GISSIG LiDAR

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The main topics that will be covered

- What is LiDAR?
- Using LiDAR
- Limitations of LiDAR
- Future Projects for the LiDAR

What is LiDAR

- LiDAR Stands for Light Detection And Ranging
- LiDAR was first developed in the late 1960s and was not fully commercialized until the early 1990s

Uses of LiDAR

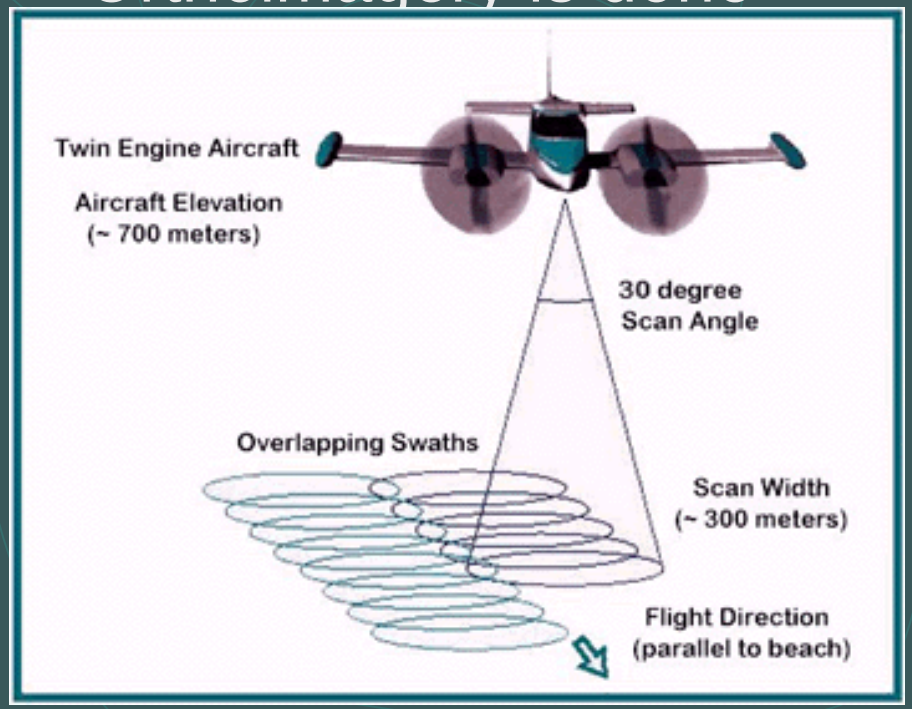
- LIDAR data can be used for the following applications
  - Measure distance or elevation
  - Measure speed
  - Measure rotation
  - Measure chemical composition and concentration
  - Remote sensing applications

LiDAR Sensors

- There are a few types of LiDAR Sensors
  - Standard Geographic (Aerial)
  - Water Penetrating (Aerial)
  - Land Based
    - For Speed Control
    - 3D Scanning of Objects
    - Chemical Analysis from a distance

How is Geographic LiDAR collected

- LiDAR is collected much the same way Orthoimagery is done



LiDAR Collection Continued

- As the plane flies over a surface a Infrared beam is emitted from the sensor to the ground
- Elevations can be calculated based on the echo of the beam off of the ground
- Also because different surfaces absorb IR wavelengths differently the return will have a change in intensity which can be used to identify surface type or chemical composition

What does LiDAR Data look Like

- LiDAR data is comprised of 4 attributes
  - X
  - Y
  - Elevation
  - Intensity

