3/19/2018

Dear Editorial Board.

This letter accompanies the manuscript, “From the predictable to the unexpected: kelp forest and benthic invertebrate community dynamics following decades of sea otter expansion” which we wish to submit for consideration as an article to Oecologia.

Understanding species interactions and their consequences for the dynamics, stability, and resilience of ecological communities are a fundamental aim of ecology. Both historically and today, studies of strongly interacting species play an outsized role in our understanding of how ecological communities function. In this manuscript, we combine data for three trophic levels of a classic trophic cascade community – sea otters, benthic invertebrates, and kelp – at 10 sites spanning 100 km and nearly thirty years to understand the multi-scale consequences of both direct effects of sea otters on their prey and their indirect connection with kelp forests. Our analyses bring a new spatial and temporal perspective to this classic and well-studied trophic interaction. We leverage the spatial time-series to show how inference about interactions at the coast-wide scale differ strongly from site level patterns. Furthermore, we show that the inferred interaction between sea otters and kelp shift from being tightly coupled during the first half of the time-series to statistically unrelated in the second half. We also document both immediate and gradual consequences of sea otter invasion for different components of the benthic invertebrate community. We believe our work can serve to reconcile distinct perspectives about the role of bottom-up vs. top-down forces in kelp forest communities and has implications for spatial management of resources when component species strongly interact.

Thank you for your consideration.

Sincerely,

A.O. Shelton