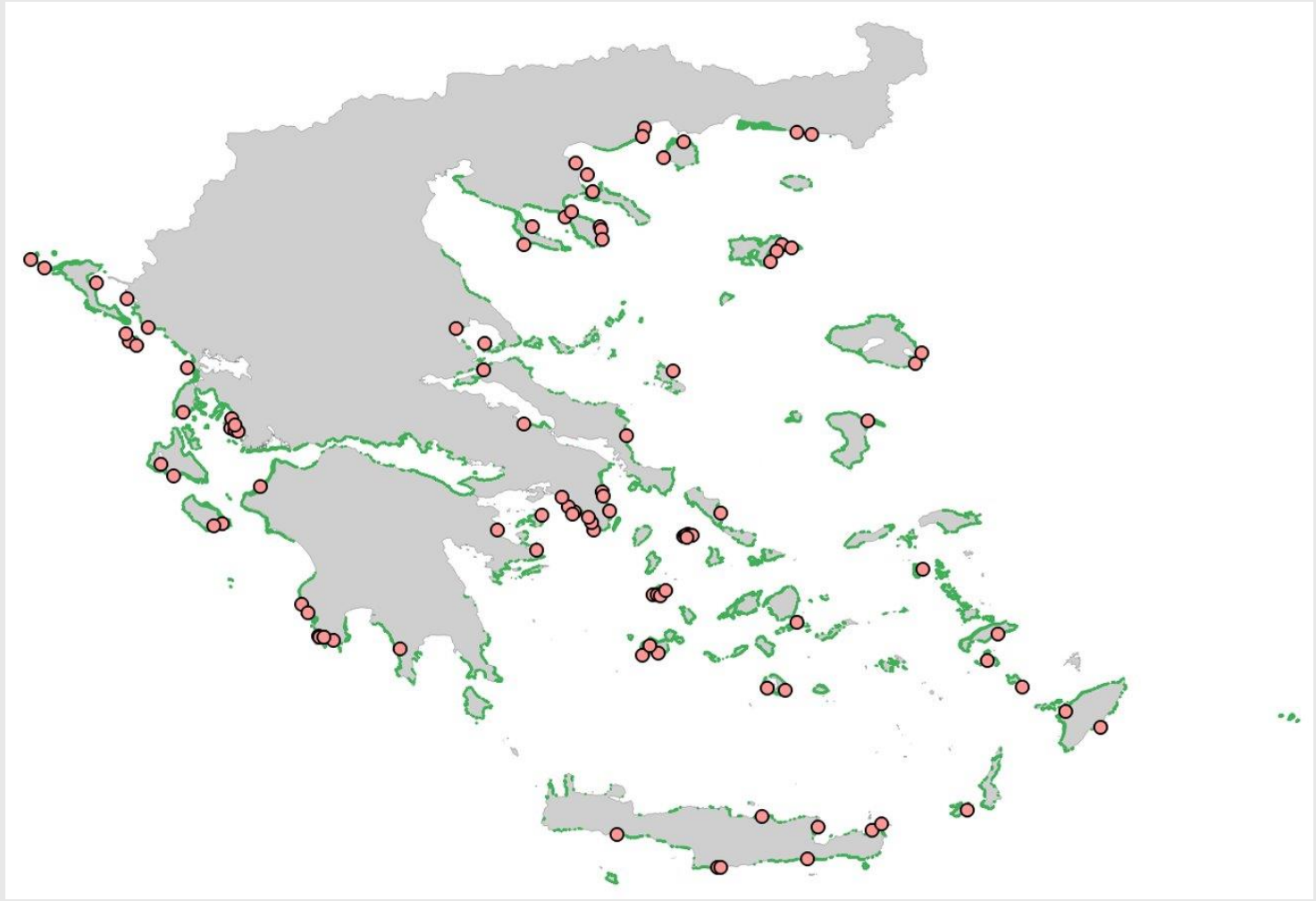
# Trends in European seagrass species

Missing information from the Eastern Mediterranean seagrass ecosystems

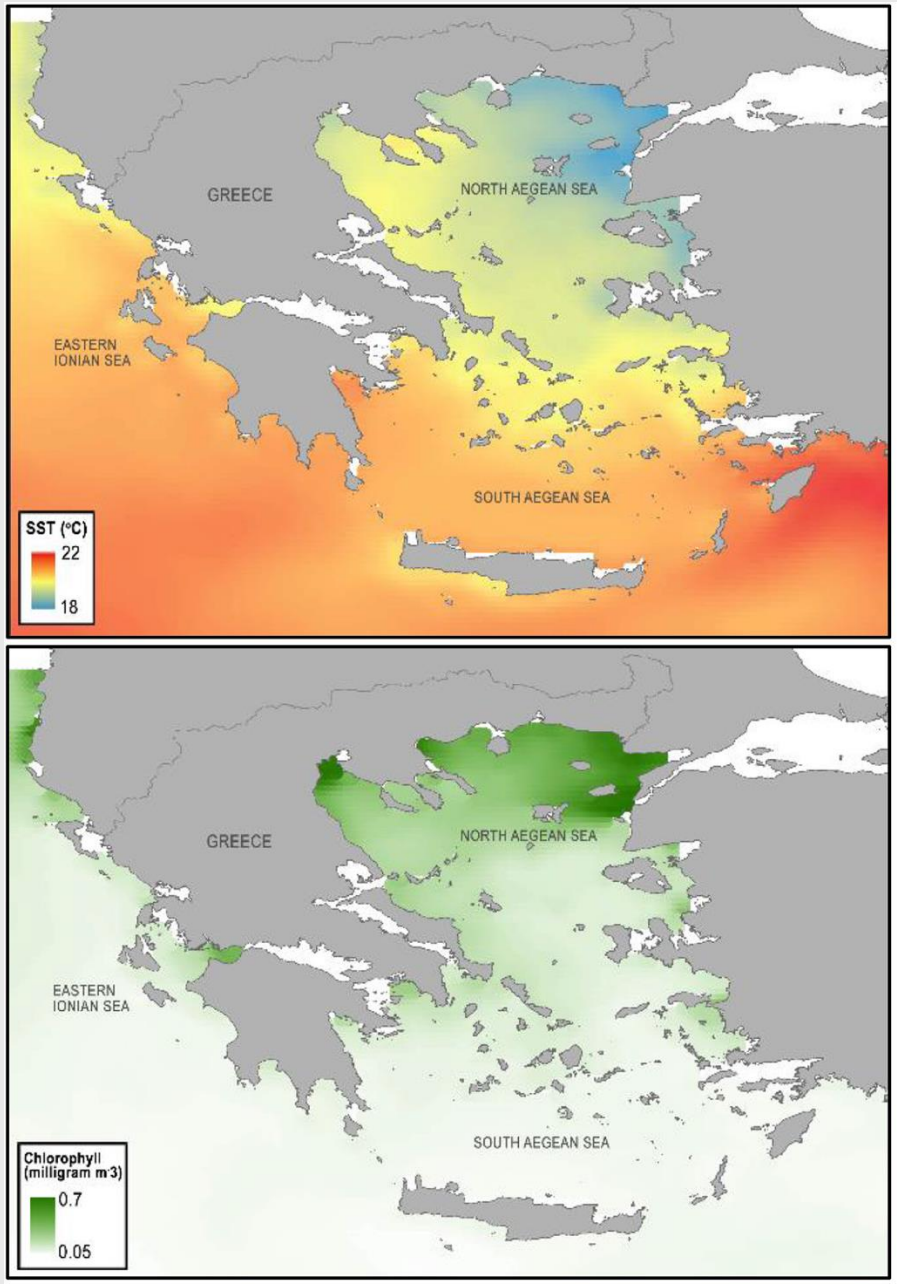


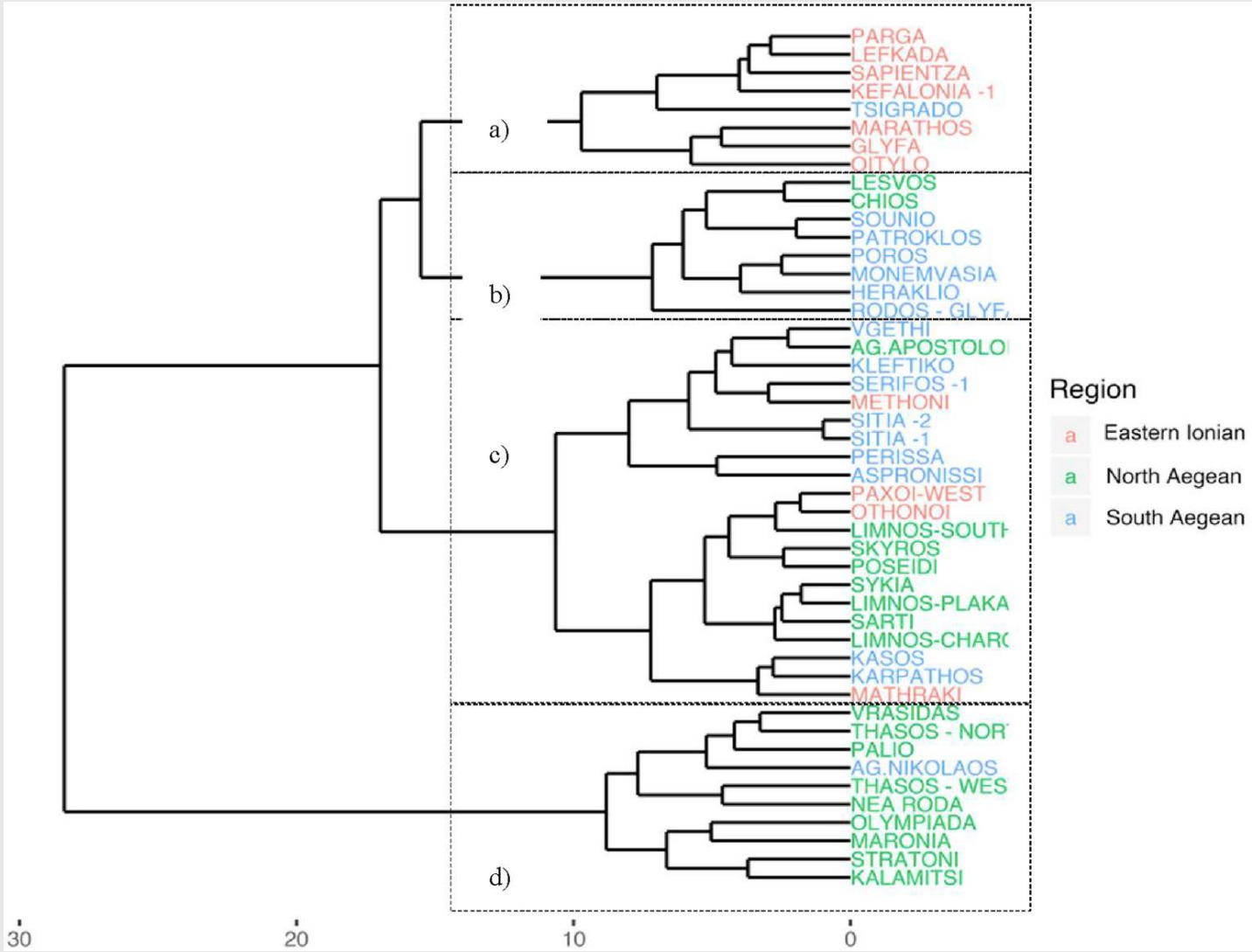

de los Santos et al. 2019

Good understanding of seagrass ecological status through the implementation of related EU Directives (> 100 sites)



