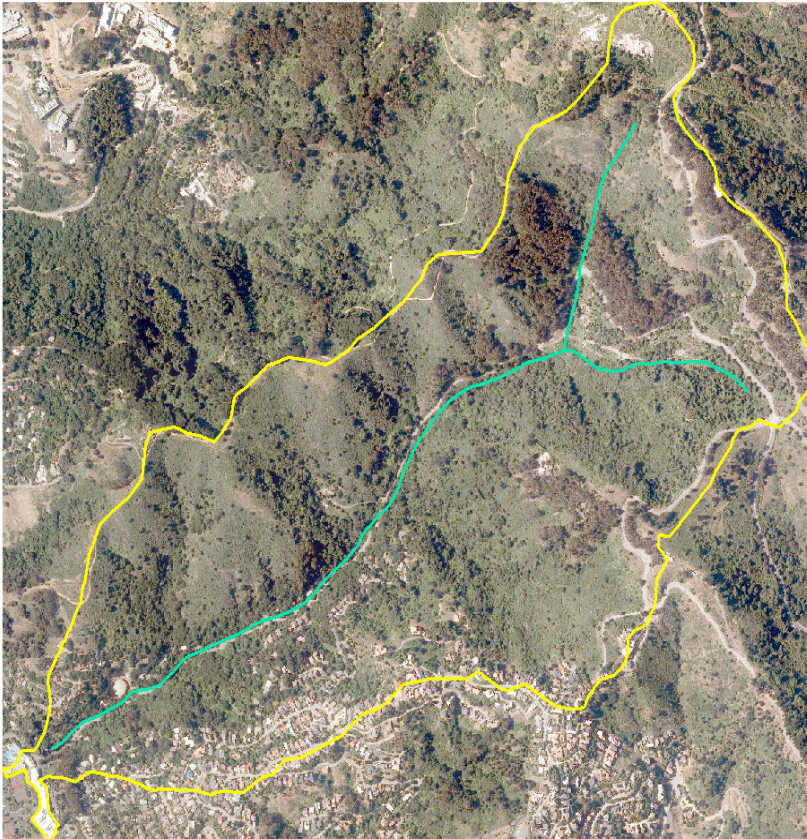Alice Hua
GEOG 188: Sect 102
10/2/19

Lab 08: Spatial Operation II - Raster & Surface Analysis

In building the Suitability Model of the Claremont Canyon for an Outdoor Classroom, I considered 4 layers of Constraints and 3 layers of Opportunites. The flow chart below lists the different layers I used in this suitability analysis.

