1. **Dataset Title -** Soil total carbon and nitrogen

2. **Dataset Author(s)** - Bailey A. Murphy (corresponding)

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3. **Time of Interest -** 2019/09/28 00:00:00 to 2019/09/28 23:59:59

4. **Area of Interest** -

Bounding Box: 45.915, -90.343; 45.915, -90.227; 45.980, -90.227; 45.980, -90.343

Site	Latitude	Longitude	Dominant Vegetation	Elevation (m)
NE1	45.9734833	-90.2723	pine	472
NE2	45.9557333	-90.2406	pine	474
NE3	45.9749	-90.2327333	hardwood	484
NE4	45.9618667	-90.2270333	maple	483
NW1	45.972001	-90.323172	pine	471
NW2	45.9677333	-90.3087833	aspen	472
NW3	45.9689167	-90.3010333	wetland	465
NW5	45.9458333	-90.2943667	grass	463
SE2	45.9365167	-90.2640833	hardwood	474
SE3	45.92715	-90.2475	aspen	470
SE5	45.9380833	-90.2381833	aspen	471
SE6	45.9197333	-90.2288333	pine	473
SW1	45.9149	-90.3425	aspen	467
SW2	45.9409	-90.3177333	aspen	467
SW3	45.920667	-90.3099	hardwood	465
SW4	45.9392167	-90.2823167	hardwood	469

5. **Data Frequency –** Single

6. **Data Spatial Type** - .csv file format with single header row. Columns are ‘Sample Name’ (name of site where the sample was collected), ‘% Nitrogen’ (percentage of total soil sample that was nitrogen), and ‘% Carbon’ (percentage of total soil sample that was nitrogen).

7. **General Dataset Description -** All soil samples were taken at CHEESEHEAD sites on September 28, 2019. Samples were taken using a T-probe soil sampler within 5 m of the tower. Tower center coordinates are used. All samples were of the top 0-15 cm of soil mixed, three sample replicates were collected at each site. Soil samples were analyzed for total carbon and nitrogen at the University of Wisconsin-Madison by the Jackson Grassland Ecology Lab using a Thermo Flash EA 1112 analyzer.

   The Thermo Flash EA 1112 carbon/nitrogen analyzer is an elemental analyzer from Thermo Scientific used for defining the elemental composition of samples. Flash EA 1112 analyzers are based on dynamic flash combustion, which produces complete combustion of the sample followed by an accurate and precise determination of the elemental gases produced. A dedicated chromatography column connected to a highly sensitive thermal conductivity detector ensures a wide detection range from 100 ppm to 100 % for both Carbon and Nitrogen determinations. Samples placed in the auto sampler are purged with pure helium gas and then dropped into a vertical combustion reactor packed with chromium oxide and silvered cobaltic oxide held at 900 degrees Celsius. Once the autosampler drops the sample a small pulse of pure oxygen is introduced into the helium flow, producing a flash combustion. The temperature increases to 1700 degrees Celsius and the combusted sample changes into a gas and is swept into a reduction reactor containing copper wires at 680 degrees Celsius. Excess oxygen is taken out, and oxides of nitrogen are reduced to nitrogen gas in the reduction reactor. After passing through the reduction reactor the gasses enter a desiccant trap. The cleaned sample gasses now pass through a gas chromatograph column to separate nitrogen from carbon. At this time the gasses pass through a thermal conductivity detector and a peak area chromatograph is generated.

   Soils were fully air-dried for at least 48 hours before being coarsely ground using a Wiley mill and sieved with a 1 mm screen. Samples were placed in 2 mL Eppendorph-style microfuge tubes, along with three sterilized ball bearings. Samples were homogenized using a shaker-table for approximately 45 minutes in 15-minute intervals. Samples were weighed and portioned into tin rolls, tamped, and folded to remove excess air in the sample. The completed, rolled samples were then weighed again and placed on a microplate tray. For each batch of samples analyzed, two blanks, three bypass samples, 4-6 calibration standards, and one set of check standards (i.e., one silty soil and one clay soil standard between 8-10 mg for every 24 samples) were used for quality assurance and control. Blanks are rolled empty tins, and provide a zero for calibration. Bypass samples are random samples from the sample set with masses in the same ranges of the sample set. Bypass samples serve as “sacrificial” samples consisting of the material to be analyzed that are combusted so that the C and N peaks can be identified and the software centered on them. Calibration standards are tins with standards at varying masses, and are used to generate a calibration curve, which is then used to determine the amount of carbon or nitrogen in a sample. Check standards (also called controls) are positive controls used to confirm the accuracy of the instrument, and are different from the material used to calibrate the instrument. Three replicates were collected from each soil sample and averaged for a mean total percentage of carbon and nitrogen in each sample.

8. **File Names** -

Soil_total_carbon_nitrogen.csv
Soil_total_carbon_nitrogen_README.pdf

9. **Data restrictions** - No restrictions, CHEESEHEAD standard user agreement required.

10. **Digital Object Identifier (DOI) –** https://doi.org/10.26023/RDW7-29CB-J612

11. **GCMD Keywords** –

Soil chemistry
Terrestrial ecosystems
Carbon
Nitrogen