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City of Pasadena's Tree Canopy Analysis

Identifying the Forest from the Trees





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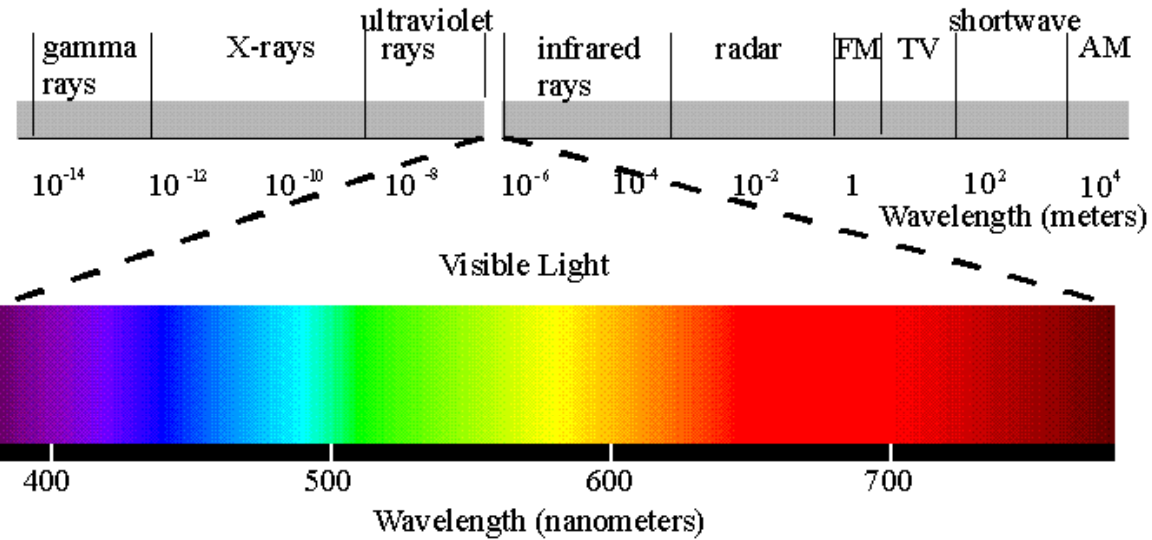
- Located in Los Angeles County, CA
- Home to the Rose Bowl, Rose Parade, NASA's Jet Propulsion Lab, CalTech, and many historic home and neighborhoods
- 23.5 sq mi.
- 146,000 residents
- 1 Star Status with Urban Accords
- 60,000 street trees
- 25,000 park trees
- Awards from National Arbor Day Foundation:
 - 7 Tree City USA Awards
 - 6 Tree City USA Growth Awards
 - 5 Tree Line City USA Awards





