

Urban Applications of LiDAR (1)

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5.1 Introduction

5.2 Road Extraction

5.3 Building Extraction and 3D Reconstruction

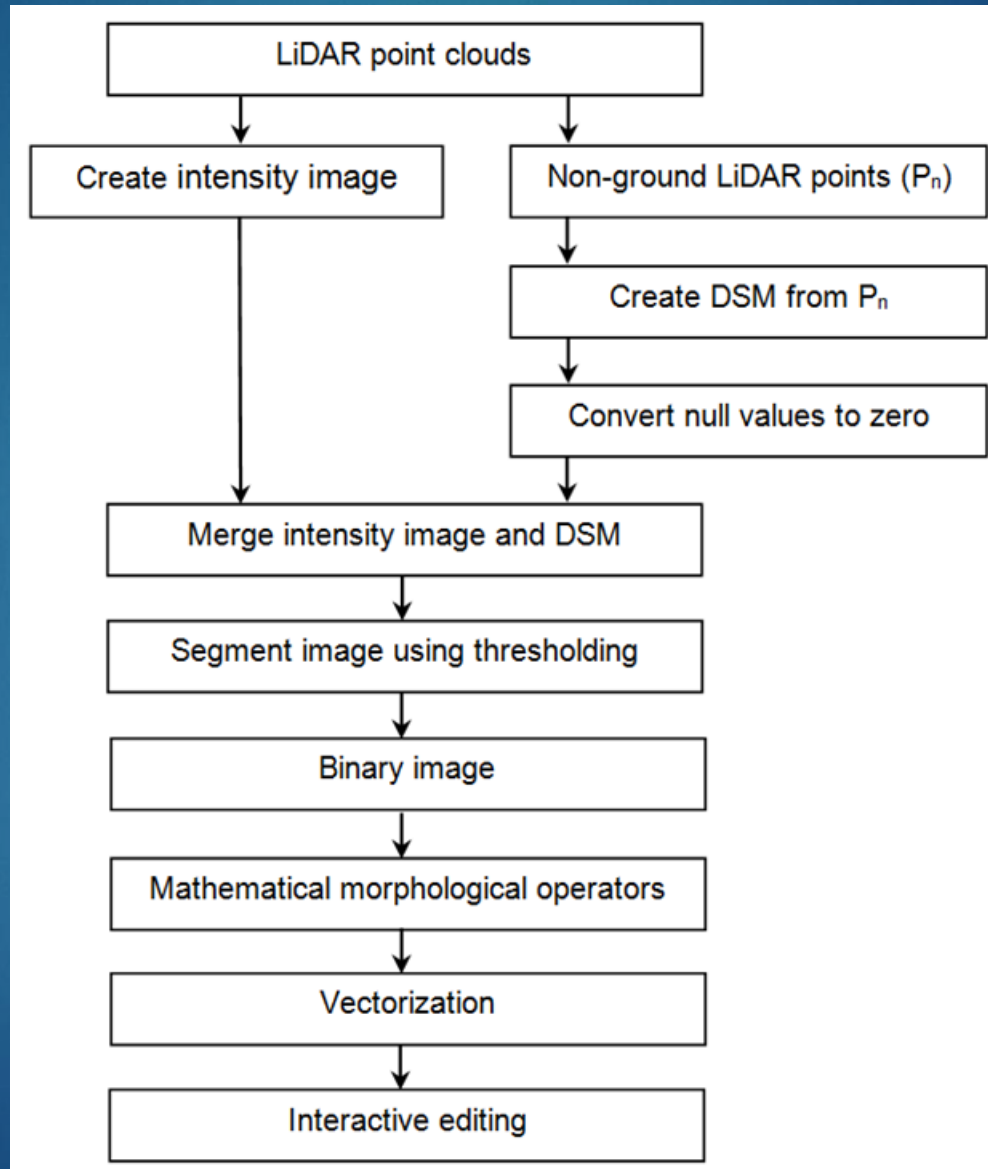
5.4 Population Estimation

5.5 Change Detection

5.6 Assessment of Post-Disaster Building Damage

5.7 Assessment of Post-Disaster Road Blockage

Road Extraction



LiDAR Intensity (Denton, TX)



