Data Article

Dataset of plant community composition in the Zumwalt Prairie Preserve, Oregon, USA

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1. Data

The Pacific Northwest Bunchgrass Prairie (PNB) ecosystem is one of the most endangered and among the least studied grasslands in North America [2,3]. These data were obtained by sampling vascular plant composition across the Zumwalt Prairie Preserve (Zumwalt; northeastern Oregon), the largest intact remnant of PNB in the United States. Sampling occurred in 2008 & 2009. The presented data include: (1) A map (Fig. 1) showing the distribution and abundance of the four most abundant

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non-native species across within Zumwalt Prairie Preserve sampled in between 2008 and 2009; (2) Regression (NPMR) generated contour plots (Fig. 2) of species foliar cover in community space, community space being defined by the two primary axes generated using Non-metric Multidimensional Scaling (NMS); and (3) Downloadable CSV files (Appendix A and Appendix B) that include vascular plant species abundance (foliar cover) summaries, and relationships to community variation across the study area as well as raw species abundance matrices by plot. Refer to Ref. [1] for detailed interpretation, discussion, and related analyses.

2. Experimental design, materials, and methods

131 grassland plots were established using a stratified random sampling design. The Zumwalt was categorized into prairie and canyon lands; the canyon lands were excluded from the study area. The remaining prairie was divided into quarter-quarter (0.25 x 0.25 miles or 16.2 ha) sections based on the US Public Land Survey System, and plots were randomly located within each quarter-quarter section [1]. A GEO-Explorer Trimble 3 handheld Global Positioning System was used to navigate to the selected plots. Three line-point intercept [4] transects oriented in a spoke design and radiating out from the center of the plot at 0°, 120°, and 240° relative to magnetic North were established within each plot [5]. Species intercepts with transects were observed at 1 m increments, for a total of 150 points sampled (50 per transect) in each plot. Percent foliar cover (per plot) was calculated as the total number of hits for a given species divided by the 150 total possible points multiplied by 100. Because multiple species, at different canopy layers, are often intercepted at the same point, total plot cover can be >100%. Presence absence of dominant non-native vascular plant species were also recorded within subplots (0.4 x 0.4 m) spaced at 5 m increments along each transect line for a total possible frequency of 30 subplots per plot. Eight plots were excluded from analyses because they had burned within three years prior to sampling. Therefore, data from 123 plots was used in the analysis.

To evaluate spatial patterns of non-native species abundance and their relationships to community composition and land use, the foliar cover of dominant species (native and non-native) and the location of old fields were plotted spatially as bubble maps across the Zumwalt study area using the ggplot2
package in R [6,7]. Perennial non-native grass species were concentrated in or adjacent to old fields, while annual non-natives were more widely distributed, with higher abundances in uncultivated areas particularly those with more xeric conditions (Fig. 1).

Non-metric multidimensional scaling (NMS [8]) was used to extract the dominant species composition gradients in our dataset [1]. Three-dimensional response surfaces of species abundance (foliar cover) in NMS ordination space (Fig. 2) were generated for dominant native and non-native species using Non-parametric Multiplicative Regression [9] with a local mean estimator, Gaussian kernel smoother, and automatic average minimum neighborhood size option in PC-ORD 7.0 [8]. NPMR automatically models interactions among predictors and has built in over-fitting protection consisting of a leave-one-out cross validation method during model fitting [9]. Cross validated $R^2$ ($\chi R^2$) and $R^2$ values were both used to evaluate model fits. Cross validated $R^2$ values differ from the conventional $R^2$ because it is based on the exclusion of each data point from the estimate of the response at that point [9].
Fig. 2. NPMR generated contour plots showing species abundance (% foliar cover) in 2008 & 2009 as a function of NMS ordination axes. ACMI = Achillea millefolium, ARSO2 = Arnica sororia, BRCA5 = Bromus carinatus, Bromus = Bromus arvensis & Bromus hordeaceus, DAUN = Dactyon unispicata, FEID = Festuca idahoensis. Red corresponds to high foliar cover, and blue indicates lower cover. NPMR generated contour plots showing species abundance in 2008 & 2009 as a function of NMS ordination axes. Red corresponds to high foliar cover, and blue indicates lower cover. GETR = Geum triflorum, KOMA = Koeleria macrantha, Lupin = Lupinus spp., POGR9 = Potentilla gracilis, POPR = Poa pratensis, POSE = Poa secunda. NPMR generated contour plots showing species abundance in 2008 & 2009 as a function of NMS ordination axes. Add species codes. Red corresponds to high foliar cover, and blue indicates lower cover. PSSP6 = Pseudoroegneria spicata, THIN6 = Thinopyrum intermedium, VEDU = Ventenata dubia. Red corresponds to high foliar cover, and blue indicates lower cover.
Fig. 2. (continued).
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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dib.2019.104690.
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