Pre-ABoVE: Poplar Vegetation Plots, Arctic and Interior Alaska and Yukon, 2003-2005

Get Data

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Summary

This data set provides vegetation cover and environmental plot data collected from 32 balsam poplar (Populus balsamifera L., Salicaceae) vegetation plots located on the Arctic Slope of Alaska and in the interior boreal forests of Alaska and the Yukon from 2003 to 2005. The estimated percent land cover by species per plot are according to the older Braun-Blanquet cover-abundance scale. Plot data includes moisture, topographic position, slope, aspect, shape, and soil data.

There are two data files in comma-separated format (.csv) with this data set. There are also three companion files which provide plot photos and define data value codes and scalars.

Figure 1. Photos of balsam poplar study area Ivishak Hot Springs in Arctic Alaska (Plot 18). Note the open water in the winter months that is indicative of a perennial spring (Breen, 2014).

Citation

Breen, A.L., D.A. Walker, and L.A. Druckenmiller. 2017. Pre-ABoVE: Poplar Vegetation Plots, Arctic and Interior Alaska and Yukon, 2003-2005. ORNL DAAC, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1376

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1. Data Set Overview

This data set provides vegetation cover and environmental plot data collected from 32 balsam poplar (*Populus balsamifera L.,* Salicaceae) vegetation plots located on the the Arctic Slope of Alaska and in the interior boreal forests of Alaska and the Yukon from 2003 to 2005. The Arctic study area is bounded by the Noatak River to the west and the Kongakut River to the east. Vegetation species and percent cover classes are provided. Plot data includes moisture, topographic position, slope, aspect, shape, and soil data.

The data are provided according to the original source and also according to the listings provided in the TURBOVEG data base, a software program for managing vegetation-plot data (see http://www.synbiosys.alterra.nl/turboveg/).

Project: Arctic-Boreal Vulnerability Experiment (ABoVE)

The Arctic-Boreal Vulnerability Experiment (ABoVE) is a NASA Terrestrial Ecology Program field campaign based in Alaska and western Canada between 2016 and 2021. Climate change in the Arctic and Boreal region is unfolding faster than anywhere else on Earth. ABoVE seeks a better understanding of the vulnerability and resilience of ecosystems and society to this changing environment.

Acknowledgements

These data were obtained from the Alaska Arctic Geoecological Atlas (http://agc.portal.gina.alaska.edu/), which provides access to existing Arctic vegetation plot and map data in support of the ABoVE campaign.

This research was supported by a National Science Foundation Doctoral Dissertation Improvement grant (DEB-0608539) and by a Center for Global Change and Arctic System Research (University of Alaska Fairbanks) student award to Breen and by the National Science Foundation grant OPP-9996383 to Marilyn Walker.

2. Data Characteristics

Spatial Coverage: Arctic Foothills and the interior boreal forests of Alaska and Yukon

Domain: Core ABoVE region

ABoVE grid location: Ahh0Avv0, Ahh1Avv0, Ahh1Avv1

Spatial Resolution: Point resolution. Each plot was a minimum of 100 m2

Temporal Coverage: 2003-01-01 to 2006-12-31

Temporal Resolution: Each plot was sampled once.

Study Area (All latitude and longitude given in decimal degrees)

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Arctic Foothills and the interior boreal forests of Alaska and Yukon	-162.741	-135.222	69.4718	61.07605

Data File Information

There are two data files with this data set in comma-separated (.csv) format. These data may also be found in the TURBOVEG database. There are also three companion files which provide plot photos and define data value codes and scalars.

Missing data are represented as -9999.

Table 1. Data files and descriptions.

Data File Name	Description
Poplar_Veg_Plots_Environmental.csv	Plot data including soil code, moisture, slope, aspect, and topography data. Also includes percent groundcover

Poplar_Veg_Plots_Species.csv	This file contains species cover data for the poplar vegetation plots. The source of these data is the Phytocoenologia publication (Breen 2014). Both the author's determination and the current taxonomy according to the Panarctic Species List (PASL) are listed. Taxa are listed in alphabetical order according to the accepted PASL name. The estimated percent land cover by species per plot are the old Braun-Blanquet cover-abundance scale where: 0= (none present) r= (rare) + (common but less than 1 percent) 1 (1-5%) 2 (6-25%) 3 (26-50%) 4 (51-75%) 5 (76-100%) The plots are named according to the original stand numbers

