# EDI Metadata Template (2016)[[1]](#footnote-1)

Data should be in csv text file. If starting with an Excel spreadsheet, please make sure it does not contain any formulas and comments on cells. If you need comments put them in their own column. If data were used in a database and major table linking is necessary to analyze, please de-normalize into a flat file, not just database table exports.

## Dataset Title

(be descriptive, more than 5 words): Lake Sunapee: High Frequency Water Temperature Data – 2007-2017

## Short name or nickname you use to refer to this dataset:

Sunapee buoy temperature 2007-2017

## Abstract

(include what, why, where, when, and how)

The Lake Sunapee instrumented buoy is equipped with a thermistor chain comprised of Nexsens T500 Node thermistors (2010-current) and previously TempLine thermistors from Apprise Technology. The below-surface depth of the sensors fluctuated through the years, in the recent past have been at 1m intervals beginning at 1.5m below the water surface through 10.5m below the surface. Data are collected every 10 minutes.

The Lake Sunapee buoy is located at a location near Loon Island during the summer months and in the Lake Sunapee harbor during the winter months (2010-current) except the first few years of data (2007-2010), when the buoy was located near Loon Island all year.

Beginning winter 2014, a HOBO temperature string was deployed at the summer buoy location to monitor winter water temperatures. The below-surface depth of the sensors have been at 1m intervals beginning at 1.5m below the water surface through 9.5m below the surface. Data are collected every 15 minutes. Additionally, during the summer of 2015, the HOBO temperature string was deployed in place of the thermistors while they were being serviced. The summer depths during 2015 deployment were at 1m intervals beginning at 0.5m through 8.5m depth.

All datasets have been QAQC’d to remove obviously errant readings, highly suspicious readings and artifacts of buoy maintenance.

The buoy is also instrumented with dissolved oxygen sensors at 1.5m (2007-current) and 10.5m (2013-current), a conductivity and chlorophyll sensor (2015-current), and various meteorological sensors (PAR, air temperature, wind speed and direction; 2007-current) – data available in other datasets.

## Investigators

(list in order as for a paper with e-mail addresses, organization and preferably ORCID ID, if you don’t have one, get it, it’s easy and free: <http://orcid.org/>) add table rows as needed

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| First Name | Last Name | Organization | e-mail address | ORCID ID (optional) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LSPA |  | Lake Sunapee Protective Association | lspa@lakesunapee.org |  |
| Bethel | Steele | Cary Institute of Ecosystem Studies | steeleb@caryinstitute.org | 0000-0003-4365-4103 |
| Kathleen C. | Weathers | Cary Instititue of Ecosystem Studies | [weathersk@caryinstitute.org](mailto:weathersk@caryinstitute.org) | 0000-0002-3575-6508 |

## Other personnel names and roles

(field crew, data entry etc. with e-mail addresses, organization and ORCID ID)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| First Name | Last Name | Organization | e-mail address | ORCID ID (optional) | Role in project |
| June | Fichter | Lake Sunapee Protective Association | junef@lakesunapee.org |  | Data collection |
| Geoff | Lizotte | Lake Sunapee Protective Association |  |  | Data collection |
| John | Merriman | Lake Sunapee Protective Association |  |  | Buoy Technical |

## Keywords

(list and separate by comma, please check out these resources <http://vocab.lternet.edu>, ) Please determine one or two keywords that best describe your lab, station, and/or project (e.g., Trout Lake Station, NTL LTER, UW Center for Limnology).

Lake Sunapee Protective Association, high-frequency data, buoy data, water temperature

## Funding of this work:

Add rows to table if several grants were involved, list only the main PI, start with main grant first:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| PI First Name | PI Last Name | PI ORCID ID (optional) | Title of Grant | Funding Agency | Funding Identification Number |
| Lindsey | Rustad |  | **Development of Real-Time Environmental Sensor Technology and Applications for the Northeast: A Proposal from the NERC Northeastern Environmental Sensor Working Group (NESN)** | NSRC Project |  |
| June | Fichter |  |  | Frey Foundation |  |
| Kathleen C. | Weathers | 0000-0002-3575-6508 | Collaborative Research: Building Analytical, Synthesis, and Human Network Skills Needed for Macrosystem Science: a Next Generation Graduate Student Training Model Based on GLEON | National Science Foundation | 1137327 |
| Kathleen C. | Weathers | 0000-0002-3575-6508 | Collaborative Research: CI-Team Demonstration: Developing a Model for Engagement of Citizen Scientists: Lake Associations | National Science Foundation | 0936174 |

## Timeframe

* Begin date: 2007-08-27 23:00:00 EDT
* End date: 2017-12-31 23:50 EDT
* Data collection ongoing. Starting winter of 2010, buoy is moved to harbor to prevent ice damage. Date of move is determined by weather and LSPA staff availability.