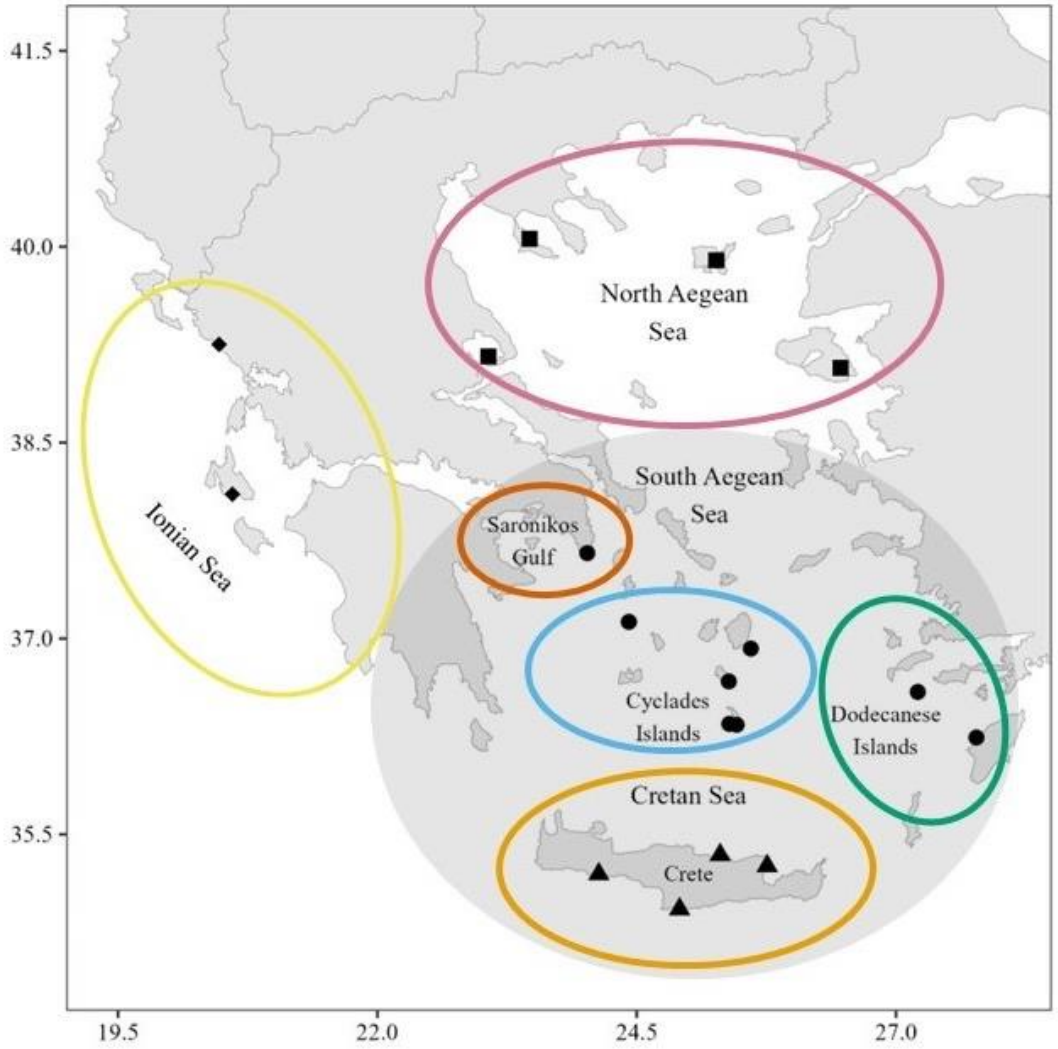
# Spatial differentiation

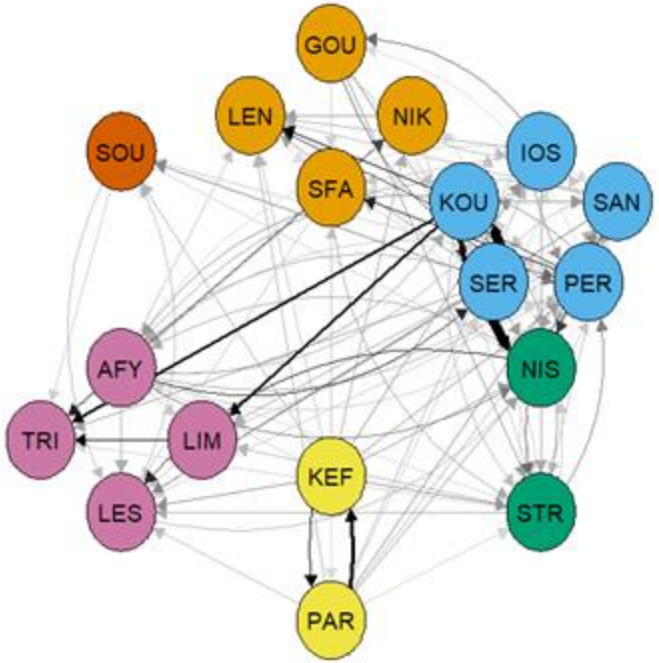


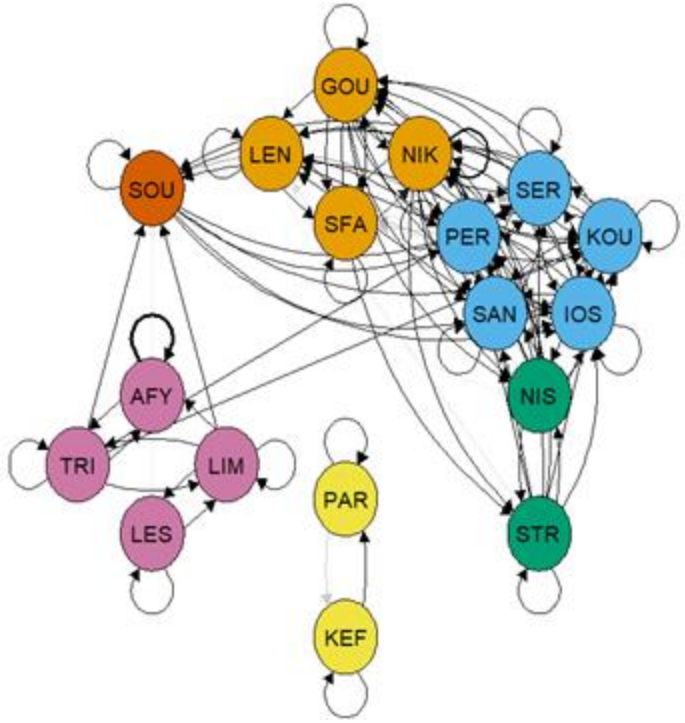

Gerakaris et al., 2021 Marine Environmental Research

