

Read me file for:

S.J. Leroux, E. Vander Wal, Y.F. Wiersma, L. Charron, J.D. Ebel, N.M. Ellis, C. Hart, E. Kissler, P.W. Saunders, L. Moudra, A.L. Tanner, S. Yalcin. [in review]. Stoichiometric distribution models: ecological stoichiometry at the landscape extent.

This data package includes forty-two files:

### **1) Leroux et al\_StDMs\_RCode.R**

This file contains the R code used for our analysis and creation of figures for the manuscript. We have put comments throughout the code to facilitate use. The code uses the data sets described below.

### **2) wB\_FoliarChemistry\_June2.csv**

This data file includes information on the foliar chemistry of the wB samples we collected and the landscape covariates associated with these samples. See manuscript for methods to determine wB foliar chemistry and for a description of the data sources for the landscape covariates.

#### **Column headings and definitions:**

**PlotID** – Name of plot sampled. "C" means it was a coniferous stand, "M" means it was a mixed stand, and "D" means it was a deciduous stand.

**Lab\_ID** – Name of the sample allocated by the University of Guelph Agriculture and Food Laboratory

**Easting** – GPS coordinates of site (6 digits).

**Northing** – GPS coordinates of site (7 digits).

**LandCover** – Landscape variable extracted from Commission for Environmental Cooperation land cover data set at the location of the plot. Two categories (coniferous and other (e.g., deciduous, mixedwood)).

**Species** – Tree species sampled. wB = white birch.

**PercentN** – Percentage of Nitrogen in wB foliar sample.

**PercentP** – Percentage of Phosphorous in wB foliar sample.

**PercentC** – Percentage of Carbon in wB foliar sample.

**Sp\_Code** – Landscape variable extracted from Government of Newfoundland and Labrador Forest Resource Inventory data dominant tree species at the location of the plot. Three categories: balsam fir (bF) (75% bF composition), bFPlus (50-75% bF with rest made of black spruce (bS) and/or white birch (wB)), and SPlus (50-75% bS or white spruce with rest made of mostly bF and/or wB).

**Height** – Landscape variable extracted from Government of Newfoundland and Labrador Forest Resource Inventory data stand height at the location of the plot. Four categories; 0-6.5m (AA), 6.6-9.5m (C), 9.6-12.5m (D), 12.6-21.5m (Z).

**Elevation** – Landscape variable extracted from GeoBase Canadian digital elevation data at the location of the plot (m).

**Slope** – Landscape variable extracted from GeoBase Canadian digital elevation data at the location of the plot (%).

**AspectNormalized** – Landscape variable extracted from GeoBase Canadian digital elevation data at the location of the plot (degrees).

### **3-5) wB\_Transect\_small.csv, wB\_Transect\_medium.csv, wB\_Transect\_large.csv**

This data file includes information on the height and basal diameter of wB individuals sampled in our density transects. The three different files contain data on three size classes of wB sampled; small (0.3-0.5m), medium (0.51-1m), and large (1.01-2m). See manuscript for detailed methods.

#### **Column headings and definitions:**

**PlotID** – Name of plot sampled. "C" means it was a coniferous stand, "M" means it was a mixed stand, and "D" means it was a deciduous stand.

**Individual** – Number of the individual wB identified in this plot's transect.

**Height\_cm** – Height of the individual wB (cm).

**Basal diameter\_mm** – Basal diameter of the individual wB (mm).

**Distance sampled\_m** – Distance sampled along the transect to obtain the sample (max 40 (m)).

### **6) wB\_BiomassData.csv**

This data file includes information on the height, basal diameter and mass of wB foliage for individuals sampled for total browsable biomass estimates. See manuscript for detailed methods.

**Column headings and definitions:**

**SaplingID** – Name of individual wB sampled.

**Height\_cm** – Height of the individual wB sampled (cm).

**Basal diameter\_mm** – Basal diameter of the individual wB sampled (mm).

**WetMass\_g** – Wet mass of the individual wB sampled (g).

**DryMass\_g** – Dry mass of the individual wB sampled (g).

**7) wB\_NumInd.csv**

This data file includes information on the number of small (0.3-0.5m), medium (0.51-1m), and large (1.01-2m) wB individuals sampled in our transects. See manuscript for detailed methods.

**Column headings and definitions:**

**PlotID** – Name of plot sampled. "C" means it was a coniferous stand, "M" means it was a mixed stand, and "D" means it was a deciduous stand.

**Num\_Sm\_Plot** – Number of small wB individuals sampled during the transect in this plot.

**Dist\_Sm\_m** – Distance travelled to sample the number of small wB individuals reported above in this plot (m).

**Sm\_MSquared** – Transect level areal estimate of number of small wB individuals sampled in transect ( $m^2$ ).

**Sm\_PlotSquared** – Plot level ( $314.16 m^2$ ) areal estimate of number of small wB individuals sampled ( $/314.16m^2$ ). This estimate is an extrapolation from the number of small individuals observed in the transect.

**Sm\_PlotSquared\_Ceiling** – Sm\_PlotSquared rounded up to the nearest integer ( $/314.16m^2$ ).

**Num\_Md\_Plot** – Number of medium wB individuals sampled during the transect in this plot.

**Dist\_Md\_m** – Distance travelled to sample the number of medium wB individuals reported above in this plot (m).

**Md\_MSquared** – Transect level areal estimate of number of medium wB individuals sampled in transect (m<sup>2</sup>).

**Md\_PlotSquared** – Plot level (314.16 m<sup>2</sup>) areal estimate of number of medium wB individuals sampled (/314.16m<sup>2</sup>). This estimate is an extrapolation from the number of medium individuals observed in the transect.

