

Laboratory 3 (Case Study 3)

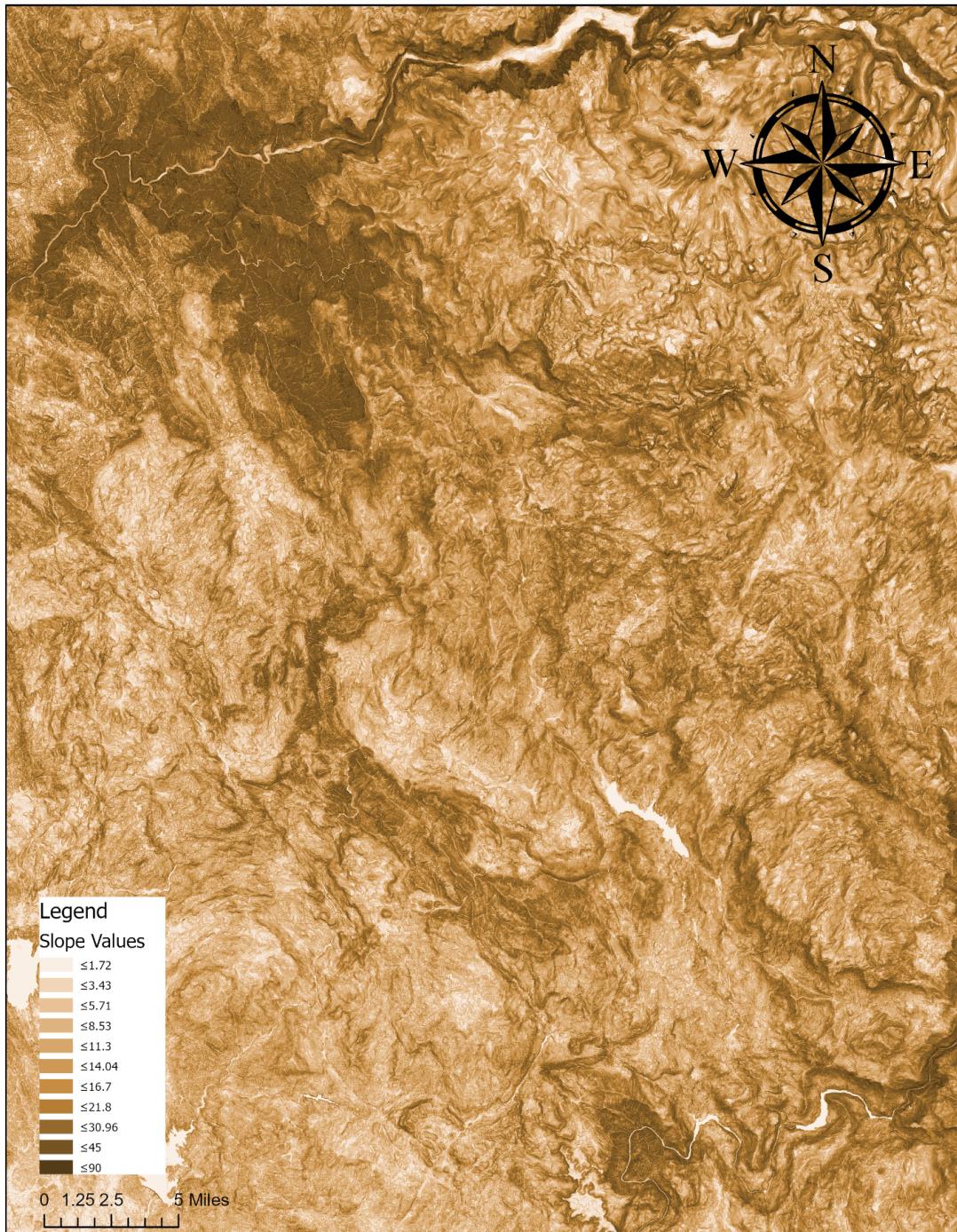
Name: Jason Gates

Date: 06/9/2022

Engr 180 Summer 2022

- Export a production quality map.

