MINNESOTA GEOSPATIAL INFORMATION OFFICE

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MnGeo USNG 10k Map Notes

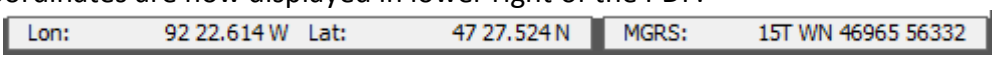
Funded by the Federal Geographic Data Committee via a National Spatial Data Infrastructure Cooperative Agreements Program (CAP) grant in early 2008, the Minnesota Structures Collaborative (MSC) project sought to develop state and local partnerships and the technical capacity for the statewide collection, publication and long term, sustainable maintenance of this data. Local organizations have the most detailed, current knowledge about their communities and potentially have the greatest capacity to provide the needed data.

One accomplishment of the CAP effort was the creation of a statewide geospatial map library of structures based on a 10K USNG grid. These standardized maps can be quickly downloaded by visiting http://www.mngeo.state.mn.us/USNG/maps.html. The following notes describe the process used to create these maps. An experienced ArcMap technician can recreate these products using these notes for reference and downloading the .mxd and shapefiles found on MnGeo's web site.

All maps were created using ArcGIS 10.0. Each map document features a map series that was created using Data Driven Pages and the TerraGo Publisher Extension version 6.0.2.40. There are a total of 7 map documents, one each for the USNG zones and their boundaries.

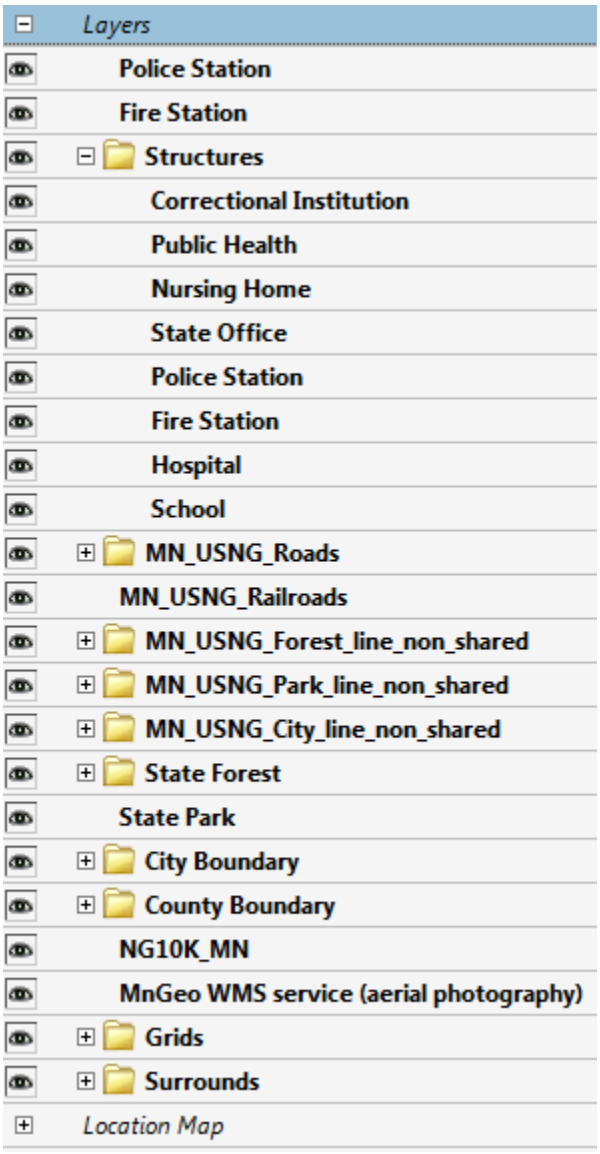
Update – 9/18/12:

The maps are now spatially enabled and the structure layers have attributes (name and address), i.e. they are now GeoPDF maps. The information provided below covers the functionality of Acrobat X (version 10) and TerraGo Tool v6.

