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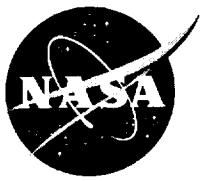

Technical Report Series on the Boreal Ecosystem-Atmosphere Study (BOREAS)

Forrest G. Hall and Andrea Papagno, Editors

Volume 186

BOREAS TE-22 Allometric Forest Survey Data

H.H. Shugart and E. Nielsen

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

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BOREAS TE-22 Allometric Forest Survey Data

H.H. Shugart, Eric Nielsen

Summary

The BOREAS TE-22 team collected data sets in support of its efforts to characterize and interpret information on the forest structure of boreal vegetation in the SSA and NSA during the 1994 growing season. The data are stored in tabular ASCII files.

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1. Data Set Overview

1.1 Data Set Identification

BOREAS TE-22 Allometric Forest Survey Data

1.2 Data Set Introduction

Terrestrial Ecology (TE)-22 collected spatial characteristics of boreal forest areas as part of the BOReal Ecosystem-Atmosphere Study (BOREAS) in the Southern Study Area (SSA) and the Northern Study Area (NSA) during the 1994 growing season.

1.3 Objective/Purpose

The objective of this research was to gain a better understanding of the impact of spatial heterogeneity on tree physiological processes.

1.4 Summary of Parameters

The data files contain parameters that can be divided according to a spatial scale of large to small:

- Plot
- Hectare
- Tree

Parameters relating to the entire plot are the location of the mapped plot or study area, stem map area, and the slope of the mapped plot. Parameters on a per hectare basis are tree density per hectare, basal area per hectare, percent of basal area that belongs to a specific species, and biomass per hectare. Parameters on the tree scale are crown height, crown depth, crown diameter, diameter at breast height (DBH), and the crown position of a tree.

1.5 Discussion

We are modeling the fixation and allocation of carbon into a heterogeneous forest structure, with the ability to predict climate-driven productivity and biomass into the future. One motivation for the model's development was the prospect of initializing it with only remotely sensed data, allowing projections of productivity and biomass (and ecosystem level correlates of these) to be made across broad spatial scales.

A dual-based model was constructed in which a forest plot was represented either as a collection of individual trees or as a spatially explicit canopy. Mechanistic modeling of canopy processes such as photosynthesis and evapotranspiration is performed in the canopy representation. Processes best understood at the level of the individual, such as carbon and nitrogen allocation among plant parts and senescence and mortality, are performed in the individual representation. Conversion between the two representations is performed by using crown allometries. Generally, the individual representation provides parameters for the canopy model, while the canopy model provides results of canopy processes that are used for incrementing the individual model.

1.6 Related Data Sets

BOREAS TE-06 Allometry Data
BOREAS TE-07 Dendrology Data
BOREAS RSS-15 SIR-C and Landsat TM Biomass and Landcover Maps of the NSA and SSA
BOREAS TE-22 Allometric Forest Survey Data
BOREAS TE-23 Map Plot Data

2. Investigator(s)

2.1 Investigator(s) Name and Title

H.H. Shugart
Eric Nielsen

2.2 Title of Investigation

Multidisciplinary Integrative Models of Forest Ecosystem Dynamics for the Boreal Forest Biome

2.3 Contact Information

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3. Theory of Measurements

One of the focuses of this research is the better understanding of the impact of spatial heterogeneity on tree physiological processes. We wanted to supplement the plot mapping work of TE-20 and TE-23 by sampling auxiliary sites. In addition to increasing the spatial extent of mapped territory, this work also extends plot maps to a wider variety of stand ages and environmental conditions.

4. Equipment

4.1 Sensor/Instrument Description
None given.

4.1.1 Collection Environment
Standard plot size was 30 m x 30 m, but some low-density and/or heterogeneous sites were 40 m x 40 m (and one, T7T3S, was 20 m x 20 m).

4.1.2 Source/Platform
None given.

4.1.3 Source/Platform Mission Objectives
None given.

4.1.4 Key Variables
The key variables include the location of the mapped plot or study area; stem map area; slope of the mapped plot; tree density per hectare; basal area per hectare; percent of basal area that belongs to a specific species; biomass per hectare; and crown height, crown depth, crown diameter, DBH, and crown position of a sample tree.

4.1.5 Principles of Operation
The centers of mapped plots generally correspond with the (0,0) reference point for the hemispherical photos of TE-23. The plots were oriented with respect to true north (using the declinations given in the data set, generally those given in Sellers and Hall, 1996). Standard plot size was 30 m x 30 m, but some low-density and/or heterogeneous sites were 40 m x 40 m (and one,

T7T3S, was 20 m x 20 m). The northwest corner of the mapped plot was considered the (0,0) point (therefore, for a standard 30-m x 30-m plot, the hemispherical photo center point is located at (15 m,15 m)). Positions are given as (x,y) pairs where x is the distance east of the plot origin, and y is the distance south.

4.1.6 Sensor/Instrument Measurement Geometry
None given.

4.1.7 Manufacturer of Sensor/Instrument
None given.

4.2 Calibration
None given.

4.2.1 Specifications

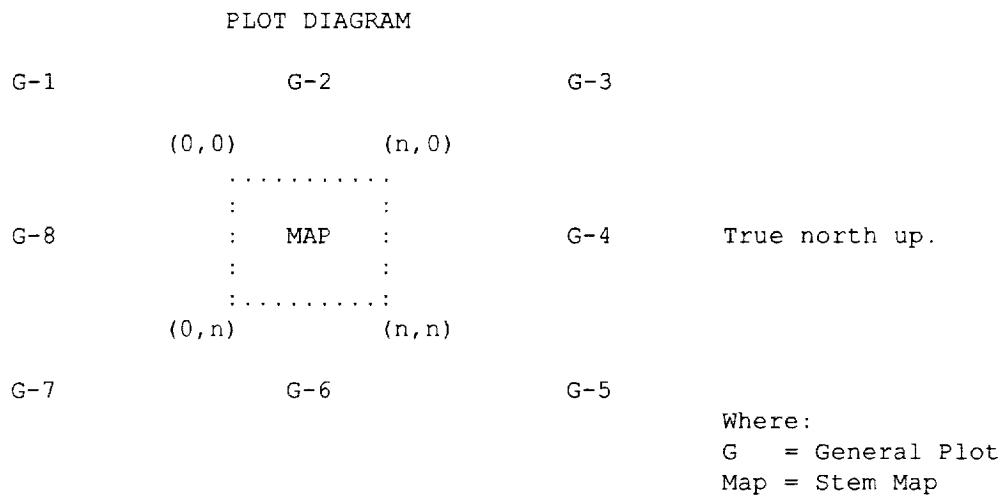
4.2.1.1 Tolerance
None given.

