

## **Electronic Geospatial Data Format and Submission Guidance for DNRE Grantees and Contractors**

The Michigan Department of Natural Resources and Environment (MDNRE) requests that all contractors and consultants working on DNRE projects that require geo-spatial product deliverables follow the data format and related requirements described below. These requirements also apply to electronic copies of the data, text, tables, and figures included in reports. This includes but is not limited to base maps, graphics and figures in GIS or CAD formats, raster data, tabular data in a spreadsheet, database, or ASCII format, or data and output using specialized analytical software.

Federal Geographic Data Committee (FGDC) compliant metadata should accompany data sets to the extent possible (see <http://www.fgdc.gov/metadata>). Certain DNRE program areas may have more specific requirements. The DNRE must be able to open, edit and save electronic files. Alternative formats and media require prior written approval of the DNRE. Adherence to these data formats and standards will allow DNRE staff and the public to re-use the contracted deliverables using common GIS and database software. These electronic data submittals will be standard practice along with submitting hard copy reports to DNRE and does not eliminate the requirement to provide hard copies of reports to the DNRE.

### **Basemap and Report Figure Data**

Data will preferably be submitted in a recognized GIS format, namely the ESRI shapefile format as opposed to CAD file format. If the contractors or consultants works in a CAD environment, submit the CAD base map and figures in either DWG and DXF or DGN and DXF file formats. Data in CAD file formats should include as much attribute data as possible as to what each CAD feature is, what it is named, availability of a geographic reference point (i.e., point of origin), etc.

Georeferenced raster images (for instance aerial photos) should be submitted in TIFF, GEOTIFF, or MrSID image file formats with the associated world files. Appropriate metadata should be provided with all files, such as the source for the raster images, dates of aerial photography and the type of the imagery, color bands (i.e., black & white, color, color infra-red), ortho-rectification, positional accuracy, flight elevation, resolution, scale, etc.

Michigan State government and the DNRE in general uses the Michigan GeoRef coordinate system, North American Datum 1983 (NAD 1983), in meters. Submit all GIS base map data in Michigan GeoRef coordinates if possible. For more information on the Michigan GeoRef coordinate system:

[http://www.michigan.gov/documents/DNR\\_Map\\_Proj\\_and\\_MI\\_Georef\\_Info\\_20889\\_7.pdf](http://www.michigan.gov/documents/DNR_Map_Proj_and_MI_Georef_Info_20889_7.pdf)

If the data must be submitted in a coordinate system other than MI GeoRef, supply the coordinate system name, datum, units, and another accessory information that will accurately describe the coordinate system (zones if UTM or State Plane). If the CAD file is in a local coordinate system, state what the point of origin is.

Often DNRE contractors or consultants create working base maps or figures (for example cross-sections) in a GIS, CAD or some other file format and produce final report figures in the Portable Document File (PDF) or some other common format image format. In these cases, send the report figures and maps electronically in addition to the original GIS/CAD files.

### **Method of Base Map Construction**

Describe the method of base map construction if known and the level of accuracy. State whether it was constructed from tracing an aerial photo, standard land survey techniques, global positioning system techniques or some other method. Include the positional accuracy of the source material or tools and instruments used (i.e., 7.5' USGS topographic map, survey or recreational grade GPS, etc.).

### **Latitude and Longitude Requirements**

Contractors and consultants building databases with latitude and longitude coordinate fields or submitting tabular data for incorporation into a DNRE database, must also include the mandatory metadata fields. For more information on latitude and longitude data requirements see: [http://www.epa.gov/edr/LatLongStandard\\_08112006.pdf](http://www.epa.gov/edr/LatLongStandard_08112006.pdf)

### **Tabular Data and Database**

Tabular data in reports often include summaries of laboratory analytical data, water level elevation data, monitor well construction data, well and boring X and Y location data (local and or projected coordinates), grain size analysis data, hydraulic conductivity data, etc. This data is often in an electronic spreadsheet or database format. Submit tabular data in either a Microsoft Excel or Microsoft Access database format or both if both are used.

Many software programs can export a file to an Excel format. If that does not work, supply data in a standard file format that can be read in Excel including ASCII text files (tab, comma, space delimited), and .dbf.

### **Text of Reports**

Printed Reports are to include electronic copies of the report text and tables. Text of the electronic files is to be in Microsoft Word DOC format. Adobe Acrobat PDF files are acceptable if they were created from a non-graphic source.

### **Specialized Analytical Software Data**

Many DNRE contractors and consultants use specialized software to gather, analyze and interpret data. These may include, but not be limited to, boring and well construction logs, downhole geophysical logs, groundwater and surface modeling, aquifer pumping test data, statistical analysis data etc. This data should also be submitted electronically upon request along with a description of which software package and version used.

### **Media**

The electronic data can be transmitted to DNRE in the following formats in order of preference:

- 1) CD ROM (CD-R)
- 2) Compressed or uncompressed e-mail attachments (15 MB size limit) to the DNRE project manager
- 3) DNRE FTP site. Instructions will be sent as/if needed.
- 4) DVD-R (DVD-R or DVD+R)

For further information about these standards, please contact either your DNRE project or grant manager, or John Esch at [eschj@michigan.gov](mailto:eschj@michigan.gov) and 517-241-1534.