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# Technical documentation for the approximate point locations and year of collection for over 50,000 specimens in the University of Michigan Herbarium's Michigan Flora database

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# Technical documentation for the approximate point locations and year of collection for over 50,000 specimens in the University of Michigan Herbarium's Michigan Flora database

## Metadata:

- [Identification Information](#)
  - [Data Quality Information](#)
  - [Spatial Data Organization Information](#)
  - [Spatial Reference Information](#)
  - [Entity and Attribute Information](#)
  - [Distribution Information](#)
  - [Metadata Reference Information](#)
- 

### *Identification\_Information:*

#### *Citation:*

#### *Citation\_Information:*

*Originator:* Rachel Simpson

*Publication\_Date:* Unpublished material

#### *Title:*

Technical documentation for the approximate point locations and year of collection for over 50,000 specimens in the University of Michigan Herbarium's Michigan Flora database

*Edition:* 1.0

*Geospatial\_Data\_Presentation\_Form:* vector digital data

### *Description:*

#### *Abstract:*

This is a set of points representing the approximate locations at which over 50,000 plant specimens were collected in Michigan. The major component of the work whose results are described here consisted of translating the descriptive locality information of museum specimens into mappable coordinates. Specifically, I developed a spatial component for a subset of specimens documented in the University of Michigan Herbarium's Michigan Flora database. The Michigan Flora database, compiled by Edward Voss, presently Curator Emeritus, University of Michigan Herbarium, beginning in 1956 and continuing through the present, contains the information written on specimen labels of Gymnosperms (conifers and relatives) and Angiosperms (flowering plants) from Michigan that Voss examined in the process of writing the Michigan Flora (Voss 1972, 1985, 1996). The specimens were collected beginning in the early nineteenth century and are located in over 20 herbaria. The " includes records typed/printed on slips of paper as well as the subset of records that are computerized. For the research I used the 56776 computerized records available at the time the research was begun. The county-level distributional data are already available through the Michigan Flora (Voss 1972, 1985, 1995) and a more recently updated website (Reznicek et al. 2004).

The specific methods used to associate locality descriptions with mappable coordinates depended on the type of information available in the locality. When available a U.S. Public Land Survey System section coordinate was extracted and standardized. It was then associated with a latitude and longitude for the centroid, the geographical center as calculated using GIS software, of the section, using a reference data set for the state maintained by the Michigan Department of Natural Resources. For most records, however, coordinates were assigned by associating the specimen record with a geographic feature found in an electronic gazetteer, the Geographic Names Information System (GNIS), maintained by the U.S. Geological Survey (U.S. Geological Survey 1981). Each feature in this gazetteer is associated with an x and y coordinate in units of decimal degrees. The selection of a feature in the electronic gazetteer was accomplished using the database software application 4D (4th Dimension, San Jose, CA), customized to permit a combination of automated and manual matching of each specimen locality with place name(s) for the relevant county in the reference gazetteer. The Originator thanks Jeremy B. Young for the database customizing. The overall result was that 92% of the records were georeferenced to some level of precision better than county. More than half of the records pertained to specimens collected after 1950 and another third between 1900 and 1950. A century, decade, and year was assigned to or standardized for 96% of the records; in the original data for only 37% of the records from specimen labels was a four-digit year explicitly provided.

More information will be found in "Mapping herbarium specimens: a case study using locality information from the University of Michigan Herbarium's Michigan Flora database," a manuscript in preparation by Rachel A. Simpson.

This data set was developed by Rachel A. Simpson while at the Shapiro Science Library, The University of Michigan, Ann Arbor, MI 48109-1185. The work was funded by the University Library and the Rackham Graduate School, University of Michigan, through a joint post-graduate fellowship.

Sources used in research:

Hanes, C. R., & F. N. Hanes. 1947. *Flora of Kalamazoo County, Michigan*. [Authors], Schoolcraft, Michigan. xii + 295 pp.

Payne, R. L. & B. MacIntosh. 2004. 22nd Session of the United Nations Group of Experts on Geographical Names: Report of the United States/Canada Division. 5 pp.

Romig, W. [1972]. *Michigan Place Names*. Walter Romig Publ., Grosse Pointe. [Facsimile reprint, 1986, by Wayne State Univ. Press, Detroit]. 673 pp.

