

Effects of Sea Star Wasting Disease on Mussel Recruitment

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Abstract

Patterns of recruitment are important when determining community dynamics and adult abundance within an ecosystem. Mussels (*Mytilus* spp.) are an ecologically important foundation species that provide complex habitat for a diverse suite of marine species and are used as biological indicators for environmental pollution. To use mussels as biological indicators, we must understand the timing of mussel dispersal and recruitment. In coastal intertidal zones, mussel populations are kept in check through predation by sea stars, a keystone species, which opens up primary substrate for other sessile invertebrates and algae. Understanding mussel population dynamics is important to make predictions about how intertidal ecosystems will respond to loss of keystone predators through sea star wasting disease. To see if mussel recruitment was impacted by sea star wasting disease, we used tuffy collectors to monitor mussel recruitment in the intertidal at Hopkins Marine Station Marine Life Refuge. After tuffy collectors are filtered and sorted under a dissecting microscope, we will look for changes in mussel recruitment during and after the sea star wasting disease event. We expect higher numbers of mussel recruitment during the peak of the sea star wasting disease from 2013 to 2014.

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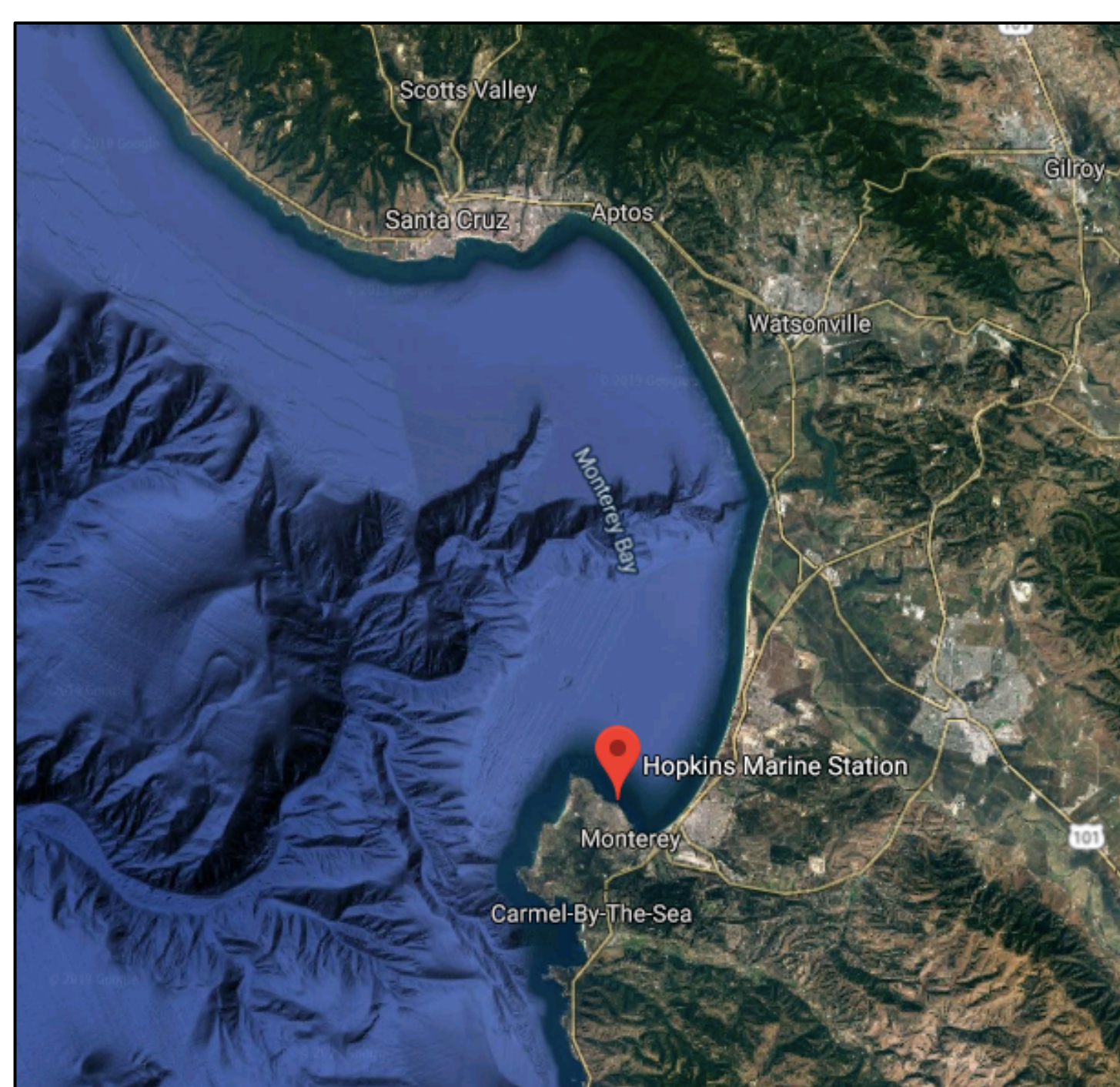
Introduction

- Mussels (*Mytilus spp.*) are an ecologically important foundation species
- Mussel populations are kept in check by sea stars, a keystone species
- Understanding mussel dispersal and recruitment is important to make predictions about how intertidal ecosystems will respond to loss of keystone predators through sea star wasting disease (SSWD)
- Recent SSWD event first noted in central California in fall 2013



Methods

- Tuffy collectors were bolted onto rocks at Hopkins Marine Station Marine Life Refuge
- These recruitment collectors were swapped in the field and brought back to the lab
- After filtration, contents of tuffy collectors preserved in 70% ethanol were sorted under a dissecting microscope
- Counts were recorded on a spreadsheet
- Data collection began in 2014, after SSWD event started



Mussel recruitment was high during the peak of the sea star wasting disease.

