

Remote Sensing and GIS

For this week's homework we will use both a web site and the class GIS project. It will help if you do this web site part before you use the class GIS project. For the class GIS project you will come to a lab session on Friday 2/27 to become familiar with how to use it.

1. Use the web site www.geocommunicator.gov to familiarize yourself with the field area and answer the following questions.
Go to the "interactive maps – land status"
Zoom in so that you have a map of the Salton Sea region. Click on different data bases of the map layers (on the right hand side of the map) so you can see what they do. In particular, compare different base maps (Topo Map NGS and Digital Ortho Imagery Color) for the region.
 - a. Find the Coachella Canal (on the E side of the Salton Sea). Which way does the water flow in this canal? How much elevation change is there along the canal from where it intersects the Southern Pacific Railroad to where it crosses Interstate 10? (Explain how you figured this out.)
 - b. Find the Whitewater River. Where does it cross I-10 and where does it end? What is the elevation difference between these two locations? Which way does the water flow in this river? (Again explain how you figured out these answers.)
 - c. Find the Mecca Hills. What are the major drainages that cut through the Mecca Hills? For each drainage, list the elevation difference that is present from one side of the Mecca Hills to the other. Which way does the water flow in these drainages?
 - d. Now zoom in on Painted Canyon and Box Canyon Road in the Mecca Hills. On your map layers, click on "Surface Management Status" and make sure to choose the options BLM Wilderness Areas, BLM Wilderness Areas labels, BLM, and Bureau of Indian Affairs. Also on the main map layers, click on "PLSS" and open the folder. Select Township Labels, Townships, and Sections. Give the Township, Range, and section number of the lands owned by the Native American (Indian) tribes in this vicinity.
 - e. You will see that Painted Canyon is BLM land (but not wilderness) for part of the distance and then it becomes wilderness. Find the point at which the wilderness begins in the bottom of the canyon. Give the latitude and longitude of this point. Also give the UTM coordinates of this point.
 - f. Select "Roads" on the map layers. Painted Canyon Road should show up.
 - Is any part of this road in BLM wilderness? If so, which part?
 - Is any part of this road on Native American land? If so, which part of the road and what Native American tribe does it belong to?
 - Does the position of this road agree with where it is plotted on the topo map? If not, where is it different?
 - What other human-built infrastructure coincides with the lower-elevation part of Painted Canyon road?

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- g. Now look at the Orocopia Mtns on the topo map base. List three possible ways to drive on the E side of the Orocopia Mtns from I-10 down to highway 111. Are all of these roads in the BLM "Roads" data base? Do any of these roads pass through US Military land, and if so, where?

2. Homework part 2 – do this (at least part 2.1) in the GIS lab

2.1. Using the class GIS project, construct a basemap(s) of the NE Salton Sea region including the Mecca Hills and the Orocopia Mtns/Diligencia Basin, showing the mapped Quaternary faults. Annotate your map with any geologically or culturally important features (other faults, major alluvial fans, place names, names of faults, etc.) and include scale bars, a geographic reference (latitude/longitude ticks) , and a North arrow, as well as legends for any colors or symbols that you use.

Print out your map to turn in, but save the file because you will use it later on in the class.

2.2 Make a perspective image of the Mecca Hills using Google Earth or similar product (based on aerial photographs and an unknown DEM). Sketch on it the locations of major faults. Turn this in with your homework.

2.3 Use the two maps/images above as well as the results of Part 1 of this homework (the part you did using the GeoCommunicator web site). Write a page answering these two topics:

- What features are offset by the San Andreas fault in this area? How could you tell that the San Andreas fault is there (if you did not have the mapped trace of it already available to you in the GIS project)? Can you see evidence for any other major fault?
- Where in this region do you recommend that our class do geophysical surveys across the San Andreas fault? Why do you suggest these locations?

EXTRA CREDIT.

Usually during field camp we will have one shorter work day in order to go on a hike or do some geotourism. Pick your TWO favorite destinations from the list below. Explain what roads we would use to drive there from our camp site at Salt Creek (on the E shore of the Salton Sea) and about how long you think it will take to get there. (If you don't know what any of these places are, you can look them up on the internet.)

- Bat Caves Buttes
- Dos Palmas Preserve (Rancho Dos Palmas)
- Joshua Tree National Park
- Obsidian Butte
- Wiest Lake County Park
- Thousand Palms Oasis