Metadata template[[1]](#footnote-1) for datasets of *L&O-Letters* articles

**Instructions:**

Metadata provides enough structured information for other scientists to understand and use your data. To prepare your metadata, you will need to fill in the information in the tables below and take the followings steps:

1. Fill in the tables below for your dataset that you will be making available. If you have more than one dataset, then fill in information requested for Table 2 (the data dictionary) for each dataset.
2. Save this file in this RTF format and upload your metadata to the *L&O-Letters* website when you submit your manuscript.
3. Timing of depositing your data in a repository: You should submit your data to a repository at the time of submission, however, you do not need to provide the link to the data until the manuscript has received a decision of major or minor revision. During the review process, we will review your metadata. In some cases, reviewers may ask for the data during the review stage, at which point you need to make it available.

[PLEASE DELETE THESE INSTRUCTIONS ONCE YOU FILL THIS FORM IN]

**Table 1.** Description of the fields needed to describe the creation of your dataset.

|  |  |
| --- | --- |
| **Title of dataset** | Data for “The effects of increasing chloride and temperatures on freshwater zooplankton communities” |
| **URL of dataset** | *Provide the URL of the data repository for the dataset. For the manuscript review stage, it is acceptable to say that this is forthcoming upon decision at the first review stage* |
| **Abstract** | Across the Northern hemisphere, chloride concentrations in lakes are increasing from decades of road salt use, threatening aquatic ecosystems. Zooplankton are especially sensitive to increasing chloride, but water quality guidelines are likely insufficient for their protection, particularly in soft-water lakes on the Canadian Shield. Additionally, guidelines do not consider how additional stressors, such as increasing lake temperatures, could exacerbate negative effects of chloride on zooplankton. To determine the effects of increasing chloride and temperatures on freshwater plankton communities and investigate the adequacy of the current Canadian Water Quality Guideline for chloride (CWQG), we conducted a mesocosm experiment using thirty concentrations of chloride, ambient or warmed temperatures, and plankton from a Canadian Shield lake. Increasing chloride concentrations led to reduced zooplankton biomass and richness, even at concentrations below the CWQG, and an increase in cyanobacteria abundance, suggesting that policies regulating road salt application should be revised to better protect aquatic ecosystems. This dataset contains all relevant data to support our conclusions. |
| **Keywords** | Zooplankton, Phytoplankton, Chloride, Climate Change, Road Salt, Canadian Shield, Arnott |
| **Lead author for the dataset** | Alexandra McClymont |
| **Title and position of lead author** | Graduate student |
| **Organization and address of lead author** | Queen’s University, Department of Biology, 116 Barrie street, Kingston, Ontario, Canada, K7L 3N6  Current: 194 Ridgemont Lane, Fernie, BC, Canada, V0B 1M2. |
| **Email address of lead author** | Alex.mcclymont7@gmail.com |
| **Additional authors or contributors to the dataset** | Alexandra McClymont, Shelley Arnott, Jim Rusak |
| **Organization associated with the data** | *Organization associated with the data if other than the organization of the data author or contact person* |
| **Funding** | *List the principle investigator names, title of grant, funding agency, and funding identification number* |
| **License** | *Select a license for your data. We have 2 recommendations:* [***CCO***](https://creativecommons.org/publicdomain/zero/1.0/) *– most accommodating of data reuse, or* [***CCBY***](https://creativecommons.org/licenses/by/4.0/) *– requires attribution* |
| **Geographic location – verbal description** | Dorset Environmental Science Center, 1026 Bellwood Acres Road, Dorset, Ontario, Canada |
| **Geographic coverage bounding coordinates** | 45.2252°N, 78.9303°W |
| **Time frame - Begin date** | June 28, 2018 |
| **Time frame - End date** | August 23, 2018 |
| **General study design** | We conducted a mesocosm experiment, using 30 nominal concentrations of chloride from ambient (16.9 mg/L) to 1500 mg/L, either ambient or warmed temperatures, and a plankton community from a Canadian Shield lake. This experiment extended for six weeks. We collected samples for chlorophyll *a* concentration, phytoplankton community composition, and zooplankton biomass and community composition. |