# Connectivity of seagrass ecosystems



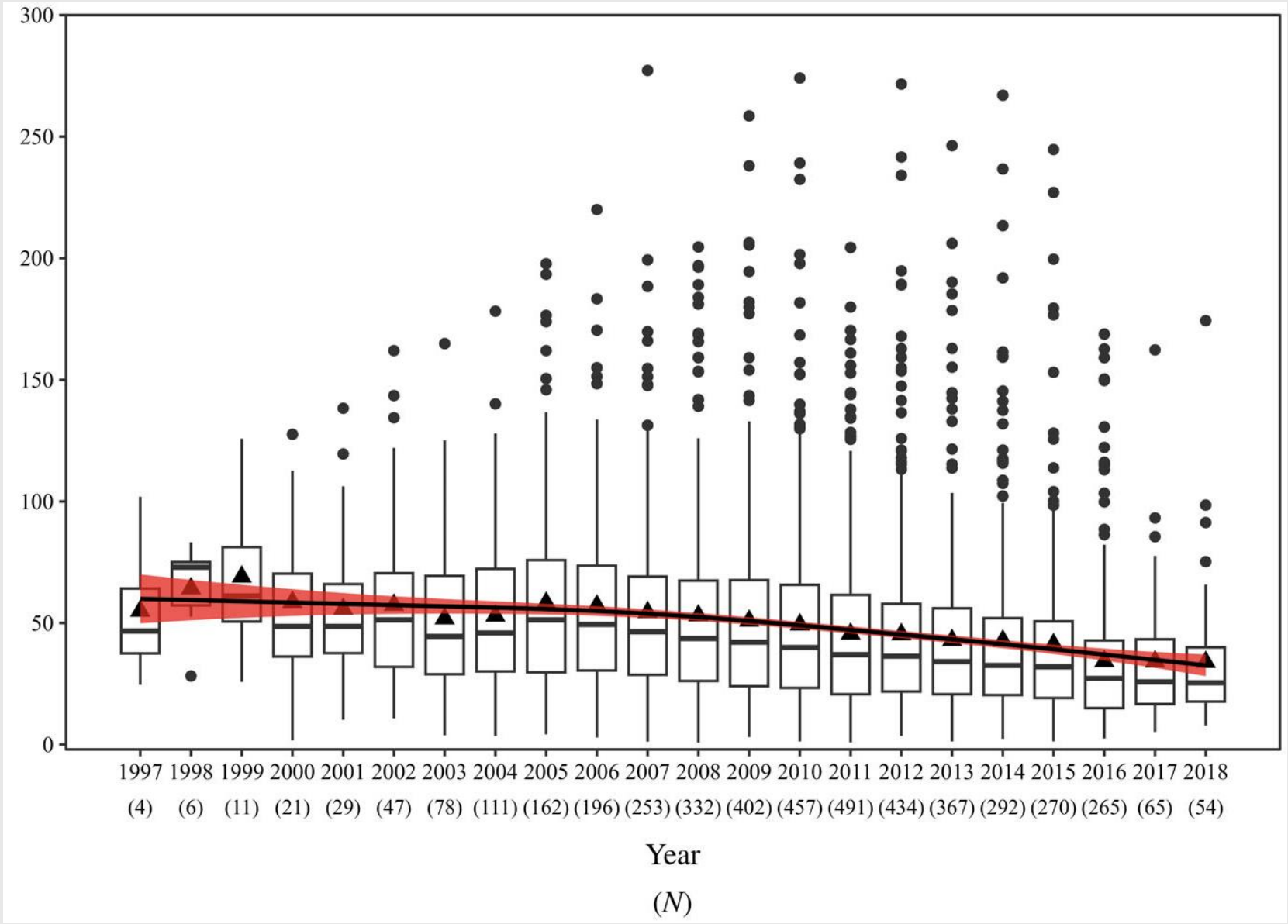

Genetic
(realized)




Oceanographic
(potential)

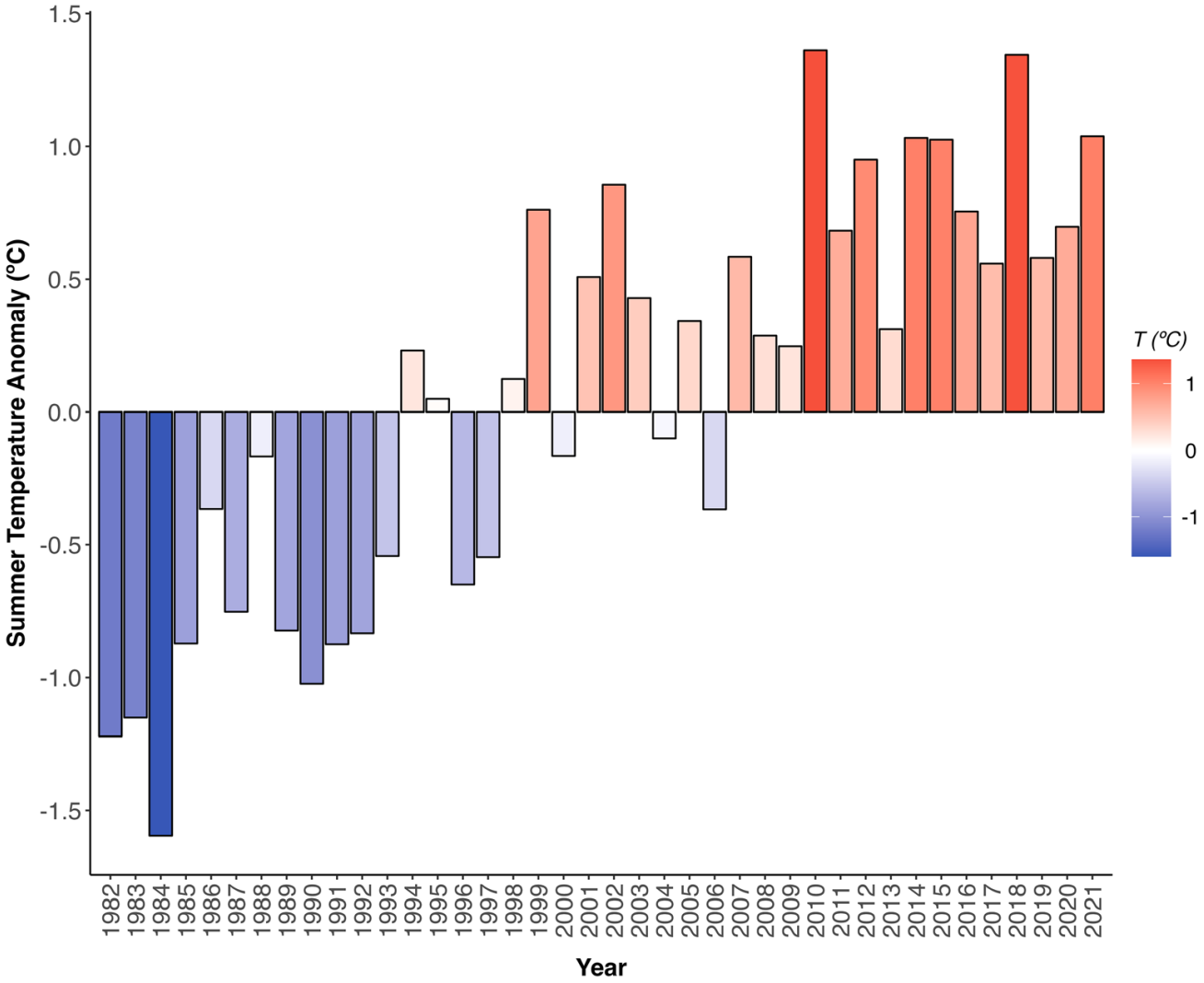
Litsi-Mizan et al, 2023
Biodiversity and Conservation