In my concept of an Outdoor classroom, the classroom should avoid being built on poor slope stability, faults and steep slope. It should also be built where there is a big enough area for the purpose of outdoor activities that the classroom might conduct. On the other hand, the classroom need to receive plenty of sunlight and be close to a water source for the purpose of science education and or the purpose of inducing calmness, while at the same time this classroom needs to closer to the surrounding homes for accessibility.
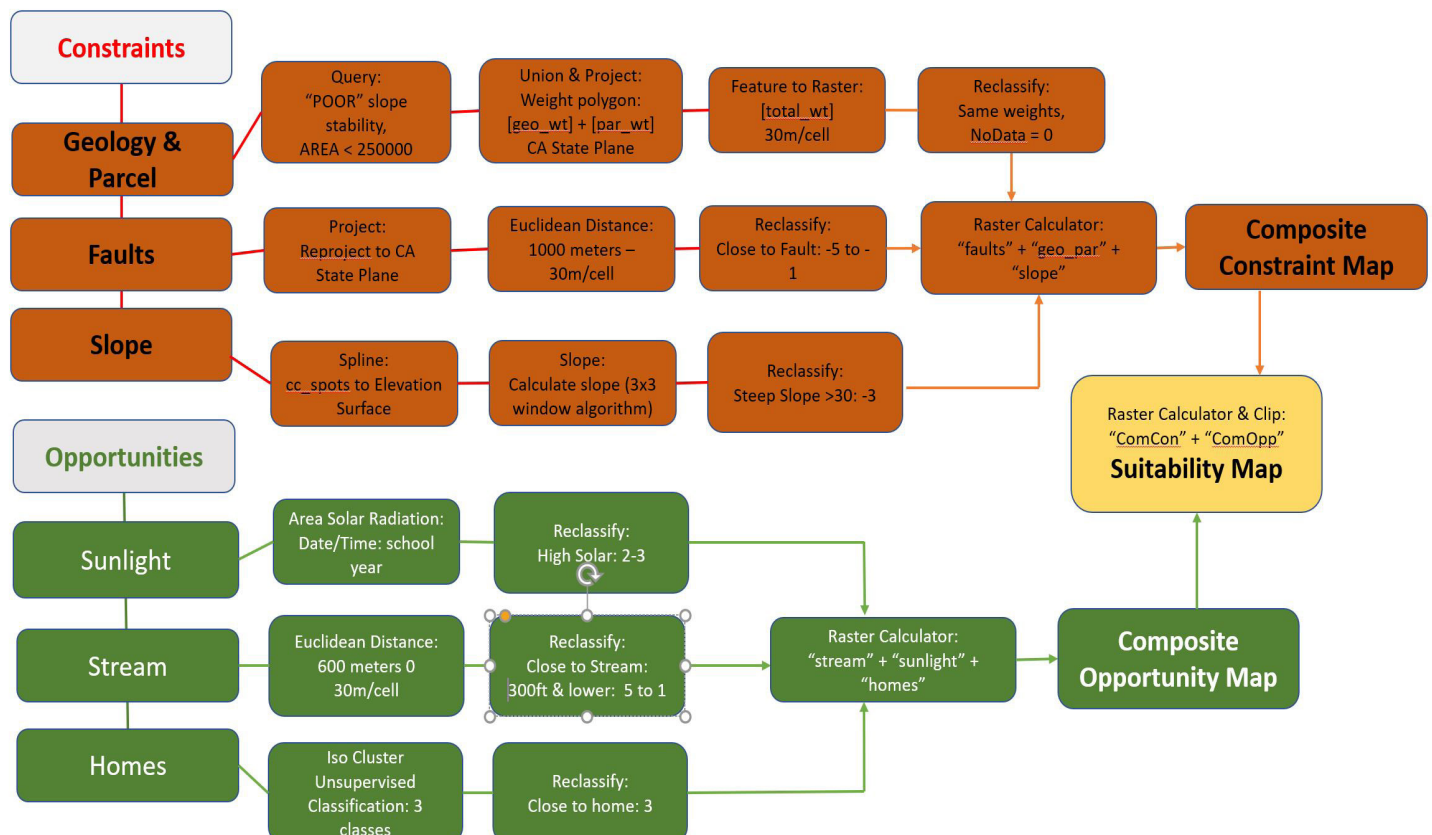
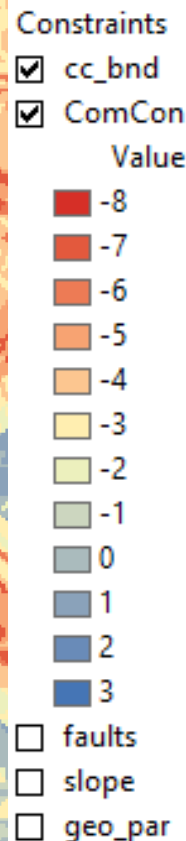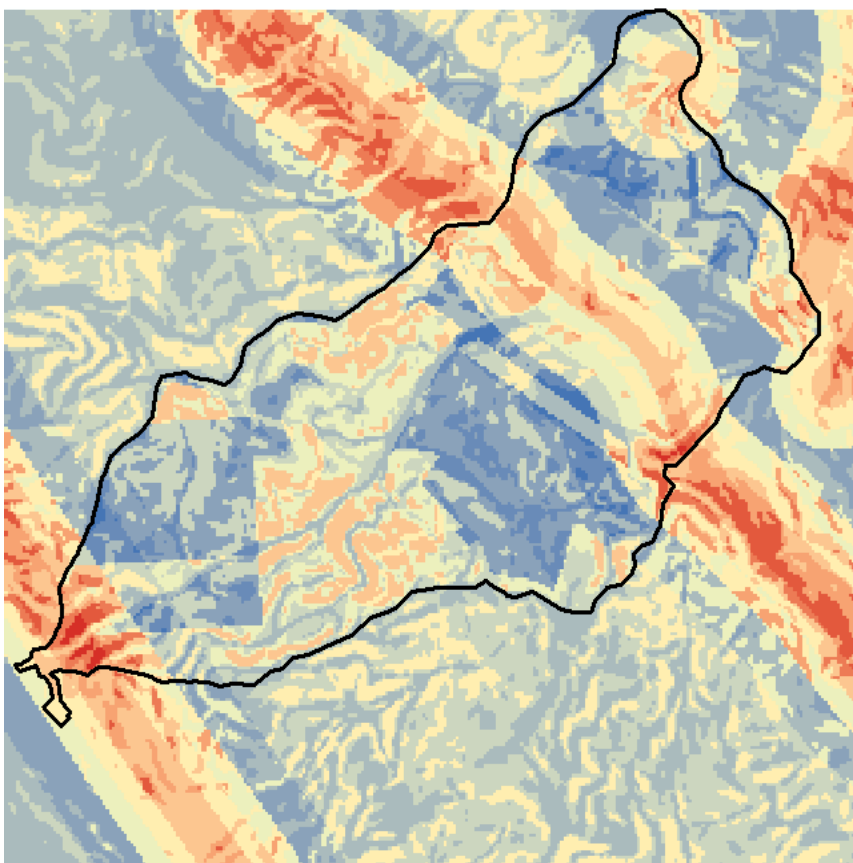**The Constraints:** Slope, Geology and Parcel, Faults