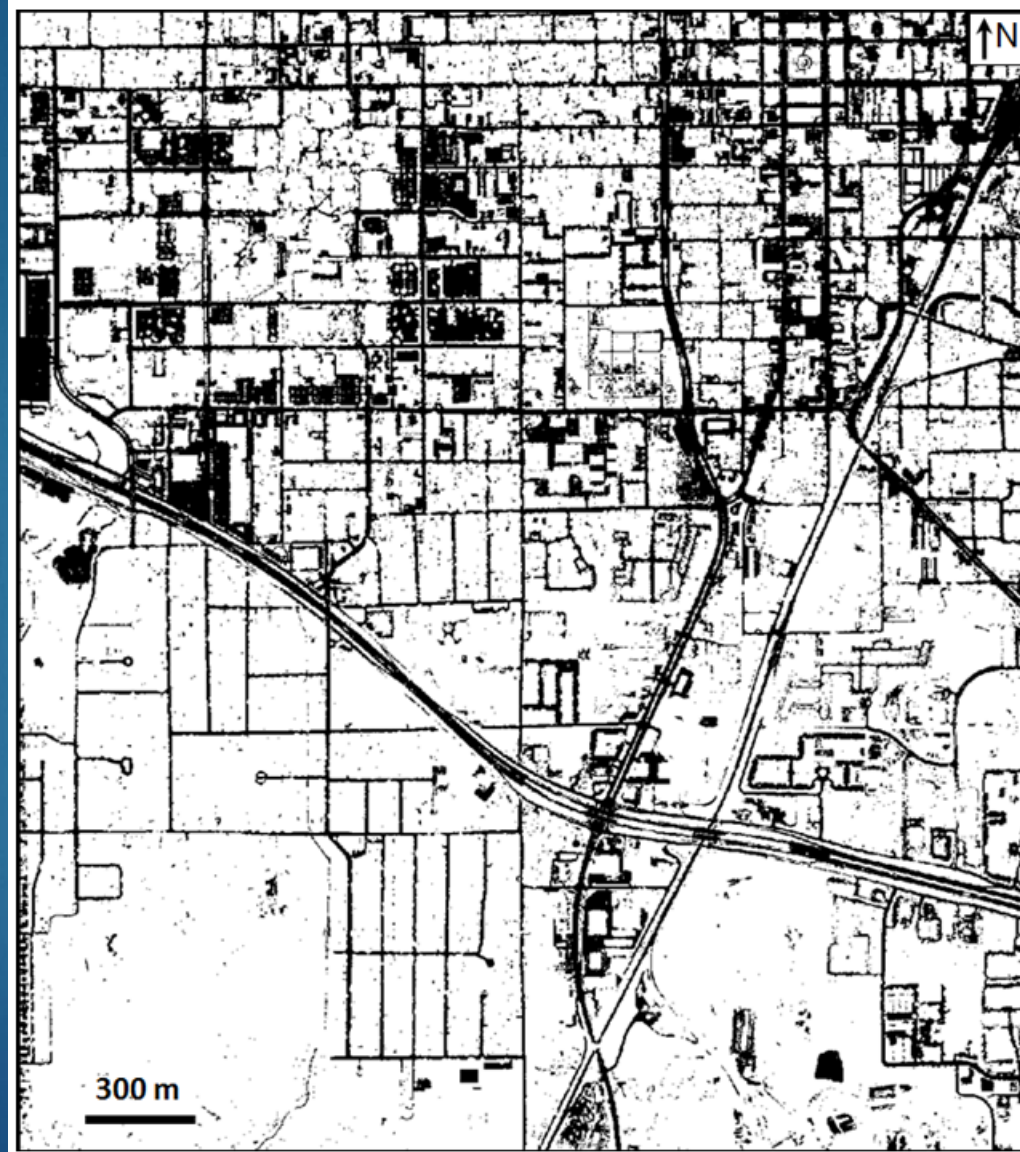
Non-ground DSM



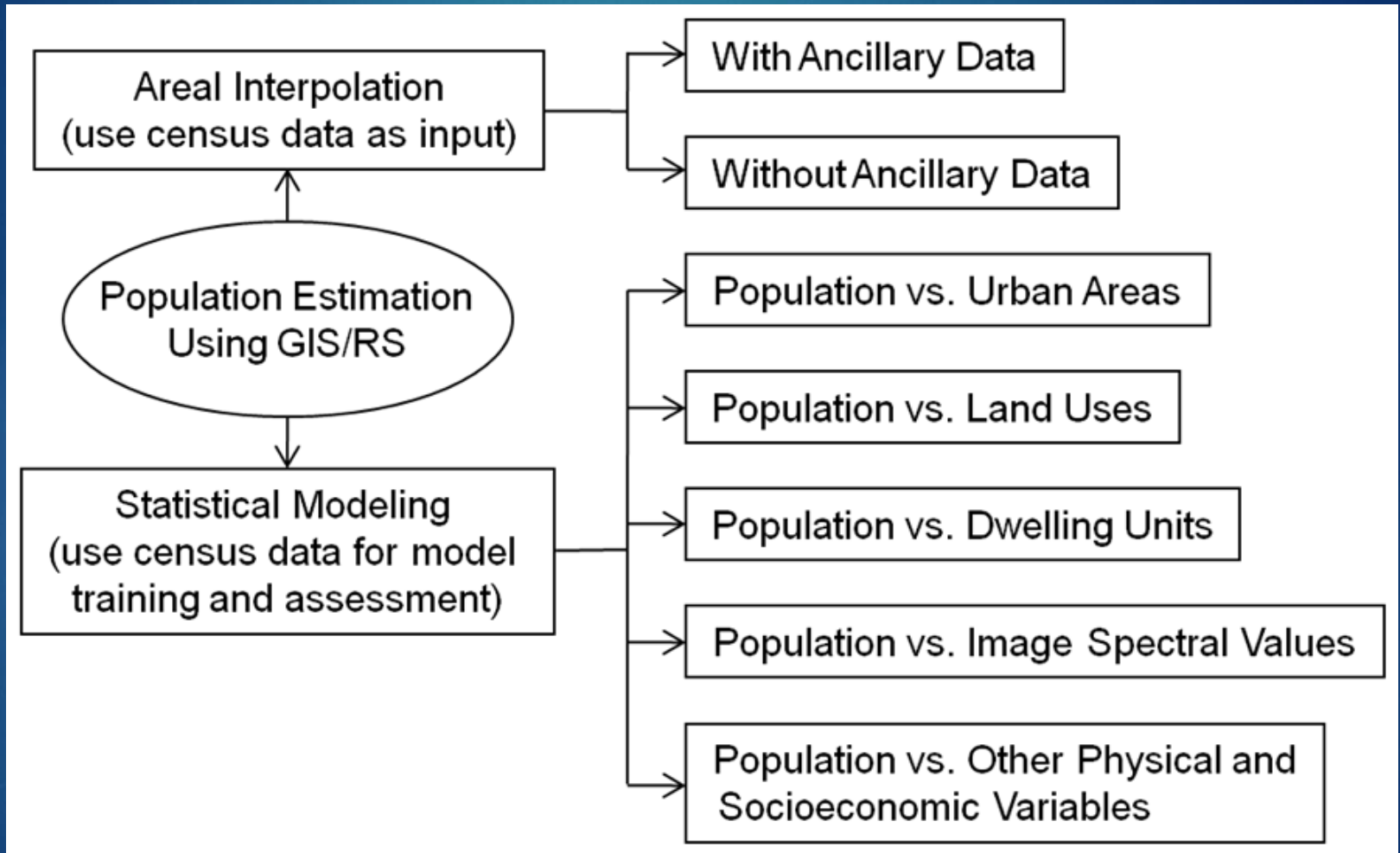
Intensity + Non-ground DSM



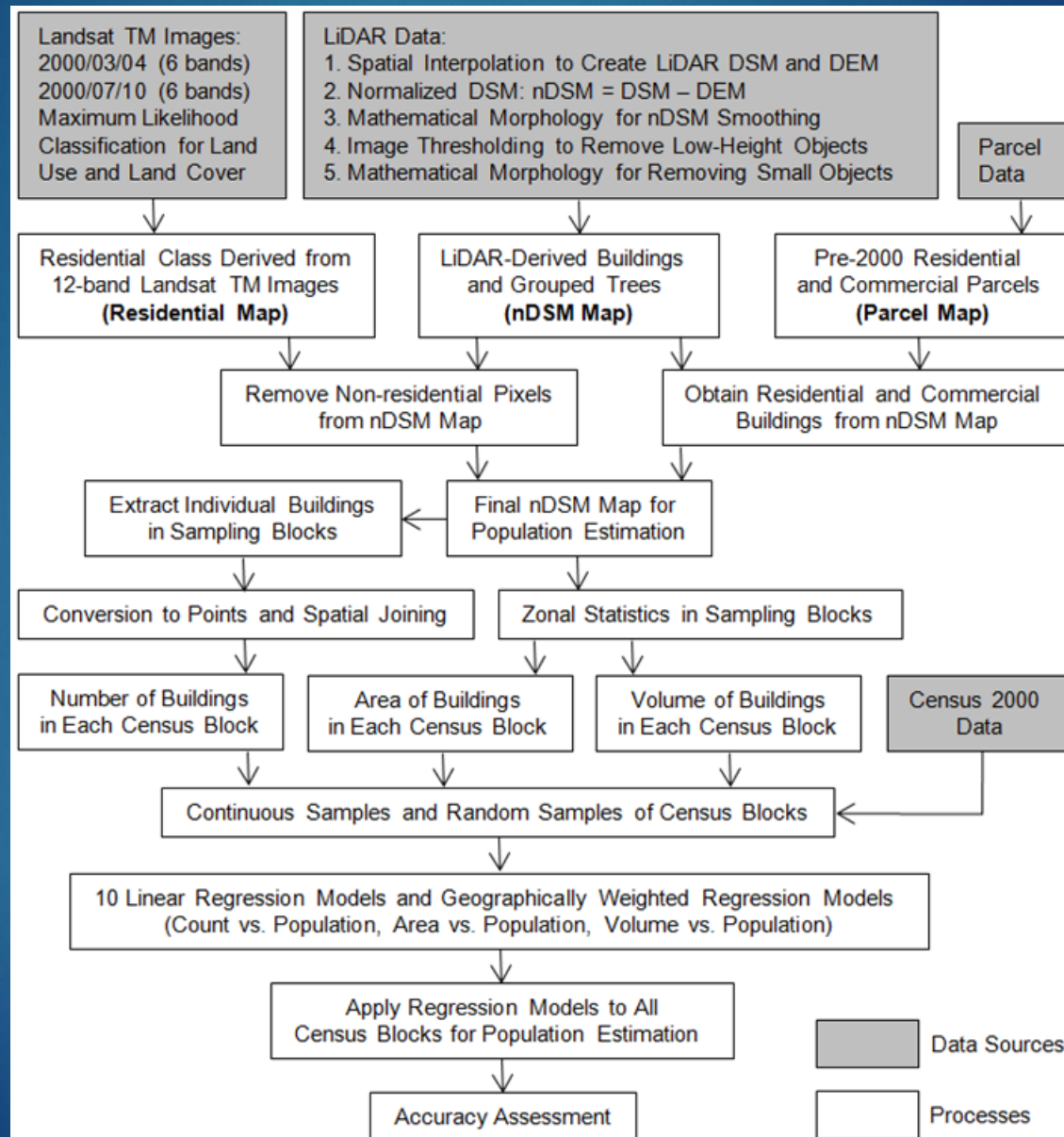
