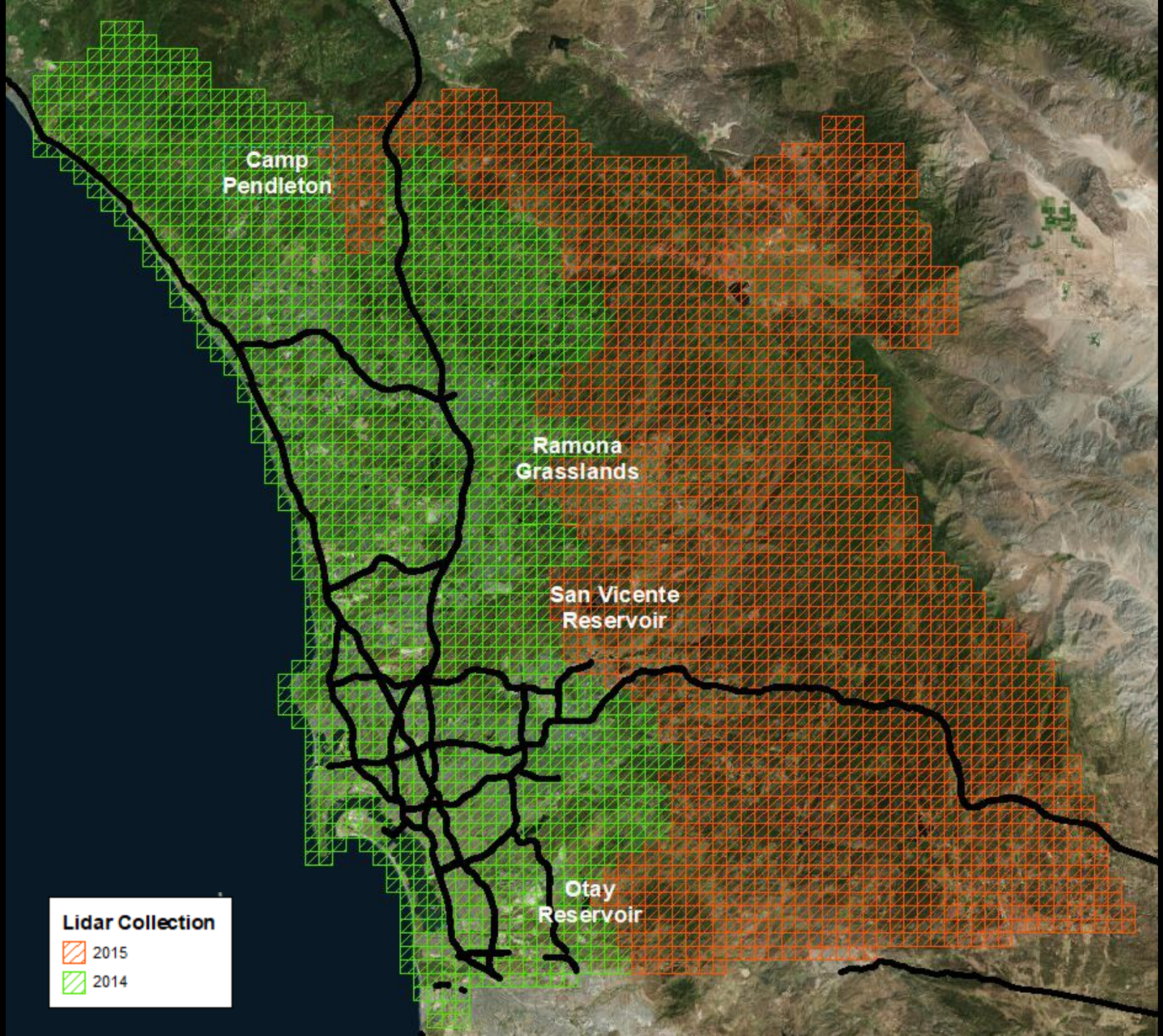
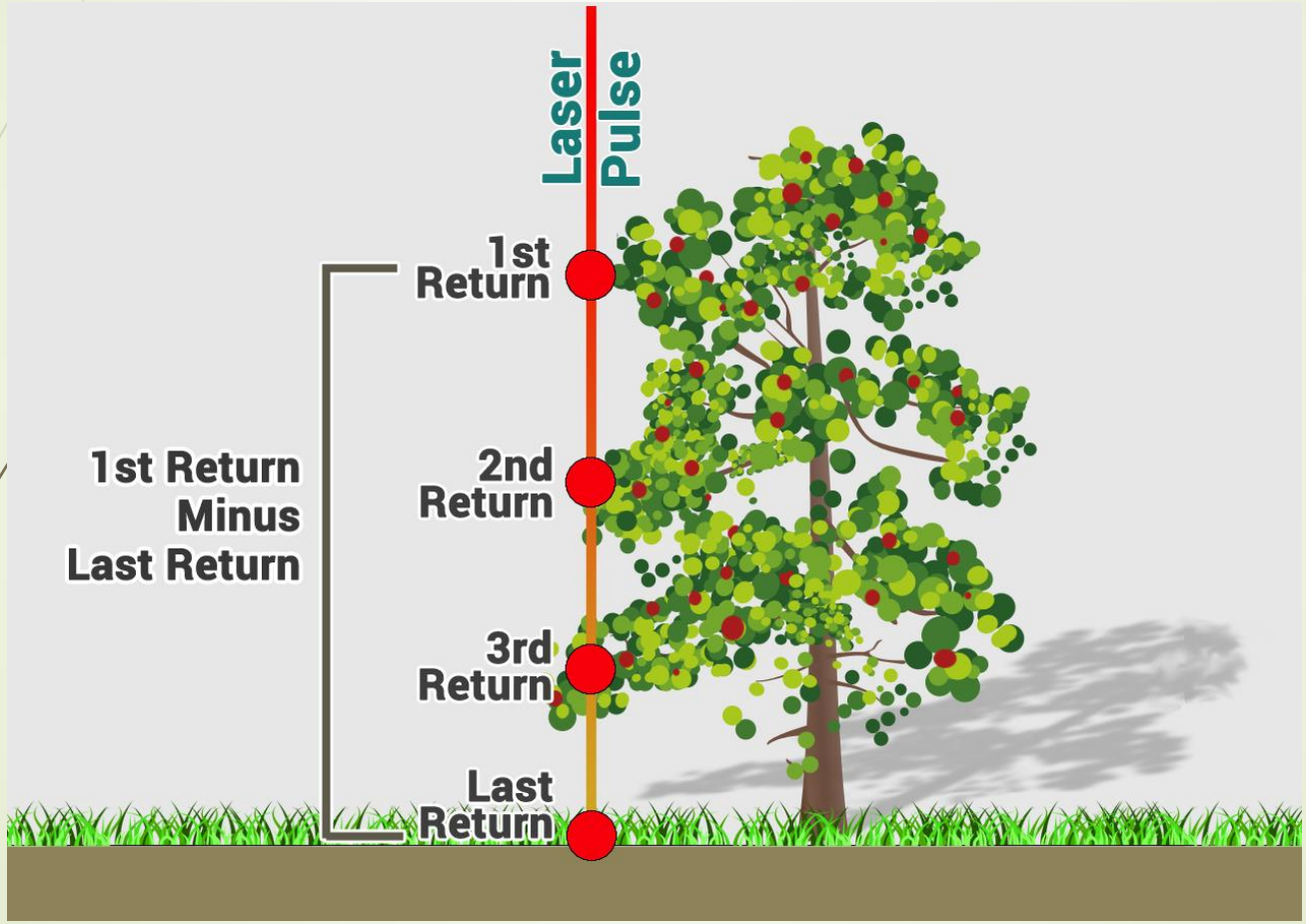
Modeling CSS and Chaparral vegetation life-forms