Slopes of Mountainous Terrain Topography Near Merced County



Made by Jason Gates (6/13/2022)

Esri, NASA, NGA, USGS, Fresno County Dept. PWP, California State Parks, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS

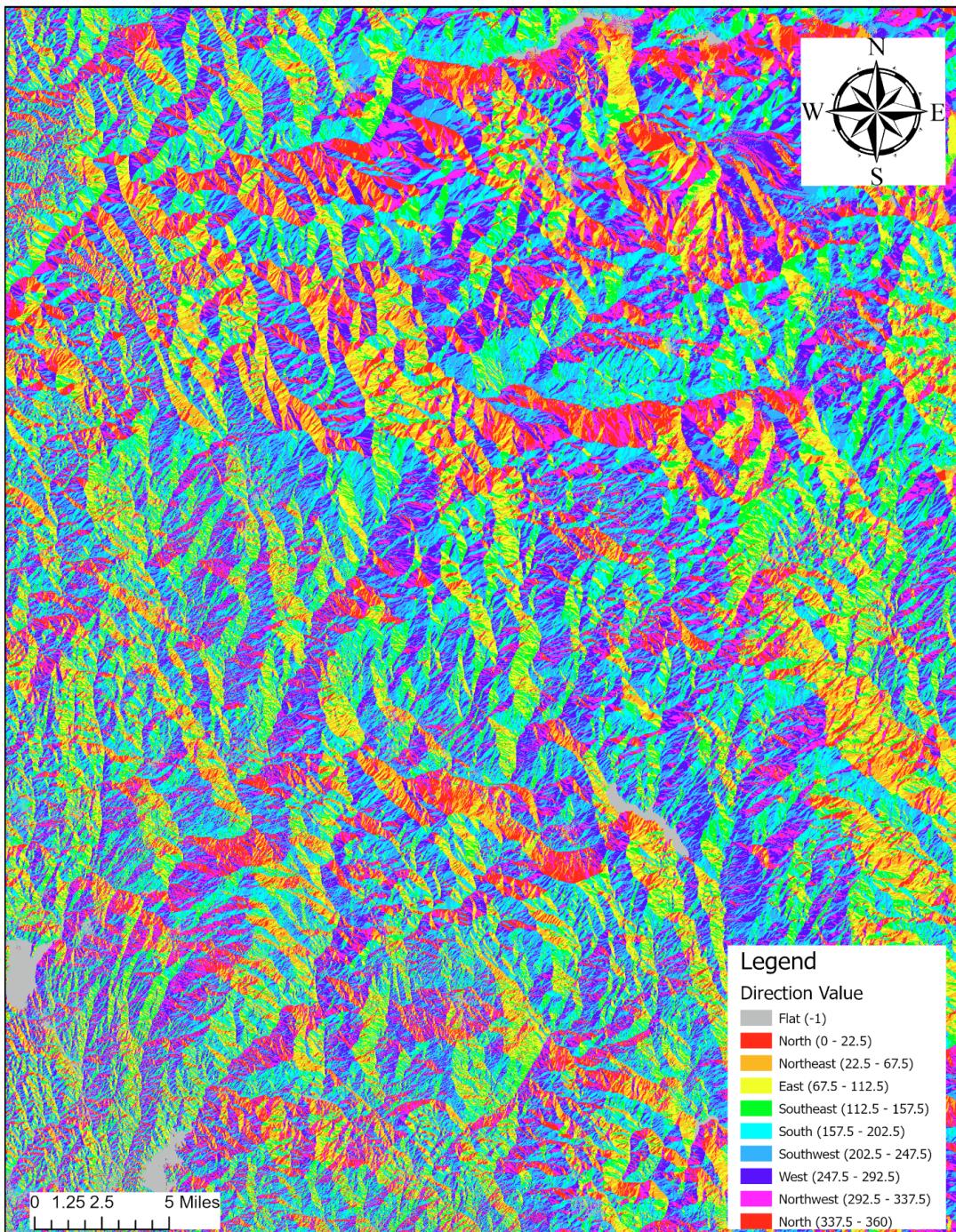
- Describe your submission in a couple of sentences./span>

- This map represents the slope of terrain in a landscape area near Merced. This is the slope of hills or mountains. This map shows the steepness of each part of the hills or mountains. The lower the slope value in the legend indicates the flatter the terrain. In contrast, the higher the slope value means the steeper the terrain is in that area. This would be helpful for navigation to see what areas are steep or flat. If the area is

steep, the person should take much more caution and be aware of their surroundings more. In a flatter area, the person would be in less danger than stepper areas.

