Professor Joerg Heber

Editor in Chief

*Plos One*

Public Library of Science

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August 17th, 2020

Dear Dr. Heber,

We are pleased to submit the manuscript “eDNA Metabarcoding as a Biomonitoring Tool for Marine Protected Areas” for consideration as a Research Article in *Plos One*. Environmental DNA (eDNA) is a promising approach for assessing marine biodiversity because it is a safe, rapid, and cost effective way to survey taxa. Here we demonstrate that eDNA metabarcoding is an effective complementary tool to visual monitoring methods inside and outside a marine protected area (MPA).

The monitoring of MPAs is critical for marine ecosystem management, however current monitoring efforts are hampered in scope and scale due to the limitations of SCUBA-based visual surveys. Here we directly compare eDNA metabarcoding and traditional visual surveys of fish communities inside and outside a Southern California MPA to understand the strengths and limitations of each approach. Our study demonstrates that eDNA methods capture the majority fish species observed during pairwise underwater visual census. In addition, eDNA metabarcoding approaches detected an additional 30 fish species not observed in paired visual surveys, but previously observed during monitoring efforts. Importantly, we found significant variation eDNA fish community signatures on the scale of locations (50m) and sites (~1000m) demonstrating the sensitivity of eDNA metabarcoding to discriminate community composition inside and outside MPAs. Results indicate the utility of eDNA for monitoring marine ecosystems, providing an important complementary tool for visual monitoring methods, helping monitor activities across space, time, and depth inside and outside MPAs.

The authors have no conflicts of interest to report. A version of this work was included in the lead authors doctoral dissertation. All data generated for this study will be made available through a Dryad link upon acceptance of the manuscript. We recommend the following Academic Editors: Hideyuki Doi, Samantha E. M. Munroe, Anderson B. Mayfield , William David Halliday, and Alejandro Pérez-Matus. Thank you for considering this manuscript for publication in *Plos One*.

Sincerely,

Zachary Gold, on behalf of all authors

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