



# Arctic Geobotanical Atlas

A plant-to-planet website of maps and related information produced by the Alaska Geobotany Center

www.arcticatlas.org

## Abstract:

The Arctic Geobotanical Atlas (AGA) is a web-based multi-scale (plant-to-planet) collection of geobotanical maps and supporting data. Vegetation is mapped at eight scales ranging from 1:1 scale (1 m<sup>2</sup> plots) to 1:7,500,000 (entire Arctic). Visualization tools allow users to view thematic maps and raster data by several methods. The AGA currently focuses on the Circumpolar Arctic and Arctic Alaska, but also includes data from the Arctic Long-Term Ecological Research site at Toolik Lake, Alaska, and research sites in the surrounding Toolik Lake Research Natural Area (Imnavait Creek and the Kuparuk River Basin). Diverse geobotanical themes include vegetation, geology, topography, landforms, surficial geomorphology and soil type. Vegetation data is linked to the primary literature, providing detailed community and species descriptions.

The AGA will also be one of the primary outreach and education components for the upcoming Greening of the Arctic (GOA) project (one element of the International Polar Year initiative). The GOA project will examine the spatial and temporal trends of greening in the Arctic, how these trends are affecting the indigenous people of the Arctic, and communicate the results to students, scientists, government agencies, and the general public. A variety of tools will help users understand issues related to the greening of the Arctic. Users will also have access to data (GIS, environmental measurements) and descriptive information (reports, prepared maps, refereed publications) from the Circumpolar Arctic Vegetation Map and other maps at sites along the GOA transects.

The maps and website were developed at the Alaska Geobotany Center in collaboration with other groups at the University of Alaska Fairbanks, including: Water and Environmental Research Center, Geographic Information Network of Alaska, and Toolik Field Station.

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## References:

CAVM Team. 2003. Circumpolar Arctic Vegetation Map. (1:7,500,000 scale), Map No. 1 U.S. Fish and Wildlife Service. Anchorage, AK.

Walker D.A., Raynolds M.K., Daniels F.J.A., Einarsson E., et al. 2005. The Circumpolar Arctic Vegetation Map. *Journal of Vegetation Science* 16: 267-282 + appendices.

Raynolds M.A., Walker D.A. and Maier H.A. 2006 (under revision). NDVI patterns and phytomass distribution in the circumpolar Arctic. *Remote Sensing of Environment*.

Reynolds J.F. and Tenhunen J.D. 1996. *Landscape Function and Disturbance in Arctic Tundra*. Springer-Verlag. New York.

Walker D.A. and Walker M.D. 1996. Terrain and vegetation of the Imnavait Creek Watershed. Pages 73-108 in J. F. Reynolds and J. D., editors. *Tenhunen. Landscape Function: Implications for Ecosystem Disturbance, a Case Study in Arctic Tundra*. Springer-Verlag, New York.

## Component Projects



### Circumpolar Arctic Vegetation Map (CAVM)

The CAVM covers the global region north of the Arctic tree-line. It contains maps and descriptions of the vegetation, bioclimate subzones, floristic provinces, topography, landscapes, lake cover, substrate pH, and plant biomass. This section also contains an area analysis of the map by bioclimate subzones and countries (CAVM Team, 2003; Walker et al., 2005).

### Alaska Arctic Tundra Vegetation Map (AATVM)

The AATVM is a plant community-level map of Arctic Alaska derived from the CAVM. It portrays the variation in plant communities across all of Arctic Alaska, in contrast to the physiognomic-level mapping of the CAVM (Raynolds et al., 2006).

### Toolik Lake/Kuparuk River Basin Hierarchic Geobotanical Atlas (TLKGA)

This is a series of geobotanical maps constructed during and following the Department of Energy's R4D studies at Imnavait Creek (Reynolds and Tenhunen, 1996). It includes maps of the Imnavait Creek (Walker and Walker, 1996) and Toolik Lake study sites at five scales ranging from 1x1 m plots where individual species are mapped, to maps of the entire Kuparuk River Basin (approximately 9200 km<sup>2</sup>).

## Photo and Image Library



The Photo and Image Library includes photographs of map units and plant species.

### Map Unit Photos and Images

1. Vegetation units
2. Bioclimate subzones
3. Images of maps
4. Geomorphic units

### Plant Species Photos

1. Non-vascular species
2. Vascular species

## About the AGA

Contact information, website development credits, funding agencies and collaborators, how the site was developed, how to use the website, standards used to develop the site, a disclaimer, and copyright information.

## Supporting Data

Baseline plot information for vegetation, soils, and site factors for the study plots at Toolik Lake, Imnavait Creek, Happy Valley, Prudhoe Bay, and elsewhere.

## Bibliography

Literature that is cited in various parts of the AGA and a list of key publications produced by the various mapping projects. Citations in the text are linked to the bibliography.