| **Methods description** | We conducted a mesocosm experiment at the Dorset Environmental Science Centre in Ontario, Canada (DESC, 45.2252°N, 78.9303°W) beginning on June 28, 2018. We crossed a chloride gradient with either ambient or warmed temperatures for a total of 60 mesocosms. Our chloride gradient contained 30 nominal chloride concentrations between ambient in our source lake (16.9 mg/L) and 1500 mg/L  Mesocosms were placed under steel-frame geodesic domes (Cressy Tool & Die Ltd, Picton, Ontario) covered with semi-transparent (70% light transmission) polyethylene tarps (Northern Greenhouse Sales Inc., Gretna, Manitoba). Temperature treatments were created by adjusting greenhouse venting for an average temperature increase of 2.7°C. Mesocosms were covered with 1 mm fiberglass mesh to prevent colonization by aerial insects.  Zooplankton were collected from Paint Lake, Ontario, on June 27 using an 80 µm net, and then mixed and dispersed into mesocosms so that mesocosm concentrations reflected lake concentrations.  On June 28, we added chloride as NaCl (≥99% pure; Fisher Scientific, Waltham, Massachusetts).  Based on average phosphorus and nitrogen concentrations in Paint Lake in May 2013, 2014, and 2017, we added 2.5 µg phosphorus (as K2PO4; Fisher Scientific) and 81.0 µg nitrogen (as NH4NO; Sigma Aldrich, St. Louis, Missouri) to each mesocosm each week to replace an estimated 35% loss per week to periphyton, denitrification, and sedimentation.  We suspended HOBO temperature loggers (Onset Computer Corporation, Bourne, Massachusetts) 30 cm above the bottom of each warmed mesocosm and in eight ambient temperature mesocosms. On July 28, we added 20 L of distilled water into all mesocosms to replace water lost to evaporation.  We collected samples for chlorophyll *a*, phytoplankton, and zooplankton from each mesocosm before chloride was added, and then again after six weeks. We sampled mesocosms in order of increasing chloride concentration, rinsing sampling equipment thoroughly in filtered (80 μm) lake water. |
| **Laboratory, field, or other analytical methods** | *Describe the lab, field, or other processing methods for each variable included in the data table. This section may, and should, be long. You should insert additional rows in this table to complete this section.* |
| **Temperature** | HOBO temperature loggers (Onset Computer Corporation, Bourne, Massachusetts) were suspended in the middle depth of every warmed mesocosms and in eight ambient temperature mesocosms. Water temperature was recorded every 15 minutes for the duration of the experiment |
| **Chloride concentration** | Chloride samples from each mesocosm were collected as grab samples on July 3 and August 23, 2018. Chloride concentration was analyzed using ion chromatography, and chloride concentrations used in all analyses were the average of concentrations from both sampling dates. |
| **Chlorophyll *a* concentration** | Chlorophyll *a* samples were collected from each mesocosm as grab samples 0.3 m below the water’s surface before chloride was added (week 0) and then again after six weeks (week 6). Samples were stored in darkness at 4°C for ~24 hours. To estimate chlorophyll *a* concentration, 250 mL of each sample was filtered through a G4 glass fibre filter (1.2 μm pore size) which was frozen, extracted in methanol for 24 hours, and quantified using a TD-700 fluorometer (Turner Designs, Sunnyvale, California) following Welschmeyer (1994). |
| **Phytoplankton** | Phytoplankton samples were collected from each mesocosm as grab samples 0.3 m below the water’s surface before chloride was added (week 0) and then again after six weeks (week 6). Samples were stored in darkness at 4°C for ~24 hours. To quantify concentrations of major phytoplankton classes (cryptophytes, cyanobacteria, green algae, and golden-brown algae (diatoms and chrysophytes)), we analyzed 25 mL of each grab sample using a bbe AlgaeLabAnalyzer (bbe Moldaenke GmbH, Schwentinental, Germany). |
| **Zooplankton** | We collected zooplankton samples from the bottom, middle, and top of each mesocosm using a 12 L Schindler-Patalas trap with 50 μm mesh. We pooled samples from all depths for each mesocosm, anaesthetized zooplankton in carbonated water, and preserved samples in >70% ethanol. We identified zooplankton using a Leica M165-C dissecting microscope and a Leica DM E compound microscope (Leica Microsystems, Wetzlar, Germany). Cladocerans and copepods were identified to species except for chydorids, which were identified to family, and immature copepods which were identified as nauplii or cyclopoid or calanoid copepodids. Rotifers were identified to genus. We measured the body length of the first 25 individuals of each taxon in a sample using a counting and measuring software (Plankton Counting Tool, Wong 2018). Body length was used to estimate biomass using published formulae. |
| **Taxonomic species or groups** | Zooplankton, including Bosmina spp., chydorid spp., Cyclops scutifer, Daphnia longiremus, Daphnia mendotae, Diacyclops thomasi, Diaphanosoma brachyrum, Epischura lacustris, Eubosmina spp., Holopedium glacialis, Leptodiaptomus minutus, Leptodora kindtii, Microcyclops varicans, Orthocyclops modestus, Scapaloberis mucronate, Sida crystallina, Skistodiaptomus oregonensis, Tropocyclops prasinus extensus, Anuraeopsis spp., Ascomorpha spp., Asplancha spp., Bipalpus spp., Brachionus spp., Collotheca pelagica, Conochilus spp., Euchlanis spp., Gastropus spp., Kellicottia spp., Keratella spp., Lecane spp., Lepadella spp., Monostyla spp., Ploesoma spp., Polyarthra spp., Pompholyx spp., Synchaeta spp., Trichocerca spp., Trichotria spp., Tylotrocha spp. |
| **Quality control** | All laboratory and field instruments were calibrated before use.  Sampling equipment was thoroughly rinsed in filter lake water in between mesocosms.  Several samples were examined twice to ensure consistency in taxonomic identification.  Any statistical outliers were examined |
| **Additional information** | *Any additional information that may help future users of the data not included in the above rows, or in the table below.* |
|  |  |