4.2.2 Frequency of Calibration
None given.

4.2.3 Other Calibration Information
Not applicable.

5. Data Acquisition Methods

To provide information on the homogeneity of the sampled sites (and consequently the 'representativeness' of the mapped plots), a broader scale sampling procedure was also used. Circular plots, labeled G-1 through G-8, of 100 m^2 each (5.64-m radius) were established in a square surrounding the mapped plot (see diagram below). The centers of the sides of this square were located 30 m distant from the center of the stem map (labeled MAP). When combined with the center 100-m^2 circle (extracted from the stem map), this yields a regularly spaced 3 x 3 grid of plots (totaling 900 m^2, across an area of approximately 3,600 m^2).



Notes: General plots 1-8 are 100-m^2 circles (5.64-m radius). G-2, G-4, G-6, and G-8 are 30 m N, E, S, and W of the stem map center, respectively. A 5.64-m-radius circle is extracted from the center of the stem map to form G-9 (this sample is included in the general plot data summary, but individual tree data are not relisted; i.e., they can be found in the stem map data).

For the stem maps, data were collected for each tree (>= 5 DBH, except for some unproductive sites where 4 cm was used as a cutoff instead), and sapling (tree species < 5 cm DBH but > 1 m high), shrub (nontree woody species > 1 m high), ground cover, and some soils information was collected as well. The following information were collected for trees:

- (x,y) coordinates. Measured to the nearest 25 cm. Absolute locations should not be considered correct to better than +/- 1 m because of inaccuracies in the sampling method. Most locations should be correct to within +/- 50 cm, however.

- Species.

- DBH. Measured to the nearest 0.1 cm.

- Crown position, using the following categories:
  - Dominant: Emergent from canopy, > 90 % of crown exposed from all sides
  - Codominant: > 50 % of crown exposed on all sides, or fully exposed on at least one side of crown (180 degrees)
  - Partial codominant: > 50 % of crown exposed on one side of crown
  - Intermediate: At least some exposure of crown from sides
  - Gap: Angle between the vertical and the tops of surrounding crowns > 45 degrees
  - Vertical: Previous angle < 45 degrees (i.e., direct light must penetrate nearly straight down to reach crown)
  - Suppressed: No direct exposure even from directly above
  - Dead: Dead but still rooted (not sampled in all plots)

These definitions were adopted to characterize the radiation environment experienced by each tree more precisely. By matching data collected using these categories with data collected by TE-20 using the standard (dominant, codominant, intermediate, suppressed) categories, the following translations were generated:

- TE-22 Classification ----> Standard Classification
- Dominant, Codominant -> Dominant
- Partial codominant -------> Codominant
- Intermediate, Gap --------> Intermediate
- Vertical, Suppressed ----> Suppressed

- Mean height, mean crown depth, and mean crown diameter. Measured for a sampling (usually 10-20 trees per stem map, depending on canopy heterogeneity) of canopy and near-canopy trees. Crown spread measured across two perpendicular diameters.

Shrub and sapling data were collected in four 30 m x 1 m belt transects across the stem map. The number of individuals of each species meeting the definitions above were counted. In those plots, for which dead trees were not included in the stem map, the number of dead trees of each species in these belts was also noted. A count was also made of the number of down tree boles crossing each of these belts (old boles judged to be remaining from previous stands were not included in this count).

Ground cover sampling was performed in the center 1 m square of each 10 m x 10 m segment. The percentage cover of feather mosses, sphagnum, moss lichens, forbs, fungi, leaf litter, rocks, and organic and mineral soil was estimated for each subplot. If moss, lichen, or leaf litter constituted a significant fraction of the cover, its depth was noted (including partially decayed material, but not humus). The number of seedlings (< 1 m high) of each tree species in the subplot was recorded.

In three of the ground cover subplots (generally in the northwest, central, and southeast 10 m x 10 m segments), the depth to mineral soil was measured, and the organic and mineral soils described.

Canopy closure was also estimated in these locations using a spherical densiometer.

Degree of slope, aspect, and slope position were determined for each mapped plot.

Data Collected - General Sampling

Sampling of the 'general plots' used for broader-scale site characterization. Ground cover percentages and depths were estimated over the entire plot area rather than within a smaller subplot. Some heights were measured unless they appeared identical to those in the mapped plot.

6. Observations

6.1 Data Notes

The data set contains the list of sites sampled with variables describing the sampling procedure at each. Stem maps were not produced for several of the sites, either because TE-23 planned to produce them (e.g., W0Y5A, MTOW - the mixed aspen-spruce TE tower site in the SSA), or because of time constraints (e.g., G9I4S, at which a ninth circular plot was established at the site center). The exact location sampled deserves mention in a couple of cases. D9I1A* is not located at the actual auxiliary site because we could not find it. It is within several hundred meters of the site, however, in a pretty homogeneous forest. G4I3M is the first Forestry Canada point reached from the tie-in, and is the site used by TE-23 for photos. G4I3M2 is Forestry Canada point 2, and was heloflagged at the time we were there (25-Jul-1994). Information on age and productivity will be revised when data from tree cores are obtained.

Also see Section 10.2.5.

6.2 Field Notes

None given.

7. Data Description

7.1 Spatial Characteristics

None given.

