

aava_barrow_ibp_pwebber_1978_readme_metadata.pdf

AAVA readme file for Barrow IBP Tundra Biome Plots (February 17, 2020)

Dataset Title: Alaska Arctic Vegetation Archive: Barrow IBP Tundra Biome Vegetation Plots (Webber 1978; Villarreal et al. 2012)

Dataset Authors: Patrick Webber & Sandra Villarreal

Alaska Arctic Vegetation Archive Dataset Name: barrow_ibp_pwebber (BRW_PW)

Dataset Description:

The Barrow vegetation plots were originally described and mapped by Dr. Patrick J. Webber in 1972 as part of the International Biological Program (IBP). The U. S. Tundra Biome Program focused on long-term studies to understand tundra adaptations as they relate to the distribution of vascular plants, bryophytes and lichens to environmental factors in the light of future oil development on the coastal plain. These sites were resampled by Webber, Craig Tweedie, Robert Hollister, Sandra Villarreal and others in 1999, 2008, and 2010, and assessed for community change by Villarreal as part of the 'IPY Back to the Future: Resampling old research sites to assess changes in high latitude terrestrial ecosystem structure and function project' (NSF Award No. 0732885). The tundra at Barrow is considered coastal tundra located in the most northern region of North Slope and is characterized by various microtopographic features such as polygons, as well as many ponds and lakes.

Each vegetation plot consists of a 1m x 10m belt with a 1m x 10cm strip along the inside. Each plot is divided into ten 1m x 1m sub-plots in which species percent cover is visually estimated in the 1m x 10cm strip and species presence in the 1m x 90cm sub-plot. The vegetation plot data chosen for inclusion in the Alaska-AVA are summaries of the ten 1m x 1m sub-plots.

Forty-three plots, were originally established in 1972 and were used to characterize 10 plant communities for the IBP project including: 1) Arctophila creek margin (1 plot), 2) Arctophila fulva pond margin (2 plots), 3) Arctophila pond margin (1 plot), 4) Cochlearia officinalis pioneer meadow and creek bed (2 plots) 5) Dry Luzula confusa heath (1 plot), 6) Dry Salix rotundifolia heath (6 plots), 7) Mesic Carex aquatilis-Poa arctica meadow (12 plots), 8) Moist Carex aquatilis-Oncophorus wahlenbergii meadow (4 plots), 9) Wet Carex aquatilis-Eriophorum russeolum meadow (8 plots), 10) Wet Dupontia fisheri-Eriophorum angustifolium meadow (6 plots). An updated classification and change analysis is provided in Villarreal et al. (2012) for individual sub-plots.

Original data from 1972 were classified and community descriptions

were published as a report (Webber & Ebert 1973) and as a component of two IBP books (Brown et al. 1980, Webber 1978, Webber et al. 1980). These data and their corresponding resampling data from 1999, 2008, and 2010 for the 33 relocated sites (330 sub-plots) were assessed for change and published as part of a PhD dissertation (Villarreal 2013), site-specific papers (Lara et al. 2012, Villarreal et al. 2012) and as part of a synthesis of the larger IPY Back to the Future project (Callaghan et al. 2011). Webber also provided insight on the quality of these and other datasets collected using his plant community sampling method at the Alaska AVA Boulder Workshop (Webber 2014).

References:

Brown, J., K.R. Everett, P.J. Webber, S.F. MacLean, Jr., and D.F. Murray. 1980. The coastal tundra at Barrow. Pages 1–29 in Brown, J. et al., editors. An Arctic ecosystem: the coastal tundra at Barrow, Alaska. Dowden, Hutchinson & Ross, Stroudsburg, Pennsylvania, U.S.A.

Callaghan. T. V., C. E. Tweedie, J. Ackerman, C. Andrews, J. Bergstedt, et al. 2012. Multi-Decadal Changes in Tundra Environments and Ecosystems: The International Polar Year-Back to the Future Project (IPY-BTF). *Ambio* 40:705–716.

Lara M. J, S. Villarreal, D. R. Johnson, R. D. Hollister, P. J. Webber and C. E. Tweedie. 2012. Estimated change in tundra ecosystem function near Barrow, Alaska between 1972 and 2010. *Environmental Research Letters* 7:015507

Miller, P. C., P. J. Webber, W. C. Oechel, and L. L. Tieszen. 1980. Biophysical processes and primary production in tundra. Pages 186–218 in Brown, J. et al., editors. An Arctic ecosystem: the coastal tundra at Barrow, Alaska. Dowden, Hutchinson & Ross, Stroudsburg, Pennsylvania, U.S.A.