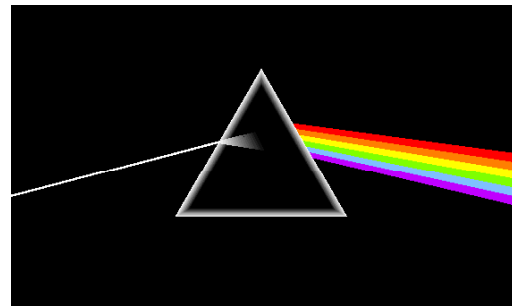
Electromagnetic Spectrum

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Shorter Wavelengths ←

→ Longer Wavelengths

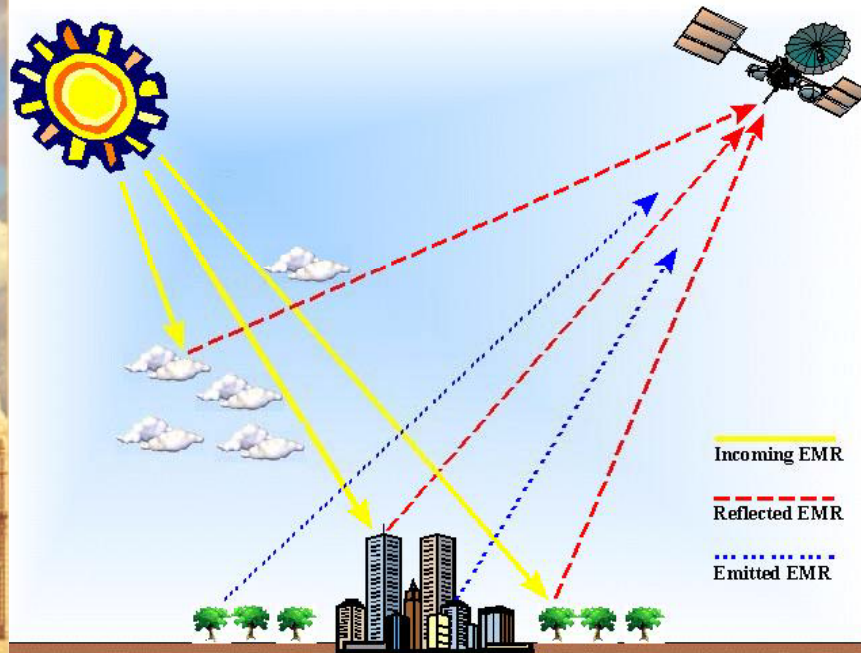


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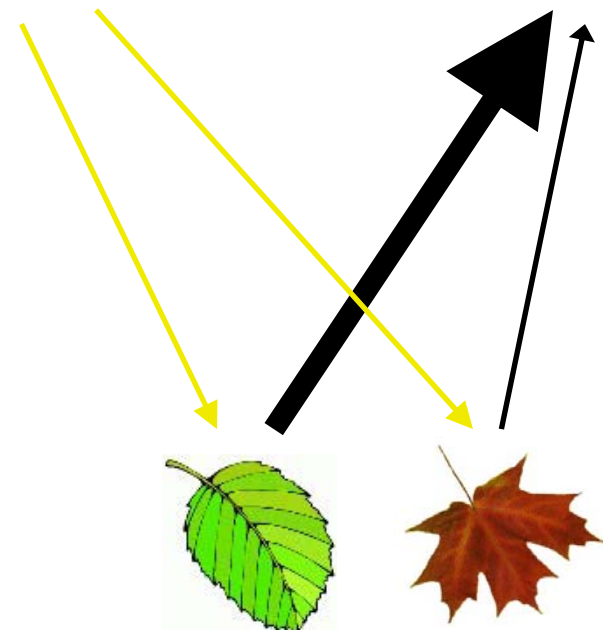
Electromagnetic Reflectance

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Emitted
Solar
Radiation

Reflected
Near IR






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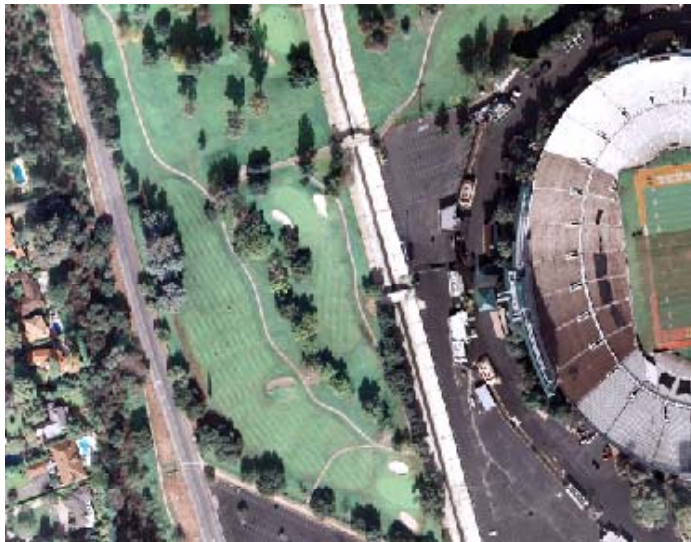


3 Band Photos




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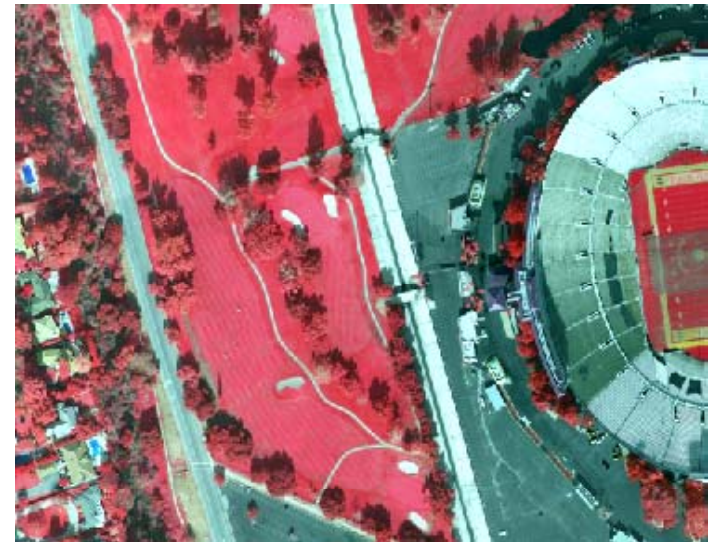
Regular Photos

-  Red 255,0,0
-  Green 0,255,0
-  Blue 0,0,255



Near Infra-Red Photos

-  Near IR 255,0,0
-  Red 0,255,0
-  Green 0,0,255



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Finding Vegetation

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$$NDVI = \frac{(NIR - RED)}{(NIR + RED)}$$

Normalized Difference Vegetation Index (NDVI)

- Used to identify vegetation based on Near IR reflectance
- The higher the value the more healthy the vegetation
- Inverse can also be used to find water

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Elevation Models

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Bald Earth Model
Representation of
Earth's surface



Surface Model
Includes terrain and
objects above terrain

- Buildings
- Trees

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Tying it All Together

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- **Vegetation versus Non-Vegetation**
 - > Vegetation NDVI value of 0.035 or greater
- **Canopy versus Turf**
 - > Elevation difference 8 feet or greater