- Export a production quality map.

Direction of the Slope of Local Topography near Merced County

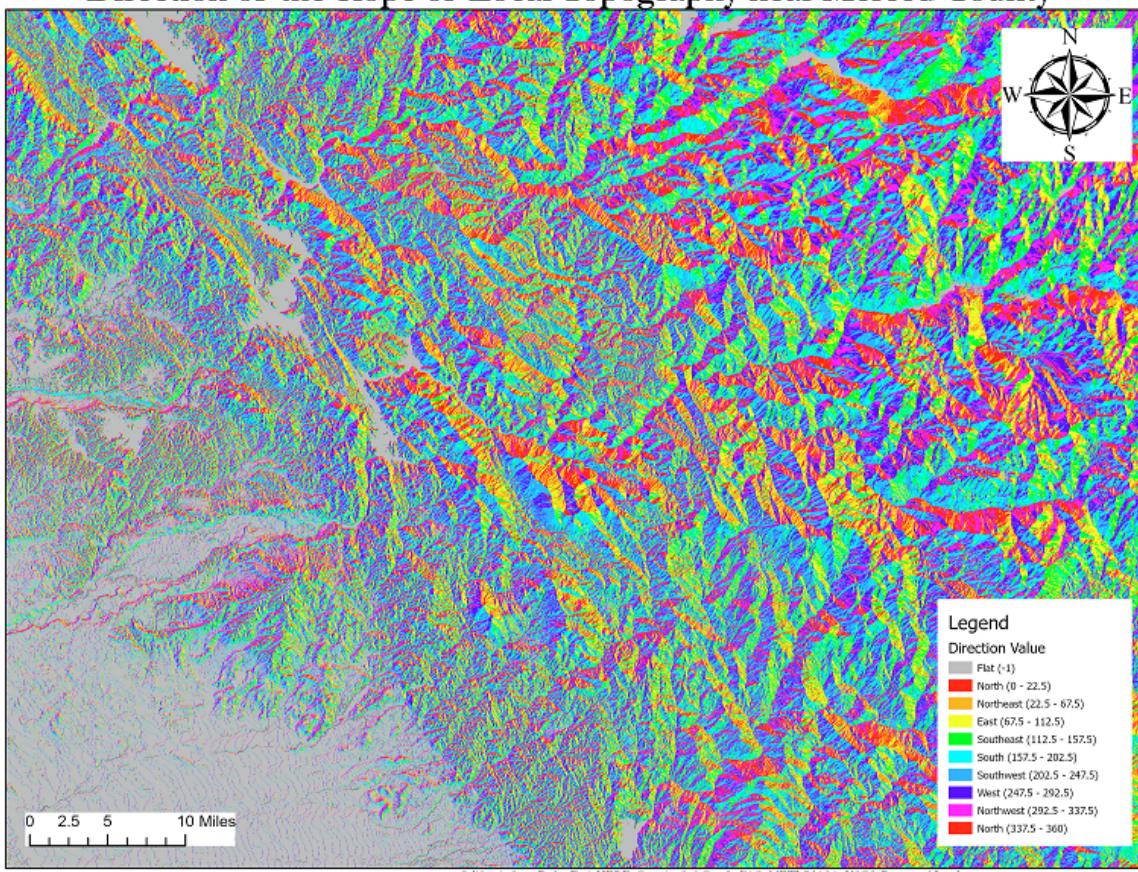


Made by Jason Gates
(6/13/2022)

Esri, CGIAR, USGS, Fresno County Dept. PWP, California State Parks, Esri, HERE, Garmin,
SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS

Version #1: Primarily shows the mountains.

