Pre-ABoVE: Arctic Vegetation Plots in NPS Arctic Network Parks, Alaska, 2002-2008

Documentation Revision Date: 2017-12-07

Data Set Version: 1

Summary

This dataset provides environmental, soil, and vegetation data collected at selected locations in the parks and preserves of the National Park Service (NPS) Arctic Network (ARCN) between 2002 and 2008. The ARCN includes five national parks and preserves in northern Alaska encompassing 19.5 million acres and represents some of the wildest, most undisturbed areas left on earth: The Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Gates of the Arctic National Park and Preserve, Kobuk Valley National Park, and the Noatak National Preserve. The sampling sites were chosen to represent the full range of vegetation in the area with replication, and for uniformity in floristic composition and environmental conditions and were positioned on transects along toposequences within major physiographic units (riverine, lacustrine, lowland, upland, subalpine and alpine). Specific attributes include dominant vegetation, species, and cover, soil chemistry, physical characteristics, moisture, and organic matter, as well as site disturbance from various sources.

There are three data files provided with this dataset in comma-separated (.csv) format.

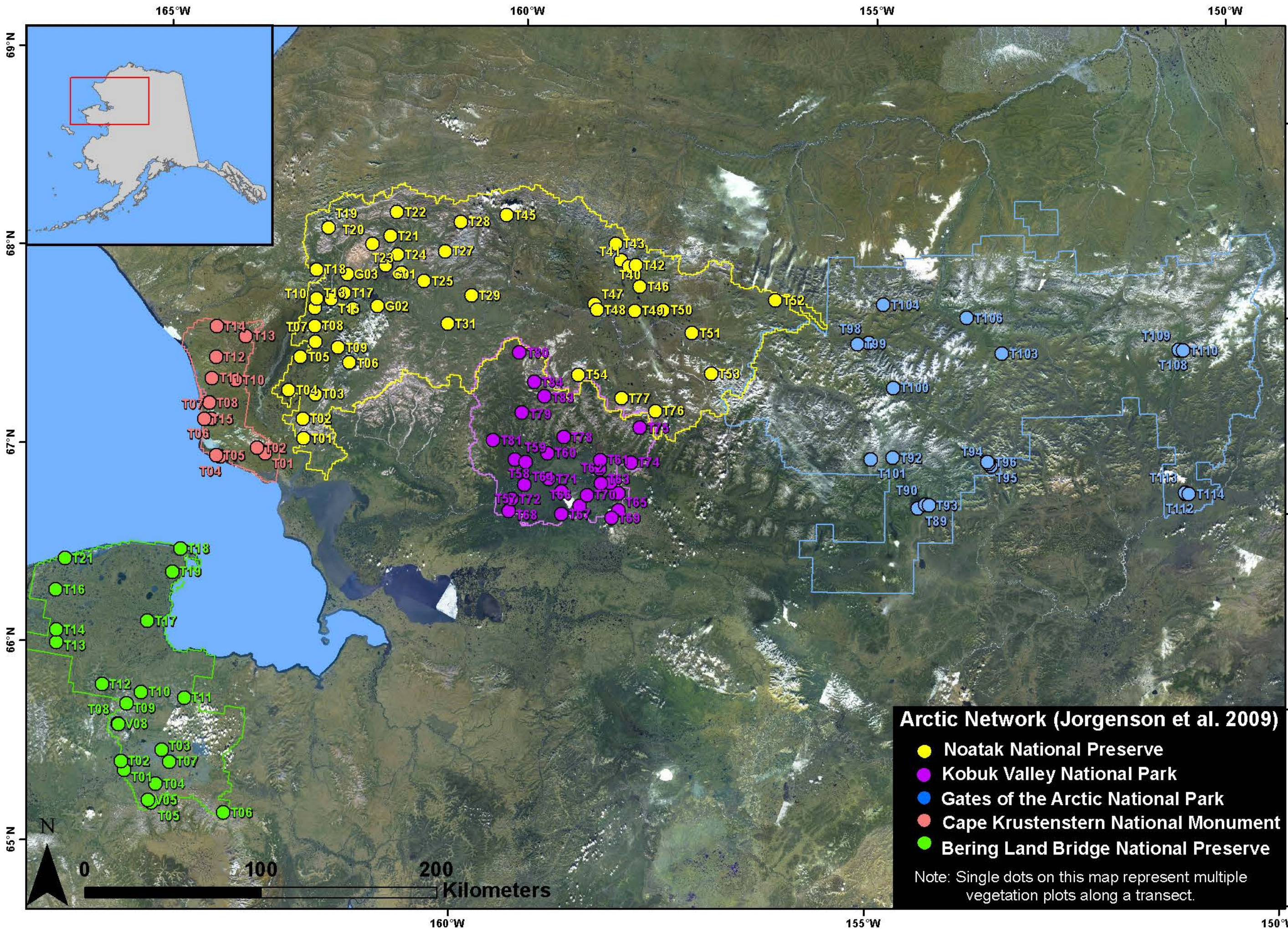

Figure 1. Map of locations of the vegetation plots in the five ARCN parks and preserves. Single dots on the map represent multiple vegetation plots along transects. The transect number adjacent to the dot can be linked to the field plot number. Map courtesy of the Alaska Arctic Geoecological Atlas.

Citation

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Table of Contents

1. Data Set Overview

This dataset provides environmental, soil, and vegetation data collected at selected locations in the parks and preserves of the National Park Service (NPS) Arctic Network (ARCN) between 2002 and 2008. The ARCN includes five national parks and preserves in northern Alaska encompassing 19.5 million acres and represents some of the wildest, most undisturbed areas left on earth: The Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Gates of the Arctic National Park and Preserve, Kobuk Valley National Park, and the Noatak National Preserve. The sampling sites were chosen to represent the full range of vegetation