Voss, E. G. 1972. *Michigan Flora. Part I. Gymnosperms and monocots*. Cranbrook Institute of Science Bulletin 55 and University of Michigan Herbarium. xv + 488 pp.

-. 1978. *Botanical beachcombers and explorers: pioneers of the 19th Century in the upper Great Lakes*. Contributions from the University of Michigan Herbarium 13. viii + 100 pp.

-. 1985. *Michigan Flora. Part II*. Cranbrook Institute of Science Bulletin 59 and University of Michigan Herbarium. xix + 724 pp.

-. 1996. *Michigan Flora. Part III. Dicots (Pyrolaceae-Compositae)*. Cranbrook Institute of Science Bulletin 61 and University of Michigan Herbarium. xix + 622 pp.

- 1999. Labeling of herbarium specimens. Michigan Botanist 38(4): 57-63.

Related publications: Reznicek, A. A., E. G. Voss, & R. A. Simpson. Online Atlas of Michigan Plants. Edition 1. April 2004. University of Michigan. Ann Arbor, Michigan. Available online at URL: <http://herbarium.lsa.umich.edu/website/michflora>.

*Purpose:*

To serve as preliminary distributional data which will be improved by users over time. Ultimate purpose of data is to enable mapping and analyses of plant distributions and of patterns, both spatial and temporal, of plant collecting.

*Time\_Period\_of\_Content:*

*Time\_Period\_Information:*

*Range\_of\_Dates/Times:*

*Beginning\_Date:* 1803

*Ending\_Date:* 2000

*Currentness\_Reference:* ground condition

*Status:*

*Progress:* In work

*Maintenance\_and\_Update\_Frequency:* Unknown

*Spatial\_Domain:*

*Bounding\_Coordinates:*

*West\_Bounding\_Coordinate:* -90.390

*East\_Bounding\_Coordinate:* -82.073

*North\_Bounding\_Coordinate:* 48.280

*South\_Bounding\_Coordinate:* 41.634

*Keywords:*

*Theme:*

*Theme\_Keyword\_Thesaurus:* ESRI

*Theme\_Keyword:* biota

*Theme:*

*Theme\_Keyword\_Thesaurus:* none

*Theme\_Keyword:* flora

*Theme\_Keyword:* specimen

*Theme\_Keyword:* University of Michigan Herbarium

*Theme\_Keyword:* herbarium

*Theme\_Keyword:* plant

*Theme\_Keyword:* Michigan Flora

*Place:*

*Place\_Keyword\_Thesaurus:* none

*Place\_Keyword:* Michigan

*Access\_Constraints:* Data are not available for distribution at the time of writing.

*Use\_Constraints:* not applicable

*Point\_of\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319

*Contact\_Facsimile\_Telephone:* 402-472-4608

*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu

*Hours\_of\_Service:* 0900 - 1700 Central Time

*Contact\_Instructions:* Contact by e-mail recommended.

*Data\_Set\_Credit:*

The Originator/Author thanks Ed Voss for providing information about the Michigan Flora project and for his willingness to make the electronic records available for the project. Any errors in representing the project here are the Author's. Tony Reznicek provided the electronic records, current scientific names, and helpful discussion. Jeremy B. Young built the 4D database structure and scripts. Katherine Bridges and Robert Fogel provided helpful discussion. The Originator was supported during the execution of the work by a joint postdoctoral fellowship from the University of Michigan Library and University of Michigan Rackham Graduate School.

*Native\_Data\_Set\_Environment:* ArcView 3.x and ArcMap 8.x.

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*Data\_Quality\_Information:*

*Attribute\_Accuracy:*

*Attribute\_Accuracy\_Report:*

Accuracy of attributes was not tested and no assumptions about the accuracy should be made by the user. Data should be seen as being in draft form and a need for corrections fully expected. Data are probably accurate enough for regional scale analyses/representations. One issue that was not dealt with here is that there are approximately 103 'records' which actually comprise additional information for the previous record in the database. As I understood it, this occurs because when the Michigan Flora database was originally begun, fields were of fixed-length due to software constraints. I chose not to make any changes to the content of the original data fields, in order to preserve its integrity. Therefore these non-conforming records were not collapsed. The 'additional information' records are indicated as such in the Michigan Flora's 'ORIG\_DET2' field (e.g., 'ADDITIONAL INFORMATION FOR RECORD 9836').

