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

Forrest G. Hall, Editors

Volume 94
BOREAS Hardcopy Maps

Elizabeth Nelson, SSAI, NASA Goddard Space Flight Center, Greenbelt, Maryland
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National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

September 2000
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BOREAS Hardcopy Maps
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Summary

BOREAS hardcopy maps are a collection of approximately 1,000 hardcopy maps representing the physical, climatological, and historical attributes of areas covering primarily the Manitoba and Saskatchewan provinces of Canada. These maps were collected by BORIS and CCRS staff to provide basic information about site positions, manmade features, topography, geology, hydrology, land cover types, fire history, climate, and soils of the BOREAS study region. These maps are not available for distribution through the BOREAS project but may be used as an onsite resource. Information is provided within this document for individuals who want to order copies of these maps from the original map source.

Note that the maps are not contained on the BOREAS CD-ROM set. An inventory listing file is supplied on the CD-ROM to inform users of the maps that are available.

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1. Data Set Overview

1.1 Data Set Identification
BOREAS Hardcopy Maps

1.2 Data Set Introduction
BOReal Ecosystem-Atmosphere Study (BOREAS) hardcopy maps are a collection of approximately 1,000 hardcopy maps representing the physical, climatological, and historical attributes of areas covering primarily the Manitoba and Saskatchewan provinces of Canada. These maps were collected by BOREAS Information System (BORIS) and Canada Centre for Remote Sensing (CCRS) staff to provide basic information about site positions, manmade features, topography, geology, hydrology, land cover types, fire history, climate, and soils of the BOREAS study region. These maps
are not available for distribution through the BOREAS project but may be used as an onsite resource. Information is provided within this document for individuals who want to order copies of these maps from the original map source.

1.3 Objective/Purpose
The BOREAS Staff Science effort covered project-level activities requiring uniform data collection procedures across sites and time. Locating and acquiring various map-based information over the BOREAS study areas was included in this undertaking. The maps were acquired to provide basic information about the geographic position of manmade features and potential sites, topography, geology, hydrology, land cover types, fire history records, climate, and soils of the BOREAS study area. The maps were used in the planning and execution stages of the experiment in site selection and use, in aircraft mission planning, and for providing baseline information to investigators about the historical and physical characteristics of the area.

1.4 Summary of Parameters
The map types found in the BOREAS collection include Bedrock, Climate, Fire History, Forest Cover, Geochemistry, Soils, Surficial Geology, Topography, and Water Resources, primarily of the Manitoba and Saskatchewan provinces.

1.5 Discussion
BOREAS staff interacted with numerous scientists and agency representatives in finding the maps that exist in this collection. The maps in the collection were purchased with project funds and are copyrighted. Because this is copyrighted information, BORIS cannot copy or distribute the maps. Contact information about the various maps is provided in Section 7.3.4 of this document.

1.6 Related Data Sets
BOREAS Forest Cover Data Layers of the NSA in Raster Format
BOREAS Elevation Contours over the NSA and SSA in ARC/Info Generate Format
BOREAS HYD-08 DEM Data over the NSA-MSA and SSA-MSA in the UTM Projection
BOREAS Regional DEM in Raster Format and AEAC Projection

2. Investigator

2.1 Investigator Name and Title
BOREAS Staff Science

2.2 Title of Investigation
BOREAS Staff Science GIS Data Collection Program

2.3 Contact Information
Contact 1:
Beth Nelson
SSAI
Code 923
NASA GSFC
Greenbelt, MD 20771
(301) 286-4005
(301) 286-0239 (fax)
Elizabeth.Nelson@gsfc.nasa.gov
3. Theory of Measurements

The maps in the BOREAS collection were obtained from various sources. Map types and the original map sources are listed in detail in Section 7.3.4. Overall, the maps were derived and updated from interpretation of aerial photography and from ground surveys. Any details on the compilation and derivation for a particular map may be obtained by contacting the original map source.