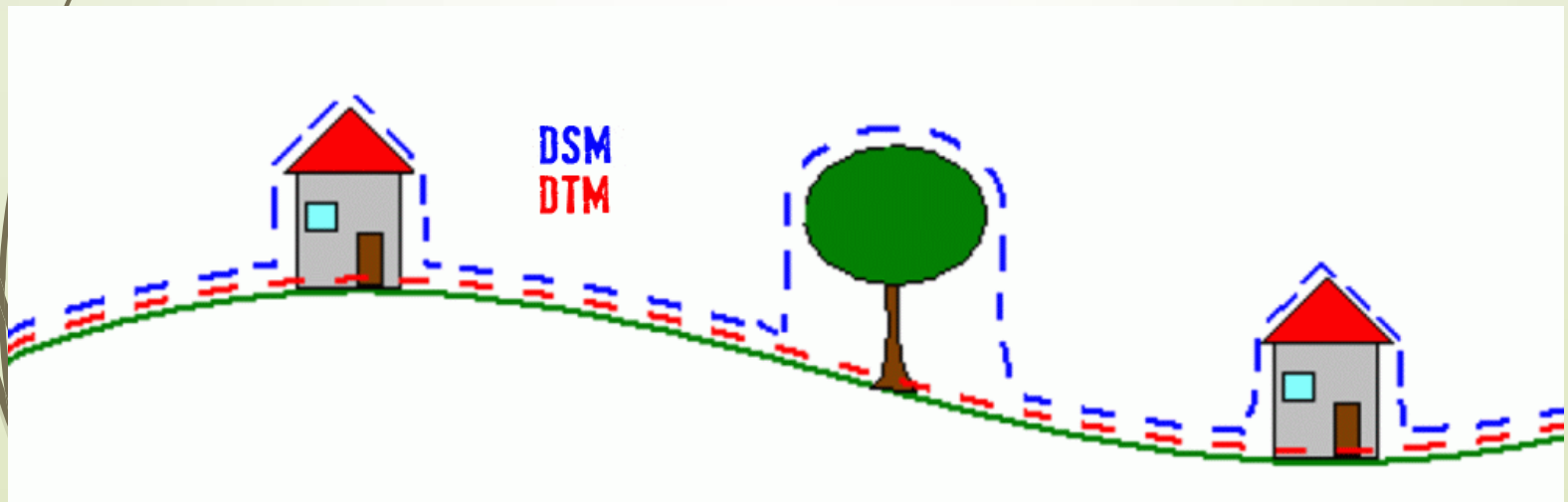

Camp
Pendleton
Ramona
Grasslands
San Vicente
Reservoir
Otay
Reservoir
Lidar Collection
2015
2014

Lidar


Laser Pulse
1st Return
2nd Return
3rd Return
Last Return
1st Return Minus Last Return

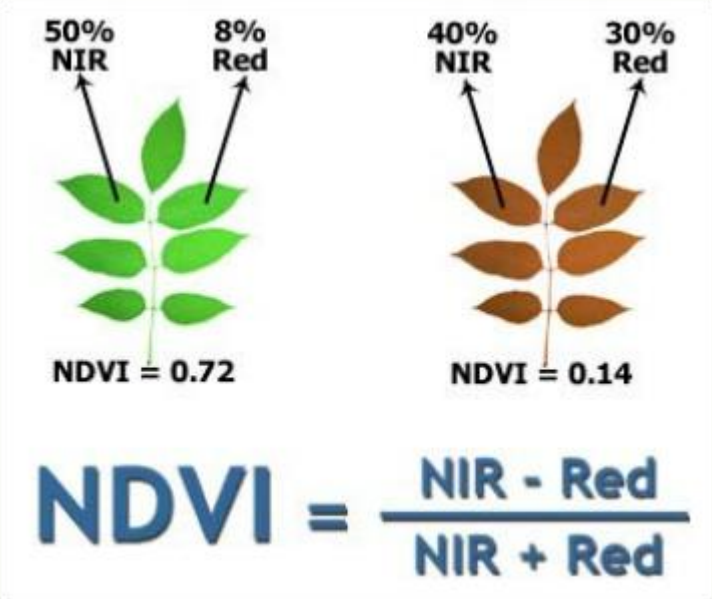
Lidar products

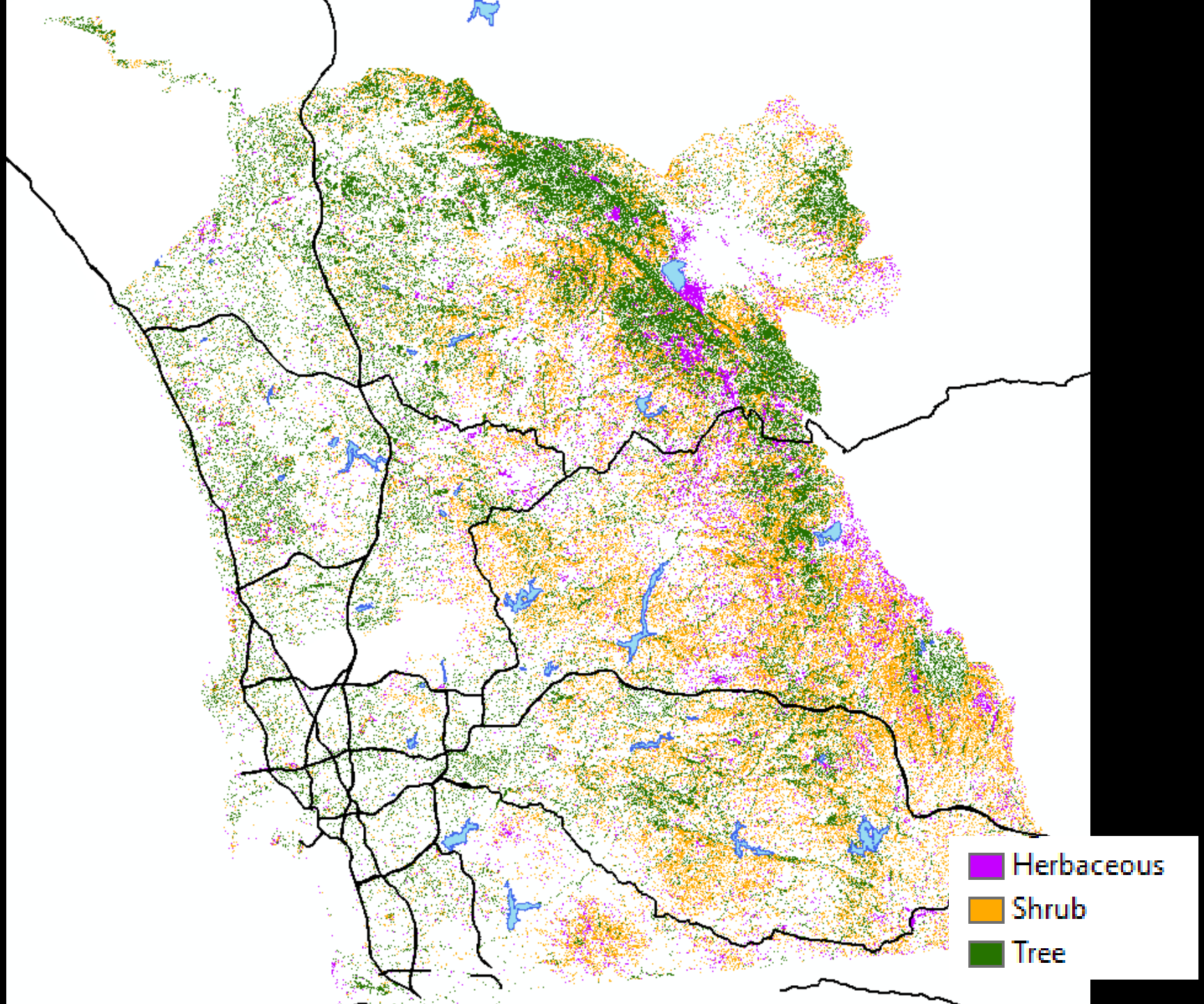
- Digital Elevation Model (DEM)- bare ground elevation.
- Digital Surface Model (DSM)- includes objects above the bare ground (trees, buildings)
- Normalized Digital Surface Models (nDSM)- difference between the DSM and DEM (aka height)

