

Effects of seagrass on non-native invertebrates in Tomales Bay




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Smithsonian

Environmental Research Center

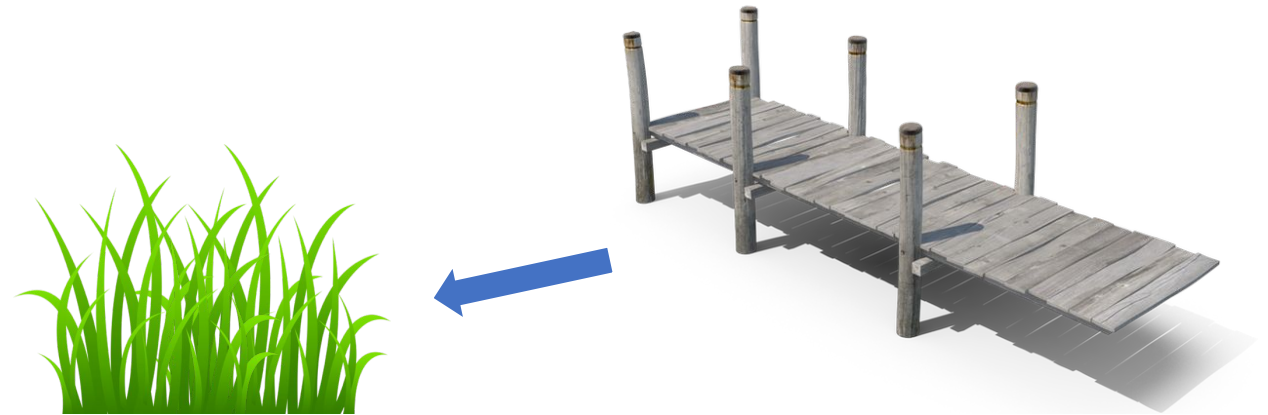


Beyond the Golden Gate Research Symposium

January 20, 2022

Non-native species have the potential to spread from artificial to natural habitats

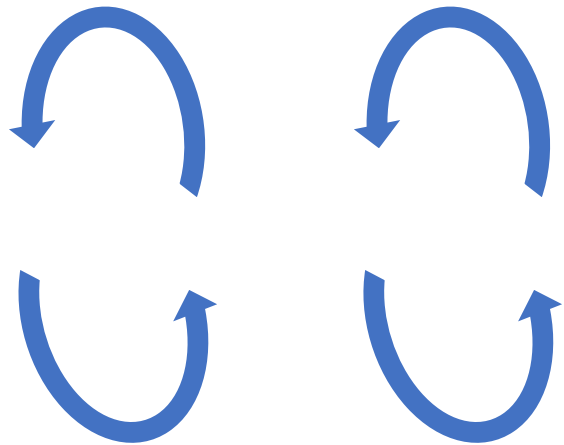
- Many introduced species in marine and estuarine environments are sessile filter feeding invertebrates (fouling species)
- Fouling species can degrade seagrass habitats and ecosystem services