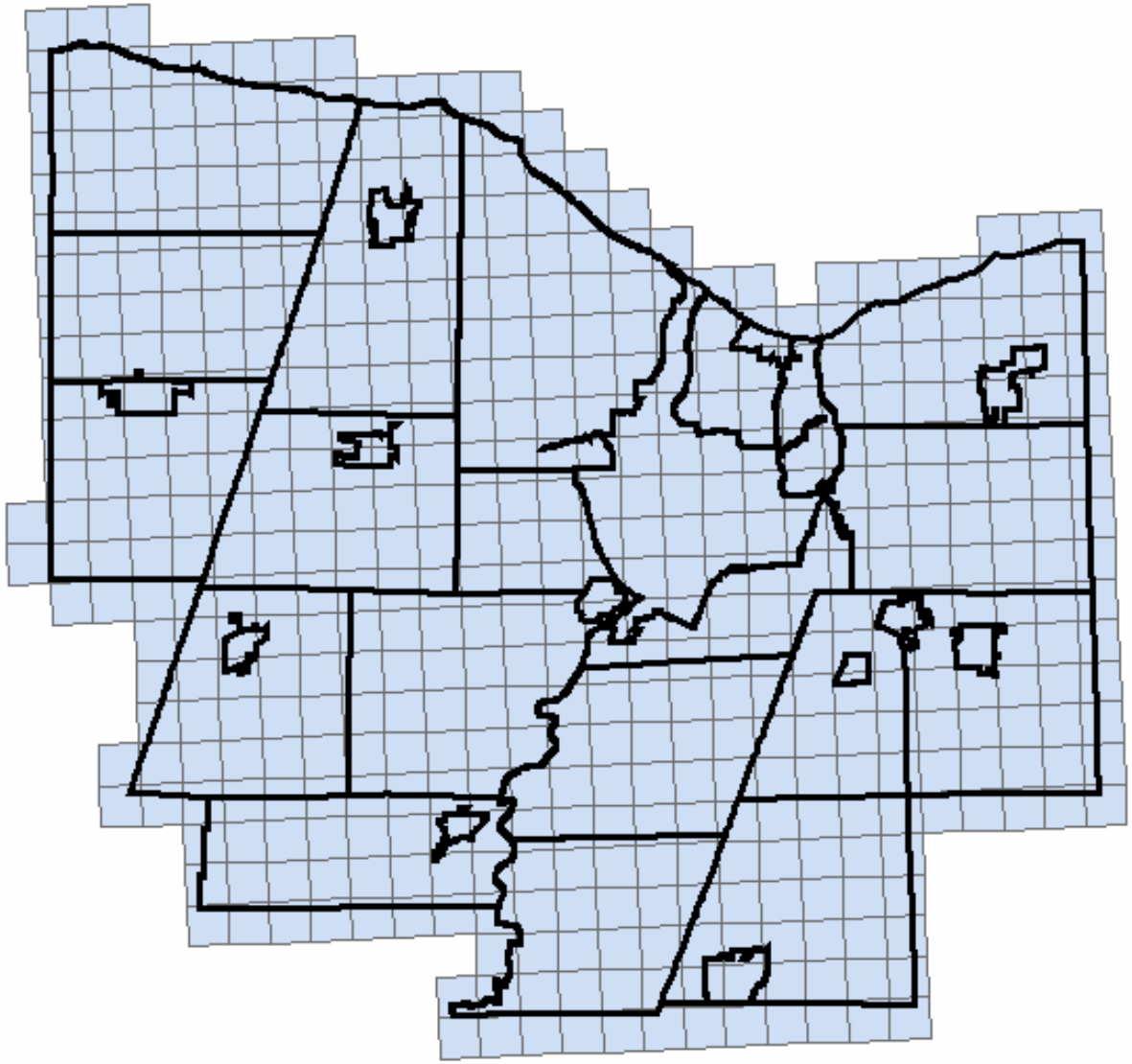
What does the derivable look like

EASTING	NORTHING	ELEVATION	INTENSITY
1355800.01000000000	1127581.62999999000	561.84000000000	66
1355800.02000000000	1125511.54000000000	534.51000000000	56
1355800.02000000000	1125728.90999999000	546.26000000000	48
1355800.02000000000	1127122.34000000000	563.89000000000	70
1355800.03000000000	1126544.83000000000	564.99000000000	53
1355800.04000000000	1125108.12999999000	532.59000000000	21
1355800.04000000000	1125284.62000000000	534.08000000000	29
1355800.04000000000	1125836.62000000000	549.45000000000	36

