Title: Datasets for ECoMap analysis in Wisconsin

Summary: These datasets were used in the analysis detailed in the paper “Shea, M.E., M.K. Clayton, P.A. Townsend, S. Berg, H. Elza, and D.J. Mladenoff. Identifying ecotone location using the co-occurrence property. Journal of Vegetation Science.”

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Date created: July 19, 2020

Date updated: July 19, 2020

Geographic location:

* Wisconsin, USA
* xmin: -92.888114 degrees
* ymin: 42.491983 degrees
* xmax: -86.805415 degrees
* ymax: 47.080621 degrees

Datasets:

* all\_trees\_pred\_12Aug2019.csv
  + Summary: Differentiated witness tree obtained from the Wisconsin General Land Office Survey Records database, created by the Forest Ecosystem and Landscape Ecology Lab at University of Wisconsin-Madison ([felel.labs.russell.wisc.edu](https://felel.labs.russell.wisc.edu/)) and archived at the State Cartographer’s Office at University of Wisconsin-Madison ([sco.wisc.edu](https://www.sco.wisc.edu/)). These data contain information on the location, species, distance from corner, and diameter of corner and quarter-corner witness trees from the original Public Land Survey, which occurred in Wisconsin from 1832-1891. Witness trees were differentiated following the steps outlined in Appendix S1 of the paper cited above.
  + More information on this dataset can be found in the file GLOUserGuide\_v3.pdf.
  + Spatial information: The spatial coordinates in this dataset are based on the map projection: NAD83/Wisconsin Transverse Mercator map projection, EPSG:3070
  + Columns
    - dtrscot
      * Description: Code identifying each observation. Derived from Public Land Survey section and corner identifying code (d = domain; t = township; r = range; s = section; c = corner), observation number (o), and tree number (t).
      * Data format: numeric
    - X
      * Description: X-coordinate of witness tree point, in meters
      * Data format: numeric
    - Y
      * Description: X-coordinate of witness tree point, in meters
      * Data format: numeric
    - Dist
      * Description: Distance of witness tree to corner point
      * Units: Links (1 link = 0.201 meter)
      * Data format: numeric
      * No data code: NA
    - Diam
      * Description: Diameter of witness tree
      * Units: Inches
      * Data format: numeric
      * No data code: NA
    - SPname
      * Description: Species name from undifferentiated dataset
      * Data format: Factor
      * Codes
        + AH: Ash spp.
        + AL: Alder spp.
        + AS: Aspen spp.
        + BA: Black ash
        + BE: American beech
        + BI: Birch spp.
        + BO: Bur oak
        + BU: Butternut
        + BW: Black walnut
        + BX: Boxelder
        + CE: Cedar spp.
        + CH: Black cherry
        + CO: Cottonwood
        + EL: Elm spp.
        + FI: Balsam fir
        + HA: Hackberry
        + HE: Eastern hemlock
        + HI: Hickory spp.
        + IR: Ironwood
        + JO: Black/northern pin oak
        + JP: Jack pine
        + LI: American basswood
        + MA: Maple spp.
        + OA: Oak spp.
        + PI: Pine spp.
        + RE: Red elm
        + RM: Red maple
        + RO: Northern red oak
        + RP: Red pine
        + RR: Rare species (designated before differentiation)
        + SO: Swamp white oak
        + SP: Spruce spp.
        + SU: Sugar maple
        + TA: Eastern tamarack
        + TH: Hawthorn spp.
        + UK: Unknown (designated before differentiation)
        + WA: White ash
        + WB: Paper birch
        + WE: White elm
        + WI: Willow spp.
        + WM: Silver maple
        + WO: White oak
        + WP: Eastern white pine
        + YB: Yellow birch
        + ZZ: Points without trees (usually prairie)
    - SP\_new
      * Description: Species name following differentiation. This is what is used in the analyses detailed in the paper.
      * Data format: Factor
      * Codes
        + AL: Alder spp.
        + AS: Aspen spp.
        + BA: Black ash
        + BE: American beech
        + BO: Bur oak
        + BU: Butternut
        + BW: Black walnut
        + BX: Boxelder
        + CE: Cedar spp.
        + CH: Black cherry
        + CO: Cottonwood
        + FI: Balsam fir
        + HA: Hackberry
        + HE: Eastern hemlock
        + HI: Hickory spp.
        + IR: Ironwood
        + JO: Black/northern pin oak
        + JP: Jack pine
        + LI: American basswood
        + RE: Red elm
        + RM: Red maple
        + RO: Northern red oak
        + RP: Red pine
        + RR: Rare species (designated before differentiation)
        + SO: Swamp white oak
        + SP: Spruce spp.
        + SU: Sugar maple
        + TA: Eastern tamarack
        + TH: Hawthorn spp.
        + UK: Unknown (designated before differentiation)
        + WA: White ash
        + WB: Paper birch
        + WE: White elm
        + WI: Willow spp.
        + WM: Silver maple
        + WO: White oak
        + WP: Eastern white pine
        + YB: Yellow birch
        + ZZ: Points without trees (usually prairie)
    - type
      * Description: designates whether the tree name has been changed following differentiation.
      * Data format: factor
      * Codes:
        + ambig: tree was differentiated (ambiguous species prior to differentiation)
        + known: tree was not differentiated (known species prior to differentiation)
* 6mi\_Grid\_ecoregions\_area.csv
  + Summary: Area of each 6mi grid cell within each Forest Service ecoregion. This dataset was created in ArcGIS using the Union tool to combine 6mi\_Grid and 212\_222\_merge\_extended. Calculate Geometry was used to calculate the area of each polygon.
  + Columns:
    - Grid\_ID
      * Description: ID of 6mi\_Grid
      * Data format: numeric
    - Ecoregion