4. Equipment

4.1 Sensor/Instrument Description
Unknown.

4.1.1 Collection Environment
Unknown.

4.1.2 Source/Platform
Unknown.

4.1.3 Source/Platform Mission Objectives
Unknown.

4.1.4 Key Variables
Bedrock, Climate, Fire History, Forest Cover, Geochemistry, Soils, Surficial Geology, Topography, and Water Resources.

4.1.5 Principles of Operation
Unknown.

4.1.6 Sensor/Instrument Measurement Geometry
Unknown.

4.1.7 Manufacturer of Sensor/Instrument
Unknown.

4.2 Calibration

4.2.1 Specifications
Unknown.

4.2.1.1 Tolerance
Unknown.
4.2.2 Frequency of Calibration
Unknown.

4.2.3 Other Calibration Information
Unknown.

5. Data Acquisition Methods
The BOREAS hardcopy maps were located and acquired from various sources by BOREAS staff at National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) and CCRS. Details on the map sources are given in Section 7.3.4 of this document.

6. Observations

6.1 Data Notes
None.

6.2 Field Notes
None.

7. Data Description

7.1 Spatial Characteristics

7.1.1 Spatial Coverage
The BOREAS map collection covers various portions of the Saskatchewan and Manitoba provinces as well as the entire Canadian region for some parameters. Details on specific coverage can be obtained by contacting the designated persons in Section 2.3 or by contacting the map sources given in Section 7.3.4.

The climatic map data cover the entire region of Canada, as does the topographic map index. All other maps cover areas in Universal Transverse Mercator (UTM) zone 13 and/or 14.

The North American Datum of 1983 (NAD83) corner coordinates of the overall BOREAS region, which includes both the Southern Study Area (SSA) and the Northern Study Area (NSA), are:

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwest 58.979 N</td>
<td>111.000 W</td>
</tr>
<tr>
<td>Northeast 58.844 N</td>
<td>93.502 W</td>
</tr>
<tr>
<td>Southwest 51.000 N</td>
<td>111.000 W</td>
</tr>
<tr>
<td>Southeast 50.089 N</td>
<td>96.969 W</td>
</tr>
</tbody>
</table>

The NAD83 corner coordinates of the BOREAS SSA are:

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwest 54.321 N</td>
<td>106.228 W</td>
</tr>
<tr>
<td>Northeast 54.225 N</td>
<td>104.237 W</td>
</tr>
<tr>
<td>Southwest 53.515 N</td>
<td>106.321 W</td>
</tr>
<tr>
<td>Southeast 53.420 N</td>
<td>104.368 W</td>
</tr>
</tbody>
</table>
The NAD83 corner coordinates of the NSA are:

<table>
<thead>
<tr>
<th></th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwest</td>
<td>56.249 N</td>
<td>98.825 W</td>
</tr>
<tr>
<td>Northeast</td>
<td>56.083 N</td>
<td>97.234 W</td>
</tr>
<tr>
<td>Southwest</td>
<td>55.542 N</td>
<td>99.045 W</td>
</tr>
<tr>
<td>Southeast</td>
<td>55.379 N</td>
<td>97.489 W</td>
</tr>
</tbody>
</table>

7.1.2 Spatial Coverage Map
Not available.

7.1.3 Spatial Resolution
The spatial resolution is specific to the scale of the individual maps.

7.1.4 Projection
The maps are in various projections and need to be referenced specifically for this information.

7.1.5 Grid Description
Not available.

7.2 Temporal Characteristics

7.2.1 Temporal Coverage
The original compilation and revision dates of the maps are specific to the individual map sheets.

