



**GIS SPATIAL DATA, TABULAR DATA, AND METADATA  
ASSOCIATED WITH REPORT 365  
AGGREGATE RESOURCES EVALUATION  
MILLE LACS COUNTY, MINNESOTA, OCTOBER 2008**

Project of the Minnesota Department of Natural Resources (MN DNR), Division of  
Lands and Minerals, Mineral Potential Unit, Aggregate Resource Mapping Program  
Website: [http://www.dnr.state.mn.us/lands\\_minerals/aggregate\\_maps/index.html](http://www.dnr.state.mn.us/lands_minerals/aggregate_maps/index.html)

*Contents of milldata.zip*

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**MN DNR, Division of Lands and Minerals, Aggregate Resource Mapping  
Program's GIS Spatial and Tabular Data Developed or Modified for this Study  
{resource\mn\_dnr}**

**MN DNR GIS Spatial Data (Shapefiles, .shp)**

**{resource\mn\_dnr\spatial}**

millsgp.shp: Polygon Features, Mille Lacs County Sand and Gravel Potential. This dataset consists of information about the geology, geological characteristics, and sand and gravel potential of 226 map units in Mille Lacs County, Minnesota. Five fields relate to the surficial geology of the map unit, including id, sediment, landform, surficial geology description, and dominant lithology. Five fields relate to sand and gravel characteristics, including probability, quality, texture, overburden thickness, and deposit size of the map unit. These characteristics were used to calculate the aggregate potential of the map unit for sand and gravel.

millfobs.shp\*: Point Features, Mille Lacs County Field Observations. This dataset includes information gathered in the field. Fieldwork was completed in the fall of 2005 through spring of 2006. It includes approximately 322 field observation sites within Mille Lacs County and contains a field description of each site, the dominant type of material encountered, the source of information, type of site, unit thickness, and overburden thickness. This shapefile's table can be related to the sieve analysis database (millsieve.dbf), which stores sieve data for selected field observations.

millpits.shp^: Point Features, Mille Lacs County Aggregate Pits and Quarries. This dataset consists of location information for 224 aggregate pits (218 - Gravel, 2 - Quarry, 2 - Sand, & 2 - Borrow) in Mille Lacs County, Minnesota. This shapefile's table can be related to the MN/DOT test pit quality database (milldotqual.dbf), which displays quality for selected Aggregate Source Information System sourced aggregate pits.

\*Shapefile has related database table found in 'DNR GIS Tabular Data'

^ Shapefile has related database table found in 'MN/DOT GIS Tabular Data'

millcsp.shp: Polygon Features, Mille Lacs County Crushed Stone Potential. This dataset consists of information about the geology, geological characteristics, and aggregate potential of crushed stone potential units in Mille Lacs County, Minnesota. Four attribute fields relate to crushed stone characteristics, including overburden thickness, quality, probability, and bedrock geological unit. These characteristics were used to calculate the aggregate potential of the map unit for crushed stone.

millmgsbg.shp: Polygon Features, Mille Lacs County Bedrock Geology Hybrid. This dataset consists of bedrock geology mapping units for Mille Lacs County, Minnesota. The bedrock geology is compiled from two Minnesota Geological Survey (MGS) miscellaneous map series, 'Bedrock Geology of Mille Lacs 30 x 60 Minute Quadrangle' (1:100,000, M-100, 1999) and 'Bedrock Geology and Superimposed Magnetic on Gravity Anomaly of for East-Central Minnesota' (1:200,000, M-132, 2003), as well as, a MN DNR general bedrock geologic interpretation of the far southeast corner of Mille Lacs County at a 1:200,000 scale where MGS data was not available.

milllobmdl.shp: Point Features, Mille Lacs County Overburden Model Data Points. This dataset includes 655 data points used in a spatial analytical overburden model within Mille Lacs County, Minnesota using ESRI GIS software. This dataset and subsequent raster overburden model were captured and developed to assist in determining crushed stone potential in Mille Lacs County, MN. Overburden data were gathered from field observations, NRCS soil surveys, exploratory drillings, Minnesota Geological Survey (MGS) bedrock outcrops, as well as from the County Well Index database. Field observations of bedrock outcrops were gathered in the field, and later digitized using ArcGIS 9.2. Soil survey data were downloaded in 2005 and queried for bedrock outcrops. MGS bedrock outcrop data were obtained from MGS spatial datasets for miscellaneous map series M-100 and M-132. Field verified County Well Index (CWI) data were downloaded in October of 2006. CWI contains spatially located data of wells drilled throughout Minnesota. An additional County Well Index dataset was downloaded that contains unlocated well data. CWI 'unlocated' well data has not been field verified, however they have been approximately located using the Public Land Survey (PLS) information provided on the CWI well log. The MN DNR selected and approximately located relevant unlocated wells that either encountered bedrock or didn't encounter bedrock, but would help sink the overburden model, known as minima. The MN DNR located approximately these wells using the following sources: Minnesota Department of Health CWI online, Mille Lacs County plat maps, 2005 FSA Air Photos, [www.mapquest.com](http://www.mapquest.com), [www.infospace.com](http://www.infospace.com), and Mille Lacs County Parcel Tax data found at <http://morris.state.mn.us/tax/> To approximately locate a well, a combination of these sources were utilized to corroborate a location.

