Lab 6:Evaluating Insect Damage to Forest Resources in New Mexico

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Description of Study Area

- The study area is located in Sandia Mountains and over the past decade it has been the scene of a major insect infestation. “Its physical manifestation is a large concentration of dead trees in the Pino Canyon, which provides a stark contrast with live trees in adjacent parts of the mountains.” (Found on page 1 of the Evaluating Insect Damage to Forest Resources in New Mexico PDF; Second paragraph, and second sentence).

Description of Project Objectives

- Demonstrate the ability of multi-spectral datasets in evaluating environmental issues.
- Understand the process of demonstrating this ability.
- Get use to working with multi-spectral datasets .

Data Sets Used

- Here is a list of the data sets that were used in completing this lab:
  - → Colour Orthophotos with high spatial resolution
  - → Landsat images
  - → Shapefiles of the study area
  - → GPS points, which are provided
  - → ASTER image

Data Preparation

- Part 1- Acquiring Orthophotos and Satellite Imagery

  → Explore provided data

  → Determine appropriate imagery for particular applications

  → Use an index to search for orthophotos and download orthophotos (This is the link where we found the orthophotos: http://amus.bernco.gov/website/sid/SID2016/)

- Part 2 – Familiarization and Data Preparation Activities

  → Familiarize one self with the study area

  → Familiarize one self with available data

  → Create a composite image to be used for analysis

  → Create a spatial subset of an ASTER dataset

Data Preparation

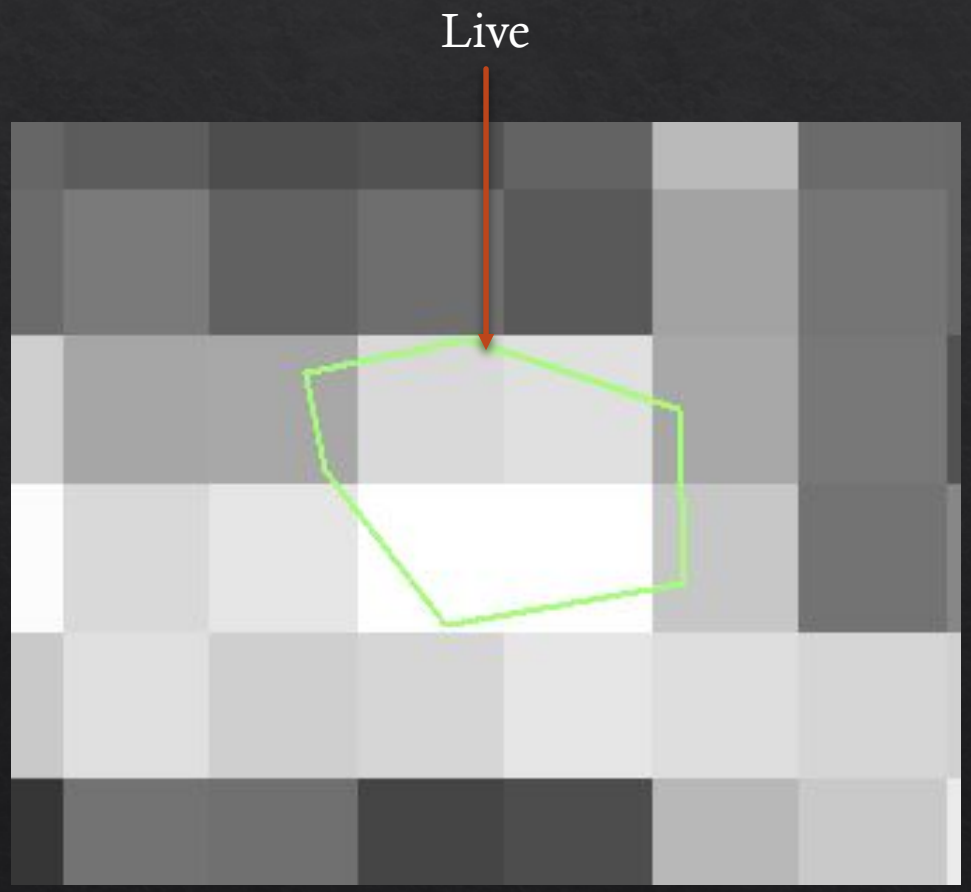
- Part 3 - Normalized Difference Vegetation Index (NDVI)

