

# DIGITAL MAPPING TECHNIQUES 2014

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See Presentations and Proceedings  
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<http://ngmdb.usgs.gov/info/dmt/>

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# Extracting GIS data from US Topo PDFs using Adobe Illustrator with Avenza MAPublisher

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Digital Mapping Techniques



2014



Association of  
American State Geologists

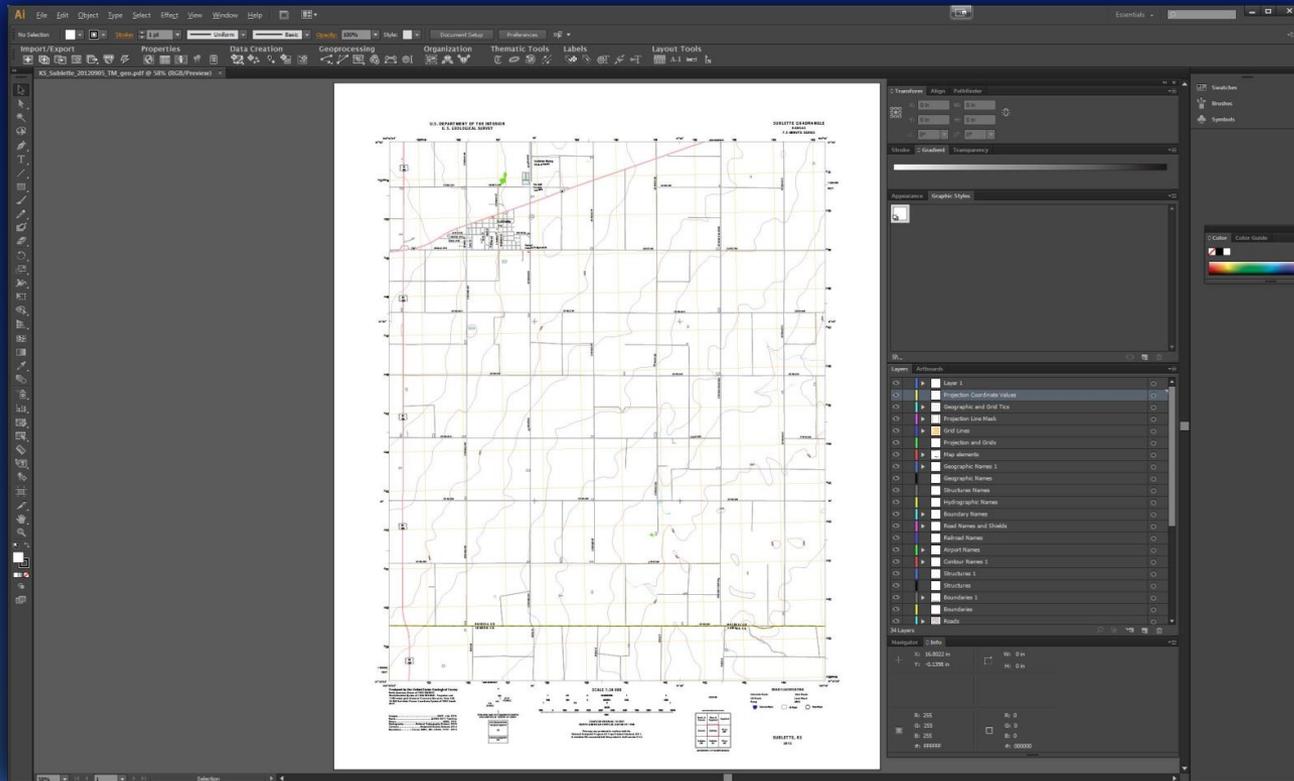
United States  
Geological Survey

# Background

- The new USGS US Topo PDFs provide a wealth of geospatial data that may be of use as base layers in geologic mapping;
- That data will not, however, be directly accessible in GIS format until release of the US Topo GIS Packets;
- The Avenza MAPublisher extension to Adobe Illustrator provides a way to export US Topo layers to either GIS data (Esri shapefile or exchange formats) or to other formats that may be converted to GIS data, depending on the layer:
  - Available export formats include:
    - AutoCAD drawing (.dwg) and drawing/exchange (.dxf);
    - Delimited XY text data (.csv);
    - Esri ArcINFO generate (.gen), interchange (.e00), and shapefile (.shp);
    - Geography Markup Language (.gml, .xml);
    - Google Earth (.kml, .kmz);
    - MapInfo Interchange Format (.mif) and Table (.tab)