\*Shapefile has related database table found in 'DNR GIS Tabular Data'

^ Shapefile has related database table found in 'MN/DOT GIS Tabular Data'

### **MN DNR GIS Tabular Data (Databases, .dbf)**

{resource\mn\_dnr\tabular}

millsieve.dbf: Database, Mille Lacs County Sieve Analysis Table, 2007.

### **MN DNR GIS Associated Metadata (.html)**

{resource\mn\_dnr\metadata}

*The associated metadata in html format, where "\_att" indicates the fields and attributes in the spatial database*

millpits.html (millpits\_att.html)  
millsgp.html (millsgppy\_att.html)  
millfobs.html(millfobs\_att.html)  
millcsp.html (millcsp\_att.html)  
millmgsbg.html (millmgsbg\_att.html)  
milllobmdl.html (milllobmdl\_att.html)

## **Minnesota Geological Survey (MGS) Data Used in this Study**

{resource\mgs}

### **MGS GIS Spatial Data (Shapefiles, shp)**

{resource\mgs\spatial}

millcwiwells.shp\*\*: Point Features, Mille Lacs County CWI Well Locations, 2005. This dataset consists of the locations of wells (905) drilled within Mille Lacs County that have been field verified by MGS staff. The County Well Index (CWI) is a database that contains information about wells drilled throughout Minnesota. In this case, a subset of the locations were used to look at the geological descriptions of these wells. Approximately 766 of the 905 wells contained geological descriptions that were used in this study. The original CWI file was downloaded from the Minnesota Geological Survey (MGS) in 2005. CWI is web accessible at: <http://www.health.state.mn.us/divs/eh/cwi/>. The shapefile contains a field (doh\_path) that can be hyper linked to the above mentioned web page based on the well's relateid. Hyper linking can be utilized when using ESRI software, ArcView 3.x or ArcGIS 9.x. To note, some wells are not displayed due to either security reasons or have yet to be implemented into the system.

\*\* Shapefile has related database table found in 'MGS GIS Tabular Data'

### **MGS GIS Tabular Data (Databases, dbf)**

**{resource\mgs\tabular}**

millcwistrat.dbf: Database, Mille Lacs County CWI Well Stratigraphy Table, 2005. This is the database of geological descriptions used for this project. This database was extracted from the c4st table in cwidata.mdb and contains the stratigraphy for 766 wells from millcwiwells.shp. The stratigraphy table (millcwistrat.dbf) can be linked (ArcView 3.x) or related (ArcGIS 9.x) to millcwiwells.shp on the field 'relateid'.

millcwiwells\_unloc.dbf:

millcwistrat\_unloc.dbf

### **MGS GIS Associated Metadata (html)**

**{resource\mgs\metadata}**

*The associated metadata in html format, where "\_att" indicates the fields and attributes in the spatial database*

millcwiwells.htm (millcwiwells\_att.htm)

*Includes stratigraphy field and attribute information.*

## **Minnesota Department of Transportation Data (MN/DOT) Used in this Study**

**{resource\mn\_dot}**

### **MN/DOT GIS Spatial Data (Shapefiles, shp)**

**{resource\mn\_dot\spatial}**

millasis0304: MN/DOT Aggregate Source Information System (ASIS) spatial data downloaded in March of 2004. This is the original shapefile that was reviewed and edited in the field for purpose of completing an Aggregate Pit inventory of Mille Lacs County, Minnesota. The updated data for this study can be found in the millpits shapefile under field 'source' attribute 'ASIS'. See milldotqual.dbf below for more details.

### **MN/DOT GIS Tabular Data (Databases, dbf)**

**{resource\mn\_dot\tabular}**

milldotqual.dbf: Database, Mille Lacs County MN/DOT ASIS Quality Table, 2004. This dataset consists of information about the quality of Minnesota Department of Transportation's ASIS gravel pits and aggregate sources extracted and inserted into this database by the Minnesota Department of Natural Resources, Division of Lands and Minerals. Quality information includes soundness, durability, and mineral content. This table summarizes the quality data that is presented on the MN/DOT pit sheets. MN/DOT has specifications that the aggregate must meet to be used for specific jobs. This table summarizes the quality data by averaging the values of the pit and giving the range of values. The data can be joined to millpits.shp using the 'ASIS\_NUMBR' field.

### **MN/DOT GIS Associated Metadata (html & pdf)**

**{resource\mn\_dot\metadata}**

*The associated metadata in html format, where "\_att" indicates the fields and attributes in the spatial database*

milldotqual.html (milldotqual\_att.html)

metasis2003.pdf (Metadata in PDF format for millasis0304.shp)