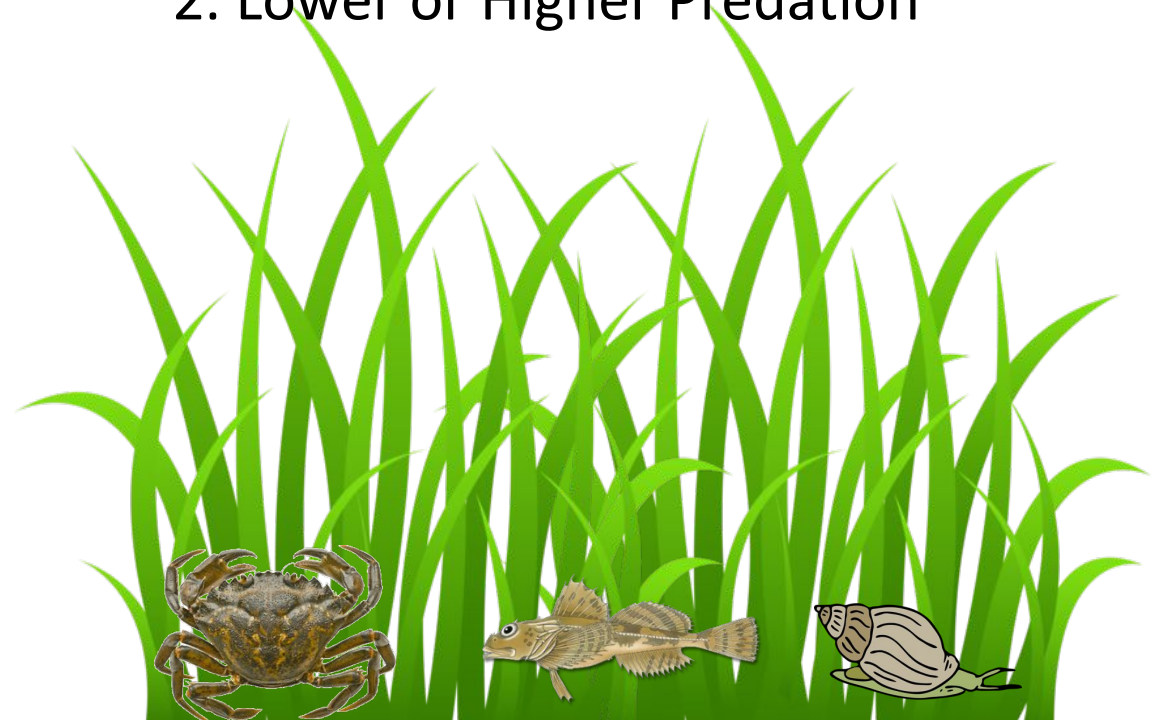
How does seagrass affect the growth and establishment of introduced fouling species?

Seagrass could influence fouling species in two ways

1. Higher Water Flow
2. Lower or Higher Predation



1. Reduced Water Flow
2. Lower or Higher Predation

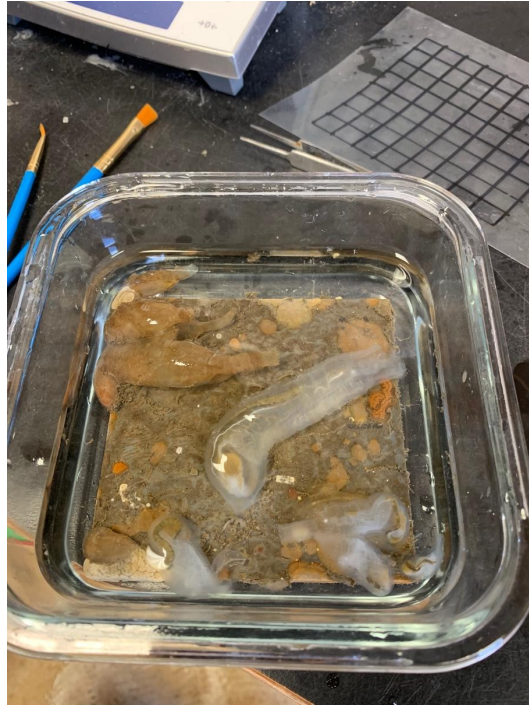


How does seagrass affect the growth and establishment of introduced fouling species?