Binary Image



Population Estimation Methods



Flowchart for Population Estimation



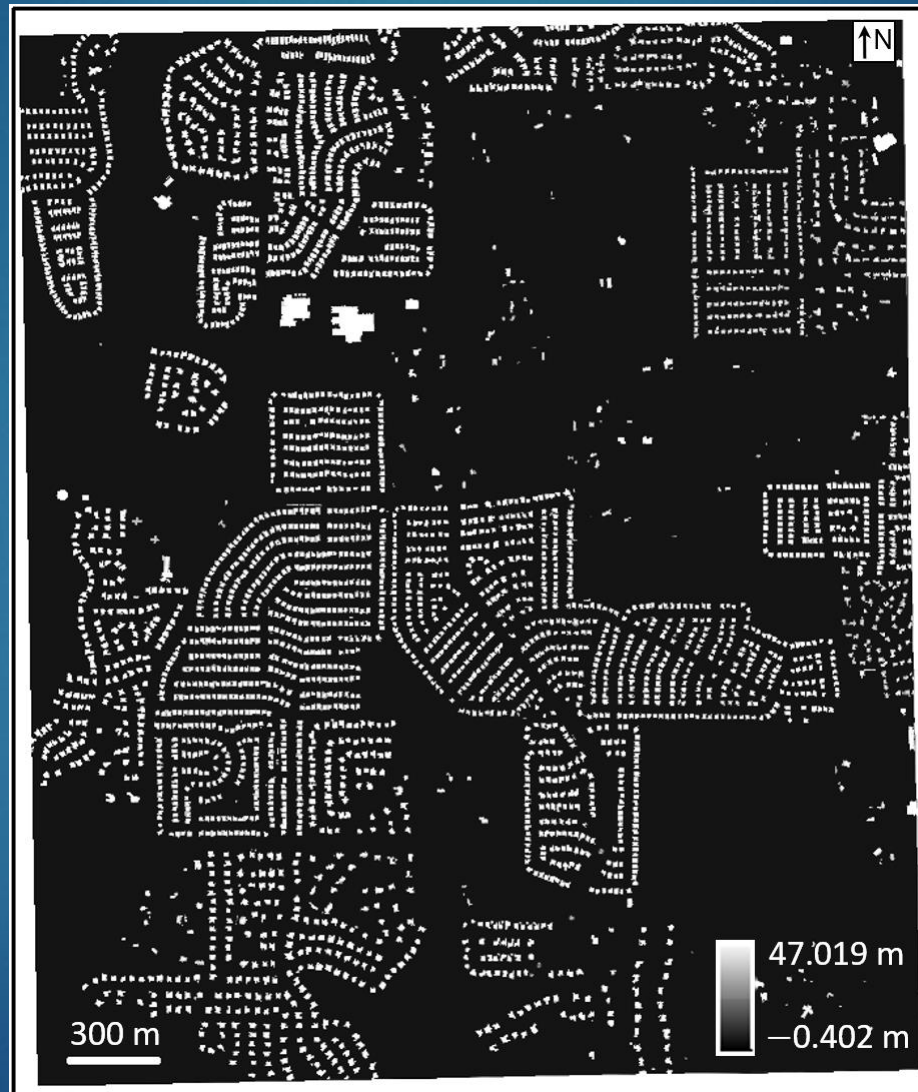
DTM of a study area in Denton, TX