*Logical\_Consistency\_Report:* None

*Completeness\_Report:*

The data used in the project were a subset of the Michigan Flora database. The subset consisted of those data available electronically (versus those existing only on 3 X 5 notecards) at the time the project was begun (November 2000) and supplemented by records added electronically between Nov. 2000 and May 2001. These records were treated in the various processes described in the Lineage section. The outcome was that various fields were added which included standardized information for every applicable record (e.g., a standardized county name field was added, such that records listed as being in 'Arenac A,' the Michigan Flora database designation for the Charity Islands, were designated in a separate field as being in 'Arenac'). However, some records were not georeferenced and for some a year-of-collection was not added. Reasons are outlined in a paper being submitted to the "Michigan Botanist."

*Lineage:*

*Source\_Information:*

*Source\_Citation:*

*Citation\_Information:*

*Originator:* Edward G. Voss  
*Publication\_Date:* 20010501  
*Title:* The Michigan Flora database  
*Edition:* none  
*Geospatial\_Data\_Presentation\_Form:* spreadsheet  
*Publication\_Information:*  
     *Publication\_Place:* Ann Arbor, Michigan  
     *Publisher:* University of Michigan Herbarium

*Type\_of\_Source\_Media:* computer files  
*Source\_Time\_Period\_of\_Content:*  
     *Time\_Period\_Information:*  
         *Range\_of\_Dates/Times:*  
             *Beginning\_Date:* 1803  
             *Ending\_Date:* Present  
     *Source\_Currentness\_Reference:* ground condition  
*Source\_Citation\_Abbreviation:* Michigan Flora database  
*Source\_Contribution:*

The data were the foundation for the work documented here, because they consist of the specimen label information that was then used to create the spatial and temporal data.

*Source\_Information:*

*Source\_Citation:*

*Citation\_Information:*

*Originator:* U.S. Geological Survey  
*Publication\_Date:* 19810501  
*Title:* Geographic Names Information System (GNIS)  
*Geospatial\_Data\_Presentation\_Form:* Tabular digital data  
*Publication\_Information:*  
     *Publication\_Place:* Reston, VA  
     *Publisher:* U.S. Geological Survey  
*Online\_Linkage:* <<http://geonames.usgs.gov>>

*Type\_of\_Source\_Media:* online  
*Source\_Time\_Period\_of\_Content:*  
     *Time\_Period\_Information:*  
         *Range\_of\_Dates/Times:*  
             *Beginning\_Date:* 1974  
             *Ending\_Date:* Present  
     *Source\_Currentness\_Reference:* ground condition  
*Source\_Citation\_Abbreviation:* GNIS  
*Source\_Contribution:*

For most specimen records a place name referred to in the Locality field was identified and standardized and then assigned point coordinates. These coordinates were looked up in the GNIS.

*Source\_Information:*

*Source\_Citation:*

*Citation\_Information:*

*Originator:* Michigan Department of Natural Resources  
*Publication\_Date:* unknown  
*Title:* Public Land Survey sections  
*Geospatial\_Data\_Presentation\_Form:* map  
*Publication\_Information:*

*Publication\_Place:* Lansing, MI

*Publisher:* Michigan Department of Natural Resources

*Online\_Linkage:* <<http://www.mcgi.state.mi.us/mgdl/>>

*Type\_of\_Source\_Media:* CD-ROM

*Source\_Time\_Period\_of\_Content:*

*Time\_Period\_Information:*

*Single\_Date/Time:*

*Calendar\_Date:* 2001

*Source\_Currentness\_Reference:* approximate date CD was received by Originator by mail

*Source\_Citation\_Abbreviation:* PLSS

*Source\_Contribution:*

For some specimen records a Public Land Survey System section was identified and standardized and then assigned coordinates. These coordinates were looked up in the PLSS.