in the area with replication, and for uniformity in floristic composition and environmental conditions and were positioned on transects along toposequences within major physiographic units (riverine, lacustrine, lowland, upland, subalpine and alpine). Specific attributes include dominant vegetation, species, and cover, soil chemistry, physical characteristics, moisture, and organic matter, as well as site disturbance from various sources.

Vegetation composition and structure were assessed semi-quantitatively. Total cover of each plant growth form (e.g.,tall shrub, dwarf shrub, lichens) was estimated independently of the cover estimates for individual species. Geologic and surface-form variables recorded include physiography, surface geomorphic unit, slope, aspect, surface form, and height of microrelief. For all plots, the dominant mineral texture, the depth of surface organic matter, cumulative thickness of all organic horizons, depth to rock (>15% by volume), and depth of thaw were recorded. Soils from a selected subset of plots were sampled, classified, and analyzed for a wide range of parameters in a laboratory.

Project: Arctic-Boreal Vulnerability Experiment

The Arctic-Boreal Vulnerability Experiment (ABoVE) is a NASA Terrestrial Ecology Program field campaign that will take place 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.

Acknowledgement: The study was accomplished over an eight-year period (2002-2009) by ABR Inc. Environmental and Research and Services. The objective of the project was to provide maps and data for resource managers to evaluate land resources and develop management strategies that are appropriate to the landscape. Funding for the project was provided by the U.S. Department of Interior, National Park Service.

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.

2. Data Characteristics

Spatial Coverage: Bering Land Bridge National Preserve (BELA), Cape Krusenstern National Monument (CAKR), Gates of the Arctic National Park (GAAR), Kobuk Valley National Park (KOVA), and Noatak National Preserve (NOAT).

Spatial Resolution: Point

Temporal Coverage: 2002-07-10 to 2008-08-10 (CAKR and BELA were sampled during 2002–2003. Field surveys were done in NOAT in 2005–2006, KOVA in 2007, and GAAR in 2008.)

Temporal Resolution: One-time sampling at each site during the peak of annual growing season.