- Map coordinates are now displayed in lower right of the PDF.
  - 

- Standard Acrobat Tools
  - Layers – left side of Acrobat window
    - 
    - List of layers

- Note: Police station and fire station have two layers. When these structures were in the same location, one location was shifted so both are visible.



-
  - Object Data Tool can be used to select and view structure attributes – right side of window at Extended > Extended Features > Analyze
    - 

  - Model Tree – left side of window – displays the results of the Object Data Tool
    - 
    - Structures Available (sample) – Top of Model Tree panel

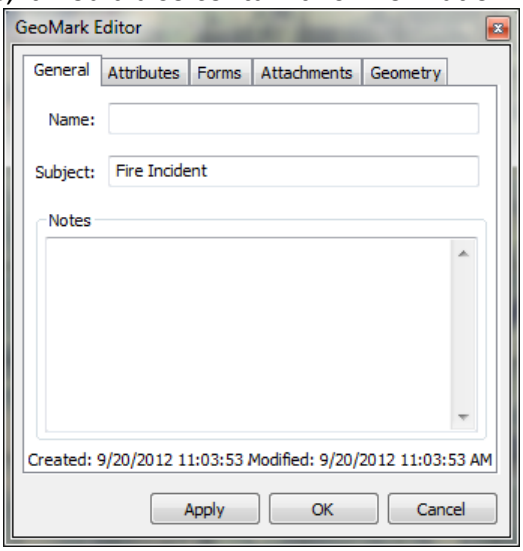
School : Nelle Shean Elem
Fire Station : BIWABIK TOWNSHIP VOLUNTEER FIRE DEPARTMENT
Fire Station : LAKELAND VOLUNTEER FIRE DEPARTMENT
Police Station : BIWABIK TOWNSHIP POLICE DEPARTMENT
State Office : DNR OHV Rec Area
Fire Station : GILBERT FIRE DEPARTMENT
Police Station : GILBERT POLICE DEPARTMENT

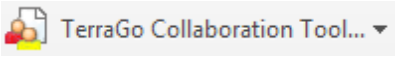
- Selected Structure (sample) – Bottom of Model Tree panel

Property	Value
name	LAKELAND VOLUNTEER FIRE DEPARTMENT
address	4667 VERMILION TRAIL
city	GILBERT
state	MN
zip	55741
NEAR_SHIFT	No

- Find will search text and structure attributes – Edit > Find (Ctrl + F)
- Adding TerraGo's toolbar (http://www.terragotech.com/products/terrago-toolbar/register) will add more functionality.
  - GeoPDF
    - GeoTool
    - GeoLocator
    - GeoMeasure – Length or Area
      - GeoMeasure - Measures Le...
    - GeoTrack – Start GPS Track or Hide Flag
      - GeoTrack - Displays the Cu...
  - GeoMark
    - Note: GeoMarks can be exported as a shapefile
    - GeoNote
    - GeoRectangle
    - GeoLine
    - GeoPolyLine
    - GeoPolygon
    - GeoStamp
      - Add GeoStamp

- Categories
  - Incidents
  - Infrastructures
  - Natural Events
  - Operations (Black)
  - Operations (Red)

- GeoMark Editor – This window is used to add attributes to the GeoMarks listed above. If a shapefile is created as part of the process, it would also contain this information.
  - 

- TerraGo Collaboration Tool
  - 

This is not meant to be a complete tutorial. TerraGo does webinars which cover a variety of subjects (http://www.terragotech.com/news-and-events/webinars).

Update – 3/11/11:

The ESRI Map Documents (MXDs), data and this document were prepared for public release. Please note:

- The MXDs data paths were change to relative paths, i.e. they will not need repairing as long as the data and MXDs are in the same directory.
- All data was converted to shapefiles.
- Cap Structures Grant data attributes were simplified for release.

The correct MXD is critical to ensure that the information will be displayed properly.