The average size of one of these tables are 13 Million records

How Monroe County is Currently Using LiDAR

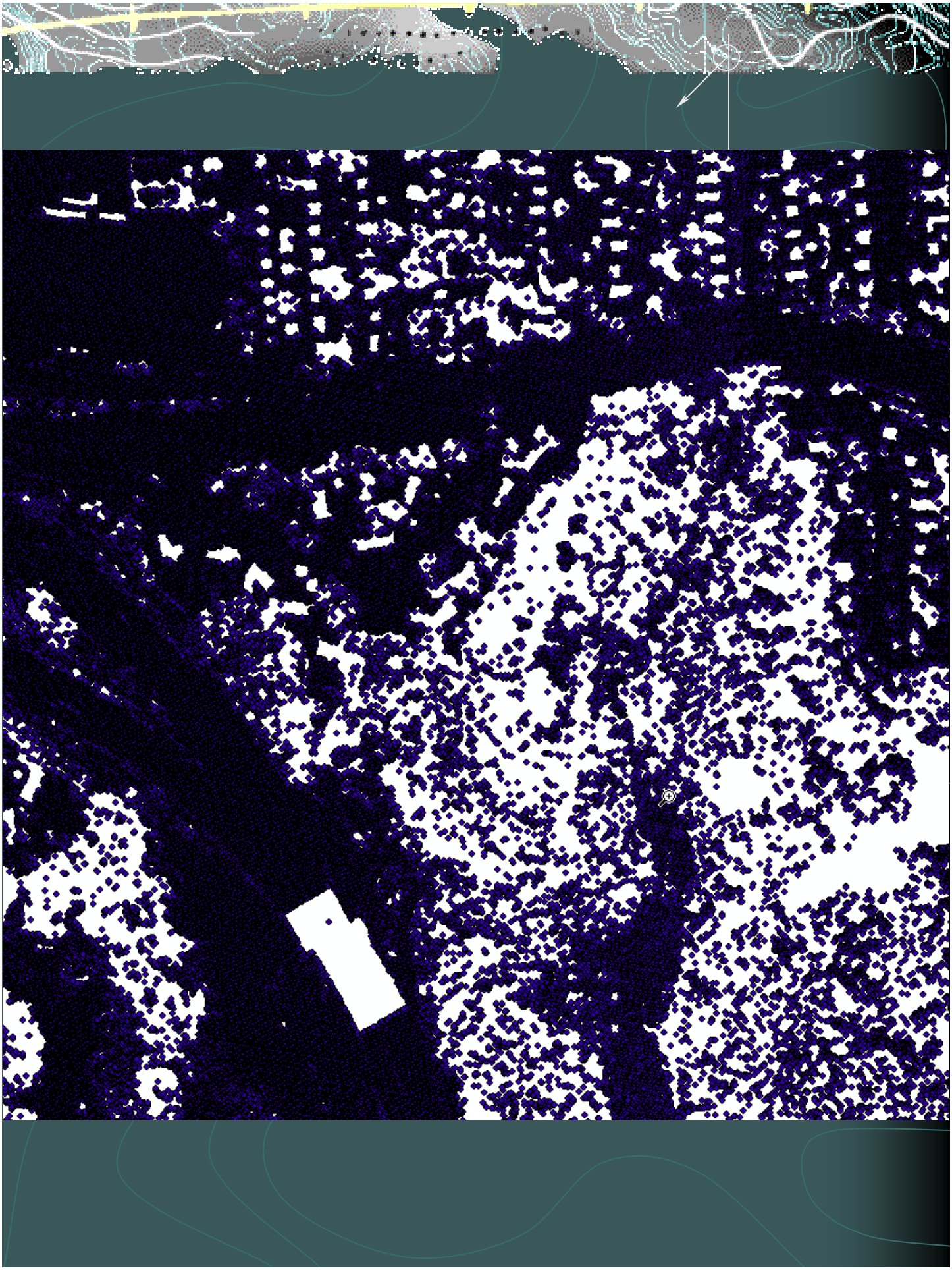
- Current Conversion Methods
- Contours
- 3D Models