7.2.2 Temporal Coverage Map
Not available.

7.2.3 Temporal Resolution
Not available.

7.3 Data Characteristics

7.3.1 Parameter/Variable
The maps in the collection provide information on the following features:

- CLIMATE
- FIRE HISTORY
- FOREST COVER
- GEOLOGY - BEDROCK
- GEOLOGY - CHEMISTRY
- GEOLOGY - PHOTOGRAPHY
- GEOLOGY - QUATERNARY
- GEOLOGY - SURFICIAL
- FORESTRY - HYPSOMETRY
- LAND CAPACITY
- LAND COVER
- LAND TYPE
- OBSERVING STATIONS
- PLANT COMMUNITY
- RADIATION NETWORK
- SOILS
- SOIL CAPACITY
The parameters contained in the map inventory listing file on the CD-ROM are:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROVINCE</td>
<td>The Canadian province covered by the map. Examples include SASKATCHEWAN and MANITOBA.</td>
</tr>
<tr>
<td>MAP_NAME</td>
<td>The name of the map.</td>
</tr>
<tr>
<td>MAP_SUBJECT</td>
<td>The subject material covered by the map. Examples include GEOLOGY, FIRE, HISTORY, and FOREST COVER.</td>
</tr>
<tr>
<td>SCALE</td>
<td>The scale of the map. Examples include 1:24,000, 1:100,000, and 1:250,000.</td>
</tr>
<tr>
<td>MAP_FORM</td>
<td>The form in which the map data are stored. Examples include PAPER and DIGITAL</td>
</tr>
<tr>
<td>MAP_SOURCE</td>
<td>The source from which the map is available.</td>
</tr>
<tr>
<td>NW_LONGITUDE</td>
<td>The NAD83 based longitude coordinate of the northwest corner of the minimum bounding rectangle for the data.</td>
</tr>
<tr>
<td>NE_LONGITUDE</td>
<td>The NAD83 based longitude coordinate of the northeast corner of the minimum bounding rectangle for the data.</td>
</tr>
<tr>
<td>SE_LONGITUDE</td>
<td>The NAD83 based longitude coordinate of the southeast corner of the minimum bounding rectangle for the data.</td>
</tr>
<tr>
<td>SW_LONGITUDE</td>
<td>The NAD83 based longitude coordinate of the southwest corner of the minimum bounding rectangle for the data.</td>
</tr>
</tbody>
</table>
NW_LATITUDE
The NAD83 based latitude coordinate of the northwest corner of the minimum bounding rectangle for the data.

NE_LATITUDE
The NAD83 based latitude coordinate of the northeast corner of the minimum bounding rectangle for the data.

SE_LATITUDE
The NAD83 based latitude coordinate of the southeast corner of the minimum bounding rectangle for the data.

SW_LATITUDE
The NAD83 based latitude coordinate of the southwest corner of the minimum bounding rectangle for the data.

7.3.3 Unit of Measurement
The measurement units for the parameters contained in the inventory listing file on the CD-ROM are:

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Units</th>
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</thead>
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<tr>
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</tr>
<tr>
<td>MAP_NAME</td>
<td>[none]</td>
</tr>
<tr>
<td>MAP_SUBJECT</td>
<td>[none]</td>
</tr>
<tr>
<td>SCALE</td>
<td>[none]</td>
</tr>
<tr>
<td>MAP_FORM</td>
<td>[none]</td>
</tr>
<tr>
<td>MAP_SOURCE</td>
<td>[none]</td>
</tr>
<tr>
<td>NW_LONGITUDE</td>
<td>[degrees]</td>
</tr>
<tr>
<td>NE_LONGITUDE</td>
<td>[degrees]</td>
</tr>
<tr>
<td>SE_LONGITUDE</td>
<td>[degrees]</td>
</tr>
<tr>
<td>SW_LONGITUDE</td>
<td>[degrees]</td>
</tr>
<tr>
<td>NW_LATITUDE</td>
<td>[degrees]</td>
</tr>
<tr>
<td>NE_LATITUDE</td>
<td>[degrees]</td>
</tr>
<tr>
<td>SE_LATITUDE</td>
<td>[degrees]</td>
</tr>
<tr>
<td>SW_LATITUDE</td>
<td>[degrees]</td>
</tr>
</tbody>
</table>