Methods



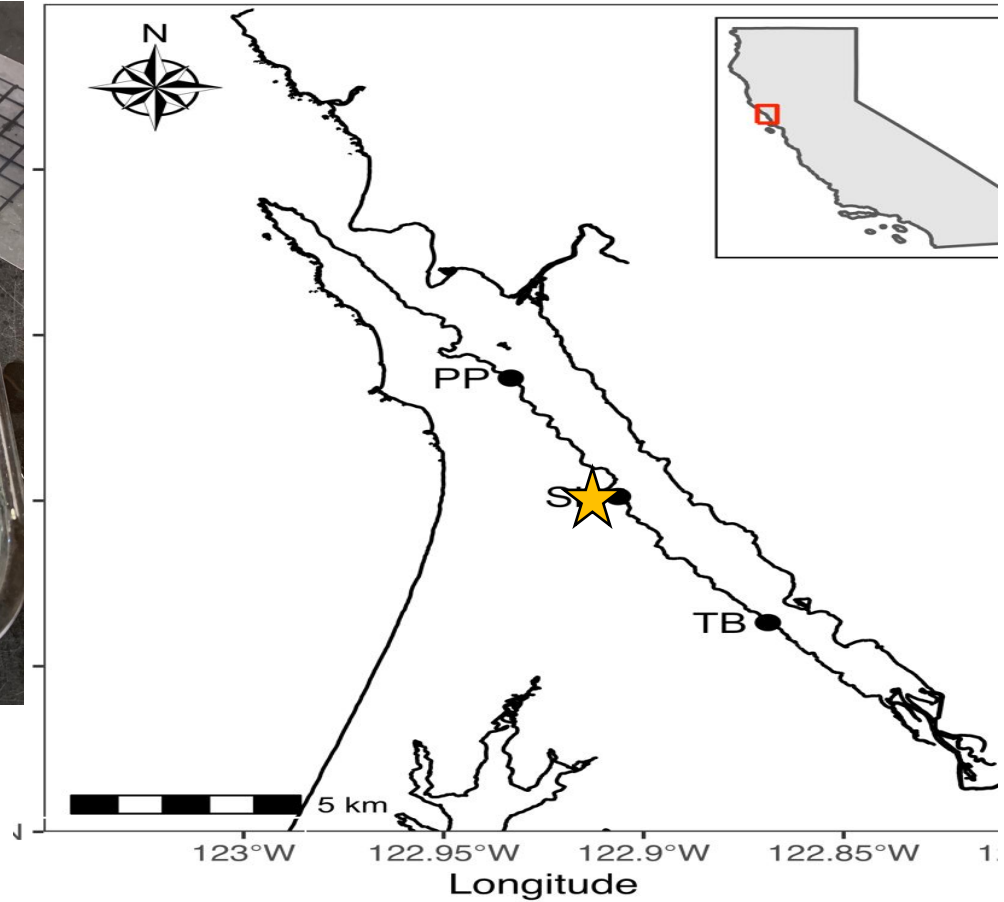
- SM small mesh cage (no predators)
- LM large mesh cage (no macropredators)
- P partial cage (cage control)
- O open