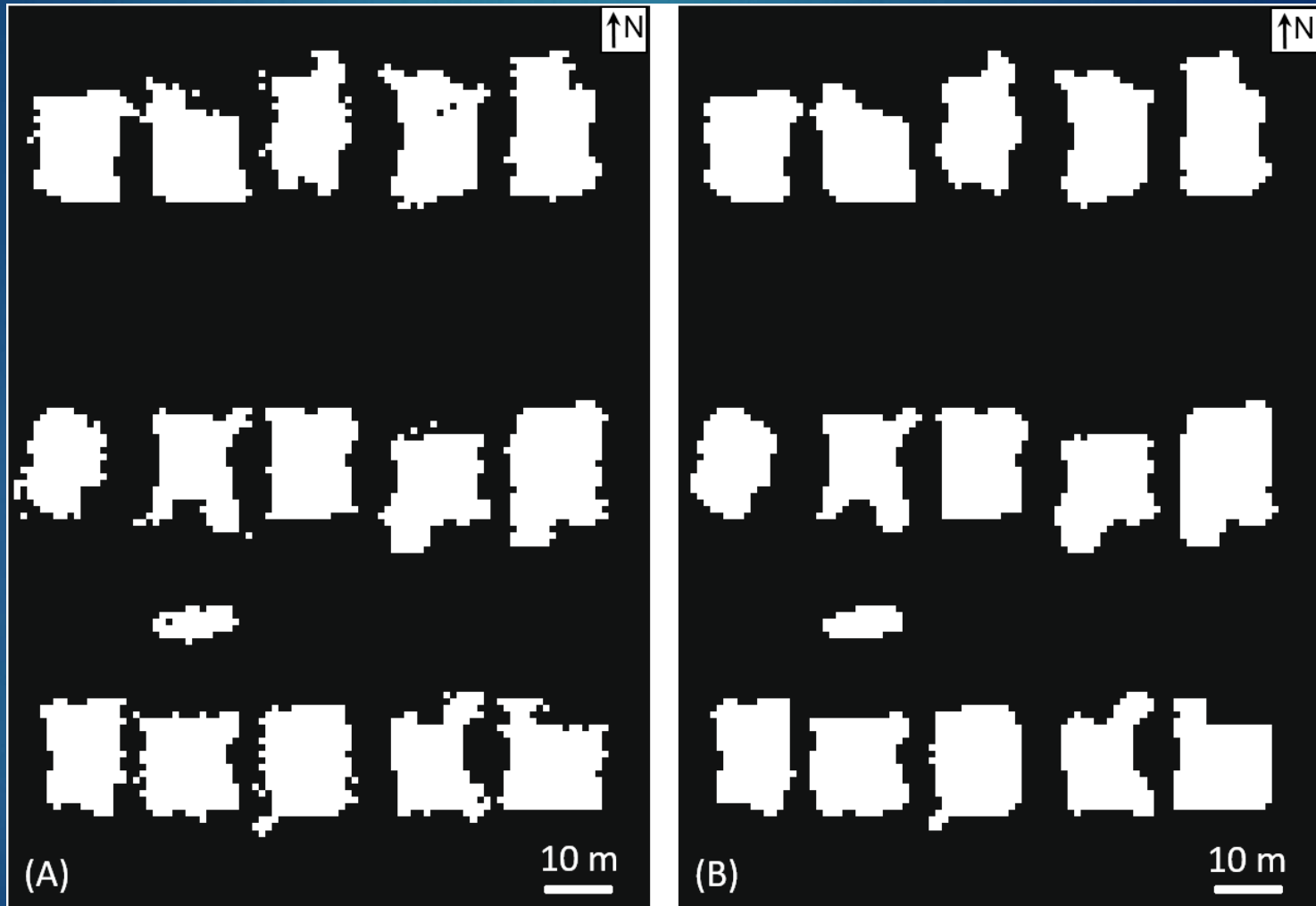
DSM



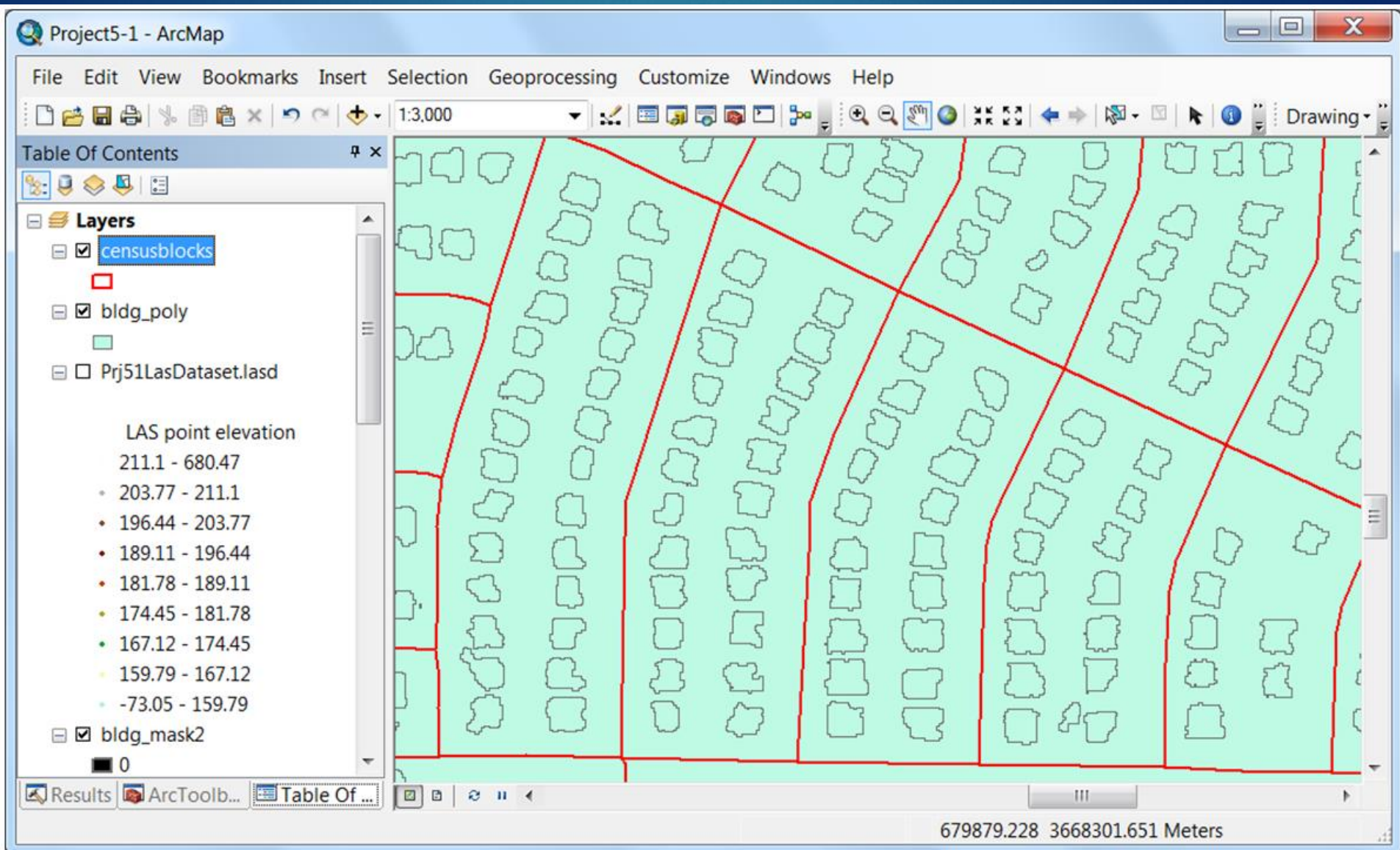
DHM



Noise Removal



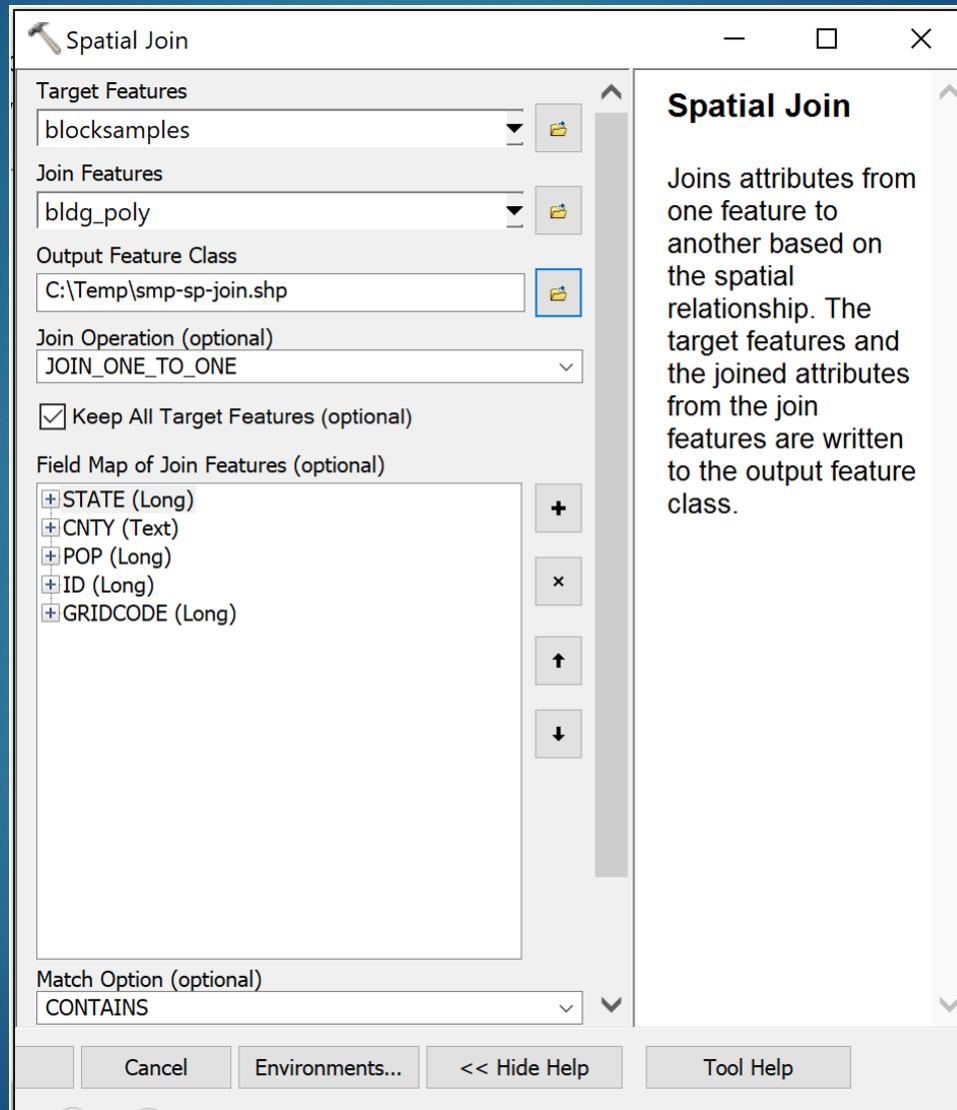
Building Footprints Extracted from LiDAR



