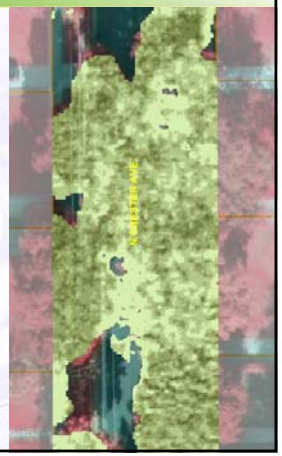
Pasadena's Use of Near-IR Imagery to Identify Tree Canopy in Public Right-of-Way

Brian Sims
GIS Coordinator
City of Pasadena

May 29, 2008



Tree City USA 2008

- More than 85,000 trees
- 7th Tree City USA Award
- 6th Tree City USA Growth Award
- 5th Tree Line USA Award

Analysis Goals

Calculate the percent of public right of way covered by tree canopy.

Data Used

- 4" Near-Infrared
- Digital Surface Model (DSM)
- Digital Elevation Model (DEM)
- Parcels

Vegetation Detection

- Normalized Difference Vegetation Index (NDVI)
- NDVI = (NIR – Red)/(NIR + Red)
- Values between -1.0 and 1.0
- Values close to 1.0 indicate higher levels of NIR reflectance, in plants due to more photosynthesis

Data Prep. Process

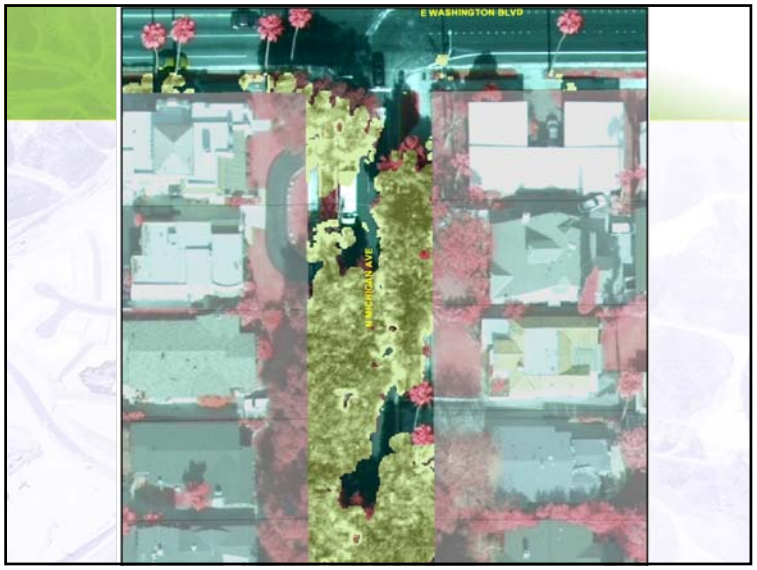
1. Dissolve parcels based on common value (create one if needed)
2. Create new polygon feature class, which covers the full extent of analysis area/right of way
3. Union new polygon feature class with dissolved parcels
4. Edit unioned polygon feature class and delete features not coincident with dissolved parcels. Resulting feature class represents right of way.

Analysis Process

1. Convert NIR raster to point using Spatial Analyst
2. Clip points using right of way polygon (see data prep)
3. Spatially join G,R,NIR bands to points using Hawth's Analysis Tools
4. Interpolate surface from DSM points (Spline, Tension, weight: 10, # of points: 3)

Analysis Process

5. Spatially join DSM to points using Hawth's Analysis Tools
6. Spatially join DEM to points using Hawth's Analysis Tools
7. Calculate NDVI for points (NDVI = (NIR – Red) / (NIR + Red)
8. Calculate elevation difference (DSM – DEM)
9. Select and export points with (NDVI >= 0) AND (Elevation Difference >= 8')



Next Step

- Repeat process using raster only
- Test using command line operations
- Benchmark with one tile
- Scale process to all tiles
- Potentially run on full tile rather than ROW

Questions / Comments / Concerns

Thank you for your participation!