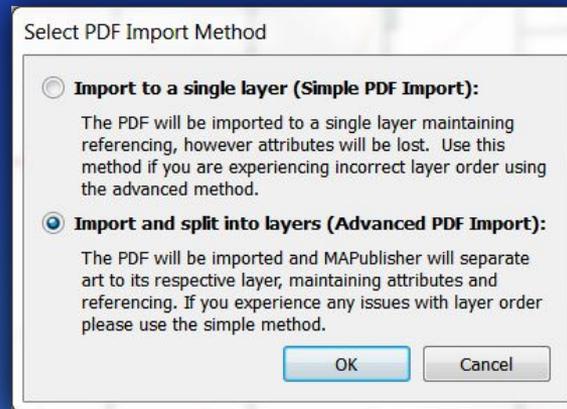
# Software

Compatible version of Adobe Illustrator with the  
MAPublisher extension (current version – 9.4;  
[www.avenza.com](http://www.avenza.com))



# Steps

- Open the US Topo PDF in Illustrator – before it opens, you will be presented with options that must be selected for the layers to be exportable as GIS data;
  - On import, the PDF must be split into layers:



# Steps

- Each layer is then assigned a feature type and map view. Map data you want to export to GIS are set to the appropriate feature types and “map layers” for the map view:

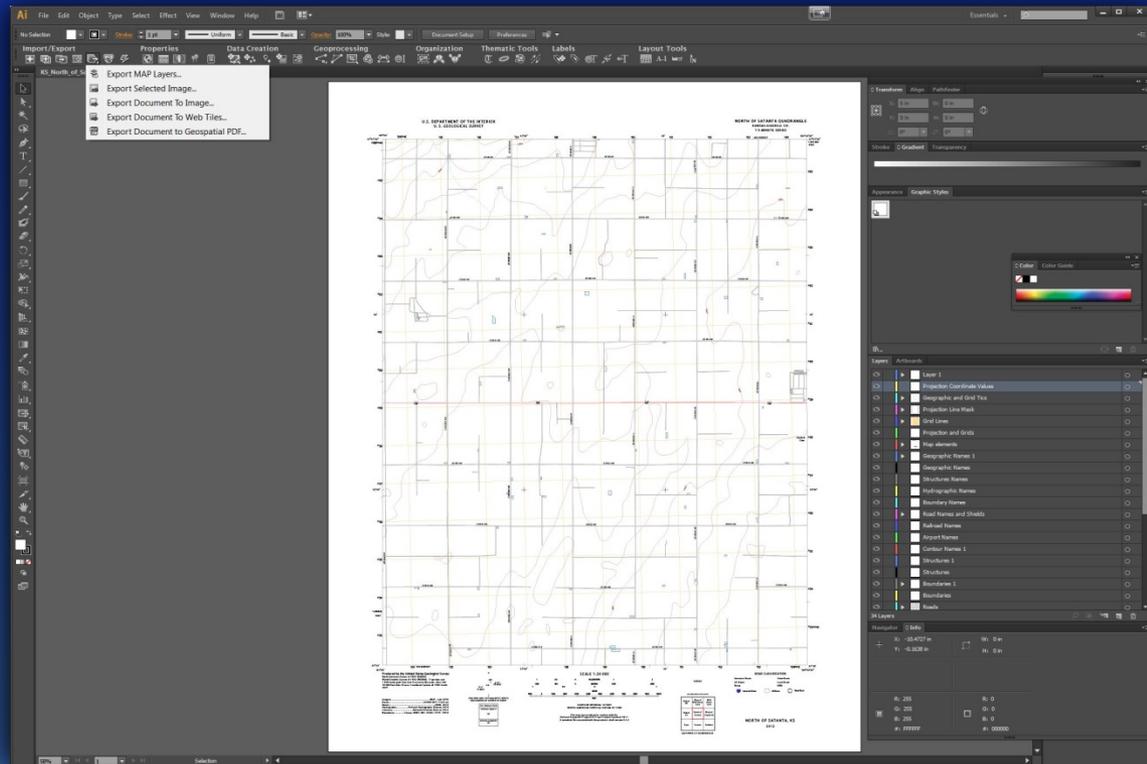
Layer Assignment

	Layer	Feature Type	MAP View
✓	Projection Coordinate Values	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Projection and Grids	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Geographic Names	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Railroad Names	Text	Map Layers