7.1.1 Spatial Coverage

Site List and Descriptions

Site ID	Study Area	Dominant Species	Age	Productivity
D9G4A	SSA	Quaking Aspen	mature	average
D9I1A	SSA	Quaking Aspen	intermediate average	
F5I6P	SSA	Jack Pine	intermediate average	
F7J0P	SSA	Black Spruce/Jack Pine/White Spruce	mature	high
G4I3M	SSA	Quaking Aspen/White Spruce/Balsam Fir	mature	high
G4I3M2	SSA	Balsam Fir/White Spruce/Quaking Aspen	mature	high

G4K8P	SSA	Jack Pine	mature	low
G6K8S	SSA	Black Spruce/Tamarack	intermediate average	
G9I4S	SSA	Black Spruce	mature	low
G9L0P	SSA	Jack Pine	mature	high
MTOW	SSA	Quaking Aspen/Black Spruce	intermediate average	
99O9P	TRANSECT	Jack Pine/Black Spruce	intermediate low (rock)	
P7V1A	NSA	Quaking Aspen	mature	high
Q3V3P	NSA	Jack Pine/Quaking Aspen	mature	high
S9P3A	NSA	Quaking Aspen/P.Birch	intermediate average	
T0P5M	NSA	Black Spruce/Quaking Aspen	mature	high
T0P8S	NSA	Black Spruce	mature	high
T4U9S	NSA	Black Spruce/Tamarack	intermediate average	
T7T3S	NSA	Black Spruce	mature	low (muskeg)
T8Q9P	NSA	Jack Pine	intermediate high	
W0Y5A	NSA	Quaking Aspen	intermediate low	

The NSA measurement sites and associated North American Datum of 1983 (NAD83) coordinates are:

Site Type	Site ID	Latitude	Longitude	UTM Zone	UTM Northing	UTM Easting
NSA-9BS	T4U9S	55.83455°N	97.98364°W	14	6,188,132.8	563,657.5
NSA-9BS	T0P8S	55.88351°N	98.80225°W	14	6,193,132.0	512,370.1
NSA-9BS	T7T3S	55.89358°N	98.22621°W	14	6,194,505.6	548,391.8
NSA-9JP	Q3V3P	55.55712°N	98.02473°W	14	6,157,222.2	561,517.9
NSA-9JP	T8Q9P	55.93219°N	98.6105°W	14	6,198,601.4	524,334.5
NSA-9JP	99O9P	55.88173°N	99.03952°W	14	6,192,917.5	497,527.8

NSA-ASP	P7V1A	55.50253°N	98.07478°W	14	6,151,103.7	558,442.1
NSA-ASP	S9P3A	55.88576°N	98.87621°W	14	6,193,371.6	507,743.3
NSA-ASP	W0Y5A	56.00339°N	97.3355°W	14	6,207,706.6	603,796.6
NSA-MIX	T0P5M	55.88911°N	98.85662°W	14	6,193,747.3	508,967.7
SSA-9BS	G6K8S	53.94446°N	104.759°W	13	5,977,146.9	515,847.9
SSA-9BS	G9I4S	53.99877°N	105.11805°W	13	5,983,169.1	492,291.2
SSA-9JP	F5I6P	53.86608°N	105.11175°W	13	5,968,627.1	492,651.3
SSA-9JP	G9L0P	53.97576°N	104.73779°W	13	5,980,856.0	517,197.7
SSA-9JP	F7J0P	53.88336°N	105.05115°W	13	5,970,323.3	496,667.0
SSA-9JP	G4K8P	53.91883°N	104.76401°W	13	5,974,516.6	515,499.1
SSA-ASP	within 30 meters of D9I1A			13	5,952,900	486,300
SSA-ASP	D9G4A	53.74019°N	105.46929°W	13	5,954,718.4	469,047.1.
SSA-MIX	D9I1M	53.7254°N	105.20643°W	13	5,952,989.7	486,379.7.
SSA-MIX	G4I3M	53.9375°N	105.14246°W	13	5,976,354.9	490,677.3.

7.1.2 Spatial Coverage Map
Not available.

7.1.3 Spatial Resolution
The data are point measurements at the given locations.

7.1.4 Projection
Not applicable.

7.1.5 Grid Description
Not applicable.

7.2 Temporal Characteristics

7.2.1 Temporal Coverage
Measurements were made during the growing season of 1994.

7.2.2 Temporal Coverage Map
None given.

7.2.3 Temporal Resolution
None given.

7.3 Data Characteristics

The files consist of three types:

- Map Plot Site Information
- Map Plot Summary Information
- Tree Stem Map Information

7.3.1 Parameter/Variable

The parameters contained in the Tree Survey data files on the CD-ROM are:

TREE_MAP_PLOT_SITE

Column Name
SITE_NAME
SUB_SITE
MEASUREMENT_YEAR
PLOT_DECLINATION
MIN_TREE_DIAMETER_BREAST_HT
MAP_CREATED
STEM_MAP_AREA
DEAD_TREE_STEM_MAP
ASPECT_MAP_SLOPE
MEAN_MAP_SLOPE
GENERAL_SAMPLING
GENERAL_SAMPLING_AREA
DEAD_TREE_GENERAL_SAMPLING
CRTFCN_CODE
REVISION_DATE

TREE_MAP_PLOT_SUMMARY

Column Name
SITE_NAME
SUB_SITE
MEASUREMENT_YEAR
PLOT_ID
TREE_STEM_DENSITY
BASAL_AREA
BASAL_AREA_PICEA_MARIANA
BASAL_AREA_PICEA_GLAUCA
BASAL_AREA_POPULUS_TREMULOIDES
BASAL_AREA_POPULUS_BALSAMIFERA
BASAL_AREA_PINUS_BANKSIANA
BASAL_AREA_BETULA_PAPYRIFERA
BASAL_AREA_LARIX_LARICINA
BASAL_AREA_ABIES_BALSAMEA
BASAL_AREA_SALIX
CALC_BIOMASS_DENSITY
MEAN_TREE_HEIGHT
MEAN_CROWN_DEPTH
MEAN_CROWN_DIAMETER
NUM_DEAD_TREE
NUM_SAPLING
NUM_SHRUBS
PERCENT_MOSS

PERCENT_LICHEN
PERCENT_LITTER
MEAN_MOSS_DEPTH
MEAN_LICHEN_DEPTH
MEAN_LITTER_DEPTH
MEAN_ORGANIC_SOIL_DEPTH
CRTFCN_CODE
REVISION_DATE

TREE_STEM_MAP

Column Name
SITE_NAME
SUB_SITE
MEASUREMENT_YEAR
PLOT_ID
SPECIES
X_GRID_COORD
Y_GRID_COORD
GENERAL_SUBPLOT_ID
TREE_DIAMETER_BREAST_HT
DOMINANCE_CLASS
CRTFCN_CODE
REVISION_DATE

7.3.2 Variable Description/Definition

The descriptions of the parameters contained in the Tree Survey data files on the CD-ROM are:

TREE_MAP_PLOT_SITE

Column Name	Description
SITE_NAME	The identifier assigned to the site by BOREAS, in the format SSS-TTT-CCCCC, where SSS identifies the portion of the study area: NSA, SSA, REG, TRN, and TTT identifies the cover type for the site, 999 if unknown, and CCCCC is the identifier for site, exactly what it means will vary with site type.
SUB_SITE	The identifier assigned to the sub-site by BOREAS, in the format GGGGG-IIIII, where GGGGG is the group associated with the sub-site instrument, e.g. HYD06 or STAFF, and IIIII is the identifier for sub-site, often this will refer to an instrument.
MEASUREMENT_YEAR	The year in which the data were collected.
PLOT_DECLINATION	The declination of the plot.
MIN_TREE_DIAMETER_BREAST_HT	The minimum tree diameter measured at breast height (137 cm) above the ground.
MAP_CREATED	Tells if a map was created.
STEM_MAP_AREA	The area of the stem map (always square).
DEAD_TREE_STEM_MAP	Tells if there were dead trees recorded in the stem map.
ASPECT_MAP_SLOPE	The direction in which the slope goes downward with respect to true North using the declination

	given.
MEAN_MAP_SLOPE	The average slope from the upper to the lower edge of the mapped plot.
GENERAL_SAMPLING	Tells if general sampling (circular plots) was performed.
GENERAL_SAMPLING_AREA	The area covered by the circular plots, including the central circle extracted from the stem map (if applicable).
DEAD_TREE_GENERAL_SAMPLING	Tells if dead trees were recorded in the general sampling (circular plots).
CRTFCN_CODE	The BOREAS certification level of the data. Examples are CPI (Checked by PI), CGR (Certified by Group), PRE (Preliminary), and CPI-??? (CPI but questionable).
REVISION_DATE	The most recent date when the information in the referenced data base table record was revised.

TREE_MAP_PLOT_SUMMARY

Column Name	Description
SITE_NAME	The identifier assigned to the site by BOREAS, in the format SSS-TTT-CCCCC, where SSS identifies the portion of the study area: NSA, SSA, REG, TRN, and TTT identifies the cover type for the site, 999 if unknown, and CCCCC is the identifier for site, exactly what it means will vary with site type.
SUB_SITE	The identifier assigned to the sub-site by BOREAS, in the format GGGGG-IIIII, where GGGGG is the group associated with the sub-site instrument, e.g. HYD06 or STAFF, and IIIII is the identifier for sub-site, often this will refer to an instrument.
MEASUREMENT_YEAR	The year in which the data were collected.
PLOT_ID	The identifier for the plot from which the measurement came.
TREE_STEM_DENSITY	The number of trees per hectare.
BASAL_AREA	The basal area per hectare.
BASAL_AREA_PICEA_MARIANA	The percent of basal area that is Picea mariana.
BASAL_AREA_PICEA_GLAUCA	The percent of basal area that is Picea glauca.
BASAL_AREA_POPULUS_TREMULOIDES	The percent of basal area that is Populus tremuloides.
BASAL_AREA_POPULUS_BALSAMIFERA	The percent of basal area that is Populus balsamifera.
BASAL_AREA_PINUS_BANKSIANA	The percent of basal area that is Pinus banksiana.
BASAL_AREA_BETULA_PAPYRIFERA	The percent of basal area that is Betula papyrifera.
BASAL_AREA_LARIX_LARICINA	The percent of basal area that is Larix laricina.
BASAL_AREA_ABIES_BALSAMEA	The percent of basal area that is Abies balsamea.
BASAL_AREA_SALIX	The percent of basal area that is Salix spp..
CALC_BIOMASS_DENSITY	The biomass per hectare calculated using the generalized equations of Singh (1986).
MEAN_TREE_HEIGHT	The mean height of the measured trees.

MEAN_CROWN_DEPTH	The average crown depth of the trees.
MEAN_CROWN_DIAMETER	The average crown diameter of the trees.
NUM_DEAD_TREE	The number of dead trees per hectare.
NUM_SAPLING	The number of saplings per hectare.
NUM_SHRUBS	The number of shrubs per hectare.
PERCENT_MOSS	The percentage of moss in the plot.
PERCENT_LICHEN	The percentage of lichen in the plot.
PERCENT_LITTER	The percentage of litter in the plot.
MEAN_MOSS_DEPTH	The average depth of the moss in the plot.
MEAN_LICHEN_DEPTH	The average depth of the lichen in the plot.
MEAN_LITTER_DEPTH	The average depth of the litter in the plot.
MEAN_ORGANIC_SOIL_DEPTH	The average depth of the organic soil in the plot, including humus but not partially decomposed moss and lichen.
CRTFCN_CODE	The BOREAS certification level of the data. Examples are CPI (Checked by PI), CGR (Certified by Group), PRE (Preliminary), and CPI-??? (CPI but questionable).
REVISION_DATE	The most recent date when the information in the referenced data base table record was revised.

TREE_STEM_MAP

Column Name	Description
SITE_NAME	The identifier assigned to the site by BOREAS, in the format SSS-TTT-CCCCC, where SSS identifies the portion of the study area: NSA, SSA, REG, TRN, and TTT identifies the cover type for the site, 999 if unknown, and CCCCC is the identifier for site, exactly what it means will vary with site type.
SUB_SITE	The identifier assigned to the sub-site by BOREAS, in the format GGGGG-IIIII, where GGGGG is the group associated with the sub-site instrument, e.g. HYD06 or STAFF, and IIIII is the identifier for sub-site, often this will refer to an instrument.
MEASUREMENT_YEAR	The year in which the data were collected.
PLOT_ID	The identifier for the plot from which the measurement came.
SPECIES	Botanical (Latin) name of the species (Genus species).
X_GRID_COORD	The X grid coordinate where the measurements were taken. Corresponds to the distance from the reference, which was the tower, except at the black spruce site. See documentation for more details.
Y_GRID_COORD	The Y grid coordinate where the measurements were taken. Corresponds to the distance from the reference, which was the tower, except at the black spruce site. See documentation for more details.
GENERAL_SUBPLOT_ID	The subplot id for the general (circular) plots. `9` means that a circular plot was installed at

	the center because no stem map was recorded.
TREE_DIAMETER_BREAST_HT	The diameter of the tree at breast height (137 cm above the ground).
DOMINANCE_CLASS	The dominance class of the tree.
CRTFCN_CODE	The BOREAS certification level of the data. Examples are CPI (Checked by PI), CGR (Certified by Group), PRE (Preliminary), and CPI-??? (CPI but questionable).
REVISION_DATE	The most recent date when the information in the referenced data base table record was revised.