Tweedie, C. E. 2013. IPY Back to the Future (BTF): Re-sampling old research sites to assess change in high latitude terrestrial ecosystem structure and function. NSF Arctic Data Center. doi:10.5065/D6XS5SD1.

Villarreal, S., R. D. Hollister, D. R. Johnson, M. J. Lara, P. J. Webber, and C. E. Tweedie. 2012. Tundra vegetation change near Barrow, Alaska (1972–2010). *Environmental Research Letters* 7: 015508.

Villarreal, S. 2013. International Polar Year (IPY) Back to the Future (BTF): Changes in arctic ecosystem structure over decadal time scales. PhD thesis, The University of Texas at El Paso, El Paso, Texas, USA.

Webber, P. J. 2014. The nature and appropriateness, to the Arctic Vegetation Archive (AVA), of data sets gathered using the Webber plant community sampling method. In Walker, D.nA. (Ed). Alaska Arctic Vegetation Archive Workshop, Boulder, Colorado, October 14–16, 2013. CAFF Proceedings Report #11. Akureyri, Iceland. ISBN:

978-9935-431-29-5.

Webber, P. J. and D. C. Ebert. 1973. Ordination and production of tundra vegetation from Niwot Ridge, Colorado, and Point Barrow, Alaska. U.S. International Biological Program, Washington DC Tundra Biome Data Report 73-22.

Webber, P. J. 1978. Spatial and temporal variation of the vegetation and its production, Barrow, Alaska. Pages 37-112 in L. L. Tieszen, editor. Vegetation and Production Ecology of an Alaskan Arctic Tundra. Springer-Verlag, New York, New York, U.S.A.

Webber, P. J., P. C. Miller, F. S. Chapin III, and B. H. McCown. 1980. The Vegetation Pattern and Succession. Pages 186-218 in Brown, J. et al., editors. An Arctic ecosystem: the coastal tundra at Barrow, Alaska. Dowden, Hutchinson & Ross, Stroudsburg, Pennsylvania, U.S.A.

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Primary Agency: Systems Ecology Lab, University of Texas El Paso

Direct Plot Archive Record Link: <http://agc.portal.gina.alaska.edu/catalogs/10178-alaska-arctic-vegetation-archive-barrow-vegeta>

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Link to VegBank Record:
Will add when available

Missing data: Indicated by '-9' for numerical data and 'n/a' for categorical or text data

Files Available for Download:

1) AAVA Barrow IBP Tundra Biome Modified Source Data

1a) Barrow IBP Species Cover

aava_barrow_ibp_pwebber_1978_1972a_spp_modsrc.csv
aava_barrow_ibp_pwebber_1978_1972a_spp_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_1972b_spp_modsrc.csv
aava_barrow_ibp_pwebber_1978_1972b_spp_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_1999_spp_modsrc.csv
aava_barrow_ibp_pwebber_1978_1999_spp_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_2008_spp_modsrc.csv
aava_barrow_ibp_pwebber_1978_2008_spp_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_2010_spp_modsrc.csv

aava_barrow_ibp_pwebber_1978_2010_spp_modsrc.xlsx

These files contain the 1972, 1999, 2008 and 2000 species cover data for the Barrow IBP Tundra Biome vegetation sites in both .csv and .xlsx format. The source of these data is the Back to the Future project page within the NSF Arctic Data Center archival site (Tweedie 2016) and are mean summaries of the ten 1m x 1m sub-plots that together comprise the 1-m x 10-m belt. We assumed homogeneity across the 1m x 10cm strip and 1m x 90cm sub-plots. For those species recorded as present with no cover value in the 1m x 90cm sub-plot, we assigned a rare cover estimate of 0.1% prior to calculating the mean percent cover value for each plot. Therefore, for each species observed, mean cover equals 1/10 of the sum of the percent cover in the full 1m x 10m belt. The plot area since we report mean cover values from sub-plots is 1m x 1m or 1 m².

Plot locations were obtained via GPS in the early 2000s and are reported for all years of data collection. Species cover data are by percentage. 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 plot numbers in the source data are the author's field plot numbers, to view a crosswalk of the field plot numbers to the plot numbers used in Webber (1978), see the file associated with Supplementary Material #3 below. 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, and for this dataset are prefaced by the year sampled. For 1972, there are separate files for the plots that were relocated and resampled in subsequent years (1972a) and for the plots that were not relocated (1972b).