✓	Roads	Line	Map Layers
✓	Road Names and Shields	Text	Map Layers
✓	Transportation Names	Text	Map Layers
✓	Boundaries	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Boundary Names	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Boundaries	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Hydrographic Features	<Auto-detect>	Map Layers
✓	Hydrographic Names	Text	Map Layers
✓	Hydrography	<Auto-detect>	Map Layers
✓	Structures	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Structures Names	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Structures	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Geographic Names	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Map Collar	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Projection Line Mask	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Geographic and Grid Tics	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Map Frame	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Map elements	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Grid Lines	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Railroads	Line	Map Layers
✓	Airport Names	Text	Map Layers
✓	Airports	<Auto-detect>	Map Layers
✓	Contour Names	Text	Map Layers
✓	Contour Names	Text	Map Layers
✓	Contour Features	Line	Map Layers
✓	Land Cover	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Woodland	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Images	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]
✓	Orthoimage	<Auto-detect>	<input checked="" type="checkbox"/> [Non-MAP Layers]

OK  
Use Default

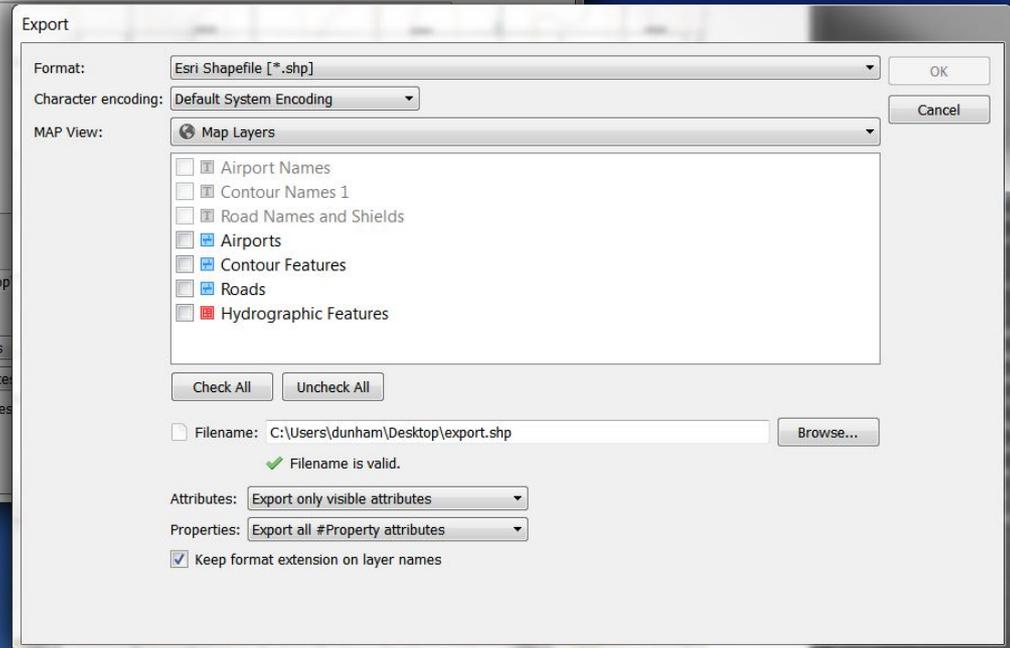
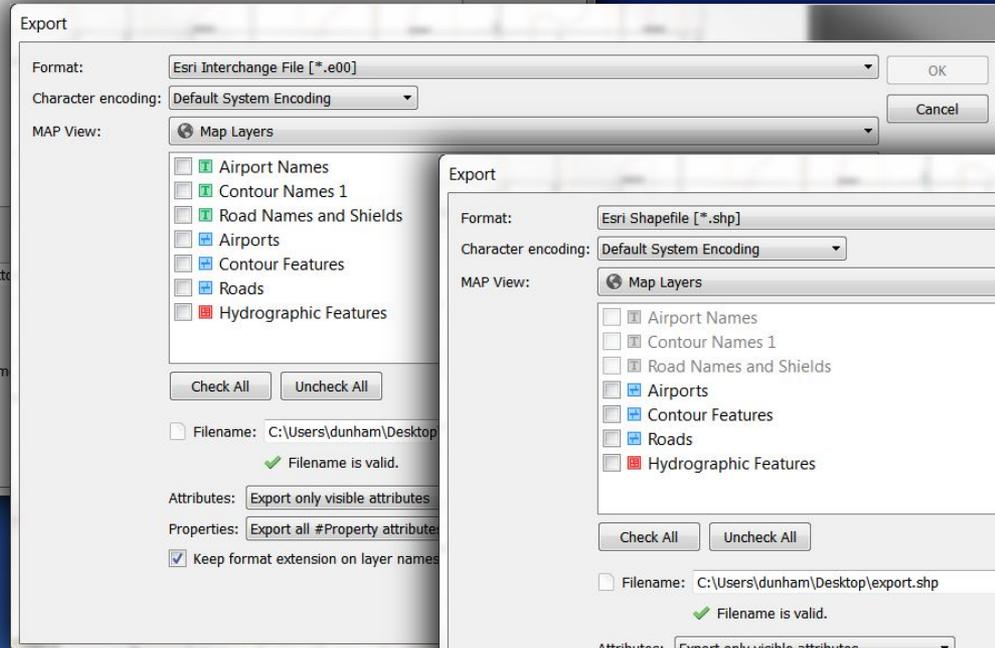
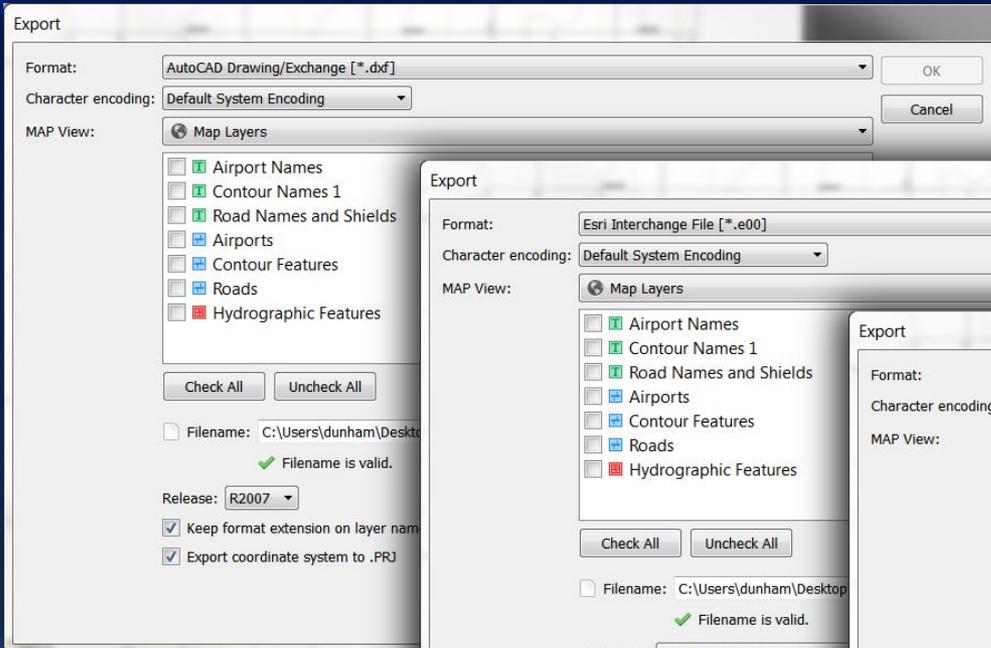
# Steps