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

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Five parks in Alaska above the Arctic Circle	-165.323	-150.839	68.49017	65.27672

Data File Information

There are three data files in comma-separated format (.csv) with this dataset. The files provide vegetation, plot characterization, and soil characterization data. Where the unit/format is listed as "code" refer to the companion file **jorgensont_2009_envlegend.pdf.**

Table 1. Data files and descriptions

Data File Name	Description
arctic_network_environmental_data.csv	Plot environmental characterization data
arctic_network_species_data.csv	Plot species cover data in comma separated (.csv) format. Both the author's determination and the current taxonomy according to the Panarctic Species List (PASL) are provided
arctic_network_soil_data.csv	Soil data from 39 selected plots

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

Missing or not measured values have been set to -9999 for numeric data or NA for alphanumeric or categorical data.

Column number	Variable	Units/format	Description
			Field plot number. The field plot numbers follow the pattern: **location_transect_plot_year** Where: Location:

1	field_plot_number		• BELA - Bering Land Bridge National Preserve • CAKR - Cape Krusenstern National Monument • GAAR - Gates of the Arctic National Park and Preserve • KOVA - Kobuk Valley National Park • NOAT - Noatak National Preserve Transect number (e.g., T01, T110) Plot number (up to 25 plots per transect) Year of data collection (2002 - 2008) Example: BELA_T01_02_2002
2	date	yyyymmdd	Date plot was investigated
3	location		Plot location: Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Gates of the Arctic National Park, Kobuk Valley National Park, Noatak National Preserve
4	transect_number		Transect number
5	latitude	decimal degrees	Plot latitude (NAD83)
6	longitude	decimal degrees	Plot longitude (NAD83)
7	geographic_landmark		Geographic landmark at site
8	elevation	m	Elevation in meters
9	plot_radius	m	Plot radius, usually 10-m
10	plot_size	m2	Plot size
11	site_physiography		Physiography of the site (alpine, upland, lowland, lacustrine (ponded), riverine, coastal)
12	slope	degrees	Slope of plot
13	aspect	degrees	Aspect-degrees or too flat to determine
14	surface_geomorphology_unit	code	Surficial geology-parent material
15	subsurface_geomorphology_unit	code	Surficial geomorphology
16	macrotopography		Macrotopography, classified according to a system modified from that of Schoeneberger et al.(1998)
17	microtopography		Microtopography classified according to the periglacial system of Washburn (1973)
18	microrelief	cm	Microrelief
19	water_regime		USFWS, National Wetlands Inventory
20	water_depth	cm	Depths before reaching water where negative values are below the surface and positive values are above the surface
21	saturated_less_than_30cm		Saturated less than 30 cm
22	drainage		Description of drainage
23	soil_moisture		Soil moisture description -- moist, wet, dry, aquatic. D.A. Walker used soil moisture in conjunction with plant communities to infer site moisture
24	lowest_mottle_depth	cm	Depth to mottled soil
25	low_matrix_depth	cm	Low matrix depth
26	hydric_soil		Hydric soil (yes or no)
27	water_ph		Water pH
28	water_conductivity	microsiemens	Water conductivity
29	soil_ph_10cm		Soil pH at 10 cm. (0.1 units from paste)