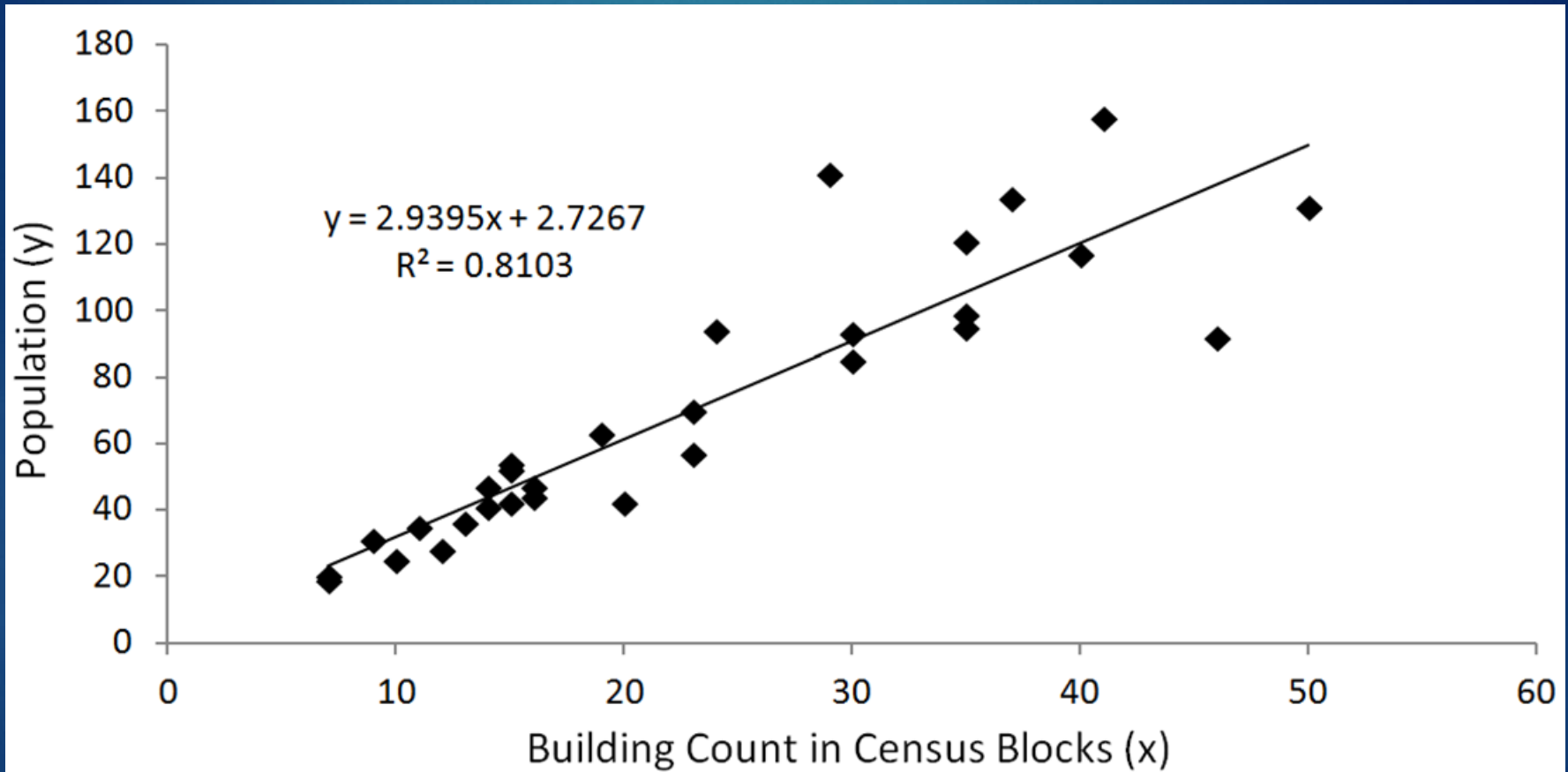
Sampling Census Blocks



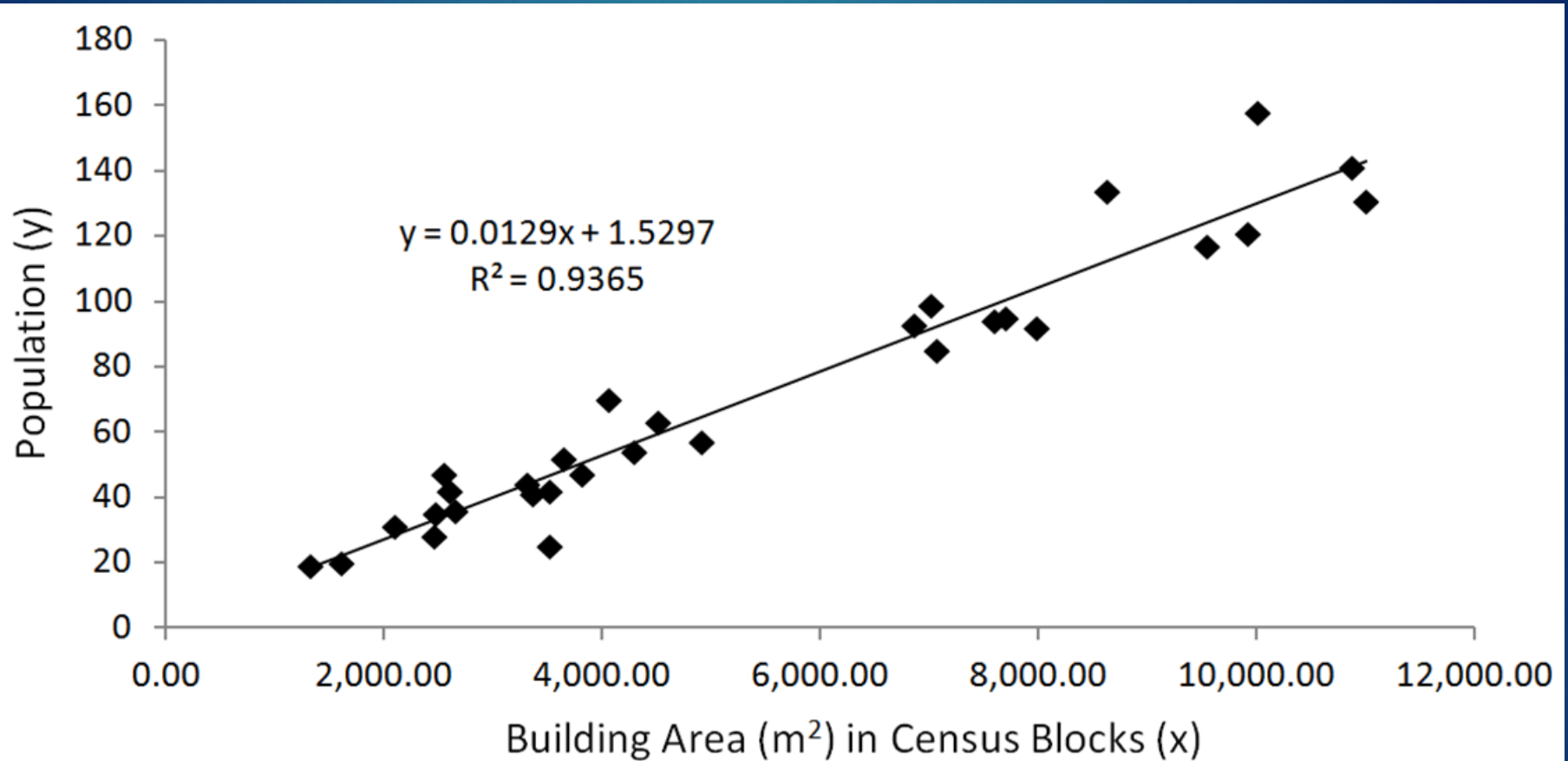
Using spatial join to get building count



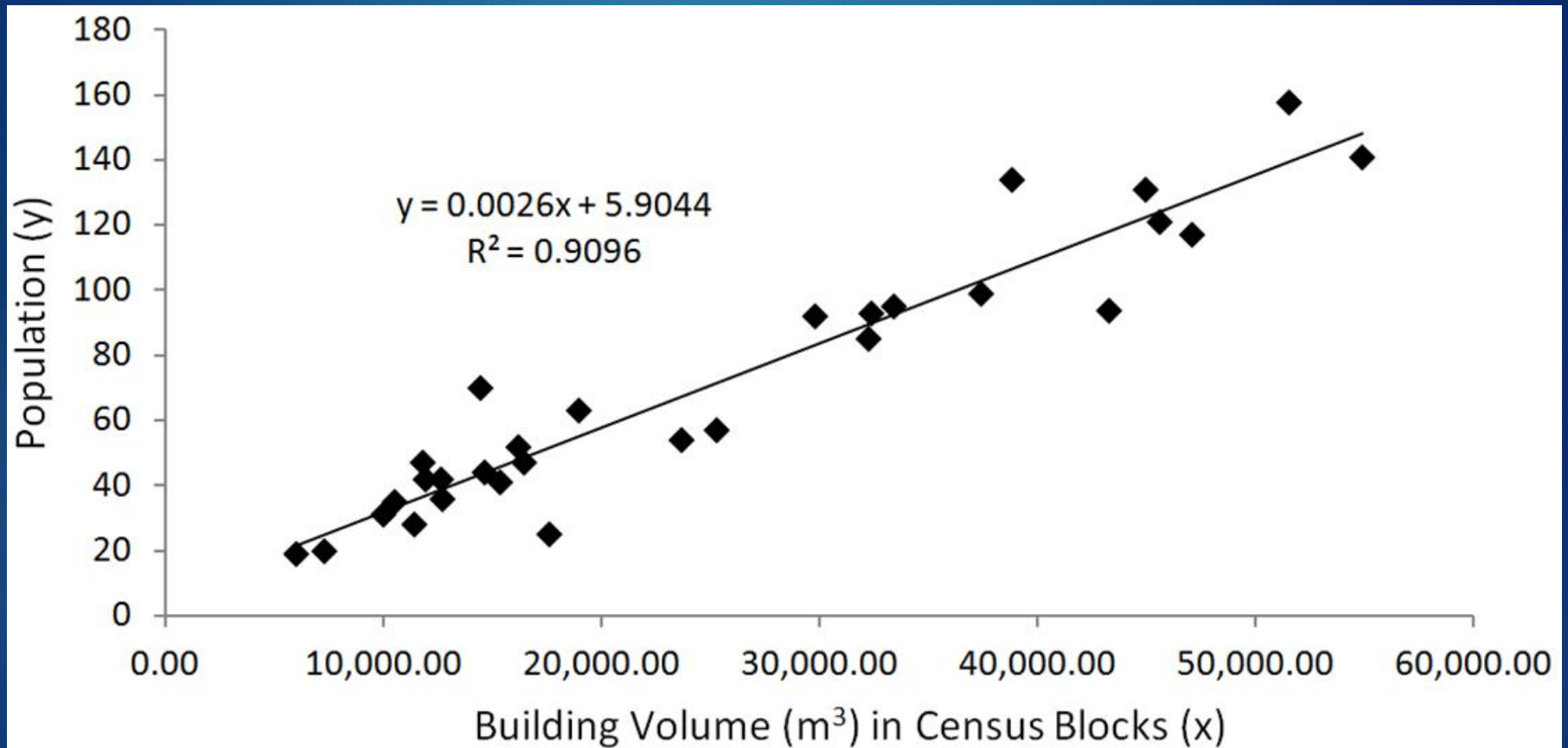
Population vs. Building Count



Population vs. Building Area



Population vs. Building Volume



3D Sample Tools

3D Sample Tools

Conversion

- ↶ ASCII Text To LAS
- ↶ LAS Dataset To Point
- ↷ LAS Dataset To Tiled Rasters
- ↶ LAS File Extent As Polygon
- ↶ LAZ To zLAS
- ↷ Mosaic To LAS Dataset
- ↷ Terrain To Tiled Rasters
- ↶ TIN To LandXML
- ↶ TIN to Multipatch
- ↶ zLAS To LAZ