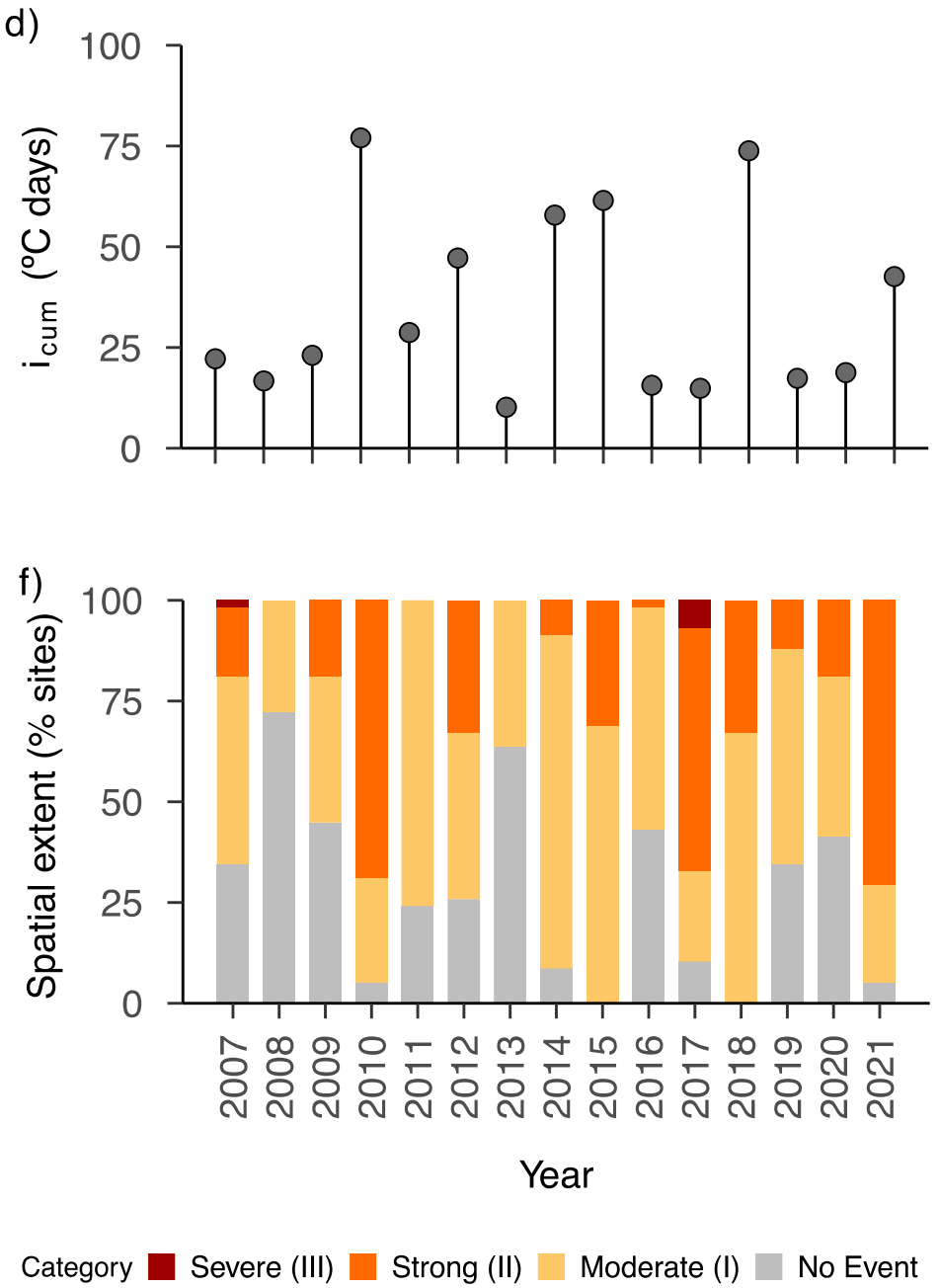
# 20-year seagrass production trend




Litsi-Mizan et al., 2023 New Phytologist

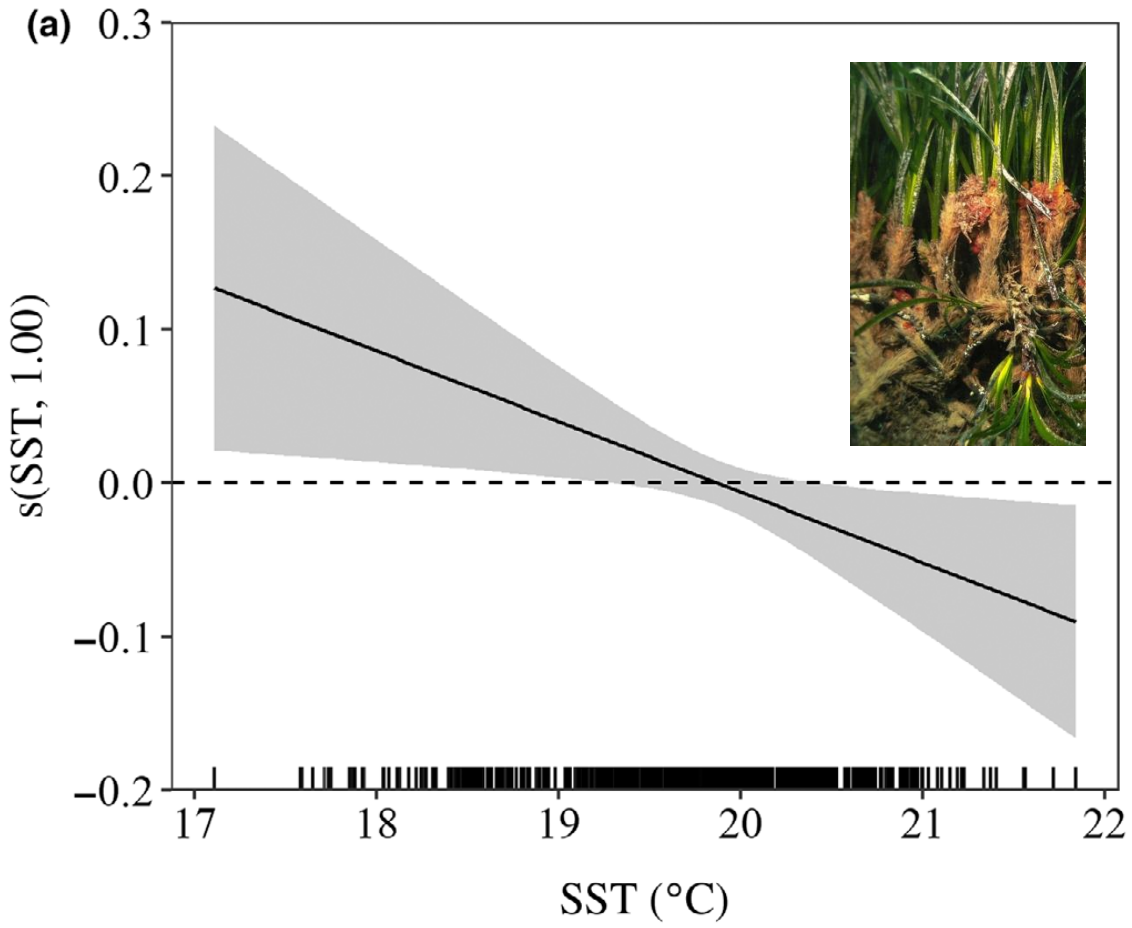
# Warming



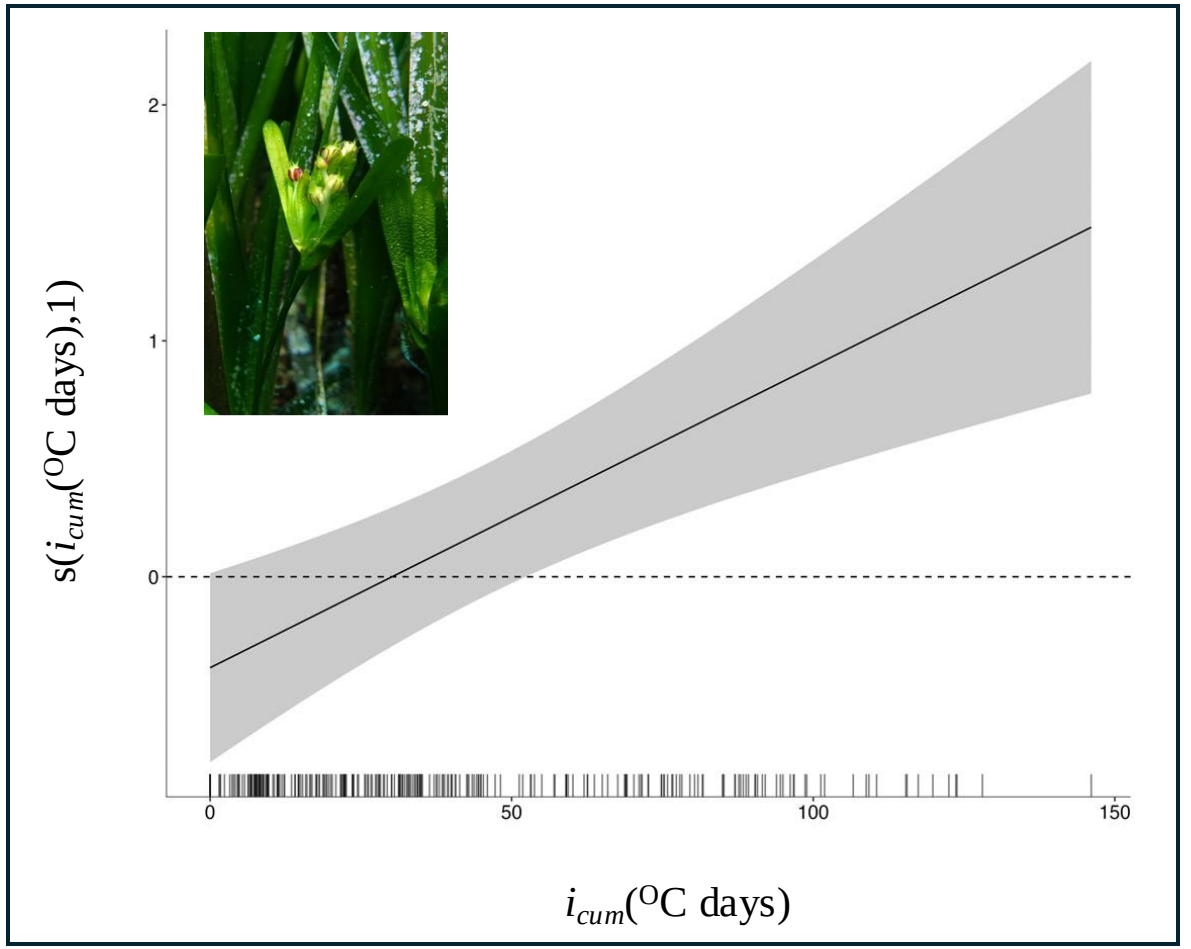

Garcia-Escudero et al., 2024 Limnology and Oceanography

# Decrease in seagrass production



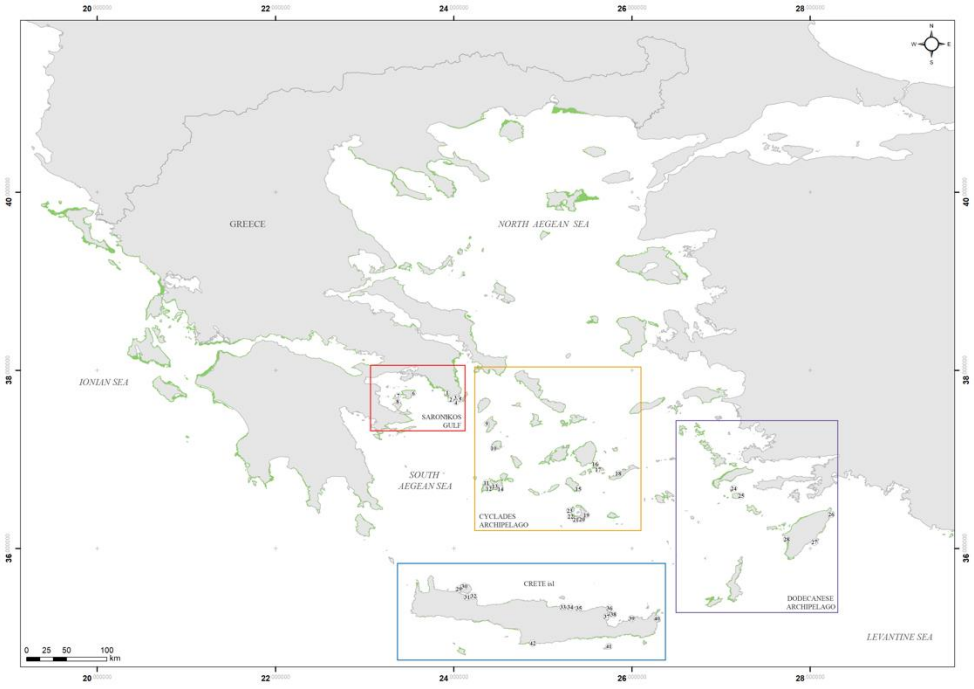

Litsi-Mizan et al., 2023 New Phytologist