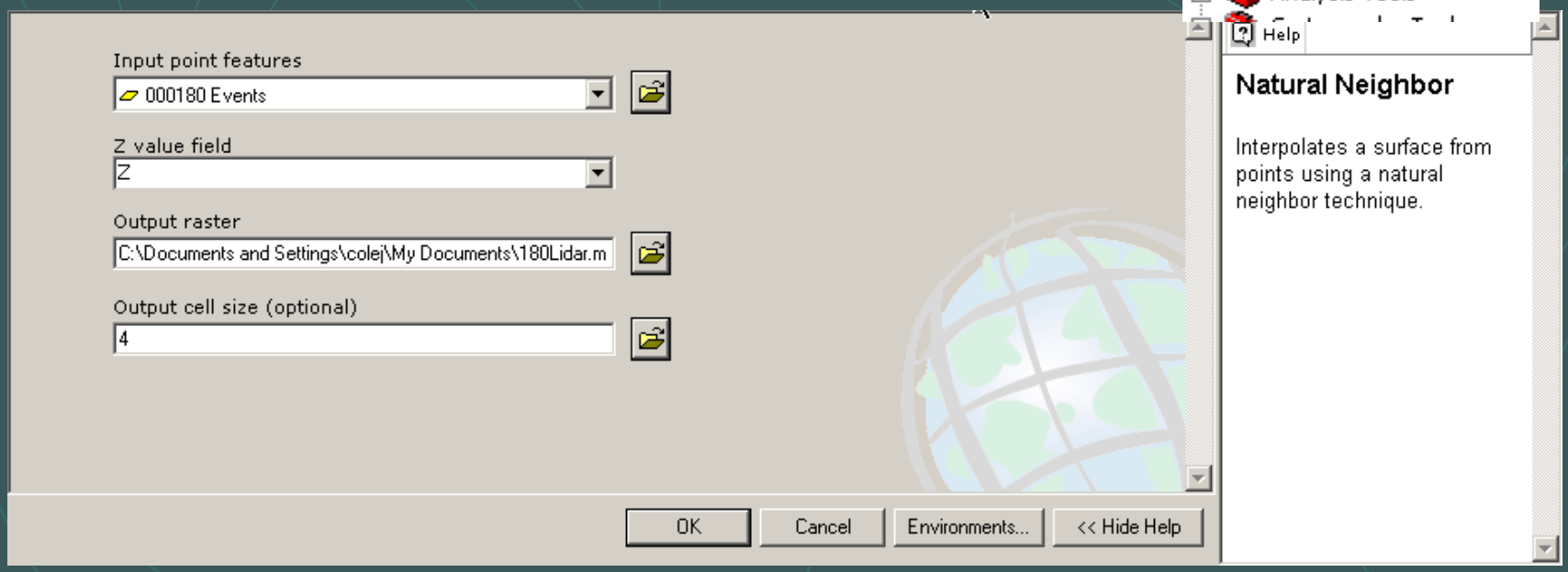
Monroe County is broken down to 509 tiles each comprising just over 1.5 square miles