## Geographic location

* Verbal description: Lake Sunapee is located in the Sugar River watershed within Sullivan and Merrimack Counties, NH, USA. It is a drainage lake with predominantly muck substrate. It has a surface area of 1667 hectares, 53 kilometers of highly developed shoreline and a maximum depth of 33.7 meters. The location of the buoy is 43.39° N, 72.06° W (ice-on harbor position from winter 2009 forward: 43.39° N, 72.08° W). Verbal description of summer buoy location: SSE of Loon Island, water depth 10.5-12m, water fluctuations seasonally 0.75 to 1m. The following bounding coordinates are for Lake Sunapee as defined by the polygon contained in the New Hampshire Hydrography Dataset (NHHD) as downloaded from GRANIT ([http://www.granit.sr.unh.edu/data/search?dset=nhhd&#](http://www.granit.sr.unh.edu/data/search?dset=nhhd&)).
* North bounding coordinates (decimals) 43.430745° N
* South bounding coordinates (decimals) 43.321744° N
* East bounding coordinates (decimals) 72.030408° W
* West bounding coordinates (decimals) 72.083095° W

## Taxonomic species or groups

## Methods

(please be specific, include instrument descriptions, or point to a protocol online, if this is a data compilation please specify datasets used, preferably their DOI or URL plus general citation information)

Data were collated and cleaned using R Studio (v. 1.1.383), R version 3.4.3. Obviously errant readings, highly suspicious readings and artifacts of buoy maintenance were recoded to ‘NA’ from the raw data and columns were renamed from the raw data for consistency between data years.

The underwater temperature data are broken into 4 records: the dataset from the thermistors only (2007-2017\_tempstring\_L1.csv), the dataset from the winter hobo temperature sensors (2014-2017\_wintertempstring\_L1.csv), the dataset from the summer 2015 deployment of the hobo sensors in place of the thermistors (2015summerhobo\_L1.csv) and the dataset representing the long-term temperature record harmonized from all sources (2007-2017\_fulltemprecord\_L1.csv).

## Data Table

* Column name: exactly as it appears in the dataset. Please avoid special characters, dashes and spaces.
* Description: please be specific, it can be lengthy
* Unit: please avoid special characters and describe units in this pattern: e.g. microSiemenPerCentimeter, microgramsPerLiter, absoptionPerMolePerCentimeter
* Code explanation: if you use codes in your column, please explain in this way: e.g. LR=Little Rock Lake, A=Sample suspect, J=Nonstandard routine followed
* Data format: please tell us exactly how the date and time is formatted: e.g. mm/dd/yyyy hh:mm:ss plus the time zone and whether or not daylight savings was observed.
* If a code for ‘no data’ is used, please specify: e.g. -99999

Please add rows as needed

2007-2017\_tempstring\_L1.csv

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| datetime | Date and time (GMT -4) of buoy record – no daylight savings observed in this data set | YYYY-MM-DD HH: MM:SS |  |
| Location | Location of buoy: ‘loon’ = 43.39° N, 72.06° W, ‘harbor’ = 43.39° N, 72.08° W) | ‘loon’ = buoy at loon location, ‘harbor’ = buoy at harbor location, ‘offline’ = buoy offline, no data recorded, ‘in transit’ = buoy being moved between harbor and loon location data presumed errant recoded as NA, ‘harbor, water sensors offline’ = buoy in harbor, only some sensors reporting |  |
| TempC\_0p5m | Water temperature at 0.5m depth | degreesCelsius | NA |
| TempC\_1m | Water temperature at 1m depth | degreesCelsius | NA |
| TempC\_1p5m | Water temperature at 1.5m depth | degreesCelsius | NA |
| TempC\_2m | Water temperature at 2m depth | degreesCelsius | NA |
| TempC\_2p5m | Water temperature at 2.5m depth | degreesCelsius | NA |
| TempC\_3m | Water temperature at 3m depth | degreesCelsius | NA |
| TempC\_3p5m | Water temperature at 3.5m depth | degreesCelsius | NA |
| TempC\_4p5m | Water temperature at 4.5m depth | degreesCelsius | NA |
| TempC\_5p5m | Water temperature at 5.5m depth | degreesCelsius | NA |
| TempC\_6p5m | Water temperature at 6.5m depth | degreesCelsius | NA |
| TempC\_7p5m | Water temperature at 7.5m depth | degreesCelsius | NA |
| TempC\_8p5m | Water temperature at 8.5m depth | degreesCelsius | NA |
| TempC\_9p5m | Water temperature at 9.5m depth | degreesCelsius | NA |
| TempC\_10p5m | Water temperature at 10.5m depth | degreesCelsius | NA |
| TempC\_11p5m | Water temperature at 11.5m depth; sensor flagged at this depth as possibly in sediment ‘b’ | degreesCelsius | NA |
| TempC\_13p5m | Water temperature at 13.5m depth; sensor flagged at this depth as possibly in sediment ‘b’ | degreesCelsius | NA |
| temp\_flag | Flag for temperature data | i = data is intermittent, some functionality issues in thermistors, some data may be errant; q = data is intermittently questionable – periods of flatline data and random errant points; b = thermistor may be in sediment; d = depth likely incorrect, sensor hung up in line. If depth listed in front of flag, the flag is only pertinent to the sensor at that depth otherwise flag is applicable to all data columns. | NA |