7.3.3 Unit of Measurement

The measurement units for the parameters contained in the Tree Survey data files on the CD-ROM are:

TREE_MAP_PLOT_SITE

Column Name	Units
SITE_NAME	[none]
SUB_SITE	[none]
MEASUREMENT_YEAR	[unitless]
PLOT_DECLINATION	[degrees East]
MIN_TREE_DIAMETER_BREAST_HT	[meters]
MAP_CREATED	[none]
STEM_MAP_AREA	[meters^2]
DEAD_TREE_STEM_MAP	[none]
ASPECT_MAP_SLOPE	[degrees]
MEAN_MAP_SLOPE	[degrees]
GENERAL_SAMPLING	[none]
GENERAL_SAMPLING_AREA	[meters^2]
DEAD_TREE_GENERAL_SAMPLING	[none]
CRTFCN_CODE	[none]
REVISION_DATE	[DD-MON-YY]

TREE_MAP_PLOT_SUMMARY

Column Name	Units
SITE_NAME	[none]
SUB_SITE	[none]
MEASUREMENT_YEAR	[unitless]
PLOT_ID	[none]
TREE_STEM_DENSITY	[count][hectare^-1]
BASAL_AREA	[meters^2][hectare^-1]
BASAL_AREA_PICEA_MARIANA	[percent]
BASAL_AREA_PICEA_GLAUCA	[percent]
BASAL_AREA_POPULUS_TREMULOIDES	[percent]
BASAL_AREA_POPULUS_BALSAMIFERA	[percent]
BASAL_AREA_PINUS_BANKSIANA	[percent]
BASAL_AREA_BETULA_PAPYRIFERA	[percent]
BASAL_AREA_LARIX_LARICINA	[percent]
BASAL_AREA_ABIES_BALSAMEA	[percent]
BASAL_AREA_SALIX	[percent]
CALC_BIOMASS_DENSITY	[kilograms][hectare^-1]
MEAN_TREE_HEIGHT	[meters]

MEAN_CROWN_DEPTH	[meters]
MEAN_CROWN_DIAMETER	[meters]
NUM_DEAD_TREE	[count][hectare^-1]
NUM_SAPLING	[count][hectare^-1]
NUM_SHRUBS	[count][hectare^-1]
PERCENT_MOSS	[percent]
PERCENT_LICHEN	[percent]
PERCENT_LITTER	[percent]
MEAN_MOSS_DEPTH	[millimeters]
MEAN_LICHEN_DEPTH	[millimeters]
MEAN_LITTER_DEPTH	[millimeters]
MEAN_ORGANIC_SOIL_DEPTH	[millimeters]
CRTFCN_CODE	[none]
REVISION_DATE	[DD-MON-YY]

TREE_STEM_MAP

Column Name	Units
SITE_NAME	[none]
SUB_SITE	[none]
MEASUREMENT_YEAR	[unitless]
PLOT_ID	[none]
SPECIES	[none]
X_GRID_COORD	[meters]
Y_GRID_COORD	[meters]
GENERAL_SUBPLOT_ID	[none]
TREE_DIAMETER_BREAST_HT	[meters]
DOMINANCE_CLASS	[none]
CRTFCN_CODE	[none]
REVISION_DATE	[DD-MON-YY]

7.3.4 Data Source

The sources of the parameter values contained in the Tree Survey data files on the CD-ROM are:

TREE_MAP_PLOT_SITE

Column Name	Data Source
SITE_NAME	[BORIS Designation]
SUB_SITE	[BORIS Designation]
MEASUREMENT_YEAR	[Human Observer]
PLOT_DECLINATION	[Human Observer]
MIN_TREE_DIAMETER_BREAST_HT	[Laboratory Equipment]
MAP_CREATED	[Human Observer]
STEM_MAP_AREA	[Laboratory Equipment]
DEAD_TREE_STEM_MAP	[Human Observer]
ASPECT_MAP_SLOPE	[Laboratory Equipment]
MEAN_MAP_SLOPE	[Laboratory Equipment]
GENERAL_SAMPLING	[Human Observer]
GENERAL_SAMPLING_AREA	[Laboratory Equipment]
DEAD_TREE_GENERAL_SAMPLING	[Human Observer]
CRTFCN_CODE	[BORIS Designation]
REVISION_DATE	[BORIS Designation]

TREE_MAP_PLOT_SUMMARY

Column Name	Data Source
SITE_NAME	[BORIS Designation]
SUB_SITE	[BORIS Designation]
MEASUREMENT_YEAR	[Human Observer]
PLOT_ID	[Human Observer]
TREE_STEM_DENSITY	[Laboratory Equipment]
BASAL_AREA	[Laboratory Equipment]
BASAL_AREA_PICEA_MARIANA	[Laboratory Equipment]
BASAL_AREA_PICEA_GLAUCA	[Laboratory Equipment]
BASAL_AREA_POPULUS_TREMULOIDES	[Laboratory Equipment]
BASAL_AREA_POPULUS_BALSAMIFERA	[Laboratory Equipment]
BASAL_AREA_PINUS_BANKSIANA	[Laboratory Equipment]
BASAL_AREA_BETULA_PAPYRIFERA	[Laboratory Equipment]
BASAL_AREA_LARIX_LARICINA	[Laboratory Equipment]
BASAL_AREA_ABIES_BALSAMEA	[Laboratory Equipment]
BASAL_AREA_SALIX	[Laboratory Equipment]
CALC_BIOMASS_DENSITY	[Laboratory Equipment]
MEAN_TREE_HEIGHT	[Laboratory Equipment]
MEAN_CROWN_DEPTH	[Laboratory Equipment]
MEAN_CROWN_DIAMETER	[Laboratory Equipment]
NUM_DEAD_TREE	[Human Observer]
NUM_SAPLING	[Human Observer]
NUM_SHRUBS	[Human Observer]
PERCENT_MOSS	[Human Observer]
PERCENT_LICHEN	[Human Observer]
PERCENT_LITTER	[Human Observer]
MEAN_MOSS_DEPTH	[Laboratory Equipment]
MEAN_LICHEN_DEPTH	[Laboratory Equipment]
MEAN_LITTER_DEPTH	[Laboratory Equipment]
MEAN_ORGANIC_SOIL_DEPTH	[Laboratory Equipment]
CRTFCN_CODE	[BORIS Designation]
REVISION_DATE	[BORIS Designation]