Slope: To avoid steep slope for the classroom, I first used the elevation surface layer generated from spot shapefile to calculate the slope using the Slope tool. The resulting layer of decimal degrees of slope is furthered processed by the Reclassify tool. I manual classified the slope into 3 different classes, slope that is steeper than 30° receives a weight of -3.

Geology and Parcel: To avoid poor slope stability and small area for the classroom, I queried for POOR slope stability and parcels that are smaller than 250,000ft. I weighted the POOR geology to -2 while the smaller parcels receive a weight of -1, bigger parcels receive a weight of 2.
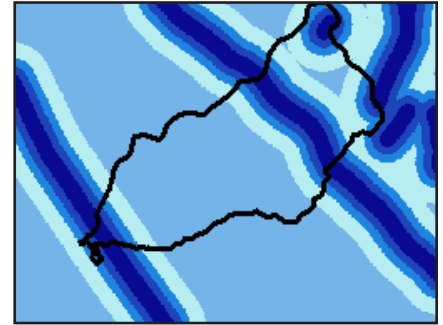
Faults: To avoid the classroom being built on fault lines, I used the Euclidean Distance tool to buffer the area by maximum of 1000 meters. I then reclassify fault zones into 5 classes using equal interval. The class closest to the faults is weighted as a -4, next class is -3, -2 and 1 for zone furthest away, 0 for NoData.

Constraints
☑ cc_bnd
☑ ComCon
  Value
■ -8
■ -7
■ -6
■ -5
■ -4
■ -3
■ -2
■ -1
■ 0
■ 1
■ 2
■ 3
☐ faults
☐ slope
☐ geo_par