2014-2017\_wintertempstring\_L1.csv

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| datetime | Date and time (GMT -4) of buoy record – no daylight savings observed in this data set | YYYY-MM-DD HH: MM:SS |  |
| TempC\_1p5m | Water temperature at 1.5m depth | degreesCelsius | NA |
| TempC\_2p5m | Water temperature at 2.5m depth | degreesCelsius | NA |
| TempC\_3p5m | Water temperature at 3.5m depth | degreesCelsius | NA |
| TempC\_4p5m | Water temperature at 4.5m depth | degreesCelsius | NA |
| TempC\_5p5m | Water temperature at 5.5m depth | degreesCelsius | NA |
| TempC\_6p5m | Water temperature at 6.5m depth | degreesCelsius | NA |
| TempC\_7p5m | Water temperature at 7.5m depth | degreesCelsius | NA |
| TempC\_8p5m | Water temperature at 8.5m depth | degreesCelsius | NA |
| TempC\_9p5m | Water temperature at 9.5m depth | degreesCelsius | NA |
| Location | Location of buoy: ‘loon’ = 43.39° N, 72.06° W | ‘loon’ = hobo string deployed at loon location |  |

2015\_summerhobo\_L1.csv

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| datetime | Date and time (GMT -4) of buoy record – no daylight savings observed in this data set | YYYY-MM-DD HH: MM:SS |  |
| TempC\_0p5m | Water temperature at 0.5m depth | degreesCelsius | NA |
| TempC\_1p5m | Water temperature at 1.5m depth | degreesCelsius | NA |
| TempC\_2p5m | Water temperature at 2.5m depth | degreesCelsius | NA |
| TempC\_3p5m | Water temperature at 3.5m depth | degreesCelsius | NA |
| TempC\_4p5m | Water temperature at 4.5m depth | degreesCelsius | NA |
| TempC\_5p5m | Water temperature at 5.5m depth | degreesCelsius | NA |
| TempC\_6p5m | Water temperature at 6.5m depth | degreesCelsius | NA |
| TempC\_7p5m | Water temperature at 7.5m depth | degreesCelsius | NA |
| TempC\_8p5m | Water temperature at 8.5m depth | degreesCelsius | NA |
| Location | Location of buoy: ‘loon’ = 43.39° N, 72.06° W | ‘loon’ = hobo string deployed at loon location |  |

2007-2017\_fulltemprecord\_L1.csv

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| datetime | Date and time (GMT -4) of buoy record – no daylight savings observed in this data set | YYYY-MM-DD HH: MM:SS |  |
| Location | Location of buoy: ‘loon’ = 43.39° N, 72.06° W, ‘harbor’ = 43.39° N, 72.08° W) | ‘loon’ = buoy at loon location, ‘harbor’ = buoy at harbor location, ‘offline’ = buoy offline, no data recorded, ‘in transit’ = buoy being moved between harbor and loon location data presumed errant recoded as NA, ‘harbor, water sensors offline’ = buoy in harbor, only some sensors reporting |  |
| TempC\_0p5m | Water temperature at 0.5m depth | degreesCelsius | NA |
| TempC\_1m | Water temperature at 1m depth | degreesCelsius | NA |
| TempC\_1p5m | Water temperature at 1.5m depth | degreesCelsius | NA |
| TempC\_2m | Water temperature at 2m depth | degreesCelsius | NA |
| TempC\_2p5m | Water temperature at 2.5m depth | degreesCelsius | NA |
| TempC\_3m | Water temperature at 3m depth | degreesCelsius | NA |
| TempC\_3p5m | Water temperature at 3.5m depth | degreesCelsius | NA |
| TempC\_4p5m | Water temperature at 4.5m depth | degreesCelsius | NA |
| TempC\_5p5m | Water temperature at 5.5m depth | degreesCelsius | NA |
| TempC\_6p5m | Water temperature at 6.5m depth | degreesCelsius | NA |
| TempC\_7p5m | Water temperature at 7.5m depth | degreesCelsius | NA |
| TempC\_8p5m | Water temperature at 8.5m depth | degreesCelsius | NA |
| TempC\_9p5m | Water temperature at 9.5m depth | degreesCelsius | NA |
| TempC\_10p5m | Water temperature at 10.5m depth | degreesCelsius | NA |
| TempC\_11p5m | Water temperature at 11.5m depth; sensor flagged at this depth as possibly in sediment ‘b’ | degreesCelsius | NA |
| TempC\_13p5m | Water temperature at 13.5m depth; sensor flagged at this depth as possibly in sediment ‘b’ | degreesCelsius | NA |
| temp\_flag | Flag for temperature data | i = data is intermittent, some functionality issues in thermistors, some data may be errant; q = data is intermittently questionable – periods of flatline data and random errant points; b = thermistor may be in sediment; d = depth likely incorrect, sensor hung up in line. If depth listed in front of flag, the flag is only pertinent to the sensor at that depth otherwise flag is applicable to all data columns. | NA |
| source | Source of temperature record | ‘thermistors’ or ‘hobo’ |  |

## Notes and Comments

1. This document liberally borrows from similar documents at SBC and GCE [↑](#footnote-ref-1)