

aava_tooliklake_dwalker_1991_readme_metadata.txt

AAVA readme file for Toolik Lake (August 31, 2016)

Dataset Title: Alaska Arctic Vegetation Archive: Toolik Lake Vegetation Plots

Dataset Author: Donald A. (Skip) Walker

Alaska Arctic Vegetation Archive Dataset Name: tooliklake_dwalker (TL_DW)

Dataset Description:

The vegetation of the Toolik Lake area was described and mapped by D.

A. Walker et al. during the Department of Energy R4D (Response, Resistance, and Resilience to, and Recovery from Disturbance in Arctic ecosystems, Grant No. DE-FG02-84ER60242.A006) study in 1988-89. Toolik Lake is a glaciated landscape in the southern Arctic Foothills of the Brooks Range, North Slope, Alaska. The primary source document for this dataset is a data report prepared for the R4D project (Walker and Barry 1991).

Eighty-one plots were subjectively located in 26 plant communities and 4 broad habitat types including: 1) dry tundra (including gravelly south-facing slopes, till and outwash deposits, ground squirrel mounds, stone stripes, and nonsorted circles) (19 plots), 2) snowbeds (7 plots), 3) moist tundra (including tussock tundra, moist nonacidic tundra, moist shrublands) (27 plots), and 4) wet tundra (including fens, and aquatic tundra) (15 plots).

All the plots were permanently marked with a 4-foot black and white-striped 1-inch PVC pipe with the plot number stamped into an aluminum tag at the top of the post. GPS coordinates were obtained for most plots in the mid-2000s. The size of each sample area was estimated after a complete species list was obtained. Species and environmental data (including soil physical variables, subjective site assessments, and active layer depths) were collected in the field and soil samples were brought back to the lab for chemical assessments. These data are all included in the data report (Walker and Barry 1991).

The vegetation data from Toolik Lake and Imnavait Creek were combined and classified using the Braun-Blanquet approach (Walker et al. 1994). These data and others that included biomass and spectral data (NDVI, LAI, iPar) were used in subsequent publications and maps (Shippert et al. 1995, Walker et al. 1995, Walker and Maier 2008, Walker et al. 2014).

References:

Shippert, M. M., D. A. Walker, N. A. Auerbach, and B. E. Lewis. 1995. Biomass and leaf-area index maps derived from SPOT images for Toolik Lake and Imnavait Creek areas, Alaska. *Polar Record* 31:147–154.

Walker D. A. and N. Barry. 1991. Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions. Data Report, Department of Energy R4D Program, Institute of Arctic and Alpine Research, University of Colorado, Boulder, CO, USA.

Walker, D. A., N. A. Auerbach, and M. M. Shippert. 1995. NDVI, biomass, and landscape evolution of glaciated terrain in northern Alaska. *Polar Record* 31:169–178.

Walker, D. A., and H. A. Maier. 2008. Vegetation in the Vicinity of the Toolik Lake Field Station, Alaska. Biological papers of the University of Alaska, No. 28, Institute of Arctic Biology, University of Alaska, Fairbanks.

Walker, D. A., T. D. Hamilton, H. A. Maier, C. A. Munger, and M. K. Raynolds. 2014. Glacial history and long-term ecology in the Toolik Lake region. Pages 61–80 in J. E. Hobbie and G. W. Kling, editors. *Alaska's changing Arctic: Ecological consequences for tundra, streams, and lakes*. Oxford, New York.

Walker, M.D., D.A. Walker and N.A. Auerbach. 1994. Plant communities of a tussock tundra landscape in the Brooks Range Foothills, Alaska. *Journal of Vegetation Science* 5:843–866.

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Direct Plot Archive Record Link: <http://geobotanical.portal.gina.alaska.edu/catalogs/6803-alaska-arctic.vegetation-archive-toolik-lake-v>

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Link to VegBank Record: http://vegbank.org/vegbank/views/project_summary.jsp?clearSearch=0&andqsent=6&andxwhereMatchAny=false&andxwhereMatchWholeWords=false&andperPage=10&andwhere=where_keywords_pk_in&andxwhereKey=xwhere_kw_match&andxwhereSearch=true&andwparam=project__project&andselEntity=proje

ctandxwhereParams=toolik+lake

Missing data: Indicated by '-9999' for numerical data and 'n/a' for categorical or text data

Files Available for Download:

1) AAVA Toolik Lake Modified Source Data

1a) Toolik Lake Species Cover

aava_tooliklake_dwalker_1991_spp_modsrc.csv

aava_tooliklake_dwalker_1991_spp_modsrc.xlsx

These files contain species cover data for the Toolik Lake vegetation plots in both .csv and .xlsx format. The source of these data is the Toolik Lake data report (Walker and Barry 1991). Species cover classes are the old Braun-Blanquet cover-abundance scale: r (rare), + (common, but less than 1 percent cover), 1 (1-5 percent), 2 (6 to 25 percent), 3 (26 to 50 percent), 4 (51 to 75 percent), 5 (76 to 100 percent). 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. In two instances, taxa were lumped into a single taxon in the PASL: 1) *Dicranum spadiceum* (*Dicranum angustum* and *Dicranum spadium*) and 2) *Calliergon stramineum* (*Brachythecium stramineum* and *Calliergon stramineum*). The plot numbers in the 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.

1b) Toolik Lake Environmental Data

aava_tooliklake_dwalker_1991_allenv_modsrc.csv

aava_tooliklake_dwalker_1991_allenv_modsrc.xlsx

These files contain modified environmental data for the Toolik Lake vegetation plots in both .csv and .xlsx format. The source of these data is the Toolik Lake Data Report (Walker and Barry 1991; Tables 1, 2, 4, 5 and text) and the Toolik-Arctic Geobotanical Atlas website (<http://www.arcticatlas.org/>). For the source of the fields within the file, see below. The header data in the Turboveg database only includes a subset of these data. The plot numbers in the 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. The codes used in this file are in the Legend for Environmental Variables file in the project metadata folder (aava_tooliklake_dawalker_1991_envlegend_metadata.pdf).

Improvements to the source data include: 1) Dashes recorded in Aspect field indicated to flat to determine, 2) latitude and longitude

were obtained in the mid-2000s by the Toolik GIS group and converted to decimal degrees and projected to WGS84, 3) latitude and longitude for plots 28 and 55 were estimated using the aerial photograph plot map and Google Earth, 4) the sampling date for plot 73 was estimated from D. Walker's field notebook and is accurate within one or two days, 5) soil variables were derived by plot, typically at 10 cm depth, from the complete soils data in the ancillary folder. Soil texture is primarily from the top mineral horizon per the soil text descriptions; secondarily from 10 cm, or listed as 'organic' when no mineral horizon is present.

2) AAVA Toolik Lake Turboveg Database

aava_tooliklake_dwalker_1991_tv.zip

This file is the Toolik Lake Turboveg Database (.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 for the database are consistent across all datasets in the AAVA. There are both required and recommended fields for inclusion in the AAVA. Consequently, only a subset of the modified source environmental data are included in the database and these may be cross-walked to the AAVA data dictionary. 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.

For the cross-walk from the source data to the database, we made the following changes: 1) although Walker et al. (1994) report plot size is about 80 square meters, the plot area is recorded as '-1' to indicate the plot had no boundaries, 2) added plot elevation, which is the elevation for the Toolik Field Station (all plots have this same elevation), 3) Braun-Blanquet cover code values of "+" and "r" in the biotic data for dwarf shrub, graminoid, forb, lichen, bryophyte, and horsetail were changed to "1 percent" as the database requires an integer, and, 4) species names that are missing from the PASL were crosswalked as needed and these changes are noted in the 'REMARKS' field.

3) AAVA Toolik Lake Ancillary Data

3a) Toolik Lake Plot Location Map

aava_tooliklake_dwalker_1991_plotmap_anc.pdf

This file is a plot map of the Toolik Lake permanent vegetation plots from the online Toolik-Arctic Geobotanical Atlas.

3b) Toolik Lake Plot Photos

aava_tooliklake_dwalker_1991_plotphotos_anc.pdf

This file contains general site, vegetation, and soil photos (if present) from the Toolik Lake permanent vegetation plots from the online Toolik-Arctic Geobotanical Atlas.

3c) Toolik Lake Soils Data

aava_tooliklake_dwalker_1991_soildata_anc.csv

aava_tooliklake_dwalker_1991_soildata_anc.xlsx

aava_tooliklake_dwalker_1991_soildesc_anc.pdf

These are the complete soils data and descriptions for the Toolik Lake permanent vegetation plots that are modified from the data report (Table 5 and Appendix). Soil nomenclature and terminology are according to Soil Survey Staff (1974). Symbols used in the data report to indicate 'insufficient sample' or 'not analyzed' are replaced by text. See the data report (Walker and Barry 1991) and the Toolik-Arctic Geobotanical Atlas website (<http://www.arcticatlas.org/>) for further information.