*Process\_Step:*

*Process\_Description:*

After receiving data exported by the University of Michigan Herbarium from its native Foxbase format to a generic tabular format, the data were imported into Excel and checked for import errors. Note: This and other process steps were performed at the University of Michigan Library. The contact information has been updated to reflect the Originator's current address.

*Source\_Used\_Citation\_Abbreviation:* Michigan Flora database

*Process\_Date:* 20010501

*Process\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319

*Contact\_Facsimile\_Telephone:* 402-472-4608

*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu

*Hours\_of\_Service:* 0900 - 1700 Central Time

*Contact\_Instructions:* Contact by e-mail recommended.

*Process\_Step:*

*Process\_Description:*

After receiving data exported by the University of Michigan Herbarium from its native Foxbase format to a generic tabular format, the data were imported into Excel and checked for errors from the importing process. Processing steps applied to those data were reapplied to this new set of data. The 2 data sets were then integrated. Note: This and other process steps were performed at the University of Michigan Library. The contact information has been updated to reflect the Originator's current

address.

*Source\_Used\_Citation\_Abbreviation:* Michigan Flora database

*Process\_Date:* 200105

*Process\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of  
Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319

*Contact\_Facsimile\_Telephone:* 402-472-4608

*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu

*Hours\_of\_Service:* 0900 - 1700 Central Time

*Contact\_Instructions:* Contact by e-mail recommended.

*Process\_Step:*

*Process\_Description:*

Data were prepared for georeferencing. This process involved a number of steps mostly performed with Microsoft Excel. Fields were designated as being the 'original' data [here used to mean the data as it appeared after importing from the Michigan Flora Project], and new fields were prepared. Some of these fields were populated with standardized data or data otherwise processed. Examples: 1) Standardized county name fields were created and populated by drawing from a lookup-table containing the original county name/spelling and a standardized name. In one of these fields, the designations for island groups were retained ('Arenac A' was retained), and in another field they were not used ('Arenac A' became 'Arenac.'). 2) A locality field was created by concatenating the 2 original locality fields. The original uses a second locality field when the fixed-length field is filled [Related is the fact that sometimes specimen information 'overflowed' such that a second record was used - see Completeness Report for more information]. 3) A standardized name field ('lookup\_name') was created and populated by drawing from a lookup-table containing all variations of the names and the then-correct name (based on a table sent by Tony Reznicek, Curator, University of Michigan Herbarium). This field facilitated working with the data but the data are undoubtedly already out-of-date. Name problems I could identify are noted in an additional field.

*Source\_Used\_Citation\_Abbreviation:* Michigan Flora database

*Process\_Date:* 200105

*Process\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of  
Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:**Address\_Type:* mailing address*Address:* 102 Nebraska Hall*City:* Lincoln*State\_or\_Province:* Nebraska*Postal\_Code:* 68588-0517*Country:* USA*Contact\_Voice\_Telephone:* 402-472-1319*Contact\_Facsimile\_Telephone:* 402-472-4608*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu*Hours\_of\_Service:* 0900 - 1700 Central Time*Contact\_Instructions:* Contact by e-mail recommended.*Process\_Step:**Process\_Description:*

A field for the year-of-collection was created and populated. In the original data, year is presented exactly as written on the specimen label and therefore is non-standardized and often lacks an indication of the century of collection. Pattern searching and filtering, using Microsoft Excel, were used to help parse 4-digit years from the date field. In some cases the century but not a decade and single-digit year were given, and so an attempt to parse the century was also made (and results put in a field for that purpose). For records for which the century was not identified, I created a table of collectors and gathered birth and death dates for as many as possible. I used this to assist in determining the likely century of the collection. Because the data were treated en masse, if the data did not fit a particular pattern my methods did not allow parsing of a 4-digit date. There are many records that actually do have an explicitly given 4-digit year which I nonetheless did not capture.