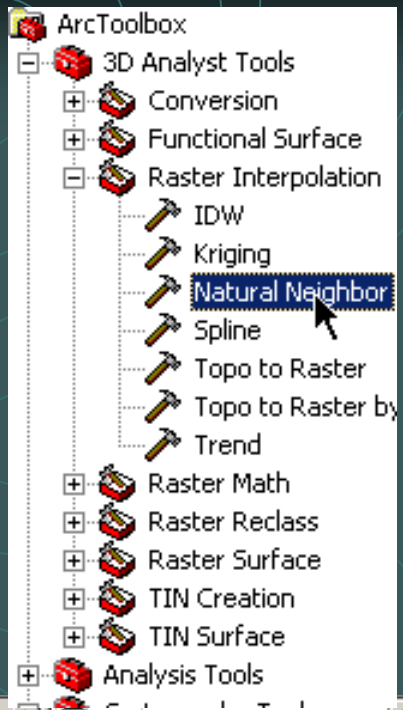
Current Conversion Method

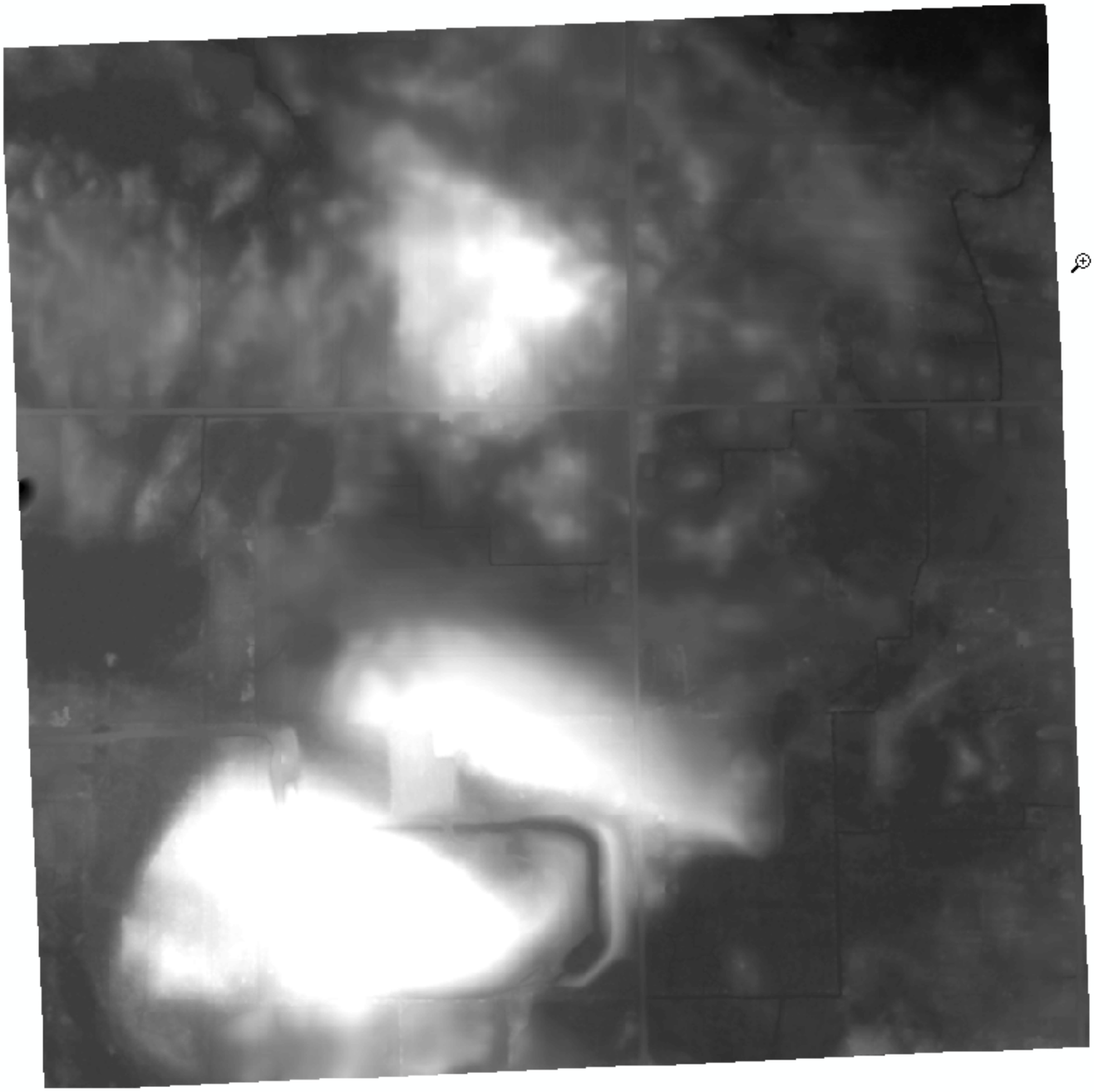
- The way we currently convert LiDAR to a usable form is a two step process
  1. We convert the raw tables to points
  2. We then interpolate the points to a raster using 3D analyst
     - One thing about this process is that due to the size of the data only a few tiles can be processed at this time
     - We are currently experimenting with a couple of different tools to allow for faster turn around time and a more seamless dataset