30	soil_ph_30cm	code	Soil pH at 30 cm (0.1 units from paste)
31	soil_conductivity	MICROSIEMENS per CM	Soil conductivity
32	site_ph		A single measure of pH for a site. It is either (in priority from highest to lowest) equal to the water_ph, soil_ph_10, or soil_ph_30 depending on which data we have available for pH.
33	site_conductivity	microsiemens	Site-soil conductivity
34	site_chemistry	code	Site-soil chemistry
35	thaw_depth	cm	Thaw depth
36	permafrost		Permafrost-yes, no, or NA
37	top_organic_layer_depth	cm	Depth of the top organic layer
38	cumulative_organic_layers	cm	Total organic layers in 40 cm
39	dominant_mineral_texture_top_40cm		Dominant mineral texture in the top 40 cm of soil
40	loess_thickness	cm	Eolian silt thickness
41	root_depth	cm	Rooting depth
42	surface_fragment_cover	%	Percent with surface fragment cover
43	frost_boils	%	Percent of plot with frost boils
44	rock_depth	cm	Depth of rock
45	cryoturbation		Cryoturbation (yes, no, or unknown)
46	soil_stratigraphy		Soil stratigraphy (yes or no)
47	soil_sample		Soil sample (yes or no)
48	soil_plug_probe_max_depth	cm	Maximum depth of the soil probe
49	soil_sampling_method		Soil sampling method: pit, plug, surface, probe, etc
50	soil_class		Soil class (NRCS, 2003)
51	soil_association		Soil association
52	veg_class	code	Vegetation generally was classified in the field to Level IV of the Alaska Vegetation Classification (AVC) developed by Viereck et al. (1992). Additionally, plant associations were classified and named according to standard methods (Vegetation Subcommittee 2008, Jennings et al. 2009).
53	ecotype_veg_structure	code	Ecotype associated with the vegetation. Refer to section 5 of this document for a description as to how these were derived**.**
54	disturbance	code	Plot disturbance
55	field_floristic_class		Field floristic class
56	final_floristic_class		Final floristic class
57	plot_ecotype		Ecotype at plot. Refer to section 5 of this document for a description as to how these were derived, and also to the companion file **jorgensont_2009_ecosurvey.pdf**
58	dominant_plants		Dominant plants at the plot
59	ecotype_analysis		Indicates if an ecotype analysis was performed to reduce the number of ecotype classes (yes or no)
60	environ_outliers		Plots with unusual ecosystem associations (components, geomorphic units, soil properties, drainage, etc.). Associations either were lumped with those having similar characteristics or excluded as atypical (outliers). The values are

			yes or no or a remark
61	veg_outlier		Plots with unusual ecosystem associations (components, veg structure, plant associations, etc.). Associations either were lumped with those having similar characteristics or excluded as atypical (outliers). The values are yes or no or a remark
62	geomorphology_data_review		Indicates if the geomorphology data were reviewed (yes or no)
63	ecotype_rare		Indicates if the ecotype at the plot was rare (yes or no)
64	veg_sampling_quality	code	Vegetation sampling quality
65	ecotype_abbrev		Abbreviated name of ecotype
66	map_ecotype_arctic_network_nps		Ecotype on the Arctic Network NPS map
67	map_ecotype_abbrev_arctic_network_nps		Ecotype name abbreviated on the Arctic Network NPS map
68	map_veg_arctic_network_nps		Vegetation on the Arctic Network NPS map
69	soil_landscape_description		Description of landscape associated with the plots where soil samples were taken
70	cover_needleleaf_trees	%	Percent of plot covered with needle leaf trees
71	needleleaf_tree_crown_class		Needle leaf tree crown classes: O-OVERTOPPING, D-DOMINANT, C-CODOMINANT, I-INTERMEDIATE, U-UNDERSTORY
72	cover_broadleaf_trees	%	Percent of plot covered with broadleaf trees
73	broadleaf_tree_crown_class		Broadleaf tree crown classes: O-OVERTOPPING, D-DOMINANT, C-CODOMINANT, I-INTERMEDIATE, U-UNDERSTORY
74	cover_dwarf_broadleaf	%	Percent of plot covered with dwarf broadleaf
75	dwarf_broadleaf_crown_class		Dwarf Broadleaf crown classes: O-OVERTOPPING, D-DOMINANT, C-CODOMINANT, I-INTERMEDIATE, U-UNDERSTORY
76	cover_dwarf_needleleaf	%	Percent of plot covered with dwarf needleleaf
77	dwarf_needleleaf_crown_class		Dwarf Needleleaf crown classes: O-OVERTOPPING, D-DOMINANT, C-CODOMINANT, I-INTERMEDIATE, U-UNDERSTORY
78	cover_standing_dead_trees	%	Percent of plot covered with standing dead trees
79	cover_tall_shrubs	%	Percent of plot covered with tall shrubs
80	cover_low_shrubs	%	Percent of plot covered with low shrubs
81	cover_dwarf_shrubs	%	Percent of plot covered with dwarf shrubs
82	cover_ graminoids	%	Percent of plot covered with graminoids
83	cover_tussocks	%	Percent of plot covered with tussocks
84	cover_forbs	%	Percent of plot covered with forbs
85	cover_moss	%	Percent of plot covered with moss
86	cover_lichens	%	Percent of plot covered with lichen
87	cover_litter	%	Percent of plot covered with litter
88	cover_litter_alone	%	Percent of plot area lacking overtopping vegetation
89	cover_bare_soil	%	Percent of plot covered with bare soil
90	cover_water	%	Percent of plot covered with water
91	notes	%	Percent of plot covered with prostrate dwarf shrubs. live/standing dead
92	field_notes	%	Percent of plot covered with evergreen shrubs, live/standing dead
93	observer_environ_data		Observer of environmental data
94	observer_veg_data		Observer of vegetation data