# Increase in seagrass flowering

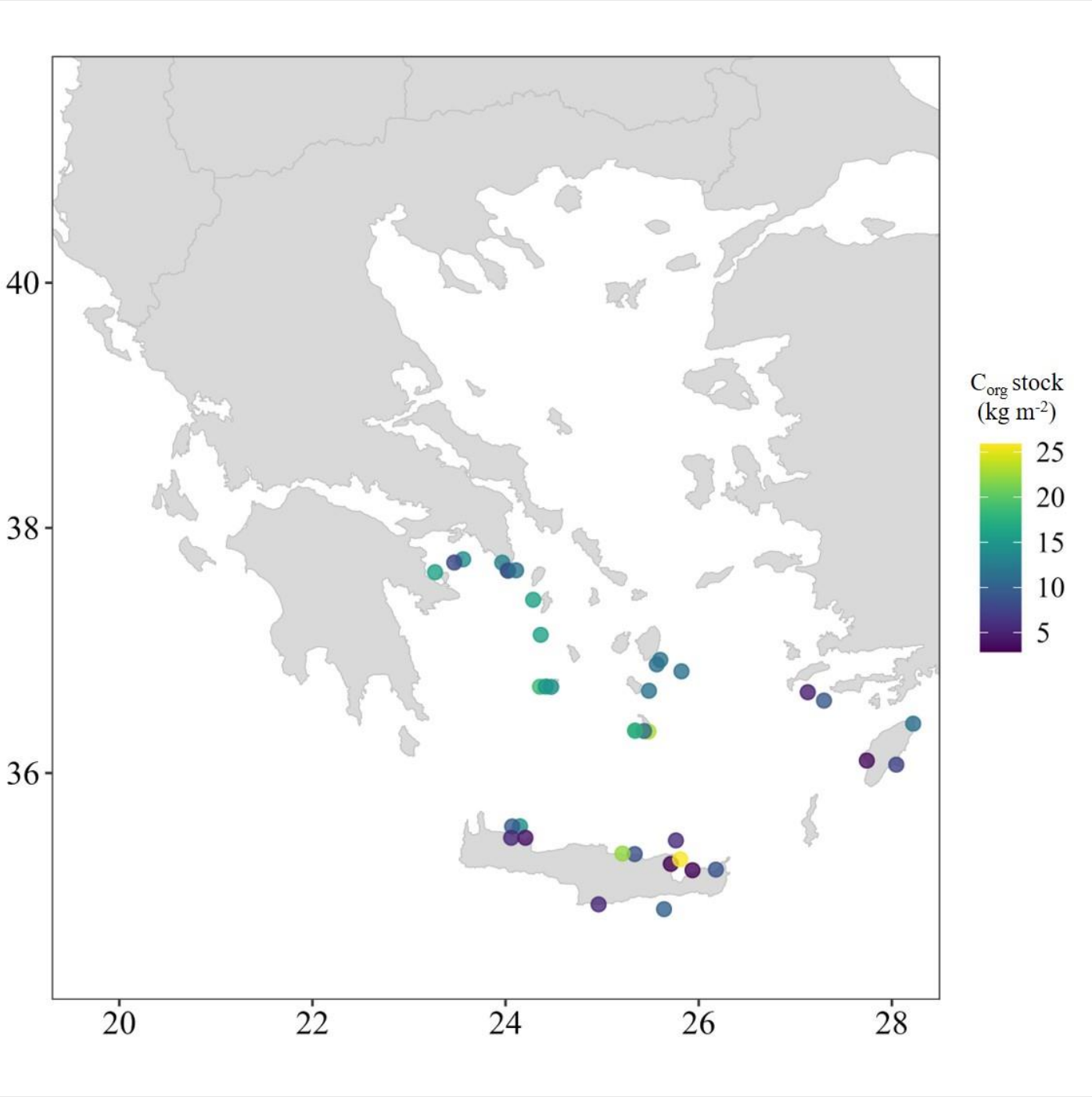



Garcia-Escudero et al., 2024 Limnology and Oceanography

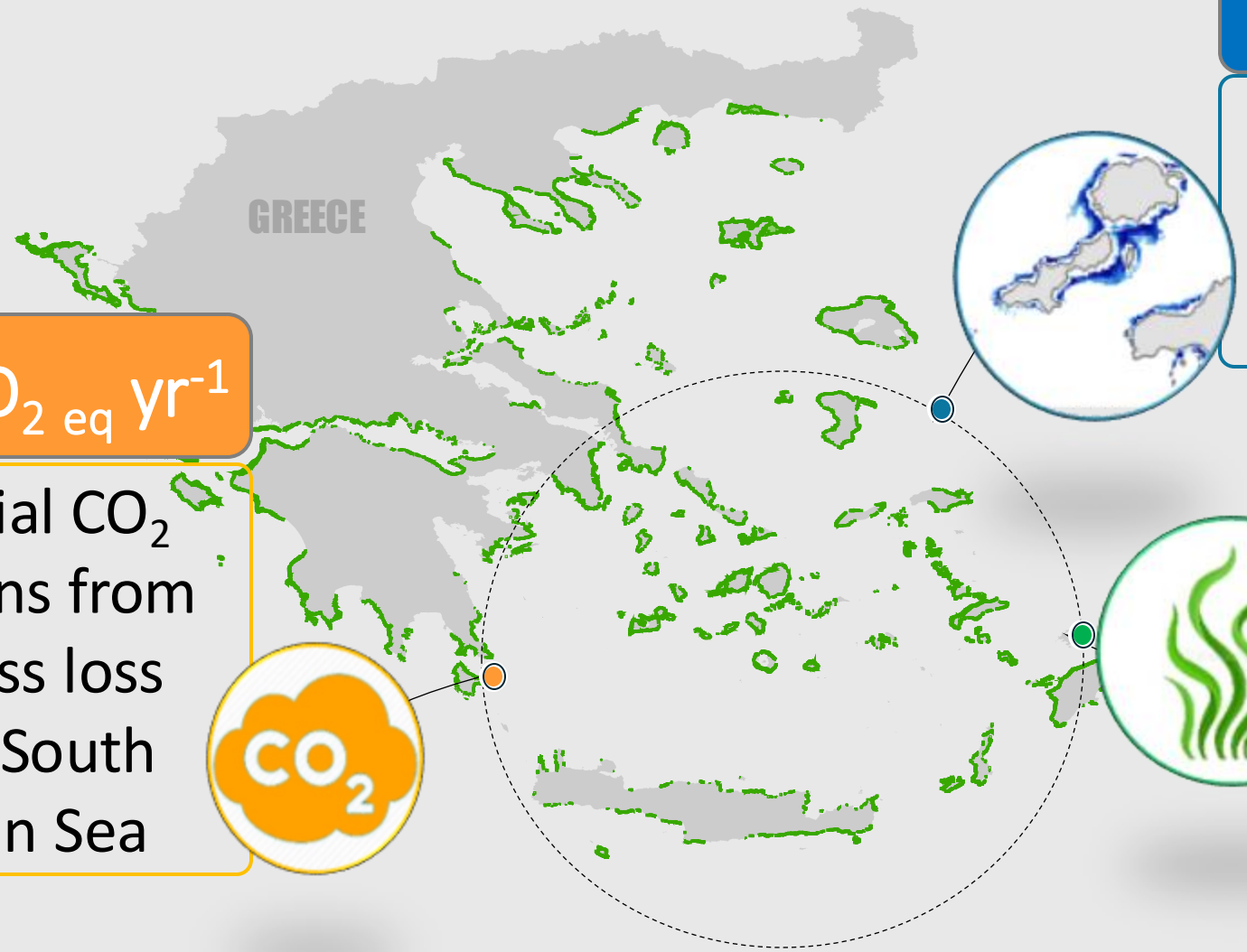
# Blue Carbon




Apostolaki et al., under revision JGR Biogeosciences



# SEAGRASS BLUE CARBON




**6,633 kt $C_{org}$**

stored at 1 m of sediments in the South Aegean Sea

**61 kt $CO_{2\ eq}$ $yr^{-1}$**

Potential $CO_2$ emissions from seagrass loss in the South Aegean Sea

