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## Assignment 7: GEOG 181A (Intermediate GIS)

*Assignment Prompt: In an effort to meet increasing demand for higher education, UCLA wants to establish a satellite campus. It is estimated that the satellite campus will serve approximately 5,000 additional students and staff. The UC Regents and LA County have put out an RFP (i.e., Request for Proposals) to identify the best location for this new campus. At this point in time the only criterion is that the campus must be situated within Los Angeles County. You are assigned to conduct the Suitability Analysis to select the best location.*

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### UCLA Satellite Campus Suitability Analysis

UCLA seeks to expand its educational operations by establishing a new satellite campus in LA County. When considering a new campus location, it is imperative to consider both natural and cultural factors. UCLA's GIS team has chosen three variables to analyze: 1) Slope Grade, 2) Prospective Student Population, and 3) Distance to Public Libraries. Using ArcGIS Pro, the team conducted a suitability analysis to weigh the three variables and narrow down potential campus locations to three regions, with each being 100 square kilometers in area.

This suitability analysis was broken down into two parts: the first being calculated using the Raster Calculator Tool, and the second being calculated using the Suitability Modeler Workflow. The Raster Calculator Tool allowed for a quicker, more streamlined process, as it prompted them to manually build and run a single Python expression using custom weights for each of the fields. The Suitability Modeler Workflow provided a more detailed, step-by-step interface, which allowed the team to manually input the weights and select the ideal transformation functions for each individual layer. This workflow utilized built-in continuous functions to return results, requiring analysts to first reclassify any layers with discrete or missing values to be continuous. In this case, the team only had to reclassify the "Prospective Student Population" layer before running the analysis.

To return comparable results, the team weighted the layers in the same way for both methods. "Slope Grade" and "Prospective Student Population" were both set at 0.4, or 40% weight. "Slope Grade" was an important variable because terrain that was too steep would require substantially higher costs of building infrastructure, as well as introduce higher risks for landslides or mudslides. However, "Prospective Student Population" was equally important when considering the purpose of this new campus: meeting the increasing demand for higher education. Much of this rising demand comes from working-class families whose children seek

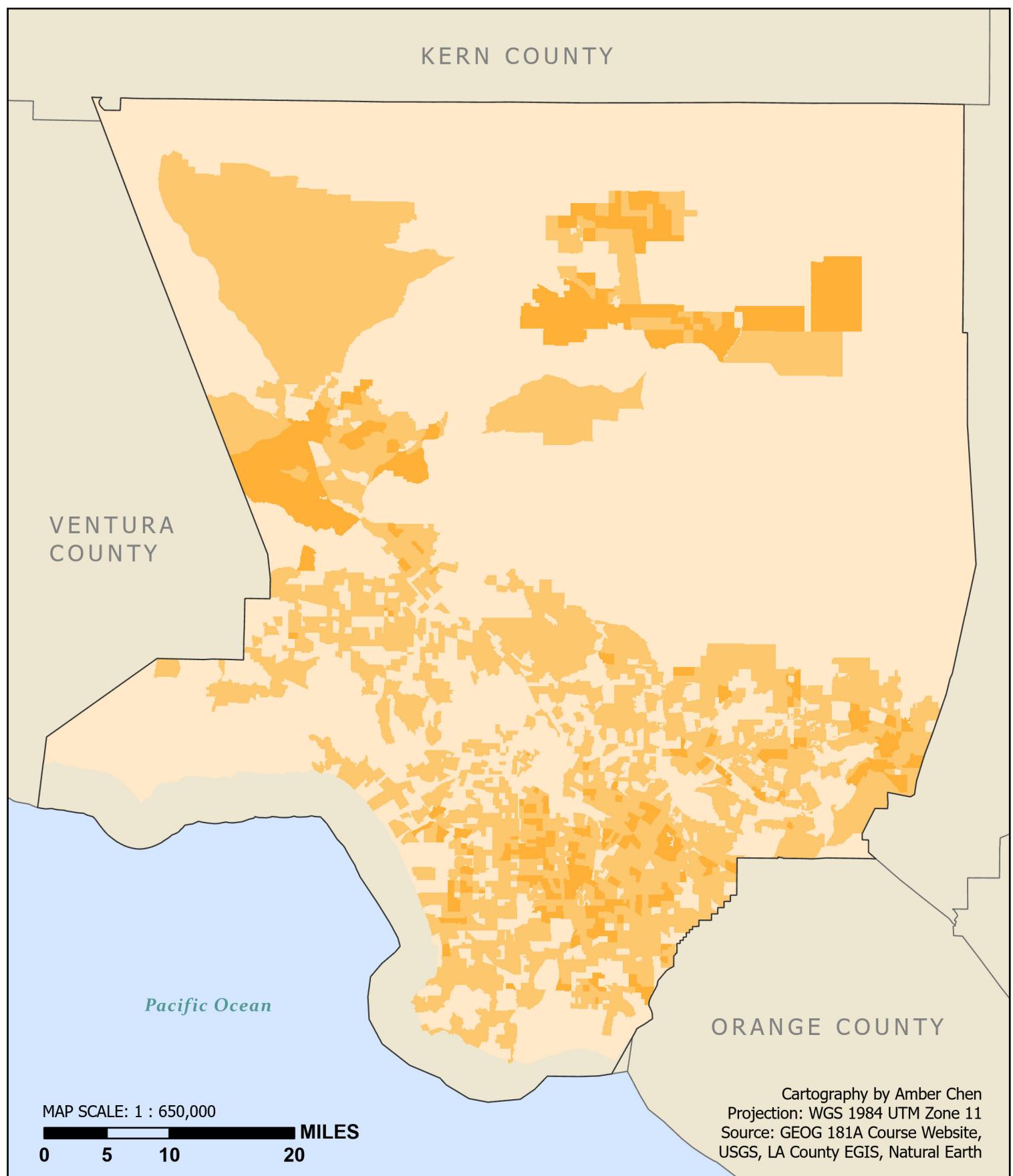
higher education, yet cannot afford on-campus housing costs despite obtaining federal aid for tuition. By situating the new satellite campus in a region with a high population of children aged 14 and under, the campus will serve not just traditional students, but also commuters.