MAPS

Map List:

1. **10KMBOOK_10_14.mxd** = Grid zone 14.
2. **10KMBOOK_10_15.mxd** = Grid zone 15.
3. **10KMBOOK_10_16.mxd** = Grid zone 16.
4. **10KMBOOK_10_GZ_14_hz.mxd** = Horizontal grid zone boundary for 14.
5. **10KMBOOK_10_GZ_14_vt.mxd** = Vertical grid zone boundary for 14.
6. **10KMBOOk_10_GZ_15_hz.mxd** = Horizontal grid zone boundary for 15.
7. **10KMBOOK_10_GZ_15_vt.mxd** = Vertical grid zone boundary for 15.
8. **10KMBOOK_10_GZ_16_hz.mxd** = Horizontal grid zone boundary for 16.
9. **10KMBOOK_10_GZ_16_vt.mxd** = Vertical grid zone boundary for 16.

Note: You will need to recreate the map series. Each map contains a map book that was developed with Data Driven Pages. These maps can be accessed by clicking on the Data Driven Pages toolbar. If the toolbar is not present, it can be added Customize > Toolbars > Data Driven Pages.

DATA

Each map contains a NG10K layer with the field 'NG' which is used to drive the respective map books.

Note: All USNG layers including the pseudo polygons for the grid zone boundaries were developed by Randy Knippel and renamed for the structures project. For issues and updates to these files please contact Randy Knippel, Dakota County, Minnesota at randy.knippel@co.dakota.mn.us or 952-891-7080.

USNG Features:

1. **MN_USNG_10K_14** used in 10KMBOOK_10_14.mxd.
2. **MN_USNG_10K_15** used in 10KMBOOK_10_15.mxd.
3. **MN_USNG_10K_16** used in 10KMBOOK_10_16.mxd.
4. **NG10K_pseudo_14_horizontal** used in 10KMBOOK_10_GZ_14_hz.mxd.
5. **NG10K_pseudo_14_vert** used in 10KMBOOK_10_GZ_14_vert.mxd.
6. **NG10K_pseudo_15_horizontal** used in 10KMBOOK_10_GZ_15_hz.mxd.
7. **NG10K_pseudo_15_vert** used in 10KMBOOK_10_GZ_15_vert.mxd.

In addition to the USNG data driving the map books, there are 7 layers in the mxd's containing the CAP Structures data.

Files:

1. MN_USNG_Police_12_11.shp labeled as Police Station in the mxd's.
2. MN_USNG_Firestation12.shp labeled as Fire Station in the mxd's.
3. MN_USNG_CorrInst_11_07 labeled as Correctional Institution in the mxd's.
4. MN_USNG_PubHealth_09_10 labeled as Public Health in the mxd's.
5. MN_USNG_NursingHomes labeled as Nursing Home in the mxd's.
6. MN_USNG_Hospitals12.shp labeled as Hospital in the mxd's.
7. MN_USNG_Schools12.shp labeled as School in the mxd's.

The police and school data required some preprocessing before it could be used.

Police:

- Selection query.
- Only records with a code of 922120 were used for the structures project.

School:

- Selection query per Joella Givens, Mn/DOT
- Only records where sch_class_mde =
    - 10 - Elem (PK-6)
      20 - Midd (5-8)
      31 - Junior high (7-8 or 7-9)
      32 - Senior high (9-12)
      33 - Secondary (7-12)
      40 - K-12
      80 - Technical Colleges (PSEO)
      81 - Post Secondary School / Program
      82 - Community and Adult Education Program
- Also all schools where sch_name = 'School District Office' were removed.

In addition to the structures data, there are several basemap layers in the mxd's. Many of these are self explanatory, but some require a more detailed description.