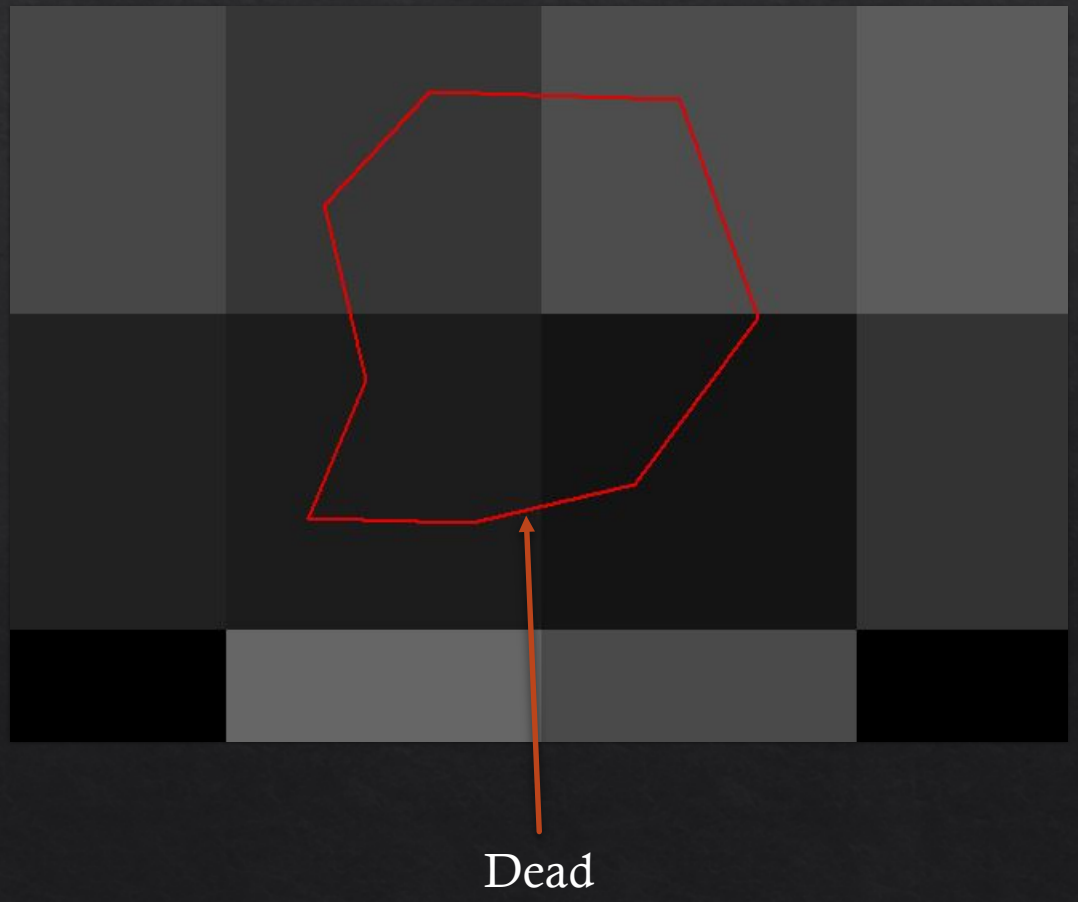
→ Understand how NDVI measures vegetation greenness

→ Generate an NDVI image in ArcMap for the Sandia study area

Screen Captures of Live and Dead Tree Areas with the 2016 Ortho Photos

Screen Captures of Live and Dead Tree Areas with the NDVI image





Discussion of discrepancies between orthophotos and NDVI

- One discrepancy that one can see when flipping between the orthophotos and the NDVI image is rocky areas show as dead tree areas, so without the multi-spectral image and the amount of detail that it shows, one would not be able to tell if it was dead trees or rock, but with the multi-spectral image one IS able to zoom/focus in on an area if unknown and you would be able to tell if it was rock or dead trees.

Comparison of mean overall NDVI for Pino and Oso Canyons

Statistics	
Ex_Pino_NDVI	
Build Parameters	skipped columns:1, rows:1, ignored value(s):
Min	0.005586592014878988
Max	0.3928571343421936
Mean	0.1645940655433919
Std dev.	0.05568553378138749
Classes	0