TREE_STEM_MAP

Column Name	Data Source
SITE_NAME	[BORIS Designation]
SUB_SITE	[BORIS Designation]
MEASUREMENT_YEAR	[Human Observer]
PLOT_ID	[Human Observer]
SPECIES	[Human Observer]
X_GRID_COORD	[Human Observer]
Y_GRID_COORD	[Human Observer]
GENERAL_SUBPLOT_ID	[Human Observer]
TREE_DIAMETER_BREAST_HT	[Laboratory Equipment]
DOMINANCE_CLASS	[Human Observer]
CRTFCN_CODE	[BORIS Designation]
REVISION_DATE	[BORIS Designation]

7.3.5 Data Range

The following table gives information about the parameter values found in the Tree Survey data files on the CD-ROM are:

TREE_MAP_PLOT_SITE

Column Name	Minimum Data Value	Maximum Data Value	Missng Data Value	Unrel Data Value	Below Detect Limit	Data Not Cllctd
SITE_NAME	NSA-9BS-AUX04	SSA-MIX-AUX02	None	None	None	None
SUB_SITE	9TE22-MAP01	9TE22-MAP01	None	None	None	None
MEASUREMENT_YEAR	1994	1994	None	None	None	None
PLOT_DECLINATION	0	17	None	None	None	None
MIN_TREE_DIAMETER_BREAST_HT	0	.05	None	None	None	None
MAP_CREATED	NO	YES	None	None	None	None
STEM_MAP_AREA	400	1600	-999	None	None	None
DEAD_TREE_STEM_MAP	NO	YES	-999	None	None	None
ASPECT_MAP_SLOPE	0	350	-999	None	None	None
MEAN_MAP_SLOPE	0	12	-999	None	None	None
GENERAL_SAMPLING	YES	YES	None	None	None	None
GENERAL_SAMPLING_AREA	500	900	None	None	None	None
DEAD_TREE_GENERAL_SAMPLING	NO	YES	None	None	None	None
CRTFCN_CODE	CPI	CPI	None	None	None	None
REVISION_DATE	12-FEB-99	12-FEB-99	None	None	None	None

TREE_MAP_PLOT_SUMMARY

Column Name	Minimum Data Value	Maximum Data Value	Missng Data Value	Unrel Data Value	Below Detect Limit	Data Not Cllctd
SITE_NAME	NSA-9BS-AUX04	SSA-MIX-AUX02	None	None	None	None
SUB_SITE	9TE22-MAP01	9TE22-MAP01	None	None	None	None
MEASUREMENT_YEAR	1994	1994	None	None	None	None
PLOT_ID	N/A	N/A	None	None	None	None
TREE_STEM_DENSITY	438	6011	-999	None	None	None
BASAL_AREA	6.08	47.94	-999	None	None	None
BASAL_AREA_PICEA_MARIANA	0	100	-999	None	None	None
BASAL_AREA_PICEA_GLAUCA	0	42.5	-999	None	None	None
BASAL_AREA_POPULUS_TREMULOIDES	0	100	-999	None	None	None
BASAL_AREA_POPULUS_BALSAMIFERA	0	7.8	-999	None	None	None
BASAL_AREA_PINUS_BANKSIANA	0	100	-999	None	None	None
BASAL_AREA_BETULA_PAPYRIFERA	0	26.4	-999	None	None	None
BASAL_AREA_LARIX_LARICINA	0	25.9	-999	None	None	None

BASAL_AREA_ABIES_BALSAMEA	0	43.4	-999	None	None	None
BASAL_AREA_SALIX	0	2.7	-999	None	None	None
CALC_BIOMASS_DENSITY	13684	219501	-999	None	None	None
MEAN_TREE_HEIGHT	4.9	24.4	-999	None	None	None
MEAN_CROWN_DEPTH	2.7	15.7	-999	None	None	None
MEAN_CROWN_DIAMETER	.9	6.1	-999	None	None	None
NUM_DEAD_TREE	0	2750	-999	None	None	None
NUM_SAPLING	0	6083	-999	None	None	None
NUM_SHRUBS	0	25225	-999	None	None	None
PERCENT_MOSS	0	95	-999	None	None	None
PERCENT_LICHEN	0	70	-999	None	None	None
PERCENT_LITTER	0	55	-999	None	None	None
MEAN_MOSS_DEPTH	40	250	-999	None	None	None
MEAN_LICHEN_DEPTH	20	80	-999	None	None	None
MEAN_LITTER_DEPTH	10	600	-999	None	None	None
MEAN_ORGANIC_SOIL_DEPTH	-9990	340	None	None	None	None
CRTFCN_CODE	CPI	CPI	None	None	None	None
REVISION_DATE	12-FEB-99	12-FEB-99	None	None	None	None

TREE_STEM_MAP

Column Name	Minimum Data Value	Maximum Data Value	Missng Data Value	Unrel Data Value	Below Detect Limit	Data Not Cllctd
SITE_NAME	NSA-9BS-AUX04	SSA-MIX-AUX02	None	None	None	None
SUB_SITE	9TE22-MAP01	9TE22-MAP01	None	None	None	None
MEASUREMENT_YEAR	1994	1994	None	None	None	None
PLOT_ID	N/A	N/A	None	None	None	None
SPECIES	N/A	N/A	None	None	None	None
X_GRID_COORD	0	39.75	None	None	None	Blank
Y_GRID_COORD	0	40	None	None	None	Blank
GENERAL_SUBPLOT_ID	1	9	None	None	None	Blank
TREE_DIAMETER_BREAST_HT	4	64.9	None	None	None	Blank
DOMINANCE_CLASS	N/A	N/A	None	None	None	None
CRTFCN_CODE	CPI	CPI	None	None	None	None
REVISION_DATE	23-FEB-99	24-FEB-99	None	None	None	None

Minimum Data Value -- The minimum value found in the column.
Maximum Data Value -- The maximum value found in the column.
Missng Data Value -- The value that indicates missing data. This is used to indicate that an attempt was made to determine the parameter value, but the attempt was unsuccessful.
Unrel Data Value -- The value that indicates unreliable data. This is used to indicate an attempt was made to determine the parameter value, but the value was deemed to be unreliable by the analysis personnel.
Below Detect Limit -- The value that indicates parameter values below the instruments detection limits. This is used to indicate that an attempt was made to determine the parameter value, but the analysis personnel determined

```
                    that the parameter value was below the detection
                    limit of the instrumentation.
Data Not Cllctd     -- This value indicates that no attempt was made to
                    determine the parameter value.  This usually
                    indicates that BORIS combined several similar but
                    not identical data sets into the same data base table
                    but this particular science team did not
                    measure that parameter.

Blank -- Indicates that blank spaces are used to denote that type of value.
N/A   -- Indicates that the value is not applicable to the respective column.
None  -- Indicates that no values of that sort were found in the column.
-------------------------------------------------------------------------------
```

