**Lab 6**

**Topographic Analysis: Fluvial Geomorphology**

Download and open the data file from my web page. As always, work through the questions, then head to Canvas and do the quiz. Take your time!

**Section 1**

Drainage patterns.

1. Double-click the Pattern 1 placemark. Which type of drainage pattern is in this immediate area? What is the name of the mountain you are looking at?

2. Double-click Pattern 2. Which type of drainage pattern is in this immediate area? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What is the name of the mountain range that this area is part of?

3. Double-click Pattern 3. Although this is not a drainage pattern, it is an interesting pattern on the landscape (the dark and light green areas).What do you think caused this pattern? Don’t zoom in too far.

4. Double-click Pattern 4. Which type of drainage pattern is in this area? What geomorphological process results in this pattern?

5. Double-click Pattern 5. Which type of channel pattern is this? What fluvial conditions create in this pattern? What important city is just to the north (and a little west) of this placemark?

**Section 2,**

Sacramento River and political boundaries. Check and double-click the SACRAMENTO RIVER folder. Also, make sure the California Counties layer is on – the white lines are county boundaries

1. How many times does the county boundary cross the Sacramento River within the red boundary box? Why don’t they match?

2. Double-click the Cutoff #1 placemark. This is another example of the political boundaries not keeping pace with shifting river channels. How might this sort of thing cause problems? Write down a couple of reasons. If you can’t think of things, head to google, there appear to be plenty of articles about the topic.

3. Just for fun, double-click the Kentucky Bend placemark. This area is actually part of Kentucky that was created due to a combination of surveyors’ errors and the shifting Mississippi river. Logically, what state should it be part of? What state is it part of? Remember, if Google Earth doesn’t give you the answer, good ole google might.

**Section 3,**

Cumberland Gap, MD. Check and double-click the CUMBERLAND GAP folder.

1. Zoom in and out and fly around the area to get a sense of the landscape. Turn things on and off. What is the general name given to the feature identified as “The Narrows”? (you may need to google this) What is the term for this type of drainage pattern?

2. Use the ruler tool to measure the gap from point A to point B. How wide is it (miles)?

What is the vertical relief from point B to the surface of the stream, using the elevation shown by Google Earth's status bar (look for “elev” down at the bottom right of the image screen.)?

**Section 4**. (note, you may need to visit your friend google to answer some of these).

1. The Columbia River is the 4th largest in the US (by discharge). Through much of its course (in WA), it travels through a desert. Explain the source of the water (in WA) for this river (from precipitation to entering the river).
2. The Columbia River basin includes which Canadian Provinces and which 7 US states?
3. Goto Waldo Lake, OR. There’s a large patch of tan colored landscape immediately to the North. Why is it not green like the rest of the area?
4. Goto Meteor Crater in GE. If this area were wet, what sort of drainage pattern would probably form here?
5. What’s the drainage pattern in the area surrounding Raynesford, MT?
6. **Isa lake** is thus the only natural lake in the world to drain to two different oceans. Because of this it is also known as the Two-Ocean Lake. Go there in GE. The Eastern outflow eventually goes to which ocean?

**Section 5**

In this section, we’re going to look at the relationship between hydrologic units, catchments, and streams.

Turn off the ex24 and CA counties layers. And turn on the Waters feature layers (all of them). This is a data layer downloaded from the EPA – and trimmed down for this lab. Zoom in so the Ellensburg area more or less fills your screen. Note, this may load slowly, hit F5 (refresh) and hang out. Maybe multiple times. It’s a national dataset. Patience is a virtue.

Note that you can click on the various features and more info will pop up. Clicking on the stream will get info about the stream (at least for the more major streams). There isn’t much useful in the catchments. But there is info for the hydro units. To click on the hydro units, you will need to turn catchments off.

Hydrologic units are the largest feature shown. Catchments are subdivisions of hydro units. Both are based on streams and the area they drain.

Start by turning off everything except the hydrologic units (HU) layer. Locate the Robinson Creek/Yakima River HU – it’s to the west of Ellensburg and includes the metropolis of Thorp.

*What’s the area (in sq. km)? Approximately how large is it e/w and N/s (in km) – pick about the max length in both directions?*  You will note that it includes areas of forest, shrub steppe, irrigated agriculture, and riparian.

Turn on the streams layer. Locate Robinson Creek. It’s the major stream in this hydro unit. You’ll note that it doesn’t flow into the Yakima River anymore. In fact, you’ll note that most of the streams in this HU don’t make it to the river. *Why not?* (this will require zooming in, thinking, and perhaps turning on other layers)

You’ll also note that the lines you’re looking at don’t always quite match what’s on the ground. This is because they are part of a slightly imprecise national dataset, and not created by people who were zoomed way in on nice google earth imagery.

Turn on the catchment layer. Firs thing you notice is that there’s now a lot of lines on the screen! And that the catchments overlap the HU’s. This is because catchments are subdivisions of a HU. Zoom in on Robinson Creek again. *What does that catchment represent?* Think about what would happen to a drop of water falling in that area.

Finally, just a note for those of you who might be interested in strange places across the world. Check out <https://www.atlasobscura.com> and lose yourself in the strangeness that is our world (both natural and human).

Sections 1-3 borrowed from exercise 24 at <http://wps.pearsoned.com/esm_thomsen_apg_9/246/63020/16133246.cw/content/index.html> and modified/improved by Bob. Section 4 is entirely home grown.