*Source\_Used\_Citation\_Abbreviation:* Michigan Flora database*Source\_Used\_Citation\_Abbreviation:* PLSS*Process\_Date:* 200105*Process\_Contact:**Contact\_Information:**Contact\_Person\_Primary:**Contact\_Person:* Rachel A. Simpson*Contact\_Organization:* School of Natural Resources, University of Nebraska-Lincoln*Contact\_Position:* Research Assistant Professor*Contact\_Address:**Address\_Type:* mailing address*Address:* 102 Nebraska Hall*City:* Lincoln*State\_or\_Province:* Nebraska*Postal\_Code:* 68588-0517*Country:* USA*Contact\_Voice\_Telephone:* 402-472-1319*Contact\_Facsimile\_Telephone:* 402-472-4608*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu*Hours\_of\_Service:* 0900 - 1700 Central Time*Contact\_Instructions:* Contact by e-mail recommended.*Process\_Step:**Process\_Description:*

Fields for township, range, section, section direction (N or S) and a concatenation of

those were created and populated. In the original data, Public Land Survey System coordinates are represented exactly as written and are part of the 'Locality' field. Pattern searching and filtering, using Microsoft Excel, were used to help parse and standardize the data. Coordinates for the resulting section were then retrieved from the PLSS data set.

*Source\_Used\_Citation\_Abbreviation:* Michigan Flora database

*Process\_Date:* 200105

*Process\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319

*Contact\_Facsimile\_Telephone:* 402-472-4608

*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu

*Hours\_of\_Service:* 0900 - 1700 Central Time

*Contact\_Instructions:* Contact by e-mail recommended.

*Process\_Step:*

*Process\_Description:*

Approximate coordinates for specimen localities were assigned, by identifying a place named in the locality and then retrieving coordinates for that place from the GNIS. In addition other information for that place was retrieved from the GNIS.

This work was done using a database tool that permitted a combination of automated and manual operations on the data. The work is described in more detail in the manuscript referred to in Abstract.

*Source\_Used\_Citation\_Abbreviation:* Michigan Flora database

*Source\_Used\_Citation\_Abbreviation:* GNIS

*Process\_Date:* 2002

*Process\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319  
*Contact\_Facsimile\_Telephone:* 402-472-4608  
*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu  
*Hours\_of\_Service:* 0900 - 1700 Central Time  
*Contact\_Instructions:* Contact by e-mail recommended.

*Process\_Step:*

*Process\_Description:* Metadata were created.

*Process\_Date:* 20051010

*Process\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of  
Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319

*Contact\_Facsimile\_Telephone:* 402-472-4608

*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu

*Hours\_of\_Service:* 0900 - 1700 Central Time

*Contact\_Instructions:* Contact by e-mail recommended.

---

*Spatial\_Data\_Organization\_Information:*

*Indirect\_Spatial\_Reference:* Vector coverage across the state of Michigan

*Direct\_Spatial\_Reference\_Method:* Vector

*Point\_and\_Vector\_Object\_Information:*

*SDTS\_Terms\_Description:*

*SDTS\_Point\_and\_Vector\_Object\_Type:* Entity point

*Point\_and\_Vector\_Object\_Count:* 56571

*SDTS\_Terms\_Description:*

*SDTS\_Point\_and\_Vector\_Object\_Type:* Label point

*Point\_and\_Vector\_Object\_Count:* 951

*SDTS\_Terms\_Description:*

*SDTS\_Point\_and\_Vector\_Object\_Type:* GT-polygon composed of chains

*Point\_and\_Vector\_Object\_Count:* 951

*SDTS\_Terms\_Description:*

*SDTS\_Point\_and\_Vector\_Object\_Type:* Point

*Point\_and\_Vector\_Object\_Count:* 4

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*Spatial\_Reference\_Information:*

*Horizontal\_Coordinate\_System\_Definition:*

*Planar:*

*Grid\_Coordinate\_System:*

*Grid\_Coordinate\_System\_Name:* Universal Transverse Mercator

*Universal\_Transverse\_Mercator:*

*UTM\_Zone\_Number:* 14

*Transverse\_Mercator:*

*Scale\_Factor\_at\_Central\_Meridian:* 0.9996

*Longitude\_of\_Central\_Meridian:* -99

*Latitude\_of\_Projection\_Origin:* 0.0

*False\_Easting:* 500000

*False\_Northing:* 0.0

*Planar\_Coordinate\_Information:*

*Planar\_Coordinate\_Encoding\_Method:* coordinate pair

*Coordinate\_Representation:*

*Abscissa\_Resolution:* 0.002048

*Ordinate\_Resolution:* 0.002048

*Planar\_Distance\_Units:* meters

*Geodetic\_Model:*

*Horizontal\_Datum\_Name:* North American Datum of 1983

*Ellipsoid\_Name:* Geodetic Reference System 80

*Semi-major\_Axis:* 6378137.000000

*Denominator\_of\_Flattening\_Ratio:* 298.257222

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*Entity\_and\_Attribute\_Information:*

