DIGITAL MAPPING TECHNIQUES 2014

The following was presented at DMT ‘14
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The contents of this document are provisional

See Presentations and Proceedings from the DMT Meetings (1997-2014)

http://ngmdb.usgs.gov/info/dmt/
Ohio Karst

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Outline

- What is karst
- Methods
- Field + Photos
What is Karst

- Forms by dissolution of
  - Carbonates (limestone or dolomite)
  - Evaporites (gypsum or salt)

- Characterized by:
  - Sinkholes
  - Disappearing streams
  - Caves
  - Springs
Methods

- LiDAR (Light Distance And Ranging)
  - 2006 @ 0.5ft vertical accuracy (OSIP)
  - DEM mosaicing
  - ‘Fill Sinks’
  - Create grid code

- Imagery
  - 2012 and older @ 6in per-pixel OSIP II.
- Clip the LiDAR to the project extent.
- Mosaic to new raster (in parts) 16bit+-, 1band.
Loss of Contrast (If Using DEM)

- Symbology -> Stretched -> Statistics -> From Current Display Extent.
- Shows full ramp when zoomed in.
Removes low enclosed areas.
Subtract the filled from the unfilled (ID lows).
Reclassify (spatial analyst) using a gridcode.
Convert .grid to .shp to allow editing (raster to polygon).
Assign a custom color ramp to gridcode.
Cleaning Up

- Begin Removing Polygons (especially 1ft)
- Adjust transparency (60%)
Features such as ground roughness, ditches, and waves on bodies of water contribute hundreds of thousands of tiny polygons. How to delete these isolated pocks without affecting the larger groups of polygons?
‘Automated’ removal

- Select polys smaller than area 6.25 (res. is 2.5²).
- Export small polys to a file and delete from main set (after backup). Save.
- Start editing small polys.
- ‘Select by location’ small polys set that intersects the main set (sans small polys).
- Switch selection, delete selection, save.
- Right click main feature class -> load -> load data (choose small polys feature class).
- Consider deleting Grid code 1 polys this way.
1988  Photos can monitor growth over time
2006 - Photos can monitor growth over time
Field Verification

- Stream bank/ water reflections
- Culverts/ bridges
- Storm drains
- Foundations
Non Karst Lows

- Quarries and stream channels.
Known and Probable Karst in Ohio

revised 5-2007

Delaware
Sink mapped in 2011
Sink revisited in 2014
Known and Probable Karst in Ohio

revised 5-2007

Bellevue
Urban development
Infrastructure
Groundwater contamination
Drainage and erosion
Diagonal sink
Sink from field
Trash filled
Trash in sink throat
Deer bones
Clean sink
Diagonal Sink

- Large recent collapse near a house.
- Many sinks in this field.
Bellevue South statistics

- 937 total points of interest (502 left to check)
- 159 Confirmed sinkholes
- 180 Suspect visited points
- 96 Suspect Not Visited (poor LiDAR/aerial)
- 412 photos

- Many rock or concrete filled sinks
- Many stand pipes (more than elsewhere)
- Some trash filled (less than other areas)