Worst site: Based on this Constraint map, the most constrained locations would be North and Southside within the Claremount boundary. These are the sites of existing fault lines. In conjunction, the Northside stripe seen on this map also has poor slope stability. Zoom further in on this Northside stripe to the Southeast margin is the area of highest constraint value because it also has a smaller land area.
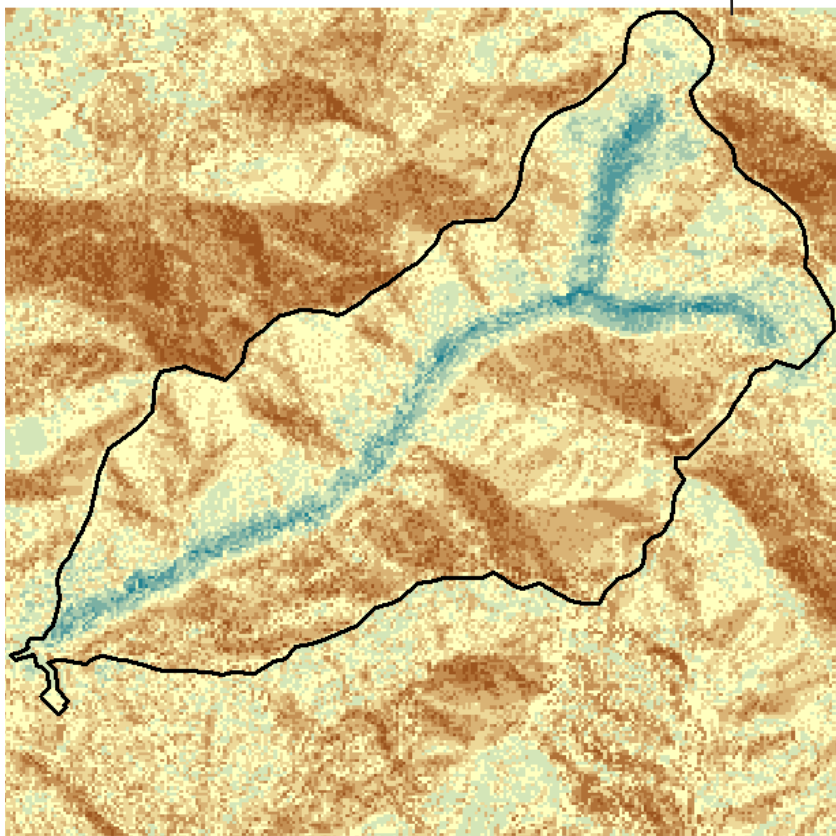
The Opportunities: Sunlight, Stream and Homes
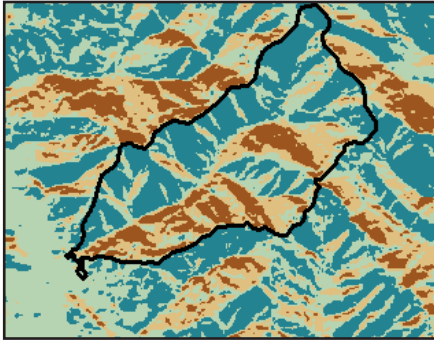
Sunlight: An outdoor classroom would need sunlight to enhance learning. By using the Area Solar Radiation tool, I passed in the evelation surface layer generated earlier, queried for the school year (Aug - Dec, 2019) because this is the time where students are most likely are going to school. I then reclassified 4 classes in equal interval, classes with higher solar incidence receive a 4, 3, 2.