Feature Analysis

- ↶ Adjust Multipatch Z
- ↶ Cast Shadows On Raster
- ↶ Contour Multipatch
- ↷ Create Sun Sightlines
- ↷ Create Sun Skymap
- ↶ Cross Section Lines
- ↷ Cross Section Polygons
- ↶ Explode Multipatch
- ↶ Simplify 3D Line

Lidar Analysis

- ↶ LAS Building Multipatch
- ↶ LAS Building Polygon
- ↶ LAS Overlap Areas
- ↶ LAS Point Statistics By Area
- ↶ Locate LAS Points By Proximity
- ↶ Sample Z From LAS

Lidar Classification

- ↶ Classify LAS By Height
- ↶ Classify LAS Ground Points
- ↶ Classify LAS Model Key Points
- ↶ Classify LAS Noise
- ↶ Classify LAS Overlap Points
- ↶ Classify LAS Rooftop Points

Lidar Management

- ↷ Check LAS
- ↶ Create PRJ for LAS
- ↷ Delete PRJ For LAS
- ↷ EzLAS Optimizer
- ↶ LAS File Information
- ↷ LAS Reporter
- ↶ LAS To LAS
- ↶ Rearrange LAS Points
- ↷ Split LAS File

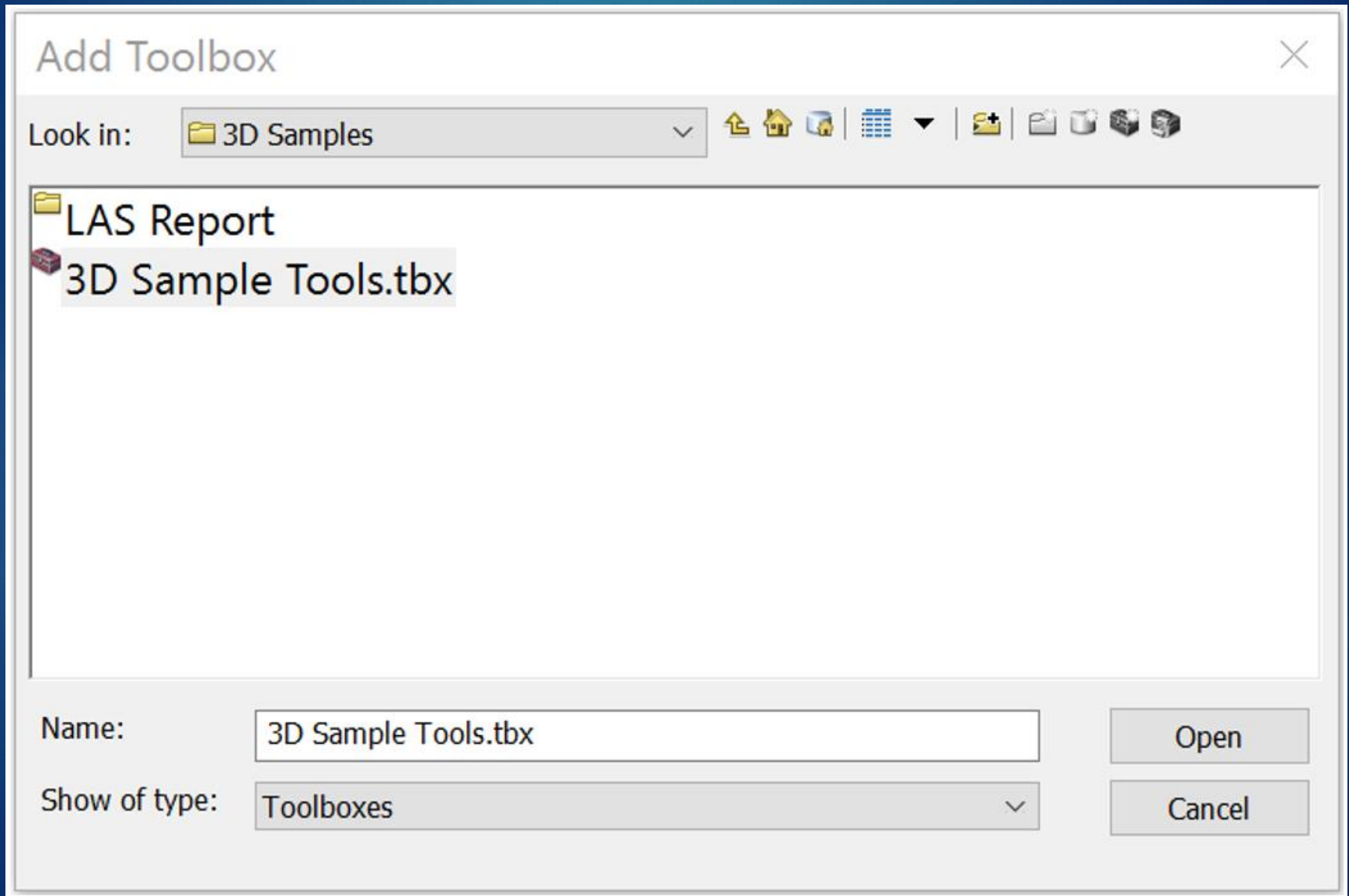
TIN

- ↶ Closest TIN Node
- ↶ Create Fence Diagram
- ↶ Extract TIN
- ↶ Integrate TINs
- ↶ Set TIN Node Z