*Overview\_Description:*

*Entity\_and\_Attribute\_Overview:*

Some of the fields listed are the original Michigan Flora fields. Others are 'housekeeping' fields used during the research. Fields whose names begin with 'GNIS\_' are fields whose values come from the GNIS for the particular place assigned to the specimen's locality. They include feature type, county, and coordinates in decimal degrees. Fields whose names begin with 'TRS' have information pertaining to the PLSS (township, range, section). 'HAVE\_TRS' and 'HAVE\_GNIS' indicate whether a PLSS coordinate and a GNIS coordinate, respectively, were assigned to the specimen. In some cases, both were available, and in that case the PLSS coordinate was assumed to be more precise. The fields 'X\_COOR' and 'Y\_COOR' show the final coordinate values assigned.

*Entity\_and\_Attribute\_Detail\_Citation:*

To be provided once data are deposited with the University of Michigan Herbarium.

---

*Distribution\_Information:*

*Distributor:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of  
Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319

*Contact\_Facsimile\_Telephone:* 402-472-4608

*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu

*Hours\_of\_Service:* 0900 - 1700 Central Time

*Contact\_Instructions:* Contact by e-mail recommended.

*Resource\_Description:* Offline Data

*Distribution\_Liability:*

No warranty expressed or implied is made by any of the people or institutions referred to in this document regarding the positional or attribute accuracy or utility of this information. The act of distribution shall not constitute any such warranty and no responsibility is assumed by the any of the people or institutions referred to in this document in the use of the data. Users should consider the data created by the Originator to contain errors, to vary greatly in spatial accuracy, and to be incomplete. Furthermore, while every effort was made to retain the original Michigan Flora database data fields, they should not by any means be considered to be an authoritative representation of the Michigan Flora database. For example, errors in translation among data formats may have occurred. More importantly, changes to the Michigan Flora database may have been made (e.g., corrections) after the Originator received a copy of the data. For this reason it may be useful to note that in the Michigan Flora database, when a record is modified (or added), the date on which the change was made is recorded in a field designated for this purpose.

*Custom\_Order\_Process:* Contact Originator for information.

*Available\_Time\_Period:*

*Time\_Period\_Information:*

*Range\_of\_Dates/Times:*

*Beginning\_Date:* 1803

*Ending\_Date:* 2000

---

*Metadata\_Reference\_Information:*

*Metadata\_Date:* 20060202

*Metadata\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Rachel A. Simpson

*Contact\_Organization:* School of Natural Resources, University of  
Nebraska-Lincoln

*Contact\_Position:* Research Assistant Professor

*Contact\_Address:*

*Address\_Type:* mailing address

*Address:* 102 Nebraska Hall

*City:* Lincoln

*State\_or\_Province:* Nebraska

*Postal\_Code:* 68588-0517

*Country:* USA

*Contact\_Voice\_Telephone:* 402-472-1319

*Contact\_Facsimile\_Telephone:* 402-472-4608

*Contact\_Electronic\_Mail\_Address:* rsimpson2@unl.edu

*Hours\_of\_Service:* 0900 - 1700 Central Time

*Contact\_Instructions:* Contact by e-mail recommended.

*Metadata\_Standard\_Name:* FGDC Content Standards for Digital Geospatial Metadata

*Metadata\_Standard\_Version:* FGDC-STD-001-1998

*Metadata\_Time\_Convention:* local time

*Metadata\_Access\_Constraints:* none

*Metadata\_Use\_Constraints:*

This metadata file is intended to accompany the geospatial data set identified. It is not to be altered or summarized. If this geospatial data set was received from anyone besides the Originator, this metadata file and the geospatial data set it describes may lack integrity.

*Metadata\_Extensions:*

*Online\_Linkage:* <<http://www.esri.com/metadata/esriprof80.html>>

*Profile\_Name:* ESRI Metadata Profile

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