June 2, 2022

Dr. Kathryn Cottingham

Editor-in-Chief, *Ecology*

Ecological Society of America

Dear Dr. Cottingham and Editorial Board Members,

We appreciate the invitation to resubmit our manuscript titled “Delayed trophic response of a marine predator to ocean condition and prey availability during the past century,” which we are re-submitting to Ecology as an Article.

Both reviewers and the subject matter editor saw value in the work, particularly the richness of the dataset. We immensely appreciate the detailed comments and thoughtful suggestions of the reviewers. Their dedication to providing constructive reviews has certainly improved the manuscript and for that we are grateful. The reviewers recommended methodological clarifications, clarification of our ecological message, and additional data reporting. We have carefully considered and responded to all of the reviewer comments. In so doing, the revised

manuscript:

1. Includes information regarding tissue turnover time in bone collagen in the main text and appendix

2. Includes information of harbor seal foraging strategy and cause of death as it relates to methodological assumptions

3. Clarifies our message about the importance of delayed predator response to the environment given recent extreme environmental events and providing additional context that supports our result

4. Reports our results with propagated error and provides an additional figure to describe the spatio-temporal distribution of sampling in the appendix.

The nearshore marine predator we examined (harbor seals) showed delayed trophic response (quantified as trophic level) to ocean conditions and prey availability on multiple temporal scales, as different perturbations propagate through the food web at different rates. This result highlights importance of considering dynamic multiscale interactions of predators to their environment when seeking to understand predator responses to environmental change, as multiple ecological factors are often changing simultaneously and predator response occurs at multiple temporal scales.

Finally, Compound specific stable isotope analysis of source amino acids is a relatively new

methodology, and we believe our work will advance this field substantially. Specifically, this analysis applies a number of methodological approaches that have been recommended in previous work but are not commonly implemented in CSSIA. The analysis applies 1) multi-trophic enrichment factor 2) system specific beta value and 3) considers tissue turnover and includes it in the modeling approach. Furthermore, we also consider delayed predator response to food web dynamics.

This version of the manuscript has been approved for submission by all authors and is not being considered for publication elsewhere. Please address correspondence to me at: University of Alaska, College of Fisheries and Ocean Sciences. Email: mfeddern@alaska.edu; Phone: (603) 651-6802.

Please contact me with any questions.

Sincerely,

Megan Feddern