**Md\_PlotSquared\_Ceiling** – Md\_PlotSquared rounded up to the nearest integer (/314.16m<sup>2</sup>).

**Num\_Lrg\_Plot** – Number of large wB individuals sampled during the transect in this plot.

**Dist\_Lrg\_m** – Distance travelled to sample the number of large wB individuals reported above in this plot (m).

**Lrg\_MSquared** – Transect level areal estimate of number of large wB individuals sampled in transect (m<sup>2</sup>).

**Lrg\_PlotSquared** – Plot level (314.16 m<sup>2</sup>) areal estimate of number of large wB individuals sampled (/314.16m<sup>2</sup>). This estimate is an extrapolation from the number of large individuals observed in the transect.

**Lrg\_PlotSquared\_Ceiling** – Lrg\_PlotSquared rounded up to the nearest integer (/314.16m<sup>2</sup>).

**8-24) M001\_2011\_P.csv, M002\_2013\_P.csv, M003\_2011\_P.csv, M003\_2015\_P.csv, M004\_2011\_P.csv, M004\_2014\_P.csv, M005\_2011\_P.csv, M005\_2015\_P.csv, M006\_2015\_P.csv, M007\_2010\_P.csv, M007\_2014\_P.csv, M008\_2011\_P.csv, M009\_2011\_P.csv, M011\_2014\_P.csv, M012\_2014\_P.csv, M013\_2015\_P.csv, M015\_2014\_P.csv**

These data files include spatial covariate data for the GPS points of 17 moose we had collared on the island of Newfoundland. Data are from the late spring/early summer (June 1 – July 15). See manuscript for detailed methods.

**25-41) M001\_2011\_R.csv, M002\_2013\_R.csv, M003\_2011\_R.csv, M003\_2015\_R.csv, M004\_2011\_R.csv, M004\_2014\_R.csv, M005\_2011\_R.csv, M005\_2015\_R.csv, M006\_2015\_R.csv, M007\_2010\_R.csv, M007\_2014\_R.csv, M008\_2011\_R.csv, M009\_2011\_R.csv, M011\_2014\_R.csv, M012\_2014\_R.csv, M013\_2015\_R.csv, M015\_2014\_R.csv**

These data files include spatial covariate data for the random points generated within each moose minimum convex polygon for the 17 moose we had collared on the island of Newfoundland. Data are from the late spring/early summer (June 1 – July 15). See manuscript for detailed methods.

All column headings and definitions are identical for data sets 8-41.

### **Column headings and definitions:**

**StudyArea** – Study area where moose was collared. Either Plum Point, Old Man’s Pond or Topsails (see Fig. 2c).

**MooseID** – Identification number of collared moose.

**PresAvail** – Response of species distribution model indicating if the data point is from a GPS collar (=1) or from a random point (=0).

**dist\_road** – Distance from the location of this moose collar or random point to the nearest road (m).

**dist\_wetland** – Distance from the location of this moose collar or random point to the nearest wetland (m).

**dist\_water** – Distance from the location of this moose collar or random point to the nearest body of water (m).

**scale\_Elevation** – Scaled  $((x - \text{mean}(x)) / \text{sd}(x))$  landscape variable extracted from GeoBase Canadian digital elevation data at the location of this moose collar or random point (m).

**scale\_Slope** – Scaled  $((x - \text{mean}(x)) / \text{sd}(x))$  Landscape variable extracted from GeoBase Canadian digital elevation data at the location of this moose collar or random point (%).

**scale\_AspectN** – Scaled  $((x - \text{mean}(x)) / \text{sd}(x))$  landscape variable (normalized aspect) extracted from GeoBase Canadian digital elevation data at the location of this moose collar or random point (degrees).

**PercentC** – Predicted percent Carbon of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**PercentN** – Predicted percent Nitrogen of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**PercentP** – Predicted percent Phosphorous of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**qtyC** – Predicted quantity of Carbon ( $\text{g/m}^2$ ) of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**qtyN** – Predicted quantity of Nitrogen ( $\text{g/m}^2$ ) of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**qtyP** – Predicted quantity of Phosphorous ( $\text{g/m}^2$ ) of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**CNratio** – Predicted molar C:N ratio of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**CPratio** – Predicted molar C:P ratio of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**NPratio** – Predicted molar N:P ratio of wB foliage at the location of this moose collar or random point. Prediction is from wB StDM. See manuscript for methods.

**Height** – Landscape variable extracted from Government of Newfoundland and Labrador Forest Resource Inventory data stand height at the location of this moose collar or random point. Four categories; 0-6.5m (AA), 6.6-9.5m (C), 9.6-12.5m (D), 12.6-21.5m (Z).

**Sp\_Code** – Landscape variable extracted from Government of Newfoundland and Labrador Forest Resource Inventory data dominant tree species at the location of this moose collar or random point. Four categories: balsam fir (bF) (75% bF composition), bFPlus (50-75% bF with rest made of black spruce (bS) and/or white birch (wB)), SPlus (50-75% bS or white spruce with rest made of mostly bF and/or wB).

**LandCover** – Landscape variable extracted from Commission for Environmental Cooperation land cover data set at the location of this moose collar or random point. Two categories (coniferous and other (e.g., deciduous, mixedwood)).

#### 42) yMooseNPRatio.csv

Predicted molar N:P ratio of wB foliage across the landscape. Prediction is from wB StDM. See manuscript for methods.

**Column headings and definitions:**

**Value** – Value of predicted molar N:P ratio of wB foliage for every pixel (row) in the study landscape. Prediction is from wB StDM. See manuscript for methods.

Queries regarding this data package should be directed to:

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