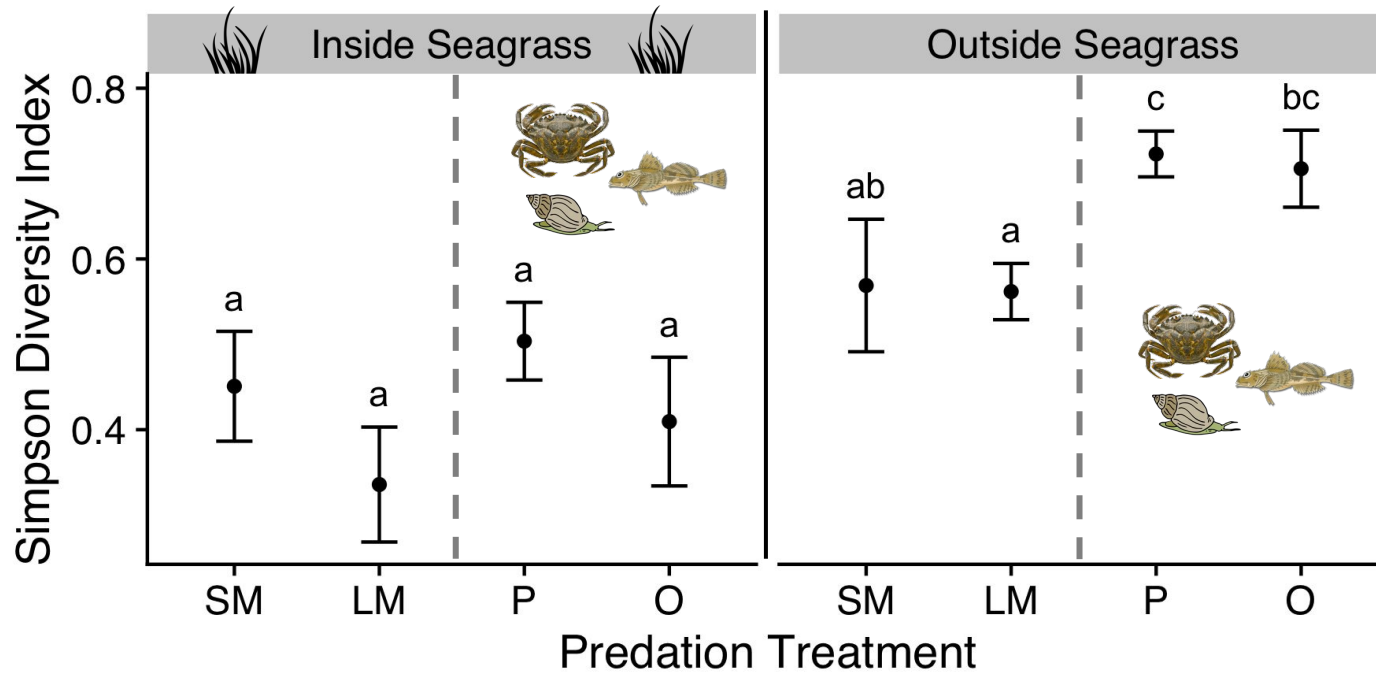
June – October 2018

N = 48

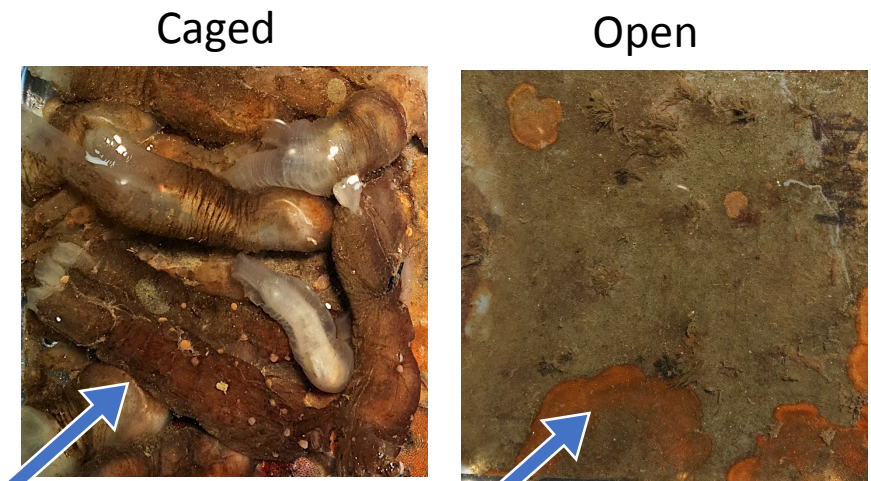
Point counts on settlement plates



Seagrass is stressful to fouling species but could provide refuge from predators



Abundance, richness, and diversity were ~ 1.5x higher outside of seagrass than inside!