95	office_notes		Office notes
96	data_origin		Origin of data

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

Missing or not measured values have been set to -9999 for numeric data or NA for alphanumeric or categorical data.

Column number	Column header	Description
1	PASL_taxon_scientific_name	Current nomenclature according to the Panarctic Species List (PASL)
2	PASL_taxon_scientific_name_author	Current nomenclature according to the Panarctic Species List (PASL) with the data authors name
3	dataset_taxon	Dataset taxonomy
4-292	TURBOVEG_plot_accession_number and dataset_plot_number_author	Two rows of column headers which are plot numbers/accession numbers. The first row is TURBOVEG accession numbers 11686-12621. The 2nd row is dataset_plot_number_author; the plot numbers as named in the original dataset by the abbreviated site name, transect number, plot number, and date. Species cover classes are by percent. If cover was <10% or >90%, then cover of each species was visually estimated to the nearest 1%; for cover of 10–90%, it was estimated to the nearest 5%. Isolated individuals or species with very low cover were assigned a cover value of 0.1%

Table 4. Variables in the file **arctic_network_soil_data.csv**

Missing or not measured values have been set to -9999 for numeric data or NA for alphanumeric or categorical data.

Column number	Variable	Units/format	Description
1	field_plot_number		Plot number. As described for environmental data.
2	rock_type		Rock type
3	general_geology		General geology
4	electrical_conductivity		Electrical conductivity of soil
5	lime_estimate		Estimated lime content
6	extractable_no3	ppm	Nitrate content provided in parts per million, extracted with AB-DTPA
7	extractable_p	ppm	Phosphorus content provided in parts per million, extracted with AB-DTPA
8	extractable_k	ppm	Potassium content provided in parts per million, extracted with AB-DTPA
9	extractable_zn	ppm	Zinc content provided in parts per million, extracted with AB-DTPA
10	extractable_fe	ppm	Iron content provided in parts per million, extracted with AB-DTPA
11	extractable_mn	ppm	Manganese content provided in parts per million, extracted with AB-DTPA
12	extractable_cu	ppm	Copper content provided in parts per million, extracted with AB-DTPA
13	si	%	Silicon content provided as a percent
14	organic_matter	%	Soil organic matter provided as a percent
15	total_ca	%	Total calcium provided as a percent
16	total_mg	%	Total magnesium provided as a percent
17	total_na	%	Total sodium provided as a percent
18	total_k	%	Total potassium provided as a percent
19	total_p	%	Total phosphorus provided as a percent