      * Description: ID of 212\_222\_merge\_extended, the USDA Forest Service Ecoregion boundary between the Eastern Broadleaf Forest and Laurentian Mixed Forest in Wisconsin.
      * Data format: factor
      * Codes:
        + 212: Laurentian Mixed Forest (LMF)
        + 222: Eastern Broadleaf Forest (EBF)
    - F\_AREA:
      * Description: Area of each united Grid\_ID and Ecoregion polygon
      * Data format: numeric
      * Units: meters squared
* 212\_222\_merge\_extended
  + Summary: Modified map (polygons) of the USDA Forest Service Ecoregion Subsection boundary between Eastern Broadleaf Forest (222) and Laurentian Mixed Forest (212) in Wisconsin, Minnesota, Iowa, Illinois and Upper Michigan. The map was created from the USDA Forest Service Ecoregion Subsection map (S\_USA.EcomapSubsections from here: <https://data.fs.usda.gov/geodata/edw/datasets.php?xmlKeyword=Ecomap>). All subsections in 222 and 212 in the states listed above were merged, so there are only two polygons. The northern, southern, and eastern boundaries were edited and extended further north, south, and east. This was to accommodate tests of alternative boundary locations, where the boundary was shifted north and south, as detailed in the main text of the article.
  + Spatial information: Map projection is WGS84 Web Mercator (Auxiliary Sphere) (EPSG:3857).
  + Columns:
    - FID
      * Description: unique ID number for each polygon
      * Data format: ObjectID
    - Shape
      * Description: describes what type of spatial dataset this is
      * Data format: Geometry
      * Code:
        + Polygon: The dataset is polygon
    - Id
      * Description: the result of merging datasets. There is no information in this column.
    - Ecoregion
      * Description: Identifier for the USDA Forest Service ecoregion of each polygon.
      * Data format: Short
      * Code:
        + 212: Laurentian Mixed Forest (LMF)
        + 222: Eastern Broadleaf Forest (EBF)
* WI\_HARN\_mask
  + Summary: Wisconsin boundary with locations where no Public Land Survey exist removed. This dataset was derived from the USStates ESRI dataset on US state boundaries, which has since been replaced by US\_StateBoundaries. Areas within the state were masked out based on where we know no witness tree data were collected (due to large inland lakes or un-surveyed tribal lands)
  + Spatial information: Map projection is NAD83/Wisconsin Transverse Mercator (EPSG:3070).
  + Columns: Tabular data are not important for this analysis.
* 6mi\_Grid
  + Summary: 6 mile x 6 mile polygon grid cells created in ArcGIS using the Fishnet tool.
  + Spatial information: Map projection is NAD83/Wisconsin Transverse Mercator (EPSG:3070).
  + Columns:
    - FID
      * Description: Unique ObjectID for each object
      * Data format: ObjectID
    - Shape
      * Description: describes what type of spatial dataset this is
      * Data format: Geometry
      * Code:
        + Polygon: The dataset is polygon
    - Id
      * Description: there is no information in this column
    - Grid\_ID:
      * Description: Unique code for each polygon. This is the code that is used in analyses.
      * Data format: Long
* 2km\_Grid
  + Summary: 2 km x 2 km polygon grid cells created in ArcGIS using the Fishnet tool.
  + Spatial information: Map projection is NAD83/Wisconsin Transverse Mercator (EPSG:3070).
  + Columns:
    - FID
      * Description: Unique ObjectID for each object
      * Data format: ObjectID
    - Shape
      * Description: describes what type of spatial dataset this is
      * Data format: Geometry
      * Code:
        + Polygon: The dataset is polygon
    - Id
      * Description: there is no information in this column
    - Grid\_ID:
      * Description: Unique code for each polygon. This is the code that is used in analyses.
      * Data format: Long
* 4km\_Grid
  + Summary: 4 km x 4 km polygon grid cells created in ArcGIS using the Fishnet tool.
  + Spatial information: Map projection is NAD83/Wisconsin Transverse Mercator (EPSG:3070).
  + Columns:
    - FID
      * Description: Unique ObjectID for each object
      * Data format: ObjectID
    - Shape
      * Description: describes what type of spatial dataset this is
      * Data format: Geometry
      * Code:
        + Polygon: The dataset is polygon
    - Id
      * Description: there is no information in this column
    - Grid\_ID:
      * Description: Unique code for each polygon. This is the code that is used in analyses.
      * Data format: Long
* 12mi\_Grid
  + Summary: 12 mile x 12 mile polygon grid cells created in ArcGIS using the Fishnet tool.
  + Spatial information: Map projection is NAD83/Wisconsin Transverse Mercator (EPSG:3070).
  + Columns:
    - FID
      * Description: Unique ObjectID for each object
      * Data format: ObjectID
    - Shape
      * Description: describes what type of spatial dataset this is
      * Data format: Geometry
      * Code:
        + Polygon: The dataset is polygon
    - Id
      * Description: there is no information in this column
    - Grid\_ID:
      * Description: Unique code for each polygon. This is the code that is used in analyses.
      * Data format: Long
* 18mi\_Grid
  + Summary: 18 mile x 18 mile polygon grid cells created in ArcGIS using the Fishnet tool.
  + Spatial information: Map projection is NAD83/Wisconsin Transverse Mercator (EPSG:3070).
  + Columns:
    - FID
      * Description: Unique ObjectID for each object
      * Data format: ObjectID
    - Shape
      * Description: describes what type of spatial dataset this is
      * Data format: Geometry
      * Code:
        + Polygon: The dataset is polygon
    - Id
      * Description: there is no information in this column
    - Grid\_ID:
      * Description: Unique code for each polygon. This is the code that is used in analyses.
      * Data format: Long