Additionally, by examining the concentration of these younger students, researchers can ensure the campus will serve students for years to come. Lastly, the team gave “Distance to Public Libraries” a 0.2, or 20% weight. Knowing that many students would enjoy studying off-campus or utilizing public library resources, researchers chose to consider this variable. Locations were given higher scores if they were within 5 kilometers of a public library, making them easily accessible through public transportation. However, because UCLA’s new campus would certainly contain libraries of its own, the analysts decided to give this variable less weight than the others.

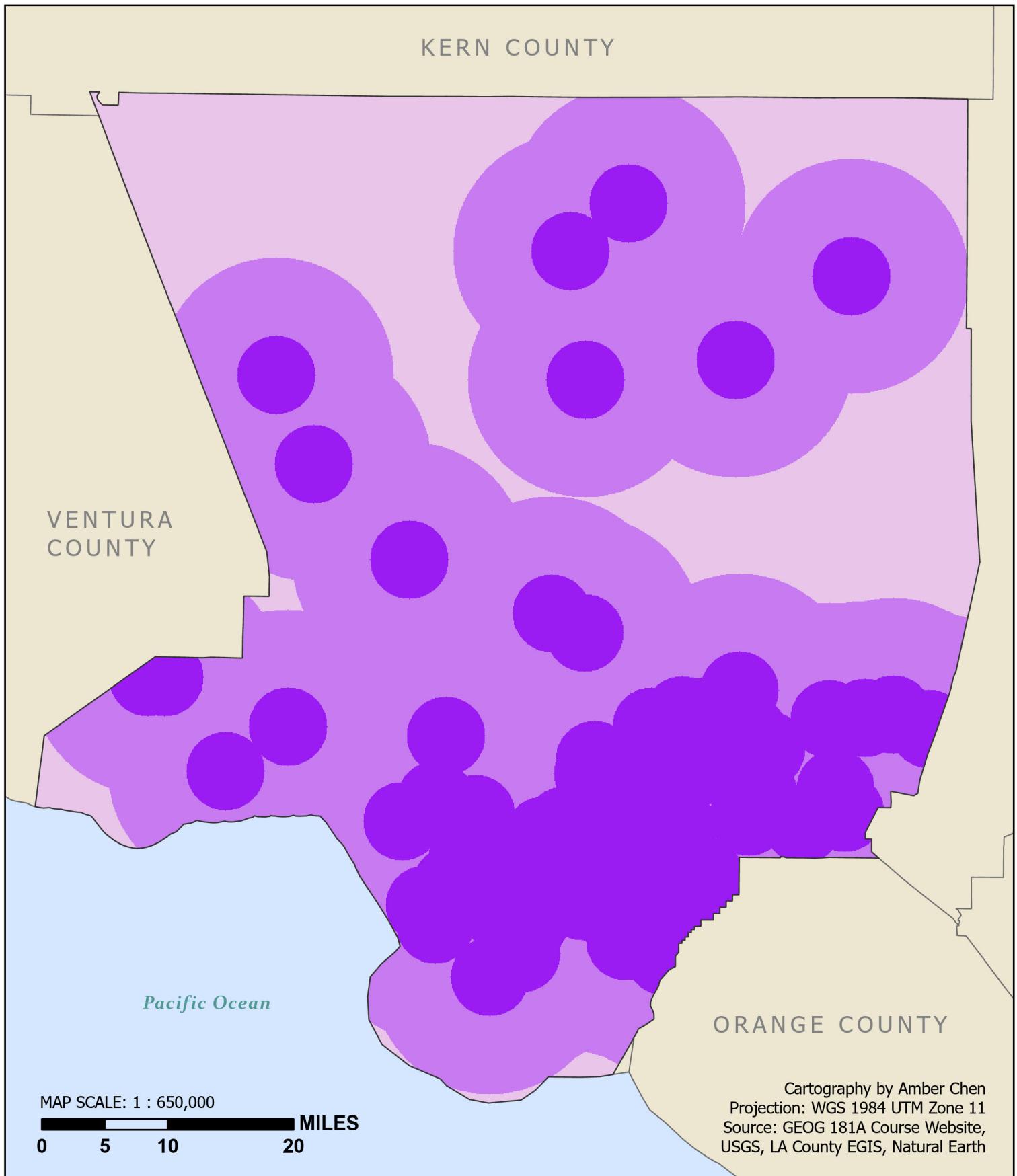
The team’s suitability analysis result was pretty reasonable when generating the most-suitable campus location, placing it in South and Southeast LA, spanning Compton, Paramount, Lynwood, and more. This was fitting, as the region consists of mostly flat ground, has a high student population, and lies within close proximity to many LA public libraries. The second and third-most suitable campus locations were unexpected, however. Both are located in Antelope Valley, high up north in LA County. Both Palmdale and Lancaster both have lower population densities than their more southern counterparts. Any campus established there would require unforgiving commutes for the many students traveling from Central Los Angeles. Upon examining the individual variables that produced this result, however, the team found that these two campus locations did, in fact, check all the boxes: they were mostly on flat ground, were within 5 kilometers of public libraries, and contained somewhat high populations of school-aged children. Nevertheless, analysts noticed that these high populations were outliers among the more sparsely-populated campus surroundings, and ruled that these two proposed campus locations were highly impractical considering their distance from the majority of LA County’s population.

To improve the suitability analysis, the team decided they would take more factors into consideration before presenting their final campus location proposal. Some other important variables include zoning regulations, environmental constraints such as land cover and soil type, risk of natural disasters based on earthquake fault lines and wildfire hazard zones, and distance from highly-populated urban centers. In conclusion, this project illustrated the importance of considering a variety of physical and cultural factors when determining a suitable location for a college campus. Considering results from both the Raster Calculator Tool and the Suitability Modeler Workflow allow urban planners to make informed decisions, balancing cost-effectiveness and practicality with appeal to prospective students when siting a new satellite campus. With the right geographic location, UCLA would be able take great strides towards its mission to meet rising higher education demands, all while making higher education more accessible towards traditionally underrepresented students.