20	total_al	%	Total aluminum provided as a percent
21	total_fe	%	Total iron provided as a percent
22	total_mn	%	Total manganese provided in mg/kg
23	total_ti	%	Total titanium provided as a percent
24	total_cu	mg per kg	Total copper provided in mg/kg
25	total_zn	mg per kg	Total zinc provided in mg/kg
26	total_ni	mg per kg	Total nickel provided in mg/kg
27	total_mo	mg per kg	Total molybdenum provided in mg/kg
28	total_cd	mg per kg	Total cadmium provided in mg/kg
29	total_cr	mg per kg	Total chromium provided in mg/kg
30	total_sr	mg per kg	Total strontium provided in mg/kg
31	total_b	mg per kg	Total boron provided in mg/kg
32	total_ba	mg per kg	Total barium provided in mg/kg
33	total_be	mg per kg	Total beryllium provided in mg/kg
34	total_cu	mg per kg	Total copper provided in mg/kg
35	total_pb	mg per kg	Total lead provided in mg/kg
36	total_v	mg per kg	Total vanadium provided in mg/kg
37	total_se	mg per kg	Total selenium provided in mg/kg
38	total_s	mg per kg	Total sulfur provided in mg/kg
39	n	%	Nitrogen content provided as a percent
40	c	%	Carbon content provided as a percent
41	caco3	%	Calcium carbonate content provided as a percent
42	So4-s	mg per kg	Sulfur content (in sulfate) provided in mg/kg
43	sand	%	Percent sand
44	silt	%	Percent silt
45	clay	%	Percent clay
46	texture		Soil texture

Companion Files

Table 5. Companion files and descriptions

Data File Name	Description
jorgensont_2009_envlegend.pdf	Codes and descriptions used in the data files. Reformatted and with additional codes from Jorgenson et al, (2009)
jorgensont_2009_ecosurvey.pdf	Full report of the study (Jorgenson et al, 2009). Note that this report provides information in addition to the methods which pertain to the data provided with this dataset
Arctic_Network_Veg_plots.pdf	A PDF of this guide document

3. Application and Derivation

This data can be used to provide maps and data for resource managers to allow them to evaluate land resources and develop management strategies that are appropriate to the landscape.

4. Quality Assessment

No specific quality assessment information provided.

5. Data Acquisition, Materials, and Methods

Site Descriptions

Vegetation sampling for an ecological land survey classification at selected locations in the parks and preserves of the National Park Service (NPS) Arctic Network (ARCN) was completed from 2002-2008. Intensive sampling was done along toposequences (transects) located within major physiographic units, including riverine, lacustrine, lowland, upland, subalpine and alpine areas using the ecological subsection mapping for the ARCN (Swanson 2001, Jorgenson 2001, Jorgenson et al. 2002). The sites included the five national parks and preserves in northern Alaska encompassing 19.5 million acres and represents some of the wildest, most undisturbed areas left on earth. Initial ecological surveys and mapping were done for CAKR and BELA during 2002–2003 (Jorgenson et al. 2004). Subsequent field surveys were done in NOAT during 2005–2006, KOVA in 2007, and GAAR in 2008. A total of 936 plots were sampled. The five sites are described below:

Cape Krusenstern (79 plots): A cape on the northwestern coast of Alaska near the village of Kivalina, north of the Arctic Circle.

The Bering Land Bridge National Preserve (129 plots): The Preserve is located on the Seward Peninsula in northwest Alaska; it is a remnant of the land bridge that connected Asia with North America more than 13,000 years ago.

Gates of the Arctic National Park and Preserve (170 plots): This park is the northernmost national park in the U.S. and lies north of the Arctic Circle and primarily consists of portions of the Brooks Range.

Kobuk Valley National Park (200 plots): This park is located in northwestern Alaska, 25 miles (40 km) north of the Arctic Circle. The park is known for caribou migration routes and the eolian sand dunes.

Noatak National Preserve (358 plots): A Preserve in northwestern Alaska above the Arctic Circle. The preserve extends westward from Gates of the Arctic National Park along the Brooks Range to the north and the Baird Mountains to the south, enclosing the valley of the Noatak River. It is bordered to the north by the National Petroleum Reserve–Alaska. The lower valley of the Noatak is not part of the preserve, separating the preserve from Cape Krusenstern National Monument on the coast. The preserve includes the transition zone from boreal forest to tundra near the southern edge of the preserve.