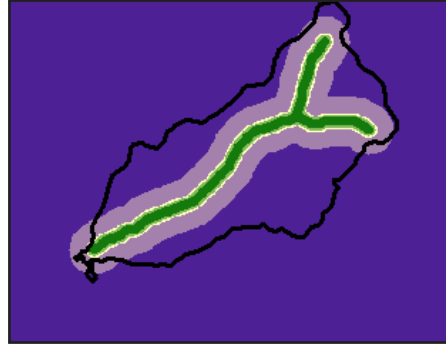
Stream: Students in outdoor classroom will definitely benefit from being close to water for its educational and psychological effects. Here, I used Euclidean distance too to buffer by a maximum distance of 600 meters. I reclassified the layer into 4 classes, area within 300 meters of the stream to weights of 4 and 3. Area less than 600ft but further than 300ft of the stream as weights 1 and 2.
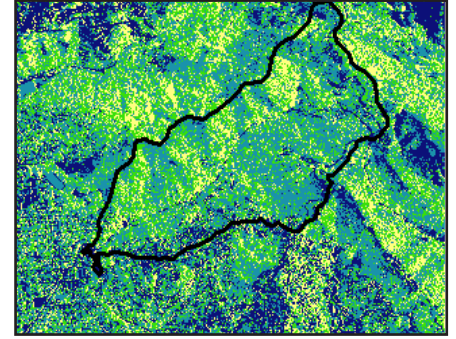
Homes: Being close to homes, this outdoor classroom will have a higher walk score and is accessible to those living nearby. Using the Iso Cluster Unsupervised Classification, I classified the NAIP imagery into 4 classes. From observation, class 4 correspond with homes, so it receives a 3. the further away from home, the lower weight the class receive from 2 to 0.
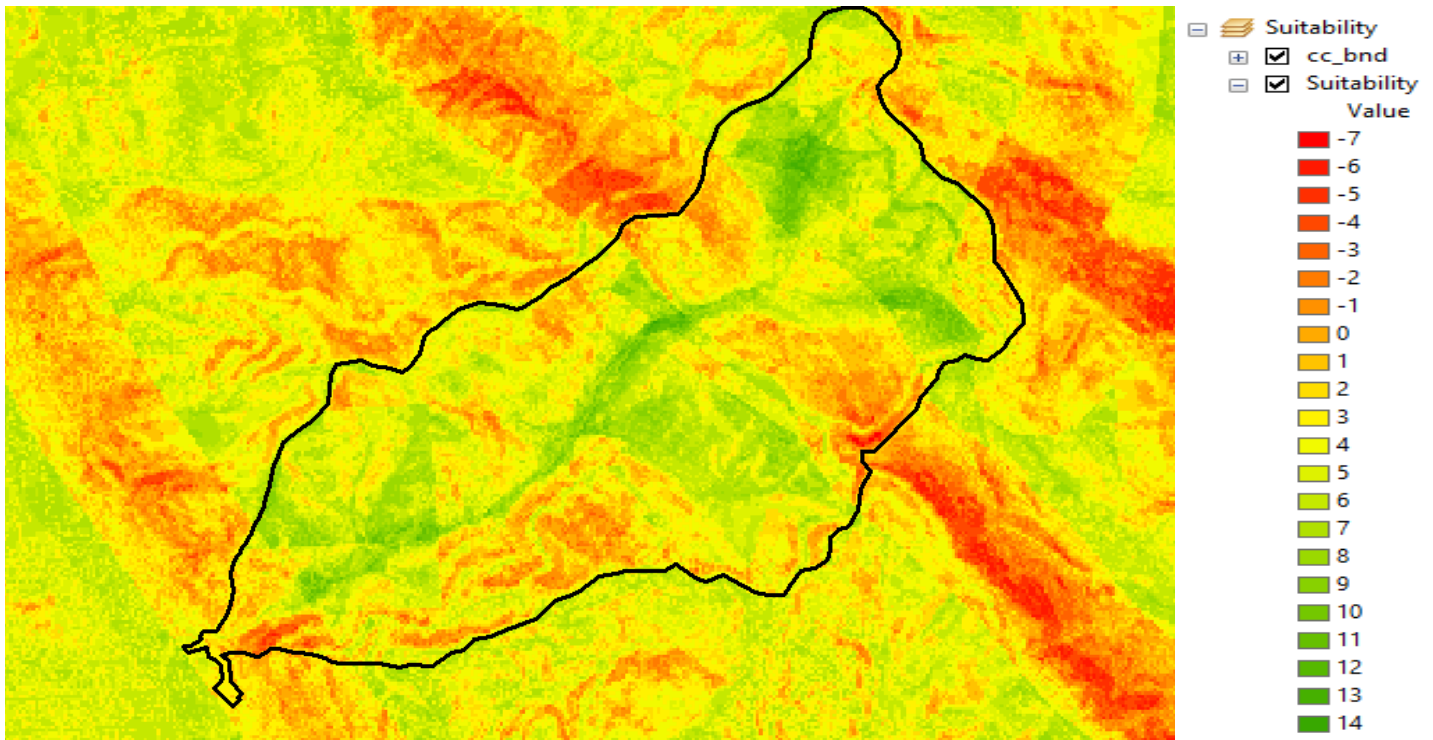