Results

- Mussel recruit populations were highest in 2014, during the peak of sea star wasting disease
- There is a significant difference in the average number of mussel recruits between 2014 and 2019 ($p < 0.001$)

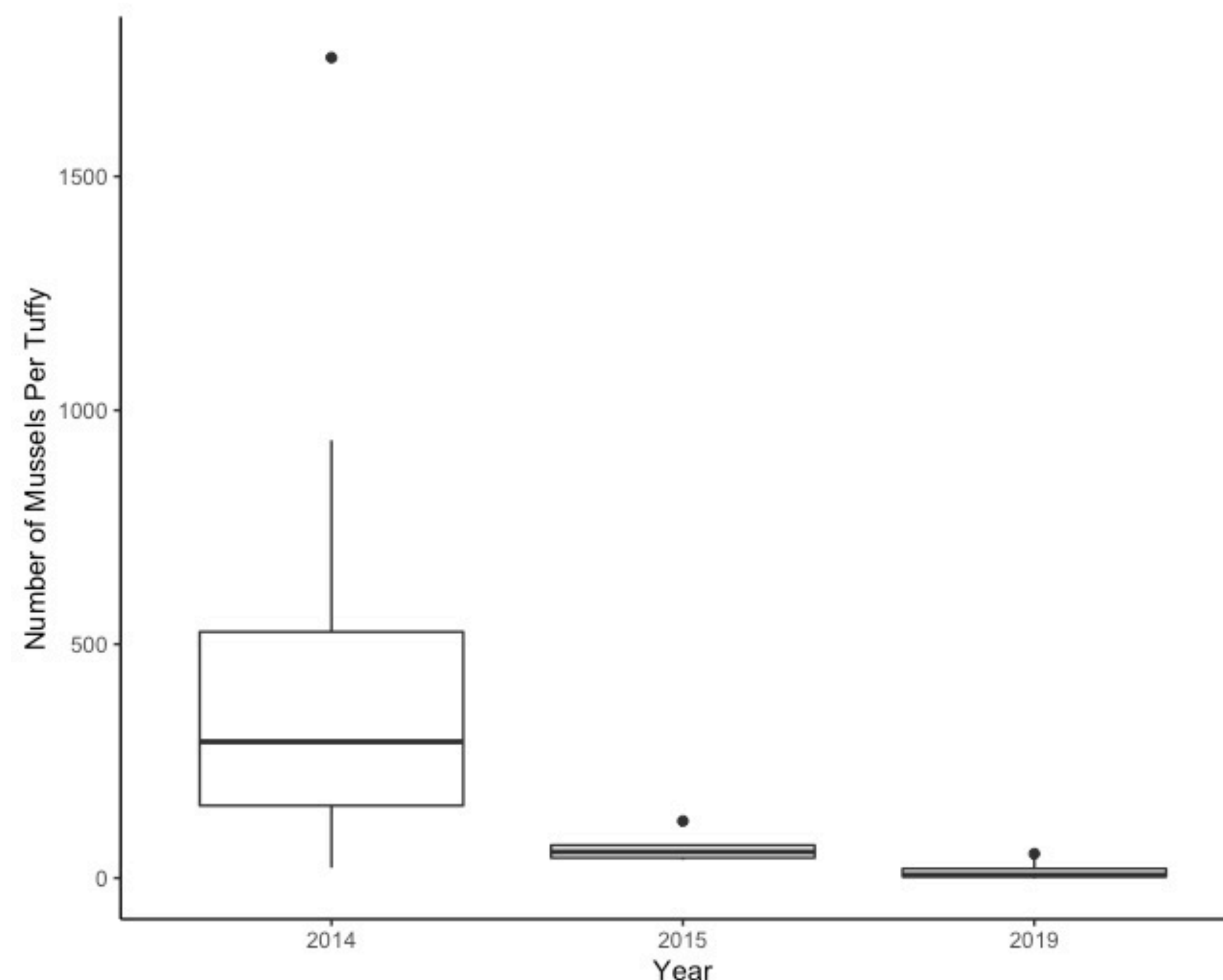


Figure 1. Boxplot comparing the average number of mussel recruits in 2014, 2015, and 2019. There is a significant difference in the average number of mussel recruits between 2014 and 2019 ($p < 0.001$).



Figure 2. Line graph showing *Pisaster ochraceus* population density at Hopkins Marine Station from 2003 to 2017. Data taken from Miner et al. 2018.

Discussion

- Mussel recruitment was high at the peak of sea star wasting disease, possibly due to a lack of predation by sea stars
- As sea star populations recover, mussel recruitment will decrease
- Mussel recruitment declined in 2019 after the peak of SSWD but we do not yet have data on sea star density for comparison
- Increase in the mussel population due to SSWD can impact the biodiversity of the intertidal community

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Acknowledgements

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