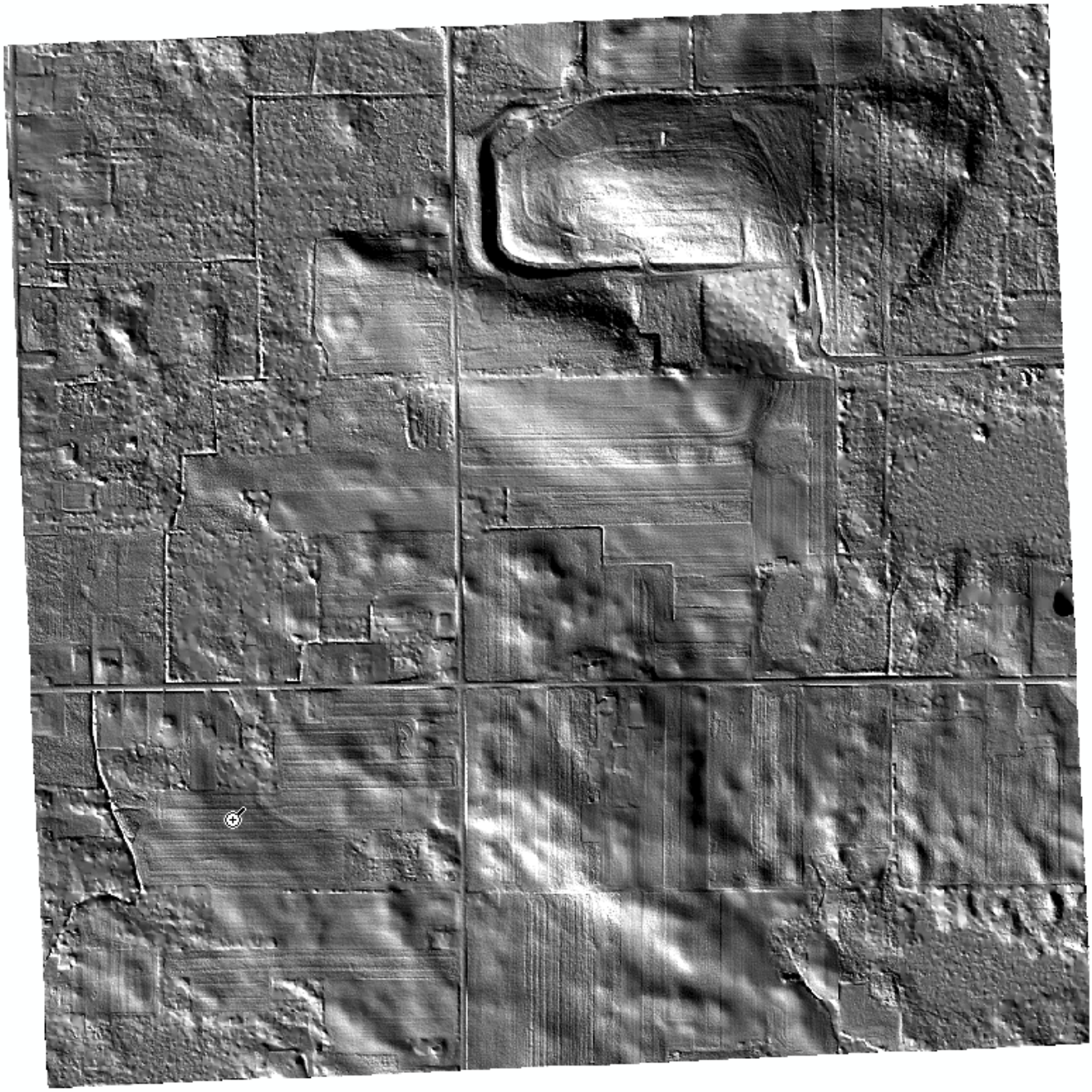


The tool that I use for creating a DEM is the Natural Neighbor tool found in the 3D analyst toolbox









Creating Contours

- To create contours you need to have a raster image already generated
- Then in 3D analyst you click on raster surface and then contour

3D Modeling

- With LiDAR 3D modeling is possible on a very accurate scale
- 3D models allow you to get a feel for the land for many different projects such as
  - Excavations
  - Wetland Delineations
  - And many other construction projects

Limitations of the Data

- The light beam cannot penetrate tree cover and water
  - This prevents accurate readings at the forest floor except in areas where there are gaps in the canopy
  - Generally LiDAR cannot penetrate deeply into water due to LiDAR being in the IR wavelength
- Sheer Size of the data prevents usage
  - Storage (for example the Monroe County database there are 250gigs of raw data)
  - Processing of the raw data to create datasets that are usable
- Snapshot of the area at the time of the flight
- Picks up small obstructions that move

Future Projects

- Construction Projects
  - Black Creek
  - Airport Remediation
  - Millseat land fill power station

Flood Models

- 3 Stages
  1. Sent to State for FEMA mapping
  2. Semi Real time model being developed
  3. Fully automated real time with web access

Distribution of LiDAR

- The LiDAR falls under the same contract as our Pictometry Imagery so we can distribute it to Monroe County Entities
- Currently we are not distributing a complete LiDAR dataset but we are hoping to be able to provide this soon
- We can distribute select areas of 1 or 2 tiles for projects

Questions

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A Copy of this presentation will be hosted on Monroe County's Website

www.monroecounty.gov/gis-index.php