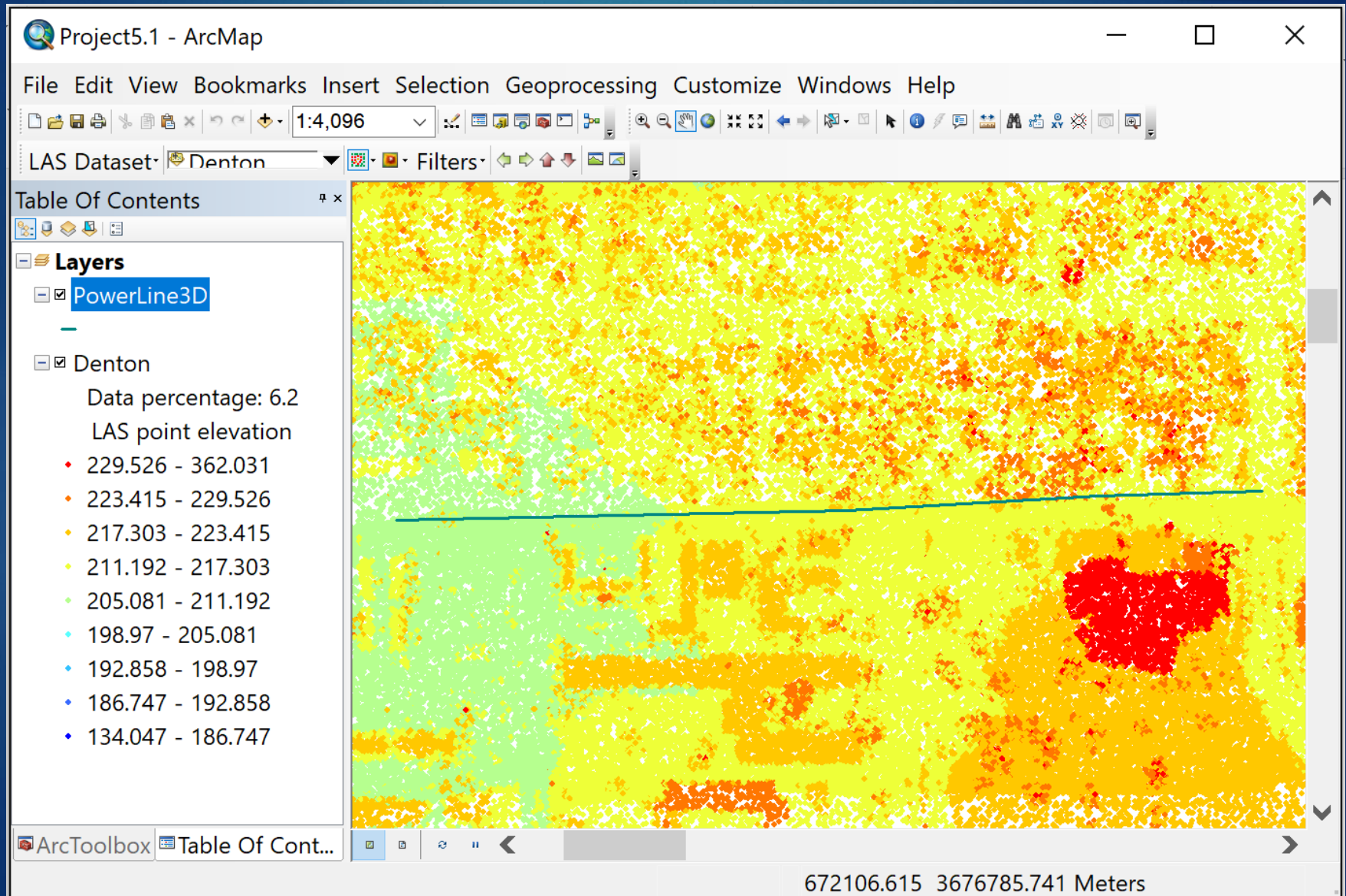
Vegetation Analysis

- ↶ Canopy Peaks
- ↶ LAS Height Metrics As Raster
- ↶ Tree Crown Extent
- ↶ Tree Crown Radius

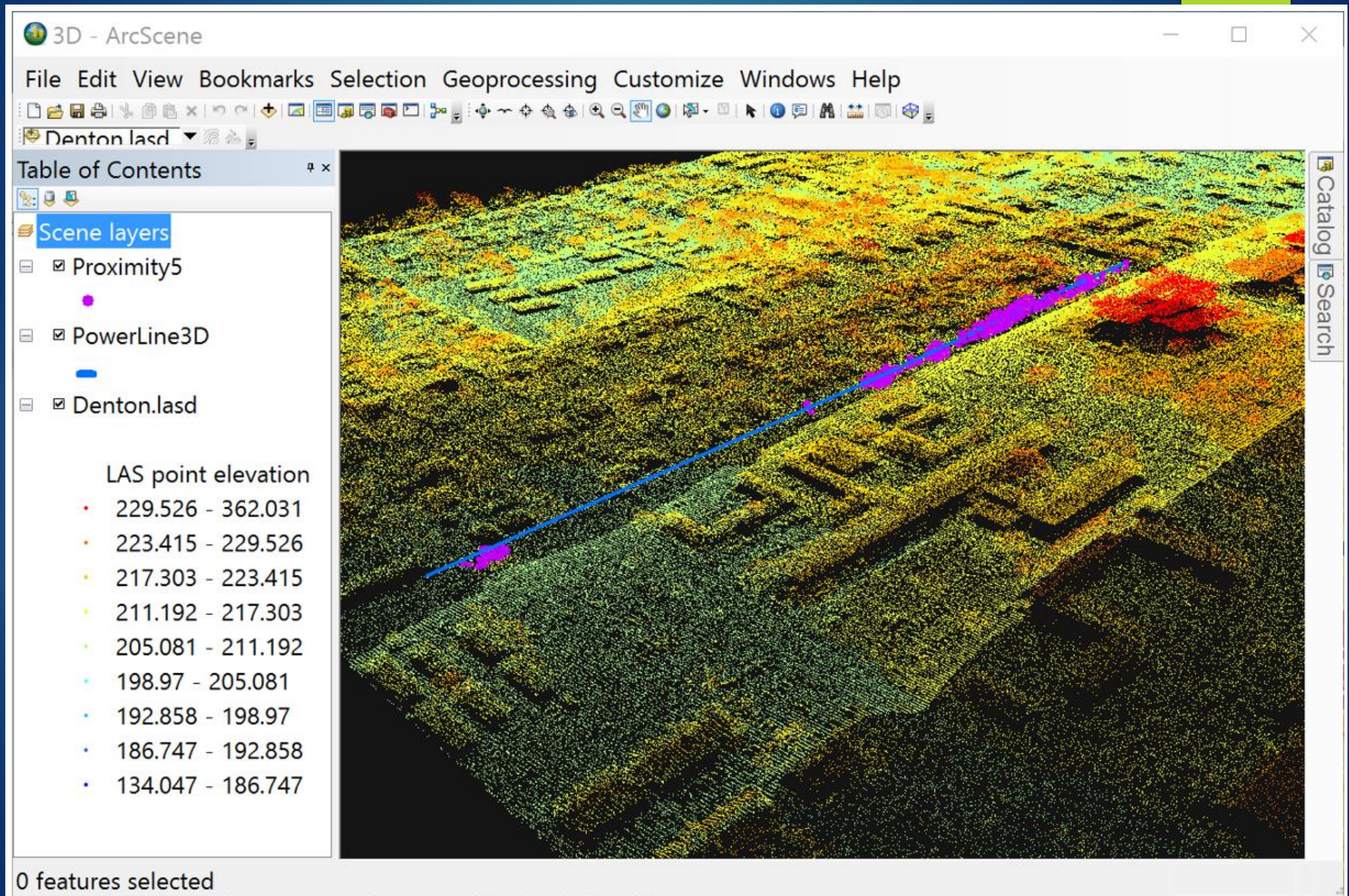
Adding 3D Sample Tools



Project 5.1: 3D Proximity Analysis



Project 5.1: 3D Proximity Analysis



If you are still looking for a course project, you may try this one ...

1. Download “Denton2011.las” from <http://geography.unt.edu/~pdong/LiDAR/Chapter5/Project5.1/>
2. Develop a method to map individual trees or tree groups (taller than 2 m) in the dataset, and save the tree locations and tree heights in a shapefile or geodatabase.
3. Do some accuracy assessment (true or false) through field investigation.
4. Write a project report.