# EDI Metadata Template (2020)[[1]](#footnote-1)

## Dataset Title

Data for “**Snowmelt periods as hot moments for soil N dynamics: A case study in Maine, USA”**

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

BBWM vernal transition

## Abstract

This is the data archive for the corresponding publication with the same title (doi: 0.1007/s10661-020-08733-0). The vernal transition represents the seasonal transition to spring, occurring as temperatures rise at the end of winter. With rapid snowmelt, microbial community turnover, and accelerated nutrient cycling, this is a critical but relatively under-studied period of ecosystem function. We conducted a study over two consecutive winters (2015-2016) at the Bear Brook Watershed in Maine to examine how changing winter conditions (warming winters, reduced snow accumulation) altered soil nitrogen availability and stream N export during winter and the vernal transition, and how these patterns were influenced by ecosystem N status (N-enriched vs. N-limited). Of the two study years, 2016 had a warmer winter with substantially less snow accumulation and a discontinuous snowpack — and as a result, had a longer vernal transition and a snowpack that thawed before the vernal transition began. Across both years, snowmelt triggered a transition, signaled by increased ammonium concentrations in soil, decreased soil nitrate concentrations due to flushing by meltwater, and increased stream nitrate exports. Despite the contrasting winter conditions, both years showed similar patterns in N availability and export, differing only in the timing of these transitions. The vernal transition has conventionally been considered a critical period for biogeochemical cycling, because the associated snowmelt event triggers physicochemical and biochemical changes in soil systems. This was consistent with our results in 2015, but our data for 2016 show that this may not always hold true, and instead, that warmer, low-snow winters may demonstrate a temporal asynchrony between snowmelt and the vernal transition. We also show that ecosystem N status is a strong driver of the seasonal N pattern, and the interaction of N status and changing climate must be further investigated to understand ecosystem function under our current predicted trajectory of warming winters, declining snowfall, and winter thaw events.

## Investigators

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
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## Other personnel names and roles

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| First Name | Middle Initial | Last Name | Organization | e-mail address | ORCID ID (optional) | Role in project |
|  |  |  |  |  |  |  |

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## Keywords

BBWM; Bear Brook; vernal transition; forest soils; nitrogen; N-enrichment; snowmelt

## 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 Middle Initial | PI Last Name | PI ORCID ID (optional) | Title of Grant | Funding Agency | Funding Identification Number |
|  |  |  |  |  |  |  |

## Timeframe

* Begin date: 2015
* End date: 2016
* Data collection ongoing/completed: completed

## Geographic location

* Verbal description: BBWM is located in eastern Maine, USA (44°52'N, 68°06'W) at an elevation of 450.8 m. Soils are coarse-loamy, mixed, frigid Typic and Aquic Haplorthods. Bedrock consists dominantly of quartzite, phyllite, and calc-silicate low-grade metasediments, and minor granite dikes. The lower elevations are dominated by hardwood stands, and the upper elevations are dominated by softwood stands.
* North bounding coordinates (decimals): 44.870000
* South bounding coordinates (decimals): 44.870000
* East bounding coordinates (decimals): -68.100000
* West bounding coordinates (decimals): -68.100000

## Taxonomic species or groups

## Methods

Soil and stream samples were collected during winter and spring of 2015 and 2016, and analyzed for ammonium and/or nitrate. Detailed methods can be found in the corresponding manuscript (doi: 0.1007/s10661-020-08733-0). The processing script and workflow are hosted on GitHub (<https://github.com/kaizadp/bbwm_vernal_transition>).

## Data Table

**snowpack\_depth.csv**

Snowpack measurements for 2015-16

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| Year | Year sampled |  |  |
| Month | Month sampled |  |  |
| Day | Day sampled |  |  |
| variable | Data collection location/source | EB = East Bear  WB = West Bear  Survey = data obtained from the Maine Cooperative Snow Survey, Beddington location |  |
| depth\_cm | Snowpack depth | centimeters |  |

**soil\_n.csv**

Soil extractable nitrogen

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| Year | Year sampled |  |  |
| Month | Month sampled |  |  |
| Day | Day sampled |  |  |
| Season | Season |  |  |
| Sample | Sample number |  |  |
| Watershed | Watershed/sampling location | EB = East Bear  WB = West Bear |  |
| Forest | Stand type | HW = hardwood |  |
| Horizon | Soil horizon | O = O (organic) horizon |  |
| NO3\_mg\_kg | Soil-extractable nitrate as N | MilligramsNitrogenPerGramSoil |  |
| NH4\_mg\_kg | Soil-extractable ammonium as N | MilligramsNitrogenPerGramSoil |  |

**stream\_n.csv**

Stream nitrate concentrations

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| Watershed | Watershed/sampling location | EB = East Bear  WB = West Bear |  |
| Year | Year sampled |  |  |
| Month | Month sampled |  |  |
| Day | Day sampled |  |  |
| NO3\_ueq\_L | Stream nitrate | MicroEquivalentsPerLiter |  |
| NO3\_mg\_L | Stream nitrate | MilligramsNitrogenPerLiter |  |

**streamflow.csv**

Streamflow discharge and gage height measurements

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| Year | Year sampled |  |  |
| Month | Month sampled |  |  |
| Day | Day sampled |  |  |
| yday | Day of year/Julian day |  |  |
| mean\_discharge\_m3\_s | Daily mean discharge | CubicMetersPerSecond |  |
| total\_discharge\_m3\_s | Daily total discharge | CubicMetersPerSecond |  |
| cum\_discharge\_m3\_s | Cumulative total discharge | CubicMetersPerSecond |  |
| gageht\_cm | Gage height | Centimeters |  |
| n | Number of measurements |  |  |

**temp\_movingavg.csv**

Air and soil temperature (7-day moving averages)

|  |  |  |  |
| --- | --- | --- | --- |
| Column name | Description | Unit or  code explanation or date format | Empty value code |
| Year | Year |  |  |
| Month | Month |  |  |
| Day | Day |  |  |
| Season | Season | Winter = winter  VT = vernal transition  GS = growing season  Fall = fall/autumn |  |
| JulianDay | Julian Day |  |  |
| airtemp\_C | Air temperature | Celsius |  |
| orgtemp\_C | Organic soil temperature | Celsius |  |
| min10cmtemp\_C | Mineral soil (10 cm) temperature | Celsius |  |

## Articles

(List articles citing this dataset)

|  |  |  |
| --- | --- | --- |
| Article DOI or URL (DOI is preferred) | Article title | Journal title |
| 0.1007/s10661-020-08733-0 | **Snowmelt periods as hot moments for soil N dynamics: A case study in Maine, USA** | Environmental Monitoring and Assessment |

## Scripts/code (software)

(List any software scripts/code you would like to archive along with your data. These may include processing scripts you wrote to create, clean, or analyze the data.)

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

## Data provenance

(Were these data derived from other data? If so, you will want to document this information so users know where these data come from.)

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

## Notes and Comments

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