**37 % of 2030 target**

Potential contribution through conservation

# National Plan for Energy and Climate - revision

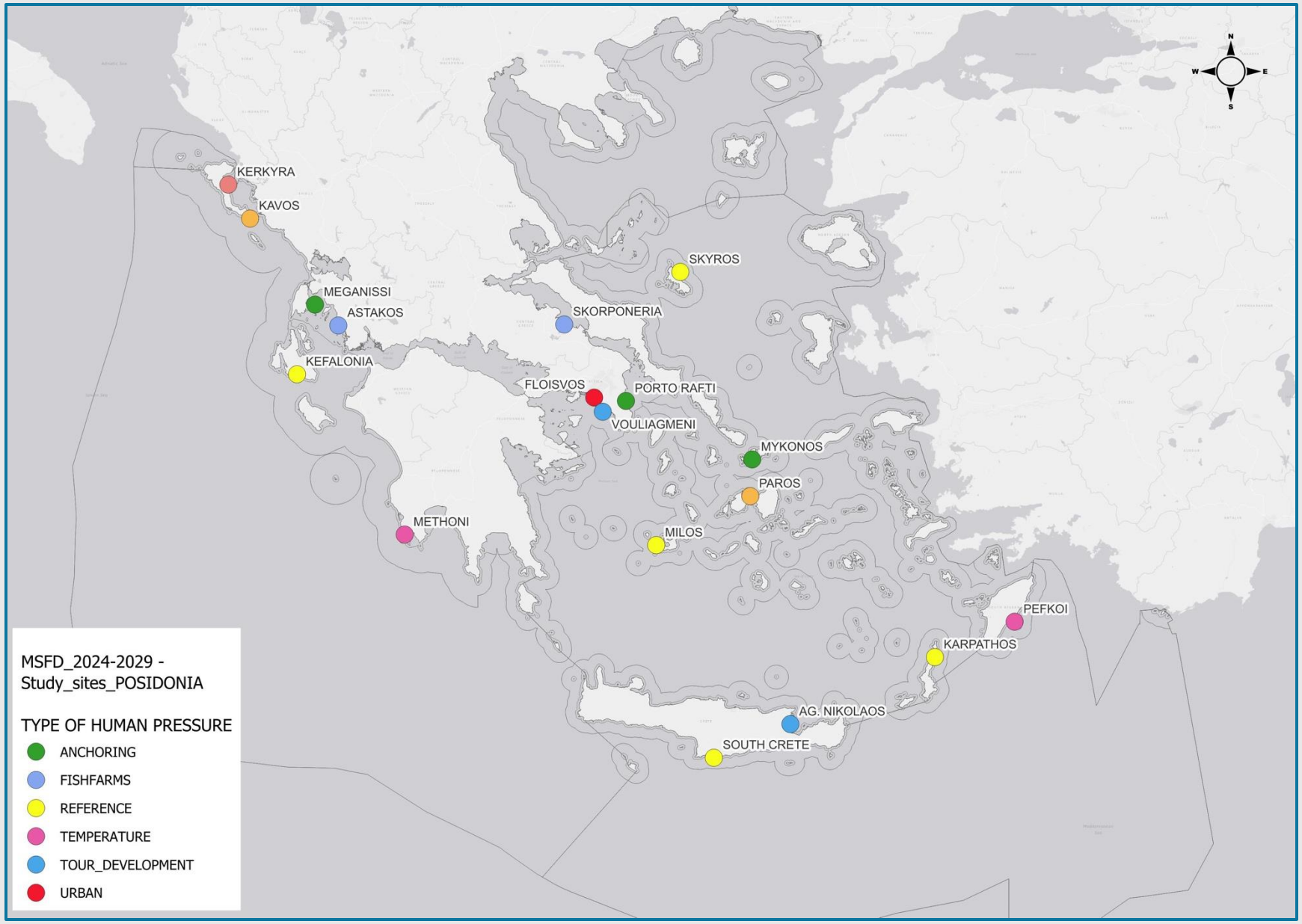
- inclusion of removals by *Posidonia* meadows among the potential measures to increase the contribution of LULUCF sector to reach climate neutrality by 2050
- on voluntary basis