Direction of the Slope of Local Topography near Merced County



Created by Jason Gates (ENGR 180) 06/9/2022

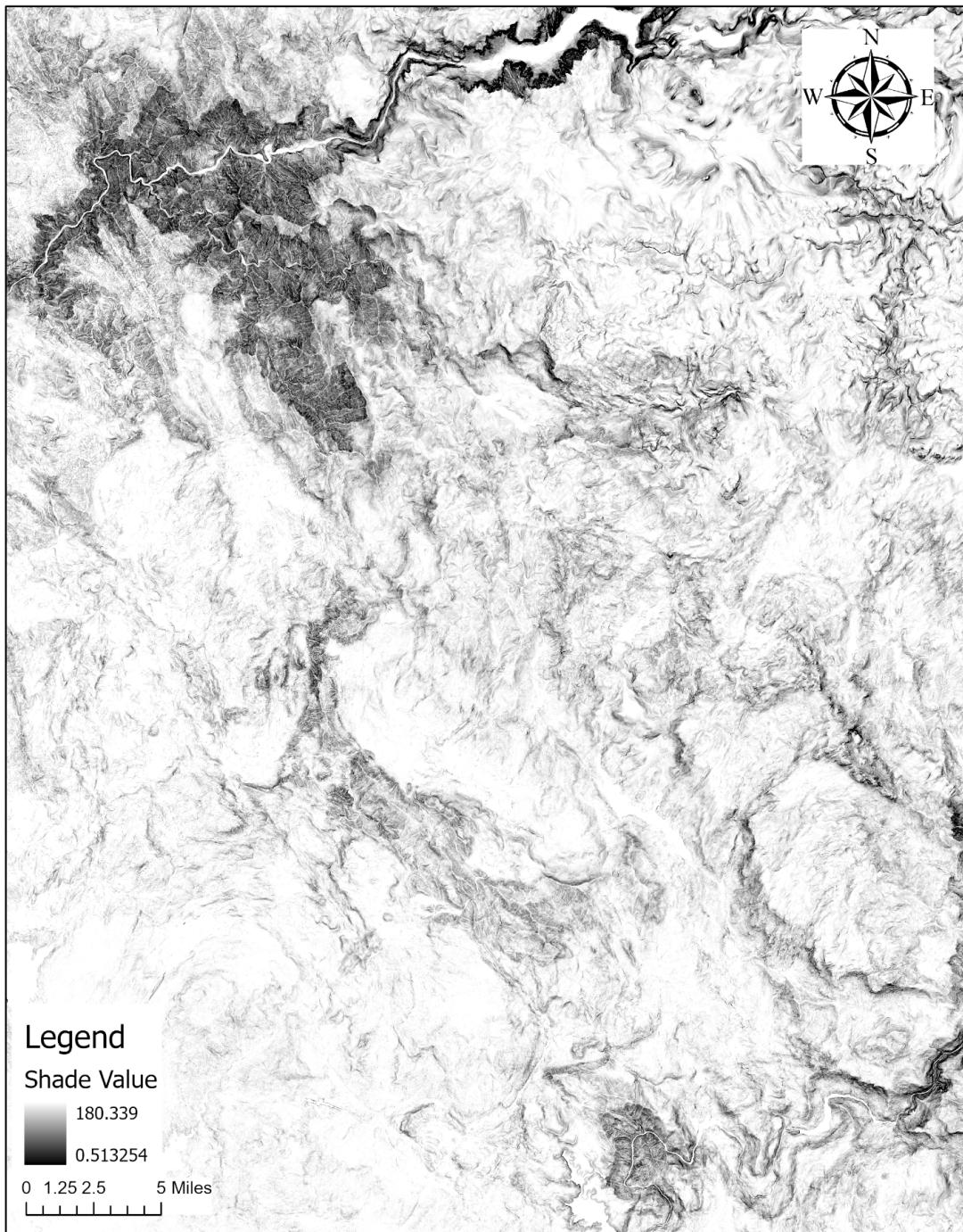
California State Parks, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, Esri, CGIAR, USGS

Version #2: Shows both mountains and flat land.

