

Preregistration

LDP Mock Preregistration

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2021-10-06

Citations in parentheses: (Gushulak *et al.*, 2021), (but also, see Gushulak *et al.*, 2021)

Citation out of parentheses: Gushulak *et al.* (2021) state that...

See what references you can add by opening the .bib file in a RStudio and using the name after `@{article}` (e.g. `@article{gushulak_effects_2021}`), or by running `citr::insert_citation()` (requires installing `citr`).

NOTE: to knit using a bib file, you will need to install a different version of `prereg` using `remotes::install_github("crsh/prereg@issue-16")`. not sure why this happens. – Stefano

Roles

1. Research question + hypothesis (William)

- clearly identify the research question of interest in the replication?
- include at least 1 testable hypothesis?

2. **Data** (Julee, Kate)

- Description of existing data and/or data collection procedures? (If existing data is included, is the reference(s) to the original data source included?)
- A description of the variables included in the dataset and/or to be included in the analysis
- A study design plan?

3. **Analysis**

- Does the pre-registration include at least 1 example statistical analysis using simulated/dummy data?
- Are the simulated data informed by published data?

4. **Figure** (William)

- Does the pre-registration include a figure?
- summarize/present the key variables in the analysis (with appropriate response and predictor variables)?
- Include properly labelled axes and a legend (if applicable)?
- Include a figure caption

5. **Literature** (Julee)

- Does the pre-registration include in-text citations and a bibliography of all studies mentioned?

Study Information

Title	LDP Mock Preregistration
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Description	Enter your response here.
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Hypotheses Enter your response here.

Design Plan

Study type **Experiment.** A researcher randomly assigns treatments to study subjects, this includes field or lab experiments. This is also known as an intervention experiment and includes randomized controlled trials.

Observational Study. Data is collected from study subjects that are not randomly assigned to a treatment. This includes surveys, natural experiments, and regression discontinuity designs.

Meta-Analysis. A systematic review of published studies.

Other. Please explain.

Blinding No blinding is involved in this study.

For studies that involve human subjects, they will not know the treatment group to which they have been assigned.

Personnel who interact directly with the study subjects (either human or non-human subjects) will not be aware of the assigned treatments.

Personnel who analyze the data collected from the study are not aware of the treatment applied to any given group.

Study design Enter your response here.

Randomization Enter your response here.

Sampling Plan

Existing data

Registration prior to creation of data. As of the date of submission of this research plan for preregistration, the data have not yet been collected, created, or realized.

Registration prior to any human observation of the data. As of the date of submission, the data exist but have not yet been quantified, constructed, observed, or reported by anyone - including individuals that are not associated with the proposed study. Examples include museum specimens that have not been measured and data that have been collected by non-human collectors and are inaccessible.

Registration prior to accessing the data. As of the date of submission, the data exist, but have not been accessed by you or your collaborators. Commonly, this includes data that has been collected by another researcher or institution.

Registration prior to analysis of the data. As of the date of submission, the data exist and you have accessed it, though no analysis has been conducted related to the research plan (including calculation of summary statistics). A common situation for this scenario when a large dataset exists that is used for many different studies over time, or when a data set is randomly split into a sample for exploratory analyses, and the other section of data is reserved for later confirmatory data analysis.

Registration following analysis of the data. As of the date of submission, you have accessed and analyzed some of the data relevant to the research plan. This includes preliminary analysis of variables, calculation of descriptive statistics, and observation of data distributions. Please see <https://cos.io/prereg> for more information.

Explanation of existing data

Enter your response here.

Data collection procedures

Enter your response here.

Sample size	Enter your response here.
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Sample size rationale	Enter your response here.
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Stopping rule	Enter your response here.
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Variables

Manipulated variables

Depth

For phytobenthos analyses, we will manipulate the depth that surface sediment samples are collected. Three sediment samples will be collected for every 1-m depth interval of Gall Lake. Samples for this categorical variable will range from a 1-m to 16-m depth and will be determined with the use of a depth sounder (Gushulak *et al.*, 2021). In R scripts, this manipulated variable will be named `depth_m`.

Measured variables

Stable Isotopic Analysis

The single outcome variables for the stable isotopic ratio of nitrogen and carbon will be measured from freeze-dried sediment subsamples of Gall Lake. Samples will be placed in a Thermo Finnigan Delta V isotope ratio mass spectrometer that has a ConFlow IV dilution inlet system as described by Gushulak *et al.* (2021) Following the calibration procedure for laboratory standards explained in Bunting *et al.* (2010) and Savage, Leavitt & Elmgren (2004), the isotope values will be analyzed with the use of atmospheric gas. The standard notation for the stable isotopic ratio of nitrogen and carbon are $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$, respectively. In R scripts, these single outcome variables will be named `d15n` and `d13c` for nitrogen and carbon, respectively.

Indices

Nitrogen and Carbon Content

Using generalized additive models, we will be determining the percent content of nitrogen and carbon in the depth intervals of Gall lake by manipulating the stable isotope content of these elements. Specifically, gamma distributions as described by Mushet *et al.* (2020) will be used to determine the percent content. In R scripts, the manipulated variables will be named `perc_n` and `perc_c` for nitrogen and carbon, respectively.

equation?

Analysis Plan

Statistical models	Enter your response here.
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Transformations	Enter your response here.
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Inference criteria	
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Data exclusion	Enter your response here.
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Missing data	Enter your response here.
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Exploratory analyses (optional)	N/A
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Other

Other (Optional)	Enter your response here.
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References

- Bunting L., Leavitt P.R., Weidman R.P. & Vinebrooke R.D. (2010). Regulation of the nitrogen biogeochemistry of mountain lakes by subsidies of terrestrial dissolved organic matter and the implications for climate studies. *Limnology and Oceanography* **55**, 333–345. <https://doi.org/10.4319/lo.2010.55.1.0333>
- Gushulak C.A.C., Haig H.A., Kingsbury M.V., Wissel B., Cumming B.F. & Leavitt P.R. (2021). Effects of spatial variation in benthic phototrophs along a depth gradient on assessments of whole-lake processes. *Freshwater Biology*, fwb.13820. <https://doi.org/10.1111/fwb.13820>
- Mushet G.R., Laird K.R., Leavitt P.R., Maricle S., Klassen A. & Cumming B.F. (2020). Bottom-Up Forces Drive Increases in the Abundance of Large Daphnids in Four Small Lakes Stocked with Rainbow Trout (*Oncorhynchus mykiss*), Interior British Columbia, Canada. *Ecosystems* **23**, 873–890. <https://doi.org/10.1007/s10021-019-00443-0>
- Savage C., Leavitt P.R. & Elmgren R. (2004). Distribution and retention of effluent nitrogen in surface sediments of a coastal bay. *Limnology and Oceanography* **49**, 1503–1511. <https://doi.org/10.4319/lo.2004.49.5.1503>