- dependent on the enhancement of the MRV system for the national GHG reporting

# The science we need:

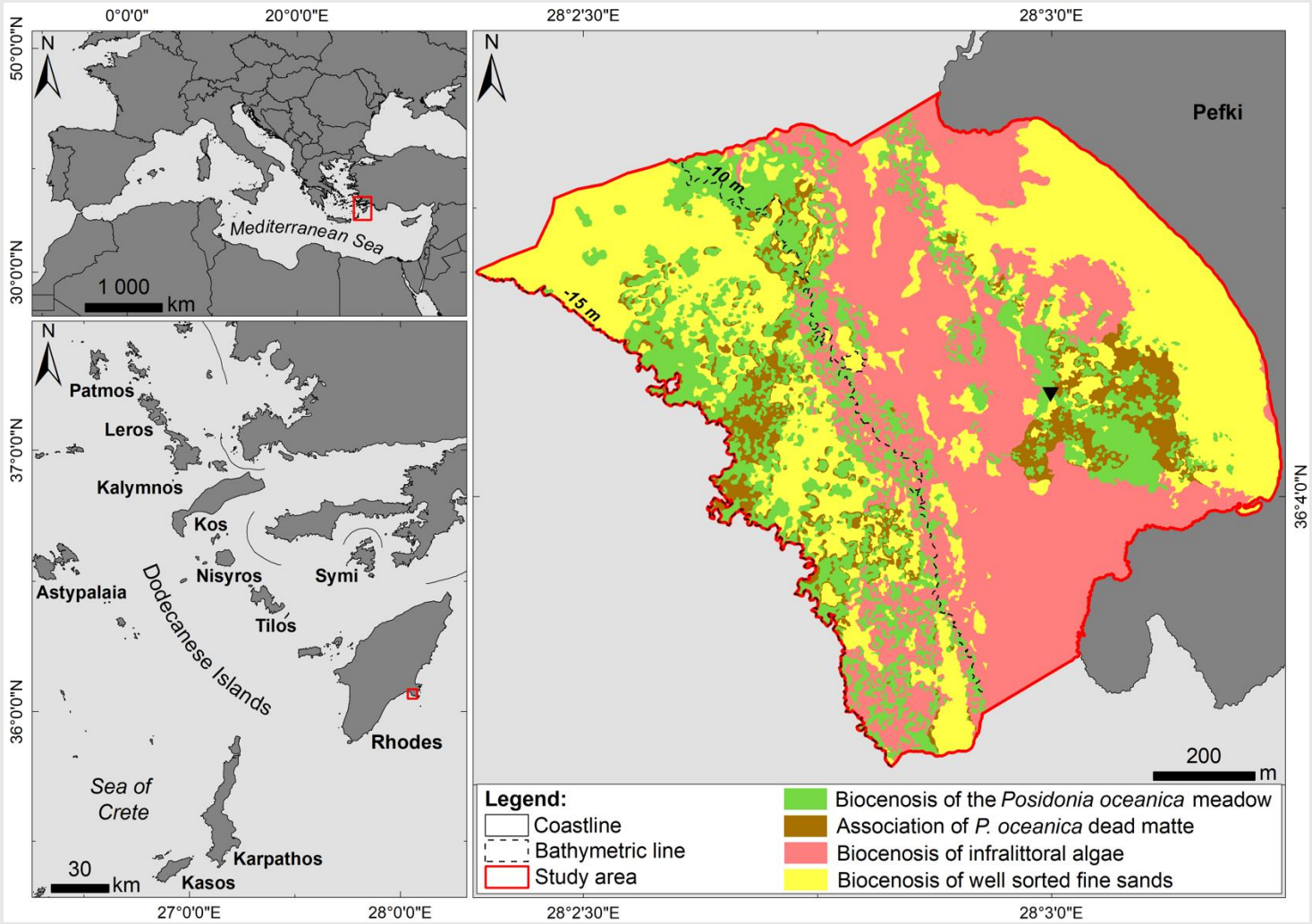
- Monitor habitat condition and habitat loss (identify pressures and update extent, determine loss rate)
- Determine the interrelation between BC and seagrass loss/gain
- Assess the vulnerability of BC stocks to disturbance
- Estimate GHG emissions in healthy and degraded meadows