**Table 2.** Data dictionary: description of the variables (i.e., columns) in EACH dataset.

Dataset filename: Dorset\_Salt\_Experiment\_Zooplankton\_Data.csv

Dataset description: Zooplankton concentration and biomass data in support of Dorset salt experiment (McClymont et al. 2021).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column name** | **Description** | **Units** | **Code explanation** | **Data format** | **Missing data code** |
| cl.nom | Nominal concentration of chloride | mg/L | No code | numeric | NA |
| cl.ave | Average concentration of chloride between week 0 (initial) and week 6 (final) samples | mg/L | No code | numeric | NA |
| temp | Temperature: ambient or warmed (average temperature increase of 2.7°C) | No units | A = ambient temperature; W = warmed | factor | NA |
| week | Week of experiment in which samples were collected: 0 (initial) or 6 (final) | Count | No code | integer | NA |
| species | Taxon identified to lowest possible identification: genus for rotifers, species for mature copepods and cladocerans, with the exception of chydorids, and immature copepods as nauplii or immature cyclopoids or calanoids | No units | spp = species; imm = immature | character | NA |
| group | Higher level taxonomic group: rotifer, copepod, or cladoceran | No units | No code | character | NA |
| conc.meso | Concentration of each zooplankton taxon in each mesocosm | n/L | No code | numeric | NA |
| biomass.ug | Biomass of each zooplankton taxon in each mesocosm, plus the minimum detectable concentration (1 individual/36 L) times the average mass per individual in each week for each taxon | µg/L | No code | numeric | NA |

Dataset filename: Dorset\_Salt\_Experiment\_Phytoplankton\_Data.csv

Dataset description: Total chlorophyll *a* concentrations and concentrations of chlorophyll *a* in four main algal groups, in support of Dorset salt experiment (McClymont et al. 2021).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column name** | **Description** | **Units** | **Code explanation** | **Data format** | **Missing data code** |
| cl.nom | Nominal concentration of chloride | mg/L | No code | numeric | NA |
| cl.ave | Average concentration of chloride between week 0 (initial) and week 6 (final) samples | mg/L | No code | numeric | NA |
| temp | Temperature: ambient or warmed (average temperature increase of 2.7°C) | No units | A = ambient temperature; W = warmed | factor | NA |
| week | Week of experiment in which samples were collected: 0 (initial) or 6 (final) | Count | No code | integer | NA |
| chl.conc | Concentration of total chlorophyll *a*, as quantified by a Turner Designs fluorometer | mg/L | No code | numeric | NA |
| green.algae.conc | Concentration of chlorophyll *a* associated with green algae, as quantified by a bbe AlgaeLabAnalyser, plus the minimum detectable concentration (0.01 µg chlorophyll a/L) | µg/L | No code | numeric | NA |
| bluegreen.algae.conc | Concentration of chlorophyll *a* associated with bluegreen algae (cyanobacteria), as quantified by a bbe AlgaeLabAnalyser, plus the minimum detectable concentration (0.01 µg chlorophyll a/L) | µg/L | No code | numeric | NA |
| goldenbrown.algae.conc | Concentration of chlorophyll *a* associated with golden-brown algae (diatoms and chrysophytes), as quantified by a bbe AlgaeLabAnalyser, plus the minimum detectable concentration (0.01 µg chlorophyll a/L) | µg/L | No code | numeric | NA |
| cryptophyta.conc | Concentration of chlorophyll *a* associated with cryptophytes, as quantified by a bbe AlgaeLabAnalyser, plus the minimum detectable concentration (0.01 µg chlorophyll a/L) | µg/L | No code | numeric | NA |

**Table 3. Data provenance**

If you used data derived from other sources, provide the information here so future users know where the data came from.

|  |  |  |  |
| --- | --- | --- | --- |
| **Dataset title** | **Dataset DOI or URL** | **Creator (name & email)** | **Contact (name & email)** |
|  |  |  |  |
|  |  |  |  |

**Scripts/code (software) –** *OPTIONAL*

It is recommended that you also provide your scripts along with your data, although it is not required at this time in our journal.

|  |  |  |
| --- | --- | --- |
| **File name** | **Description** | **Scripting language** |
|  |  |  |
|  |  |  |

**Notes and Comments:**

1. *This document liberally borrows from a similar document provided by the Environmental Data Initiative* [↑](#footnote-ref-1)