- Describe your submission in a couple of sentences. Can you think of a use for the aspect tool that's not covered in the Esri documentation?
 - The map shows the direction the downhill slope faces in topography near Merced. It also shows the different directions that slopes face through the legend and is represented in the map. It is measured clockwise from 0 degrees to 360 degrees. The flat category represents having no downslope direction. Knowing the direction of the slopes can help others gain a better understanding of the local topography and if there is a fire or disaster in that specific area, people will know how to navigate it properly and efficiently stop the disaster. The high contrast communicates direction efficiently and helps us see mountain ridges.
 - The Aspect tool can be useful for deciding where to build a solar powered building on a hillside. The person building the solar powered building would most likely want to maximize the sunlight and be able to gain solar energy efficiently. The east and west slopes usually have a decent amount of sunlight, while the north facing hillsides usually have the least amount of sunlight. The south-facing slopes have the most sunlight, so the person building the solar powered building would use the aspect tool to find an ideal place on a hillside that gets the most energy.

Save your production quality map as ned_13_hillshade_rc

Raster Calculator Hillshade of Topography near Merced County



Made by Jason Gates (6/13/2022)

Esri, NASA, NGA, USGS, Fresno County Dept. PWP, California State Parks, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS

This was produced using the formula:

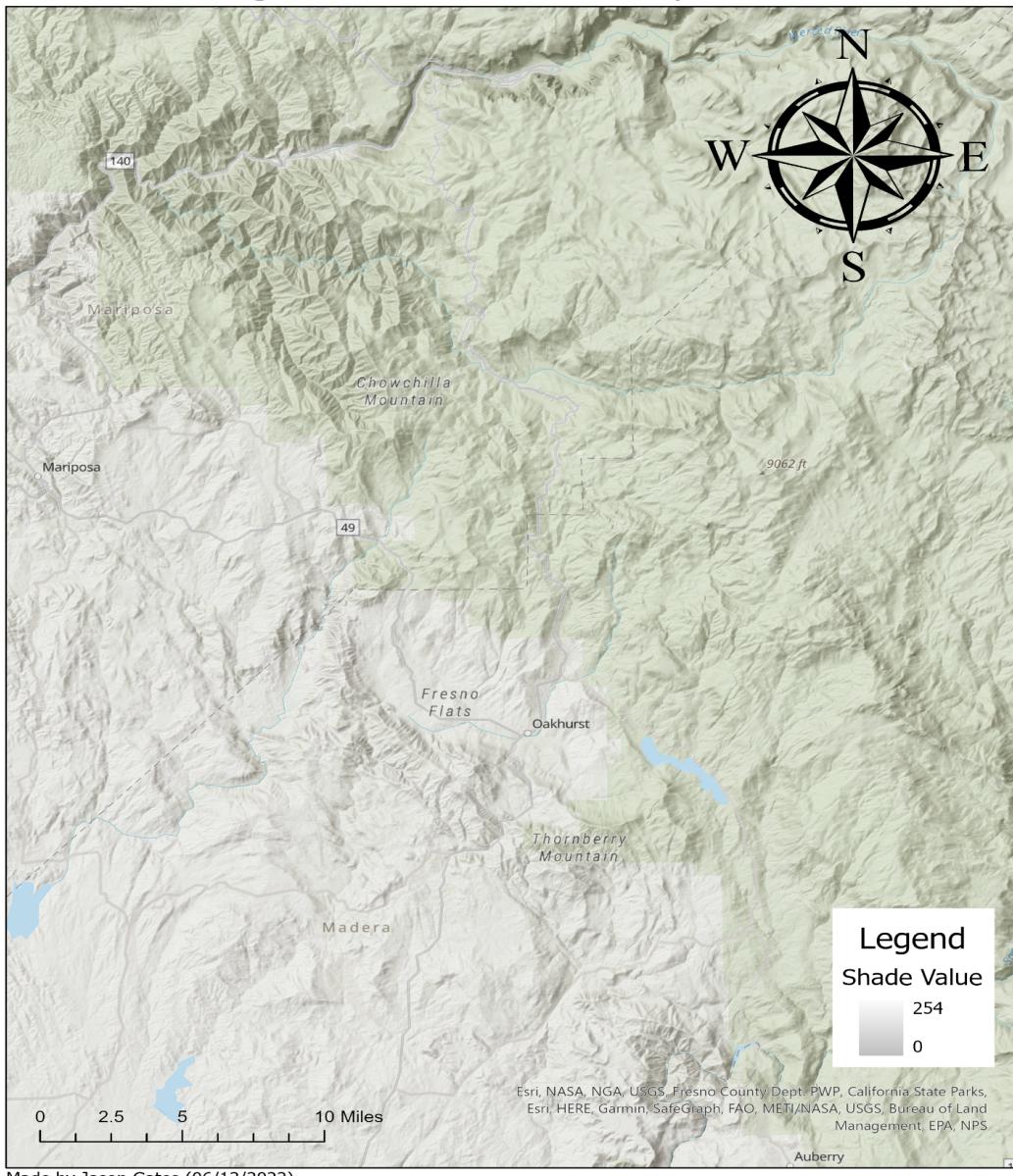
$$255.0 * (\cos(45 * 0.01745) * \cos("ned13_slope" * 0.01745)) + (\sin(45 * 0.01745) * \sin("ned13_slope" * 0.01745) * \cos(315 * 0.01745 - "ned13_aspect" * 0.01745))$$