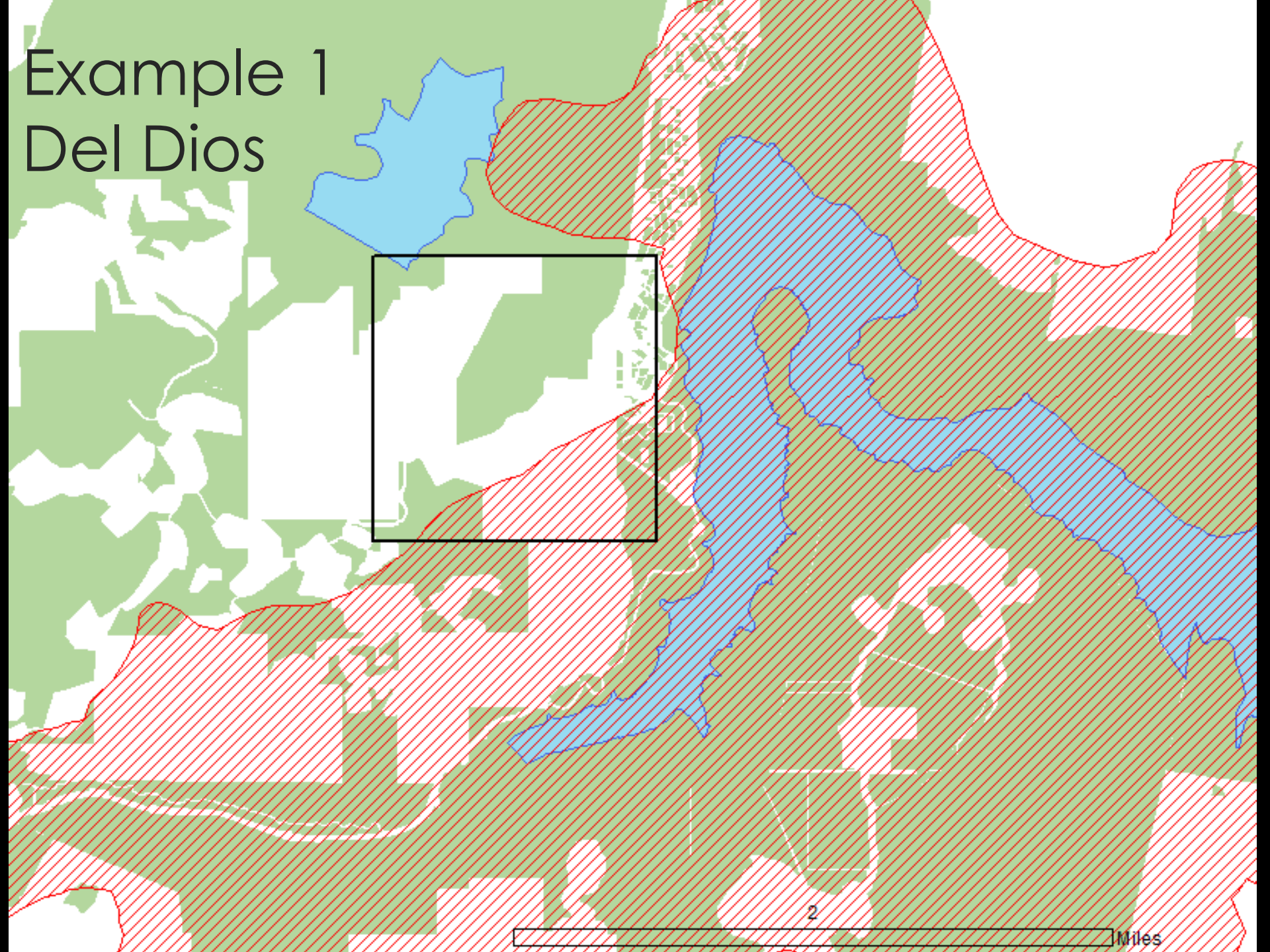


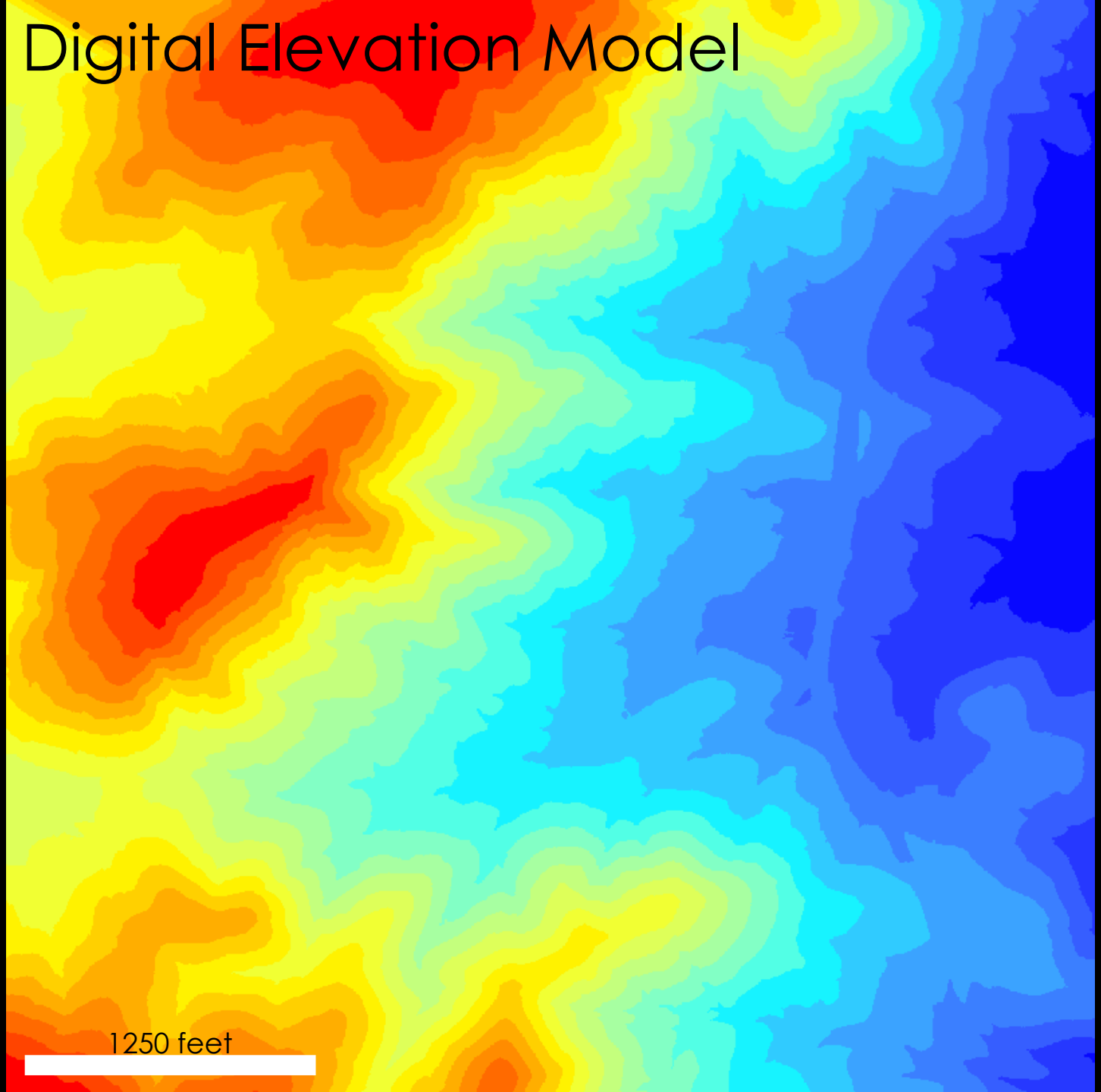
NDVI

- Normalized Difference Vegetation Index
- Measures the amount of photosynthetically active vegetation using near-infrared and red
- Ranges from -1 to 1
- Calculated from NAIP imagery (2ft resolution) and San Diego Regional Imagery (9in resolution)

