Statement of Significance for Limnology & Oceanography

At submission you will be required to enter a brief statement of the novelty, significance, and breadth of interest of the science presented in the proposed manuscript (**200 words or fewer**), as well as a statement indicating why L&O is the best outlet for the work (**100 words or fewer**). The statement of significance will be provided to the editors and reviewers, but will not be included in the final version of an accepted manuscript.

**a brief statement of the novelty, significance, and breadth of interest of the science presented in the proposed manuscript (191 of 200 words)**

Our manuscript describes how concentrated, bottom-up disturbance along Lake Baikal’s shoreline can propagate throughout food webs. We investigate how sewage-associated nutrients from three discrete lakeside developments (80-1,963 permanent residents) are causing increased filamentous algal abundance in Baikal’s nearshore, thereby altering available resources and nutrition for grazing invertebrates. We used emerging organic micropollutants, such as pharmaceuticals and personal care products (PPCPs), to link sewage indicators with human activity, and then to assess biotic responses, we compare micropollutants concentrations with co-located benthic algal and macroinvertebrate community compositions and food web metrics (stable isotopes and fatty acids). Our combined results suggest that despite the small human population living on Lake Baikal’s shoreline, sewage contributions from settlements can (1) increase filamentous algal abundance, (2) alter macroinvertebrate composition, and (3) require grazers to compensate for changing resource nutrition.

Together, this study demonstrates how low-level eutrophication of oligotrophic systems can cause food webs to respond in nuanced, less visible ways. Although many studies focus on the apparent, stark consequences of eutrophication, our work highlights how systems respond to punctuated nutrient addition and, furthermore, showcases how trophic levels may respond differently, with respect to structure and available nutrition.

**statement indicating why L&O is the best outlet for the work (99 of 100 words)**

This manuscript will interest a wide L&O readership. From a basic ecology perspective, we investigate how bottom-up disturbances along a gradient can propagate throughout a food web. From an applied perspective, we highlight how our results can inform monitoring programs, especially as re-occurring littoral sampling tend to be uncommon relative to pelagic efforts.

Together, this manuscript uses applied techniques to investigate basic research questions, where ensuing conclusions have important implications for monitoring efforts. As such, we believe that this manuscript amenable to attracting readers interested in basic and applied limnologists, especially those interested in consequences of eutrophying oligotrophic systems.

Reviewers:

* **Karen Kidd (McMaster University, ​karenkidd@mcmaster.ca)**
* Sarah Whorley (Daemen College, swhorley@daemen.edu)
* **Guillaume Grosboi (University of Quebec – Chicoutimi; guillaume.grosbois1@uqac.ca)**
* **Sarah Roberts (Centre for Inland Waters, Environment and Climate Change, sarah.roberts2@canada.ca)**
* Peter McIntyre (Cornell University; pbm3@cornell.edu)
* **Harvey Bootsman (University of Wisconsin – Milwaukee; hbootsma@uwm.edu)**
* Michail Gladyshev (Institute of Biophysics of Federal Research Center ‘‘Krasnoyarsk Science Center’’ of Siberian Branch of Russian Academy of Sciences, glad@ibp.ru)

Significance Statement for Limnology & Oceanography Letters **(115 of 125 words)**

This significance statement is included in the final publication…

We present a unified dataset of co-located benthic littoral nutrient concentrations, sewage indicators, algal and macroinvertebrate community abundance, stable isotopes, and fatty acids from Lake Baikal (Siberia). While researchers have studied Baikal’s exceptionally diverse endemic taxa for centuries, this product is the first publicly available dataset of Baikal benthic amphipod species abundance as well as amphipod fatty acid profiles in a machine-readable format with standardized metadata. Furthermore, with over 150 co-located variables, this dataset is the most extensive, publicly available description of Baikal’s nearshore benthic communities and food webs. The data are highly structured and incorporate a scripted, sequential workflow, enabling the dataset to either supplement current monitoring efforts or provide data for syntheses across systems.

Possible reviewers:

* Kendra Spence Cheruvelil (Michigan State University, [ksc@msu.edu](mailto:ksc@msu.edu))
* Gavin Simpson (University of Regina, gavin.simpson@uregina.ca)
* Grace Wilkinson (Iowa State University/University of Wisconsin-Madison, wilkinso@iastate.edu)
* Marcus Beck (Tampa Bay Estuary Program, mbeck@tbep.org)