Methods

Vegetation and plot characteristics

Data were collected at 936 plots along 91 toposequences. Along each transect, 1–20 plots were sampled, each in a distinct vegetation type or spectral signature identifiable on aerial photographs. All sample locations were located on aerial photographs and coordinates (including approximate elevations) were obtained with a Global Positioning System (GPS) receiver (accuracy ±15 m). At each plot (~10-m radius), descriptions or measurements of geology, hydrology, soil stratigraphy, soil chemistry and vegetation structure and cover were recorded.

Vegetation generally was classified in the field to Level IV of the Alaska Vegetation Classification (AVC) developed by Viereck et al. (1992). Additionally, plant associations were classified and named according to standard methods (Vegetation Subcommittee 2008, Jennings et al. 2009).

Vegetation composition and structure were assessed semi-quantitatively. If cover was <10% or >90%, then cover of each species was visually estimated to the nearest 1%; for cover of 10–90%, it was estimated to the nearest 5%. Isolated individuals or species with very low cover were assigned a cover value of 0.1%. A species list was compiled that included most vascular plants and the dominant nonvascular plants observed in the plot.

Total cover of each plant growth form (e.g.,tall shrub, dwarf shrub, lichens) was estimated independently of the cover estimates for individual species. Data were cross-checked to ensure that the summed cover of individual species within a growth form category was comparable to the total cover estimated for that growth form. Taxonomic nomenclature is based on Viereck & Little (1972) for trees and shrubs, and Hultén (1968) for all other taxa, with references to currently accepted synonyms throughout the text. Floristic data compiled by the park for guidance (Parker 2006) was also used. Unknown dominant vascular species were identified by Dave Murray and Carolyn Parker, University of Alaska Museum of the North Herbarium (ALA), Fairbanks. Nomenclature for bryophytes and lichens followed the USDA PLANTS National Database (USDA 2008). Identification of mosses and lichens during field sampling was limited to dominant, readily identifiable species. Dominant cryptogams that could not be identified in the field were collected and sent to Mikhail Zhurbenko and Olga Afonina, Komarov Botanical Institute, Russia, for identification (Jorgenson et al., 2009).

Hydrologic variables measured at each sampling site included depth of water above or below ground surface, depth to saturated soil, pH, and electrical conductivity (EC). Water quality measurements (pH and EC) were made with Oakton or Cole-Palmer portable meters that were calibrated daily with standard solutions.

Geomorphology

Previous landscape analysis of northern Alaska (Jorgenson et al., 2002) were relied on as a guide to our identification of geomorphic and geologic units. Materials near the surface (<2 m) were emphasized because they have the greatest influence on ecological processes.Geologic and surface-form variables recorded include physiography, surface geomorphic unit, slope, aspect, surface form, and height of microrelief.

Surface forms (macrotopography) were classified according to a system modified from that of Schoeneberger et al. (1998). Microtopography was classified according to the periglacial system of Geomorphic units were assigned to physiographic settings based on their erosional or depositional processes. Surface-forms were aggregated into a reduced set of slope elements (crest, upper slope, lower slope, toe, and flat).

Figure 2. Geomorphology: Alpine Ericaceous–Dryas Dwarf Shrub. Dryas Dwarf Shrub can be found on hillside colluvium, older moraine, talus, weathered bedrock and abandoned alluvial fan deposits above 450 m elevation throughout ARCN. Macrotopography includes slopes, shoulders and crests (Jorgenson et al., 2009).

Ecotypes

Classification of ecotypes was accomplished in three general steps:

(1) the ecological components were individually classified for each detailed ground description,

(2) relationships along transects were examined to illustrate trends across the landscape, and

(3) contingency tables were used to identify the common relationships and central tendencies among ecological components. In developing the ecotype classes, ecological characteristics (primarily geomorphology and vegetation structure) that could be interpreted from aerial photographs were emphasized. Also a nomenclature for ecotypes that describes ecological characteristics (climate, physiography, soil chemistry, moisture, vegetation structure, and dominant species) was developed using a terminology that can be easily understood (Jorgenson et al, 2009).