1b) Barrow IBP Tundra Biome Environmental Data

aava_barrow_ibp_pwebber_1978_1972a_allenv_modsrc.csv
aava_barrow_ibp_pwebber_1978_1972a_allenv_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_1972b_allenv_modsrc.csv
aava_barrow_ibp_pwebber_1978_1972b_allenv_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_1999_allenv_modsrc.csv
aava_barrow_ibp_pwebber_1978_1999_allenv_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_2008_allenv_modsrc.csv
aava_barrow_ibp_pwebber_1978_2008_allenv_modsrc.xlsx
aava_barrow_ibp_pwebber_1978_2010_allenv_modsrc.csv
aava_barrow_ibp_pwebber_1978_2010_allenv_modsrc.xlsx

These files contain modified environmental data for the 1972, 1999, 2008 and 2000 Barrow IBP Tundra Biome vegetation plots in both .csv and .xlsx format. The source of these data is Villarreal (pers. comm. 2014). These data are identical to the header data in the Turboveg database as no project specific environmental data were available. It is anticipated additional environmental data will be made available at

the project archive site (Tweedie 2016). The header data are site summaries for the ten 1 x 1m Barrow IBP sub-plots.

Improvements to the source data include: 1) functional type percent covers for 2010 were calculated from species cover data by Sandra Villarreal, and 2) Patrick Webber provided a hand-drawn map made during his field work. Using the map in conjunction with Google Earth the latitudes and longitudes were estimated for the unrelocated sites.

2) Barrow IBP Tundra Biome Turboveg Database

aava_barrow_ibp_pwebber_1978_1972a_tv.zip
aava_barrow_ibp_pwebber_1978_1972b_tv.zip
aava_barrow_ibp_pwebber_1978_1999_tv.zip
aava_barrow_ibp_pwebber_1978_2008_tv.zip
aava_barrow_ibp_pwebber_1978_2010_tv.zip

These files are the 1972, 1999, 2008 and 2000 Barrow IBP Tundra Biome Turboveg Databases (.dbf). Turboveg is a software program for managing vegetation-plot data (see <http://www.synbiosys.alterra.nl/turboveg/>). The database includes both species cover and environmental header data. The header data are site summaries for the 10 1m x 1m Barrow IBP sub-plots. The header data for the database are consistent across all datasets in the AAVA. There are both required and recommended fields for inclusion in the AAVA. The species nomenclature used in the database is according to the Panarctic Species List created for the Arctic Vegetation Archive. The current data dictionary and PASL files are required for the correct use of this data in Turboveg. These files are updated periodically and available for download via 'Data and Resources' section of the data record. The codes in the Alaska AAVA Turboveg data dictionary can be viewed via the plot archive website on the Alaska Arctic Geobotanical Atlas (<http://geobotanical.portal.gina.alaska.edu/plot-archive/turboveg-table>).

For the cross-walk from the source data to the Turboveg database, we made the following changes: 1) functional type percent covers for 2010 were calculated from species cover data, and species names that are missing from the PASL were crosswalked as needed and these changes are noted in the Turboveg field 'REMARKS.' Habitat types were assigned by D. A. 'Skip' Walker in 2013, modified by Jozef Sibik and D. A. 'Skip' Walker in 2016, and modified again by Sibik and Walker in November 2019. All habitat type code changes are documented in the modified source environmental data file for the project. A history of habitat type code changes is detailed in a metadata folder titled 'Habitat_type_history_metadata_2013-2019.'

3) AAVA Barrow IBP Tundra Biome Ancillary Data

3a) Barrow IBP Tundra Biome Plot Location Map
aava_barrow_ibp_pwebber_1978_plotmap_anc.pdf

This file is a plot map of the 33 relocated Barrow IBP sites (single point for each set of ten 1 x 1m sub-plots).

3b) Barrow IBP Tundra Biome Plot photos
aava_barrow_ibp_pwebber_1978_plotphotos_anc.pdf

This file contains site and sub-plot photos (where available) from 1972 (select plots), 2000 and 2010. Plots were resampled in 1999, but were not re-photographed until the following year in 2000. There are some plot photos that are missing in some years.