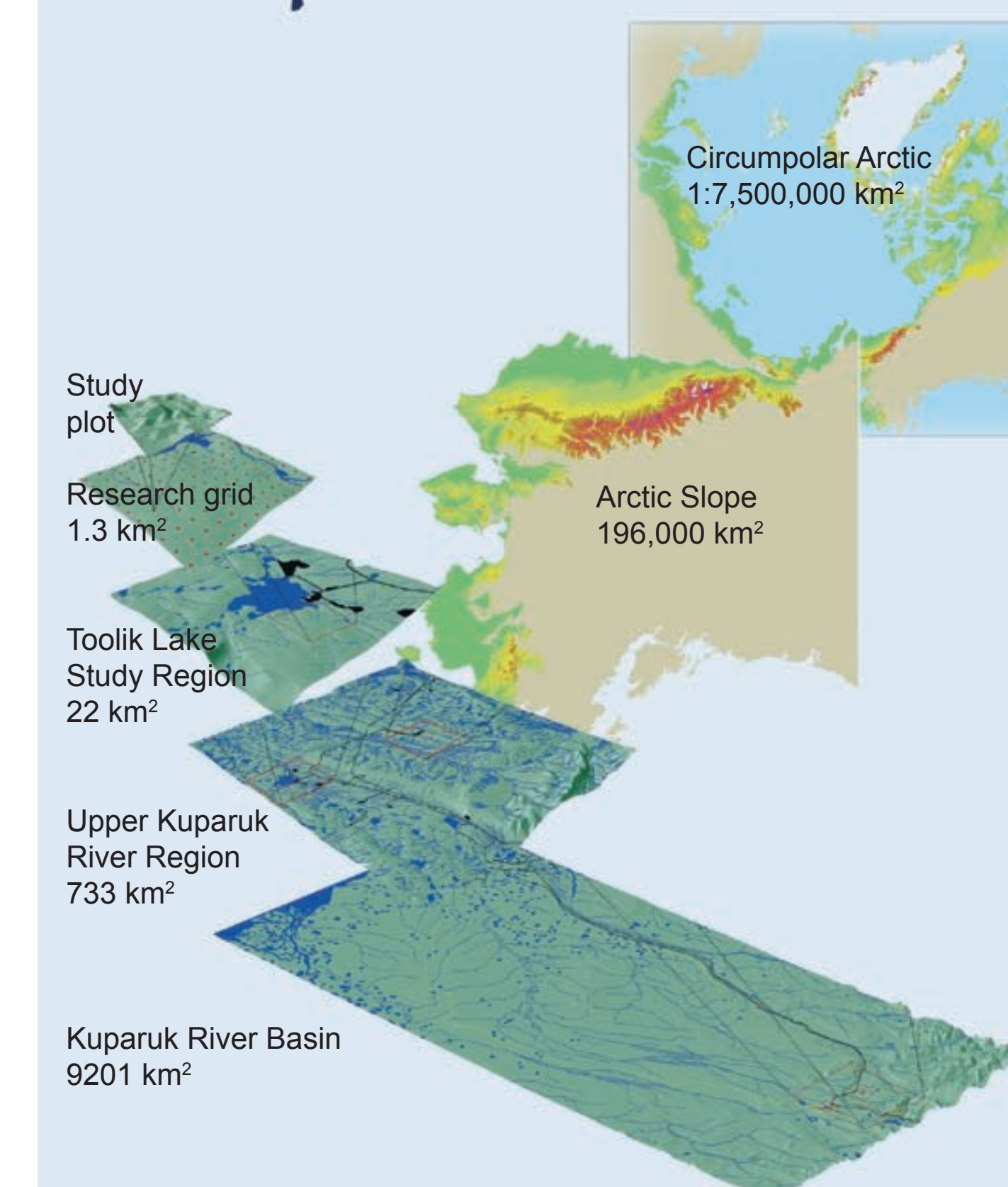
## Glossary

An alphabetical list of scientific terms used in the website and publications. Some words are specific to the Arctic, and some are more general scientific terms.

## Credits:

E.M. Barbour<sup>1</sup> ([fnemb@uaf.edu](mailto:fnemb@uaf.edu)), D.A. Walker<sup>1</sup>, H.A. Maier<sup>1</sup>, A.W. Balsler<sup>2</sup>, J.P. Grimes<sup>3</sup>, T.A. Heinrichs<sup>3</sup>, M. Nolan<sup>4</sup>, P. Prokein<sup>4</sup>, C.L. Pylant<sup>1</sup>, M.K. Raynolds<sup>1</sup>, L.M. Rogan<sup>2</sup>, V.L. Sharpton<sup>3</sup>, D.L. Stahlke<sup>3</sup>, and S.G. Vockeroth<sup>1</sup>.  
<sup>1</sup>Alaska Geobotany Center, <sup>2</sup>Toolik Field Station, <sup>3</sup>Geographic Information Network of Alaska, <sup>4</sup>Water and Environmental Research Center; all at the University of Alaska Fairbanks, Fairbanks, Alaska 99775. Presented at the 2006 Arctic Science Conference, Arctic AAAS Division Meeting, University of Alaska Fairbanks, Fairbanks, Alaska, October 2-4, 2006.

## Maps



### Map Catalog

This section contains all the maps, which can be selected by region, scale, theme, or time. The Atlas also contains digital map data in a variety of forms, including:

1. Map list
2. Digital elevation models (DEMs)
3. Multispectral data (satellite-derived) in pixel or raster format, (maps are also available as PDFs)
4. GIS vector and raster data by region

### Structure and Four-Dimensional Framework

The Atlas has a four dimensional framework that allows users to select maps according to any of the following criteria:

1. Region of interest (horizontal dimension)
2. Scale of interest (vertical dimension)
3. Theme or topic of interest (depth dimension)
4. Year of interest (time dimension)

### Visualization Tools

Students and researchers can explore the Arctic in a variety of ways. There are three different visualization tools that display GIS data (SwathViewer, GINA Map Server, and TerraExplorer). There are also several short QuickTime movies that fly over the Arctic.