Table 2. Variables in the file **Poplar_Veg_Plots_Environmental.csv**

Column number	Variable	Units/format	Description
1	FIELD_PLOT_NUM	text	The plot numbers in the modified source data are the author's. The main plot numbers in the Turboveg database are accession numbers and will differ. The author's plot numbers are retained in the 'Field releve number' field in the Turboveg database
2	DATE	YYYYMMDD	Survey date
3	BIOME	text	Arctic or Boreal
4	HABITAT	text	Description of the habitat at the plot
5	LOCALITY	text	Description of study plot location
6	LATITUDE	decimal degrees	Latitude of the study plot in decimal degrees. All coordinates were projected to the WGS84 datum
7	LONGITUDE	decimal degrees	Longitude of the study plot in decimal degrees. All coordinates were projected to the WGS84 datum
8	ELEVATION	m	Elevation of plot area in meters
9	SLOPE	degrees	Slope of plot area in degrees
10	ASPECT	degrees	Aspect of plot area in degrees
11	STAND_AREA	m2	Stand area in meters squared
12	LANDFORM	code	Refer to the code defined in the companion file Poplar_Veg_Plots_legend.pdf
13	SURFICIAL_GEOLOGY	code	Refer to the code defined in the companion file Poplar_Veg_Plots_legend.pdf
4	POPLAR_REPRODUCTION	code	Refer to the code defined in the companion file Poplar_Veg_Plots_legend.pdf
15	TOPOGRAPHIC_POSITION	code	Refer to the code defined in the companion file Poplar_Veg_Plots_legend.pdf
16	SNOW_DURATION	scalar	Refer to the code for scalars defined in the companion file Poplar_Veg_Plots_legend.pdf
17	SITE_CONTOUR	code	Refer to the code defined in the companion file Poplar_Veg_Plots_legend.pdf
18	STABILITY	scalar	Refer to the code for scalars defined in the companion file Poplar_Veg_Plots_legend.pdf
19	EXPOSURE	scalar	Refer to the code for scalars defined in the companion file

			Poplar_Veg_Plots_legend.pdf
20	SITE_MOISTURE	scalar	Refer to the code for scalars defined in the companion file Poplar_Veg_Plots_legend.pdf
21	SOIL_MOISTURE	scalar	Refer to the code for scalars defined in the companion file Poplar_Veg_Plots_legend.pdf
22	DISTURBANCE_TYPE	scalar	Refer to the code for scalars defined in the companion file Poplar_Veg_Plots_legend.pdf
23	DISTURBANCE_DEGREE	scalar	Refer to the code for scalars defined in the companion file Poplar_Veg_Plots_legend.pdf
24	TREE_CANOPY_HEIGHT	m	Tree canopy height in meters
25	SHRUB_HEIGHT	cm	Shrub height in centimeters
26	FORB_GRAMINOID_HEIGHT	cm	Height in centimeters
27	MOSS_ORGANIC_A_HORIZON_HEIGHT	cm	Height in centimeters
28	STAND_BASAL_AREA	m2/ha	Stand basal area reported in meters squared per ha
29	STAND_DENSITY	trees/ha	Stand density reported as the # of trees per hectare
30	LITTER_DEPTH	cm	Litter depth provided in centimeters
31	ORGANIC_HORIZON_PRESENT	text	Organic horizon
32	BURIED_ORGANIC_HORIZONS	text	Buried organic horizon
33	TREE_COVER	%	Percent of plot cover that is trees
34	TREE_SAPLINGS_COVER	%	Percent of plot cover that is tree saplings
35	DECIDUOUS_SHRUBS_COVER	%	Percent of plot cover that is deciduous shrub
36	EVERGREEN_SHRUBS_COVER	%	Percent of plot cover that is evergreen shrubs
37	SHRUBS_COVER	%	Percent of plot cover that is shrubs
38	FORBS_COVER	%	Percent of plot cover that is forbs
39	GRAMINOIDS_COVER	%	Percent of plot cover that is graminoids
40	HORSETAILS_COVER	%	Percent of plot cover that is horsetails
41	BRYOPHYTES_COVER	%	Percent of plot cover that is bryophytes
42	LICHEN_COVER	%	Percent of plot cover that is lichen
43	LITTER_COVER	%	Percent of plot cover that is litter
44	STANDING_DEAD_COVER	%	Percent of plot cover that is standing dead vegetation
45	BARE_ROCK_COVER	%	Percent of plot cover that is bare rock
46	BARE_SOIL_COVER	%	Percent of plot cover that is bare soil
47	OPEN_WATER_COVER	%	Percent of plot cover that is open water
48	TOTAL_DEAD_COVER	%	Percent of plot cover that is dead
49	TOTAL_VEGETATION_COVER	%	Percent of plot cover that is total vegetation