# LA County School-Aged Population Analysis

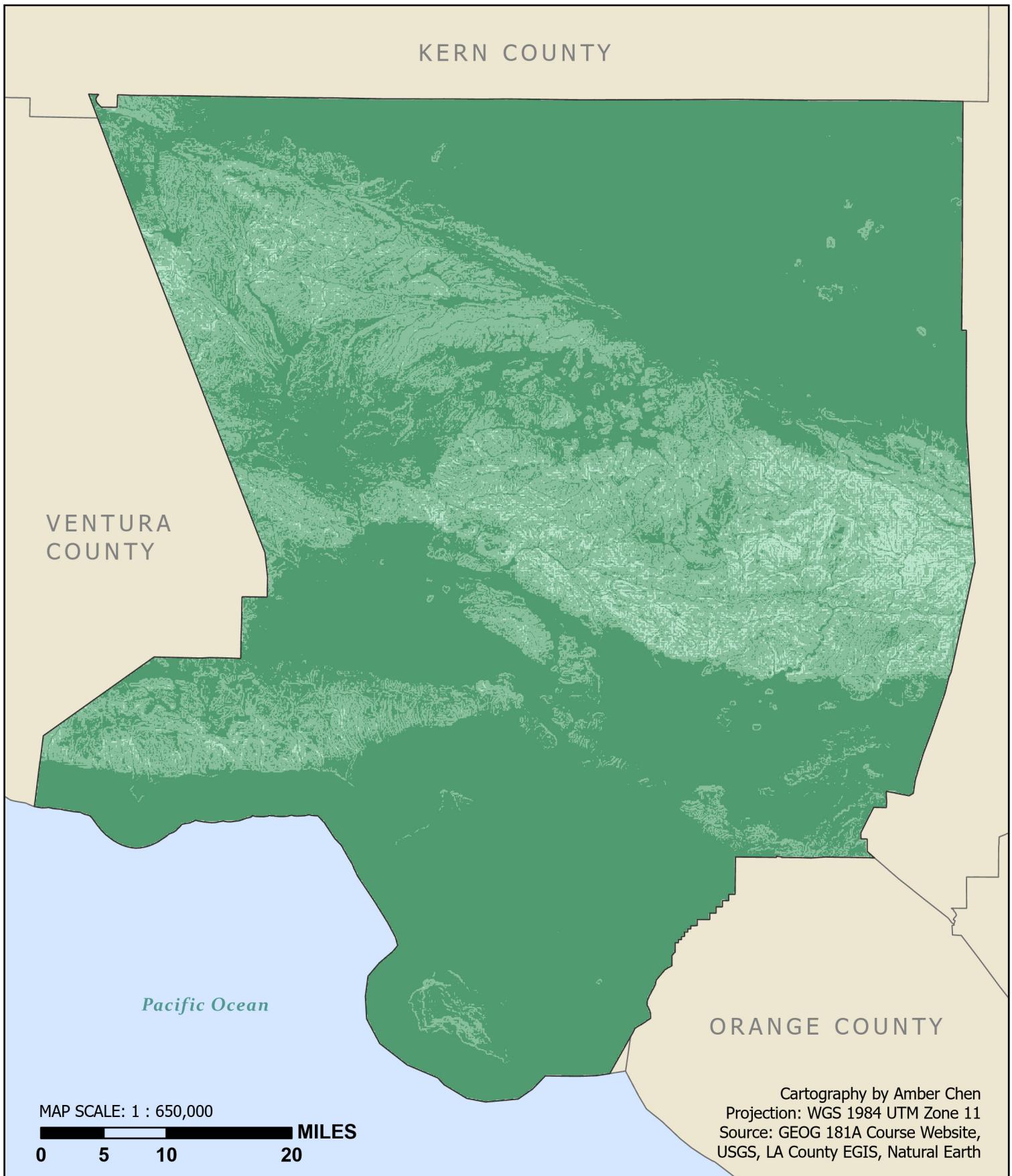


# Distance to Public Libraries in LA County



# Los Angeles County Slope Grade Analysis

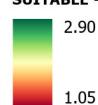
Slope Grade	
SHALLOW -> STEEP	
< 10 m	darkest green
< 30 m	medium green
< 90 m	lightest green