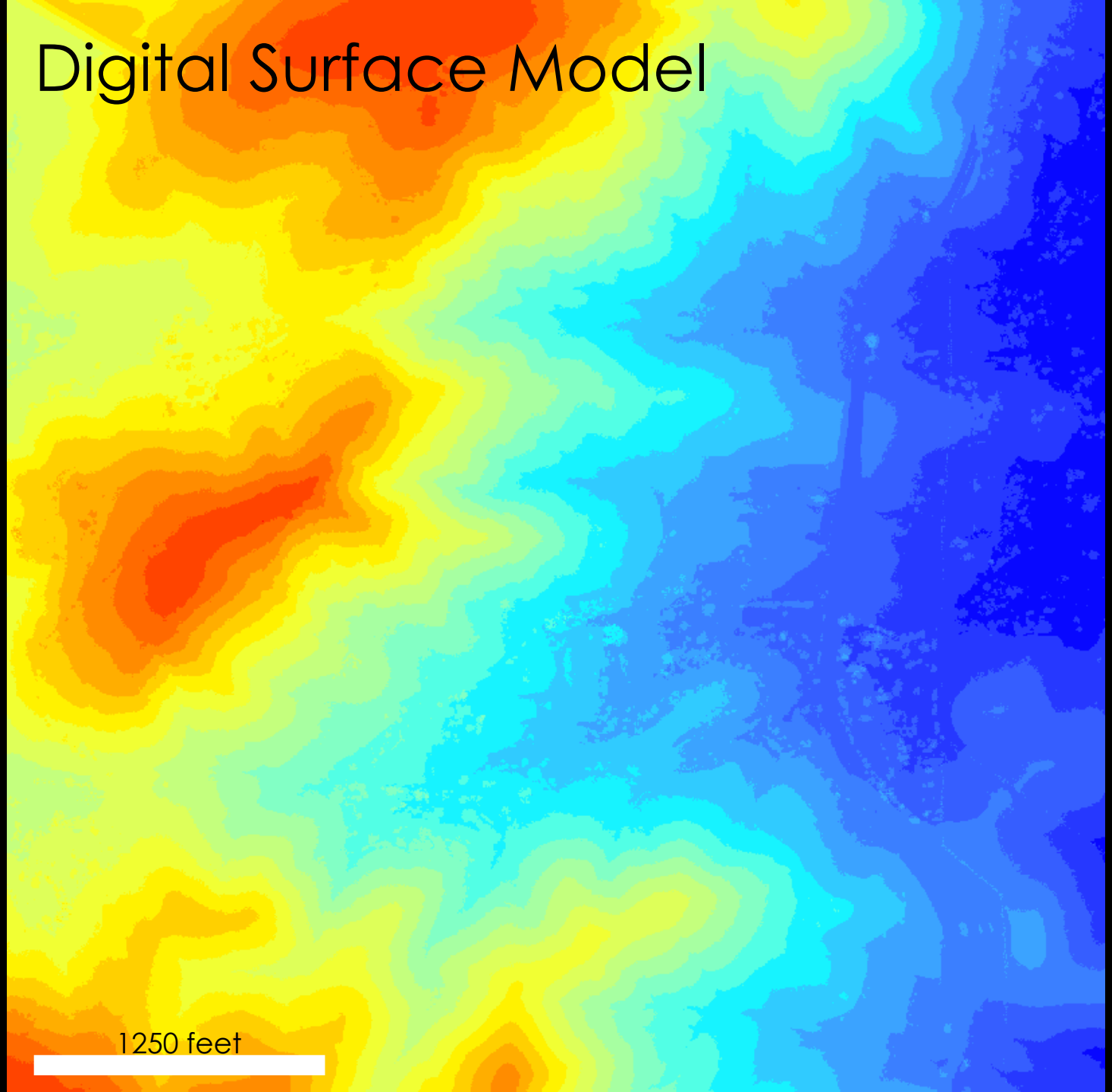



Herbaceous
Shrub
Tree

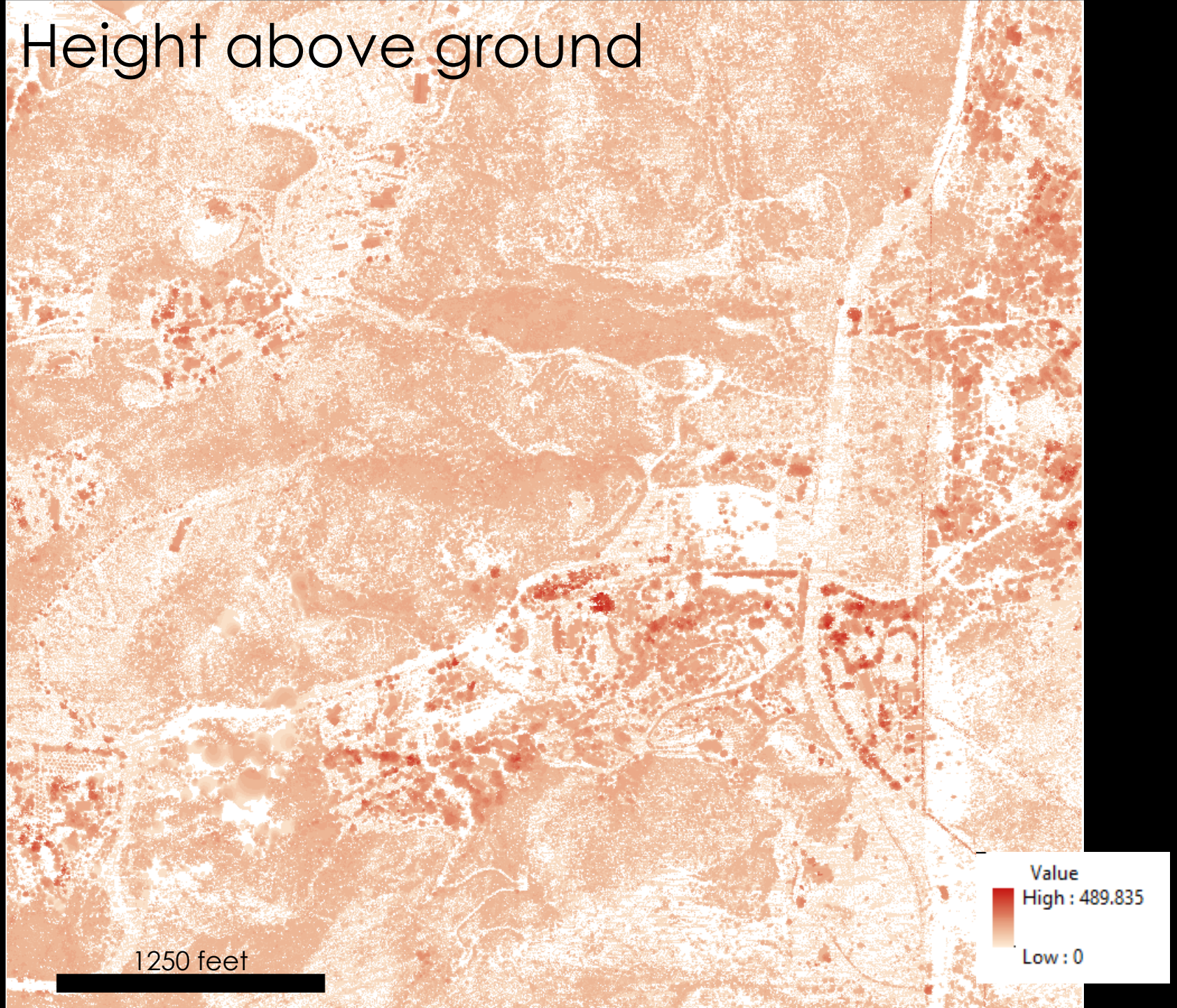

Example 1
Del Dios
2
Miles

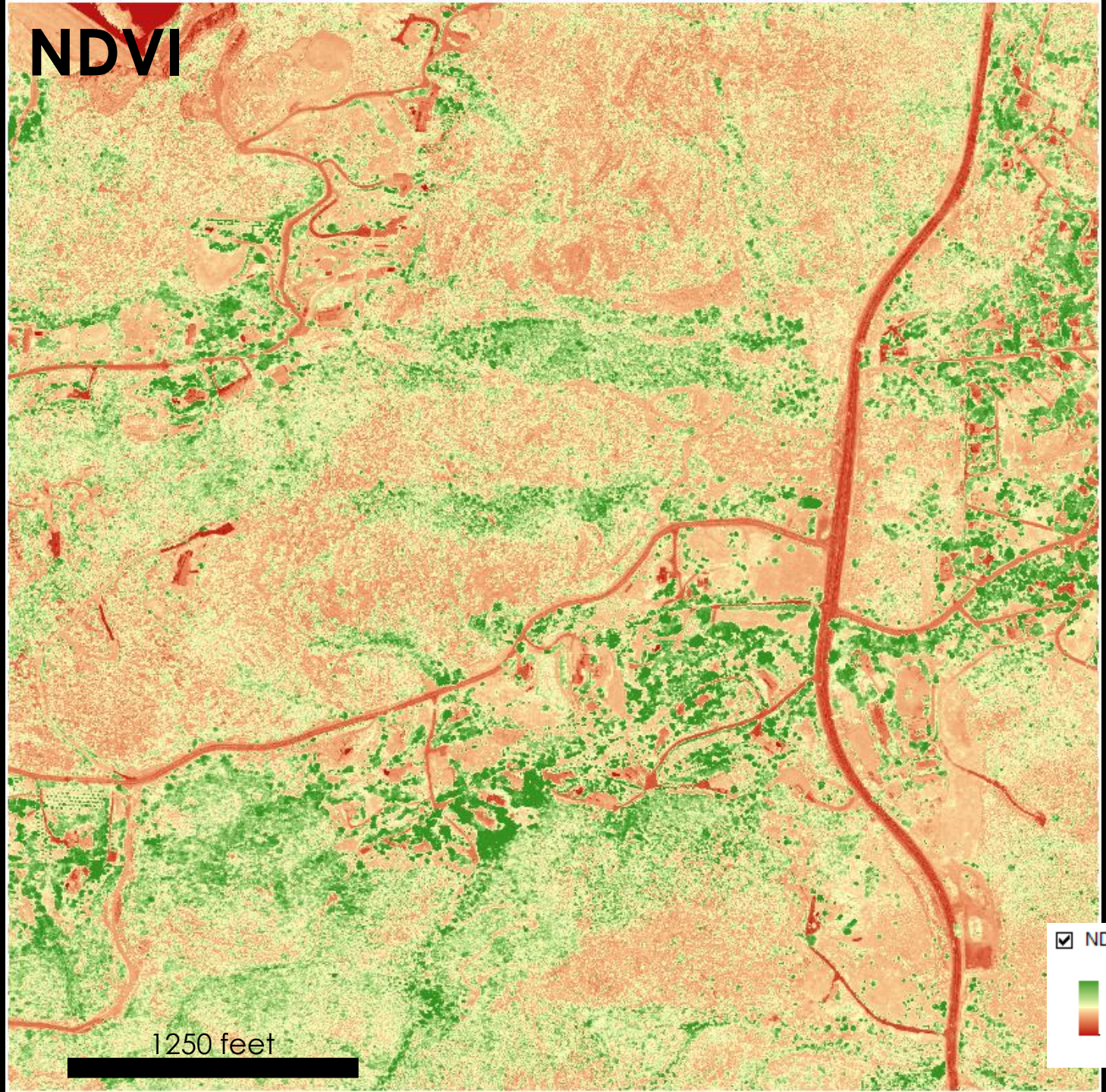

Digital Elevation Model
1250 feet

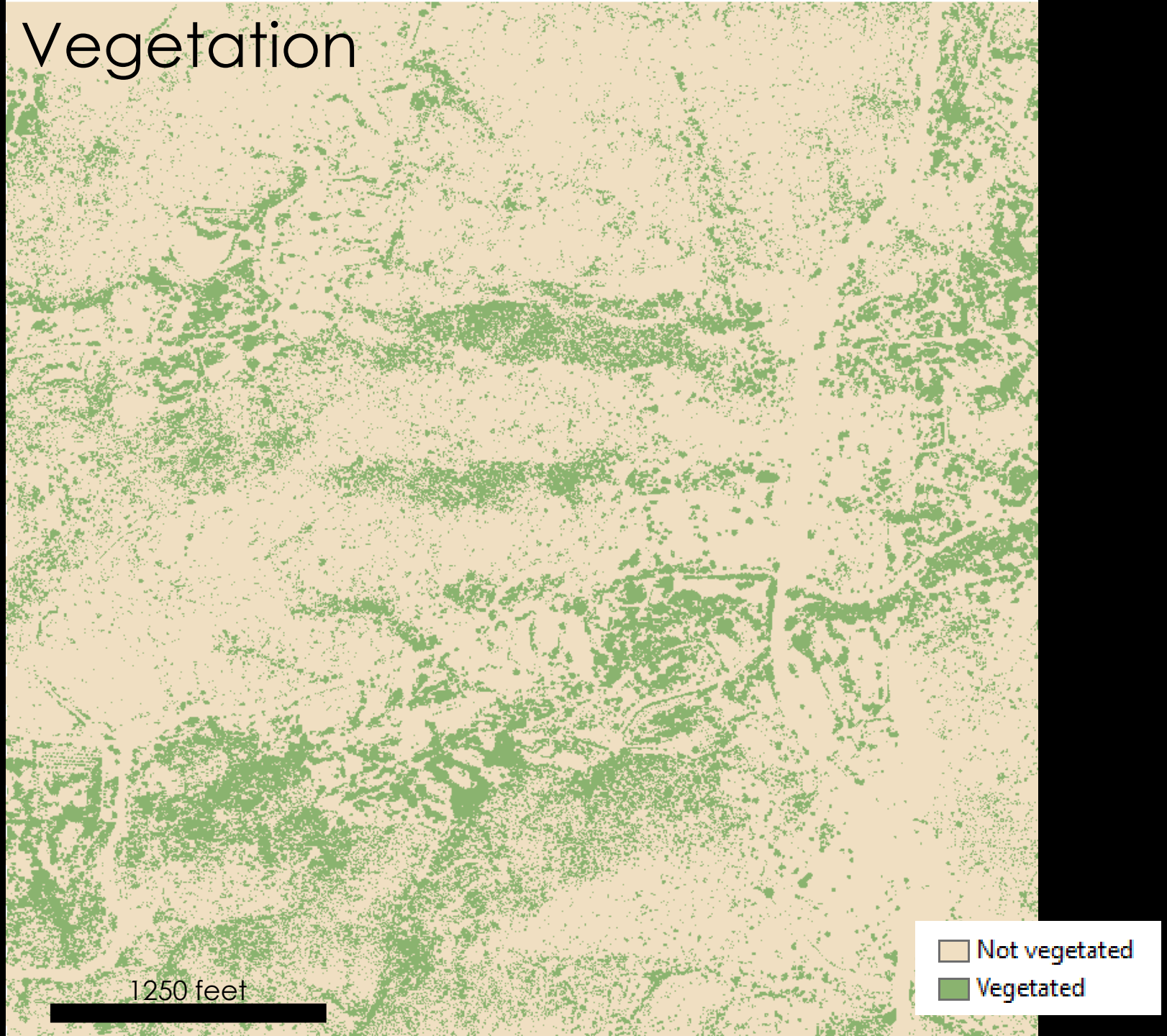
Digital Surface Model

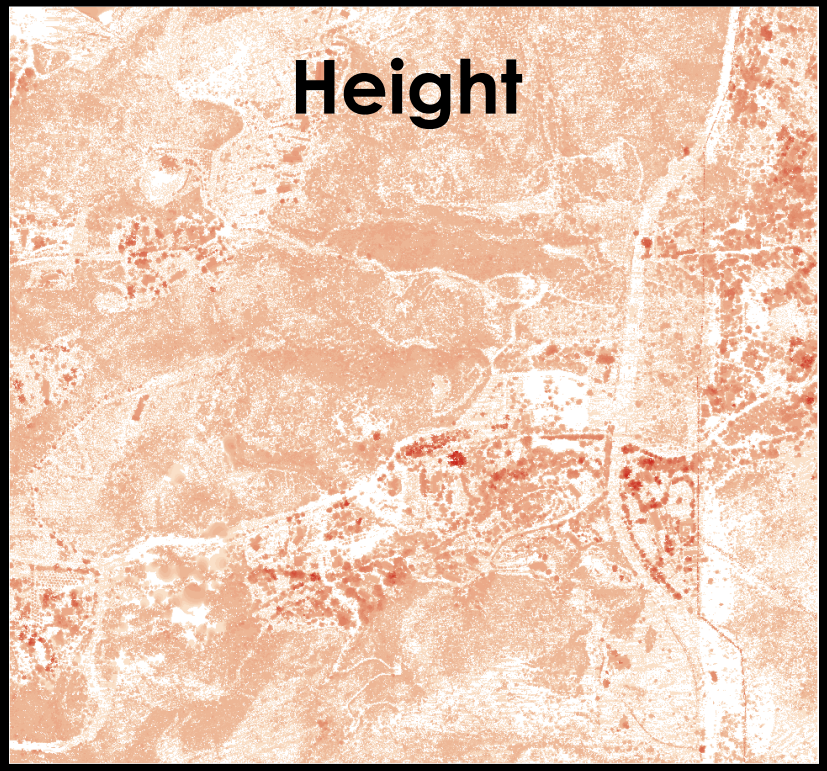


