February, 2019

Dr. Robert Howarth, Editor-in-Chief

Limnology and Oceanography

Dear Dr. Howarth,

I write to submit a work of original research on behalf of the authors for consideration as a primary research article in *Limnology and Oceanography*. The research presented in the article, entitled “Spatial variability of sediment methane production and methanogen communities within a reservoir: importance of organic matter source and quantity”, depicts clear spatial differences across a reservoir in methane production rates, OM quantity and source, and it evaluates the differences in methane production rates across a eutrophic reservoir. Specifically this paper addresses the role that OM source and quantity play in determining the production rates.

Understanding the conditions that are associated with high methane production, and consequently emissions, may be important in mitigation efforts. Reservoirs are man-made systems and often highly managed, which in turn could provide an opportunity for mitigating the GHG emissions to the atmosphere. Understanding factors that may lead to high methane production is key in these mitigation efforts.

This work contributes to our understanding of environmental factors surrounding methane production. In particular, it focuses on the role of the combination of organic matter source and quantity in a natural setting. While lab experiments have demonstrated the importance of algal-derived OM, understanding if translates to a natural setting is critical.

Megan Berberich, Jake Beaulieu, Trinity Hamilton and Ishi Buffam designed the study and research plan. The grant that helped fund this research were obtained by IB and TH. JB also provided financial assistance. MB and SW conducted field work with contributions from JB, IB, and other non-bibliographic contributors. MB conducted lab work and processed samples with contributions TH, and other non-bibliographic contributors. MB managed data, carried out statistical analysis, and wrote the manuscript with contributions from all authors.

This work is related to work that Jake Beaulieu has conducted in that it centers around methane in reservoirs and he has previously quantified methane emissions in the same reservoir.

Sincerely,

Megan Berberich

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Online notes:

**Cover Letter:** Each manuscript must be accompanied by a cover letter that briefly describes how the work advances understanding in the field. This letter should also describe other manuscripts the authors have published or intend to publish on closely related work and the relationship of the current submission to these other manuscripts. Further, the cover letter should indicate the contributions made by each of the authors to the submission.