3d) Toolik Lake Spectral and Biomass Data

aava_tooliklake_dwalker_1991_spectralbiomassdata_anc.xlsx

aava_tooliklake_dwalker_1991_spectralbiomassdata_anc.csv

These are the complete NDVI, LAI, iPAR and above ground biomass data and description by Margaret M. Shippert for the Toolik Lake permanent vegetation plots. The data is published in Shippert et al. (1995) and Walker et al. (1995).

The NDVI data are derived from field spectroscopy carried out with a ASD PS-II portable field spectrometer between 25 July and 10 August 1993. The NDVI values were calculated from reflectances at wavelengths corresponding to the Landsat TM red band (630–690 nm) and the near-infrared band (760–900 nm). The LAI was measured with a PCA-2000 plant canopy analyzer by LI-COR Inc. IPAR was measured with a LI-1000 line quantum sensor by LI-COR Inc. Total biomass was measured by collecting all above-ground organic material at each sample site within a 50x20 cm wire frame centered over the site of reflectance, LAI and iPAR measurements.

Overall 3 random replicates were sampled at each plot – these data sets are named by the suffix A, B, or C to the plot ID number. Note: We corresponded with Dr. Shippert and she informed us that the original data files have been lost during moves and only assume her Toolik Plot (TP) numbers correspond to the Toolik Lake plot numbers established by Walker whose field numbers begin with SWT. Due to the difficulties in recovery of this data set, we assume that the plot numbers correspond to the plot numbers of Walker et al. (1991). Further assessment and verification of plot numbers is needed.

3e) Toolik Lake Publications

shippertm_1995_polarrec_spotndvibiomasslai.pdf

walkerd_1991_dataprnt_tooliklakevegplots.pdf

walkerd_1995_polarrec_ndvibiomass_evolarctic.pdf

walkerd_2008_biologicalpapersuaf_tlkvegmaps folder

walkerd_2014_bkchpt_glacialhistory_vegtooliklake.pdf

walkerm_1994_jvegsci_tsscktnrveg.pdf

These are pdf files of the references cited in the dataset description for the Toolik Lake permanent vegetation plots. Journal names are abbreviated using the standards for the abbreviation of titles of periodicals and serial titles.

4) AAVA Toolik Lake Metadata

aava_tooliklake_dwalker_1991_readme_metadata.txt

aava_tooliklake_dwalker_1991_envlegend_metadata.pdf

aava_tooliklake_dwalker_1991_envlegend_metadata.doc

These files are metadata for the Toolik Lake permanent vegetation plots and include a readme file and metadata legend for the modified environmental data that are specific to this dataset.

Modifications to environmental source data:

The table below in comma separated values format indicates the modifications made to source data in the preparation of the AAVA Toolik Lake Modified Source Environmental Data files (aava_tooliklake_dwalker_1991_allenv_modsrc.csv and aava_tooliklake_dwalker_1991_allenv_modsrc.xlsx) and fields that were used to crosswalk these data to the Turboveg database (aava_tooliklake_dwalker_1991_tv.zip).

VARIABLE, IN MODIFIED SOURCE ENVIRONMENTAL DATA FILE, IN TURBOVEG FILE, SOURCE AND CHANGES MADE TO DATA

FIELD PLOT NUMBER, Y, Y, Tables 1; 2; 4; and 5 (Walker and Barry 1991).

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

(aava_tooliklake_dwalker_1991_tv.xml).

PRINCIPAL HABITAT, Y, Y, Table 1 (Walker and Barry 1991). Crosswalked to the Turboveg field 'Habitat.'

PRELIMINARY COMMUNITY NAME, Y, Y, Table 1 (Walker and Barry 1991). 'Plant community name' in Turboveg except for those plots from M. Walker et al.'s 1994 analysis. 'Site moisture' in Turboveg came from Table 1.

PLANT COMMUNITY, Y, N, Table 2 (Walker and Barry 1991). Part of 'Remarks' field in Turboveg.

MICROSITE, Y, N, Table 2 (Walker and Barry 1991). Part of 'Remarks' field in Turboveg.

DATE SAMPLED (YYYYMMDD),Y,Y,Table 4 (Walker and Barry 1991). Date for plot 73 (+ or - one day) was estimated from D. A. Walker's field notebook.