7.4 Sample Data Record

The following are wrapped versions of records from a sample of Tree Survey data files on the CD-ROM are:

TREE_MAP_PLOT_SITE

```
SITE_NAME,SUB_SITE,MEASUREMENT_YEAR,PLOT_DECLINATION,MIN_TREE_DIAMETER_BREAST_HT,
MAP_CREATED,STEM_MAP_AREA,DEAD_TREE_STEM_MAP,ASPECT_MAP_SLOPE,MEAN_MAP_SLOPE,
GENERAL_SAMPLING,GENERAL_SAMPLING_AREA,DEAD_TREE_GENERAL_SAMPLING,CRTFCN_CODE,
REVISION_DATE
'NSA-9BS-AUX04','9TE22-MAP01',1994,9.0,.05,'YES',900,'NO',45,1,'YES',900,'NO',
'CPI',12-FEB-99
'NSA-9BS-AUX07','9TE22-MAP01',1994,0.0,.05,'YES',900,'YES',300,3,'YES',900,'NO',
'CPI',12-FEB-99
```

TREE_MAP_PLOT_SUMMARY

```
SITE_NAME,SUB_SITE,MEASUREMENT_YEAR,PLOT_ID,TREE_STEM_DENSITY,BASAL_AREA,
BASAL_AREA_PICEA_MARIANA,BASAL_AREA_PICEA_GLAUCA,BASAL_AREA_POPULUS_TREMULOIDES,
BASAL_AREA_POPULUS_BALSAMIFERA,BASAL_AREA_PINUS_BANKSIANA,
BASAL_AREA_BETULA_PAPYRIFERA,BASAL_AREA_LARIX_LARICINA,
BASAL_AREA_ABIES_BALSAMEA,BASAL_AREA_SALIX,CALC_BIOMASS_DENSITY,
MEAN_TREE_HEIGHT,MEAN_CROWN_DEPTH,MEAN_CROWN_DIAMETER,NUM_DEAD_TREE,NUM_SAPLING,
NUM_SHRUBS,PERCENT_MOSS,PERCENT_LICHEN,PERCENT_LITTER,MEAN_MOSS_DEPTH,
MEAN_LICHEN_DEPTH,MEAN_LITTER_DEPTH,MEAN_ORGANIC_SOIL_DEPTH,CRTFCN_CODE,
REVISION_DATE
'NSA-9BS-AUX04','9TE22-MAP01',1994,'-M',3389,31.42,71.2,0.0,0.0,0.0,0.0,.2,25.9,
0.0,2.7,111373.0,13.4,9.6,3.2,750,2167,167,60.0,5.0,12.0,250,-999,-999,110,'CPI',
12-FEB-99
'NSA-9BS-AUX04','9TE22-MAP01',1994,'-G',3178,27.62,81.0,0.0,0.0,7.8,0.0,0.0,9.8,
0.0,1.4,-999.0,-999.0,-999.0,-999.0,-999,-999,-999,73.0,2.0,14.0,-999,-999,-999,
-9990,'CPI',12-FEB-99
```

TREE_STEM_MAP

```
SITE_NAME,SUB_SITE,MEASUREMENT_YEAR,PLOT_ID,SPECIES,X_GRID_COORD,Y_GRID_COORD,
GENERAL_SUBPLOT_ID,TREE_DIAMETER_BREAST_HT,DOMINANCE_CLASS,CRTFCN_CODE,
REVISION_DATE
'NSA-9BS-AUX04','9TE22-MAP01',1994,'MAP','Picea mariana',0.0,1.0,'',12.6,'GAP',
'CPI',24-FEB-99
'NSA-9BS-AUX04','9TE22-MAP01',1994,'MAP','Picea mariana',0.0,2.5,'',19.0,
'PARTIAL CODOMINANT','CPI',24-FEB-99
```

8. Data Organization

8.1 Data Granularity

The smallest unit of data tracked by the BOREAS Information System (BORIS) was the data collected at a given site on a given date.

8.2 Data Format(s)

The Compact Disk-Read-Only Memory (CD-ROM) files contain American Standard Code for Information Interchange (ASCII) numerical and character fields of varying length separated by commas. The character fields are enclosed with single apostrophe marks. There are no spaces between the fields.

Each data file on the CD-ROM has four header lines of Hyper-Text Markup Language (HTML) code at the top. When viewed with a Web browser, this code displays header information (data set title, location, date, acknowledgments, etc.) and a series of HTML links to associated data files and related data sets. Line 5 of each data file is a list of the column names, and line 6 and following lines contain the actual data.

9. Data Manipulations

9.1 Formulae

None given.

9.1.1 Derivation Techniques and Algorithms

None given.

9.2 Data Processing Sequence

None given.

9.2.1 Processing Steps

None given.

9.2.2 Processing Changes

None given.

9.3 Calculations

9.3.1 Special Corrections/Adjustments

None given.

9.3.2 Calculated Variables

None given.

9.4 Graphs and Plots

None given.

10. Errors

10.1 Sources of Error

None given.

10.2 Quality Assessment

10.2.1 Data Validation by Source
None given.

10.2.2 Confidence Level/Accuracy Judgment
None given.

10.2.3 Measurement Error for Parameters
None given.

10.2.4 Additional Quality Assessments
None given.

10.2.5 Data Verification by Data Center
Data were examined for general consistency and clarity.

The Tree Stem Map Data submitted by TE-22 personnel had 17 rows of data removed from the extracted data files due to invalid data in the dominance_class column. The rows that were removed are listed below.

```
SITE_NAME,SUB_SITE,MEASUREMENT_YEAR,PLOT_ID,SPECIES,X_GRID_COORD,Y_GRID_COORD,
GENERAL_SUBPLOT_ID,TREE_DIAMETER_BREAST_HT,DOMINANCE_CLASS,CRTFCN_CODE,
REVISION_DATE
'NSA-9BS-AUX07','9TE22-MAP01',1994,'GENERAL','Picea mariana',,,'5',23.4,'8',
'CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',8.1,'?',
'CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',14.0,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',13.8,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',14.7,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',7.9,'?',
'CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',14.9,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',8.8,'?',
'CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',17.9,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',12.5,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',16.5,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',10.4,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',17.1,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',9.7,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',11.3,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',16.3,
'?','CPI',24-FEB-99
'SSA-ASP-AUX08','9TE22-MAP01',1994,'GENERAL','Populus tremuloides',,,'5',17.2,
'?','CPI',24-FEB-99
```

11. Notes

11.1 Limitations of the Data
None given.

11.2 Known Problems with the Data
None given.

11.3 Usage Guidance
None given.

11.4 Other Relevant Information
Thanks to Carolyn Dowling and David Lawrence at UVA for field assistance and to Jason for help in site location.