Figure 3. Ecotype: Lowland Ericaceous Shrub Bog. This ecotype occurs in bogs, including collapse scar and undifferentiated bogs, and in the ice-rich centers of drained-lake basins, ice-poor thaw basin margins, and on abandoned meander overbank deposits (Jorgenson et al., 2009).

Figure 4. Upland Sandy Barrens encompasses the active portions of the Great Kobuk Sand Dunes, Little Kobuk Sand Dunes and isolated smaller exposed dunes in ARCN. These eolian active sand dunes are found at < 100 m elevation (Jorgenson et al., 2009).

Soils

Soils were classified to the soil subgroup level according to NRCS soil taxonomy, Ninth Edition (NRCS 2003). When data needed for the taxonomic keys were not available, a best guess was used when assigning classes. For example, it was difficult to determine if permafrost was present in rocky soils. Consequently, permafrost was assumed to be present in alpine environments assuming mean annual air temperatures were low. Similarly, differentiating eutrocryepts from dystrocryepts was based on a cutpoint of 5.5 for the pH reaction, although the actual diagnostic criteria is based on a cutpoint of 60% base saturation from laboratory analyses.

To assess differences in bedrock chemistry, soils were collected from the C horizon at 39 sites and sent to the Soil, Plant and Water Testing Laboratory at Colorado State University, Boulder, Co for analysis.

Soil stratigraphy was described from a shallow soil core or soil pit at each plot. Most soil profiles were limited to the seasonally thawed layer (~0.5–1 m) above the permafrost and were described from soil plugs dug with a shovel. For all plots, the dominant mineral texture, the depth of surface organic matter, cumulative thickness of all organic horizons, depth to rock (>15% by volume), and depth of thaw were recorded. When water was not present, EC and pH were measured from a saturated soil paste. A single simplified texture (i.e., loamy, sandy, organic) was assigned to characterize the dominant texture in the top 40 cm at each plot for ecotype classification.

Figure 5. Top image is geomorphology Alpine Alkaline Barrens which occurs at elevations above 400 m through ARCN. The associated soils (bottom image) are blocky or rubbly and typically lack a surface organic horizon. The dominant soils in this ecotype are Typic Gelorthents (poorly developed soils, permafrost below 1 m) and Typic Eutrogelepts (non-acidic, partially developed with permafrost below 1 m) (Jorgenson et al., 2009).

Ecosystem Outliers

Common relationships among ecosystem components were identified by use of contingency tables. The contingency tables sorted plots by physiography, soil texture, geomorphic unit, slope position, drainage, soil chemistry (pH and salinity), vegetation structure, and plant association. From these tables, common associations were identified and unusual associations either were lumped with those having similar characteristics or excluded as atypical (outliers). A contingency table analysis was used to evaluate how well these general relationships conformed to the dataset, and how reliably they could be used to extrapolate trends across the landscape. During development of the relationships, outliers were excluded from the table because of inconsistencies among physiography, texture, geomorphology, drainage, soil chemistry, and vegetation. Refer to the companion file **jorgensont_2009_ecosurvey.pdf** for additional details regarding the contingency analysis.

Figure 6. Upland Spruce-Birch forest. These mixed forests are uncommon and occur on hillside colluvium, eolian inactive sand deposits, older moraine and older till within the boreal forest zone in KOVA and GAAR. Surfaces are always sloped, and rock outcrops are frequently present (Jorgenson et al., 2009).

This dataset was edited by Dr. Amy Breen and Lisa Druckenmiller and provided by the GINA repository at http://geobotanical.portal.gina.alaska.edu/catalogs/10184-alaska-arctic- vegetation-archive-arctic-network

6. Data Access

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

Pre-ABoVE: Arctic Vegetation Plots in NPS Arctic Network Parks, Alaska, 2002-2008

Contact for Data Center Access Information:

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

7. References

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