7.3.4 Data Source
The source of the parameter values contained in the inventory listing file on the CD-ROM are:

<table>
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<tr>
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<th>Data Source</th>
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<tbody>
<tr>
<td>PROVINCE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>MAP_NAME</td>
<td>[Taken from the map sheet or derived by BORIS staff based on map content]</td>
</tr>
<tr>
<td>MAP_SUBJECT</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>SCALE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>MAP_FORM</td>
<td>[Determined by BORIS staff]</td>
</tr>
<tr>
<td>MAP_SOURCE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>NW_LONGITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
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<tr>
<td>NE_LONGITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>SE_LONGITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>SW_LONGITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>NW_LATITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>NE_LATITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>SE_LATITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
<tr>
<td>SW_LATITUDE</td>
<td>[Determined by BORIS staff from map information]</td>
</tr>
</tbody>
</table>
The original sources for the various maps are:

<table>
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<tr>
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<tr>
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</tr>
<tr>
<td></td>
<td></td>
<td>4905 Dufferin Street</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Downsview, Ontario</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CANADA M3H 5T4</td>
</tr>
<tr>
<td>Forestry Canada</td>
<td>1:15,840</td>
<td>Forestry Branch</td>
</tr>
<tr>
<td>(Manitoba)</td>
<td></td>
<td>Manitoba Natural Resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>300-530 Kenaston Boulevard</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>Forestry Canada</td>
<td>1:12,500</td>
<td>Saskatchewan Environment &amp; Resource Management Forest Inventory</td>
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<tr>
<td>(Saskatchewan)</td>
<td></td>
<td>Forests and Lands Branch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Box 3003, McIntosh Mall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prince Albert, Saskatchewan</td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
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<td>Forest Cover</td>
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<td></td>
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<td></td>
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<td>Box 3003, McIntosh Mall</td>
</tr>
<tr>
<td></td>
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</tr>
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</tr>
<tr>
<td>Forest Cover</td>
<td>1:50,000</td>
<td>Agriculture Canada</td>
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<tr>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>CANADA K1A 0C6</td>
</tr>
</tbody>
</table>
Geology - Bedrock 1:1,000,000  Manitoba Energy and Mines
   Publication and Information
   555-330 Graham Avenue
   Winnipeg, Manitoba
   CANADA R3C 4E3

Geology - Bedrock 1:250,000  Saskatchewan Research Council
   Resources Division
   15 Innovation Boulevard
   Saskatoon, Saskatchewan
   CANADA S7N 2X8

Geology - Bedrock 1:1,000,000  Saskatchewan Energy and Mines
   Marketing and Publications
   1914 Hamilton Street, 3rd Floor
   Regina, Saskatchewan
   CANADA S4P 4V4

Geology - Bedrock 1:1,267,200  Saskatchewan Research Council
   Geological Division
   15 Innovation Boulevard
   Saskatoon, Saskatchewan
   CANADA S7N 2X8

Geology-Chemistry 1:250,000  Energy, Mines, and Resources
   Geological Survey of Canada Publications Office
   601 Booth Street
   Ottawa, Ontario
   CANADA K1A 0E8

Geology-Photography 1:125,000  Energy, Mines, and Resources
   Geological Survey of Canada Publications Office
   601 Booth Street
   Ottawa, Ontario
   CANADA K1A 0E8

Geology-Quaternary 1:250,000  Saskatchewan Energy and Mines
   Marketing and Publications
   1914 Hamilton Street, 3rd Floor
   Regina, Saskatchewan
   CANADA S4P 4V4

Geology-Surficial 1:250,000  Energy, Mines, and Resources, Canada
   Geological Survey of Canada Publications Office
   601 Booth Street
   Ottawa, Ontario
   CANADA K1A 0E8