Table 3. Variables in the file **Poplar_Veg_Plots_Species.csv**

Column number	Column header	Description
1	PASL_TAXON_SCIENTIFIC_ NAME	Current nomenclature according to the Panarctic Species List (PASL)
2	PASL_TAXON_SCIENTIFIC_ NAME_AU	Current nomenclature according to the Panarctic Species List (PASL) with the data authors (AU) name
3	DATASET_TAXON	Data set taxonomy
		Plot names- 33 column headers. The plot

4-37	DATASET_PLOT_ NUM	numbers as named by the author. Column headers= 3 letter abbreviation followed by a #. For example, "NOA3". The data values are the estimated percent land cover by species per plot according to the older Braun-Blanquet cover-abundance scale where: 0= (none present) r= (rare) + (common but less than 1 percent) 1 (1-5%) 2 (6-25%) 3 (26-50%) 4 (51-75%) 5 (76-100%) Example data are provided in Table 4 below

Example data from the file **Poplar_Veg_Plots_Species.csv**:

PASL_TAXON_SCIENTIFIC_NAME	PASL_TAXON_SCIENTIFIC_ NAME_AU	DATASET TAXON	NOA3	KON1	IVI4
Abietinella abietina	Abietinella abietina (Hedw.) Fleisch.	Abietinella abietina	0	0	0
Achillea millefolium s. borealis	Achillea millefolium s. borealis (Bong.) Breitung	Achillea millefolium ssp. borealis	0	0	0
Aconitum delphinifolium [s. delphinifolium]	Aconitum delphinifolium [s. delphinifolium] DC.	Aconitum delphinifolium var. delphinifolium	0	0	1

Companion files

There are three companion files with this data set:

Poplar_Veg_Plots_Legend.pdf	Defines the code and scalars found in the file Poplar_Veg_Plots_Environmental.csv
Poplar_Veg_Plots_Photos	Provides photos of the study area
Poplar_Veg_Plots.pdf	This document in pdf format

3. Application and Derivation

The presence of balsam poplar in northern Alaska is strongly linked to climate. These data could be useful in climate change studies. An alteration of temperature regime caused by climate change will likely result in an increase in the abundance and distribution of balsam poplar on the arctic slope of Alaska (Breen, 2014).

4. Quality Assessment

Voucher specimens were collected for identification purposes, and a representative specimen for each taxon was deposited in the Herbarium of the University of Alaska Museum of the North.

5. Data Acquisition, Materials, and Methods

Site Description

Vegetation cover and environmental plot data were collected from 2003 to 2005 from 32 balsam poplar (*Populus balsamifera L.,* Salicaceae) vegetation plots located on the the Arctic Slope of Alaska and in the interior boreal forests of Alaska and the Yukon from 2003 to 2005. The Arctic study area is

bounded by the Noatak River to the west and the Kongakut River to the east. The boreal forest study area is bounded to the east by the Kobuk River and to the west by the headwaters of the Yukon River (Breen, 2014).