- The PDF will display in Illustrator as a normal PDF. You can then begin exporting layers as GIS data;
- Many other things can also be done with the map in this state, including import of GIS data INTO this map.



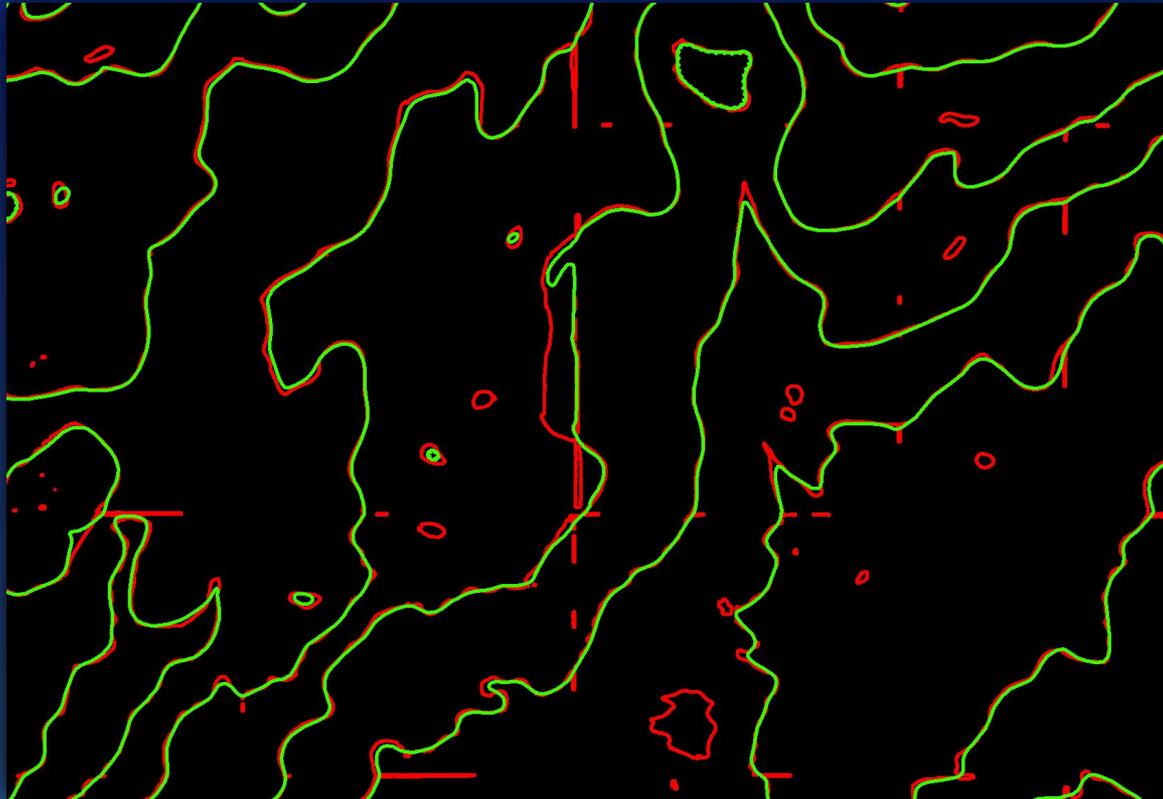
# Steps

- When exporting map layers, MAPublisher gives export options based on the characteristics of the layer, as shown below in the comparison of layer export to different formats;