Roads:

- **MN_USNG_Roads.shp**
- In the mxd's this layer has custom symbology.
- Code:
    - 01 = Interstate
    - 02 = U.S. Highway

  - 03 = State Highway
  - 04 = County Road
  - 07 = County Road
  - 22= Interchange
- Also custom labels utilizing the MN Highway Shield symbols.
  - These symbols were downloaded here: http://arcscripts.esri.com/details.asp?dbid=11884
  - Downloaded them and added to my font library.
- For exact specifications on symbology and labeling (color, width, font, etc…) examine the Layer Properties of the roads layer in the mxd's.

City Boundaries:

- Original file mnctu09.shp copied to above directory.
- SQL query "CTU_TYPE" = 'city'.
- Result = **MN_USNG_City.shp**
- New file contained only city boundaries.
- Needed to label city boundaries along the edge.
- Issue W/ Maplex labeling engine.
  - When trying to label a polygon shapefile along the boundary using Maplex, polygons are not labeled where there is no adjoining polygon.
- Developed workaround.
  - Converted polygon layer to polyline using Polygon To Line tool (Data Management).
  - This tool inserts a LEFT_ID and RIGHT_ID field.
  - Used SQL query on attributes to select LEFT_ID = -1 (This selected all lines that don't adjoin.)
  - Exported selected features as a new shapefile.
  - Joined new shapefile to original polygon shapefile. (RID =FID in old file)
  - Exported joined shapefile (now containing attributes from polygon) as a new shapefile.
  - Labeled lines and symbolized them as no color.
  - **MN_USNG_City_line_non_shared.shp**
- Both shapefiles are used in the map.
- **MN_USNG_City.shp** labeled as City Boundary in mxd's.
- For exact specifications on symbology and labeling (color, width, font, etc…) examine the Layer Properties of both layers in the mxd's.

State Forests and Parks:

- Used same workaround as city boundaries to label.
- **MN_USNG_Forest.shp** labeled as State Forest in mxd's.
- **MN_USNG_Park.shp** labeled as State Park in mxd's.

- For exact specifications on symbology and labeling (color, width, font, etc…) examine the Layer Properties of all 4 layers' in the mxd's.

Shields:

- In each mxd is a series of 4 shield files used specifically for the map legend.
- Data source: **shield.shp**.
- Each file is symbolized with the appropriate marker symbol.
- Symbols were added separately to the maps as legends and grouped with the existing map legends.
- See mxd's as it is easy to figure out.
    - Legend_Shield_1
    - Legend_Shield_2
    - Legend_Shield_3
    - Legend_Shield_4

MSC DATA UPDATES

The hope is that each time the CAP structures data undergoes a major update; the 10K map books will be re-generated. Only the CAP data will have to be updated. The USNG layer driving the map book and all the base map data will not need to be touched. I recommend a three step approach to re-generating the maps after a new CAP data update.

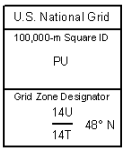
1. Put the new CAP data into the folders listed above keeping the same names and adding the new date.
2. Open the mxd's individually and re-point the respective layers to the new data sources.
3. Third, export the maps with the new data. The TerraGo Publisher extension was used to export the maps to PDF.

The same dynamic text elements appear in each mxd. These text elements will have to be replaced if the USNG layers used to drive the map books are ever changed.

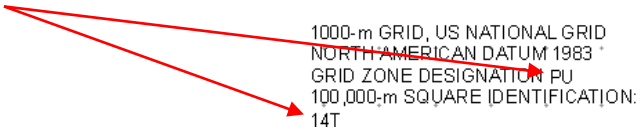
- Element 1 - 10K designator. Driven by a 10K text field in each separate USNG layer.

PU81

- Element 2 – Grid box. Driven by several fields in each separate USNG layer. Examine USNG layer before editing.



- Element 3 – In Text.



- Element 4 – Prepared By text: Driven by Date/Time option in dynamic text editor.

Prepared By: MnGeo, January 05, 2010

If you have any questions regarding these notes, the data or .mxds, contact:

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For more information regarding the Minnesota Structures Collaborative, visit:

http://www.mngeo.state.mn.us/committee/emprep/structures/index.html

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