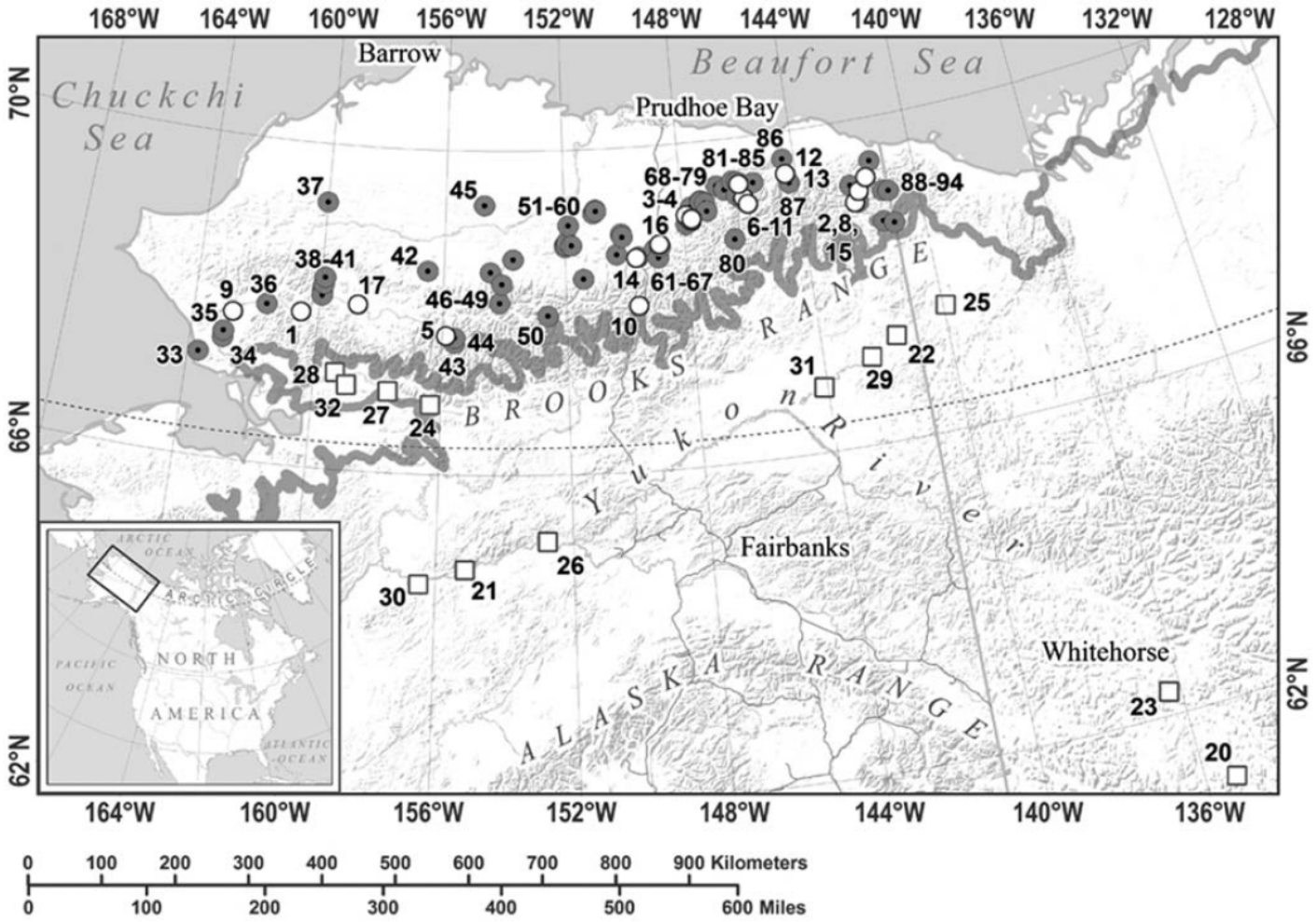

Figure 2. Location of study sites in Alaska and Yukon (1-32, open symbols) and known balsam poplar occurrences on the Arctic Slope in Alaska (33-94, gray circles). The study sites in the Arctic are denoted with circles and those in the boreal forests are denoted with squares. The gray line depicts the arctic treeline (CAVM Team 2003). The plots are numbered as in Breen (2014).

Methods

The study plots were chosen subjectively in areas of homogeneous, representative vegetation and geo-referenced. The minimum sampling area was approximately 100 m2. The vegetation data were analyzed using the Braun-Blanquet approach, and the plant community types were published in Breen (2014). The differentiation of vegetation types was based on diagnostic species. The criteria proposed by Dierschke (1994) was followed to assess the degree of fidelity of character species and to determine differential species

The point centre quarter method was used to estimate stand density (trees/ha), basal area and canopy height (Mueller-Dombois and Ellenberg 1974).

Elevation, slope, aspect, stability, exposure, parent material and geomorphology were noted at each site. Site and soil moisture and snow duration were categorized on scales of 1 to 10 (Breen, 2014; Komárková 1983).

Figure 3. Vegetation plot photos on a south-facing slope adjacent to the Noatak River (Plot 17) in Arctic Alaska (Breen, 2014).

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

Pre-ABoVE: Poplar Vegetation Plots, Arctic and Interior Alaska and Yukon, 2003-2005

Contact for Data Center Access Information:

- E-mail: uso@daac.ornl.gov
- Telephone: +1 (865) 241-3952

7. References

Breen, A. L. 2014. Balsam poplar (Populus balsamifera L.) communities on the Arctic Slope of Alaska. Phytocoenologia 44:1–24.DOI: https://doi.org/10.1127/0340-269X/2014/0044-0522

CAVM Team (2003): Circumpolar Arctic Vegetation Map. (1:7,500,000 scale), Conservation of Arctic Flora and Fauna (CAFF) Map No. 1. U.S. Fish and Wildlife Service, Anchorage, Alaska. ISBN: 978-0-9767525-0-9.

Dierschke, H. (1994): Pflanzensoziologie. – Ulmer Verlag, Stuttgart. DOI: 10.1002/fedr.19951060122

Komárková, V. (1983): Environmental data for 235 plots in the Gunnison and Uncompahgre National Forests. Progress report #5. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, U.S. A.

Mueller-Dombois, D. and Ellenberg, H. (1974): Aims and methods of vegetation ecology. – John Wiley & Sons, New York, USA. ISBN: 0-471-62290-7