Describe your submission in a couple of sentences. Does your result look like a traditional relief map (Google relief maps if needed)?

- The map below gives a clear picture of the topography of the Merced area by mimicking the sun's light onto the land and manipulating brightness to emphasize mountains or hills. The shade values help show elevation through manipulation of shadows and different shade values. Darker areas indicate higher elevation while lighter areas indicate lower elevation. The sunlight on the land causes illumination, shading and shadows onto the hills of an area. The light in the map is represented as shadows and helps give it a more 3D look. However, hillshading is good for visualizing the hills, but doesn't give absolute elevation values.
- It somewhat looks like a relief map and both show the lighting effect on a map based on variations of elevation. They both manipulate shadows to give the elevation a 3D effect and make it a pop out to the audience. It emphasizes how flat or hilly an area is on a map. The difference I can see is that relief maps are usually colorful and bright, but mine has a mixture of black and white colors. Relief maps can have contour lines to help indicate elevation while my map doesn't. Overall, it seems they are both similar looking maps, but can have some differences.

- Export your production quality map

Hillshading On Mountain Landscape Near Merced



Write a cover short letter (1/2 to 1/3 page, single spaced) to send with the map information you created for the strike team commander. The cover letter should have a clear disclaimer about the intent of the maps (to provide background/terrain information to support their strategic planning), information about when they were finalized, and how to get in touch with you (i.e. contact info). Include a formal statement modeled off these links, but adapted and streamlined to fit our specific scenario.

GIS Maps Disclaimer:

The purpose of the map provided is to make sure crews or groups using this map have a better understanding of the local topography and terrain. This will help enable efficient strategic planning and assist with navigating the local topography. The maps show important characteristics of the terrain such as terrain formation, shadows, slopes and the direction of each slope. In other words, these maps help visualize the local topography. These maps are solely focused on depicting the mountainous or hilly terrain near Merced county. The maps are made for reference purposes only and are compiled from multiple sources. The information shown may not be accurate, complete or have possible errors and we are not responsible or liable for the misuse or misinterpretation of any information. We are also not responsible for any consequences, losses or damages that occur while using our maps. We strived to make the information in the maps as accurate and up to date as possible. These maps were created and finalized on June 16th 2022. Data can continue to change in any situation, so we will continue to update and finalize the maps if any changes occur to uphold the intended accuracy and precision of our maps. If there are any questions or inaccuracies and errors in the map please contact me at jgates3@ucmerced.edu .

References

Helmer, & Cena. (2021, November 12). *Relief Map: Definition, History & Use*.

Study.Com. Retrieved June 14, 2022, from

<https://study.com/academy/lesson/relief-map-definition-and-lesson.html>

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[http://wiki.gis.com/wiki/index.php/Aspect_\(geography\)#Importance_of_Aspect](http://wiki.gis.com/wiki/index.php/Aspect_(geography)#Importance_of_Aspect)

Dempsey, C. (2019, May 19). *Relief Shading*. GIS Lounge. Retrieved June 14, 2022, from <https://www.gislounge.com/relief-shading/>

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