Geology-Surficial 1:1,000,000  Manitoba Energy and Mines
   Publication and Information
   555-330 Graham Avenue
   Winnipeg, Manitoba
   CANADA R3C 4E3
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<th>Subject</th>
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<th>Publisher</th>
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</thead>
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<tr>
<td>Geology-Surficial</td>
<td>1:250,000</td>
<td>Saskatchewan Research Council Resources Division</td>
<td>15 Innovation Boulevard, Saskatoon, Saskatchewan, CANADA S7N 2X8</td>
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<tr>
<td></td>
<td>1:300,000</td>
<td>Agriculture Canada</td>
<td>Land Resources Research Centre, K.W. Neatby Building, Central Experimental Farm, Ottawa, Ontario, CANADA K1A 0C6</td>
</tr>
<tr>
<td>Forestry-Hypsometry</td>
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<td>Energy, Mines, and Resources, Canada</td>
<td>Surveys and Mapping Branch, Canada Map Office, 615 Booth Street, Ottawa, Ontario, CANADA K1A 0E9</td>
</tr>
<tr>
<td>Land Capacity (Forested)</td>
<td>1:250,000</td>
<td>Information Canada</td>
<td>Ottawa, Ontario, CANADA K1A 0S9</td>
</tr>
<tr>
<td></td>
<td>1:250,000</td>
<td>F.R.S.C.</td>
<td>Queen's Printer and Controller of Stationery, Ottawa, Ontario, CANADA</td>
</tr>
<tr>
<td>Land Capacity (Wilderness)</td>
<td>1:250,000</td>
<td>Energy, Mines, and Resources, Canada</td>
<td>Surveys and Mapping Branch, Canada Map Office, 615 Booth Street, Ottawa, Ontario, CANADA K1A 0E9</td>
</tr>
<tr>
<td>Land Capacity (Wilderness)</td>
<td>1:250,000</td>
<td>Information Canada</td>
<td>Ottawa, Ontario, CANADA K1A 0S9</td>
</tr>
<tr>
<td>Land Cover (AVHRR image based)</td>
<td>1:1,000,000</td>
<td>Surveys and Mapping Branch, Manitoba Natural Resources</td>
<td>1007 Century Street, Winnipeg, Manitoba, CANADA R3H 0W4</td>
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<tr>
<td>Feature</td>
<td>Scale</td>
<td>Production Authority</td>
<td>Address</td>
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<tr>
<td>Land Type (Manitoba)</td>
<td>1:250,000</td>
<td>Office of Canada Manitoba Soil Survey</td>
<td>Department of Soil Science Ellis Building University of Manitoba Winnipeg, Manitoba CANADA R3T 2N2</td>
</tr>
<tr>
<td>Observing Stations</td>
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<td>Atmospheric Environment Service Information Branch</td>
<td>4905 Dufferin Street Downsview, Ontario CANADA M3H 5T4</td>
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<tr>
<td>Radiation Network</td>
<td>Unknown</td>
<td>Atmospheric Environment Service Information Branch</td>
<td>4905 Dufferin Street Downsview, Ontario CANADA M3H 5T4</td>
</tr>
<tr>
<td>Plant Community (Saskatchewan)</td>
<td>1:50,000</td>
<td>Agriculture Canada Land Resources Research Centre</td>
<td>K.W. Neatby Building Central Experimental Farm Ottawa, Ontario CANADA K1A 0C6</td>
</tr>
<tr>
<td>Soils (Saskatchewan)</td>
<td>1:50,000</td>
<td>Agriculture Canada Land Resources Research Centre</td>
<td>K.W. Neatby Building Central Experimental Farm Ottawa, Ontario CANADA K1A 0C6</td>
</tr>
<tr>
<td>Soils (Saskatchewan)</td>
<td>1:300,000</td>
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<td>K.W. Neatby Building Central Experimental Farm Ottawa, Ontario CANADA K1A 0C6</td>
</tr>
<tr>
<td>Soils (Saskatchewan)</td>
<td>1:125,000</td>
<td>Saskatchewan Soil Survey</td>
<td>5C26 Agriculture Building University of Saskatchewan Saskatoon, Saskatchewan CANADA S7N 0W0</td>
</tr>
<tr>
<td>Soil Capacity (Agriculture) (Saskatchewan)</td>
<td>1:250,000</td>
<td>Saskatchewan Soil Survey</td>
<td>5C26 Agriculture Building University of Saskatchewan Saskatoon, Saskatchewan CANADA S7N 0W0</td>
</tr>
<tr>
<td>Soil Landscape (Saskatchewan) (Manitoba)</td>
<td>1:1,000,000</td>
<td>Agriculture Canada Land Resources Research Centre</td>
<td>K.W. Neatby Building Central Experimental Farm Ottawa, Ontario CANADA K1A 0C6</td>
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</table>
The following table gives information about the parameter values found in the inventory table on the CD-ROM.