Height above ground




NDVI
1250 feet
NDVI
Value
High : 0.696629
Low : -0.888

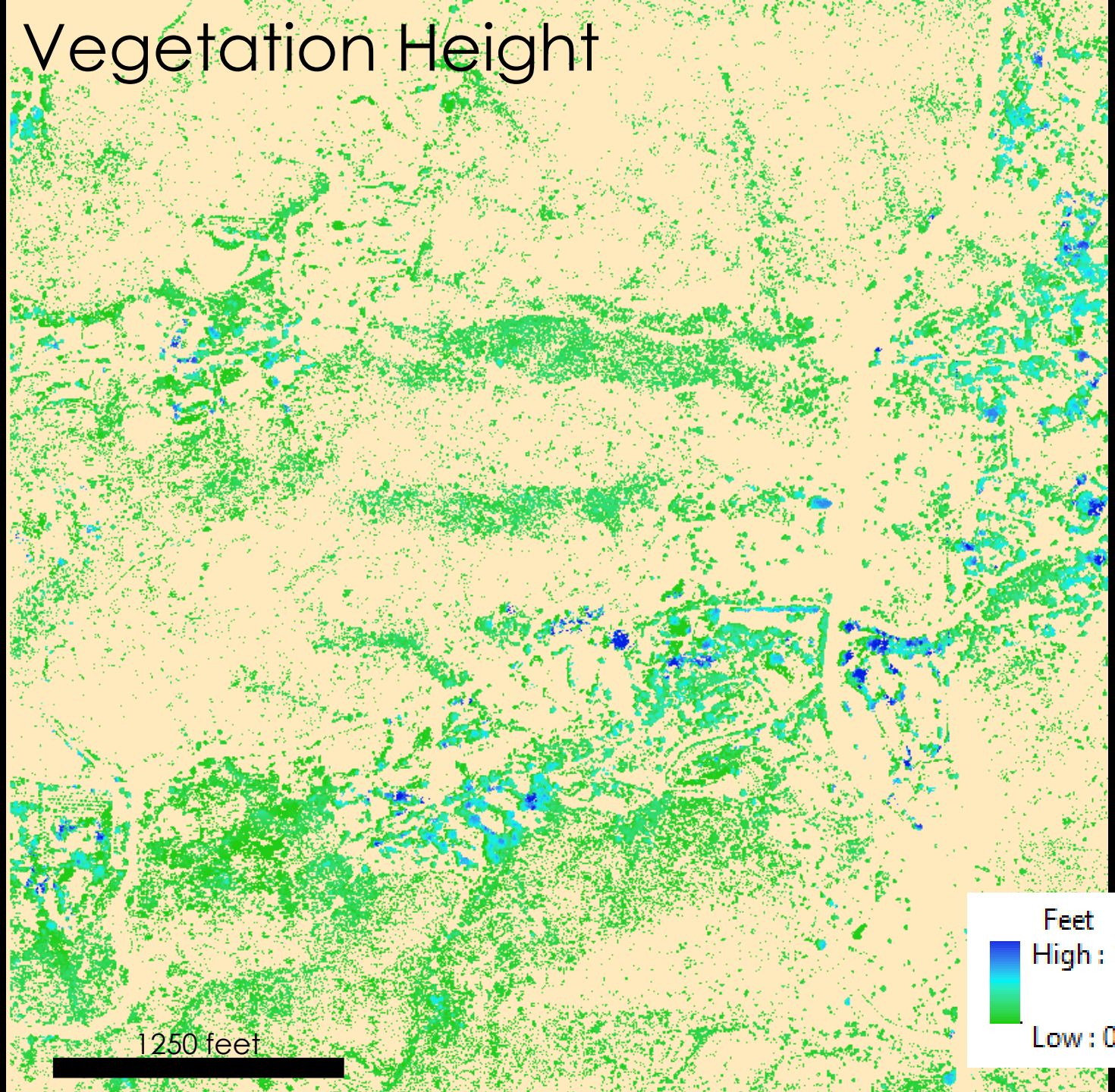

Vegetation
1250 feet
Not vegetated
Vegetated


Height

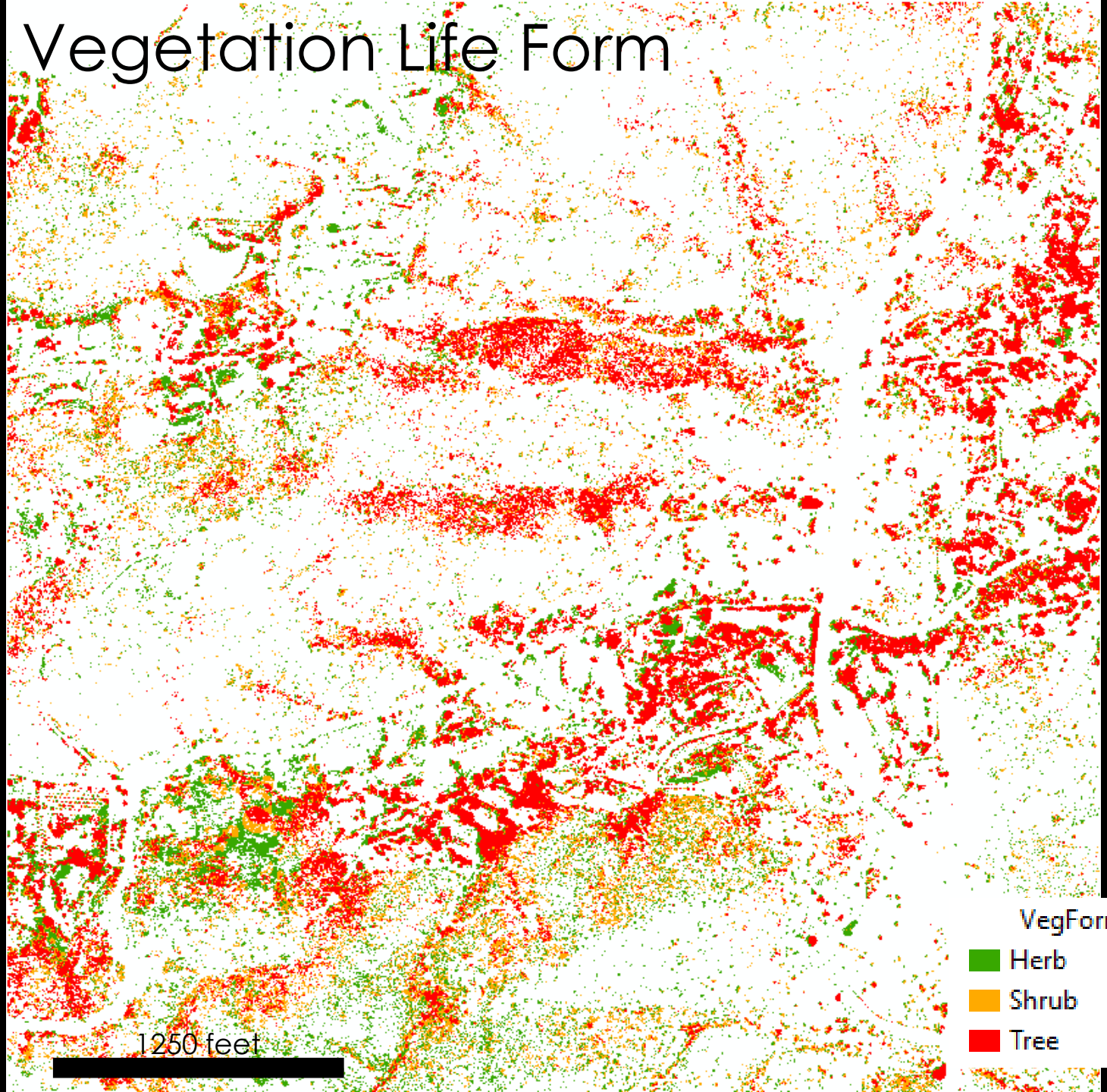
+

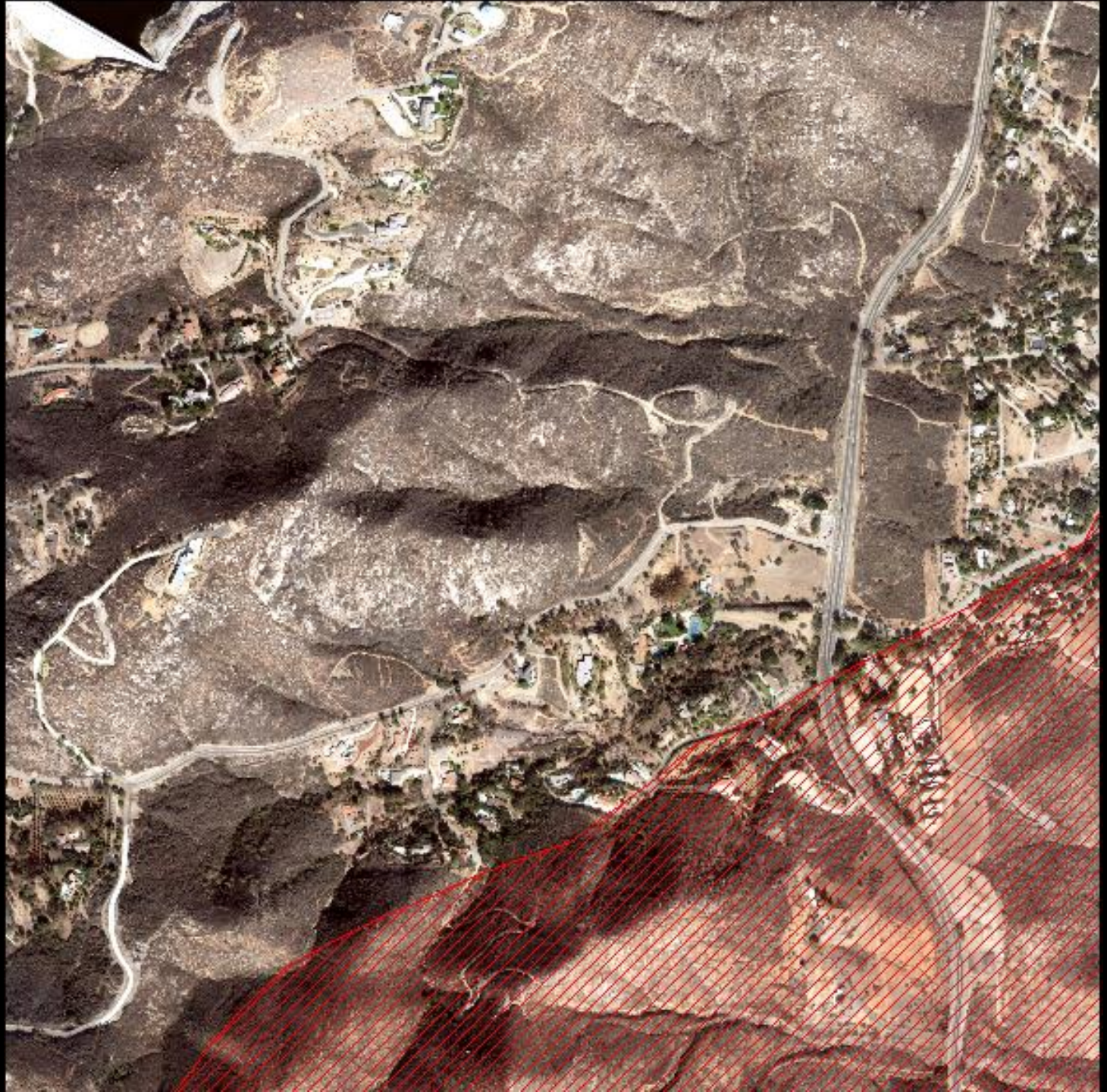

Vegetation

Vegetation Height