LATITUDE-WGS 84 (DD),Y,Y,Data collected by Toolik GIS mid 2000's located in abiotic table (Table 4) for download on Toolik-Arctic Vegetation Archive Website. Plots 28 and 55 were estimated by A. Breen and L. Wirth using the aerial photograph in the report and Google Earth. All coordinates were projected to the WGS84 datum by L. Wirth (GINA) in 2013 and checked against the aerial photograph.

LONGITUDE-WGS 84 (DD),Y,Y,Data collected by Toolik GIS mid 2000's located in abiotic table (Table 4) for download on Toolik-Arctic Vegetation Archive Website. Plots 28 and 55 were estimated by A. Breen and L. Wirth using the aerial photograph in the report and Google Earth. All coordinates were projected to the WGS84 datum by L. Wirth (GINA) in 2013 and checked against the aerial photograph.

LANDFORM (CODE),Y,N,Table 4 (Walker and Barry 1991). Aided in crosswalk to the Turboveg field 'Surficial geology.'

SURFICIAL GEOLOGY (CODE),Y,Y,Table 4 (Walker and Barry 1991). Crosswalked to Turboveg field 'Surficial geology.'

GLACIAL GEOLOGY (CODE),Y,N,Table 4 (Walker and Barry 1991).

SURFICIAL GEOMORPHOLOGY (CODE),Y,N,Table 4 (Walker and Barry 1991).

Aided in crosswalk to the Turboveg field 'Habitat type.'

MICROSITE (CODE),Y,N,Table 4 (Walker and Barry 1991). Aided in crosswalk to the Turboveg field 'Habitat type.'

TOPOGRAPHIC POSITION (CODE),Y,Y,Table 4 (Walker and Barry 1991). Aided in crosswalk to the Turboveg field 'Topographic position.'

SLOPE (DEGREES),Y,Y,Table 4 (Walker and Barry 1991).

ASPECT (DEGREES),Y,Y,Table 4 (Walker and Barry 1991). Aspects recorded as too flat to determine in the modified source file were crosswalked to -1 in Turboveg field 'Aspect.'

EXPOSURE (SCALAR),Y,N,Table 4 (Walker and Barry 1991).

SITE MOISTURE (SCALAR),Y,N,Table 4 (Walker and Barry 1991).

ESTIMATED SNOW DURATION (SCALAR),Y,N,Table 4 (Walker and Barry 1991).

STABILITY (SCALAR),Y,N,Table 4 (Walker and Barry 1991).

CRYOTURBATION (PERCENT),Y,N,Table 4 (Walker and Barry 1991).

MICRORELIEF HEIGHT (CM),Y,N,Table 4 (Walker and Barry 1991).

THAW DEPTH (CM),Y,N,Table 4 (Walker and Barry 1991).

WATER COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).

BARE SOIL COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).

ROCK COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).

SOIL UNITS (CODE),Y,N,Table 4 (Walker and Barry 1991).

SOIL MOISTURE (SCALAR),Y,N,Table 4 (Walker and Barry 1991). Note the header for this field was incorrect in the data report and was corrected on the Toolik-Arctic Vegetation Archive Website.

TALL SHRUB COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).

LOW SHRUB COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).

DWARF SHRUB COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).

Crosswalked to Turboveg cover standards where '+' and 'r' are modified to 1 percent.