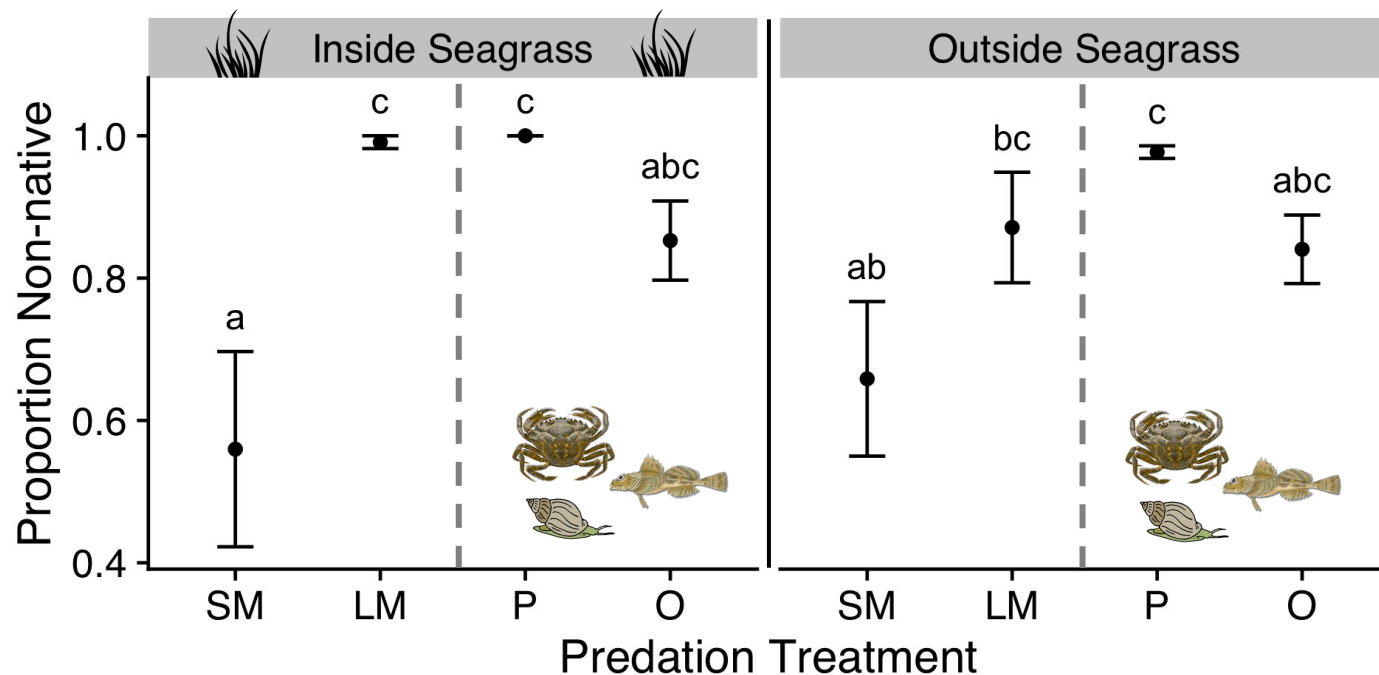


Native and non-native solitary ascidians

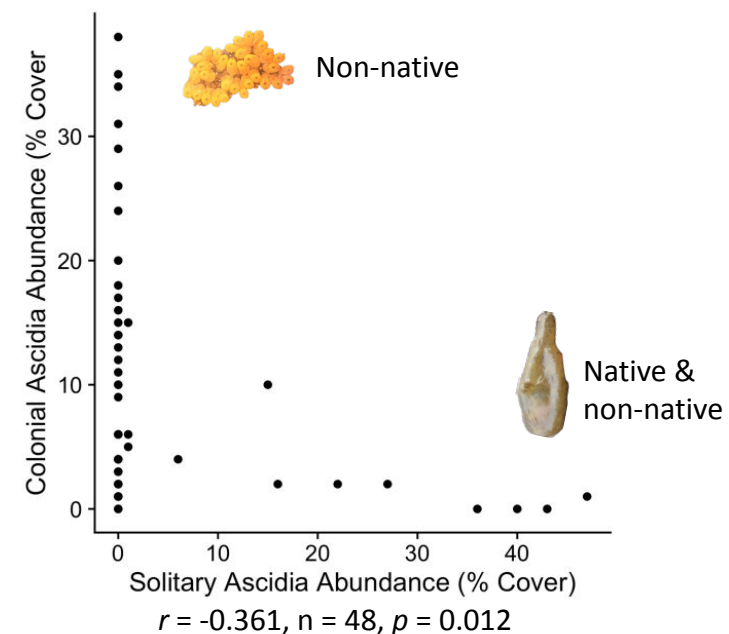
Non-native encrusting bryozoans

ANOVA
 Predation ($F = 5.485, p = 0.002$)
 Seagrass ($F = 44.221, p < 0.001$)
 Interaction ($F = 2.951, p = 0.044$)

Seagrass did not affect the proportion non-native, but predation did



- Seagrass habitats had similar amounts of non-native species as outside of seagrass
- Predation increased the proportion of non-native species



ANOVA
 Predation ($F = 10.57, p < 0.001$)

How does seagrass affect the growth and establishment of introduced fouling species?

- Seagrass habitats are stressful for filter-feeding invertebrates
- Seagrass may provide refuge from predators
- Predators remove native species, allowing for non-native species to proliferate

Effects of seagrass on biological invasions are complex



- >56 non-native species in seagrass ecosystems worldwide (Williams 2007)
- Different effects on different trophic levels
- Seagrass conditions and abiotic conditions could contribute to spatial variability in invasion success
- Invasion success is expected to increase with climate change

Acknowledgements

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Thank you!

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