3c) Barrow IBP Tundra Biome Publications
callaghant_2011_ambio_ipybtfsynthesis.pdf
laram_2012_envreslett_ecosystemchangebarrow.pdf
villarreal_2012_envreslett_vegchangebarrow.pdf
villarreal_2013_utep_phddissertation.pdf
webberp_1978_bkchptr_vegprodbarrow.pdf
webberp_2014_aavaworkshopproc_samplingmethod.pdf

These are .pdf files of the primary reference cited in the dataset description for the Barrow IBP vegetation plots. The journal name is abbreviated according to the standards for the abbreviation of titles of periodicals and serial titles.

3d) Barrow IBP Tundra Biome Supplemental Material

These are materials provided by Patrick Webber that reference the Barrow IBP vegetation plots. Most of the explanatory text for each of the files was provided by Webber.

Supplemental Material 1)

aava_barrow_ibp_pwebber_1978_supmat1_plotmap_anc.pdf (plot location map):

Comments from Pat Webber in 2016: "This is a miniature version of the larger map (Supplementary material 6). It dates from around 1972. There are several of these miniatures around; one similar to this is in the Data Report 73-22. Plot numbering is by the original 3 and 4 digit scheme. If you want to use the map to verify GPS coordinates it may not be too useful. You might be able to do something by overlaying with the larger map on a modern image with accurate coordinates."

Supplemental Material 2)

aava_barrow_ibp_pwebber_1978_supmat2_plotcoord_anc.pdf (crosswalk of relocated plots and geographic coordinates from 1998):

In 1998 an effort was made to relocate Webber's original 1972 and 1978 plots. These are the notes from that visit from Pat Webber from 2016: "The "original" IBP numbers and "new plot numbers" match mine from 1972/1978 (see supplemental material 3 from Jerry Brown memo of January 1973). We can be sure this is a correct crosswalk for the

first re-sample done by Bob Hollister. Sandra, Craig and Bob will have to assure that there was no later new numbering. At this time (1998) I believe that Brian re-tagged and may have re-staked all relocated plots with small unobtrusive stakes and tags. Incidentally, I believe that he did the same for the Meade River/Atqasuk plots of Komarkova and Webber.”

Supplemental Material 3)

aava_barrow_ibp_pwebber_1978_supmat3_plotnotes_anc.pdf (crosswalk of original IBP and Webber’s sample and published numbers):

Comments from Pat Webber in 2016: “There are two scanned pages from the 6-page Jerry Brown memo of January 1973. It has all 43 ordination plots. The table is identical in content to Table B-XV in the Webber and Ebert Data Report 73-22. The nodal (plant community) membership should be ignored (it was not the final). It was from a trial ordination, which may have excluded cryptogams and stands that were pioneers and rudiments. Several of these stands finally formed Nodum VIII.”

Supplemental Material 4)

aava_barrow_ibp_pwebber_1978_supmat4_corrfig_anc.pdf (missing Webber plot and corrected Figure 3 of Webber 1978)

Comments from Pat Webber in 2016: “Plot # 1 of Nodum IV was not put on Figure 3. This was a drafting error on my part that was never caught. So there were 43 plots. Plot #1 is the original IBP plot #1301.”

Supplemental Material 5)

aava_barrow_ibp_pwebber_1978_supmat5_plotnotes_anc.pdf (map of alignment of Webber plots within the adopted IBP plots.):

Comments from Pat Webber in 2016: “The strange alignment of my 10, one meter square, plots (i.e., my “Stand”) within some of the adopted IBP plots. These are the sub-plots of the Villarreal’s analysis in her dissertation and of your table.”

Supplemental Material 6) aava_barrow_ibp_1978_supmat6_ibpmap_anc.pdf (IBP Tundra Biome Project map):

Comment from Pat Webber in 2016: “This is a map showing study sites and location of the US IBP Tundra Biome work at Barrow, AK.”

Supplemental Material 7)

aava_barrow_ibp_1978_supmat7_plotnotes_anc.pdf (plot notes and coordinates from sampling in 1972 and 1999):

These are plot notes Webber shared from their sampling efforts in 1972 and 1999. Most of this information is included in the modified environmental data.

4) AAVA Barrow IBP Tundra Biome Metadata

aava_barrow_ibp_webberp_1978_readme_metadata.txt

Folder: Habitat_type_history_metadata_2013-2019

This file is metadata for the Barrow IBP vegetation plots and includes a readme file specific to this dataset. Habitat types changed during the course of the project through review and analysis. A history of these changes is included in the metadata folder titled 'Habitat_type_history_metadata_2013-2019.'

There were no modifications to the source data to prep the AAVA Barrow IBP Tundra Biome Modified Source Environmental Data files. These data are identical to that in the Turboveg databases.