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<tr>
<th>Column Name</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
<th>Missing Data</th>
<th>Unrel Data</th>
<th>Below Data</th>
<th>Detect Not</th>
<th>Limit</th>
<th>Collectd</th>
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</thead>
<tbody>
<tr>
<td>PROVINCE</td>
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<td>SASKATCHEWAN</td>
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<td>MAP_NAME</td>
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<tr>
<td>SW_LONGITUDE</td>
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<td>-96.00016</td>
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<tr>
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<td>60.00022</td>
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<td>None</td>
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<td>None</td>
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<td>59.00019</td>
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<tr>
<td>SW_LATITUDE</td>
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<td>None</td>
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<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
Minimum Data Value -- The minimum value found in the column.
Maximum Data Value -- The maximum value found in the column.
Missing 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
A sample data record for the hardcopy maps is not applicable. The following are wrapped versions of the first few records from the hardcopy maps inventory table on the CD-ROM:

PROVINCE, MAP_NAME, MAP_SUBJECT, SCALE, MAP_FORM, MAP_SOURCE, NW_LONGITUDE, NE_LONGITUDE, SE_LONGITUDE, SW_LONGITUDE, NW_LATITUDE, NE_LATITUDE, SE_LATITUDE, SW_LATITUDE
'MANITOBA', 'T 75 R05 W', 'FC AUX', '15840', 'PAPER', 'MNR-FB', -98.23855, -98.08131, -98.08332, -98.24021, 55.5478, 55.54672, 55.46055, 55.46162
'MANITOBA', 'T 76 R04 W', 'FC AUX', '15840', 'PAPER', 'MNR-FB', -98.08331, -97.92573, -97.92808, -98.08332, 55.63508, 55.6338, 55.46055, 55.46182

8. Data Organization

8.1 Data Granularity
The maps can be obtained singly or in groups by contacting the sources indicated in Section 7.3.4.

8.2 Data Format
Each map varies in its size, format, and projection.
The CD-ROM inventory listing file consists of 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.
9. Data Manipulations

9.1 Formulae

9.1.1 Derivation Techniques and Algorithms
Not available.

9.2 Data Processing Sequence

9.2.1 Processing Steps
BORIS staff processed the maps by:
- Extracting geographic coordinate, scale, and thematic information from the maps and placing it in an American Standard Code for Information Interchange (ASCII) file on disk
- Reading the ASCII information in the disk file and loading the online data base with needed information

9.2.2 Processing Changes
None.

9.3 Calculations

9.3.1 Special Corrections/Adjustments
None.

9.3.2 Calculated Variables
None.

9.4 Graphs and Plots
None.

10. Errors

10.1 Sources of Error
Each of the map suppliers should be contacted regarding any errors in the maps.

10.2 Quality Assessment
Each of the map suppliers should be contacted regarding any quality information.

10.2.1 Data Validation by Source
Unknown.

10.2.2 Confidence Level/Accuracy Judgment
Unknown.

10.2.3 Measurement Error for Parameters
Unknown.

10.2.4 Additional Quality Assessments
Unknown.
10.2.5 Data Verification by Data Center
BORIS staff visually inspected at the maps to assess that they did in fact seem to depict the parameters listed but did not perform any ground checks of the accuracy. The inventory and description of the maps was deemed accurate.