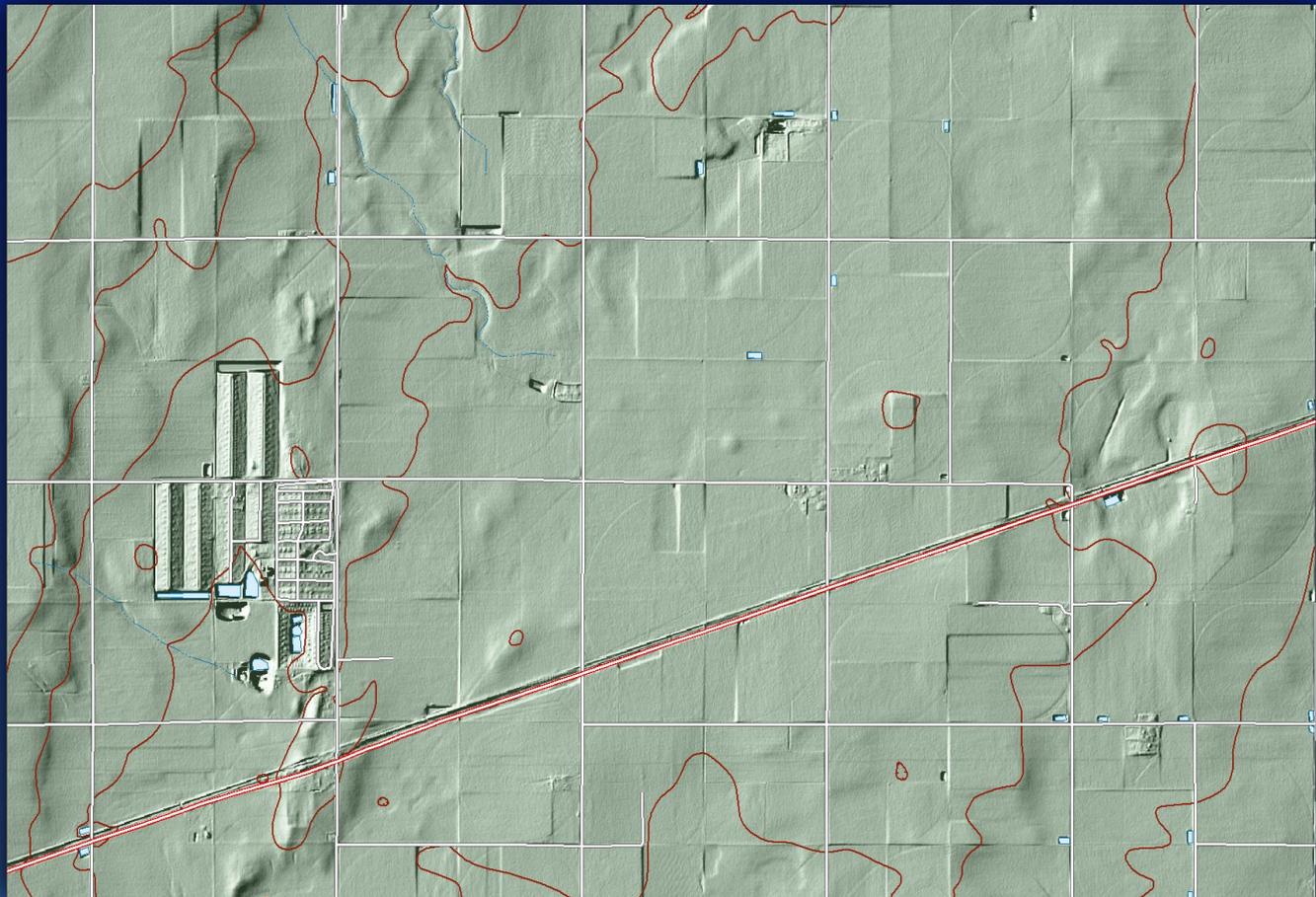
# Output data examples

Comparison of the contours exported from US Topo (green) with USGS' recently-released (<http://pubs.usgs.gov/sir/2012/5167/sir2012-5167.pdf>) 10-ft contours of the same portion of the Copeland, KS quadrangle (red).