MEAN SHRUB HEIGHT (CM),Y,Y,Table 4 (Walker and Barry 1991).
 GRAMINOID COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).
 Crosswalked to Turboveg cover standards where '+' and 'r' are modified to 1 percent.
 FORB COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991). Crosswalked to Turboveg cover standards where '+' and 'r' are modified to 1 percent.
 LICHEN COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).
 Crosswalked to Turboveg cover standards where '+' and 'r' are modified to 1 percent.
 BRYOPHYTE COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).
 Crosswalked to Turboveg cover standards where '+' and 'r' are modified to 1 percent.
 HORSETAIL COVER (PERCENT),Y,Y,Table 4 (Walker and Barry 1991).
 Crosswalked to Turboveg cover standards where '+' and 'r' are modified to 1 percent.
 DISTURBANCE-HUMAN (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-FOX (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-BEAR (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-CARIBOU (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-SQUIRREL (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-LEMMING/VOLE (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-MOOSE (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-BIRD (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 DISTURBANCE-INSECT (SCALAR),Y,N,Table 4 (Walker and Barry 1991).
 HORIZON-AT 10 CM (SOIL SURVEY STAFF 1974),Y,N,Table 5 (Walker and Barry 1991).
 HORIZON DEPTHS (CM),Y,N,Table 5 (Walker and Barry 1991).
 WET COLOR-AT 10 CM (MUNSELL),Y,N,Table 5 (Walker and Barry 1991).
 BULK DENSITY-AT 10 CM (G/CC),Y,N,Table 5 (Walker and Barry 1991).
 GRAVEL less than 2 MM-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and Barry 1991).
 SAND-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and Barry 1991).
 SILT-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and Barry 1991).
 CLAY-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and Barry 1991).
 TEXTURE-AT 10 CM (SOIL SURVEY STAFF 1974),Y,N,"Table 5 (Walker and Barry 1991). Soil abbreviations follow U.S. Department of Agriculture, Natural Resources Conservation Service standards."
 SOIL TEXTURE-TOP MINERAL HORIZON (SOIL SURVEY STAFF 1974),Y,Y,"Table 5 (Walker and Barry 1991). Soil abbreviations follow U.S. Department of Agriculture, Natural Resources Conservation Service standards. Soil texture is primarily from the top mineral horizon per the soil descriptions; secondarily from 10 cm, or are assigned 'organic' when no mineral horizon is present. Crosswalked to the Turboveg field 'Soil texture.'"
 WATER-GRAVIMETRIC-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and Barry 1991).
 WATER-FIELD CAPACITY 1/3 ATM-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and Barry 1991).
 WATER-WILTING POINT 15 ATM-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and

Barry 1991).

ORGANIC MATTER-AT 10 CM (PERCENT),Y,N,Table 5 (Walker and Barry 1991).

PH-PASTE-AT 10 CM,Y,Y,Table 5 (Walker and Barry 1991).

SOIL PH-TOP OF MINERAL HORIZON,Y,N,Table 5 (Walker and Barry 1991).

ELECTRICAL CONDUCTIVITY-PASTE-AT 10 CM (MMHOS/CM),Y,N,Table 5 (Walker and Barry 1991).

N03-NH4HC03-DTPA EXTRACT-AT 10 CM (PPM),Y,N,Table 5 (Walker and Barry 1991).

P-NH4HC03-DTPA EXTRACT-AT 10 CM (PPM),Y,N,Table 5 (Walker and Barry 1991).

K-NH4HC03-DTPA EXTRACT-AT 10 CM (PPM),Y,N,Table 5 (Walker and Barry 1991).

ZN-NH4HC03-DTPA EXTRACT-AT 10 CM (PPM),Y,N,Table 5 (Walker and Barry 1991).

FE-NH4HC03-DTPA EXTRACT-AT 10 CM (PPM),Y,N,Table 5 (Walker and Barry 1991).

MN-NH4HC03-DTPA EXTRACT-AT 10 CM (PPM),Y,N,Table 5 (Walker and Barry 1991).

CU-NH4HC03-DTPA EXTRACT-AT 10 CM (PPM),Y,N,Table 5 (Walker and Barry 1991).

CA-NH40AC EXTRACT-AT 10 cm (MEQ/100 G),Y,N,Table 5 (Walker and Barry 1991).

MG-NH40AC EXTRACT-AT 10 cm (MEQ/100 G),Y,N,Table 5 (Walker and Barry 1991).

NA-NH40AC EXTRACT-AT 10 cm (MEQ/100 G),Y,N,Table 5 (Walker and Barry 1991).

K-NH40AC EXTRACT-AT 10 cm (MEQ/100 G),Y,N,Table 5 (Walker and Barry 1991).

CAC03 EQUIVALENT-AT 10 cm (PERCENT),Y,N,Table 5 (Walker and Barry 1991).

CATION EXCHANGE CAPACITY-AT 10 cm (MEQ/100 G),Y,N,Table 5 (Walker and Barry 1991).

P-BRAY METHOD-AT 10 cm (PPM),Y,N,Table 5 (Walker and Barry 1991).

ELEVATION (M),Y,Y,"General elevation for Toolik Lake Station (source: Google Earth, accessed 2013)."

PLOT SIZE (SQUARE METERS),Y,Y,From sampling methods pg. 2 text (Walker and Barry 1991).

PLOT SHAPE,Y,Y,From sampling methods pg. 2 text (Walker and Barry 1991). Crosswalked to Turboveg field 'Plot shape.'

SOIL ORGANIC DEPTH (CM),Y,Y,L. Druckenmiller used soil horizon depths and descriptions from Table 5 (Walker and Barry 1991) to estimate soil organic layer depths.