11. Notes

11.1 Limitations of the Data
Individuals desiring to use the maps must acquire their own copies through the sources provided in Section 7.3.4.

11.2 Known Problems with the Data
None.

11.3 Usage Guidance
None.

11.4 Other Relevant Information
Not available.

12. Application of the Data Set
The maps can be used as visual references or can be digitized to create digital data sets for computer analyses.

13. Future Modifications and Plans
None.

14. Software

14.1 Software Description
BORIS staff tabulated the needed information in Microsoft Excel spreadsheet files and used the output spreadsheets to load the data base tables.

14.2 Software Access
Microsoft Excel is commercially available.

15. Data Access
Note that the maps are not contained on the BOREAS CD-ROM set. An inventory listing file is supplied on the CD-ROM to inform users of the maps that are available. This inventory listing is available from the Earth Observing System Data and Information System (EOSDIS) Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC). For hardcopies of the individual maps, contact the sources provided in Section 7.3.4.
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
The maps referenced here exist in hardcopy form.

17. References

17.1 Platform/Sensor/Instrument/Data Processing Documentation
None.

17.2 Journal Articles and Study Reports


17.3 Archive/DBMS Usage Documentation

None.

18. Glossary of Terms

None.

19. List of Acronyms

- ASCII - American Standard Code for Information Interchange
- BOREAS - BOREal Ecosystem-Atmosphere Study
- BORIS - BOREAS Information System
- CCRS - Canada Centre for Remote Sensing
- DAAC - Distributed Active Archive Center
- EOS - Earth Observing System
- EOSDIS - EOS Data and Information System
- GIS - Geographic Information System
- GSFC - Goddard Space Flight Center
- NAD83 - North American Datum of 1983
- NASA - National Aeronautics and Space Administration
- NSA - Northern Study Area
- ORNL - Oak Ridge National Laboratory
- PANP - Prince Albert National Park
- SSA - Southern Study Area
- URL - Uniform Resource Locator
- UTM - Universal Transverse Mercator
20. Document Information

20.1 Document Revision Date
Written: 10-Aug-1995
Last Updated: 05-Feb-1999

20.2 Document Review Date(s)
BORIS Review: 23-Jan-1997
Science Review: 03-Feb-1997

20.3 Document ID

20.4 Citation

When using these data, please include the following acknowledgement as well as citations of relevent papers in Section 17.2:

The BOREAS hardcopy maps were located and acquired from various sources by BORIS staff at NASA GSFC and CCRS. Their conscientious effort in finding the maps is greatly appreciated.

Also, cite the BOREAS CD-ROM set as:

20.5 Document Curator

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

**BOREAS Hardcopy Maps**

**AUTHOR(S)**
Elizabeth Nelson and Jeffrey A. Newcomer
Forrest G. Hall, Editor

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National Aeronautics and Space Administration
Washington, DC 20546-0001

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7121 Standard Drive, Hanover, MD 21076-1320. (301) 621-0390.

**ABSTRACT (Maximum 200 words)**
BOREAS hardcopy maps are a collection of approximately 1,000 hardcopy maps representing the physical, climatological, and historical attributes of areas covering primarily the Manitoba and Saskatchewan provinces of Canada. These maps were collected by BORIS and CCRS staff to provide basic information about site positions, manmade features, topography, geology, hydrology, land cover types, fire history, climate, and soils of the BOREAS study region. These maps are not available for distribution through the BOREAS project but may be used as an onsite resource. Information is provided within this document for individuals who want to order copies of these maps from the original map source.