# Suitability Modeler for UCLA's New Satellite Campus Location

## Potential Satellite Campus Locations

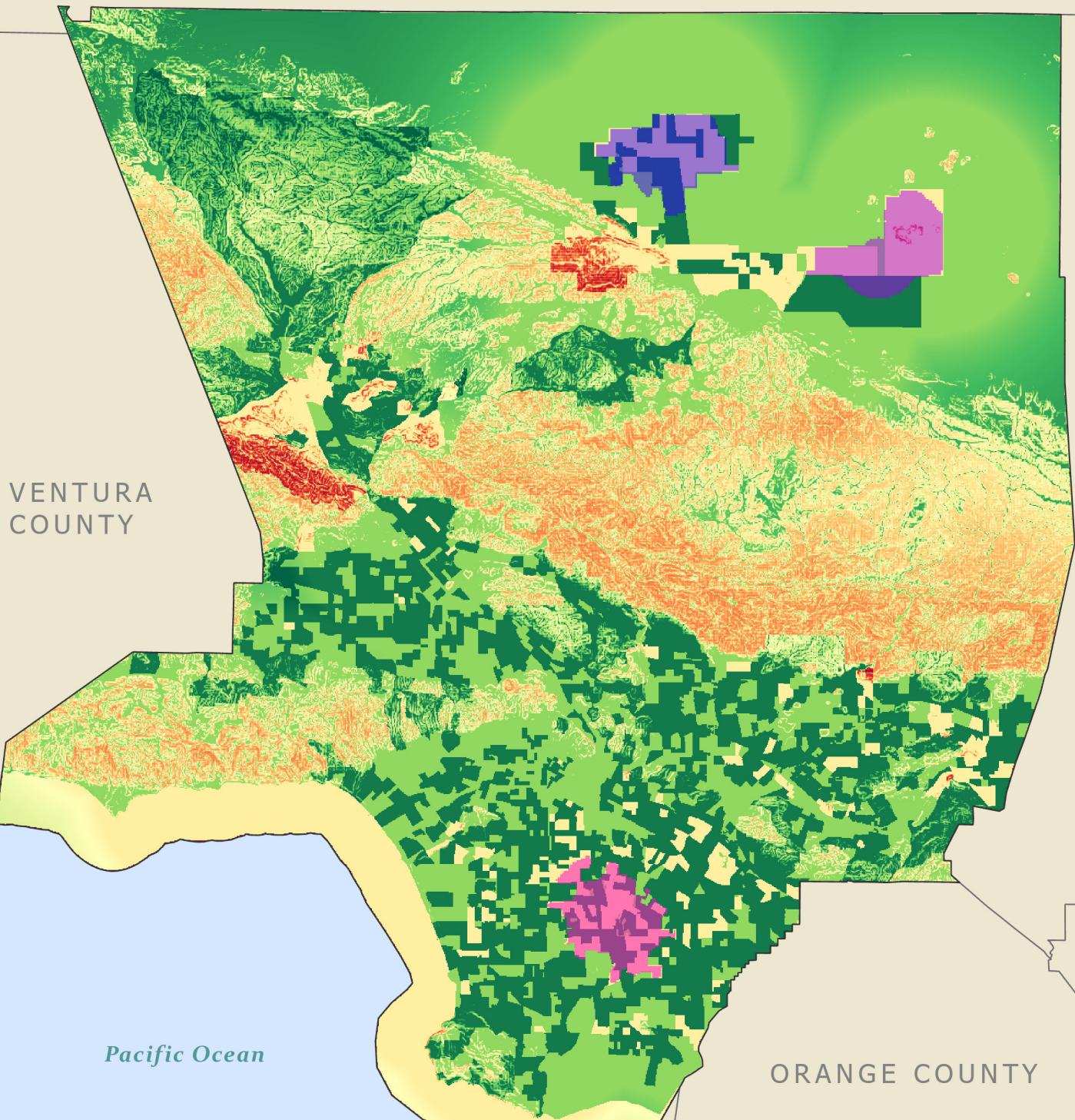
SUITABILITY SCORE (MOST SUITABLE -> LEAST SUITABLE)



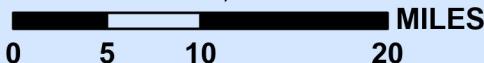
### PROPOSED CAMPUS LOCATIONS

- Best Location
- Second-Best Location
- Third-Best Location

KERN COUNTY



MAP SCALE: 1 : 650,000



Cartography by Amber Chen  
Projection: WGS 1984 UTM Zone 11  
Source: GEOG 181A Course Website,  
USGS, LA County EGIS, Natural Earth

# UCLA New Satellite Campus Location Evaluation

## Potential Satellite Campus Locations

### PROPOSED CAMPUS LOCATIONS

- Best Location
- Second-Best Location
- Third-Best Location

### REGION SUITABILITY SCORE

- 3 - Most Suitable
- 1 - Least Suitable