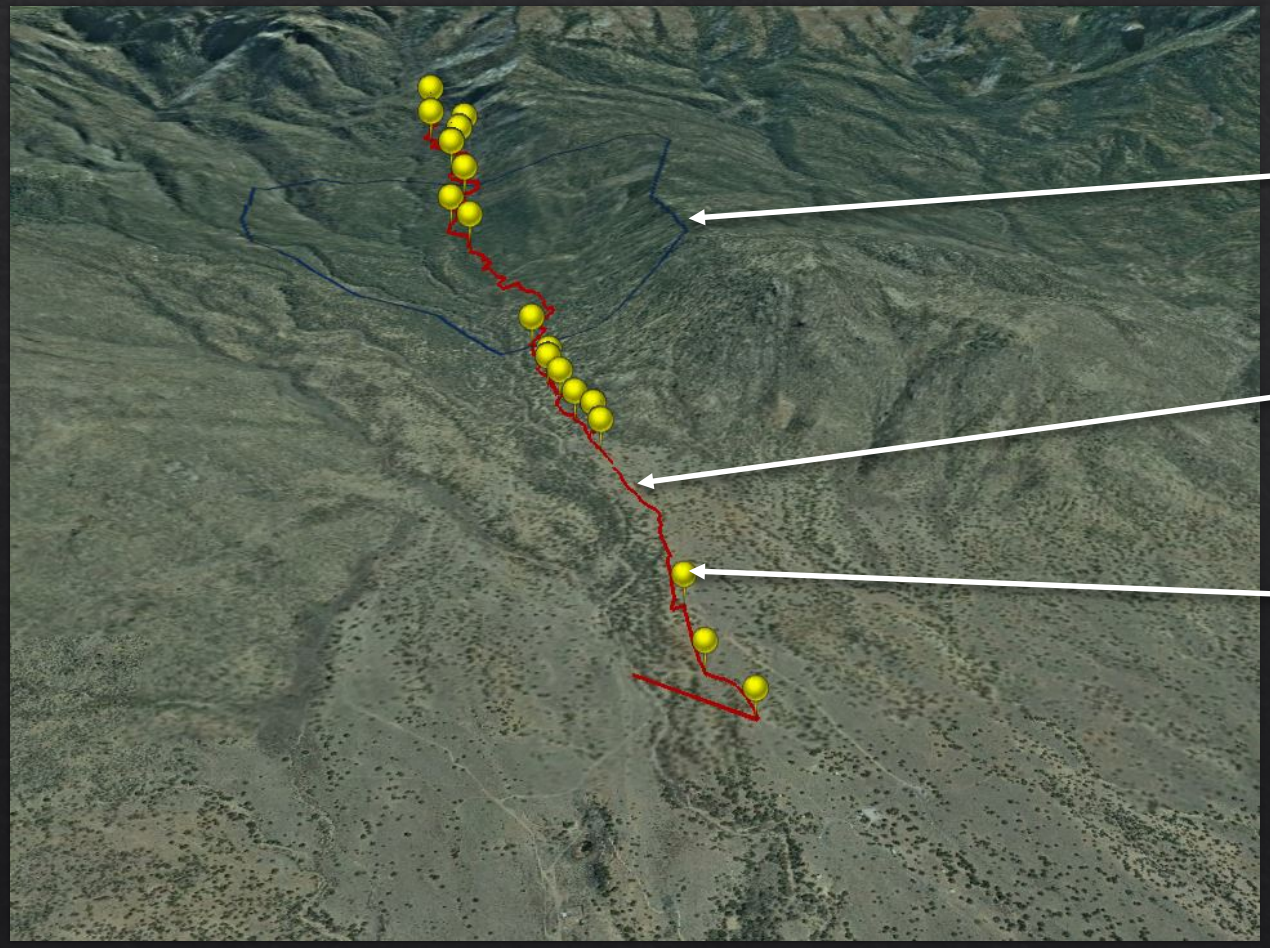
Statistics	
Ex_Oso_NDVI	
Build Parameters	skipped columns:1, rows:1, ignored value(s):
Min	0.01886792480945587
Max	0.4088050425052643
Mean	0.2247892023385296
Std dev.	0.06890355468504471
Classes	0

- The screen shot on the left is that of the statistics for the NDVI of Pino which shows that the mean is 0.1645940655433919.
- The screen shot on the right is that of the statistics for the NDVI of Oso which shows that the mean is 0.2247892023385296.

Conclusions regarding usefulness of multi-spectral satellite images for identifying dead trees in the Sandia Mountains

- Multi-spectral satellite images are ideal for identifying dead trees in the Sandia Mountains. One can see clearly where the dead trees are compared to the live trees, this is due to the spatial resolution of the images, which is 1 meter.
- Multi-spectral satellite images are ideal for identifying any type of vegetation like this, this is due to the fact that you can zoom/focus in on one area and see what type of vegetation can be found within the study area.

3D Model using the NDVI image, GPS Track, GPS Points and also the Pino Canyon Trail



This blue outline that you can see is where the Pino Canyon is located.

This red line is the track that runs through the Pino Canyon.

The yellow points are GPS way points that were collected along the track.

This screen shot is looking East into the Pino Canyon. Well working within ArcGlobe.