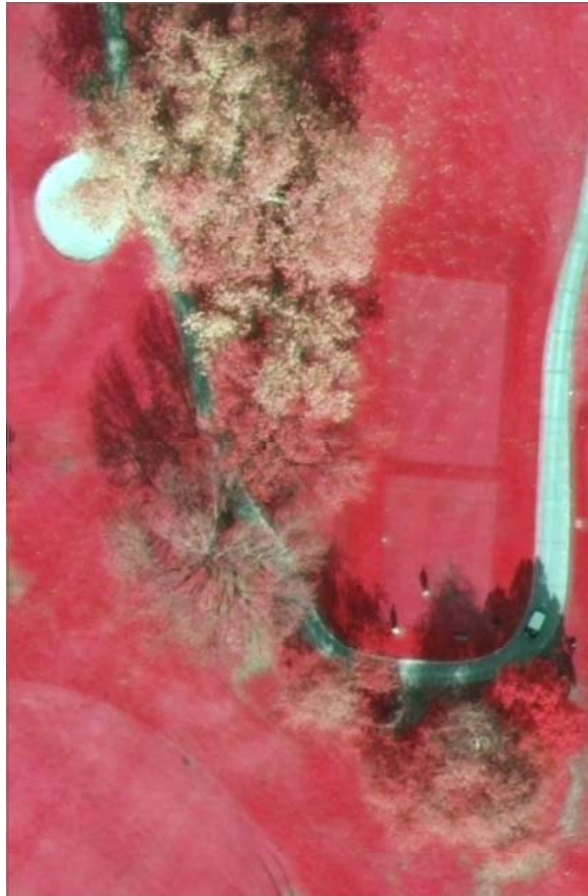


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Resulting Tree Canopy

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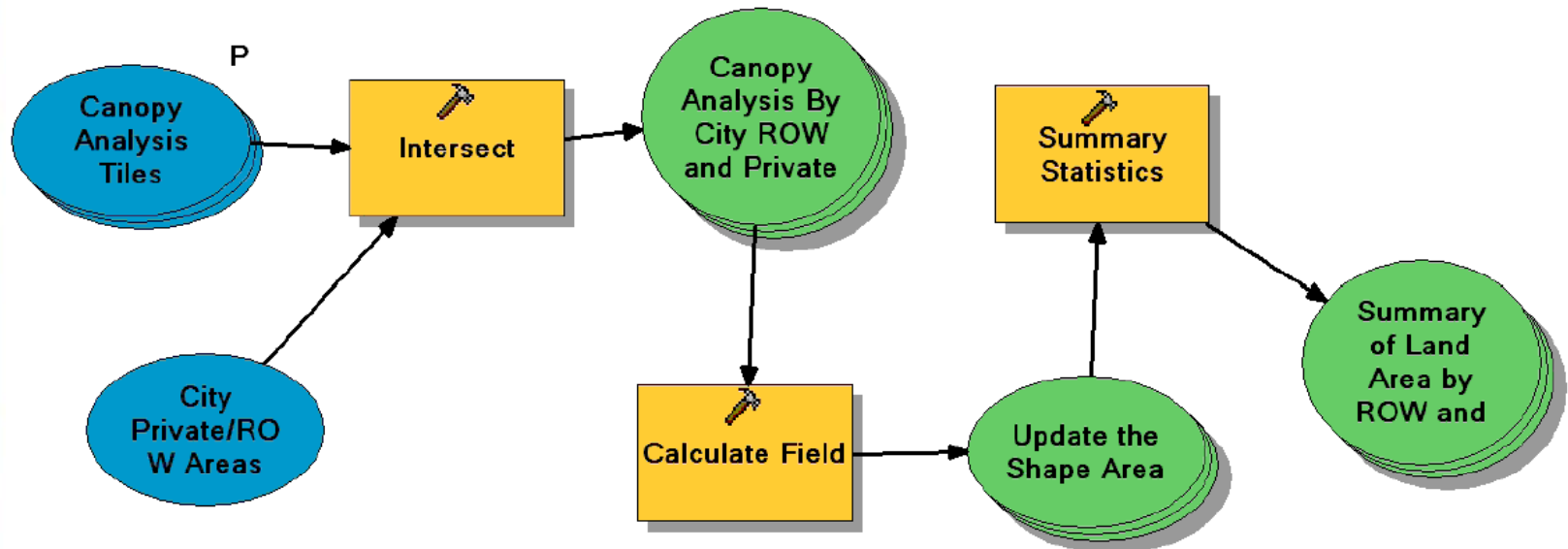


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Canopy Land Area Model*

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*Model was created using ArcGIS 9.3

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Results

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- The City of Pasadena contains 6.58 square miles of tree canopy!
- Over 28 percent of the City of Pasadena is covered by tree canopy!
- Over 18 percent of Pasadena's tree canopy is located within the public right of way!

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