12. Application of the Data Set

This data set can be used to study the spatial characteristics of the boreal forest.

13. Future Modifications and Plans

None given.

14. Software

14.1 Software Description
None given.

14.2 Software Access
None given.

15. Data Access

The allometric forest survey data are available from the Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

15.1 Contact Information
For BOREAS data and documentation please contact:

ORNL DAAC User Services
Oak Ridge National Laboratory
P.O. Box 2008 MS-6407
Oak Ridge, TN 37831-6407
Phone: (423) 241-3952
Fax: (423) 574-4665
E-mail: ornldaac@ornl.gov or ornl@eos.nasa.gov

15.2 Data Center Identification

Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) for Biogeochemical Dynamics http://www-eosdis.ornl.gov/.

15.3 Procedures for Obtaining Data

Users may obtain data directly through the ORNL DAAC online search and order system [http://www-eosdis.ornl.gov/] and the anonymous FTP site [ftp://www-eosdis.ornl.gov/data/] or by contacting User Services by electronic mail, telephone, fax, letter, or personal visit using the contact information in Section 15.1.

15.4 Data Center Status/Plans

The ORNL DAAC is the primary source for BOREAS field measurement, image, GIS, and hardcopy data products. The BOREAS CD-ROM and data referenced or listed in inventories on the CD-ROM are available from the ORNL DAAC.

16. Output Products and Availability

16.1 Tape Products

None.

16.2 Film Products

None.

16.3 Other Products

These data are available on the BOREAS CD-ROM series.

17. References

17.1 Platform/Sensor/Instrument/Data Processing Documentation

None.

17.2 Journal Articles and Study Reports

Newcomer, J., D. Landis, S. Conrad, S. Curd, K. Huemmrich, D. Knapp, A. Morrell, J. Nickeson, A. Papagno, D. Rinker, R. Strub, T. Twine, F. Hall, and P. Sellers, eds. 2000. Collected Data of The Boreal Ecosystem-Atmosphere Study. NASA. CD-ROM.

Sellers, P. and F. Hall. 1994. Boreal Ecosystem-Atmosphere Study: Experiment Plan. Version 1994-3.0, NASA BOREAS Report (EXPLAN 94).

Sellers, P. and F. Hall. 1996. Boreal Ecosystem-Atmosphere Study: Experiment Plan. Version 1996-2.0, NASA BOREAS Report (EXPLAN 96).

Sellers, P., F. Hall, and K.F. Huemmrich. 1996. Boreal Ecosystem-Atmosphere Study: 1994 Operations. NASA BOREAS Report (OPS DOC 94).

Sellers, P., F. Hall, and K.F. Huemmrich. 1997. Boreal Ecosystem-Atmosphere Study: 1996 Operations. NASA BOREAS Report (OPS DOC 96).

Sellers, P., F. Hall, H. Margolis, B. Kelly, D. Baldocchi, G. den Hartog, J. Cihlar, M.G. Ryan, B. Goodison, P. Crill, K.J. Ranson, D. Lettenmaier, and D.E. Wickland. 1995. The boreal ecosystem-atmosphere study (BOREAS): an overview and early results from the 1994 field year. Bulletin of the American Meteorological Society. 76(9):1549-1577.

Sellers, P.J., F.G. Hall, R.D. Kelly, A. Black, D. Baldocchi, J. Berry, M. Ryan, K.J. Ranson, P.M. Crill, D.P. Lettenmaier, H. Margolis, J. Cihlar, J. Newcomer, D. Fitzjarrald, P.G. Jarvis, S.T. Gower, D. Halliwell, D. Williams, B. Goodison, D.E. Wickland, and F.E. Guertin. 1997. BOREAS in 1997: Experiment Overview, Scientific Results and Future Directions. Journal of Geophysical Research 102(D24): 28,731-28,770.

Singh, T. 1986. Generalizing biomass equations for the boreal forest region of west-central Canada. Forest Ecology and Management 17: 97-107.

17.3 Archive/DBMS Usage Documentation

None.

18. Glossary of Terms

Basal Area - The area of the base of the tree. Origin - Defined as (0,0), the northwest corner of the plot. Stem Map - The position of a tree in a plot based on the coordinate system (X,Y) of the plot. X - The distance east of the plot origin. Y - The distance south of the plot origin.

19. List of Acronyms

ASCII	- American Standard Code for Information Interchange
BOREAS	- BOReal Ecosystem-Atmosphere Study
BORIS	- BOREAS Information System
CD-ROM	- Compact Disk-Read-Only Memory
DAAC	- Distributed Active Archive Center
DBH	- Diameter at Breast Height
DOY	- Julian Day of Year
EOS	- Earth Observing System
EOSDIS	- EOS Data and Information System
GIS	- Geographic Information System
GMT	- Greenwich Mean Time
GSFC	- Goddard Space Flight Center
HTML	- HyperText Markup Language
IFC	- Intensive Field Campaign
MIX	- Mixed Wood
NAD83	- North American Datum of 1983
NASA	- National Aeronautics and Space Administration
NOAA	- National Oceanic and Atmospheric Administration
NSA	- Northern Study Area
OA	- Old Aspen
OBS	- Old Black Spruce
OJP	- Old Jack Pine
ORNL	- Oak Ridge National Laboratory
PANP	- Prince Albert National Park
RSS	- Remote Sensing Science
SIR-C	- Shuttle Imaging Radar-C
SSA	- Southern Study Area

TE - Terrestrial Ecology
TF - Tower Flux
TM - Thematic Mapper
URL - Uniform Resource Locator
UTM - Universal Transverse Mercator
YJP - Young Jack Pine

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The BOREAS TE-22 team collected data sets in support of its efforts to characterize and interpret information on the forest structure of boreal vegetation in the SSA and NSA during the 1994 growing season. The data are stored in tabular ASCII files.

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