Opportunities
- ☑ cc_bnd
- ☑ ComOpp

Value
- ■ 1
- ■ 2
- ■ 3
- ■ 4
- ■ 5
- ■ 6
- ■ 7
- ■ 8
- ■ 9
- ■ 10
- ■ 11

- ☑ homes
- ☑ sunlight
- ☑ stream

Best site: Based on this Opportunities map, the best site for an outdoor classroom would be along the stream, particularly in the triple junction of it (intersection of Fire Trail and Claremont Ave). East and West regions of the stream are good site, however, East of the stream receives more sunlight. The best site may therefore be in 2/3 of the Eastside of the stream located in the middle of the Claremont.

The Suitability Model: Constraints + Opportunities

     The map above is the combined suitability map for this study. There are some competing interests at play (e.i. close to homes but also large area) between the Constraints and Opportunities maps that have resulted in the most suitable place for an outdoor classroom in the furthest Northeast corners and southwest region, East of the stream as well as the middle and partial West of the stream. Using the Segment Mean Shift tool to group adjacent pixels according to its spectral signature in the map below, you can that our suitable classroom will most likely be in a more secluded area of the Claremount.
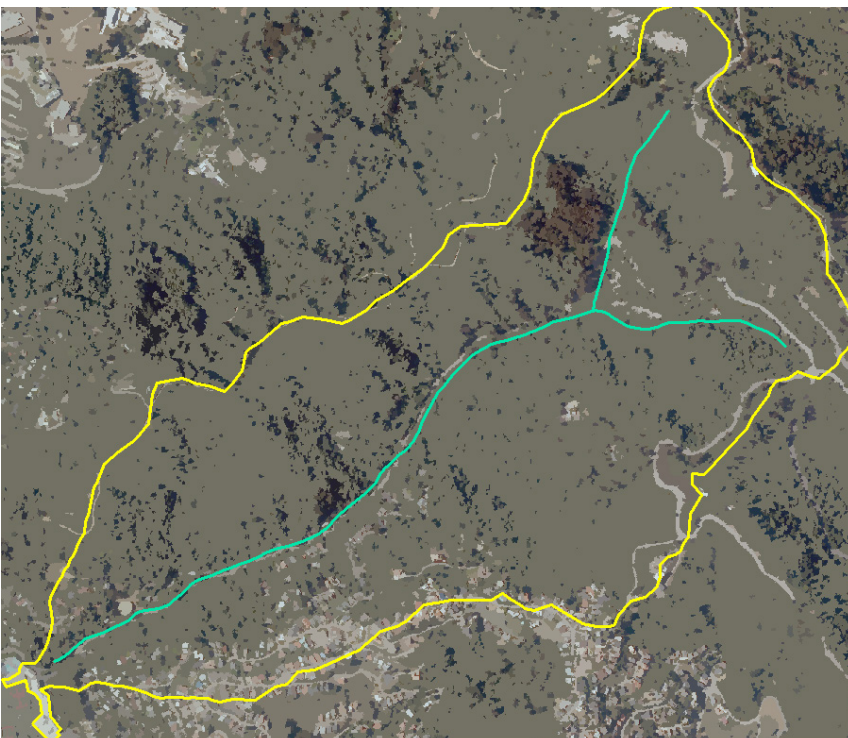
One site for this classroom could be where the Fire Trail and Claremont Ave intersect because it has the highest weighted factor of 14. Using only my criteria for this suitability study, I would condemn sites of the Golden Bear Field, the Witter Rugby Field and private homes West of the stream as well as homes West of the Claremont Club & Spa. However, there maybe other criteria that my model did not include that could have resulted in a different suitability model for these sites.