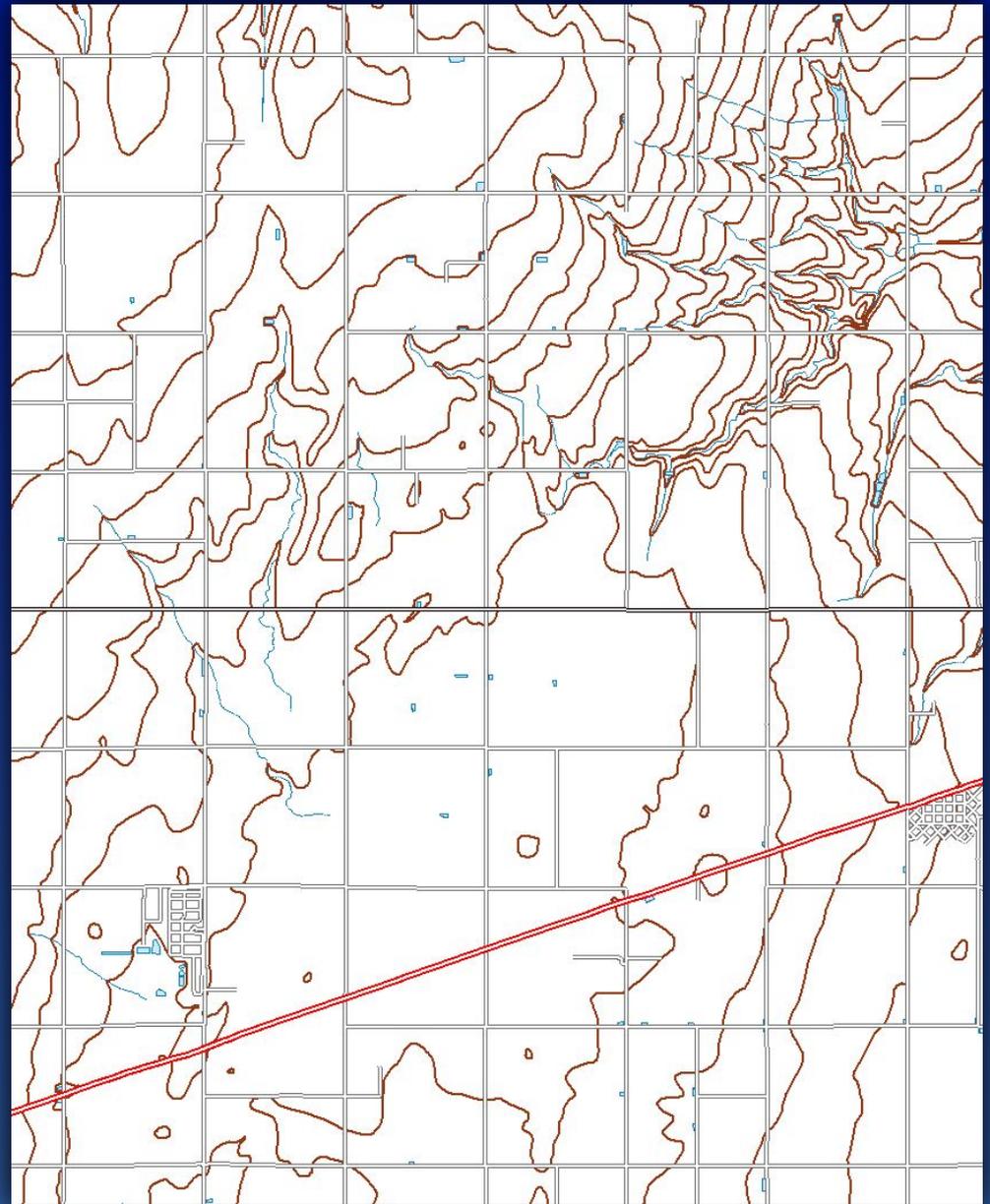
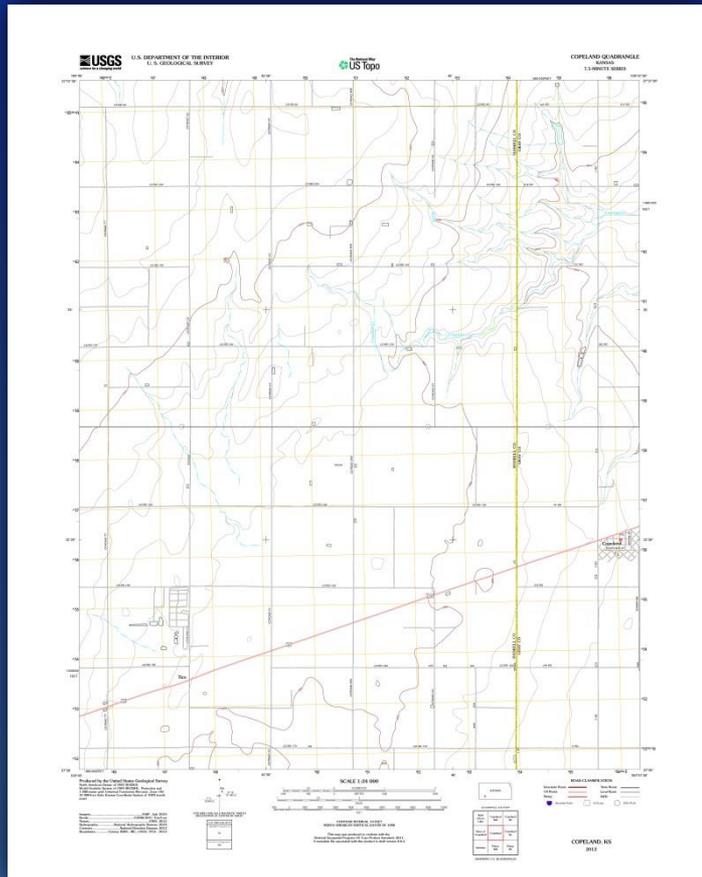
# Output data examples

The contours, roads, and hydrography match well with a 5m LiDAR hillshade generated from a 1m LiDAR DEM.



# Output data examples

Contour, road, and hydrography data for the Copeland, KS quadrangle.



# Limitations

This methodology provides a way to extract GIS data from the new US Topo maps in the absence of available data from USGS. However, the exported data may only be of use in map compositions without extra work:

- The exported GIS data contain no traditional attributes such as contour elevation values, road names, or stream names;
- Exported data layers are WYSIWYG. For example, exported linear hydrographic features are exported to GIS exactly as they appear on the map - an intermittent stream symbolized by a dashed line will be exported as many short line segments;
- Depending on the layer's properties, it may still require cleanup in GIS, even for graphics use.

# Questions?