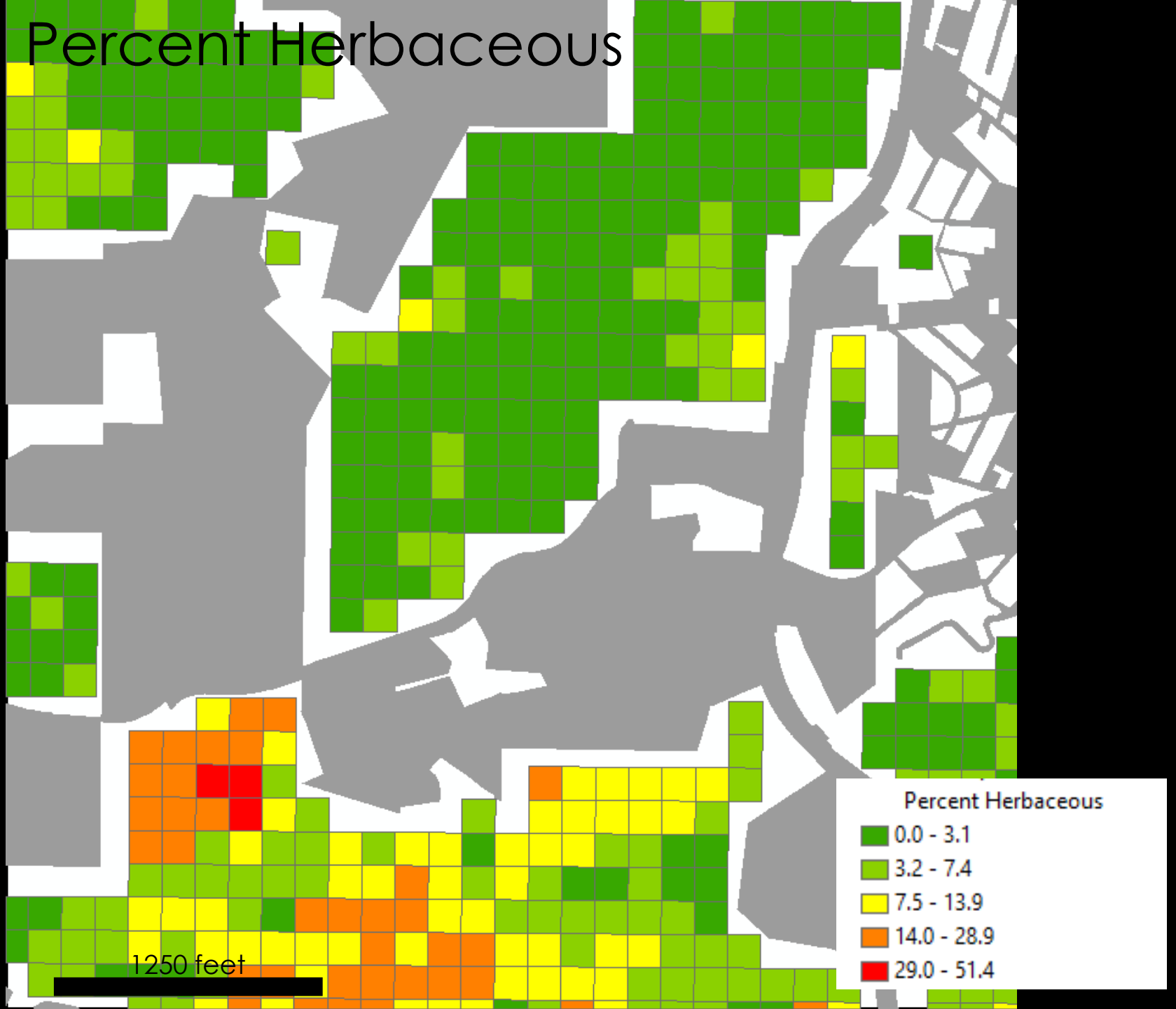


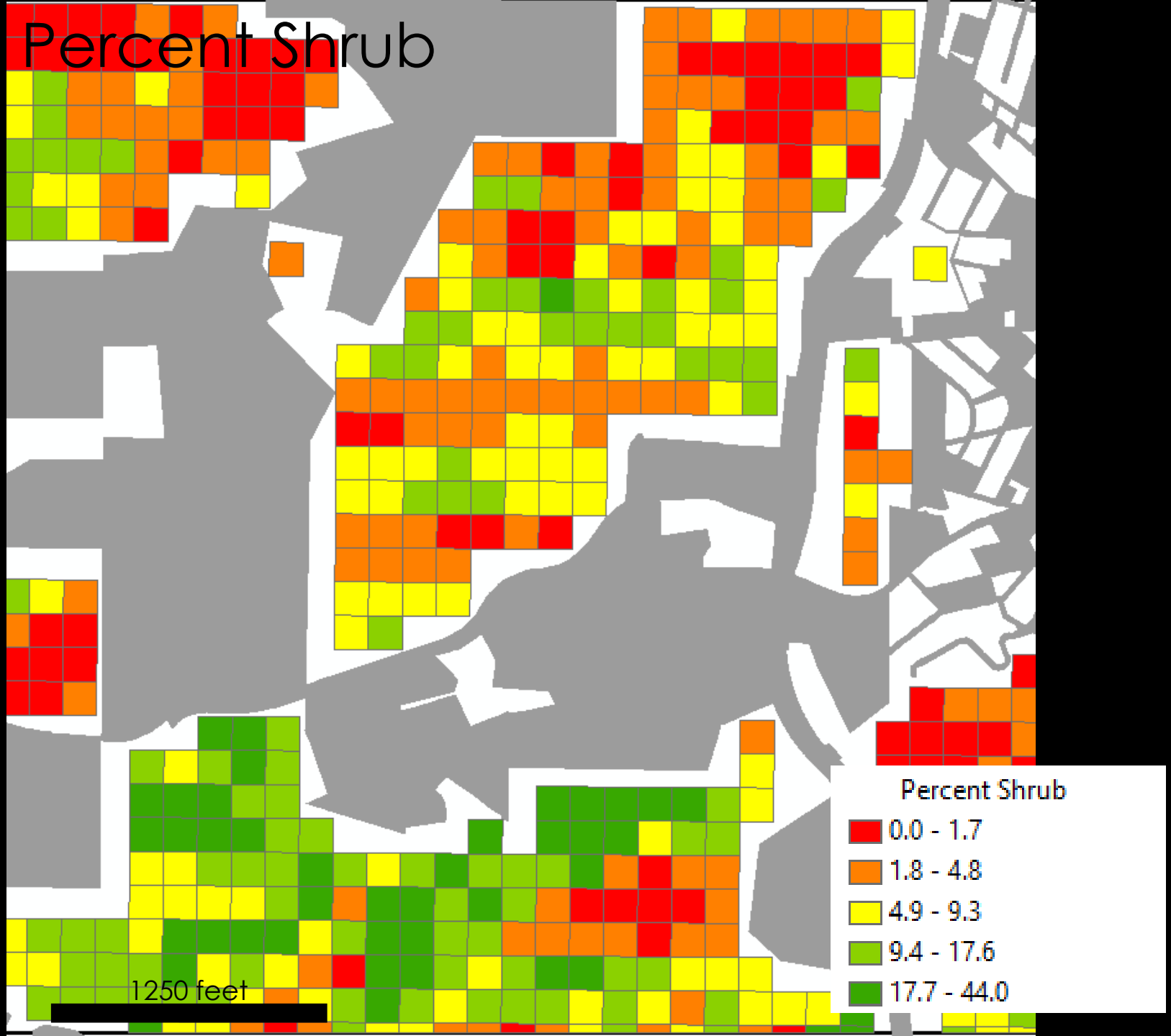
Vegetation Life Form



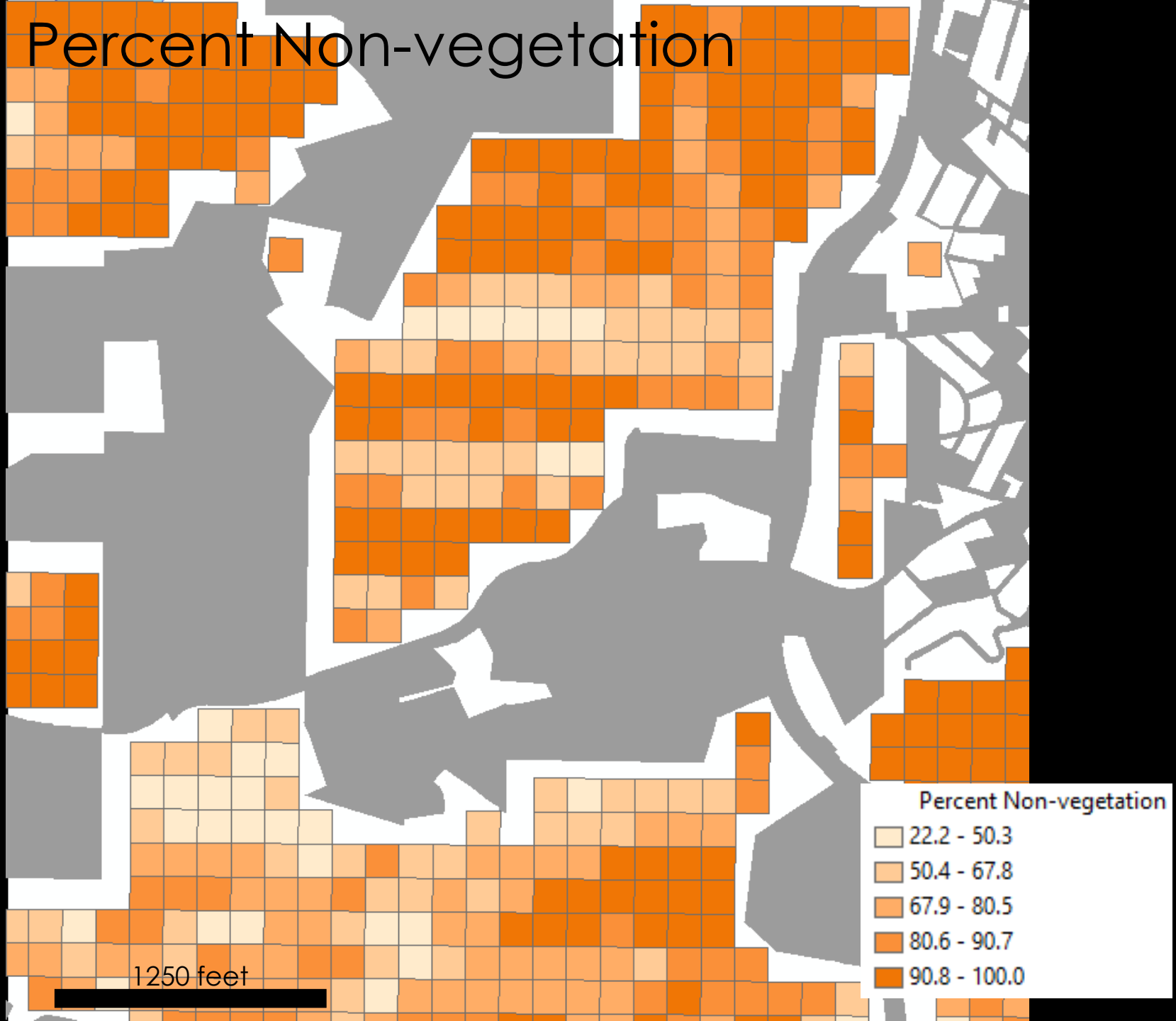


Percent Herbaceous




Percent Shrub
Percent Shrub
0.0 - 1.7
1.8 - 4.8
4.9 - 9.3
9.4 - 17.6
17.7 - 44.0
1250 feet

Percent Non-vegetation



Next steps

- Investigate methods using LANDSAT to identify large changes over time (from 1990s on)
  - Train model using lidar classifications, field data (CAGN, rare plants, etc), and other data sources (SDG&E fuels classification map, vegetation maps)
- Analyze how other covariates such as fire, drought, land use, and nitrogen deposition are associated with vegetation change

Schedule for Next Steps

- 2019 – Pilot study to test integrity classes, build model, train model on existing data sources
- 2020 – New imagery flown by SANDAG and NAIP
- 2020 – Field sampling to evaluate the accuracy of the model and integrity classes

Thank you
Questions?