# MSFD Descriptor 6 Sea floor integrity

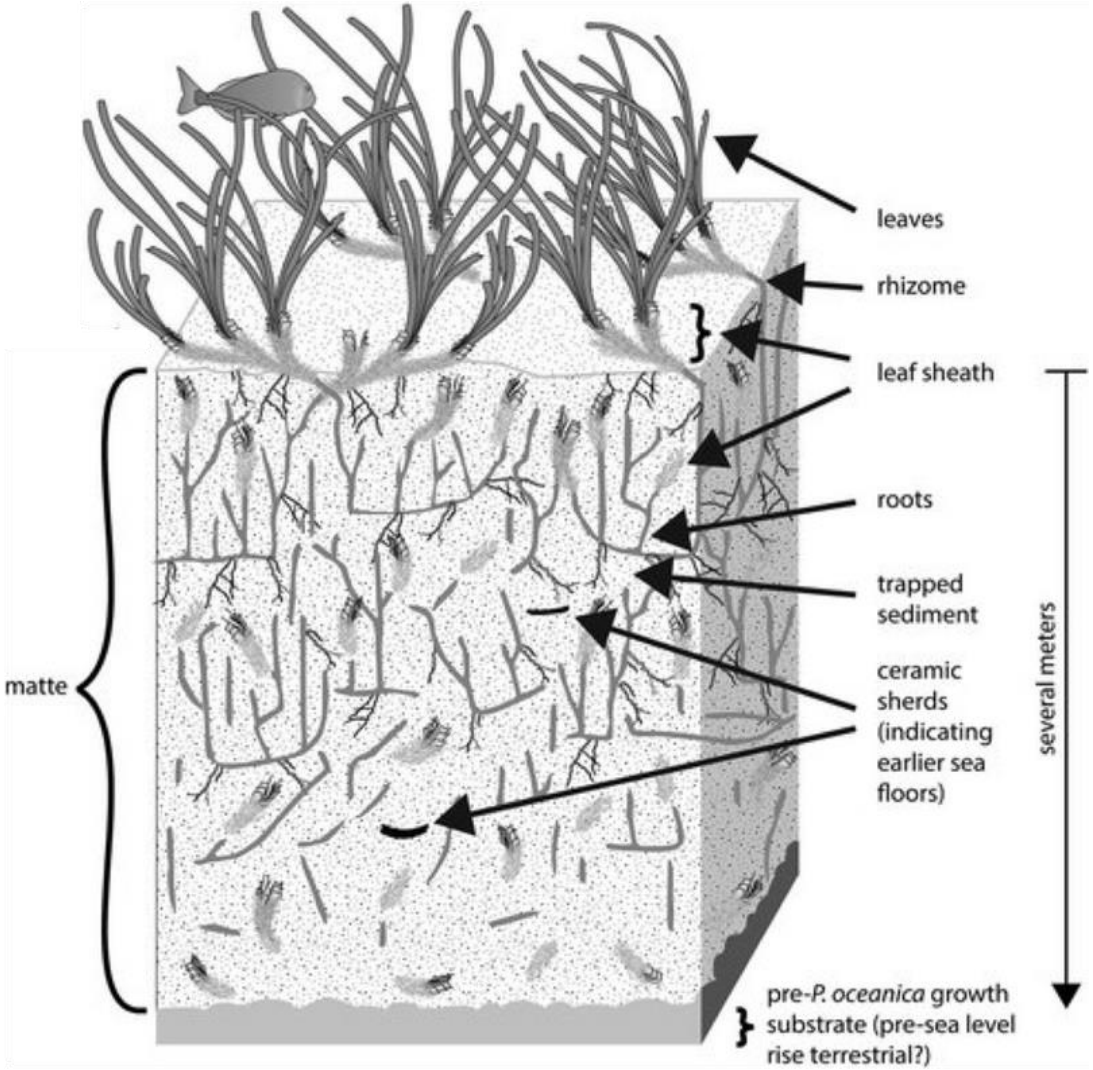
# 2024-2029

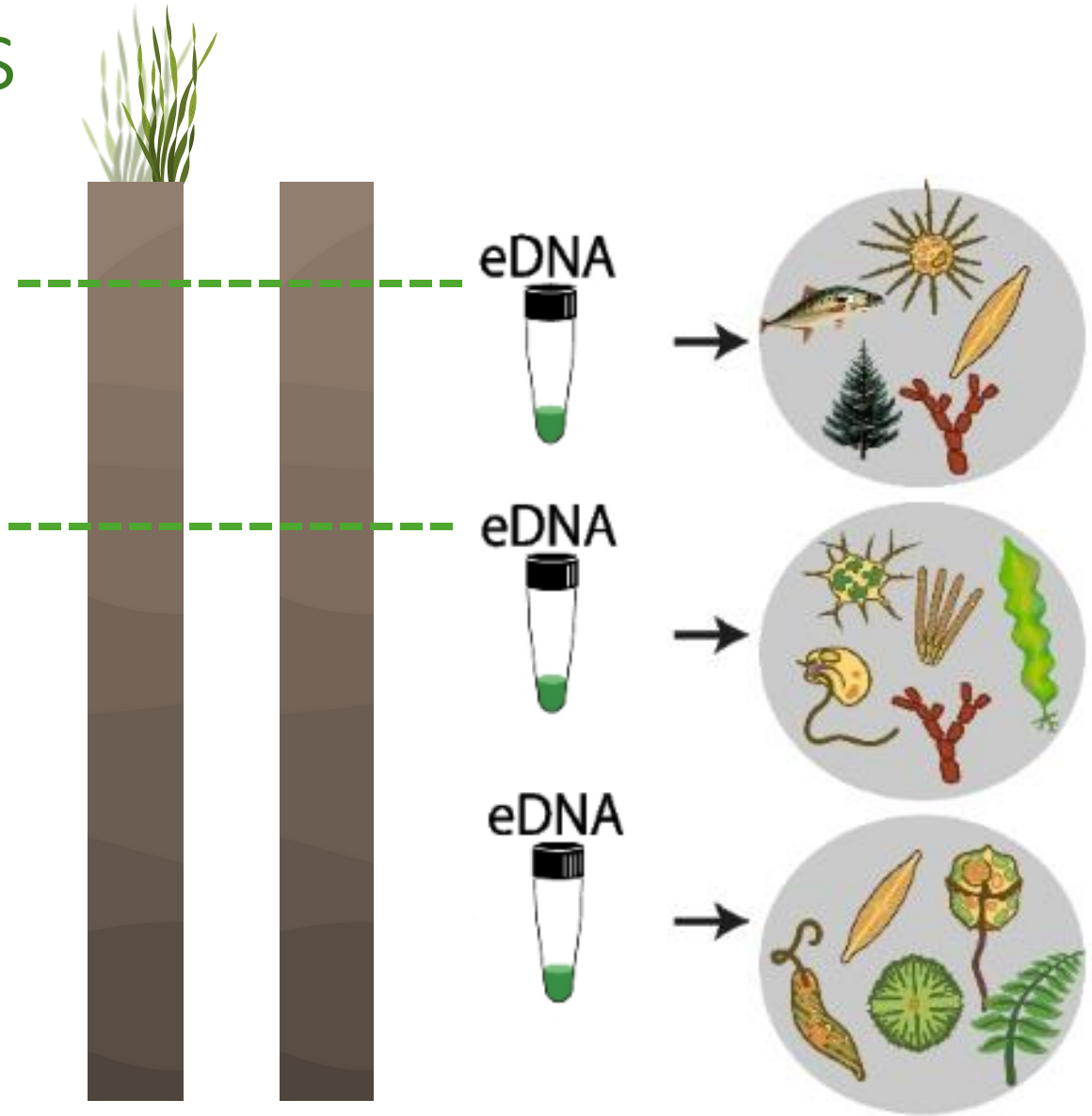


# *P. oceanica* dead matte




# Capture past ecosystems




Garcia-Escudero, PhD

2021-2025

LIFE TRANSFER
SEAGRASS TRANSPLANTATION FOR TRANSITIONAL ECOSYSTEM RECOVERY

2021-ongoing

Pilot (biodegradable coir mats)

2023-ongoing

Pilot (seed growing)

2024-2026

ARTEMIS | Interreg Euro-MED | Co-funded by the European Union

2024-2027

CRADLES | Interreg IPA ADRION | Co-funded by the European Union

2024-2025

CLIMAREST
EU MISSIONS

2021-2025

LIFE TRANSFER
SEAGRASS TRANSPLANTATION FOR TRANSITIONAL ECOSYSTEM RECOVERY

2021-ongoing

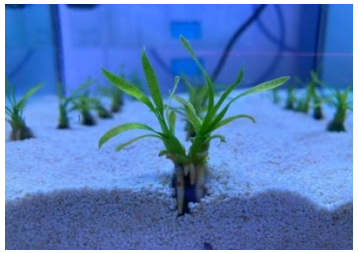
Pilot (biodegradable coir mats)

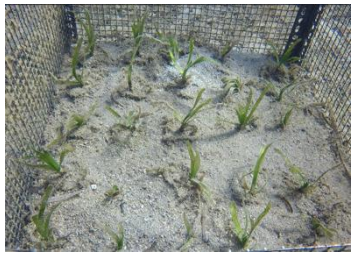
pilot (biodegradable coir mats)

2023-ongoing

Pilot (seed growing)

pilot (ex-situ seed growing)





2024-2026

ARTEMIS | Interreg Euro-MED | Co-funded by the European Union

2024-2027

CRADLES | Interreg | Co-funded by the European Union | IPA ADRION

2024-2025

CLIMAREST | EU MISSIONS

ARTEMIS | Interreg Euro-MED | Co-funded by the European Union


# Collaborations with many colleagues through multiple projects

- Vasilis Gerakaris
- Victoria Litsi-Mizan
- Catalina Garcia
- Sofia Reizopoulou
- Eleni Kaberi
- Giannis Morfis
- Giorgos-Angelos Hatiris
- Vasilis Kapsimalis
- Oscar Serrano
- Salvatrice Vizzini
- Briac Monnier